Program Data Management Plan

Portland Harbor Remedial Design Investigation – Portland Harbor Superfund Site

Prepared by

U.S. Environmental Protection Agency Region 10

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Definitions and Acronyms

ASAOC	Administrative Settlement Agreement and Order on Consent
BTEX	benzene, toluene, ethylbenzene, and xylene
cPAH	carcinogenic polycyclic aromatic hydrocarbon
DBA	database administrator
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DDx	dichlorodiphenyltrichloroethane and its derivatives
DMP	data management plan
US EPA	U.S. Environmental Protection Agency
EDD	electronic data deliverable
FS	feasibility study
HPAH	high-molecular-weight polycyclic aromatic hydrocarbon
ID	identifier
LPAH	low-molecular-weight polycyclic aromatic hydrocarbon
PAH	polycyclic aromatic hydrocarbon
BPDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl
PCDD/F	polychlorinated dibenzo-p-dioxin and furan
PDI	pre-design investigation
PEF	potency equivalent factor
PHIDB	Portland Harbor Interim Database
PP	performing party
RD	remedial design
RI	remedial investigation
RM	river mile
RPM	Remedial Project Manager (US EPA Region 10)
Scribe	US EPA data management application
Scribe.NET	web-based portal for archiving Scribe project files and data
SOW	statement of work
SQL	Structured Query Language
TCDD	tetrachlorodibenzo-p-dioxin
TCT	technical coordinating team
TEF	toxic equivalency factor
TEQ	toxic equivalent
WHO	World Health Organization

1.0 Introduction

To ensure that environmental data collected at the Portland Harbor Superfund Site during remedial design adhere to certain standards and practices, a programmatic level data management plan (DMP) was developed that provides overall guidance and data requirements for the various Performing Parties (PPs) who conduct sampling under the pre-design investigation (PDI). This document presents an update to the existing DMP dated August 2018, and attached to Administrative Settlement Agreement and Order on Consent (ASAOC) statements of work (SOWs) for the following remedial design (RD) areas:

- B1a
- B1 Navigation Channel
- U.S. Moorings
- Gasco
- River Mile (RM) 7W
- Willbridge Cove
- RM 9W
- RM 10W
- RM 11E
- RM 10E
- Willamette Cove
- Terminal 4
- RM 3.5E
- RM 2E

While this DMP is a standalone document, it is to be used in concert with the PDI work plan, including all supplements or change requests to the PDI work plan, Region 10 DMP, and the respective quality management plans developed for each performing party (PP) sampling effort. Implementation of this programmatic data management plan will allow all remedial design data to be housed in a single data base that we are calling the Portland Harbor Interim Database (PHIDB). We do not anticipate pulling the Portland Harbor remedial investigation (RI)/ feasibility study (FS) data into the PHIDB at this time.

1.1 Site Background

The site is located along the lower reach of the Willamette River in Portland, Oregon, and extends from approximately RM 1.9 to RM 11.8. While the site is extensively industrialized, it is within a region characterized by commercial, residential, recreational, and agricultural uses. Land use along the lower Willamette River within the site includes marine terminals, manufacturing, other commercial operations, public facilities, parks, and open spaces. The State of Oregon owns certain submerged and submersible lands underlying navigable and tidally influenced waters. The ownership of submerged and submersible lands is complicated and has changed over time.

This lower reach was once a shallow, meandering portion of the Willamette River but has been redirected and channelized via filling and dredging. A federally maintained navigation channel, extending nearly bank-to-bank in some areas, doubles the natural depth of the river and allows transit of large ships into the active harbor. Much of the riverbank contains overwater piers and

berths, port terminals and slips, and other engineered features. While a series of dams in the upper Willamette River watershed moderate's fluctuations of flow in the lower portions of the river, flooding still occurs approximately every 20 years, with the last occurring in 1996.

Armoring to stabilize banks covers approximately half of the harbor shoreline, which is integral to the operation of activities that characterize Portland Harbor. Riprap is the most common bank-stabilization measure. However, upland bulkheads and rubble piles are also used to stabilize the banks. Seawalls are used to control periodic flooding as most of the original wetlands bordering the Willamette in the Portland Harbor area have been filled. Some riverbank areas and adjacent parcels have been abandoned and allowed to revegetate, and beaches have formed along some modified shorelines because of relatively natural processes.

Development of the river has resulted in major modifications to the ecological function of the lower Willamette River. However, several species of invertebrates, fishes, birds, amphibians, and mammals, including some protected by the Endangered Species Act, use habitats that occur within and along the river. The river is also an important rearing site and pathway for migration of anadromous fishes, such as salmon and lamprey. Various recreational fisheries, including salmon, bass, sturgeon, crayfish, and others, are active within the lower Willamette River.

1.2 Objective and Scope

The objective of this DMP is to ensure that environmental data and supportive information are collected and documented in a consistent manner and managed in a manner that preserves, protects, and makes the information available to all stakeholders, PPs, and other affected groups. This DMP applies to data and information collected in support of the Portland Harbor Superfund Site by the PPs involved in RD sampling activities. While it does not cover all information (e.g., photos, field logs) that is managed for specific projects, it is intended to address those types of data deemed critical to overall decision-making and RD for the site. The subsections below identify the general data categories, PPs collecting environmental data, and major sampling activities.

1.2.1 Data Categories

This plan identifies standard data elements and data management processes for the following data categories:

- Project and sampling event identification information: details of the project, to include the name, site number, and U.S. Environmental Protection Agency (US EPA) region. Sampling event information will include the event identifier (ID) and event date.

- Environmental and biological sampling data: the data collected, to include field sample information, analyses performed on samples, and validated results.

- Locational data: locational data, to include geospatial information (latitude and longitude) related to sample collection efforts at specified locations, and basic well information such as screen depths and top of casing elevation.

The individual data elements for each of these categories represent the minimal amount of information needed for project-specific decision-making and data sharing among stakeholders and PPs. These are further identified in the Data Management section.

1.2.2 Major Stakeholder Groups, Performing Parties, and Community Groups

The major stakeholder groups such as the technical coordinating team (TCT), PPs, and community groups have been identified as those groups who are actively involved to various degree with site-wide planning, decision-making, environmental data collection, and subsequent data archiving for this site.

The TCT members are those who signed onto the Memorandum of Understanding for the Portland Harbor Superfund Site that intend to provide a framework for coordination and cooperation in the management of the site to optimize federal, state, and tribal expertise and available resources. The TCT members are:

- US EPA Region 10
- Oregon Department of Environmental Quality
- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Grand Ronde Community of Oregon
- Confederated Tribes of Siletz Indians
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of the Warm Springs Reservation of Oregon
- Nez Perce Tribe
- National Oceanic and Atmospheric Administration
- Oregon Department of Fish and Wildlife
- U.S. Department of the Interior

PPs are those that are actively involved in the RD as a part of a signed ASAOC.

Lastly, community groups are those that have a vested interest in the cleanup actions taken by US EPA and other parties associated with RD activities. Community group members include:

- Portland Harbor Community Advisory Group
- Willamette Riverkeeper
- Portland Harbor Community Coalition

1.2.3 Major Data Collection Activities

Each PP is to implement a RD investigation for their assigned ASAOC to support RD.

The following types of activities may be completed and will depend on the specific sampling identified in each respective US EPA-approved sampling plan submitted by each PP:

- Surface sediment sampling
- Biological tissue sampling
- Surface water sampling
- Sediment coring
- Groundwater sampling

- Riverbank soil sampling
- Downtown reach and upriver reach sampling
- Porewater sampling

2.0 Data Management

Effective data management among the Portland Harbor PPs relies upon delivery of a specified amount of data to the Portland Harbor Interim Database (PHIDB) using a common data management platform. The central repository for data will be developed and maintained by the State of Oregon and its contractor (GeoEngineers/Integral). The PHIDB will be used to compile data from various sources as it moves through the review process. Finalized RD decision data will be migrated to the Scribe database. Decision data is defined as all analytical data gathered during remedial design. Data placed into Scribe from the state's data system will represent the data of record for Portland Harbor RD activities. The PHIDB being developed by the state will be separate from the Scribe.NET database. The name and project number for the Scribe.NET database will be provided at a later date. Figure 1 provides an overview of the data consolidation and archiving process for the PHIDB.

Data delivered by a PP will be loaded by the state into a staging database (see Figure 2). During the loading, the state will assess the technical aspects of the PP data deliverable and create a report that outlines whether the data meets requirements for upload. Resubmittal of the data may be required to correct technical issues. Whether the data meets the technical requirements for loading or not, US EPA will be provided notification by the state's contractors that lists the loading status.

A second, more extensive review process will be initiated by US EPA or their contractor for all submittals to assure data meets certain requirements outlined within the approved documents for an ASAOC. US EPA will then provide a report to the respective PP outlining issues identified by US EPA. This data review continues the existing level of review that data submittals receive.

This process will continue until the staged data is successfully loaded and meets all the upload requirements. Figure 2 describes this process workflow.

In addition to submitting environmental data to the PHIDB, an electronic data deliverable (EDD) that contains only the analytical data for any blank samples collected in the field as part of the PDI field quality control program, dredging elutriate test results, waste characterization results, and any other non-standard data type requiring data validation should also be submitted to Josie Clark (clark.josie@epa.gov) with US EPA separate from the PHIDB submittal (see Table 1). Applicable blank samples are those that are each assigned a unique ID and submitted to the laboratory for analysis. Typical blank samples include rinsate blanks (i.e., equipment blanks), field blanks, and trip blanks. The types and frequencies of blank samples collected are determined by the RD PP's quality assurance project plan. Geotechnical laboratory results (i.e., index parameters and other measurements) may also be submitted to US EPA but are not required. The EDD does not need to be in a particular format so long as it contains all applicable information such that the sample result in the EDD can be confirmed in the applicable laboratory data package and data validation report to facilitate US EPA's quality and completeness review. US EPA does not plan any uses for these

data beyond the quality and completeness review. These data will not be posted to the Portland Harbor Environmental Data Portal and are not required to be submitted to the PHIDB.

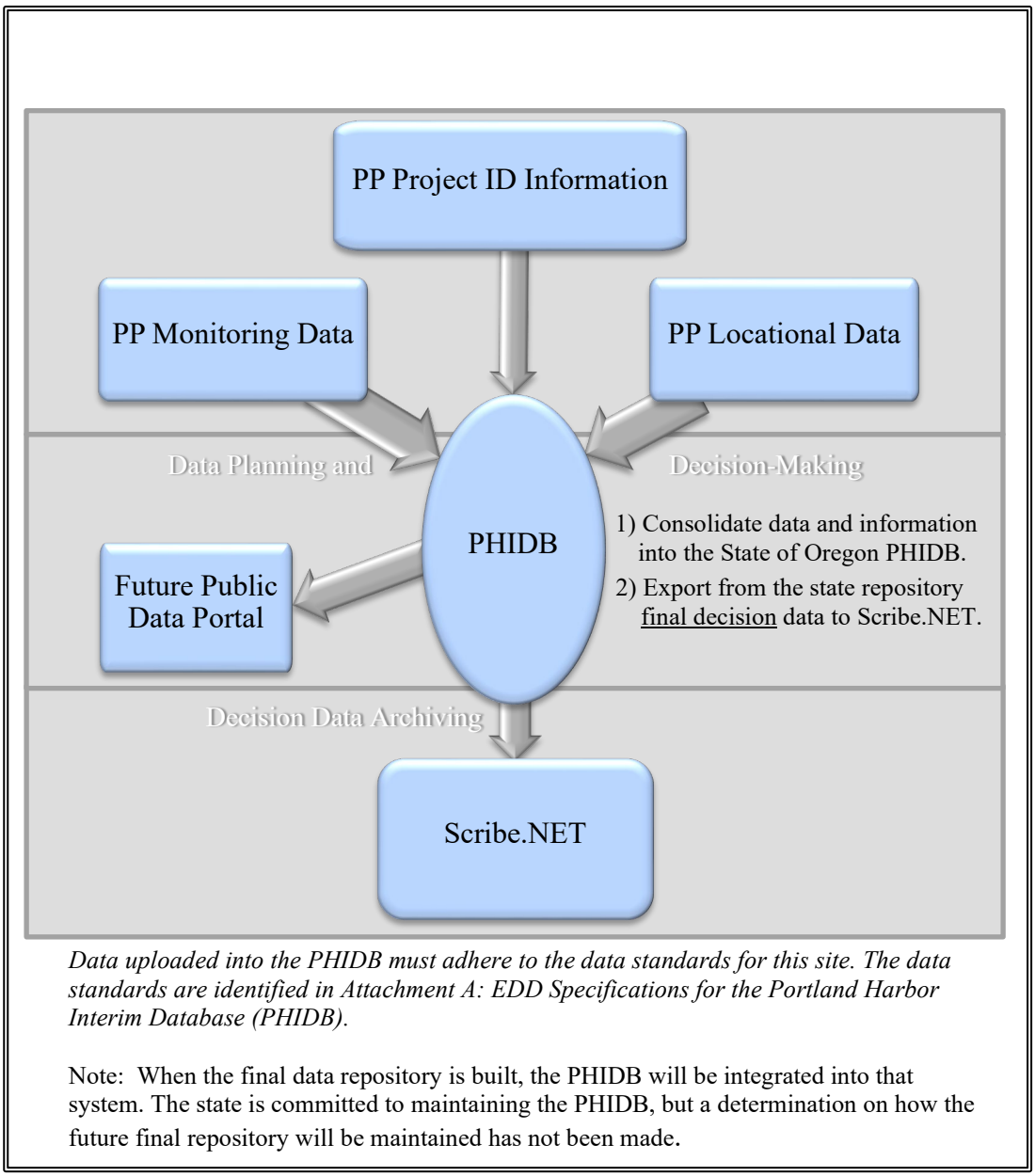


Figure 1. Data Consolidation and archiving

2.1 Data Management Platforms

PHIDB

The purpose of the PHIDB is to provide a centralized and standardized repository for the environmental characterization data and related administrative data relevant to remedial activities at the PHSS. Essential capabilities of the database, and related tools, standards, and processes, will:

- Assist US EPA in ensuring that the data collected by various parties are consistent in structure, unambiguous in representation of information, and meet basic standards for data integrity. Data integrity is supported using primary keys, foreign keys, and check constraints within the database.
- Assist US EPA in ensuring that data are available to US EPA and PPs in a single system.
- Check that a standard set of rules is applied to summarize data and calculate derived quantities, such as total polychlorinated biphenyls (PCBs) and total dichlorodiphenyltrichloroethane and its derivatives (DDx).
- Allow export of data to a customized version of a Scribe database.

The data management platform selected for the interim database PHIDB is PostgreSQL. Postgres SQL is a free, open-source relational database platform. The PHIDB will be in a cloud environment managed by the State of Oregon and/or a subcontractor to the state.

EPA, DEQ and PPs will be provided read only access to the database via a database interface.

Scribe.NET

The purpose of Scribe.NET is to provide an official archive of decision data on an EPA controlled platform. Any trustee or interested party will be able to access the data through Scribe.

Scribe is a US EPA software tool that assists in the process of managing environmental data. Scribe captures sampling, observational, and monitoring data. Examples of Scribe data include air, biota, soil, and water sampling.

Please note that latitude and longitude data collected for any activity will conform to requirements outlined in the Environmental Data Standards Council (EDSC) LATITUDE/LONGITUDE DATA STANDARD, Standard No.: EX000017.2, January 6, 2006. Geospatial Policy and Guidance documents utilized by the US EPA can be found here: https://www.epa.gov/geospatial/geospatial-policies-and-standards.

Data will be translated and exported from the State of Oregon PHIDB to Scribe by the EPA and/or the State of Oregon.

2.2 Roles and Responsibilities

The major roles and responsibilities for data management are identified for the PPs, in addition to the role of the data manager within each organization. Figure 2 provides an overview of the workflow between the State of Oregon, US EPA Region 10, and the PPs.

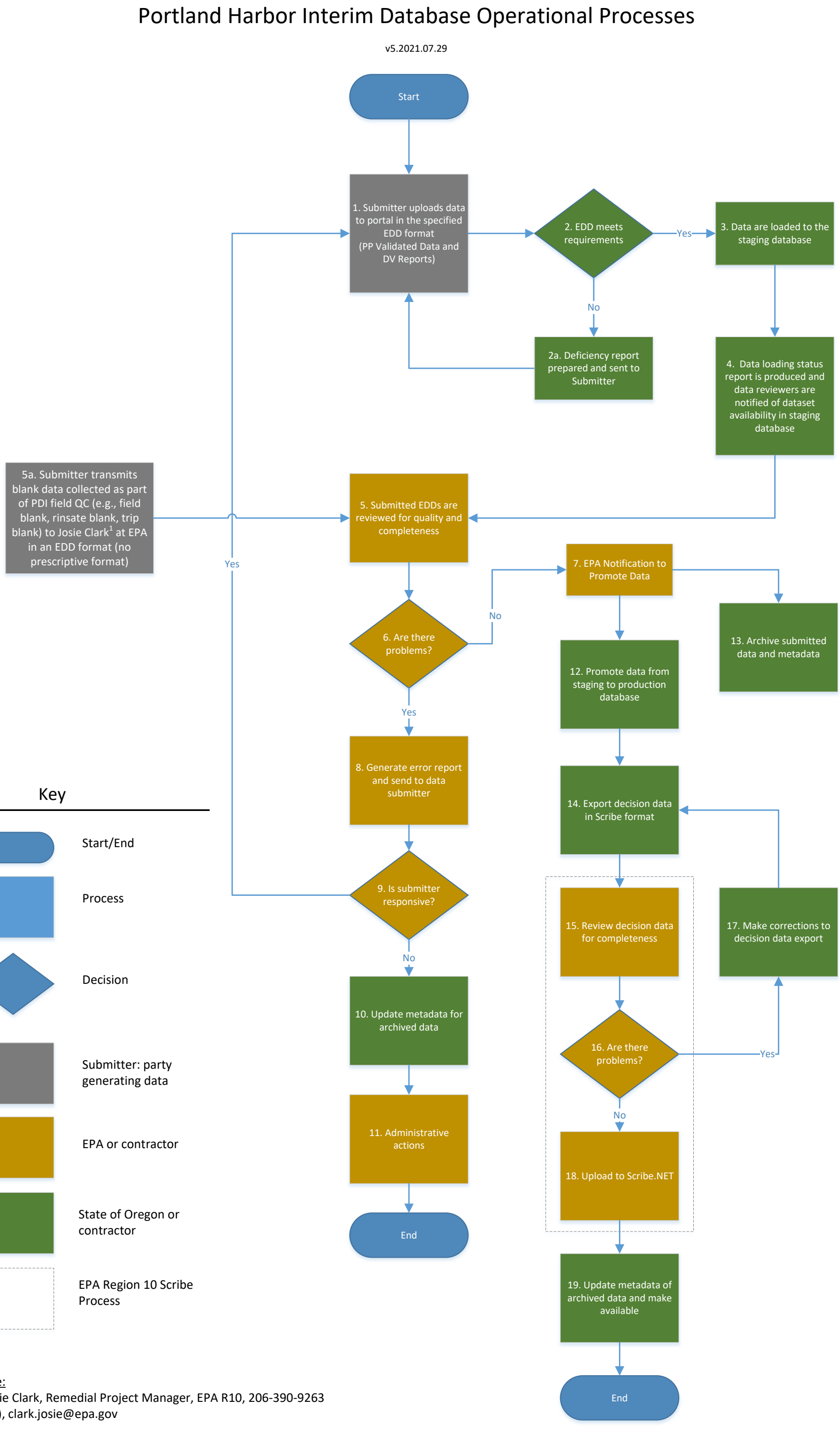
The PHIDB has an assigned database administrator (DBA), data manager, and data coordinator. A description of each of these roles follows:

DBA – The PHIDB DBA is responsible for ensuring that the PHIDB is able to meet the demands for data storage, access, and efficiency. This includes the setup and maintenance of the database hosting and database server resources, software upgrades, system logs, access permissions, and database backups.

Data Manager – The PHIDB data manager is responsible for ensuring that the PHIDB can accommodate Portland Harbor decision data and that PPs' data are expeditiously imported, checked, and made available to US EPA and others. This includes providing support to PPs regarding data submission requirements, working with PPs to resolve any data issues, making revisions the PHIDB design and submission requirements if and as necessary, developing and disseminating new valid values, and working with US EPA and its contractors to export data that are to be published to Scribe.NET.

Data Coordinator – The PHIDB data coordinator is responsible for managing the schedule and requirements associated with data submissions from the multiple PPs at the Portland Harbor Superfund site. This includes serving as the primary nexus for communication with PPs, US EPA and its contractors, and the State of Oregon regarding plans and status for the data management work; planning training on data submission for PPs; implementation of priorities when there are conflicting tasks or requirements; and allocation of State of Oregon resources necessary to keep work progressing in a timely manner.

Figure 2. Process Workflow



Note:
[1] Josie Clark, Remedial Project Manager, EPA R10, 206-390-9263 (cell), clark.josie@epa.gov

2.2.1 Performing Parties

US EPA Region 10 has the primary responsibility for oversight of all sampling and monitoring activities. US EPA has identified the minimal data elements and data delivery requirements that would allow it to achieve its oversight goals and share data among the other stakeholders, PPs, and community groups. Each of the PPs is responsible for collecting the necessary data elements covered under their respective sampling activity as approved by US EPA, and providing that information to US EPA via the State of Oregon PHIDB by submitting EDDs for upload to the state's centralized PHIDB. Coordination with US EPA will be essential to assure data requirements for a sampling event are met. To accomplish this task on a project-specific basis, the PP will need:

- A party- or project-specific DMP to cover their respective sampling activities.
- A data manager designated to complete the EDDs and coordinate with US EPA and the State of Oregon.
- Each individual ASAOC area will be granted up to 40 hours of technical support with the State's contractor to assist the PP with access to the PHIDB.

Details regarding the roles and responsibilities of the PPs' data manager are provided in the next section.

2.2.2 Performing Party Data Manager

We recommend that each of the PPs designate a data manager to create the EDD submittals and coordinate with the State of Oregon and the state's database contractor. Regardless of the data management system each PP utilizes, an EDD is required for submission to the PHIDB. The major responsibilities of the data manager are to:

- Create and manage all EDD submittals to the state's PHIDB
- Coordinate with US EPA and the State of Oregon regarding all data matters
- Participate in Portland Harbor management coordination calls for ongoing discussion, and updates or revision suggestions to this DMP. The exact timing and frequency of these calls will be determined as the work progresses.

Until a data manager is assigned, the PP Project Coordinator will be the point of contact for data issues.

2.2.3 US EPA Remedial Project Managers

Administration of US EPA's oversight of the PPs at the Portland Harbor site resides with the US EPA Superfund Remedial Project Manager (RPM). The RPM will work directly with the PPs on the direction and type of environmental sampling activities conducted. This includes data quality objective development; approval of sampling plans; and acceptance of sampling reports, assessments, and data for entry into the agency's administrative record. Central to this role is the identification of critical data needs on each approved sampling activity. RPMs will receive site DMP-suggested updates from the data managers and recommend updates to the Portland Harbor DMP as necessary.

2.2.4 US EPA Regional Portland Harbor Scribe.NET Data Coordinator

The US EPA Portland Harbor Scribe.NET data coordinator is the project's US EPA Scribe data management point of contact. The Scribe.NET data coordinator will communicate with State of Oregon PHIDB-designated data coordinator regarding the transfer of decision data to Scribe.NET.

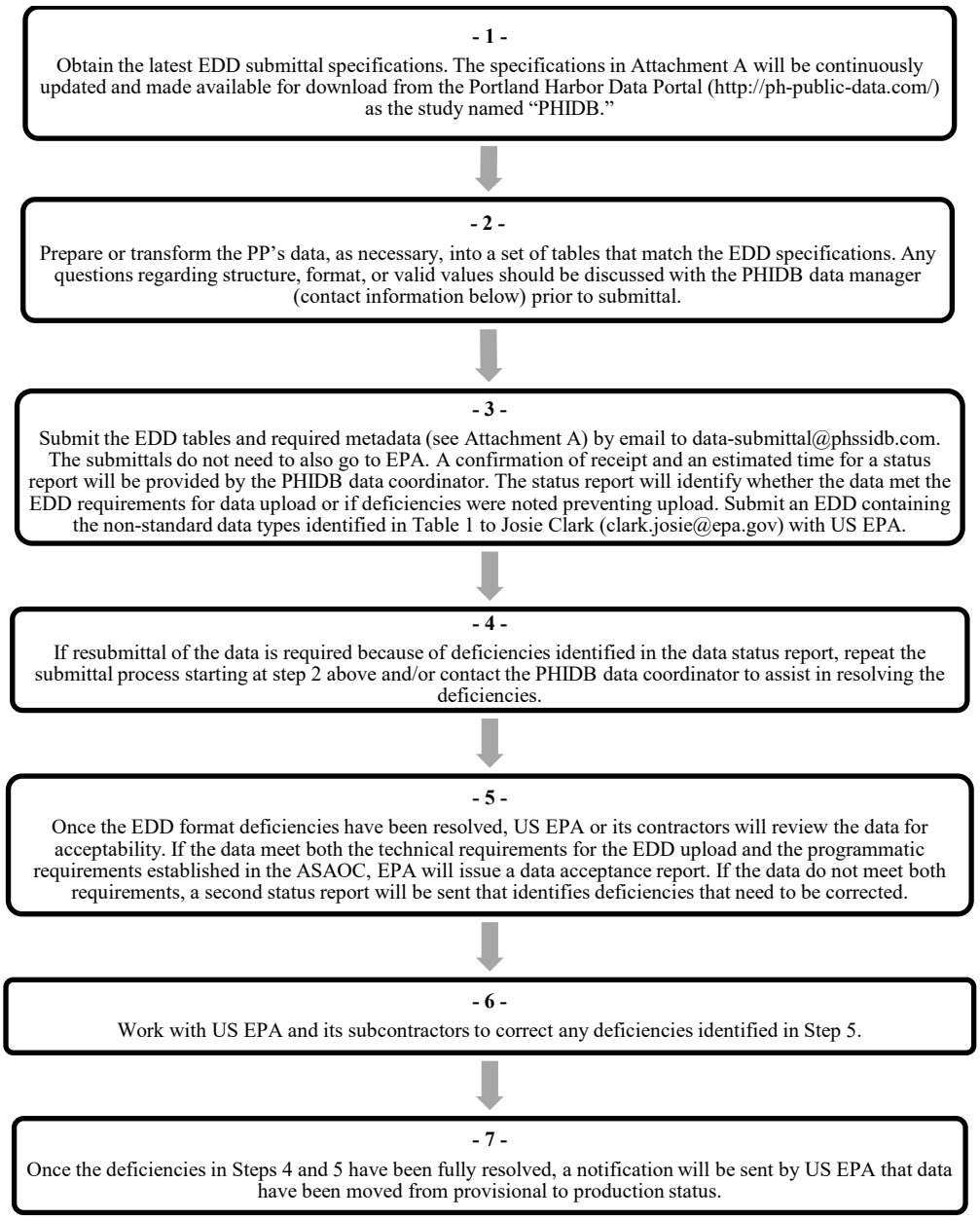
US EPA Region 10 Portland Harbor Scribe Contact: Rob Parsons, CDM Smith (Email: parsonsr@cdmsmith.com). (This point of contact is subject to change.) See section **5.1 Access** for full contact information.

3.0 Data Submittal

Specifications for submittal of PPs' RD data are described in Attachment A, *EDD Specifications for the Portland Harbor Interim Database (PHIDB)*. That document describes the format and requirements for completion of the EDD. If PPs believe a required valid value is missing from the EDD, they should email data-submittal@phssidb.com, and we will work to resolve the issue.

3.1 Submittal Process

The process that a PP's data manager should follow when submitting data to the PHIDB includes the following steps:



3.2 Contact Information

The email address to be used for data submittal and for other support requests regarding PHIDB is:

- data-submittal@phssidb.com– This email address should be for submittal of completed EDDs, associated metadata and other support and status requests.

Information sent to this email address will be routed to the appropriate individuals at US EPA, the State of Oregon, and their contractors. Follow-up to support requests will come from the PHIDB data coordinator or a data manager using their own individual business email address. For additional contact information see section **5.1 Access**.

4.0 Data Verification

PPs will not be required to initiate Scribe projects. A primary Scribe project will be initiated by US EPA Region 10 for the Portland Harbor Superfund Site and it will be the primary storage for all postprocessed PHIDB decision data. Coordination by US EPA with the PHIDB development team and the State of Oregon data coordinator will be ongoing to assure valid values and other project related information to be processed to Scribe is current.

5.0 Data Reporting

Final project information, monitoring, and locational data will be delivered to US EPA from the PHIDB data coordinator and published to Scribe.net. As a part of the ongoing transfer of data from the PHIDB to Scribe, the PH Scribe project will be available to stakeholders for download.

5.1 Access

EPA, DEQ and PPs will be provided read only access to the PHIDB internet accessible data portal and a subscription to Scribe.net. With respect to the Portland Harbor Scribe project file, each stakeholder, PP, or primary community group will have data access rights and can download the Scribe project file from Scribe. Any stakeholder, PP, or primary community group that reviews data and assesses any errors or issues with the PHIDB or Scribe data should coordinate with US EPA Region 10 or its database contractor.

State of Oregon PHIDB Database Contact:

Amanda Spencer, P.E., R.G.
Principal Hydrogeologist | GeoEngineers, Inc.
MOBILE 503-577-1535
5820 S Kelly Ave, Unit B
Portland, OR 97239
aspencer@geoengineers.com

US EPA Region 10 Scribe Database Contact:

Rob Parsons, GISP
Sr Spatial Data/Environmental Scientist
CDM Smith
555 17th Street, Suite 500
Denver, CO 80202
Phone/Fax: 720.264.1102 | Mobile: 303.921.1943
parsonsr@cdmsmith.com

6.0 Data Averaging and Treatment of Non-Detected Values

Data averaging and treatment of non-detected values during RD is based on the guidelines developed for the Portland Harbor RI/FS data (Kennedy/Jenks Consultants et al. 2004) and is described in the sections

below. Data for the parent sample, field duplicate sample, and calculated average result values all must be included in RD data submittals.

6.1 Treatment of Non-Detected Values

The non-detect result value for a given analyte can either be the reporting limit (i.e., project quantitation limit), method detection limit, or estimated detection limit based on the RD PP's quality assurance project plan, the analytical method performed, and the results of data validation. However, the non-detect limit should be less than the Portland Harbor ROD cleanup levels to the extent practicable. Data validation will be completed following the applicable National Functional Guidelines for the analyte and/or analytical method. Data reduction activities described below will occur after data validation is complete to incorporate the data qualifiers applied during validation. Non-detected values will be incorporated into the RD decision data and analyte group totals according to the rules in the following sections.

6.2 Calculation of Averages and Selection of Decision Data

Field duplicate samples will be collected at the rates specified in the PP's quality assurance project plans. The field duplicate sample result values will be evaluated with the parent sample result values following the rules described below to generate the decision data to be used during RD. However, when probabilistic statistical analyses are performed (e.g., data replacement), the parent and field duplicate samples' result values may be evaluated independent of the RD decision data. Selection of RD decision data at the individual analyte level will occur before calculation of analyte group totals. Therefore, the analyte group total result value will reflect the selection of the appropriate RD decision data at the individual analyte level (following the rules below) prior to summing.

Parent and field duplicate sample result values will be evaluated to select RD decision data as described below:

- If the parent and field duplicate result values are both reported as detected concentrations, the average concentration will be calculated, selected as the RD decision data, and used in all further data reduction activities. Validation qualifiers will be assigned to the average concentration as described in Section 8.0.
    - $RD\ Decision\ Data\ = avg(detected\ parent\ and\ field\ duplicate\ result\ values)$
- If the parent and field duplicate result values are both reported as not detected, the lowest non-detect result value (and associated validation qualifier) will be selected as the RD decision data and designated a non-detect for use in all further data reduction activities.
    - $RD\ Decision\ Data = min(not\ detected\ parent\ and\ field\ duplicate\ result\ values)$
- If the parent and field duplicate result values are mixed (i.e., one is reported as detected and the other is reported as not detected), the detected result value (and associated validation qualifier) will be selected as the RD decision data and designated a detect for use in all further data reduction activities.
    - $RD\ Decision\ Data = detected\ result\ value$

7.0 Calculation of Analyte Group Totals

Calculation of analyte group totals will generally follow the rules described in Appendix A of the *Portland Harbor RI/FS: Feasibility Study* (US EPA 2016). However, the DMP clarifies and supersedes the FS summing rules for use at the Portland Harbor Superfund Site during RD. The list of detected analytes in the Portland Harbor RI/FS data for RD-specific media of interest are included in Attachment B. The Portland Harbor RI/FS databases are available on the Portland Harbor Environmental Data Portal. The PP is responsible for including summations following the RD summing rules as part of their data submittal to the PHIDB. The analyte group totals described in Section 7.2 are required to be included in the data submittal to the PHIDB when the analytes in the group total are measured by the laboratory and when there is a Portland Harbor ROD cleanup level, remedial action level, or principal threat waste threshold. Additionally, analyte group totals without ROD cleanup levels, remedial action levels, or principal threat waste thresholds should be included in the data submittal to the PHIDB when these totals are evaluated in a PP's RD deliverable.

7.1 General Summation Rules

The procedures for calculating analyte group totals are summarized below:

- Calculated totals for an analyte group are the sum of all detected results and the sum of all non-detected results at one half the value of the non-detect. This is applicable for analytes detected at least once in the Portland Harbor RI/FS dataset within a given medium.
  - $Analyte\ Group\ Total\ = \Sigma(detected\ result\ values) + 0.5 \times$ Σ(non-detected result values detected at least once in the medium)
- If none of the analytes within a group are detected for a given sample, then the highest non-detected result value is used for the summation. This is applicable for analytes detected at least once in the Portland Harbor RI/FS dataset within a given medium.
  - $Analyte\ Group\ Total\ =$ max(non-detected result values detected at least once in the given medium)
- Analytes within a group never detected within the Portland Harbor RI/FS dataset for a given medium are excluded from the totals (i.e., treated as zero).
  - $Analyte\ Group\ Total\ = 0$

7.2 Specific Analyte Group Totals

Additional clarifying information is provided in the sections below for specific analyte group totals for the summations that may be applicable during RD. The analyte group total names and other identifying information for the PHIDB are shown in Table 2.

7.2.1 Polychlorinated Biphenyls

There are four different summations for PCBs that may be applicable during RD, as described below.

7.2.1.1 Total PCBs

Total PCBs can be calculated from either the sum of individual congeners or individual Aroclors. When both congener-based and Aroclor-based results are present for a given sample, total PCBs should be

derived from the congener values. Total PCBs as congeners represents the sum of all reported individual congeners (up to 209) following the general summation rules. Total PCBs as Aroclors represents the sum of all reported Aroclors following the general summation rules.

PCB homolog totals (e.g., monochlorobiphenyl, dichlorobiphenyl) can be calculated as the sum of individual PCB congeners in a homolog group. The co-eluting congeners from specific analytical laboratories should be determined as part of the laboratory selection process such that co-eluting congeners are constituents of the same homolog and do not affect multiple homolog groups. For completeness, decachlorobiphenyl, a single congener (PCB-209), should be reported as both its individual analyte result and as a homolog total.

7.2.1.2 Total Dioxin-Like PCB Congeners Toxic Equivalent

The dioxin-like PCB congeners and their toxic equivalency factors (TEFs) are published by the World Health Organization (WHO) for mammals (Van den Berg et al. 2006) and for fish and birds (Van den Berg et al. 1998). Reported concentrations of the dioxin-like PCB congeners are multiplied by their respective TEFs to estimate toxicity relative to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The resulting toxic equivalents (TEQs) for the individual congeners are summed to generate the total dioxin-like PCB congeners TEQ following the general summation rules.

7.2.1.3 Total Non-Dioxin-Like PCB Congeners

The dioxin-like PCB congeners are published by the WHO for mammals (Van den Berg et al. 2006) and for fish and birds (Van den Berg et al. 1998). For the remaining 197 PCB congeners that are non-dioxin like, the total non-dioxin-like PCB congeners is summed from the reported concentrations following the general summation rules.

7.2.2 Polychlorinated Dibenzo-p-Dioxins and Furans

There are two summations for polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs) that may be applicable during RD, as described below.

7.2.2.1 Total PCDD/Fs

Total PCDD/Fs are the sum of the tetra and higher PCDD/F congeners following the general summation rules. PCDD/F homolog totals (e.g., TCDDs, pentachlorodibenzo-p-dioxins) can be calculated as the sum of the individual PCDD/F congeners in a homolog group. For completeness, octachlorodibenzo-p-dioxin and octachlorodibenzofuran, which are individual PCDD/F congeners, should be reported as both their individual analyte results and as homolog totals.

7.2.2.2 Total PCDD/Fs TEQ (2,3,7,8-TCDD equivalent)

The TEFs for the PCDD/F congeners are published by the WHO for mammals (Van den Berg et al. 2006) and for fish and birds (Van den Berg et al. 1998). Reported concentrations of the PCDD/F congeners are multiplied by their respective TEFs to estimate toxicity relative to 2,3,7,8-TCDD. The resulting TEQs for the individual congeners are summed to generate the total PCDD/Fs TEQ, also known as the 2,3,7,8-TCDD equivalent, following the general summation rules.

7.2.3 Polycyclic Aromatic Hydrocarbons

There are five summations for polycyclic aromatic hydrocarbons (PAHs) that may be applicable during RD, as described below.

7.2.3.1 Total PAHs

There are 17 PAHs that are included in the total PAHs sum. These 17 PAHs are broken down into two groups based on their molecular weights, as follows:

- Low-molecular-weight polycyclic aromatic hydrocarbons (LPAHs): 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene
- High-molecular-weight polycyclic aromatic hydrocarbons (HPAHs): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene

Total PAHs are the sum of the 17 listed LPAHs and HPAHs following the general summation rules.

The HPAH benzo(j)fluoranthene typically coelutes with benzo(k)fluoranthene. When this occurs, the results can be reported as benzo(k)fluoranthene or benzo(j,k)fluoranthene as dictated by the RD PP's quality assurance project plan and the PHIDB valid values. The summation for total HPAHs, total PAHs, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) TEQ will treat benzo(j,k)fluoranthene the same as benzo(k)fluoranthene. If benzo(j)fluoranthene is reported individually, then it will individually be included in the summations for total HPAHs and total PAHs in addition to benzo(k)fluoranthene.

7.2.3.2 Total LPAHs

Total LPAHs is the sum of the seven listed LPAHs following the general summation rules.

7.2.3.3 Total HPAHs

Total HPAHs is the sum of the 10 listed HPAHs following the general summation rules.

7.2.3.4 Total Carcinogenic Polycyclic Aromatic Hydrocarbons

There are seven cPAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene. Potency equivalent factors (PEFs) are identified in EPA (1993). Reported concentrations of the individual cPAHs are multiplied by their respective PEFs to estimate toxicity relative to benzo(a)pyrene. The resulting TEQs for the individual cPAHs are summed to generate the total cPAHs TEQ, also known as the benzo(a)pyrene equivalent, following the general summation rules.

7.2.3.5 Total Benzofluoranthenes

Total benzo(x)fluoranthenes is the sum of the b, j, and k isomers of benzofluoranthene, following the general summation rules.

7.2.4 Dichlorodiphenyltrichloroethane and its Derivatives

There are six summations relating to DDx, as described below.

7.2.4.1 Total Dichlorodiphenyldichloroethane

Total dichlorodiphenyldichloroethane (DDD) is the sum of the isomers 2,4'-DDD and 4,4'-DDD, which are also known as o,p'-DDD and p,p'-DDD, respectively. The total DDD summation will follow the general summation rules.

7.2.4.2 Total Dichlorodiphenyldichloroethylene
Total dichlorodiphenyldichloroethylene (DDE) is the sum of the isomers 2,4'-DDE and 4,4'-DDE, which are also known as o,p'-DDE and p,p'-DDE, respectively. The total DDE summation will follow the general summation rules.

7.2.4.3 Total Dichlorodiphenyltrichloroethane
Total dichlorodiphenyltrichloroethane (DDT) is the sum of the isomers 2.4'-DDT and 4.4'-DDT, which are also known as o,p'-DDT and p,p'-DDT, respectively. The total DDT summation will follow the general summation rules.

7.2.4.4 Total 2,4'-DDx
Total 2,4'-DDx is the sum of the 2,4'- isomers of DDT, DDE, and DDD, following the general summation rules.

7.2.4.5 Total 4,4'-DDx
Total 4,4'-DDx is the sum of the 4,4'- isomers of DDT, DDE, and DDD, following the general summation rules.

7.2.4.6 Total DDx
Total DDx is the sum of the six DDx isomers (2,4'-DDD; 4,4'-DDD; 2,4'-DDE; 4,4'-DDE; 2,4'-DDT; 4,4'-DDT) following the general summation rules.

7.2.5 Total Chlordanes

Total chlordanes is the sum of cis-chlordane (also known as alpha-chlordane), trans-chlordane (also known as gamma-chlordane), oxychlordane, cis-nonachlor, and trans-nonachlor, following the general summation rules.

7.2.6 Total Polybrominated Diphenyl Ethers

Total polybrominated diphenyl ethers (PBDEs) is the sum of the reported PBDE congeners, following the general summation rules. There are 209 possible PBDE congeners; however, the number of PBDE congeners in commercial PBDE mixtures and environmental media are typically only a subset of the 209 congeners (Agency for Toxic Substances and Disease Registry 2017). Analytical laboratories typically analyze and report a fraction of the 209 PBDE congeners; therefore, the PBDEs summation is expected to contain only those reported congeners.

7.2.7 Total Xylenes

Total xylenes is the sum of m,p-xylene and o-xylene, following the general summation rules.

7.2.8 Benzene, Toluene, Ethylbenzene, and Xylene

Benzene, toluene, ethylbenzene, and xylene (BTEX) is the sum of the BTEX compounds, following the general summation rules.

7.2.9 Total Endosulfan

Total endosulfan is the sum of alpha-endosulfan, beta-endosulfan, and endosulfan sulfate, following the general summation rules.

7.2.10 Total Fines

Total fines are the sum of all silt and clay grain-size fractions passing U.S. standard sieve #230 (0.0625-millimeter openings). The general summation rules do not apply to total fines as this summation is not of chemical data.

7.3 Reportable Analyte Requirements for Totals

The expected number of analytes for analyte group totals is shown in Table 3. If the number of analytes reported is limited, the PP will need to give the total an "A" qualifier. If the number of analytes reported is below the minimum number of reported analytes required for computing the summation, the PP will not calculate the summation for that analyte group total.

8.0 Definition and Propagation of Qualifiers

As in the FS database, the qualifier definitions shown in Table 4 will be used in the remedial design databases. Additionally, as further discussed in RI Appendix A3 Section 1.1.2, the N-qualifier denotes that the identity of the analyte is presumptive and not definitive, generally as a result of the presence in the sample of an analytical interference, such as hydrocarbons, or in the case of pesticides, PCBs.

In cases where average concentrations are derived from results of field duplicates, or where analyte group totals are calculated, validation qualifiers will be propagated as follows:

- J or N qualifiers used for any individual analyte used to calculate an average or an analyte group total will be retained for qualifying the average and/or analyte group total.
- If one or more of the results are qualified as undetected and one or more of the other results included in a calculated analyte group total are detected and qualified as estimated, the calculated value will be qualified as estimated.
- If all of the included results are detected and one or more of the results are qualified as estimated, the calculated value (average or analyte group total) will be qualified as estimated.
- The "undetected" field will be populated with a False for detected values and a True for non-detects for all sample results and calculated values.
- Rejected values will not be used in averages or totals.

9.0 References

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Tables

Table 1

Data Types Required for Submittal to the PHIDB versus to EPA

Portland Harbor Superfund Site

Portland, Oregon

Data to Submit to the PHIDB[1]	Data to Submit to EPA Directly[2]
Typical environmental sampling data for all media collected from samples representing in situ conditions.	Field quality control program blank sample results (e.g., rinsate/equipment blanks, field blanks, trip blanks).
Groundwater monitoring well information.	Dredging elutriate test results.
Toxicity testing/bioassay results.	Waste characterization results.
Species abundance measurements.	Geotechnical laboratory results (optional submittal).[3]
	Any other non-standard data type requiring data validation.

Notes:

[1] Data submitted to the PHIDB need to conform to the *EDD Specifications for the Portland Harbor Interim Database (PHIDB).*

[2] Data submitted to EPA directly need to be provided in an EDD (no format specified).

[3] Geotechnical laboratory results include geotechnical index parameters and other measurements performed. This is an optional submittal not required by EPA.

Table 2
Analyte Nomenclature for Analyte Group Totals Contained in the PHIDB
Portland Harbor Superfund Site
Portland, Oregon

Analyte	Full_Name	Chem_Class	CAS_RN
Total PCB Aroclors	Total polychlorinated biphenyl (PCB) Aroclors	PCBs	LRAtPCB_N
Total PCB Congeners	Total polychlorinated biphenyl (PCB) congeners	PCBs	LRAtPCBCong_N
Mono-CB	Total Monochlorobiphenyl homologs	PCBs	LRASum_MonPCB_N
Dichloro-CB	Total Dichlorobiphenylhomologs	PCBs	LRASum_DiPCB_N
Tri-CB	Total Trichlorobiphenyl homologs	PCBs	LRASum_TriPCB_N
Tetra-CB	Total Tetrachlorobiphenyl homologs	PCBs	LRASum_TetPCB_N
Penta-CB	Total Pentachlorobiphenyl homologs	PCBs	LRASum_PenPCB_N
Hexa-CB	Total Hexachlorobiphenyl homologs	PCBs	LRASum_HexPCB_N
Hepta-CB	Total Heptachlorobiphenyl homologs	PCBs	LRASum_HepPCB_N
Octa-CB	Total Octachlorobiphenyl homologs	PCBs	LRASum_OctPCB_N
Nona-CB	Total Nonachlorobiphenyl homologs	PCBs	LRASum_NonPCB_N
Deca-CB	Total Decachlorobiphenyl homologs	PCBs	LRASum_DecPCB_N
PCB TEQ-Mammalian	TEQ for polychlorinated biphenyl (PCB) congeners using mammal TEFs (2005)	Dioxin-like PCB TEQ	LRAtPCBCngCPM_N
PCB TEQ-Avian	TEQ for polychlorinated biphenyl (PCB) congeners using avian TEFs (1998)	Dioxin-like PCB TEQ	LRAtPCBCngB98_N
PCB TEQ-Fish	TEQ for polychlorinated biphenyl (PCB) congeners using fish TEFs (1998)	Dioxin-like PCB TEQ	LRAtPCBCngF98_N
Total Non-DLC PCB Congeners	Total Non-Dioxin Like Congener (DLC) PCB Congeners	PCBs	LRAtPCBCong_nDLC_N
Total Dioxins/Furans	Total polychlorinated dibenzo-p-dioxins and dibenzofurans	DioxFurans	LRAtPCDDF_N
Dioxin TEQ-Mammalian	Total Dioxin/Furan TEQ 2005 (Mammal)	Dioxin TEQ	LRAtDioxFurM_N
Dioxin TEQ-Avian	Total Dioxin/Furan TEQ 1998 (Avian)	Dioxin TEQ	LRAtDioxFurB_N
Dioxin TEQ-Fish	Total Dioxin/Furan TEQ 1998 (Fish)	Dioxin TEQ	LRAtDioxFurF_N
Total PAH	Sum of all priority pollutant polynuclear aromatic hydrocarbons	PAH	LRAtPAH_17_N
Total LPAH	Sum of low molecular weight priority pollutant polynuclear aromatic hydrocarbons	PAH	LRAtPAH_17_LM_N
Total HPAH	Sum of high molecular weight priority pollutant polynuclear aromatic hydrocarbons	PAH	LRAtPAH_17_HM_N
Total cPAH(BaPeq)	TEQ for carcinogenic PAH (EPA 1993)	PAH	LRAtcPAHTEF7_N
Total Benzo(x)fluoranthenes	Sum of b, j, and k isomers of benzofluoranthene	PAH	LRAtBF_N
Total DDD	Sum of 2,4'- and 4,4'- isomers of DDD	Pesticides	LRASum_DDD_N
Total DDE	Sum of 2,4'- and 4,4'- isomers of DDE	Pesticides	LRASum_DDE_N
Total DDT	Sum of 2,4'- and 4,4'- isomers of DDT	Pesticides	LRASum_DDT_N
Total 2_4-DDx	Sum of the 2,4'- isomers of DDT, DDE, and DDD	Pesticides	LRASum_DDT2_N
Total 4_4-DDx	Sum of the 4,4'- isomers of DDT, DDE, and DDD	Pesticides	LRASum_DDT4_N
Total DDx	Sum of the 2,4' and 4,4'- isomers of DDT, DDE, and DDD	Pesticides	LRAtDDT_N
Total Chlordane	Sum of cis- and trans-chlordane, cis- and trans-nonachlor, and oxychlordane	Pesticides	LRAtChlordan_N
Total PBDE	Total polybrominated diphenyl ethers (PBDE)	PBDEs	LRAtPBDE_N
Total Xylene	Total Xylene	Volatiles	LRAtXylene_N
BTEX	Sum of benzene, toluene, ethylbenzene, and xylene	Volatiles	LRAtBTEX_N
Total Endosulfan	Sum of alpha-endosulfan, beta-endosulfan, and endosulfan sulfate	Pesticides	LRAtENDOSLF_N

Table 3

Result Requirements for Generating Analyte Totals

Portland Harbor Superfund Site

Portland, Oregon

Analyte	Expected Analytes	'A' qualify (Limited)[1]	Do Not Sum[1]
Total PCB Aroclors	7 or 9	<7	<2
Total PCB Congeners	209	<150	<100
Mono-CB	3	<3	--
Dichloro-CB	12	<10	<5
Tri-CB	24	<20	<10
Tetra-CB	42	<30	<15
Penta-CB	46	<30	<15
Hexa-CB	42	<30	<15
Hepta-CB	24	<20	<10
Octa-CB	12	<10	<5
Nona-CB	3	<3	--
Deca-CB	1	--	--
PCB TEQ-Mammalian	12	<12	<10
PCB TEQ-Avian	12	<12	<10
PCB TEQ-Fish	12	<12	<10
Total Non-DLC PCB Congeners	197	<150	<100
Total Dioxins/Furans	17	<17	<10
Dioxin TEQ-Mammalian	17	<17	<10
Dioxin TEQ-Avian	17	<17	<10
Dioxin TEQ-Fish	17	<17	<10
Total PAH	17	<17	<10
Total LPAH	7	<7	<3
Total HPAH	10	<10	<5
Total cPAH(BaPeq)	7	<7	<3
Total Benzo(x)fluoranthenes	3	<3	--
Total DDD	2	<2	--
Total DDE	2	<2	--
Total DDT	2	<2	--
Total 2_4-DDx	3	<3	--
Total 4_4-DDx	3	<3	--
Total DDx	6	<6	--
Total Chlordane	5	<5	<2
Total PBDE	--[2]	--	--
Total Xylene	2	<2	--
BTEX	5	<5	--
Total Endosulfan	3	<3	--

Notes:

[1] If a minimum number of analytes is not specified, then the summation will be performed or the analyte group total won't be given an A qualifer as long as one analyte within the analyte group is present and not rejected.

[2] There are 209 possible PBDE congeners; however, the number of PBDE congeners in commercial PBDE mixtures and environmental media are typically only a subset of the 209 congeners. Analytical laboratories typically analyze and report a fraction of the 209 PBDE congeners.

Table 4
Analytical Chemistry Qualifier Definitions
Portland Harbor Superfund Site
Portland, Oregon

Qualifier	Description
A	Summed value based on limited number of analytes.
J	Estimated value.
JA	Combined qualifier.
JN	Combined qualifier.
N	Presumptive evidence of a compound.
R	Rejected.
U	Analyte was analyzed for but not detected.
UA	Combined qualifier.
UJ	Not detected. Sample detection limit is estimated.
UJA	Combined qualifier.

Attachment A – EDD Specifications for the Portland Harbor Interim Database (PHIDB)

EDD SPECIFICATIONS FOR THE PORTLAND HARBOR INTERIM DATABASE (PHIDB)

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1.0 INTRODUCTION

The Portland Harbor Interim Database (PHIDB) is designed specifically to store environmental characterization data that are collected under a U.S. Environmental Protection Agency (EPA) consent order during remedial design (RD) sampling in the Portland Harbor Superfund Site (PHSS). Compilation of data from multiple RD studies into a single system will establish consistency in data structure and encoding, and thereby facilitate consistency in data interpretation and presentation.

Because data will be collected by numerous parties, all of whom may manage data in different systems and structures, a key step to establishing consistency within the PHIDB is for parties to submit their data in a standard digital format, or electronic data deliverable (EDD). This document describes the PHIDB EDD format for data submission. This document is organized by the following sections:

- **Data Structure (Section 2).** This section provides background on the typical scope, complexity, and organization of environmental investigations and how the PHIDB system integrates this complexity. The location identifier and coordinates, collections and samples, quality control (QC) samples and splits, and use of multiple sample identifiers are presented in Section 2.

- **Sample Specific Details (Section 3).** This section provides details related to the specific collection method in the EDD format.

- **EDD Specifications (Section 4).** The EDD Specifications describe the data dictionary for the EDD tables and the valid values and metadata for the PHIDB.

- **Data Submittal and Review (Section 5).** The data submittal section describes the process for data submittal and review.

An electronic template for the EDD tables is available to assist with the preparation and submission of RD data. It is recognized that the EDD templates and valid values will be reviewed and updated throughout the life of the PHSS cleanup. The current templates and valid value lists can be downloaded from the Portland Harbor Environmental Data Portal[1] as part of the Portland Harbor Remedial Design Programmatic Data Management Plan. In addition, detail on the design of the PHIDB can be found in the document *Portland Harbor Interim Database (PHIDB) Design Summary*[2] *(Cascadia/Integral, 2021)*, which can be downloaded from the Portland Harbor Environmental Data Portal.

[1] http://ph-public-data.com/

[2] Cascadia Associates and Integral Consulting, 2021. Portland Harbor Interim Database Design Summary. Prepared for State of Oregon. Version 1.0, April 16, 2021.

2.0 DATA STRUCTURE

Environmental sampling programs often incorporate resampling, field replication, subsampling, compositing, and sample splitting for QC purposes. Different investigators and different investigations commonly use different conventions for naming locations and samples, and to represent the relationships between samples, subsamples, composites, and splits. Software used to manage environmental data may also enforce conventions or establish constraints on how information is represented. Because the PHIDB system integrates data from multiple investigations, those different conventions must be unified in a consistent manner.

Two elements of sampling complexity that are addressed by the PHIDB structure, and therefore are represented in the EDD, are:

- Subsampling of collected material. The most common example of this in sediment sampling programs is the collection of a core that is then subsampled at different depths. Each sample that represents a core horizon must be distinguished from all other such samples, but must also be unambiguously related to all other samples from the same core. Sampling programs frequently use sample identifier schemes in which one field within the sample identifier is common among all samples from a core. A database system such as the PHIDB cannot feasibly be designed to interpret fields within sample identifiers, particularly when sample identifier designs differ between investigations. These relationships are therefore represented by the data structure design rather than by the sample identifier design to enforce data integrity.
- Splitting of samples for QC purposes. Ordinarily 5 percent of samples collected for chemical analyses is homogenized and split in the field prior to submission to a laboratory. These splits, or duplicates, must be distinguished from one another, but must both be linked so that they are identifiable as representative of the same portion of the environment that will be used for characterization and assessment. As with subsamples, the relationships between splits are represented by data structure rather than by the content of sample identifiers.

The following sections describe the way that the PHIDB system represents some of the complexity of sampling data structure. The EDD format is a simplified representation of this structure.

2.1 LOCATION IDENTIFIERS AND COORDINATES

The EDD format includes a single table for location information in which event location

identifiers and target coordinates[3] are required. Target coordinates represent intended sampling locations and are commonly included in Field Sampling Plans (Table 3—**location table**).

The actual sample location coordinates (e.g., collected with a Differential Global Positioning System) at which each sample is collected are also recorded in the EDD in Table 5 (**sample table**) with the sampling information. Both target and actual coordinates are required entries and can be the same when the sample is collected as planned. Whereas target coordinates are always represented as a single geographic point, actual sampling locations can be represented as the center of one or more points (e.g., composite sample), a line midpoint (e.g., transect), or area centroids (e.g., test pit). All coordinate data should be submitted in one coordinate system as decimal degrees in the WGS84 (World Geodetic System 1984) coordinate system and horizontal datum. Vertical datum elevations may be submitted in the North American Vertical Datum of 1988 (NAVD88) or the National Geodetic Vertical Datum of 1929 (NGVD29).

2.2 COLLECTIONS AND SAMPLES

When a sediment core is collected and subsampled into separate horizons, the core as a whole is referred to as a *collection.* The individual horizons are referred to as *samples* or *interpretive samples*[4]. Therefore, one core *collection* has a one-to-many relationship to the many *interpretive samples* within the core. The same terminology (*collection* and *sample*) is used for soil borings or sediment cores. The same terminology is also used in other cases where material is subsampled, such as when a fish is subdivided into fillet and carcass subsamples. A single fish *collection* has a one-to-many relationship to the subdivided fillet and/or carcass *interpretive samples*. For uniformity of data representation within the PHIDB, the same terminology is also used for single samples, such as surface sediment grab samples—in those cases the collection and the interpretive sample are the same.

Sampling programs may also include composite sampling, which involves collection of multiple individual samples (sub-composites) and compositing them into one sample (the composite sample) for chemical analysis; the data submittal process for composite sampling within the EDD structure is detailed in Section 3.1.

Interpretive samples can themselves be further subdivided into *analytical samples*. An interpretive sample may be split into multiple analytical samples as part of a QC program in which (typically) 5 percent of the interpretive samples is split and the two resulting analytical samples are submitted independently to the laboratory for "parent" and "duplicate" analysis. Interpretive samples may also be split into multiple analytical samples if material is to be sent to

[3] The terms "target coordinates," "canonical coordinates," and "design coordinates" all refer to the coordinates at which samples are intended to be collected. These are the coordinates that are ordinarily listed in a field sampling plan.

[4] The phrase "interpretive sample" indicates that this is the material that will be used for interpretation of environmental conditions.

different laboratories, or if different types of containers or preservatives must be used for different analyses.

This hierarchy, which includes three levels—collections, interpretive samples, and analytical samples—is used for samples in the PHIDB. The application of this hierarchy to both grab and core samples is shown on Figure 1 Common Structure for All Sampling Information. For surface sediment grab samples, the *collection* and the *interpretive sample* are the same thing (e.g., one collection to one interpretive sample with the same identifiers), and if split there will be one or more analytical samples per interpretive sample (e.g., one interpretive sample to one or more analytical samples with different identifiers). For sediment cores, the collection represents the entire core, and there will be multiple interpretive samples for that collection (e.g., one core collection to many interpretive sample[s] with different identifiers). And, again, there could be one or more analytical samples per interpretive sample.

The EDD **sample table** (Table 5) contains information to describe both collection identifiers (e.g., collection_id) and the sample identifiers (e.g., main_sample_id) derived from those collections. For collections that are subsampled, such as sediment cores, a single collection identifier should be assigned to all samples from that collection, and each of those samples must also be assigned its own unique identifier as shown on Figure 1.

When the collection and the sample are equivalent (e.g., for sediment grab samples), the collection and sample identifier should be the same (e.g., one-to-one relationship), as shown on Figure 1, and for convenience, only the collection identifier needs to be entered into the EDD sample table.

Separate upper and lower depths for collections and samples can be recorded in the EDD. The upper and lower depths for a core, for example, will not be the same as the upper and lower depths for any horizon from that core (i.e., the upper and lower depths of the interpretive sample[s] from the core). The EDD **sample table** (Table 5) contains an upper collection depth column and a lower collection depth column to store the minimum and maximum core depth, and it also includes an upper sample depth column and a lower sample depth column to store the sample-specific depths.

Separate sample materials for collections and samples can be recorded in the EDD. For example, if a water sample is filtered in the field, the material for the collection would be whole water, whereas the samples would have materials of filtered water and filterable particulates.

One approach the submitter may take is to prepare separate tables for the collection and sample information, and then join the tables using the main sample identifier to create the EDD sample table. Only the complete EDD sample table can be submitted.

2.3 QUALITY CONTROL SPLITS FOR CHEMISTRY ANALYSES

When a field interpretive sample is split to create duplicate samples that are to be analyzed separately as part of the QC program (i.e., *analytical samples*), the splits must have different analytical sample identifiers assigned but must also share the same main (interpretive) sample identifier. The PHIDB refers to field duplicates and splits as *analytical samples* where the main sample identifier contains the parent (or natural) sample identification. Field sampling programs commonly append a suffix such as "-D" to the main sample identifier to label one of the split or duplicate samples, using the main sample identifier for the other split sample, which is commonly referred to as a parent or natural sample. The PHIDB data structure enforces the duplicate or split relationship to parent sample by the data structure design rather than by the sample identifier design. Therefore, when a sample is split, each of the splits must be assigned both its own unique identifier and the identifier of the main sample, which is common between the two splits, as shown on Figure 1.

The EDD format includes separate tables for sampling information in the **sample table** (Table 5) and for analytical chemistry results for environmental samples in the **lab_result table** (Table 11). The main sample identifier appears in both tables and serves to link analytical results to interpretive and analytical (e.g., duplicate) samples. The analytical sample identifier appears only in the table of analytical chemistry results, where it distinguishes between results for different splits of the same interpretive sample. Therefore, only the collection and interpretive sample identifiers are required in the **sample table**.

2.4 USE OF MULTIPLE SAMPLE IDENTIFIERS

As described above, up to three sample identifiers are used in the PHIDB EDD format: the collection identifier, the main sample identifier (which corresponds to the interpretive sample), and the analytical sample identifier. For a core horizon that has been split, these three identifiers may all be different. For a surface sediment grab sample that has not been split, these identifiers will ordinarily all be the same (Figure 1).

Many environmental investigations use fields within a sample identifier to encode information that can be used to distinguish collections, interpretive samples, and analytical samples. For example, each sediment core may not be explicitly assigned a unique identifier, but a core (or location) identifier may be embedded within the main sample ID, so that all interpretive samples from that core have the same value within that field of the sample identifier. When data are prepared in the PHIDB EDD format, the preparer may need to create distinct identifiers to properly represent the relationships between collections, interpretive samples, and sample splits (e.g., *analytical sample*). For example, the field within the sample identifier that identifies the core may be adopted as the core (*collection*) identifier. To minimize the effort required by data preparers, the EDD allows the following simplifications (Figure 1):

- The collection and main sample identifiers are the same when there is one collection to one interpretive sample (e.g., as for a sediment grab sample)—then only one identifier, the main sample identifier, needs to be provided.
- The main sample identifier and the analytical sample identifier are the same when there are no duplicates or splits; only the main sample identifier need be provided.

3.0 SAMPLE SPECIFIC DETAILS

This section provides recommendations for how to submit composite samples and how to submit collections and samples for different types of material and sampling gear.

These examples describe common sampling designs and materials.

3.1 COMPOSITE SAMPLES

There are two ways to submit the results of sample compositing:

1. Submit only the composite sample. The composite sample is required to be included in the sample table, including a value for the "composite_type" column and optionally for the "composite_count" column. If the sample is a temporal composite, consider populating the "composite_period" column.
2. Submit both composite and subcomposite samples. This option requires submitting both the **sample table** (Table 5) and **sample_composite** table (Table 6). In addition to submitting the composite sample itself, all of the subcomposite samples that make up the composite sample need to be included in the **sample table**. The relationships between the composite and subcomposite samples are described by entries in the **sample_composite** table.

Which of these methods is used may depend on directions from EPA or the discretion of the data submitter. For example, the first approach may be taken for a simple three-point composite around a target location, and the second approach may be taken for multi-increment sampling because the subcomposites are taken over a much larger area. However, the second approach can also be adopted for three-point composites at the discretion of the data submitter.

If the second approach is taken, each of the subcomposite samples must have target coordinates and other required information recorded for creation of a row in the location table for each subcomposite sample. Actual coordinates for the collection are recorded in the **sample table** (Table 5).

There are different sample scenarios based on the type of sampling:

A. Multipoint Composite:

    a. Both composite and subcomposite are part of the same collection

    b. Subcomposite coordinates are represented by "sample_lat_centroid_dd" and "sample_lon_centroid_dd" columns or by "coll_coords" column. The composite sample is a spatial average of the subcomposite coordinates. Subcomposite depths are recorded in the **sample table** (Table 5). The composite depth should be representative of all the subcomposites (e.g., an average of maximum value).

B. Multi Increment Sampling:

   a. Composite and subcomposite samples are part of different collections.

   b. Subcomposite coordinates are represented by "sample_lat_centroid_dd" and "sample_lon_centroid_dd" columns or by "coll_coords" column. The composite sample is a spatial average of the subcomposite coordinates. Subcomposite depths are recorded in the **sample table** (Table 5). The composite depth should be representative of all the subcomposites (e.g., an average of maximum value).

The "coll_coords" column in the **sample table** (Table 5) is formatted as "well-known text" and can be used to record multiple subcomposite points, a line (transect), or a polygon area to represent the extent of a spatial composite.[5]

The EDD specifications themselves do not require that the **sample_composite** table (Table 6) be used, but other documents may impose that requirement. Similarly, the "composite_count" and "composite_period" values are not required by the EDD specification, but may be required by some other controlling document (e.g., the Sampling and Analysis Plan [SAP] or the Quality Assurance Project Plan [QAPP] for the sampling program).

3.2 COLLECTIONS AND SAMPLES FOR SPECIFIC DATA TYPES

For many types of material and sampling methods, a collection corresponds to a single gear deployment. This is not a firmly fixed relationship however, because sometimes multiple gear deployments may generate the material for a single collection. The following specific examples illustrate some of the relationships that may occur between gear deployments, collections, and samples. Note that gear deployments are not explicitly represented in the PHIDB, but they provide some context for the interpretation of collections and samples.

The collection method recorded in the **sample table** (Table 5) should identify the gear and/or sampling method used, not the material sampled.

Sediment Cores and Soil Borings

The entire core (or boring) should be considered a collection, and there should be multiple samples per collection. The collection upper and lower depths should represent the top and bottom of the core (or boring), respectively. The collection date should be the time that the core was retrieved. The vertical reference point should be the sediment or soil surface. The collection part should indicate that each sample is a vertical section. Upper and lower sample depths should be the depths of each interpretive sample below the vertical reference point.

[5] Well-known text is a text markup language for representing vector geometry objects.

Sediment or Soil Surface Grabs, Surface Water Samples, and Groundwater Samples

Ordinarily each grab sample should be both a collection and a sample. Upper and lower collection and sample depths should be the same. The vertical reference point for sediment and soil surface grabs should be the sediment or soil surface, respectively. The vertical reference point for water samples may be either the water surface or the sediment surface. In some cases multiple deployments of a grab sampler may be required to collect enough material to create a collection and sample. In those cases the collection upper and lower depths should be representative of the entire set of gear deployments.

Sediment Box Corers

The material collected in a single box corer deployment should be considered to be a single collection if subsamples from within the box core will not be vertically sectioned. In that case the subsamples will represent multiple samples from the same collection. If subsamples (sub-cores) will be vertically sectioned, then each sub-core should be considered to be a collection, and each vertical horizon from a sub-core should be considered to be a separate sample.

Multi Corers

Each core collected with a multi-corer should be considered to be a separate collection, and each vertical horizon from any of the cores should be considered to be a separate sample.

Sediment Traps

For sediment traps that collect a single quantity of material during each deployment (e.g., the Aquatec[6] single-bottle trap), all of the material collected from each deployment should be considered to be both a collection and a sample, similar to a grab sample.

For sediment traps that simultaneously collect several amounts of material during a single deployment (e.g., the OceanInstruments ST-20 sediment trap), all of the material collected during a single deployment of the instrument should be considered to be a collection, and the material from each individual trap should be considered to be a separate sample.

For sediment traps that sequentially collect a series of samples (e.g., the Hydrobios multi sediment trap), each sequentially-collected sample should be considered to be both a collection and a sample.

The sediment trap gear should be specified as part of the collection method. The collection date for sediment traps should be the date at which the sampler is retrieved, and the collection period should be provided in the "composite_period" column and should represent the duration of the deployment.

[6] Use of trade names does not constitute an endorsement of any manufacturer or particular equipment.

The vertical reference point for sediment trap samples may be either the water surface or the sediment surface. Collection and sample depths are required.

Porewater

A porewater collection is considered to be all of the material collected using a single method from the time of gear deployment to retrieval. For most collection methods, including pushpoint samplers, peepers, and semipermeable membranes, each collection will correspond to a single sample. Polydimethylsiloxane-coated fiber (PDMS) samplers may be sectioned after retrieval, and in such cases the entire fiber should be considered to be the collection and sections considered to be individual samples. The porewater collection period should be provided in the "composite_period" column and should represent the duration of the deployment.

3.3 DETECTION LIMITS

PHIDB contains method detection limit (MDL), quantitation limit (QL), instrument detection limit (IDL), and reporting limit (RL) columns.

The RL may be the MDL, QL or IDL, all of which would be supplied by the analytical laboratory, or another value supplied by the data validator. If the RL does not match the MDL, QL or IDL then the data submitter needs to populate the data validator comments to identify that the value was identified based on the data validator's quality assurance/quality control review of the data.

4.0 EDD SPECIFICATIONS

The EDD Specifications consist of a Data Dictionary, Valid Values, and Metadata. Each of these elements is described below.

4.1 DATA DICTIONARY

The PHIDB data dictionary is a set of informational tables describing the contents, format, and structure of the database and the relationship between the elements of the database. The PHIDB data dictionary consists of up to 13 data tables, not all of which may be needed for every study. The tables are listed below, and Table 1 provides a brief description of each table.

- **field_event table** (Table 2)
- **location table** (Table 3)
- **well table** (Table 4)
- **sample table** (Table 5)
- **sample_composite table** (Table 6)
- **collection_measurement table** (Table 7)
- **sample_measurement table** (Table 8)
- **collection_observation table** (Table 9)
- **sample_observation table** (Table 10)
- **lab_result table** (Table 11)
- **tox_test_batch table** (Table 12)
- **tox_test_result table** (Table 13)
- **species_abundance table** (Table 14)

Descriptions of each EDD table (i.e., the data dictionary) are presented in the attached Tables 2 through 14. The EDD table descriptions specify the columns that are to be included in each table, the type of information that each column represents, the data type of each column, and constraints on each column. Constraints include: (a) whether or not a value is required in the column; (b) whether or not each column makes up the primary key of a table, where the primary key must be unique across all rows; and (c) whether or not a column must be filled with one of a set of valid values.

Ordinarily, only four tables need to be populated for an environmental chemistry study, which are: the **field_event table** (Table 2), **location table** (Table 3), **sample table** (Table 5), and **lab_result table** (Table 11). An Entity Relationship Diagram (ERD) of these four EDD tables is shown on Figure 2 EDD Tables—Entity Relationship Diagram. Other tables allow additional

information to be provided on field measurements, sample compositing, toxicity test data, and species abundance data.

4.2 VALID VALUES

Lists of valid values are included as Appendix A Valid Values. More detailed notes are provided for some entries to provide additional guidelines for populating the data columns. Data submitters are encouraged to translate related values when possible. For example, analyte names can be translated by matching Chemical Abstracts Service (CAS) numbers.

Please choose from the following two options if there is no corresponding or equivalent valid value.

1. Submitters may prepare new valid values in the same structure as Appendix A tables. Please provide new valid values tables prior to, or with, the data submittal. If that is the case, the submitter may propose a code and definition for the new valid value, ensuring that its meaning does not conflict or overlap with any established value.

2. Email the Data Coordinator for valid value suggestions and you will receive a response normally within one business day.

4.3 METADATA

A table of metadata should accompany each data submission. The metadata table should have two columns, titled "Metadata item" and "Description"; a template is provided in Table 15—Metadata items for each submission. The table should contain all of the following items:

- Submittal title: A name that uniquely identifies the data set that is being submitted. This may correspond to the name of a document such as a Work Plan or to an Administrative Settlement Agreement and Order on Consent (ASAOC) title. The submittal title should remain the same if subsequent versions of the data set are prepared and submitted.
- Submittal version: An integer that should be equal to 1 for the first submittal and that is incremented by 1 for each re-submittal of the same data set (if any).
- Data set date: The date and time, in ISO-8601 base or extended format, at which data were accessed or extracted for preparation of the EDD tables.
- Preparation date: The date and time, in ISO-8601 base or extended format, at which preparation of the EDD tables was completed. This must not be earlier than the data set date.
- Preparer: The name of the person who prepared the EDD tables, or to whom questions can be addressed.
- Preparer organization: The preparer's employer or other affiliation.

- Preparer email: The email address of the preparer.
- Preparer phone: A phone number for the preparer.
- Version revisions: Text describing changes to the data set or the EDD tables since the prior version of the same submittal, if any. This is required if the value of the *Submittal version* item is greater than 1.
- PHDP document: The title of a document on the Portland Harbor Environmental Data Portal that most accurately describes the scope or content of the submitted data set. This item is optional and need not be included if no relevant document exists.
- Comments: Any other description of the data set or the EDD that the submitter considers to be pertinent and valuable. This item is optional.

The metadata should be submitted in a digital form with the EDD tables in a table named "Metadata."

5.0 DATA SUBMITTAL AND REVIEW

EDD tables should be prepared using the table and column names exactly as given in Tables 2 through 14. Valid values to be used in the EDD tables are listed in Appendix A. Please check the portal before each data submittal for the current version of the valid values. First time submitters are encouraged to contact the PHIDB Data Manager prior to initiating data upload to review the submittal process; the Data Manager can be reached at the following address: data-submittal@phssidb.com.

EDD tables can be prepared and submitted in any of the following formats:

- Microsoft Access database file. A template Access file is available at the Portland Harbor Environmental Data Portal. However, Access is limited in its ability to represent PHIDB relationships. Please contact the PHIDB Data Manager if issues are encountered with the Access database template.
- Microsoft Excel workbook. Each worksheet should represent a single EDD table, and the worksheet name should match the corresponding EDD table name. The first row in each worksheet should contain column names, and all succeeding rows should contain data as specified in Tables 2 through 14. Comments and formatting should not be used to explicitly or implicitly convey any additional information.
- LibreOffice Calc workbook. This has the same requirements as an Excel workbook.
- CSV files. Each CSV file should represent a single EDD table, and the filename should match the corresponding EDD table name. The first row in each file should contain the column names, and all following rows should contain data as specified in Tables 2 through 14.

File names should all be prefixed with the date of submission, in YYYY-MM-DD format. If multiple versions are submitted on the same date, version indicators should be added (e.g., v1).

After each data set is submitted, it will be subjected to a series of checks to verify conformance with the EDD structure and other constraints. A list of the current set of initial QA checks[7] is provided in Appendix B Quality Assurance Checks. These checks will include, but not necessarily be limited to:

- Submission of a complete set of tables;
- Use of defined or proposed valid values;
- Valid primary keys for each table;

[7] QA checks may be expanded as warranted.

- All required data values are provided based on the "Required" column in Tables 2 through 14;
- Valid relationships between tables (e.g., all main sample identifiers that are referenced in the **lab_result table** [Table 11] are present in the **sample table** [Table 5]);
- Consistent identifiers within and between EDD tables (e.g., all sample identifiers contain consistent use of lower or upper case);
- Internal consistency checks (e.g., no collection has different depths on different lines of the **sample table** [Table 5]); and
- Conformance checks: requirements of the relevant ASAOC are met (e.g., with respect to sampling locations and analytes).

If these checks result in the identification of problems or ambiguities, a report of the issues will be provided to the submitter, and resubmittal of the data will be requested. Undefined valid values are the most frequent problem identified that requires a resubmittal.

After submitted data have passed these checks, the data will be loaded into a copy of PHIDB. Additional integrity and relational checks occur when the data are loaded into PHIDB that may identify issues beyond the QA checks. Once the data are loaded to a copy of PHIDB it is reviewed by EPA or its contractors. This phase of review will focus on technical content and compliance with any relevant order and approved SAP and QAPP documents. If deficiencies are found, the submitter will be asked to correct them by providing additional information or by correcting and re-submitting the data set. After completion of this technical review, the data will be loaded into the main PHIDB database and will be available for online users.

TABLES

Table 1. EDD Table Summary

Table name	Table No.	Purpose	Required
field_event	2	Describes the study (field event) that was carried out. This table should contain only a single row for each data submission.	Always
location	3	Describes target locations for sampling, including coordinates and event-specific location identifiers.	Always
well	4	Describes wells that are sampled for groundwater.	
sample	5	Describes the environmental samples collected in terms of both collections and main samples, as described in the text of the EDD specification document.	Always
sample_composite	6	Describes how individual environmental samples were composited.	As determined by SOW or work plan.
collection_measurement	7	Contains quantitative field measurements that were made on a collection or at the time that a collection was acquired.	Only when field measurements are made that are specific to a collection.
sample_measurement	8	Contains quantitative field measurements that were made on a sample--i.e., on a portion of a collection. If collections and samples are equivalent (e.g., for surface grab samples), then all field measurements should be recorded in Table 7 *collection_measurement* table.	Only when field measurements are made that are specific to a sample.
collection_observation	9	Contains categorical field observations that were made on a collection or at the time that a collection was acquired.	
sample_observation	10	Contains categorical field observations that were made on a sample. If collection and samples are equivalent, then all field observations should be recorded in Table 9 *collection_observation* table.	
lab_result	11	Contains analytical chemistry results for environmental samples. This includes both laboratory-reported results and calculated results such as sums. Results are reported only for environmental samples, including field splits (duplicates), but not any other field or laboratory quality control samples. Detail down to the level of laboratory replicate results should be included.	Only when analytical chemistry measurements have been made.
tox_test_batch	12	Describes the type(s) of toxicity tests run on environmental samples, and identifies each batch of tests that were conducted simultaneously.	Only when toxicity tests are conducted.
tox_test_result	13	Contains the results of toxicity tests on environmental samples.	Only when toxicity tests are conducted.
species_abundance	14	Contains measurements of species abundance (e.g., benthic infauna enumeration) made on each environmental sample.	Only when species abundance measurements have been made.

Table 2. The field_event table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
field_event	event_description	Description of the event, for example: Lower Burke Canyon Repository Predesign Investigation.	Text	255	Yes	No	Yes	
	field_activity	The type of activity to be conducted (e.g., remedial design sampling, confirmation sampling, post-closure monitoring).	Text	35	Yes	Yes	No	l_field_activity
	asaoc_id	Identifier for the ASAOC that this field event is conducted to support.	Text	50	Yes	No	No	
	event_status	Event completion status (e.g., pending, underway, completed).	Text	24	No	Yes	No	l_event_status
	spatial_extent	A polygon or multipolygon representation of the spatial extent of the event, in well-known text (WKT) format.	Text	Unlimited	No	No	No	
	sponsor	Name of the organization on whose behalf the field event is undertaken.	Text	200	No	No	No	
	sponsor_contact	Contact information for the field event sponsor.	Text	255	No	No	No	
	contractor	Full name of the company contracted by the sponsor to conduct or manage the sampling.	Text	200	Yes	No	No	
	qapp_approved	Indicates if the QAPP has been approved for the sampling effort.	Boolean	0	Yes	No	No	
	qapp_approving_org	Identifies the agency or other organization that approved the QAPP for the sampling effort.	Text	100	No	No	No	
	qapp_approved_other	Other information about approval of the QAPP.	Text	150	No	No	No	

Table 3. The location table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
location	event_location_id	Investigation-specific location identifier (Note 1). This is the target location identifier.	Text	50	Yes	No	**Yes**	
	location_description	Narrative description of the location.	Text	255	Yes	No	No	
	other_location_id	The universal PHIDB location identifier, if known (Note 1).	Text	50	No	No	No	
	target_latitude_dd	The target latitude for this sampling location, in decimal degrees.	Floating-point		Yes	No	Note 2	
	target_longitude_dd	The target longitude for this sampling location, in decimal degrees, with at least five decimal digits of precision.	Floating-point		Yes	No	Note 2	
	target_srid	The spatial reference ID for the coordinates. This should be 4326, representing WGS84.	Text	8	Yes	No	No	
	country_code	Country code. This should be "USA."	Text	75	No	Yes	No	l_country_code
	county_fips_code	County code.	Text	150	No	Yes	No	l_fips_code
	elev_datum	Datum used to determine the elevation measurement (e.g., NAVD88; NGVD29).	Text	50	Note 3	Yes	No	l_elev_datum
	elev_method	Method used to determine the elevation measurement (e.g., Altimetry, GPS, Interpolation, Survey).	Text	24	No	Yes	No	l_elev_method
	geo_method	Geopositioning method used to establish latitude and longitude coordinates (e.g., GPS, Interpolation, Survey).	Text	24	Yes	Yes	No	l_position_method
	huc_eight_digit_code	Eight digit USGS HUC code. equals Sub_Basin.	Text	20	No	No	No	
	location_zone	Location categorization (e.g., subtidal, intertidal, upland, facility).	Text	24	No	Yes	No	l_zone_type
	river_mile	River mile, to at least tenths of a mile.	Floating-point	0	No	No	No	
	river_bank	Code to specify whether the location is near a river bank or in the channel.	Text	24	No	Yes	No	l_riverbank
	state_code	State code—2 character state abbreviation.	Text	2	No	Yes	No	l_state
	stream_or_creek_name	Name of the water body represented by this location.	Text	200	No	No	No	
	surf_elev	The ground elevation of a geographic point where samples or field measurements are collected.	Floating-point	0	No	No	No	
	surf_units	Surface elevation units (e.g., feet, meters).	Text	20	Note 3	Yes	No	l_unit
	usgs_station_id	USGS location identifier.	Text	100	No	No	No	
	usgs_station_name	USGS location name.	Text	255	No	No	No	

Notes

1 Each investigation may assign a new identifier to a previously sampled location that has a different "universal" location identifier.

2 The combination of target latitude and longitude must be unique on every row.

3 Required if a value is provided for *surf_elev* .

Table 4. The well table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
well	well_id	Well identifier.	Text	50	Yes	No	Yes	
	event_location_id	Investigation-specific location identifier.	Text	50	Yes	No	No	location.event_location_id
	vertical_reference_point	The surface from which depths are measured (e.g., top of casing, well benchmark).	Text	24	Yes	Yes	No	l_vert_ref_pt
	well_hole_depth_measure	The maximum depth of the well.	Floating point		No	No	No	
	well_hole_depth_measure_unit	The units for the well depth and screen depth measurements.	Text	20	Yes	Yes	No	l_unit
	completion_date	The date on which the well was completed.	Date/time					
	screen_upper_depth	The upper depth of the screened interval, or the upper depth of the shallowest screened interval.	Floating point		No	No	No	
	screen_lower_depth	The lower depth of the screened interval, or the lower depth of the deepest screened interval.	Floating point		No	No	No	
	well_use	The primary usage of the well.	Text	24	No	Yes	No	l_well_use
	well_status	The current status of the well.	Text	24	No	Yes	No	l_well_status
	well_status_date	The date on which the well status became applicable.	Date/time		Note 1	No	No	

Table 5. The sample table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
sample	main_sample_id	Unique sample identifier for this interpretive sample.	Text	50	Yes	No	**Yes**	
	collection_id	Unique collection identifier for each core, grab, or group of related field samples.	Text	50	Note 1	No	No	
	event_location_id	Investigation-specific location identifier.	Text	50	Yes	No	No	location table
	sub_location	Narrative description of any systematic deviation or difference from the nominal location	Text	255	No	No	No	
	collection_date	Date and time of acquisition of the collection material, in ISO-8601 base or extended format. This is often the GPS time recorded. For temporal composites, use the collection time of the final sub-composite unless specified otherwise by the sampling plan.	DateTime	0	Yes	No	No	
	sample_date	Date and time of creation of the sample for a composite or single sample, in ISO-8601 base or extended format. The sample date may be the same as the collection date if the collection is not subdivided into multiple samples.	DateTime	0	Yes	No	No	
	event_element	Identifier for a subset of the sampling effort (e.g., Phase 1, Phase 2, background sampling, random grid sampling).	Text	50	No	No	No	
	collection_method	Sample collection method (e.g., grab, core, sediment trap, low purge, box corer, peeper, etc.).	Text	24	Yes	Yes	No	l_coll_method
	collection_design	Sample collection design or scheme (e.g., single-point grab, spatial composite, temporal composite, MIS).	Text	24	Yes	Yes	No	l_coll_design
	collection_depth_upper	Upper depth of the collection relative to the vertical reference point.	Floating-point	0	Note 2	No	No	
	collection_depth_lower	Lower depth of the collection relative to the vertical reference point.	Floating-point	0	Note 2	No	No	
	collection_depth_units	Units for the upper and lower collection depths.	Text	20	Note 2	No	No	l_unit
	vertical_reference_point	The surface from which elevations or depths are measured (e.g., water surface, sediment surface, soil surface, well benchmark).	Text	50	Yes	Yes	No	l_vert_ref_pt
	vert_ref_pt_elev	The elevation of the surface reference point in the specified elevation datum.	Floating-point		No	No	No	
	vert_ref_pt_elev_units	Units for the vertical reference point.	Text	10	Note 3	Yes	No	l_unit
	elev_datum	The vertical datum for the vertical reference point elevation measurement. This should be either NAVD88 or NGVD29.	Text	50	Note 3			
	composite_type	The compositing method used for the collection (e.g., single, spatial, depth, temporal).	Text	24	Yes	Yes	No	l_composite_type
	composite_count	The number of other collections that were composited to create this collection. For example, a triplicate multipoint has a value of 3. When individually identified samples are composited, those samples can be listed in the *sample_composite* table.	Integer	0	No	No	No	
	composite_period	The length of time over which a temporal composite was conducted.	Floating-point	0	No	No	No	
	composite_period_units	The units for the composite period, for temporal composites.	Text	20	Note 4	Yes	No	l_unit
	sample_lat_centroid_dd	The latitude of the sampling point or of the centroid of the sampling line or area, in decimal degrees.	Floating-point	0	Yes	Note 5	No	
	sample_lon_centroid_dd	The longitude of the sampling point or of the centroid of the sampling line or area, in decimal degrees.	Floating-point	0	Yes	Note 5	No	
	sample_srid	The spatial reference ID for the sample centroid coordinates and for the collection coordinates. This should be 4326, representing WGS84.	Text	8	Yes	Note 5	No	
	coll_coords	Coordinates for the collection in well-known-text (WKT) format. This may represent one or more points, lines, or areas. If a value is provided, the centroid must match the provided sample centroid values.	Text	Unlimited	No	Note 6	No	

Please refer to notes on last page of table.

Table 5. The sample table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
sample	geo_method	Geopositioning method used to establish coordinates for the collection.	Text	30	Yes	Yes	No	l_position_method
	horiz_accuracy_measure	Horizontal accuracy measurement—the radius of a circle around the measured point within which the true location occurs with a 95% probability.	Floating-point	0	No	No	No	
	horiz_accuracy_measure_units	Horizontal accuracy measurement units.	Text	20	Note 7	Yes	No	l_unit
	collection_material	The type of material collected.	Text	24	Note 8	Yes	No	l_sample_material
	sample_material	The type of material sampled—this may differ from the collection material if any fractionation of the material has been performed in the field.	Text	24	Yes	Yes	No	l_sample_material
	collection_part	The fraction of the collection represented by this sample (e.g., entire, vertical horizon, filtered fraction).	Text	24	Yes	Yes	No	l_subsample_type
	sample_depth_upper	Sample upper depth relative to the vertical reference point.	Floating-point	0	Note 9	No	No	
	sample_depth_lower	Sample lower depth relative to the vertical reference point.	Floating-point	0	Note 9	No	No	
	sample_depth_units	Sample depth units.	Text	20	Note 10	Yes	No	l_unit
	taxon	Taxon code for organisms.	Text	24	No	Yes	No	l_taxon
	field_prep_method	Sample preparation, fractionation, or treatment method carried out at the time of collection (e.g., filtering).	Text	24	No	Yes	No	l_prep_method
	sample_mass	The mass of this sample.	Floating-point	0	No	No	No	
	sample_mass_units	The units for the sample mass.	Text	20	Note 11	Yes	No	l_unit
	sample_mass_basis	"Wet" or "Dry" for sample masses.	Text	10	No	Yes	No	l_meas_basis
	sample_volume	The volume of this sample.	Floating-point	0	No	No	No	
	sample_volume_units	The units for the sample volume.	Text	20	Note 12	Yes	No	l_unit
	sample_color	The color of the sample upon collection.	Text	24	No	Yes	No	l_color
	sample_odor	The odor of the sample upon collection.	Text	24	No	Yes	No	l_odor
	sampling_reasons	Description of the purpose for collection of this sample.	Text	255	No	Yes	No	l_sample_reason—Note 13
	sampler_org	Name of organization that collected the sample.	Text	100	Yes	No	No	
	sampler_person	Name of the person who collected the sample.	Text	64	No	No	No	
	remarks	Comments on the sample.	Text	255	No	No	No	

Notes

1 The collection ID must be provided if it is different from the main sample ID. If it is not provided, it will be set identical to the main sample ID during import of the EDD.
2 Collection depths are required if the collection and the sample are not identical, and the material collected is sediment, surface water, soil, or groundwater. If the collection and the sample are identical, collection depths should be omitted or equal to the sample depths. If depths are required, both depths must be provided.
3 Required if *vert_ref_pt_elev* is provided.
4 Required if *composite_period* is provided.
5 Sample-specific actual coordinates are required. If there are multiple coordinates for a sample (as for a spatial composite), then those may be provided as WKT in the *coll_coords* column. However, the required centroid of the locations must be provided in the *sample_lat_centroid_dd* and s*ample_lon_centroid_dd* columns.
6 See https://www.ogc.org/standards/wkt-crs
7 Required if *horiz_accuracy_measure* is provided.
8 Required if the collection material is different than the sample material.
9 Required if the sample material is sediment, surface water, soil, or groundwater. Both depths must be provided.
10 Required if *sample_depth_upper* and *sample_depth_lower* are provided.
11 Required if *sample_mass* is provided.
12 Required if *sample_volume* is provided.
13 The entry must be a comma-separated list of valid values.

Table 6. The sample_composite table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
sample_composite	main_sample_id	Unique sample identifier for the interpretive sample that is a composite.	Text	50	Yes	No	**Yes**	sample table
	subcomposite_sample_id	Unique sample identifier for one of the interpretive samples that makes up the composite. A separate row should be added for each subcomposite sample.	Text	50	Yes	No	**Yes**	sample table
	subcomposite_mass	The mass of this subcomposite sample used in the composite.	Floating-point	0	No	No	No	
	subcomposite_mass_units	The units for the subcomposite mass.	Text	20	Note 1	Yes	No	l_unit
	subcomposite_volume	The volume of this subcomposite used in the composite.	Floating-point	0	No	No	No	
	subcomposite_volume_units	The units for the subcomposite volume.	Text	20	Note 2	Yes	No	l_unit

Notes

1 Required if *subcomposite_mass* is provided.

2 Required if *subcomposite_volume* is provided.

Table 7. The collection_measurement table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
Collection_Measurement	collection_id	Unique collection identifier for each core, grab, or group of related field samples.	Text	50	Yes	No	**Yes**	sample.collection_id Note 1
	collection_measurement	The type of measurement made (e.g., Salinity, pH, Water Temperature).	Text	24	Yes	Yes	**Yes**	l_measurement
	measurement_method	The method used to make the sample measurement.	Text	24	Yes	Yes	**Yes**	l_meas_method
	replicate	Replicate identifier to distinguish multiple measurements (e.g., “1”, “2”).	Text	10	Yes	No	**Yes**	
	measured_value	The numerical result of the measurement.	Floating-point	0	Yes	No	No	
	collection_measurement_units	Result unit of measurement.	Text	20	Yes	Yes	No	l_unit
	qa_level	Level of data quality review used.	Text	24	Yes	Yes	No	l_qa_level
	reportable	Flag to distinguish reportable and non-reportable results based on data quality review.	Boolean	0	Yes	No	No	
	collection_measurement_comments	Comments on the measured value.	Text	255	No	No	No	

Note

1 The sample table (Table 5) does not have a unique key on the *collection_id* column; however, the values used here must appear in that column.

Table 8. The sample_measurement table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
sample_measurement	main_sample_id	Unique sample identifier for this interpretive sample.	Text	50	Yes	No	**Yes**	d_sample
	sample_measurement	The type of measurement made (e.g., mass, volume, temperature).	Text	24	Yes	Yes	**Yes**	l_measurement
	measurement_method	The method used to make the sample measurement.	Text	24	Yes	Yes	**Yes**	l_meas_method
	replicate	Replicate identifier to distinguish multiple measurements (e.g., “1”, “2”).	Text	10	Yes	No	**Yes**	
	measured_value	The numerical result of the measurement.	Floating-point	0	Yes	No	No	
	sample_measurement_units	Result unit of measurement.	Text	20	Yes	Yes	No	l_unit
	qa_level	Level of data quality review used.	Text	24	Yes	Yes	No	l_qa_level
	reportable	Flag to distinguish reportable and non-reportable results based on data quality review.	Boolean	0	Yes	No	No	
	sample-measurement_comments	Comments on the measured value.	Text	255	No	No	No	

Table 9. The collection_observation table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
Collection_Observation	collection_id	Unique collection identifier for each core, grab, or group of related field samples.	Text	50	Yes	No	Yes	sample.collection_id
	observation_type	The class of observation made (e.g., Tide Stage) using the *observation_type* column.	Text	24	Yes	Yes	Yes	l_observation
	observation	The observation made; one of the categorical values using the observation class column of the observation lookup table. For example "Ebb" for tide stage.	Text	24	Yes	Yes	Yes	l_observation
	collection_observation_comments	Comments on the observation.	Text	255	No	No	No	

Table 10. The sample_observation table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
Sample_Observation	main_sample_id	Unique sample identifier for this interpretive sample.	Text	50	Yes	No	Yes	sample.main_sample_id
	observation_type	The class of observation made (e.g., Sediment Class) using the *observation_type* column.	Text	24	Yes	Yes	Yes	l_observation
	observation	The observation made; one of the categorical values using the observation class column of the observation lookup table. For example "Silty gravel" for Sediment Class.	Text	24	Yes	Yes	Yes	l_observation
	sample_observation_comments	Comments on the observation.	Text	255	No	No	No	

Table 11. The lab_result table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
lab_result	main_sample_id	Unique sample identifier for the interpretive sample.	Text	50	Yes	No	**Yes**	sample
	analytical_sample_id	Unique sample identifier for each analytical sample.	Text	50	Note 1	No	**Yes**; Note 1	
	lab_sdg	Laboratory Sample Delivery Group (batch) ID.	Text	50	Yes	Note 2	**Yes**	
	analysis	Lab analysis (e.g., metals, VOCs).	Text	24	Yes	Yes	**Yes**	l_lab_analysis
	analyte	Analyte/parameter name (e.g., lead, arsenic, etc.).	Text	24	Yes	Yes	**Yes**	l_analyte
	preparation_method	Lab preparation method (e.g., extraction method).	Text	24	Yes	Yes	**Yes**	l_prep_method
	analytical_method	Lab analytical method (e.g., 8270M).	Text	24	Yes	Yes	**Yes**	l_anal_method
	material_analyzed	Material analyzed.	Text	24	Yes	Yes	**Yes**	l_sample_material
	fraction_analyzed	Indicator of what fraction of the sample was analyzed (e.g., total, dissolved, leachate, sieved size interval).	Text	24	Yes	Yes	**Yes**	l_fractions
	lab_replicate	Laboratory replicate identifier.	Text	20	Yes	No	**Yes**; Note 3	
	calculated	Is this a calculated result rather than a value reported by the laboratory?	Boolean	0	Yes	No	No	
	calculation_method	Standardized description of the calculation method used.	Text	24	Note 4	Yes	No	l_calc_method
	result	Result (concentration or equivalent) reported by the lab. If the analyte was not detected, the chosen reporting limit should be used.	Floating-point	0	Yes	No	No	
	sig_figs	Significant digits of the result.	Integer	0	Yes	No	No	
	result_units	Result unit of measurement.	Text	20	Yes	Yes	No	l_unit
	basis	"Wet" for *wet_weight* basis reporting; "Dry" for *dry_weight* reporting.	Text	10	Yes	Yes	No	l_meas_basis
	lab_qualifiers	Qualifiers and flags assigned by the laboratory.	Text	16	No	Yes	No	

Please refer to notes on last page of table.

Table 11. The lab_result table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
lab_result	tic	Is this a tentatively identified compound (TIC)?	Boolean	0	Yes	No	No	
	validated	Has this result been validated?	Boolean	0	Yes	No	No	
	validation_level	Stage of validation: electronic and manual.	Text	24	Yes	Yes	No	l_validation_level
	result_qualifiers	Final validated result qualifiers/flags (e.g., J;U;ND;<;>).	Text	12	Note 5	Yes	No	
	undetected	Flag to distinguish detected and undetected results, based on lab or validation qualifiers.	Boolean	0	Yes	No	No	
	estimated	Flag to distinguish estimated and non-estimated results, based on lab or validation qualifiers.	Boolean	0	Yes	No	No	
	rejected	Flag to distinguish rejected and non-rejected results, based on lab or validation qualifiers.	Boolean	0	Yes	No	No	
	reportable	Flag to distinguish reportable and non-reportable results, based on validation or data quality review.	Boolean	0	Yes	No	No	
	validator	Validation company name.	Text	100	No	No	No	
	validator_comments	Comment on the validation assessment for this result.	Text	255	No	No	No	
	lab_result_comments	Comments on the results that do not pertain to either the validation results or data quality review results.	Text	255	No	No	No	
	qa_comments	QA comment resulting from any data quality review conducted in addition to data validation. The name(s) of the data quality reviewer(s) should be included.	Text	255	No	No	No	

Please refer to notes on last page of table.

Table 11. The lab_result table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
lab_result	date_received	Date and time that the analysis was received by the lab in ISO-8601 basic or extended format	DateTime	0	No	No	No	
	date_extracted	Date and timethat the sample was extracted by the lab in ISO-8601 basic or extended format	DateTime	0	No	No	No	
	date_analyzed	Date and time that the analysis was performed by the lab in ISO-8601 basic or extended format	DateTime	0	No	No	No	
	dilution_factor	Effective test dilution factor.	Floating-point	0	Yes	No	No	
	lab_name	Laboratory that performed the analysis	Text	24	Yes	Yes	No	l_lab
	lab_sample_id	Sample identifier assigned by the laboratory	Text	50	No	No	No	
	original_lab_result	Original result reported by the laboratory, if data validation resulted in restatement of the value.	Numeric	0	No	No	No	
	lab_cal_batch	The laboratory's calibration batch identifier.	Text	50	No	No	No	
	lab_qc_batch	The laboratory's quality control batch identifier.	Text	50	No	No	No	
	idl	Instrument Detection Limit (IDL) as determinded by the instrument.	Floating-point	0	No	No	No	
	idl_units	IDL units.	Text	20	Note 6	Yes	No	l_unit
	mdl	Sample-specific Method Detection Limit (MDL) as provided by the lab.	Floating-point	0	No	No	No	
	mdl_units	MDL units.	Text	20	Note 7	Yes	No	l_unit
	quantitation_limit	Quantitation limit as determined by the lab.	Floating-point	0	No	No	No	

Please refer to notes on last page of table.

Table 11. The lab_result table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
lab_result	quantitation_limit_units	Quantitation limit units.	Text	20	Note 8	Yes	No	l_unit
	reporting_limit	Reporting limit as determined by the lab or validator.	Floating-point	0	Note 9	No	No	
	reporting_limit_units	Reporting limit units.	Text	20	Note 10	Yes	No	l_unit
	value_type	WQX result value type (e.g., actual, estimated, calculated).	Text	24	No	Yes	No	l_result_value_type

Notes

1 The analytical sample ID must be provided if it is different from the main sample ID. If it is not provided, the analytical sample ID will be set identical to the main sample ID during import of the EDD.

2 If there are duplicate SDG IDs from different laboratories, prefix them with the laboratory name to eliminate these conflicts.

3 When samples are analyzed in duplicate, both results should be reported and distinguished by the laboratory replicate ID.

4 The *calculation_method* is required if the *calculated* value is set to True.

5 Final qualifiers should be reported if they have been assigned. This should include any laboratory qualifiers that are retained through the data validation process.

6 Required if *idl* is provided.

7 Required if *mdl* is provided.

8 Required if *quantitation_limit* is provided.

9 The reporting limit may be the MDL, QL or IDL or another value supplied by the data validator. If the RL does not match the MDL, QL or IDL then populate the data validator comments with an explanation of the value.

10 Required if *reporting_limit* is provided.

Table 12. The tox_test_batch table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
tox_test_batch	lab_name	Toxicity test laboratory.	Text	24	Yes	No	**Yes**	l_lab
	tox_test_batch	Laboratory-specific toxicity test batch identifier.	Text	50	Yes	No	**Yes**	
	tox_test_type	Type of toxicity test conducted (e.g., amphipod 10-day bioassay, echinoderm 72-hour bioassay).	Text	24	Yes	Yes	No	l_tox_test_type
	taxon	Taxon code for organism used for the toxicity test.	Text	24	Yes	Yes	No	l_taxon
	life_stage	Life stage of organisms used for the toxicity test.	Text	20	Yes	Yes	No	l_life_stage
	start_date	Starting date of the toxicity test, in ISO-8601 basic or extended format.	DateTime	0	No	No	No	
	end_date	Ending date of the toxicity test, in ISO-8601 basic or extended format.	DateTime	0	No	No	No	
	qa_level	Level of data quality review used.	Text	24	Yes	Yes	No	l_qa_level

Table 13. The tox_test_result table

Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
tox_test_result	main_sample_id	Unique sample identifier for an interpretive sample.	Text	50	Yes	No	Yes	sample
	lab_name	Toxicity test laboratory.	Text	50	Yes	No	Yes	l_lab
	tox_test_batch	Laboratory-specific toxicity test batch identifier.	Text	50	Yes	No	Yes	tox_test_batch
	tox_test_variable	The variable in which results of the test are expressed (e.g., survival, growth, reproduction).	Text	24	Yes	Yes	Yes	l_tox_test_var
	tox_test_measurement	The type of measurement made (e.g., count of survivors, percent normal, change in mass).	Text	24	Yes	Yes	Yes	l_tox_test_meas
	replicate	Replicate identifier.	Text	20	Yes	No	Yes	
	tox_test_result	The numeric result of the toxicity test.	Numeric	0	Yes	No	No	
	tox_test_units	The units for the toxicity test result.	Text	20	Yes	Yes	No	l_unit
	qa_level	Level of data quality review used.	Text	24	Yes	Yes	No	l_qa_level
	tox_test_result-comments	Comments on this toxicity test result.	Text	255	No	No	No	

Table 14. The species_abundance table

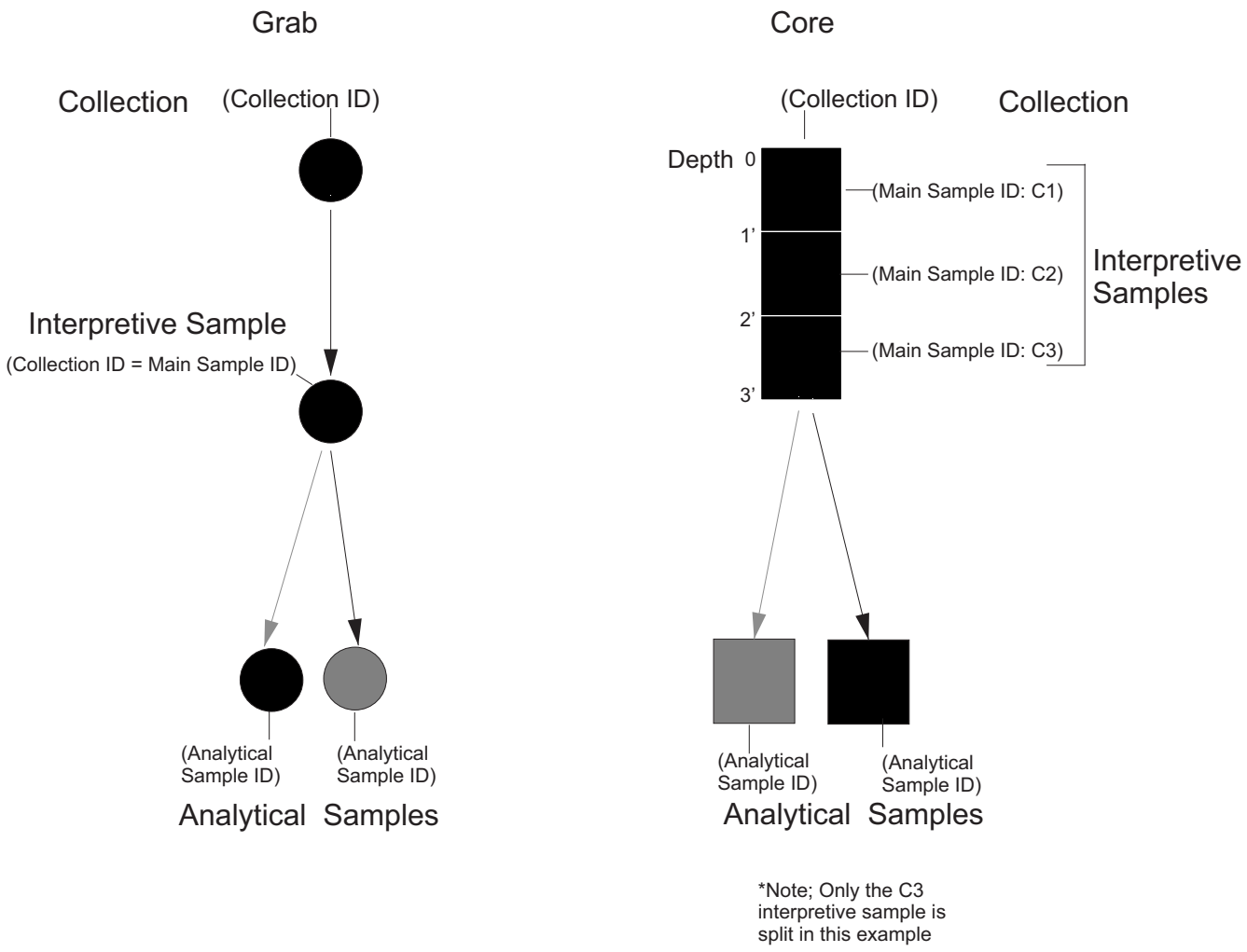
Table	Column	Description	Data Type	Size	Required	Valid Values	Primary Key	Foreign key to
species_abundance	main_sample_id	Unique sample identifier for an interpretive sample.	Text	50	Yes	No	Yes	sample
	taxon	Taxon code for the organism for which abundance was measured.	Text	24	Yes	Yes	Yes	l_taxon
	sex	Sex of organism.	Text	1	Yes	Yes	Yes	l_sex
	life_stage	Life stage of organism.	Text	24	Yes	Yes	Yes	l_life_stage
	abundance_measurement	Type of abundance measurement (e.g., count, concentration, density, spatial coverage).	Text	24	Yes	Yes	Yes	l_abund_meas
	replicate	Replicate identifier.	Text	20	Yes	No	Yes	
	abundance	Abundance measurement.	Floating-point	0	Yes	No	No	
	abundance_units	Abundance measurement units.	Text	20	Yes	Yes	No	l_unit
	lab_name	Laboratory that measured the abundance.	Text	24	No	Yes	No	l_lab
	species_abundance_comments	Comments on the species abundance measurement.	Text	255	No	No	No	

Table 15. Metadata items for each submission

Metadata item	Description
Submittal title	
Submittal version	
Data set date	
Preparation date	
Preparer	
Preparer organization	
Preparer email	
Preparer phone	
Version revisions	
PHDP document	

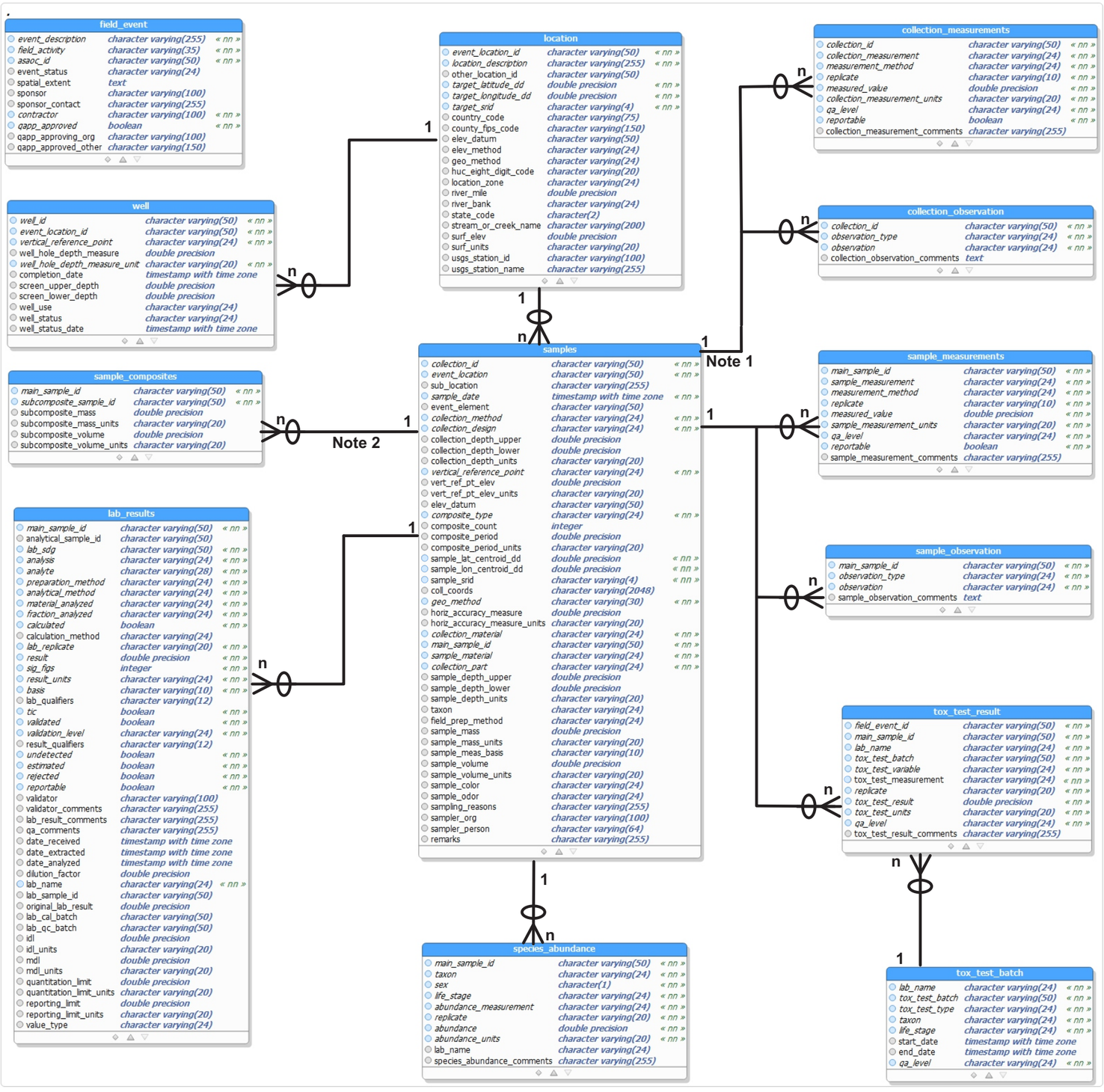
Comments

FIGURES



Common Structure for All Sampling Information

Figure **1**



Notes
1. The collection_id is not a primary key of the sample table, but the sample table must contain all collection_id values used in the collection_measurement or collection_observation tables.
2. Both main sample IDs and subcomposite sample IDs that appear in the sample_composite table must match main_sample_id values in the sample table.

EDD Tables - Entity Relationship Diagram

Figure **2**

APPENDIX A

Valid values provided in separate Excel file on Portland Harbor Environmental Data Portal

APPENDIX B

Quality Assurance Checks

QA ID	Message	EDD Table	Severity[1]	Comments
1	Missing (null) elevation datum (elev_datum) values when the surface elevation is specified.	location	Fatal	
2	Missing (null) elev_datum or vert_ref_point values when the vertical reference point elevation is specified.	location	Fatal	
3	Missing (null) location identifiers.	location	Fatal	
4	Missing (null) location description values.	location	Fatal	
5	Missing (null) main_sample_id values.	sample	Fatal	
6	Missing (null) event_location values.	sample	Fatal	
7	Missing (null) collection_date values.	sample	Fatal	
8	Missing (null) sample_date values.	sample	Fatal	
9	Missing (null) collection_method values.	sample	Fatal	
10	Missing (null) collection_design values.	sample	Fatal	
11	Missing (null) vertical_reference_point values.	sample	Fatal	
12	Missing (null) sample_material values.	sample	Fatal	
13	Missing (null) lab_sdg identifiers.	lab_result	Fatal	
14	Missing (null) preparation_method values.	lab_result	Fatal	
15	Missing (null) analytical_method values.	lab_result	Fatal	
16	Missing (null) material_analyzed values.	lab_result	Fatal	
17	Missing (null) result (e.g., concentration) values.	lab_result	Fatal	
18	Missing (null) result_units values.	lab_result	Fatal	
19	Missing (null) basis values.	lab_result	Fatal	
20	Missing (null) tic values.	lab_result	Fatal	
21	Missing (null) validated (flag) values.	lab_result	Fatal	
22	Missing (null) validation_level values.	lab_result	Fatal	
23	Missing (null) undetected flags.	lab_result	Fatal	
24	Missing (null) estimated flags.	lab_result	Fatal	
25	Missing (null) rejected flags.	lab_result	Fatal	
26	Missing (null) reportable flags.	lab_result	Fatal	
27	Missing (null) lab_name identifiers.	lab_result	Fatal	
28	Different location identifiers with the same target coordinates. A single identifier should be used or may be created during data loading to ensure uniqueness.	location	Warning	A single location identifier is expected to be assigned to each unique pair of coordinates. Exceptions indicate a potential error or a special circumstance.
29	Collections with multiple (different) upper and lower depths or units for collections that may not be cores or borings.	sample	Fatal	Multiple samples with different upper and lower depths are expected for cores and borings but may be an issue for other types of samples.
30	Collections with multiple (different) collection dates.	sample	Fatal	If a collection is a temporal composite, the latest date should be used.
31	Collections with multiple (different) location identifiers.	sample	Fatal	If a collection is a spatial composite, the centroid or other representative location should be used.
32	Collection depths are missing (null) for a sediment, groundwater, or surface water sample.	sample	Fatal	
33	Missing (null) horiz_accuracy_measure_units where horiz_accuracy_measure is provided.	sample	Fatal	

QA ID	Message	EDD Table	Severity[1]	Comments
34	Missing (null) sample_depth_upper or sample_depth_lower for surface water, groundwater, or sediment (not including sediment traps).	sample	Fatal	
35	Missing (null) sample depths units where sample depths are provided.	sample	Fatal	
36	Missing (null) sample_mass_units where sample_mass is provided.	sample	Fatal	
37	Missing (null) sample_volume_units where sample_volume is provided.	sample	Fatal	
38	The same SDG identifier is used for different laboratories.	lab_result	Fatal	
39	Missing (null) calculation_method for calculated results.	lab_result	Fatal	
40	Missing (null) idl_units where an IDL value is provided.	lab_result	Fatal	
41	Missing (null) mdl_units where an MDL value is provided.	lab_result	Fatal	
42	Missing (null) quantitation_limit_units where a quantitation limit is provided.	lab_result	Fatal	
43	Missing (null) reporting_limit_units where a reporting limit is provided.	lab_result	Fatal	
44	Unrecognized geo_method (positioning method) value in location table.	location	Fatal	
45	Unrecognized river bank value.	location	Fatal	
46	Unrecognized country_code value.	location	Fatal	
47	Unrecognized elev datum value.	location	Fatal	
48	Unrecognized surf_units value.	location	Fatal	
49	Unrecognized elev_method value.	location	Fatal	
50	Unrecognized location_zone value.	location	Fatal	
51	Unrecognized composite_type value.	sample	Fatal	
52	Unrecognized collection_method value.	sample	Fatal	
53	Unrecognized elev_datum value.	sample	Fatal	
54	Unrecognized collection_depth_units value.	sample	Fatal	
55	Unrecognized taxon value.	sample	Fatal	
56	Unrecognized horiz_accuracy_measure_units value.	sample	Fatal	
57	Unrecognized collection_design value.	sample	Fatal	
58	Unrecognized collection_material value.	sample	Fatal	
59	Unrecognized composite_period_units value.	sample	Fatal	
60	Unrecognized vertical_reference_point value.	sample	Fatal	
61	Unrecognized geo_method (positioning method) value in samples table.	sample	Fatal	
62	Unrecognized sample_volume_units value.	sample	Fatal	
63	Unrecognized sample_mass_units value.	sample	Fatal	
64	Unrecognized sample_odor value.	sample	Fatal	
65	Unrecognized sample_depth_units value.	sample	Fatal	
66	Unrecognized field_prep_method value.	sample	Fatal	
67	Unrecognized sample_color value.	sample	Fatal	
68	Unrecognized sampling_reason value.	sample	Fatal	
69	Unrecognized sample_mass_basis value.	sample	Fatal	
70	Unrecognized idl_units value.	lab_result	Fatal	
71	Unrecognized validator value.	lab_result	Fatal	
72	Unrecognized result_units value.	lab_result	Fatal	
73	Unrecognized basis value.	lab_result	Fatal	
74	Unrecognized lab_name value.	lab_result	Fatal	

QA ID	Message	EDD Table	Severity[1]	Comments
75	Unrecognized analytical_method value.	lab_result	Fatal	
76	Unrecognized analysis value.	lab_result	Fatal	
77	Unrecognized material_analyzed value.	lab_result	Fatal	
78	Unrecognized quantitation_limit_units value.	lab_result	Fatal	
79	Unrecognized validation_level value.	lab_result	Fatal	
80	Unrecognized analyte value.	lab_result	Fatal	
81	Unrecognized mdl_units value.	lab_result	Fatal	
82	Unrecognized reporting_limit_units value.	lab_result	Fatal	
83	Unrecognized preparation_method value.	lab_result	Fatal	
84	Unrecognized value_type value.	lab_result	Fatal	
85	Unrecognized fraction_analyzed alue.	lab_result	Fatal	
86	Unrecognized calculation_method value.	lab_result	Fatal	
87	There are multiple collection_id values for a group of samples that appear to be a single collection (e.g., core).	sample	Warning	This check can only identify possible issues; those need to be evaluated individually.
88	Invalid (non-numeric) result value(s).	lab_result	Fatal	

Notes

1. Fatal errors must be corrected before the data can be loaded. Warnings indicate a potential issue that requires attention by the PHIDB Data Manager and Submitter.

Attachment B – Detected Analytes in Portland Harbor RI/FS Data for Remedial Design Media of Interest

Table 1
Sediment Analyte List

CAS Number	Analyte
GS_COLLOID	< 0.001 mm
GS_<0.075	< 0.075 mm
GS_>0.075	> 0.075 mm
GS_CLAY200	>= 0.001 to <0.005 mm
GS_FCLAY	>10 Phi clay
GS_MFCLAY	>9 Phi clay
630-20-6	1,1,1,2-Tetrachloroethane
71-55-6	1,1,1-Trichloroethane
79-34-5	1,1,2,2-Tetrachloroethane
79-00-5	1,1,2-Trichloroethane
75-34-3	1,1-Dichloroethane
75-35-4	1,1-Dichloroethene
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
96-18-4	1,2,3-Trichloropropane
120-82-1	1,2,4-Trichlorobenzene
95-63-6	1,2,4-Trimethylbenzene
95-50-1	1,2-Dichlorobenzene
107-06-2	1,2-Dichloroethane
78-87-5	1,2-Dichloropropane
108-67-8	1,3,5-Trimethylbenzene
541-73-1	1,3-Dichlorobenzene
106-46-7	1,4-Dichlorobenzene
110-57-6	1,4-Dichloro-trans-2-butene
2245-38-7	1,6,7-Trimethylnaphthalene
99-87-6	1-Methyl-4-isopropylbenzene
90-12-0	1-Methylnaphthalene
832-69-9	1-Methylphenanthrene
4901-51-3	2,3,4,5-Tetrachlorophenol
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran
25167-83-3_3	2,3,4,6;2,3,5,6-Tetrachlorophenol coelution
58-90-2	2,3,4,6-Tetrachlorophenol
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
935-95-5	2,3,5,6-Tetrachlorophenol
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin
93-76-5	2,4,5-T
95-95-4	2,4,5-Trichlorophenol
88-06-2	2,4,6-Trichlorophenol
94-75-7	2,4-D
94-82-6	2,4-DB
53-19-0	2,4'-DDD
3424-82-6	2,4'-DDE
789-02-6	2,4'-DDT
120-83-2	2,4-Dichlorophenol
105-67-9	2,4-Dimethylphenol
51-28-5	2,4-Dinitrophenol
121-14-2	2,4-Dinitrotoluene
581-42-0	2,6-Dimethylnaphthalene
91-58-7	2-Chloronaphthalene
95-57-8	2-Chlorophenol
91-57-6	2-Methylnaphthalene
95-48-7	2-Methylphenol
C_3+4MPHN	3- and 4-Methylphenol Coelution
91-94-1	3,3'-Dichlorobenzidine
99-09-2	3-Nitroaniline
72-54-8	4,4'-DDD
72-55-9	4,4'-DDE
50-29-3	4,4'-DDT
59-50-7	4-Chloro-3-methylphenol
106-47-8	4-Chloroaniline
106-44-5	4-Methylphenol
100-01-6	4-Nitroaniline
100-02-7	4-Nitrophenol
GS_CCLAY	8-9 Phi clay
GS_MCLAY	9-10 Phi clay
83-32-9	Acenaphthene
208-96-8	Acenaphthylene

Table 1
Sediment Analyte List

CAS Number	Analyte
67-64-1	Acetone
AVS	Acid Volatile Sulfides
107-02-8	Acrolein
309-00-2	Aldrin
959-98-8	alpha-Endosulfan
319-84-6	alpha-Hexachlorocyclohexane
7429-90-5	Aluminum
7664-41-7	Ammonia
12172-73-5	Amosite
62-53-3	Aniline
120-12-7	Anthracene
7440-36-0	Antimony
12674-11-2	Aroclor 1016
11104-28-2	Aroclor 1221
11141-16-5	Aroclor 1232
53469-21-9	Aroclor 1242
12672-29-6	Aroclor 1248
11097-69-1	Aroclor 1254
11096-82-5	Aroclor 1260
37324-23-5	Aroclor 1262
11100-14-4	Aroclor 1268
12767-79-2	Aroclors
7440-38-2	Arsenic
17428-41-0	Arsenic pentavalent
22541-54-4	Arsenic trivalent
1332-21-4	Asbestos
103-33-3	Azobenzene
7440-39-3	Barium
71-43-2	Benzene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
BKBFLANTH	Benzo(b+k)fluoranthene
192-97-2	Benzo(e)pyrene
191-24-2	Benzo(g,h,i)perylene
BKJFLANTH	Benzo(j+k)fluoranthene
207-08-9	Benzo(k)fluoranthene
56832-73-6	Benzofluoranthenes
65-85-0	Benzoic acid
100-51-6	Benzyl alcohol
7440-41-7	Beryllium
13966-02-4	Beryllium-7
33213-65-9	beta-Endosulfan
319-85-7	beta-Hexachlorocyclohexane
108-60-1	Bis(2-chloro-1-methylethyl) ether
111-91-1	Bis(2-chloroethoxy) methane
111-44-4	Bis(2-chloroethyl) ether
39638-32-9	Bis(2-chloroisopropyl) ether
117-81-7	Bis(2-ethylhexyl) phthalate
BTEX	BTEX
BULKDENSITY	Bulk density
85-68-7	Butylbenzyl phthalate
78763-54-9	Butyltin ion
C10-C12-ALIP	C10-C12 Aliphatics
C10-C12-AROM	C10-C12 Aromatics
C12-C16-ALIP	C12-C16 Aliphatics
C12-C16-AROM	C12-C16 Aromatics
C16-C21-ALIP	C16-C21 Aliphatics
C16-C21-AROM	C16-C21 Aromatics
C1_218-01-9	C1-Chrysene
C1_132-65-0	C1-Dibenzothiophene
C1_FLRANPYRN	C1-Fluoranthene/pyrene
C1_86-73-7	C1-Fluorene
C1_91-20-3	C1-Naphthalene
C1-Naphthalene (calc'd)	C1-Naphthalene (calc'd)
C1_PHANANTH	C1-Phenanthrene/anthracene
C21-C34-ALIP	C21-C34 Aliphatics
C21-C34-AROM	C21-C34 Aromatics
C2_218-01-9	C2-Chrysene
C2_132-65-0	C2-Dibenzothiophene
C2_FLRANPYRN	C2-Fluoranthene/pyrene
C2_86-73-7	C2-Fluorene
C2_91-20-3	C2-Naphthalene
C2_PHANANTH	C2-Phenanthrene/anthracene
C3_218-01-9	C3-Chrysene
C3_132-65-0	C3-Dibenzothiophene
C3_FLRANPYRN	C3-Fluoranthene/pyrene

Table 1
Sediment Analyte List

CAS Number	Analyte
C3_86-73-7	C3-Fluorene
C3_91-20-3	C3-Naphthalene
C3_PHANANTH	C3-Phenanthrene/anthracene
C4_218-01-9	C4-Chrysene
C4_132-65-0	C4-Dibenzothiophene
C4_91-20-3	C4-Naphthalene
C4_PHANANTH	C4-Phenanthrene/anthracene
C8-C10-ALIP	C8-C10 Aliphatics
C8-C10-AROM	C8-C10 Aromatics
7440-43-9	Cadmium
7440-70-2	Calcium
86-74-8	Carbazole
75-15-0	Carbon disulfide
10045-97-3	Cesium-137
57-74-9	Chlordane (cis & trans)
16887-00-6	Chloride
108-90-7	Chlorobenzene
124-48-1	Chlorodibromomethane
75-00-3	Chloroethane
67-66-3	Chloroform
74-87-3	Chloromethane
2921-88-2	Chlorpyrifos
7440-47-3	Chromium
18540-29-9	Chromium hexavalent
218-01-9	Chrysene
12001-29-5	Chrysotile
156-59-2	cis-1,2-Dichloroethene
5103-71-9	cis-Chlordane
5103-73-1	cis-Nonachlor
GS_CLAY	Clay
GS_CS	Coarse sand
GS_CSILT	Coarse silt
7440-48-4	Cobalt
7440-50-8	Copper
57-12-5	Cyanide
75-99-0	Dalapon
319-86-8	delta-Hexachlorocyclohexane
53-70-3	Dibenzo(a,h)anthracene
132-64-9	Dibenzofuran
132-65-0	Dibenzothiophene
84-74-2	Dibutyl phthalate
683-18-1	Dibutyltin dichloride
14488-53-0	Dibutyltin ion
1918-00-9	Dicamba
25512-42-9	Dichlorobiphenyl homologs
75-71-8	Dichlorodifluoromethane
120-36-5	Dichloroprop
60-57-1	Dieldrin
DRH	Diesel Range Hydrocarbons
DRH (SGT)	Diesel Range Hydrocarbons (silica gel treated)
84-66-2	Diethyl phthalate
131-11-3	Dimethyl phthalate
117-84-0	Di-n-octyl phthalate
Dioxin TEQ - Birds	Dioxin TEQ - Birds
Dioxin TEQ - Fish	Dioxin TEQ - Fish
Dioxin TEQ - Mammals	Dioxin TEQ - Mammals
TEQ_DIOXIN.0	Dioxin/furan TCDD toxicity equivalent (ND = 0)
TEQ_PCB.0	Dioxin-like PCB congener TCDD toxicity equivalent (ND = 0)
92-52-4	Diphenyl
1031-07-8	Endosulfan sulfate
72-20-8	Endrin
7421-93-4	Endrin aldehyde
53494-70-5	Endrin ketone
100-41-4	Ethylbenzene
GS_FG	Fine gravel
GS_FS	Fine sand
GS_FSILT	Fine silt
GS_FINES	Fines
206-44-0	Fluoranthene
86-73-7	Fluorene
68476-30-2	Fuel oil no. 2
58-89-9	gamma-Hexachlorocyclohexane
GRH	Gasoline Range Hydrocarbons
GS_GRANULE	Granule
GS_GRAVEL	Gravel
GWC	Gravimetric water content
HORH	Heavy Oil Range Hydrocarbons

Table 1
Sediment Analyte List

CAS Number	Analyte
76-44-8	Heptachlor
1024-57-3	Heptachlor epoxide
28655-71-2	Heptachlorobiphenyl homologs
38998-75-3	Heptachlorodibenzofuran homologs
37871-00-4	Heptachlorodibenzo-p-dioxin homologs
118-74-1	Hexachlorobenzene
26601-64-9	Hexachlorobiphenyl homologs
87-68-3	Hexachlorobutadiene
55684-94-1	Hexachlorodibenzofuran homologs
34465-46-8	Hexachlorodibenzo-p-dioxin homologs
67-72-1	Hexachloroethane
HPAH	High Molecular Weight PAH
193-39-5	Indeno(1,2,3-cd)pyrene
7439-89-6	Iron
78-59-1	Isophorone
98-82-8	Isopropylbenzene
7439-92-1	Lead
14255-04-0	Lead-210
LIQUID-LIM	Liquid Limit
LPAH	Low Molecular Weight PAH
68782-97-8	Lube Oil
15831-10-4	m,p-Cresol
179601-23-1	m,p-Xylene
7439-95-4	Magnesium
7439-96-5	Manganese
94-74-6	MCPA
93-65-2	MCPP
GS_MEAN	Mean grain size
GS_MEDIAN	Median grain size
GS_MG	Medium gravel
GS_MS	Medium sand
GS_MSILT	Medium silt
GS_MFG	Medium-fine gravel
7439-97-6	Mercury
72-43-5	Methoxychlor
79-20-9	Methyl acetate
74-88-4	Methyl iodide
108-10-1	Methyl isobutyl ketone
591-78-6	Methyl n-butyl ketone
1634-04-4	Methyl tert-butyl ether
108-87-2	Methylcyclohexane
74-95-3	Methylene bromide
75-09-2	Methylene chloride
78-93-3	Methylethyl ketone
22967-92-6	Methylmercury
2385-85-5	Mirex
MOISTURE	Moisture
1118-46-3	Monobutyltin trichloride
27323-18-8	Monochlorobiphenyl homologs
M09800000	Motor oil
91-20-3	Naphthalene
104-51-8	n-Butylbenzene
7440-02-0	Nickel
14797-55-8	Nitrate
62-75-9	N-Nitrosodimethylamine
86-30-6	N-Nitrosodiphenylamine
621-64-7	N-Nitrosodipropylamine
53742-07-7	Nonachlorobiphenyl homologs
103-65-1	n-Propylbenzene
55722-26-4	Octachlorobiphenyl homologs
39001-02-0	Octachlorodibenzofuran
3268-87-9	Octachlorodibenzo-p-dioxin
ORP	Oxidation-Reduction Potential
27304-13-8	Oxychlordane
95-47-6	o-Xylene
PBDE028	PBDE028
PBDE047	PBDE047
PBDE099	PBDE099
PBDE100	PBDE100
PBDE153	PBDE153
PBDE154	PBDE154
PBDE183	PBDE183
1163-19-5	PBDE209
PCB TEQ - Birds	PCB TEQ - Birds
PCB TEQ - Fish	PCB TEQ - Fish
PCB TEQ - Mammals	PCB TEQ - Mammals
2051-60-7	PCB001

Table 1
Sediment Analyte List

CAS Number	Analyte
2051-61-8	PCB002
2051-62-9	PCB003
13029-08-8	PCB004
PCB004_010	PCB004 & 010
16605-91-7	PCB005
PCB005_008	PCB005 & 008
25569-80-6	PCB006
33284-50-3	PCB007
PCB007_009	PCB007 & 009
34883-43-7	PCB008
34883-39-1	PCB009
33146-45-1	PCB010
2050-67-1	PCB011
2974-92-7	PCB012
PCB012_013	PCB012 & 013
2974-90-5	PCB013
34883-41-5	PCB014
2050-68-2	PCB015
38444-78-9	PCB016
PCB016_032	PCB016 & 032
37680-66-3	PCB017
37680-65-2	PCB018
PCB018_030	PCB018 & 030
38444-73-4	PCB019
38444-84-7	PCB020
PCB020_021_033	PCB020 & 021 & 033
PCB020_028	PCB020 & 028
55702-46-0	PCB021
PCB021_033	PCB021 & 033
38444-85-8	PCB022
55720-44-0	PCB023
55702-45-9	PCB024
PCB024_027	PCB024 & 027
55712-37-3	PCB025
38444-81-4	PCB026
PCB026_029	PCB026 & 029
38444-76-7	PCB027
7012-37-5	PCB028
15862-07-4	PCB029
35693-92-6	PCB030
16606-02-3	PCB031
38444-77-8	PCB032
38444-86-9	PCB033
37680-68-5	PCB034
37680-69-6	PCB035
38444-87-0	PCB036
38444-90-5	PCB037
53555-66-1	PCB038
38444-88-1	PCB039
38444-93-8	PCB040
PCB040_041_071	PCB040 & 041 & 071
52663-59-9	PCB041
PCB041_064_071_	PCB041 & 064 & 071 & 072
36559-22-5	PCB042
PCB042_059	PCB042 & 059
70362-46-8	PCB043
PCB043_049	PCB043 & 049
PCB043_073	PCB043 & 073
41464-39-5	PCB044
PCB044_047_065	PCB044 & 047 & 065
70362-45-7	PCB045
PCB045_051	PCB045 & 051
41464-47-5	PCB046
2437-79-8	PCB047
70362-47-9	PCB048
PCB048_075	PCB048 & 075
41464-40-8	PCB049
PCB049_069	PCB049 & 069
62796-65-0	PCB050
PCB050_053	PCB050 & 053
68194-04-7	PCB051
35693-99-3	PCB052
PCB052_069	PCB052 & 069
41464-41-9	PCB053
15968-05-5	PCB054
74338-24-2	PCB055
41464-43-1	PCB056

Table 1
Sediment Analyte List

CAS Number	Analyte
PCB056_060	PCB056 & 060
70424-67-8	PCB057
41464-49-7	PCB058
PCB059_062_075	PCB059 & 062 & 075
33025-41-1	PCB060
33284-53-6	PCB061
PCB061_070	PCB061 & 070
PCB061_070_074_	PCB061 & 070 & 074 & 076
54230-22-7	PCB062
74472-34-7	PCB063
52663-58-8	PCB064
33284-54-7	PCB065
32598-10-0	PCB066
PCB066_076	PCB066 & 076
73575-53-8	PCB067
73575-52-7	PCB068
60233-24-1	PCB069
32598-11-1	PCB070
41464-46-4	PCB071
41464-42-0	PCB072
74338-23-1	PCB073
32690-93-0	PCB074
70362-48-0	PCB076
32598-13-3	PCB077
70362-49-1	PCB078
41464-48-6	PCB079
33284-52-5	PCB080
70362-50-4	PCB081
52663-62-4	PCB082
60145-20-2	PCB083
PCB083_099	PCB083 & 099
52663-60-2	PCB084
PCB084_092	PCB084 & 092
65510-45-4	PCB085
PCB085_116	PCB085 & 116
PCB085_116_117	PCB085 & 116 & 117
55312-69-1	PCB086
PCB086_087_097_	PCB086 & 087 & 097 & 108 & 119 & 125
PCB086_087_109_	PCB086 & 087 & 097 & 109 & 119 & 125
38380-02-8	PCB087
PCB087_117_125	PCB087 & 117 & 125
55215-17-3	PCB088
PCB088_091	PCB088 & 091
73575-57-2	PCB089
68194-07-0	PCB090
PCB090_101	PCB090 & 101
PCB090_101_113	PCB090 & 101 & 113
68194-05-8	PCB091
52663-61-3	PCB092
73575-56-1	PCB093
PCB093_095_098_	PCB093 & 095 & 098 & 100 & 102
PCB093_100	PCB093 & 100
73575-55-0	PCB094
38379-99-6	PCB095
PCB095_098_102	PCB095 & 098 & 102
73575-54-9	PCB096
41464-51-1	PCB097
60233-25-2	PCB098
PCB098_102	PCB098 & 102
38380-01-7	PCB099
39485-83-1	PCB100
37680-73-2	PCB101
68194-06-9	PCB102
60145-21-3	PCB103
56558-16-8	PCB104
32598-14-4	PCB105
70424-69-0	PCB106
PCB106_118	PCB106 & 118
70424-68-9	PCB107
PCB107_109	PCB107 & 109
PCB107_124	PCB107 & 124
PCB108_112	PCB108 & 112
PCB108_124	PCB108 & 124
74472-35-8	PCB109
38380-03-9	PCB110
PCB110_115	PCB110 & 115
39635-32-0	PCB111

Table 1
Sediment Analyte List

CAS Number	Analyte
PCB111_115	PCB111 & 115
74472-36-9	PCB112
68194-10-5	PCB113
74472-37-0	PCB114
74472-38-1	PCB115
18259-05-7	PCB116
68194-11-6	PCB117
31508-00-6	PCB118
56558-17-9	PCB119
68194-12-7	PCB120
56558-18-0	PCB121
76842-07-4	PCB122
65510-44-3	PCB123
70424-70-3	PCB124
74472-39-2	PCB125
57465-28-8	PCB126
39635-33-1	PCB127
38380-07-3	PCB128
PCB128_162	PCB128 & 162
PCB128_166	PCB128 & 166
55215-18-4	PCB129
PCB129_138_160_	PCB129 & 138 & 160 & 163
PCB129_138_163	PCB129 & 138 & 163
52663-66-8	PCB130
61798-70-7	PCB131
38380-05-1	PCB132
PCB132_161	PCB132 & 161
35694-04-3	PCB133
PCB133_142	PCB133 & 142
52704-70-8	PCB134
PCB134_143	PCB134 & 143
52744-13-5	PCB135
PCB135_151	PCB135 & 151
PCB135_151_154	PCB135 & 151 & 154
38411-22-2	PCB136
35694-06-5	PCB137
35065-28-2	PCB138
PCB138_163_164	PCB138 & 163 & 164
56030-56-9	PCB139
PCB139_140	PCB139 & 140
PCB139_149	PCB139 & 149
59291-64-4	PCB140
52712-04-6	PCB141
41411-61-4	PCB142
68194-15-0	PCB143
68194-14-9	PCB144
74472-40-5	PCB145
51908-16-8	PCB146
PCB146_165	PCB146 & 165
68194-13-8	PCB147
PCB147_149	PCB147 & 149
74472-41-6	PCB148
38380-04-0	PCB149
68194-08-1	PCB150
52663-63-5	PCB151
68194-09-2	PCB152
35065-27-1	PCB153
PCB153_168	PCB153 & 168
60145-22-4	PCB154
33979-03-2	PCB155
38380-08-4	PCB156
PCB156_157	PCB156 & 157
69782-90-7	PCB157
74472-42-7	PCB158
PCB158_160	PCB158 & 160
39635-35-3	PCB159
41411-62-5	PCB160
39635-34-2	PCB162
74472-44-9	PCB163
74472-45-0	PCB164
74472-46-1	PCB165
41411-63-6	PCB166
52663-72-6	PCB167
59291-65-5	PCB168
32774-16-6	PCB169
35065-30-6	PCB170
52663-71-5	PCB171

Table 1
Sediment Analyte List

CAS Number	Analyte
PCB171_173	PCB171 & 173
52663-74-8	PCB172
68194-16-1	PCB173
38411-25-5	PCB174
40186-70-7	PCB175
52663-65-7	PCB176
52663-70-4	PCB177
52663-67-9	PCB178
52663-64-6	PCB179
35065-29-3	PCB180
PCB180_193	PCB180 & 193
74472-47-2	PCB181
60145-23-5	PCB182
PCB182_187	PCB182 & 187
52663-69-1	PCB183
PCB183_185	PCB183 & 185
74472-48-3	PCB184
52712-05-7	PCB185
74472-49-4	PCB186
52663-68-0	PCB187
74487-85-7	PCB188
39635-31-9	PCB189
41411-64-7	PCB190
74472-50-7	PCB191
74472-51-8	PCB192
69782-91-8	PCB193
35694-08-7	PCB194
52663-78-2	PCB195
42740-50-1	PCB196
PCB196_203	PCB196 & 203
33091-17-7	PCB197
PCB197_200	PCB197 & 200
68194-17-2	PCB198
PCB198_199	PCB198 & 199
52663-75-9	PCB199
52663-73-7	PCB200
40186-71-8	PCB201
2136-99-4	PCB202
52663-76-0	PCB203
74472-52-9	PCB204
74472-53-0	PCB205
40186-72-9	PCB206
52663-79-3	PCB207
52663-77-1	PCB208
2051-24-3	PCB209
92062-34-5	Pencil pitch
25429-29-2	Pentachlorobiphenyl homologs
30402-15-4	Pentachlorodibenzofuran homologs
36088-22-9	Pentachlorodibenzo-p-dioxin homologs
87-86-5	Pentachlorophenol
Percent moisture (calc'd)	Percent moisture (calc'd)
14797-73-0	Perchlorate
198-55-0	Perylene
12408-02-5	pH
85-01-8	Phenanthrene
108-95-2	Phenol
7723-14-0	Phosphorus
638-36-8	Phytane
PLSTIC-LIM	Plastic Limit
PLSTIC-IDX	Plasticity Index
7440-09-7	Potassium
1921-70-6	Pristane
129-00-0	Pyrene
13982-63-3	Radium-226
RRH	Residual Range Hydrocarbons
RRH (SGT)	Residual Range Hydrocarbons (silica gel treated)
483-65-8	Retene
GS_SAND	Sand
135-98-8	Sec-butylbenzene
7782-49-2	Selenium
GS_SIEVE010	Sieve 10
GS_SIEVE100	Sieve 100
GS_SIEVE140	Sieve 140
GS_SIEVE020	Sieve 20
GS_SIEVE200	Sieve 200
GS_SILT200	Sieve 200 silt
GS_SIEVE230	Sieve 230

Table 1
Sediment Analyte List

CAS Number	Analyte
GS_SIEVE3/4	Sieve 3/4 inch
GS_SIEVE3/8	Sieve 3/8 inch
GS_SIEVE030	Sieve 30
GS_SIEVE004	Sieve 4
GS_SIEVE040	Sieve 40
GS_SIEVE060	Sieve 60
GS_SILT	Silt
7440-22-4	Silver
93-72-1	Silvex
7440-23-5	Sodium
SPEC_GRAV	Specific Gravity
100-42-5	Styrene
14808-79-8	Sulfate
18496-25-8	Sulfide
Sum DDD (calc'd)	Sum DDD (calc'd)
Sum DDE (calc'd)	Sum DDE (calc'd)
Sum DDT (calc'd)	Sum DDT (calc'd)
SumPAH_ESB34	Sum of 34 PAHs (ESB calc'd)
98-06-6	tert-Butylbenzene
1461-25-2	Tetrabutyltin
26914-33-0	Tetrachlorobiphenyl homologs
30402-14-3	Tetrachlorodibenzofuran homologs
41903-57-5	Tetrachlorodibenzo-p-dioxin homologs
127-18-4	Tetrachloroethene
7440-28-0	Thallium
7440-31-5	Tin
7440-32-6	Titanium
108-88-3	Toluene
Total % Fines (calc'd)	Total % Fines (calc'd)
Total Aroclors (direct contact, industrial beach sediment)	Total Aroclors (direct contact, industrial beach sediment)
Total Aroclors (direct contact, in-water sediment)	Total Aroclors (direct contact, in-water sediment)
Total Aroclors (direct contact, recreational/transient beach sediment)	Total Aroclors (direct contact, recreational/transient beach sediment)
BAPEQ	Total BaPEq
Total Benzofluoranthenes (calc'd)	Total Benzofluoranthenes (calc'd)
Total Chlordane (calc'd)	Total Chlordane (calc'd)
TOTCHLDANE	Total Chlordanes
Total Chlordanes (direct contact, in-water sediment)	Total Chlordanes (direct contact, in-water sediment)
Total Chlordanes (direct contact, recreational/transient beach sediment)	Total Chlordanes (direct contact, recreational/transient beach sediment)
Total cPAH PEQ (direct contact, industrial beach sediment)	Total cPAH PEQ (direct contact, industrial beach sediment)
Total cPAH PEQ (direct contact, in-water sediment)	Total cPAH PEQ (direct contact, in-water sediment)
Total cPAH PEQ (direct contact, recreational/transient beach sediment)	Total cPAH PEQ (direct contact, recreational/transient beach sediment)
CPAH	Total cPAHs
Total cPAHs (calc'd)	Total cPAHs (calc'd)
Total DDD (direct contact, industrial beach sediment)	Total DDD (direct contact, industrial beach sediment)
Total DDD (direct contact, in-water sediment)	Total DDD (direct contact, in-water sediment)
Total DDD (direct contact, recreational/transient beach sediment)	Total DDD (direct contact, recreational/transient beach sediment)
Total DDE (direct contact, in-water sediment)	Total DDE (direct contact, in-water sediment)
Total DDE (direct contact, recreational/transient beach sediment)	Total DDE (direct contact, recreational/transient beach sediment)
Total DDT (direct contact, industrial beach sediment)	Total DDT (direct contact, industrial beach sediment)
Total DDT (direct contact, in-water sediment)	Total DDT (direct contact, in-water sediment)
Total DDT (direct contact, recreational/transient beach sediment)	Total DDT (direct contact, recreational/transient beach sediment)
Total DDTs (calc'd)	Total DDTs (calc'd)
Total Diesel-Residual Hydrocarbons (calc'd)	Total Diesel-Residual Hydrocarbons (calc'd)
Total Dioxin/Furan TEQ (direct contact, industrial beach sediment)	Total Dioxin/Furan TEQ (direct contact, industrial beach sediment)
Total Dioxin/Furan TEQ (direct contact, in-water sediment)	Total Dioxin/Furan TEQ (direct contact, in-water sediment)
Total Dioxin/Furan TEQ (direct contact, recreational/transient beach sediment)	Total Dioxin/Furan TEQ (direct contact, recreational/transient beach sediment)
TOTENDOSLFN	Total Endosulfan
Total Endosulfan (calc'd)	Total Endosulfan (calc'd)
Total Endosulfan (direct contact, in-water sediment)	Total Endosulfan (direct contact, in-water sediment)
Total HPAHs (calc'd)	Total HPAHs (calc'd)
Total LPAHs (calc'd)	Total LPAHs (calc'd)
E17075011	Total of 2,4' and 4,4'-DDD
E966176	Total of 2,4' and 4,4'-DDD, -DDE, -DDT
E17075029	Total of 2,4' and 4,4'-DDE
E17075037	Total of 2,4' and 4,4'-DDT
PP_DDT3ISO	Total of 4,4'-DDD, -DDE, -DDT
TOC	Total organic carbon
130498-29-2	Total PAHs
Total PAHs (calc'd)	Total PAHs (calc'd)
1336-36-3	Total PCB Congeners
Total PCB Congeners (calc'd)	Total PCB Congeners (calc'd)
Total PCB Congeners (direct contact, in-water sediment)	Total PCB Congeners (direct contact, in-water sediment)
Total PCB TEQ (direct contact, industrial beach sediment)	Total PCB TEQ (direct contact, industrial beach sediment)
Total PCB TEQ (direct contact, in-water sediment)	Total PCB TEQ (direct contact, in-water sediment)
TOTPCBS	Total PCBs
Total PCBs (calc'd)	Total PCBs (calc'd)
Total PCBs Aroclors (calc'd)	Total PCBs Aroclors (calc'd)

Table 1
Sediment Analyte List

CAS Number	Analyte
TOTPCDD_F	Total PCDD/F
TPH	Total Petroleum Hydrocarbons
Total Petroleum Hydrocarbons (calc'd)	Total Petroleum Hydrocarbons (calc'd)
TPH (SGT)	Total Petroleum Hydrocarbons (silica gel treated)
TSO	Total solids
TEQ_TOTAL.0	Total TCDD toxicity equivalent (ND = 0)
Total TEQ - Birds	Total TEQ - Birds
Total TEQ - Fish	Total TEQ - Fish
Total TEQ - Mammals	Total TEQ - Mammals
Total Toxic Dioxin Furans (calc'd)	Total Toxic Dioxin Furans (calc'd)
TVS	Total volatile solids
Total Xylenes (calc'd)	Total Xylenes (calc'd)
Total Xylenes (direct contact, in-water sediment)	Total Xylenes (direct contact, in-water sediment)
8001-35-2	Toxaphene
156-60-5	trans-1,2-Dichloroethene
5103-74-2	trans-Chlordane
39765-80-5	trans-Nonachlor
688-73-3	Tributyltin
1461-22-9	Tributyltin chloride
36643-28-4	Tributyltin ion
25323-68-6	Trichlorobiphenyl homologs
79-01-6	Trichloroethene
7440-62-2	Vanadium
GS_VCS	Very coarse sand
GS_VFS	Very fine sand
GS_VFSILT	Very fine silt
75-01-4	Vinyl chloride
1330-20-7	Xylene
7440-66-6	Zinc

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
GS_<0.075	< 0.075 mm
GS_MFCLAY	>9 Phi clay
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
120-82-1	1,2,4-Trichlorobenzene
106-46-7	1,4-Dichlorobenzene
2245-38-7	1,6,7-Trimethylnaphthalene
90-12-0	1-Methylnaphthalene
832-69-9	1-Methylphenanthrene
4901-51-3	2,3,4,5-Tetrachlorophenol
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
935-95-5	2,3,5,6-Tetrachlorophenol
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin
94-75-7	2,4-D
94-82-6	2,4-DB
53-19-0	2,4'-DDD
3424-82-6	2,4'-DDE
789-02-6	2,4'-DDT
581-42-0	2,6-Dimethylnaphthalene
91-57-6	2-Methylnaphthalene
95-48-7	2-Methylphenol
72-54-8	4,4'-DDD
72-55-9	4,4'-DDE
50-29-3	4,4'-DDT
106-44-5	4-Methylphenol
GS_CCLAY	8-9 Phi clay
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
67-64-1	Acetone
309-00-2	Aldrin
959-98-8	alpha-Endosulfan
7429-90-5	Aluminum
62-53-3	Aniline
120-12-7	Anthracene

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
7440-36-0	Antimony
11104-28-2	Aroclor 1221
53469-21-9	Aroclor 1242
12672-29-6	Aroclor 1248
11097-69-1	Aroclor 1254
11096-82-5	Aroclor 1260
12767-79-2	Aroclors
7440-38-2	Arsenic
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
BKBFLANTH	Benzo(b+k)fluoranthene
192-97-2	Benzo(e)pyrene
191-24-2	Benzo(g,h,i)perylene
207-08-9	Benzo(k)fluoranthene
65-85-0	Benzoic acid
100-51-6	Benzyl alcohol
33213-65-9	beta-Endosulfan
319-85-7	beta-Hexachlorocyclohexane
117-81-7	Bis(2-ethylhexyl) phthalate
BTEX	BTEX
85-68-7	Butylbenzyl phthalate
78763-54-9	Butyltin ion
C1_218-01-9	C1-Chrysene
C1_132-65-0	C1-Dibenzothiophene
C1_FLRANPYRN	C1-Fluoranthene/pyrene
C1_86-73-7	C1-Fluorene
C1_PHANANTH	C1-Phenanthrene/anthracene
C2_218-01-9	C2-Chrysene
C2_132-65-0	C2-Dibenzothiophene
C2_FLRANPYRN	C2-Fluoranthene/pyrene
C2_86-73-7	C2-Fluorene
C2_91-20-3	C2-Naphthalene
C2_PHANANTH	C2-Phenanthrene/anthracene
C3_218-01-9	C3-Chrysene
C3_132-65-0	C3-Dibenzothiophene
C3_FLRANPYRN	C3-Fluoranthene/pyrene
C3_86-73-7	C3-Fluorene
C3_91-20-3	C3-Naphthalene
C3_PHANANTH	C3-Phenanthrene/anthracene
C4_218-01-9	C4-Chrysene
C4_91-20-3	C4-Naphthalene
C4_PHANANTH	C4-Phenanthrene/anthracene
7440-43-9	Cadmium
86-74-8	Carbazole

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
108-90-7	Chlorobenzene
7440-47-3	Chromium
18540-29-9	Chromium hexavalent
218-01-9	Chrysene
5103-71-9	cis-Chlordane
5103-73-1	cis-Nonachlor
GS_CLAY	Clay
GS_CS	Coarse sand
GS_CSILT	Coarse silt
7440-50-8	Copper
319-86-8	delta-Hexachlorocyclohexane
53-70-3	Dibenzo(a,h)anthracene
132-64-9	Dibenzofuran
132-65-0	Dibenzothiophene
84-74-2	Dibutyl phthalate
14488-53-0	Dibutyltin ion
25512-42-9	Dichlorobiphenyl homologs
60-57-1	Dieldrin
DRH	Diesel Range Hydrocarbons
DRH (SGT)	Diesel Range Hydrocarbons (silica gel treated)
84-66-2	Diethyl phthalate
131-11-3	Dimethyl phthalate
117-84-0	Di-n-octyl phthalate
TEQ_DIOXIN.0	Dioxin/furan TCDD toxicity equivalent (ND = 0)
TEQ_PCB.0	Dioxin-like PCB congener TCDD toxicity equivalent (ND = 0)
92-52-4	Diphenyl
1031-07-8	Endosulfan sulfate
72-20-8	Endrin
7421-93-4	Endrin aldehyde
100-41-4	Ethylbenzene
GS_FG	Fine gravel
GS_FS	Fine sand
GS_FSILT	Fine silt
GS_FINES	Fines
206-44-0	Fluoranthene
86-73-7	Fluorene
58-89-9	gamma-Hexachlorocyclohexane
GRH	Gasoline Range Hydrocarbons
76-44-8	Heptachlor
1024-57-3	Heptachlor epoxide
28655-71-2	Heptachlorobiphenyl homologs
38998-75-3	Heptachlorodibenzofuran homologs
37871-00-4	Heptachlorodibenzo-p-dioxin homologs
118-74-1	Hexachlorobenzene
26601-64-9	Hexachlorobiphenyl homologs

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
87-68-3	Hexachlorobutadiene
55684-94-1	Hexachlorodibenzofuran homologs
34465-46-8	Hexachlorodibenzo-p-dioxin homologs
67-72-1	Hexachloroethane
HPAH	High Molecular Weight PAH
193-39-5	Indeno(1,2,3-cd)pyrene
78-59-1	Isophorone
7439-92-1	Lead
LPAH	Low Molecular Weight PAH
179601-23-1	m,p-Xylene
GS_MG	Medium gravel
GS_MS	Medium sand
GS_MSILT	Medium silt
7439-97-6	Mercury
72-43-5	Methoxychlor
74-88-4	Methyl iodide
78-93-3	Methylethyl ketone
2385-85-5	Mirex
27323-18-8	Monochlorobiphenyl homologs
91-20-3	Naphthalene
7440-02-0	Nickel
53742-07-7	Nonachlorobiphenyl homologs
55722-26-4	Octachlorobiphenyl homologs
39001-02-0	Octachlorodibenzofuran
3268-87-9	Octachlorodibenzo-p-dioxin
27304-13-8	Oxychlordane
2051-60-7	PCB001
2051-61-8	PCB002
2051-62-9	PCB003
13029-08-8	PCB004
PCB004_010	PCB004 & 010
PCB005_008	PCB005 & 008
25569-80-6	PCB006
33284-50-3	PCB007
PCB007_009	PCB007 & 009
34883-43-7	PCB008
33146-45-1	PCB010
2050-67-1	PCB011
PCB012_013	PCB012 & 013
2050-68-2	PCB015
38444-78-9	PCB016
PCB016_032	PCB016 & 032
37680-66-3	PCB017
37680-65-2	PCB018
PCB018_030	PCB018 & 030

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
38444-73-4	PCB019
PCB020_021_033	PCB020 & 021 & 033
PCB020_028	PCB020 & 028
38444-85-8	PCB022
55720-44-0	PCB023
PCB024_027	PCB024 & 027
55712-37-3	PCB025
38444-81-4	PCB026
PCB026_029	PCB026 & 029
38444-76-7	PCB027
7012-37-5	PCB028
15862-07-4	PCB029
35693-92-6	PCB030
16606-02-3	PCB031
38444-77-8	PCB032
37680-68-5	PCB034
37680-69-6	PCB035
38444-90-5	PCB037
53555-66-1	PCB038
38444-93-8	PCB040
PCB040_041_071	PCB040 & 041 & 071
PCB041_064_071_	PCB041 & 064 & 071 & 072
36559-22-5	PCB042
PCB042_059	PCB042 & 059
PCB043_049	PCB043 & 049
PCB043_073	PCB043 & 073
41464-39-5	PCB044
PCB044_047_065	PCB044 & 047 & 065
70362-45-7	PCB045
PCB045_051	PCB045 & 051
41464-47-5	PCB046
2437-79-8	PCB047
70362-47-9	PCB048
PCB048_075	PCB048 & 075
PCB049_069	PCB049 & 069
62796-65-0	PCB050
PCB050_053	PCB050 & 053
68194-04-7	PCB051
35693-99-3	PCB052
PCB052_069	PCB052 & 069
41464-41-9	PCB053
15968-05-5	PCB054
74338-24-2	PCB055
41464-43-1	PCB056
PCB056_060	PCB056 & 060

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
70424-67-8	PCB057
41464-49-7	PCB058
PCB059_062_075	PCB059 & 062 & 075
33025-41-1	PCB060
PCB061_070	PCB061 & 070
PCB061_070_074_	PCB061 & 070 & 074 & 076
74472-34-7	PCB063
52663-58-8	PCB064
32598-10-0	PCB066
PCB066_076	PCB066 & 076
73575-53-8	PCB067
73575-52-7	PCB068
41464-42-0	PCB072
74338-23-1	PCB073
32690-93-0	PCB074
32598-13-3	PCB077
70362-49-1	PCB078
41464-48-6	PCB079
70362-50-4	PCB081
52663-62-4	PCB082
PCB083_099	PCB083 & 099
52663-60-2	PCB084
PCB084_092	PCB084 & 092
PCB085_116	PCB085 & 116
55312-69-1	PCB086
PCB086_087_109_	PCB086 & 087 & 097 & 109 & 119 & 125
PCB087_117_125	PCB087 & 117 & 125
PCB088_091	PCB088 & 091
73575-57-2	PCB089
PCB090_101	PCB090 & 101
PCB090_101_113	PCB090 & 101 & 113
52663-61-3	PCB092
73575-56-1	PCB093
PCB093_100	PCB093 & 100
73575-55-0	PCB094
38379-99-6	PCB095
PCB095_098_102	PCB095 & 098 & 102
73575-54-9	PCB096
41464-51-1	PCB097
PCB098_102	PCB098 & 102
38380-01-7	PCB099
39485-83-1	PCB100
60145-21-3	PCB103
56558-16-8	PCB104
32598-14-4	PCB105

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
PCB106_118	PCB106 & 118
70424-68-9	PCB107
PCB107_109	PCB107 & 109
PCB108_112	PCB108 & 112
PCB108_124	PCB108 & 124
38380-03-9	PCB110
PCB110_115	PCB110 & 115
39635-32-0	PCB111
PCB111_115	PCB111 & 115
68194-10-5	PCB113
74472-37-0	PCB114
68194-11-6	PCB117
31508-00-6	PCB118
56558-17-9	PCB119
68194-12-7	PCB120
56558-18-0	PCB121
76842-07-4	PCB122
65510-44-3	PCB123
70424-70-3	PCB124
57465-28-8	PCB126
PCB128_162	PCB128 & 162
PCB128_166	PCB128 & 166
55215-18-4	PCB129
PCB129_138_163	PCB129 & 138 & 163
52663-66-8	PCB130
61798-70-7	PCB131
38380-05-1	PCB132
PCB132_161	PCB132 & 161
35694-04-3	PCB133
PCB133_142	PCB133 & 142
52704-70-8	PCB134
PCB134_143	PCB134 & 143
52744-13-5	PCB135
PCB135_151	PCB135 & 151
38411-22-2	PCB136
35694-06-5	PCB137
PCB138_163_164	PCB138 & 163 & 164
PCB139_140	PCB139 & 140
PCB139_149	PCB139 & 149
59291-64-4	PCB140
52712-04-6	PCB141
68194-14-9	PCB144
74472-40-5	PCB145
51908-16-8	PCB146
PCB146_165	PCB146 & 165

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
68194-13-8	PCB147
PCB147_149	PCB147 & 149
74472-41-6	PCB148
68194-08-1	PCB150
52663-63-5	PCB151
68194-09-2	PCB152
35065-27-1	PCB153
PCB153_168	PCB153 & 168
60145-22-4	PCB154
33979-03-2	PCB155
38380-08-4	PCB156
PCB156_157	PCB156 & 157
69782-90-7	PCB157
74472-42-7	PCB158
PCB158_160	PCB158 & 160
39635-35-3	PCB159
39635-34-2	PCB162
74472-45-0	PCB164
74472-46-1	PCB165
41411-63-6	PCB166
52663-72-6	PCB167
59291-65-5	PCB168
32774-16-6	PCB169
35065-30-6	PCB170
52663-71-5	PCB171
PCB171_173	PCB171 & 173
52663-74-8	PCB172
68194-16-1	PCB173
38411-25-5	PCB174
40186-70-7	PCB175
52663-65-7	PCB176
52663-70-4	PCB177
52663-67-9	PCB178
52663-64-6	PCB179
35065-29-3	PCB180
PCB180_193	PCB180 & 193
74472-47-2	PCB181
60145-23-5	PCB182
PCB182_187	PCB182 & 187
52663-69-1	PCB183
74472-48-3	PCB184
52712-05-7	PCB185
52663-68-0	PCB187
74487-85-7	PCB188
39635-31-9	PCB189

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
41411-64-7	PCB190
74472-50-7	PCB191
74472-51-8	PCB192
69782-91-8	PCB193
35694-08-7	PCB194
52663-78-2	PCB195
42740-50-1	PCB196
PCB196_203	PCB196 & 203
33091-17-7	PCB197
68194-17-2	PCB198
PCB198_199	PCB198 & 199
52663-75-9	PCB199
52663-73-7	PCB200
40186-71-8	PCB201
2136-99-4	PCB202
52663-76-0	PCB203
74472-52-9	PCB204
74472-53-0	PCB205
40186-72-9	PCB206
52663-79-3	PCB207
52663-77-1	PCB208
2051-24-3	PCB209
25429-29-2	Pentachlorobiphenyl homologs
30402-15-4	Pentachlorodibenzofuran homologs
36088-22-9	Pentachlorodibenzo-p-dioxin homologs
87-86-5	Pentachlorophenol
198-55-0	Perylene
85-01-8	Phenanthrene
108-95-2	Phenol
129-00-0	Pyrene
RRH	Residual Range Hydrocarbons
RRH (SGT)	Residual Range Hydrocarbons (silica gel treated)
7782-49-2	Selenium
GS_SIEVE140	Sieve 140
GS_SIEVE020	Sieve 20
GS_SIEVE200	Sieve 200
GS_SIEVE040	Sieve 40
GS_SIEVE060	Sieve 60
GS_SILT	Silt
7440-22-4	Silver
93-72-1	Silvex
SPEC_GRAV	Specific Gravity
18496-25-8	Sulfide
26914-33-0	Tetrachlorobiphenyl homologs
30402-14-3	Tetrachlorodibenzofuran homologs

Table 2
Sediment Trap Analyte List

CAS Number	Analyte
41903-57-5	Tetrachlorodibenzo-p-dioxin homologs
108-88-3	Toluene
BAPEQ	Total BaPEq
TOTCHLDANE	Total Chlordanes
CPAH	Total cPAHs
TOTENDOSLFN	Total Endosulfan
E17075011	Total of 2,4' and 4,4'-DDD
E966176	Total of 2,4' and 4,4'-DDD, -DDE, -DDT
E17075029	Total of 2,4' and 4,4'-DDE
E17075037	Total of 2,4' and 4,4'-DDT
PP_DDT3ISO	Total of 4,4'-DDD, -DDE, -DDT
TOC	Total organic carbon
130498-29-2	Total PAHs
1336-36-3	Total PCB Congeners
TOTPCBS	Total PCBs
TOTPCDD_F	Total PCDD/F
TPH	Total Petroleum Hydrocarbons
TPH (SGT)	Total Petroleum Hydrocarbons (silica gel treated)
TSO	Total solids
TEQ_TOTAL.0	Total TCDD toxicity equivalent (ND = 0)
5103-74-2	trans-Chlordane
39765-80-5	trans-Nonachlor
36643-28-4	Tributyltin ion
25323-68-6	Trichlorobiphenyl homologs
GS_VCS	Very coarse sand
GS_VFS	Very fine sand
GS_VFSILT	Very fine silt
1330-20-7	Xylene
7440-66-6	Zinc

Table 3
Riverbank Soil Analyte List

CAS Number	Analyte
108-67-8	1,3,5-Trimethylbenzene
7440-36-0	Antimony
12672-29-6	Aroclor 1248
11097-69-1	Aroclor 1254
11096-82-5	Aroclor 1260
12767-79-2	Aroclors
7440-38-2	Arsenic
7440-39-3	Barium
7440-41-7	Beryllium
BTEX	BTEX
7440-43-9	Cadmium
7440-47-3	Chromium
7440-48-4	Cobalt
7440-50-8	Copper
57-12-5	Cyanide
DRH	Diesel Range Hydrocarbons
HORH	Heavy Oil Range Hydrocarbons
7439-89-6	Iron
7439-92-1	Lead
7439-96-5	Manganese
7439-97-6	Mercury
M09800000	Motor oil
7440-02-0	Nickel
7782-49-2	Selenium
7440-22-4	Silver
7440-32-6	Titanium
TOTPCBS	Total PCBs
TPH	Total Petroleum Hydrocarbons
TSO	Total solids
688-73-3	Tributyltin
7440-62-2	Vanadium
1330-20-7	Xylene
7440-66-6	Zinc

Table 4
Transition Zone Water Analyte List

CAS Number	Analyte
71-55-6	1,1,1-Trichloroethane
79-34-5	1,1,2,2-Tetrachloroethane
79-00-5	1,1,2-Trichloroethane
75-34-3	1,1-Dichloroethane
75-35-4	1,1-Dichloroethene
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
96-18-4	1,2,3-Trichloropropane
120-82-1	1,2,4-Trichlorobenzene
95-63-6	1,2,4-Trimethylbenzene
95-50-1	1,2-Dichlorobenzene
107-06-2	1,2-Dichloroethane
78-87-5	1,2-Dichloropropane
108-67-8	1,3,5-Trimethylbenzene
541-73-1	1,3-Dichlorobenzene
106-46-7	1,4-Dichlorobenzene
99-87-6	1-Methyl-4-isopropylbenzene
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
94-75-7	2,4-D
53-19-0	2,4'-DDD
789-02-6	2,4'-DDT
105-67-9	2,4-Dimethylphenol
91-57-6	2-Methylnaphthalene
95-48-7	2-Methylphenol
72-54-8	4,4'-DDD
72-55-9	4,4'-DDE
50-29-3	4,4'-DDT
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
67-64-1	Acetone
107-02-8	Acrolein
ALK	Alkalinity
7429-90-5	Aluminum
120-12-7	Anthracene
7440-36-0	Antimony
7440-38-2	Arsenic
7440-39-3	Barium
71-43-2	Benzene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene

Table 4
Transition Zone Water Analyte List

CAS Number	Analyte
191-24-2	Benzo(g,h,i)perylene
207-08-9	Benzo(k)fluoranthene
7440-41-7	Beryllium
117-81-7	Bis(2-ethylhexyl) phthalate
74-97-5	Bromochloromethane
75-27-4	Bromodichloromethane
BTEX	BTEX
7440-43-9	Cadmium
7440-70-2	Calcium
471-34-1	Calcium carbonate
86-74-8	Carbazole
124-38-9	Carbon dioxide
75-15-0	Carbon disulfide
16887-00-6	Chloride
108-90-7	Chlorobenzene
75-00-3	Chloroethane
67-66-3	Chloroform
74-87-3	Chloromethane
7440-47-3	Chromium
218-01-9	Chrysene
156-59-2	cis-1,2-Dichloroethene
7440-48-4	Cobalt
E1640291	Conductivity
7440-50-8	Copper
57-12-5	Cyanide
57-12-5A	Cyanide amenable to chlorination
75-99-0	Dalapon
53-70-3	Dibenzo(a,h)anthracene
132-64-9	Dibenzofuran
84-74-2	Dibutyl phthalate
120-36-5	Dichloroprop
DRH	Diesel Range Hydrocarbons
131-11-3	Dimethyl phthalate
Dioxin TEQ - Birds	Dioxin TEQ - Birds
Dioxin TEQ - Fish	Dioxin TEQ - Fish
Dioxin TEQ - Mammals	Dioxin TEQ - Mammals
TEQ_DIOXIN.0	Dioxin/furan TCDD toxicity equivalent (ND = 0)
DOC	Dissolved organic carbon
DO	Dissolved oxygen
74-84-0	Ethane
100-41-4	Ethylbenzene
74-85-1	Ethylene
206-44-0	Fluoranthene
86-73-7	Fluorene
GRH_Aliph_C10-12_calc'd	Gasoline fraction (aliphatic): C10-C12 (calc'd)

Table 4
Transition Zone Water Analyte List

CAS Number	Analyte
GRH_Aliph_C4-C6_calc'd	Gasoline fraction (aliphatic): C4-C6 (calc'd)
GRH_Aliph_C6-C8_calc'd	Gasoline fraction (aliphatic): C6-C8 (calc'd)
GRH_Aliph_C8-C10_calc'd	Gasoline fraction (aliphatic): C8-C10 (calc'd)
GRH_Aro_Benzene_calc'd	Gasoline fraction (aromatic): Benzene (calc'd)
GRH_Aro_C10-C12_calc'd	Gasoline fraction (aromatic): C10-C12 (calc'd)
GRH_Aro_C8-C10_calc'd	Gasoline fraction (aromatic): C8-C10 (calc'd)
GRH_Aro_Toluene_calc'd	Gasoline fraction (aromatic): Toluene (calc'd)
GRH	Gasoline Range Hydrocarbons
38998-75-3	Heptachlorodibenzofuran homologs
37871-00-4	Heptachlorodibenzo-p-dioxin homologs
55684-94-1	Hexachlorodibenzofuran homologs
34465-46-8	Hexachlorodibenzo-p-dioxin homologs
HPAH	High Molecular Weight PAH
193-39-5	Indeno(1,2,3-cd)pyrene
7439-89-6	Iron
98-82-8	Isopropylbenzene
7439-92-1	Lead
LPAH	Low Molecular Weight PAH
68782-97-8	Lube Oil
179601-23-1	m,p-Xylene
7439-95-4	Magnesium
7439-96-5	Manganese
7439-97-6	Mercury
74-82-8	Methane
108-10-1	Methyl isobutyl ketone
591-78-6	Methyl n-butyl ketone
1634-04-4	Methyl tert-butyl ether
74-95-3	Methylene bromide
75-09-2	Methylene chloride
78-93-3	Methylethyl ketone
91-20-3	Naphthalene
104-51-8	n-Butylbenzene
7440-02-0	Nickel
14797-55-8	Nitrate
14797-65-0	Nitrite
103-65-1	n-Propylbenzene
ORP	Oxidation-Reduction Potential
95-47-6	o-Xylene
30402-15-4	Pentachlorodibenzofuran homologs
14797-73-0	Perchlorate
12408-02-5	pH
85-01-8	Phenanthrene
108-95-2	Phenol
7723-14-0	Phosphorus
7440-09-7	Potassium

Table 4
Transition Zone Water Analyte List

CAS Number	Analyte
129-00-0	Pyrene
RRH	Residual Range Hydrocarbons
135-98-8	Sec-butylbenzene
7782-49-2	Selenium
7440-22-4	Silver
93-72-1	Silvex
7440-23-5	Sodium
100-42-5	Styrene
14808-79-8	Sulfate
18496-25-8	Sulfide
Sum DDD (calc'd)	Sum DDD (calc'd)
Sum DDE (calc'd)	Sum DDE (calc'd)
Sum DDT (calc'd)	Sum DDT (calc'd)
TEMP	Temperature
98-06-6	tert-Butylbenzene
30402-14-3	Tetrachlorodibenzofuran homologs
41903-57-5	Tetrachlorodibenzo-p-dioxin homologs
127-18-4	Tetrachloroethene
7440-28-0	Thallium
7440-32-6	Titanium
108-88-3	Toluene
BAPEQ	Total BaPEq
Total Benzofluoranthenes (calc'd)	Total Benzofluoranthenes (calc'd)
Total cPAH PEQ (shallow TZW screening)	Total cPAH PEQ (shallow TZW screening)
CPAH	Total cPAHs
Total cPAHs (calc'd)	Total cPAHs (calc'd)
Total DDD (shallow TZW screening)	Total DDD (shallow TZW screening)
Total DDE (shallow TZW screening)	Total DDE (shallow TZW screening)
Total DDT (shallow TZW screening)	Total DDT (shallow TZW screening)
Total DDTs (calc'd)	Total DDTs (calc'd)
Total Diesel-Residual Hydrocarbons (calc'd)	Total Diesel-Residual Hydrocarbons (calc'd)
Total Dioxin/Furan TEQ (shallow TZW screening)	Total Dioxin/Furan TEQ (shallow TZW screening)
TDS	Total dissolved solids
Total HPAHs (calc'd)	Total HPAHs (calc'd)
Total LPAHs (calc'd)	Total LPAHs (calc'd)
E17075011	Total of 2,4' and 4,4'-DDD
E966176	Total of 2,4' and 4,4'-DDD, -DDE, -DDT
E17075029	Total of 2,4' and 4,4'-DDE
E17075037	Total of 2,4' and 4,4'-DDT
PP_DDT3ISO	Total of 4,4'-DDD, -DDE, -DDT
TOC	Total organic carbon
130498-29-2	Total PAHs
Total PAHs (calc'd)	Total PAHs (calc'd)
TOTPCDD_F	Total PCDD/F
TPH	Total Petroleum Hydrocarbons

Table 4
Transition Zone Water Analyte List

CAS Number	Analyte
Total Petroleum Hydrocarbons (calc'd)	Total Petroleum Hydrocarbons (calc'd)
TSS	Total suspended solids
TEQ_TOTAL.0	Total TCDD toxicity equivalent (ND = 0)
Total Toxic Dioxin Furans (calc'd)	Total Toxic Dioxin Furans (calc'd)
Total Xylenes (calc'd)	Total Xylenes (calc'd)
Total Xylenes (shallow TZW screening)	Total Xylenes (shallow TZW screening)
156-60-5	trans-1,2-Dichloroethene
79-01-6	Trichloroethene
TURBID	Turbidity
7440-62-2	Vanadium
108-05-4	Vinyl acetate
75-01-4	Vinyl chloride
1330-20-7	Xylene
7440-66-6	Zinc

Table 5
Stormwater Analyte List

CAS Number	Analyte
95-50-1	1,2-Dichlorobenzene
106-46-7	1,4-Dichlorobenzene
90-12-0	1-Methylnaphthalene
93-76-5	2,4,5-T
94-75-7	2,4-D
94-82-6	2,4-DB
53-19-0	2,4'-DDD
3424-82-6	2,4'-DDE
789-02-6	2,4'-DDT
120-83-2	2,4-Dichlorophenol
105-67-9	2,4-Dimethylphenol
91-57-6	2-Methylnaphthalene
95-48-7	2-Methylphenol
C_3+4MPHN	3- and 4-Methylphenol Coelution
72-54-8	4,4'-DDD
72-55-9	4,4'-DDE
50-29-3	4,4'-DDT
106-44-5	4-Methylphenol
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
67-64-1	Acetone
309-00-2	Aldrin
ALK	Alkalinity
959-98-8	alpha-Endosulfan
319-84-6	alpha-Hexachlorocyclohexane
7429-90-5	Aluminum
120-12-7	Anthracene
7440-36-0	Antimony
12674-11-2	Aroclor 1016
53469-21-9	Aroclor 1242
11097-69-1	Aroclor 1254
11096-82-5	Aroclor 1260
11100-14-4	Aroclor 1268
12767-79-2	Aroclors
7440-38-2	Arsenic
7440-39-3	Barium
71-43-2	Benzene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
191-24-2	Benzo(g,h,i)perylene
207-08-9	Benzo(k)fluoranthene
56832-73-6	Benzofluoranthenes
65-85-0	Benzoic acid
7440-41-7	Beryllium
33213-65-9	beta-Endosulfan
319-85-7	beta-Hexachlorocyclohexane
117-81-7	Bis(2-ethylhexyl) phthalate
BTEX	BTEX

Table 5
Stormwater Analyte List

CAS Number	Analyte
85-68-7	Butylbenzyl phthalate
7440-43-9	Cadmium
7440-70-2	Calcium
86-74-8	Carbazole
16887-00-6	Chloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
7440-47-3	Chromium
18540-29-9	Chromium hexavalent
218-01-9	Chrysene
5103-71-9	cis-Chlordane
5103-73-1	cis-Nonachlor
E1640291	Conductivity
7440-50-8	Copper
75-99-0	Dalapon
319-86-8	delta-Hexachlorocyclohexane
53-70-3	Dibenzo(a,h)anthracene
132-64-9	Dibenzofuran
84-74-2	Dibutyl phthalate
1918-00-9	Dicamba
25512-42-9	Dichlorobiphenyl homologs
120-36-5	Dichloroprop
60-57-1	Dieldrin
DRH	Diesel Range Hydrocarbons
84-66-2	Diethyl phthalate
131-11-3	Dimethyl phthalate
117-84-0	Di-n-octyl phthalate
TEQ_DIOXIN.0	Dioxin/furan TCDD toxicity equivalent (ND = 0)
TEQ_PCB.0	Dioxin-like PCB congener TCDD toxicity equivalent (ND = 0)
DOC	Dissolved organic carbon
1031-07-8	Endosulfan sulfate
72-20-8	Endrin
7421-93-4	Endrin aldehyde
53494-70-5	Endrin ketone
100-41-4	Ethylbenzene
E1643212	Flow
206-44-0	Fluoranthene
86-73-7	Fluorene
58-89-9	gamma-Hexachlorocyclohexane
GRH	Gasoline Range Hydrocarbons
HARD	Hardness as CaCO3
HORH	Heavy Oil Range Hydrocarbons
76-44-8	Heptachlor
1024-57-3	Heptachlor epoxide
28655-71-2	Heptachlorobiphenyl homologs
118-74-1	Hexachlorobenzene
26601-64-9	Hexachlorobiphenyl homologs
87-68-3	Hexachlorobutadiene
67-72-1	Hexachloroethane

Table 5
Stormwater Analyte List

CAS Number	Analyte
HPAH	High Molecular Weight PAH
193-39-5	Indeno(1,2,3-cd)pyrene
7439-89-6	Iron
78-59-1	Isophorone
98-82-8	Isopropylbenzene
7439-92-1	Lead
LPAH	Low Molecular Weight PAH
7439-95-4	Magnesium
7439-96-5	Manganese
93-65-2	MCPP
7439-97-6	Mercury
72-43-5	Methoxychlor
75-09-2	Methylene chloride
2385-85-5	Mirex
27323-18-8	Monochlorobiphenyl homologs
91-20-3	Naphthalene
7440-02-0	Nickel
14797-55-8	Nitrate
53742-07-7	Nonachlorobiphenyl homologs
55722-26-4	Octachlorobiphenyl homologs
3268-87-9	Octachlorodibenzo-p-dioxin
OILGREASE	Oil And Grease
27304-13-8	Oxychlordane
2051-60-7	PCB001
2051-61-8	PCB002
2051-62-9	PCB003
13029-08-8	PCB004
PCB004_010	PCB004 & 010
PCB005_008	PCB005 & 008
25569-80-6	PCB006
PCB007_009	PCB007 & 009
34883-43-7	PCB008
2050-67-1	PCB011
PCB012_013	PCB012 & 013
34883-41-5	PCB014
2050-68-2	PCB015
38444-78-9	PCB016
PCB016_032	PCB016 & 032
37680-66-3	PCB017
37680-65-2	PCB018
PCB018_030	PCB018 & 030
38444-73-4	PCB019
PCB020_021_033	PCB020 & 021 & 033
PCB020_028	PCB020 & 028
PCB021_033	PCB021 & 033
38444-85-8	PCB022
55720-44-0	PCB023
PCB024_027	PCB024 & 027
55712-37-3	PCB025

Table 5
Stormwater Analyte List

CAS Number	Analyte
38444-81-4	PCB026
PCB026_029	PCB026 & 029
38444-76-7	PCB027
7012-37-5	PCB028
15862-07-4	PCB029
35693-92-6	PCB030
16606-02-3	PCB031
38444-77-8	PCB032
37680-68-5	PCB034
37680-69-6	PCB035
38444-87-0	PCB036
38444-90-5	PCB037
53555-66-1	PCB038
38444-88-1	PCB039
38444-93-8	PCB040
PCB040_041_071	PCB040 & 041 & 071
PCB041_064_071_	PCB041 & 064 & 071 & 072
36559-22-5	PCB042
PCB042_059	PCB042 & 059
70362-46-8	PCB043
PCB043_049	PCB043 & 049
41464-39-5	PCB044
PCB044_047_065	PCB044 & 047 & 065
70362-45-7	PCB045
PCB045_051	PCB045 & 051
41464-47-5	PCB046
2437-79-8	PCB047
70362-47-9	PCB048
PCB048_075	PCB048 & 075
PCB049_069	PCB049 & 069
62796-65-0	PCB050
PCB050_053	PCB050 & 053
68194-04-7	PCB051
35693-99-3	PCB052
PCB052_069	PCB052 & 069
41464-41-9	PCB053
15968-05-5	PCB054
74338-24-2	PCB055
41464-43-1	PCB056
PCB056_060	PCB056 & 060
70424-67-8	PCB057
41464-49-7	PCB058
PCB059_062_075	PCB059 & 062 & 075
33025-41-1	PCB060
PCB061_070	PCB061 & 070
PCB061_070_074_	PCB061 & 070 & 074 & 076
54230-22-7	PCB062
74472-34-7	PCB063
52663-58-8	PCB064

Table 5
Stormwater Analyte List

CAS Number	Analyte
33284-54-7	PCB065
32598-10-0	PCB066
PCB066_076	PCB066 & 076
73575-53-8	PCB067
73575-52-7	PCB068
74338-23-1	PCB073
32690-93-0	PCB074
32598-13-3	PCB077
70362-49-1	PCB078
41464-48-6	PCB079
70362-50-4	PCB081
52663-62-4	PCB082
60145-20-2	PCB083
PCB083_099	PCB083 & 099
52663-60-2	PCB084
PCB084_092	PCB084 & 092
PCB085_116	PCB085 & 116
PCB085_116_117	PCB085 & 116 & 117
55312-69-1	PCB086
PCB086_087_097_	PCB086 & 087 & 097 & 108 & 119 & 125
PCB087_117_125	PCB087 & 117 & 125
PCB088_091	PCB088 & 091
73575-57-2	PCB089
PCB090_101	PCB090 & 101
PCB090_101_113	PCB090 & 101 & 113
52663-61-3	PCB092
PCB093_095_098_	PCB093 & 095 & 098 & 100 & 102
73575-55-0	PCB094
PCB095_098_102	PCB095 & 098 & 102
73575-54-9	PCB096
41464-51-1	PCB097
38380-01-7	PCB099
39485-83-1	PCB100
60145-21-3	PCB103
32598-14-4	PCB105
PCB106_118	PCB106 & 118
PCB107_109	PCB107 & 109
PCB107_124	PCB107 & 124
PCB108_112	PCB108 & 112
74472-35-8	PCB109
38380-03-9	PCB110
PCB110_115	PCB110 & 115
PCB111_115	PCB111 & 115
68194-10-5	PCB113
74472-37-0	PCB114
31508-00-6	PCB118
56558-17-9	PCB119
68194-12-7	PCB120
76842-07-4	PCB122

Table 5
Stormwater Analyte List

CAS Number	Analyte
65510-44-3	PCB123
70424-70-3	PCB124
57465-28-8	PCB126
39635-33-1	PCB127
PCB128_162	PCB128 & 162
PCB128_166	PCB128 & 166
55215-18-4	PCB129
PCB129_138_160_	PCB129 & 138 & 160 & 163
52663-66-8	PCB130
61798-70-7	PCB131
38380-05-1	PCB132
PCB132_161	PCB132 & 161
35694-04-3	PCB133
PCB133_142	PCB133 & 142
PCB134_143	PCB134 & 143
52744-13-5	PCB135
PCB135_151_154	PCB135 & 151 & 154
38411-22-2	PCB136
35694-06-5	PCB137
PCB138_163_164	PCB138 & 163 & 164
PCB139_140	PCB139 & 140
PCB139_149	PCB139 & 149
59291-64-4	PCB140
52712-04-6	PCB141
68194-14-9	PCB144
74472-40-5	PCB145
51908-16-8	PCB146
PCB146_165	PCB146 & 165
68194-13-8	PCB147
PCB147_149	PCB147 & 149
74472-41-6	PCB148
68194-08-1	PCB150
52663-63-5	PCB151
68194-09-2	PCB152
35065-27-1	PCB153
PCB153_168	PCB153 & 168
60145-22-4	PCB154
38380-08-4	PCB156
PCB156_157	PCB156 & 157
69782-90-7	PCB157
74472-42-7	PCB158
PCB158_160	PCB158 & 160
39635-35-3	PCB159
39635-34-2	PCB162
74472-45-0	PCB164
41411-63-6	PCB166
52663-72-6	PCB167
59291-65-5	PCB168
32774-16-6	PCB169

Table 5
Stormwater Analyte List

CAS Number	Analyte
35065-30-6	PCB170
52663-71-5	PCB171
PCB171_173	PCB171 & 173
52663-74-8	PCB172
68194-16-1	PCB173
38411-25-5	PCB174
40186-70-7	PCB175
52663-65-7	PCB176
52663-70-4	PCB177
52663-67-9	PCB178
52663-64-6	PCB179
35065-29-3	PCB180
PCB180_193	PCB180 & 193
74472-47-2	PCB181
60145-23-5	PCB182
PCB182_187	PCB182 & 187
52663-69-1	PCB183
PCB183_185	PCB183 & 185
74472-48-3	PCB184
52712-05-7	PCB185
74472-49-4	PCB186
52663-68-0	PCB187
74487-85-7	PCB188
39635-31-9	PCB189
41411-64-7	PCB190
74472-50-7	PCB191
69782-91-8	PCB193
35694-08-7	PCB194
52663-78-2	PCB195
42740-50-1	PCB196
PCB196_203	PCB196 & 203
33091-17-7	PCB197
PCB197_200	PCB197 & 200
68194-17-2	PCB198
PCB198_199	PCB198 & 199
52663-75-9	PCB199
52663-73-7	PCB200
40186-71-8	PCB201
2136-99-4	PCB202
52663-76-0	PCB203
74472-52-9	PCB204
74472-53-0	PCB205
40186-72-9	PCB206
52663-79-3	PCB207
52663-77-1	PCB208
2051-24-3	PCB209
25429-29-2	Pentachlorobiphenyl homologs
87-86-5	Pentachlorophenol
14797-73-0	Perchlorate

Table 5
Stormwater Analyte List

CAS Number	Analyte
12408-02-5	pH
85-01-8	Phenanthrene
7723-14-0	Phosphorus
7440-09-7	Potassium
129-00-0	Pyrene
RRH	Residual Range Hydrocarbons
7782-49-2	Selenium
7440-22-4	Silver
7440-23-5	Sodium
14808-79-8	Sulfate
TEMP	Temperature
26914-33-0	Tetrachlorobiphenyl homologs
30402-14-3	Tetrachlorodibenzofuran homologs
127-18-4	Tetrachloroethene
7440-28-0	Thallium
7440-31-5	Tin
108-88-3	Toluene
BAPEQ	Total BaPEq
TOTCHLDANE	Total Chlordanes
CPAH	Total cPAHs
Total DDE (direct contact, groundwater seep)	Total DDE (direct contact, groundwater seep)
TDS	Total dissolved solids
TOTENDOSLFN	Total Endosulfan
E17075011	Total of 2,4' and 4,4'-DDD
E966176	Total of 2,4' and 4,4'-DDD, -DDE, -DDT
E17075029	Total of 2,4' and 4,4'-DDE
E17075037	Total of 2,4' and 4,4'-DDT
TOC	Total organic carbon
130498-29-2	Total PAHs
1336-36-3	Total PCB Congeners
TOTPCBS	Total PCBs
TOTPCDD_F	Total PCDD/F
TPH	Total Petroleum Hydrocarbons
TSS	Total suspended solids
TEQ_TOTAL.0	Total TCDD toxicity equivalent (ND = 0)
8001-35-2	Toxaphene
5103-74-2	trans-Chlordane
39765-80-5	trans-Nonachlor
36643-28-4	Tributyltin ion
25323-68-6	Trichlorobiphenyl homologs
79-01-6	Trichloroethene
TURBID	Turbidity
7440-62-2	Vanadium
1330-20-7	Xylene
7440-66-6	Zinc

Table 6
Groundwater Seeps Analyte List

CAS Number	Analyte
83-32-9	Acenaphthene
120-12-7	Anthracene
7440-36-0	Antimony
11097-69-1	Aroclor 1254
12767-79-2	Aroclors
7440-38-2	Arsenic
7440-39-3	Barium
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
BKBFLANTH	Benzo(b+k)fluoranthene
117-81-7	Bis(2-ethylhexyl) phthalate
BTEX	BTEX
7440-43-9	Cadmium
7440-47-3	Chromium
218-01-9	Chrysene
7440-50-8	Copper
84-74-2	Dibutyl phthalate
DRH	Diesel Range Hydrocarbons
100-41-4	Ethylbenzene
206-44-0	Fluoranthene
86-73-7	Fluorene
HORH	Heavy Oil Range Hydrocarbons
HPAH	High Molecular Weight PAH
7439-92-1	Lead
LPAH	Low Molecular Weight PAH
179601-23-1	m,p-Xylene
7439-96-5	Manganese
7439-97-6	Mercury
7440-02-0	Nickel
OILGREASE	Oil And Grease
95-47-6	o-Xylene
85-01-8	Phenanthrene
129-00-0	Pyrene
BAPEQ	Total BaPEq
CPAH	Total cPAHs
130498-29-2	Total PAHs
TOTPCBS	Total PCBs
TPH	Total Petroleum Hydrocarbons
TSS	Total suspended solids
1330-20-7	Xylene
7440-66-6	Zinc

Table 7
Surface Water Analyte List

CAS Number	Analyte
75-35-4	1,1-Dichloroethene
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
95-63-6	1,2,4-Trimethylbenzene
108-67-8	1,3,5-Trimethylbenzene
106-46-7	1,4-Dichlorobenzene
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin
94-75-7	2,4-D
94-82-6	2,4-DB
53-19-0	2,4'-DDD
53-19-0	2,4'-DDD
3424-82-6	2,4'-DDE
3424-82-6	2,4'-DDE
789-02-6	2,4'-DDT
789-02-6	2,4'-DDT
789-02-6	2,4'-DDT
91-57-6	2-Methylnaphthalene
91-57-6	2-Methylnaphthalene
91-57-6	2-Methylnaphthalene
72-54-8	4,4'-DDD
72-54-8	4,4'-DDD
72-54-8	4,4'-DDD
72-55-9	4,4'-DDE
72-55-9	4,4'-DDE
72-55-9	4,4'-DDE
50-29-3	4,4'-DDT
50-29-3	4,4'-DDT
50-29-3	4,4'-DDT
59-50-7	4-Chloro-3-methylphenol
106-47-8	4-Chloroaniline
83-32-9	Acenaphthene
83-32-9	Acenaphthene
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
208-96-8	Acenaphthylene
208-96-8	Acenaphthylene
309-00-2	Aldrin
309-00-2	Aldrin
309-00-2	Aldrin
ALK	Alkalinity
959-98-8	alpha-Endosulfan
959-98-8	alpha-Endosulfan
959-98-8	alpha-Endosulfan
319-84-6	alpha-Hexachlorocyclohexane
319-84-6	alpha-Hexachlorocyclohexane
319-84-6	alpha-Hexachlorocyclohexane
7429-90-5	Aluminum
7664-41-7	Ammonia
62-53-3	Aniline

Table 7
Surface Water Analyte List

CAS Number	Analyte
120-12-7	Anthracene
120-12-7	Anthracene
120-12-7	Anthracene
7440-36-0	Antimony
12672-29-6	Aroclor 1248
11097-69-1	Aroclor 1254
11096-82-5	Aroclor 1260
12767-79-2	Aroclors
7440-38-2	Arsenic
71-43-2	Benzene
56-55-3	Benzo(a)anthracene
56-55-3	Benzo(a)anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
50-32-8	Benzo(a)pyrene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
205-99-2	Benzo(b)fluoranthene
205-99-2	Benzo(b)fluoranthene
191-24-2	Benzo(g,h,i)perylene
191-24-2	Benzo(g,h,i)perylene
191-24-2	Benzo(g,h,i)perylene
BKJFLANTH	Benzo(j+k)fluoranthene
BKJFLANTH	Benzo(j+k)fluoranthene
207-08-9	Benzo(k)fluoranthene
65-85-0	Benzoic acid
33213-65-9	beta-Endosulfan
33213-65-9	beta-Endosulfan
33213-65-9	beta-Endosulfan
319-85-7	beta-Hexachlorocyclohexane
319-85-7	beta-Hexachlorocyclohexane
319-85-7	beta-Hexachlorocyclohexane
117-81-7	Bis(2-ethylhexyl) phthalate
117-81-7	Bis(2-ethylhexyl) phthalate
117-81-7	Bis(2-ethylhexyl) phthalate
BTEX	BTEX
85-68-7	Butylbenzyl phthalate
85-68-7	Butylbenzyl phthalate
85-68-7	Butylbenzyl phthalate
78763-54-9	Butyltin ion
7440-43-9	Cadmium
7440-70-2	Calcium
86-74-8	Carbazole
16887-00-6	Chloride
7440-47-3	Chromium
18540-29-9	Chromium hexavalent
218-01-9	Chrysene
218-01-9	Chrysene
218-01-9	Chrysene
156-59-2	cis-1,2-Dichloroethene
5103-71-9	cis-Chlordane
5103-71-9	cis-Chlordane
5103-71-9	cis-Chlordane
5103-73-1	cis-Nonachlor
5103-73-1	cis-Nonachlor
E1640291	Conductivity
7440-50-8	Copper
57-12-5	Cyanide
57-12-5A	Cyanide amenable to chlorination
75-99-0	Dalapon
319-86-8	delta-Hexachlorocyclohexane
319-86-8	delta-Hexachlorocyclohexane
319-86-8	delta-Hexachlorocyclohexane
DEPTH	Depth
53-70-3	Dibenzo(a,h)anthracene
53-70-3	Dibenzo(a,h)anthracene
53-70-3	Dibenzo(a,h)anthracene
132-64-9	Dibenzofuran
84-74-2	Dibutyl phthalate
84-74-2	Dibutyl phthalate
14488-53-0	Dibutyltin ion
25512-42-9	Dichlorobiphenyl homologs
25512-42-9	Dichlorobiphenyl homologs
60-57-1	Dieldrin
60-57-1	Dieldrin
60-57-1	Dieldrin
84-66-2	Diethyl phthalate

Table 7
Surface Water Analyte List

CAS Number	Analyte
84-66-2	Diethyl phthalate
131-11-3	Dimethyl phthalate
131-11-3	Dimethyl phthalate
117-84-0	Di-n-octyl phthalate
117-84-0	Di-n-octyl phthalate
Dioxin TEQ - Birds	Dioxin TEQ - Birds
Dioxin TEQ - Birds	Dioxin TEQ - Birds
Dioxin TEQ - Birds	Dioxin TEQ - Birds
Dioxin TEQ - Fish	Dioxin TEQ - Fish
Dioxin TEQ - Fish	Dioxin TEQ - Fish
Dioxin TEQ - Fish	Dioxin TEQ - Fish
Dioxin TEQ - Mammals	Dioxin TEQ - Mammals
Dioxin TEQ - Mammals	Dioxin TEQ - Mammals
Dioxin TEQ - Mammals	Dioxin TEQ - Mammals
TEQ_DIOXIN.0	Dioxin/furan TCDD toxicity equivalent (ND = 0)
TEQ_DIOXIN.0	Dioxin/furan TCDD toxicity equivalent (ND = 0)
TEQ_DIOXIN.0	Dioxin/furan TCDD toxicity equivalent (ND = 0)
TEQ_PCB.0	Dioxin-like PCB congener TCDD toxicity equivalent (ND = 0)
TEQ_PCB.0	Dioxin-like PCB congener TCDD toxicity equivalent (ND = 0)
TEQ_PCB.0	Dioxin-like PCB congener TCDD toxicity equivalent (ND = 0)
DOC	Dissolved organic carbon
DO	Dissolved oxygen
1031-07-8	Endosulfan sulfate
1031-07-8	Endosulfan sulfate
1031-07-8	Endosulfan sulfate
72-20-8	Endrin
72-20-8	Endrin
72-20-8	Endrin
7421-93-4	Endrin aldehyde
53494-70-5	Endrin ketone
53494-70-5	Endrin ketone
53494-70-5	Endrin ketone
100-41-4	Ethylbenzene
206-44-0	Fluoranthene
206-44-0	Fluoranthene
206-44-0	Fluoranthene
86-73-7	Fluorene
86-73-7	Fluorene
86-73-7	Fluorene
58-89-9	gamma-Hexachlorocyclohexane
58-89-9	gamma-Hexachlorocyclohexane
58-89-9	gamma-Hexachlorocyclohexane
HARD	Hardness as CaCO3
76-44-8	Heptachlor
76-44-8	Heptachlor
76-44-8	Heptachlor
1024-57-3	Heptachlor epoxide
1024-57-3	Heptachlor epoxide
1024-57-3	Heptachlor epoxide
28655-71-2	Heptachlorobiphenyl homologs
28655-71-2	Heptachlorobiphenyl homologs
38998-75-3	Heptachlorodibenzofuran homologs
38998-75-3	Heptachlorodibenzofuran homologs
37871-00-4	Heptachlorodibenzo-p-dioxin homologs
37871-00-4	Heptachlorodibenzo-p-dioxin homologs
37871-00-4	Heptachlorodibenzo-p-dioxin homologs
118-74-1	Hexachlorobenzene
118-74-1	Hexachlorobenzene
118-74-1	Hexachlorobenzene
26601-64-9	Hexachlorobiphenyl homologs
26601-64-9	Hexachlorobiphenyl homologs
87-68-3	Hexachlorobutadiene
87-68-3	Hexachlorobutadiene
87-68-3	Hexachlorobutadiene
55684-94-1	Hexachlorodibenzofuran homologs
55684-94-1	Hexachlorodibenzofuran homologs
34465-46-8	Hexachlorodibenzo-p-dioxin homologs
34465-46-8	Hexachlorodibenzo-p-dioxin homologs
HPAH	High Molecular Weight PAH
HPAH	High Molecular Weight PAH
HPAH	High Molecular Weight PAH
193-39-5	Indeno(1,2,3-cd)pyrene
193-39-5	Indeno(1,2,3-cd)pyrene
193-39-5	Indeno(1,2,3-cd)pyrene
7439-89-6	Iron
78-59-1	Isophorone
7439-92-1	Lead

Table 7
Surface Water Analyte List

CAS Number	Analyte
LPAH	Low Molecular Weight PAH
LPAH	Low Molecular Weight PAH
LPAH	Low Molecular Weight PAH
179601-23-1	m,p-Xylene
7439-95-4	Magnesium
7439-96-5	Manganese
93-65-2	MCPP
7439-97-6	Mercury
72-43-5	Methoxychlor
72-43-5	Methoxychlor
72-43-5	Methoxychlor
27323-18-8	Monochlorobiphenyl homologs
27323-18-8	Monochlorobiphenyl homologs
91-20-3	Naphthalene
91-20-3	Naphthalene
91-20-3	Naphthalene
7440-02-0	Nickel
53742-07-7	Nonachlorobiphenyl homologs
53742-07-7	Nonachlorobiphenyl homologs
55722-26-4	Octachlorobiphenyl homologs
55722-26-4	Octachlorobiphenyl homologs
39001-02-0	Octachlorodibenzofuran
39001-02-0	Octachlorodibenzofuran
3268-87-9	Octachlorodibenzo-p-dioxin
3268-87-9	Octachlorodibenzo-p-dioxin
3268-87-9	Octachlorodibenzo-p-dioxin
ORP	Oxidation-Reduction Potential
27304-13-8	Oxychlordane
27304-13-8	Oxychlordane
95-47-6	o-Xylene
PCB TEQ - Birds	PCB TEQ - Birds
PCB TEQ - Birds	PCB TEQ - Birds
PCB TEQ - Birds	PCB TEQ - Birds
PCB TEQ - Fish	PCB TEQ - Fish
PCB TEQ - Fish	PCB TEQ - Fish
PCB TEQ - Fish	PCB TEQ - Fish
PCB TEQ - Mammals	PCB TEQ - Mammals
PCB TEQ - Mammals	PCB TEQ - Mammals
PCB TEQ - Mammals	PCB TEQ - Mammals
2051-60-7	PCB001
2051-60-7	PCB001
2051-61-8	PCB002
2051-61-8	PCB002
2051-62-9	PCB003
2051-62-9	PCB003
13029-08-8	PCB004
13029-08-8	PCB004
16605-91-7	PCB005
16605-91-7	PCB005
25569-80-6	PCB006
25569-80-6	PCB006
33284-50-3	PCB007
33284-50-3	PCB007
34883-43-7	PCB008
34883-43-7	PCB008
34883-39-1	PCB009
34883-39-1	PCB009
33146-45-1	PCB010
33146-45-1	PCB010
2050-67-1	PCB011
2050-67-1	PCB011
PCB012_013	PCB012 & 013
PCB012_013	PCB012 & 013
34883-41-5	PCB014
34883-41-5	PCB014
2050-68-2	PCB015
2050-68-2	PCB015
38444-78-9	PCB016
38444-78-9	PCB016
PCB016_032	PCB016 & 032
37680-66-3	PCB017
37680-66-3	PCB017
37680-66-3	PCB017
PCB018_030	PCB018 & 030
PCB018_030	PCB018 & 030
38444-73-4	PCB019
38444-73-4	PCB019

Table 7
Surface Water Analyte List

CAS Number	Analyte
38444-73-4	PCB019
PCB020_028	PCB020 & 028
PCB020_028	PCB020 & 028
PCB021_033	PCB021 & 033
PCB021_033	PCB021 & 033
38444-85-8	PCB022
38444-85-8	PCB022
55720-44-0	PCB023
55720-44-0	PCB023
55702-45-9	PCB024
55702-45-9	PCB024
55712-37-3	PCB025
55712-37-3	PCB025
PCB026_029	PCB026 & 029
PCB026_029	PCB026 & 029
38444-76-7	PCB027
38444-76-7	PCB027
7012-37-5	PCB028
16606-02-3	PCB031
16606-02-3	PCB031
16606-02-3	PCB031
38444-77-8	PCB032
38444-77-8	PCB032
37680-68-5	PCB034
37680-68-5	PCB034
37680-69-6	PCB035
37680-69-6	PCB035
38444-87-0	PCB036
38444-87-0	PCB036
38444-90-5	PCB037
38444-90-5	PCB037
38444-90-5	PCB037
53555-66-1	PCB038
53555-66-1	PCB038
38444-88-1	PCB039
38444-88-1	PCB039
PCB040_041_071	PCB040 & 041 & 071
PCB040_041_071	PCB040 & 041 & 071
PCB041_064_071_	PCB041 & 064 & 071 & 072
36559-22-5	PCB042
36559-22-5	PCB042
PCB042_059	PCB042 & 059
70362-46-8	PCB043
70362-46-8	PCB043
PCB043_049	PCB043 & 049
41464-39-5	PCB044
PCB044_047_065	PCB044 & 047 & 065
PCB044_047_065	PCB044 & 047 & 065
70362-45-7	PCB045
PCB045_051	PCB045 & 051
PCB045_051	PCB045 & 051
41464-47-5	PCB046
41464-47-5	PCB046
2437-79-8	PCB047
70362-47-9	PCB048
70362-47-9	PCB048
PCB049_069	PCB049 & 069
PCB049_069	PCB049 & 069
PCB050_053	PCB050 & 053
PCB050_053	PCB050 & 053
68194-04-7	PCB051
35693-99-3	PCB052
35693-99-3	PCB052
PCB052_069	PCB052 & 069
41464-41-9	PCB053
15968-05-5	PCB054
15968-05-5	PCB054
74338-24-2	PCB055
74338-24-2	PCB055
41464-43-1	PCB056
41464-43-1	PCB056
PCB056_060	PCB056 & 060
70424-67-8	PCB057
70424-67-8	PCB057
41464-49-7	PCB058
41464-49-7	PCB058
PCB059_062_075	PCB059 & 062 & 075

Table 7
Surface Water Analyte List

CAS Number	Analyte
PCB059_062_075	PCB059 & 062 & 075
33025-41-1	PCB060
33025-41-1	PCB060
PCB061_070	PCB061 & 070
PCB061_070_074_	PCB061 & 070 & 074 & 076
PCB061_070_074_	PCB061 & 070 & 074 & 076
74472-34-7	PCB063
74472-34-7	PCB063
52663-58-8	PCB064
52663-58-8	PCB064
32598-10-0	PCB066
32598-10-0	PCB066
PCB066_076	PCB066 & 076
73575-53-8	PCB067
73575-53-8	PCB067
73575-52-7	PCB068
73575-52-7	PCB068
41464-42-0	PCB072
41464-42-0	PCB072
74338-23-1	PCB073
74338-23-1	PCB073
32690-93-0	PCB074
32598-13-3	PCB077
32598-13-3	PCB077
70362-49-1	PCB078
41464-48-6	PCB079
41464-48-6	PCB079
33284-52-5	PCB080
70362-50-4	PCB081
70362-50-4	PCB081
52663-62-4	PCB082
52663-62-4	PCB082
PCB083_099	PCB083 & 099
PCB083_099	PCB083 & 099
52663-60-2	PCB084
52663-60-2	PCB084
PCB084_092	PCB084 & 092
PCB085_116_117	PCB085 & 116 & 117
PCB085_116_117	PCB085 & 116 & 117
PCB086_087_097_	PCB086 & 087 & 097 & 108 & 119 & 125
PCB086_087_097_	PCB086 & 087 & 097 & 108 & 119 & 125
PCB087_117_125	PCB087 & 117 & 125
PCB088_091	PCB088 & 091
PCB088_091	PCB088 & 091
73575-57-2	PCB089
73575-57-2	PCB089
PCB090_101	PCB090 & 101
PCB090_101_113	PCB090 & 101 & 113
PCB090_101_113	PCB090 & 101 & 113
52663-61-3	PCB092
52663-61-3	PCB092
PCB093_095_098_	PCB093 & 095 & 098 & 100 & 102
PCB093_095_098_	PCB093 & 095 & 098 & 100 & 102
73575-55-0	PCB094
73575-55-0	PCB094
PCB095_098_102	PCB095 & 098 & 102
73575-54-9	PCB096
73575-54-9	PCB096
41464-51-1	PCB097
38380-01-7	PCB099
60145-21-3	PCB103
60145-21-3	PCB103
56558-16-8	PCB104
56558-16-8	PCB104
32598-14-4	PCB105
32598-14-4	PCB105
32598-14-4	PCB105
70424-69-0	PCB106
70424-69-0	PCB106
PCB106_118	PCB106 & 118
PCB107_124	PCB107 & 124
PCB107_124	PCB107 & 124
74472-35-8	PCB109
74472-35-8	PCB109
38380-03-9	PCB110
PCB110_115	PCB110 & 115
PCB110_115	PCB110 & 115

Table 7
Surface Water Analyte List

CAS Number	Analyte
39635-32-0	PCB111
39635-32-0	PCB111
74472-36-9	PCB112
74472-36-9	PCB112
74472-37-0	PCB114
74472-37-0	PCB114
31508-00-6	PCB118
31508-00-6	PCB118
68194-12-7	PCB120
68194-12-7	PCB120
56558-18-0	PCB121
56558-18-0	PCB121
76842-07-4	PCB122
76842-07-4	PCB122
65510-44-3	PCB123
65510-44-3	PCB123
57465-28-8	PCB126
57465-28-8	PCB126
39635-33-1	PCB127
39635-33-1	PCB127
PCB128_166	PCB128 & 166
PCB128_166	PCB128 & 166
PCB129_138_160_	PCB129 & 138 & 160 & 163
PCB129_138_160_	PCB129 & 138 & 160 & 163
52663-66-8	PCB130
52663-66-8	PCB130
61798-70-7	PCB131
61798-70-7	PCB131
38380-05-1	PCB132
38380-05-1	PCB132
PCB132_161	PCB132 & 161
35694-04-3	PCB133
35694-04-3	PCB133
PCB134_143	PCB134 & 143
PCB134_143	PCB134 & 143
PCB135_151_154	PCB135 & 151 & 154
PCB135_151_154	PCB135 & 151 & 154
38411-22-2	PCB136
38411-22-2	PCB136
35694-06-5	PCB137
35694-06-5	PCB137
PCB138_163_164	PCB138 & 163 & 164
PCB139_140	PCB139 & 140
PCB139_140	PCB139 & 140
PCB139_149	PCB139 & 149
52712-04-6	PCB141
52712-04-6	PCB141
41411-61-4	PCB142
41411-61-4	PCB142
68194-14-9	PCB144
68194-14-9	PCB144
74472-40-5	PCB145
74472-40-5	PCB145
51908-16-8	PCB146
51908-16-8	PCB146
PCB147_149	PCB147 & 149
PCB147_149	PCB147 & 149
74472-41-6	PCB148
74472-41-6	PCB148
68194-08-1	PCB150
68194-08-1	PCB150
68194-09-2	PCB152
68194-09-2	PCB152
35065-27-1	PCB153
PCB153_168	PCB153 & 168
PCB153_168	PCB153 & 168
33979-03-2	PCB155
33979-03-2	PCB155
38380-08-4	PCB156
PCB156_157	PCB156 & 157
PCB156_157	PCB156 & 157
74472-42-7	PCB158
74472-42-7	PCB158
39635-35-3	PCB159
39635-35-3	PCB159
39635-34-2	PCB162
39635-34-2	PCB162

Table 7
Surface Water Analyte List

CAS Number	Analyte
74472-45-0	PCB164
74472-45-0	PCB164
74472-46-1	PCB165
74472-46-1	PCB165
52663-72-6	PCB167
52663-72-6	PCB167
32774-16-6	PCB169
32774-16-6	PCB169
35065-30-6	PCB170
35065-30-6	PCB170
PCB171_173	PCB171 & 173
PCB171_173	PCB171 & 173
52663-74-8	PCB172
52663-74-8	PCB172
38411-25-5	PCB174
38411-25-5	PCB174
38411-25-5	PCB174
40186-70-7	PCB175
40186-70-7	PCB175
52663-65-7	PCB176
52663-65-7	PCB176
52663-70-4	PCB177
52663-70-4	PCB177
52663-67-9	PCB178
52663-67-9	PCB178
52663-64-6	PCB179
52663-64-6	PCB179
35065-29-3	PCB180
PCB180_193	PCB180 & 193
PCB180_193	PCB180 & 193
74472-47-2	PCB181
74472-47-2	PCB181
60145-23-5	PCB182
60145-23-5	PCB182
PCB182_187	PCB182 & 187
PCB183_185	PCB183 & 185
PCB183_185	PCB183 & 185
74472-48-3	PCB184
74472-48-3	PCB184
74472-49-4	PCB186
74472-49-4	PCB186
52663-68-0	PCB187
52663-68-0	PCB187
74487-85-7	PCB188
74487-85-7	PCB188
39635-31-9	PCB189
39635-31-9	PCB189
41411-64-7	PCB190
41411-64-7	PCB190
74472-50-7	PCB191
74472-50-7	PCB191
74472-51-8	PCB192
74472-51-8	PCB192
35694-08-7	PCB194
35694-08-7	PCB194
52663-78-2	PCB195
52663-78-2	PCB195
42740-50-1	PCB196
42740-50-1	PCB196
PCB197_200	PCB197 & 200
PCB197_200	PCB197 & 200
PCB198_199	PCB198 & 199
PCB198_199	PCB198 & 199
40186-71-8	PCB201
40186-71-8	PCB201
2136-99-4	PCB202
2136-99-4	PCB202
52663-76-0	PCB203
52663-76-0	PCB203
74472-52-9	PCB204
74472-52-9	PCB204
74472-53-0	PCB205
74472-53-0	PCB205
40186-72-9	PCB206
40186-72-9	PCB206
52663-79-3	PCB207
52663-79-3	PCB207

Table 7
Surface Water Analyte List

CAS Number	Analyte
52663-77-1	PCB208
52663-77-1	PCB208
2051-24-3	PCB209
2051-24-3	PCB209
25429-29-2	Pentachlorobiphenyl homologs
25429-29-2	Pentachlorobiphenyl homologs
30402-15-4	Pentachlorodibenzofuran homologs
30402-15-4	Pentachlorodibenzofuran homologs
36088-22-9	Pentachlorodibenzo-p-dioxin homologs
36088-22-9	Pentachlorodibenzo-p-dioxin homologs
14797-73-0	Perchlorate
12408-02-5	pH
85-01-8	Phenanthrene
85-01-8	Phenanthrene
85-01-8	Phenanthrene
108-95-2	Phenol
7440-09-7	Potassium
129-00-0	Pyrene
129-00-0	Pyrene
129-00-0	Pyrene
135-98-8	Sec-butylbenzene
7782-49-2	Selenium
7440-22-4	Silver
7440-23-5	Sodium
14808-79-8	Sulfate
Sum DDD (calc'd)	Sum DDD (calc'd)
Sum DDD (calc'd)	Sum DDD (calc'd)
Sum DDD (calc'd)	Sum DDD (calc'd)
Sum DDD (calc'd)	Sum DDD (calc'd)
Sum DDE (calc'd)	Sum DDE (calc'd)
Sum DDE (calc'd)	Sum DDE (calc'd)
Sum DDE (calc'd)	Sum DDE (calc'd)
Sum DDE (calc'd)	Sum DDE (calc'd)
Sum DDT (calc'd)	Sum DDT (calc'd)
Sum DDT (calc'd)	Sum DDT (calc'd)
Sum DDT (calc'd)	Sum DDT (calc'd)
Sum DDT (calc'd)	Sum DDT (calc'd)
TEMP	Temperature
26914-33-0	Tetrachlorobiphenyl homologs
26914-33-0	Tetrachlorobiphenyl homologs
30402-14-3	Tetrachlorodibenzofuran homologs
30402-14-3	Tetrachlorodibenzofuran homologs
41903-57-5	Tetrachlorodibenzo-p-dioxin homologs
41903-57-5	Tetrachlorodibenzo-p-dioxin homologs
7440-28-0	Thallium
108-88-3	Toluene
Total Aroclors (surface water bioaccum screening)	Total Aroclors (surface water bioaccum screening)
Total Aroclors (surface water: direct contact by diver)	Total Aroclors (surface water: direct contact by diver)
Total Aroclors (surface water: direct contact by trans/beach use, drink)	Total Aroclors (surface water: direct contact by trans/beach use, drink)
BAPEQ	Total BaPEq
BAPEQ	Total BaPEq
BAPEQ	Total BaPEq
Total Benzofluoranthenes (calc'd)	Total Benzofluoranthenes (calc'd)
Total Benzofluoranthenes (calc'd)	Total Benzofluoranthenes (calc'd)
Total Benzofluoranthenes (calc'd)	Total Benzofluoranthenes (calc'd)
Total Benzofluoranthenes (calc'd)	Total Benzofluoranthenes (calc'd)
Total Chlordane (calc'd)	Total Chlordane (calc'd)
Total Chlordane (calc'd)	Total Chlordane (calc'd)
Total Chlordane (calc'd)	Total Chlordane (calc'd)
Total Chlordane (calc'd)	Total Chlordane (calc'd)
TOTCHLDANE	Total Chlordanes
TOTCHLDANE	Total Chlordanes
TOTCHLDANE	Total Chlordanes
Total Chlordanes (surface water bioaccum screening)	Total Chlordanes (surface water bioaccum screening)
Total Chlordanes (surface water bioaccum screening)	Total Chlordanes (surface water bioaccum screening)
Total Chlordanes (surface water: direct contact by diver)	Total Chlordanes (surface water: direct contact by diver)
Total Chlordanes (surface water: direct contact by diver)	Total Chlordanes (surface water: direct contact by diver)
Total Chlordanes (surface water: direct contact by trans/beach use, drink)	Total Chlordanes (surface water: direct contact by trans/beach use, drink)
Total cPAH PEQ (surface water bioaccum screening)	Total cPAH PEQ (surface water bioaccum screening)
Total cPAH PEQ (surface water bioaccum screening)	Total cPAH PEQ (surface water bioaccum screening)
CPAH	Total cPAHs
CPAH	Total cPAHs
CPAH	Total cPAHs
Total cPAHs (calc'd)	Total cPAHs (calc'd)
Total cPAHs (calc'd)	Total cPAHs (calc'd)
Total cPAHs (calc'd)	Total cPAHs (calc'd)
Total cPAHs (calc'd)	Total cPAHs (calc'd)

Table 7
Surface Water Analyte List

CAS Number	Analyte
Total DDD (surface water bioaccum screening)	Total DDD (surface water bioaccum screening)
Total DDD (surface water bioaccum screening)	Total DDD (surface water bioaccum screening)
Total DDD (surface water: direct contact by diver)	Total DDD (surface water: direct contact by diver)
Total DDD (surface water: direct contact by diver)	Total DDD (surface water: direct contact by diver)
Total DDD (surface water: direct contact by trans/beach use, drink)	Total DDD (surface water: direct contact by trans/beach use, drink)
Total DDE (surface water bioaccum screening)	Total DDE (surface water bioaccum screening)
Total DDE (surface water bioaccum screening)	Total DDE (surface water bioaccum screening)
Total DDE (surface water: direct contact by diver)	Total DDE (surface water: direct contact by diver)
Total DDE (surface water: direct contact by diver)	Total DDE (surface water: direct contact by diver)
Total DDE (surface water: direct contact by trans/beach use, drink)	Total DDE (surface water: direct contact by trans/beach use, drink)
Total DDT (surface water bioaccum screening)	Total DDT (surface water bioaccum screening)
Total DDT (surface water bioaccum screening)	Total DDT (surface water bioaccum screening)
Total DDT (surface water: direct contact by diver)	Total DDT (surface water: direct contact by diver)
Total DDT (surface water: direct contact by diver)	Total DDT (surface water: direct contact by diver)
Total DDT (surface water: direct contact by trans/beach use, drink)	Total DDT (surface water: direct contact by trans/beach use, drink)
Total DDT (surface water: direct contact by trans/beach use, drink)	Total DDT (surface water: direct contact by trans/beach use, drink)
Total DDTs (calc'd)	Total DDTs (calc'd)
Total DDTs (calc'd)	Total DDTs (calc'd)
Total DDTs (calc'd)	Total DDTs (calc'd)
Total DDTs (calc'd)	Total DDTs (calc'd)
Total Dioxin/Furan TEQ (surface water bioaccum screening)	Total Dioxin/Furan TEQ (surface water bioaccum screening)
Total Dioxin/Furan TEQ (surface water: direct contact by diver)	Total Dioxin/Furan TEQ (surface water: direct contact by diver)
Total Dioxin/Furan TEQ (surface water: direct contact by trans/beach use, drink)	Total Dioxin/Furan TEQ (surface water: direct contact by trans/beach use, drink)
TDS	Total dissolved solids
TOTENDOSLFN	Total Endosulfan
TOTENDOSLFN	Total Endosulfan
TOTENDOSLFN	Total Endosulfan
Total Endosulfan (calc'd)	Total Endosulfan (calc'd)
Total Endosulfan (calc'd)	Total Endosulfan (calc'd)
Total Endosulfan (calc'd)	Total Endosulfan (calc'd)
Total Endosulfan (calc'd)	Total Endosulfan (calc'd)
Total Endosulfan (surface water bioaccum screening)	Total Endosulfan (surface water bioaccum screening)
Total Endosulfan (surface water bioaccum screening)	Total Endosulfan (surface water bioaccum screening)
Total Endosulfan (surface water: direct contact by diver)	Total Endosulfan (surface water: direct contact by diver)
Total Endosulfan (surface water: direct contact by diver)	Total Endosulfan (surface water: direct contact by diver)
Total Endosulfan (surface water: direct contact by trans/beach use, drink)	Total Endosulfan (surface water: direct contact by trans/beach use, drink)
Total HPAHs (calc'd)	Total HPAHs (calc'd)
Total HPAHs (calc'd)	Total HPAHs (calc'd)
Total HPAHs (calc'd)	Total HPAHs (calc'd)
Total HPAHs (calc'd)	Total HPAHs (calc'd)
Total LPAHs (calc'd)	Total LPAHs (calc'd)
Total LPAHs (calc'd)	Total LPAHs (calc'd)
Total LPAHs (calc'd)	Total LPAHs (calc'd)
Total LPAHs (calc'd)	Total LPAHs (calc'd)
E17075011	Total of 2,4' and 4,4'-DDD
E17075011	Total of 2,4' and 4,4'-DDD
E17075011	Total of 2,4' and 4,4'-DDD
E966176	Total of 2,4' and 4,4'-DDD, -DDE, -DDT
E966176	Total of 2,4' and 4,4'-DDD, -DDE, -DDT
E966176	Total of 2,4' and 4,4'-DDD, -DDE, -DDT
E17075029	Total of 2,4' and 4,4'-DDE
E17075029	Total of 2,4' and 4,4'-DDE
E17075029	Total of 2,4' and 4,4'-DDE
E17075037	Total of 2,4' and 4,4'-DDT
E17075037	Total of 2,4' and 4,4'-DDT
E17075037	Total of 2,4' and 4,4'-DDT
PP_DDT3ISO	Total of 4,4'-DDD, -DDE, -DDT
PP_DDT3ISO	Total of 4,4'-DDD, -DDE, -DDT
PP_DDT3ISO	Total of 4,4'-DDD, -DDE, -DDT
TOC	Total organic carbon
130498-29-2	Total PAHs
130498-29-2	Total PAHs
130498-29-2	Total PAHs
Total PAHs (calc'd)	Total PAHs (calc'd)
Total PAHs (calc'd)	Total PAHs (calc'd)
Total PAHs (calc'd)	Total PAHs (calc'd)
Total PAHs (calc'd)	Total PAHs (calc'd)
1336-36-3	Total PCB Congeners
1336-36-3	Total PCB Congeners
1336-36-3	Total PCB Congeners
Total PCB Congeners (calc'd)	Total PCB Congeners (calc'd)
Total PCB Congeners (calc'd)	Total PCB Congeners (calc'd)
Total PCB Congeners (calc'd)	Total PCB Congeners (calc'd)
Total PCB Congeners (surface water bioaccum screening)	Total PCB Congeners (surface water bioaccum screening)
Total PCB Congeners (surface water: direct contact by diver)	Total PCB Congeners (surface water: direct contact by diver)
Total PCB Congeners (surface water: direct contact by trans/beach use, drink)	Total PCB Congeners (surface water: direct contact by trans/beach use, drink)
Total PCB TEQ (surface water bioaccum screening)	Total PCB TEQ (surface water bioaccum screening)

Table 7
Surface Water Analyte List

CAS Number	Analyte
Total PCB TEQ (surface water: direct contact by diver)	Total PCB TEQ (surface water: direct contact by diver)
Total PCB TEQ (surface water: direct contact by trans/beach use, drink)	Total PCB TEQ (surface water: direct contact by trans/beach use, drink)
TOTPCBS	Total PCBs
TOTPCBS	Total PCBs
TOTPCBS	Total PCBs
Total PCBs (calc'd)	Total PCBs (calc'd)
Total PCBs (calc'd)	Total PCBs (calc'd)
Total PCBs (calc'd)	Total PCBs (calc'd)
Total PCBs (calc'd)	Total PCBs (calc'd)
Total PCBs Aroclors (calc'd)	Total PCBs Aroclors (calc'd)
TOTPCDD_F	Total PCDD/F
TOTPCDD_F	Total PCDD/F
TOTPCDD_F	Total PCDD/F
TSS	Total suspended solids
TSS 0.45	Total suspended solids w/0.45 um filter
TEQ_TOTAL.0	Total TCDD toxicity equivalent (ND = 0)
TEQ_TOTAL.0	Total TCDD toxicity equivalent (ND = 0)
TEQ_TOTAL.0	Total TCDD toxicity equivalent (ND = 0)
Total TEQ - Birds	Total TEQ - Birds
Total TEQ - Birds	Total TEQ - Birds
Total TEQ - Birds	Total TEQ - Birds
Total TEQ - Fish	Total TEQ - Fish
Total TEQ - Fish	Total TEQ - Fish
Total TEQ - Fish	Total TEQ - Fish
Total TEQ - Mammals	Total TEQ - Mammals
Total TEQ - Mammals	Total TEQ - Mammals
Total TEQ - Mammals	Total TEQ - Mammals
Total Toxic Dioxin Furans (calc'd)	Total Toxic Dioxin Furans (calc'd)
Total Toxic Dioxin Furans (calc'd)	Total Toxic Dioxin Furans (calc'd)
Total Toxic Dioxin Furans (calc'd)	Total Toxic Dioxin Furans (calc'd)
Total Xylenes (calc'd)	Total Xylenes (calc'd)
156-60-5	trans-1,2-Dichloroethene
5103-74-2	trans-Chlordane
5103-74-2	trans-Chlordane
5103-74-2	trans-Chlordane
39765-80-5	trans-Nonachlor
39765-80-5	trans-Nonachlor
36643-28-4	Tributyltin ion
25323-68-6	Trichlorobiphenyl homologs
25323-68-6	Trichlorobiphenyl homologs
79-01-6	Trichloroethene
TURBID	Turbidity
75-01-4	Vinyl chloride
1330-20-7	Xylene
7440-66-6	Zinc

Table 8
Porewater Analyte List

CAS Number	Analyte
120-12-7	Anthracene
129-00-0	Pyrene
130498-29-2	Total PAHs
132-64-9	Dibenzofuran
14488-53-0	Dibutyltin ion
1461-25-2	Tetrabutyltin
191-24-2	Benzo(g,h,i)perylene
193-39-5	Indeno(1,2,3-cd)pyrene
205-99-2	Benzo(b)fluoranthene
206-44-0	Fluoranthene
207-08-9	Benzo(k)fluoranthene
208-96-8	Acenaphthylene
218-01-9	Chrysene
36643-28-4	Tributyltin ion
483-65-8	Retene
50-32-8	Benzo(a)pyrene
53-70-3	Dibenzo(a,h)anthracene
56-55-3	Benzo(a)anthracene
7429-90-5	Aluminum
7439-89-6	Iron
7439-92-1	Lead
7439-95-4	Magnesium
7439-96-5	Manganese
7439-97-6	Mercury
7440-02-0	Nickel
7440-09-7	Potassium
7440-22-4	Silver
7440-23-5	Sodium
7440-38-2	Arsenic
7440-39-3	Barium
7440-47-3	Chromium
7440-48-4	Cobalt
7440-50-8	Copper
7440-62-2	Vanadium
7440-66-6	Zinc
7440-70-2	Calcium
7664-41-7	Ammonia
78763-54-9	Butyltin ion
83-32-9	Acenaphthene
85-01-8	Phenanthrene
86-73-7	Fluorene
87-86-5	Pentachlorophenol
90-12-0	1-Methylnaphthalene
91-20-3	Naphthalene
91-57-6	2-Methylnaphthalene

Table 8
Porewater Analyte List

CAS Number	Analyte
BAPEQ	Total BaPEq
CPAH	Total cPAHs
HPAH	High Molecular Weight PAH
LPAH	Low Molecular Weight PAH
SPEC_GRAV	Specific Gravity
TSO	Total solids