INVESTIGATION REPORT

FINAL
INVESTIGATION REPORT
PORT OF OLYMPIA BUDD INLET SEDIMENT SITE

Prepared for

Port of Olympia
915 Washington Street NE
Olympia, Washington 98501

Prepared by

Anchor QEA, LLC
720 Olive Way, Suite 1900
Seattle, Washington 98101

August 2016

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FOREWORD

The information presented in this Investigation Report (Report) describes investigation activities, including field sampling and laboratory analyses and validation, presents the nature and extent of contamination, describes potential ongoing and historical sources of contamination, and describes natural recovery processes based on available data. This Report will provide the basis for evaluations presented in the Identification and Evaluation of Interim Action Alternatives Memorandum (Alternatives Memo), which will develop the conceptual site model (CSM) and cleanup levels used to develop and evaluate potential Interim Action remedial alternatives to address contaminated sediments in the Study Area.

The Port of Olympia (Port; via Anchor QEA, LLC) and the Washington State Department of Ecology (Ecology; via NewFields) both conducted chemometric studies to support identification of potential sources of dioxin/furan contamination to sediments in Budd Inlet in Olympia, Washington. Ecology's chemometric study used a similar Budd Inlet sediment dataset and is available on Ecology's Budd Inlet Site website (NewFields 2015). Both studies found three very similar underlying factors that account for most of the data variance and acknowledge that stormwater is a pathway; however, different interpretive statistical methodologies were used in each study and different conclusions were reached regarding what two of the three underlying factors represent. Ecology will use the results of their study for future decision-making at the Budd Inlet Site. A summary of the interpretation of sources associated with the factor profiles from each study is provided below.

Differences in Interpretation of Factor Profiles by Ecology and the Port

Department of Ecology (NewFields 2015)	Port of Olympia (Appendix D)
Factor 1 – Hog fuel burning	Factor 3 – Hog fuel burning
Factor 2 – Pentachlorophenol • Historical use • Current contamination	Factor 2 – Mixed urban source • Regional sediment profiles • Urban background • Sewage • Nearby catch basins
Factor 3 – PCBs • Historical use at and around the Port peninsula	Factor 1 – Mixed combustion source • Truck diesel, highway • Asphalt • Burn barrels • Medical waste incineration

The Department of Ecology has prepared a Foreword further documenting the differences between the Port of Olympia chemometric analysis and that conducted by Ecology. This Foreword can be found in Appendix D of this Report.

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/kg	micrograms per kilogram
AET	adverse effects threshold
Alternatives Memo	Identification and Evaluation of Interim Action Alternatives Memorandum
AO	Agreed Order
ARI	Analytical Resources Incorporated
ASTM	American Society for Testing and Materials
bgs	below ground surface
City	City of Olympia
cm	centimeter
cm/yr	centimeters per year
COPC	chemicals of potential concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CPT	cone penetration test
Cs-137	cesium-137
CSL	cleanup screening level
CSM	conceptual site model
CSO	combined sewer overflow
CU-TX	consolidated-undrained triaxial compression
D/F	dioxin/furan
Delson	Delson Lumber
DMMP	Dredge Material Management Program
Ecology	Washington State Department of Ecology
EDL	estimated detection limit
EISDGM	Existing Information Summary and Data Gaps Memorandum
EMPC	estimated maximum potential concentration
$g/cm^2/yr$	grams per square centimeter per year
HPAH	high-molecular-weight polycyclic aromatic hydrocarbon
HWA	HWA Geosciences, Inc.
IDW	inverse distance weighting
LAET	lowest adverse effects threshold

2LAET	second lowest adverse effects threshold
LCS	laboratory control sample
LOTT	Lacey-Olympia-Tumwater-Thurston County Clean Water Alliance
LPAH	low-molecular-weight polycyclic aromatic hydrocarbon
MLLW	mean lower low water
MS	matrix spike
MSD	matrix spike duplicate
MSS	Marine Sampling Services
MTCA	Model Toxics Control Act
ng/kg	nanogram per kilogram
OC	organic carbon
PAH	polycyclic aromatic hydrocarbon
Pb-210	lead-210
PCB	polychlorinated biphenyls
PCP	pentachlorophenol
Port	Port of Olympia
PPE	personal protective equipment
PQL	practical quantitation limit
PSEP	Puget Sound Estuary Protocol
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
r^2	Correlation coefficient
RBTC	risk-based threshold concentration
Report	Investigation Report
RI	remedial investigation
RPD	relative percent difference
RSS	Research Support Services
SAP	Sampling and Analysis Plan
SCO	sediment cleanup objective
SCUM II	Sediment Cleanup User Manual II
SMS	Sediment Management Standards
SPT	Standard Penetration Test
SQS	sediment quality standards

SRM	standard reference material
SVOC	semi-volatile organic compounds
SWAC	spatially weighted average concentration
TEF	toxic equivalency factors
TEQ	toxic equivalence or toxic equivalency
TOC	total organic carbon
TS	total solids
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VST	vane shear testing
Work Plan	Budd Inlet Sediment Site Work Plan

1 INTRODUCTION AND BACKGROUND

This Investigation Report (Report) has been prepared as required by an amendment to Agreed Order (AO) No. DE 6083 (Ecology 2008a and 2012) between the Port of Olympia (Port) and the Washington State Department of Ecology (Ecology). The amendment requires that additional investigations be conducted into the nature and extent of contamination and potential sources of contamination to sediments in the vicinity of the Port peninsula in Budd Inlet (Figure 1-1). This Report is a component of Task 3 as described in the Budd Inlet Sediment Site Work Plan (Work Plan; Anchor QEA 2012a) and presents the results of the chemistry and geotechnical sediment investigations completed under the Port's Budd Inlet Sediment Site Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP; Anchor QEA 2013a). Additional information, such as a summary of the nature and extent of sediment contamination, source evaluations, and natural recovery processes, are also included in this Report. These additional components are based on the new data presented in this Report and the historical data presented in the Existing Information Summary and Data Gaps Memorandum (EISDGM; Anchor QEA 2012b).

1.1 Purpose of Report

The information presented in this Report describes investigation activities, including field sampling and laboratory analyses and validation, presents the nature and extent of contamination, describes potential ongoing and historical sources of contamination, and describes natural recovery processes based on available data. This Report will provide the basis for evaluations presented in the Identification and Evaluation of Interim Action Alternatives Memorandum (Alternatives Memo), which will develop the conceptual site model (CSM) and cleanup levels used to develop and evaluate potential Interim Action remedial alternatives to address contaminated sediments in the Study Area.

1.2 Site Description and Background

The Port is located in the northern portion of the City of Olympia (City) on a peninsula within Budd Inlet, which is a small embayment in southern Puget Sound (Figure 1-1). Budd Inlet is divided into West Bay and East Bay in the southernmost point of Budd Inlet. The filling of tidelands in the late 1800s and early 1900s created the Port peninsula, West Bay and

East Bay of Budd Inlet, and the downtown area of Olympia. The Port peninsula consists of approximately 150 acres; the entire Study Area is approximately 271 acres.

A summary of West Bay, East Bay, and the Study Area are provided below. Detailed background information related to property features, regulatory background, and historical operational uses are presented in the EISDGM (Anchor QEA 2012b).

1.2.1 West Bay

The Olympia Harbor federal navigation channel extends into Budd Inlet's West Bay widens into a turning basin near its southern end, adjacent to the Port's Marine Terminal berthing area (Figure 1-2). The Port manages the harbor area under a Port Management Agreement with the Department of Natural Resources. Along the Marine Terminal, the harbor area is mostly defined as a 54-foot-wide swath that extends from the south end of the Marine Terminal to the north end and beyond (Figure 1-2). This narrow swath extends from the face of the Port's Marine Terminal landward, thus including the under-wharf area of the Marine Terminal. Waterward of the Marine Terminal, the berthing areas coincide with the federal turning basin (Port of Olympia 2008).

The Marine Terminal is approximately 60 acres and provides approximately 2,500 lineal feet of wharf and 76,000 square feet of warehousing. Three modern ships, or a combination of vessels, can be hosted simultaneously at the Marine Terminal. Current upland use immediately adjacent to the berths and turning basin include log storage yards and loading docks (Port of Olympia 2008).

The area south of the Marine Terminal includes a boat basin and waterfront shops and restaurants. West Bay also contains three marinas: Fiddlehead, Martin, and the Olympia Yacht Club. Within West Bay, five contaminated sites under separate AOs with Ecology are located along the western shoreline: Westbay Marina, Hardel Mutual Plywood, Reliable Steel, Solid Wood, Inc., and Industrial Petroleum, Inc. (Figure 1-2).

At the southern end of West Bay, the Deschutes River drains into Capitol Lake. This area was once an estuary where freshwater from the Deschutes River intermingled with salt water from Budd Inlet. The lake was created in 1951 as a reflection pond for the State

Capitol by installing an earthen dam and an approximately 82-foot wide tide gate with spillways across the mouth of the Deschutes River under the 5th Avenue Bridge in Olympia (USGS 2006). The flow of freshwater into West Bay is controlled by gated discharges from Capitol Lake.

1.2.2 East Bay

A second federal navigation channel is authorized from north of the peninsula that extends into Budd Inlet East Bay to elevation –13 feet mean lower low water (MLLW). The primary commercial facilities in East Bay are Swantown Marina and Swantown Boatworks, located on the eastern side of the peninsula (Figure 1-2). The federal navigation channel also extends to the boat launch ramp located just north of Swantown Marina. Swantown Marina has been in operation since 1983 (previously referred to as East Bay Marina prior to 1995) and is owned and operated by the Port and maintains slips for approximately 700 vessels. Swantown Boatworks provides vessel service, haul out, and a vessel storage facility (SAIC 2008).

Two contaminated sites under AOs with Ecology are located on the Port peninsula adjacent to East Bay (Figure 1-2); the Cascade Pole cleanup site is located on the north end of the peninsula that includes a portion of the sediment within East Bay, and East Bay Redevelopment Site is on the southern portion of the peninsula.

Moxlie/Indian Creek, which originates from an artesian spring approximately 1.5 miles south of Budd Inlet, flows into East Bay through a mile-long culvert that discharges at the southern end of East Bay (Anchor QEA 2012b). East Bay was placed on the 1998 303(d) impaired water list for polychlorinated biphenyls (PCBs) based on a single composite sample of mussel tissue collected from the culvert at the mouth of Moxlie/Indian Creek (Ecology 2003 as cited in SAIC 2008).

1.2.3 Study Area Boundary

Figure 1-2 shows the boundaries of the Study Area along with relevant historical and current site features, such as Ecology-listed contaminated sites, historical wood waste burners, and current operators (e.g., marinas and Port). The AO Amendment defines the Study Area boundary; however, the Interim Action cleanup boundary may extend beyond. The Study Area boundary includes the aquatic areas adjacent to property owned by the Port, which comprises of the Port's berthing areas, under-wharf areas, and log pond in West Bay, and areas adjacent to Port property north of the peninsula and in East Bay, as shown in Figure 1-2. The former Cascade Pole site is excluded from the Study Area since it is being investigated and remediated under a separate AO between the Port and Ecology as shown on Figure 1-2.

1.3 Document Organization

The first part of this Report provides the details of the recent sampling and analyses conducted under the SAP/QAPP (Anchor QEA 2013a) and a presentation of the testing results and data quality. The subsequent sections regarding nature and extent, potential ongoing sources, and natural recovery processes in and around the Study Area are based on the comprehensive dataset (2013 data and historical data). The Report is organized as follows:

- Section 2 – Field Sampling Summary: Provides an overview of the 2013 field sampling components, including any deviations from the SAP/QAPP
- Section 3 – Data Quality: Presents a summary of the 2013 data quality objectives and the results of data validation
- Section 4 – Sample Results: Presents the chemical testing results for the 2013 subsurface sediment, surface grabs, and geotechnical testing
- Section 5 – Nature and Extent of Contamination: Includes an evaluation of the nature and extent of contamination based on the comprehensive dataset compiled from the EISDGM and 2013 studies
- Section 6 – Source Evaluations: Includes source evaluations, fingerprinting, and multivariate statistical analysis of dioxin/furans (D/Fs)
- Section 7 – Natural Recovery Processes: Presents data related to natural recovery processes such as sedimentation and erosion
- Section 8 – Investigation Summary: Provides a concise summary of conclusions presented in this Report
- Section 9 – References: Lists references cited in development of this Report
- Tables, Figures, and Appendices – Contain the field data, laboratory data, data validation reports, and chemometric statistical evaluations

2 FIELD SAMPLING SUMMARY

Section 2 describes the sampling and processing protocols used for the sediment chemistry, geochronology, and geotechnical field tasks and describes any SAP/QAPP deviations. Figure 2-1 shows the sampling locations. Tables 2-1, 2-2, and 2-3 provide field data, including sample coordinates, mudline elevation, sample recovery, testing parameters, and visual observations.

2.1 Sediment Sampling and Processing

2.1.1 Surface Grabs

Surface grabs were collected from the upper 10 centimeters (cm) of sediment to provide information on the nature and extent of contamination in the bioactive zone. Sixty-five surface grab samples were collected as part of the Budd Inlet Characterization Study. Table 2-1 provides a field data summary of all surface grab samples. Most samples were collected using a hydraulic powergrab operated by Marine Sampling Services (MSS) aboard the MSS vessel *Nancy Anne* on March 6, 7, 8, 11, 12, and 13, 2013. Sediment samples from three under-pier locations were collected using an Ekman grab operated by Anchor QEA aboard the Research Support Services (RSS) vessel *Carolyn Dow* on March 11 and 12, 2013. Five supplemental samples were collected using an Ekman grab aboard an Anchor QEA vessel on May 22, 2013. The Anchor QEA vessel was used for the supplemental sampling because the research vessels had already mobilized away from the site for other project work. For all 65 surface sediment grabs, full recovery was obtained and all processing procedures outlined in the SAP/QAPP (Anchor QEA 2013a) were followed with the exception of minor deviations described in Section 2.3. Appendix A-1 presents the field sediment collection forms.

Chemical analyses were conducted by the Ecology accredited laboratory Analytical Resources Incorporated (ARI), in Tukwila, Washington. All surface sediment samples were submitted for the following chemical tests:

- D/Fs by U.S. Environmental Protection Agency (USEPA) method 1613B
- Grain size by Puget Sound Estuary Protocol (PSEP)
- Polycyclic aromatic hydrocarbons (PAHs) by USEPA method 8270D
- Total organic carbon (TOC) by method Plumb, 1981
- Total solids (TS) by method SM2540B

All surface sediment samples were analyzed for D/Fs, as these are the primary chemical of interest for the Budd Inlet Sediment Site Investigation. At the request of Ecology, PAHs were also analyzed at all surface sediment locations. Select samples near potential sources (e.g., outfalls or based on areas with known historical elevated contaminant levels) were additionally analyzed for the following chemical tests:

- Sediment Management Standards (SMS) metals by USEPA methods 6010C and 7471A
- SMS semi-volatile organic compounds (SVOCs) by USEPA method 8270D
- PCB aroclors by USEPA method 8082 following PSEP

Analytical results are discussed in Section 4.2.1.

2.1.2 Subsurface Cores

Subsurface cores were collected to provide data on the vertical extent of elevated concentrations of contaminants. Fifty cores were collected for chemical analysis and four cores were collected for geochronological (i.e., radiochemistry) analysis. All cores were collected using a 4-inch-diameter decontaminated aluminum core tube barrel driven by a hydraulic vibracorer (Figure 2-1). Forty-six cores were collected aboard the MSS vessel Nancy Anne on February 25 and 28, and March 1, 4, 5, and 6, 2013. MSS used 15-foot length core tubes. Eight under-pier locations were collected aboard the RSS vessel Carolyn Dow on March 11 through March 14, 2013. RSS used varying length core tubes (8-, 10-, or 12-foot lengths).

Cores were driven down to the target depth, or until refusal, and then winched up on to the vessel. The percent recovery of each core was calculated based on the recovered length of sediment and the penetration depth. Sediment core tubes were sliced into 5-foot sections and transported upright using a refrigerated truck to the processing facility (ARI) at the end of each collection day. All cores were kept at less than 6 degrees Celsius and processed within 72 hours of collection. Cores were collected, logged, and processed in accordance with the SAP/QAPP (Anchor QEA 2013a) with the exception of minor deviations described in Section 2.3. Tables 2-2 and 2-3 present a summary of the field data and samples collected from each chemistry and geochronology core, respectively.

For the chemistry cores, targeted sample intervals were adjusted based on percent recovery (core drive by recovered length) assuming uniform compaction throughout the core. Appendix A-2 presents the field core collection logs and Appendix A-3 includes the compaction corrected sediment core logs. Select sample intervals from each chemistry core were analyzed for D/Fs, grain size, TOC, and TS. Some samples were also analyzed for SMS parameters (SVOC, PCBs, and metals). The remaining collected samples were frozen at the laboratory for potential future analysis. A tiered approach was used for sample analysis (i.e., deeper intervals were tested based on the chemical concentration of the higher intervals) to determine the depth of elevated chemical concentrations. Analytical results are discussed in Section 4.2.2.

The four geochronology cores were sliced into 2-cm sections throughout the length of the core. Because of volume restrictions and good core collection recoveries (ranging from 91 to 97 percent), sample intervals taken from geochronology cores were not adjusted for compaction. Select samples based on the predicted cesium-137 peak were submitted for analysis at Mass Spec Services in Orangeburg, New York. Geochronology data evaluation, including sedimentation rate determination, is presented in Section 7.1.1.

2.2 Geotechnical Sampling and Processing

Geotechnical explorations consisted of eight hollow-stem auger borings, three cone penetration tests (CPTs), ten vane shear tests, four jet probe transects, and seven debris observation transects (Figure 2-2). To complete the geotechnical sampling design as described in the SAP/QAPP (Anchor QEA 2013a), three separate field efforts were conducted. Upland soil borings were performed at locations SB-1, SB-3, SB-4, and SB-7 and CPTs were performed at locations CPT-1, CPT-2, and CPT-3 between February 25 and 27, 2013. The locations of these explorations are shown on Figure 2-2. In-water soil borings were performed via a barge at locations SB-2, SB-5, SB-6, and SB-8 between March 12 and 14, 2013. All jet probe transects, debris observation transects, and vane shear tests were performed between May 21 and 22, 2013. Details of each exploration method (soil boring, CPT, vane shear, jet probe, and debris observation) are presented in the following subsections. All samples were collected, logged, and processed in accordance with the SAP/QAPP (Anchor QEA 2013a) and delivered to the HWA Geosciences Inc. (HWA) laboratory located in Bothell, Washington. Minor deviations with respect to sampling locations are described in Section 2.3.

2.2.1 Soil Borings

Soil borings were performed to investigate and characterize the geotechnical properties of sediments and soils to support development and evaluation of potential remedial alternatives. The borings were performed at in-water and upland locations to supplement existing geotechnical exploration data previously collected for other studies, as described in the EISDGM (Anchor QEA 2012b). Upland soil borings at SB-1, SB-3, SB-4, and SB-7 were advanced using a truck-mounted, hollow-stem auger drill rig provided and operated by Holocene Drilling. In-water soil borings SB-2, SB-5, SB-6, and SB-8 were performed in water with a barge using the same truck-mounted drill rig and drill method, which was mobilized onto the marine salvage vessel, the *Seahorse*. The vessel was internally powered and held stationary over the in-water boring location by deploying spud piles on the starboard and port sides of the vessel. Soil boring locations are shown on Figure 2-2. Boring logs for the eight soil borings are included in Appendix A-4.

Samples from soil borings were collected at regular intervals from the ground surface and mudline downward using two methods: split-spoon (American Society of Testing and Materials [ASTM] D1586) and Shelby tube sampling (ASTM D1587). Geotechnical index test samples were collected using a split-spoon sampler to allow Standard Penetration Test (SPT) blow counts to be recorded. SPT sampling was performed using an automatic trip hammer with a hammer efficiency of 6 percent for a 140-pound weight with a 30-inch, free-fall height. Split-spoon samplers had a 2-inch outside diameter with a smooth interior diameter of 1.375 inches. Blow counts were recorded for each 6-inch interval of the sampler that was driven. A total drive length of 18 inches was performed unless refusal was encountered. Refusal is defined as a blow count value of 50 for a drive interval of 6 inches or less and was encountered in borings SB-4 and SB-5 at elevations of -46.0 and -58.6 feet MLLW, respectively.

Geotechnical samples for testing strength, consolidation, bulk density, and dynamic properties were obtained using stainless-steel, thin-walled Shelby tubes. Samplers used had a 3-inch outside diameter and were 30 inches in length. Shelby tubes were advanced into the soil stratum using hydraulic pressure applied by the drill rig. Samplers were advanced 24 inches and allowed to rest several minutes before extraction. Following extraction from the borehole, samples were classified based on visual observations at the end of the tube and sealed, stored, and handled as described in the SAP/QAPP (Anchor QEA 2013a).

2.2.2 Cone Penetration Test

CPT was performed to investigate and characterize the geotechnical properties of sediments and soils to support development and evaluation of potential remedial alternatives. Three CPTs were performed at upland locations: two near the log pond and one at the approximate middle of the Marine Terminal. The CPTs were performed with porewater pressure readings made during advancement, and seismic shear wave velocity measurements made at approximately 5- to 10-foot intervals. In addition, pore pressure dissipation tests were performed three times for CPT-1 and CPT-2 and four times for CPT-3. The three CPTs were originally proposed to be advanced to a depth of 100 feet below ground surface (bgs). During advancement, a dense gravel layer was encountered at approximately 55 to 60 feet bgs for all CPTs, which resulted in refusal of the cone. CPTs were terminated in the dense gravel layer, and a final pore pressure dissipation test was performed. Logs from the CPT tests are presented in Appendix A-4.

2.2.3 Vane Shear Test

Vane shear testing (VST; ASTM D 2573) was performed to characterize the shear strength of near surface sediments. VST was performed at ten locations around West Bay and East Bay of Budd Inlet. The tests were conducted on May 22, 2013. Tests were performed using RocTest vane borer Model H-60 at depth intervals 1 to 2 feet below the mudline. Both peak and residual undrained strengths were measured. Testing results are presented in Section 4.

2.2.4 Underpier Probing and Debris Observations

A dive team conducted a visual survey of surficial debris and the condition of the riprap slope and its current extents under the pier. The debris and riprap observations were performed by a two-person dive crew to collect the following information: debris type, relative size, location from the pierface, and condition of the riprap slope. The debris observed for each transect is referenced in feet upslope from the pierface on diagrams in

Appendix A-4. Measurements were made using a tape measure referenced to the pierface. Following placement of the measuring tape, the divers started from the pierface and moved up to the exposed riprap slope to observe debris. The video was viewed in the wheelhouse of the dive boat by Anchor QEA field staff, which characterized the debris, recorded respective measurements, and diagrammed the layout of the debris. Anchor QEA field staff and divers communicated using underwater transponders. Results of debris observed at each transect is depicted on figures included in Appendix A-4.

A variety of debris was observed at the seven transects, including the following:

- Loose riprap
- Timber and concrete piles (broken, laying horizontal), estimated to be up to 20 feet in length
- Timber pile stubs (i.e., embedded piles broken off several feet above the mudline)
- Loose or buried cables
- Metal debris piles
- Steel pipes
- Rubber tires

Probing was conducted using a metal rod, rather than jet probing described in the SAP/QAPP (Anchor QEA 2013a). Probing indicated the presence of loose riprap at all locations for a distance of 5 to 11 feet immediately down slope of the exposed riprap slope toe, which resulted in a distance of 40 to 75 feet from the pierface. Sediment thickness above the riprap at the lowest extent of riprap on the slope was measured to be less than 0.5 feet.

2.3 Deviations from Sampling and Analysis Plan and Quality Assurance Project Plan

Deviations from the approved SAP/QAPP were generally determined on site during the field investigation events. Provided is a description of these deviations.

2.3.1 Sediment

- All surface grabs were collected within 2 meters of the target sampling location except for two under-pier locations [SS-10 (16.5 m) and SS-17 (2.1 m)] which were moved offshore (perpendicular to the pier) due to riprap or debris, and three shoreline locations [SS-3 (4.5 m), SS-39 (7.1 m), and SS-59 (6.3 m)] that were moved slightly offshore due to tidal restrictions or presence of large gravel/riprap.

- Five supplemental surface grab locations were added to further investigate the potential for contaminant sources near outfalls south of the Study Area in West Bay (SS-61, SS-62, SS-63, SS-64, and SS-65).
- Subsurface cores were attempted at the target coordinates. If low recovery or refusal occurred, locations were moved a short distance (within 10 m) of the target coordinates. Locations near the pier were moved parallel to the pier face. All subsurface cores were collected within 10 m of the target sampling coordinates except for four under-pier locations [(SC-11 (16.0 m), SC-12 (15.2 m), SC-17 (10.3 m), and SC-19 (11.3 m)], which were moved offshore (perpendicular to the pier) due to riprap or debris.
- For under-pier locations (subsurface cores and surface grabs), no GPS was accessible. A GPS location was collected at the pier face, and the station coordinates were estimated in CAD based on measured distance beneath the pier.
- Mudline elevations recorded at the following subsurface cores were substantially different (+/- 5 feet) than the elevations from the February 12, 2011, U.S. Army Corps of Engineers (USACE) bathymetric survey: SC-06 (-11 feet), SC-11 (-12.5 feet), SC-12 (-18.4 feet), SC-17 (-17.6 feet), SC-19 (-22.5 feet), SC-20 (-7.3 feet), SC-22 (-7.1 feet), SC-23 (-7.9 feet), SC-47 (+9.8 feet), SC-50 (+5.6 feet), GC-02 (-15.4 feet), GC-04 (+14.2 feet). Most of these locations are underpier at the Port Marine Terminal, where bathymetric measurements are less accurate and small changes in sampling location can affect actual elevation.
- Subsurface cores all achieved the target penetration depths except for SC-18, which had a target penetration of 14 feet and actual penetration 11.9 feet (highest recovery after three attempts).
- Subsurface cores all achieved the target recovery of 75 percent except for 12 cores. Of those 12 cores, 7 had recoveries of 70 percent or greater (SC-20 [73 percent], SC-28 [73 percent], SC-35 [70 percent], SC-36 [74 percent], SC-37 [71 percent], SC-42 [74 percent], and SC-45 [74 percent]). Four cores were under-pier or pier face locations (SC-07 [67 percent], SC-10 [45 percent], SC-15 [61 percent], and SC-22 [66 percent]). SC-05 was located offshore of the pierface and had a best recovery of 55 percent.

Anthropogenic debris, riprap, mussel shells, and wood waste were the primary causes of these low recoveries. The attempt with the highest percent recovery was retained for processing.

- Full penetration and recovery was not obtained at most locations, which resulted in the bottom interval collected from some subsurface cores as being less than the target interval stated in the SAP.
- Sample intervals differed from the SAP for several subsurface cores due to differences in estimated and actual mudline elevations, recovered core lengths, and field observation-based sampling (e.g., as a result of sediment stratigraphy). The following cores had differences: SC-04, SC-06, SC-07, SC-08, SC-09, SC-10, SC-15, SC-18, SC-20, SC-22, SC-23, SC-30, SC-35, SC-46, SC-49, and SC-50.
- As specified in the SAP, a tiered approach was used to determine which intervals from each core should be analyzed for one or more chemical parameters. The following additional samples [stations (with core intervals)] were added to the testing program: SC-02 (1-2, 4-5 feet), SC-04 (11.8-13.5 feet), SC-08 (5.4-6.4, 7.4-8.4 feet), SC-09 (8-9, 9-10 feet), SC-10 (8.2-9.1 feet), SC-11 (8-10 feet), SC-12 (8-10, 10-11.2 feet), SC-13 (9.5-10.4, 10.4-11.4 feet), SC-14 (1-2, 2-3 feet), SC-15 (8.7-9.7, 9.7-10.7 feet), SC-16 (6-7 feet), SC-17 (8-10 feet, 10-11.1 feet), SC-18 (9.7-10.7 feet), SC-19 (8-10, 10-11.2 feet), SC-20 (7.7-8.7 feet), SC-22 (10.6-12.1, 12.1-12.9 feet), SC-25 (1-2 feet), SC-26 (1-2 feet), SC-27 (4-5 feet), SC-28 (1-2 feet), SC-31 (1-2 feet), SC-32 (0-1, 1-2 feet), SC-33 (1-2 feet), SC-34 (0-1 feet), SC-35 (0-1 feet), SC-36 (4-5 feet), SC-37 (1-2 feet), SC-38 (1-2 feet), SC-39 (1-2, 3-4 feet), SC-40 (1-2 feet), SC-41 (1-2, 2-3 feet), SC-42 (1-2 feet), SC-43 (2-3 feet), SC-44 (2-3, 3-4 feet), SC-45 (1-2, 2-3 feet), SC-47 (2-3, 3-4 feet), SC-48 (1-2 feet), SC-49 (2-3, 3-4, 4-6, 6-8, 10.5-11.4 feet), SC-50 (3-4, 4-6, 6-8, 8-9.3, 12.4-13 feet).
- For geochronology cores, lead-210 and cesium-137 were initially analyzed for every third sample within a core. These intervals were selected in order to measure the range of potential historical sediment deposition rates. Additional samples were triggered based on the first round of data results.
- TOC and TS analyses were omitted from the geochronology samples due to insufficient sample volume. These analyses were intended to provide supplemental information and do not impact the data quality objectives of the sedimentation rate determination.

- In core SC-22, samples were collected every recovered 1 foot rather than every 2 feet in situ to allow more resolution for chemical characterization.

2.3.2 Geotechnical

- Soil borings SB-01 and SB-03 were moved approximately 270 feet to the south and 50 feet to the north, respectively, due to an inability to safely extend drilling equipment over the edge of the Marine Terminal. Therefore, SB-01 and SB-03 were performed at the south and north ends of the Marine Terminal, respectively, where drilling could safely be performed.
- CPT explorations were terminated approximately 40 to 45 feet shallower than the proposed depth of 100 feet bgs due to refusal from gravelly soils encountered during advancement.
- Vane shear test VST-1 was moved 122 feet to the west. The test was performed at the new location; however, the presence of granular sediments produced unreliable test results for purposes of estimating the undrained shear strength. The granular nature of the sediments was the only data recorded at this location. Vane shear test VST-6 was moved 270 feet to the north to perform the test in shallower water due to water depth limitations to the testing apparatus. Vane shear tests VST-2, VST-3, VST-4, and VST 10 were moved approximately 240 to 330 feet toward the navigation channel to seek deeper water due to draft requirements of the vessel.
- Jetting using a water pump to advance the probe was unnecessary as the diver crew was able to advance the probe using mechanical means.

2.4 Sample Handling and Shipment

All samples were delivered to the laboratory by Anchor QEA staff within holding time and temperature requirements. Sediment samples were delivered to ARI. Geotechnical samples were delivered to HWA. HWA stored samples in a moisture-controlled environment until testing could be performed. Geochronological samples were submitted for analysis to Mass Spec Services. There are no temperature or holding time requirements for radiochemistry testing.

2.5 Investigative Waste Management

Investigation-derived waste material generated during the sampling event included excess sediment core sample processing materials not used for sample analyses, soil cuttings generated during boring activities, and disposable sampling supplies and personnel protective equipment (PPE) used in sample processing.

Clean sampling supplies and PPE were disposed of in the City's municipal solid waste system. Solids (i.e., sediment and soil) and wastewater (i.e., decontamination and drilling process water) were stored in 55-gallon drums on site until waste characterization was completed. Waste management was facilitated by PSC. Solid waste was picked up on June 20 and 27, 2013 and transported to the Alaska Street Reload and Recycling Facility in Seattle, Washington, under manifest numbers 865207-13 and 869761-13, respectively. Wastewater was treated at Burlington Environmental in Tacoma, Washington, prior to disposal into the City of Tacoma's municipal wastewater system.

3 DATA QUALITY

This section provides a summary of project quality assurance/quality control (QA/QC) objectives for chemical testing data, and provides the findings of data validation activities.

3.1 Testing Labs and Methods

Chemical testing was performed by ARI. ARI is certified by Ecology and the National Environmental Laboratory Accreditation Program (NELAP). Mass Spec Services performed the radiochemistry testing. HWA performed the geotechnical testing.

All analyses conformed to procedures described in the approved SAP/QAPP (Anchor QEA 2013a). Appendix B provides the laboratory data reports and Appendix C provides the data validation reports.

Chemical testing adhered to the QA/QC procedures suggested in SW-846 (USEPA 1986) method, Ecology SMS guidance, and/or Puget Sound Sediment Reference Material guidance (USACE 2013). The data validations of the chemistry results were performed under USEPA National Functional Guidelines for Data Review (2008, 2010, and 2011) and USACE Puget Sound SRM guidance (USACE 2013). External data validation was not conducted for geotechnical and geochronology testing because there is no prescribed validation guidance for these tests. These tests were evaluated internally based on completeness and method QA/QC requirements, if applicable.

3.2 Data Quality Objectives

The SAP/QAPP (Anchor QEA 2013a) was written to ensure that data of acceptable quality were generated to support the sediment investigation. The quality of the laboratory data is assessed by precision, accuracy, representativeness, comparability, and completeness. Applicable quantitative goals for these data quality parameters were listed in Table 7-3 of the SAP/QAPP (Anchor QEA 2013a). Each parameter is discussed below:

- Precision: Laboratory precision was measured with matrix spike (MS)/matrix spike duplicate (MSD) analyses; and laboratory duplicate analyses. Precision goals were generally met, and in cases where they were not, data were qualified as estimated according to USEPA National Functional Guidelines (2008, 2010, and 2011).

- Accuracy and Bias: Accuracy was measured with laboratory control sample (LCS), standard reference material (SRM), MS, and MSD sample percent recoveries. Accuracy goals were generally met, and in cases where they were not, data were qualified as estimated according to National Functional Guidelines (2008, 2010, and 2011). In these instances, the usability of the data was determined by the extent of the exceedance. The validation reports submitted in Appendix C specify the specific outliers and whether the bias was high or low.
- Representativeness: The list of analytes has been identified to provide a comprehensive assessment of the known and potential contaminants at the sampling sites.
- Comparability: The laboratory used common traceable calibration standards, spiking standards, and regional reference materials. Specific information can be found in the laboratory data packages (Appendix B).
- Completeness: Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. The completeness goal of 95 percent was met.

3.3 Quality Assurance/Quality Control Findings

The overall data QA/QC program for the sediment investigation evaluation followed procedures presented in the SAP/QAPP (Anchor QEA 2013a). Measures were taken to ensure data quality meets the requirements specified by Ecology protocols (Ecology 2015).

3.3.1 Field Quality Assurance/Quality Control

Field QA/QC procedures used for this project included collecting field duplicate samples at a frequency of 1 per 20 samples, and avoiding cross contamination between sample intervals and locations. Field duplicates were prepared by splitting a field sample (grab or core) after compositing/homogenization. Field duplicates were screened against a 50 relative percent difference (RPD) criteria. In general, field duplicate RPDs were well within this criteria indicating that samples were homogenized adequately during sample processing.

3.3.2 Laboratory Quality Assurance/Quality Control

Project-specific action limits based on regional criteria (Ecology 2008b; USACE 2013) were used to assess the precision and accuracy of method blanks, LCS, MS/MSD, SRM, and laboratory replicate samples. The frequencies and control limits of these quality control samples are listed in Tables 7-2 and 7-3 of the SAP/QAPP, respectively (Anchor QEA 2013a). Any quality control results that exceeded these criteria were qualified in the validation process. A summary of all qualified data can be found in the data validation report(s) in Appendix B.

3.3.3 Data Review and Validation

All chemical data submitted in this Report were validated by Laboratory Data Consultants in Carlsbad, California. All results were checked for completeness (correct method, hold times met, results reported for each sample). All analytical results were validated at an USEPA Stage 2A level except D/F results, which were validated at a Stage 4 level according to regional advisory guidance (USACE 2013). The data validations were performed under USEPA National Functional Guidelines for Data Review (2008, 2010, and 2011) and USACE Puget Sound SRM guidance (USACE 2013).

Data validation verified the accuracy and precision of chemical determinations performed during this investigation. Data qualifiers assigned because of the data validation and their definitions are shown on each of the respective analytical results tables. Data may have been qualified as biased or estimated for a particular analysis based on method or technical criteria. Data qualified with a "J" indicates that the associated numerical value is the approximate concentration of the analyte. Data qualified with a "UJ" indicates the approximate reporting limit below which the analyte was not detected. Consequently, these data qualifications are not expected to impact the data quality objectives.

D/F results qualified with the estimated maximum potential concentration (EMPC) data qualifier indicate a response that did not meet all requirements of positive identification, specifically the ion abundance ratio for the quantitation ions. EMPC qualifiers were retained in this dataset. Many samples had one or more EMPC qualifications in the results. The majority of these results were in low level detections or total homolog fractions. Total homologs were qualified if any congener within the total (210 congeners total) was qualified. Data validation indicated that the method protocols were followed, and the data are usable as qualified.

All sediment investigation data were determined to be useable as reported from the laboratory or as qualified in this Report for the purposes of sediment characterization.

4 SAMPLE RESULTS

This section describes the data reporting procedures used in the Report and presents the laboratory results for the surface and subsurface sediment and geotechnical samples collected in 2013.

4.1 Data Reporting Procedure Summary

The various data reporting procedures used in the data tables are described in the following subsections.

4.1.1 Toxic Equivalency and Chemical Sum Calculations

4.1.1.1 Toxic Equivalency Calculations

D/F congener toxic equivalency (TEQ) is calculated using the World Health Organization consensus toxic equivalency factor (TEF) values (Van den Berg et al. 2006) for mammals as presented in Table 4-1. The TEQ is calculated as the sum of each congener concentration multiplied by the corresponding toxic equivalency factory (TEF) value.

Carcinogenic PAHs (cPAHs) are presented as TEQ sums, calculated by using the TEFs presented in Table 4-2, from Model Toxics Control Act (MTCA) guidance (Ecology 2007).

4.1.1.2 Chemical Sum Calculations

The Sediment Cleanup User Manual II (SCUM II, Ecology 2015) recommends summing rules for calculated totals of grouped chemicals. When all results that are part of a total are detect, the sum is simply the total of the detections. Several summing methods are available when components of the total are non-detect, all of which minimize the bias introduced in the summed result. The more non-detects present in a sample, the more likely a bias could be introduced in the summed result. The results provided in this Report include multiple summation rules to provide a range of bias that may be present in the calculated result as well as accommodate the emerging methods of addressing non-detects and other debatable values (i.e., EMPCs). The following summation rules are used in this Report, when applicable:

- The constituents included in SMS parameter sums (low-molecular-weight polycyclic aromatic hydrocarbon [LPAH], high-molecular-weight polycyclic aromatic hydrocarbon [HPAH], Aroclors, and benzofluoranthenes) follow the summing rules in WAC 173-204-320(2b).
- EMPC values are reported as is (EMPC included) and EMPC = U at the EMPC value (Ecology 2015 - Appendix). EMPC values are only relevant to D/F TEQ sums.
- SMS rules do not provide guidance for TEQ sums (cPAH and D/F). For this dataset TEQs were calculated with non-detect values (U) reported as U=0 and U=1/2 of the method detection limit (MDL), 1/2 of the estimated detection limit (EDL) for D/Fs, or 1/2 of the EMPC for D/Fs with an EMPC qualifier (when using the EMPC = non-detect calculation). Sums presented on figures include the EMPC and use U=0.

4.1.2 Screening Criteria

For the purposes of this Report, SMS chemicals are screened against SMS benthic criteria. Results of D/Fs and cPAHs are also presented in this Report. DFs are screened against a range of arbitrary thresholds (i.e., 0-5, 5-10, 10-20, 20-40, 40-100, 100-500, and greater than 500 nanograms per kilogram [ng/kg]). These results will be further screened in the Alternatives Memo based on practical quantitation limits (PQLs), regional and/or natural background levels, and risk-based threshold concentrations (RBTCs) developed for the protection of human health.

4.1.2.1 Sediment Management Standards Parameters

Sediment results were screened against SMS criteria: the sediment quality standard (SQS) and cleanup screening level (CSL). The SQS corresponds to "a sediment quality that will result in no adverse effects, including no acute or chronic adverse effects on biological resources and no significant health risk to humans" (Ecology 2013). The SQS is specific to benthic criteria. A sediment cleanup objective (SCO) that includes human health criteria will be established in the Alternatives Memo. The CSL is a minor adverse effects level, which is the minimum level to be achieved in all cleanup actions under SMS.

For some chemicals, the SMS criteria are based on organic carbon (OC)-normalized concentrations. If the TOC content of a sediment sample is outside of the recommended range for marine sediment OC normalization (less than 0.5 percent or greater than 5 percent; Ecology 2015), then dry-weight concentrations were compared with the marine sediment adverse effects threshold (AET) criteria (Ecology 2015). The AETs are defined as the sediment concentration of a contaminant above which statistically significant adverse effects are expected to occur. The AETs are defined on a dry weight basis and were developed for amphipod, oyster, benthic, and microtox thresholds (PTI 1988). The lowest AET (LAET) is functionally equivalent to the SQS, and the second lowest AET (2LAET) is functionally equivalent to the CSL.

4.1.2.2 Dioxins and Furans

D/F results are presented as TEQ sums reported in ng/kg units. No standard numeric criteria for D/Fs are promulgated in SMS for sediment, but concentrations are screened against a range of thresholds in this Report. The lowest screening level (5 ng/kg) is the PQL identified in the SCUM II guidance (Ecology 2015). Additional screening levels will be developed in the Alternatives Memo to use as the TEQ-based cleanup level, based on calculated human health thresholds, background values, and PQL.

4.1.2.3 Carcinogenic Polycyclic Aromatic Hydrocarbons

The results for cPAHs are presented as TEQ sums reported as micrograms per kilogram (µg/kg) units. No standard numeric criteria for cPAHs are promulgated in SMS for sediment. The lowest screening level (9 µg/kg) is the PQL identified in the SCUM II guidance (Ecology 2015). Additional screening levels will be developed in the Alternatives Memo to use as the TEQ-based cleanup level, based on calculated human health thresholds, background values, and PQL.

4.2 Sediment Results

The following subsections provide a brief summary of the results from surface grabs, subsurface cores, and geotechnical borings. In Section 5, this data is used in combination with the historical data presented in the EISDGM (Anchor QEA 2012) to show the nature and extent of surface and subsurface contamination at the site.

4.2.1 Surface Sediment

Surface sediment results are presented in Tables 4-3 and 4-4 and Figure 4-1. Table 4-3 presents the surface grab D/F results, TS, TOC, and grain size. Table 4-4 presents surface grab SMS parameters results. Laboratory data packages and data validation reports are presented in Appendices B and C, respectively.

4.2.1.1 Chemistry

D/F TEQs ranged from 2 ng/kg (location POBI-SS-06 near the Port's A-outfall) to 98 ng/kg (location POBI-SS-59 near East Bay Redevelopment Site and Moxlie Creek outfalls) for all 2013 samples. SMS chemicals exceeded screening criteria at only a few surface sediment locations. These chemicals (and locations) are listed below:

- Samples near outfalls within Study Area
  - POBI-SS-02 – benzoic acid above SQS
  - POBI-SS-06 – benzyl alcohol above SQS
  - POBI-SS-31 – mercury above SQS near outfalls outside Study AreaPOBI-SS-37 – benzo(a)pyrene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene above SQS
  - POBI-SS-50 – phenol above SQS
  - POBI-SS-61 – benzyl alcohol above CSL, bis(2-ethylhexyl)phthalate above 2LAET, and butylbenzyl phthalate and di-n-butyl phthalate above LAET
- Marine Terminal under-pier samples
  - POBI-SS-13 – acenaphthene above SQS
  - POBI-SS-17 – acenaphthene and butylbenzylphthalate above LAET

All of the surface grab locations with SMS exceedances are adjacent to active outfalls except for POBI-SS-13 and POBI-SS-17, which are under-pier locations near the Marine Terminal. Figure 4-1 shows new and historical surface grab locations along with D/F TEQ concentrations and SMS exceedances.

4.2.1.2 Physical

TOC ranged from 0.67 to 9.4 percent, with an average of 3.65 percent in 2013 samples. Of those samples, 54 were within the 0.5 to 5 percent TOC range typical of Puget Sound sediments, and 11 contained greater than 5 percent TOC. TS ranged from 18.7 to 77.2 percent, with an average of 42.3 percent in 2013 samples.

Surface sediments were predominantly non-plastic silts containing sand, shell fragments, and other organic fragments. Fines content ranged from 7.8 to 98.9 percent, with an average of 63.4 percent in 2013 samples. Three samples contained substantial shell fragments (e.g., greater than 30 percent): near Fiddlehead Marina (POBI-SS-03), Berth 1-2 (POBI-SS-10), and Swantown Marina (POBI-SS-40). Silty Sands were encountered near Berth 1 (POBI-SS-06), north end of Log Pond (POBI-SS-23), two locations along the eastern shore of East Bay (POBI-SS-57, POBI-SS-39), the Swantown Haulout (POBI-SS-53), and along the western edge of the Cascade Pole site (POBI-SS-34). Gravel was encountered at one location along the eastern shore of East Bay (POBI-SS-37). One sample with substantial decomposing wood fragments was collected to the northwest outside of the Study Area (POBI-SS-27).

4.2.2 Subsurface Sediment

4.2.2.1 Chemical

Subsurface sediment results are presented in Tables 4-5 and 4-6 and Figure 4-2. Table 4-5 presents the subsurface D/F results TS, TOC, and grain size. Table 4-6 presents subsurface SMS parameters results. Laboratory data packages and data validation reports are presented in Appendices B and C, respectively.

D/F TEQs varied significantly by depth and location. The highest concentrations of D/Fs are in the southern portion of East Bay and adjacent to the Berth Area. Chemicals that exceed SMS or AET screening levels at one or more location or depth include 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, benzoic acid, 1,2,4-trichlorobenzene, 1,2-dicholorobenzene, 1,4-dichlorobenzene, n-nitrosodiphenylamine, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, dibenzofuran, PAHs, total PCBs, cadmium, mercury, silver, and zinc. Section 5 presents this data in conjunction with the historical dataset to show the nature and extent of contamination in and around the Study Area.

4.2.2.2 Physical

Lithology descriptions were determined and recorded based upon features including density, consistency, moisture content, color, composition, grain size, organic matter content, and other notable characteristics. Budd Inlet sediment was grouped into three stratigraphic units based primarily on density, color, sediment type, and texture. Other information used to identify these units included the presence of anthropogenic material, biota, and dredge events. The three stratigraphic units are:

- Recent: This upper unit consisted predominantly of non- to low-plasticity inorganic silts. The surface fraction of silt often contained up to 10 percent sand. A thin biologically active layer was observed at many locations at the sediment-water interface as evidenced by abundant bivalves (Mytilus sp.) and bivalve shells. Recent materials were characterized by higher moisture content, soft to firm density, and higher visible organic matter and biota compared with underlying materials. Shell fragments, organic fragments (wood), and anthropogenic debris were often present scattered throughout the unit. A hydrogen sulfide-like odor was common.
- Transition: This middle unit formed a transition zone between recent and native units and was characterized as a mix of both sedimentary units. Transition layers were identified predominantly as sandy silts and silts with sand and consisted of varying percentages of silt, sand, and shell fragments. Occasional layers containing poorly sorted gravel were also encountered. Transition layers were characterized by increased density and a higher percentage of sand, shell, and gravel than recent units. Within this matrix, beds and pockets of poorly graded sands and inorganic silts were also present.
- Native: This lower unit contained predominantly two matrices. The shallower native layer was often a poorly graded sand matrix with 5 percent fines and up to 20 percent rounded gravel. The sand matrix consisted of multicolored grains of white, gray, black, red, and orange. In cases where the sand layer was fully penetrated by coring, the matrix typically graded to inorganic Silt of increased density and medium plasticity. Layers of undecomposed wood were sometimes encountered in native matrices.

- Other: Layers with substantial shell fragments were encountered mid-core at locations near the Marine Terminal and Log Pond (from 1 to 8 feet below mudline in POBI-SC-23, 4.6 to 8.7 feet below mudline in POBI-SC-24, and 2.5 to 7.8 feet below mudline in POBI-SC-26). A layer of decomposed woody debris with strong hydrogen sulfide-like odor was encountered from 0.5 to 2 feet below mudline in core POBI-SC-49 (adjacent to East Bay Redevelopment Site). A black silty sand layer with strong hydrocarbon-like odor and sheen was observed from 6.6 to 7.4 feet below mudline in core POBI-SC-19 near Marine Terminal Berth 3 North. Two cores encountered the residuals management sand cover layer placed during the Interim Action in the Berth 2 and 3 Area (POBI-SC-13 from 2 to 3 feet below mudline and POBI-SC-15 from 0.5-2.3 feet below mudline).

4.3 Geotechnical Results

Geotechnical testing is needed for remedial design purposes. This section presents the test results, which will be used for feasibility evaluations of remedial alternatives and remedial design. Geotechnical data results are summarized in Tables 4-7 to 4-10.

Results from index testing, which includes the following, are presented in Table 4-7:

- Moisture content (ASTM D2216)
- Atterberg limits (ASTM D4318)
- Grain size analysis (ASTM D6913)
- Specific gravity (ASTM D854)

Index testing was performed for all soil units described in Section 4.4. Sand and gravel soil units were targeted for grain size analysis while units of predominately silt and clay were subjected to Atterberg limits testing.

Consolidation testing was performed using two test methods: one-dimensional oedometer (ASTM D2435) and constant rate of strain (ASTM D4186). The compressive properties can be estimated from the graphical outputs provided by HWA. The graphical outputs from the laboratory reports are included in Appendix B. Both types of consolidation testing were performed for the two cohesive units identified at the site: Silt/Organic Silt and Silt/Silty Clay.

Test results for unconsolidated undrained triaxial compression (UU-TX; ASTM D2850) and consolidated-undrained triaxial compression (CU-TX; ASTM D4767) are presented in Table 4-8 and 4-9, respectively. Strength parameters were estimated from graphical outputs and are included in Appendix B. Both types of triaxial compression testing were performed for the two cohesive units identified at the site: Silt/Organic Silt and Silt/Silty Clay.

Results of in-situ vane shear testing are presented in Table 4-10.

4.4 Geotechnical Boring Sample Conditions

General descriptions of the soil units identified from the borings advanced at this site are presented below, in order from the ground surface downward. Further evaluation and characterization of these soil properties will be performed during development and evaluation of remedial alternatives.

Plasticity of each soil unit is included below. Plasticity is defined as the degree a soil can be molded or reworked without rupturing and was determined in the field following the logging methodology outlined in ASTM 2488. Non-plastic sediments cannot be formed or molded into a 1/8-inch thread. Fine-grained soils of increased plasticity (low, medium, high) were determined by their ability to be rolled into a 1/8-inch thread. Soil plasticity was confirmed by the laboratory on a select number of samples for Atterberg limits.

4.4.1 Fill

Fill is identified as loose to medium dense, fine to medium grained sand with silt and variable shell and gravel content. The deposit is generally brownish gray to dark gray with gray and white sand grains and tends to become looser with depth. Fill was observed to be as thick as 20 feet at the upland corner of the log pond (SB-04) and northern end of the port property (SB-07) and to an elevation of approximately -2.0 feet MLLW. Historical documents report that fill exists in the under-pier slope (Figure 2-20 from Anchor QEA 2012b), but the unit was not encountered on explorations performed near the pier (SB-01, SB-02, and SB-03).

4.4.2 Silt and Organic Silt

In-water sediments are generally very soft to soft, sandy silt and vary spatially in organic content. In explorations performed near the pier, the sediments are observed to be very soft to soft, brownish gray to greenish brown, very fine to fine grained sandy silt with abundant shells fragments, low to high plasticity and moderate to high organic content. At explorations performed in and near the log pond, the unit contained little to moderate organic content, was brown to grayish brown, was low to medium plasticity, and contained very fine to fine grained sandy silt. The thickness of this layer ranges from approximately 7.5 to 27 feet. The bottom elevation varies spatially and ranges from -18.1 feet at the north end of the log pond to -46.5 feet MLLW in Berth 2 of the Marine Terminal. The moisture content of this material ranges from 38 to 138 percent.

4.4.3 Silty Sand and Sand with Silt

This unit is loose to medium dense, gray to dark gray, fine to medium grained silty sand and sand with silt, with non-plastic fines and occasional gravel and shells. At in-water locations, the unit ranges in thickness from 12.0 to 28.5 feet thick and has a general bottom elevation ranging from -40.5 feet MLLW near the south end of the pier (SB-01) to -52 feet MLLW near the end of the abandoned wooden pier (SB-06). At the upland corner of the log pond (SB-04), the unit was 24.5 feet thick with a bottom elevation of approximately -34 feet MLLW.

4.4.4 Sand and Gravel with Silt

This unit is medium dense to very dense, primarily gray and multi-colored, medium to coarse grained sand and gravel with non-plastic silt and sub-rounded to sub-angular particles. The unit is 10.5 to 24.0 feet thick. The bottom elevation ranges spatially and does not exhibit a predictable trend. The bottom elevation was deepest at the north end of the pier (SB-03), to -74.0 feet MLLW, and shallowest at the upland corner of the log pond (SB-04), to -54.0 feet MLLW.

4.4.5 Silt and Silty Clay

This unit is stiff to very stiff, light gray to olive gray, silt, and silty clay with very fine grained sand and low to high plasticity. The layer was fully penetrated by borings SB-02, SB-04, SB-06, and SB-08. In these borings, the layer thickness ranges from 4.5 to 9.0 feet. Near the south end of the pier (SB-01), the layer is low plastic silt and at least 15.0 feet thick. The bottom elevation is shallowest at the upland corner (SB-04) and north end of the log pond (SB-08), -63.0 and -64.0 feet MLLW, respectively. The moisture content of this material ranges from 27.0 percent to 40.0 percent.

4.4.6 Silty Sand with Interbedded Silt Layers

This unit primarily consists of medium dense to dense, light gray to gray, fine to medium grain silty sand with little to no plasticity. SB-06 indicated that the unit consists of alternating layers of silty sand and silt. At elevation -95.0 feet MLLW, a silt layer with an approximate thickness of 10.5 feet is underlain by a silty sand layer with a thickness of 11.5 feet. The boring was terminated in a stiff silt layer with a top elevation of -117 feet MLLW.

5 NATURE AND EXTENT OF CONTAMINATION

This section summarizes the historical and recent sediment investigations performed within Budd Inlet between 2003 and 2013 to establish chemicals of potential concern (COPCs) in the Study Area and characterize the nature and extent of contamination. A summary of the investigations reviewed is presented in Table 5-1. Information covered in this section includes the following:

- Chemicals of potential concern
- Surface sediment quality
- Subsurface sediment quality

5.1 Chemicals of Potential Concern

Results from several historical sediment investigations were presented in the EISDGM (Anchor QEA 2012b), which were used to identify data gaps and areas of potential concern. A list of COPCs was defined in the Work Plan (Anchor QEA 2012a), which included D/Fs, acenaphthene, and mercury. The current results presented in Section 4 of this Report are used to further refine the COPC list, which are determined based on the chemicals that exceed SMS criteria. D/Fs are included in the COPC list, as well as PAHs, PCBs, 12 SVOCs, cadmium, mercury, silver, and zinc. The COPCs are summarized in Table 5-2 along with their applicable regulatory criteria and will be further screened in the Alternatives Memo during development of cleanup levels. The nature and extent of the COPCs are discussed in Sections 5.2 and 5.3 (*Surface Sediment Quality* and *Subsurface Sediment Quality*, respectively). COPCs are listed below.

5.1.1 Dioxin and Furan

- Surface sediment concentrations range from 0.65 to 98.9 ng/kg and average 19.5 ng/kg.
- Subsurface sediment concentrations range from 0.004 to 4,206 ng/kg and average 65 ng/kg.

5.1.2 Polycyclic Aromatic Hydrocarbons

- Surface Sediment
  - Acenaphthene exceeded SMS or AET criteria in surface sediments at two locations within the Study Area (POBI-SS-13 and POBI-SS-17)
- Subsurface Sediment
  - All PAHs except acenaphthylene exceeded SMS or AET criteria in one or more subsurface sediment interval within two localized areas within the Study Area, at the northern Berth Area and near the Moxlie/Indian Creek and East Bay Redevelopment Site
- As part of the cleanup level development in the Alternatives Memo, cPAHs will also be evaluated to calculate RBTCs that are protective of human health; cPAHs will be retained as a COPC, pending screening conducted in the Alternatives Memo

5.1.3 Semi-volatile Organic Compounds

- Surface Sediment
  - Benzyl alcohol and butylbenzyl phthalate exceed SMS or LAET criteria in surface sediment at one location each (POBI-SS-06 and POBI-SS-17, respectively)
- Subsurface Sediment
  - 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, benzoic acid, 1,2,4-trichlorobenzene, 1,2-dicholorobenzene, 1,4-dichlorobenzene, n-nitrosodiphenylamine, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, and dibenzofuran exceed SMS or AET criteria in subsurface sediments within two localized areas within the Study Area, at the northern Berth Area and near the Moxlie/Indian Creek and East Bay Redevelopment Site

5.1.4 Polychlorinated Biphenyls

- Surface sediment
  - PCBs did not exceed SMS criteria in surface sediment

- Subsurface sediment
  - PCBs exceed SMS or AET criteria in subsurface sediments within two localized areas within the Study Area, at the northern Berth Area and near the Moxlie/Indian Creek and East Bay Redevelopment Site

5.1.5 Metals

- Surface sediment
  - Mercury exceeded SQS at one location (POBI-SS-31)
- Subsurface sediment
  - Cadmium, mercury, silver, and zinc exceed SMS criteria in subsurface sediments within one localized area within the Study Area at the northern Berth Area; mercury was also slightly above the SQS in one other localized subsurface area near the Moxlie/Indian Creek and East Bay Redevelopment Site

5.2 Surface Sediment Quality

Surface sediment chemical quality was directly measured in and around the Study Area during four studies conducted in years 2006, 2007 to 2010, and 2013. Data collected prior to 2013 was mostly D/Fs (only five samples in the historical dataset had SMS parameters analyzed), while data collected in 2013 included PAHs at all locations and other SMS chemicals at select locations. Historical data that no longer represents the current conditions (i.e. dredged areas) were excluded from the dataset. Summary statistics (e.g., minimum, maximum, mean) on this comprehensive chemical dataset is provided in Table 5-3. As discussed in Section 4.2.1, some chemicals exceed SMS or AET criteria in isolated locations in and around the Study Area, mostly adjacent to active outfalls. Figure 4-1 shows D/F TEQ concentrations and SMS chemical concentrations that are above screening criteria. D/F TEQs (U=0) in the Study Area (Cascade Pole site excluded) ranged between 0.6 ng/kg (POC-S2) and 98.9 ng/kg (POBI-SS-59), and cPAH TEQs (U=0) in the Study Area ranged from 2.5 µg/kg (POBI-SS-21) to 435 µg/kg (POBI-SS-13). TOC in and around the Study Area ranged from 0.57 percent to 9.4 percent with an average concentration of 3.7 percent.

Inverse distance weighting (IDW) is a method used to interpolate concentrations of areas between known data points (where samples were collected). IDW was calculated using the Spatial Analyst tool in ArcGIS data software. Figures 5-1 and 5-2 present interpolated surface sediment D/F TEQ and cPAH TEQ concentrations, respectively.

Spatially weighted average concentrations (SWACs) are based on the IDW and are used to estimate an average concentration across a specified area. The Cascade Pole site is not part of the Budd Inlet Sediment Characterization Study Area; however, sample concentrations from this site were included in SWAC calculations because ecological and human health risks are based on exposure to all sediment in the area, including the Cascade Pole site and the larger Study Area. SWACs were calculated using the Zonal Statistical tool in ArcGIS. The SWAC areas defined for Budd Inlet in this study are described in Chart 1. The SWACs in the Study Area are 16 ng/kg and 82 µg/kg for D/F and cPAHs, respectively.

Chart 1
SWAC Summary

SWAC Area	SWAC Value	
	D/F	cPAH
Study Area as defined in the Agreed Order	16 ng/kg	82 µg/kg
Study Area portion of West Bay	13 ng/kg	72 µg/kg
Study Area portion of East Bay	21 ng/kg	93 µg/kg
Entire West Bay (with northern boundary defined by Study Area extent)	15 ng/kg	87 µg/kg
Entire East Bay (with northern boundary defined by Study Area extent)	21 ng/kg	148 µg/kg

Notes:
µg/kg = microgram per kilogram
cPAH = carcinogenic polycyclic aromatic hydrocarbon
D/F = dioxin/furan
ng/kg = nanogram per kilogram
SWAC = spatially weighted average concentration

5.2.1 West Bay

As seen on Figure 5-1, D/F TEQs range from 0.1 ng/kg (SD18) to 59.8 ng/kg (BI-S7), but are generally between 10 to 20 ng/kg in most of West Bay including the federal navigation channel. The SWAC for all of West Bay (as depicted on Figures 5-1 and 5-2) is 15 ng/kg.

The SWAC for the Study Area portion of West Bay is 13 ng/kg. Lower concentrations are found in the Berth Areas, which range from 2.0 to 21.6 ng/kg and average 10 ng/kg, partly as a result of placement of clean sand cover after the Interim Action[1] dredging in 2009. Underpier concentrations ranged from 0.6 to 44.7 ng/kg and averaged 17.5 ng/kg. Concentrations near the discharge of Capitol Lake tend to have lower concentrations, including in the southwest portion of West Bay, which are consistent with concentrations measured in Capitol Lake in 2008 (SAIC 2008). D/F TEQs were typically higher (20 to 40 ng/kg) outside of the Study Area near the marinas (Fiddlehead, Martin, and Olympia Yacht Club) and near city outfalls located in the same vicinity as the marinas. The highest concentrations of D/Fs in West Bay are outside of the Study Area near the Hardel Mutual Plywood site (59.8 ng/kg).

As seen on Figure 5-2, cPAH TEQs are generally lower than 100 µg/kg in most of West Bay, except for several shoreline areas. The SWAC for all of West Bay is 87 µg/kg. The SWAC for the Study Area portion of West Bay is 72 µg/kg. Lower concentrations are present along the central and southwest portions of West Bay. cPAH TEQs are higher in the Berth Area (71.3 to 668 µg/kg, average of 278 µg/kg), outside of the Study Area near the marinas (164 to 468 µg/kg, average of 242 µg/kg), and near the Hardel Mutual Plywood/Reliable Steel sites (4.3 to 1,489 µg/kg, average of 360 µg/kg).

As described in Section 4.2.1 and Figure 4-1, there were a few exceedances of SMS or AET screening levels in surface sediment. In the West Bay portion of the Study Area, benzyl alcohol was elevated at a location adjacent to the Port's Basin A outfall (POBI-SS-06), acenaphthene was elevated at an under-pier location near Berth 2 (POBI-SS-13), acenaphthene and butylbenzyl phthalate were elevated near Berth 3 North (POBI-SS-17), and mercury was elevated near the northern peninsula Lacey-Olympia-Tumwater-Thurston County Clean Water Alliance (LOTT) outfall (POBI-SS-31). None of the Study Area location concentrations exceed the CSL. Outside of the Study Area, benzoic acid, benzyl alcohol,

[1] Under Ecology's oversight, the Port dredged 9,515 cubic yards of sediments containing elevated levels of D/Fs within a portion of Berths 2 and 3 110 feet wide by 800 feet long. Dredging was conducted to an elevation of -39 feet MLLW over most of the area, but to -40 feet MLLW within 10 feet of the pier face. Dredged areas were covered with an anti-degradation sand cover to provide a clean surface at the end of the project.

bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, and di-n-butyl phthalate were elevated near the Fiddlehead Marina outfalls (POBI-SS-02 and POBI-SS-61).

5.2.2 East Bay

As seen on Figure 5-1, D/F concentrations are generally more elevated in East Bay compared to West Bay. TEQs range from 1.2 ng/kg (CP-19) to 98.9 ng/kg (POBI-SS-59) with most between 20 and 40 ng/kg. The SWAC for all of East Bay (as depicted on Figures 5-1 and 5-2) is 21 ng/kg. The SWAC for the Study Area portion of East Bay is also 21 ng/kg. The highest TEQs are located in the southern portion of East Bay near the Moxlie/Indian Creek outfall and adjacent to East Bay Redevelopment Site, which decreases into the Swantown Marina area to the north. Lower concentrations are present north of the marina and within the Cascade Pole cleanup boundary. Section 6 discusses potential ongoing and historical sources affiliated with these areas. The majority of remaining outfalls in East Bay is on the eastern shoreline and drain residential areas. D/F concentrations near these outfalls are lower than the rest of East Bay (average of 12 ng/kg).

As seen on Figure 5-2, cPAH concentrations are generally more elevated in East Bay compared to West Bay. The cPAH SWAC for all of East Bay is 148 µg/kg, and 93 µg/kg within the Study Area of East Bay. Elevated concentrations generally correlate with elevated D/F concentrations, with higher concentrations near the southern portion of East Bay and decreasing to the north. Outside of the Study Area, location POBI-SS-37 (adjacent to residential outfall) has the highest cPAH TEQ measured (2,688 ng/kg).

Chemicals that slightly exceed the SQS screening level near outfalls on the eastern shoreline include benzo(a)pyrene, benzo(g,h,i)perylene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene at location POBI-SS-37 and phenol at POBI-SS-50 (Figure 4-1, sheet 6 of 7). No samples in East Bay exceeded the CSL.

5.3 Subsurface Sediment Quality

Subsurface sediment chemical quality was directly measured in and around the Study Area during 14 studies conducted in years 2003 to 2011, and 2013. Some cores intervals collected in 2008, prior to the Interim Action dredging were removed as part of that action, but all intervals shown on Figure 4-2 represent current conditions[2]. Approximately 250 samples were tested for D/Fs with a subset of these having additional SMS parameters analyzed. Summary statistics on this comprehensive chemical dataset are provided in Table 5-4. Figure 4-2 shows sediment core profiles with D/F TEQ concentration ranges and SMS chemical exceedances (when applicable). Figures 5-3a through 5-3l show core profiles along representative cross-sections of key areas in West Bay and East Bay. D/F TEQs and SMS chemical concentrations in the Study Area ranged greatly by location and depth. A description of these elevated concentrations is presented in this section.

The southern portion of the Berth Area was dredged in 2013/2014 by the Port to maintain navigation depths (season 1). The portion adjacent to the pierface was also dredged in early 2015 (season 2). A number of cores are located within the maintenance dredge area, many of which were tested to estimate predicted post-dredge concentrations, as summarized separately for the Dredge Material Management Program (DMMP; Anchor QEA 2013b). All results are included in this section.

5.3.1 West Bay

Elevated concentrations of D/Fs and SMS chemicals in West Bay are described below for the underpier area, Berth Area, and federal navigation channel and for areas outside these areas. TOC in West Bay typically fell within the normal range (0.5 to 5 percent) with some lower TOC values present in deeper intervals and a few higher levels (up to 9.1 percent at POBI-SC-23 and 6 to 8 feet below mudline) in the Berth Area.

5.3.1.1 Underpier Area, Berth Area, and Federal Navigation Channel

D/F concentrations in subsurface sediment are elevated compared to surface concentrations in the Berth Area and underpier areas, just north of the Berth Area and in the federal navigation channel adjacent to the Berth Area. Additionally, some SMS chemicals are also elevated in portions of these areas. Figure 5-3i shows the vertical profiles of cores collected

[2] Chemical concentrations shown in Figure 4-2 are still representative of current conditions; however the mudline elevation changed for a few cores following the Interim Action. The elevations of the subsurface samples are retained in the database and represent current conditions.

in the Berth Area. Figures 5-3c, 5-3d, 5-3e, and 5-3f show the east-west cross section of portions of this area.

Most D/F TEQs range from 20 to 100 ng/kg except for the north end of the Marine Terminal, which has higher concentrations of D/Fs and SMS chemicals. Within this area, both underpier and in the Berth Area, four locations had D/F TEQs greater than 500 ng/kg, with the highest concentration (4,206 ng/kg) in the Study Area at location BI-C5 at 6 to 7 feet below mudline.

SMS chemicals exceed SMS or AET screening levels at one or more interval in cores BI-C5, POBI-SC-12, POBI-SC-17, POBI-SC-19, POBI-SC-22, and POBI-SC-23. The chemicals include 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, benzoic acid, 1,2,4-trichlorobenzene, 1,2-dicholorobenzene, 1,4-dichlorobenzene, n-nitrosodiphenylamine, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, dibenzofuran, PAHs, total PCBs, cadmium, mercury, silver, and zinc. Two cores contained elevated SMS concentrations but no elevated D/Fs at the deepest core interval in the under-pier Berth Area. POBI-SC-12 contained PAHs above SMS criteria at 10 to 11.2 feet, and POBI-SC-17 contained PAHs and dibenzofuran above SMS criteria at 10 to 11.1 feet.

The Berth Area has historically been maintained to elevation -42 feet MLLW, but D/F TEQs greater than 5 ng/kg are present as deep as -47 feet MLLW (BI-C15, POBI-SC-18 and POBI-SC-13). Other cores in this area are generally consistent with the dredge elevation (elevated D/F concentrations are shallower than -42 feet MLLW) with the exception of locations POBI-SC-22 (-46 feet MLLW), POBI-SC-20 (-43 feet MLLW), POBI-SC-10 (-46 feet MLLW), POBI-SC-07 (-45 feet MLLW), POBI-SC-08 (-43 feet MLLW), and POBI-SC-04 (-46 feet MLLW).

Figure 5-3j provides dioxin concentrations for cores in the federal navigation channel. The channel has historically been maintained to elevation -30 feet MLLW, but historical bathymetric surveys indicated elevations as deep as -35 feet MLLW (Anchor QEA 2012a). Consistent with this information, elevated concentrations of D/F (greater than 5 ng/kg) are found at elevations as deep as -36 feet MLLW at locations POBI-SC-05 and POBI-SC-09.

The thickness of sediment with elevated D/F concentrations ranges from 0 to 9 feet and averages 3 feet below mudline for cores in the Navigation Channel outside of the Berth Area.

The 2013 study was designed to delineate the vertical extent of elevated chemical concentrations. The vertical extent of contamination was identified at most sediment cores, except for seven cores in the Berth Area. These cores have elevated concentrations of D/Fs above 5 ng/kg as a conservative screening value or other SMS chemicals in the deepest interval collected. These are described below:

- Berth Area
  - POBI-SC-07 – South Berth Area: D/F TEQ is 60 ng/kg at -45 feet MLLW (13 feet below mudline)
  - POBI-SC-20 – North of Berth Area: D/F TEQ is 113 ng/kg at -43 feet MLLW (8.5 feet below mudline); presence of native gravel was encountered at -45 feet MLLW but not sampled
  - POBI-SC-22 – North of Berth Area: D/F TEQ is 357 ng/kg at -46 feet MLLW (13 feet below mudline); this interval also has elevated mercury, 4-methylphenol, 2,4-dimethylphenol, 1,4-dichlorobenzene, dibenzofuran, PAHs, and PCBs above SQS or CSL
- Underpier Berth Area
  - POBI-SC-11: D/F TEQ is 10 ng/kg at 12 feet below mudline
  - POBI-SC-17: PAHs are elevated above SQS or CSL 11 feet below mudline
  - POBI-SC-19: D/F TEQ is 26 ng/kg and PAHs are elevated above SQS or CSL 11 feet below mudline
  - POBI-SC-23: PAHs and 2,4-dimethylphenol are elevated above SQS or CSL 10 feet below mudline

5.3.1.2 Other Areas

In other areas of West Bay, the upper intervals of the cores contain D/F concentrations that are similar to collocated or nearby surface sediment locations. At these locations, the interval at which concentrations become lower than the surface (less than 10 ng/kg) is encountered around 1 to 2 feet. Two locations outside of the elevated concentration areas have significantly higher D/F TEQs at depth compared to the surface. Location BI-C2, near the former Solid Wood, Inc. site (now West Bay Park), has a TEQ of 50 ng/kg at 1 to 2 feet compared to the West Bay SWAC of 15 ng/kg. Location POBI-SC-24, near the log pond, is 77 ng/kg at 2 to 3 feet compared to the surface of 20 to 30 ng/kg (Figure 5-3h).

5.3.2 East Bay

East Bay subsurface sediment D/F concentrations are presented in Figure 4-2, sheets 5, 6, and 7, and Figure 5-3l. Cores near the Moxlie/Indian Creek outfall and East Bay Redevelopment Site contain the highest concentrations of D/F and SMS chemicals. Elevated D/Fs are also present in subsurface intervals near the Swantown Marina and Swantown Boatworks Haulout.

5.3.2.1 Area Near Moxlie/Indian Creek Outfall and East Bay Redevelopment Site

Two cores were collected near the Moxlie/Indian Creek outfall and East Bay Redevelopment Site in the 2013 study. One core was in the Study Area (POBI-SC-49) and one was just outside of it (POBI-SC-50). Both locations had generally increasing D/F concentrations with depth. TEQs ranged from 27 to 1,283 ng/kg in POBI-SC-49 and 22 to 225 ng/kg in POBI-SC-50. The highest D/F concentrations in POBI-SC-49 occurred 0 to 4 feet below mudline and 10.5 to 11.4 feet below mudline, with lower concentrations present between these intervals. D/F concentrations were highest in deeper intervals in POBI-SC-50 (4 to 10 feet). TOC was within the normal range (0.5 to 5 percent) except for POBI-SC-49 samples from 0 to 1 feet and 1 to 2 feet below mudline, which had substantial wood waste and high TOC (7.3 and 28.8 percent, respectively). Other chemicals that exceeded SMS screening criteria at these two locations include bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, 1,4-dichlorobenzene, 2,4-dimethylphenol, 4-methylphenol, PCBs, and mercury. Elevated D/Fs and concentrations above SQS or CSL criteria were observed in the deepest interval collected at each of these locations:

- POBI-SC-49: D/F TEQ is 212 ng/kg and mercury was above SQS at 11.5 feet below mudline
- POBI-SC-50: D/F TEQ is 13 ng/kg and 4-methylphenol was above CSL at 13 feet below mudline

5.3.2.2 Swantown Marina and Swantown Boatworks Area

In a sediment characterization study conducted in 2005, cores were collected in East Bay federal navigation channel and adjacent Swantown Boatworks haulout dock to characterize for suitability of open water disposal under DMMP protocols. The top 4 feet of cores within a designated dredge material management unit (DMMU) were composited among two or more cores and submitted for full DMMP chemical analysis. These D/F TEQs ranged from 5 to 52 ng/kg, which tend to be higher than collocated or nearby surface sediment samples. Deeper interval composites at these locations contained TEQs ranging from 26 to 44 ng/kg, with the deepest intervals ranging from 0.3 to 78 ng/kg. Dredging in the area of these DMMP cores has not occurred. A small portion of the Swantown Boatworks haulout area was dredged in 2013/2014 (as part of maintenance dredging), but none of these samples are located in this area.

Cores collected in this area in 2013 include POBI-SC-44, POBI-SC-45, and POBI-SC-46. Core POBI-SC-45 was about 75 feet outside of the federal navigation channel and had a TEQ of 58 ng/kg in the upper 1 to 2 feet. Samples below 2 feet below mudline were less than 5 ng/kg. Core POBI-SC-44 was taken further outside of the federal navigation channel and had lower TEQs than co-located or nearby surface sediment samples (9 to 15 ng/kg in the top 4 feet). POBI-SC-46 was located within the haulout area that was dredged in 2013/2014, and was predicted to expose concentrations less than 5 ng/kg. TOC in these cores were generally within the normal range, except for some deeper intervals that have less than 0.5 percent.

Subsurface sediment in the Swantown Marina area generally contains contamination in the upper 1 to 2 feet of sediment. Presence of contamination tends to correlate with historical dredge elevations in 1982 of -8, -10, and -12 feet MLLW.

Throughout East Bay, D/F concentrations less than or equal to 5 ng/kg were reached in this area with the following exceptions:

- POBI-SC-44: D/F TEQ is 10 ng/kg 4 feet below mudline
- OLYC03/OLYC08/OLYZ03: D/F TEQ is 78 ng/kg at 9 feet below mudline
- OLYC04 /OLYZ04: D/F TEQ is 26 ng/kg at 5 feet below mudline

6 SOURCE EVALUATIONS

Section 6 summarizes historical and potential ongoing sources of sediment contamination based on surface and subsurface sediment concentrations. Planned additional testing of lateral inputs into the Study Area may further refine the discussion of potential ongoing sources of contamination described in this section. As the primary COPC, the main focus of the source evaluation is D/F. Other chemicals exceeded criteria at a few localized shoreline areas and are also discussed (PAHs, SVOCs, and metals). Section 6.1 presents a general summary of sources of surface sediment COPCs, Section 6.2 describes potential ongoing sources based on sediment data, and Section 6.3 presents an overview of source control activities. Site-specific historical sources are discussed in Section 6.4, and D/F congener profiles and chemometric results are described in Sections 6.5.

6.1 Common Sources of Surface Sediment Chemicals of Potential Concern

Section 6.1 describes common sources of COPCs based on elevated concentrations in surface sediment in the Study Area. D/F is a site-wide contaminant, but PAHs, phthalates, and mercury are present only in localized areas near outfalls. PAHs and phthalates tend to be ubiquitous urban contaminants, which tend to be primarily contributed through stormwater and atmospheric deposition (Ecology 2010). Other COPCs with elevated concentrations in subsurface sediment are the result of historical sources, as discussed in Section 6.4.

6.1.1 Dioxin and Furans

Dioxins and furans enter the environment from a variety of sources, and are generally byproducts of chemical manufacturing and combustion or incineration processes involving chlorine compounds. They can also be produced during incineration of wood, oil, and wastes. Major contributors of D/F to the environment include the following:

- Hog-fuel boilers burning salt-laden wood
- Hog-fuel boiler ash
- Vehicle emissions and combustion of gasoline and diesel
- Residential wood burning
- Backyard burning of household waste

- Byproducts and derivatives of chemical production (e.g., pentachlorophenol [PCP], PCBs, 2,4,5-T)
- Incineration of municipal solid waste and medical waste
- Secondary copper smelting
- Forest fires
- Land applications of sewage sludge
- Cement kilns
- Coal-fired power plants
- Chlorine bleaching of wood pulp

D/Fs are present at some level throughout the environment, in air, food, water, soils, and sediments. D/Fs tend to be found in higher concentrations near industrial areas, but are present in various concentrations throughout urban, rural, and even remote wilderness areas. Urban soil and sediment concentrations of D/F commonly represent the combined influences of multiple sources (NewFields et al. 2013).

6.1.2 Polycyclic Aromatic Hydrocarbons

The primary pathways for PAHs are stormwater, atmospheric deposition, and leaching from treated wood products. PAHs are generated from the burning of organic matter, fossil fuels, and charcoal (pyrogenic) and are present in refined petroleum products (petrogenic). PAHs are continually generated and released to Budd Inlet and the atmosphere through petroleum use and combustion. In addition, PAHs were historically released from manufacturing operations, machine shops, and repair and fueling facilities for vehicles, trains, and watercraft. They can continue to be released by most of these sources, but best management practices (BMPs) for controlling spills and leaks have reduced input from these sources. Timber piles in Budd Inlet and utility poles and railroad ties in the watershed have historically been treated with creosote. As these structures degrade, they can deposit PAHs directly into Budd Inlet (such as in localized areas from in-water creosoted structures) or onto impervious surfaces that enter Budd Inlet by stormwater, which tends to occur slowly over time.

6.1.3 Other Semi-volatile Organic Compounds

Benzyl alcohol and butylbenzyl phthalate are present at elevated levels in two samples in the Study Area. The primary pathway for phthalates is stormwater and atmospheric deposition (Ecology 2010). Phthalates are associated with plastics such as polyvinyl chloride (PVC) pipe, vinyl siding, tarps, home windows, automotive surfaces (e.g., bumpers and seals), and wiring sleeves (Floyd|Snider 2007). Phthalates are commonly detected in the Puget Sound region sediment and were regionally evaluated by the Sediment Phthalates Work Group[3], which concluded that phthalates are widespread in urban and other developed environments and are ubiquitous in urban water, soil, sediment, and air (Floyd|Snider 2007).

Benzyl alcohol is often associated with urban runoff, and storm drain and combined sewer outfall discharges (Ecology 2010, King County 2006). Benzyl alcohol, a natural solvent, is commonly found in urban runoff. It occurs in the environment both naturally, in flowers, trees, and wood waste; and anthropogenically, in cosmetic and food products, such as chewing gum and gelatin (King County 2008).

6.1.4 Mercury

Mercury can be generated by industrial practices and be transported via stormwater runoff, wastewater, and/or atmospheric deposition. Elevated dissolved concentrations of metals sometimes discharge from the LOTT outfall at the north end of the Study Area when conductivity is elevated (Butti 2013).

6.2 Ongoing Sources

Potential ongoing sources of contamination to Budd Inlet are described in this section based on the presence of elevated surface sediment chemistry. The primary ongoing source is from stormwater discharges, including Moxlie/Indian Creek and other smaller outfalls.

[3] The Sediment Phthalates Work Group consists of representation from the cities of Tacoma and Seattle, King County, and the U.S. Environmental Protection Agency. The Work Group's goal was to "work together to collaboratively summarize and evaluate existing information on phthalates sediment containment issues, identify data gaps, and provide recommendations to address phthalates sediment contamination to agencies and the community to consider." (Floyd|Snider 2007)

Fifteen outfalls are present along the Port peninsula shoreline within the Study Area, and over 50 are present outside the Study Area. Figure 6-1a shows the stormwater outfall locations. The EISDGM provides details on each of these outfalls (Anchor QEA 2012b). As discussed in Section 5.2 and shown on Figures 5-1 and 5-2, higher concentrations of surface sediment COPCs are concentrated near several of these outfalls, especially outfalls that include stormwater runoff from industrial or large urban drainage basins.

The following four discharge areas correlate with the highest D/F concentrations in lower Budd Inlet:

- As shown on Figure 6-1b, the Moxlie/Indian Creek outfall drains 4.5 square miles of mostly developed areas, including high-density commercial and industrial areas. This 72-inch-diameter outfall also historically discharged the State and Chestnut Street combined sewer overflow (CSO; outfall 003), which has been sealed.
- As shown on Figure 6-1c, the outfall from the East Bay Redevelopment Site drains portions of the City just south of the LOTT facility and along Olympia Avenue NE and Jefferson Street NE.
- As shown on Figure 6-1d, the outfalls adjacent to Hardel Mutual Plywood site drain residential areas, portions of West Bay Drive NW, and portions of the former Hardel site.
- As shown on Figure 6-1e, the outfalls near Fiddlehead Marina drain several city streets and parking lots. LOTT outfall 002 has also historically discharged CSO overflow.

Elevated PAHs were present in surface sediment near these outfalls (based on cPAH concentrations), along with an outfall along the eastern shoreline of East Bay near sample POBI-SS-37, which drains portions of East Bay Drive NE and adjacent residences.

Other COPCs that are elevated near specific outfalls are described as follows:

- Within the Study Area
  - Mercury by the primary LOTT discharge located at the northern end of the Study Area (48 inches in diameter; location POBI-SS-31)
  - Benzyl alcohol near the Port's Basin A outfall (location POBI-SS-06)

  - Butylbenzyl phthalate beneath the northern portion of the marine terminal (location POBI-SS-17)
- Outside the Study Area
  - Benzyl alcohol, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, and di-n-butyl phthalate by an outfall at Fiddlehead Marina (location POBI-SS-61)
  - Benzoic acid near a separate Fiddlehead Marina outfall (location POBI-SS-02)
  - Phenol near a residential outfall on the eastern shoreline of East Bay (East Bay Drive NE drainage; location POBI-SS-50)

Surface sediment concentrations of D/F, PAHs, and other COPCs decrease beyond the immediate vicinity of these outfalls, suggesting that stormwater inputs may be contributing to the elevated concentrations. The Port obtained permission from the City of Olympia to collect samples at several catch basin locations in the vicinity of the Study Area based on the presence of elevated surface concentrations near City stormwater outfalls. This supplemental work was described in an Addendum to the SAP/QAPP (Anchor QEA 2013c). Samples were collected on February 12, 2014, and submitted to ARI for TS, TOC, D/F and PAH analysis. All sampling procedures in the SAP/QAPP Addendum were followed, except where some proposed locations could not be sampled due to insufficient solids accumulation and/or recent cleanings. Results are presented in Table 6-1 and Figures 6-2a through 6-2e. D/F TEQs ranged from 12.5 to 855 ng/kg with an average of 132 ng/kg, and cPAH results ranged from non-detect to 367 µg/kg with an average of 189 µg/kg. These results indicate that catch basin solids are similar to or higher than sediments in the vicinity of the associated outfalls. Section 6.5.1 presents the D/F congener profiles of these catch basin samples for comparison to Budd Inlet surface sediment samples.

The next step is to install sediment traps in the City stormwater system to determine if suspended solids with elevated concentrations of D/F and/or PAHs are entering Budd Inlet from the stormwater system. Data from this study will be reported separately when it is available.

6.3 Source Control Activities

In 2011 and 2013, in compliance with Administrative Order No. 8499, the Port submitted Source Control Monitoring Work Plans (Anchor QEA 2011a, 2013d) to monitor concentrations of D/Fs of solids in specific catch basins that are part of the Port Marine Terminal stormwater system. The Port performs monthly catch basin monitoring of those catch basins to assess if solids have accumulated and if the system needs to be cleaned out. The Port also regularly inspects and cleans the catch basins on the Port Peninsula that lie outside the fenced Marine Terminal. In 2012 and 2013, the Port sampled catch basin solids and stormwater discharge in its A and B Basins for D/F (solids) and 2,3,7,8-TCDD (stormwater). The results of the source control monitoring investigations were presented in two Source Control Investigation Data Reports (Anchor QEA 2012c, 2014) and are summarized in Tables 6-2 and 6-3. The conclusions of the studies indicate the following:

- Solids accumulate very slowly within stormwater basins A and B.
- D/F concentrations in catch basin solids are lower than concentrations present before the Port conducted catch basin cleanouts in 2010 (Figure 6-3), although one location (A02CB) had an increase in concentration between 2012 and 2013. A02CB is located in a low industrial area within the marine terminal, outside of the logyard. The main use of this area since the 2012 sample collection has been truck traffic, primarily associated with the 2013 maintenance dredge event, and ongoing rail traffic. Both of these activities generate D/Fs via exhaust; however, localized studies have not been conducted to determine how much contribution could originate from these sources. The Port expects to continue regular clean-outs of catch basins in stormwater basins A and B.
- No 2,3,7,8-TCDD was detected in trace-level stormwater samples. Results suggest that despite elevated concentrations of D/F in catch basins, stormwater from basins A and B is not a source of 2,3,7,8-TCDD to Budd Inlet.
- Sediment concentrations adjacent to the Port's A and B outfalls (Figures 5-1 and 5-2) are not elevated compared to the rest of lower Budd Inlet, suggesting that higher concentration sediments that were historically present in the catch basins (and subsequently removed during cleaning) were not being deposited in Budd Inlet.

Section 6.5.1 presents the D/F congener profiles of these catch basin samples for comparison to Budd Inlet surface sediment samples. Additional discussion of source control activities and the potential for recontamination will be included in the Alternatives Memo. Source control programs for the City and LOTT discharges are ongoing.

6.4 Historical Sources

The Port's peninsula has supported industrial activities since its development in the late 1800s. Several sources of D/Fs were present including wood waste burning, wood treating, warehouse/factory fires, emissions from combustion engines, and industrial waste. Several sources of PAHs were also present, including creosote pilings, motor oil runoff from paved areas, and other combustion sources that also generate D/Fs. The potential for several activities to generate D/Fs and other COPCs are discussed in this section.

6.4.1 Atmospheric Deposition

Wood waste burners (i.e., hog-fuel boilers, wigwam burners) have been identified at nine locations near the Study Area, as shown in Figure 1-2 and 6-1a. The presence of these burners was confirmed in various remedial investigation (RI) reports and historical aerial photographs and maps (Figures 6-4a through 6-4f), as detailed below:

- West Bay Marina (Hart Crowser 2011)
- Hardel plywood (Greylock 2007).
- Solid Wood, Inc. (Ecology 2008c), shown in Figure 6-4a (unknown source)
- Delson Lumber, shown in Figure 6-4b (photograph from company website; Delson 2013)
- Washington Veneer, shown in Figure 6-4c (PIONEER 2010b) and Sanborn Map
- East Bay Redevelopment Site (two burners), shown in Figure 6-4d (PIONEER 2010b)
- Cascade Pole, shown in Figure 6-4e (PIONEER 2010b)
- Unknown operator, shown in Figure 6-4f (PIONEER 2010b)

Sediment (surface or subsurface) with higher D/F concentrations in the vicinity of historical wood waste burners is located near Solid Wood, Inc., Hardel Mutual Plywood, Delson Lumber, and East Bay Redevelopment Site. Atmospheric deposition could have deposited on sediments directly, or indirectly, through deposition on nearby soils and paved areas that could be transported back into the water through stormwater runoff or erosion. The predominant wind direction in Olympia is from the south and southwest, suggesting that the majority of deposition would occur in Budd Inlet, on the Port's peninsula, and on nearby shoreline areas.

PAHs and phthalates are also transported by atmospheric deposition. In addition to the wood waste burners, several industrial emissions (smoke stacks) were present on and along the peninsula as depicted in Figures 6-4a through 6-4f.

6.4.2 Historical Pit

The northern portion of the Berth Area has subsurface concentrations that are significantly higher than other nearby areas. Aerial photographs taken from 1946 and 1960 indicate the presence of an open pit in this vicinity (Figures 6-5a and 6-5b). The date of construction is unknown, and the pit was not present based on aerial photographs from 1970. Activities associated with this pit are unknown, but could have included discharge of wastewater from industrial activities on the peninsula. Elevated subsurface sediment concentrations in this area include:

- D/F (up to 4,206 ng/kg-TEQ)
- Metals (cadmium up to 8 mg/kg, mercury up to 3.17 mg/kg, silver up to 18.1 mg/kg, and zinc up to 449 mg/kg)
- SVOCs (2,4-dimethylphenol up to 270 µg/kg, 2-methylphenol up to 230 µg/kg, 4-methylphenol up to 7,600 µg/kg, benzoic acid up to 1,300 µg/kg, 1,2,4-trichlorobenzene up to 200 µg/kg, 1,2-dicholorobenzene up to 180 µg/kg, 1,4-dichlorobenzene up to 850 µg/kg, n-nitrosodiphenylamine up to 630 µg/kg, bis(2-ethylhexyl)phthalate up to 2,000 µg/kg, butylbenzyl phthalate up to 130 µg/kg, and dibenzofuran up to 22,000 µg/kg)
- PAHs (up to 92,400 µg/kg for HPAH and 160,000 µg/kg for LPAH)
- PCBs (up to 2,400 µg/kg)

A steel sheetpile wall was driven to approximately -10 feet MLLW on the north end of the marine terminal in 1989. Previous to that, a wooden bulkhead had been in place in approximately the same area since the late 1920s. The pit was located waterward of these bulkhead structures and was a source of contaminants to Budd Inlet. Additional sedimentation could have deposited in this area, resulting in burial of contaminated subsurface sediment.

6.4.3 Stormwater and Combined Sewer Overflow Discharges

Section 6.2 provides information about discharges of stormwater and CSOs to the Study Area. Historical discharges of stormwater are a potential source, including at the Moxlie/Indian Creek outfall. This outfall also discharged CSO overflow from the State and Chestnut Street CSO, which is now sealed. Prior to sealing, this was an active CSO input to East Bay, which may have transported elevated levels of contaminants. Some of the SMS exceedances found in this area in subsurface sediment are typically associated with sewage. 1-4-dichlorobenzene is known to be associated with portable toilet waste since the deodorizing blocks used in the toilets contain 1-4-dichlorobenzene (Windward and Anchor QEA 2013). PAHs and phthalates are ubiquitous in urban areas and are commonly found in stormwater, as described in Sections 6.1.2, and 6.1.3, respectively.

Elevated PCBs are also present in the upper 8 feet of POBI-SC-49 and 2 to 4 feet and 8 to 10 feet below mudline of POBI-SC-50 in cores near this discharge, which may be associated with discharges from this outfall. PCBs are extremely persistent in the environment, are one of the most ubiquitous of all environmental contaminants, and are detected in a variety of matrices (e.g., sediment, soil, dust, tissue, and plants) (Ecology 2010). These PCBs are likely attributed to historical uses, including spills or leaks, as no known ongoing sources are present and no PCBs were measured above SQS in surface sediment during the 2013 study. The latest record of an overflow from this outfall was on January 1, 1990 (LOTT 2011).

Combined sewer overflow discharges were also present at LOTT outfalls 002 and 001 (near Fiddlehead Marina and the northern tip of the peninsula, respectively). In 2007, 9 million gallons of screened, untreated, non-disinfected combined sewer effluent was discharged to outfall 002, and 2.75 million gallons of primary treated, disinfected effluent was discharged at outfall 001. In 2009, 6.3 million gallons of blended, disinfected final effluent was discharged at outfall 002 (LOTT 2011).

6.4.4 Adjacent Cleanup Sites

As described in the EISDGM, activities located on adjacent cleanup sites could have contributed D/Fs and other COPCs to Budd Inlet (Anchor QEA 2012b). The presence of upland contamination has been investigated at each of these sites, but the nature and extent of contamination in sediment has not been thoroughly investigated. Stormwater effluent concentrations to Budd Inlet from each of these sites and elsewhere throughout Budd Inlet are not available. A brief description of results of investigations at each of these sites is described below.

6.4.4.1 Reliable Steel

This site is currently being investigated under an AO with Ecology. It was a former lumber mill until 1941, after which it was used for boat building, welding, and fabrication activities. D/F in surface sediment is as high as 33 ng/kg, but D/F data was not present in any remediation documents.

6.4.4.2 Hardel Mutual Plywood

Upland cleanup is complete and this site has been removed from Ecology's Hazardous Sites List. Three sediment samples collected during the RI in 2007 contained D/F between 18 ng/kg and 41 ng/kg (Greylock 2007). One sediment sample also contained bis(2-thylhexyl)phthalate at a concentration of 94 mg/kg, which is 1.2 times the CSL. Ecology concluded that there have been no documented uses of this site that would have produced phthalates or D/F and these chemicals were not required to be part of the cleanup action plan. However, this site did have a wood waste burner, which could have contributed D/F to both soils and nearby sediment. Additionally, the site facility burned to the ground in 1996, which may have contributed contaminants via air deposition or runoff to Budd Inlet from water used to fight the fire. As seen on Figure 4-1d (page 4 of 7) surface sediment concentrations are as high as 59.8 ng/kg (BI-S7).

6.4.4.3 East Bay Redevelopment Site

This site generated D/Fs from burners at two on-site locations (PIONEER 2010a) and also generated PAHs from a variety of processes, including fuel areas, transformers, and tar dipping tanks. Sediments were not the focus of the site cleanup and the extent to which upland activities contributed to in-water contamination is unknown. In the Soil-to-Surface Water Empirical Evaluation Report (PIONEER 2011), no complete and significant groundwater exposure pathways were identified for the site. Elevated levels of PCBs, PAHs, phthalates, 1,4-dichlorobenzene, cresol compounds (methylphenols), and mercury were present in subsurface sediments near this site. Based on an undated historical aerial photograph (Figure 6-4f), a pile-supported structure was present in nearshore sediment areas. Elevated levels of PAHs could have been the result of creosote treated wood, which may also be responsible for leached cresol compounds (2,4-dimethylphenol and 2- and 4-methylphenol). Subsurface location POBI-SC-49 is adjacent to the East Bay Redevelopment site and had total PAH (LPAH plus HPAH) concentrations ranging from 447 to 2,502 µg/kg, 2,4-dimethylphenol ranging from non-detect to 17 µg/kg, and 2- and 4- methylphenol ranging from non-detect to 330 µg/kg. Direct inputs to sediment may also have occurred from dumping or other industrial activities that have not been explored in adjacent sediments. Core POBI-SC-49 contained almost 2 feet of decomposing wood (Appendix A-3) with elevated D/F concentrations, and PCB, 1,4-dichlorobenzene, bis(2-ethylhexly)phthalate, and butylbenzylphthalate concentrations above SMS criteria.

6.4.4.4 Cascade Pole

The Cascade Pole site is a cleanup site located at the northern end of the Port peninsula along the shoreline of East Bay of Budd Inlet. This former wood treating facility used creosote and later PCP dissolved in a carrier oil. This site has historical contamination that has resulted in elevated concentrations of PAHs, PCP, and D/Fs in soil, groundwater, sediment, and benthic organisms.

Upland cleanup actions included the installation of a groundwater treatment system for light non-aqueous phase liquid (LNAPL) recovery, dredging and capping of contaminated sediments, and installation of a slurry wall around the site to limit groundwater migration of contaminants to Budd Inlet (SAIC 2008). The site cleanup level for PAHs and PCP in sediment was the SMS CSL, except for D/F which was 80 ng/kg. Groundwater cleanup levels are derived from MTCA Method A (total petroleum hydrocarbons) and Method B (PCP and PAHs). Routine groundwater results indicate that site groundwater is in compliance with the AO (i.e., no COPCs above screening levels outside of the slurry wall) and that the bentonite slurry wall and hydraulic control system are effectively preventing groundwater contamination from reaching Budd Inlet (Landau 2011).

6.5 Dioxin and Furan Data Analysis

As discussed in Section 6.1, a number of different processes generate D/F, which tend to produce differing distributions, or percent concentrations, of the individual D/F congeners. This section describes two methods to evaluate sources and spatial patterns of D/F congener profiles, which contributes to the understanding of the likelihood of historical inputs and potential for ongoing contributions of D/F in the Study Area.

6.5.1 Dioxin and Furan Fingerprinting

Chemical fingerprinting is a technique used to differentiate potential sources of chemical contaminants. For D/F, congener profiles from site samples can be compared to other site samples to evaluate similarity of groups of samples. Congener profiles from site samples can also be compared to known sources, known as reference profiles. For this evaluation, similarities of congener profiles were evaluated for groups of surface sediment samples in different geographic areas of Budd Inlet. Subsurface sediment D/F congener profiles were also compared to reference profiles. While comparison is provided to reference profiles, it should be noted that urban sediment D/F concentrations commonly represent the combined influences of multiple sources and can be altered by weathering and the lack of detection of specific congeners (Shield et. al. 2006).

Reference profiles that are compared to site samples include hog-fuel boilers, stormwater runoff, diesel and gasoline automobile emissions, pentachlorophenol, and others (Figure 6-6a). Site-specific profiles were also generated. Soil samples from the East Bay Redevelopment Site are presented in Figure 6-6b. These profiles represent stockpile and test pit samples collected during soil excavation. Stockpiles were staged in different zones, which can be correlated to specific industrial work areas within the Site (PIONEER 2010b). Catch basin sample profiles from the City and Port stormwater systems are presented in Figure 6-6c.

All sediment profiles were dominated by octa-chloro dibenzo-p-dioxin (OCDD). In order to examine patterns of sediment profiles, the influence of this dominant congener was minimized by normalizing each of the 17 congeners to the relative TEQ. For the relative TEQ, the TEF-scaled congener concentration is divided by the total TEQ calculated for that sample. This standardization method takes advantage of the detail provided in the congener specific result. All profiles presented in the figures and discussed in this section are based on relative TEQ rather than percent congener contribution to the sum.

6.5.1.1 Surface Sediment

Figures 6-7a through 6-7h provide congener profiles of sample results from groups of West Bay and East Bay surface sediment samples. These profiles were compared to reference profiles presented in Figure 6-6a, 6-6b, and 6-6c. Few samples were a close match with any of the published reference source profiles (Figure 6-6a). A few samples are similar to select profiles from upland soils from the East Bay Redevelopment Site (Figure 6-6b). Many sediment samples closely resemble profiles of City and Port catch basin samples (Figure 6-6c). In Budd Inlet, surface sediment appears to be comprised of a mixture of several sources due to disturbance and mixing. As seen in Figure 6-7a, the majority of samples collected in 2013 tend to be similar. Many samples may not match published reference profiles well, likely due to more than one source, weathering, and uniqueness of area-specific profiles (i.e., hog fuel air deposition). Patterns between groups of samples can be used to evaluate similarities between individual samples that can be explained by contribution of D/F from a similar source or combination of sources. The underlying signature was similar in most samples; however, a few distinct samples or groups of samples are apparent, which could indicate unique or ongoing source contributions at some locations. Due to the similarity between surface sediment and catch basin samples (Figure 6-6c), it is likely that stormwater inputs are a key contributor of D/F to surface sediment, although similar processes (i.e., erosion and air deposition) may be contributing to both. A summary of the fingerprinting results for groups of similar surface sediment samples are provided below:

- West Bay and East Bay (Figure 6-7a): Similarities are present between West Bay and East Bay samples collected in 2013. A few samples contain different patterns than other samples, which are further described in subsequent bullets.
- Fiddlehead and Martin Marinas (Figure 6-7b): Locations closest to the marinas have a slightly higher contribution of 1,2,3,4,6,7,8- heptachlorodibenzo-p-dioxin (HPCDD)

than the majority of surface samples in Budd Inlet. Location POBI-SS-61, which has the highest TEQ in this area, also has a slightly different signature (higher 1,2,3,4,6,7,8- heptachlorodibenzofuran [HPCDF]) and potentially represents a slightly different mixture of sources.

- Hardel Mutual Plywood and Solid Wood, Inc. (Figure 6-7c): Several locations adjacent to these former sites along the western shoreline have higher contributions of 1,2,3,7,8- pentachlorodibenzo-p-dioxin (PECDD), which tend to be similar to the percent contribution from 1,2,3,4,6,7,8-HPCDD. Several hog-fuel boiler reference profiles (Figure 6-6) show a higher contribution of 1,2,3,7,8-PECDD, suggesting that direct atmospheric deposition from wood waste burning or indirect deposition as a result of atmospheric deposition, erosion, and/or stormwater runoff of upland areas could be the source of D/F in this area. Two historical wood waste burners are present in this vicinity (Figure 1-2). The higher 1,2,3,7,8-PECDD contribution could also be related to the 1996 fire at the Hardel building, which would have a similar profile to other wood burning reference profiles. The City catch basin West Bay profiles (Figure 6-6c) also have similar distributions of 1,2,3,7,8-PECDD and 1,2,3,4,6,7,8-HPCDD.
- Federal Navigation Channel, Berth Area, and West Bay-Other Areas (Figure 6-7d): Samples from the federal navigation channel, in the Berth Area or under pier at the Marine Terminal, and in other portions of West Bay (not including the marinas or samples near Hardel Mutual Plywood and Solid Wood, Inc.) tend to have similar relative TEQ profiles that do not appear to be highly similar to reference profiles, including catch basin profiles from the Port samples, which have higher contribution of 1,2,3,4,6,7,8-HPCDD and all HXCDD congeners than samples near the Berth Area. These samples, which are farther away from outfalls, may represent sediments influenced by multiple sources.
- Swantown Marina (Figure 6-7e): Samples in this area all have similar signatures, which include slightly higher contributions of 1,2,3,4,6,7,8-HPCDD over other congeners. These profiles are similar to those in the federal navigation channel, Berth Area, and West Bay areas.
- Moxlie/Indian Creek near East Bay Redevelopment Site (Figure 6-7f): Surface sediment samples in this area had several different patterns. Sediment samples from near Moxlie Creek are most similar to the profiles found in City catch basin samples

collected near East Bay (Figure 6-6c). All samples resemble one or more stockpile soil samples from the adjacent uplands (Figure 6-6b); however, sample signatures are present in parts of West Bay and East Bay that may not directly represent a source from the East Bay Redevelopment Site.

- Four samples (BI-C18, POBI-SS-56, POBI-SS-58, and POBI-SS-60) have similar profiles to the Swantown Marina area.
- Two distinct samples are adjacent to smaller outfalls. POBI-SS-59 has higher contribution of 1,2,3,4,6,7,8-HPCDD, and POBI-SS-53 has higher contribution of 1,2,3,7,8-PECDD.
- Sample BI-S30, which was collected in 2007, has a very high contribution of 1,2,3,4,6,7,8-HPCDD (almost 50 percent of the TEQ) and looks similar to the pentachlorophenol profile (Figure 6-6a). However, this sample was reoccupied in 2013 with POBI-SS-60, which looks more similar to Swantown Marina samples.

- East Bay-Other Areas (Figure 6-7g): Sample locations along the eastern shoreline outfalls and at the far northeastern edge of the Study Area generally have higher contribution of 1,2,3,7,8-PECDD than other East Bay samples. Several of these samples also have lower TEQs than other East Bay samples. Similar to the Hardel Mutual Plywood site, atmospheric deposition from burners could have impacted the surrounding residential soils (which have less urban development), atmospheric deposition entering the sediment directly or indirectly from erosion and stormwater runoff.
- Cascade Pole (Figure 6-7h): Congener profiles of historical samples collected from the Cascade Pole site indicate a significantly higher contribution of 1,2,3,4,6,7,8-HPCDD in several samples, which is similar to the pentachlorophenol reference profile (Figure 6-6a). Higher 1,2,3,4,6,7,8-HPCDD is found in most samples in the Study Area. However, this contribution is not as high as seen in Cascade Pole samples (greater than 40 percent).

6.5.1.2 Subsurface Sediment and Upland Soils

Fingerprinting of subsurface sediment indicates several unique relative TEQ congener profiles, sometimes within the same core (e.g., different sample intervals), indicating that different sources potentially contributed to elevated D/F concentrations at different historical time periods at the same location. This section presents a summary of the key findings of the comparison of subsurface sediment profiles to published reference profiles (Figure 6-6a) and nearby soil samples from the East Bay Redevelopment Site (Figures 6-6b). Congener profiles are not presented for each sample interval due to the amount of sample intervals tested. Key subsurface fingerprinting results are presented below:

- Moxlie/Indian Creek and East Bay Redevelopment Site Sediments (Figure 6-8a):
  - POBI-SC-49 has a similar profile through the length of the core. It is similar to the profiles of the adjacent surface grabs (POBI-SS-58 and POBI-SS-56), with higher 1,2,3,4,6,7,8-HPCDD, and to some upland samples from Zones 2 and 4 of East Bay Redevelopment Site excavation.
  - POBI-SC-50 has three distinct profiles through the length of the core. The upper intervals (to 2 feet below mudline) are similar to the surface, with higher 1,2,3,4,6,7,8-HPCDD, but the middle intervals (2 to 10 feet below mudline) have higher contributions of furans, which are similar to several of the historical East Bay Redevelopment Site upland soil samples. The deepest interval (12.4 to 13 feet below mudline) has a unique signature from the rest of the core and consists mostly of 1,2,3,7,8-PECDD, similar to the hog fuel boiler reference profiles (Figure 6-6a).
- Swantown Marina (Figure 6-8b): In all core samples near Swantown Marina, 1,2,3,4,6,7,8-HPCDD is the dominant congener and generally contains more dioxins than furans. This is similar to the surface sediment in this area.
- Solid Wood, Inc. (Figure 6-8c): BI-C2 (1 to 2 feet and 2 to 3 feet below mudline) have similar profiles to the majority of West Bay surface samples, with higher 1,2,3,4,6,7,8-HPCDD. POBI-SC-14 (1 to 2 feet below mudline) has higher contribution of 1,2,3,7,8-PECDD, which matches some of the hog-fuel burner reference profiles.
- Northern Berth Area (Figure 6-8d): Most profiles are similar to nearby surface sediment samples, with higher 1,2,3,4,6,7,8-HPCDD. However, several deeper profiles from the northern Berth Area (including under-pier cores) have higher contributions of 1,2,3,4,7,8- HXCDF (BI-C5 from 6 to 7 feet below mudline) and 1,2,3,4,6,7,8-HPCDF (POBI-SC-19 from 8 to 10 and 10 to 12 feet below mudline) than nearby surface samples. Higher contributions of furans can be associated with several sources including waste incineration and truck diesel (Figure 6-6a).

6.5.2 Chemometric Analysis

Chemometrics, or multivariate statistical analysis of chemical datasets, has been applied to D/F congeners in a variety of systems, including in sediments. The relationship between sources and congener profiles provides the theoretical basis for chemometrics analysis, which identifies underlying patterns in the data and determines the contribution of these patterns (factors) to each sample based on dioxin/furan congener profiles.

The Port conducted a chemometric analysis to support identification of potential sources of dioxin/furan to Budd Inlet sediments (Appendix D). A separate chemometric analysis was also conducted by Ecology using a similar Budd Inlet sediment dataset, which is available on Ecology's Budd Inlet Site website (NewFields 2016). Both studies found three very similar underlying factors that account for most of the data variance and acknowledge stormwater as a pathway; however, different but similar in function interpretive statistical methodologies were used in each study and different conclusions were reached regarding what two of the three underlying factors represent. Ecology will use the results of their study for future decision-making at the Budd Inlet Site. A summary of the interpretation of sources associated with the factor profiles from each study is provided in Chart 2.

Chart 2
Differences in Interpretation of Factor Profiles by Ecology and the Port

Department of Ecology (NewFields 2015)	Port of Olympia (Appendix D)
Factor 1 – Hog fuel burning	Factor 3 – Hog fuel burning
Factor 2 – Pentachlorophenol • Historical use • Current contamination	Factor 2 – Mixed urban source • Regional sediment profiles • Urban background • Sewage • Nearby catch basins
Factor 3 – PCBs • Historical use at and around the Port peninsula	Factor 1 – Mixed combustion source • Truck diesel, highway • Asphalt • Burn barrels • Medical waste incineration

The results of the Port's chemometrics evaluation indicate that multiple sources have contributed D/Fs to sediments in the vicinity of Budd Inlet, with the relative contribution from those sources varying spatially. Three underlying factors were found to account for most of the variance in the data, as follows:

1. Factor 1 - Mixed Combustion Sources. This underlying factor is associated with several elevated furan combustion sources including diesel combustion, highway, asphalt, and burn barrel reference profiles. Factor contributions are strongest in high-concentration subsurface samples along the southwestern shoreline of East Bay and the eastern shoreline of West Bay.
2. Factor 2 - Mixed Urban Sources. The underlying factor is associated with the catch basins, as well as a variety of residential background, sewage, and regional sediment reference profiles. Source contribution is observed in mid-concentration surface and subsurface samples.
3. Factor 3 - Hog Fuel Burning. Strong contributions are seen for this factor in low-concentration subsurface samples, especially from the southern portions of East Bay and West Bay, and also in lower-concentration surface samples.

Spatially distinct areas with differing mixtures of sources were identified, including the following:

1. The eastern shore of East Bay, mid-channel of West Bay, and north of the peninsula, which have lower D/F sum concentrations and strong Factor 3 (hog fuel burning) contributions but low factor contributions for Factors 1 (mixed combustion sources) and 2 (mixed urban sources)
2. The area in West Bay, adjacent to Fiddlehead Marina, with greater Factor 2 contributions (mixed urban sources)
3. The Berthing Area south of Berth 3 North, where samples have very strong Factor 1 contributions (mixed combustion sources) and moderately elevated Factor 2 contributions (mixed urban sources)
4. Along the western shore of West Bay (adjacent to Solid Wood Inc. and Hardel Mutual Plywood), where samples have moderate contributions from Factor 2 (mixed urban sources)

5. Catch basins on the Port marine terminal and along the southern shore of East Bay (City catch basins), with strong Factor 2 contributions (mixed urban sources)
6. City catch basins to the west of West Bay and west of the East Bay Redevelopment Site, with strong Factor 1 contributions (mixed combustion sources)

A small number of elevated-concentration subsurface samples near Berth 3 North (e.g., SC19-6-8, BI-C4-6-7) are consistent with PCP reference source profiles and historical high-concentration Cascade Pole samples. Based on the multivariate statistical techniques used in Appendix D (principal component analysis, hierarchical cluster analysis, and positive matrix factorization analysis), PCP and the high-concentration Cascade Pole samples had weak factor contributions on all three factors, indicating that they are not main underlying or ongoing sources to surface sediment. However, as mentioned in Section 6.4.2, contributions from the historical pit near Berth 3 North was a historical source of PCP, PCB, and cPAH contamination to Budd Inlet since the pit located waterward of bulkhead structures.

In summary, this analysis suggests a consistent mixture of D/F sources to both subsurface and surface sediments. Subsurface samples exhibit spatially and temporally variable contributions from distinct, elevated-concentration sources, and surface samples exhibit a fairly uniform mixture of hog fuel burning, urban, and combustion sources.

7 SEDIMENTATION AND TEMPORAL TRENDS

Natural recovery of aquatic sediments can occur through physical processes, biological processes, and chemical processes. Natural recovery is defined as the effects of natural processes that permanently reduce risks from contaminants in surface sediments (Apitz et al. 2002) and effectively reduce or isolate contaminant toxicity, mobility, or volume. The potential for natural recovery of sediment is determined through multiple lines of evidence including sediment inputs and sedimentation rates. This section summarizes the results of geochronological cores collected as part of the investigation, other studies, and temporal changes in reoccupied surface sediment stations between multiple events.

7.1.1 Net Sedimentation Rates

Sedimentation rate data was collected in Budd Inlet during the 2013 investigation (Anchor QEA 2013a) and as part of studies in 2008 (SAIC 2008) and 1993 (Landau 1993). This consists of an estimate of net sedimentation measured from high-resolution sediment cores. Sedimentation rates are expressed in terms of the thickness of sediment accumulated per unit time or in density per unit time. This section discusses the net sedimentation rate measurements. Net sedimentation rate is the accumulation rate of sediment in the bed following deposition of sediment from the water column and erosion of sediment from the bed. Table 7-1 provides historical and 2013 estimated net sedimentation rates.

Sedimentation rates are thought to have been affected by the dam that was constructed in 1951 to create Capitol Lake. As part of the 2007 sampling, estimated mass sedimentation rates were calculated in the sediment estimated to have accumulated pre- and post-1951. The mass sedimentation rates calculated in the three cores ranged from 0.24 grams per square centimeter per year ($g/cm^2/yr$) to 0.45 $g/cm^2/yr$ (post-1951). The range of sedimentation rates is equivalent to 0.14 to 0.35 centimeter per year (cm/yr). Rates were higher in the southern areas than the northern areas of the inlet and higher in East Bay than West Bay. Results for this study are discussed in further detail in the Budd Inlet Sediment Characterization Report (SAIC 2008).

An earlier study of sedimentation rates using geochronology techniques was conducted in the Cascade Pole cleanup area (Landau 1993). The samples collected for geochronology analyses were limited to a small area. Mass sedimentation rates were determined to range from approximately 0.19 g/cm^2/yr to 0.21 g/cm^2/yr in this area based on Cesium-137 (Cs-137) and lead-210 (Pb-210), each of which equate to approximately 0.1 cm/yr. The range of sedimentation rates is equivalent to 0.12 to 0.13 cm/yr.

As part of the 2013 investigation, samples for sedimentation rate analyses were collected from Budd Inlet stations GC-01, GC-02, GC-03, and GC-04 shown in Figure 2-1. Net sedimentation rates were estimated from the radioisotope profile data (Table 7-1). Cesium-137 (Cs-137) and lead-210 (Pb-210) were measured in the four high-resolution sediment cores. Lead-210 profiles from the study are presented in Figure 7-1.

Dating using the Cs-137 core data would be based on both the first appearance of Cs-137 in 1950 and the peak level in 1965. Because the source of Cs-137 was from atmospheric nuclear weapons testing, it is not continuously generated and tends to provide a suitable marker for estimating sedimentation rates. However, Cs-137 was not detected in any of the samples analyzed from cores GC-02 and GC-04. Cesium-137 was detected at very low levels in some of the upper intervals from cores GC-01 and GC-03, but not in deeper intervals. No Cs-137 peaks from the years of maximum deposition were apparent in either core.

The Pb-210 data in 2013 cores exhibited fairly good linearity for each of the cores to varying depths, with the best correlation apparent in core GC-02 (correlation coefficient [r^2] = 0.94), indicating a fairly continuous deposition rate (Figure 7-1). Core GC-04 exhibited the poorest correlation with scattered plots around the linear trendline ($r^2 = 0.63$), indicating a more irregular deposition rate possibly due to mixing from prop wash and other episodic events. GC-01 exhibited marginally better correlation ($r^2 = 0.74$), also indicating some disturbance. The results below 50 cm depth were not included in the analysis because the results were not linear below this depth and because more recent deposition trends better estimate current deposition rates. GC-03 exhibited better correlation ($r^2 = 0.86$), indicating slight disturbances. Disturbances were more evident in the upper 20 cm.

The estimated bulk density used to calculate the mass sedimentation rate (1.60 g/cm^3) was the same used in the Cascade Pole study (Landau 1993). Calculated deposition rates were 1.0 cm/yr for GC-01, located at the southern end of the Study Area in West Bay, 1.1 cm/yr for

GC-02, located at the southern end of the Marine Terminal on the slope, and 0.7 cm/yr for GC-03, at the northwest corner of the Study Area. The calculated deposition rate for core GC-04 in East Bay was 0.9 cm/yr. These results suggest net sedimentation rates are slightly higher in the southern portion of the Study Area (more than 1 cm/yr) than the northern portion of the Study Area (less than 0.7 cm/yr).

7.1.2 Lacey-Olympia-Tumwater-Thurston County Clean Water Alliance Sediment Trap Study

LOTT conducted a sediment trap study in 1996 and 1997 (LOTT 2008), which collected both short-term and long-term sediment trap data over a 13-month period (September 1996 to September 1997). Long-term data was collected at four locations: three along the center line of Budd Inlet and one location in West Bay. Short-term data was collected at two locations within Budd Inlet: one in the approximate center of the inlet and one along the western side of the inlet, near Olympia Shoal (EISDGM, Figure 2-14; Anchor QEA 2013b). Long-term traps were used to determine gross sediment accumulation rates and the short-term traps were used to determine loading of inorganic and organic matter to sediments. The sediment rates ranged from 0.2 to 0.8 cm/yr in central Budd Inlet and 2.0 cm/yr in West Bay (LOTT 2008). Only one long-term sediment trap was located within the Study Area, located in West Bay, which indicated deposition of 2.0 cm/yr. These gross sediment deposition rates do not account for scour from vessel movement or current velocities, which will be further discussed in the Alternatives Memo.

7.1.3 Temporal Surface Sediment Chemical Trends – Reoccupied Stations

Samples were collected as part of the Interim Cleanup Action Pilot Study monitoring events in 2009 and 2010. The results demonstrate temporal trends (over 21 months) in D/F concentrations. Additionally samples were collected in 2013 to reoccupy stations sampled in 2007 (SAIC 2008).

7.1.3.1 Interim Cleanup Action Pilot Study Stations

Surface sediment chemistry was collected in December 2010 by the Port, which was 21 months following the Berths 2 and 3 Interim Cleanup Action Pilot Study (Anchor QEA 2011b). Previous sampling was conducted immediately following placement of a residuals management sand cover layer and at 3, 9, and 15 months following completion of the Interim Action (Anchor QEA 2009b, 2010a, and 2010b, respectively). Two of these samples were also tested in 2007. Samples were collected from the under-pier area, Berth Area, and ambient area, but residuals management sand cover material was only placed in the Berth Area. A summary of concentrations for Interim Cleanup Action Pilot Study stations are summarized in Table 7-2.

Average TEQ concentrations at reoccupied stations in the Berth Area increased from 0.2 ng/kg following sand cover placement to 5.6 ng/kg at the 21-month monitoring event suggesting concentrations were equilibrating with surrounding areas not included in the Interim Action.

Underpier samples were collected from four locations during all five of the monitoring events and averaged 36 ng/kg to 39 ng/kg during three events in the 9 months following construction. Average concentrations declined to between 15 ng/kg and 17 ng/kg in the 15 and 21 month events, respectively. The declines were likely as a result of a number of Capitol Lake flushing events (Anchor QEA 2009a).

Ambient samples collected away from the pier and outside of the Interim Action remediation area averaged 21.8 ng/kg to 23.8 ng/kg during three sampling events in the 9 months following construction. Two of these samples were tested in 2007, each of which increased during the 2009 sampling. Concentrations declined to an average of 5.5 ng/kg in the 15-month monitoring event as a result of the Capitol Lake flushing. Average concentrations during the 21-month monitoring event were 13.7 ng/kg, indicating concentrations were equilibrating with surrounding areas. One station (AM-50) was re-occupied in 2013, and it was verified that the D/F concentrations in this area have equilibrated.

7.1.3.2 Other Re-occupied Stations

Three additional 2013 sample locations were collected to re-occupy Ecology locations collected in 2007. POBI-SS-01 reoccupied BI-S2 in the southern part of West Bay, POBI-SS-42 reoccupied BI-C10 in the northern part of East Bay, and POBI-SS-60 reoccupied BI-S30 in the southern part of East Bay. D/F results are listed below:

- BI-S2 (2007) = 10.3 ng/kg
- POBI-SS-01 (2013) = 11.8 ng/kg
- BI-C10 (2007)= 30.6 ng/kg
- POBI-SS-42 (2013) = 31.3 ng/kg
- BI-S30 (2007) = 60.3 ng/kg
- POBI-SS-60 (2013) = 19.9 ng/kg

Concentrations were similar for West Bay (POBI-SS-01) and northern East Bay samples (POBI-SS-42) between 2007 and 2013, suggesting consistent concentrations in deposited sediment in these areas. POBI-SS-60 in southern East Bay was lower than the 2007 result. However, other sample results near POBI-SS-60 indicate higher concentrations similar to the 2007 result, suggesting variability in surface sediment conditions.

8 INVESTIGATION SUMMARY

This section provides a concise summary of the results of the Budd Inlet Sediment Investigation, specifically regarding sources of contamination and nature and extent of contamination in the Study Area. A CSM will be developed in the Alternatives Memo.

8.1 Nature and Extent of Contamination

This section summarizes the key observations on the nature and extent of sediment contamination, based on investigations conducted between 2003 and 2013.

8.1.1 Contaminants of Potential Concern in the Study Area

Contaminants of Potential Concern in the Study Area include the following:

- Surface sediment COPCs include D/Fs, PAHs (based on cPAH concentrations), mercury, butylbenzyl phthalate, and benzyl alcohol
- Subsurface sediment COPCs in the Berth Area include 2,4-dimethylphenol, 2- and 4-methylphenol, benzoic acid, 1,2,4-trichlorobenzene, 1,2-dicholorobenzene, 1,4-dichlorobenzene, n-nitrosodiphenylamine, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, dibenzofuran, PAHs, total PCBs, cadmium, mercury, silver, and zinc
- Subsurface sediment COPCs near Moxlie/Indian Creek and the East Bay Redevelopment Site areas include bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, 1,4-dichlorobenzene, 2,4-dimethylphenol, 4-methylphenol, PCBs, and mercury

8.1.2 Surface Sediment

East Bay D/F concentrations tend to be higher than West Bay (SWAC is 15 ng/kg in West Bay and 21 ng/kg in East Bay). East Bay cPAH concentrations are also higher than West Bay (the SWAC is 87 ng/kg in West Bay and 148 ng/kg in East Bay). All other surface sediment COPCs (mercury, butylbenzyl phthalate, acenaphthene (exceeds benthic criteria), and benzyl alcohol) are elevated in localized areas near outfalls.

8.1.2.1 East Bay

- Surface sediment D/F concentrations tend to be highest at the southern end of East Bay (98.9 ng/kg) and tend to decrease farther to the north, with concentrations in the

Swantown Marina area ranging from 27.1 to 39.1 ng/kg and concentrations at the northern end of the Study Area are 27.6 ng/kg or lower.

- Shoreline samples along the eastern shoreline in East Bay tend to have lower D/F concentrations than other parts of East Bay and range from 6.1 to 23.5 ng/kg.
- One location outside of the study area on the north portion of the eastern shoreline (POBI-SS-37) has elevated PAHs.
- D/F Concentrations within the Cascade Pole site boundary range from non-detect to 26.1 ng/kg.

8.1.2.2 West Bay

- Higher surface sediment D/F concentrations in West Bay are located south of the Study Area near outfalls at Fiddlehead Marina (up to 45.9 ng/kg) and near the Reliable Steel (33.2 ng/kg) and Hardel Mutual Plywood (59.8 ng/kg) sites.
- In under-pier, Berth Area, and federal navigation channel areas, D/F concentrations range from 0.6 to 44.7 ng/kg, with most under 25 ng/kg.
- Within the Study Area, one sample is elevated for butylbenzyl phthalate and one for acenapthene in the under-pier sediment.

8.1.3 Subsurface Sediment

8.1.3.1 Berth Area

High concentrations of D/Fs and PAHs are present in subsurface sediment near the northern end of the Marine Terminal, with elevated dioxin elevated beyond 11 feet below mudline. Additionally, elevated levels of 2,4-dimethylphenol, 2- and 4- methylphenol, benzoic acid, 1,2,4-trichlorobenzene, 1,2-dicholorobenzene, 1,4-dichlorobenzene, n-nitrosodiphenylamine, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, dibenzofuran, PAHs, total PCBs, cadmium, mercury, silver, and zinc occur at various depths.

8.1.3.2 West Bay Federal Navigation Channel Sediments

Elevated D/F is generally several feet thick, but extends down to 8 feet below mudline at one core (POBI-SC-09). Depth of contamination tends to correlate with historical navigation dredge depths, with deeper sediment below the authorized navigation depth having lower concentrations of contaminants.

8.1.3.3 Swantown Marina and Boatworks Haulout

Elevated D/F concentrations are present in the upper 1 to 2 feet in the Swantown Marina, which tends to correlate with historical dredge depths, with deeper sediment below the original dredge depth having lower concentrations of contaminants. In shoaled areas along the shoreline, D/Fs are present up to 9 feet below mudline.

8.1.3.4 Area Near Moxlie/Indian Creek Outfall and East Bay Redevelopment Site

Subsurface sediments in this area contain elevated D/Fs, PAHs, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, 1,4-dichlorobenzene, 2,4-dimethylphenol, 4-methylphenol, PCBs, and mercury. Elevated concentrations of D/Fs and some other chemicals are present beyond 13 feet below mudline.

8.2 Sources of Contamination

Potential ongoing and historical sources are summarized in this section by COPC based on the results presented in Sections 5 and 6.

Dioxin/Furan

D/F are a site-wide issue. D/F are present at elevated levels in surface and subsurface sediments throughout Budd Inlet. Concentrations are the result of several historical and potential ongoing sources as discussed below:

- Historical Sources:
  - The primary historical source of D/F contamination is atmospheric deposition from wood waste burners in and around the Study Area through direct contributions to the Study Area or indirect contributions via stormwater inputs.
  - Other combustion activities typical of urban and industrial environments may have contributed, including vehicle emissions, incineration, and residential and commercial fires.

  - Historical wood treating activities, including at the Cascade Pole site.
  - Historical activities in the vicinity of the pit near the northern portion of the Marine Terminal may have contributed to elevated D/F concentrations at least during the period of 1946 to 1960. Congener profiles suggest more than one possible source for this subsurface contamination.

- Potential Ongoing Sources:

  - The primary source of ongoing D/F inputs appears to be via stormwater inputs from urban outfalls and Moxlie/Indian Creek. Typical activities contributing to stormwater inputs may include vehicle emissions and other urban combustion activities as well as erosion of soil containing elevated D/F concentrations potentially associated with historical activities, such as wood waste burners.
  - Atmospheric deposition is also likely an ongoing source of D/F, likely associated with urban combustion activities.
  - Elevated surface sediment concentrations near other cleanup sites, such as Reliable Steel and Hardel Mutual Plywood, may suggest potential ongoing sources in the vicinity of those areas.
  - D/F congener profiles do not suggest ongoing contributions of D/F to the Study Area from the Cascade Pole site.

PAHs:

Elevated PAHs are predominantly from historical sources or localized near outfalls. Historical and ongoing sources of PAHs are summarized below:

- Creosote piling is a historical and potential ongoing source for elevated PAHs in the Marine Terminal area.
- In the area near the northern portion of the Marine Terminal, historical sources of PAHs may include creosote piling or direct dumping to the historical pit.
- Elevated PAHs near outfalls tend to be localized and may be the result of stormwater/CSO releases and runoff from motor oil and urban combustion sources.

Mercury:

Mercury is localized near LOTT Outfall 001. One localized surface sediment concentration of mercury is present near the LOTT outfall at the northern end of the Study Area, which is likely the result of discharges of water with elevated dissolved concentrations associated with high conductivity at the LOTT treatment plan (Butti 2013).

Phthalates, Benzoic Acid, and Benzyl Alcohol:

Phthalates, benzoic acid, and benzyl alcohol are associated with ongoing stormwater discharges. Butylbenzyl phthalate and benzyl alcohol are elevated in one surface sediment sample each within the Study area near the Marine Terminal. These elevated concentrations are localized near outfalls. Benzoic acid, di-n-butyl phthalate, and bis(2-ethylhexyl) phthalate are elevated near outfalls at Fiddlehead Marina, but these compounds are not elevated in surface sediment within the Study Area. Historical sources are likely responsible for elevated subsurface concentrations in the northern Berth Area (benzoic acid was elevated in one location [POBI-SC-19] and phthalates in one location [POBI-SC-23]) and near the Moxlie/Indian Creek outfall and East Bay Redevelopment Site (phthalates at one location [POBI-SC-49]).

Other Contaminants:

Other subsurface contamination may result from historical sources as follows:

- The exact source of other SVOCs, PCBs, and other metals in subsurface sediment is unknown, but elevated levels are not present above SMS criteria in surface sediment, suggesting historical sources.
- Elevated concentrations at the northern portion of the Marine Terminal could be associated with dumping into an open pit.
- Elevated concentrations near the Moxlie/Indian Creek outfall and East Bay Redevelopment Site area could be associated with dumping activities or historical stormwater or CSO discharges.
- 2,4-dimethylphenol and 2- and 4- methylphenol present in subsurface sediment near the Marine Terminal and near the Moxlie/Indian Creek outfall and East Bay Redevelopment Site may be the result of historical creosote pilings.

8.3 Sedimentation and Temporal Trends

Calculated deposition rates from 2013 geochronological testing were slightly higher in areas near the southern portion of the Study Area than northern portions. Net deposition for cores GC-01 and GC-02 was estimated to be 1.0 cm/yr. Net deposition was slightly lower for core GC-03, which was located at the northwest corner of the Study Area (0.7 cm/yr). In East Bay, near the southern end of the Study Area, net deposition was 0.9 cm/yr. These results are comparable to previous studies, suggesting net sedimentation rates are slightly higher in the southern portion of the Study Area (1 to 2 cm/yr) than the northern portion of the Study Area (0.1 to 0.7 cm/yr). Additional description of physical processes, including additional evaluations on net sedimentation rates will included in the Alternatives Memo.

Re-occupied surface sediment sample results in West Bay illustrate the influence that the frequency of flushing of Capitol Lake has on sediment concentrations. Samples collected in 2007 had higher D/F concentrations in 2009, but decreased to lower levels in 2010 following several lake flushing events. Stations sampled in 2007 and 2013 indicated that consistent concentrations in sediment is being deposited at the southern end of West Bay and northern end of East Bay. In East Bay, considerable variability is present in results at the southern end, with no trend apparent. Concentrations entering the system from stormwater outfalls, Moxlie/Indian Creek, and Capitol Lake will play a role in predicting recovery.

8.4 Next Steps

The Port is currently working with the City to collect additional source characterization samples at several locations in the vicinity of the Study Area based on the presence of elevated surface concentrations near outfalls, which may include catch basin solids or sediment traps (Anchor QEA 2013c). These data may provide more information regarding the contribution of potential ongoing sources of contamination and will be considered during evaluation of a potential Interim Action for the Study Area. Data from these studies will be reported separately as they become available.

The Port will develop the Alternatives Memo in 2016 to identify and analyze potential remedial alternatives to address contaminated sediments in the Study Area. The Alternatives Memo will identify preliminary cleanup levels and boundaries for the Interim Action based on the nature and extent of contamination in the Study Area presented in this Report.

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TABLES

Table 2-1
Surface Grab Sample Summary

Station ID	Sample Station Coordinates[1,2]		Sample Collection Date	Mudline Elevation (MLLW)[3]	Recovery Depth (cm) 0-10 cm Sampled[4]	Sample ID	Surface Sediment Testing[5]					Grab Comment	Sediment Observation
	Easting (X)	Northing (Y)					Grain Size, TOC/TS, D/F, Archive	PAH	Metals	PCB	SVOC		
POBI-SS-01SG	1040484.69	634671.36	3/12/2013	-7.6	12	POBI-SS-01-0-10-130312	X	X				Flat surface, undisturbed. overlying water. Anthropogenic material, crabs, hermit crabs, worms, shrimp on surface.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML), 80% non-plastic fines, 20% fine sand. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-02SG	1041142.33	634772.56	3/12/2013	-7	30	POBI-SS-02-0-10-130312	X		X	X	X	Clear overlying water, slightly winnowed surface, undisturbed.	0-1 cm: Brown, soft, SILT (ML), 90% non-plastic fines, 10% fine sand. Moderate H2S-like odor. 1-10 cm: Dark gray, soft, SANDY SILT (ML), 60% non-plastic fines, 40% medium sand. Moderate H2S-like odor. Same until bottom of grab (plasticity increases slightly).
POBI-SS-03SG	1041136.41	635129.17	3/12/2013	-3.0	15	POBI-SS-03-0-10-130312	X		X	X	X	Slightly winnowed surface, undisturbed, biota (crabs, mussels present on surface).	0-1 cm: Brown, soft, SHELLS AND GRAVEL, 95% whole mussel shells and fine to coarse gravel, 5% non-plastic fines. Crabs, worms, clams, shell hash on surface. 1-9 cm: Dark gray, soft, SILTY SAND WITH GRAVEL (SM), 15% fine to coarse gravel, 30% non-plastic fines. 55% fine sand and shell hash. 9-10 cm: Black, soft, SILT WITH SAND (ML), 25% fine sand, 75% low plasticity fines. Same to bottom of grab.
POBI-SS-04SG	1040836.94	635301.23	3/12/2013	-17.5	27	POBI-SS-04-0-10-130312	X	X				Overlying water, slightly winnowed, intact surface.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 5% shells and shell hash 1-10 cm: Dark gray, soft, SILT (ML), 90% non-plastic fines, 10% fine sand. Moderate H2S-like odor. Same until bottom of grab (plasticity increases with depth).
POBI-SS-05SG	1040389.31	635122.72	3/12/2013	-0.5	25	POBI-SS-05-0-10-130312	X	X				Clear overlying water, flat surface, undisturbed.	0-1 cm: Brown, soft, SILT (ML), 80% non-plastic fines, 10% fine sand. 10% shell hash. 1-10 cm: Dark gray, soft, SANDY SILT (ML), 55% low plasticity fines, 45% fine sand. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-06SG	1040940.18	635558.55	3/12/2013	-16.2	30	POBI-SS-06-0-10-130312	X		X	X	X	Overlying water, flat surface.	0-3 cm: Brown, soft, POORLY GRADED SAND WITH GRAVEL (SP), 5% non-plastic fines, 45% fine to coarse gravel, 45% fine to medium sand. 5% snails and shell hash. 3-10 cm: Dark gray, soft, SILTY SAND (SM), 45% low plasticity fines, 50% f-sand. 5% shell hash. Same to bottom of grab.
POBI-SS-07SG	1040394.79	635564.97	3/12/2013	-13.4	28	POBI-SS-07-0-10-130312	X	X				Flat undisturbed surface, whole shells present.	0-1 cm: Brown, soft, SILT (ML), 70% non-plastic fines, 10% fine sand. 20% whole shells and shell hash on surface. 1-10 cm: Dark gray, soft, SANDY SILT (ML), 55% non-plastic fines, 40% fine sand. 5% shell hash. Same until bottom of grab.
POBI-SS-08SG	1040020.25	635552.88	3/13/2013	-0.3	25	POBI-SS-08-0-10-130313	X	X				Clear overlying water, flat intact surface.	0-1 cm: Brown, soft, SILT (ML), 95% non-plastic fines. 5% worms and wood fibers. Slight H2S-like odor. 1-10 cm: Dark gray, soft, SILT (ML), 80% non-plastic fines, 15% fine sand, 5% worms and wood fibers. Slight H2S-like odor. Same until bottom of grab.

Table 2-1
Surface Grab Sample Summary

	Sample Station Coordinates[1,2]						Surface Sediment Testing[5]						
Station ID	Easting (X)	Northing (Y)	Sample Collection Date	Mudline Elevation (MLLW)[3]	Recovery Depth (cm) 0-10 cm Sampled[4]	Sample ID	Grain Size, TOC/TS, D/F, Archive	PAH	Metals	PCB	SVOC	Grab Comment	Sediment Observation
POBI-SS-09SG	1039485.41	635506.16	3/12/2013	1.1	25	POBI-SS-09-0-10-130312	X		X	X	X	Flat undisturbed surface, overlying water, biota present on surface.	0-3 cm: Brown, soft, SILTY SAND WITH GRAVEL (SM), 20% fine to coarse gravel, 25% non-plastic fines, 25% fine to medium sand. 30% shell hash. 3-9 cm: Dark gray, soft, SILTY SAND (SM), 30% non-plastic fines, 40% f-sand. 30% shell hash. 9-10 cm: Black, soft, SILT WITH SAND (ML), 20% fine sand, 80% non-plastic fines.
POBI-SS-10SG	1040879.84	635945.02	3/11/2013	-21.4	11	POBI-SS-10-0-10-130311	X		X	X	X	23 ft underpier, Clear overlying water surface intact.	0-1 cm: Brown, soft, SILT (ML), 40% non-plastic fines. 60% shells on surface. 1-10 cm: Dark gray, soft, SILT (ML), 60% non-plastic fines. 40% shells and shell hash.
POBI-SS-11SG	1040461.06	635941.34	3/12/2013	-27.8	27	POBI-SS-11-0-10-130312	X	X				Clear overlying water, flat surface, undisturbed.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-12SG	1040018.81	635950.65	3/13/2013	-14.3	26	POBI-SS-12-0-10-130313	X	X				Undisturbed surface, slightly winnowed, overlying water.	0-1 cm: Brown, soft, SILT (ML) 95% non-plastic fines. 5% shells. 1-10 cm: Dark gray, soft, SILT (ML), 90% non-plastic fines, 10% fine sand. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-13SG	1040860.22	636545.00	3/12/2013	-12.5	12	POBI-SS-13-0-10-130312	X		X	X	X	Good recovery.	0-1 cm: Brown, soft, SILT (ML), 90% non-plastic fines. 10% shells on surface. 1-10 cm: Dark gray, soft, SANDY SILT (ML),45% non-plastic fines, 30% fine sand. 25% shells and shell hash. Same until bottom of grab.
POBI-SS-14SG	1040435.57	636439.03	3/12/2013	-30.8	28	POBI-SS-14-0-10-130312	X	X				Clear overlying water, flat surface, undisturbed, shrimp found on surface.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark brown, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Same until bottom of grab.
POBI-SS-15SG	1039959.26	636454.49	3/13/2013	-19.4	29	POBI-SS-15-0-10-130313	X	X				Flat surface, clear overlying water.	0-2 cm: Brown, soft, SILT (ML) 100% non-plastic fines. Moderate H2S-like odor. 2-10 cm: Dark gray, soft, SILT (ML), 90% non-plastic fines, 5% fine sand, 5% shells and twigs. Moderate H2S-like odor. Same until bottom of grab.
POBI-SS-16SG	1039420.61	636473.82	3/12/2013	1.8	27	POBI-SS-16-0-10-130312	X		X	X	X	Clear overlying water, flat surface, undisturbed.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML), 85% non-plastic fines, 15% fine sand. Same until bottom of grab.
POBI-SS-17SG	1040806.79	637183.77	3/13/2013	-9.4	13	POBI-SS-17-0-10-130313	X		X	X	X	Jaws closed, intact surface.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Black, soft, SANDY SILT (ML), 45% low plasticity fines, 30% fine sand, 25% shells. Same to bottom of the grab.
POBI-SS-18SG	1040724.14	637306.68	3/12/2013	-35.8	26	POBI-SS-18-0-10-130312	X		X	X	X	Clear overlying water, undisturbed, flat surface.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. Slight H2S-like odor. 1-10 cm: Dark gray, soft, SILT (ML),95% non-plastic fines, 5% fine sand. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-19SG	1040849.81	637446.31	3/11/2013	-6	25	POBI-SS-19-0-10-130311	X		X	X	X	Clear overlying water, flat, intact surface.	0-2 cm: Brown, soft, SILT (ML), 90% non-plastic fines, 5% fine sand. 5% shells and wood fibers. 2-10 cm: Dark gray, soft, SILT (ML), 65% low plasticity fines, 25% fine sand. 10% shells, wood fragments (bark) and fibers. Slight H2S-like odor. Same to bottom of grab.

Table 2-1
Surface Grab Sample Summary

Station ID	Sample Station Coordinates[1,2]		Sample Collection Date	Mudline Elevation (MLLW)[3]	Recovery Depth (cm) 0-10 cm Sampled[4]	Sample ID	Surface Sediment Testing[5]					Grab Comment	Sediment Observation
	Easting (X)	Northing (Y)					Grain Size, TOC/TS, D/F, Archive	PAH	Metals	PCB	SVOC		
POBI-SS-19SG-DU	1040849.81	637446.31	3/11/2013	-6	25	POBI-SS-19-0-10-130311DUP	X		X	X	X	Clear overlying water, flat intact surface.	0-2 cm: Brown, soft, SILT (ML), 90% non-plastic fines, 5% fine sand. 5% shells and wood fibers. 2-10 cm: Dark gray, soft, SILT (ML), 65% low plasticity fines, 25% fine sand. 10% shells, wood fragments (bark) and fibers. Slight H2S-like odor. Same to bottom of grab.
POBI-SS-20SG	1040661.85	637584.68	3/11/2013	-32.7	28	POBI-SS-20-0-10-130311	X	X				Clear overlying water, flat intact surface.	0-1 cm: Brown, soft, SILT (ML), 95% non-plastic fines. 5% shells. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Moderate H2S-like odor. Same until bottom of grab.
POBI-SS-21SG	1039983.62	637530.41	3/6/2013	-5.6	20	POBI-SS-21-0-10-130306	X				X	Slightly sloped surface, clear overlying water, intact.	0-1 cm: Brown, soft, POORLY SORTED SAND (SP), 90% fine to medium sand, 5% non-plastic fines. 5% whole shells. 1-10 cm: Dark gray, soft, SILTY SAND (SM), 80% fine to medium sand, 15% low plasticity fines. 5% shell fragments. Shell fragments increase toward the bottom of grab.
POBI-SS-22SG	1039580.87	637517.54	3/6/2013	-1.7	23	POBI-SS-22-0-10-130306	X				X	Flat overlying water, intact surface.	0-1 cm: Brown, soft, SILT (ML), 95% non-plastic fines. 5% whole shells. Slight H2S-like odor. 1-10 cm: Dark gray, soft, SILT WITH SAND (ML), 75% low-plasticity fines, 25% fine sand. Slight H2S-like odor. Trace rainbow sheen. Same to bottom of grab.
POBI-SS-23SG	1040768.93	638055.28	3/11/2013	-12.4	20	POBI-SS-23-0-10-130311	X	X				Clear overlying water, slightly winnowed surface, intact with worms and shells on surface.	0-2 cm: Brown, soft, SILT (ML), 80% non-plastic fines, 10% fine sand, 10% shells, barnacles, shell hash. 2-10 cm: Dark gray, soft, SANDY SILTY (ML), 30% low plasticity fines, 60% fine sand, 10% shell hash. Same until the end of grab.
POBI-SS-24SG	1040260.62	638041.98	3/11/2013	-28.8	26	POBI-SS-24-0-10-130311	X	X				Clear overlying water, undisturbed.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-25SG	1039836.14	638053.48	3/11/2013	-10.7	20	POBI-SS-25-0-10-130311	X	X				Clear overlying water, flat undisturbed surface.	0-2 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 2-10 cm: Dark gray, soft, SILT (ML) 95% non-plastic fines. 5% shell hash. Slight H2S-like odor.
POBI-SS-26SG	1039545.28	638001.14	3/6/2013	-2.4	26	POBI-SS-26-0-10-130306	X				X	Clear overlying water, flat intact surface	0-1 cm: Brown, soft, SILT (ML), 95% non plastic fines. 5% whole shells. Slight H2S-like odor. 1-10 cm: Dark gray, soft, SANDY SILT (ML), 70% low plasticity fines, 30% fine sand. Slight H2S-like odor.
POBI-SS-27SG	1039444.65	638610.90	3/6/2013	-2.2	27	POBI-SS-27-0-10-130306	X				X	Flat, intact surface, clear overlying water.	0-1 cm: Brown, soft, SILT (ML), 90% non-plastic fines, 5% wood up to 3 inches, 5% shells. 1-10 cm: Dark gray, soft, SILT (ML), 40% non-plastic fines, 20% fine sand. 40% decomposing wood fragments. Slight H2S-like odor. Wood contents decrease with depth.
POBI-SS-28SG	1039851.78	638669.91	3/11/2013	-10.4	28	POBI-SS-28-0-10-130311	X	X				Flat surface, overlying water, undisturbed.	0-1 cm: Brown, soft, SILT (ML), 90% non-plastic fines, 5% fine sand, 5% shells. 1-10 cm: Dark gray, soft, SILT (ML), 90% non-plastic fines, 10% fine sand. slight H2S-like odor. Same until bottom of grab.
POBI-SS-29SG	1040084.01	638438.53	3/11/2013	-4.8	25	POBI-SS-29-0-10-130311	X	X				Flat surface, overlying water, undisturbed.	0-2 cm: Brown, soft, SILT (ML), 90% non-plastic fines, 10% fine sand. Crab on surface, some shells (<5%). 2-10 cm: Dark gray, soft, SANDY SILT (ML), 65% low plasticity fines, 35% fine sand. Same until bottom of grab.

Table 2-1
Surface Grab Sample Summary

Station ID	Sample Station Coordinates[1,2]		Sample Collection Date	Mudline Elevation (MLLW)[3]	Recovery Depth (cm) 0-10 cm Sampled[4]	Sample ID	Surface Sediment Testing[5]					Grab Comment	Sediment Observation
	Easting (X)	Northing (Y)					Grain Size, TOC/TS, D/F, Archive	PAH	Metals	PCB	SVOC		
POBI-SS-30SG	1040825.52	638532.84	3/11/2013	-2.1	25	POBI-SS-30-0-10-130311	X	X				Flat surface, intact surface.	0-2 cm: Brown, soft, SILTY SAND (SM), 40% non-plastic fines, 55% fine sand, 5% shells, shrimp, worms. 2-10 cm: Dark gray, soft, SILTY SAND (SM), 45% low-plasticity fines, 55% fine sand. Same to bottom of grab. 5 inch long sand shrimp.
POBI-SS-31SG	1040904.85	639271.02	3/6/2013	-4.8	26	POBI-SS-31-0-10-130306	X		X	X	X	Clear overlying water, flat surface.	0-1 cm: Brown, soft, SILT (ML), 95% non-plastic fines, 5% shells and worms. Slight H2S-like odor. 1-10 cm: Dark gray, soft, SILTWITH SAND (ML), 70% low plasticity fines, 20% fine sand, 5% shells and worms. Slight H2S-like odor. Same to bottom of grab.
POBI-SS-32SG	1041181.04	638395.86	3/8/2013	7.8	16	POBI-SS-32-0-10-130308	X		X	X	X	Clear overlaying water, flat intact surface.	0-10 cm: Dark gray with brown mottling, soft, SILTY SAND (SM), 70% fine sand, 25% non-plastic fines, 5% worms and shells. Same to bottom of grab.
POBI-SS-33SG	1041335.77	638567.75	3/8/2013	6.7	12	POBI-SS-33-0-10-130308	X	X				Clear overlaying water, flat intact surface.	0-10 cm: Gray, soft, SILTY SAND (SM), 90% fine sand, 5% low plasticity fines, 5% shells and worms. Same to bottom of grab.
POBI-SS-34SG	1041426.49	639272.56	3/11/2013	-1	18	POBI-SS-34-0-10-130311	X	X				Flat undisturbed surface, clear overlying water, snails on surface.	0-2 cm: Brown, soft, SILTY SAND (SM), 25% non-plastic fines, 70% fine sand, 5% shells and snails. 2-10 cm: Dark gray, soft, POORLY GRADED SAND (SP), 70% fine sand, 10% non-plastic fines, 5% shell hash. Same to bottom of grab.
POBI-SS-35SG	1042464.98	639296.33	3/11/2013	-4.2	23	POBI-SS-35-0-10-130311	X	X				Clear, overlying water, flat surface, undisturbed	0-3 cm: Brown, soft, SILT (ML), 85% non-plastic fines, 5% fine sand, 10% shells, barnacles, worms and hermit crabs. 3-10 cm: Dark gray, soft, SILT WITH SAND (ML), 70% low plasticity fines, 25% fine sand. 5% wood debris, shells and worms. Same until bottom of grab.
POBI-SS-36SG	1042995.74	638191.49	3/7/2013	-12.4	30	POBI-SS-36-0-10-130307	X	X				Clear overlying water, flat surface.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-37SG	1043605.42	638407.71	3/11/2013	7.4	16	POBI-SS-37-0-10-130311	X		X	X	X	Clear overlying water, flat surface with biota present.	0-2 cm: Gray, soft, POORLY GRADED GRAVEL GP), 90% fine to coarse subrounded gravel and barnacles, 10% fine sand. 2-10 cm: Brown, soft, SILTY SAND WITH GRAVEL (SM), 10% non-plastic fines, 45% fine to coarse subrounded gravel, 45% fine sand. Same to bottom of grab.
POBI-SS-38SG	1042938.62	637674.30	3/7/2013	-11.3	29	POBI-SS-38-0-10-130307	X	X				Surface water present, surface intact, 50% diatom cover.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 50% diatom growth on surface. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Slight H2S-like odor. Same to bottom of grab.
POBI-SS-39SG	1043712.30	637698.59	3/7/2013	7.8	14	POBI-SS-39-0-10-130307	X		X	X	X	Clear overlying water, flat intact surface with shells.	0-2 cm: SHELLS AND GRAVEL, 85% shells and barnacles, 15% coarse subrounded gravel. 2-3 cm: Brown, SILTY SAND WITH GRAVEL (SM), 20% non-plastic fines, 20% fine to coarse gravel, 40% fine sand, 20% shells and barnacles. 3-10 cm: Black, SILTY SAND WITH GRAVEL (SM), 20% non-plastic fines, 20% fine to coarse gravel, 40% fine sand, 20% shells and barnacles. Same to bottom of grab. 10- Bottom of Grab, Same as 3-10 cm.

Table 2-1
Surface Grab Sample Summary

Station ID	Sample Station Coordinates[1,2] Easting (X)	Northing (Y)	Sample Collection Date	Mudline Elevation (MLLW)[3]	Recovery Depth (cm) 0-10 cm Sampled[4]	Sample ID	Surface Sediment Testing[5] Grain Size, TOC/TS, D/F, Archive	PAH	Metals	PCB	SVOC	Grab Comment	Sediment Observation
POBI-SS-40SG	1042751.91	637372.86	3/7/2013	-7.3	26	POBI-SS-40-0-10-130307	X		X	X	X	Clear surface water, surface intact, abundant shells on surface, snails	0-2 cm: Brown, soft, SILT (ML), 50% non-plastic fines, 50% shells. 2-10 cm: Dark gray, soft, SILT WITH SAND (ML), 70% non-plastic fines, 15% fine sand, 15% shells. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-41SG	1042943.78	637429.91	3/7/2013	-12.2	30	POBI-SS-41-0-10-130307	X	X				Surface intact, clear overlying water	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML) 90% non-plastic fines, 5% fine sand, 5% shells. Slight H2S-like odor. Same to bottom of grab.
POBI-SS-41SG-DU	1042943.78	637429.91	3/7/2013	-12.2	30	POBI-SS-41-0-10-130307DUP	X	X				Surface intact, clear overlying water	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML) 90% non-plastic fines, 5% fine sand, 5% shells. Slight H2S-like odor. Same to bottom of grab.
POBI-SS-42SG	1043225.14	637313.17	3/7/2013	-13.3	30	POBI-SS-42-0-10-130307	X	X				Clear overlying water present, surface intact.	0-1 cm: Brown, soft, SILT (ML), 95% non-plastic fines, 5% shell and diatoms. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Slight H2S-odor. Same until bottom of grab.
POBI-SS-43SG	1043050.80	637091.99	3/7/2013	-12.4	30	POBI-SS-43-0-10-130307	X	X				Flat intact surface, clear water on top.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% shell. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-44SG	1043607.13	637095.71	3/6/2013	6.3	25	POBI-SS-44-0-10-130306	X		X	X	X	Flat surface, clear overlying water.	0-2 cm: Brown, soft, SANDY SILT WITH GRAVEL (ML), 30% medium to coarse sand, 20% fine to coarse gravel, 30% non-plastic fines, 20% whole shells and shell hash. 2-10 cm: Black with brown mottling, soft, SILT WITH GRAVEL (ML), 30% medium to coarse sand, 10% fine to coarse gravel, 40% non-plastic fines, 20% whole shells and shell hash. Trace worms. Same to bottom of grab.
POBI-SS-45SG	1043079.03	636796.98	3/8/2013	-11.3	30	POBI-SS-45-0-10-130308	X	X				Flat, intact surface, clear overlying water.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. Moderate H2S-like odor. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Moderate H2S-like odor, trace rainbow sheen. Same until bottom of grab.
POBI-SS-46SG	1043754.09	636698.63	3/7/2013	6.4	21	POBI-SS-46-0-10-130307	X		X	X	X	Clear overlying water, flat intact surface.	0-1 cm: Brown, soft, SILT (ML), 80% non-plastic fines, 15% fine sand, 5% shells and wood debris. 1-10 cm: Dark gray, soft, SANDY SILT (ML), 50% low plasticity fines, 45% fine sand, 5% wood debris. Same to bottom of grab.
POBI-SS-47SG	1043099.95	636427.02	3/8/2013	-10	29	POBI-SS-47-0-10-130308	X	X				Clear overlying water, flat surface.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. Moderate H2S-like odor. 1-10 cm: Dark gray, soft, SILT (ML), 85% non-plastic fines, 10% fine sand, 5% wood debris. Moderate H2S-like odor. Same until bottom of grab.
POBI-SS-48SG	1043089.36	636202.87	3/8/2013	-11.3	28	POBI-SS-48-0-10-130308	X	X				Flat, intact surface with organics, clear overlying water.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. Moderate H2S-like odor. 1-10 cm: Dark gray, soft, SILT (ML), 90% non-plastic fines, 10% fine to medium. Moderate H2S-like odor. Same until bottom of grab.

Table 2-1
Surface Grab Sample Summary

Station ID	Sample Station Coordinates[1,2]		Sample Collection Date	Mudline Elevation (MLLW)[3]	Recovery Depth (cm) 0-10 cm Sampled[4]	Sample ID	Surface Sediment Testing[5]					Grab Comment	Sediment Observation
	Easting (X)	Northing (Y)					Grain Size, TOC/TS, D/F, Archive	PAH	Metals	PCB	SVOC		
POBI-SS-49SG	1043398.43	636212.70	3/8/2013	-11.6	26	POBI-SS-49-0-10-130308	X	X				Flat surface with biota, intact, clear overlying water.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. Moderate H2S-like odor. 1-10 cm: Dark gray, soft, SILT (ML), 90% non-plastic fines, 10% fine to coarse sand. Moderate H2S-like odor. Same until bottom of grab.
POBI-SS-50SG	1043846.51	636280.40	3/7/2013	6.7	26	POBI-SS-50-0-10-130307	X		X	X	X	Clear overlying water, flat intact surface.	0-2 cm: Brown, soft, SILT (ML), 70% non-plastic fines, 20% fine sand, 10% shells. 2-10 cm: Dark gray, soft, SILT (ML), 60% low plasticity fines, 30% fine sands, 10% worms and shells. Same to bottom of grab.
POBI-SS-51SG	1042976.62	635926.07	3/11/2013	-9.1	26	POBI-SS-51-0-10-130311	X	X				Overlying water, flat surface with biota present.	0-10 cm: Black, soft, SILT (ML), 100% non-plastic fines. Moderate H2S-like odor Same to bottom of grab.
POBI-SS-52SG	1043274.36	635933.56	3/11/2013	-10.4	28	POBI-SS-52-0-10-130311	X	X				Flat, undisturbed surface, clear overlying water.	0-0.5 cm: Brown, very soft, SILT (ML), 100% non-plastic fines. Slight H2S-like odor. 0.5-10 cm: Black, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. Moderate H2S-like odor. Same until bottom of grab.
POBI-SS-53SG	1043349.38	635518.96	3/8/2013	0.4	20	POBI-SS-53-0-10-130308	X		X	X	X	Slightly winnowed surface, intact with shells and barnacles, clear overlying water.	0-2 cm: Brown, soft, SILTY SAND (SM), 70% fine sand, 15% non-plastic fines, 5% coarse subrounded gravel, 10% shells. Slight H2S-like odor. 2-10 cm: Dark gray, soft, SILTY SAND (SM), 50% fine sand, 30% non-plastic fines, 10% coarse subrounded gravel, 10% shells. Slight H2S-like odor. Same to bottom of grab.
POBI-SS-54SG	1043743.09	635569.70	3/8/2013	3.9	30	POBI-SS-54-0-10-130308	X	X				Clear overlying water, flat intact surface.	0-2 cm: Olive gray, soft, SILT (ML), 95% non plastic fines, 5% fine sand. 2-10 cm: Gray with red and black mottling, soft, SILT (ML), 80% low plasticity fines, 20% fine sand. Same to bottom of grab.
POBI-SS-55SG	1043982.57	635686.74	3/7/2013	8	20	POBI-SS-55-0-10-130307	X		X	X	X	Slightly winnowed intact surface over clear water.	0-1 cm: Brown, soft, SILT (ML), 50% non-plastic fines, 30% fine sand, 20% shells and wood. 1-10 cm: Dark gray with light gray mottling, soft, SILT (ML), 60% low plasticity fines, 20% fines sand, 10% wood and shells. Same to bottom of grab.
POBI-SS-56SG	1043355.82	635149.26	3/11/2013	1.3	24	POBI-SS-56-0-10-130311	X	X				Overlying water, intact surface, biota present.	0-2 cm: Brown, soft, SILT (ML) 90% non-plastic fines, 10% shells and barnacles. 2-6 cm: Dark gray, soft, SILT (ML),75% non-plastic fines, 20% fine sand. 5% wood debris and leaves. 6-10 cm: Dark gray, soft, SILT (ML), 75% low plasticity fines, 20% fine sand. 5% wood debris and leaves. Same to bottom of grab.
POBI-SS-57SG	1043899.32	634914.79	3/7/2013	8.9	23	POBI-SS-57-0-10-130307	X		X	X	X	Clear overlying water, flat intact surface	0-1 cm: Brown, soft, SILTY SAND (SM), 15% non-plastic fines, 85% fine sand. 1-10 cm: Dark gray, soft, SILTY SAND (SM), 20% non-plastic fines, 75% fine sands, 5% worms, worm tubes, and shells. Same to bottom of grab.
POBI-SS-57SG-DU	1043899.32	634914.79	3/7/2013	8.9	23	POBI-SS-57-0-10-130307DUP	X		X	X	X	Clear overlying water, flat intact surface	0-1 cm: Brown, soft, SILTY SAND (SM), 15% non-plastic fines, 85% fine sand. 1-10 cm: Dark gray, soft, SILTY SAND (SM), 20% non-plastic fines, 75% fine sands, 5% worms, worm tubes, and shells. Same to bottom of grab.

Table 2-1
Surface Grab Sample Summary

	Sample Station Coordinates[1,2]						Surface Sediment Testing[5]						
Station ID	Easting (X)	Northing (Y)	Sample Collection Date	Mudline Elevation (MLLW)[3]	Recovery Depth (cm) 0-10 cm Sampled[4]	Sample ID	Grain Size, TOC/TS, D/F, Archive	PAH	Metals	PCB	SVOC	Grab Comment	Sediment Observation
POBI-SS-58SG	1043393.55	634700.09	3/12/2013	1.6	21	POBI-SS-58-0-10-130312	X	X				Clear overlying water, flat undisturbed surface with biota.	0-1 cm: Brown, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. 5% shell hash. 1-10 cm: Dark gray, soft, SILT (ML), 95% non-plastic fines, 5% fine sand. 5% shell hash. Slight H2S-like odor. Same until bottom of grab.
POBI-SS-59SG	1043402.24	634334.88	3/7/2013	3	17	POBI-SS-59-0-10-130307	X		X	X	X	Slightly winnowed intact surface, clear overlying water.	0-1 cm: Brown, soft, SILT (ML), 100% non-plastic fines. 1-10 cm: Dark gray, soft, SILT (ML), 70% low plasticity fines, 10% fine sand, 10% shells. Same until bottom of grab.
POBI-SS-60SG	1043550.33	634239.95	3/7/2013	6.6	23	POBI-SS-60-0-10-130307	X		X	X	X	Flat intact surface, clear water on top.	0-2 cm: Brown, soft, SILT (ML), 80% non-plastic fines, 20% fine sand. 2-10 cm: Dark gray with red mottling, soft, SANDY SILT (ML), 50% low plasticity fines, 45% fine sand, 5% organic matter and shells. Same to bottom of grab.
POBI-SS-61SG	1041194.161	635095.758	5/22/2013	-4.8	15	POBI-SS-61-0-10-130522	X	X	X	X	X	Abundant organic matter on surface, intact sample, overlying water, no winnowing	0-4 cm: Black, soft, SILT (ML), 60% non-plastic fines, 40% decaying leaves. 4-10 cm: Black, soft, SAND (SM), 70% fine sand, 20% fines, 10% shell fragments and gravel. Strong H2S-like odor, slight rainbow sheen. Same until bottom of grab.
POBI-SS-62SG	1041096.467	635090.578	5/22/2013	-8.8	16	POBI-SS-62-0-10-130522	X	X	X	X	X	Flat, intact surface, overlying water.	0-4 cm: Brownish gray, soft, SILT (ML), 95% non-plastic fines, 5% shell fragments. 4-10 cm: Dark gray, soft, SILT (ML), 70% non-plastic fines, 20% coarse to medium sand, 10% shell fragments. Trace rainbow sheen on surface. Same until bottom of grab.
POBI-SS-63SG	1041181.968	635008.039	5/22/2013	-6.1	12	POBI-SS-63-0-10-130522	X	X	X	X	X	Clear overlying water, good jaw closure.	0-2 cm: SHELLS, 100% shell and mussel debris. 2-10 cm: Grayish brown, soft, SILTY SAND (SM), 60% fine sand, 40% fines. No odor. Same until bottom of grab.
POBI-SS-64SG	1041176.761	634658.143	5/22/2013	-4.9	12	POBI-SS-64-0-10-130522	X	X	X	X	X	Clear overlying water, good closure.	0-1 cm: Brown, soft, SILT (ML), 90% non-plastic fines, 5% fine sand, 5% shells. 1-10 cm: Dark gray, soft, SANDY SILT (SM), 30% fine sand, 70% fines. One crab. Same until bottom of grab.
POBI-SS-65SG	1041151.839	634582.792	5/22/2013	-3	14	POBI-SS-65-0-10-130522	X	X	X	X	X	Clear overlying water, intact surface.	0-2 cm: Brown, SILT (ML), 90% fines, 5% shells, 5% organic matter. 2-10 cm: Dark gray, SILT WITH SAND (ML), 60% fines, 20% fine sand, 20% shells, 5% organic matter. 3 crabs in grab. Same until bottom of grab.

Notes:
1 = Actual coordinates and mudlines for accepted surface sediment samples.
2 = Horizontal datum is North American Datum of 1983 (NAD83) Washington State Plane (WSP), U.S. Survey feet.
3 = Vertical datum is in Mean Lower Lower Water (MLLW), feet.
4 = All samples collected with a hydraulic powergrab, except for underpier stations (SS-10, SS-13, SS-17) collected with an Ekman grab.
5 = Grain size, total organic carbon (TOC), and total solids (TS) by PSEP method; PAHs by SW8270D method; metals by EPA 6010B/6020 method; mercury by SW7474 method; PCBs include all SMS PCBs by SW8082 method; SVOC includes all SMS SVOCs (including PAHs) by SW8270D method. See Table 7-1 *Analyte List, Analytical Methods, and Reporting Limits* in the SAP/QAPP (Anchor QEA 2013) for more details.

Table 2-2
Subsurface Core Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery(ft)	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	In situ Sample Interval (decimal feet)[4]	Sample Name	Subsurface Sediment Testing[5]							
	Easting (X)	Northing (Y)									Grain Size	TOC/ TS	D/F	Metals	SVOC	PCB	PAH	Archive
POBI-SC-01	1040209.03	635257.27	14.0	12.2	87.1%	3/5/2013	3/6/2013	0.2	0-0.5	POBI-SC-01-0-0.5-130306	X	X	X					
									0.5-1.0	POBI-SC-01-0.5-1-130306	X	X	X					X
									1.0-1.5	POBI-SC-01-1-1.5-130306	X	X	X					
									1.5-2.0	POBI-SC-01-1.5-2-130306	X	X	X					
									2-3	POBI-SC-01-2-3-130306								X
									3-4	POBI-SC-01-3-4-130306								X
									4-6	POBI-SC-01-4-6-130306	X	X	X					X
									6-8	POBI-SC-01-6-8-130306								X
									8-10	POBI-SC-01-8-10-130306	X	X	X					X
									10-11.6	POBI-SC-01-10-12-130306								X
POBI-SC-02	1040783.00	635268.88	14.0	11.0	78.6%	3/4/2013	3/5/2013	-16.8	0-1	POBI-SC-02-0-1-130305								X
									1-2	POBI-SC-02-1-2-130305		X	X					X
									2-3	POBI-SC-02-2-3-130305								X
									3-4	POBI-SC-02-3-4-130305								X
									4-5	POBI-SC-02-4-5-130305		X	X					X
									5-6	POBI-SC-02-5-6-130305	X	X	X					
									5-6	POBI-SC-02-5-6-130305DUP		X	X					
									6-7	POBI-SC-02-6-7-130305	X	X	X					X
									7-8	POBI-SC-02-7-8-130305								X
									8-9	POBI-SC-02-8-9-130305								X
									9-10	POBI-SC-02-9-10-130305								X
POBI-SC-03	1040928.43	635573.81	14.0	11.9	85.0%	3/4/2013	3/5/2013	-21.1	0-2	POBI-SC-03-0-2-130305	X	X	X	X	X	X	X	
									2-4	POBI-SC-03-2-4-130305	X	X	X	X	X	X	X	
									4-6	POBI-SC-03-4-6-130305	X	X	X	X	X	X	X	
									6-8	POBI-SC-03-6-8-130305								X
									8-10	POBI-SC-03-8-10-130305								X
									10-12	POBI-SC-03-10-12-130305								X
POBI-SC-04	1040861.74	635714.98	14.0	10.9	77.9%	2/25/2013	2/26/2013	-34.2	7.8-9.8	POBI-SC-04-7-9-130226								X
									9.8-11.8	POBI-SC-04-9-11-130226	X	X	X					X
									11.8-13.5	POBI-SC-04-11-13-130226		X	X					
POBI-SC-05	1040485.89	635689.90	8.7	4.8	54.6%	3/5/2013	3/6/2013	-30.2	0-1	POBI-SC-05-0-1-130306								X
									1-2	POBI-SC-05-1-2-130306								X
									2-3	POBI-SC-05-2-3-130306	X	X	X					
									3-4	POBI-SC-05-3-4-130306	X	X	X					
									3-4	POBI-SC-05-3-4-130306DUP		X	X					
									4-5	POBI-SC-05-4-5-130306		X	X					
									5-6	POBI-SC-05-5-6-130306		X	X					X
POBI-SC-06	1040892.15	635867.36	4.6	4.7	102.2%	3/11/2013	3/12/2013	-17.0	0-0.5	POBI-SC-06-0-0.5-130313		X	X					X
									0.5-1.0	POBI-SC-06-0.5-1-130313		X	X					X
									1.0-1.5	POBI-SC-06-1-1.5-130313		X	X					
									1.5-2.0	POBI-SC-06-1.5-2-130313		X	X					X
									2-3.9	POBI-SC-06-2-4-130313								X

Table 2-2
Subsurface Core Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery(ft)	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	In situ Sample Interval (decimal feet)[4]	Sample Name	Subsurface Sediment Testing[5]							
	Easting (X)	Northing (Y)									Grain Size	TOC/ TS	D/F	Metals	SVOC	PCB	PAH	Archive
POBI-SC-07	1040854.35	635891.08	14.0	9.4	66.8%	2/25/2013	2/26/2013	-32.0	10-12	POBI-SC-07-12-14-130226								X
									12-13	POBI-SC-07-14-16-130226	X	X	X					X
									12-13	POBI-SC-07-14-16-130226DUP	X	X	X					
POBI-SC-08	1040801.10	635860.90	9.2	7.1	77.2%	2/25/2013	2/26/2013	-36.6	0-1.4	POBI-SC-08-0-1-130226								X
									1.4-2.4	POBI-SC-08-1-2-130226								X
									2.4-3.4	POBI-SC-08-2-3-130226								X
									3.4-5.4	POBI-SC-08-3-5-130226	X	X	X					X
									5.4-6.4	POBI-SC-08-5-6-130226		X	X					X
									6.4-7.4	POBI-SC-08-6-7-130226								X
									7.4-8.4	POBI-SC-08-7-8-130226		X	X					X
POBI-SC-09	1040151.99	636022.96	14.0	13.1	93.6%	2/26/2013	2/27/2013	-26.6	0-1	POBI-SC-09-0-1-130227								X
									1-2	POBI-SC-09-1-2-130227								X
									2-3	POBI-SC-09-2-3-130227								X
									3-4	POBI-SC-09-3-4-130227								X
									4-5	POBI-SC-09-4-5-130227								X
									5-6	POBI-SC-09-5-6-130227								X
									6-7	POBI-SC-09-6-7-130227	X	X	X					X
									7-8	POBI-SC-09-7-8-130227	X	X	X					X
									8-9	POBI-SC-09-8-9-130227		X	X					X
									9-10	POBI-SC-09-9-10-130227		X	X					X
									10.7-11.5	POBI-SC-09-10.6-11.5-130227								X
									11.5-13.7	POBI-SC-09-11.5-13.6-130227								X
POBI-SC-10	1040828.09	636141.96	10.0	4.5	45.0%	2/25/2013	2/27/2013	-37.8	4.2-6.2	POBI-SC-10-9-11-130227								X
									6.2-8.2	POBI-SC-10-11-13-130227	X	X	X					X
									8.2-9.1	POBI-SC-10-13-14-130227		X	X					X
POBI-SC-11	1040867.45	636065.95	12.2	10.0	82.0%	3/12/2013	3/13/2013	-25.5	0-2	POBI-SC-11-0-2-130313								X
									2-4	POBI-SC-11-2-4-130313	X	X	X	X	X			
									4-6	POBI-SC-11-4-6-130313								X
									4-6	POBI-SC-11-4-6-130313DUP								X
									6-8	POBI-SC-11-6-8-130313	X	X	X	X	X			
									8-10	POBI-SC-11-8-10-130313		X	X					X
									10-11.6	POBI-SC-11-10-12-130313								X
POBI-SC-12	1040841.94	636402.80	12.0	9.4	78.3%	3/12/2013	3/13/2013	-17.4	0-2	POBI-SC-12-0-2-130313								X
									2-4	POBI-SC-12-2-4-130313	X	X	X	X	X	X	X	
									4-6	POBI-SC-12-4-6-130313								X
									6-8	POBI-SC-12-6-8-130313	X	X	X	X	X	X	X	
									8-10	POBI-SC-12-8-10-130313		X	X		X		X	X
									10-11.2	POBI-SC-12-10-12-130313		X			X		X	X
POBI-SC-13	1040819.30	636407.07	12.5	10.3	82.4%	2/26/2013	2/27/2013	-36.9	5.1-7.5	POBI-SC-13-4-6-130227								X
									7.5-9.5	POBI-SC-13-6-8-130227	X	X	X					X
									9.5-10.4	POBI-SC-13-8-9-130227		X	X					X
									9.5-10.4	POBI-SC-13-8-9-130227DUP		X	X					
									10.4-11.4	POBI-SC-13-9-10-130227		X	X					X

Table 2-2
Subsurface Core Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery(ft)	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	In situ Sample Interval (decimal feet)[4]	Sample Name	Subsurface Sediment Testing[5]							
	Easting (X)	Northing (Y)									Grain Size	TOC/ TS	D/F	Metals	SVOC	PCB	PAH	Archive
POBI-SC-14	1039419.18	636507.31	13.0	11.3	86.5%	3/5/2013	3/6/2013	0.9	0-1	POBI-SC-14-0-1-130306								X
									1-2	POBI-SC-14-1-2-130306		X	X					X
									2-3	POBI-SC-14-2-3-130306		X	X					X
									3-4	POBI-SC-14-3-4-130306								X
POBI-SC-15	1040806.98	636577.97	14.0	8.5	60.7%	2/25/2013	2/26/201	-37.3	4.7-6.7	POBI-SC-15-7-9-130226								X
									6.7-8.7	POBI-SC-15-9-11-130226								X
									8.7-9.7	POBI-SC-15-11-12-130226		X	X					X
									9.7-10.7	POBI-SC-15-12-13-130226		X	X					X
									10.7-11.7	POBI-SC-15-13-14-130226								X
POBI-SC-16	1040140.81	636605.48	11.5	10.6	92.2%	2/27/2013	2/28/2013	-27.7	0-1	POBI-SC-16-0-1-130228								X
									1-2	POBI-SC-16-1-2-130228								X
									2-3	POBI-SC-16-2-3-130228								X
									3-4	POBI-SC-16-3-4-130228								X
									4-5	POBI-SC-16-4-5-130228	X	X	X					X
									5-6	POBI-SC-16-5-6-130228	X	X	X					X
									6-7	POBI-SC-16-6-7-130228		X	X					X
									7-8	POBI-SC-16-7-8-130228								X
POBI-SC-17	1040809.11	636860.29	12.0	9.1	75.8%	3/13/2013	3/15/2013	-23.6	0-2	POBI-SC-17-0-2-130315								X
									2-4	POBI-SC-17-2-4-130315	X	X	X	X	X	X	X	
									4-6	POBI-SC-17-4-6-130315								X
									6-8	POBI-SC-17-6-8-130315	X	X	X	X	X	X	X	
									8-10	POBI-SC-17-8-10-130315		X			X		X	X
									10-11.1	POBI-SC-17-10-12-130315		X					X	X
									10-11.1	POBI-SC-17-10-12-130315DUP		X					X	X
POBI-SC-18	1040779.65	636968.32	11.9	10.2	85.7%	2/27/2013	2/28/2013	-36.3	5.7-7.7	POBI-SC-18-4-6-130228								X
									5.7-7.7	POBI-SC-18-4-6-130228DUP								X
									7.7-9.7	POBI-SC-18-6-8-130228	X	X	X					X
									9.7-10.7	POBI-SC-18-8-9-130228		X	X					X
									10.7-11.4	POBI-SC-18-9-10-130228								X
POBI-SC-19	1040783.50	637141.37	12.3	10.0	81.3%	3/13/2013	3/15/2013	-24.5	0-2	POBI-SC-19-0-2-130315								X
									2-4	POBI-SC-19-2-4-130315	X	X	X	X	X	X	X	
									4-6	POBI-SC-19-4-6-130315								X
									6-8	POBI-SC-19-6-8-130315	X	X	X	X	X	X	X	
									8-10	POBI-SC-19-8-10-130315		X	X				X	X
									10-11.2	POBI-SC-19-10-12-130315		X	X				X	X
POBI-SC-20	1040769.43	637116.78	13.5	9.8	72.6%	2/26/2013	2/27/2013	-34.3	3.7-5.7	POBI-SC-20-11-13-130227								X
									5.7-7.7	POBI-SC-20-13-15-130227	X	X	X					X
									7.7-8.7	POBI-SC-20-15-16-130227		X	X					X

Table 2-2
Subsurface Core Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery(ft)	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	In situ Sample Interval (decimal feet)[4]	Sample Name	Subsurface Sediment Testing[5]							
	Easting (X)	Northing (Y)									Grain Size	TOC/ TS	D/F	Metals	SVOC	PCB	PAH	Archive
POBI-SC-21	1040388.65	637320.21	11.5	9.7	84.7%	2/27/2013	3/1/2013	-30.3	0-1	POBI-SC-21-0-1-130301								X
									1-2	POBI-SC-21-1-2-130301	X	X	X					
									2-3	POBI-SC-21-2-3-130301	X	X	X					
									3-4	POBI-SC-21-3-4-130301								X
									4-5	POBI-SC-21-4-5-130301								X
									5-6	POBI-SC-21-5-6-130301								X
POBI-SC-22	1040750.81	637244.93	14.0	9.3	66.1%	3/6/2013	3/7/2013	-33.1	0-1.5	POBI-SC-22-0-1-130307								X
									1.5-3	POBI-SC-22-1-2-130307								X
									3-4.5	POBI-SC-22-2-3-130307								X
									4.5-6	POBI-SC-22-3-4-130307								X
									6-7.6	POBI-SC-22-4-5-130307								X
									7.6-9.1	POBI-SC-22-5-6-130307								X
									9.1-10.6	POBI-SC-22-6-7-130307								X
									10.6-12.1	POBI-SC-22-7-8-130307	X	X	X	X	X	X	X	X
									12.1-12.9	POBI-SC-22-8-8.5-130307	X	X	X	X	X	X	X	X
POBI-SC-23	1040785.40	637260.93	12.0	11.2	93.3%	3/14/2013	3/15/2013	-16.9	0-2	POBI-SC-23-0-2-130315								X
									2-4	POBI-SC-23-2-4-130315								X
									4-6	POBI-SC-23-4-6-130315								X
									6-8	POBI-SC-23-6-8-130315	X	X	X	X	X	X	X	
									8-10.3	POBI-SC-23-8-10-130315	X	X	X	X	X	X	X	
POBI-SC-24	1040918.27	637452.31	14.0	11.3	80.4%	3/5/2013	3/6/2013	-5.9	0-1	POBI-SC-24-0-1-130306								X
									1-2	POBI-SC-24-1-2-130306								X
									2-3	POBI-SC-24-2-3-130306	X	X	X					
									3-4	POBI-SC-24-3-4-130306	X	X	X					
									4-5	POBI-SC-24-4-5-130306								X
									5-6	POBI-SC-24-5-6-130306								X
									6-7	POBI-SC-24-6-7-130306								X
									7-8	POBI-SC-24-7-8-130306								X
POBI-SC-25	1040434.27	637835.38	9.7	7.7	79.4%	2/27/2013	2/28/2013	-31.1	0-1	POBI-SC-25-0-1-130228								X
									1-2	POBI-SC-25-1-2-130228		X	X					X
									2-3	POBI-SC-25-2-3-130228	X	X	X					
									2-3	POBI-SC-25-2-3-130228DUP		X	X					
									3-4	POBI-SC-25-3-4-130228	X	X	X					
									4-5	POBI-SC-25-4-5-130228								X
									5-6	POBI-SC-25-5-6-130228								X
POBI-SC-26	1040894.46	637870.53	14.0	12.5	89.3%	3/5/2013	3/7/2013	-8.0	0-1	POBI-SC-26-0-1-130307								X
									1-2	POBI-SC-26-1-2-130307		X	X					X
									2-3	POBI-SC-26-2-3-130307	X	X	X					
									3-4	POBI-SC-26-3-4-130307	X	X	X					X
									4-5	POBI-SC-26-4-5-130307								X
									5-6	POBI-SC-26-5-6-130307								X
									6-7	POBI-SC-26-6-7-130307								X
									7-8	POBI-SC-26-7-8-130307								X

Table 2-2
Subsurface Core Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery(ft)	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	In situ Sample Interval (decimal feet)[4]	Sample Name	Subsurface Sediment Testing[5]							
	Easting (X)	Northing (Y)									Grain Size	TOC/ TS	D/F	Metals	SVOC	PCB	PAH	Archive
POBI-SC-27	1040482.51	638459.99	9.9	7.7	77.8%	3/5/2013	3/6/2013	-33.1	0-1	POBI-SC-27-0-1-130306								X
									1-2	POBI-SC-27-1-2-130306								X
									1-2	POBI-SC-27-1-2-130306DUP								X
									2-3	POBI-SC-27-2-3-130306	X	X	X					
									3-4	POBI-SC-27-3-4-130306	X	X	X					
									4-5	POBI-SC-27-4-5-130306		X	X					X
									5-6	POBI-SC-27-5-6-130306								X
POBI-SC-28	1040463.13	639036.56	9.3	6.8	73.1%	3/6/2013	3/7/2013	-34.2	0-1	POBI-SC-28-0-1-130307								X
									1-2	POBI-SC-28-1-2-130307		X	X					X
									2-3	POBI-SC-28-2-3-130307	X	X	X					
									3-4	POBI-SC-28-3-4-130307	X	X	X					
									4-5	POBI-SC-28-4-5-130307								X
									5-6	POBI-SC-28-5-6-130307								X
POBI-SC-29	1040857.56	638858.13	10.1	9.5	94.1%	3/5/2013	3/7/2013	-0.5	0-1	POBI-SC-29-0-1-130307	X	X	X					
									1-2	POBI-SC-29-1-2-130307								X
									2-3	POBI-SC-29-2-3-130307								X
									3-4	POBI-SC-29-3-4-130307								X
POBI-SC-30	1041156.41	638944.13	10.8	9.6	88.7%	3/5/2013	3/7/2013	2.4	0-1	POBI-SC-30-0-1-130307	X	X	X					
									1-2	POBI-SC-30-1-2-130307								X
									1-2	POBI-SC-30-1-2-130307DUP								X
									2-3	POBI-SC-30-2-3-130307								X
									3-4	POBI-SC-30-3-4-130307								X
									4.9-6	POBI-SC-30-4.9-6-130307								X
POBI-SC-31	1040869.72	639241.68	9.7	9.1	94.1%	3/6/2013	3/7/2013	-6.9	0-1	POBI-SC-31-0-1-130307								X
									1-2	POBI-SC-31-1-2-130307		X	X	X				X
									2-3	POBI-SC-31-2-3-130307								X
									3-4	POBI-SC-31-3-4-130307								X
POBI-SC-32	1042409.17	639263.37	9.5	9.3	97.4%	3/1/2013	3/4/2013	-3.6	0-1	POBI-SC-32-0-1-130304		X	X					X
									1-2	POBI-SC-32-1-2-130304		X	X					X
									2-3	POBI-SC-32-2-3-130304								X
									3-4	POBI-SC-32-3-4-130304								X
									3-4	POBI-SC-32-3-4-130304DUP								X
POBI-SC-33	1043624.84	638363.09	10.3	9.4	91.7%	3/4/2013	3/5/2013	7.5	0-1	POBI-SC-33-0-1-130305								X
									1-2	POBI-SC-33-1-2-130305		X	X				X	X
									2-3	POBI-SC-33-2-3-130305								X
									3-4	POBI-SC-33-3-4-130305								X
POBI-SC-34	1043169.58	638319.94	10.3	10.1	98.5%	3/1/2013	3/4/2013	-16.1	0-1	POBI-SC-34-0-1-130304		X	X					X
									1-2	POBI-SC-34-1-2-130304	X	X	X					X
									2-3	POBI-SC-34-2-3-130304								X
									3-4	POBI-SC-34-3-4-130304								X

Table 2-2
Subsurface Core Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery(ft)	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	In situ Sample Interval (decimal feet)[4]	Sample Name	Subsurface Sediment Testing[5]							
	Easting (X)	Northing (Y)									Grain Size	TOC/ TS	D/F	Metals	SVOC	PCB	PAH	Archive
POBI-SC-35	1042902.88	638103.52	13.8	9.7	70.3%	2/27/2013	2/28/2013	-10.5	0-1	POBI-SC-35-0-1-130228		X	X					X
									1-2	POBI-SC-35-1-2-130228	X	X	X					X
									2-3	POBI-SC-35-2-3-130228								X
									3-4	POBI-SC-35-3-4-130228								X
									7.1-8.6	POBI-SC-35-7.1-8.6-130228								X
POBI-SC-36	1042718.44	637958.85	14.0	10.3	73.6%	3/4/2013	3/5/2013	-8.5	0-1	POBI-SC-36-0-1-130305								X
									1-2	POBI-SC-36-1-2-130305								X
									2-3	POBI-SC-36-2-3-130305								X
									3-4	POBI-SC-36-3-4-130305	X	X	X					
									4-5	POBI-SC-36-4-5-130305		X	X					X
									5-6	POBI-SC-36-5-6-130305								X
POBI-SC-37	1042912.17	637428.86	6.9	4.9	71.3%	3/4/2013	3/5/2013	-11.0	0-1	POBI-SC-37-0-1-130305								X
									1-2	POBI-SC-37-1-2-130305		X	X					X
									2-3	POBI-SC-37-2-3-130305	X	X	X					
									3-4	POBI-SC-37-3-4-130305								X
POBI-SC-38	1043723.05	637662.38	10.0	8.1	81.0%	2/28/2013	3/1/2013	9.3	0-1	POBI-SC-38-0-1-130301								X
									1-2	POBI-SC-38-1-2-130301		X	X					X
									1-2	POBI-SC-38-1-2-130301DUP		X	X					X
									2-3	POBI-SC-38-2-3-130301								X
									3-4	POBI-SC-38-3-4-130301								X
POBI-SC-39	1043316.49	637284.30	12.8	10.8	84.4%	3/4/2013	3/5/2013	-12.9	0-1	POBI-SC-39-0-1-130305								X
									1-2	POBI-SC-39-1-2-130305		X	X					X
									2-3	POBI-SC-39-2-3-130305								X
									3-4	POBI-SC-39-3-4-130305		X	X					X
									4-5	POBI-SC-39-4-5-130305	X	X	X					
									5-6	POBI-SC-39-5-6-130305								X
									6-8	POBI-SC-39-6-8-130305								X
									8-10	POBI-SC-39-8-10-130305								X
									8-10	POBI-SC-39-8-10-130305DUP								X
POBI-SC-40	1043609.18	637045.29	12.0	10.6	88.3%	2/27/2013	2/27/2013	5.7	0-1	POBI-SC-40-0-1-130228								X
									1-2	POBI-SC-40-1-2-130228		X	X					X
									2-3	POBI-SC-40-2-3-130228								X
									3-4	POBI-SC-40-3-4-130228								X
POBI-SC-41	1043053.48	636795.87	11.3	9.9	87.6%	3/4/2013	3/5/2013	-10.0	0-1	POBI-SC-41-0-1-130305								X
									1-2	POBI-SC-41-1-2-130305		X	X					X
									2-3	POBI-SC-41-2-3-130305		X	X					X
									3-4	POBI-SC-41-3-4-130305	X	X	X					
									4-5	POBI-SC-41-4-5-130305								X
POBI-SC-42	1043891.84	636237.55	14.0	10.3	73.6%	2/27/2013	2/28/2013	7.7	0-1	POBI-SC-42-0-1-130228								X
									0-1	POBI-SC-42-0-1-130228DUP								X
									1-2	POBI-SC-42-1-2-130228		X	X		X		X	X
									2-3	POBI-SC-42-2-3-130228								X
									3-4	POBI-SC-42-3-4-130228								X

Table 2-2
Subsurface Core Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery(ft)	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	In situ Sample Interval (decimal feet)[4]	Sample Name	Subsurface Sediment Testing[5]							
	Easting (X)	Northing (Y)									Grain Size	TOC/ TS	D/F	Metals	SVOC	PCB	PAH	Archive
POBI-SC-43	1043392.45	636241.58	13.6	10.6	77.9%	3/4/2013	3/6/2013	-11.0	0-1	POBI-SC-43-0-1-130306								X
									1-2	POBI-SC-43-1-2-130306								X
									2-3	POBI-SC-43-2-3-130306		X	X					X
									3-4	POBI-SC-43-3-4-130306	X	X	X					
									4-5	POBI-SC-43-4-5-130306	X	X	X					
									5-6	POBI-SC-43-5-6-130306								X
POBI-SC-44	1042989.33	635979.20	10.0	8.1	81.0%	2/28/2013	3/1/2013	-9.1	0-1	POBI-SC-44-0-1-130301								X
									1-2	POBI-SC-44-1-2-130301	X	X	X					X
									2-3	POBI-SC-44-2-3-130301		X	X					X
									3-4	POBI-SC-44-3-4-130301		X	X					X
POBI-SC-45	1043304.08	635974.50	9.7	7.2	74.2%	3/4/2013	3/5/2013	-9.8	0-1	POBI-SC-45-0-1-130305								X
									0-1	POBI-SC-45-0-1-130305DUP								X
									1-2	POBI-SC-45-1-2-130305		X	X					X
									2-3	POBI-SC-45-2-3-130305		X	X					X
									3-4	POBI-SC-45-3-4-130305	X	X	X					
									4-5	POBI-SC-45-4-5-130305								X
POBI-SC-46	1043238.59	635687.86	14.0	12.6	90.0%	2/26/2013	2/27/2013	-5.7	6.3-8.8.3	POBI-SC-46-6-8-130227								X
									8.3-10.3	POBI-SC-46-8-10-130227	X	X	X					X
									10.3-11.3	POBI-SC-46-10-11-130227								X
									11.3-12.3	POBI-SC-46-11-12-130227								X
POBI-SC-47	1043355.42	635468.73	12.0	11.7	97.1%	2/26/2013	2/27/2013	-0.2	0-1	POBI-SC-47-0-1-130227	X	X	X	X	X	X	X	
									1-2	POBI-SC-47-1-2-130227	X	X	X	X	X	X	X	X
									2-3	POBI-SC-47-2-3-130227		X	X		X		X	X
									3-4	POBI-SC-47-3-4-130227		X	X				X	X
									4-6	POBI-SC-47-4-6-130227								X
									6-8	POBI-SC-47-6-8-130227								X
									8-10	POBI-SC-47-8-10-130227								X
POBI-SC-48	1043869.58	634887.97	10.2	10.2	100.0%	2/28/2013	3/1/2013	8.3	0-1	POBI-SC-48-0-1-130301								X
									1-2	POBI-SC-48-1-2-130301		X	X					X
									2-3	POBI-SC-48-2-3-130301								X
									3-4	POBI-SC-48-3-4-130301								X
POBI-SC-49	1043407.64	634656.36	12.0	10.3	85.8%	2/28/2013	3/1/2013	3.8	0-1	POBI-SC-49-0-1-130301	X	X	X	X	X	X	X	
									1-2	POBI-SC-49-1-2-130301	X	X	X	X	X	X	X	
									2-3	POBI-SC-49-2-3-130301		X	X	X	X	X	X	X
									3-4	POBI-SC-49-3-4-130301		X	X	X	X	X	X	X
									4-6	POBI-SC-49-4-6-130301		X	X	X	X	X	X	X
									6-8	POBI-SC-49-6-8-130301		X	X	X	X	X	X	X
									10.5-11.4	POBI-SC-49-10.5-11.4-130301		X	X	X	X	X	X	X

Table 2-2
Subsurface Core Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery(ft)	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	In situ Sample Interval (decimal feet)[4]	Sample Name	Subsurface Sediment Testing[5]							
	Easting (X)	Northing (Y)									Grain Size	TOC/ TS	D/F	Metals	SVOC	PCB	PAH	Archive
POBI-SC-50	1043495.85	634188.40	14.0	11.3	80.7%	2/28/2013	3/1/2013	2.4	0-1	POBI-SC-50-0-1-130301	X	X	X	X	X	X	X	
									1-2	POBI-SC-50-1-2-130301	X	X	X	X	X	X	X	
									2-3	POBI-SC-50-2-3-130301	X	X	X	X	X	X	X	
									3-4	POBI-SC-50-3-4-130301		X	X		X	X	X	X
									4-6	POBI-SC-50-4-6-130301		X	X	X	X	X	X	X
									6-8	POBI-SC-50-6-8-130301		X	X	X	X	X	X	X
									8-9.3	POBI-SC-50-8-10-130301		X	X	X	X	X	X	X
									12.4-13	POBI-SC-50-12.4-13-130301		X	X	X	X	X	X	X

Notes:
1 = Actual coordinates and mudlines for accepted surface sediment samples.
2 = Horizontal datum is North American Datum of 1983 (NAD83) Washington State Plane (WSP), U.S. Survey feet.
3 = Vertical datum is in Mean Lower Lower Water (MLLW), feet.
4 = All samples collected with a hydraulic vibracore.
5 = Grain size, total organic carbon (TOC), and total solids (TS) by PSEP method; PAHs by SW8270D method; metals by EPA 6010B/6020 method; mercury by SW7474 method; PCBs include all SMS PCBs by SW8082 method; SVOC includes all SMS SVOCs (including PAHs) by SW8270D method. See Table 7-1 *Analyte List, Analytical Methods, and Reporting Limits* in the SAP/QAPP (Anchor QEA 2013) for more details.

Table 2-3
Geochronology Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	Sample Interval (decimal feet)	Subsurface Sediment Sample ID[4]	Surface Sediment Testing[5]		
	Easting (X)	Northing (Y)									Pb-210	Cs-137	Archive
POBI-GC-01	1040105.66	635128.03	10.4	10.1	97.1%	3/01/2013	3/04/2013	1.1	0-2	POBI-GC-01-0-2-130304	X	X	
									2-4	POBI-GC-01-2-4-130304			X
									4-6	POBI-GC-01-4-6-130304			X
									6-8	POBI-GC-01-6-8-130304	X	X	
									8-10	POBI-GC-01-8-10-130304			X
									10-12	POBI-GC-01-10-12-130304			X
									12-14	POBI-GC-01-12-14-130304	X	X	
									14-16	POBI-GC-01-14-16-130304			X
									16-18	POBI-GC-01-16-18-130304			X
									18-20	POBI-GC-01-18-20-130304	X	X	
									20-22	POBI-GC-01-20-22-130304			X
									22-24	POBI-GC-01-22-24-130304			X
									24-26	POBI-GC-01-24-26-130304	X	X	
									26-28	POBI-GC-01-26-28-130304			X
									28-30	POBI-GC-01-28-30-130304			X
									30-32	POBI-GC-01-30-32-130304	X	X	
									32-34	POBI-GC-01-32-34-130304			X
									34-36	POBI-GC-01-34-36-130304			X
									36-38	POBI-GC-01-36-38-130304	X	X	
									38-40	POBI-GC-01-38-40-130304			X
									40-42	POBI-GC-01-40-42-130304			X
									42-44	POBI-GC-01-42-44-130304	X	X	
									44-46	POBI-GC-01-44-46-130304			X
									46-48	POBI-GC-01-46-48-130304			X
									48-50	POBI-GC-01-48-50-130304	X	X	
									50-52	POBI-GC-01-50-52-130304			X
									52-54	POBI-GC-01-52-54-130304			X
									54-60	POBI-GC-01-54-60-130304	X	X	
									60-62	POBI-GC-01-60-62-130304	X	X	
									62-64	POBI-GC-01-62-64-130304			X
									64-66	POBI-GC-01-64-66-130304			X
									66-68	POBI-GC-01-66-68-130304	X	X	
									68-70	POBI-GC-01-68-70-130304			X
									70-72	POBI-GC-01-70-72-130304			X
									72-74	POBI-GC-01-72-74-130304	X	X	
									74-76	POBI-GC-01-74-76-130304			X
									76-78	POBI-GC-01-76-78-130304			X
									78-80	POBI-GC-01-78-80-130304	X	X	
									80-82	POBI-GC-01-80-82-130304			X
									82-84	POBI-GC-01-82-84-130304			X
									84-90	POBI-GC-01-84-90-130304	X	X	
									90-92	POBI-GC-01-90-92-130304	X	X	
									92-94	POBI-GC-01-92-94-130304			X
									94-96	POBI-GC-01-94-96-130304			X
									96-98	POBI-GC-01-96-98-130304	X	X	
									98-100	POBI-GC-01-98-100-130304			X
									100-102	POBI-GC-01-100-102-130304			X
									102-104	POBI-GC-01-102-104-130304	X	X	
									104-106	POBI-GC-01-104-106-130304		X	X
									106-108	POBI-GC-01-106-108-130304		X	X
									108-110	POBI-GC-01-108-110-130304	X	X	X

Table 2-3
Geochronology Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	Sample Interval (decimal feet)	Subsurface Sediment Sample ID[4]	Surface Sediment Testing[5]		
	Easting (X)	Northing (Y)									Pb-210	Cs-137	Archive
POBI-GC-01 (cont.)	1040105.66 (cont.)	635128.03 (cont.)	10.4 (cont.)	10.1 (cont.)	97.1% (cont.)	3/01/2013 (cont.)	3/04/2013 (cont.)	1.1 (cont.)	110-112	POBI-GC-01-110-112-130304		X	X
									112-114	POBI-GC-01-112-114-130304			X
									114-116	POBI-GC-01-114-116-130304	X		X
									116-118	POBI-GC-01-116-118-130304		X	X
									118-120	POBI-GC-01-118-120-130304		X	X
									120-122	POBI-GC-01-120-122-130304	X	X	X
									122-124	POBI-GC-01-122-124-130304		X	X
									124-126	POBI-GC-01-124-126-130304			X
									126-128	POBI-GC-01-126-128-130304	X		X
									128-130	POBI-GC-01-128-130-130304		X	X
									130-132	POBI-GC-01-130-132-130304		X	X
									132-134	POBI-GC-01-132-134-130304	X	X	X
									134-136	POBI-GC-01-134-136-130304		X	X
									136-138	POBI-GC-01-136-138-130304		X	X
									138-140	POBI-GC-01-138-140-130304	X		X
									140-142	POBI-GC-01-140-142-130304		X	X
									142-144	POBI-GC-01-142-144-130304		X	X
									144-146	POBI-GC-01-144-146-130304	X	X	X
									146-148	POBI-GC-01-146-148-130304		X	X
									148-150	POBI-GC-01-148-150-130304		X	X
									150-152	POBI-GC-01-150-152-130304	X		X
									152-154	POBI-GC-01-152-154-130304		X	X
									154-156	POBI-GC-01-154-156-130304		X	X
									156-158	POBI-GC-01-156-158-130304	X	X	X
									158-160	POBI-GC-01-158-160-130304		X	X
									160-162	POBI-GC-01-160-162-130304		X	X
									162-164	POBI-GC-01-162-164-130304	X		X
									164-166	POBI-GC-01-164-166-130304		X	X
									166-168	POBI-GC-01-166-168-130304		X	X
									168-170	POBI-GC-01-168-170-130304	X	X	X
									170-172	POBI-GC-01-170-172-130304		X	X
									172-174	POBI-GC-01-172-174-130304		X	X
									174-176	POBI-GC-01-174-176-130304	X		X
									176-178	POBI-GC-01-176-178-130304		X	X
									178-180	POBI-GC-01-178-180-130304		X	X
									180-182	POBI-GC-01-180-182-130304	X	X	X

Table 2-3
Geochronology Sample Summary

	Coordinates[1,2]										Surface Sediment Testing[5]		
Station ID	Easting (X)	Northing (Y)	Penetration (ft)	Recovery	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	Sample Interval (decimal feet)	Subsurface Sediment Sample ID[4]	Pb-210	Cs-137	Archive
POBI-GC-02	1040895.24	635826.96	9.2	8.4	91.3%	3/11/2013	3/13/2013	-16.3	0-2	POBI-GC-02-0-2-130313	X	X	
									2-4	POBI-GC-02-2-4-130313			X
									4-6	POBI-GC-02-4-6-130313			X
									6-8	POBI-GC-02-6-8-130313	X	X	
									8-10	POBI-GC-02-8-10-130313			X
									10-12	POBI-GC-02-10-12-130313			X
									12-14	POBI-GC-02-12-14-130313	X	X	
									14-16	POBI-GC-02-14-16-130313			X
									16-18	POBI-GC-02-16-18-130313			X
									18-20	POBI-GC-02-18-20-130313	X	X	
									20-22	POBI-GC-02-20-22-130313			X
									22-24	POBI-GC-02-22-24-130313			X
									24-26	POBI-GC-02-24-26-130313	X	X	
									26-28	POBI-GC-02-26-28-130313			X
									28-30	POBI-GC-02-28-30-130313			X
									30-32	POBI-GC-02-30-32-130313	X	X	
									32-34	POBI-GC-02-32-34-130313			X
									34-36	POBI-GC-02-34-36-130313			X
									36-38	POBI-GC-02-36-38-130313	X	X	
									38-40	POBI-GC-02-38-40-130313			X
									40-42	POBI-GC-02-40-42-130313			X
									42-44	POBI-GC-02-42-44-130313	X	X	
									44-46	POBI-GC-02-44-46-130313			X
									46-48	POBI-GC-02-46-48-130313			X
									48-50	POBI-GC-02-48-50-130313	X	X	
									50-52	POBI-GC-02-50-52-130313			X
									52-54	POBI-GC-02-52-54-130313			X
									54-56	POBI-GC-02-54-56-130313	X	X	
									56-58	POBI-GC-02-56-58-130313			X
									58-60	POBI-GC-02-58-60-130313			X
									60-62	POBI-GC-02-60-62-130313	X	X	
									62-64	POBI-GC-02-62-64-130313			X
									64-66	POBI-GC-02-64-66-130313			X
									66-68	POBI-GC-02-66-68-130313	X	X	
									68-70	POBI-GC-02-68-70-130313			X
									70-72	POBI-GC-02-70-72-130313			X
									72-74	POBI-GC-02-72-74-130313	X	X	
									74-76	POBI-GC-02-74-76-130313			X
									76-78	POBI-GC-02-76-78-130313			X
									78-80	POBI-GC-02-78-80-130313	X	X	
									80-82	POBI-GC-02-80-82-130313			X
									82-84	POBI-GC-02-82-84-130313			X
									84-86	POBI-GC-02-84-86-130313	X	X	
									86-88	POBI-GC-02-86-88-130313			X
									88-90	POBI-GC-02-88-90-130313			X
									90-92	POBI-GC-02-90-92-130313	X	X	
									92-94	POBI-GC-02-92-94-130313			X
									94-96	POBI-GC-02-94-96-130313			X
									96-98	POBI-GC-02-96-98-130313	X	X	
									98-100	POBI-GC-02-98-100-130313			X
									100-102	POBI-GC-02-100-102-130313			X

Table 2-3
Geochronology Sample Summary

Station ID	Coordinates[1,2] Easting (X)	Coordinates[1,2] Northing (Y)	Penetration (ft)	Recovery	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	Sample Interval (decimal feet)	Subsurface Sediment Sample ID[4]	Surface Sediment Testing[5] Pb-210	Surface Sediment Testing[5] Cs-137	Surface Sediment Testing[5] Archive
POBI-GC-02	1040895.24	635826.96	9.2	8.4	91.3%	3/11/2013	3/13/2013	-16.3	102-104	POBI-GC-02-102-104-130313	X	X	
(cont.)	(cont.)	(cont.)	(cont.)	(cont.)	(cont.)	(cont.)	(cont.)	(cont.)	104-106	POBI-GC-02-104-106-130313			X
									106-108	POBI-GC-02-106-108-130313			X
									108-110	POBI-GC-02-108-110-130313	X	X	
									110-112	POBI-GC-02-110-112-130313			X
									112-114	POBI-GC-02-112-114-130313			X
									114-116	POBI-GC-02-114-116-130313	X	X	
									116-118	POBI-GC-02-116-118-130313			X
									118-120	POBI-GC-02-118-120-130313			X
									120-122	POBI-GC-02-120-122-130313	X	X	
									122-124	POBI-GC-02-122-124-130313			X
									124-126	POBI-GC-02-124-126-130313			X
									126-128	POBI-GC-02-126-128-130313	X	X	
									128-130	POBI-GC-02-128-130-130313			X
									130-132	POBI-GC-02-130-132-130313			X
									132-136	POBI-GC-02-132-136-130313	X	X	
									136-138	POBI-GC-02-136-138-130313			X
									138-140	POBI-GC-02-138-140-130313	X	X	
									140-142	POBI-GC-02-140-142-130313			X
									142-144	POBI-GC-02-142-144-130313			X
									144-146	POBI-GC-02-144-146-130313	X	X	
									146-148	POBI-GC-02-146-148-130313			X
									148-150	POBI-GC-02-148-150-130313			X
									150-152	POBI-GC-02-150-152-130313	X	X	
									152-154	POBI-GC-02-152-154-130313			X
									154-156	POBI-GC-02-154-156-130313			X
									156-158	POBI-GC-02-156-158-130313	X	X	
									158-160	POBI-GC-02-158-160-130313			X
									160-162	POBI-GC-02-160-162-130313			X
									162-164	POBI-GC-02-162-164-130313	X	X	
									164-166	POBI-GC-02-164-166-130313			X
									166-168	POBI-GC-02-166-168-130313			X
									168-170	POBI-GC-02-168-170-130313	X	X	
									170-172	POBI-GC-02-170-172-130313			X
									172-174	POBI-GC-02-172-174-130313			X
									174-176	POBI-GC-02-174-176-130313	X	X	
									176-178	POBI-GC-02-176-178-130313			X
									178-180	POBI-GC-02-178-180-130313			X
									180-182	POBI-GC-02-180-182-130313	X	X	
									182-184	POBI-GC-02-182-184-130313			X
									184-186	POBI-GC-02-184-186-130313			X
									186-188	POBI-GC-02-186-188-130313	X	X	
									188-190	POBI-GC-02-188-190-130313			X
									190-192	POBI-GC-02-190-192-130313			X
									192-194	POBI-GC-02-192-194-130313	X	X	
									194-196	POBI-GC-02-194-196-130313			X
									196-198	POBI-GC-02-196-198-130313			X
									198-200	POBI-GC-02-198-200-130313	X	X	
									200-202	POBI-GC-02-200-202-130313			X
									202-204	POBI-GC-02-202-204-130313			X
									204-206	POBI-GC-02-204-206-130313	X	X	

Table 2-3
Geochronology Sample Summary

Station ID	Coordinates[1,2] Easting (X)	Coordinates[1,2] Northing (Y)	Penetration (ft)	Recovery	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	Sample Interval (decimal feet)	Subsurface Sediment Sample ID[4]	Surface Sediment Testing[5] Pb-210	Surface Sediment Testing[5] Cs-137	Surface Sediment Testing[5] Archive
POBI-GC-02 (cont.)	1040895.24 (cont.)	635826.96 (cont.)	9.2 (cont.)	8.4 (cont.)	91.3% (cont.)	3/11/2013 (cont.)	3/13/2013 (cont.)	-16.3 (cont.)	206-208	POBI-GC-02-206-208-130313			X
									208-210	POBI-GC-02-208-210-130313			X
									210-212	POBI-GC-02-210-212-130313	X	X	
									212-214	POBI-GC-02-212-214-130313			X
									214-216	POBI-GC-02-214-216-130313			X
									216-218	POBI-GC-02-216-218-130313	X	X	
									218-220	POBI-GC-02-218-220-130313			X
									220-222	POBI-GC-02-220-222-130313			X
									222-224	POBI-GC-02-222-224-130313	X	X	

Table 2-3
Geochronology Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	Sample Interval (decimal feet)	Subsurface Sediment Sample ID[4]	Surface Sediment Testing[5]		
	Easting (X)	Northing (Y)									Pb-210	Cs-137	Archive
POBI-GC-03	1039835.28	639146.96	10.1	9.7	96.0%	2/28/2013	3/8/2013	-7.4	0-2	POBI-GC-03-0-2-130308	X	X	
									2-4	POBI-GC-03-2-4-130308			X
									4-6	POBI-GC-03-4-6-130308			X
									6-10	POBI-GC-03-6-10-130308	X	X	
									10-12	POBI-GC-03-10-12-130308			X
									12-14	POBI-GC-03-12-14-130308	X	X	
									14-16	POBI-GC-03-14-16-130308			X
									16-18	POBI-GC-03-16-18-130308			X
									18-20	POBI-GC-03-18-20-130308	X	X	
									20-22	POBI-GC-03-20-22-130308			X
									22-24	POBI-GC-03-22-24-130308			X
									24-26	POBI-GC-03-24-26-130308	X	X	
									26-28	POBI-GC-03-26-28-130308			X
									28-30	POBI-GC-03-28-30-130308			X
									30-32	POBI-GC-03-30-32-130308	X	X	
									32-34	POBI-GC-03-32-34-130308			X
									34-36	POBI-GC-03-34-36-130308			X
									36-38	POBI-GC-03-36-38-130308	X	X	
									38-40	POBI-GC-03-38-40-130308			X
									40-42	POBI-GC-03-40-42-130308			X
									42-44	POBI-GC-03-42-44-130308	X	X	
									44-46	POBI-GC-03-44-46-130308			X
									46-48	POBI-GC-03-46-48-130308			X
									48-50	POBI-GC-03-48-50-130308	X	X	
									50-52	POBI-GC-03-50-52-130309			X
									52-54	POBI-GC-03-52-54-130309	X	X	X
									54-56	POBI-GC-03-54-56-130310	X		X
									56-58	POBI-GC-03-56-58-130310		X	X
									58-60	POBI-GC-03-58-60-130311	X		X
									60-62	POBI-GC-03-60-62-130311		X	X
									62-64	POBI-GC-03-62-64-130312			X
									64-66	POBI-GC-03-64-66-130312	X	X	X
									66-68	POBI-GC-03-66-68-130313	X		X
									68-70	POBI-GC-03-68-70-130313		X	X
									70-72	POBI-GC-03-70-72-130314	X		X
									72-74	POBI-GC-03-72-74-130314		X	X
									74-76	POBI-GC-03-74-76-130315			X
									76-78	POBI-GC-03-76-78-130315	X	X	X
									78-80	POBI-GC-03-78-80-130316	X		X
									80-82	POBI-GC-03-80-82-130316		X	X
									82-84	POBI-GC-03-82-84-130317	X		X
									84-86	POBI-GC-03-84-86-130317		X	X
									86-88	POBI-GC-03-86-88-130318			X
									88-90	POBI-GC-03-88-90-130318	X	X	X

Table 2-3
Geochronology Sample Summary

Station ID	Coordinates[1,2]		Penetration (ft)	Recovery	Core Recovery (%)	Sample Collection Date	Sample Processing Date	Mudline Elevation (MLLW)[3]	Sample Interval (decimal feet)	Subsurface Sediment Sample ID[4]	Surface Sediment Testing[5]		
	Easting (X)	Northing (Y)									Pb-210	Cs-137	Archive
POBI-GC-04	1043535.36	635545.54	10	9.4	94.0%	2/28/2013	3/7/2013	1.5	0-2	POBI-GC-04-0-2-130307	X	X	
									2-4	POBI-GC-04-2-4-130307			X
									4-6	POBI-GC-04-4-6-130307			X
									6-8	POBI-GC-04-6-8-130307	X	X	
									8-10	POBI-GC-04-8-10-130307		X	X
									10-12	POBI-GC-04-10-12-130307			X
									12-14	POBI-GC-04-12-14-130307	X	X	
									14-16	POBI-GC-04-14-16-130307			X
									16-18	POBI-GC-04-16-18-130307			X
									18-20	POBI-GC-04-18-20-130307	X	X	
									20-22	POBI-GC-04-20-22-130307			X
									22-24	POBI-GC-04-22-24-130307			X
									24-26	POBI-GC-04-24-26-130307	X	X	
									26-28	POBI-GC-04-26-28-130307			X
									28-30	POBI-GC-04-28-30-130307			X
									30-32	POBI-GC-04-30-32-130307	X	X	
									32-34	POBI-GC-04-32-34-130307			X
									34-36	POBI-GC-04-34-36-130307			X
									36-38	POBI-GC-04-36-38-130307	X	X	
									38-40	POBI-GC-04-38-40-130307			X
									40-42	POBI-GC-04-40-42-130307			X
									42-44	POBI-GC-04-42-44-130307	X	X	
									44-46	POBI-GC-04-44-46-130307			X
									46-48	POBI-GC-04-46-48-130307			X
									48-50	POBI-GC-04-48-50-130307	X	X	
									50-52	POBI-GC-04-50-52-130309			X
									52-54	POBI-GC-04-52-54-130309		X	X
									54-56	POBI-GC-04-54-56-130310	X	X	X
									56-58	POBI-GC-04-56-58-130310		X	X
									58-60	POBI-GC-04-58-60-130311		X	X
									60-62	POBI-GC-04-60-62-130311	X		X
									62-64	POBI-GC-04-62-64-130312		X	X
									64-66	POBI-GC-04-64-66-130312		X	X
									66-68	POBI-GC-04-66-68-130313	X	X	X
									68-70	POBI-GC-04-68-70-130313		X	X
									70-72	POBI-GC-04-70-72-130314		X	X
									72-74	POBI-GC-04-72-74-130314	X		X
									74-76	POBI-GC-04-74-76-130315		X	X
									76-78	POBI-GC-04-76-78-130315		X	X
									78-80	POBI-GC-04-78-80-130316	X	X	X
									80-82	POBI-GC-04-80-82-130316		X	X
									82-84	POBI-GC-04-82-84-130317	X		X
									84-86	POBI-GC-04-84-86-130317		X	X
									86-88	POBI-GC-04-86-88-130318			X
									88-90	POBI-GC-04-88-90-130318	X	X	X

Notes:
** Blue indicates that the sample has been triggered but data have not been received.
1 = Actual coordinates and mudlines for accepted surface sediment samples.
2 = Horizontal datum is North American Datum of 1983 (NAD83) Washington State Plane (WSP), U.S. Survey feet.
3 = Vertical datum is in Mean Lower Lower Water (MLLW), feet.
4 = All samples collected with a hydraulic vibracore.
5 = Lead-210 (Pb-210) and Cesium-137 (Cs-137) by HASL300 method. See Table 7-1 *Analyte List, Analytical Methods, and Reporting Limits* in the SAP/QAPP (Anchor QEA 2013) for more details.

Table 4-1

Dioxin/Furan Toxic Equivalency Factor Values

Dioxin/Furan Congener	Toxic Equivalency Factor Value
1,2,3,4,6,7,8-HPCDF	0.01
1,2,3,4,6,7,8-HPCDD	0.01
1,2,3,4,7,8,9-HPCDF	0.01
1,2,3,4,7,8-HXCDF	0.1
1,2,3,4,7,8-HXCDD	0.1
1,2,3,6,7,8-HXCDF	0.1
1,2,3,6,7,8- HXCDD	0.1
1,2,3,7,8,9-HXCDF	0.1
1,2,3,7,8,9- HXCDD	0.1
1,2,3,7,8-PeCDF	0.03
1,2,3,7,8-PeCDD	1
2,3,4,6,7,8-HXCDF	0.1
2,3,4,7,8-PeCDF	0.3
2,3,7,8-TCDF	0.1
2,3,7,8-TCDD	1
OCDF	0.0003
OCDD	0.0003

Table 4-2

Carcinogenic Polycyclic Aromatic Hydrocarbon Toxic Equivalency Factor Values

Carcinogenic Polycyclic Aromatic Hydrocarbon	Toxic Equivalency Factor Value
Benzo(a)pyrene	1
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Dibenz(a,h)anthracene	0.1
Indeno(1,2,3-cd)pyrene	0.1

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-01	POBI-SS-02	POBI-SS-03	POBI-SS-04	POBI-SS-05	POBI-SS-06
Sample ID	POBI-SS-01-0-10-130312	POBI-SS-02-0-10-130312	POBI-SS-03-0-10-130312	POBI-SS-04-0-10-130312	POBI-SS-05-0-10-130312	POBI-SS-06-0-10-130312
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/12/2013	3/12/2013	3/12/2013	3/12/2013	3/12/2013	3/12/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	3.69	4.91	2.84	5.28	2.32	2.01
Total solids	34.8	40.1	60.7	31.5	46.4	73.3
Grain Size (pct)						
Total Gravel	0.8	0.9	61.6	1.1	2.5	42.9
Total Sand	15.1	35.9	16.4	10.7	47.7	48
Total Silt	55.5	34.2	17.4	51.6	32.4	5.7
Total Clay	28.6	28.8	4.6	36.6	17.5	3.4
Total Fines (silt + clay)	84.1	63	22	88.2	49.9	9.1
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.457 U	0.946	0.774 U	0.641 U	0.335 U	0.0405 U
1,2,3,7,8-PeCDD	2.36 EMPC	6.7	3.06	2.93	1.69	0.461 EMPC
1,2,3,4,7,8-HxCDD	3.03	11.3	4.99	3.6	1.87	0.555 EMPC
1,2,3,6,7,8-HxCDD	15.5	38.9	21.2	17.9	9.35	2.73
1,2,3,7,8,9-HxCDD	7.09	24.8	10.4	8.38	4.26	1.31
1,2,3,4,6,7,8-HpCDD	315	1200	551	433	188	57.9
1,2,3,4,6,7,8,9-OCDD	2430	12300 J	4980 J	3900	1360	433
2,3,7,8-TCDF	1.48	2.28	2.14	1.84 EMPC	1.17 EMPC	0.214 EMPC
1,2,3,7,8-PeCDF	1.31 J	2.37 J	1.76	1.88	0.96 J	0.286 J
2,3,4,7,8-PeCDF	1.4	2.26	1.51	1.7	1.05	0.313 J
1,2,3,4,7,8-HxCDF	5.52	9.28	5.77	7.7	3.42	1.29
1,2,3,6,7,8-HxCDF	2.92	5.66	3.55	3.49	1.87	0.732 EMPC
1,2,3,7,8,9-HxCDF	1.32	2.59	1.81	2.47	0.932 J	0.281 EMPC
2,3,4,6,7,8-HxCDF	4.4	9.96	4.72	5.59	2.98	0.879 J
1,2,3,4,6,7,8-HpCDF	86.6	187	118	104	54.3	17.2
1,2,3,4,7,8,9-HpCDF	3.48	12.9	5.64 EMPC	5.46	2.21	0.899 J
1,2,3,4,6,7,8,9-OCDF	155	707	416	225	87.6	36
Total Tetrachlorodibenzo-p-dioxin (TCDD)	14.1 EMPC	20.5 EMPC	13.5 EMPC	15.6 EMPC	10.8 EMPC	2.96 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	26.3 EMPC	49.3	24.2 EMPC	30.8 EMPC	19.5	5 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	148	379	192	188	97.5	25.7 EMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	857	3460	1800	1380	496	151
Total Tetrachlorodibenzofuran (TCDF)	23.6 EMPC	40.6 EMPC	29.9 EMPC	27.9 EMPC	19.6 EMPC	4.74 EMPC
Total Pentachlorodibenzofuran (PeCDF)	49.9 EMPC	94.5 EMPC	53.9 EMPC	61.5 EMPC	36.2 EMPC	9.73 EMPC
Total Hexachlorodibenzofuran (HxCDF)	122 EMPC	240 EMPC	147 EMPC	154 EMPC	80.3 EMPC	23.4 EMPC
Total Heptachlorodibenzofuran (HpCDF)	231	635	362 EMPC	289 EMPC	138	42.2
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	9.4 J	36.7 J	17.3 J	15.1	7.4 J	1.6 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	10.8 J	36.7 J	17.7 J	15.5	7.6 J	2.0 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	11.8 J	36.7 J	17.4 J	15.3	7.5 J	2.3 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	12.0 J	36.7 J	17.8 J	15.6	7.7 J	2.3 J

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-07	POBI-SS-08	POBI-SS-09	POBI-SS-10	POBI-SS-11	POBI-SS-12
Sample ID	POBI-SS-07-0-10-130312	POBI-SS-08-0-10-130313	POBI-SS-09-0-10-130312	POBI-SS-10-0-10-130311	POBI-SS-11-0-10-130312	POBI-SS-12-0-10-130313
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/12/2013	3/13/2013	3/12/2013	3/11/2013	3/12/2013	3/13/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**2.57**	**2.71**	**2.61**	**2.89**	**4.59**	**4.65**
Total solids	**39.8**	**35.3**	**63**	**35.7**	**30.6**	**28.9**
Grain Size (pct)						
Total Gravel	**5.1**	0.1 U	**43.5**	**10.2**	**0.2**	0.1 U
Total Sand	**41.9**	**17.1**	**41.2**	**42.5**	**3.7**	**10**
Total Silt	**34.3**	**57.4**	**11.6**	**30**	**59.7**	**61**
Total Clay	**18.6**	**25.5**	**3.8**	**17.3**	**36.3**	**29.1**
Total Fines (silt + clay)	**52.9**	**82.9**	**15.4**	**47.3**	**96**	**90.1**
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.404 U	0.547 U	0.312 U	**0.566 EMPC**	0.654 U	0.551 U
1,2,3,7,8-PeCDD	**1.8**	**3.93**	**1.41**	**4.13**	**3.93**	**3.08 EMPC**
1,2,3,4,7,8-HxCDD	**2.37**	**3.36**	**1.53**	**7.01**	**4.94**	**3.67**
1,2,3,6,7,8-HxCDD	**12.6**	**21.9**	**5.41**	**23.8**	**27.2**	**20.5**
1,2,3,7,8,9-HxCDD	**5.76**	**10.1**	**3.12**	**15.2**	**11.7**	**9.04**
1,2,3,4,6,7,8-HpCDD	**246**	**305**	**94.9**	**545**	**546**	**378**
1,2,3,4,6,7,8,9-OCDD	**1770**	**2160**	**596**	**4380 J**	**4080 J**	**2710**
2,3,7,8-TCDF	**1.23**	**1.51**	**0.813 EMPC**	**1.76**	**2.57**	**1.89**
1,2,3,7,8-PeCDF	**1.13**	**1.42**	**0.493 EMPC**	**1.52 J**	**2.38 J**	**1.66**
2,3,4,7,8-PeCDF	**1.27**	**1.5**	**0.567 J**	**1.74**	**2.39**	**1.84**
1,2,3,4,7,8-HxCDF	**4.74**	**5.45**	**1.31 J**	**7.73**	**10.7**	**7.21**
1,2,3,6,7,8-HxCDF	**2.34**	**3.01**	**0.826 J**	**4.36**	**5**	**3.63**
1,2,3,7,8,9-HxCDF	**1.2**	**1.4 J**	**0.412 J**	**1.89 J**	**2.43**	**1.74 J**
2,3,4,6,7,8-HxCDF	**3.64**	**4.47**	**1.22**	**6.86**	**7.86**	**5.75**
1,2,3,4,6,7,8-HpCDF	**76.1**	**94.5**	**20.7**	**164**	**187**	**123**
1,2,3,4,7,8,9-HpCDF	**3.12 EMPC**	**3.62**	**0.776 EMPC**	**8.69 J**	**6.51**	**4.69**
1,2,3,4,6,7,8,9-OCDF	**129**	**149**	**32.5**	**563**	**286**	**195**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**12 EMPC**	**17.9 EMPC**	**8.15 EMPC**	**15.1 EMPC**	**26.1 EMPC**	**19.1 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**22.3 EMPC**	**38.5 EMPC**	**13 EMPC**	**33.3**	**46.4 EMPC**	**34.5 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**120**	**212**	**50.7 EMPC**	**216**	**267**	**186 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**607**	**755**	**233**	**1370**	**1420**	**971**
Total Tetrachlorodibenzofuran (TCDF)	**20.5 EMPC**	**27.7 EMPC**	**14.7 EMPC**	**23.8 EMPC**	**39.3 EMPC**	**31.6 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**41.9 EMPC**	**50.5 EMPC**	**18.3 EMPC**	**61.3 EMPC**	**85.7 EMPC**	**62.5 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**105 EMPC**	**124 JEMPC**	**30.6 EMPC**	**176 J**	**237 EMPC**	**155 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**197 EMPC**	**237**	**51.4 EMPC**	**505 J**	**475 EMPC**	**311**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**9.4**	**14.3 J**	**4.3 J**	**20.2 J**	**20.7 J**	**12.0 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**9.6**	**14.5 J**	**4.5 J**	**20.5 J**	**21.0 J**	**13.7 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**9.4**	**14.3 J**	**4.4 J**	**21.0 J**	**20.7 J**	**15.0 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**9.6**	**14.5 J**	**4.6 J**	**21.0 J**	**21.0 J**	**15.2 J**

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-13	POBI-SS-14	POBI-SS-15	POBI-SS-16	POBI-SS-17	POBI-SS-18
Sample ID	POBI-SS-13-0-10-130312	POBI-SS-14-0-10-130312	POBI-SS-15-0-10-130313	POBI-SS-16-0-10-130312	POBI-SS-17-0-10-130313	POBI-SS-18-0-10-130312
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/12/2013	3/12/2013	3/13/2013	3/12/2013	3/13/2013	3/12/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	3.68	3.6	4.23	4.77	7.14	4.46
Total solids	35.7	31.7	29.3	35.9	31.28	23.3
Grain Size (pct)						
Total Gravel	13.3	0.2	0.2	2.2	25.4	0.3
Total Sand	39	4.1	10.6	11.7	34.3	4.2
Total Silt	28.6	58.7	59.3	59.5	21.8	63.3
Total Clay	19.1	37	30	26.7	18.4	32.5
Total Fines (silt + clay)	47.7	95.7	89.3	86.2	40.2	95.8
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.705 U	0.623 U	0.673 U	1.05	0.614 U	0.595 U
1,2,3,7,8-PeCDD	4.48	4.1	3.2 EMPC	5.96	3.96	3.63
1,2,3,4,7,8-HxCDD	6.53	4.9	3.93 J	6.84	5.32	4.47
1,2,3,6,7,8-HxCDD	26.3	27.2	21.8	30.9	27	26.1
1,2,3,7,8,9-HxCDD	15	12.4	10	14.5	13	12.3
1,2,3,4,6,7,8-HpCDD	623	557	400	525	667	509
1,2,3,4,6,7,8,9-OCDD	5320 J	3930	3100	3280	5220 J	3700
2,3,7,8-TCDF	2.5	2.56	2.09	3.6	2.29	2.15
1,2,3,7,8-PeCDF	3.25	2.33 J	1.94 EMPC	2.7 J	2.39	2.09 J
2,3,4,7,8-PeCDF	3.18	2.51	2.08	3.05	2.93	2.31
1,2,3,4,7,8-HxCDF	22.2	11.2	7.95	8.88	14.1	10.8
1,2,3,6,7,8-HxCDF	6.65	5.1	3.76	5.47	5.03	4.57
1,2,3,7,8,9-HxCDF	2.39	2.52	1.71 JEMPC	2.27	3.04	2.3
2,3,4,6,7,8-HxCDF	7.48	8.04	6.84	9.56	8.22	7.39
1,2,3,4,6,7,8-HpCDF	201	188	134	164	176	167
1,2,3,4,7,8,9-HpCDF	7.75	6.5	5.19	5.88	8.55	6.44
1,2,3,4,6,7,8,9-OCDF	466	284	215	223	453	334
Total Tetrachlorodibenzo-p-dioxin (TCDD)	21.2 EMPC	24.6 EMPC	18.8 EMPC	46.8 EMPC	18.2 EMPC	23.6 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	40	47.6	34.7 EMPC	71.3	38.1	43.3
Total Hexachlorodibenzo-p-dioxin (HxCDD)	255	271	199 J	293	255	258
Total Heptachlorodibenzo-p-dioxin (HpCDD)	1970	1370	1010	1200	1770	1260
Total Tetrachlorodibenzofuran (TCDF)	49.8 EMPC	39.3 EMPC	34.2 EMPC	62.3 EMPC	29.7 EMPC	35 EMPC
Total Pentachlorodibenzofuran (PeCDF)	101 EMPC	87.1 EMPC	69.5 EMPC	117 EMPC	81.5 EMPC	76.2 EMPC
Total Hexachlorodibenzofuran (HxCDF)	222 EMPC	233 EMPC	175 JEMPC	244 EMPC	239 EMPC	215 EMPC
Total Heptachlorodibenzofuran (HpCDF)	483 EMPC	475	333 EMPC	402 EMPC	537 EMPC	464
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	24.5 J	21.1 J	12.6 J	24.2 J	23.0 J	19.4 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	24.8 J	21.4 J	14.7 J	24.2 J	23.2 J	19.7 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	24.5 J	21.1 J	16.1 J	24.2 J	23.0 J	19.4 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	24.8 J	21.4 J	16.4 J	24.2 J	23.2 J	19.7 J

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-19	POBI-SS-19	POBI-SS-20	POBI-SS-21	POBI-SS-22
Sample ID	POBI-SS-19-0-10-130311	POBI-SS-19-0-10-130311DUP	POBI-SS-20-0-10-130311	POBI-SS-21-0-10-130306	POBI-SS-22-0-10-130306
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/11/2013	3/11/2013	3/11/2013	3/6/2013	3/6/2013
Sample Type	N	FD	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	4.9	3.29	5.01	2.12	3.93
Total solids	34.4	33.8	26.7	66.7	38.3
Grain Size (pct)					
Total Gravel	4.7	10.8	0.1 U	0.3	0.1
Total Sand	29.5	28.1	4.5	79.7	23.8
Total Silt	39.1	35.9	60.2	11.7	52.7
Total Clay	26.7	25	35.3	8.3	23.4
Total Fines (silt + clay)	65.8	60.9	95.5	20	76.1
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	0.654 EMPC	0.787	0.635 EMPC	0.237 EMPC	0.729
1,2,3,7,8-PeCDD	4.14	4.18	3.93	0.782 J	4.33
1,2,3,4,7,8-HxCDD	5.69	7.19	4.76	0.933 EMPC	4.9
1,2,3,6,7,8-HxCDD	28	37.2	26	5.82	26.5
1,2,3,7,8,9-HxCDD	13.2	17.2	12	2.34 EMPC	11.1
1,2,3,4,6,7,8-HpCDD	690	903	521	102	395
1,2,3,4,6,7,8,9-OCDD	5450 J	7050 J	3750	656	2530
2,3,7,8-TCDF	2.01	2.33	2.49	0.485 EMPC	2.96
1,2,3,7,8-PeCDF	2.24 J	3.23 J	2.22 J	0.423 EMPC	2.18 J
2,3,4,7,8-PeCDF	2.79	4.64	2.36	0.449 J	2.3
1,2,3,4,7,8-HxCDF	14	22.3	10.5	1.83 EMPC	7.91
1,2,3,6,7,8-HxCDF	5.53	7.32	4.71	1.07	4.83
1,2,3,7,8,9-HxCDF	3.01 J	5.2 J	2.21 J	0.558 J	2.57 J
2,3,4,6,7,8-HxCDF	8.96	11.6	7.93	1.92	8.6
1,2,3,4,6,7,8-HpCDF	216	212	172	37.5	153
1,2,3,4,7,8,9-HpCDF	8.74 J	10.9 J	6.49 J	1.4	5.29
1,2,3,4,6,7,8,9-OCDF	434	471	266	68	189
Total Tetrachlorodibenzo-p-dioxin (TCDD)	19.7 EMPC	24.3 EMPC	29.8 EMPC	5.7 EMPC	34.5 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	41.1 EMPC	41.7	49.1	10.6 EMPC	54.8
Total Hexachlorodibenzo-p-dioxin (HxCDD)	252	291	262	51.7 EMPC	230
Total Heptachlorodibenzo-p-dioxin (HpCDD)	1720	2060	1250	229	885
Total Tetrachlorodibenzofuran (TCDF)	27.6 EMPC	32.6 EMPC	37.7 EMPC	8.31 EMPC	53.6 EMPC
Total Pentachlorodibenzofuran (PeCDF)	87.4 EMPC	111 EMPC	83.4 EMPC	18.3 EMPC	103 EMPC
Total Hexachlorodibenzofuran (HxCDF)	266 J	344 JEMPC	222 JEMPC	49.4 JEMPC	230 JEMPC
Total Heptachlorodibenzofuran (HpCDF)	583 J	625 J	440 J	102	382 EMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	24.0 J	31.0 J	20.0 J	3.5 J	19.1 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	24.3 J	31.0 J	20.3 J	3.9 J	19.1 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	24.7 J	31.0 J	20.6 J	4.3 J	19.1 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	24.7 J	31.0 J	20.6 J	4.3 J	19.1 J

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-23	POBI-SS-24	POBI-SS-25	POBI-SS-26	POBI-SS-27	POBI-SS-28
Sample ID	POBI-SS-23-0-10-130311	POBI-SS-24-0-10-130311	POBI-SS-25-0-10-130311	POBI-SS-26-0-10-130306	POBI-SS-27-0-10-130306	POBI-SS-28-0-10-130311
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/11/2013	3/11/2013	3/11/2013	3/6/2013	3/6/2013	3/11/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	3.7	6.21	4.19	3.78	6.58	5.12
Total solids	56.2	30.2	30	38.1	30.1	32
Grain Size (pct)						
Total Gravel	13.9	0.1 U	0.1 U	0.1	2.5	0.1 U
Total Sand	60.5	3.5	4.9	27.5	31.2	10.1
Total Silt	15.1	60.8	59.6	51.8	44.9	54.4
Total Clay	10.5	35.6	35.5	20.6	21.4	35.5
Total Fines (silt + clay)	25.6	96.4	95.1	72.4	66.3	89.9
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.254 EMPC	0.714 EMPC	0.708 EMPC	0.956 EMPC	1.42	0.708 EMPC
1,2,3,7,8-PeCDD	1.13	3.82	4.51	4.33	11.1	3.64 EMPC
1,2,3,4,7,8-HxCDD	1.34 EMPC	4.32	5.47	4.63	11.3	4.25
1,2,3,6,7,8-HxCDD	6.94	28.4	34.1	28.3	73.2	28
1,2,3,7,8,9-HxCDD	3.37	13.2	12.9	10.7	26.3	10.5
1,2,3,4,6,7,8-HpCDD	155	450	572	416	1090	463
1,2,3,4,6,7,8,9-OCDD	1210	3100	3640	2850	6600 J	3100
2,3,7,8-TCDF	0.589	2.35	2.52	2.95	3.96	2.28
1,2,3,7,8-PeCDF	0.605 JEMPC	2.06 J	2.42	2.08	3.93 J	2.03 EMPC
2,3,4,7,8-PeCDF	0.609 J	1.98	2.46	2.57	4.65	1.94
1,2,3,4,7,8-HxCDF	2.91	9.32	10.9	7.69	16.4	8.95
1,2,3,6,7,8-HxCDF	1.23	4.58	6.06	4.74	10.9	4.7
1,2,3,7,8,9-HxCDF	0.704 J	2.2 J	2.56 J	2.06 J	5.56 J	2.23 J
2,3,4,6,7,8-HxCDF	2.11	6.97	10.6	8.45	22.8	8.51
1,2,3,4,6,7,8-HpCDF	45.1	171	229	168	433	184
1,2,3,4,7,8,9-HpCDF	1.75 J	5.85 J	7.5 J	5.84	13.8	6.27 J
1,2,3,4,6,7,8,9-OCDF	64.8	248	283	244	638	246
Total Tetrachlorodibenzo-p-dioxin (TCDD)	7.81 EMPC	28.9 EMPC	27.9 EMPC	25.5 EMPC	54 EMPC	24.7 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	12.8 EMPC	49.6	54.9	45.9 EMPC	111	45.4 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	73.1 EMPC	267	296	221	558	246 EMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	408	1060	1340	967	2380	1100
Total Tetrachlorodibenzofuran (TCDF)	9.89 EMPC	34.1 EMPC	41.1 EMPC	53.6 EMPC	76.9 EMPC	34.6 EMPC
Total Pentachlorodibenzofuran (PeCDF)	23.6 EMPC	75.7 EMPC	103 EMPC	104 EMPC	237 EMPC	91.6 EMPC
Total Hexachlorodibenzofuran (HxCDF)	60.3 JEMPC	206 J	307 JEMPC	249 JEMPC	677 J	252 JEMPC
Total Heptachlorodibenzofuran (HpCDF)	112 J	431 J	572 J	427 EMPC	1190	463 JEMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	5.499 J	18.9 J	23.1 J	19.0 J	48.6 J	15.1 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	5.702 J	19.2 J	23.4 J	19.4 J	48.6 J	17.3 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	5.905 J	19.6 J	23.8 J	20.0 J	48.6 J	19.5 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	5.905 J	19.6 J	23.8 J	20.0 J	48.6 J	19.5 J

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-29	POBI-SS-30	POBI-SS-31	POBI-SS-32	POBI-SS-33
Sample ID	POBI-SS-29-0-10-130311	POBI-SS-30-0-10-130311	POBI-SS-31-0-10-130306	POBI-SS-32-0-10-130308	POBI-SS-33-0-10-130308
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/11/2013	3/11/2013	3/6/2013	3/8/2013	3/8/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**2.46**	**1.53**	**2.43**	**1.29**	**1.37**
Total solids	**45**	**52.3**	**44.9**	**69.3**	**76.1**
Grain Size (pct)					
Total Gravel	**0.1**	**0.9**	0.1 U	**0.7**	**0.4**
Total Sand	**35.1**	**63**	**27.1**	**65.5**	**91.8**
Total Silt	**42.7**	**23.7**	**53.4**	**24**	**5.7**
Total Clay	**22**	**12.3**	**19.6**	**9.8**	**2.1**
Total Fines (silt + clay)	**64.7**	**36**	**73**	**33.8**	**7.8**
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	**0.454 EMPC**	**0.634 EMPC**	**0.531 EMPC**	0.4 U	0.22 U
1,2,3,7,8-PeCDD	**2.34**	**2.26**	**2.29**	**1.34**	**0.575 J**
1,2,3,4,7,8-HxCDD	**2.42**	**1.93**	**2.54**	**1.13**	**0.587 J**
1,2,3,6,7,8-HxCDD	**15.8**	**11.2**	**14**	**3.29**	**2.49**
1,2,3,7,8,9-HxCDD	**5.99**	**4.72**	**7.03**	**2.14**	**1.48**
1,2,3,4,6,7,8-HpCDD	**261**	**198**	**284**	**60.8**	**50.7**
1,2,3,4,6,7,8,9-OCDD	**1720**	**1420**	**1910**	**386**	**332**
2,3,7,8-TCDF	**1.34 EMPC**	**2.14**	**1.63 EMPC**	**1.27**	**0.273**
1,2,3,7,8-PeCDF	**1.2**	**1.53 JEMPC**	**1.32 J**	**0.873 J**	**0.31 J**
2,3,4,7,8-PeCDF	**1.21 EMPC**	**2.05**	**1.41**	**0.985**	**0.357 J**
1,2,3,4,7,8-HxCDF	**5.03**	**5.17**	**5.52**	**1.79**	**1.25**
1,2,3,6,7,8-HxCDF	**2.7**	**2.27**	**2.62**	**1.51**	**0.526 J**
1,2,3,7,8,9-HxCDF	**1.45 JEMPC**	**1.18 JEMPC**	**1.48 J**	**0.5 J**	0.196 U
2,3,4,6,7,8-HxCDF	**4.86**	**4.05**	**4.29**	**2.3**	**0.946 J**
1,2,3,4,6,7,8-HpCDF	**99.3**	**75**	**147**	**103**	**15.8**
1,2,3,4,7,8,9-HpCDF	**3.4 J**	**2.36 J**	**3.29**	**0.806 J**	**0.465 J**
1,2,3,4,6,7,8,9-OCDF	**131**	**86.9**	**140**	**53.5**	**17.6**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**13.7 EMPC**	**24.3 EMPC**	**28.4 EMPC**	**16.4 EMPC**	**3.41 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**26.1**	**25.7 EMPC**	**35.1**	**20.2**	**5.17 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**132**	**104**	**145**	**44.4**	**27.1 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**607**	**486**	**653**	**154**	**123**
Total Tetrachlorodibenzofuran (TCDF)	**21.7 EMPC**	**43.5 EMPC**	**30.1 EMPC**	**25.2 EMPC**	**4.74 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**52.1 EMPC**	**69.5 EMPC**	**51.1 EMPC**	**37.3 EMPC**	**10.3 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**138 JEMPC**	**115 JEMPC**	**125 JEMPC**	**62.3 JEMPC**	**20.8 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**251 J**	**174 JEMPC**	**317 EMPC**	**163**	**32.6 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**10.2 J**	**9.2 J**	**11.5 J**	**4.8 J**	**2.2 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**10.8 J**	**9.6 J**	**11.8 J**	**5.0 J**	**2.3 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**11.3 J**	**10.0 J**	**12.2 J**	**4.8 J**	**2.2 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**11.3 J**	**10.0 J**	**12.2 J**	**5.0 J**	**2.3 J**

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-34	POBI-SS-35	POBI-SS-36	POBI-SS-37	POBI-SS-38	POBI-SS-39
Sample ID	POBI-SS-34-0-10-130311	POBI-SS-35-0-10-130311	POBI-SS-36-0-10-130307	POBI-SS-37-0-10-130311	POBI-SS-38-0-10-130307	POBI-SS-39-0-10-130307
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/11/2013	3/11/2013	3/7/2013	3/11/2013	3/7/2013	3/7/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**0.672**	**3.63**	**6.64**	**1.8**	**4.16**	**2.25**
Total solids	**70.7**	**44.5**	**29**	**77.2**	**26.4**	**75.6**
Grain Size (pct)						
Total Gravel	**0.1**	**1.2**	0.1 U	**42.5**	**0.4**	**63.2**
Total Sand	**80.1**	**27.9**	**3.5**	**42.8**	**4**	**26.7**
Total Silt	**14.7**	**44.4**	**61.9**	**9**	**62.3**	**6.8**
Total Clay	**5.2**	**26.4**	**34.6**	**5.7**	**33.3**	**3.5**
Total Fines (silt + clay)	**19.9**	**70.8**	**96.5**	**14.7**	**95.6**	**10.3**
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	**0.268 EMPC**	**1.28**	0.732 U	**0.462 EMPC**	**0.834 EMPC**	0.348 U
1,2,3,7,8-PeCDD	**0.499 J**	**5.55**	**4.14**	**1.89**	**4.9**	**1.56**
1,2,3,4,7,8-HxCDD	**0.593 EMPC**	**5.86**	**5.04**	**2.33**	**6.17**	**1.87**
1,2,3,6,7,8-HxCDD	**2.86**	**31.2**	**25.9**	**9.9**	**33.3**	**6.85**
1,2,3,7,8,9-HxCDD	**1.41 EMPC**	**12.7**	**12.9**	**5.01**	**16.8**	**4.46**
1,2,3,4,6,7,8-HpCDD	**57.3**	**679**	**609 J**	**216**	**759 J**	**145 J**
1,2,3,4,6,7,8,9-OCDD	**399**	**4700 J**	**4430 J**	**1470**	**5530 J**	**929**
2,3,7,8-TCDF	**0.45 EMPC**	**5.53**	**2.71**	**1.54**	**3.17**	**0.898**
1,2,3,7,8-PeCDF	**0.367 J**	**4.11 J**	**2.48**	**1.36**	**3.01**	**0.84 J**
2,3,4,7,8-PeCDF	**0.369 J**	**4.56**	**2.59**	**1.56**	**3.03**	**1.09**
1,2,3,4,7,8-HxCDF	**1.19**	**13.7**	**9.74**	**4.03**	**12.4**	**2.61**
1,2,3,6,7,8-HxCDF	**0.633 J**	**6.08**	**4.82**	**2.13**	**6.01**	**1.45**
1,2,3,7,8,9-HxCDF	**0.335 JEMPC**	**3.26 J**	**2.55 EMPC**	**0.97 J**	**3.25 EMPC**	**0.701 J**
2,3,4,6,7,8-HxCDF	**0.955 EMPC**	**10.2**	**7.72**	**3.11**	**9.5**	**2.3**
1,2,3,4,6,7,8-HpCDF	**20.2**	**210**	**138**	**49.7**	**187**	**31.4**
1,2,3,4,7,8,9-HpCDF	**0.63 JEMPC**	**6.33 J**	**6.18**	**2.02 J**	**7.24**	**1.45 EMPC**
1,2,3,4,6,7,8,9-OCDF	**21**	**254**	**251**	**70.3**	**304**	**52.7**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**5.78 EMPC**	**65.5 EMPC**	**25.3 EMPC**	**12.8 EMPC**	**32.1 EMPC**	**9.61 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**6.88 EMPC**	**82.6**	**46.5 EMPC**	**20.8 EMPC**	**56.5 EMPC**	**17**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**30.6 EMPC**	**312**	**248 EMPC**	**94.4 EMPC**	**323**	**72.9**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**138**	**1550**	**1470 J**	**468**	**1870 J**	**326 J**
Total Tetrachlorodibenzofuran (TCDF)	**7.76 EMPC**	**111 EMPC**	**41.2 EMPC**	**27.3 EMPC**	**48 EMPC**	**17.7 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**13.2 EMPC**	**156 EMPC**	**88 EMPC**	**42.3 EMPC**	**105 EMPC**	**30.9 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**27.6 JEMPC**	**300 JEMPC**	**197 EMPC**	**81.2 JEMPC**	**233 EMPC**	**49 EMPC**
Total Heptachlorodibenzofuran (HpCDF)	**42.8 JEMPC**	**496 J**	**365 EMPC**	**123 J**	**473 EMPC**	**74.9 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**2.0 J**	**27.6 J**	**20.8 J**	**8.4 J**	**26.0 J**	**6.1 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**2.3 J**	**27.6 J**	**21.3 J**	**8.7 J**	**26.5 J**	**6.3 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**2.6 J**	**27.6 J**	**21.1 J**	**9.0 J**	**27.1 J**	**6.1 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**2.6 J**	**27.6 J**	**21.4 J**	**9.0 J**	**27.1 J**	**6.3 J**

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-40	POBI-SS-41	POBI-SS-41	POBI-SS-42	POBI-SS-43
Sample ID	POBI-SS-40-0-10-130307	POBI-SS-41-0-10-130307	POBI-SS-41-0-10-130307DUP	POBI-SS-42-0-10-130307	POBI-SS-43-0-10-130307
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/7/2013	3/7/2013	3/7/2013	3/7/2013	3/7/2013
Sample Type	N	N	FD	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**4.96**	**1.98**	**4.54**	**5.01**	**4.88**
Total solids	**25.2**	**28.4**	**28.7**	**24.8**	**24.3**
Grain Size (pct)					
Total Gravel	**14**	0.1 U	0.1 U	0.1 U	0.1 U
Total Sand	**13.7**	**3.8**	**2.8**	**2.4**	**1.7**
Total Silt	**48.6**	**62.5**	**62.1**	**61.3**	**61.2**
Total Clay	**23.6**	**33.8**	**35.1**	**36.5**	**37.2**
Total Fines (silt + clay)	**72.2**	**96.3**	**97.2**	**97.8**	**98.4**
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	0.767 U	**1.02 EMPC**	**0.979 EMPC**	**1.04 EMPC**	**0.916 EMPC**
1,2,3,7,8-PeCDD	**3.98**	**6.02**	**6.01**	**5.82**	**5.61**
1,2,3,4,7,8-HxCDD	**5.6**	**8.07**	**7.54**	**7.49**	**7.66**
1,2,3,6,7,8-HxCDD	**28.2**	**38.1**	**37.7**	**40.6**	**38.6**
1,2,3,7,8,9-HxCDD	**14.7**	**19.7**	**18.7**	**22.3**	**20**
1,2,3,4,6,7,8-HpCDD	**668 J**	**913 J**	**883 J**	**830 J**	**894 J**
1,2,3,4,6,7,8,9-OCDD	**4860 J**	**6630 J**	**6350 J**	**5810 J**	**6410 J**
2,3,7,8-TCDF	**2.36**	**3.63**	**3.45**	**3.44**	**3.55**
1,2,3,7,8-PeCDF	**2.36 EMPC**	**3.11**	**3.46**	**3.3**	**3.57**
2,3,4,7,8-PeCDF	**2.59**	**3.79**	**3.38 EMPC**	**3.32**	**3.95**
1,2,3,4,7,8-HxCDF	**10.5**	**14.8**	**14.9**	**14.5**	**15.1**
1,2,3,6,7,8-HxCDF	**4.88**	**7.24**	**6.9**	**6.72**	**7.19**
1,2,3,7,8,9-HxCDF	**2.82**	**3.8**	**3.72**	**3.48**	**3.83**
2,3,4,6,7,8-HxCDF	**8.18**	**11**	**10.8**	**11.2**	**11.4**
1,2,3,4,6,7,8-HpCDF	**170**	**217**	**216**	**215**	**228**
1,2,3,4,7,8,9-HpCDF	**6.73**	**8.65**	**8.39**	**8.76**	**9.14**
1,2,3,4,6,7,8,9-OCDF	**283**	**346**	**339**	**384**	**364**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**28.2 EMPC**	**33.2 EMPC**	**36.7 EMPC**	**40.5 EMPC**	**35.9 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**44.7**	**66.5**	**66.4**	**69.5**	**64.7**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**262**	**370 EMPC**	**363**	**393**	**372**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**1560 J**	**2110 J**	**2040 J**	**1890 J**	**2140 J**
Total Tetrachlorodibenzofuran (TCDF)	**41.4 EMPC**	**55.4 EMPC**	**58.1 EMPC**	**62 EMPC**	**59.9 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**87.7 EMPC**	**126 EMPC**	**126 EMPC**	**126 EMPC**	**131 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**204 EMPC**	**287 EMPC**	**283 EMPC**	**280 EMPC**	**288 EMPC**
Total Heptachlorodibenzofuran (HpCDF)	**426 EMPC**	**545 EMPC**	**537 EMPC**	**550 EMPC**	**572 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**22.5 J**	**31.4 J**	**29.6 J**	**30.3 J**	**31.0 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**23.0 J**	**31.9 J**	**30.6 J**	**30.8 J**	**31.4 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**22.5 J**	**32.4 J**	**31.6 J**	**31.3 J**	**31.9 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**23.0 J**	**32.4 J**	**31.6 J**	**31.3 J**	**31.9 J**

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-44	POBI-SS-45	POBI-SS-46	POBI-SS-47	POBI-SS-48
Sample ID	POBI-SS-44-0-10-130306	POBI-SS-45-0-10-130308	POBI-SS-46-0-10-130307	POBI-SS-47-0-10-130308	POBI-SS-48-0-10-130308
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/6/2013	3/8/2013	3/7/2013	3/8/2013	3/8/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**1.86**	**5.25**	**2.09**	**4.6**	**4.35**
Total solids	**63**	**22.4**	**59.7**	**23.5**	**26**
Grain Size (pct)					
Total Gravel	**48.4**	0.1 U	**3.7**	0.1 U	0.1 U
Total Sand	**30.2**	**6.2**	**46.3**	**8.8**	**10.6**
Total Silt	**15.2**	**57.5**	**39**	**53.2**	**57.1**
Total Clay	**6.3**	**36.5**	**10.9**	**38.2**	**32.3**
Total Fines (silt + clay)	**21.5**	**94**	**49.9**	**91.4**	**89.4**
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	0.394 U	**0.92 EMPC**	**1.33 EMPC**	**1.18 EMPC**	**1.04**
1,2,3,7,8-PeCDD	**2.21**	**6.84**	**5.9**	**7.55**	**7.07**
1,2,3,4,7,8-HxCDD	**2.64**	**8.94**	**6.41**	**10.4**	**9.74**
1,2,3,6,7,8-HxCDD	**10.6**	**47.1**	**22.3**	**45.3**	**44**
1,2,3,7,8,9-HxCDD	**6.65**	**23.3**	**13.8**	**24.7**	**23.1**
1,2,3,4,6,7,8-HpCDD	**225 J**	**927**	**512 J**	**1050**	**1050**
1,2,3,4,6,7,8,9-OCDD	**1480**	**6720 J**	**3260**	**7550 J**	**7520 J**
2,3,7,8-TCDF	**1.28 EMPC**	**3.55**	**4.59**	**4.54**	**3.75**
1,2,3,7,8-PeCDF	**1.18 EMPC**	**3.66 J**	**3.8**	**4.16 J**	**3.94 J**
2,3,4,7,8-PeCDF	**1.5 EMPC**	**3.97**	**4.82**	**4.72**	**4.73**
1,2,3,4,7,8-HxCDF	**4**	**15.6**	**10.3**	**18.3**	**18.6**
1,2,3,6,7,8-HxCDF	**2.29 EMPC**	**7.75**	**5.56**	**8.94**	**8.71**
1,2,3,7,8,9-HxCDF	**1.02**	**3.65 J**	**2.63**	**4.69 J**	**4.49 J**
2,3,4,6,7,8-HxCDF	**3.45**	**11.9**	**8.86**	**13.8**	**13.8**
1,2,3,4,6,7,8-HpCDF	**51.8**	**230**	**102**	**268**	**258**
1,2,3,4,7,8,9-HpCDF	**2.44 EMPC**	**10.1**	**5.4**	**12.2**	**11.7**
1,2,3,4,6,7,8,9-OCDF	**85.4**	**433**	**172**	**494**	**497**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**14.2 EMPC**	**37.8 EMPC**	**65 EMPC**	**51.2 EMPC**	**39.3 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**23.8 EMPC**	**69.2**	**84.9 EMPC**	**86.3**	**70.5**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**109 EMPC**	**427**	**250**	**434**	**401**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**501 J**	**2280**	**1090 J**	**2410**	**2390**
Total Tetrachlorodibenzofuran (TCDF)	**25.4 EMPC**	**64.1 EMPC**	**105 EMPC**	**72.6 EMPC**	**75.3 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**45.3 EMPC**	**128 EMPC**	**145 EMPC**	**158 EMPC**	**150 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**78.1 EMPC**	**296 JEMPC**	**174 EMPC**	**357 JEMPC**	**353 J**
Total Heptachlorodibenzofuran (HpCDF)	**126 EMPC**	**598**	**264 EMPC**	**705 EMPC**	**683**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**8.3 J**	**34.1 J**	**22.1 J**	**37.9 J**	**37.9 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**9.1 J**	**34.6 J**	**22.8 J**	**38.5 J**	**37.9 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**9.2 J**	**35.1 J**	**23.5 J**	**39.1 J**	**37.9 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**9.3 J**	**35.1 J**	**23.5 J**	**39.1 J**	**37.9 J**

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-49	POBI-SS-50	POBI-SS-51	POBI-SS-52	POBI-SS-53
Sample ID	POBI-SS-49-0-10-130308	POBI-SS-50-0-10-130307	POBI-SS-51-0-10-130311	POBI-SS-52-0-10-130311	POBI-SS-53-0-10-130308
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/8/2013	3/7/2013	3/11/2013	3/11/2013	3/8/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**4.58**	**1.35**	**9.4**	**2.75**	**2.73**
Total solids	**27.6**	**55.8**	**18.7**	**28.9**	**52.6**
Grain Size (pct)					
Total Gravel	0.1 U	**12.5**	0.1 U	**0.1**	**16.5**
Total Sand	**8.1**	**30.1**	**1**	**5.1**	**55**
Total Silt	**64.2**	**45.7**	**62.8**	**64.6**	**19**
Total Clay	**27.7**	**11.7**	**36.1**	**30.2**	**9.7**
Total Fines (silt + clay)	**91.9**	**57.4**	**98.9**	**94.8**	**28.7**
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	**1.14**	0.806 U	**0.974 EMPC**	**1.29 EMPC**	**1.23**
1,2,3,7,8-PeCDD	**7.67**	**3.68**	**6.48**	**7.61**	**4.32**
1,2,3,4,7,8-HxCDD	**11.1**	**4.09**	**9.2**	**10.7**	**4.27**
1,2,3,6,7,8-HxCDD	**45.7**	**14.3**	**39.4**	**48.1**	**19.1**
1,2,3,7,8,9-HxCDD	**24.2**	**9.26**	**20.4**	**24**	**9.81**
1,2,3,4,6,7,8-HpCDD	**1030**	**299 J**	**952**	**1120**	**369**
1,2,3,4,6,7,8,9-OCDD	**7040 J**	**1880**	**7010 J**	**7870 J**	**2350**
2,3,7,8-TCDF	**4.41**	**2.49**	**3.46**	**4.2**	**4.32**
1,2,3,7,8-PeCDF	**4.31 J**	**2.04**	**3.64 J**	**4.4 J**	**2.93 J**
2,3,4,7,8-PeCDF	**5.68**	**2.77**	**4.45**	**5.82**	**4.14**
1,2,3,4,7,8-HxCDF	**20.5**	**6.42**	**17.2**	**22.5**	**9.08**
1,2,3,6,7,8-HxCDF	**9.33**	**3.52**	**7.76**	**10**	**4.37**
1,2,3,7,8,9-HxCDF	**4.84 J**	**1.57 EMPC**	**3.78 J**	**4.62 J**	**2.17 J**
2,3,4,6,7,8-HxCDF	**14.9**	**5.7**	**13.3**	**16.8**	**7.02**
1,2,3,4,6,7,8-HpCDF	**264**	**74.6**	**255**	**282**	**95.7**
1,2,3,4,7,8,9-HpCDF	**13.7**	**3.75**	**11.8 J**	**14.5 J**	**5.11**
1,2,3,4,6,7,8,9-OCDF	**533**	**125**	**478**	**646**	**194**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**52.4 EMPC**	**36.3 EMPC**	**31.8 EMPC**	**54.3 EMPC**	**56.2 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**82.5**	**47.5 EMPC**	**64**	**93 EMPC**	**54.3**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**413**	**153 EMPC**	**365**	**426**	**175**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**2220**	**656 JEMPC**	**2090**	**2340**	**807**
Total Tetrachlorodibenzofuran (TCDF)	**91.4 EMPC**	**50.3 EMPC**	**63.5 EMPC**	**79 EMPC**	**110 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**172 EMPC**	**78.4 EMPC**	**147 EMPC**	**193 EMPC**	**120 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**383 JEMPC**	**113 EMPC**	**325 JEMPC**	**418 JEMPC**	**168 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**716 EMPC**	**185 EMPC**	**669 J**	**815 J**	**270**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**39.5 J**	**13.5 J**	**33.8 J**	**40.3 J**	**18.4 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**39.5 J**	**14.0 J**	**34.3 J**	**41.0 J**	**18.4 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**39.5 J**	**13.7 J**	**34.8 J**	**41.6 J**	**18.4 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**39.5 J**	**14.1 J**	**34.8 J**	**41.6 J**	**18.4 J**

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-54	POBI-SS-55	POBI-SS-56	POBI-SS-57	POBI-SS-57
Sample ID	POBI-SS-54-0-10-130308	POBI-SS-55-0-10-130307	POBI-SS-56-0-10-130311	POBI-SS-57-0-10-130307	POBI-SS-57-0-10-130307DUP
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date	3/8/2013	3/7/2013	3/11/2013	3/7/2013	3/7/2013
Sample Type	N	N	N	N	FD
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	2.33	1.47	4.49	1.78	2.46
Total solids	54	55.8	41.8	69.7	69.8
Grain Size (pct)					
Total Gravel	0.7	10.1	13.8	2.5	1.8
Total Sand	20.4	32.4	15.9	72.5	73.1
Total Silt	64.5	47.8	49.8	19.3	19
Total Clay	14.2	9.8	20.5	5.9	6.1
Total Fines (silt + clay)	78.7	57.6	70.3	25.2	25.1
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	1.79	0.774 U	1.6	0.47 U	0.441 U
1,2,3,7,8-PeCDD	9.85	3.63	8.08	2.16	2.29 EMPC
1,2,3,4,7,8-HxCDD	9.85	4.5	10.9	3.14	3.12
1,2,3,6,7,8-HxCDD	27.9	16	50.1	11.4	10.5
1,2,3,7,8,9-HxCDD	18.2	10.8	22	7.14	6.77
1,2,3,4,6,7,8-HpCDD	490	339 J	1160	253 J	244 J
1,2,3,4,6,7,8,9-OCDD	2900	2140	8250 J	1660	1570
2,3,7,8-TCDF	6.82	2.44	5.36	1.25	1.52
1,2,3,7,8-PeCDF	4.97 J	2.06	6.24 J	1.2 EMPC	1.2
2,3,4,7,8-PeCDF	6.62	2.77	9.39	1.55 EMPC	1.56
1,2,3,4,7,8-HxCDF	11.9 J	7.08	35.6	4.48	4.5
1,2,3,6,7,8-HxCDF	7.32	3.85	12.7	2.5	2.51
1,2,3,7,8,9-HxCDF	2.79 J	1.77	7.87 J	1.21	1.18
2,3,4,6,7,8-HxCDF	10.8	6.32	19.8	4.24	4.2
1,2,3,4,6,7,8-HpCDF	137	83.8	328	55.2	52.7
1,2,3,4,7,8,9-HpCDF	7	4.3	16.2 J	3.12	3
1,2,3,4,6,7,8,9-OCDF	233	161	628	106	106
Total Tetrachlorodibenzo-p-dioxin (TCDD)	132 EMPC	30.2 EMPC	69.4 EMPC	12.9 EMPC	13.2 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	164 EMPC	47.5 EMPC	96.4 EMPC	23.5	23.8 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	346	169 EMPC	392 EMPC	113	105 EMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	1100	751 J	2410	576 J	533 J
Total Tetrachlorodibenzofuran (TCDF)	154 EMPC	50.6 EMPC	117 EMPC	27.3 EMPC	30.2 EMPC
Total Pentachlorodibenzofuran (PeCDF)	161 EMPC	83.5 EMPC	278 EMPC	54.2 EMPC	52.1 EMPC
Total Hexachlorodibenzofuran (HxCDF)	216 JEMPC	125 EMPC	573 JEMPC	87.5 EMPC	81.6 EMPC
Total Heptachlorodibenzofuran (HpCDF)	341 EMPC	217 EMPC	938 J	148	144
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	30.6 J	14.8 J	46.8 J	9.3 J	7.4 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	30.6 J	15.1 J	46.2 J	9.8 J	8.8 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	30.6 J	14.8 J	46.8 J	9.8 J	9.7 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	30.6 J	15.1 J	46.8 J	10.1 J	10.0 J

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-58	POBI-SS-59	POBI-SS-60	POBI-SS-61	POBI-SS-61
Sample ID	POBI-SS-58-0-10-130312	POBI-SS-59-0-10-130307	POBI-SS-60-0-10-130307	POBI-SS-161-0-10-130522	POBI-SS-61-0-10-130522
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm		
Sample Date	3/12/2013	3/7/2013	3/7/2013	5/22/2013	5/22/2013
Sample Type	N	N	N	FD	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	2.61	2.77	2.22	6.22	7.76
Total solids	43.8	50.9	52	47.01	44.22
Grain Size (pct)					
Total Gravel	8.3	1.1	1.2	8.5	5.1
Total Sand	20.4	29.7	43.6	71.7	70.8
Total Silt	56.9	51.7	45.3	13.9	17.3
Total Clay	14.2	17.5	10.1	5.9	6.8
Total Fines (silt + clay)	71.1	69.2	55.4	19.8	24.1
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	1.86	1.77 EMPC	0.7 U	0.842 J	0.851 J
1,2,3,7,8-PeCDD	8.82	12.8	4.1	7.11 J	7.41 J
1,2,3,4,7,8-HxCDD	11.9	24.6	6.82	16.1 J	16.5 J
1,2,3,6,7,8-HxCDD	55.9	130	24.9	49.6	53
1,2,3,7,8,9-HxCDD	26.5	54.5	15	34.8	34.4
1,2,3,4,6,7,8-HpCDD	1270	3490 J	531 J	1300	1240
1,2,3,4,6,7,8,9-OCDD	8820 J	27100 J	3680	10500 J	9810 J
2,3,7,8-TCDF	5.8	5.54	1.69	1.48	1.59
1,2,3,7,8-PeCDF	5.69 J	7.49	1.9	2.85 J	3.25 J
2,3,4,7,8-PeCDF	8.24	9.93	2.71	2.49	2.5
1,2,3,4,7,8-HxCDF	32.8	47.2	8.61	12.2	12.3
1,2,3,6,7,8-HxCDF	12.3	17.7	4.89	15.4	15.8
1,2,3,7,8,9-HxCDF	8.57	13.3	2.46 EMPC	3.35 J	3.68 J
2,3,4,6,7,8-HxCDF	21.1	31.2	7.5	13.4	12.6
1,2,3,4,6,7,8-HpCDF	330	480	114	552	529
1,2,3,4,7,8,9-HpCDF	21.1	43.5	7.77	21	17.2
1,2,3,4,6,7,8,9-OCDF	838	1480	364	1900	1560
Total Tetrachlorodibenzo-p-dioxin (TCDD)	46.3 EMPC	43.6 EMPC	13.9 EMPC	14.5 EMPC	15.5 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	85.2	93.3	31.2 EMPC	35 JEMPC	36.6 J
Total Hexachlorodibenzo-p-dioxin (HxCDD)	443 EMPC	718	168	293 JEMPC	305 JEMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	2570	6140 J	1010 J	2530	2490
Total Tetrachlorodibenzofuran (TCDF)	111 EMPC	100 EMPC	32.8 EMPC	21.7 EMPC	22.9 EMPC
Total Pentachlorodibenzofuran (PeCDF)	260 EMPC	316 EMPC	87.9 EMPC	112 JEMPC	120 JEMPC
Total Hexachlorodibenzofuran (HxCDF)	593 EMPC	832	175 EMPC	413 JEMPC	410 J
Total Heptachlorodibenzofuran (HpCDF)	1110	1850	362	1570	1440 EMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	50.0 J	97.1 J	19.7 J	45.9 J	45.4 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	50.0 J	98.0 J	20.1 J	45.9 J	45.4 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	50.0 J	99.0 J	20.0 J	45.9 J	45.4 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	50.0 J	99.0 J	20.2 J	45.9 J	45.4 J

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SS-62	POBI-SS-63	POBI-SS-64	POBI-SS-65
Sample ID	POBI-SS-62-0-10-130522	POBI-SS-63-0-10-130522	POBI-SS-64-0-10-130522	POBI-SS-65-0-10-130522
Sample Depth				
Sample Date	5/22/2013	5/22/2013	5/22/2013	5/22/2013
Sample Type	N	N	N	N
Matrix	SE	SE	SE	SE
Conventional Parameters (pct)				
Total organic carbon	3.82	4.02	1.96	3.79
Total solids	34.33	35.75	52.02	35.69
Grain Size (pct)				
Total Gravel	8.4	12.6	7.3	19.7
Total Sand	23.8	34.4	63.6	23.7
Total Silt	40.3	38.9	19.4	34.2
Total Clay	27.6	14.1	9.9	22.5
Total Fines (silt + clay)	67.9	53	29.3	56.7
Dioxin Furans (ng/kg)				
2,3,7,8-TCDD	0.675 EMPC	0.657 EMPC	0.43 EMPC	0.83 EMPC
1,2,3,7,8-PeCDD	4.9 J	4.12 J	2.38 J	6.26 J
1,2,3,4,7,8-HxCDD	8.15 J	6.82 J	3.8 J	9.44 J
1,2,3,6,7,8-HxCDD	35.5	32.1	18.3	43.3
1,2,3,7,8,9-HxCDD	18.8	15.1	8.58	23.2
1,2,3,4,6,7,8-HpCDD	1000	942	585	1270
1,2,3,4,6,7,8,9-OCDD	9170 J	9020 J	5820 J	11900 J
2,3,7,8-TCDF	1.99	1.74	1.23	1.88
1,2,3,7,8-PeCDF	2.14 J	1.97 J	1.15 J	2.18 J
2,3,4,7,8-PeCDF	2.28	1.85	1.13	2.43 EMPC
1,2,3,4,7,8-HxCDF	9.02	7.5	3.87	9.53
1,2,3,6,7,8-HxCDF	5.07	4.57	2.16	5.49
1,2,3,7,8,9-HxCDF	2.72 J	2.37 J	1.35 J	2.86 J
2,3,4,6,7,8-HxCDF	8.15	3.78	2.31 EMPC	8.95
1,2,3,4,6,7,8-HpCDF	161	132	65.3	161
1,2,3,4,7,8,9-HpCDF	8.52	6.74	3.87	8.81
1,2,3,4,6,7,8,9-OCDF	384	369	205	396
Total Tetrachlorodibenzo-p-dioxin (TCDD)	21.6 EMPC	17.1 EMPC	8.62 EMPC	22.8 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	43 J	34.8 JEMPC	21.6 JEMPC	51.6 JEMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	359 J	331 J	197 J	469 JEMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	3500	3650	2290	4490
Total Tetrachlorodibenzofuran (TCDF)	28.3 EMPC	24.4 EMPC	16.3 EMPC	32.3 EMPC
Total Pentachlorodibenzofuran (PeCDF)	87 JEMPC	77 JEMPC	43.4 JEMPC	104 JEMPC
Total Hexachlorodibenzofuran (HxCDF)	201 JEMPC	167 JEMPC	87.1 JEMPC	222 J
Total Heptachlorodibenzofuran (HpCDF)	465	401	208 EMPC	484 EMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	29.2 J	25.8 J	15.0 J	34.9 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	29.5 J	26.1 J	15.4 J	35.7 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	29.9 J	26.4 J	15.7 J	36.4 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	29.9 J	26.4 J	15.7 J	36.4 J

Table 4-3
2013 Surface Grab Dioxin and Furan Results

Notes:

Dioxin/Furan TEQ Concentration (ng/kg Dry Weight)

0-5
5.01-10
10.01-20
20.01-40
40.01-100
100.01-500
>500

Bold = Detected result

D/F = dioxin and furans

EMPC = Estimated Maximum Possible Concentration

J = Estimated value

TEQ= toxic equivalency quotient reported in ng/kg, values over 1 ng/kg were rounded to one decimal place

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-01	POBI-SS-02	POBI-SS-03	POBI-SS-04	POBI-SS-05
				Sample ID	POBI-SS-01-0-10-130312	POBI-SS-02-0-10-130312	POBI-SS-03-0-10-130312	POBI-SS-04-0-10-130312	POBI-SS-05-0-10-130312
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/12/2013	3/12/2013	3/12/2013	3/12/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**3.69**	**4.91**	**2.84**	**5.28**	**2.32**
Total solids					**34.8**	**40.1**	**60.7**	**31.5**	**46.4**
Grain Size (pct)									
Total Gravel					**0.8**	**0.9**	**61.6**	**1.1**	**2.5**
Total Sand					**15.1**	**35.9**	**16.4**	**10.7**	**47.7**
Total Silt					**55.5**	**34.2**	**17.4**	**51.6**	**32.4**
Total Clay					**28.6**	**28.8**	**4.6**	**36.6**	**17.5**
Total Fines (silt + clay)					**84.1**	**63**	**22**	**88.2**	**49.9**
Metals (mg/kg)									
Arsenic	57	93			--	10 U	10 U	--	--
Cadmium	5.1	6.7			--	**2.4**	**2**	--	--
Chromium	260	270			--	**35**	**29**	--	--
Copper	390	390			--	**98.6**	**87.2**	--	--
Lead	450	530			--	**20 J**	**17 J**	--	--
Mercury	0.41	0.59			--	**0.14 J**	**0.12 J**	--	--
Silver	6.1	6.1			--	0.7 U	0.7 U	--	--
Zinc	410	960			--	**109**	**115**	--	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	**11 J**	56 U	--	--
2-Methylphenol (o-Cresol)	63	63			--	**8.7 J**	14 U	--	--
4-Methylphenol (p-Cresol)	670	670			--	**190**	**130**	--	--
Benzoic acid	650	650			--	**780 J**	280 U[1]	--	--
Benzyl alcohol	57	73			--	58 U	56 U	--	--
Pentachlorophenol	360	690			--	140 U	140 U	--	--
Phenol	420	1200			--	**99**	**89**	--	--
1,2,4-Trichlorobenzene			31	51	--	14 U	14 U	--	--
1,2-Dichlorobenzene			35	50	--	14 U	14 U	--	--
1,4-Dichlorobenzene			110	110	--	14 U	14 U	--	--
bis(2-Ethylhexyl)phthalate			1300	3100	--	**160**	**830**	--	--
Butylbenzyl phthalate			63	900	--	**11 J**	**20**	--	--
Dibenzofuran			540	540	**13 J**	**38 J**	56 U	**33**	**24**
Diethyl phthalate			200	1200	--	14 U	14 U	--	--
Dimethyl phthalate			71	160	--	14 U	**8.6 J**	--	--
Di-n-butyl phthalate			1400	5100	--	58 U	**50 J**	--	--
Di-n-octyl phthalate			6200	6200	--	58 U	56 U	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-01	POBI-SS-02	POBI-SS-03	POBI-SS-04	POBI-SS-05
				Sample ID	POBI-SS-01-0-10-130312	POBI-SS-02-0-10-130312	POBI-SS-03-0-10-130312	POBI-SS-04-0-10-130312	POBI-SS-05-0-10-130312
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/12/2013	3/12/2013	3/12/2013	3/12/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	--	14 U	14 U	--	--
n-Nitrosodiphenylamine			28	40	--	58 U	56 U	--	--
Hexachlorobutadiene			11	120	--	14 U	14 U	--	--
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	0.285 U	0.493 U	--	--
1,2-Dichlorobenzene	2.3	2.3			--	0.285 U	0.493 U	--	--
1,4-Dichlorobenzene	3.1	9			--	0.285 U	0.493 U	--	--
bis(2-Ethylhexyl)phthalate	47	78			--	**3.259**	**29.225**	--	--
Butylbenzyl phthalate	4.9	64			--	**0.224 J**	**0.704**	--	--
Dibenzofuran	15	58			**0.352 J**	**0.774 J**	1.972 U	**0.625**	**1.034**
Diethyl phthalate	61	110			--	0.285 U	0.493 U	--	--
Dimethyl phthalate	53	53			--	0.285 U	**0.303 J**	--	--
Di-n-butyl phthalate	220	1700			--	1.181 U	**1.761 J**	--	--
Di-n-octyl phthalate	58	4500			--	1.181 U	1.972 U	--	--
Hexachlorobenzene	0.38	2.3			--	0.285 U	0.123 U[1]	--	--
n-Nitrosodiphenylamine	11	11			--	1.181 U	1.972 U	--	--
Hexachlorobutadiene	3.9	6.2			--	0.285 U	0.493 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	19 U	**38 J**	56 U	**23**	**21**
Acenaphthene			500	500	**12 J**	**41 J**	56 U	**36**	**17 J**
Acenaphthylene			1300	1300	19 U	58 U	56 U	**18 J**	**20**
Anthracene			960	960	**21**	**61**	**50 J**	**56**	**55**
Benzo(a)anthracene			1300	1600	**39**	**130**	**100**	**100**	**72**
Benzo(a)pyrene			1600	1600	**45**	**150**	**81**	**130**	**55**
Benzo(b,j,k)fluoranthenes					**110**	**470**	**270**	**330**	**120**
Benzo(g,h,i)perylene			670	720	**35**	**120**	**70**	**81**	**37**
Chrysene			1400	2800	**60**	**320**	**250**	**200**	**160**
Dibenzo(a,h)anthracene			230	230	19 U	**39**	**23**	**22**	19 U
Fluoranthene			1700	2500	**170**	**500**	**330**	**320**	**200**
Fluorene			540	540	**12 J**	58 U	56 U	**33**	**26**
Indeno(1,2,3-c,d)pyrene			600	690	**30**	**110**	**56**	**71**	**32**
Naphthalene			2100	2100	**52**	**130**	**34 J**	**110**	**120**
Phenanthrene			1500	1500	**56**	**200**	**120**	**140**	**120**
Pyrene			2600	3300	**160**	**580**	**320**	**450**	**190**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**110**	**470**	**270**	**330**	**120**
Total LPAH (SMS) (U = 0)			5200	5200	**153 J**	**432 J**	**204 J**	**393 J**	**358 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-01	POBI-SS-02	POBI-SS-03	POBI-SS-04	POBI-SS-05
				Sample ID	POBI-SS-01-0-10-130312	POBI-SS-02-0-10-130312	POBI-SS-03-0-10-130312	POBI-SS-04-0-10-130312	POBI-SS-05-0-10-130312
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/12/2013	3/12/2013	3/12/2013	3/12/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Total HPAH (SMS) (U = 0)			12000	17000	**649**	**2419**	**1500**	**1704**	**866**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**63.5**	**228.1**	**128.4**	**184.3**	**79**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**64.45**	**228.1**	**128.4**	**184.3**	**79.95**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			0.515 U	**0.774 J**	1.972 U	**0.436**	**0.905**
Acenaphthene	16	57			**0.325 J**	**0.835 J**	1.972 U	**0.682**	**0.733 J**
Acenaphthylene	66	66			0.515 U	1.181 U	1.972 U	**0.341 J**	**0.862**
Anthracene	220	1200			**0.569**	**1.242**	**1.761 J**	**1.061**	**2.371**
Benzo(a)anthracene	110	270			**1.057**	**2.648**	**3.521**	**1.894**	**3.103**
Benzo(a)pyrene	99	210			**1.22**	**3.055**	**2.852**	**2.462**	**2.371**
Benzo(g,h,i)perylene	31	78			**0.949**	**2.444**	**2.465**	**1.534**	**1.595**
Chrysene	110	460			**1.626**	**6.517**	**8.803**	**3.788**	**6.897**
Dibenzo(a,h)anthracene	12	33			0.515 U	**0.794**	**0.81**	**0.417**	0.819 U
Fluoranthene	160	1200			**4.607**	**10.183**	**11.62**	**6.061**	**8.621**
Fluorene	23	79			**0.325 J**	1.181 U	1.972 U	**0.625**	**1.121**
Indeno(1,2,3-c,d)pyrene	34	88			**0.813**	**2.24**	**1.972**	**1.345**	**1.379**
Naphthalene	99	170			**1.409**	**2.648**	**1.197 J**	**2.083**	**5.172**
Phenanthrene	100	480			**1.518**	**4.073**	**4.225**	**2.652**	**5.172**
Pyrene	1000	1400			**4.336**	**11.813**	**11.268**	**8.523**	**8.19**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**2.981**	**9.572**	**9.507**	**6.25**	**5.172**
Total LPAH (SMS) (U = 0)	370	780			**4.146 J**	**8.798 J**	**7.183 J**	**7.443 J**	**15.431 J**
Total HPAH (SMS) (U = 0)	960	5300			**17.588**	**49.267**	**52.817**	**32.273**	**37.328**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	19 U	18 U	--	--
Aroclor 1221					--	19 U	18 U	--	--
Aroclor 1232					--	19 U	18 U	--	--
Aroclor 1242					--	19 U	18 U	--	--
Aroclor 1248					--	19 U	18 U	--	--
Aroclor 1254					--	**17 J**	**18**	--	--
Aroclor 1260					--	19 U	18 U	--	--
Total PCB Aroclors (U = 0)			130	1000	--	**17 J**	**18**	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	**0.346 J**	**0.634**	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-06	POBI-SS-07	POBI-SS-08	POBI-SS-09	POBI-SS-10
				Sample ID	POBI-SS-06-0-10-130312	POBI-SS-07-0-10-130312	POBI-SS-08-0-10-130313	POBI-SS-09-0-10-130312	POBI-SS-10-0-10-130311
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/12/2013	3/13/2013	3/12/2013	3/11/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**2.01**	**2.57**	**2.71**	**2.61**	**2.89**
Total solids					**73.3**	**39.8**	**35.3**	**63**	**35.7**
Grain Size (pct)									
Total Gravel					**42.9**	**5.1**	0.1 U	**43.5**	**10.2**
Total Sand					**48**	**41.9**	**17.1**	**41.2**	**42.5**
Total Silt					**5.7**	**34.3**	**57.4**	**11.6**	**30**
Total Clay					**3.4**	**18.6**	**25.5**	**3.8**	**17.3**
Total Fines (silt + clay)					**9.1**	**52.9**	**82.9**	**15.4**	**47.3**
Metals (mg/kg)									
Arsenic	57	93			6 U	--	--	8 U	10 U
Cadmium	5.1	6.7			**0.7**	--	--	**0.7**	**2.5**
Chromium	260	270			**25**	--	--	**23.5**	**31**
Copper	390	390			**17**	--	--	**23**	**62.4**
Lead	450	530			**3 J**	--	--	**10 J**	**11**
Mercury	0.41	0.59			**0.04 J**	--	--	**0.04 J**	**0.11**
Silver	6.1	6.1			0.4 U	--	--	0.5 U	0.8 U
Zinc	410	960			**42**	--	--	**54**	**102**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			18 U	--	--	19 U	**9.3 J**
2-Methylphenol (o-Cresol)	63	63			4.6 U	--	--	4.7 U	**9.1**
4-Methylphenol (p-Cresol)	670	670			**14**	--	--	**25**	**140**
Benzoic acid	650	650			360 U	--	--	370 U	**150 J**
Benzyl alcohol	57	73			**70**	--	--	**9.6 J**	20 U
Pentachlorophenol	360	690			46 U	--	--	47 U	49 U
Phenol	420	1200			11 U	--	--	**14 J**	**66**
1,2,4-Trichlorobenzene			31	51	4.6 U	--	--	4.7 U	4.9 U
1,2-Dichlorobenzene			35	50	4.6 U	--	--	4.7 U	4.9 U
1,4-Dichlorobenzene			110	110	4.6 U	--	--	4.7 U	**2.5 J**
bis(2-Ethylhexyl)phthalate			1300	3100	**30**	--	--	**57**	**94**
Butylbenzyl phthalate			63	900	4.6 U	--	--	4.7 U	**11**
Dibenzofuran			540	540	18 U	**14 J**	**10 J**	19 U	**86**
Diethyl phthalate			200	1200	21 U	--	--	5.1 U	28 U
Dimethyl phthalate			71	160	4.6 U	--	--	4.7 U	**6.4**
Di-n-butyl phthalate			1400	5100	18 U	--	--	19 U	20 U
Di-n-octyl phthalate			6200	6200	18 U	--	--	19 U	20 U

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-06	POBI-SS-07	POBI-SS-08	POBI-SS-09	POBI-SS-10
				Sample ID	POBI-SS-06-0-10-130312	POBI-SS-07-0-10-130312	POBI-SS-08-0-10-130313	POBI-SS-09-0-10-130312	POBI-SS-10-0-10-130311
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/12/2013	3/13/2013	3/12/2013	3/11/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	**CSL**	**LAET**	**2LAET**					
Hexachlorobenzene			22	70	4.6 U	--	--	4.7 U	4.9 U
n-Nitrosodiphenylamine			28	40	18 U	--	--	19 U	20 U
Hexachlorobutadiene			11	120	4.6 U	--	--	4.7 U	4.9 U
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.229 U	--	--	0.18 U	0.17 U
1,2-Dichlorobenzene	2.3	2.3			0.229 U	--	--	0.18 U	0.17 U
1,4-Dichlorobenzene	3.1	9			0.229 U	--	--	0.18 U	**0.087 J**
bis(2-Ethylhexyl)phthalate	47	78			**1.493**	--	--	**2.184**	**3.253**
Butylbenzyl phthalate	4.9	64			0.229 U	--	--	0.18 U	**0.381**
Dibenzofuran	15	58			0.896 U	**0.545 J**	**0.369 J**	0.728 U	**2.976**
Diethyl phthalate	61	110			1.045 U	--	--	0.195 U	0.969 U
Dimethyl phthalate	53	53			0.229 U	--	--	0.18 U	**0.221**
Di-n-butyl phthalate	220	1700			0.896 U	--	--	0.728 U	0.692 U
Di-n-octyl phthalate	58	4500			0.896 U	--	--	0.728 U	0.692 U
Hexachlorobenzene	0.38	2.3			0.229 U	--	--	0.18 U	0.17 U
n-Nitrosodiphenylamine	11	11			0.896 U	--	--	0.728 U	0.692 U
Hexachlorobutadiene	3.9	6.2			0.229 U	--	--	0.18 U	0.17 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	18 U	20 U	19 U	19 U	20 U
Acenaphthene			500	500	18 U	**12 J**	19 U	19 U	**240**
Acenaphthylene			1300	1300	18 U	20 U	19 U	19 U	20 U
Anthracene			960	960	**10 J**	**20**	**14 J**	19 U	**82**
Benzo(a)anthracene			1300	1600	**20**	**35**	**26**	**24**	**69**
Benzo(a)pyrene			1600	1600	**18**	**44**	**38**	**34**	**72**
Benzo(b,j,k)fluoranthenes					**41**	**100**	**77**	**94**	**190**
Benzo(g,h,i)perylene			670	720	**12 J**	**32**	**28**	**42**	**22**
Chrysene			1400	2800	**27**	**61**	**43**	**52**	**140**
Dibenzo(a,h)anthracene			230	230	**4.7**	20 U	19 U	**13**	**13**
Fluoranthene			1700	2500	**46**	**150**	**87**	**51**	**410**
Fluorene			540	540	18 U	**13 J**	19 U	19 U	**100**
Indeno(1,2,3-c,d)pyrene			600	690	**10 J**	**29**	**24**	**34**	**24**
Naphthalene			2100	2100	18 U	**48**	**32**	**25**	**81**
Phenanthrene			1500	1500	**27**	**57**	**37**	**32**	**360**
Pyrene			2600	3300	**69**	**140**	**87**	**60**	**360**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**41**	**100**	**77**	**94**	**190**
Total LPAH (SMS) (U = 0)			5200	5200	**37 J**	**150 J**	**83 J**	**57**	**863**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-06	POBI-SS-07	POBI-SS-08	POBI-SS-09	POBI-SS-10
				Sample ID	POBI-SS-06-0-10-130312	POBI-SS-07-0-10-130312	POBI-SS-08-0-10-130313	POBI-SS-09-0-10-130312	POBI-SS-10-0-10-130311
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/12/2013	3/13/2013	3/12/2013	3/11/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Total HPAH (SMS) (U = 0)			12000	17000	**247.7 J**	**591**	**410**	**404**	**1300**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**25.8 J**	**61.01**	**51.13**	**51.02**	**103**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**25.8 J**	**62.01**	**52.08**	**51.02**	**103**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			0.896 U	0.778 U	0.701 U	0.728 U	0.692 U
Acenaphthene	16	57			0.896 U	**0.467 J**	0.701 U	0.728 U	**8.304**
Acenaphthylene	66	66			0.896 U	0.778 U	0.701 U	0.728 U	0.692 U
Anthracene	220	1200			**0.498 J**	**0.778**	**0.517 J**	0.728 U	**2.837**
Benzo(a)anthracene	110	270			**0.995**	**1.362**	**0.959**	**0.92**	**2.388**
Benzo(a)pyrene	99	210			**0.896**	**1.712**	**1.402**	**1.303**	**2.491**
Benzo(g,h,i)perylene	31	78			**0.597 J**	**1.245**	**1.033**	**1.609**	**0.761**
Chrysene	110	460			**1.343**	**2.374**	**1.587**	**1.992**	**4.844**
Dibenzo(a,h)anthracene	12	33			**0.234**	0.778 U	0.701 U	**0.498**	**0.45**
Fluoranthene	160	1200			**2.289**	**5.837**	**3.21**	**1.954**	**14.187**
Fluorene	23	79			0.896 U	**0.506 J**	0.701 U	0.728 U	**3.46**
Indeno(1,2,3-c,d)pyrene	34	88			**0.498 J**	**1.128**	**0.886**	**1.303**	**0.83**
Naphthalene	99	170			0.896 U	**1.868**	**1.181**	**0.958**	**2.803**
Phenanthrene	100	480			**1.343**	**2.218**	**1.365**	**1.226**	**12.457**
Pyrene	1000	1400			**3.433**	**5.447**	**3.21**	**2.299**	**12.457**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**2.04**	**3.891**	**2.841**	**3.602**	**6.574**
Total LPAH (SMS) (U = 0)	370	780			**1.841 J**	**5.837 J**	**3.063 J**	**2.184**	**29.862**
Total HPAH (SMS) (U = 0)	960	5300			**12.323 J**	**22.996**	**15.129**	**15.479**	**44.983**
PCB Aroclors (µg/kg)									
Aroclor 1016					18 U	--	--	17 U	19 U
Aroclor 1221					18 U	--	--	17 U	19 U
Aroclor 1232					18 U	--	--	17 U	28 U
Aroclor 1242					18 U	--	--	17 U	19 U
Aroclor 1248					18 U	--	--	17 U	19 U
Aroclor 1254					18 U	--	--	17 U	**19**
Aroclor 1260					18 U	--	--	17 U	19 U
Total PCB Aroclors (U = 0)			130	1000	18 U	--	--	17 U	**19**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			0.896 U	--	--	0.651 U	**0.657**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-11	POBI-SS-12	POBI-SS-13	POBI-SS-14	POBI-SS-15
				Sample ID	POBI-SS-11-0-10-130312	POBI-SS-12-0-10-130313	POBI-SS-13-0-10-130312	POBI-SS-14-0-10-130312	POBI-SS-15-0-10-130313
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/13/2013	3/12/2013	3/12/2013	3/13/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**4.59**	**4.65**	**3.68**	**3.6**	**4.23**
Total solids					**30.6**	**28.9**	**35.7**	**31.7**	**29.3**
Grain Size (pct)									
Total Gravel					**0.2**	0.1 U	**13.3**	**0.2**	**0.2**
Total Sand					**3.7**	**10**	**39**	**4.1**	**10.6**
Total Silt					**59.7**	**61**	**28.6**	**58.7**	**59.3**
Total Clay					**36.3**	**29.1**	**19.1**	**37**	**30**
Total Fines (silt + clay)					**96**	**90.1**	**47.7**	**95.7**	**89.3**
Metals (mg/kg)									
Arsenic	57	93			--	--	10 U	--	--
Cadmium	5.1	6.7			--	--	**2.4**	--	--
Chromium	260	270			--	--	**32**	--	--
Copper	390	390			--	--	**64.8**	--	--
Lead	450	530			--	--	**15 J**	--	--
Mercury	0.41	0.59			--	--	**0.12 J**	--	--
Silver	6.1	6.1			--	--	0.8 U	--	--
Zinc	410	960			--	--	**110**	--	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	--	**13 J**	--	--
2-Methylphenol (o-Cresol)	63	63			--	--	**18**	--	--
4-Methylphenol (p-Cresol)	670	670			--	--	**190**	--	--
Benzoic acid	650	650			--	--	**460 J**	--	--
Benzyl alcohol	57	73			--	--	**56 J**	--	--
Pentachlorophenol	360	690			--	--	140 U	--	--
Phenol	420	1200			--	--	**140**	--	--
1,2,4-Trichlorobenzene			31	51	--	--	14 U	--	--
1,2-Dichlorobenzene			35	50	--	--	**11 J**	--	--
1,4-Dichlorobenzene			110	110	--	--	**17**	--	--
bis(2-Ethylhexyl)phthalate			1300	3100	--	--	**310 J**	--	--
Butylbenzyl phthalate			63	900	--	--	**12 J**	--	--
Dibenzofuran			540	540	**16 J**	**11 J**	**99 J**	**14 J**	**18 J**
Diethyl phthalate			200	1200	--	--	28 U	--	--
Dimethyl phthalate			71	160	--	--	14 U	--	--
Di-n-butyl phthalate			1400	5100	--	--	57 U	--	--
Di-n-octyl phthalate			6200	6200	--	--	57 U	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-11	POBI-SS-12	POBI-SS-13	POBI-SS-14	POBI-SS-15
				Sample ID	POBI-SS-11-0-10-130312	POBI-SS-12-0-10-130313	POBI-SS-13-0-10-130312	POBI-SS-14-0-10-130312	POBI-SS-15-0-10-130313
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/13/2013	3/12/2013	3/12/2013	3/13/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	--	--	14 U	--	--
n-Nitrosodiphenylamine			28	40	--	--	57 U	--	--
Hexachlorobutadiene			11	120	--	--	14 U	--	--
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	--	0.38 U	--	--
1,2-Dichlorobenzene	2.3	2.3			--	--	**0.299 J**	--	--
1,4-Dichlorobenzene	3.1	9			--	--	**0.462**	--	--
bis(2-Ethylhexyl)phthalate	47	78			--	--	**8.424 J**	--	--
Butylbenzyl phthalate	4.9	64			--	--	**0.326 J**	--	--
Dibenzofuran	15	58			**0.349 J**	**0.237 J**	**2.69 J**	**0.389 J**	**0.426 J**
Diethyl phthalate	61	110			--	--	0.761 U	--	--
Dimethyl phthalate	53	53			--	--	0.38 U	--	--
Di-n-butyl phthalate	220	1700			--	--	1.549 U	--	--
Di-n-octyl phthalate	58	4500			--	--	1.549 U	--	--
Hexachlorobenzene	0.38	2.3			--	--	0.38 U	--	--
n-Nitrosodiphenylamine	11	11			--	--	1.549 U	--	--
Hexachlorobutadiene	3.9	6.2			--	--	0.38 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**13 J**	19 U	**51 J**	**14 J**	**22**
Acenaphthene			500	500	**16 J**	19 U	**830 J**	19 U	**15 J**
Acenaphthylene			1300	1300	19 U	19 U	**110 J**	19 U	**13 J**
Anthracene			960	960	**28**	**15 J**	**240 J**	**26**	**28**
Benzo(a)anthracene			1300	1600	**52**	**28**	**340 J**	**52**	**49**
Benzo(a)pyrene			1600	1600	**53**	**33**	**310 J**	**61**	**52**
Benzo(b,j,k)fluoranthenes					**140**	**75**	**620 J**	**150**	**110**
Benzo(g,h,i)perylene			670	720	**39**	**25**	**190 J**	**43**	**34**
Chrysene			1400	2800	**92**	**46**	**500 J**	**91**	**70**
Dibenzo(a,h)anthracene			230	230	19 U	19 U	**81**	**12 J**	20 U
Fluoranthene			1700	2500	**170**	**110**	**680 J**	**180**	**160**
Fluorene			540	540	**13 J**	19 U	**330 J**	**12 J**	**18 J**
Indeno(1,2,3-c,d)pyrene			600	690	**33**	**20**	**160 J**	**37**	**30**
Naphthalene			2100	2100	**61**	**42**	**220 J**	**45**	**100**
Phenanthrene			1500	1500	**69**	**44**	**650 J**	**74**	**96**
Pyrene			2600	3300	**180**	**97**	**920 J**	**210**	**160**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**140**	**75**	**620 J**	**150**	**110**
Total LPAH (SMS) (U = 0)			5200	5200	**187 J**	**101 J**	**2380 J**	**157 J**	**270 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-11	POBI-SS-12	POBI-SS-13	POBI-SS-14	POBI-SS-15
Sample ID					POBI-SS-11-0-10-130312	POBI-SS-12-0-10-130313	POBI-SS-13-0-10-130312	POBI-SS-14-0-10-130312	POBI-SS-15-0-10-130313
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/12/2013	3/13/2013	3/12/2013	3/12/2013	3/13/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Total HPAH (SMS) (U = 0)			12000	17000	**759**	**434**	**3801 J**	**836 J**	**665**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**76.42**	**45.76**	**435.1 J**	**87.01 J**	**71.6**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**77.37**	**46.71**	**435.1 J**	**87.01 J**	**72.6**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**0.283 J**	0.409 U	**1.386 J**	**0.389 J**	**0.52**
Acenaphthene	16	57			**0.349 J**	0.409 U	**22.554 J**	0.528 U	**0.355 J**
Acenaphthylene	66	66			0.414 U	0.409 U	**2.989 J**	0.528 U	**0.307 J**
Anthracene	220	1200			**0.61**	**0.323 J**	**6.522 J**	**0.722**	**0.662**
Benzo(a)anthracene	110	270			**1.133**	**0.602**	**9.239 J**	**1.444**	**1.158**
Benzo(a)pyrene	99	210			**1.155**	**0.71**	**8.424 J**	**1.694**	**1.229**
Benzo(g,h,i)perylene	31	78			**0.85**	**0.538**	**5.163 J**	**1.194**	**0.804**
Chrysene	110	460			**2.004**	**0.989**	**13.587 J**	**2.528**	**1.655**
Dibenzo(a,h)anthracene	12	33			0.414 U	0.409 U	**2.201**	**0.333 J**	0.473 U
Fluoranthene	160	1200			**3.704**	**2.366**	**18.478 J**	**5**	**3.783**
Fluorene	23	79			**0.283 J**	0.409 U	**8.967 J**	**0.333 J**	**0.426 J**
Indeno(1,2,3-c,d)pyrene	34	88			**0.719**	**0.43**	**4.348 J**	**1.028**	**0.709**
Naphthalene	99	170			**1.329**	**0.903**	**5.978 J**	**1.25**	**2.364**
Phenanthrene	100	480			**1.503**	**0.946**	**17.663 J**	**2.056**	**2.27**
Pyrene	1000	1400			**3.922**	**2.086**	**25 J**	**5.833**	**3.783**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**3.05**	**1.613**	**16.848 J**	**4.167**	**2.6**
Total LPAH (SMS) (U = 0)	370	780			**4.074 J**	**2.172 J**	**64.674 J**	**4.361 J**	**6.383 J**
Total HPAH (SMS) (U = 0)	960	5300			**16.536**	**9.333**	**103.288 J**	**23.222 J**	**15.721**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	--	18 U	--	--
Aroclor 1221					--	--	18 U	--	--
Aroclor 1232					--	--	18 U	--	--
Aroclor 1242					--	--	18 U	--	--
Aroclor 1248					--	--	18 U	--	--
Aroclor 1254					--	--	**17 J**	--	--
Aroclor 1260					--	--	18 U	--	--
Total PCB Aroclors (U = 0)			130	1000	--	--	**17 J**	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	--	**0.462 J**	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-16	POBI-SS-17	POBI-SS-18	POBI-SS-19	POBI-SS-19
				Sample ID	POBI-SS-16-0-10-130312	POBI-SS-17-0-10-130313	POBI-SS-18-0-10-130312	POBI-SS-19-0-10-130311	POBI-SS-19-0-10-130311DUP
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/13/2013	3/12/2013	3/11/2013	3/11/2013
				Sample Type	N	N	N	N	FD
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**4.77**	**7.14**	**4.46**	**4.9**	**3.29**
Total solids					**35.9**	**31.28**	**23.3**	**34.4**	**33.8**
Grain Size (pct)									
Total Gravel					**2.2**	**25.4**	**0.3**	**4.7**	**10.8**
Total Sand					**11.7**	**34.3**	**4.2**	**29.5**	**28.1**
Total Silt					**59.5**	**21.8**	**63.3**	**39.1**	**35.9**
Total Clay					**26.7**	**18.4**	**32.5**	**26.7**	**25**
Total Fines (silt + clay)					**86.2**	**40.2**	**95.8**	**65.8**	**60.9**
Metals (mg/kg)									
Arsenic	57	93			10 U	10 U	20 U	10 U	10 U
Cadmium	5.1	6.7			**2.7**	**2.8**	**3.2**	**4.2**	**3.2**
Chromium	260	270			**37**	**26**	**41**	**33**	**34**
Copper	390	390			**65.6**	**56.4**	**73.7**	**68.6**	**75.2**
Lead	450	530			**21 J**	**24**	**18 J**	**15**	**16**
Mercury	0.41	0.59			**0.21 J**	**0.09 J**	**0.14 J**	**0.15**	**0.19**
Silver	6.1	6.1			0.9 U	0.8 U	1 U	0.9 U	0.8 U
Zinc	410	960			**109**	**151**	**112**	**128**	**132**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			**15 J**	58 U	20 U	**6.2 J**	**8.3 J**
2-Methylphenol (o-Cresol)	63	63			**18**	**9.8 J**	**4.7 J**	**9**	**6.9**
4-Methylphenol (p-Cresol)	670	670			**260**	**81**	**56**	**82**	**74**
Benzoic acid	650	650			**500 J**	1200 U	**170 J**	**160 J**	**100 J**
Benzyl alcohol	57	73			19 U	58 U	**7 J**	19 U	20 U
Pentachlorophenol	360	690			**17 J**	140 U	49 U	48 U	50 U
Phenol	420	1200			**150**	**110**	**31**	**100**	**63**
1,2,4-Trichlorobenzene			31	51	4.8 U	14 U	4.9 U	4.8 U	5 U
1,2-Dichlorobenzene			35	50	**3.9 J**	14 U	4.9 U	4.8 U	5 U
1,4-Dichlorobenzene			110	110	**13**	14 U	4.9 U	4.8 U	5 U
bis(2-Ethylhexyl)phthalate			1300	3100	**150**	**200 J**	**87 J**	**130**	**64**
Butylbenzyl phthalate			63	900	**6**	**72 J**	**5.9**	**13**	**20**
Dibenzofuran			540	540	**52**	**81 J**	**18 J**	**17 J**	**21**
Diethyl phthalate			200	1200	12 U	62 UJ	13 U	24 U	20 U
Dimethyl phthalate			71	160	4.8 U	14 U	4.9 U	**44**	**23**
Di-n-butyl phthalate			1400	5100	19 U	58 U	20 U	19 U	20 U
Di-n-octyl phthalate			6200	6200	19 U	58 U	20 U	19 U	20 U

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-16	POBI-SS-17	POBI-SS-18	POBI-SS-19	POBI-SS-19
Sample ID					POBI-SS-16-0-10-130312	POBI-SS-17-0-10-130313	POBI-SS-18-0-10-130312	POBI-SS-19-0-10-130311	POBI-SS-19-0-10-130311DUP
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/12/2013	3/13/2013	3/12/2013	3/11/2013	3/11/2013
Sample Type					N	N	N	N	FD
Matrix					SE	SE	SE	SE	SE
Hexachlorobenzene			22	70	4.8 U	14 U	4.9 U	4.8 U	5 U
n-Nitrosodiphenylamine			28	40	19 UJ	58 U	20 U	19 U	20 U
Hexachlorobutadiene			11	120	4.8 U	14 U	4.9 U	4.8 U	5 U
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.101 U	0.196 U	0.11 U	0.098 U	0.152 U
1,2-Dichlorobenzene	2.3	2.3			**0.082 J**	0.196 U	0.11 U	0.098 U	0.152 U
1,4-Dichlorobenzene	3.1	9			**0.273**	0.196 U	0.11 U	0.098 U	0.152 U
bis(2-Ethylhexyl)phthalate	47	78			**3.145**	**2.801 J**	**1.951 J**	**2.653**	**1.945**
Butylbenzyl phthalate	4.9	64			**0.126**	**1.008 J**	**0.132**	**0.265**	**0.608**
Dibenzofuran	15	58			**1.09**	**1.134 J**	**0.404 J**	**0.347 J**	**0.638**
Diethyl phthalate	61	110			0.252 U	0.868 UJ	0.291 U	0.49 U	0.608 U
Dimethyl phthalate	53	53			0.101 U	0.196 U	0.11 U	**0.898**	**0.699**
Di-n-butyl phthalate	220	1700			0.398 U	0.812 U	0.448 U	0.388 U	0.608 U
Di-n-octyl phthalate	58	4500			0.398 U	0.812 U	0.448 U	0.388 U	0.608 U
Hexachlorobenzene	0.38	2.3			0.101 U	0.196 U	0.11 U	0.098 U	0.152 U
n-Nitrosodiphenylamine	11	11			0.398 UJ	0.812 U	0.448 U	0.388 U	0.608 U
Hexachlorobutadiene	3.9	6.2			0.101 U	0.196 U	0.11 U	0.098 U	0.152 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**44**	**52 J**	20 U	**16 J**	**17 J**
Acenaphthene			500	500	**27**	**550 J**	**18 J**	**30**	**14 J**
Acenaphthylene			1300	1300	**42**	**43 J**	20 U	19 U	**31**
Anthracene			960	960	**46**	**200 J**	**24 J**	**58**	**89**
Benzo(a)anthracene			1300	1600	**69**	**460 J**	**51 J**	**130**	**160**
Benzo(a)pyrene			1600	1600	**66**	**490 J**	**50 J**	**48**	**170**
Benzo(b,j,k)fluoranthenes					**160**	**1000 J**	**120 J**	**300**	**390**
Benzo(g,h,i)perylene			670	720	**57**	**160 J**	**24 J**	19 U	**27**
Chrysene			1400	2800	**96**	**660 J**	**94 J**	**240**	**310**
Dibenzo(a,h)anthracene			230	230	**18**	**93 J**	**11**	**18**	**22**
Fluoranthene			1700	2500	**280 J**	**800 J**	**130 J**	**380**	**290**
Fluorene			540	540	**33**	**110 J**	**19 J**	**12 J**	**15 J**
Indeno(1,2,3-c,d)pyrene			600	690	**41**	**160 J**	**22 J**	**18 J**	**39**
Naphthalene			2100	2100	**270 J**	**120 J**	**26 J**	**40**	**36**
Phenanthrene			1500	1500	**190**	**400 J**	**71 J**	**130**	**120**
Pyrene			2600	3300	**300**	**1600 J**	**130 J**	**330**	**510**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**160**	**1000 J**	**120 J**	**300**	**390**
Total LPAH (SMS) (U = 0)			5200	5200	**608 J**	**1423 J**	**158 J**	**270 J**	**305 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-16	POBI-SS-17	POBI-SS-18	POBI-SS-19	POBI-SS-19
				Sample ID	POBI-SS-16-0-10-130312	POBI-SS-17-0-10-130313	POBI-SS-18-0-10-130312	POBI-SS-19-0-10-130311	POBI-SS-19-0-10-130311DUP
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/12/2013	3/13/2013	3/12/2013	3/11/2013	3/11/2013
				Sample Type	N	N	N	N	FD
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Total HPAH (SMS) (U = 0)			12000	17000	**1087 J**	**5423 J**	**632 J**	**1464 J**	**1918**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**95.76**	**667.9 J**	**71.34 J**	**97 J**	**234.2**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**95.76**	**667.9 J**	**71.34 J**	**97 J**	**234.2**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**0.922**	**0.728 J**	0.448 U	**0.327 J**	**0.517 J**
Acenaphthene	16	57			**0.566**	**7.703 J**	**0.404 J**	**0.612**	**0.426 J**
Acenaphthylene	66	66			**0.881**	**0.602 J**	0.448 U	0.388 U	**0.942**
Anthracene	220	1200			**0.964**	**2.801 J**	**0.538 J**	**1.184**	**2.705**
Benzo(a)anthracene	110	270			**1.447**	**6.443 J**	**1.143 J**	**2.653**	**4.863**
Benzo(a)pyrene	99	210			**1.384**	**6.863 J**	**1.121 J**	**0.98**	**5.167**
Benzo(g,h,i)perylene	31	78			**1.195**	**2.241 J**	**0.538 J**	0.388 U	**0.821**
Chrysene	110	460			**2.013**	**9.244 J**	**2.108 J**	**4.898**	**9.422**
Dibenzo(a,h)anthracene	12	33			**0.377**	**1.303 J**	**0.247**	**0.367**	**0.669**
Fluoranthene	160	1200			**5.87 J**	**11.204 J**	**2.915 J**	**7.755**	**8.815**
Fluorene	23	79			**0.692**	**1.541 J**	**0.426 J**	**0.245 J**	**0.456 J**
Indeno(1,2,3-c,d)pyrene	34	88			**0.86**	**2.241 J**	**0.493 J**	**0.367 J**	**1.185**
Naphthalene	99	170			**5.66 J**	**1.681 J**	**0.583 J**	**0.816**	**1.094**
Phenanthrene	100	480			**3.983**	**5.602 J**	**1.592 J**	**2.653**	**3.647**
Pyrene	1000	1400			**6.289**	**22.409 J**	**2.915 J**	**6.735**	**15.502**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**3.354**	**14.006 J**	**2.691 J**	**6.122**	**11.854**
Total LPAH (SMS) (U = 0)	370	780			**12.746 J**	**19.93 J**	**3.543 J**	**5.51 J**	**9.271 J**
Total HPAH (SMS) (U = 0)	960	5300			**22.788 J**	**75.952 J**	**14.17 J**	**29.878 J**	**58.298**
PCB Aroclors (µg/kg)									
Aroclor 1016					19 U	19 U	19 U	19 U	19 UJ
Aroclor 1221					19 U	19 U	19 U	19 U	19 UJ
Aroclor 1232					19 U	19 U	28 U	19 U	19 UJ
Aroclor 1242					19 U	19 U	19 U	19 U	19 UJ
Aroclor 1248					48 U	19 U	19 U	19 U	19 UJ
Aroclor 1254					48 U	**31**	**21**	**22**	**21 J**
Aroclor 1260					19 U	**21**	19 U	19 U	19 UJ
Total PCB Aroclors (U = 0)			130	1000	48 U	**52**	**21**	**22**	**21 J**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			1.006 U	**0.728**	**0.471**	**0.449**	**0.638 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET					
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-20	POBI-SS-21	POBI-SS-22	POBI-SS-23	POBI-SS-24
Sample ID					POBI-SS-20-0-10-130311	POBI-SS-21-0-10-130306	POBI-SS-22-0-10-130306	POBI-SS-23-0-10-130311	POBI-SS-24-0-10-130311
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/11/2013	3/6/2013	3/6/2013	3/11/2013	3/11/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Conventional Parameters (pct)									
Total organic carbon					**5.01**	**2.12**	**3.93**	**3.7**	**6.21**
Total solids					**26.7**	**66.7**	**38.3**	**56.2**	**30.2**
Grain Size (pct)									
Total Gravel					0.1 U	**0.3**	**0.1**	**13.9**	0.1 U
Total Sand					**4.5**	**79.7**	**23.8**	**60.5**	**3.5**
Total Silt					**60.2**	**11.7**	**52.7**	**15.1**	**60.8**
Total Clay					**35.3**	**8.3**	**23.4**	**10.5**	**35.6**
Total Fines (silt + clay)					**95.5**	**20**	**76.1**	**25.6**	**96.4**
Metals (mg/kg)									
Arsenic	57	93			--	--	--	--	--
Cadmium	5.1	6.7			--	--	--	--	--
Chromium	260	270			--	--	--	--	--
Copper	390	390			--	--	--	--	--
Lead	450	530			--	--	--	--	--
Mercury	0.41	0.59			--	--	--	--	--
Silver	6.1	6.1			--	--	--	--	--
Zinc	410	960			--	--	--	--	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	19 U	**6.2 J**	--	--
2-Methylphenol (o-Cresol)	63	63			--	4.7 U	4.8 U	--	--
4-Methylphenol (p-Cresol)	670	670			--	**60**	**400**	--	--
Benzoic acid	650	650			--	**110 J**	**250 J**	--	--
Benzyl alcohol	57	73			--	19 U	**8.8 J**	--	--
Pentachlorophenol	360	690			--	47 U	48 U	--	--
Phenol	420	1200			--	26 U	**91**	--	--
1,2,4-Trichlorobenzene			31	51	--	4.7 U	4.8 U	--	--
1,2-Dichlorobenzene			35	50	--	4.7 U	**2.6 J**	--	--
1,4-Dichlorobenzene			110	110	--	4.7 U	**6**	--	--
bis(2-Ethylhexyl)phthalate			1300	3100	--	**18 J**	**84**	--	--
Butylbenzyl phthalate			63	900	--	4.7 U	**7.5**	--	--
Dibenzofuran			540	540	20 U	19 U	**25**	20 U	19 U
Diethyl phthalate			200	1200	--	24 U	59 U	--	--
Dimethyl phthalate			71	160	--	4.7 U	4.8 U	--	--
Di-n-butyl phthalate			1400	5100	--	19 U	19 U	--	--
Di-n-octyl phthalate			6200	6200	--	19 U	19 U	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-20	POBI-SS-21	POBI-SS-22	POBI-SS-23	POBI-SS-24
				Sample ID	POBI-SS-20-0-10-130311	POBI-SS-21-0-10-130306	POBI-SS-22-0-10-130306	POBI-SS-23-0-10-130311	POBI-SS-24-0-10-130311
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/11/2013	3/6/2013	3/6/2013	3/11/2013	3/11/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	--	4.7 U	4.8 U	--	--
n-Nitrosodiphenylamine			28	40	--	19 U	19 U	--	--
Hexachlorobutadiene			11	120	--	4.7 U	4.8 U	--	--
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	0.222 U	0.122 U	--	--
1,2-Dichlorobenzene	2.3	2.3			--	0.222 U	**0.066 J**	--	--
1,4-Dichlorobenzene	3.1	9			--	0.222 U	**0.153**	--	--
bis(2-Ethylhexyl)phthalate	47	78			--	**0.849 J**	**2.137**	--	--
Butylbenzyl phthalate	4.9	64			--	0.222 U	**0.191**	--	--
Dibenzofuran	15	58			0.399 U	0.896 U	**0.636**	0.541 U	0.306 U
Diethyl phthalate	61	110			--	1.132 U	1.501 U	--	--
Dimethyl phthalate	53	53			--	0.222 U	0.122 U	--	--
Di-n-butyl phthalate	220	1700			--	0.896 U	0.483 U	--	--
Di-n-octyl phthalate	58	4500			--	0.896 U	0.483 U	--	--
Hexachlorobenzene	0.38	2.3			--	0.222 U	0.122 U	--	--
n-Nitrosodiphenylamine	11	11			--	0.896 U	0.483 U	--	--
Hexachlorobutadiene	3.9	6.2			--	0.222 U	0.122 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	20 U	19 U	**27**	20 U	19 U
Acenaphthene			500	500	20 U	19 U	**28**	20 U	19 U
Acenaphthylene			1300	1300	20 U	19 U	**32**	20 U	19 U
Anthracene			960	960	**15 J**	19 U	**36**	**11 J**	**11 J**
Benzo(a)anthracene			1300	1600	**33**	19 U	**42**	**31**	**19 J**
Benzo(a)pyrene			1600	1600	**34**	19 U	**46**	**35**	**22**
Benzo(b,j,k)fluoranthenes					**76**	**24 J**	**110**	**65**	**49**
Benzo(g,h,i)perylene			670	720	**22**	19 U	**40**	**21**	**17 J**
Chrysene			1400	2800	**70**	**13 J**	**71**	**58**	**37**
Dibenzo(a,h)anthracene			230	230	20 U	4.7 U	**8.7**	20 U	19 U
Fluoranthene			1700	2500	**91**	**25**	**160**	**56**	**62**
Fluorene			540	540	20 U	19 U	**28**	20 U	19 U
Indeno(1,2,3-c,d)pyrene			600	690	**20**	19 U	**28**	**20**	**14 J**
Naphthalene			2100	2100	**29**	**24**	**280**	**12 J**	**28**
Phenanthrene			1500	1500	**38**	**20**	**110**	**19 J**	**28**
Pyrene			2600	3300	**110**	**35**	**180**	**74**	**72**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**76**	**24 J**	**110**	**65**	**49**
Total LPAH (SMS) (U = 0)			5200	5200	**82 J**	**44**	**514**	**42 J**	**67 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-20	POBI-SS-21	POBI-SS-22	POBI-SS-23	POBI-SS-24
Sample ID					POBI-SS-20-0-10-130311	POBI-SS-21-0-10-130306	POBI-SS-22-0-10-130306	POBI-SS-23-0-10-130311	POBI-SS-24-0-10-130311
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/11/2013	3/6/2013	3/6/2013	3/11/2013	3/11/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Total HPAH (SMS) (U = 0)			12000	17000	**456**	**97 J**	**685.7**	**360**	**292 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**47.6**	**2.5 J**	**65.6**	**47.18**	**30.57 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**48.6**	**14.2 J**	**65.6**	**48.18**	**31.52 J**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			0.399 U	0.896 U	**0.687**	0.541 U	0.306 U
Acenaphthene	16	57			0.399 U	0.896 U	**0.712**	0.541 U	0.306 U
Acenaphthylene	66	66			0.399 U	0.896 U	**0.814**	0.541 U	0.306 U
Anthracene	220	1200			**0.299 J**	0.896 U	**0.916**	**0.297 J**	**0.177 J**
Benzo(a)anthracene	110	270			**0.659**	0.896 U	**1.069**	**0.838**	**0.306 J**
Benzo(a)pyrene	99	210			**0.679**	0.896 U	**1.17**	**0.946**	**0.354**
Benzo(g,h,i)perylene	31	78			**0.439**	0.896 U	**1.018**	**0.568**	**0.274 J**
Chrysene	110	460			**1.397**	**0.613 J**	**1.807**	**1.568**	**0.596**
Dibenzo(a,h)anthracene	12	33			0.399 U	0.222 U	**0.221**	0.541 U	0.306 U
Fluoranthene	160	1200			**1.816**	**1.179**	**4.071**	**1.514**	**0.998**
Fluorene	23	79			0.399 U	0.896 U	**0.712**	0.541 U	0.306 U
Indeno(1,2,3-c,d)pyrene	34	88			**0.399**	0.896 U	**0.712**	**0.541**	**0.225 J**
Naphthalene	99	170			**0.579**	**1.132**	**7.125**	**0.324 J**	**0.451**
Phenanthrene	100	480			**0.758**	**0.943**	**2.799**	**0.514 J**	**0.451**
Pyrene	1000	1400			**2.196**	**1.651**	**4.58**	**2**	**1.159**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**1.517**	**1.132 J**	**2.799**	**1.757**	**0.789**
Total LPAH (SMS) (U = 0)	370	780			**1.637 J**	**2.075**	**13.079**	**1.135 J**	**1.079 J**
Total HPAH (SMS) (U = 0)	960	5300			**9.102**	**4.575 J**	**17.448**	**9.73**	**4.702 J**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	--	--	--	--
Aroclor 1221					--	--	--	--	--
Aroclor 1232					--	--	--	--	--
Aroclor 1242					--	--	--	--	--
Aroclor 1248					--	--	--	--	--
Aroclor 1254					--	--	--	--	--
Aroclor 1260					--	--	--	--	--
Total PCB Aroclors (U = 0)			130	1000	--	--	--	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	--	--	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-25	POBI-SS-26	POBI-SS-27	POBI-SS-28	POBI-SS-29
Sample ID					POBI-SS-25-0-10-130311	POBI-SS-26-0-10-130306	POBI-SS-27-0-10-130306	POBI-SS-28-0-10-130311	POBI-SS-29-0-10-130311
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/11/2013	3/6/2013	3/6/2013	3/11/2013	3/11/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Conventional Parameters (pct)									
Total organic carbon					**4.19**	**3.78**	**6.58**	**5.12**	**2.46**
Total solids					**30**	**38.1**	**30.1**	**32**	**45**
Grain Size (pct)									
Total Gravel					0.1 U	**0.1**	**2.5**	0.1 U	**0.1**
Total Sand					**4.9**	**27.5**	**31.2**	**10.1**	**35.1**
Total Silt					**59.6**	**51.8**	**44.9**	**54.4**	**42.7**
Total Clay					**35.5**	**20.6**	**21.4**	**35.5**	**22**
Total Fines (silt + clay)					**95.1**	**72.4**	**66.3**	**89.9**	**64.7**
Metals (mg/kg)									
Arsenic	57	93			--	--	--	--	--
Cadmium	5.1	6.7			--	--	--	--	--
Chromium	260	270			--	--	--	--	--
Copper	390	390			--	--	--	--	--
Lead	450	530			--	--	--	--	--
Mercury	0.41	0.59			--	--	--	--	--
Silver	6.1	6.1			--	--	--	--	--
Zinc	410	960			--	--	--	--	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	**5.9 J**	**7.7 J**	--	--
2-Methylphenol (o-Cresol)	63	63			--	4.8 U	**13**	--	--
4-Methylphenol (p-Cresol)	670	670			--	**390**	**420**	--	--
Benzoic acid	650	650			--	**220 J**	**360 J**	--	--
Benzyl alcohol	57	73			--	**14 J**	**31**	--	--
Pentachlorophenol	360	690			--	**35 J**	**46 J**	--	--
Phenol	420	1200			--	**84**	**170**	--	--
1,2,4-Trichlorobenzene			31	51	--	4.8 U	4.9 U	--	--
1,2-Dichlorobenzene			35	50	--	4.8 U	**3.1 J**	--	--
1,4-Dichlorobenzene			110	110	--	**5.3**	**8.2**	--	--
bis(2-Ethylhexyl)phthalate			1300	3100	--	**210**	**130**	--	--
Butylbenzyl phthalate			63	900	--	**6**	**48**	--	--
Dibenzofuran			540	540	19 U	**23**	**34**	19 U	19 U
Diethyl phthalate			200	1200	--	10 U	21 U	--	--
Dimethyl phthalate			71	160	--	4.8 U	**36**	--	--
Di-n-butyl phthalate			1400	5100	--	19 U	20 U	--	--
Di-n-octyl phthalate			6200	6200	--	19 U	20 U	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-25	POBI-SS-26	POBI-SS-27	POBI-SS-28	POBI-SS-29
				Sample ID	POBI-SS-25-0-10-130311	POBI-SS-26-0-10-130306	POBI-SS-27-0-10-130306	POBI-SS-28-0-10-130311	POBI-SS-29-0-10-130311
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/11/2013	3/6/2013	3/6/2013	3/11/2013	3/11/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	--	4.8 U	4.9 U	--	--
n-Nitrosodiphenylamine			28	40	--	19 U	20 U	--	--
Hexachlorobutadiene			11	120	--	4.8 U	4.9 U	--	--
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	0.127 U	0.074 U	--	--
1,2-Dichlorobenzene	2.3	2.3			--	0.127 U	**0.047 J**	--	--
1,4-Dichlorobenzene	3.1	9			--	**0.14**	**0.125**	--	--
bis(2-Ethylhexyl)phthalate	47	78			--	**5.556**	**1.976**	--	--
Butylbenzyl phthalate	4.9	64			--	**0.159**	**0.729**	--	--
Dibenzofuran	15	58			0.453 U	**0.608**	**0.517**	0.371 U	0.772 U
Diethyl phthalate	61	110			--	0.265 U	0.319 U	--	--
Dimethyl phthalate	53	53			--	0.127 U	**0.547**	--	--
Di-n-butyl phthalate	220	1700			--	0.503 U	0.304 U	--	--
Di-n-octyl phthalate	58	4500			--	0.503 U	0.304 U	--	--
Hexachlorobenzene	0.38	2.3			--	0.127 U	0.074 U	--	--
n-Nitrosodiphenylamine	11	11			--	0.503 U	0.304 U	--	--
Hexachlorobutadiene	3.9	6.2			--	0.127 U	0.074 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	19 U	**24**	**32**	19 U	19 U
Acenaphthene			500	500	19 U	**25**	**25**	19 U	19 U
Acenaphthylene			1300	1300	19 U	**21**	**18 J**	19 U	19 U
Anthracene			960	960	**12 J**	**43**	**45**	**11 J**	19 U
Benzo(a)anthracene			1300	1600	**26**	**72**	**60**	**23**	**24**
Benzo(a)pyrene			1600	1600	**31**	**78**	**65**	**28**	**24**
Benzo(b,j,k)fluoranthenes					**64**	**160**	**150**	**62**	**60**
Benzo(g,h,i)perylene			670	720	**23**	**49**	**41**	**22**	**16 J**
Chrysene			1400	2800	**51**	**110**	**96**	**41**	**47**
Dibenzo(a,h)anthracene			230	230	19 U	**13**	**16**	19 U	19 U
Fluoranthene			1700	2500	**71**	**210**	**220**	**70**	**69**
Fluorene			540	540	19 U	**21**	**28**	19 U	19 U
Indeno(1,2,3-c,d)pyrene			600	690	**18 J**	**41**	**38**	**18 J**	**14 J**
Naphthalene			2100	2100	**25**	**160**	**190**	**34**	**57**
Phenanthrene			1500	1500	**33**	**120**	**110**	**32**	**25**
Pyrene			2600	3300	**90**	**230**	**240**	**94**	**88**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**64**	**160**	**150**	**62**	**60**
Total LPAH (SMS) (U = 0)			5200	5200	**70 J**	**390**	**416 J**	**77 J**	**82**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-25	POBI-SS-26	POBI-SS-27	POBI-SS-28	POBI-SS-29
Sample ID					POBI-SS-25-0-10-130311	POBI-SS-26-0-10-130306	POBI-SS-27-0-10-130306	POBI-SS-28-0-10-130311	POBI-SS-29-0-10-130311
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/11/2013	3/6/2013	3/6/2013	3/11/2013	3/11/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Total HPAH (SMS) (U = 0)			12000	17000	**374 J**	**963**	**926**	**358 J**	**342 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**42.31 J**	**107.7**	**92.36**	**38.71 J**	**34.27 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**43.26 J**	**107.7**	**92.36**	**39.66 J**	**35.22 J**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			0.453 U	**0.635**	**0.486**	0.371 U	0.772 U
Acenaphthene	16	57			0.453 U	**0.661**	**0.38**	0.371 U	0.772 U
Acenaphthylene	66	66			0.453 U	**0.556**	**0.274 J**	0.371 U	0.772 U
Anthracene	220	1200			**0.286 J**	**1.138**	**0.684**	**0.215 J**	0.772 U
Benzo(a)anthracene	110	270			**0.621**	**1.905**	**0.912**	**0.449**	**0.976**
Benzo(a)pyrene	99	210			**0.74**	**2.063**	**0.988**	**0.547**	**0.976**
Benzo(g,h,i)perylene	31	78			**0.549**	**1.296**	**0.623**	**0.43**	**0.65 J**
Chrysene	110	460			**1.217**	**2.91**	**1.459**	**0.801**	**1.911**
Dibenzo(a,h)anthracene	12	33			0.453 U	**0.344**	**0.243**	0.371 U	0.772 U
Fluoranthene	160	1200			**1.695**	**5.556**	**3.343**	**1.367**	**2.805**
Fluorene	23	79			0.453 U	**0.556**	**0.426**	0.371 U	0.772 U
Indeno(1,2,3-c,d)pyrene	34	88			**0.43 J**	**1.085**	**0.578**	**0.352 J**	**0.569 J**
Naphthalene	99	170			**0.597**	**4.233**	**2.888**	**0.664**	**2.317**
Phenanthrene	100	480			**0.788**	**3.175**	**1.672**	**0.625**	**1.016**
Pyrene	1000	1400			**2.148**	**6.085**	**3.647**	**1.836**	**3.577**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**1.527**	**4.233**	**2.28**	**1.211**	**2.439**
Total LPAH (SMS) (U = 0)	370	780			**1.671 J**	**10.317**	**6.322 J**	**1.504 J**	**3.333**
Total HPAH (SMS) (U = 0)	960	5300			**8.926 J**	**25.476**	**14.073**	**6.992 J**	**13.902 J**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	--	--	--	--
Aroclor 1221					--	--	--	--	--
Aroclor 1232					--	--	--	--	--
Aroclor 1242					--	--	--	--	--
Aroclor 1248					--	--	--	--	--
Aroclor 1254					--	--	--	--	--
Aroclor 1260					--	--	--	--	--
Total PCB Aroclors (U = 0)			130	1000	--	--	--	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	--	--	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-30	POBI-SS-31	POBI-SS-32	POBI-SS-33	POBI-SS-34
				Sample ID	POBI-SS-30-0-10-130311	POBI-SS-31-0-10-130306	POBI-SS-32-0-10-130308	POBI-SS-33-0-10-130308	POBI-SS-34-0-10-130311
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/11/2013	3/6/2013	3/8/2013	3/8/2013	3/11/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**1.53**	**2.43**	**1.29**	**1.37**	**0.672**
Total solids					**52.3**	**44.9**	**69.3**	**76.1**	**70.7**
Grain Size (pct)									
Total Gravel					**0.9**	0.1 U	**0.7**	**0.4**	**0.1**
Total Sand					**63**	**27.1**	**65.5**	**91.8**	**80.1**
Total Silt					**23.7**	**53.4**	**24**	**5.7**	**14.7**
Total Clay					**12.3**	**19.6**	**9.8**	**2.1**	**5.2**
Total Fines (silt + clay)					**36**	**73**	**33.8**	**7.8**	**19.9**
Metals (mg/kg)									
Arsenic	57	93			--	10 U	7 U	--	--
Cadmium	5.1	6.7			--	**2.2**	**0.6**	--	--
Chromium	260	270			--	**32**	**23.6**	--	--
Copper	390	390			--	**43**	**21**	--	--
Lead	450	530			--	**10**	**6**	--	--
Mercury	0.41	0.59			--	**0.51J**	**0.07**	--	--
Silver	6.1	6.1			--	0.7 U	0.4 U	--	--
Zinc	410	960			--	**72**	**44**	--	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	**3.5 J**	19 UJ	--	--
2-Methylphenol (o-Cresol)	63	63			--	4.7 U	4.8 U	--	--
4-Methylphenol (p-Cresol)	670	670			--	**150**	**5 J**	--	--
Benzoic acid	650	650			--	**120 J**	390 UJ	--	--
Benzyl alcohol	57	73			--	**7.4 J**	19 U	--	--
Pentachlorophenol	360	690			--	47 U	48 UJ	--	--
Phenol	420	1200			--	**46**	**35**	--	--
1,2,4-Trichlorobenzene			31	51	--	4.7 U	4.8 U	--	--
1,2-Dichlorobenzene			35	50	--	4.7 U	4.8 U	--	--
1,4-Dichlorobenzene			110	110	--	**5.2**	4.8 U	--	--
bis(2-Ethylhexyl)phthalate			1300	3100	--	**44**	24 U	--	--
Butylbenzyl phthalate			63	900	--	**4 J**	**9.3**	--	--
Dibenzofuran			540	540	**29**	**19**	19 U	19 U	18 U
Diethyl phthalate			200	1200	--	10 U	8.2 U	--	--
Dimethyl phthalate			71	160	--	4.7 U	4.8 U	--	--
Di-n-butyl phthalate			1400	5100	--	19 U	19 U	--	--
Di-n-octyl phthalate			6200	6200	--	19 U	19 U	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-30	POBI-SS-31	POBI-SS-32	POBI-SS-33	POBI-SS-34
				Sample ID	POBI-SS-30-0-10-130311	POBI-SS-31-0-10-130306	POBI-SS-32-0-10-130308	POBI-SS-33-0-10-130308	POBI-SS-34-0-10-130311
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/11/2013	3/6/2013	3/8/2013	3/8/2013	3/11/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	--	4.7 U	4.8 U	--	--
n-Nitrosodiphenylamine			28	40	--	19 U	19 U	--	--
Hexachlorobutadiene			11	120	--	4.7 U	4.8 U	--	--
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	0.193 U	0.372 U	--	--
1,2-Dichlorobenzene	2.3	2.3			--	0.193 U	0.372 U	--	--
1,4-Dichlorobenzene	3.1	9			--	**0.214**	0.372 U	--	--
bis(2-Ethylhexyl)phthalate	47	78			--	**1.811**	1.86 U	--	--
Butylbenzyl phthalate	4.9	64			--	**0.165 J**	**0.721**	--	--
Dibenzofuran	15	58			**1.895**	**0.782**	1.473 U	1.387 U	2.679 U
Diethyl phthalate	61	110			--	0.412 U	0.636 U	--	--
Dimethyl phthalate	53	53			--	0.193 U	0.372 U	--	--
Di-n-butyl phthalate	220	1700			--	0.782 U	1.473 U	--	--
Di-n-octyl phthalate	58	4500			--	0.782 U	1.473 U	--	--
Hexachlorobenzene	0.38	2.3			--	0.193 U	0.372 U	--	--
n-Nitrosodiphenylamine	11	11			--	0.782 U	1.473 U	--	--
Hexachlorobutadiene	3.9	6.2			--	0.193 U	0.372 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**37**	**26**	19 U	19 U	18 U
Acenaphthene			500	500	**29**	**16 J**	19 U	19 U	18 U
Acenaphthylene			1300	1300	**20**	**15 J**	19 U	19 U	18 U
Anthracene			960	960	**42**	**28**	19 U	19 U	18 U
Benzo(a)anthracene			1300	1600	**57**	**24**	**12 J**	19 U	**19**
Benzo(a)pyrene			1600	1600	**67**	**28**	**12 J**	19 U	**22**
Benzo(b,j,k)fluoranthenes					**110**	**69**	**25 J**	**12 J**	**32 J**
Benzo(g,h,i)perylene			670	720	**47**	**23**	19 UJ	19 U	**14 J**
Chrysene			1400	2800	**96**	**32**	**16 J**	19 U	**25**
Dibenzo(a,h)anthracene			230	230	**12 J**	**4.7**	**2.9 J**	19 U	18 U
Fluoranthene			1700	2500	**280**	**85**	**32**	**17 J**	**50**
Fluorene			540	540	**28**	**20**	19 UJ	19 U	18 U
Indeno(1,2,3-c,d)pyrene			600	690	**36**	**17 J**	19 UJ	19 U	**11 J**
Naphthalene			2100	2100	**180**	**130**	**28**	**19**	**25**
Phenanthrene			1500	1500	**180**	**60**	**23**	19 U	**24**
Pyrene			2600	3300	**300**	**120**	**43**	**23**	**71**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**110**	**69**	**25 J**	**12 J**	**32 J**
Total LPAH (SMS) (U = 0)			5200	5200	**479**	**269 J**	**51 J**	**19**	**49**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET					
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-30	POBI-SS-31	POBI-SS-32	POBI-SS-33	POBI-SS-34
Sample ID					POBI-SS-30-0-10-130311	POBI-SS-31-0-10-130306	POBI-SS-32-0-10-130308	POBI-SS-33-0-10-130308	POBI-SS-34-0-10-130311
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/11/2013	3/6/2013	3/8/2013	3/8/2013	3/11/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Total HPAH (SMS) (U = 0)			12000	17000	**1005 J**	**402.7 J**	**142.9 J**	**52 J**	**244 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**89.46 J**	**39.8 J**	**16.1 J**	**1.2 J**	**28.45 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**89.46 J**	**39.8 J**	**17.1 J**	**13.645 J**	**29.35 J**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**2.418**	**1.07**	1.473 U	1.387 U	2.679 U
Acenaphthene	16	57			**1.895**	**0.658 J**	1.473 U	1.387 U	2.679 U
Acenaphthylene	66	66			**1.307**	**0.617 J**	1.473 U	1.387 U	2.679 U
Anthracene	220	1200			**2.745**	**1.152**	1.473 U	1.387 U	2.679 U
Benzo(a)anthracene	110	270			**3.725**	**0.988**	**0.93 J**	1.387 U	**2.827**
Benzo(a)pyrene	99	210			**4.379**	**1.152**	**0.93 J**	1.387 U	**3.274**
Benzo(g,h,i)perylene	31	78			**3.072**	**0.947**	1.473 UJ	1.387 U	**2.083 J**
Chrysene	110	460			**6.275**	**1.317**	**1.24 J**	1.387 U	**3.72**
Dibenzo(a,h)anthracene	12	33			**0.784 J**	**0.193**	**0.225 J**	1.387 U	2.679 U
Fluoranthene	160	1200			**18.301**	**3.498**	**2.481**	**1.241 J**	**7.44**
Fluorene	23	79			**1.83**	**0.823**	1.473 UJ	1.387 U	2.679 U
Indeno(1,2,3-c,d)pyrene	34	88			**2.353**	**0.7 J**	1.473 UJ	1.387 U	**1.637 J**
Naphthalene	99	170			**11.765**	**5.35**	**2.171**	**1.387**	**3.72**
Phenanthrene	100	480			**11.765**	**2.469**	**1.783**	1.387 U	**3.571**
Pyrene	1000	1400			**19.608**	**4.938**	**3.333**	**1.679**	**10.565**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**7.19**	**2.84**	**1.938 J**	**0.876 J**	**4.762 J**
Total LPAH (SMS) (U = 0)	370	780			**31.307**	**11.07 J**	**3.953 J**	**1.387**	**7.292**
Total HPAH (SMS) (U = 0)	960	5300			**65.686 J**	**16.572 J**	**11.078 J**	**3.796 J**	**36.31 J**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	20 U	17 U	--	--
Aroclor 1221					--	20 U	17 U	--	--
Aroclor 1232					--	20 U	17 U	--	--
Aroclor 1242					--	20 U	17 U	--	--
Aroclor 1248					--	20 U	17 U	--	--
Aroclor 1254					--	20 U	17 U	--	--
Aroclor 1260					--	20 U	17 U	--	--
Total PCB Aroclors (U = 0)			130	1000	--	20 U	17 U	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	0.823 U	1.318 U	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-35	POBI-SS-36	POBI-SS-37	POBI-SS-38	POBI-SS-39
				Sample ID	POBI-SS-35-0-10-130311	POBI-SS-36-0-10-130307	POBI-SS-37-0-10-130311	POBI-SS-38-0-10-130307	POBI-SS-39-0-10-130307
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/11/2013	3/7/2013	3/11/2013	3/7/2013	3/7/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**3.63**	**6.64**	**1.8**	**4.16**	**2.25**
Total solids					**44.5**	**29**	**77.2**	**26.4**	**75.6**
Grain Size (pct)									
Total Gravel					**1.2**	0.1 U	**42.5**	**0.4**	**63.2**
Total Sand					**27.9**	**3.5**	**42.8**	**4**	**26.7**
Total Silt					**44.4**	**61.9**	**9**	**62.3**	**6.8**
Total Clay					**26.4**	**34.6**	**5.7**	**33.3**	**3.5**
Total Fines (silt + clay)					**70.8**	**96.5**	**14.7**	**95.6**	**10.3**
Metals (mg/kg)									
Arsenic	57	93			--	--	7 U	--	20 U
Cadmium	5.1	6.7			--	--	**0.8**	--	**0.8**
Chromium	260	270			--	--	**21.8**	--	**20**
Copper	390	390			--	--	**41.2**	--	**23.9**
Lead	450	530			--	--	**13**	--	**15**
Mercury	0.41	0.59			--	--	**0.05**	--	**0.05**
Silver	6.1	6.1			--	--	0.4 U	--	1 U
Zinc	410	960			--	--	**76**	--	**51**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	--	19 UJ	--	19 UJ
2-Methylphenol (o-Cresol)	63	63			--	--	4.7 U	--	**2.4 J**
4-Methylphenol (p-Cresol)	670	670			--	--	**19**	--	**26**
Benzoic acid	650	650			--	--	760 UJ	--	380 UJ
Benzyl alcohol	57	73			--	--	19 U	--	19 U
Pentachlorophenol	360	690			--	--	47 U	--	48 U
Phenol	420	1200			--	--	**32 J**	--	**38**
1,2,4-Trichlorobenzene			31	51	--	--	4.7 U	--	4.8 U
1,2-Dichlorobenzene			35	50	--	--	4.7 U	--	4.8 U
1,4-Dichlorobenzene			110	110	--	--	4.7 U	--	4.8 U
bis(2-Ethylhexyl)phthalate			1300	3100	--	--	**150**	--	**45**
Butylbenzyl phthalate			63	900	--	--	4.7 U	--	4.8 U
Dibenzofuran			540	540	**140**	**21**	38 U	**16 J**	19 U
Diethyl phthalate			200	1200	--	--	**130**	--	4.8 U
Dimethyl phthalate			71	160	--	--	4.7 U	--	4.8 U
Di-n-butyl phthalate			1400	5100	--	--	38 U	--	19 U
Di-n-octyl phthalate			6200	6200	--	--	38 U	--	19 U

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-35	POBI-SS-36	POBI-SS-37	POBI-SS-38	POBI-SS-39
				Sample ID	POBI-SS-35-0-10-130311	POBI-SS-36-0-10-130307	POBI-SS-37-0-10-130311	POBI-SS-38-0-10-130307	POBI-SS-39-0-10-130307
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/11/2013	3/7/2013	3/11/2013	3/7/2013	3/7/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	--	--	4.7 U	--	4.8 U
n-Nitrosodiphenylamine			28	40	--	--	19 U	--	19 U
Hexachlorobutadiene			11	120	--	--	4.7 U	--	4.8 U
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	--	0.261 U	--	0.213 U
1,2-Dichlorobenzene	2.3	2.3			--	--	0.261 U	--	0.213 U
1,4-Dichlorobenzene	3.1	9			--	--	0.261 U	--	0.213 U
bis(2-Ethylhexyl)phthalate	47	78			--	--	**8.333**	--	**2**
Butylbenzyl phthalate	4.9	64			--	--	0.261 U	--	0.213 U
Dibenzofuran	15	58			**3.857**	**0.316**	2.111 U	**0.385 J**	0.844 U
Diethyl phthalate	61	110			--	--	**7.222**	--	0.213 U
Dimethyl phthalate	53	53			--	--	0.261 U	--	0.213 U
Di-n-butyl phthalate	220	1700			--	--	2.111 U	--	0.844 U
Di-n-octyl phthalate	58	4500			--	--	2.111 U	--	0.844 U
Hexachlorobenzene	0.38	2.3			--	--	0.261 U	--	0.213 U
n-Nitrosodiphenylamine	11	11			--	--	1.056 U	--	0.844 U
Hexachlorobutadiene	3.9	6.2			--	--	0.261 U	--	0.213 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**150**	**15 J**	38 U	19 U	19 U
Acenaphthene			500	500	**180**	**18 J**	**32 J**	**14 J**	19 U
Acenaphthylene			1300	1300	**63**	**14 J**	38 U	19 U	19 U
Anthracene			960	960	**210**	**44**	**93**	**35**	**17 J**
Benzo(a)anthracene			1300	1600	**220**	**87**	**1100**	**62**	**35**
Benzo(a)pyrene			1600	1600	**270**	**95**	**2100**	**59**	**33**
Benzo(b,j,k)fluoranthenes					**460**	**230**	**3000**	**160**	**60**
Benzo(g,h,i)perylene			670	720	**120**	**58**	**1700**	**37**	**24**
Chrysene			1400	2800	**260**	**170**	**1400**	**130**	**42**
Dibenzo(a,h)anthracene			230	230	**42**	**16 J**	**340**	**12 J**	**8.3**
Fluoranthene			1700	2500	**480**	**300**	**1900**	**310**	**87**
Fluorene			540	540	**120**	**18 J**	**23 J**	**16 J**	19 U
Indeno(1,2,3-c,d)pyrene			600	690	**110**	**53**	**1300**	**35**	**19**
Naphthalene			2100	2100	**1200**	**94**	**61**	**52**	**41**
Phenanthrene			1500	1500	**370**	**100**	**460**	**120**	**42**
Pyrene			2600	3300	**740**	**380**	**1900**	**320**	**86**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**460**	**230**	**3000**	**160**	**60**
Total LPAH (SMS) (U = 0)			5200	5200	**2143**	**288 J**	**669 J**	**237 J**	**100 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-35	POBI-SS-36	POBI-SS-37	POBI-SS-38	POBI-SS-39
Sample ID					POBI-SS-35-0-10-130311	POBI-SS-36-0-10-130307	POBI-SS-37-0-10-130311	POBI-SS-38-0-10-130307	POBI-SS-39-0-10-130307
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/11/2013	3/7/2013	3/11/2013	3/7/2013	3/7/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Total HPAH (SMS) (U = 0)			12000	17000	**2702**	**1389 J**	**14740**	**1125 J**	**394.3**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**355.8**	**135.3 J**	**2688**	**87.2 J**	**45.7**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**355.8**	**135.3 J**	**2688**	**87.2 J**	**45.7**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**4.132**	**0.226 J**	2.111 U	0.457 U	0.844 U
Acenaphthene	16	57			**4.959**	**0.271 J**	**1.778 J**	**0.337 J**	0.844 U
Acenaphthylene	66	66			**1.736**	**0.211 J**	2.111 U	0.457 U	0.844 U
Anthracene	220	1200			**5.785**	**0.663**	**5.167**	**0.841**	**0.756 J**
Benzo(a)anthracene	110	270			**6.061**	**1.31**	**61.111**	**1.49**	**1.556**
Benzo(a)pyrene	99	210			**7.438**	**1.431**	**116.667**	**1.418**	**1.467**
Benzo(g,h,i)perylene	31	78			**3.306**	**0.873**	**94.444**	**0.889**	**1.067**
Chrysene	110	460			**7.163**	**2.56**	**77.778**	**3.125**	**1.867**
Dibenzo(a,h)anthracene	12	33			**1.157**	**0.241 J**	**18.889**	**0.288 J**	**0.369**
Fluoranthene	160	1200			**13.223**	**4.518**	**105.556**	**7.452**	**3.867**
Fluorene	23	79			**3.306**	**0.271 J**	**1.278 J**	**0.385 J**	0.844 U
Indeno(1,2,3-c,d)pyrene	34	88			**3.03**	**0.798**	**72.222**	**0.841**	**0.844**
Naphthalene	99	170			**33.058**	**1.416**	**3.389**	**1.25**	**1.822**
Phenanthrene	100	480			**10.193**	**1.506**	**25.556**	**2.885**	**1.867**
Pyrene	1000	1400			**20.386**	**5.723**	**105.556**	**7.692**	**3.822**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**12.672**	**3.464**	**166.667**	**3.846**	**2.667**
Total LPAH (SMS) (U = 0)	370	780			**59.036**	**4.337 J**	**37.167 J**	**5.697 J**	**4.444 J**
Total HPAH (SMS) (U = 0)	960	5300			**74.435**	**20.919 J**	**818.889**	**27.043 J**	**17.524**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	--	18 U	--	19 U
Aroclor 1221					--	--	18 U	--	19 U
Aroclor 1232					--	--	18 U	--	19 U
Aroclor 1242					--	--	18 U	--	19 U
Aroclor 1248					--	--	18 U	--	19 U
Aroclor 1254					--	--	18 U	--	19 U
Aroclor 1260					--	--	18 U	--	19 U
Total PCB Aroclors (U = 0)			130	1000	--	--	18 U	--	19 U
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	--	1 U	--	0.844 U

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-40	POBI-SS-41	POBI-SS-41	POBI-SS-42	POBI-SS-43
				Sample ID	POBI-SS-40-0-10-130307	POBI-SS-41-0-10-130307	POBI-SS-41-0-10-130307DUP	POBI-SS-42-0-10-130307	POBI-SS-43-0-10-130307
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/7/2013	3/7/2013	3/7/2013	3/7/2013	3/7/2013
				Sample Type	N	N	FD	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**4.96**	**1.98**	**4.54**	**5.01**	**4.88**
Total solids					**25.2**	**28.4**	**28.7**	**24.8**	**24.3**
Grain Size (pct)									
Total Gravel					**14**	0.1 U	0.1 U	0.1 U	0.1 U
Total Sand					**13.7**	**3.8**	**2.8**	**2.4**	**1.7**
Total Silt					**48.6**	**62.5**	**62.1**	**61.3**	**61.2**
Total Clay					**23.6**	**33.8**	**35.1**	**36.5**	**37.2**
Total Fines (silt + clay)					**72.2**	**96.3**	**97.2**	**97.8**	**98.4**
Metals (mg/kg)									
Arsenic	57	93			20 U	--	--	--	--
Cadmium	5.1	6.7			**2.6**	--	--	--	--
Chromium	260	270			**38**	--	--	--	--
Copper	390	390			**88.4**	--	--	--	--
Lead	450	530			**17**	--	--	--	--
Mercury	0.41	0.59			**0.13**	--	--	--	--
Silver	6.1	6.1			1 U	--	--	--	--
Zinc	410	960			**120**	--	--	--	--
Semivolatile Organics (μg/kg)									
2,4-Dimethylphenol	29	29			**4.6 J**	--	--	--	--
2-Methylphenol (o-Cresol)	63	63			5 U	--	--	--	--
4-Methylphenol (p-Cresol)	670	670			**59**	--	--	--	--
Benzoic acid	650	650			**200 J**	--	--	--	--
Benzyl alcohol	57	73			20 U	--	--	--	--
Pentachlorophenol	360	690			50 U	--	--	--	--
Phenol	420	1200			**57**	--	--	--	--
1,2,4-Trichlorobenzene			31	51	5 U	--	--	--	--
1,2-Dichlorobenzene			35	50	5 U	--	--	--	--
1,4-Dichlorobenzene			110	110	5 U	--	--	--	--
bis(2-Ethylhexyl)phthalate			1300	3100	**120**	--	--	--	--
Butylbenzyl phthalate			63	900	**4.6 J**	--	--	--	--
Dibenzofuran			540	540	**13 J**	**15 J**	**12 J**	**14 J**	**18 J**
Diethyl phthalate			200	1200	**38 J**	--	--	--	--
Dimethyl phthalate			71	160	**3.5 J**	--	--	--	--
Di-n-butyl phthalate			1400	5100	20 U	--	--	--	--
Di-n-octyl phthalate			6200	6200	20 U	--	--	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-40	POBI-SS-41	POBI-SS-41	POBI-SS-42	POBI-SS-43
Sample ID					POBI-SS-40-0-10-130307	POBI-SS-41-0-10-130307	POBI-SS-41-0-10-130307DUP	POBI-SS-42-0-10-130307	POBI-SS-43-0-10-130307
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Date					3/7/2013	3/7/2013	3/7/2013	3/7/2013	3/7/2013
Sample Type					N	N	FD	N	N
Matrix					SE	SE	SE	SE	SE
Hexachlorobenzene			22	70	5 U	--	--	--	--
n-Nitrosodiphenylamine			28	40	20 U	--	--	--	--
Hexachlorobutadiene			11	120	5 U	--	--	--	--
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.101 U	--	--	--	--
1,2-Dichlorobenzene	2.3	2.3			0.101 U	--	--	--	--
1,4-Dichlorobenzene	3.1	9			0.101 U	--	--	--	--
bis(2-Ethylhexyl)phthalate	47	78			**2.419**	--	--	--	--
Butylbenzyl phthalate	4.9	64			**0.093 J**	--	--	--	--
Dibenzofuran	15	58			**0.262 J**	**0.758 J**	**0.264 J**	**0.279 J**	**0.369 J**
Diethyl phthalate	61	110			**0.766 J**	--	--	--	--
Dimethyl phthalate	53	53			**0.071 J**	--	--	--	--
Di-n-butyl phthalate	220	1700			0.403 U	--	--	--	--
Di-n-octyl phthalate	58	4500			0.403 U	--	--	--	--
Hexachlorobenzene	0.38	2.3			0.101 U	--	--	--	--
n-Nitrosodiphenylamine	11	11			0.403 U	--	--	--	--
Hexachlorobutadiene	3.9	6.2			0.101 U	--	--	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	20 U	**13 J**	**15 J**	20 U	20 U
Acenaphthene			500	500	20 U	**12 J**	19 U	**13 J**	**18 J**
Acenaphthylene			1300	1300	**11 J**	**9.8 J**	19 U	20 U	**12 J**
Anthracene			960	960	**26**	**31**	**32**	**24**	**37**
Benzo(a)anthracene			1300	1600	**47**	**64**	**53**	**43**	**65**
Benzo(a)pyrene			1600	1600	**47**	**75**	**59**	**56**	**77**
Benzo(b,j,k)fluoranthenes					**130**	**190**	**140**	**140**	**210**
Benzo(g,h,i)perylene			670	720	**27**	**46**	**37**	**44**	**53**
Chrysene			1400	2800	**84**	**160**	**120**	**88**	**160**
Dibenzo(a,h)anthracene			230	230	**11**	**12 J**	19 U	**12 J**	**13 J**
Fluoranthene			1700	2500	**190**	**260**	**140**	**180**	**430**
Fluorene			540	540	**12 J**	**13 J**	**12 J**	**11 J**	**18 J**
Indeno(1,2,3-c,d)pyrene			600	690	**25**	**44**	**34**	**36**	**49**
Naphthalene			2100	2100	**66**	**60**	**56**	**62**	**88**
Phenanthrene			1500	1500	**54**	**80**	**60**	**60**	**120**
Pyrene			2600	3300	**170**	**320**	**210**	**190**	**390**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**130**	**190**	**140**	**140**	**210**
Total LPAH (SMS) (U = 0)			5200	5200	**169 J**	**205.8 J**	**160 J**	**170 J**	**293 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-40	POBI-SS-41	POBI-SS-41	POBI-SS-42	POBI-SS-43
				Sample ID	POBI-SS-40-0-10-130307	POBI-SS-41-0-10-130307	POBI-SS-41-0-10-130307DUP	POBI-SS-42-0-10-130307	POBI-SS-43-0-10-130307
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/7/2013	3/7/2013	3/7/2013	3/7/2013	3/7/2013
				Sample Type	N	N	FD	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Total HPAH (SMS) (U = 0)			12000	17000	**731**	**1171 J**	**793**	**789 J**	**1447 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**69.14**	**107.6 J**	**82.9**	**79.98 J**	**112.3 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**69.14**	**107.6 J**	**83.85**	**79.98 J**	**112.3 J**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			0.403 U	**0.657 J**	**0.33 J**	0.399 U	0.41 U
Acenaphthene	16	57			0.403 U	**0.606 J**	0.419 U	**0.259 J**	**0.369 J**
Acenaphthylene	66	66			**0.222 J**	**0.495 J**	0.419 U	0.399 U	**0.246 J**
Anthracene	220	1200			**0.524**	**1.566**	**0.705**	**0.479**	**0.758**
Benzo(a)anthracene	110	270			**0.948**	**3.232**	**1.167**	**0.858**	**1.332**
Benzo(a)pyrene	99	210			**0.948**	**3.788**	**1.3**	**1.118**	**1.578**
Benzo(g,h,i)perylene	31	78			**0.544**	**2.323**	**0.815**	**0.878**	**1.086**
Chrysene	110	460			**1.694**	**8.081**	**2.643**	**1.756**	**3.279**
Dibenzo(a,h)anthracene	12	33			**0.222**	**0.606 J**	0.419 U	**0.24 J**	**0.266 J**
Fluoranthene	160	1200			**3.831**	**13.131**	**3.084**	**3.593**	**8.811**
Fluorene	23	79			**0.242 J**	**0.657 J**	**0.264 J**	**0.22 J**	**0.369 J**
Indeno(1,2,3-c,d)pyrene	34	88			**0.504**	**2.222**	**0.749**	**0.719**	**1.004**
Naphthalene	99	170			**1.331**	**3.03**	**1.233**	**1.238**	**1.803**
Phenanthrene	100	480			**1.089**	**4.04**	**1.322**	**1.198**	**2.459**
Pyrene	1000	1400			**3.427**	**16.162**	**4.626**	**3.792**	**7.992**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**2.621**	**9.596**	**3.084**	**2.794**	**4.303**
Total LPAH (SMS) (U = 0)	370	780			**3.407 J**	**10.394 J**	**3.524 J**	**3.393 J**	**6.004 J**
Total HPAH (SMS) (U = 0)	960	5300			**14.738**	**59.141 J**	**17.467**	**15.749 J**	**29.652 J**
PCB Aroclors (µg/kg)									
Aroclor 1016					20 U	--	--	--	--
Aroclor 1221					20 U	--	--	--	--
Aroclor 1232					30 U	--	--	--	--
Aroclor 1242					20 U	--	--	--	--
Aroclor 1248					20 U	--	--	--	--
Aroclor 1254					20 U	--	--	--	--
Aroclor 1260					20 U	--	--	--	--
Total PCB Aroclors (U = 0)			130	1000	30 U	--	--	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			0.605 U	--	--	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-44	POBI-SS-45	POBI-SS-46	POBI-SS-47	POBI-SS-48
				Sample ID	POBI-SS-44-0-10-130306	POBI-SS-45-0-10-130308	POBI-SS-46-0-10-130307	POBI-SS-47-0-10-130308	POBI-SS-48-0-10-130308
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/6/2013	3/8/2013	3/7/2013	3/8/2013	3/8/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**1.86**	**5.25**	**2.09**	**4.6**	**4.35**
Total solids					**63**	**22.4**	**59.7**	**23.5**	**26**
Grain Size (pct)									
Total Gravel					**48.4**	0.1 U	**3.7**	0.1 U	0.1 U
Total Sand					**30.2**	**6.2**	**46.3**	**8.8**	**10.6**
Total Silt					**15.2**	**57.5**	**39**	**53.2**	**57.1**
Total Clay					**6.3**	**36.5**	**10.9**	**38.2**	**32.3**
Total Fines (silt + clay)					**21.5**	**94**	**49.9**	**91.4**	**89.4**
Metals (mg/kg)									
Arsenic	57	93			8 U	--	8 U	--	--
Cadmium	5.1	6.7			**0.9**	--	**1.2**	--	--
Chromium	260	270			**20**	--	**27.1**	--	--
Copper	390	390			**90.1**	--	**96**	--	--
Lead	450	530			**17**	--	**38**	--	--
Mercury	0.41	0.59			**0.07 J**	--	**0.12**	--	--
Silver	6.1	6.1			0.5 U	--	0.5 U	--	--
Zinc	410	960			**64**	--	**90**	--	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			18 U	--	**5.3 J**	--	--
2-Methylphenol (o-Cresol)	63	63			4.6 U	--	**5.4**	--	--
4-Methylphenol (p-Cresol)	670	670			**72**	--	**190**	--	--
Benzoic acid	650	650			370 U	--	**180 J**	--	--
Benzyl alcohol	57	73			18 U	--	20 U	--	--
Pentachlorophenol	360	690			46 U	--	49 U	--	--
Phenol	420	1200			38 U	--	**120**	--	--
1,2,4-Trichlorobenzene			31	51	4.6 U	--	4.9 U	--	--
1,2-Dichlorobenzene			35	50	4.6 U	--	4.9 U	--	--
1,4-Dichlorobenzene			110	110	**5.5**	--	**3.8 J**	--	--
bis(2-Ethylhexyl)phthalate			1300	3100	**90**	--	**33**	--	--
Butylbenzyl phthalate			63	900	**3.5 J**	--	4.9 U	--	--
Dibenzofuran			540	540	**17 J**	**35**	**31**	**32**	**18 J**
Diethyl phthalate			200	1200	20 U	--	25 U	--	--
Dimethyl phthalate			71	160	4.6 U	--	4.9 U	--	--
Di-n-butyl phthalate			1400	5100	18 U	--	20 U	--	--
Di-n-octyl phthalate			6200	6200	18 U	--	20 U	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-44	POBI-SS-45	POBI-SS-46	POBI-SS-47	POBI-SS-48
				Sample ID	POBI-SS-44-0-10-130306	POBI-SS-45-0-10-130308	POBI-SS-46-0-10-130307	POBI-SS-47-0-10-130308	POBI-SS-48-0-10-130308
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/6/2013	3/8/2013	3/7/2013	3/8/2013	3/8/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	4.6 U	--	4.9 U	--	--
n-Nitrosodiphenylamine			28	40	18 U	--	**2.4 J**	--	--
Hexachlorobutadiene			11	120	4.6 U	--	4.9 U	--	--
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.247 U	--	0.234 U	--	--
1,2-Dichlorobenzene	2.3	2.3			0.247 U	--	0.234 U	--	--
1,4-Dichlorobenzene	3.1	9			**0.296**	--	**0.182 J**	--	--
bis(2-Ethylhexyl)phthalate	47	78			**4.839**	--	**1.579**	--	--
Butylbenzyl phthalate	4.9	64			**0.188 J**	--	0.234 U	--	--
Dibenzofuran	15	58			**0.914 J**	**0.667**	**1.483**	**0.696**	**0.414 J**
Diethyl phthalate	61	110			1.075 U	--	1.196 U	--	--
Dimethyl phthalate	53	53			0.247 U	--	0.234 U	--	--
Di-n-butyl phthalate	220	1700			0.968 U	--	0.957 U	--	--
Di-n-octyl phthalate	58	4500			0.968 U	--	0.957 U	--	--
Hexachlorobenzene	0.38	2.3			0.247 U	--	0.234 U	--	--
n-Nitrosodiphenylamine	11	11			0.968 U	--	**0.115 J**	--	--
Hexachlorobutadiene	3.9	6.2			0.247 U	--	0.234 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**18**	**16 J**	**29**	**25**	**15 J**
Acenaphthene			500	500	**18**	**40**	**31**	**26**	**16 J**
Acenaphthylene			1300	1300	**20**	**18 J**	**62**	**18 J**	**11 J**
Anthracene			960	960	**21**	**69**	**58**	**69**	**36**
Benzo(a)anthracene			1300	1600	**28**	**120**	**100**	**120**	**76**
Benzo(a)pyrene			1600	1600	**32**	**120**	**98**	**180**	**92**
Benzo(b,j,k)fluoranthenes					**71**	**350**	**160**	**360**	**240**
Benzo(g,h,i)perylene			670	720	**30**	**73**	**59**	**110**	**67**
Chrysene			1400	2800	**44**	**310**	**120**	**260**	**160**
Dibenzo(a,h)anthracene			230	230	**8.3**	**18 J**	**18**	**32**	**19**
Fluoranthene			1700	2500	**110**	**1100**	**310**	**890**	**350**
Fluorene			540	540	**19**	**41**	**32**	**32**	**18 J**
Indeno(1,2,3-c,d)pyrene			600	690	**20**	**68**	**48**	**82**	**60**
Naphthalene			2100	2100	**130**	**86**	**230**	**100**	**60**
Phenanthrene			1500	1500	**71**	**210**	**230**	**190**	**84**
Pyrene			2600	3300	**110**	**730**	**330**	**640**	**330**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**71**	**350**	**160**	**360**	**240**
Total LPAH (SMS) (U = 0)			5200	5200	**279**	**464 J**	**643**	**435 J**	**225 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-44	POBI-SS-45	POBI-SS-46	POBI-SS-47	POBI-SS-48
				Sample ID	POBI-SS-44-0-10-130306	POBI-SS-45-0-10-130308	POBI-SS-46-0-10-130307	POBI-SS-47-0-10-130308	POBI-SS-48-0-10-130308
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/6/2013	3/8/2013	3/7/2013	3/8/2013	3/8/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Total HPAH (SMS) (U = 0)			12000	17000	**453.3**	**2889 J**	**1243**	**2674**	**1394**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**45.2**	**178.7 J**	**131.8**	**242**	**133.1**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**45.2**	**178.7 J**	**131.8**	**242**	**133.1**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**0.968**	**0.305 J**	**1.388**	**0.543**	**0.345 J**
Acenaphthene	16	57			**0.968**	**0.762**	**1.483**	**0.565**	**0.368 J**
Acenaphthylene	66	66			**1.075**	**0.343 J**	**2.967**	**0.391 J**	**0.253 J**
Anthracene	220	1200			**1.129**	**1.314**	**2.775**	**1.5**	**0.828**
Benzo(a)anthracene	110	270			**1.505**	**2.286**	**4.785**	**2.609**	**1.747**
Benzo(a)pyrene	99	210			**1.72**	**2.286**	**4.689**	**3.913**	**2.115**
Benzo(g,h,i)perylene	31	78			**1.613**	**1.39**	**2.823**	**2.391**	**1.54**
Chrysene	110	460			**2.366**	**5.905**	**5.742**	**5.652**	**3.678**
Dibenzo(a,h)anthracene	12	33			**0.446**	**0.343 J**	**0.861**	**0.696**	**0.437**
Fluoranthene	160	1200			**5.914**	**20.952**	**14.833**	**19.348**	**8.046**
Fluorene	23	79			**1.022**	**0.781**	**1.531**	**0.696**	**0.414 J**
Indeno(1,2,3-c,d)pyrene	34	88			**1.075**	**1.295**	**2.297**	**1.783**	**1.379**
Naphthalene	99	170			**6.989**	**1.638**	**11.005**	**2.174**	**1.379**
Phenanthrene	100	480			**3.817**	**4**	**11.005**	**4.13**	**1.931**
Pyrene	1000	1400			**5.914**	**13.905**	**15.789**	**13.913**	**7.586**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**3.817**	**6.667**	**7.656**	**7.826**	**5.517**
Total LPAH (SMS) (U = 0)	370	780			**15**	**8.838 J**	**30.766**	**9.457 J**	**5.172 J**
Total HPAH (SMS) (U = 0)	960	5300			**24.371**	**55.029 J**	**59.474**	**58.13**	**32.046**
PCB Aroclors (µg/kg)									
Aroclor 1016					16 U	--	18 U	--	--
Aroclor 1221					16 U	--	18 U	--	--
Aroclor 1232					16 U	--	18 U	--	--
Aroclor 1242					16 U	--	18 U	--	--
Aroclor 1248					16 U	--	18 U	--	--
Aroclor 1254					16 U	--	**18**	--	--
Aroclor 1260					16 U	--	18 U	--	--
Total PCB Aroclors (U = 0)			130	1000	16 U	--	**18**	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			0.86 U	--	**0.861**	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-49	POBI-SS-50	POBI-SS-51	POBI-SS-52	POBI-SS-53
				Sample ID	POBI-SS-49-0-10-130308	POBI-SS-50-0-10-130307	POBI-SS-51-0-10-130311	POBI-SS-52-0-10-130311	POBI-SS-53-0-10-130308
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/8/2013	3/7/2013	3/11/2013	3/11/2013	3/8/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**4.58**	**1.35**	**9.4**	**2.75**	**2.73**
Total solids					**27.6**	**55.8**	**18.7**	**28.9**	**52.6**
Grain Size (pct)									
Total Gravel					0.1 U	**12.5**	0.1 U	**0.1**	**16.5**
Total Sand					**8.1**	**30.1**	**1**	**5.1**	**55**
Total Silt					**64.2**	**45.7**	**62.8**	**64.6**	**19**
Total Clay					**27.7**	**11.7**	**36.1**	**30.2**	**9.7**
Total Fines (silt + clay)					**91.9**	**57.4**	**98.9**	**94.8**	**28.7**
Metals (mg/kg)									
Arsenic	57	93			--	9 U	--	--	--
Cadmium	5.1	6.7			--	**0.9**	--	--	--
Chromium	260	270			--	**23.7**	--	--	--
Copper	390	390			--	**29.1**	--	--	--
Lead	450	530			--	**12**	--	--	--
Mercury	0.41	0.59			--	**0.1**	--	--	--
Silver	6.1	6.1			--	0.5 U	--	--	--
Zinc	410	960			--	**54**	--	--	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	19 UJ	--	--	--
2-Methylphenol (o-Cresol)	63	63			--	4.8 U	--	--	--
4-Methylphenol (p-Cresol)	670	670			--	**62**	--	--	--
Benzoic acid	650	650			--	380 UJ	--	--	--
Benzyl alcohol	57	73			--	19 U	--	--	--
Pentachlorophenol	360	690			--	48 U	--	--	--
Phenol	420	1200			--	**520**	--	--	--
1,2,4-Trichlorobenzene			31	51	--	4.8 U	--	--	--
1,2-Dichlorobenzene			35	50	--	4.8 U	--	--	--
1,4-Dichlorobenzene			110	110	--	**2.9 J**	--	--	--
bis(2-Ethylhexyl)phthalate			1300	3100	--	**32**	--	--	--
Butylbenzyl phthalate			63	900	--	**3.3 J**	--	--	--
Dibenzofuran			540	540	**18 J**	**15 J**	**17 J**	**20 J**	**35**
Diethyl phthalate			200	1200	--	22 U	--	--	--
Dimethyl phthalate			71	160	--	4.8 U	--	--	--
Di-n-butyl phthalate			1400	5100	--	19 U	--	--	--
Di-n-octyl phthalate			6200	6200	--	19 U	--	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-49	POBI-SS-50	POBI-SS-51	POBI-SS-52	POBI-SS-53
				Sample ID	POBI-SS-49-0-10-130308	POBI-SS-50-0-10-130307	POBI-SS-51-0-10-130311	POBI-SS-52-0-10-130311	POBI-SS-53-0-10-130308
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/8/2013	3/7/2013	3/11/2013	3/11/2013	3/8/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	--	4.8 U	--	--	--
n-Nitrosodiphenylamine			28	40	--	19 U	--	--	--
Hexachlorobutadiene			11	120	--	4.8 U	--	--	--
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	0.356 U	--	--	--
1,2-Dichlorobenzene	2.3	2.3			--	0.356 U	--	--	--
1,4-Dichlorobenzene	3.1	9			--	**0.215 J**	--	--	--
bis(2-Ethylhexyl)phthalate	47	78			--	**2.37**	--	--	--
Butylbenzyl phthalate	4.9	64			--	**0.244 J**	--	--	--
Dibenzofuran	15	58			**0.393 J**	**1.111 J**	**0.181 J**	**0.727 J**	**1.282**
Diethyl phthalate	61	110			--	1.63 U	--	--	--
Dimethyl phthalate	53	53			--	0.356 U	--	--	--
Di-n-butyl phthalate	220	1700			--	1.407 U	--	--	--
Di-n-octyl phthalate	58	4500			--	1.407 U	--	--	--
Hexachlorobenzene	0.38	2.3			--	0.356 U	--	--	--
n-Nitrosodiphenylamine	11	11			--	1.407 U	--	--	--
Hexachlorobutadiene	3.9	6.2			--	0.356 U	--	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**14 J**	**16 J**	20 U	20 U	**71**
Acenaphthene			500	500	**15 J**	**14 J**	**14 J**	**15 J**	**37**
Acenaphthylene			1300	1300	**9.9 J**	**21**	20 U	**12 J**	**29**
Anthracene			960	960	**32**	**18 J**	**28**	**37**	**44**
Benzo(a)anthracene			1300	1600	**74**	**24**	**52**	**100**	**50**
Benzo(a)pyrene			1600	1600	**110**	**24**	**71**	**150**	**56**
Benzo(b,j,k)fluoranthenes					**250**	**57**	**160**	**300**	**110**
Benzo(g,h,i)perylene			670	720	**92**	**14 J**	**55**	**120**	**39**
Chrysene			1400	2800	**130**	**31**	**91**	**190**	**74**
Dibenzo(a,h)anthracene			230	230	**22**	**7.3**	**15 J**	**31**	**9.9 J**
Fluoranthene			1700	2500	**270**	**110**	**210**	**380**	**250**
Fluorene			540	540	**15 J**	**14 J**	**15 J**	**17 J**	**36**
Indeno(1,2,3-c,d)pyrene			600	690	**79**	**16 J**	**47**	**100**	**31**
Naphthalene			2100	2100	**69**	**120**	**73**	**90**	**290**
Phenanthrene			1500	1500	**96**	**75**	**70**	**120**	**180**
Pyrene			2600	3300	**270**	**110**	**200**	**320**	**250**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**250**	**57**	**160**	**300**	**110**
Total LPAH (SMS) (U = 0)			5200	5200	**236.9 J**	**262 J**	**200 J**	**291 J**	**616**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-49	POBI-SS-50	POBI-SS-51	POBI-SS-52	POBI-SS-53
				Sample ID	POBI-SS-49-0-10-130308	POBI-SS-50-0-10-130307	POBI-SS-51-0-10-130311	POBI-SS-52-0-10-130311	POBI-SS-53-0-10-130308
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/8/2013	3/7/2013	3/11/2013	3/11/2013	3/8/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Total HPAH (SMS) (U = 0)			12000	17000	**1297**	**393.3 J**	**901 J**	**1691**	**869.9 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**153.8**	**34.7 J**	**99.31 J**	**205**	**76.8 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**153.8**	**34.7 J**	**99.31 J**	**205**	**76.8 J**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**0.306 J**	**1.185 J**	0.213 U	0.727 U	**2.601**
Acenaphthene	16	57			**0.328 J**	**1.037 J**	**0.149 J**	**0.545 J**	**1.355**
Acenaphthylene	66	66			**0.216 J**	**1.556**	0.213 U	**0.436 J**	**1.062**
Anthracene	220	1200			**0.699**	**1.333 J**	**0.298**	**1.345**	**1.612**
Benzo(a)anthracene	110	270			**1.616**	**1.778**	**0.553**	**3.636**	**1.832**
Benzo(a)pyrene	99	210			**2.402**	**1.778**	**0.755**	**5.455**	**2.051**
Benzo(g,h,i)perylene	31	78			**2.009**	**1.037 J**	**0.585**	**4.364**	**1.429**
Chrysene	110	460			**2.838**	**2.296**	**0.968**	**6.909**	**2.711**
Dibenzo(a,h)anthracene	12	33			**0.48**	**0.541**	**0.16 J**	**1.127**	**0.363 J**
Fluoranthene	160	1200			**5.895**	**8.148**	**2.234**	**13.818**	**9.158**
Fluorene	23	79			**0.328 J**	**1.037 J**	**0.16 J**	**0.618 J**	**1.319**
Indeno(1,2,3-c,d)pyrene	34	88			**1.725**	**1.185 J**	**0.5**	**3.636**	**1.136**
Naphthalene	99	170			**1.507**	**8.889**	**0.777**	**3.273**	**10.623**
Phenanthrene	100	480			**2.096**	**5.556**	**0.745**	**4.364**	**6.593**
Pyrene	1000	1400			**5.895**	**8.148**	**2.128**	**11.636**	**9.158**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**5.459**	**4.222**	**1.702**	**10.909**	**4.029**
Total LPAH (SMS) (U = 0)	370	780			**5.172 J**	**19.407 J**	**2.128 J**	**10.582 J**	**22.564**
Total HPAH (SMS) (U = 0)	960	5300			**28.319**	**29.133 J**	**9.585 J**	**61.491**	**31.864 J**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	18 U	--	--	--
Aroclor 1221					--	18 U	--	--	--
Aroclor 1232					--	18 U	--	--	--
Aroclor 1242					--	18 U	--	--	--
Aroclor 1248					--	18 U	--	--	--
Aroclor 1254					--	**14 J**	--	--	--
Aroclor 1260					--	18 U	--	--	--
Total PCB Aroclors (U = 0)			130	1000	--	**14 J**	--	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	**1.037 J**	--	--	--

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-54	POBI-SS-55	POBI-SS-56	POBI-SS-57	POBI-SS-57
				Sample ID	POBI-SS-54-0-10-130308	POBI-SS-55-0-10-130307	POBI-SS-56-0-10-130311	POBI-SS-57-0-10-130307	POBI-SS-57-0-10-130307DUP
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/8/2013	3/7/2013	3/11/2013	3/7/2013	3/7/2013
				Sample Type	N	N	N	N	FD
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**2.33**	**1.47**	**4.49**	**1.78**	**2.46**
Total solids					**54**	**55.8**	**41.8**	**69.7**	**69.8**
Grain Size (pct)									
Total Gravel					**0.7**	**10.1**	**13.8**	**2.5**	**1.8**
Total Sand					**20.4**	**32.4**	**15.9**	**72.5**	**73.1**
Total Silt					**64.5**	**47.8**	**49.8**	**19.3**	**19**
Total Clay					**14.2**	**9.8**	**20.5**	**5.9**	**6.1**
Total Fines (silt + clay)					**78.7**	**57.6**	**70.3**	**25.2**	**25.1**
Metals (mg/kg)									
Arsenic	57	93			--	8 U	--	**8**	7 U
Cadmium	5.1	6.7			--	**0.8**	--	**0.8**	**0.6**
Chromium	260	270			--	**26.1**	--	**28.3**	**22.1**
Copper	390	390			--	**34.1**	--	**26.8**	**21.3**
Lead	450	530			--	**14**	--	**12**	**11**
Mercury	0.41	0.59			--	**0.1**	--	**0.06**	**0.06**
Silver	6.1	6.1			--	0.5 U	--	0.4 U	0.4 U
Zinc	410	960			--	**61**	--	**53**	**47**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	20 UJ	--	19 UJ	19 UJ
2-Methylphenol (o-Cresol)	63	63			--	4.9 U	--	4.7 U	4.7 U
4-Methylphenol (p-Cresol)	670	670			--	**46**	--	**27**	**43**
Benzoic acid	650	650			--	390 UJ	--	380 UJ	370 UJ
Benzyl alcohol	57	73			--	20 U	--	19 U	19 U
Pentachlorophenol	360	690			--	49 U	--	47 U	47 U
Phenol	420	1200			--	**38**	--	**42**	**75**
1,2,4-Trichlorobenzene			31	51	--	4.9 U	--	4.7 U	4.7 U
1,2-Dichlorobenzene			35	50	--	4.9 U	--	4.7 U	4.7 U
1,4-Dichlorobenzene			110	110	--	**2.8 J**	--	4.7 U	**2.6 J**
bis(2-Ethylhexyl)phthalate			1300	3100	--	**39**	--	**38**	**45**
Butylbenzyl phthalate			63	900	--	**5.1**	--	**4.4 J**	**4.5 J**
Dibenzofuran			540	540	**49**	**18 J**	**59**	19 U	**10 J**
Diethyl phthalate			200	1200	--	7.8 U	--	26 U	7.5 U
Dimethyl phthalate			71	160	--	4.9 U	--	4.7 U	4.7 U
Di-n-butyl phthalate			1400	5100	--	20 U	--	19 U	19 U
Di-n-octyl phthalate			6200	6200	--	20 U	--	19 U	19 U

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-54	POBI-SS-55	POBI-SS-56	POBI-SS-57	POBI-SS-57
				Sample ID	POBI-SS-54-0-10-130308	POBI-SS-55-0-10-130307	POBI-SS-56-0-10-130311	POBI-SS-57-0-10-130307	POBI-SS-57-0-10-130307DUP
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/8/2013	3/7/2013	3/11/2013	3/7/2013	3/7/2013
				Sample Type	N	N	N	N	FD
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Hexachlorobenzene			22	70	--	4.9 U	--	4.7 U	4.7 U
n-Nitrosodiphenylamine			28	40	--	20 U	--	19 U	19 U
Hexachlorobutadiene			11	120	--	4.9 U	--	4.7 U	4.7 U
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	0.333 U	--	0.264 U	0.191 U
1,2-Dichlorobenzene	2.3	2.3			--	0.333 U	--	0.264 U	0.191 U
1,4-Dichlorobenzene	3.1	9			--	**0.19 J**	--	0.264 U	**0.106 J**
bis(2-Ethylhexyl)phthalate	47	78			--	**2.653**	--	**2.135**	**1.829**
Butylbenzyl phthalate	4.9	64			--	**0.347**	--	**0.247 J**	**0.183 J**
Dibenzofuran	15	58			**2.103**	**1.224 J**	**1.314**	1.067 U	**0.407 J**
Diethyl phthalate	61	110			--	0.531 U	--	1.461 U	0.305 U
Dimethyl phthalate	53	53			--	0.333 U	--	0.264 U	0.191 U
Di-n-butyl phthalate	220	1700			--	1.361 U	--	1.067 U	0.772 U
Di-n-octyl phthalate	58	4500			--	1.361 U	--	1.067 U	0.772 U
Hexachlorobenzene	0.38	2.3			--	0.333 U	--	0.264 U	0.191 U
n-Nitrosodiphenylamine	11	11			--	1.361 U	--	1.067 U	0.772 U
Hexachlorobutadiene	3.9	6.2			--	0.333 U	--	0.264 U	0.191 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**51**	**16 J**	**59**	19 U	**9.3 J**
Acenaphthene			500	500	**35**	**13 J**	**47**	19 U	19 U
Acenaphthylene			1300	1300	**46**	**23**	**30**	19 U	19 U
Anthracene			960	960	**58**	**25**	**91**	**10 J**	**14 J**
Benzo(a)anthracene			1300	1600	**67**	**49**	**130**	**19**	**22**
Benzo(a)pyrene			1600	1600	**92**	**62**	**180**	**23**	**25**
Benzo(b,j,k)fluoranthenes					**200**	**150**	**350**	**52**	**63**
Benzo(g,h,i)perylene			670	720	**80**	**59**	**130**	**21**	**22**
Chrysene			1400	2800	**110**	**76**	**200**	**26**	**31**
Dibenzo(a,h)anthracene			230	230	**16 J**	**21**	**35**	**6.6**	**7.1**
Fluoranthene			1700	2500	**330**	**190**	**440**	**61**	**80**
Fluorene			540	540	**39**	**18 J**	**53**	19 U	19 U
Indeno(1,2,3-c,d)pyrene			600	690	**65**	**47**	**110**	**15 J**	**19**
Naphthalene			2100	2100	**350**	**130**	**320**	**40**	**52**
Phenanthrene			1500	1500	**230**	**120**	**240**	**34**	**51**
Pyrene			2600	3300	**350**	**170**	**500**	**64**	**84**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**200**	**150**	**350**	**52**	**63**
Total LPAH (SMS) (U = 0)			5200	5200	**758**	**329 J**	**781**	**84 J**	**117 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-54	POBI-SS-55	POBI-SS-56	POBI-SS-57	POBI-SS-57
				Sample ID	POBI-SS-54-0-10-130308	POBI-SS-55-0-10-130307	POBI-SS-56-0-10-130311	POBI-SS-57-0-10-130307	POBI-SS-57-0-10-130307DUP
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
				Sample Date	3/8/2013	3/7/2013	3/11/2013	3/7/2013	3/7/2013
				Sample Type	N	N	N	N	FD
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Total HPAH (SMS) (U = 0)			12000	17000	**1310 J**	**824**	**2075**	**287.6 J**	**353.1**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**127.9 J**	**89.46**	**244.5**	**32.5 J**	**36.4**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**127.9 J**	**89.46**	**244.5**	**32.5 J**	**36.4**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**2.189**	**1.088 J**	**1.314**	1.067 U	**0.378 J**
Acenaphthene	16	57			**1.502**	**0.884 J**	**1.047**	1.067 U	0.772 U
Acenaphthylene	66	66			**1.974**	**1.565**	**0.668**	1.067 U	0.772 U
Anthracene	220	1200			**2.489**	**1.701**	**2.027**	**0.562 J**	**0.569 J**
Benzo(a)anthracene	110	270			**2.876**	**3.333**	**2.895**	**1.067**	**0.894**
Benzo(a)pyrene	99	210			**3.948**	**4.218**	**4.009**	**1.292**	**1.016**
Benzo(g,h,i)perylene	31	78			**3.433**	**4.014**	**2.895**	**1.18**	**0.894**
Chrysene	110	460			**4.721**	**5.17**	**4.454**	**1.461**	**1.26**
Dibenzo(a,h)anthracene	12	33			**0.687 J**	**1.429**	**0.78**	**0.371**	**0.289**
Fluoranthene	160	1200			**14.163**	**12.925**	**9.8**	**3.427**	**3.252**
Fluorene	23	79			**1.674**	**1.224 J**	**1.18**	1.067 U	0.772 U
Indeno(1,2,3-c,d)pyrene	34	88			**2.79**	**3.197**	**2.45**	**0.843 J**	**0.772**
Naphthalene	99	170			**15.021**	**8.844**	**7.127**	**2.247**	**2.114**
Phenanthrene	100	480			**9.871**	**8.163**	**5.345**	**1.91**	**2.073**
Pyrene	1000	1400			**15.021**	**11.565**	**11.136**	**3.596**	**3.415**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**8.584**	**10.204**	**7.795**	**2.921**	**2.561**
Total LPAH (SMS) (U = 0)	370	780			**32.532**	**22.381 J**	**17.394**	**4.719 J**	**4.756 J**
Total HPAH (SMS) (U = 0)	960	5300			**56.223 J**	**56.054**	**46.214**	**16.157 J**	**14.354**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	17 U	--	16 U	16 U
Aroclor 1221					--	17 U	--	16 U	16 U
Aroclor 1232					--	17 U	--	16 U	16 U
Aroclor 1242					--	17 U	--	16 U	16 U
Aroclor 1248					--	17 U	--	16 U	16 U
Aroclor 1254					--	17 U	--	**16 J**	**14 J**
Aroclor 1260					--	17 U	--	16 U	16 U
Total PCB Aroclors (U = 0)			130	1000	--	17 U	--	**16 J**	**14 J**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	1.156 U	--	**0.899 J**	**0.569 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-58	POBI-SS-59	POBI-SS-60	POBI-SS-61	POBI-SS-61
				Sample ID	POBI-SS-58-0-10-130312	POBI-SS-59-0-10-130307	POBI-SS-60-0-10-130307	POBI-SS-161-0-10-130522	POBI-SS-61-0-10-130522
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm		
				Sample Date	3/12/2013	3/7/2013	3/7/2013	5/22/2013	5/22/2013
				Sample Type	N	N	N	FD	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**2.61**	**2.77**	**2.22**	**6.22**	**7.76**
Total solids					**43.8**	**50.9**	**52**	**47.01**	**44.22**
Grain Size (pct)									
Total Gravel					**8.3**	**1.1**	**1.2**	**8.5**	**5.1**
Total Sand					**20.4**	**29.7**	**43.6**	**71.7**	**70.8**
Total Silt					**56.9**	**51.7**	**45.3**	**13.9**	**17.3**
Total Clay					**14.2**	**17.5**	**10.1**	**5.9**	**6.8**
Total Fines (silt + clay)					**71.1**	**69.2**	**55.4**	**19.8**	**24.1**
Metals (mg/kg)									
Arsenic	57	93			--	10 U	9 U	10 U	10 U
Cadmium	5.1	6.7			--	**1.4**	**1**	**1.2**	**1.1**
Chromium	260	270			--	**31**	**32.7**	**24**	**25**
Copper	390	390			--	**46.9**	**38.6**	**49.8**	**76**
Lead	450	530			--	**45**	**39**	**40**	**39**
Mercury	0.41	0.59			--	**0.15**	**0.08**	**0.09**	**0.11**
Silver	6.1	6.1			--	0.6 U	0.6 U	0.6 U	0.6 U
Zinc	410	960			--	**136**	**112**	**192**	**182**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			--	**7.5 J**	**3.9 J**	**7.9 J**	**9.4 J**
2-Methylphenol (o-Cresol)	63	63			--	**9**	**3.9 J**	**8.7**	**9.7**
4-Methylphenol (p-Cresol)	670	670			--	**120**	**36**	**62**	**96**
Benzoic acid	650	650			--	**340 J**	**250 J**	**410 J**	**390 J**
Benzyl alcohol	57	73			--	20 U	**40**	**77**	20 U
Pentachlorophenol	360	690			--	**39 J**	**21 J**	**85**	**160**
Phenol	420	1200			--	**110**	**51**	**96**	**90**
1,2,4-Trichlorobenzene			31	51	--	4.9 U	4.8 U	4.8 U	5 U
1,2-Dichlorobenzene			35	50	--	4.9 U	4.8 U	4.8 U	5 U
1,4-Dichlorobenzene			110	110	--	**8.9**	4.8 U	**4.5 J**	**5.4**
bis(2-Ethylhexyl)phthalate			1300	3100	--	**870**	**570**	**2500**	**2300**
Butylbenzyl phthalate			63	900	--	**86**	**42**	**270**	**83**
Dibenzofuran			540	540	**50**	**30**	**16 J**	38 U	40 U
Diethyl phthalate			200	1200	--	25 U	**42 J**	37 U	37 U
Dimethyl phthalate			71	160	--	**29**	**3.9 J**	**4.5 J**	**9.1**
Di-n-butyl phthalate			1400	5100	--	**44**	19 U	**1500**	**610**
Di-n-octyl phthalate			6200	6200	--	20 U	**19**	**80**	**79**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-58	POBI-SS-59	POBI-SS-60	POBI-SS-61	POBI-SS-61
Sample ID					POBI-SS-58-0-10-130312	POBI-SS-59-0-10-130307	POBI-SS-60-0-10-130307	POBI-SS-161-0-10-130522	POBI-SS-61-0-10-130522
Sample Depth					0 - 10 cm	0 - 10 cm	0 - 10 cm		
Sample Date					3/12/2013	3/7/2013	3/7/2013	5/22/2013	5/22/2013
Sample Type					N	N	N	FD	N
Matrix					SE	SE	SE	SE	SE
Hexachlorobenzene			22	70	--	4.9 U	4.8 U	4.8 U	5 U
n-Nitrosodiphenylamine			28	40	--	20 U	19 U	**3.8 J**	20 U
Hexachlorobutadiene			11	120	--	4.9 U	4.8 U	4.8 U	5 U
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			--	0.177 U	0.216 U	0.077 U	0.064 U
1,2-Dichlorobenzene	2.3	2.3			--	0.177 U	0.216 U	0.077 U	0.064 U
1,4-Dichlorobenzene	3.1	9			--	**0.321**	0.216 U	**0.072 J**	**0.07**
bis(2-Ethylhexyl)phthalate	47	78			--	**31.408**	**25.676**	**40.193**	**29.639**
Butylbenzyl phthalate	4.9	64			--	**3.105**	**1.892**	**4.341**	**1.07**
Dibenzofuran	15	58			**1.916**	**1.083**	**0.721 J**	0.611 U	0.515 U
Diethyl phthalate	61	110			--	0.903 U	**1.892 J**	0.595 U	0.477 U
Dimethyl phthalate	53	53			--	**1.047**	**0.176 J**	**0.072 J**	**0.117**
Di-n-butyl phthalate	220	1700			--	**1.588**	0.856 U	**24.116**	**7.861**
Di-n-octyl phthalate	58	4500			--	0.722 U	**0.856**	**1.286**	**1.018**
Hexachlorobenzene	0.38	2.3			--	0.177 U	0.216 U	0.077 U	0.064 U
n-Nitrosodiphenylamine	11	11			--	0.722 U	0.856 U	**0.061 J**	0.258 U
Hexachlorobutadiene	3.9	6.2			--	0.177 U	0.216 U	0.077 U	0.064 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**51**	**72**	**14 J**	38 U	40 U
Acenaphthene			500	500	**41**	**18 J**	**17 J**	38 U	40 U
Acenaphthylene			1300	1300	**26**	20 U	19 U	38 U	40 U
Anthracene			960	960	**110**	**57**	**44**	**40**	**38 J**
Benzo(a)anthracene			1300	1600	**200**	**200**	**270**	**92**	**100**
Benzo(a)pyrene			1600	1600	**290**	**300**	**330**	**120**	**160**
Benzo(b,j,k)fluoranthenes					**610**	**720**	**740**	**330**	**320**
Benzo(g,h,i)perylene			670	720	**220**	**160**	**160**	**110**	**160**
Chrysene			1400	2800	**330**	**310**	**380**	**220**	**200**
Dibenzo(a,h)anthracene			230	230	**57**	**77**	**76**	**36**	**53**
Fluoranthene			1700	2500	**710**	**560**	**660**	**330**	**270**
Fluorene			540	540	**52**	**16 J**	**18 J**	38 U	40 U
Indeno(1,2,3-c,d)pyrene			600	690	**190**	**160**	**160**	**90**	**110**
Naphthalene			2100	2100	**210**	**110**	**42**	**50**	**42**
Phenanthrene			1500	1500	**350**	**260**	**270**	**140**	**140**
Pyrene			2600	3300	**700**	**760**	**650**	**310**	**270**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**610**	**720**	**740**	**330**	**320**
Total LPAH (SMS) (U = 0)			5200	5200	**789**	**461 J**	**391 J**	**230**	**220 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-58	POBI-SS-59	POBI-SS-60	POBI-SS-61	POBI-SS-61
				Sample ID	POBI-SS-58-0-10-130312	POBI-SS-59-0-10-130307	POBI-SS-60-0-10-130307	POBI-SS-161-0-10-130522	POBI-SS-61-0-10-130522
				Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm		
				Sample Date	3/12/2013	3/7/2013	3/7/2013	5/22/2013	5/22/2013
				Sample Type	N	N	N	FD	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Total HPAH (SMS) (U = 0)			12000	17000	**3307**	**3247**	**3426**	**1638**	**1643**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**399**	**418.8**	**458.4**	**177**	**220.3**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**399**	**418.8**	**458.4**	**177**	**220.3**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**1.954**	**2.599**	**0.631 J**	0.611 U	0.515 U
Acenaphthene	16	57			**1.571**	**0.65 J**	**0.766 J**	0.611 U	0.515 U
Acenaphthylene	66	66			**0.996**	0.722 U	0.856 U	0.611 U	0.515 U
Anthracene	220	1200			**4.215**	**2.058**	**1.982**	**0.643**	**0.49 J**
Benzo(a)anthracene	110	270			**7.663**	**7.22**	**12.162**	**1.479**	**1.289**
Benzo(a)pyrene	99	210			**11.111**	**10.83**	**14.865**	**1.929**	**2.062**
Benzo(g,h,i)perylene	31	78			**8.429**	**5.776**	**7.207**	**1.768**	**2.062**
Chrysene	110	460			**12.644**	**11.191**	**17.117**	**3.537**	**2.577**
Dibenzo(a,h)anthracene	12	33			**2.184**	**2.78**	**3.423**	**0.579**	**0.683**
Fluoranthene	160	1200			**27.203**	**20.217**	**29.73**	**5.305**	**3.479**
Fluorene	23	79			**1.992**	**0.578 J**	**0.811 J**	0.611 U	0.515 U
Indeno(1,2,3-c,d)pyrene	34	88			**7.28**	**5.776**	**7.207**	**1.447**	**1.418**
Naphthalene	99	170			**8.046**	**3.971**	**1.892**	**0.804**	**0.541**
Phenanthrene	100	480			**13.41**	**9.386**	**12.162**	**2.251**	**1.804**
Pyrene	1000	1400			**26.82**	**27.437**	**29.279**	**4.984**	**3.479**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**23.372**	**25.993**	**33.333**	**5.305**	**4.124**
Total LPAH (SMS) (U = 0)	370	780			**30.23**	**16.643 J**	**17.613 J**	**3.698**	**2.835 J**
Total HPAH (SMS) (U = 0)	960	5300			**126.705**	**117.22**	**154.324**	**26.334**	**21.173**
PCB Aroclors (µg/kg)									
Aroclor 1016					--	19 U	17 U	19 U	18 U
Aroclor 1221					--	19 U	17 U	19 U	18 U
Aroclor 1232					--	19 U	17 U	19 U	36 U
Aroclor 1242					--	19 U	17 U	19 U	18 U
Aroclor 1248					--	**58**	43 U	29 U	18 U
Aroclor 1254					--	**120**	**37**	**63**	**54**
Aroclor 1260					--	**44**	22 U	29 U	27 U
Total PCB Aroclors (U = 0)			130	1000	--	**222**	**37**	**63**	**54**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			--	**8.014**	**1.667**	**1.013**	**0.696**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-62	POBI-SS-63	POBI-SS-64	POBI-SS-65
Sample ID					POBI-SS-62-0-10-130522	POBI-SS-63-0-10-130522	POBI-SS-64-0-10-130522	POBI-SS-65-0-10-130522
Sample Depth								
Sample Date					5/22/2013	5/22/2013	5/22/2013	5/22/2013
Sample Type					N	N	N	N
Matrix					SE	SE	SE	SE
Conventional Parameters (pct)								
Total organic carbon					**3.82**	**4.02**	**1.96**	**3.79**
Total solids					**34.33**	**35.75**	**52.02**	**35.69**
Grain Size (pct)								
Total Gravel					**8.4**	**12.6**	**7.3**	**19.7**
Total Sand					**23.8**	**34.4**	**63.6**	**23.7**
Total Silt					**40.3**	**38.9**	**19.4**	**34.2**
Total Clay					**27.6**	**14.1**	**9.9**	**22.5**
Total Fines (silt + clay)					**67.9**	**53**	**29.3**	**56.7**
Metals (mg/kg)								
Arsenic	57	93			**20**	**20**	**11**	**20**
Cadmium	5.1	6.7			**3.5**	**2.7**	**1.6**	**3**
Chromium	260	270			**40**	**32**	**20.7**	**38**
Copper	390	390			**126**	**113**	**51.2**	**106**
Lead	450	530			**21**	**23**	**12**	**23**
Mercury	0.41	0.59			**0.17**	**0.15**	**0.08**	**0.16**
Silver	6.1	6.1			0.9 U	0.9 U	0.6 U	0.8 U
Zinc	410	960			**174**	**133**	**78**	**133**
Semivolatile Organics (µg/kg)								
2,4-Dimethylphenol	29	29			**12 J**	**9.5 J**	**18 J**	**7.1 J**
2-Methylphenol (o-Cresol)	63	63			**9.2**	**6.2**	**7.3**	**5.9**
4-Methylphenol (p-Cresol)	670	670			**140**	**75**	**180**	**120**
Benzoic acid	650	650			**350 J**	**180 J**	**170 J**	**200 J**
Benzyl alcohol	57	73			**48**	**20**	**25**	**37**
Pentachlorophenol	360	690			**22 J**	**17 J**	48 U	**16 J**
Phenol	420	1200			**73**	**36**	**69**	**43**
1,2,4-Trichlorobenzene			31	51	4.8 U	4.8 U	4.8 U	4.8 U
1,2-Dichlorobenzene			35	50	4.8 U	4.8 U	4.8 U	4.8 U
1,4-Dichlorobenzene			110	110	**4 J**	**4.8**	4.8 U	**3 J**
bis(2-Ethylhexyl)phthalate			1300	3100	**240**	**230**	**63**	**98**
Butylbenzyl phthalate			63	900	**20 J**	**14**	**37**	**11**
Dibenzofuran			540	540	**21**	**40**	**27**	**19**
Diethyl phthalate			200	1200	30 U	21 U	31 U	15 U
Dimethyl phthalate			71	160	**9**	**6.4**	**3 J**	**6.3**
Di-n-butyl phthalate			1400	5100	**49**	**46**	19 U	19 U
Di-n-octyl phthalate			6200	6200	19 U	19 U	19 U	19 U

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SS-62	POBI-SS-63	POBI-SS-64	POBI-SS-65
Sample ID					POBI-SS-62-0-10-130522	POBI-SS-63-0-10-130522	POBI-SS-64-0-10-130522	POBI-SS-65-0-10-130522
Sample Depth								
Sample Date					5/22/2013	5/22/2013	5/22/2013	5/22/2013
Sample Type					N	N	N	N
Matrix					SE	SE	SE	SE
Hexachlorobenzene			22	70	4.8 U	4.8 U	4.8 U	4.8 U
n-Nitrosodiphenylamine			28	40	19 UJ	**4.5 J**	**17 J**	19 U
Hexachlorobutadiene			11	120	4.8 U	4.8 U	4.8 U	4.8 U
Semivolatile Organics (mg/kg-OC)								
1,2,4-Trichlorobenzene	0.81	1.8			0.126 U	0.119 U	0.245 U	0.127 U
1,2-Dichlorobenzene	2.3	2.3			0.126 U	0.119 U	0.245 U	0.127 U
1,4-Dichlorobenzene	3.1	9			**0.105 J**	**0.119**	0.245 U	**0.079 J**
bis(2-Ethylhexyl)phthalate	47	78			**6.283**	**5.721**	**3.214**	**2.586**
Butylbenzyl phthalate	4.9	64			**0.524 J**	**0.348**	**1.888**	**0.29**
Dibenzofuran	15	58			**0.55**	**0.995**	**1.378**	**0.501**
Diethyl phthalate	61	110			0.785 U	0.522 U	1.582 U	0.396 U
Dimethyl phthalate	53	53			**0.236**	**0.159**	**0.153 J**	**0.166**
Di-n-butyl phthalate	220	1700			**1.283**	**1.144**	0.969 U	0.501 U
Di-n-octyl phthalate	58	4500			0.497 U	0.473 U	0.969 U	0.501 U
Hexachlorobenzene	0.38	2.3			0.126 U	0.119 U	0.245 U	0.127 U
n-Nitrosodiphenylamine	11	11			0.497 UJ	**0.112 J**	**0.867 J**	0.501 U
Hexachlorobutadiene	3.9	6.2			0.126 U	0.119 U	0.245 U	0.127 U
Polycyclic Aromatic Hydrocarbons (µg/kg)								
2-Methylnaphthalene			670	670	19 U	**58**	**27**	19 U
Acenaphthene			500	500	**19**	**35**	**18 J**	**16 J**
Acenaphthylene			1300	1300	**12 J**	**43**	**34**	**31**
Anthracene			960	960	**51**	**89**	**70**	**91**
Benzo(a)anthracene			1300	1600	**110**	**280**	**180**	**220**
Benzo(a)pyrene			1600	1600	**110**	**340**	**200**	**220**
Benzo(b,j,k)fluoranthenes					**310**	**750**	**420**	**530**
Benzo(g,h,i)perylene			670	720	**61**	**130**	**84**	**93**
Chrysene			1400	2800	**310**	**580**	**310**	**470**
Dibenzo(a,h)anthracene			230	230	**26**	**49**	**31**	**33**
Fluoranthene			1700	2500	**300**	**700**	**670**	**720**
Fluorene			540	540	**23**	**52**	**34**	**27**
Indeno(1,2,3-c,d)pyrene			600	690	**62**	**140**	**89**	**96**
Naphthalene			2100	2100	**34**	**110**	**110**	**71**
Phenanthrene			1500	1500	**100**	**520**	**390**	**210**
Pyrene			2600	3300	**330**	**840**	**620**	**770**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**310**	**750**	**420**	**530**
Total LPAH (SMS) (U = 0)			5200	5200	**239 J**	**849**	**656 J**	**446 J**

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SS-62	POBI-SS-63	POBI-SS-64	POBI-SS-65
				Sample ID	POBI-SS-62-0-10-130522	POBI-SS-63-0-10-130522	POBI-SS-64-0-10-130522	POBI-SS-65-0-10-130522
				Sample Depth				
				Sample Date	5/22/2013	5/22/2013	5/22/2013	5/22/2013
				Sample Type	N	N	N	N
				Matrix	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET				
Total HPAH (SMS) (U = 0)			12000	17000	**1619**	**3809**	**2604**	**3152**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**163.9**	**467.7**	**275.1**	**312.6**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**163.9**	**467.7**	**275.1**	**312.6**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)								
2-Methylnaphthalene	38	64			0.497 U	**1.443**	**1.378**	0.501 U
Acenaphthene	16	57			**0.497**	**0.871**	**0.918 J**	**0.422 J**
Acenaphthylene	66	66			**0.314 J**	**1.07**	**1.735**	**0.818**
Anthracene	220	1200			**1.335**	**2.214**	**3.571**	**2.401**
Benzo(a)anthracene	110	270			**2.88**	**6.965**	**9.184**	**5.805**
Benzo(a)pyrene	99	210			**2.88**	**8.458**	**10.204**	**5.805**
Benzo(g,h,i)perylene	31	78			**1.597**	**3.234**	**4.286**	**2.454**
Chrysene	110	460			**8.115**	**14.428**	**15.816**	**12.401**
Dibenzo(a,h)anthracene	12	33			**0.681**	**1.219**	**1.582**	**0.871**
Fluoranthene	160	1200			**7.853**	**17.413**	**34.184**	**18.997**
Fluorene	23	79			**0.602**	**1.294**	**1.735**	**0.712**
Indeno(1,2,3-c,d)pyrene	34	88			**1.623**	**3.483**	**4.541**	**2.533**
Naphthalene	99	170			**0.89**	**2.736**	**5.612**	**1.873**
Phenanthrene	100	480			**2.618**	**12.935**	**19.898**	**5.541**
Pyrene	1000	1400			**8.639**	**20.896**	**31.633**	**20.317**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**8.115**	**18.657**	**21.429**	**13.984**
Total LPAH (SMS) (U = 0)	370	780			**6.257 J**	**21.119**	**33.469 J**	**11.768 J**
Total HPAH (SMS) (U = 0)	960	5300			**42.382**	**94.751**	**132.857**	**83.166**
PCB Aroclors (µg/kg)								
Aroclor 1016					19 UJ	19 UJ	17 UJ	18 UJ
Aroclor 1221					19 UJ	19 UJ	17 UJ	18 UJ
Aroclor 1232					28 UJ	23 UJ	26 UJ	18 UJ
Aroclor 1242					19 UJ	19 UJ	17 UJ	18 UJ
Aroclor 1248					19 UJ	19 UJ	17 UJ	18 UJ
Aroclor 1254					28 UJ	28 UJ	17 UJ	27 UJ
Aroclor 1260					19 UJ	19 UJ	17 UJ	18 UJ
Total PCB Aroclors (U = 0)			130	1000	28 UJ	28 UJ	26 UJ	27 UJ
PCB Aroclors (mg/kg-OC)								
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			0.733 UJ	0.697 UJ	1.327 UJ	0.712 UJ

Table 4-4
2013 Surface Grab Sediment Management Standards Parameters Results

Notes:
(Yellow) Detected concentration is greater than SMS_Marine_CSL_2013 screening level
(Cyan) Detected concentration is greater than SMS_Marine_SCO_2013 screening level
(Green) Detected concentration is greater than LAET screening level
(Orange) Detected concentration is greater than 2LAET screening level
All screening levels come from SCUM II guidance (Ecology, 2012b)
[1] = The non-detect value is reported at the method detection limit (MDL)
Bold = Detected result
J = Estimated value
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-01	POBI-SC-01	POBI-SC-01	POBI-SC-01	POBI-SC-01
Sample ID	POBI-SC-01-0-0.5-130306	POBI-SC-01-0.5-1-130306	POBI-SC-01-1-1.5-130306	POBI-SC-01-1.5-2-130306	POBI-SC-01-4-6-130306
Sample Depth	0 - 0.5 ft	0.5 - 1 ft	1 - 1.5 ft	1.5 - 2 ft	4 - 6 ft
Sample Date	3/6/2013	3/6/2013	3/6/2013	3/6/2013	3/6/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**2.86**	**3.17**	**3.59**	**2.57**	**1.99**
Total solids	**46.7**	**59.3**	**64.2**	**65.5**	**66.9**
Grain Size (pct)					
Total Gravel	**0.6**	**9.5**	**21.5**	**22.5**	**6.9**
Total Sand	**44.3**	**54.7**	**52.3**	**43.9**	**59.6**
Total Silt	**37.9**	**23.7**	**18**	**23.6**	**20.1**
Total Clay	**17.4**	**12**	**8.2**	**10.2**	**13.5**
Total Fines (silt + clay)	**55.3**	**35.7**	**26.2**	**33.8**	**33.6**
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	**0.43 EMPC**	**0.454 EMPC**	**0.369 EMPC**	0.0473 U	**0.127 EMPC**
1,2,3,7,8-PeCDD	**2.47 EMPC**	**2**	**1.27 EMPC**	0.0611 U	0.0497 U
1,2,3,4,7,8-HxCDD	**2.52**	**2.34**	**1.24**	**0.0453 EMPC**	0.0675 U
1,2,3,6,7,8-HxCDD	**12.3**	**11.5**	**6**	0.0591 U	0.0695 U
1,2,3,7,8,9-HxCDD	**6.29**	**5.67**	**2.76**	**0.0808 EMPC**	0.0735 U
1,2,3,4,6,7,8-HpCDD	**246**	**205**	**103**	**1.6**	**0.647 EMPC**
1,2,3,4,6,7,8,9-OCDD	**1780**	**1180**	**622**	**10.7**	**5.25**
2,3,7,8-TCDF	**1.29**	**1.11**	**1.1**	**0.0985 EMPC**	0.0596 U
1,2,3,7,8-PeCDF	**1.21**	**0.999 EMPC**	**0.746 J**	0.0611 U	0.0516 U
2,3,4,7,8-PeCDF	**0.939 J**	**0.985 J**	**0.816 J**	**0.0355 EMPC**	0.0556 U
1,2,3,4,7,8-HxCDF	**4.25**	**3.32**	**2.22**	0.0532 U	0.0397 U
1,2,3,6,7,8-HxCDF	**2.51**	**1.75**	**1.22**	**0.0467 J**	0.0357 U
1,2,3,7,8,9-HxCDF	**1.62 J**	**1.12 JEMPC**	**0.682 JEMPC**	0.0611 U	0.0457 U
2,3,4,6,7,8-HxCDF	**4.03**	**2.95**	**2**	**0.0577 J**	0.0397 U
1,2,3,4,6,7,8-HpCDF	**68.3**	**51.6**	**32.6**	**0.575 EMPC**	**0.0675 EMPC**
1,2,3,4,7,8,9-HpCDF	**3.06**	**2.1**	**1.33 EMPC**	0.0335 U	0.0516 U
1,2,3,4,6,7,8,9-OCDF	**115**	**66.6**	**38.4**	**0.656 J**	0.123 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**18 EMPC**	**35 EMPC**	**14.9 EMPC**	**0.875 EMPC**	**0.554 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**30.2 EMPC**	**43.2 EMPC**	**17.9 EMPC**	**0.945 EMPC**	**0.153 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**126**	**124**	**59.5 EMPC**	**1.89 EMPC**	**0.633 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**622**	**456**	**233**	**3.81**	**1.8 EMPC**
Total Tetrachlorodibenzofuran (TCDF)	**23.6 EMPC**	**24.5 EMPC**	**23.4 EMPC**	**0.91 EMPC**	**0.336 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**44.8 EMPC**	**39.7 EMPC**	**27.8 EMPC**	**0.62 EMPC**	**0.0325 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**101 JEMPC**	**76.6 JEMPC**	**50 JEMPC**	**0.72 JEMPC**	**0.0413 J**
Total Heptachlorodibenzofuran (HpCDF)	**174**	**125 EMPC**	**77.9 EMPC**	**1.11 EMPC**	**0.143 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**7.5 J**	**8.1 J**	**3.5 J**	**0.0298 J**	**0.0016**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**9.0 J**	**8.4 J**	**4.3 J**	**0.1132 J**	**0.1244**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**10.4 J**	**8.7 J**	**5.2 J**	**0.0687 J**	**0.1357**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**10.4 J**	**8.7 J**	**5.2 J**	**0.1327 J**	**0.1915**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-01	POBI-SC-02	POBI-SC-02	POBI-SC-02	POBI-SC-02
Sample ID	POBI-SC-01-8-10-130306	POBI-SC-02-1-2-130305	POBI-SC-02-4-5-130305	POBI-SC-02-5-6-130305	POBI-SC-02-5-6-130305DUP
Sample Depth	8 - 10 ft	1 - 2 ft	4 - 5 ft	5 - 6 ft	5 - 6 ft
Sample Date	3/6/2013	3/5/2013	3/5/2013	3/5/2013	3/5/2013
Sample Type	N	N	N	N	FD
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**2.5**	**3.2**	**2.78**	**3.52**	**3.37**
Total solids	**74.7**	**38.02**	**47.17**	**45.7**	**46**
Grain Size (pct)					
Total Gravel	**4.4**	--	--	**0.5**	--
Total Sand	**79.6**	--	--	**12**	--
Total Silt	**9.7**	--	--	**54.7**	--
Total Clay	**6.3**	--	--	**33**	--
Total Fines (silt + clay)	**16**	--	--	**87.7**	--
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	**0.125 EMPC**	**1.38**	0.559 U	**0.386 EMPC**	**0.528 EMPC**
1,2,3,7,8-PeCDD	0.0717 U	**6.85**	**1.63**	**0.801 J**	**1.33**
1,2,3,4,7,8-HxCDD	0.0717 U	**8.33**	**0.875 J**	**0.297 J**	**0.719 EMPC**
1,2,3,6,7,8-HxCDD	0.0717 U	**60.1 J**	**1.77**	**0.646 J**	**1.23**
1,2,3,7,8,9-HxCDD	**0.0896 EMPC**	**22.8**	**1.46**	**0.65 EMPC**	**1.11**
1,2,3,4,6,7,8-HpCDD	**0.795 EMPC**	**1570**	**10.6**	**4.25**	**8.02**
1,2,3,4,6,7,8,9-OCDD	**5.88**	**16100 J**	**33.9**	**18.1**	**26.4**
2,3,7,8-TCDF	0.0478 U	**3.92**	**2.3**	**1.36**	**1.86**
1,2,3,7,8-PeCDF	0.0498 U	**4.28**	**1.42 J**	**0.726 J**	**0.974 J**
2,3,4,7,8-PeCDF	0.0538 U	**4.46**	**1.49**	**0.776 J**	**0.966 J**
1,2,3,4,7,8-HxCDF	0.0398 U	**22.1**	**0.927 J**	**0.441 J**	**0.575 JEMPC**
1,2,3,6,7,8-HxCDF	0.0378 U	**9.97**	**1.05**	**0.431 J**	**0.692 J**
1,2,3,7,8,9-HxCDF	0.0458 U	**5.65 J**	**0.314 J**	**0.0807 EMPC**	**0.194 EMPC**
2,3,4,6,7,8-HxCDF	0.0418 U	**14.8**	**1.3 J**	**0.378 JEMPC**	**0.567 J**
1,2,3,4,6,7,8-HpCDF	0.0279 U	**348 J**	**3.92**	**1.13**	**1.68**
1,2,3,4,7,8,9-HpCDF	0.0398 U	**13.3**	**0.238 J**	**0.211 EMPC**	**0.144 EMPC**
1,2,3,4,6,7,8,9-OCDF	0.0757 U	**624**	**2.39**	**1.25 EMPC**	**1.03 J**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**0.555 EMPC**	**36 EMPC**	**37.9 EMPC**	**17.2 EMPC**	**32.6 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**0.104 EMPC**	**73.9**	**36.2 EMPC**	**15.1 EMPC**	**31.4 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**0.755 EMPC**	**526 JEMPC**	**38.4 EMPC**	**15.6 EMPC**	**34.4 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**2.12 EMPC**	**4900**	**21.8**	**8.37**	**16.1**
Total Tetrachlorodibenzofuran (TCDF)	**0.0863 EMPC**	**56 EMPC**	**49.7 EMPC**	**26.6 EMPC**	**37.2 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	0.0538 U	**161 EMPC**	**31.9 EMPC**	**10.6 EMPC**	**14.6 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	0.0458 U	**455 JEMPC**	**14.6 J**	**3.8 EMPC**	**6.03 EMPC**
Total Heptachlorodibenzofuran (HpCDF)	0.0398 U	**903 JEMPC**	**6.58 EMPC**	**2.14 EMPC**	**2.73 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**0.0018**	**48.8 J**	**3.3 J**	**1.4 J**	**2.3 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**0.1356**	**48.8 J**	**3.6 J**	**1.7 J**	**2.6 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**0.1437**	**48.8 J**	**3.3 J**	**2.0 J**	**3.0 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**0.2065**	**48.8 J**	**3.6 J**	**2.0 J**	**3.0 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-02	POBI-SC-03	POBI-SC-03	POBI-SC-03	POBI-SC-04	POBI-SC-04
Sample ID	POBI-SC-02-6-7-130305	POBI-SC-03-0-2-130305	POBI-SC-03-2-4-130305	POBI-SC-03-4-6-130305	POBI-SC-04-9-11-130226	POBI-SC-04-11-13-130226
Sample Depth	6 - 7 ft	0 - 2 ft	2 - 4 ft	4 - 6 ft	9 - 11 ft	11 - 13 ft
Sample Date	3/5/2013	3/5/2013	3/5/2013	3/5/2013	2/26/2013	2/26/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**3.43**	**1.74**	**0.352**	**0.369**	**2.95**	**0.208**
Total solids	**46.7**	**70.5**	**83**	**82.6**	**57.8**	**80.05**
Grain Size (pct)						
Total Gravel	**6.6**	**6.5**	**1.1**	**2.1**	**17.7**	--
Total Sand	**11.8**	**71.2**	**95.3**	**96.3**	**44.4**	--
Total Silt	**49.8**	**15.7**	**2.9**	1.7 U	**20.6**	--
Total Clay	**31.8**	**6.7**	**0.7**	1.7 U	**17.4**	--
Total Fines (silt + clay)	**81.6**	**22.4**	**3.6**	1.7 U	**38**	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	**0.318 EMPC**	**0.145 EMPC**	0.0444 U	0.051 U	**0.949**	0.0634 U
1,2,3,7,8-PeCDD	**0.388 EMPC**	**0.33 EMPC**	0.0541 U	0.0569 U	**3.52**	0.0653 U
1,2,3,4,7,8-HxCDD	0.0855 U	**0.475 EMPC**	0.083 U	0.0785 U	**4.95**	0.0475 U
1,2,3,6,7,8-HxCDD	**0.274 J**	**2.42**	0.0849 U	0.0805 U	**32**	0.0495 U
1,2,3,7,8,9-HxCDD	**0.272 J**	**1.09**	0.0869 U	0.0824 U	**10.5**	0.0396 U
1,2,3,4,6,7,8-HpCDD	**2.56**	**49.4**	**1.42**	**0.343 J**	**769**	**0.851 J**
1,2,3,4,6,7,8,9-OCDD	**20.3**	**371**	**8.86**	**3.7**	**5020 J**	**5.21**
2,3,7,8-TCDF	**0.829 EMPC**	**0.256 EMPC**	0.0309 U	0.0393 U	**2.17**	0.0436 U
1,2,3,7,8-PeCDF	**0.364 J**	**0.262 J**	**0.0521 EMPC**	0.0432 U	**2.85**	0.0337 U
2,3,4,7,8-PeCDF	**0.304 J**	**0.282 EMPC**	0.0425 U	0.0451 U	**3.29**	0.0396 U
1,2,3,4,7,8-HxCDF	**0.205 EMPC**	**1.21**	0.0502 U	0.0432 U	**16.8**	0.0356 U
1,2,3,6,7,8-HxCDF	**0.217 J**	**0.456 EMPC**	0.0483 U	0.0412 U	**6.42**	0.0337 U
1,2,3,7,8,9-HxCDF	0.0875 U	**0.199 EMPC**	0.0676 U	0.0589 U	**3.88**	0.0416 UJ
2,3,4,6,7,8-HxCDF	**0.193 EMPC**	**0.821 J**	0.0541 U	0.0451 U	**10.2**	0.0376 U
1,2,3,4,6,7,8-HpCDF	**0.73 EMPC**	**18.1**	**0.112 EMPC**	**0.0491 EMPC**	**223**	**0.352 J**
1,2,3,4,7,8,9-HpCDF	0.0875 U	**0.682 EMPC**	0.0869 U	0.0883 U	**9.84**	0.123 U
1,2,3,4,6,7,8,9-OCDF	**0.529 EMPC**	**25.9**	**0.145 J**	0.108 U	**372**	**0.352 EMPC**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**8.11 EMPC**	**3.02 EMPC**	**0.719 EMPC**	**0.697 EMPC**	**15.5 EMPC**	0.429 U
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**5.16 EMPC**	**4.43 EMPC**	**0.208 EMPC**	**0.19 EMPC**	**40.1**	0.0653 U
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**5.7 EMPC**	**21.9 EMPC**	**0.821 EMPC**	**0.523 EMPC**	**309**	**0.554 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**6.12**	**129**	**3.72**	**1.09**	**2310**	**2.68 EMPC**
Total Tetrachlorodibenzofuran (TCDF)	**15.4 EMPC**	**4.3 EMPC**	**0.0905 EMPC**	0.0393 U	**33.1 EMPC**	0.0436 U
Total Pentachlorodibenzofuran (PeCDF)	**3.84 EMPC**	**9.58 EMPC**	**0.053 EMPC**	0.0451 U	**96.9 EMPC**	0.0706 U
Total Hexachlorodibenzofuran (HxCDF)	**1.89 EMPC**	**22.2 EMPC**	0.0676 U	0.0589 U	**296**	0.232 UJ
Total Heptachlorodibenzofuran (HpCDF)	**1.18 EMPC**	**42.9 EMPC**	**0.279 EMPC**	**0.0495 EMPC**	**630 EMPC**	**0.731 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**0.2101 J**	**1.4 J**	**0.0169 J**	**0.0045 J**	**25.9 J**	**0.0136 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**0.6373 J**	**1.7 J**	**0.0996 J**	**0.0901 J**	**25.9 J**	**0.1015 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**1.0 J**	**2.1 J**	**0.0196 J**	**0.005 J**	**25.9 J**	**0.0137 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**1.1 J**	**2.1 J**	**0.1009 J**	**0.0903 J**	**25.9 J**	**0.1015 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-05	POBI-SC-05	POBI-SC-05	POBI-SC-05	POBI-SC-05
Sample ID	POBI-SC-05-2-3-130306	POBI-SC-05-3-4-130306	POBI-SC-05-3-4-130306DUP	POBI-SC-05-4-5-130306	POBI-SC-05-5-6-130306
Sample Depth	2 - 3 ft	3 - 4 ft	3 - 4 ft	4 - 5 ft	5 - 6 ft
Sample Date	3/6/2013	3/6/2013	3/6/2013	3/6/2013	3/6/2013
Sample Type	N	N	FD	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	3.05	3	3.68	3.01	0.111
Total solids	49.7	52.1	51.4	49.79	86.52
Grain Size (pct)					
Total Gravel	8.3	9.8	--	--	--
Total Sand	34.7	34.4	--	--	--
Total Silt	34.7	34.8	--	--	--
Total Clay	22.3	21	--	--	--
Total Fines (silt + clay)	57	55.8	--	--	--
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	0.91	0.869 EMPC	0.777 EMPC	0.897 J	0.197 EMPC
1,2,3,7,8-PeCDD	4.15	3.31	3.06	3.53	0.0704 EMPC
1,2,3,4,7,8-HxCDD	4.04	2.75	2.83	3.49	0.0704 EMPC
1,2,3,6,7,8-HxCDD	18.9	11.9	11.9	15.5	0.207 J
1,2,3,7,8,9-HxCDD	8.38	5.6	5.69	7.75	0.131 EMPC
1,2,3,4,6,7,8-HpCDD	386	237	240	356	3.43
1,2,3,4,6,7,8,9-OCDD	2490	1510	1520	2420	22.3
2,3,7,8-TCDF	3.39	2.84	3.13	2.94	0.0684 EMPC
1,2,3,7,8-PeCDF	2.79 J	2.11 J	2.24 J	2.32 J	0.0665 U
2,3,4,7,8-PeCDF	3.61	2.86	2.98	3.49	0.0704 U
1,2,3,4,7,8-HxCDF	14.4	10.6	10.6	14.8	0.0547 J
1,2,3,6,7,8-HxCDF	6.18	4.8	4.91	5.45	0.0762 EMPC
1,2,3,7,8,9-HxCDF	3.55 J	2.17 J	2.18 J	2.3 J	0.0645 U
2,3,4,6,7,8-HxCDF	10.4	7.8	8.45	3.79	0.0567 U
1,2,3,4,6,7,8-HpCDF	323	322	264	201	2.42 J
1,2,3,4,7,8,9-HpCDF	7.83	5.74	6.03	7.52	0.0723 EMPC
1,2,3,4,6,7,8,9-OCDF	413	365	342	504	3.29
Total Tetrachlorodibenzo-p-dioxin (TCDD)	64.1 EMPC	53.8 EMPC	37.6 EMPC	38.5 EMPC	1.25 U
Total Pentachlorodibenzo-p-dioxin (PeCDD)	76.1	46.7	44 EMPC	48.3	0.772 U
Total Hexachlorodibenzo-p-dioxin (HxCDD)	170	112	112 EMPC	154	2.67 UJ
Total Heptachlorodibenzo-p-dioxin (HpCDD)	766	447	453 EMPC	678	7.14
Total Tetrachlorodibenzofuran (TCDF)	85 EMPC	72.6 EMPC	76.7 EMPC	81.6 EMPC	0.382 EMPC
Total Pentachlorodibenzofuran (PeCDF)	155 EMPC	127 EMPC	127 EMPC	109 EMPC	0.811 EMPC
Total Hexachlorodibenzofuran (HxCDF)	289 JEMPC	226 JEMPC	210 JEMPC	222 JEMPC	2.18 JEMPC
Total Heptachlorodibenzofuran (HpCDF)	724	652	576	546	4.99 JEMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	21.2 J	15.3 J	14.6 J	17.7 J	0.0923 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	21.2 J	15.7 J	15.0 J	17.7 J	0.2613 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	21.2 J	16.2 J	15.4 J	17.7 J	0.3951 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	21.2 J	16.2 J	15.4 J	17.7 J	0.4127 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-06	POBI-SC-06	POBI-SC-06	POBI-SC-06	POBI-SC-07
Sample ID	POBI-SC-06-0-0.5-130313	POBI-SC-06-0.5-1-130313	POBI-SC-06-1-1.5-130313	POBI-SC-06-1.5-2-130313	POBI-SC-07-14-16-130226
Sample Depth	0 - 0.5 ft	0.5 - 1 ft	1 - 1.5 ft	1.5 - 2 ft	14 - 16 ft
Sample Date	3/13/2013	3/13/2013	3/13/2013	3/13/2013	2/26/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**3.73**	**4.73**	**2.44**	**1.05**	**3.63**
Total solids	**66.88**	**51.22**	**63.84**	**64.62**	**53.1**
Grain Size (pct)					
Total Gravel	--	--	--	--	**18.4**
Total Sand	--	--	--	--	**20.9**
Total Silt	--	--	--	--	**25.7**
Total Clay	--	--	--	--	**35**
Total Fines (silt + clay)	--	--	--	--	**60.7**
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	0.417 U	0.172 U	0.256 U	0.149 U	**1.61 EMPC**
1,2,3,7,8-PeCDD	**2.18**	0.0868 U	**0.776 J**	0.0743 U	**9.21**
1,2,3,4,7,8-HxCDD	**3.37**	**0.187 J**	**1.16**	**0.0958 EMPC**	**12.3**
1,2,3,6,7,8-HxCDD	**14**	**0.98**	**5.3**	**0.485 J**	**74.5**
1,2,3,7,8,9-HxCDD	**7.57**	**0.513 J**	**2.44**	**0.321 J**	**26.2**
1,2,3,4,6,7,8-HpCDD	**326**	**24.3**	**136**	**9.65**	**1720**
1,2,3,4,6,7,8,9-OCDD	**2630**	**190**	**1090**	**73.1**	**11300 J**
2,3,7,8-TCDF	**1.19**	**0.11 EMPC**	**0.485**	**0.0567 EMPC**	**4.46**
1,2,3,7,8-PeCDF	**1.07 J**	**0.122 EMPC**	**0.462 J**	**0.0587 EMPC**	**6.88**
2,3,4,7,8-PeCDF	**1.12**	**0.0945 EMPC**	**0.447 J**	0.0508 U	**8.05**
1,2,3,4,7,8-HxCDF	**4.51**	**0.415 J**	**1.88**	**0.164 EMPC**	**41.5**
1,2,3,6,7,8-HxCDF	**2.44**	**0.195 EMPC**	**0.875 J**	**0.045 EMPC**	**14.8**
1,2,3,7,8,9-HxCDF	**1.15 JEMPC**	0.162 U	**0.642 J**	**0.0567 EMPC**	**9.57**
2,3,4,6,7,8-HxCDF	**3.61**	**0.39 EMPC**	**1.54**	**0.0762 J**	**11.3 EMPC**
1,2,3,4,6,7,8-HpCDF	**84.9**	**5.77**	**31.4**	**2.25 EMPC**	**483**
1,2,3,4,7,8,9-HpCDF	**4.18**	**0.341 J**	**1.4**	0.119 U	**21.7**
1,2,3,4,6,7,8,9-OCDF	**239**	**10.9**	**60.3**	**4.39**	**865**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**11.7 EMPC**	**1.31 EMPC**	**3.94 EMPC**	1.09 U	**31.6 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**20.7 EMPC**	**1.94 EMPC**	**8.1 EMPC**	**0.839 EMPC**	**89.2 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**136**	**10.8**	**59.5 EMPC**	**6.12 EMPC**	**736**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**922**	**77.9**	**468**	**34.1**	**5120**
Total Tetrachlorodibenzofuran (TCDF)	**18 EMPC**	**1.32 EMPC**	**7.41 EMPC**	**0.687 EMPC**	**68.9 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**37.9 EMPC**	**3.06 EMPC**	**16.5 EMPC**	**1.12 EMPC**	**228 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**101 JEMPC**	**7.93 JEMPC**	**42.6 JEMPC**	**3.64 EMPC**	**760 EMPC**
Total Heptachlorodibenzofuran (HpCDF)	**243**	**15**	**84.1 EMPC**	**6.26 EMPC**	**1410**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**11.2 J**	**0.5739 J**	**4.4 J**	**0.208 J**	**56.1 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**11.5 J**	**0.7621 J**	**4.5 J**	**0.3609 J**	**57.4 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**11.3 J**	**0.6754 J**	**4.4 J**	**0.274 J**	**58.8 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**11.6 J**	**0.8129 J**	**4.5 J**	**0.3939 J**	**58.8 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-07	POBI-SC-08	POBI-SC-08	POBI-SC-08	POBI-SC-09
Sample ID	POBI-SC-07-14-16-130226DUP	POBI-SC-08-3-5-130226	POBI-SC-08-5-6-130226	POBI-SC-08-7-8-130226	POBI-SC-09-6-7-130227
Sample Depth	14 - 16 ft	3 - 5 ft	5 - 6 ft	7 - 8 ft	6 - 7 ft
Sample Date	2/26/2013	2/26/2013	2/26/2013	2/26/2013	2/27/2013
Sample Type	FD	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	3.99	3.33	3.49	0.508	5.19
Total solids	53.5	36.3	40.7	84.36	42.1
Grain Size (pct)					
Total Gravel	20.7	0.3	--	--	0.1 U
Total Sand	24	5	--	--	6.9
Total Silt	23.9	48.3	--	--	55
Total Clay	31.4	46.4	--	--	38.2
Total Fines (silt + clay)	55.3	94.7	--	--	93.2
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	1.72 EMPC	0.864 EMPC	1.43	0.207 EMPC	1.47
1,2,3,7,8-PeCDD	9.04	4.69	7.57	0.441 J	8.95
1,2,3,4,7,8-HxCDD	13.3	5.78	9.68	0.495 EMPC	10.9
1,2,3,6,7,8-HxCDD	73.8	38.2	63.4	3.75 J	52.4
1,2,3,7,8,9-HxCDD	25.7	14.2	23.7	1.39	24.6
1,2,3,4,6,7,8-HpCDD	1710	778	1370	80.4	1160
1,2,3,4,6,7,8,9-OCDD	11100 J	5680 J	9400 J	530	7690 J
2,3,7,8-TCDF	4.27	2.97	4.44	0.669 J	4.97
1,2,3,7,8-PeCDF	6.15	2.94	5.3 J	0.697 J	5.73 J
2,3,4,7,8-PeCDF	7.62	3.15	5.31	1.84	8.19
1,2,3,4,7,8-HxCDF	40.4	15.1	26.1	2.96	46
1,2,3,6,7,8-HxCDF	14.2	6.7	10.8	1.17	15.5
1,2,3,7,8,9-HxCDF	9.37	3.12	5.99 J	0.689 J	9.46
2,3,4,6,7,8-HxCDF	24.3	5.02 EMPC	8.27	1.57	24.7
1,2,3,4,6,7,8-HpCDF	477	218	366	28.4 J	557
1,2,3,4,7,8,9-HpCDF	21.4	8.95	15.3	1.49	26
1,2,3,4,6,7,8,9-OCDF	894	337	695	51.6	1160
Total Tetrachlorodibenzo-p-dioxin (TCDD)	28 EMPC	25.8 EMPC	43.9 EMPC	3.67 EMPC	50
Total Pentachlorodibenzo-p-dioxin (PeCDD)	82	55.9 EMPC	86.8	5.48 EMPC	94.1 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	739	346 EMPC	499 EMPC	31.6 JEMPC	434
Total Heptachlorodibenzo-p-dioxin (HpCDD)	5150	2120	3250	180	2260
Total Tetrachlorodibenzofuran (TCDF)	63.7 EMPC	40.7 EMPC	78 EMPC	16.8 EMPC	111 EMPC
Total Pentachlorodibenzofuran (PeCDF)	211 EMPC	96.8 EMPC	154 EMPC	23.6 EMPC	264 EMPC
Total Hexachlorodibenzofuran (HxCDF)	729 EMPC	305 EMPC	527 JEMPC	40.5 JEMPC	683 EMPC
Total Heptachlorodibenzofuran (HpCDF)	1400 EMPC	594	1010 EMPC	77.7 JEMPC	1660
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	57.7 J	26.2 J	46.5 J	3.5 J	52.0 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	58.6 J	26.7 J	46.5 J	3.6 J	52.0 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	59.5 J	27.6 J	46.5 J	3.8 J	52.0 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	59.5 J	27.6 J	46.5 J	3.8 J	52.0 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-09	POBI-SC-09	POBI-SC-09	POBI-SC-10	POBI-SC-10
Sample ID	POBI-SC-09-7-8-130227	POBI-SC-09-8-9-130227	POBI-SC-09-9-10-130227	POBI-SC-10-11-13-130227	POBI-SC-10-13-14-130227
Sample Depth	7 - 8 ft	8 - 9 ft	9 - 10 ft	11 - 13 ft	13 - 14 ft
Sample Date	2/27/2013	2/27/2013	2/27/2013	2/27/2013	2/27/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	4.03	3.5	2.77	3.38	1.66
Total solids	37.4	42.2	47.63	47.3	88.14
Grain Size (pct)					
Total Gravel	1	--	--	2	--
Total Sand	6.9	--	--	22.1	--
Total Silt	46.6	--	--	39.8	--
Total Clay	45.6	--	--	36.1	--
Total Fines (silt + clay)	92.2	--	--	75.9	--
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	1.38 EMPC	0.928 J	0.811 EMPC	1.06 EMPC	0.177 U
1,2,3,7,8-PeCDD	10.7	3.11	2.34	4.89	0.435 J
1,2,3,4,7,8-HxCDD	14.8	1.9	1.34	6.7	0.479 J
1,2,3,6,7,8-HxCDD	71.6	8.68	4.08 J	41.1	3.05
1,2,3,7,8,9-HxCDD	31.4	4.59	2.43	14.7	1.22
1,2,3,4,6,7,8-HpCDD	1560	127	41.3	896	69
1,2,3,4,6,7,8,9-OCDD	10100 J	797	130	6430 J	509
2,3,7,8-TCDF	5.31	3.63	2.78	2.98	0.26 J
1,2,3,7,8-PeCDF	6.35	2.39 J	1.68 J	4.63	0.419 U
2,3,4,7,8-PeCDF	11	3.49	2.07	5.09	0.404 EMPC
1,2,3,4,7,8-HxCDF	67.2	8.19	1.73 J	36.6	3.08
1,2,3,6,7,8-HxCDF	21	4.32	1.83	11.3	0.959 EMPC
1,2,3,7,8,9-HxCDF	9.53	1.5 J	0.549 J	6.78	0.657 J
2,3,4,6,7,8-HxCDF	34.1	7.41	2.92 J	18.5	0.758 EMPC
1,2,3,4,6,7,8-HpCDF	856	262	34.5 J	418	32.5
1,2,3,4,7,8,9-HpCDF	35.3	2.85	0.815 J	19.2	1.53
1,2,3,4,6,7,8,9-OCDF	2030	160	32.2	808	67.7
Total Tetrachlorodibenzo-p-dioxin (TCDD)	50.5 EMPC	39.3 EMPC	48.4 EMPC	23.2 EMPC	3.15 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	105	45.4	52.3 EMPC	55.3	4.66 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	543	91.6	69.2 JEMPC	318	24.4 EMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	3120	284	81.2 EMPC	1820	138
Total Tetrachlorodibenzofuran (TCDF)	127 EMPC	116 EMPC	62.6 EMPC	52.1 EMPC	5.96 EMPC
Total Pentachlorodibenzofuran (PeCDF)	316 EMPC	138 EMPC	67.3 EMPC	173 EMPC	14 EMPC
Total Hexachlorodibenzofuran (HxCDF)	920 EMPC	209 JEMPC	43.2 JEMPC	552 EMPC	44.3 JEMPC
Total Heptachlorodibenzofuran (HpCDF)	2570	453	63.3 J	1260 EMPC	88.7
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	67.8 J	13.4 J	5.6 J	36.0 J	2.5 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	68.5 J	13.4 J	6.0 J	36.5 J	2.8 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	69.2 J	13.4 J	6.4 J	37.0 J	2.8 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	69.2 J	13.4 J	6.4 J	37.0 J	3.0 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-11	POBI-SC-11	POBI-SC-11	POBI-SC-12	POBI-SC-12	POBI-SC-12
Sample ID	POBI-SC-11-2-4-130313	POBI-SC-11-6-8-130313	POBI-SC-11-8-10-130313	POBI-SC-12-2-4-130313	POBI-SC-12-6-8-130313	POBI-SC-12-8-10-130313
Sample Depth	2 - 4 ft	6 - 8 ft	8 - 10 ft	2 - 4 ft	6 - 8 ft	8 - 10 ft
Sample Date	3/13/2013	3/13/2013	3/13/2013	3/13/2013	3/13/2013	3/13/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	4.05	3.86	2.8	5.96	3.57	1.28
Total solids	40.59	66.54	73.1	31.39	64.5	72.95
Grain Size (pct)						
Total Gravel	17.8	17.3	--	3.6	15.5	--
Total Sand	27.6	50.4	--	17.2	49.2	--
Total Silt	31.7	17.4	--	34.7	22.5	--
Total Clay	23.1	15	--	44.7	12.7	--
Total Fines (silt + clay)	54.8	32.4	--	79.4	35.2	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.708 U	0.495 U	0.4 EMPC	0.966 EMPC	0.28 U	0.219 EMPC
1,2,3,7,8-PeCDD	4.25	1.86	1.69	6.23	1.01	0.7 J
1,2,3,4,7,8-HxCDD	5.8	2.55	2.15	10.6	1.27	0.581 J
1,2,3,6,7,8-HxCDD	35.7	13.8	11.5	46	6.93	0.761 J
1,2,3,7,8,9-HxCDD	13.6	6.03	4.8	23.5	2.7	0.598 J
1,2,3,4,6,7,8-HpCDD	900	337	268	1230	158	5.94
1,2,3,4,6,7,8,9-OCDD	7100 J	2320	1850	10100 J	1110	42.8
2,3,7,8-TCDF	2.85	1.47	0.997	3.54	0.632 EMPC	0.197 J
1,2,3,7,8-PeCDF	2.91 J	1.52	1.21	3.89 J	0.704 J	0.666 J
2,3,4,7,8-PeCDF	3.25	1.55	1.5	4	0.729 J	0.577 J
1,2,3,4,7,8-HxCDF	14.1	7.58	8.95	18.4	3.66	0.73 J
1,2,3,6,7,8-HxCDF	6.64	2.88	2.94	7.82	1.39	0.586 J
1,2,3,7,8,9-HxCDF	3.09	1.85	1.79 J	3.55	0.748 J	0.579 J
2,3,4,6,7,8-HxCDF	8.95	4.24	2.16	10.4	1.97	0.664 J
1,2,3,4,6,7,8-HpCDF	196	83.4	79.3	232	49.7	1.98
1,2,3,4,7,8,9-HpCDF	7.15	3.9	4.72	9	1.9	0.584 J
1,2,3,4,6,7,8,9-OCDF	269	164	167	426	80.3	3.2
Total Tetrachlorodibenzo-p-dioxin (TCDD)	20.6 EMPC	13.2 EMPC	8.78 EMPC	29.1 EMPC	5.74 EMPC	0.762 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	47.5	21.9 EMPC	16.4	61.4	10.5 EMPC	0.974 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	350	138	92.4	455	60.3	4.05 EMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	3090	1070	603	4180	421	15.7
Total Tetrachlorodibenzofuran (TCDF)	39.5 EMPC	27.1 EMPC	16 EMPC	52 EMPC	11.2 EMPC	0.311 EMPC
Total Pentachlorodibenzofuran (PeCDF)	102 EMPC	53 EMPC	41.1 EMPC	134 EMPC	25.5 EMPC	1.58 EMPC
Total Hexachlorodibenzofuran (HxCDF)	280 EMPC	126 EMPC	117 JEMPC	323 EMPC	60.3	3.98 J
Total Heptachlorodibenzofuran (HpCDF)	488	236 EMPC	228	604 EMPC	125 EMPC	4.37
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	27.6 J	11.4	9.8 J	37.8 J	5.6 J	1.5 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	28.0 J	11.6	10.0 J	38.3 J	5.7 J	1.6 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	27.6 J	11.4	10.2 J	38.8 J	5.6 J	1.7 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	28.0 J	11.6	10.2 J	38.8 J	5.8 J	1.7 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-13	POBI-SC-13	POBI-SC-13	POBI-SC-13	POBI-SC-14
Sample ID	POBI-SC-13-6-8-130227	POBI-SC-13-8-9-130227	POBI-SC-13-8-9-130227DUP	POBI-SC-13-9-10-130227	POBI-SC-14-1-2-130306
Sample Depth	6 - 8 ft	8 - 9 ft	8 - 9 ft	9 - 10 ft	1 - 2 ft
Sample Date	2/27/2013	2/27/2013	2/27/2013	2/27/2013	3/6/2013
Sample Type	N	N	FD	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**3.64**	**1.72**	**2.49**	**0.117**	**4.96**
Total solids	**58.5**	**83.9**	**80.54**	**92.04**	**45.07**
Grain Size (pct)					
Total Gravel	**11.1**	--	--	--	--
Total Sand	**44**	--	--	--	--
Total Silt	**20.9**	--	--	--	--
Total Clay	**24**	--	--	--	--
Total Fines (silt + clay)	**44.9**	--	--	--	--
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	**0.939**	0.355 U	0.366 U	0.0376 U	**1.94**
1,2,3,7,8-PeCDD	**6.07**	**1.39**	**1.27**	**0.0851 EMPC**	**7.15**
1,2,3,4,7,8-HxCDD	**9.3**	**2.04**	**1.78 EMPC**	0.0831 U	**6.13**
1,2,3,6,7,8-HxCDD	**49.1**	**11.5**	**10.5**	**0.208 JEMPC**	**21.1**
1,2,3,7,8,9-HxCDD	**16.5**	**4.4**	**4.04**	**0.138 EMPC**	**11.8**
1,2,3,4,6,7,8-HpCDD	**1170**	**278**	**257**	**5.76**	**384**
1,2,3,4,6,7,8,9-OCDD	**8580 J**	**2050**	**1880**	**44.2**	**2240**
2,3,7,8-TCDF	**3.37**	**0.743 J**	**0.752 J**	0.0376 U	**7.63**
1,2,3,7,8-PeCDF	**5.4 J**	**1.24**	**1.22**	**0.0673 JEMPC**	**4.41 J**
2,3,4,7,8-PeCDF	**9.6**	**1.8**	**1.79**	0.0593 U	**5.69**
1,2,3,4,7,8-HxCDF	**62.2**	**11.5**	**11.9**	**0.239 J**	**10.7 J**
1,2,3,6,7,8-HxCDF	**15.4**	**3.43**	**3.36**	**0.135 EMPC**	**6.4**
1,2,3,7,8,9-HxCDF	**9.99**	**1.81 J**	**1.94 J**	**0.091 J**	**2.08 J**
2,3,4,6,7,8-HxCDF	**25.7**	**2.67**	**1.95**	**0.0851 EMPC**	**9.43**
1,2,3,4,6,7,8-HpCDF	**657**	**142**	**127**	**2.39 J**	**162**
1,2,3,4,7,8,9-HpCDF	**32**	**6.26**	**6.35**	**0.168 EMPC**	**6.29**
1,2,3,4,6,7,8,9-OCDF	**1520**	**348**	**297**	**5.24**	**290**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**90.3 EMPC**	**7.52 EMPC**	**9.44 EMPC**	0.821 U	**106 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**113**	**13.9 EMPC**	**15.1**	0.546 U	**108**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**372**	**83.4 EMPC**	**78.1 EMPC**	2.25 UJ	**207 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**2230**	**539**	**501**	**13.2**	**753**
Total Tetrachlorodibenzofuran (TCDF)	**74.2 EMPC**	**21.4 EMPC**	**22 EMPC**	**0.181 EMPC**	**165**
Total Pentachlorodibenzofuran (PeCDF)	**242 EMPC**	**50.8 EMPC**	**49.5 EMPC**	**1.01 EMPC**	**154 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**846**	**182 JEMPC**	**182 JEMPC**	**3.29 JEMPC**	**207 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**2130**	**410**	**368**	**6.55 JEMPC**	**388**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**50.8 J**	**10.8 J**	**9.8 J**	**0.1293 J**	**24.7 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**50.8 J**	**11.0 J**	**10.1 J**	**0.2358 J**	**24.7 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**50.8 J**	**10.8 J**	**10.0 J**	**0.2747 J**	**24.7 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**50.8 J**	**11.0 J**	**10.2 J**	**0.3085 J**	**24.7 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-14	POBI-SC-15	POBI-SC-15	POBI-SC-16	POBI-SC-16	POBI-SC-16
Sample ID	POBI-SC-14-2-3-130306	POBI-SC-15-11-12-130226	POBI-SC-15-12-13-130226	POBI-SC-16-4-5-130228	POBI-SC-16-5-6-130228	POBI-SC-16-6-7-130228
Sample Depth	2 - 3 ft	11 - 12 ft	12 - 13 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
Sample Date	3/6/2013	2/26/2013	2/26/2013	2/28/2013	2/28/2013	2/28/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**3.22**	**0.183**	**0.3**	**3.64**	**3.72**	**1.68**
Total solids	**59.87**	**96.16**	**89.5**	**40.4**	**46.2**	**65.56**
Grain Size (pct)						
Total Gravel	--	--	--	0.1 U	**0.4**	--
Total Sand	--	--	--	**7.8**	**20.4**	--
Total Silt	--	--	--	**50.1**	**48.8**	--
Total Clay	--	--	--	**42**	**30.5**	--
Total Fines (silt + clay)	--	--	--	**92.1**	**79.3**	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	**0.417 EMPC**	0.0571 U	0.109 U	**1.51**	**0.935**	**0.279 EMPC**
1,2,3,7,8-PeCDD	**1.01**	0.0492 U	0.0835 U	**9.2**	**3.46**	**0.542 J**
1,2,3,4,7,8-HxCDD	**0.49 EMPC**	0.0472 U	0.143 U	**11.9**	**2.3**	**0.317 J**
1,2,3,6,7,8-HxCDD	**0.696 J**	**0.12 EMPC**	0.143 U	**58**	**10.5**	**0.879 J**
1,2,3,7,8,9-HxCDD	**0.639 J**	0.0512 U	0.151 U	**26.7**	**5.39**	**0.504 EMPC**
1,2,3,4,6,7,8-HpCDD	**3.45**	**1.37**	**1.77**	**1260**	**187**	**7.83**
1,2,3,4,6,7,8,9-OCDD	**12.9**	**8.88**	**11.2**	**8870 J**	**1240**	**31.3**
2,3,7,8-TCDF	**1.36**	0.0413 U	0.0775 U	**4.79**	**3.5**	**0.67 J**
1,2,3,7,8-PeCDF	**0.635 J**	0.0354 U	0.0895 U	**5.65**	**2.55 J**	**0.465 J**
2,3,4,7,8-PeCDF	**0.688 J**	0.0413 U	0.0795 U	**9.21**	**3.57**	**0.421 J**
1,2,3,4,7,8-HxCDF	**0.444 J**	0.0512 U	0.0795 U	**52.9**	**9.16**	**0.413 J**
1,2,3,6,7,8-HxCDF	**0.45 EMPC**	0.0492 U	0.0755 U	**17**	**5**	**0.423 J**
1,2,3,7,8,9-HxCDF	**0.161 JEMPC**	0.065 U	0.0875 U	**8.64**	**1.76**	**0.169 JEMPC**
2,3,4,6,7,8-HxCDF	**0.516 J**	0.0531 U	0.0875 U	**26.8**	**8.37**	**0.562 EMPC**
1,2,3,4,6,7,8-HpCDF	**0.71 J**	**0.417 EMPC**	**0.372 EMPC**	**653**	**309**	**9.34**
1,2,3,4,7,8,9-HpCDF	0.0595 U	0.0531 U	0.151 U	**26.6**	**3.7 EMPC**	**0.223 J**
1,2,3,4,6,7,8,9-OCDF	**0.498 J**	**0.559 EMPC**	**0.875 J**	**1250**	**227**	**5.62**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**33.4 EMPC**	0.286 U	**0.433**	**49.9 EMPC**	**38 EMPC**	**7.99 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**22.8**	0.197 U	0.0835 U	**88.8**	**48.7 EMPC**	**7.85 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**16.8 JEMPC**	**0.906 EMPC**	**0.948 EMPC**	**477 EMPC**	**112 EMPC**	**10.5 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**7.73**	**4.01**	**4.76**	**2580**	**414 EMPC**	**17.6**
Total Tetrachlorodibenzofuran (TCDF)	**25.6 EMPC**	0.062 U	0.0775 U	**120 EMPC**	**85.7 EMPC**	**12.9 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**12.7 EMPC**	0.184 U	0.0895 U	**263 EMPC**	**139 EMPC**	**10.7 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**4.85 JEMPC**	0.474 U	**0.481 EMPC**	**737 EMPC**	**232 EMPC**	**9.47 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**1.08 JEMPC**	**1.03 EMPC**	**1.07 EMPC**	**1820 EMPC**	**561 EMPC**	**15.6 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**1.6 J**	**0.0164**	**0.0213 J**	**56.8 J**	**15.5 J**	**1.1 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**2.0 J**	**0.1026**	**0.1757 J**	**56.8 J**	**15.6 J**	**1.3 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**2.2 J**	**0.0327**	**0.025 J**	**56.8 J**	**15.6 J**	**1.5 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**2.2 J**	**0.1108**	**0.1775 J**	**56.8 J**	**15.6 J**	**1.5 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-17	POBI-SC-17	POBI-SC-18	POBI-SC-18	POBI-SC-19	POBI-SC-19
Sample ID	POBI-SC-17-2-4-130315	POBI-SC-17-6-8-130315	POBI-SC-18-6-8-130228	POBI-SC-18-8-9-130228	POBI-SC-19-2-4-130315	POBI-SC-19-6-8-130315
Sample Depth	2 - 4 ft	6 - 8 ft	6 - 8 ft	8 - 9 ft	2 - 4 ft	6 - 8 ft
Sample Date	3/15/2013	3/15/2013	2/28/2013	2/28/2013	3/15/2013	3/15/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	3.71	1.93	3	3.24	5.09	5.69
Total solids	51.83	79.9	63.2	85.62	46.25	57.21
Grain Size (pct)						
Total Gravel	17.9	9.2	33.9	--	14.5	47.6
Total Sand	38.2	77.4	43.5	--	25.5	33.3
Total Silt	22.7	9.1	9.8	--	24.2	9.8
Total Clay	21	4.2	12.7	--	35.8	9.2
Total Fines (silt + clay)	43.7	13.3	22.5	--	60	19
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.682 U	0.131 U	0.737	0.249 EMPC	3.53	1.12
1,2,3,7,8-PeCDD	3.71	0.0575 U	4.28	0.58 J	20.9	5.66
1,2,3,4,7,8-HxCDD	5.11	0.0753 U	7.72	0.834 J	31.4	10.2
1,2,3,6,7,8-HxCDD	28.3	0.157 EMPC	68.7	6.18	477	88.3
1,2,3,7,8,9-HxCDD	12.1	0.129 EMPC	16.5	1.75	86.5	20.6
1,2,3,4,6,7,8-HpCDD	749	3.04	1760	159	11200	2880
1,2,3,4,6,7,8,9-OCDD	5920 J	21.1	12500 J	1170	84900 J	15500 J
2,3,7,8-TCDF	2.59	0.0317 U	2.69 EMPC	0.435 J	38.9	5.06
1,2,3,7,8-PeCDF	2.88	0.0416 U	4.9 J	0.668 J	76.6	5.26 J
2,3,4,7,8-PeCDF	3.12	0.0456 U	10.2	1.38 EMPC	287	11.5
1,2,3,4,7,8-HxCDF	15.2	0.0654 U	83.3	9.24	1390	49.3
1,2,3,6,7,8-HxCDF	5.72	0.0456 U	19.2	2.33	219	12.5
1,2,3,7,8,9-HxCDF	3.12 J	0.0575 U	13.2	1.61 J	237 J	10.1 J
2,3,4,6,7,8-HxCDF	8.38	0.0515 U	35.8	1.45	307	21.8
1,2,3,4,6,7,8-HpCDF	218	0.767 U	1030	101	4550	1050
1,2,3,4,7,8,9-HpCDF	9.41	0.0634 U	52.3	4.45	405	32.4
1,2,3,4,6,7,8,9-OCDF	462	1.83 J	3200	241	16600	2700
Total Tetrachlorodibenzo-p-dioxin (TCDD)	18.6 EMPC	0.597 U	18.6 EMPC	5.27 EMPC	93.3 EMPC	55 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	40.4	0.221 EMPC	46.2 EMPC	7.27 EMPC	208	120
Total Hexachlorodibenzo-p-dioxin (HxCDD)	284	1.76 EMPC	421	47.8 EMPC	2360	1350
Total Heptachlorodibenzo-p-dioxin (HpCDD)	2200	8.08	3440	336	23300	8540
Total Tetrachlorodibenzofuran (TCDF)	39 EMPC	0.0888	54 EMPC	8.61 EMPC	465 EMPC	107 EMPC
Total Pentachlorodibenzofuran (PeCDF)	101 EMPC	0.271 EMPC	246 EMPC	33.4 EMPC	3750 EMPC	308 EMPC
Total Hexachlorodibenzofuran (HxCDF)	268 JEMPC	0.819 U	1180 EMPC	123 J	10700 JEMPC	1050 JEMPC
Total Heptachlorodibenzofuran (HpCDF)	610 EMPC	2.16 EMPC	3750	307 EMPC	20400	3290
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	24.5 J	0.0373 J	65.8 J	6.1 J	583.5 J	77.3 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	24.8 J	0.1738 J	66.0 J	6.4 J	583.5 J	77.3 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	24.5 J	0.0659 J	66.1 J	6.7 J	583.5 J	77.3 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	24.8 J	0.1881 J	66.1 J	6.7 J	583.5 J	77.3 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-19	POBI-SC-19	POBI-SC-20	POBI-SC-20	POBI-SC-21
Sample ID	POBI-SC-19-8-10-130315	POBI-SC-19-10-12-130315	POBI-SC-20-13-15-130227	POBI-SC-20-15-16-130227	POBI-SC-21-1-2-130301
Sample Depth	8 - 10 ft	10 - 12 ft	13 - 15 ft	15 - 16 ft	1 - 2 ft
Sample Date	3/15/2013	3/15/2013	2/27/2013	2/27/2013	3/1/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	2.75	1.2	6.48	3.39	2.11
Total solids	62.04	69.77	43.1	50.14	59.1
Grain Size (pct)					
Total Gravel	--	--	2.9	--	1.3
Total Sand	--	--	11.8	--	48.8
Total Silt	--	--	41.1	--	32.1
Total Clay	--	--	44.1	--	17.8
Total Fines (silt + clay)	--	--	85.2	--	49.9
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	1.17	0.725 EMPC	1.67	1.55	0.452 EMPC
1,2,3,7,8-PeCDD	3.67	2.3	10.6	7.95	1.34
1,2,3,4,7,8-HxCDD	2.14	1.23	14.1	11.7	1.04
1,2,3,6,7,8-HxCDD	12.6	8.86 J	140	114	4.2
1,2,3,7,8,9-HxCDD	5.12	2.98	36.5	28.6	1.9
1,2,3,4,6,7,8-HpCDD	240	80.6	3370	2970 J	70.4
1,2,3,4,6,7,8,9-OCDD	1530	315	25200 J	23400 J	394
2,3,7,8-TCDF	4.38	2.56	7.55	7.34	1.48
1,2,3,7,8-PeCDF	3.12 J	2.8	14	12.4	0.915 JEMPC
2,3,4,7,8-PeCDF	6.32	4.23	28.8	25.1	1.1
1,2,3,4,7,8-HxCDF	18.9	20.9	201	33	2.2
1,2,3,6,7,8-HxCDF	9.66	15.3	40.3	171	1.52
1,2,3,7,8,9-HxCDF	4.21 J	5.93 J	36.2	29.7 J	0.596 J
2,3,4,6,7,8-HxCDF	6.73 EMPC	25.1	67.6	17.3	2.22 EMPC
1,2,3,4,6,7,8-HpCDF	963	4760 J	1270	1560	82.3
1,2,3,4,7,8,9-HpCDF	6.48	9.79	98.5	80.4	1.14 EMPC
1,2,3,4,6,7,8,9-OCDF	483	1760	2960	4550 J	52.4
Total Tetrachlorodibenzo-p-dioxin (TCDD)	85.5 EMPC	27.4 EMPC	119 EMPC	51 EMPC	21.9 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	92.7	41.5	153 EMPC	90.1	24.8 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	170	90.7 JEMPC	1160	754	45 EMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	594	154	8790	6170	145 EMPC
Total Tetrachlorodibenzofuran (TCDF)	119 EMPC	72.7 EMPC	109 EMPC	146 EMPC	35.9 EMPC
Total Pentachlorodibenzofuran (PeCDF)	285 EMPC	404 EMPC	508 EMPC	482 EMPC	46 EMPC
Total Hexachlorodibenzofuran (HxCDF)	616 JEMPC	2140 JEMPC	2030 EMPC	2200 JEMPC	64.8 EMPC
Total Heptachlorodibenzofuran (HpCDF)	1670	7690 J	4580	5150	144 EMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	25.2 J	61.1 J	131.50 J	113.2 J	4.7 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	25.6 J	61.4 J	131.50 J	113.2 J	5.0 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	26.0 J	61.8 J	131.50 J	113.2 J	5.3 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	26.0 J	61.8 J	131.50 J	113.2 J	5.3 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-21	POBI-SC-22	POBI-SC-22	POBI-SC-23	POBI-SC-23	POBI-SC-24
Sample ID	POBI-SC-21-2-3-130301	POBI-SC-22-7-8-130307	POBI-SC-22-8-8.5-130307	POBI-SC-23-6-8-130315	POBI-SC-23-8-10-130315	POBI-SC-24-2-3-130306
Sample Depth	2 - 3 ft	7 - 8 ft	8 - 8.5 ft	6 - 8 ft	8 - 10 ft	2 - 3 ft
Sample Date	3/1/2013	3/7/2013	3/7/2013	3/15/2013	3/15/2013	3/6/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**0.81**	**5.31**	**4.63**	**9.13**	**3.44**	**1.37**
Total solids	**69.8**	**49.5**	**54**	**45.22**	**54.83**	**59.1**
Grain Size (pct)						
Total Gravel	**3.4**	**3.2**	**2**	**13.7**	**8.4**	**0.1**
Total Sand	**33.5**	**38.6**	**48.3**	**29.7**	**66**	**40.7**
Total Silt	**50.7**	**34.1**	**27**	**28.5**	**17.2**	**43.1**
Total Clay	**12.4**	**24.1**	**22.6**	**28**	**8.5**	**16.1**
Total Fines (silt + clay)	**63.1**	**58.2**	**49.6**	**56.5**	**25.7**	**59.2**
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	**0.204 EMPC**	**4.76**	**3.17**	**9.76**	0.183 U	**0.878 EMPC**
1,2,3,7,8-PeCDD	0.0962 U	**20.1**	**15**	**42.4**	**0.195 EMPC**	**8.08**
1,2,3,4,7,8-HxCDD	0.102 U	**15.4 EMPC**	**16 EMPC**	**57.8**	**0.15 EMPC**	**9.21**
1,2,3,6,7,8-HxCDD	**0.202 J**	**230**	**310**	**1410**	**1.14 EMPC**	**56.1**
1,2,3,7,8,9-HxCDD	**0.146 EMPC**	**52.9**	**51.7**	**276**	**0.457 EMPC**	**23.3**
1,2,3,4,6,7,8-HpCDD	**3.47**	**5510 J**	**7730 J**	**23300 J**	**26.5**	**1080**
1,2,3,4,6,7,8,9-OCDD	**23.7**	**47100 J**	**67800 J**	**250000 J**	**288**	**7030 J**
2,3,7,8-TCDF	**0.115 J**	**21.2**	**18.6**	**38.4**	**0.752**	**3.94**
1,2,3,7,8-PeCDF	0.0923 U	**30.3**	**39.5**	**30.9 J**	**0.453 J**	**9.76**
2,3,4,7,8-PeCDF	0.0981 U	**81.9**	**114**	**50.8**	**0.659 EMPC**	**31.7**
1,2,3,4,7,8-HxCDF	0.0615 U	**450**	**684**	**276**	2.13 U	**169**
1,2,3,6,7,8-HxCDF	0.0577 U	**92.7**	**117**	**121**	**0.541 EMPC**	**31.6**
1,2,3,7,8,9-HxCDF	0.0865 U	**86.7**	**141**	**71.2 J**	**0.455 JEMPC**	**28.3 J**
2,3,4,6,7,8-HxCDF	0.0673 U	**176**	**191**	**435**	**1.16 EMPC**	**46.7**
1,2,3,4,6,7,8-HpCDF	**1 EMPC**	**7860**	**4540**	**21600**	**23**	**782**
1,2,3,4,7,8,9-HpCDF	0.0481 U	**231**	**347**	**589**	**0.919 J**	**49.3**
1,2,3,4,6,7,8,9-OCDF	**1.08 EMPC**	**12400**	**14500**	**60400**	**36.3**	**1020**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**2.35 EMPC**	**146**	**62.8 EMPC**	**479 EMPC**	**4.86 EMPC**	**31.3 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**1.25 EMPC**	**274**	**190**	**668**	**3.44 EMPC**	**65.4 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**3.37 EMPC**	**1170 EMPC**	**1460 EMPC**	**5350 EMPC**	**7.11 EMPC**	**348**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**8.37**	**10200 J**	**14500 J**	**58700**	**50.2**	**2310**
Total Tetrachlorodibenzofuran (TCDF)	**1.13 EMPC**	**560 EMPC**	**228 EMPC**	**1020 EMPC**	**17.5 EMPC**	**87.4 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**1.08 EMPC**	**2250 EMPC**	**1610 EMPC**	**2740 EMPC**	**10.7 EMPC**	**520 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**1.12 EMPC**	**6590 EMPC**	**7590 EMPC**	**16900 JEMPC**	**24.7 JEMPC**	**1260 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**1.97 EMPC**	**20000**	**17300**	**71800**	**59.7 EMPC**	**2010**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**0.0735 J**	**315.2 J**	**355.8 J**	**884.9 J**	**0.69 J**	**76.2 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**0.2712 J**	**316.0 J**	**356.6 J**	**884.9 J**	**1.3 J**	**76.7 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**0.3024 J**	**316.7 J**	**357.3 J**	**884.9 J**	**1.5 J**	**77.1 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**0.3856 J**	**316.7 J**	**357.3 J**	**884.9 J**	**1.7 J**	**77.1 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-24	POBI-SC-25	POBI-SC-25	POBI-SC-25	POBI-SC-25
Sample ID	POBI-SC-24-3-4-130306	POBI-SC-25-1-2-130228	POBI-SC-25-2-3-130228	POBI-SC-25-2-3-130228DUP	POBI-SC-25-3-4-130228
Sample Depth	3 - 4 ft	1 - 2 ft	2 - 3 ft	2 - 3 ft	3 - 4 ft
Sample Date	3/6/2013	2/28/2013	2/28/2013	2/28/2013	2/28/2013
Sample Type	N	N	N	FD	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**1.63**	**1.26**	**0.682**	**0.631**	**1.03**
Total solids	**58.5**	**69.07**	**73.2**	**73.6**	**70**
Grain Size (pct)					
Total Gravel	**0.1**	--	**2**	--	0.1 U
Total Sand	**21.4**	--	**50.6**	--	**14**
Total Silt	**55.4**	--	**36.1**	--	**71.7**
Total Clay	**23.1**	--	**11.3**	--	**14.3**
Total Fines (silt + clay)	**78.5**	--	**47.4**	--	**86**
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	0.0415 U	**0.252 EMPC**	0.0658 U	0.0731 U	0.0741 U
1,2,3,7,8-PeCDD	**0.0809 EMPC**	**0.44 J**	0.0812 U	0.0943 U	0.109 U
1,2,3,4,7,8-HxCDD	0.0553 U	**0.334 J**	0.145 U	0.115 U	0.129 U
1,2,3,6,7,8-HxCDD	**0.12 EMPC**	**2.37**	0.145 U	0.119 U	0.127 U
1,2,3,7,8,9-HxCDD	**0.267 J**	**0.939 J**	0.153 U	0.123 U	0.135 U
1,2,3,4,6,7,8-HpCDD	**2.28**	**39.6**	**2.38**	**2.28**	**1.61**
1,2,3,4,6,7,8,9-OCDD	**18.5**	**253**	**17.8**	**15.3**	**14.9**
2,3,7,8-TCDF	**0.162 EMPC**	**0.354 J**	0.087 U	0.0962 U	0.139 U
1,2,3,7,8-PeCDF	**0.0869 J**	**0.382 J**	0.0812 U	0.0885 U	0.0898 U
2,3,4,7,8-PeCDF	**0.0592 EMPC**	**0.362 EMPC**	0.0793 U	0.0828 U	0.0956 U
1,2,3,4,7,8-HxCDF	**0.111 J**	**0.925 J**	0.0967 U	**0.0616 EMPC**	0.0741 U
1,2,3,6,7,8-HxCDF	0.0375 U	**0.547 EMPC**	0.0948 U	0.0597 U	0.0722 U
1,2,3,7,8,9-HxCDF	0.0415 U	**0.178 JEMPC**	0.114 U	0.077 U	0.0898 U
2,3,4,6,7,8-HxCDF	0.0375 U	**0.517 EMPC**	0.103 U	0.0674 U	0.082 U
1,2,3,4,6,7,8-HpCDF	**0.962 J**	**20.1**	**1.85**	**1.54 EMPC**	0.0663 U
1,2,3,4,7,8,9-HpCDF	0.0652 U	**0.573 J**	0.0851 U	0.0847 U	0.0995 U
1,2,3,4,6,7,8,9-OCDF	**0.75 EMPC**	**22.2**	**1.45 J**	**0.891 EMPC**	0.18 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**1.85 EMPC**	**4.88 EMPC**	**0.894 EMPC**	**1.09 EMPC**	**1.44 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**1.16 EMPC**	**5.85 EMPC**	**0.691 EMPC**	**0.612 EMPC**	**0.494 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**2.18 EMPC**	**19.7 EMPC**	**2.75 EMPC**	**2.13**	**1.7 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**5.78**	**82.3**	**6.25**	**5.95**	**4.32**
Total Tetrachlorodibenzofuran (TCDF)	**2.36 EMPC**	**6.36 EMPC**	**0.197 EMPC**	**0.185 EMPC**	**0.131 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**0.828 EMPC**	**9.75 EMPC**	**0.292 EMPC**	**0.466**	0.0956 U
Total Hexachlorodibenzofuran (HxCDF)	**0.843 JEMPC**	**20.7 JEMPC**	**1.37 EMPC**	**1.39 EMPC**	0.0898 U
Total Heptachlorodibenzofuran (HpCDF)	**2 EMPC**	**43.2 EMPC**	**3.35**	**2.65 EMPC**	**0.0624 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**0.0784 J**	**1.6 J**	**0.0481 J**	**0.0274**	**0.0206**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**0.1716 J**	**1.9 J**	**0.182 J**	**0.169**	**0.1711**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**0.2055 J**	**2.1 J**	**0.0481 J**	**0.0492**	**0.0206**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**0.2351 J**	**2.1 J**	**0.182 J**	**0.18**	**0.1711**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-26	POBI-SC-26	POBI-SC-26	POBI-SC-27	POBI-SC-27	POBI-SC-27
Sample ID	POBI-SC-26-1-2-130307	POBI-SC-26-2-3-130307	POBI-SC-26-3-4-130307	POBI-SC-27-2-3-130306	POBI-SC-27-3-4-130306	POBI-SC-27-4-5-130306
Sample Depth	1 - 2 ft	2 - 3 ft	3 - 4 ft	2 - 3 ft	3 - 4 ft	4 - 5 ft
Sample Date	3/7/2013	3/7/2013	3/7/2013	3/6/2013	3/6/2013	3/6/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**2.31**	**3.28**	**2.39**	**0.961**	**1.19**	**1.19**
Total solids	**55.41**	**61.5**	**66**	**70.2**	**62.7**	**71.11**
Grain Size (pct)						
Total Gravel	--	**5.8**	**14.2**	**0.1**	**1**	--
Total Sand	--	**47.8**	**48.4**	**38.3**	**39.5**	--
Total Silt	--	**30.2**	**24.4**	**49.5**	**41.2**	--
Total Clay	--	**16.2**	**13**	**12.4**	**18.3**	--
Total Fines (silt + clay)	--	**46.4**	**37.4**	**61.9**	**59.5**	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	**0.301 EMPC**	0.182 U	0.176 U	**0.158 EMPC**	**0.387 EMPC**	0.252 U
1,2,3,7,8-PeCDD	**0.958 J**	**0.0998 EMPC**	0.0772 U	0.0553 U	**1.37**	**0.727 J**
1,2,3,4,7,8-HxCDD	**0.987**	0.129 U	0.0752 U	**0.0968 EMPC**	**1.41**	**0.919 J**
1,2,3,6,7,8-HxCDD	**6.76**	**0.685 EMPC**	**0.111 J**	**0.283 EMPC**	**6.12**	**4.57**
1,2,3,7,8,9-HxCDD	**2.66**	**0.292 J**	**0.103 EMPC**	**0.298 J**	**3.47**	**2.22**
1,2,3,4,6,7,8-HpCDD	**136**	**13 J**	**2.6 J**	**4.69**	**144**	**99**
1,2,3,4,6,7,8,9-OCDD	**908**	**90.6**	**19.7**	**36.1**	**963**	**620**
2,3,7,8-TCDF	**0.562 J**	**0.155 EMPC**	0.0416 U	0.0455 U	**1.01**	**0.457 EMPC**
1,2,3,7,8-PeCDF	**0.644 EMPC**	**0.155 EMPC**	0.0574 U	**0.0731 EMPC**	**0.81 J**	0.461 UJ
2,3,4,7,8-PeCDF	**0.784 J**	**0.145 EMPC**	0.0594 U	0.0514 U	**1.24**	**1.12**
1,2,3,4,7,8-HxCDF	**3.28**	**0.679 J**	**0.121 J**	**0.17 J**	**6.44**	**5.67**
1,2,3,6,7,8-HxCDF	**1.43**	**0.297 EMPC**	0.0713 U	**0.0652 EMPC**	**2.02**	**1.48**
1,2,3,7,8,9-HxCDF	**0.5 JEMPC**	**0.262 EMPC**	0.0871 U	0.0435 U	**1.23 J**	**1.01 J**
2,3,4,6,7,8-HxCDF	**1.06**	**0.689 J**	0.0792 U	**0.0613 EMPC**	**3.77**	**1.35**
1,2,3,4,6,7,8-HpCDF	**57.5**	**36.2**	**1.41**	**2.21**	**109**	**52.5**
1,2,3,4,7,8,9-HpCDF	**1.52**	**0.204 J**	0.115 U	**0.0652 EMPC**	**3.13**	**2.5**
1,2,3,4,6,7,8,9-OCDF	**68.4**	**25.7**	**3.02**	**3.98**	**177**	**120**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**6 EMPC**	**1.73 EMPC**	0.695 U	**1.49 EMPC**	**12.9 EMPC**	**6.58 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**8.85 EMPC**	**1.83 EMPC**	0.251 U	**0.962 EMPC**	**16.4 EMPC**	**8.68 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**47 EMPC**	**4.67 EMPC**	**1.41 EMPC**	**3.77 EMPC**	**60.3**	**38.5 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**285**	**27.1 J**	**5.47 J**	**11.7**	**290**	**190**
Total Tetrachlorodibenzofuran (TCDF)	**9.94 EMPC**	**2.94 EMPC**	**0.344 EMPC**	**0.266 EMPC**	**25.3 EMPC**	**11.3 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**24.6 EMPC**	**7.24 EMPC**	**0.295**	**0.813 EMPC**	**46.9 EMPC**	**25.5 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**62.2 JEMPC**	**23.8 EMPC**	**1.48 EMPC**	**2.19 JEMPC**	**101 JEMPC**	**63.3 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**123 EMPC**	**69.9 EMPC**	**3.91**	**5.53 EMPC**	**264 EMPC**	**143**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**5.1 J**	**0.6949 J**	**0.0701 J**	**0.1278 J**	**7.2 J**	**4.5 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**5.3 J**	**0.9363 J**	**0.2299 J**	**0.2734 J**	**7.4 J**	**4.7 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**5.5 J**	**0.9828 J**	**0.0804 J**	**0.3393 J**	**7.6 J**	**4.6 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**5.5 J**	**1.0802 J**	**0.2351 J**	**0.3791 J**	**7.6 J**	**4.7 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-28	POBI-SC-28	POBI-SC-28	POBI-SC-29	POBI-SC-30	POBI-SC-31
Sample ID	POBI-SC-28-1-2-130307	POBI-SC-28-2-3-130307	POBI-SC-28-3-4-130307	POBI-SC-29-0-1-130307	POBI-SC-30-0-1-130307	POBI-SC-31-1-2-130307
Sample Depth	1 - 2 ft	2 - 3 ft	3 - 4 ft	0 - 1 ft	0 - 1 ft	1 - 2 ft
Sample Date	3/7/2013	3/7/2013	3/7/2013	3/7/2013	3/7/2013	3/7/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	1.74	1.34	1.42	0.936	0.835	1.66
Total solids	58.76	71.2	81.6	78.2	74.3	54.83
Grain Size (pct)						
Total Gravel	--	4.5	1.2	1.6	1.9	--
Total Sand	--	65.6	94.3	85.9	79.4	--
Total Silt	--	20.7	2.9	8.8	14	--
Total Clay	--	9.2	1.4	3.7	4.7	--
Total Fines (silt + clay)	--	29.9	4.3	12.5	18.7	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.487 EMPC	0.156 EMPC	0.122 EMPC	0.222 EMPC	0.213 EMPC	0.0656 U
1,2,3,7,8-PeCDD	2.01	0.246 U	0.0921 U	0.503 EMPC	0.558 J	0.292 J
1,2,3,4,7,8-HxCDD	2.32	0.0952 EMPC	0.0483 U	0.495 J	0.554 J	0.31 J
1,2,3,6,7,8-HxCDD	10.7	0.356 J	0.427 EMPC	2.73	2.55	1.84
1,2,3,7,8,9-HxCDD	5.35	0.278 U	0.305 U	1.37	1.25	0.761 J
1,2,3,4,6,7,8-HpCDD	244	4.34	10.7	57.1	48.8	37.4
1,2,3,4,6,7,8,9-OCDD	1520	22.8	66.5	387	315	247
2,3,7,8-TCDF	1.36	0.187 EMPC	0.0753 EMPC	0.306 EMPC	0.523	0.203 J
1,2,3,7,8-PeCDF	1.19 J	0.154 EMPC	0.0676 EMPC	0.287 J	0.382 J	0.223 EMPC
2,3,4,7,8-PeCDF	1.51 EMPC	0.181 EMPC	0.108 U	0.239 J	0.479 J	0.191 EMPC
1,2,3,4,7,8-HxCDF	8.66	0.229 J	0.412 J	1.22	1.08	0.557 J
1,2,3,6,7,8-HxCDF	3.31	0.197 U	0.178 U	0.684 EMPC	0.644 J	0.304 J
1,2,3,7,8,9-HxCDF	1.54 J	0.0893 J	0.112 EMPC	0.341 J	0.32 J	0.163 JEMPC
2,3,4,6,7,8-HxCDF	2.63	0.32 J	0.425 J	1.03	1.1	0.266 J
1,2,3,4,6,7,8-HpCDF	171	9.29	9.54	23.3	33.7	7.49
1,2,3,4,7,8,9-HpCDF	4.7	0.099 JEMPC	0.247 JEMPC	0.846 J	0.558 JEMPC	0.159 EMPC
1,2,3,4,6,7,8,9-OCDF	292	4.63	9.99	22.6	17.9	7.66
Total Tetrachlorodibenzo-p-dioxin (TCDD)	17.7 EMPC	2.93 EMPC	1.44 EMPC	4.05 EMPC	5.19 EMPC	1.77 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	26.5	2.62 EMPC	1.12 EMPC	6.45 EMPC	6.56 EMPC	2.61 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	94.4	5.05 EMPC	5 EMPC	28.8 EMPC	24.2	14.5 EMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	502	9.8	22.3 EMPC	131	105	79.1
Total Tetrachlorodibenzofuran (TCDF)	33 EMPC	4.88 EMPC	1.9 EMPC	4.98 EMPC	11.3 EMPC	2.81 EMPC
Total Pentachlorodibenzofuran (PeCDF)	65.2 EMPC	4.75 EMPC	3.43 EMPC	12 EMPC	16.8 EMPC	4.39 EMPC
Total Hexachlorodibenzofuran (HxCDF)	150 J	6.92 JEMPC	9.15 JEMPC	28.4 JEMPC	31.3 JEMPC	11.5 JEMPC
Total Heptachlorodibenzofuran (HpCDF)	418	15.3 JEMPC	20 JEMPC	49.5 J	57.5 JEMPC	15.7 EMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	10.4 J	0.244 J	0.309 J	1.7 J	2.4 J	1.2414 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	10.8 J	0.5128 J	0.4918 J	2.2 J	2.6 J	1.3151 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	11.3 J	0.4881 J	0.497 J	2.6 J	2.7 J	1.3233 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	11.3 J	0.6348 J	0.5858 J	2.6 J	2.7 J	1.3561 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-32	POBI-SC-32	POBI-SC-33	POBI-SC-34	POBI-SC-34	POBI-SC-35
Sample ID	POBI-SC-32-0-1-130304	POBI-SC-32-1-2-130304	POBI-SC-33-1-2-130305	POBI-SC-34-0-1-130304	POBI-SC-34-1-2-130304	POBI-SC-35-0-1-130228
Sample Depth	0 - 1 ft	1 - 2 ft	1 - 2 ft	0 - 1 ft	1 - 2 ft	0 - 1 ft
Sample Date	3/4/2013	3/4/2013	3/5/2013	3/4/2013	3/4/2013	2/28/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**2.48**	**2.87**	**2.61**	**1.43**	**1.97**	**1.37**
Total solids	**46.08**	**43.07**	**70.15**	**52.25**	**58.4**	**45.63**
Grain Size (pct)						
Total Gravel	--	--	--	--	**7.5**	--
Total Sand	--	--	--	--	**36.9**	--
Total Silt	--	--	--	--	**37.9**	--
Total Clay	--	--	--	--	**17.7**	--
Total Fines (silt + clay)	--	--	--	--	**55.6**	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	**1.21**	**0.915 EMPC**	0.562 U	**0.483 EMPC**	0.0721 U	**0.296 EMPC**
1,2,3,7,8-PeCDD	**4.05**	**2.26**	**2**	**1.47**	**0.136 EMPC**	**0.921 J**
1,2,3,4,7,8-HxCDD	**3.55**	**1.16**	**2.31**	**1.9**	**0.351 EMPC**	**1.33**
1,2,3,6,7,8-HxCDD	**18.9**	**2.69 J**	**7.37**	**9.09**	**1.11 EMPC**	**7.14**
1,2,3,7,8,9-HxCDD	**7.82**	**1.88**	**4.96**	**4.35**	**0.704 J**	**3.12**
1,2,3,4,6,7,8-HpCDD	**368**	**25.3**	**144**	**213**	**26.6**	**173**
1,2,3,4,6,7,8,9-OCDD	**2670**	**123**	**879**	**1520**	**198**	**1330**
2,3,7,8-TCDF	**4.58**	**3.33**	**1.61 EMPC**	**2.07**	**0.146 EMPC**	**0.641 J**
1,2,3,7,8-PeCDF	**3.43 J**	**1.77**	**1.35 J**	**1.1 JEMPC**	**0.189 J**	**0.597 EMPC**
2,3,4,7,8-PeCDF	**3.84**	**1.6**	**1.56**	**1.16 EMPC**	**0.16 EMPC**	**0.673 J**
1,2,3,4,7,8-HxCDF	**8.8**	**1.15 J**	**3.84**	**3.85**	**0.579 J**	**2.52 EMPC**
1,2,3,6,7,8-HxCDF	**5.49**	**1.37**	**2.25**	**1.69**	**0.253 EMPC**	**1.2**
1,2,3,7,8,9-HxCDF	**2.18 J**	**0.371 JEMPC**	**0.867 J**	**0.908 J**	**0.148 EMPC**	**0.752 J**
2,3,4,6,7,8-HxCDF	**8.98**	**1.9**	**1.88 J**	**1.51**	**0.402 J**	**1.06 EMPC**
1,2,3,4,6,7,8-HpCDF	**341**	**28.4 J**	**49.3**	**51.4**	**6.64**	**33.6**
1,2,3,4,7,8,9-HpCDF	**3.81**	**0.321 EMPC**	**2.42**	**2.12**	**0.339 EMPC**	**1.45 EMPC**
1,2,3,4,6,7,8,9-OCDF	**187**	**11.4**	**92.6**	**84.9**	**10.8**	**55.2**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**61.7 EMPC**	**54 EMPC**	**33.7 EMPC**	**20.8 EMPC**	**2.25 EMPC**	**6.1 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**66.7**	**44.6 EMPC**	**44.8 EMPC**	**19.8**	**2.76 EMPC**	**10.3 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**176 EMPC**	**45.4 JEMPC**	**110 EMPC**	**87.4 EMPC**	**11.5 EMPC**	**61.4 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**853**	**55.6**	**301**	**481**	**58.4**	**406**
Total Tetrachlorodibenzofuran (TCDF)	**108 EMPC**	**61.5 EMPC**	**39.5 EMPC**	**23.6 EMPC**	**2.78 EMPC**	**9.55 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**139 EMPC**	**45.1 EMPC**	**42.8 EMPC**	**29 EMPC**	**5.03 EMPC**	**18.4 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**252 JEMPC**	**30.6 JEMPC**	**76.6 JEMPC**	**65.4 JEMPC**	**9.71 EMPC**	**45.2 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**569**	**45 JEMPC**	**122**	**128**	**17 EMPC**	**82.8 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**20.5 J**	**4.7 J**	**7.1 J**	**7.2 J**	**0.5692 J**	**5.0 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**20.5 J**	**5.2 J**	**7.5 J**	**7.6 J**	**0.7994 J**	**5.4 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**20.5 J**	**5.7 J**	**7.6 J**	**8.0 J**	**0.9574 J**	**5.8 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**20.5 J**	**5.7 J**	**7.6 J**	**8.0 J**	**0.9935 J**	**5.8 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-35	POBI-SC-36	POBI-SC-36	POBI-SC-37	POBI-SC-37	POBI-SC-38
Sample ID	POBI-SC-35-1-2-130228	POBI-SC-36-3-4-130305	POBI-SC-36-4-5-130305	POBI-SC-37-1-2-130305	POBI-SC-37-2-3-130305	POBI-SC-38-1-2-130301
Sample Depth	1 - 2 ft	3 - 4 ft	4 - 5 ft	1 - 2 ft	2 - 3 ft	1 - 2 ft
Sample Date	2/28/2013	3/5/2013	3/5/2013	3/5/2013	3/5/2013	3/1/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**3.04**	**2.99**	**3.17**	**2.27**	**1.31**	**0.771**
Total solids	**54**	**62.2**	**66.8**	**71.67**	**82.6**	**85.36**
Grain Size (pct)						
Total Gravel	**16.4**	**24.6**	--	--	**48.7**	--
Total Sand	**24.6**	**37.2**	--	--	**42.5**	--
Total Silt	**36.7**	**22.9**	--	--	**6.3**	--
Total Clay	**22.3**	**15.2**	--	--	**2.5**	--
Total Fines (silt + clay)	**59**	**38.1**	--	--	**8.8**	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	**0.19 EMPC**	**0.316 EMPC**	0.209 U	0.0624 U	0.0353 U	0.0615 U
1,2,3,7,8-PeCDD	**0.543 EMPC**	**0.809 J**	**0.387 EMPC**	**0.3 J**	0.0628 U	0.0496 U
1,2,3,4,7,8-HxCDD	**0.484 J**	**0.993**	**0.52 J**	**0.322 J**	0.055 U	0.0655 U
1,2,3,6,7,8-HxCDD	**3.18**	**6.63**	**3**	**1.48**	0.0569 U	**0.123 EMPC**
1,2,3,7,8,9-HxCDD	**1.4 EMPC**	**2.66**	**1.17**	**0.768 J**	**0.104 EMPC**	**0.0645 J**
1,2,3,4,6,7,8-HpCDD	**81.1**	**188**	**87**	**32.1**	**0.948 J**	**2.11**
1,2,3,4,6,7,8,9-OCDD	**585**	**1470**	**678**	**238**	**7.12**	**14.6**
2,3,7,8-TCDF	**0.292 EMPC**	**0.621 EMPC**	0.236 U	0.211 U	0.0353 U	0.0496 U
1,2,3,7,8-PeCDF	**0.366 J**	**0.694 J**	0.316 UJ	0.187 UJ	0.0353 U	0.0357 U
2,3,4,7,8-PeCDF	**0.458 EMPC**	**0.809 EMPC**	**0.395 J**	0.173 U	0.0373 U	0.0397 U
1,2,3,4,7,8-HxCDF	**1.52**	**3.36**	**1.49**	**0.581 J**	0.0334 U	**0.0349 J**
1,2,3,6,7,8-HxCDF	**0.619 EMPC**	**1.27**	**0.548 EMPC**	**0.253 J**	0.0314 U	0.0417 U
1,2,3,7,8,9-HxCDF	**0.37 EMPC**	**0.83 J**	**0.401 J**	0.162 UJ	0.0451 U	0.0536 U
2,3,4,6,7,8-HxCDF	**0.981 J**	**1.94**	**0.445 EMPC**	**0.187 EMPC**	0.0353 U	0.0437 U
1,2,3,4,6,7,8-HpCDF	**18**	**38.4**	**17.3**	**7.04**	**0.159 EMPC**	0.391 U
1,2,3,4,7,8,9-HpCDF	**0.863 J**	**1.9**	**0.812 J**	**0.285 J**	0.055 U	0.0635 U
1,2,3,4,6,7,8,9-OCDF	**27.9**	**79.8**	**32.7**	**11**	**0.269 J**	0.604 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**5.25 EMPC**	**5.54 EMPC**	**3.27 EMPC**	**8.91 EMPC**	0.324 U	**0.409 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**6.91 EMPC**	**8.48 EMPC**	**3.89 EMPC**	**6.12 EMPC**	0.0628 U	0.0367 U
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**30 EMPC**	**57.8**	**25.1**	**12.7 EMPC**	**1.05 EMPC**	0.912 U
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**183 EMPC**	**439 EMPC**	**195**	**69.8**	**2.26**	**4.74**
Total Tetrachlorodibenzofuran (TCDF)	**6.28 EMPC**	**13.2 EMPC**	**5.1 EMPC**	**3.77 EMPC**	**0.0807 EMPC**	**0.069 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**11.9 EMPC**	**26.7 EMPC**	**8.94 EMPC**	**4.8 EMPC**	0.0373 U	**0.175 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**27.1 EMPC**	**58.6 EMPC**	**24.7 JEMPC**	**9.85 JEMPC**	**0.173 EMPC**	0.517 U
Total Heptachlorodibenzofuran (HpCDF)	**48.4 EMPC**	**111 EMPC**	**45.6 EMPC**	**17.6 EMPC**	**0.355 EMPC**	0.86 U
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**1.8 J**	**5.4 J**	**2.0 J**	**1.1 J**	**0.0117 J**	**0.0354 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**2.4 J**	**5.7 J**	**2.4 J**	**1.2 J**	**0.0878 J**	**0.1187 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**3.0 J**	**6.0 J**	**2.5 J**	**1.2 J**	**0.0237 J**	**0.0477 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**3.0 J**	**6.0 J**	**2.6 J**	**1.2 J**	**0.0938 J**	**0.1248 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-38	POBI-SC-39	POBI-SC-39	POBI-SC-39	POBI-SC-40
Sample ID	POBI-SC-38-1-2-130301DUP	POBI-SC-39-1-2-130305	POBI-SC-39-3-4-130305	POBI-SC-39-4-5-130305	POBI-SC-40-1-2-130228
Sample Depth	1 - 2 ft	1 - 2 ft	3 - 4 ft	4 - 5 ft	1 - 2 ft
Sample Date	3/1/2013	3/5/2013	3/5/2013	3/5/2013	2/28/2013
Sample Type	FD	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	**0.515**	**1.32**	**0.266**	**0.255**	**2.12**
Total solids	**79.16**	**61.42**	**64.25**	**69.3**	**79.18**
Grain Size (pct)					
Total Gravel	--	--	--	**0.1**	--
Total Sand	--	--	--	**7.1**	--
Total Silt	--	--	--	**57.5**	--
Total Clay	--	--	--	**35.3**	--
Total Fines (silt + clay)	--	--	--	**92.8**	--
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	0.0693 U	**0.752 EMPC**	0.264 U	**0.199 EMPC**	0.0532 U
1,2,3,7,8-PeCDD	0.0634 U	**1.55**	**0.408 J**	0.123 U	0.065 U
1,2,3,4,7,8-HxCDD	**0.0717 J**	**0.631 J**	**0.191 J**	0.0723 U	0.0453 U
1,2,3,6,7,8-HxCDD	**0.082 J**	**1.5 J**	**0.509 J**	**0.264 EMPC**	0.0453 U
1,2,3,7,8,9-HxCDD	**0.0594 EMPC**	**1.21**	**0.917 J**	**0.39 J**	0.0473 U
1,2,3,4,6,7,8-HpCDD	**1.94**	**14.1**	**10.5**	**7.8**	0.863 U
1,2,3,4,6,7,8,9-OCDD	**13.6**	**86.5**	**236**	**325**	**7.58**
2,3,7,8-TCDF	0.0515 U	**2.7**	0.0473 U	0.0312 U	0.0453 U
1,2,3,7,8-PeCDF	0.0337 U	**1.5**	0.0493 UJ	0.0352 U	**0.0315 JEMPC**
2,3,4,7,8-PeCDF	0.0356 U	**1.29**	0.0335 U	0.0371 U	0.0355 U
1,2,3,4,7,8-HxCDF	**0.0396 EMPC**	**0.716 J**	0.0335 U	0.041 U	0.0296 U
1,2,3,6,7,8-HxCDF	**0.0376 EMPC**	**0.79 J**	0.0493 U	0.0391 U	0.0276 U
1,2,3,7,8,9-HxCDF	0.0376 U	0.0694 U	0.0375 U	0.0547 U	0.0335 U
2,3,4,6,7,8-HxCDF	0.0297 U	**1.01**	0.0316 U	0.0449 U	0.0296 U
1,2,3,4,6,7,8-HpCDF	0.415 U	**13.7 J**	**0.278 J**	**0.0898 EMPC**	0.244 U
1,2,3,4,7,8,9-HpCDF	0.0436 U	**0.246 J**	0.0473 U	0.0547 U	0.0374 U
1,2,3,4,6,7,8,9-OCDF	0.616 U	**6.12**	**1.14 J**	0.0938 U	0.56 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**0.197 EMPC**	**34.5 EMPC**	**6.46 EMPC**	**4.42 EMPC**	**0.237 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	0.129 U	**26.6 EMPC**	**3.54 EMPC**	**1.28 EMPC**	0.065 U
Total Hexachlorodibenzo-p-dioxin (HxCDD)	0.767 U	**27.3 JEMPC**	**10.6 EMPC**	**5.58 EMPC**	0.486 U
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**4.48 EMPC**	**31.5**	**29.3**	**20.7**	**1.99 EMPC**
Total Tetrachlorodibenzofuran (TCDF)	**0.0772 EMPC**	**63.1 EMPC**	0.0935 U	**0.0346**	**0.467 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**0.14 EMPC**	**34.6 EMPC**	0.0494 U	0.0371 U	**0.0707 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	0.382 U	**16.7 JEMPC**	0.237 U	0.0547 U	0.176 U
Total Heptachlorodibenzofuran (HpCDF)	0.965 U	**21.7 JEMPC**	**0.886**	**0.243 EMPC**	0.599 U
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**0.0389 J**	**3.1 J**	**0.7486 J**	**0.2145 J**	**0.0023 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**0.1262 J**	**3.5 J**	**0.8966 J**	**0.4097 J**	**0.0882 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**0.0525 J**	**3.9 J**	**0.7486 J**	**0.4408 J**	**0.0032 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**0.133 J**	**4.0 J**	**0.8966 J**	**0.5228 J**	**0.0886 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-41	POBI-SC-41	POBI-SC-41	POBI-SC-42	POBI-SC-43	POBI-SC-43
Sample ID	POBI-SC-41-1-2-130305	POBI-SC-41-2-3-130305	POBI-SC-41-3-4-130305	POBI-SC-42-1-2-130228	POBI-SC-43-2-3-130306	POBI-SC-43-3-4-130306
Sample Depth	1 - 2 ft	2 - 3 ft	3 - 4 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft
Sample Date	3/5/2013	3/5/2013	3/5/2013	2/28/2013	3/6/2013	3/6/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**0.113**	**0.12**	**0.069**	**0.901**	**0.28**	**0.432**
Total solids	**78.84**	**83.2**	**81.3**	**66.35**	**71.74**	**69.4**
Grain Size (pct)						
Total Gravel	--	--	**4.7**	--	--	0.1 U
Total Sand	--	--	**79.1**	--	--	**0.5**
Total Silt	--	--	**14.9**	--	--	**84.4**
Total Clay	--	--	**1.2**	--	--	**15.1**
Total Fines (silt + clay)	--	--	**16.1**	--	--	**99.5**
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.0417 U	0.149 U	**0.113 EMPC**	**0.488 EMPC**	0.21 U	**0.259 EMPC**
1,2,3,7,8-PeCDD	0.0517 U	0.0757 U	0.0519 U	**1.39 EMPC**	0.141 U	**0.239 EMPC**
1,2,3,4,7,8-HxCDD	0.0855 U	0.0478 U	0.0653 U	**1.66**	0.0496 U	**0.175 J**
1,2,3,6,7,8-HxCDD	**0.328 J**	0.0478 U	0.0653 U	**5.36**	**0.266 J**	**0.277 EMPC**
1,2,3,7,8,9-HxCDD	**0.215 EMPC**	0.0498 U	0.0692 U	**3.24**	**0.373 J**	**0.653 J**
1,2,3,4,6,7,8-HpCDD	**12.3**	0.508 U	**1.09**	**101**	**5.83**	**6.11**
1,2,3,4,6,7,8,9-OCDD	**93.9**	**5.04**	**14.2**	**618**	**58.3**	**82.5**
2,3,7,8-TCDF	0.0477 U	0.0339 U	0.0269 U	**1.4**	0.0377 U	0.0578 U
1,2,3,7,8-PeCDF	**0.0398 EMPC**	0.0398 U	**0.0307 EMPC**	**1.08 J**	0.0317 U	0.0538 U
2,3,4,7,8-PeCDF	**0.0457 EMPC**	0.0438 U	0.0307 U	**1.41**	0.0357 U	0.0538 U
1,2,3,4,7,8-HxCDF	**0.141 EMPC**	0.0299 U	0.0365 U	**3.43**	0.0675 U	0.0378 U
1,2,3,6,7,8-HxCDF	**0.0616 J**	0.0279 U	0.0346 U	**1.68**	0.0258 U	0.0378 U
1,2,3,7,8,9-HxCDF	0.0358 U	0.0398 U	0.0461 U	**0.594 JEMPC**	0.0437 U	0.0438 U
2,3,4,6,7,8-HxCDF	**0.0557 EMPC**	0.0319 U	0.0384 U	**1.03**	0.0496 U	0.0378 U
1,2,3,4,6,7,8-HpCDF	**1.93 J**	0.0717 U	**0.104 J**	**31.9**	**1.04**	**0.199 EMPC**
1,2,3,4,7,8,9-HpCDF	**0.0915 EMPC**	0.0378 U	0.0788 U	**1.94 EMPC**	0.0417 U	0.0618 U
1,2,3,4,6,7,8,9-OCDF	**6.15**	0.0797 U	0.0826 U	**69.9**	**1.47 EMPC**	0.0996 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	1.01 U	0.64 U	**1.01 EMPC**	**25 EMPC**	**3.24 EMPC**	**5.79 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	0.482 U	0.0757 U	**0.109 EMPC**	**26.6 EMPC**	**1.9 EMPC**	**2.7 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	3.73 UJ	**0.417 EMPC**	**0.729 EMPC**	**55.2**	**5.74 EMPC**	**7.6 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**26.7**	1.43 U	**3.1**	**209**	**15.8**	**17.4**
Total Tetrachlorodibenzofuran (TCDF)	**0.108 EMPC**	0.0339 U	0.0269 U	**28.6 EMPC**	0.245 U	**0.112 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**0.72 EMPC**	0.0438 U	**0.0796 EMPC**	**34.2 EMPC**	0.506 U	0.0538 U
Total Hexachlorodibenzofuran (HxCDF)	**2.25 JEMPC**	0.0524 U	0.0461 U	**48.8 JEMPC**	**1.23 EMPC**	**0.0508 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**6.01 JEMPC**	0.0725 U	**0.17 EMPC**	**85.2 EMPC**	**2.42**	**0.286 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**0.2113 J**	**0.0015**	**0.0162 J**	**3.8 J**	**0.1501 J**	**0.1687 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**0.2949 J**	**0.1396**	**0.1232 J**	**4.7 J**	**0.3455 J**	**0.4524 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**0.2683 J**	**0.0015**	**0.1301 J**	**5.7 J**	**0.1505 J**	**0.6963 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**0.3234 J**	**0.1396**	**0.1802 J**	**5.7 J**	**0.3458 J**	**0.7163 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-43	POBI-SC-44	POBI-SC-44	POBI-SC-44	POBI-SC-45	POBI-SC-45
Sample ID	POBI-SC-43-4-5-130306	POBI-SC-44-1-2-130301	POBI-SC-44-2-3-130301	POBI-SC-44-3-4-130301	POBI-SC-45-1-2-130305	POBI-SC-45-2-3-130305
Sample Depth	4 - 5 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	1 - 2 ft	2 - 3 ft
Sample Date	3/6/2013	3/1/2013	3/1/2013	3/1/2013	3/5/2013	3/5/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**0.445**	**1.93**	**2.58**	**4.04**	**2.56**	**0.3**
Total solids	**69.6**	**51.2**	**51**	**55.98**	**46.04**	**72.4**
Grain Size (pct)						
Total Gravel	0.1 U	**0.3**	--	--	--	--
Total Sand	**0.3**	**6.2**	--	--	--	--
Total Silt	**85.2**	**64.7**	--	--	--	--
Total Clay	**14.3**	**28.7**	--	--	--	--
Total Fines (silt + clay)	**99.5**	**93.4**	--	--	--	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.0545 U	**1.43**	**0.942 EMPC**	**1.35 EMPC**	**1.43 EMPC**	0.2 U
1,2,3,7,8-PeCDD	**0.169 EMPC**	**5.04**	**3.13**	**4.68**	**8.6**	**0.307 J**
1,2,3,4,7,8-HxCDD	**0.0992 EMPC**	**2.83**	**1.51**	**2.42**	**14.1**	**0.255 J**
1,2,3,6,7,8-HxCDD	**0.245 J**	**9.35**	**4.86**	**6.34 J**	**74.2 J**	**0.896 J**
1,2,3,7,8,9-HxCDD	**0.504 EMPC**	**4.84**	**2.5**	**3.96**	**33.2**	**0.724 J**
1,2,3,4,6,7,8-HpCDD	**5.73**	**139**	**48.6**	**55.1**	**1940**	**19.4**
1,2,3,4,6,7,8,9-OCDD	**102**	**830**	**265**	**288**	**15300 J**	**157**
2,3,7,8-TCDF	0.07 U	**4.9**	**3.46**	**4.27**	**4.28**	0.131 U
1,2,3,7,8-PeCDF	0.0467 U	**3.23 J**	**2.08 J**	**2.67**	**4.9 J**	0.129 UJ
2,3,4,7,8-PeCDF	0.0486 U	**5.34**	**3.74**	**4.35**	**6.29**	0.0514 U
1,2,3,4,7,8-HxCDF	0.035 U	**4.67 J**	**2.53**	**3.19 J**	**27.7**	**0.396 J**
1,2,3,6,7,8-HxCDF	0.0331 U	**5.17**	**3.64**	**4.21**	**11.2**	**0.249 EMPC**
1,2,3,7,8,9-HxCDF	0.0389 U	**1.53**	**1.07 J**	**1.29 J**	**6.89 J**	0.0732 UJ
2,3,4,6,7,8-HxCDF	0.035 U	**8.99 J**	**6.97**	**7.34**	**18**	**0.342 J**
1,2,3,4,6,7,8-HpCDF	0.037 U	**103**	**62.6**	**63.8 J**	**318 J**	**12.3**
1,2,3,4,7,8,9-HpCDF	0.0545 U	**2.27**	**1.41**	**1.49**	**22.5**	**0.243 EMPC**
1,2,3,4,6,7,8,9-OCDF	0.0739 U	**189**	**148**	**154**	**761**	**12.3**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**4.95 EMPC**	**77.9 EMPC**	**51.5 EMPC**	**73.9 EMPC**	**37.6 EMPC**	**3.97 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**2.5 EMPC**	**78.9**	**50.5 EMPC**	**83.9**	**80.5 EMPC**	**3.26 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**6.94 EMPC**	**114**	**58.3**	**89 JEMPC**	**523 JEMPC**	**11.3 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**16.5**	**303**	**116**	**132**	**3860**	**45.6**
Total Tetrachlorodibenzofuran (TCDF)	**0.11 EMPC**	**171 EMPC**	**119 EMPC**	**128 EMPC**	**73.8 EMPC**	**2.2 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	0.0486 U	**297 EMPC**	**205 EMPC**	**218 EMPC**	**204 EMPC**	**3.28 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	0.0389 U	**155 EMPC**	**97.9 JEMPC**	**108 JEMPC**	**478 JEMPC**	**8.36 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	0.0545 U	**237 EMPC**	**149**	**151 J**	**1010 JEMPC**	**23.6 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**0.1124 J**	**15.2 J**	**8.2 J**	**10.7 J**	**57.2 J**	**0.9361 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**0.2734 J**	**15.2 J**	**8.7 J**	**11.4 J**	**58.0 J**	**1.0696 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**0.3417 J**	**15.2 J**	**9.2 J**	**12.1 J**	**58.7 J**	**0.9634 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**0.388 J**	**15.2 J**	**9.2 J**	**12.1 J**	**58.7 J**	**1.0833 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-45	POBI-SC-46	POBI-SC-47	POBI-SC-47	POBI-SC-47	POBI-SC-47
Sample ID	POBI-SC-45-3-4-130305	POBI-SC-46-8-10-130227	POBI-SC-47-0-1-130227	POBI-SC-47-1-2-130227	POBI-SC-47-2-3-130227	POBI-SC-47-3-4-130227
Sample Depth	3 - 4 ft	8 - 10 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft
Sample Date	3/5/2013	2/27/2013	2/27/2013	2/27/2013	2/27/2013	2/27/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	**0.31**	**0.168**	**3.05**	**3**	**1.86**	**2.38**
Total solids	**72**	**77**	**57.2**	**59**	**65.63**	**60.19**
Grain Size (pct)						
Total Gravel	0.1 U	0.1 U	**5.6**	**4.4**	--	--
Total Sand	**0.6**	**7.3**	**33.3**	**30.6**	--	--
Total Silt	**84.2**	**85**	**39**	**43**	--	--
Total Clay	**15.2**	**7.7**	**22**	**22**	--	--
Total Fines (silt + clay)	**99.4**	**92.7**	**61**	**65**	--	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	**0.197 EMPC**	**0.14 EMPC**	**0.739**	**1.09 EMPC**	**1.08**	**0.491 EMPC**
1,2,3,7,8-PeCDD	0.0833 U	0.164 U	**3.82**	**4.25**	**2.52**	**0.792 EMPC**
1,2,3,4,7,8-HxCDD	0.0716 U	0.199 U	**3.68**	**2.25 EMPC**	**1.3 EMPC**	**0.289 J**
1,2,3,6,7,8-HxCDD	**0.188 EMPC**	**0.341 EMPC**	**17.3**	**5.43**	**3 EMPC**	**0.514 J**
1,2,3,7,8,9-HxCDD	**0.407 EMPC**	**0.656 EMPC**	**8.02**	**4.09**	**1.93**	**0.534 J**
1,2,3,4,6,7,8-HpCDD	**4.7**	**9.5**	**354**	**51.1**	**27.1**	**3.62**
1,2,3,4,6,7,8,9-OCDD	**77.6**	**82.7**	**2320**	**280**	**153**	**15**
2,3,7,8-TCDF	0.029 U	0.132 U	**2.95**	**4.97**	**4.62**	**2.26**
1,2,3,7,8-PeCDF	0.0368 U	0.13 U	**2.27**	**2.81**	**2.3 J**	**0.856 J**
2,3,4,7,8-PeCDF	0.0407 U	0.124 U	**3.47 EMPC**	**3.68**	**2.21**	**0.739 J**
1,2,3,4,7,8-HxCDF	0.0368 U	**0.359 EMPC**	**8.51**	**2.78 J**	**2 J**	**0.366 EMPC**
1,2,3,6,7,8-HxCDF	**0.0252 J**	0.142 U	**4.42**	**3.12**	**1.35**	**0.397 EMPC**
1,2,3,7,8,9-HxCDF	0.0484 U	0.175 U	**1.81 EMPC**	**0.808 J**	**0.439 J**	**0.125 JEMPC**
2,3,4,6,7,8-HxCDF	0.0387 U	0.167 U	**6.77**	**5.09 EMPC**	**1.01 J**	**0.426 J**
1,2,3,4,6,7,8-HpCDF	**0.0484 EMPC**	**3.28**	**83.3**	**12**	**10.4**	**3.86 J**
1,2,3,4,7,8,9-HpCDF	0.0581 U	**0.116 EMPC**	**3.26**	**0.796 J**	**0.659 J**	0.106 U
1,2,3,4,6,7,8,9-OCDF	**0.124 EMPC**	**6.48**	**104**	**13.7**	**27.1**	**1.62 J**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**4.2 EMPC**	**1.64 EMPC**	**49.2 EMPC**	**83.3 EMPC**	**55.8 EMPC**	**24.4 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**1.46 EMPC**	**0.8 EMPC**	**64.6 EMPC**	**89.4 EMPC**	**53**	**18.5 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**4.83 EMPC**	**5.53 EMPC**	**179**	**102 EMPC**	**55.8 EMPC**	**17.3 JEMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**12.7 EMPC**	**22.6**	**745 EMPC**	**105**	**55**	**7.65**
Total Tetrachlorodibenzofuran (TCDF)	**0.0424 EMPC**	**0.148**	**77.8 EMPC**	**130 EMPC**	**101 EMPC**	**43.9 EMPC**
Total Pentachlorodibenzofuran (PeCDF)	**0.0493 EMPC**	**1.18 EMPC**	**119 EMPC**	**131 EMPC**	**37.2 EMPC**	**11.2 EMPC**
Total Hexachlorodibenzofuran (HxCDF)	**0.0879 EMPC**	**4.06 EMPC**	**148 EMPC**	**61.3 EMPC**	**22 JEMPC**	**4.55 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)	**0.205 EMPC**	**9.79 EMPC**	**193 EMPC**	**26.7**	**31**	**5.92 JEMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	**0.0728 J**	**0.155**	**15.0**	**8.3 J**	**6.0 J**	**0.729 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	**0.2611 J**	**0.436**	**15.5**	**9.2 J**	**6.1 J**	**1.416 J**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	**0.3298 J**	**0.431**	**16.1**	**10.1 J**	**6.3 J**	**2.101 J**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	**0.3896 J**	**0.575**	**16.1**	**10.1 J**	**6.3 J**	**2.102 J**

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-48	POBI-SC-49	POBI-SC-49	POBI-SC-49	POBI-SC-49	POBI-SC-49
Sample ID	POBI-SC-48-1-2-130301	POBI-SC-49-0-1-130301	POBI-SC-49-1-2-130301	POBI-SC-49-2-3-130301	POBI-SC-49-3-4-130301	POBI-SC-49-4-6-130301
Sample Depth	1 - 2 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	4 - 6 ft
Sample Date	3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013
Sample Type	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE
Conventional Parameters (pct)						
Total organic carbon	1.2	7.32	28.5	3.37	2.8	1.99
Total solids	58.29	28.8	18.5	45.87	53.77	71.4
Grain Size (pct)						
Total Gravel	--	1.2	1.2	--	--	--
Total Sand	--	24.7	25.9	--	--	--
Total Silt	--	52.2	46.5	--	--	--
Total Clay	--	21.7	26.4	--	--	--
Total Fines (silt + clay)	--	73.9	72.9	--	--	--
Dioxin Furans (ng/kg)						
2,3,7,8-TCDD	0.236 EMPC	8.83	33	3.26	5.03	1.42
1,2,3,7,8-PeCDD	0.435 J	36.8	126	18.2	13.4	3.51
1,2,3,4,7,8-HxCDD	0.653 J	46.2	151	27	21	4.99
1,2,3,6,7,8-HxCDD	2.26	326	1410	189	142 J	34.5 J
1,2,3,7,8,9-HxCDD	1.38 EMPC	105	411	66	55.4	13.3
1,2,3,4,6,7,8-HpCDD	58.3	8300	27800 J	4210 J	2980	876
1,2,3,4,6,7,8,9-OCDD	436	83000 J	366000 J	34900 J	24400 J	5840 J
2,3,7,8-TCDF	0.339 EMPC	34.3	67.5	12.5	19.4	5.19
1,2,3,7,8-PeCDF	0.311 EMPC	35.8 J	155 J	16.7 J	10.8	2.63
2,3,4,7,8-PeCDF	0.449 J	53.9	232	23.8	13.4	3.61
1,2,3,4,7,8-HxCDF	1.15 J	337	1450	126 J	42	11.7
1,2,3,6,7,8-HxCDF	0.571 J	89.4	404	37.3	18.9	5.17
1,2,3,7,8,9-HxCDF	0.194 JEMPC	65.3	239	29.6 J	12.4 J	3.31 J
2,3,4,6,7,8-HxCDF	0.487 EMPC	127	543	23.1 JEMPC	30.7	8.36
1,2,3,4,6,7,8-HpCDF	11.7	3170	17900	981	500 J	133 J
1,2,3,4,7,8,9-HpCDF	0.589 EMPC	136	633	59.4	32.9	9.82
1,2,3,4,6,7,8,9-OCDF	23.8	5510	31300	2250	1190	446
Total Tetrachlorodibenzo-p-dioxin (TCDD)	4.44 EMPC	235 EMPC	763	558 EMPC	57.6 EMPC	18.9 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	5.97 EMPC	396	1160	559 EMPC	106	34.5 EMPC
Total Hexachlorodibenzo-p-dioxin (HxCDD)	21.9 EMPC	2150	8560	1510 EMPC	842 JEMPC	219 J
Total Heptachlorodibenzo-p-dioxin (HpCDD)	129	16600	56100 J	8480	6470	1610
Total Tetrachlorodibenzofuran (TCDF)	7.8 EMPC	662 EMPC	1360 EMPC	226 EMPC	237 EMPC	80 EMPC
Total Pentachlorodibenzofuran (PeCDF)	12 EMPC	1890 EMPC	7690 EMPC	536 EMPC	399 EMPC	118 EMPC
Total Hexachlorodibenzofuran (HxCDF)	19.4 JEMPC	6130 EMPC	27500 EMPC	2000 JEMPC	841 JEMPC	217 J
Total Heptachlorodibenzofuran (HpCDF)	30.7 EMPC	9660 EMPC	41900 EMPC	3220 EMPC	1700 JEMPC	506 JEMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	1.9 J	318.5 J	1283.3 J	141.5 J	99.8 J	26.8 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	2.1 J	318.5 J	1283.3 J	142.7 J	99.8 J	26.8 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	2.4 J	318.5 J	1283.3 J	143.8 J	99.8 J	26.8 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	2.4 J	318.5 J	1283.3 J	143.8 J	99.8 J	26.8 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-49	POBI-SC-49	POBI-SC-50	POBI-SC-50	POBI-SC-50
Sample ID	POBI-SC-49-6-8-130301	POBI-SC-49-10.5-11.4-130301	POBI-SC-50-0-1-130301	POBI-SC-50-1-2-130301	POBI-SC-50-2-3-130301
Sample Depth	6 - 8 ft	10.5 - 11.4 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft
Sample Date	3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	2.1	4.58	2.62	1.52	0.897
Total solids	64.86	49.32	80.9	72.5	76.2
Grain Size (pct)					
Total Gravel	--	--	42.8	38.5	0.7
Total Sand	--	--	46.6	40.5	82.6
Total Silt	--	--	8.8	17.2	13.2
Total Clay	--	--	1.9	3.9	3.5
Total Fines (silt + clay)	--	--	10.7	21.1	16.7
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	2.54 EMPC	6.29	0.586 EMPC	1.96	0.789 EMPC
1,2,3,7,8-PeCDD	6.92	26.7	1.55 EMPC	4.79	1.46
1,2,3,4,7,8-HxCDD	9.28	35.5	2.08 EMPC	5.79	1.56
1,2,3,6,7,8-HxCDD	70.7 J	209 J	10.7	27.6	19.4
1,2,3,7,8,9-HxCDD	28	77.8	4.3	12.8	4.44
1,2,3,4,6,7,8-HpCDD	1700	5440	241	607	557
1,2,3,4,6,7,8,9-OCDD	10900 J	44200 J	1750	4310 J	5290 J
2,3,7,8-TCDF	15.4	16.7	1.24	3.88	1.7 EMPC
1,2,3,7,8-PeCDF	5.73	22.2	1.12 EMPC	4.23 J	2.02 J
2,3,4,7,8-PeCDF	7.49	36	1.72 EMPC	5.95	4.12
1,2,3,4,7,8-HxCDF	19.9	185	7.2	22.9	33.2
1,2,3,6,7,8-HxCDF	8.19	57.9	2.53	8.61	6.8
1,2,3,7,8,9-HxCDF	5.48 J	42.1 J	2.33 EMPC	5.65	6.68
2,3,4,6,7,8-HxCDF	13.9	92.9	5.83 EMPC	13.4	12.5
1,2,3,4,6,7,8-HpCDF	250 J	2350 J	67.5	199	254
1,2,3,4,7,8,9-HpCDF	16.2	165	4.37 EMPC	12.3	18.8
1,2,3,4,6,7,8,9-OCDF	755	9220	203	522	941
Total Tetrachlorodibenzo-p-dioxin (TCDD)	29.8 EMPC	187 EMPC	18 EMPC	55.2 EMPC	33.7 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	60.9 EMPC	308 EMPC	22.9 EMPC	65.8	39.2
Total Hexachlorodibenzo-p-dioxin (HxCDD)	438 J	1500 J	93 EMPC	209	164 EMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	3330	10800	474	1180	1090
Total Tetrachlorodibenzofuran (TCDF)	168 EMPC	307	28.2 EMPC	94.1 EMPC	47.8 EMPC
Total Pentachlorodibenzofuran (PeCDF)	203 EMPC	936 EMPC	67 EMPC	211 EMPC	185 EMPC
Total Hexachlorodibenzofuran (HxCDF)	387 JEMPC	3400 JEMPC	126 EMPC	362	501 EMPC
Total Heptachlorodibenzofuran (HpCDF)	968 J	10400 J	240 EMPC	656	1090
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	49.6 J	211.7 J	6.3	28.4 J	21.4 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	50.9 J	211.7 J	8.2	28.4 J	21.9 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	52.1 J	211.7 J	10.0	28.4 J	22.3 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	52.1 J	211.7 J	10.0	28.4 J	22.3 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID	POBI-SC-50	POBI-SC-50	POBI-SC-50	POBI-SC-50	POBI-SC-50
Sample ID	POBI-SC-50-3-4-130301	POBI-SC-50-4-6-130301	POBI-SC-50-6-8-130301	POBI-SC-50-8-10-130301	POBI-SC-50-12.4-13-130301
Sample Depth	3 - 4 ft	4 - 6 ft	6 - 8 ft	8 - 10 ft	12.4 - 13 ft
Sample Date	3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013
Sample Type	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE
Conventional Parameters (pct)					
Total organic carbon	0.625	4.82	5.25	5.96	2.8
Total solids	74.78	57.71	57.76	56.59	57.05
Grain Size (pct)					
Total Gravel	--	--	--	--	--
Total Sand	--	--	--	--	--
Total Silt	--	--	--	--	--
Total Clay	--	--	--	--	--
Total Fines (silt + clay)	--	--	--	--	--
Dioxin Furans (ng/kg)					
2,3,7,8-TCDD	1.12	2.86	1.59	2.84	1.31 EMPC
1,2,3,7,8-PeCDD	3.93	12.5	5.97	11.9	4.63
1,2,3,4,7,8-HxCDD	4.5	11.9	5.81	13.8	2.19
1,2,3,6,7,8-HxCDD	32.2	147 J	77.7 J	178 J	6.44 J
1,2,3,7,8,9-HxCDD	10.8	31.6	15.7	37.2	4
1,2,3,4,6,7,8-HpCDD	756	2960	1630	4190	75.5
1,2,3,4,6,7,8,9-OCDD	5630 J	26900 J	15200 J	33500 J	499
2,3,7,8-TCDF	2.72	14.7	7.89	6.37	4.47
1,2,3,7,8-PeCDF	4.74	29 J	18	10.7	2.96
2,3,4,7,8-PeCDF	12.2	126	60.9	25.5	4.81
1,2,3,4,7,8-HxCDF	63	599	333	275	3.72 J
1,2,3,6,7,8-HxCDF	14.7	100	57	50.2	4.87
1,2,3,7,8,9-HxCDF	12.1 J	118 J	70.2 J	46.6 J	1.32 J
2,3,4,6,7,8-HxCDF	10	140	84.2	90.5	8.7
1,2,3,4,6,7,8-HpCDF	317	1420 J	809 J	1810 J	105 J
1,2,3,4,7,8,9-HpCDF	31.7	174	99.6	190	2.12
1,2,3,4,6,7,8,9-OCDF	1470	4550	2380	8410	233
Total Tetrachlorodibenzo-p-dioxin (TCDD)	35.7 EMPC	238 EMPC	62.7 EMPC	73.7 EMPC	59 EMPC
Total Pentachlorodibenzo-p-dioxin (PeCDD)	56.1	167	91.9 EMPC	109	68.8
Total Hexachlorodibenzo-p-dioxin (HxCDD)	216 EMPC	676 JEMPC	444 JEMPC	696 J	88.6 JEMPC
Total Heptachlorodibenzo-p-dioxin (HpCDD)	1460	6540	3600	8040	151
Total Tetrachlorodibenzofuran (TCDF)	61 EMPC	254 EMPC	132 EMPC	192 EMPC	146 EMPC
Total Pentachlorodibenzofuran (PeCDF)	215 EMPC	1430 EMPC	789 EMPC	659 EMPC	262 EMPC
Total Hexachlorodibenzofuran (HxCDF)	580 J	3510 J	2150 J	2580 JEMPC	139 JEMPC
Total Heptachlorodibenzofuran (HpCDF)	1390	5880 J	3360 JEMPC	8300 JEMPC	241 JEMPC
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)	37.0. J	225.2 J	122.20 J	167.0 J	11.8 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)	37.0 J	225.2 J	122.20 J	167.0 J	12.4 J
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)	37.0 J	225.2 J	122.20 J	167.0 J	13.0 J
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	37.0 J	225.2 J	122.20 J	167.0 J	13.0 J

Table 4-5
2013 Subsurface Dioxin and Furan Results

Notes:
Dioxin/Furan TEQ Concentration (ng/kg Dry Weight)
0-5
5.01-10
10.01-20
20.01-40
40.01-100
100.01-500
>500
Bold = Detected result
D/F = Dioxin and Furans
EMPC = Estimated Maximum Possible Concentration
J = Estimated value
SL = screening level
TEQ= toxic equivalency quotient reported in ng/kg, values over 1 ng/kg were rounded to one decimal place
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

Task					**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**
Location ID					**POBI-SC-03**	**POBI-SC-03**	**POBI-SC-03**	**POBI-SC-11**	**POBI-SC-11**
Sample ID					**POBI-SC-03-0-2-130305**	**POBI-SC-03-2-4-130305**	**POBI-SC-03-4-6-130305**	**POBI-SC-11-2-4-130313**	**POBI-SC-11-6-8-130313**
Sample Depth					**0 - 2 ft**	**2 - 4 ft**	**4 - 6 ft**	**2 - 4 ft**	**6 - 8 ft**
Sample Date					**3/5/2013**	**3/5/2013**	**3/5/2013**	**3/13/2013**	**3/13/2013**
Sample Type					**N**	**N**	**N**	**N**	**N**
Matrix					**SE**	**SE**	**SE**	**SE**	**SE**
	SCO	**CSL**	**LAET**	**2LAET**					
Conventional Parameters (pct)									
Total organic carbon					**1.74**	**0.352**	**0.369**	**4.05**	**3.86**
Total solids					**70.5**	**83**	**82.6**	**40.59**	**66.54**
Grain Size (pct)									
Total Gravel					**6.5**	**1.1**	**2.1**	**17.8**	**17.3**
Total Sand					**71.2**	**95.3**	**96.3**	**27.6**	**50.4**
Total Silt					**15.7**	**2.9**	1.7 U	**31.7**	**17.4**
Total Clay					**6.7**	**0.7**	1.7 U	**23.1**	**15**
Total Fines (silt + clay)					**22.4**	**3.6**	1.7 U	**54.8**	**32.4**
Metals (mg/kg)									
Arsenic	57	93			7 U	6 U	6 U	10 U	20 U
Cadmium	5.1	6.7			**0.8**	**0.4**	**0.4**	**2.5**	**1.5**
Chromium	260	270			**24.2**	**23.3**	**19.9**	**34**	**23**
Copper	390	390			**19.9 J**	**11.4 J**	**11 J**	**85.8**	**29.8**
Lead	450	530			3 U	2 U	2 U	**22**	**16**
Mercury	0.41	0.59			**0.03**	0.03 U	0.02 U	**0.35 J**	**0.09 J**
Silver	6.1	6.1			0.4 U	0.3 U	0.4 U	0.8 U	1 U
Zinc	410	960			**37**	**30**	**30**	**107**	**114**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			19 U	18 U	19 U	**4.3 J**	**21**
2-Methylphenol (o-Cresol)	63	63			4.8 U	4.4 U	4.6 U	**3.6 J**	**4.3 J**
4-Methylphenol (p-Cresol)	670	670			**12**	8.9 U	9.3 U	**55**	**74**
Benzoic acid	650	650			380 U	360 UJ	370 U	380 U	380 U
Benzyl alcohol	57	73			19 U	18 U	19 U	19 U	19 U
Pentachlorophenol	360	690			48 U	44 U	46 U	47 U	48 U
Phenol	420	1200			**18 J**	**9.8 J**	10 U	**55**	**55**
1,2,4-Trichlorobenzene			31	51	4.8 U	4.4 U	4.6 U	4.7 U	4.8 U
1,2-Dichlorobenzene			35	50	4.8 U	4.4 U	4.6 U	4.7 U	4.8 U
1,4-Dichlorobenzene			110	110	4.8 U	4.4 U	4.6 U	**3.6 J**	**2.7 J**
bis(2-Ethylhexyl)phthalate			1300	3100	**24**	**15 J**	23 U	**42**	**93**
Butylbenzyl phthalate			63	900	4.8 U	4.4 U	4.6 U	**7.9**	**7.3**
Dibenzofuran			540	540	19 U	18 U	19 U	**27**	**240**
Diethyl phthalate			200	1200	27 U	15 U	24 U	11 U	7.2 U
Dimethyl phthalate			71	160	4.8 U	4.4 U	4.6 U	4.7 U	4.8 U
Di-n-butyl phthalate			1400	5100	19 U	18 U	19 U	19 U	19 U
Di-n-octyl phthalate			6200	6200	19 U	18 U	19 U	19 U	19 U
Hexachlorobenzene			22	70	4.8 U	4.4 U	4.6 U	4.7 U	4.8 U
n-Nitrosodiphenylamine			28	40	19 U	18 U	19 U	19 U	**8.8 J**
Hexachlorobutadiene			11	120	4.8 U	4.4 U	4.6 U	4.7 U	4.8 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-03	POBI-SC-03	POBI-SC-03	POBI-SC-11	POBI-SC-11
Sample ID					POBI-SC-03-0-2-130305	POBI-SC-03-2-4-130305	POBI-SC-03-4-6-130305	POBI-SC-11-2-4-130313	POBI-SC-11-6-8-130313
Sample Depth					0 - 2 ft	2 - 4 ft	4 - 6 ft	2 - 4 ft	6 - 8 ft
Sample Date					3/5/2013	3/5/2013	3/5/2013	3/13/2013	3/13/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.276 U	0.483 U[1]	0.461 U[1]	0.116 U	0.124 U
1,2-Dichlorobenzene	2.3	2.3			0.276 U	1.25 U	1.247 U	0.116 U	0.124 U
1,4-Dichlorobenzene	3.1	9			0.276 U	1.25 U	1.247 U	**0.089 J**	**0.07 J**
bis(2-Ethylhexyl)phthalate	47	78			**1.379**	**4.261 J**	6.233 U	**1.037**	**2.409**
Butylbenzyl phthalate	4.9	64			0.276 U	1.25 U	1.247 U	**0.195**	**0.189**
Dibenzofuran	15	58			1.092 U	5.114 U	5.149 U	**0.667**	**6.218**
Diethyl phthalate	61	110			1.552 U	4.261 U	6.504 U	0.272 U	0.187 U
Dimethyl phthalate	53	53			0.276 U	1.25 U	1.247 U	0.116 U	0.124 U
Di-n-butyl phthalate	220	1700			1.092 U	5.114 U	5.149 U	0.469 U	0.492 U
Di-n-octyl phthalate	58	4500			1.092 U	5.114 U	5.149 U	0.469 U	0.492 U
Hexachlorobenzene	0.38	2.3			0.276 U	1.25 U	1.247 U	0.116 U	0.124 U
n-Nitrosodiphenylamine	11	11			1.092 U	5.114 U	5.149 U	0.469 U	**0.228 J**
Hexachlorobutadiene	3.9	6.2			0.276 U	1.25 U	1.247 U	0.116 U	0.124 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**13 J**	18 U	19 U	**16 J**	**62**
Acenaphthene			500	500	19 U	18 U	19 U	**28**	**270**
Acenaphthylene			1300	1300	19 U	18 U	19 U	**21**	**18 J**
Anthracene			960	960	19 U	18 U	19 U	**67**	**210**
Benzo(a)anthracene			1300	1600	**13 J**	18 U	19 U	**160**	**230**
Benzo(a)pyrene			1600	1600	**12 J**	18 U	19 U	**160**	**160**
Benzo(b,j,k)fluoranthenes					**28 J**	36 U	37 U	**400**	**340**
Benzo(g,h,i)perylene			670	720	19 U	18 U	19 U	**56**	**66**
Chrysene			1400	2800	**15 J**	18 U	19 U	**260**	**350**
Dibenzo(a,h)anthracene			230	230	**2.7 J**	4.4 U	4.6 U	**33**	**41**
Fluoranthene			1700	2500	**25**	18 U	19 U	**280**	**860**
Fluorene			540	540	19 U	18 U	19 U	**34**	**250**
Indeno(1,2,3-c,d)pyrene			600	690	19 U	18 U	19 U	**57**	**61**
Naphthalene			2100	2100	**13 J**	18 U	19 U	**67**	**320**
Phenanthrene			1500	1500	**11 J**	18 U	19 U	**120**	**700**
Pyrene			2600	3300	**59**	18 U	19 U	**1200**	**980**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**28 J**	36 U	37 U	**400**	**340**
Total LPAH (SMS) (U = 0)			5200	5200	**24 J**	18 U	19 U	**337**	**1768 J**
Total HPAH (SMS) (U = 0)			12000	17000	**154.7 J**	36 U	37 U	**2606**	**3088**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**16.5 J**	18 U	19 U	**227.6**	**230.7**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**17.5 J**	18 U	19 U	**227.6**	**230.7**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-03	POBI-SC-03	POBI-SC-03	POBI-SC-11	POBI-SC-11
				Sample ID	POBI-SC-03-0-2-130305	POBI-SC-03-2-4-130305	POBI-SC-03-4-6-130305	POBI-SC-11-2-4-130313	POBI-SC-11-6-8-130313
				Sample Depth	0 - 2 ft	2 - 4 ft	4 - 6 ft	2 - 4 ft	6 - 8 ft
				Sample Date	3/5/2013	3/5/2013	3/5/2013	3/13/2013	3/13/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**0.747 J**	5.114 U	5.149 U	**0.395 J**	**1.606**
Acenaphthene	16	57			1.092 U	5.114 U	5.149 U	**0.691**	**6.995**
Acenaphthylene	66	66			1.092 U	5.114 U	5.149 U	**0.519**	**0.466 J**
Anthracene	220	1200			1.092 U	5.114 U	5.149 U	**1.654**	**5.44**
Benzo(a)anthracene	110	270			**0.747 J**	5.114 U	5.149 U	**3.951**	**5.959**
Benzo(a)pyrene	99	210			**0.69 J**	5.114 U	5.149 U	**3.951**	**4.145**
Benzo(g,h,i)perylene	31	78			1.092 U	5.114 U	5.149 U	**1.383**	**1.71**
Chrysene	110	460			**0.862 J**	5.114 U	5.149 U	**6.42**	**9.067**
Dibenzo(a,h)anthracene	12	33			**0.155 J**	1.25 U	1.247 U	**0.815**	**1.062**
Fluoranthene	160	1200			**1.437**	5.114 U	5.149 U	**6.914**	**22.28**
Fluorene	23	79			1.092 U	5.114 U	5.149 U	**0.84**	**6.477**
Indeno(1,2,3-c,d)pyrene	34	88			1.092 U	5.114 U	5.149 U	**1.407**	**1.58**
Naphthalene	99	170			**0.747 J**	5.114 U	5.149 U	**1.654**	**8.29**
Phenanthrene	100	480			**0.632 J**	5.114 U	5.149 U	**2.963**	**18.135**
Pyrene	1000	1400			**3.391**	5.114 U	5.149 U	**29.63**	**25.389**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**1.609 J**	10.227 U	10.027 U	**9.877**	**8.808**
Total LPAH (SMS) (U = 0)	370	780			**1.379 J**	5.114 U	5.149 U	**8.321**	**45.803 J**
Total HPAH (SMS) (U = 0)	960	5300			**8.891 J**	10.227 U	10.027 U	**64.346**	**80**
PCB Aroclors (µg/kg)									
Aroclor 1016					20 U	17 U	17 U	18 U	18 U
Aroclor 1221					20 U	17 U	17 U	18 U	18 U
Aroclor 1232					20 U	17 U	17 U	18 U	18 U
Aroclor 1242					20 U	17 U	17 U	18 U	18 U
Aroclor 1248					20 U	17 U	17 U	**39**	**19**
Aroclor 1254					20 U	17 U	17 U	**35**	**24**
Aroclor 1260					20 U	17 U	17 U	**18**	18 U
Total PCB Aroclors (U = 0)			130	1000	20 U	17 U	17 U	**92**	**43**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			1.149 U	4.83 U	4.607 U	**2.272**	**1.114**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-12	POBI-SC-12	POBI-SC-12	POBI-SC-12	POBI-SC-17
Sample ID					POBI-SC-12-2-4-130313	POBI-SC-12-6-8-130313	POBI-SC-12-8-10-130313	POBI-SC-12-10-12-130313	POBI-SC-17-2-4-130315
Sample Depth					2 - 4 ft	6 - 8 ft	8 - 10 ft	10 - 12 ft	2 - 4 ft
Sample Date					3/13/2013	3/13/2013	3/13/2013	3/13/2013	3/15/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Conventional Parameters (pct)									
Total organic carbon					**5.96**	**3.57**	**1.28**	**0.89**	**3.71**
Total solids					**31.39**	**64.5**	**72.95**	**77.18**	**51.83**
Grain Size (pct)									
Total Gravel					**3.6**	**15.5**	--	--	**17.9**
Total Sand					**17.2**	**49.2**	--	--	**38.2**
Total Silt					**34.7**	**22.5**	--	--	**22.7**
Total Clay					**44.7**	**12.7**	--	--	**21**
Total Fines (silt + clay)					**79.4**	**35.2**	--	--	**43.7**
Metals (mg/kg)									
Arsenic	57	93			20 U	7 U	--	--	20 U
Cadmium	5.1	6.7			**2.6**	**1.1**	--	--	**2**
Chromium	260	270			**38**	**24.6**	--	--	**43**
Copper	390	390			**89.1**	**24.9**	--	--	**62**
Lead	450	530			**23**	**5**	--	--	**20**
Mercury	0.41	0.59			**0.18 J**	**0.07 J**	--	--	**0.21 J**
Silver	6.1	6.1			0.9 U	0.4 U	--	--	1 U
Zinc	410	960			**140**	**46**	--	--	**148**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			**18 J**	**270**	**92**	**12 J**	**23 J**
2-Methylphenol (o-Cresol)	63	63			**10**	**230**	**35**	**4.2 J**	**30**
4-Methylphenol (p-Cresol)	670	670			**130**	**150**	**36**	**4.9 J**	**300**
Benzoic acid	650	650			**210 J**	360 U	400 UJ	400 UJ	**430**
Benzyl alcohol	57	73			20 U	18 U	**10 J**	**11 J**	20 U
Pentachlorophenol	360	690			**21 J**	45 U	50 U	50 U	**20 J**
Phenol	420	1200			**200**	**97**	**20**	**3.7 J**	**260**
1,2,4-Trichlorobenzene			31	51	4.9 U	4.5 U	5 U	5 U	4.9 U
1,2-Dichlorobenzene			35	50	4.9 U	4.5 U	5 U	5 U	4.9 U
1,4-Dichlorobenzene			110	110	**8**	4.5 U	5 U	5 U	**3.7 J**
bis(2-Ethylhexyl)phthalate			1300	3100	**120**	**74**	25 U	25 U	61 U
Butylbenzyl phthalate			63	900	**12**	4.5 U	5 U	5 U	**9.5**
Dibenzofuran			540	540	**120**	**170**	**140**	**53**	**55**
Diethyl phthalate			200	1200	14 U	15 U	35 U	6.6 U	32 U
Dimethyl phthalate			71	160	4.9 U	4.5 U	5 U	5 U	4.9 U
Di-n-butyl phthalate			1400	5100	39 U	18 U	20 U	20 U	20 U
Di-n-octyl phthalate			6200	6200	39 U	18 U	20 U	20 UJ	20 U
Hexachlorobenzene			22	70	4.9 U	4.5 U	5 U	5 U	4.9 U
n-Nitrosodiphenylamine			28	40	20 U	**10 J**	20 U	20 U	**12 J**
Hexachlorobutadiene			11	120	4.9 U	4.5 U	5 U	5 U	4.9 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	**POBI-SC-12**	**POBI-SC-12**	**POBI-SC-12**	**POBI-SC-12**	**POBI-SC-17**
				Sample ID	**POBI-SC-12-2-4-130313**	**POBI-SC-12-6-8-130313**	**POBI-SC-12-8-10-130313**	**POBI-SC-12-10-12-130313**	**POBI-SC-17-2-4-130315**
				Sample Depth	**2 - 4 ft**	**6 - 8 ft**	**8 - 10 ft**	**10 - 12 ft**	**2 - 4 ft**
				Sample Date	**3/13/2013**	**3/13/2013**	**3/13/2013**	**3/13/2013**	**3/15/2013**
				Sample Type	**N**	**N**	**N**	**N**	**N**
				Matrix	**SE**	**SE**	**SE**	**SE**	**SE**
	SCO	**CSL**	**LAET**	**2LAET**					
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.082 U	0.126 U	0.391 U	0.562 U	0.132 U
1,2-Dichlorobenzene	2.3	2.3			0.082 U	0.126 U	0.391 U	0.562 U	0.132 U
1,4-Dichlorobenzene	3.1	9			**0.134**	0.126 U	0.391 U	0.562 U	**0.1 J**
bis(2-Ethylhexyl)phthalate	47	78			**2.013**	**2.073**	1.953 U	2.809 U	1.644 U
Butylbenzyl phthalate	4.9	64			**0.201**	0.126 U	0.391 U	0.562 U	**0.256**
Dibenzofuran	15	58			**2.013**	**4.762**	**10.938**	**5.955**	**1.482**
Diethyl phthalate	61	110			0.235 U	0.42 U	2.734 U	0.742 U	0.863 U
Dimethyl phthalate	53	53			0.082 U	0.126 U	0.391 U	0.562 U	0.132 U
Di-n-butyl phthalate	220	1700			0.654 U	0.504 U	1.563 U	2.247 U	0.539 U
Di-n-octyl phthalate	58	4500			0.654 U	0.504 U	1.563 U	2.247 UJ	0.539 U
Hexachlorobenzene	0.38	2.3			0.082 U	0.126 U	0.391 U	0.562 U	0.132 U
n-Nitrosodiphenylamine	11	11			0.336 U	**0.28 J**	1.563 U	2.247 U	**0.323 J**
Hexachlorobutadiene	3.9	6.2			0.082 U	0.126 U	0.391 U	0.562 U	0.132 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**45**	**210**	**270**	**37**	**70**
Acenaphthene			500	500	**100**	**550**	**460**	**180**	**750**
Acenaphthylene			1300	1300	**56**	18 U	20 U	20 U	**32**
Anthracene			960	960	**330**	**190**	**43**	**31**	**210**
Benzo(a)anthracene			1300	1600	**690**	**220**	20 U	20 U	**440**
Benzo(a)pyrene			1600	1600	**540**	**95**	20 U	20 U	**330**
Benzo(b,j,k)fluoranthenes					**1300**	**230**	40 U	40 U	**740**
Benzo(g,h,i)perylene			670	720	**230**	**25**	20 U	20 U	**140**
Chrysene			1400	2800	**830**	**280**	20 U	20 U	**550**
Dibenzo(a,h)anthracene			230	230	**110**	**19**	5 U	5 U	**81**
Fluoranthene			1700	2500	**2400**	**1100**	**34**	**45**	**1300**
Fluorene			540	540	**95**	**410**	**510**	**250**	**150**
Indeno(1,2,3-c,d)pyrene			600	690	**220**	**29**	20 U	20 U	**130**
Naphthalene			2100	2100	**340**	**1300**	**1300**	**140**	**280**
Phenanthrene			1500	1500	**260**	**1100**	**890**	**680**	**430**
Pyrene			2600	3300	**3600**	**840**	**25**	**19 J**	**1500**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**1300**	**230**	40 U	40 U	**740**
Total LPAH (SMS) (U = 0)			5200	5200	**1181**	**3550**	**3203**	**1281**	**1852**
Total HPAH (SMS) (U = 0)			12000	17000	**9920**	**2838**	**59**	**64 J**	**5211**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**780.3**	**147.6**	20 U	20 U	**474.6**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**780.3**	**147.6**	20 U	20 U	**474.6**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-12	POBI-SC-12	POBI-SC-12	POBI-SC-12	POBI-SC-17
				Sample ID	POBI-SC-12-2-4-130313	POBI-SC-12-6-8-130313	POBI-SC-12-8-10-130313	POBI-SC-12-10-12-130313	POBI-SC-17-2-4-130315
				Sample Depth	2 - 4 ft	6 - 8 ft	8 - 10 ft	10 - 12 ft	2 - 4 ft
				Sample Date	3/13/2013	3/13/2013	3/13/2013	3/13/2013	3/15/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**0.755**	**5.882**	**21.094**	**4.157**	**1.887**
Acenaphthene	16	57			**1.678**	**15.406**	**35.938**	**20.225**	**20.216**
Acenaphthylene	66	66			**0.94**	0.504 U	1.563 U	2.247 U	**0.863**
Anthracene	220	1200			**5.537**	**5.322**	**3.359**	**3.483**	**5.66**
Benzo(a)anthracene	110	270			**11.577**	**6.162**	1.563 U	2.247 U	**11.86**
Benzo(a)pyrene	99	210			**9.06**	**2.661**	1.563 U	2.247 U	**8.895**
Benzo(g,h,i)perylene	31	78			**3.859**	**0.7**	1.563 U	2.247 U	**3.774**
Chrysene	110	460			**13.926**	**7.843**	1.563 U	2.247 U	**14.825**
Dibenzo(a,h)anthracene	12	33			**1.846**	**0.532**	0.391 U	0.562 U	**2.183**
Fluoranthene	160	1200			**40.268**	**30.812**	**2.656**	**5.056**	**35.04**
Fluorene	23	79			**1.594**	**11.485**	**39.844**	**28.09**	**4.043**
Indeno(1,2,3-c,d)pyrene	34	88			**3.691**	**0.812**	1.563 U	2.247 U	**3.504**
Naphthalene	99	170			**5.705**	**36.415**	**101.563**	**15.73**	**7.547**
Phenanthrene	100	480			**4.362**	**30.812**	**69.531**	**76.404**	**11.59**
Pyrene	1000	1400			**60.403**	**23.529**	**1.953**	**2.135 J**	**40.431**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**21.812**	**6.443**	3.125 U	4.494 U	**19.946**
Total LPAH (SMS) (U = 0)	370	780			**19.815**	**99.44**	**250.234**	**143.933**	**49.919**
Total HPAH (SMS) (U = 0)	960	5300			**166.443**	**79.496**	**4.609**	**7.191 J**	**140.458**
PCB Aroclors (µg/kg)									
Aroclor 1016					20 U	19 U	--	--	18 U
Aroclor 1221					20 U	19 U	--	--	18 U
Aroclor 1232					20 U	19 U	--	--	18 U
Aroclor 1242					20 U	19 U	--	--	18 U
Aroclor 1248					**24**	19 U	--	--	31 U
Aroclor 1254					**33**	**11 J**	--	--	**36**
Aroclor 1260					**21**	19 U	--	--	22 U
Total PCB Aroclors (U = 0)			130	1000	**78**	**11 J**	--	--	**36**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			**1.309**	**0.308 J**	--	--	**0.97**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-17	POBI-SC-17	POBI-SC-17	POBI-SC-17	POBI-SC-19
				Sample ID	POBI-SC-17-6-8-130315	POBI-SC-17-8-10-130315	POBI-SC-17-10-12-130315	POBI-SC-17-10-12-130315DUP	POBI-SC-19-2-4-130315
				Sample Depth	6 - 8 ft	8 - 10 ft	10 - 12 ft	10 - 12 ft	2 - 4 ft
				Sample Date	3/15/2013	3/15/2013	3/15/2013	3/15/2013	3/15/2013
				Sample Type	N	N	N	FD	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**1.93**	**0.82**	**0.708**	**0.599**	**5.09**
Total solids					**79.9**	**77.37**	**76**	**76**	**46.25**
Grain Size (pct)									
Total Gravel					**9.2**	--	--	--	**14.5**
Total Sand					**77.4**	--	--	--	**25.5**
Total Silt					**9.1**	--	--	--	**24.2**
Total Clay					**4.2**	--	--	--	**35.8**
Total Fines (silt + clay)					**13.3**	--	--	--	**60**
Metals (mg/kg)									
Arsenic	57	93			20 U	--	--	--	**10**
Cadmium	5.1	6.7			**0.6**	--	--	--	**2.8**
Chromium	260	270			**18**	--	--	--	**37**
Copper	390	390			**9.7**	--	--	--	**93.2**
Lead	450	530			6 U	--	--	--	**48**
Mercury	0.41	0.59			0.03 UJ	--	--	--	**0.4 J**
Silver	6.1	6.1			0.9 U	--	--	--	**1.1**
Zinc	410	960			**26**	--	--	--	**133**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			**6.2 J**	**8.2 J**	--	--	**19**
2-Methylphenol (o-Cresol)	63	63			4.7 U	4.7 U	--	--	4.6 U
4-Methylphenol (p-Cresol)	670	670			**2.8 J**	9.5 U	--	--	**560**
Benzoic acid	650	650			470 UJ[1]	380 UJ	--	--	**1300 J**
Benzyl alcohol	57	73			19 U	**10 J**	--	--	19 U
Pentachlorophenol	360	690			47 U	47 UJ	--	--	**24 J**
Phenol	420	1200			6.4 U	**6.7**	--	--	**130**
1,2,4-Trichlorobenzene			31	51	4.7 U	4.7 U	--	--	4.6 U
1,2-Dichlorobenzene			35	50	4.7 U	4.7 U	--	--	4.6 U
1,4-Dichlorobenzene			110	110	4.7 U	4.7 U	--	--	**11**
bis(2-Ethylhexyl)phthalate			1300	3100	120 U	24 U	--	--	230 U
Butylbenzyl phthalate			63	900	4.7 U	4.7 U	--	--	4.6 U
Dibenzofuran			540	540	**300**	**170**	**180**	**180**	**2100**
Diethyl phthalate			200	1200	16 U	15 U	--	--	61 U
Dimethyl phthalate			71	160	4.7 U	4.7 U	--	--	**6.5**
Di-n-butyl phthalate			1400	5100	93 U	19 U	--	--	190 U
Di-n-octyl phthalate			6200	6200	93 U	19 U	--	--	190 U
Hexachlorobenzene			22	70	4.7 U	4.7 U	--	--	4.6 U
n-Nitrosodiphenylamine			28	40	**12 J**	19 U	--	--	**110**
Hexachlorobutadiene			11	120	4.7 U	4.7 U	--	--	4.6 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-17	POBI-SC-17	POBI-SC-17	POBI-SC-17	POBI-SC-19
				Sample ID	POBI-SC-17-6-8-130315	POBI-SC-17-8-10-130315	POBI-SC-17-10-12-130315	POBI-SC-17-10-12-130315DUP	POBI-SC-19-2-4-130315
				Sample Depth	6 - 8 ft	8 - 10 ft	10 - 12 ft	10 - 12 ft	2 - 4 ft
				Sample Date	3/15/2013	3/15/2013	3/15/2013	3/15/2013	3/15/2013
				Sample Type	N	N	N	FD	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.244 U	0.573 U	--	--	0.09 U
1,2-Dichlorobenzene	2.3	2.3			0.244 U	0.573 U	--	--	0.09 U
1,4-Dichlorobenzene	3.1	9			0.244 U	0.573 U	--	--	**0.216**
bis(2-Ethylhexyl)phthalate	47	78			6.218 U	2.927 U	--	--	4.519 U
Butylbenzyl phthalate	4.9	64			0.244 U	0.573 U	--	--	0.09 U
Dibenzofuran	15	58			**15.544**	**20.732**	**25.424**	**30.05**	**41.257**
Diethyl phthalate	61	110			0.829 U	1.829 U	--	--	1.198 U
Dimethyl phthalate	53	53			0.244 U	0.573 U	--	--	**0.128**
Di-n-butyl phthalate	220	1700			4.819 U	2.317 U	--	--	3.733 U
Di-n-octyl phthalate	58	4500			4.819 U	2.317 U	--	--	3.733 U
Hexachlorobenzene	0.38	2.3			0.244 U	0.573 U	--	--	0.09 U
n-Nitrosodiphenylamine	11	11			**0.622 J**	2.317 U	--	--	**2.161**
Hexachlorobutadiene	3.9	6.2			0.244 U	0.573 U	--	--	0.09 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**310**	**510**	**690**	**650**	**450**
Acenaphthene			500	500	**360**	**340**	**380**	**360**	**6400**
Acenaphthylene			1300	1300	93 U	19 U	18 U	18 U	**100 J**
Anthracene			960	960	**140**	**59**	**13 J**	**14 J**	**1900**
Benzo(a)anthracene			1300	1600	**51 J**	19 U	18 U	18 U	**2800**
Benzo(a)pyrene			1600	1600	93 U	19 U	18 U	18 U	**1400**
Benzo(b,j,k)fluoranthenes					190 U	38 U	37 U	36 U	**2600**
Benzo(g,h,i)perylene			670	720	93 U	19 U	18 U	18 U	**510**
Chrysene			1400	2800	**56 J**	19 U	**11 J**	18 U	**3200**
Dibenzo(a,h)anthracene			230	230	4.7 U	4.7 U	18 U	18 U	**200**
Fluoranthene			1700	2500	**1200**	**220**	**20**	18 U	**16000**
Fluorene			540	540	**560**	**390**	**260**	**260**	**1200**
Indeno(1,2,3-c,d)pyrene			600	690	93 U	19 U	18 U	18 U	**460**
Naphthalene			2100	2100	**590 J**	**1600 J**	**1200**	**1100**	**1700**
Phenanthrene			1500	1500	**3200**	**1100**	**290**	**290**	**4900**
Pyrene			2600	3300	**760**	**120**	**16 J**	18 U	**12000**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	190 U	38 U	37 U	36 U	**2600**
Total LPAH (SMS) (U = 0)			5200	5200	**4850 J**	**3489 J**	**2143 J**	**2024 J**	**16200 J**
Total HPAH (SMS) (U = 0)			12000	17000	**2067 J**	**340**	**47 J**	36 U	**39170**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**5.7 J**	19 U	**0.11 J**	18 U	**2038**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**66.5 J**	19 U	**13.66 J**	18 U	**2038**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-17	POBI-SC-17	POBI-SC-17	POBI-SC-17	POBI-SC-19
				Sample ID	POBI-SC-17-6-8-130315	POBI-SC-17-8-10-130315	POBI-SC-17-10-12-130315	POBI-SC-17-10-12-130315DUP	POBI-SC-19-2-4-130315
				Sample Depth	6 - 8 ft	8 - 10 ft	10 - 12 ft	10 - 12 ft	2 - 4 ft
				Sample Date	3/15/2013	3/15/2013	3/15/2013	3/15/2013	3/15/2013
				Sample Type	N	N	N	FD	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			16.062	62.195	97.458	108.514	8.841
Acenaphthene	16	57			18.653	41.463	53.672	60.1	125.737
Acenaphthylene	66	66			4.819 U	2.317 U	2.542 U	3.005 U	1.965 J
Anthracene	220	1200			7.254	7.195	1.836 J	2.337 J	37.328
Benzo(a)anthracene	110	270			2.642 J	2.317 U	2.542 U	3.005 U	55.01
Benzo(a)pyrene	99	210			4.819 U	2.317 U	2.542 U	3.005 U	27.505
Benzo(g,h,i)perylene	31	78			4.819 U	2.317 U	2.542 U	3.005 U	10.02
Chrysene	110	460			2.902 J	2.317 U	1.554 J	3.005 U	62.868
Dibenzo(a,h)anthracene	12	33			0.244 U	0.573 U	2.542 U	3.005 U	3.929
Fluoranthene	160	1200			62.176	26.829	2.825	3.005 U	314.342
Fluorene	23	79			29.016	47.561	36.723	43.406	23.576
Indeno(1,2,3-c,d)pyrene	34	88			4.819 U	2.317 U	2.542 U	3.005 U	9.037
Naphthalene	99	170			30.57 J	195.122 J	169.492	183.639	33.399
Phenanthrene	100	480			165.803	134.146	40.96	48.414	96.267
Pyrene	1000	1400			39.378	14.634	2.26 J	3.005 U	235.756
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			9.845 U	4.634 U	5.226 U	6.01 U	51.081
Total LPAH (SMS) (U = 0)	370	780			251.295 J	425.488 J	302.684 J	337.896 J	318.271 J
Total HPAH (SMS) (U = 0)	960	5300			107.098 J	41.463	6.638 J	6.01 U	769.548
PCB Aroclors (µg/kg)									
Aroclor 1016					17 U	--	--	--	18 U
Aroclor 1221					17 U	--	--	--	18 U
Aroclor 1232					17 U	--	--	--	18 U
Aroclor 1242					17 U	--	--	--	18 U
Aroclor 1248					17 U	--	--	--	180 U
Aroclor 1254					17 U	--	--	--	320
Aroclor 1260					17 U	--	--	--	91 U
Total PCB Aroclors (U = 0)			130	1000	17 U	--	--	--	320
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			0.881 U	--	--	--	6.287

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET					
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-19	POBI-SC-19	POBI-SC-19	POBI-SC-22	POBI-SC-22
Sample ID					POBI-SC-19-6-8-130315	POBI-SC-19-8-10-130315	POBI-SC-19-10-12-130315	POBI-SC-22-7-8-130307	POBI-SC-22-8-8.5-130307
Sample Depth					6 - 8 ft	8 - 10 ft	10 - 12 ft	7 - 8 ft	8 - 8.5 ft
Sample Date					3/15/2013	3/15/2013	3/15/2013	3/7/2013	3/7/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Conventional Parameters (pct)									
Total organic carbon					**5.69**	**2.75**	**1.2**	**5.31**	**4.63**
Total solids					**57.21**	**62.04**	**69.77**	**49.5**	**54**
Grain Size (pct)									
Total Gravel					**47.6**	--	--	**3.2**	**2**
Total Sand					**33.3**	--	--	**38.6**	**48.3**
Total Silt					**9.8**	--	--	**34.1**	**27**
Total Clay					**9.2**	--	--	**24.1**	**22.6**
Total Fines (silt + clay)					**19**	--	--	**58.2**	**49.6**
Metals (mg/kg)									
Arsenic	57	93			**22**	--	--	10 U	9 U
Cadmium	5.1	6.7			**1.5**	--	--	**3.8**	**2.4**
Chromium	260	270			**23.5**	--	--	**49**	**40.8**
Copper	390	390			**95.8**	--	--	**105**	**76.1**
Lead	450	530			**48**	--	--	**206**	**107**
Mercury	0.41	0.59			**0.52 J**	--	--	**2.03**	**0.59**
Silver	6.1	6.1			**1.1**	--	--	**9.8**	**2.2**
Zinc	410	960			**126**	--	--	**284**	**182**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			**34**	--	--	**130**	**56**
2-Methylphenol (o-Cresol)	63	63			**7.1**	--	--	**84**	4.6 U
4-Methylphenol (p-Cresol)	670	670			**750**	--	--	**3600**	**2200**
Benzoic acid	650	650			980 U[1]	--	--	940 U[1]	920 U[1]
Benzyl alcohol	57	73			20 U	--	--	**20**	**26**
Pentachlorophenol	360	690			49 U	--	--	**36 J**	**46**
Phenol	420	1200			**47**	--	--	**310**	**200**
1,2,4-Trichlorobenzene			31	51	**3 J**	--	--	**39**	**15**
1,2-Dichlorobenzene			35	50	**3 J**	--	--	**37**	**62**
1,4-Dichlorobenzene			110	110	**24**	--	--	**410**	**280**
bis(2-Ethylhexyl)phthalate			1300	3100	240 U	--	--	**290**	**250**
Butylbenzyl phthalate			63	900	**20**	--	--	4.6 U	**48**
Dibenzofuran			540	540	**22000**	**1600**	**970**	**1600**	**760**
Diethyl phthalate			200	1200	21 U	--	--	23 U	32 U
Dimethyl phthalate			71	160	**17**	--	--	**69**	**140 J**
Di-n-butyl phthalate			1400	5100	200 U	--	--	**340**	180 U
Di-n-octyl phthalate			6200	6200	200 U	--	--	**170 J**	180 U
Hexachlorobenzene			22	70	4.9 U	--	--	4.6 U	4.6 U
n-Nitrosodiphenylamine			28	40	**500**	--	--	**310**	**96**
Hexachlorobutadiene			11	120	4.9 U	--	--	4.6 U	4.6 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET					
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-19	POBI-SC-19	POBI-SC-19	POBI-SC-22	POBI-SC-22
Sample ID					POBI-SC-19-6-8-130315	POBI-SC-19-8-10-130315	POBI-SC-19-10-12-130315	POBI-SC-22-7-8-130307	POBI-SC-22-8-8.5-130307
Sample Depth					6 - 8 ft	8 - 10 ft	10 - 12 ft	7 - 8 ft	8 - 8.5 ft
Sample Date					3/15/2013	3/15/2013	3/15/2013	3/7/2013	3/7/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			**0.053 J**	--	--	**0.734**	**0.324**
1,2-Dichlorobenzene	2.3	2.3			**0.053 J**	--	--	**0.697**	**1.339**
1,4-Dichlorobenzene	3.1	9			**0.422**	--	--	**7.721**	**6.048**
bis(2-Ethylhexyl)phthalate	47	78			4.218 U	--	--	**5.461**	**5.4**
Butylbenzyl phthalate	4.9	64			**0.351**	--	--	0.087 U	**1.037**
Dibenzofuran	15	58			**386.643**	**58.182**	**80.833**	**30.132**	**16.415**
Diethyl phthalate	61	110			0.369 U	--	--	0.433 U	0.691 U
Dimethyl phthalate	53	53			**0.299**	--	--	**1.299**	**3.024 J**
Di-n-butyl phthalate	220	1700			3.515 U	--	--	**6.403**	3.888 U
Di-n-octyl phthalate	58	4500			3.515 U	--	--	**3.202 J**	3.888 U
Hexachlorobenzene	0.38	2.3			0.086 U	--	--	0.087 U	0.099 U
n-Nitrosodiphenylamine	11	11			**8.787**	--	--	**5.838**	**2.073**
Hexachlorobutadiene	3.9	6.2			0.086 U	--	--	0.087 U	0.099 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**9700**	**6400**	**10000**	**1600**	**590**
Acenaphthene			500	500	**30000**	**6700**	**8200**	**3100**	**2400**
Acenaphthylene			1300	1300	200 U	19 U	**99 J**	**180**	**190**
Anthracene			960	960	**5200**	**840**	**5600**	**1400**	**1800**
Benzo(a)anthracene			1300	1600	**6400**	**680**	**4300**	**1400**	**3600**
Benzo(a)pyrene			1600	1600	**1600**	**320**	**2000**	**980**	**2500**
Benzo(b,j,k)fluoranthenes					**3600**	**660**	**4000**	**1900**	**4400**
Benzo(g,h,i)perylene			670	720	**400**	**130**	**650**	**500**	**880**
Chrysene			1400	2800	**4800**	**790**	**4200**	**1900**	**4300**
Dibenzo(a,h)anthracene			230	230	**200**	19 U	**240 J**	**180 J**	**340**
Fluoranthene			1700	2500	**44000**	**4700**	**16000**	**6900**	**9700**
Fluorene			540	540	**24000**	**3800**	**7100**	**2300**	**1800**
Indeno(1,2,3-c,d)pyrene			600	690	**400**	**120**	**630**	**390**	**880**
Naphthalene			2100	2100	**13000**	**4800**	**8000**	**4100**	**2300**
Phenanthrene			1500	1500	**87000**	**8400**	**13000**	**5500**	**4900**
Pyrene			2600	3300	**31000**	**2700**	**11000**	**5200**	**8200**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**3600**	**660**	**4000**	**1900**	**4400**
Total LPAH (SMS) (U = 0)			5200	5200	**159200**	**24540**	**41999 J**	**16580**	**13390**
Total HPAH (SMS) (U = 0)			12000	17000	**92400**	**10100**	**43020 J**	**19350 J**	**34800**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**2708**	**473.9**	**2959 J**	**1386 J**	**3465**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**2708**	**474.85**	**2959 J**	**1386 J**	**3465**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-19	POBI-SC-19	POBI-SC-19	POBI-SC-22	POBI-SC-22
				Sample ID	POBI-SC-19-6-8-130315	POBI-SC-19-8-10-130315	POBI-SC-19-10-12-130315	POBI-SC-22-7-8-130307	POBI-SC-22-8-8.5-130307
				Sample Depth	6 - 8 ft	8 - 10 ft	10 - 12 ft	7 - 8 ft	8 - 8.5 ft
				Sample Date	3/15/2013	3/15/2013	3/15/2013	3/7/2013	3/7/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**170.475**	**232.727**	**833.333**	**30.132**	**12.743**
Acenaphthene	16	57			**527.241**	**243.636**	**683.333**	**58.38**	**51.836**
Acenaphthylene	66	66			3.515 U	0.691 U	**8.25 J**	**3.39**	**4.104**
Anthracene	220	1200			**91.388**	**30.545**	**466.667**	**26.365**	**38.877**
Benzo(a)anthracene	110	270			**112.478**	**24.727**	**358.333**	**26.365**	**77.754**
Benzo(a)pyrene	99	210			**28.12**	**11.636**	**166.667**	**18.456**	**53.996**
Benzo(g,h,i)perylene	31	78			**7.03**	**4.727**	**54.167**	**9.416**	**19.006**
Chrysene	110	460			**84.359**	**28.727**	**350**	**35.782**	**92.873**
Dibenzo(a,h)anthracene	12	33			**3.515**	0.691 U	**20 J**	**3.39 J**	**7.343**
Fluoranthene	160	1200			**773.286**	**170.909**	**1333.333**	**129.944**	**209.503**
Fluorene	23	79			**421.793**	**138.182**	**591.667**	**43.315**	**38.877**
Indeno(1,2,3-c,d)pyrene	34	88			**7.03**	**4.364**	**52.5**	**7.345**	**19.006**
Naphthalene	99	170			**228.471**	**174.545**	**666.667**	**77.213**	**49.676**
Phenanthrene	100	480			**1528.998**	**305.455**	**1083.333**	**103.578**	**105.832**
Pyrene	1000	1400			**544.815**	**98.182**	**916.667**	**97.928**	**177.106**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**63.269**	**24**	**333.333**	**35.782**	**95.032**
Total LPAH (SMS) (U = 0)	370	780			**2797.891**	**892.364**	**3499.917 J**	**312.241**	**289.201**
Total HPAH (SMS) (U = 0)	960	5300			**1623.902**	**367.273**	**3585 J**	**364.407 J**	**751.62**
PCB Aroclors (µg/kg)									
Aroclor 1016					18 U	--	--	4.3 U[1]	18 U
Aroclor 1221					18 U	--	--	5.8 U[1]	18 U
Aroclor 1232					18 U	--	--	5.8 U[1]	18 U
Aroclor 1242					18 U	--	--	5.8 U[1]	18 U
Aroclor 1248					91 U	--	--	5.8 U[1]	**370**
Aroclor 1254					**110**	--	--	5.8 U[1]	520 U
Aroclor 1260					64 U	--	--	5.8 U[1]	**280**
Total PCB Aroclors (U = 0)			130	1000	**110**	--	--	5.8 U[1]	**650**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			**1.933**	--	--	6.403 U	**14.039**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-23	POBI-SC-23	POBI-SC-31	POBI-SC-33	POBI-SC-42
Sample ID					POBI-SC-23-6-8-130315	POBI-SC-23-8-10-130315	POBI-SC-31-1-2-130307	POBI-SC-33-1-2-130305	POBI-SC-42-1-2-130228
Sample Depth					6 - 8 ft	8 - 10 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
Sample Date					3/15/2013	3/15/2013	3/7/2013	3/5/2013	2/28/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Conventional Parameters (pct)									
Total organic carbon					**9.13**	**3.44**	**1.66**	**2.61**	**0.901**
Total solids					**45.22**	**54.83**	**54.83**	**70.15**	**66.35**
Grain Size (pct)									
Total Gravel					**13.7**	**8.4**	--	--	--
Total Sand					**29.7**	**66**	--	--	--
Total Silt					**28.5**	**17.2**	--	--	--
Total Clay					**28**	**8.5**	--	--	--
Total Fines (silt + clay)					**56.5**	**25.7**	--	--	--
Metals (mg/kg)									
Arsenic	57	93			10 U	20 U	--	--	--
Cadmium	5.1	6.7			**8**	**1**	--	--	--
Chromium	260	270			**58**	**21**	--	--	--
Copper	390	390			**155**	**13.8**	--	--	--
Lead	450	530			**373**	6 U	--	--	--
Mercury	0.41	0.59			**3.17 J**	**0.07 J**	**0.06 J**	--	--
Silver	6.1	6.1			**18.1**	1 U	--	--	--
Zinc	410	960			**449**	**32**	--	--	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			**120**	**46**	--	--	18 UJ
2-Methylphenol (o-Cresol)	63	63			14 U	**13**	--	--	4.6 U
4-Methylphenol (p-Cresol)	670	670			**7600**	**69**	--	--	**33**
Benzoic acid	650	650			1400 U[1]	480 U[1]	--	--	370 UJ
Benzyl alcohol	57	73			**37 J**	19 U	--	--	**9.7 J**
Pentachlorophenol	360	690			**47 J**	47 U	--	--	46 U
Phenol	420	1200			**360**	13 U	--	--	**7.9**
1,2,4-Trichlorobenzene			31	51	**200**	4.7 U	--	--	4.6 U
1,2-Dichlorobenzene			35	50	**180**	4.7 U	--	--	4.6 U
1,4-Dichlorobenzene			110	110	**850**	**3.4 J**	--	--	4.6 U
bis(2-Ethylhexyl)phthalate			1300	3100	**2000**	120 U	--	--	23 U
Butylbenzyl phthalate			63	900	**120**	**5.5**	--	--	4.6 U
Dibenzofuran			540	540	**1700**	**600**	--	**70**	**12 J**
Diethyl phthalate			200	1200	54 U	18 U	--	--	**140**
Dimethyl phthalate			71	160	14 U	4.7 U	--	--	4.6 U
Di-n-butyl phthalate			1400	5100	270 U	95 U	--	--	18 U
Di-n-octyl phthalate			6200	6200	270 U	95 U	--	--	18 U
Hexachlorobenzene			22	70	14 U	4.7 U	--	--	4.6 U
n-Nitrosodiphenylamine			28	40	**630**	**47**	--	--	18 U
Hexachlorobutadiene			11	120	2.6 U[1]	4.7 U	--	--	4.6 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-23	POBI-SC-23	POBI-SC-31	POBI-SC-33	POBI-SC-42
Sample ID					POBI-SC-23-6-8-130315	POBI-SC-23-8-10-130315	POBI-SC-31-1-2-130307	POBI-SC-33-1-2-130305	POBI-SC-42-1-2-130228
Sample Depth					6 - 8 ft	8 - 10 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
Sample Date					3/15/2013	3/15/2013	3/7/2013	3/5/2013	2/28/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			**2.191**	0.137 U	--	--	0.511 U
1,2-Dichlorobenzene	2.3	2.3			**1.972**	0.137 U	--	--	0.511 U
1,4-Dichlorobenzene	3.1	9			**9.31**	**0.099 J**	--	--	0.511 U
bis(2-Ethylhexyl)phthalate	47	78			**21.906**	3.488 U	--	--	2.553 U
Butylbenzyl phthalate	4.9	64			**1.314**	**0.16**	--	--	0.511 U
Dibenzofuran	15	58			**18.62**	**17.442**	--	**2.682**	**1.332 J**
Diethyl phthalate	61	110			0.591 U	0.523 U	--	--	**15.538**
Dimethyl phthalate	53	53			0.153 U	0.137 U	--	--	0.511 U
Di-n-butyl phthalate	220	1700			2.957 U	2.762 U	--	--	1.998 U
Di-n-octyl phthalate	58	4500			2.957 U	2.762 U	--	--	1.998 U
Hexachlorobenzene	0.38	2.3			0.153 U	0.137 U	--	--	0.511 U
n-Nitrosodiphenylamine	11	11			**6.9**	**1.366**	--	--	1.998 U
Hexachlorobutadiene	3.9	6.2			0.153 U	0.137 U	--	--	0.511 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**2400**	**700**	--	**120**	**11 J**
Acenaphthene			500	500	**3400**	**990**	--	**74**	18 U
Acenaphthylene			1300	1300	**360**	95 U	--	**90**	18 U
Anthracene			960	960	**1400**	**740**	--	**76**	**14 J**
Benzo(a)anthracene			1300	1600	**1600**	**340**	--	**96**	**19**
Benzo(a)pyrene			1600	1600	**990**	**85 J**	--	**100**	18 U
Benzo(b,j,k)fluoranthenes					**2200**	**200**	--	**160**	**36 J**
Benzo(g,h,i)perylene			670	720	**690**	95 U	--	**67**	**16 J**
Chrysene			1400	2800	**2700**	**330**	--	**140**	**20**
Dibenzo(a,h)anthracene			230	230	**300**	**8.6**	--	**14 J**	**4.1 J**
Fluoranthene			1700	2500	**9400**	**2500**	--	**420 J**	**66**
Fluorene			540	540	**2800**	**1500**	--	**56**	**13 J**
Indeno(1,2,3-c,d)pyrene			600	690	**450**	95 U	--	**48**	**14 J**
Naphthalene			2100	2100	**4300**	**1700**	--	**1200 J**	**51**
Phenanthrene			1500	1500	**7100**	**6400**	--	**260 J**	**47**
Pyrene			2600	3300	**7200**	**1600**	--	**440 J**	**78**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**2200**	**200**	--	**160**	**36 J**
Total LPAH (SMS) (U = 0)			5200	5200	**19360**	**11330**	--	**1756 J**	**125 J**
Total HPAH (SMS) (U = 0)			12000	17000	**25530**	**5063.6 J**	--	**1485 J**	**253.1 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**1472**	**143.2 J**	--	**133.2 J**	**7.5 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**1472**	**147.9 J**	--	**133.2 J**	**16.5 J**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-23	POBI-SC-23	POBI-SC-31	POBI-SC-33	POBI-SC-42
				Sample ID	POBI-SC-23-6-8-130315	POBI-SC-23-8-10-130315	POBI-SC-31-1-2-130307	POBI-SC-33-1-2-130305	POBI-SC-42-1-2-130228
				Sample Depth	6 - 8 ft	8 - 10 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
				Sample Date	3/15/2013	3/15/2013	3/7/2013	3/5/2013	2/28/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**26.287**	**20.349**	--	**4.598**	**1.221 J**
Acenaphthene	16	57			**37.24**	**28.779**	--	**2.835**	1.998 U
Acenaphthylene	66	66			**3.943**	2.762 U	--	**3.448**	1.998 U
Anthracene	220	1200			**15.334**	**21.512**	--	**2.912**	**1.554 J**
Benzo(a)anthracene	110	270			**17.525**	**9.884**	--	**3.678**	**2.109**
Benzo(a)pyrene	99	210			**10.843**	**2.471 J**	--	**3.831**	1.998 U
Benzo(g,h,i)perylene	31	78			**7.558**	2.762 U	--	**2.567**	**1.776 J**
Chrysene	110	460			**29.573**	**9.593**	--	**5.364**	**2.22**
Dibenzo(a,h)anthracene	12	33			**3.286**	**0.25**	--	**0.536 J**	**0.455 J**
Fluoranthene	160	1200			**102.957**	**72.674**	--	**16.092 J**	**7.325**
Fluorene	23	79			**30.668**	**43.605**	--	**2.146**	**1.443 J**
Indeno(1,2,3-c,d)pyrene	34	88			**4.929**	2.762 U	--	**1.839**	**1.554 J**
Naphthalene	99	170			**47.097**	**49.419**	--	**45.977 J**	**5.66**
Phenanthrene	100	480			**77.766**	**186.047**	--	**9.962 J**	**5.216**
Pyrene	1000	1400			**78.861**	**46.512**	--	**16.858 J**	**8.657**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**24.096**	**5.814**	--	**6.13**	**3.996 J**
Total LPAH (SMS) (U = 0)	370	780			**212.048**	**329.36**	--	**67.28 J**	**13.873 J**
Total HPAH (SMS) (U = 0)	960	5300			**279.628**	**147.198 J**	--	**56.897 J**	**28.091 J**
PCB Aroclors (µg/kg)									
Aroclor 1016					18 U	17 U	--	--	--
Aroclor 1221					18 U	17 U	--	--	--
Aroclor 1232					18 U	17 U	--	--	--
Aroclor 1242					18 U	17 U	--	--	--
Aroclor 1248					440 U	17 U	--	--	--
Aroclor 1254					**1800**	17 U	--	--	--
Aroclor 1260					**600 J**	17 U	--	--	--
Total PCB Aroclors (U = 0)			130	1000	**2400 J**	17 U	--	--	--
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			**26.287 J**	0.494 U	--	--	--

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-47	POBI-SC-47	POBI-SC-47	POBI-SC-47	POBI-SC-49
				Sample ID	POBI-SC-47-0-1-130227	POBI-SC-47-1-2-130227	POBI-SC-47-2-3-130227	POBI-SC-47-3-4-130227	POBI-SC-49-0-1-130301
				Sample Depth	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	0 - 1 ft
				Sample Date	2/27/2013	2/27/2013	2/27/2013	2/27/2013	3/1/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Conventional Parameters (pct)									
Total organic carbon					**3.05**	**3**	**1.86**	**2.38**	**7.32**
Total solids					**57.2**	**59**	**65.63**	**60.19**	**28.8**
Grain Size (pct)									
Total Gravel					**5.6**	**4.4**	--	--	**1.2**
Total Sand					**33.3**	**30.6**	--	--	**24.7**
Total Silt					**39**	**43**	--	--	**52.2**
Total Clay					**22**	**22**	--	--	**21.7**
Total Fines (silt + clay)					**61**	**65**	--	--	**73.9**
Metals (mg/kg)									
Arsenic	57	93			8 U	8 U	--	--	20 U
Cadmium	5.1	6.7			**2.1**	**2.1**	--	--	**1.8**
Chromium	260	270			**32.5**	**33.7**	--	--	**33**
Copper	390	390			**39.6**	**34.3**	--	--	**63.5**
Lead	450	530			**21**	**14**	--	--	**48**
Mercury	0.41	0.59			**0.16**	**0.15**	--	--	**0.21**
Silver	6.1	6.1			0.5 U	0.5 U	--	--	1 U
Zinc	410	960			**69**	**63**	--	--	**112**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			**23 J**	**20 J**	**19 J**	--	**6.2 J**
2-Methylphenol (o-Cresol)	63	63			**15**	**14**	**17 J**	--	**3.7 J**
4-Methylphenol (p-Cresol)	670	670			**1500**	**730**	**450**	--	**160**
Benzoic acid	650	650			**240 J**	**140 J**	**120 J**	--	470 UJ
Benzyl alcohol	57	73			20 UJ	19 U	**15 J**	--	23 U
Pentachlorophenol	360	690			49 UJ	48 U	49 U	--	58 U
Phenol	420	1200			**220**	**120**	**81**	--	**59**
1,2,4-Trichlorobenzene			31	51	4.9 U	4.8 U	4.9 U	--	5.8 U
1,2-Dichlorobenzene			35	50	**3.7 J**	4.8 U	4.9 U	--	5.8 U
1,4-Dichlorobenzene			110	110	**9.2**	**3.4 J**	4.9 U	--	**7.1**
bis(2-Ethylhexyl)phthalate			1300	3100	**63**	**17 J**	24 U	--	**100**
Butylbenzyl phthalate			63	900	**12**	**12**	4.9 U	--	**23**
Dibenzofuran			540	540	**94**	**110**	**140**	**220**	23 U
Diethyl phthalate			200	1200	**14**	**6.2**	12 U	--	**14**
Dimethyl phthalate			71	160	4.9 U	4.8 U	4.9 U	--	5.8 U
Di-n-butyl phthalate			1400	5100	20 U	19 U	20 U	--	23 U
Di-n-octyl phthalate			6200	6200	20 U	19 U	20 U	--	23 U
Hexachlorobenzene			22	70	4.9 U	4.8 U	4.9 U	--	5.8 U
n-Nitrosodiphenylamine			28	40	20 UJ	19 U	**4.5 J**	--	23 U
Hexachlorobutadiene			11	120	4.9 U	4.8 U	4.9 U	--	5.8 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-47	POBI-SC-47	POBI-SC-47	POBI-SC-47	POBI-SC-49
Sample ID					POBI-SC-47-0-1-130227	POBI-SC-47-1-2-130227	POBI-SC-47-2-3-130227	POBI-SC-47-3-4-130227	POBI-SC-49-0-1-130301
Sample Depth					0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	0 - 1 ft
Sample Date					2/27/2013	2/27/2013	2/27/2013	2/27/2013	3/1/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.161 U	0.16 U	0.263 U	--	0.079 U
1,2-Dichlorobenzene	2.3	2.3			**0.121 J**	0.16 U	0.263 U	--	0.079 U
1,4-Dichlorobenzene	3.1	9			**0.302**	**0.113 J**	0.263 U	--	**0.097**
bis(2-Ethylhexyl)phthalate	47	78			**2.066**	**0.567 J**	1.29 U	--	**1.366**
Butylbenzyl phthalate	4.9	64			**0.393**	**0.4**	0.263 U	--	**0.314**
Dibenzofuran	15	58			**3.082**	**3.667**	**7.527**	**9.244**	0.314 U
Diethyl phthalate	61	110			**0.459**	**0.207**	0.645 U	--	**0.191**
Dimethyl phthalate	53	53			0.161 U	0.16 U	0.263 U	--	0.079 U
Di-n-butyl phthalate	220	1700			0.656 U	0.633 U	1.075 U	--	0.314 U
Di-n-octyl phthalate	58	4500			0.656 U	0.633 U	1.075 U	--	0.314 U
Hexachlorobenzene	0.38	2.3			0.161 U	0.16 U	0.263 U	--	0.079 U
n-Nitrosodiphenylamine	11	11			0.656 UJ	0.633 U	**0.242 J**	--	0.314 U
Hexachlorobutadiene	3.9	6.2			0.161 U	0.16 U	0.263 U	--	0.079 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**110**	**100**	**130**	**210**	**19 J**
Acenaphthene			500	500	**73**	**110**	**140**	**240**	23 U
Acenaphthylene			1300	1300	**130**	**270**	**460**	**850**	23 U
Anthracene			960	960	**89**	**110**	**130**	**220**	23 U
Benzo(a)anthracene			1300	1600	**69**	**68**	**66**	**83**	**29**
Benzo(a)pyrene			1600	1600	**73**	**81**	**78**	**97**	**37**
Benzo(b,j,k)fluoranthenes					**140**	**120**	**120**	**150**	**77**
Benzo(g,h,i)perylene			670	720	**73**	**76**	**85**	**100**	**30**
Chrysene			1400	2800	**84**	**83**	**83**	**100**	**40**
Dibenzo(a,h)anthracene			230	230	**13**	**10**	**9.8**	20 U	**12**
Fluoranthene			1700	2500	**430**	**520**	**550**	**890**	**68**
Fluorene			540	540	**75**	**79**	**95**	**140**	23 U
Indeno(1,2,3-c,d)pyrene			600	690	**45**	**44**	**44**	**45**	**27**
Naphthalene			2100	2100	**1100**	**1400**	**1900**	**3000**	**32**
Phenanthrene			1500	1500	**450**	**610**	**780**	**1200**	**30**
Pyrene			2600	3300	**420**	**470**	**640**	**880**	**65**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**140**	**120**	**120**	**150**	**77**
Total LPAH (SMS) (U = 0)			5200	5200	**1917**	**2579**	**3505**	**5650**	**62**
Total HPAH (SMS) (U = 0)			12000	17000	**1347**	**1472**	**1675.8**	**2345**	**385**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**100.54**	**106.03**	**102.8**	**125.8**	**51.9**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**100.54**	**106.03**	**102.8**	**126.8**	**51.9**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-47	POBI-SC-47	POBI-SC-47	POBI-SC-47	POBI-SC-49
Sample ID					POBI-SC-47-0-1-130227	POBI-SC-47-1-2-130227	POBI-SC-47-2-3-130227	POBI-SC-47-3-4-130227	POBI-SC-49-0-1-130301
Sample Depth					0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	0 - 1 ft
Sample Date					2/27/2013	2/27/2013	2/27/2013	2/27/2013	3/1/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**3.607**	**3.333**	**6.989**	**8.824**	**0.26 J**
Acenaphthene	16	57			**2.393**	**3.667**	**7.527**	**10.084**	0.314 U
Acenaphthylene	66	66			**4.262**	**9**	**24.731**	**35.714**	0.314 U
Anthracene	220	1200			**2.918**	**3.667**	**6.989**	**9.244**	0.314 U
Benzo(a)anthracene	110	270			**2.262**	**2.267**	**3.548**	**3.487**	**0.396**
Benzo(a)pyrene	99	210			**2.393**	**2.7**	**4.194**	**4.076**	**0.505**
Benzo(g,h,i)perylene	31	78			**2.393**	**2.533**	**4.57**	**4.202**	**0.41**
Chrysene	110	460			**2.754**	**2.767**	**4.462**	**4.202**	**0.546**
Dibenzo(a,h)anthracene	12	33			**0.426**	**0.333**	**0.527**	0.84 U	**0.164**
Fluoranthene	160	1200			**14.098**	**17.333**	**29.57**	**37.395**	**0.929**
Fluorene	23	79			**2.459**	**2.633**	**5.108**	**5.882**	0.314 U
Indeno(1,2,3-c,d)pyrene	34	88			**1.475**	**1.467**	**2.366**	**1.891**	**0.369**
Naphthalene	99	170			**36.066**	**46.667**	**102.151**	**126.05**	**0.437**
Phenanthrene	100	480			**14.754**	**20.333**	**41.935**	**50.42**	**0.41**
Pyrene	1000	1400			**13.77**	**15.667**	**34.409**	**36.975**	**0.888**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**4.59**	**4**	**6.452**	**6.303**	**1.052**
Total LPAH (SMS) (U = 0)	370	780			**62.852**	**85.967**	**188.441**	**237.395**	**0.847**
Total HPAH (SMS) (U = 0)	960	5300			**44.164**	**49.067**	**90.097**	**98.529**	**5.26**
PCB Aroclors (µg/kg)									
Aroclor 1016					20 U	18 U	--	--	20 U
Aroclor 1221					20 U	18 U	--	--	20 U
Aroclor 1232					20 U	18 U	--	--	20 U
Aroclor 1242					20 U	18 U	--	--	20 U
Aroclor 1248					20 U	18 U	--	--	20 U
Aroclor 1254					**40**	18 U	--	--	**300**
Aroclor 1260					20 U	18 U	--	--	150 U
Total PCB Aroclors (U = 0)			130	1000	**40**	18 U	--	--	**300**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			**1.311**	0.6 U	--	--	**4.098**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET	Budd Inlet Sediment Site POBI-SC-49 POBI-SC-49-1-2-130301 1 - 2 ft 3/1/2013 N SE	Budd Inlet Sediment Site POBI-SC-49 POBI-SC-49-2-3-130301 2 - 3 ft 3/1/2013 N SE	Budd Inlet Sediment Site POBI-SC-49 POBI-SC-49-3-4-130301 3 - 4 ft 3/1/2013 N SE	Budd Inlet Sediment Site POBI-SC-49 POBI-SC-49-4-6-130301 4 - 6 ft 3/1/2013 N SE	Budd Inlet Sediment Site POBI-SC-49 POBI-SC-49-6-8-130301 6 - 8 ft 3/1/2013 N SE
Task / Location ID / Sample ID / Sample Depth / Sample Date / Sample Type / Matrix									
Conventional Parameters (pct)									
Total organic carbon					**28.5**	**3.37**	**2.8**	**1.99**	**2.1**
Total solids					**18.5**	**45.87**	**53.77**	**71.4**	**64.86**
Grain Size (pct)									
Total Gravel					**1.2**	--	--	--	--
Total Sand					**25.9**	--	--	--	--
Total Silt					**46.5**	--	--	--	--
Total Clay					**26.4**	--	--	--	--
Total Fines (silt + clay)					**72.9**	--	--	--	--
Metals (mg/kg)									
Arsenic	57	93			30 U	10 U	9 U	7 U	7 U
Cadmium	5.1	6.7			**2**	**2.2**	**1.9**	**0.6**	**0.9**
Chromium	260	270			**28**	**41**	**46**	**28.2**	**34.2**
Copper	390	390			**81**	**60**	**66.2**	**33.2**	**46**
Lead	450	530			**70**	**124**	**253**	**109**	**128**
Mercury	0.41	0.59			**0.41**	**0.23 J**	**0.23 J**	**0.07 J**	**0.15 J**
Silver	6.1	6.1			2 U	**0.9**	**0.8**	0.4 U	0.4 U
Zinc	410	960			**118**	**116**	**135**	**95**	**94**
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			**12 J**	**17 J**	**5.9 J**	**3.4 J**	19 U
2-Methylphenol (o-Cresol)	63	63			10 U	**7.4**	4.8 U	4.7 U	4.8 U
4-Methylphenol (p-Cresol)	670	670			**330**	**270**	**170**	**100**	**92**
Benzoic acid	650	650			820 UJ	380 U	**240 J**	380 U	**120 J**
Benzyl alcohol	57	73			41 U	**12 J**	**15 J**	**10 J**	**16 J**
Pentachlorophenol	360	690			100 U	**19 J**	**18 J**	47 U	48 U
Phenol	420	1200			**66**	**44**	**50**	**20**	**18**
1,2,4-Trichlorobenzene			31	51	10 U	**2.9 J**	4.8 U	4.7 U	4.8 U
1,2-Dichlorobenzene			35	50	**5.5 J**	**4.8**	**2.8 J**	4.7 U	**3.4 J**
1,4-Dichlorobenzene			110	110	**12**	**30**	**24**	**250**	**21**
bis(2-Ethylhexyl)phthalate			1300	3100	**62**	**430**	**940**	**950**	**730**
Butylbenzyl phthalate			63	900	**37**	**85**	**98**	**42**	**130**
Dibenzofuran			540	540	41 U	**44**	**41**	**27**	**48**
Diethyl phthalate			200	1200	**18**	9.9 U	11 U	6.4 U	**31**
Dimethyl phthalate			71	160	10 U	**3.4 J**	**5.4**	4.7 U	4.8 U
Di-n-butyl phthalate			1400	5100	41 U	19 U	19 U	19 U	19 U
Di-n-octyl phthalate			6200	6200	41 U	19 U	19 U	19 U	19 U
Hexachlorobenzene			22	70	10 U	4.8 U	4.8 U	4.7 U	4.8 U
n-Nitrosodiphenylamine			28	40	41 U	19 U	19 U	19 U	19 U
Hexachlorobutadiene			11	120	10 U	4.8 U	4.8 U	4.7 U	4.8 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET					
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-49	POBI-SC-49	POBI-SC-49	POBI-SC-49	POBI-SC-49
Sample ID					POBI-SC-49-1-2-130301	POBI-SC-49-2-3-130301	POBI-SC-49-3-4-130301	POBI-SC-49-4-6-130301	POBI-SC-49-6-8-130301
Sample Depth					1 - 2 ft	2 - 3 ft	3 - 4 ft	4 - 6 ft	6 - 8 ft
Sample Date					3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			0.035 U	**0.086 J**	0.171 U	0.236 U	0.229 U
1,2-Dichlorobenzene	2.3	2.3			**0.019 J**	**0.142**	**0.1 J**	0.236 U	**0.162 J**
1,4-Dichlorobenzene	3.1	9			**0.042**	**0.89**	**0.857**	**12.563**	**1**
bis(2-Ethylhexyl)phthalate	47	78			**0.218**	**12.76**	**33.571**	**47.739**	**34.762**
Butylbenzyl phthalate	4.9	64			**0.13**	**2.522**	**3.5**	**2.111**	**6.19**
Dibenzofuran	15	58			0.144 U	**1.306**	**1.464**	**1.357**	**2.286**
Diethyl phthalate	61	110			**0.063**	0.294 U	0.393 U	0.322 U	**1.476**
Dimethyl phthalate	53	53			0.035 U	**0.101 J**	**0.193**	0.236 U	0.229 U
Di-n-butyl phthalate	220	1700			0.144 U	0.564 U	0.679 U	0.955 U	0.905 U
Di-n-octyl phthalate	58	4500			0.144 U	0.564 U	0.679 U	0.955 U	0.905 U
Hexachlorobenzene	0.38	2.3			0.035 U	0.142 U	0.171 U	0.236 U	0.229 U
n-Nitrosodiphenylamine	11	11			0.144 U	0.564 U	0.679 U	0.955 U	0.905 U
Hexachlorobutadiene	3.9	6.2			0.035 U	0.142 U	0.171 U	0.236 U	0.229 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**33 J**	**68**	**48**	**22**	**28**
Acenaphthene			500	500	41 U	**44**	**28**	**45**	**49**
Acenaphthylene			1300	1300	41 U	**12 J**	**16 J**	**15 J**	**11 J**
Anthracene			960	960	41 U	**72**	**78**	**84**	**98**
Benzo(a)anthracene			1300	1600	**51**	**130**	**130**	**160**	**180**
Benzo(a)pyrene			1600	1600	**51**	**140**	**120**	**120**	**130**
Benzo(b,j,k)fluoranthenes					**140**	**290**	**280**	**230**	**280**
Benzo(g,h,i)perylene			670	720	**43**	**92**	**110**	**68**	**88**
Chrysene			1400	2800	**70**	**180**	**180**	**200**	**250**
Dibenzo(a,h)anthracene			230	230	**20**	**38**	**40**	**28**	**35**
Fluoranthene			1700	2500	**86**	**360**	**360**	**530**	**470**
Fluorene			540	540	41 U	**53**	**37**	**51**	**68**
Indeno(1,2,3-c,d)pyrene			600	690	**41**	**75**	**72**	**54**	**62**
Naphthalene			2100	2100	**35 J**	**140**	**130**	**47**	**61**
Phenanthrene			1500	1500	**37 J**	**200**	**190**	**220**	**210**
Pyrene			2600	3300	**74**	**460**	**460**	**550**	**510**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**140**	**290**	**280**	**230**	**280**
Total LPAH (SMS) (U = 0)			5200	5200	**72 J**	**521 J**	**479 J**	**462 J**	**497 J**
Total HPAH (SMS) (U = 0)			12000	17000	**576**	**1765**	**1752**	**1940**	**2005**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**76.9**	**195.1**	**174**	**169.2**	**188.2**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**76.9**	**195.1**	**174**	**169.2**	**188.2**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-49	POBI-SC-49	POBI-SC-49	POBI-SC-49	POBI-SC-49
				Sample ID	POBI-SC-49-1-2-130301	POBI-SC-49-2-3-130301	POBI-SC-49-3-4-130301	POBI-SC-49-4-6-130301	POBI-SC-49-6-8-130301
				Sample Depth	1 - 2 ft	2 - 3 ft	3 - 4 ft	4 - 6 ft	6 - 8 ft
				Sample Date	3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**0.116 J**	**2.018**	**1.714**	**1.106**	**1.333**
Acenaphthene	16	57			0.144 U	**1.306**	**1**	**2.261**	**2.333**
Acenaphthylene	66	66			0.144 U	**0.356 J**	**0.571 J**	**0.754 J**	**0.524 J**
Anthracene	220	1200			0.144 U	**2.136**	**2.786**	**4.221**	**4.667**
Benzo(a)anthracene	110	270			**0.179**	**3.858**	**4.643**	**8.04**	**8.571**
Benzo(a)pyrene	99	210			**0.179**	**4.154**	**4.286**	**6.03**	**6.19**
Benzo(g,h,i)perylene	31	78			**0.151**	**2.73**	**3.929**	**3.417**	**4.19**
Chrysene	110	460			**0.246**	**5.341**	**6.429**	**10.05**	**11.905**
Dibenzo(a,h)anthracene	12	33			**0.07**	**1.128**	**1.429**	**1.407**	**1.667**
Fluoranthene	160	1200			**0.302**	**10.682**	**12.857**	**26.633**	**22.381**
Fluorene	23	79			0.144 U	**1.573**	**1.321**	**2.563**	**3.238**
Indeno(1,2,3-c,d)pyrene	34	88			**0.144**	**2.226**	**2.571**	**2.714**	**2.952**
Naphthalene	99	170			**0.123 J**	**4.154**	**4.643**	**2.362**	**2.905**
Phenanthrene	100	480			**0.13 J**	**5.935**	**6.786**	**11.055**	**10**
Pyrene	1000	1400			**0.26**	**13.65**	**16.429**	**27.638**	**24.286**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**0.491**	**8.605**	**10**	**11.558**	**13.333**
Total LPAH (SMS) (U = 0)	370	780			**0.253 J**	**15.46 J**	**17.107 J**	**23.216 J**	**23.667 J**
Total HPAH (SMS) (U = 0)	960	5300			**2.021**	**52.374**	**62.571**	**97.487**	**95.476**
PCB Aroclors (µg/kg)									
Aroclor 1016					190 U	18 U	18 U	17 U	18 U
Aroclor 1221					190 U	18 U	18 U	17 U	18 U
Aroclor 1232					190 U	18 U	18 U	17 U	18 U
Aroclor 1242					190 U	18 U	18 U	17 U	18 U
Aroclor 1248					190 U	83 U	180 U	83 U	180 U
Aroclor 1254					**1800**	**270**	**1100**	**240**	**860**
Aroclor 1260					770 U	**130 J**	**230 J**	**72**	**220 J**
Total PCB Aroclors (U = 0)			130	1000	**1800**	**400 J**	**1330 J**	**312**	**1080 J**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			**6.316**	**11.869 J**	**47.5 J**	**15.678**	**51.429 J**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET					
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-49	POBI-SC-50	POBI-SC-50	POBI-SC-50	POBI-SC-50
Sample ID					POBI-SC-49-10.5-11.4-130301	POBI-SC-50-0-1-130301	POBI-SC-50-1-2-130301	POBI-SC-50-2-3-130301	POBI-SC-50-3-4-130301
Sample Depth					10.5 - 11.4 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft
Sample Date					3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013
Sample Type					N	N	N	N	N
Matrix					SE	SE	SE	SE	SE
Conventional Parameters (pct)									
Total organic carbon					**4.58**	**2.62**	**1.52**	**0.897**	**0.625**
Total solids					**49.32**	**80.9**	**72.5**	**76.2**	**74.78**
Grain Size (pct)									
Total Gravel					--	**42.8**	**38.5**	**0.7**	--
Total Sand					--	**46.6**	**40.5**	**82.6**	--
Total Silt					--	**8.8**	**17.2**	**13.2**	--
Total Clay					--	**1.9**	**3.9**	**3.5**	--
Total Fines (silt + clay)					--	**10.7**	**21.1**	**16.7**	--
Metals (mg/kg)									
Arsenic	57	93			10 U	6 U	6 U	6 U	--
Cadmium	5.1	6.7			**2.8**	**0.5**	**0.9**	**0.5**	--
Chromium	260	270			**48**	**22**	**29.9**	**27.8**	--
Copper	390	390			**77.1**	**20.4**	**29.3**	**19.7**	--
Lead	450	530			**75**	**27**	**66**	**28**	--
Mercury	0.41	0.59			**0.44 J**	**0.07**	**0.23**	**0.06**	--
Silver	6.1	6.1			**0.9**	0.4 U	**0.4**	0.4 U	--
Zinc	410	960			**127**	**60**	**81**	**49**	--
Semivolatile Organics (µg/kg)									
2,4-Dimethylphenol	29	29			**13 J**	19 U	20 U	18 U	**3.8 J**
2-Methylphenol (o-Cresol)	63	63			4.9 U	4.8 U	4.9 U	4.5 U	4.6 U
4-Methylphenol (p-Cresol)	670	670			**100**	**50**	**170**	**130**	**91**
Benzoic acid	650	650			400 U	380 UJ	390 UJ	360 UJ	370 UJ
Benzyl alcohol	57	73			**18 J**	19 U	20 U	18 U	**12 J**
Pentachlorophenol	360	690			**24 J**	48 U	49 U	45 U	46 U
Phenol	420	1200			**27**	**36**	**35**	**13 J**	**9.9**
1,2,4-Trichlorobenzene			31	51	**5.6**	4.8 U	4.9 U	4.5 U	**2.8 J**
1,2-Dichlorobenzene			35	50	**2.7 J**	4.8 U	4.9 U	4.5 U	4.6 U
1,4-Dichlorobenzene			110	110	**19**	**100**	**81**	**55**	**30**
bis(2-Ethylhexyl)phthalate			1300	3100	**140**	**120**	**150**	**21 J**	**65**
Butylbenzyl phthalate			63	900	**62**	**15**	**8**	4.5 U	4.6 U
Dibenzofuran			540	540	**47**	**12 J**	**36**	**12 J**	**71**
Diethyl phthalate			200	1200	11 U	**8**	**16**	**15**	13 U
Dimethyl phthalate			71	160	**11**	4.8 U	**6**	4.5 U	4.6 U
Di-n-butyl phthalate			1400	5100	20 U	19 U	20 U	18 U	18 U
Di-n-octyl phthalate			6200	6200	20 U	19 U	20 U	18 U	18 U
Hexachlorobenzene			22	70	4.9 U	4.8 U	4.9 U	4.5 U	4.6 U
n-Nitrosodiphenylamine			28	40	20 U	19 U	**18 J**	18 U	**18 J**
Hexachlorobutadiene			11	120	4.9 U	4.8 U	4.9 U	4.5 U	4.6 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-49	POBI-SC-50	POBI-SC-50	POBI-SC-50	POBI-SC-50
				Sample ID	POBI-SC-49-10.5-11.4-130301	POBI-SC-50-0-1-130301	POBI-SC-50-1-2-130301	POBI-SC-50-2-3-130301	POBI-SC-50-3-4-130301
				Sample Depth	10.5 - 11.4 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft
				Sample Date	3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Semivolatile Organics (mg/kg-OC)									
1,2,4-Trichlorobenzene	0.81	1.8			**0.122**	0.183 U	0.322 U	0.502 U	**0.448 J**
1,2-Dichlorobenzene	2.3	2.3			**0.059 J**	0.183 U	0.322 U	0.502 U	0.736 U
1,4-Dichlorobenzene	3.1	9			**0.415**	**3.817**	**5.329**	**6.132**	**4.8**
bis(2-Ethylhexyl)phthalate	47	78			**3.057**	**4.58**	**9.868**	**2.341 J**	**10.4**
Butylbenzyl phthalate	4.9	64			**1.354**	**0.573**	**0.526**	0.502 U	0.736 U
Dibenzofuran	15	58			**1.026**	**0.458 J**	**2.368**	**1.338 J**	**11.36**
Diethyl phthalate	61	110			0.24 U	**0.305**	**1.053**	**1.672**	2.08 U
Dimethyl phthalate	53	53			**0.24**	0.183 U	**0.395**	0.502 U	0.736 U
Di-n-butyl phthalate	220	1700			0.437 U	0.725 U	1.316 U	2.007 U	2.88 U
Di-n-octyl phthalate	58	4500			0.437 U	0.725 U	1.316 U	2.007 U	2.88 U
Hexachlorobenzene	0.38	2.3			0.107 U	0.183 U	0.322 U	0.502 U	0.736 U
n-Nitrosodiphenylamine	11	11			0.437 U	0.725 U	**1.184 J**	2.007 U	**2.88 J**
Hexachlorobutadiene	3.9	6.2			0.107 U	0.183 U	0.322 U	0.502 U	0.736 U
Polycyclic Aromatic Hydrocarbons (µg/kg)									
2-Methylnaphthalene			670	670	**72**	**15 J**	**55**	**22**	**54**
Acenaphthene			500	500	**32**	**12 J**	**34**	**15 J**	**77**
Acenaphthylene			1300	1300	**20**	19 U	20 U	18 U	**11 J**
Anthracene			960	960	**72**	**24**	**130**	**13 J**	**83**
Benzo(a)anthracene			1300	1600	**120**	**59**	**450**	**15 J**	**70**
Benzo(a)pyrene			1600	1600	**90**	**58**	**260**	**9.9 J**	**35**
Benzo(b,j,k)fluoranthenes					**200**	**120**	**500**	**22 J**	**75**
Benzo(g,h,i)perylene			670	720	**76**	**37**	**100**	18 U	**19**
Chrysene			1400	2800	**160**	**83**	**500**	**22**	**97**
Dibenzo(a,h)anthracene			230	230	**26**	**15**	**56**	**3.4 J**	**7.7**
Fluoranthene			1700	2500	**390**	**160**	**1200**	**59**	**340**
Fluorene			540	540	**57**	**15 J**	**56**	**25**	**120**
Indeno(1,2,3-c,d)pyrene			600	690	**50**	**34**	**95**	18 U	**16 J**
Naphthalene			2100	2100	**160**	**40**	**87**	**23**	**73**
Phenanthrene			1500	1500	**150**	**72**	**270**	**48**	**400**
Pyrene			2600	3300	**400**	**170**	**820**	**53**	**260**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**200**	**120**	**500**	**22 J**	**75**
Total LPAH (SMS) (U = 0)			5200	5200	**491**	**163 J**	**577**	**124 J**	**764 J**
Total HPAH (SMS) (U = 0)			12000	17000	**1512**	**736**	**3981**	**184.3 J**	**919.7 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**131.2**	**81.63**	**375.1**	**14.2 J**	**52.8 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**131.2**	**81.63**	**375.1**	**15.1 J**	**52.8 J**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-49	POBI-SC-50	POBI-SC-50	POBI-SC-50	POBI-SC-50
				Sample ID	POBI-SC-49-10.5-11.4-130301	POBI-SC-50-0-1-130301	POBI-SC-50-1-2-130301	POBI-SC-50-2-3-130301	POBI-SC-50-3-4-130301
				Sample Depth	10.5 - 11.4 ft	0 - 1 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft
				Sample Date	3/1/2013	3/1/2013	3/1/2013	3/1/2013	3/1/2013
				Sample Type	N	N	N	N	N
				Matrix	SE	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET					
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
2-Methylnaphthalene	38	64			**1.572**	**0.573 J**	**3.618**	**2.453**	**8.64**
Acenaphthene	16	57			**0.699**	**0.458 J**	**2.237**	**1.672 J**	**12.32**
Acenaphthylene	66	66			**0.437**	0.725 U	1.316 U	2.007 U	**1.76 J**
Anthracene	220	1200			**1.572**	**0.916**	**8.553**	**1.449 J**	**13.28**
Benzo(a)anthracene	110	270			**2.62**	**2.252**	**29.605**	**1.672 J**	**11.2**
Benzo(a)pyrene	99	210			**1.965**	**2.214**	**17.105**	**1.104 J**	**5.6**
Benzo(g,h,i)perylene	31	78			**1.659**	**1.412**	**6.579**	2.007 U	**3.04**
Chrysene	110	460			**3.493**	**3.168**	**32.895**	**2.453**	**15.52**
Dibenzo(a,h)anthracene	12	33			**0.568**	**0.573**	**3.684**	**0.379 J**	**1.232**
Fluoranthene	160	1200			**8.515**	**6.107**	**78.947**	**6.577**	**54.4**
Fluorene	23	79			**1.245**	**0.573 J**	**3.684**	**2.787**	**19.2**
Indeno(1,2,3-c,d)pyrene	34	88			**1.092**	**1.298**	**6.25**	2.007 U	**2.56 J**
Naphthalene	99	170			**3.493**	**1.527**	**5.724**	**2.564**	**11.68**
Phenanthrene	100	480			**3.275**	**2.748**	**17.763**	**5.351**	**64**
Pyrene	1000	1400			**8.734**	**6.489**	**53.947**	**5.909**	**41.6**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**4.367**	**4.58**	**32.895**	**2.453 J**	**12**
Total LPAH (SMS) (U = 0)	370	780			**10.721**	**6.221 J**	**37.961**	**13.824 J**	**122.24 J**
Total HPAH (SMS) (U = 0)	960	5300			**33.013**	**28.092**	**261.908**	**20.546 J**	**147.152 J**
PCB Aroclors (µg/kg)									
Aroclor 1016					19 U	18 U	20 U	19 U	18 U
Aroclor 1221					19 U	18 U	20 U	19 U	18 U
Aroclor 1232					19 U	18 U	20 U	19 U	18 U
Aroclor 1242					19 U	18 U	20 U	19 U	18 U
Aroclor 1248					94 U	18 U	20 U	19 U	37 U
Aroclor 1254					**370**	**70**	**170**	**220**	**92**
Aroclor 1260					**170**	27 U	39 U	47 U	28 U
Total PCB Aroclors (U = 0)			130	1000	**540**	**70**	**170**	**220**	**92**
PCB Aroclors (mg/kg-OC)									
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			**11.79**	**2.672**	**11.184**	**24.526**	**14.72**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

	SCO	CSL	LAET	2LAET				
Task					Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
Location ID					POBI-SC-50	POBI-SC-50	POBI-SC-50	POBI-SC-50
Sample ID					POBI-SC-50-4-6-130301	POBI-SC-50-6-8-130301	POBI-SC-50-8-10-130301	POBI-SC-50-12.4-13-130301
Sample Depth					4 - 6 ft	6 - 8 ft	8 - 10 ft	12.4 - 13 ft
Sample Date					3/1/2013	3/1/2013	3/1/2013	3/1/2013
Sample Type					N	N	N	N
Matrix					SE	SE	SE	SE
Conventional Parameters (pct)								
Total organic carbon					**4.82**	**5.25**	**5.96**	**2.8**
Total solids					**57.71**	**57.76**	**56.59**	**57.05**
Grain Size (pct)								
Total Gravel					--	--	--	--
Total Sand					--	--	--	--
Total Silt					--	--	--	--
Total Clay					--	--	--	--
Total Fines (silt + clay)					--	--	--	--
Metals (mg/kg)								
Arsenic	57	93			**10**	**11**	**8**	**9**
Cadmium	5.1	6.7			**1**	**0.9**	**1.4**	**1.5**
Chromium	260	270			**44.3**	**63.2**	**41.4**	**51.1**
Copper	390	390			**41.2**	**38.5**	**56.7**	**60.4**
Lead	450	530			**72**	**46**	**100**	**30**
Mercury	0.41	0.59			**0.26 J**	**0.19 J**	**0.48 J**	**0.3 J**
Silver	6.1	6.1			**0.5**	0.5 U	**2.7**	0.5 U
Zinc	410	960			**104**	**86**	**174**	**110**
Semivolatile Organics (µg/kg)								
2,4-Dimethylphenol	29	29			**15 J**	**7.1 J**	**33**	**20**
2-Methylphenol (o-Cresol)	63	63			4.8 U	4.9 U	4.8 U	4.9 U
4-Methylphenol (p-Cresol)	670	670			**850**	**280**	**2100**	**1000**
Benzoic acid	650	650			**480**	**310 J**	**230 J**	**270 J**
Benzyl alcohol	57	73			**15 J**	**17 J**	**16 J**	20 U
Pentachlorophenol	360	690			**23 J**	**16 J**	**73**	49 U
Phenol	420	1200			**39**	**31**	**54**	**62**
1,2,4-Trichlorobenzene			31	51	**24**	**9.8 J**	**8**	4.9 U
1,2-Dichlorobenzene			35	50	**3 J**	4.9 U	**8.4**	4.9 U
1,4-Dichlorobenzene			110	110	**62**	**88**	**140**	**27**
bis(2-Ethylhexyl)phthalate			1300	3100	**93**	**44**	**170**	24 U
Butylbenzyl phthalate			63	900	**32**	**15**	**37**	**15**
Dibenzofuran			540	540	**57**	**32**	**50**	**50**
Diethyl phthalate			200	1200	**28**	15 U	11 U	18 U
Dimethyl phthalate			71	160	4.8 U	**3.6 J**	**4.2 J**	4.9 U
Di-n-butyl phthalate			1400	5100	19 U	20 U	19 U	20 U
Di-n-octyl phthalate			6200	6200	19 U	20 U	19 U	20 U
Hexachlorobenzene			22	70	4.8 U	4.9 U	4.8 U	4.9 U
n-Nitrosodiphenylamine			28	40	19 U	20 U	19 U	20 U
Hexachlorobutadiene			11	120	4.8 U	4.9 U	4.8 U	4.9 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-50	POBI-SC-50	POBI-SC-50	POBI-SC-50
				Sample ID	POBI-SC-50-4-6-130301	POBI-SC-50-6-8-130301	POBI-SC-50-8-10-130301	POBI-SC-50-12.4-13-130301
				Sample Depth	4 - 6 ft	6 - 8 ft	8 - 10 ft	12.4 - 13 ft
				Sample Date	3/1/2013	3/1/2013	3/1/2013	3/1/2013
				Sample Type	N	N	N	N
				Matrix	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET				
Semivolatile Organics (mg/kg-OC)								
1,2,4-Trichlorobenzene	0.81	1.8			**0.498**	**0.187 J**	**0.134**	0.175 U
1,2-Dichlorobenzene	2.3	2.3			**0.062 J**	0.093 U	**0.141**	0.175 U
1,4-Dichlorobenzene	3.1	9			**1.286**	**1.676**	**2.349**	**0.964**
bis(2-Ethylhexyl)phthalate	47	78			**1.929**	**0.838**	**2.852**	0.857 U
Butylbenzyl phthalate	4.9	64			**0.664**	**0.286**	**0.621**	**0.536**
Dibenzofuran	15	58			**1.183**	**0.61**	**0.839**	**1.786**
Diethyl phthalate	61	110			**0.581**	0.286 U	0.185 U	0.643 U
Dimethyl phthalate	53	53			0.1 U	**0.069 J**	**0.07 J**	0.175 U
Di-n-butyl phthalate	220	1700			0.394 U	0.381 U	0.319 U	0.714 U
Di-n-octyl phthalate	58	4500			0.394 U	0.381 U	0.319 U	0.714 U
Hexachlorobenzene	0.38	2.3			0.1 U	0.093 U	0.081 U	0.175 U
n-Nitrosodiphenylamine	11	11			0.394 U	0.381 U	0.319 U	0.714 U
Hexachlorobutadiene	3.9	6.2			0.1 U	0.093 U	0.081 U	0.175 U
Polycyclic Aromatic Hydrocarbons (µg/kg)								
2-Methylnaphthalene			670	670	**200**	**100**	**150**	**110**
Acenaphthene			500	500	**86**	**26**	**77**	**40**
Acenaphthylene			1300	1300	**12 J**	20 U	**19**	**47**
Anthracene			960	960	**48**	**26**	**49**	**43**
Benzo(a)anthracene			1300	1600	**80**	**45**	**110**	**40**
Benzo(a)pyrene			1600	1600	**52**	**33**	**99**	**33**
Benzo(b,j,k)fluoranthenes					**100**	**68**	**160**	**59**
Benzo(g,h,i)perylene			670	720	**43**	**28**	**61**	**29**
Chrysene			1400	2800	**120**	**82**	**170**	**54**
Dibenzo(a,h)anthracene			230	230	**14**	**10**	**22**	**6.7**
Fluoranthene			1700	2500	**380**	**180**	**350**	**180**
Fluorene			540	540	**110**	**53**	**82**	**51**
Indeno(1,2,3-c,d)pyrene			600	690	**30**	**21**	**45**	**19 J**
Naphthalene			2100	2100	**140**	**78**	**190**	**330**
Phenanthrene			1500	1500	**500**	**230**	**330**	**230**
Pyrene			2600	3300	**350**	**180**	**350**	**180**
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	**100**	**68**	**160**	**59**
Total LPAH (SMS) (U = 0)			5200	5200	**896 J**	**413**	**747**	**741**
Total HPAH (SMS) (U = 0)			12000	17000	**1169**	**647**	**1367**	**600.7 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					**75.6**	**48.22**	**134.4**	**46 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					**75.6**	**48.22**	**134.4**	**46 J**

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	POBI-SC-50	POBI-SC-50	POBI-SC-50	POBI-SC-50
				Sample ID	POBI-SC-50-4-6-130301	POBI-SC-50-6-8-130301	POBI-SC-50-8-10-130301	POBI-SC-50-12.4-13-130301
				Sample Depth	4 - 6 ft	6 - 8 ft	8 - 10 ft	12.4 - 13 ft
				Sample Date	3/1/2013	3/1/2013	3/1/2013	3/1/2013
				Sample Type	N	N	N	N
				Matrix	SE	SE	SE	SE
	SCO	CSL	LAET	2LAET				
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)								
2-Methylnaphthalene	38	64			**4.149**	**1.905**	**2.517**	**3.929**
Acenaphthene	16	57			**1.784**	**0.495**	**1.292**	**1.429**
Acenaphthylene	66	66			**0.249 J**	0.381 U	**0.319**	**1.679**
Anthracene	220	1200			**0.996**	**0.495**	**0.822**	**1.536**
Benzo(a)anthracene	110	270			**1.66**	**0.857**	**1.846**	**1.429**
Benzo(a)pyrene	99	210			**1.079**	**0.629**	**1.661**	**1.179**
Benzo(g,h,i)perylene	31	78			**0.892**	**0.533**	**1.023**	**1.036**
Chrysene	110	460			**2.49**	**1.562**	**2.852**	**1.929**
Dibenzo(a,h)anthracene	12	33			**0.29**	**0.19**	**0.369**	**0.239**
Fluoranthene	160	1200			**7.884**	**3.429**	**5.872**	**6.429**
Fluorene	23	79			**2.282**	**1.01**	**1.376**	**1.821**
Indeno(1,2,3-c,d)pyrene	34	88			**0.622**	**0.4**	**0.755**	**0.679 J**
Naphthalene	99	170			**2.905**	**1.486**	**3.188**	**11.786**
Phenanthrene	100	480			**10.373**	**4.381**	**5.537**	**8.214**
Pyrene	1000	1400			**7.261**	**3.429**	**5.872**	**6.429**
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			**2.075**	**1.295**	**2.685**	**2.107**
Total LPAH (SMS) (U = 0)	370	780			**18.589 J**	**7.867**	**12.534**	**26.464**
Total HPAH (SMS) (U = 0)	960	5300			**24.253**	**12.324**	**22.936**	**21.454 J**
PCB Aroclors (µg/kg)								
Aroclor 1016					19 U	19 U	19 U	19 U
Aroclor 1221					19 U	19 U	19 U	19 U
Aroclor 1232					19 U	19 U	19 U	19 U
Aroclor 1242					19 U	19 U	19 UJ	19 U
Aroclor 1248					67 U	19 U	75 UJ	19 U
Aroclor 1254					**220**	**83**	**250 J**	19 U
Aroclor 1260					**80 J**	**47 J**	**98 J**	19 U
Total PCB Aroclors (U = 0)			130	1000	**300 J**	**130 J**	**348 J**	19 U
PCB Aroclors (mg/kg-OC)								
Total PCB aroclors (SMS Marine 2013) (U = 0)	12	65			**6.224 J**	**2.476 J**	**5.839 J**	0.679 U

Table 4-6
2013 Subsurface Sediment Management Standards Parameters Results

Notes:
Detected concentration is greater than SMS_Marine_CSL_2013 screening level
Detected concentration is greater than SMS_Marine_SCO_2013 screening level
Detected concentration is greater than LAET screening level
Detected concentration is greater than 2LAET screening level
Nondetect reporting limit is greater than the lowest applicable screening level
All screening levels come from SCUM II guidance (Ecology, 2012b)
[1] = The non-detect value is reported at the method detection limit (MDL)
Bold = Detected result
J = Estimated value
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit

Table 4-7
Summary of Results for Geotechnical Index Testing

Sample ID	In situ Depth (feet)	Moisture Content (%)	Specific Gravity	Atterberg Limits: Liquid Limit (%)	Atterberg Limits: Plastic Limit (%)	Atterberg Limits: Plasticity Index (%)	Sieve Analysis Summary: Gravel (%)	Sieve Analysis Summary: Sand (%)	Sieve Analysis Summary: Clay/Silt (%)	USCS and Description
SB-01-ST-01	0.0 - 2.0	57.8	2.7	33	27	6	---	---	---	Dark gray, SILT (ML) with sand and gravel and shells
SB-01-SPT-01A	5.0 - 5.8	50.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-01-SPT-01B	5.8- 6.5	48.0	---	---	---	---	---	---	---	Dark gray, SILT (ML)
SB-01-ST-02	10.0 - 12.0	57.1	2.6	63	34	29	---	---	---	Dark gray, elastic SILT (MH)
SB-01-SPT-02	15.0 -16.5	22.0	---	---	---	---	0.3	94.0	5.7	Dark gray, poorly graded SAND with silt (SP-SM)
SB-01-SPT-03	20.0 -21.5	7.0	---	---	---	---	---	---	---	Gray, silty SAND (SM) with gravel
SB-01-SPT-04	25.0 - 26.5	7.0	---	---	---	---	---	---	---	Gray , silty SAND (SM) with gravel
SB-01-SPT-05	30.0 - 31.5	22.0	---	---	---	---	---	---	---	Gray, silty SAND (SM)
SB-01-SPT-06	35.0 - 36.5	25.0	---	---	---	---	---	---	---	Gray, silty SAND (SM)
SB-01-ST-03	40.0 - 42.0	27.8	2.7	29	25	4	---	---	---	Dark gray, SILT (ML)
SB-01-SPT-07	45.0 - 46.5	32.0	---	---	---	---	---	---	---	Gray, SILT (ML)
SB-01-SPT-08	50.0 - 51.5	32.0	---	---	---	---	---	---	---	Gray, SILT (ML)
SB-02-ST-01	3.0 - 5.0	138.2	2.4	110	52	58	---	---	---	Dark gray, elastic SILT (MH)
SB-02-SPT-01	12.0 - 13.5	19.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM) and gravel
SB-02-SPT-02	17.0 - 18.5	35.0	---	---	---	---	---	---	---	Gray, SILT (ML)
SB-02-SPT-03	22.0 - 23.5	32.0	---	36	26	10	---	---	---	Dark gray, SILT (ML)
SB-02-SPT-04	24.5 - 26.0	32.0	---	---	---	---	---	---	---	Gray, SILT (ML) with sand
SB-02-SPT-05A	27.5 - 28.5	31.0	---	---	---	---	---	---	---	Gray, SILT (ML) with sand
SB-02-SPT-05B	28.5 - 30.0	24.0	---	---	---	---	---	---	---	Dark gray silty SAND (SM)
SB-02-SPT-06	32.5 - 34.0	33.0	---	---	---	---	---	---	---	Gray, SILT (ML)
SB-02-SPT-07A	38.0 - 39.0	35.0	---	---	---	---	---	---	---	Gray, SILT (ML)
SB-02-SPT-07B	39.0 - 39.5	22.0	---	---	---	---	---	---	---	Dark gray silty SAND (SM)
SB-02-ST-02	44.5-46.5	33.1	2.7	27	26	1	---	---	---	Dark gray, SILT (ML)
SB-02-SPT-08[1]	46.5 - 48.0	---	---	---	---	---	---	---	---	---
SB-03-ST-04	15.0 - 17.0	88.7	2.5	82	45	37	---	---	---	Black, elastic SILT (MH) with sand, shells and organics
SB-03-SPT-01	20.0 - 21.5	26.0	---	---	---	---	5.2	90.2	4.6	Dark gray, poorly graded SAND (SP)
SB-03-SPT-02A	25.0 - 25.8	26.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND (SP)
SB-03-SPT-02B	25.8 - 26.5	10.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND (SP-SM) with silt and gravel
SB-03-SPT-03	30.0 - 31.5	29.0	---	---	---	---	0.0	53.0	47.0	Dark gray, silty SAND (SM)
SB-03-SPT-04	35.0 - 36.5	22.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-03-SPT-05	40.0 - 41.5	7.0	---	---	---	---	---	---	---	Gray, silty SAND (SM) with gravel
SB-03-SPT-06	45.0 - 46.5	25.0	---	---	---	---	---	---	---	Gray, sandy SILT (ML)
SB-03-ST-05	50.0 - 52.0	45.0	---	62	26	36	---	---	---	Dark gray, fat CLAY (CH)
SB-03-ST-06	55.0 - 57.0	25.9	2.8	27	26	1	---	---	---	Dark gray, SILT (ML)
SB-03-SPT-07	60.0 - 61.5	33.0	---	---	---	---	---	---	---	Gray, lean CLAY (CL)
SB-04-SPT-01	5.0 - 6.0	21.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM)

Table 4-7
Summary of Results for Geotechnical Index Testing

Sample ID	In situ Depth (feet)	Moisture Content (%)	Specific Gravity	Atterberg Limits			Sieve Analysis Summary			USCS and Description
				Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Gravel (%)	Sand (%)	Clay/Silt (%)	
SB-04-SPT-02	10.0 - 11.5	29.0	---	---	---	---	---	---	---	Gray, silty SAND (SM)
SB-04-SPT-03	15.0 - 16.5	26.0	---	---	---	---	---	---	---	Gray, silty SAND (SM)
SB-04-SPT-04	20.0 - 21.5	30.0	---	---	---	---	0.0	78.2	20.7	Dark gray, silty SAND (SM)
SB-04-SPT-05	25.0 - 26.5	59.0	---	---	---	---	---	---	---	Dark gray, SILT (ML)
SB-04-ST-01	27.0 - 29.0	39.6	2.6	39	29	10	---	---	---	Dark gray, SILT (ML) with shells
SB-04-SPT-06	30.0 - 31.5	30.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-04-SPT-07	35.0 - 36.5	31.0	---	---	---	---	0.7	67.9	31.4	Dark olive gray , silty SAND (SM)
SB-04-SPT-08	40.0 - 41.5	32.0	---	---	---	---	---	---	---	Gray, silty SAND (SM)
SB-04-SPT-09	45.0 - 46.5	24.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-04-ST-02	50.0 - 52.0	41.6	2.7	40	26	14	0.0	14.3	85.7	Dark gray, SILT (ML)
SB-04-SPT-10	55.0 - 56.5	22.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-04-SPT-11	60.0 - 61.5	19.0	---	---	---	---	---	---	---	Dark gray, poorly graded GRAVEL (GP) with sand
SB-04-SPT-12	65.0 - 66.5	24.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-04-SPT-13	70.0 - 71.5	11.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-04-SPT-14	75.0 - 76.5	40.0	---	---	---	---	---	---	---	Gray, lean CLAY (CL)
SB-04-ST-03	80.0 - 82.0	41.6	2.7	47	23	24	---	---	---	Gray, lean CLAY (CL)
SB-04-SPT-15	85.0 - 86.5	27.0	---	---	---	---	0.0	52.3	47.7	Dark olive gray , silty SAND (SM)
SB-04-SPT-16	90.0 - 91.5	25.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-04-SPT-17	95.0 - 96.5	24.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-04-SPT-18	100.0 - 101.5	25.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-05-ST-02	2.5 - 4.5	53.0	2.6	36	30	6	---	---	---	Dark gray, SILT (ML) with shells
SB-05-SPT-01	7.0 - 8.5	51.0	---	---	---	---	---	---	---	Olive gray, silty SAND (SM) with shells
SB-05-SPT-02	12.0 - 13.5	47.0	---	---	---	---	---	---	---	Olive gray, sandy SILT (ML) with shells
SB-05-SPT-03	18.0 - 19.5	48.0	---	---	---	---	---	---	---	Olive gray, sandy SILT (ML) with shells
SB-05-ST-03	21.0 - 23.0	37.5	2.7				---	---	---	Dark gray, sandy SILT (ML) with shells
SB-05-SPT-04	26.0 - 27.5	54.0		NP	NP	NP	---	---	---	Dark gray, SILT (ML) with sand and shells
SB-05-SPT-05	31.0 - 32.5	36.0	---	---	---	---	0.1	56.5	43.4	Dark gray, silty SAND (SM)
SB-05-SPT-06	36.0 - 37.5	14.0	---	---	---	---	32.0	62.5	5.5	Dark gray, poorly graded SAND with silt (SP-SM) and gravel
SB-05-SPT-07	40.5 - 42	14.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM) and gravel
SB-05-SPT-08	45.5 - 47	14.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM) and gravel
SB-06-ST-01	0.0 - 2.5	49.4	2.7	46	28	18	---	---	---	Olive gray, SILT (ML) with sand and shells
SB-06-SPT-01	6.0 - 7.5	38.0	---	---	---	---	---	---	---	Olive gray, sandy SILT (ML)
SB-06-SPT-02	12.0 - 13.5	39.0	---	29	27	2	---	---	---	Dark gray , SILT (ML) with sand
SB-06-ST-02[1]	18.0 - 19.0	---	---	---	---	---	---	---	---	---
SB-06-SPT-04	26.5 - 28	23.0	---	---	---	---	2.6	89.2	8.2	Dark gray, poorly graded SAND with silt (SP-SM)
SB-06-SPT-05	31.5 - 33	10.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM) and gravel

Table 4-7
Summary of Results for Geotechnical Index Testing

Sample ID	In situ Depth (feet)	Moisture Content (%)	Specific Gravity	Atterberg Limits			Sieve Analysis Summary			USCS and Description
				Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Gravel (%)	Sand (%)	Clay/Silt (%)	
SB-06-SPT-06	36.5 - 38	6.0	---	---	---	---	---	---	---	Dark gray, poorly graded GRAVEL (GP) with sand
SB-06-SPT-07	43.0 - 44.5	11.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM) and gravel
SB-06-SPT-08	55.5 - 57.0	20.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM)
SB-06-SPT-09	59.0 - 60.5	20.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-06-SPT-10	63.5 - 65.0	26.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-06-SPT-11	68.0 - 69.5	19.0	---	---	---	---	0.0	78.6	21.4	Dark gray, silty SAND (SM)
SB-06-SPT-12	76.5 - 78.0	36.0	---	---	---	---	0.0	2.0	98.0	Olive gray, SILT (ML)
SB-06-ST- 05[2]	79.5 - 81.5	---	---	---	---	---	---	---	---	---
SB-06-ST- 06[2]	84.5 - 86.5	---	---	---	---	---	---	---	---	---
SB-06-SPT-13	88.0 - 89.5	31.0	---	---	---	---	---	---	---	Dark gray, SILT (ML)
SB-06-SPT-14	92.0 - 93.5	26.0	---	---	---	---	---	---	---	Dark gray, sandy SILT (ML)
SB-06-SPT-15	96.5 - 98.0	34.0	---	---	---	---	0.0	0.7	99.3	Olive gray, SILT (ML)
SB-06-SPT-16	100.5 - 102.0	31.0	---	27	27	NP	---	---	---	Dark gray, SILT (ML) with sand
SB-07-SPT-01	5.0 - 6.5	17.0	---	---	---	---	---	---	---	Brown, silty SAND (SM) with gravel
SB-07-SPT-02	10.0 - 11.5	20.0	---	---	---	---	---	---	---	Gray, silty SAND (SM)
SB-07-SPT-03	15.0 - 16.5	32.0	---	---	---	---	---	---	---	Gray, silty SAND (SM)
SB-07-SPT-04	20.0 - 21.5	52.0	---	---	---	---	---	---	---	Dark gray, SILT (ML) with sand
SB-07-SPT-05	25.0 - 26.5	62.0	---	---	---	---	---	---	---	Dark gray, lean CLAY (CL)
SB-07-ST-01	27.0 - 29.0	65.0	2.6	76	35	41	---	---	---	Dark gray, fat CLAY (CH)
SB-07-SPT-06	30.0 - 31.5	40.0	---	31	28	3	---	---	---	Dark gray, sandy SILT (ML)
SB-07-SPT-07	35.0 - 36.5	42.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-07-SPT-08	40.0 - 41.5	53.0	---	---	---	---	---	---	---	Dark olive gray, SILT (ML)
SB-07-ST-02	42.0 - 44.0	39.7	2.7	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-07-SPT-09	45.0 - 46.5	36.0	---	---	---	---	---	---	---	Dark olive gray, SILT (ML) with sand
SB-07-SPT-10	50.0 - 51.5	28.0	---	---	---	---	0.0	81.7	18.3	Dark gray, silty SAND (SM)
SB-07-SPT-11	55.0 - 56.5	27.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM)
SB-08-ST-01	0.0 - 2.0	61.0	2.7	NP	NP	NP	---	---	---	Dark olive brown, SILT (ML)
SB-08-SPT-01	6.5 - 8.0	57.0	---	33	30	3	---	---	---	Olive gray, SILT (ML)
SB-08-ST-02	21.5 - 23.5	31.0	---	NP	NP	NP	---	---	---	Dark gray, silty SAND (SM) with wood
SB-08-SPT-02	11.5 - 13.0	26.0	---	---	---	---	0.0	93.7	6.3	Dark gray, poorly graded SAND with silt (SP-SM)
SB-08-SPT-03	17.0 - 18.5	35.0	---	---	---	---	---	---	---	Grayish brown, silty SAND (SM)
SB-08-ST-03	24.5 - 26.5	31.0	---	---	---	---	---	---	---	Dark gray, silty SAND (SM)
SB-08-SPT-04	27.0 - 28.5	21.0	---	---	---	---	0.5	95.0	4.5	Dark gray, poorly graded SAND (SP)
SB-08-SPT-05	30.5 - 32.0	35.0	---	---	---	---	---	---	---	Grayish brown, sandy SILT (ML)
SB-08-SPT-06A	35.5 - 37	24.0	---	---	---	---	1.9	86.0	12.1	Dark gray, silty SAND (SM)
SB-08-SPT-06B	36.5 - 38.0	17.0	---	---	---	---	---	---	---	Grayish brown, silty SAND (SM) with gravel

Table 4-7
Summary of Results for Geotechnical Index Testing

Sample ID	In situ Depth (feet)	Moisture Content (%)	Specific Gravity	Atterberg Limits			Sieve Analysis Summary			USCS and Description
				Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Gravel (%)	Sand (%)	Clay/Silt (%)	
SB-08-SPT-07	41.5 - 43.0	11.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND (SP) with gravel
SB-08-SPT-08	48.0 - 49.5	17.0	---	---	---	---	---	---	---	Dark gray, poorly graded SAND with silt (SP-SM)
SB-08-ST-04[2]	50.5 - 52.5	---	---	---	---	---	---	---	---	---
SB-08-ST-05	53.0 - 54.0	38.0	---	---	---	---	---	---	---	Gray, lean CLAY (CL)
SB-08-SPT-09	57.0 - 58.5	28.0	---	---	---	---	0.1	67.7	32.2	Dark gray, silty SAND (SM)

Notes:
USCS - Unified Soil Classification System
1 - Sample was not tested
2 - Sample testing in progress

Table 4-8
Interpreted Results from Unconsolidated-Undrained Triaxial Compression Testing (UU-TXc)

Location ID	In situ Depth (feet)	Wet Unit Weight (psf)	Dry Unit Weight (psf)	Initial Moisture Content w_0 (%)	Peak Undrained Shear Strength (psf)	USCS and Description
SB-01-ST-01	0 - 2	101.7	64.4	57.8	203	Dark gray, SILT (ML) with sand and gravel and shells
SB-01-ST-02	10 - 12	104.0	66.2	57.1	250	Dark gray, elastic SILT (MH)
SB-01-ST-03	40 - 42	127.2	99.5	27.8	14200	Dark gray, SILT (ML)
SB-02-ST-01	3 - 5	107.1	45.0	138.2	350	Dark gray, elastic SILT (MH)
SB-02-ST-02	44.5 - 46.5	120.9	90.8	33.1	13500	Dark gray, SILT (ML)
SB-03-ST-04	15 - 17	85.0	45.0	88.7	200	Black, elastic SILT (MH) with sand, shells and organics
SB-03-ST-06	55-57	124.8	99.1	25.9	29200	Dark gray, SILT (ML)
SB-04-ST-01	27 - 29	111.1	80.3	38.3	1720	Dark gray, SILT (ML) with shells
SB-04-ST-02	50-52	112.0	79.1	41.6	2830	Dark gray, SILT (ML)
SB-04-ST-03	80 - 82	110.7	87.2	27.0	5230	Gray, lean CLAY (CL)
SB-05-ST-02	2.5 - 4.5	103.0	67.1	53.5	430	Dark gray, SILT (ML) with shells
SB-06-ST-01	0 - 2	108.5	71.4	52.0	510	Olive gray, SILT (ML) with sand and shells
SB-07-ST-01	27 - 29	105.4	64.0	64.6	1830	Dark gray, fat CLAY (CH)
SB-07-ST-02	42 - 44	115.1	86.7	32.9	2660	Dark gray, silty SAND (SM)
SB-08-ST-05	53 - 54	117.9	85.5	38.0	4840	Gray, lean CLAY (CL)

Notes:

psf = pounds per square foot

min = minute

USCS = Unified Soil Classification System

Table 4-9
Interpreted Results from Consolidated-Undrained Triaxial Compression Testing (CU-TXc)

Location ID	In situ Depth (feet)	Test Specimen	Wet Unit Weight (psf)	Dry Unit Weight (psf)	Initial Moisture Content w_0 (%)	Effective Friction Angle ϕ' (deg)	Effective Cohesion c' (psf)	USCS and Description
SB-05-ST-03	21 - 23	A	121.7	86.4	40.8	37.0	0	Dark gray, sandy SILT (ML) with shells
		B	109.2	79.5	37.4			
		C	115.4	82.0	40.8			
SB-08-ST-01	0 - 2	A	104.2	67.7	53.9	38.7	76	Dark olive brown, SILT (ML)
		B	93.3	58.0	61.0			
		C	104.9	68.1	53.9			

Notes:
psf = pounds per square foot
deg = degree
min = minute
USCS = Unified Soil Classification System

Table 4-10
Results for In Situ Vane Shear Testing (VST)

Location ID	Water Depth (feet)	Test Depth Below Mudline (feet)	Vane Diameter (mm)	Calibration Factor for Vane Used	Correction Factor for Plasticity[1]	Peak Undrained Shear Strength (Su_p)		Residual Undrained Shear Strength (Su_r)		USCS and Description
						Uncorrected Gauge Reading (kpa)	Corrected Value (psf)	Uncorrected Gauge Reading (kPa)	Corrected Value (psf)	
VST-1[2]	15.1	1 to 2	65	---	---	---	---	---	---	Apparent granular sediment, not testable
VST-2	7.1	1 to 2	65	0.029	1.1	80	53	22	15	Dark gray, SILT (ML)
VST-3	8.8	1 to 2	65	0.029	1.1	120	80	55	37	Dark gray, SILT (ML)
VST-4	6.5	1 to 2	65	0.029	1.1	130	87	29	19	Dark gray, sandy SILT (ML)
VST-5	5.7	1 to 2	65	0.029	1.1	118	79	31	21	Dark gray, sandy SILT (ML)
VST-6	9.9	1 to 2	65	0.029	1.1	113	75	48	32	Dark gray, sandy SILT (ML)
VST-7	4.6	1 to 2	65	0.029	1.1	130	87	38	25	Dark gray, sandy SILT (ML)
VST-8	5.6	1 to 2	65	0.029	1.1	130	87	27	18	Dark gray, SILT (ML)
VST-9	11.5	1 to 2	65	0.029	0.86	49	26	35	18	Black, SILT (MH) with organics
VST-10	4.9	1 to 2	65	0.029	1.1	130	87	61	41	Black, sandy SILT (ML) with organics

Notes:

kpa = kilopascal

mm = millimeter

pcf = pounds per cubic foot

USCS = Unified Soil Classification System

1 - Correction factors for plasticity are based on Bjerrum (1972). Sediments classified as ML and MH have an average plasticity index of 6 and 41, respectively.

2 - Test location was unable to be performed due ot the presence of granular sediments in the near surface, which prevented the vane from being advanced.

Table 5-1
Summary of Existing Applicable Sediment Studies

Study	Year[1]	Sample Count	Analytes
Study Area Surface Samples			
Olympia Federal Navigation Channel and the Port of Olympia Berthing Area (SAIC 2006)	2006	3	D/F
Budd Inlet Sediment Characterization (SAIC 2008)	2007	19	Conventionals, D/F s, grain size, metals, organic metals, PCBs, SVOCs
Port of Olympia Berths 2 and 3 Data (multiple rounds) (Anchor QEA 2010b)	2008-2010	22	Conventionals, D/F s, grain size
Study Area Subsurface Samples			
Budd Inlet Sediment Characterization (SAIC 2008)	2007	31	Conventionals, D/F s, grain size, metals, organic metals, PCBs, SVOCs
West Bay of Budd Inlet - Sediment Characterization Study: Berths 2 and 3 Interim Action Project (Integral 2007b)	2007	17	Conventionals, D/F s, grain size
Cascade Pole Sediment Confirmation Monitoring 2003 (Ecology 2012b)	2003	1	Conventionals, dioxins
East Bay Puget Sound Dredged Disposal Analysis (PSDDA) Sediment Characterization Report (Integral 2007a)	2007	14	Conventionals, D/F s, grain size, metals, organic metals, PCBs, SVOCs
Olympia Federal Navigation Channel and the Port of Olympia Berthing Area (SAIC 2006)	2006	34	D/F
Port of Olympia Berths 2 and 3 Data (multiple rounds) (Anchor QEA 2010b)	2008-2010	15	Conventionals, D/F s, grain size
Budd Inlet Surface Samples (Outside Study Area)			
Budd Inlet Sediment Characterization (SAIC 2008)	2007	32	Conventionals, D/F s, grain size, metals, organic metals, PCBs, SVOCs
Westbay Marina Remedial Investigation (Hart Crowser 2011)	2011	8	Conventionals, D/Fs, grain size, metals, organic metals, PAHs, PCBs, SVOCs, TPH
PSAMP Long-Term Temporal Monitoring (Ecology 2012b)	2010	38	Conventionals, grain size, metals, PAHs, PCBs, SVOCs, VOCs, pesticides, biological, PCB congeners, PBDEs
Solid Wood Incorporated. (West Bay Park) Rail Spur Phase II Environmental Site Assessment. (Parametrix 2008)	2007	7	Conventionals, D/Fs

Table 5-1
Summary of Existing Applicable Sediment Studies

Study	Year[1]	Sample Count	Analytes
Hardel EIM Results (Ecology 2012b)	2007	4	Conventional, D/Fs, grain size, metals, PCBs, SVOCs, pesticides
Solid Wood Incorporated. (West Bay Park) RI/FS (Parametrix 2008)	2008	28	Conventionals, D/Fs, grain size
Priest Point Park Sediment Sampling (TCPHSS 2010)	2010	30	Conventional sand D/Fs
Toxics in stormwater runoff from Puget Sound boatyards (Ecology 2006)	2006	1	Conventionals, grain size, metals, organic metals, PAHs, PCBs, SVOCs

Notes:
1 = Data collected prior to 2002 for sediment chemistry, toxicity, and biological communities are not summarized in this report, but are available in the Project Database (Appendix D).
D/F = dioxin and furans
PAHs = polycyclic aromatic hydrocarbons
PSAMP = Puget Sound Ambient Monitoring Program
PBDEs = polybrominated diphenyl ethers
PCBs = polychlorinated biphenyls
RI/FS = Remedial Investigation/Feasibility Study
SVOCs = semivolatile organic compounds
TPH = total petroleum hydrocarbons
VOCs = volatile organic compounds

Table 5-2
Summary of COPC List with Regulatory Criteria

	SMS Marine		AET Marine[1]	
	SCO	**CSL**	**LAET**	**2LAET**
Metals	(mg/kg-dw)		(mg/kg-dw)	
Cadmium	5.1	6.7	5.1	6.7
Mercury	0.41	0.59	0.41	0.59
Silver	6.1	6.1	6.1	6.1
Zinc	410	9620	410	960
Semivolatile Organics	(mg/kg-OC)		(µg/kg-dw)	
1,2,4-Trichlorobenzene	0.81	1.8	31	51
1,2-Dichlorobenzene	2.3	2.3	35	50
1,4-Dichlorobenzene	3.1	9	110	110
bis(2-Ethylhexyl)phthalate	47	78	1300	3100
Butylbenzyl phthalate	4.9	64	63	900
Dibenzofuran	15	58	540	540
n-Nitrosodiphenylamine	11	11	28	40
Semivolatile Organics (no OC-normalization)	(µg/kg-dw)		--	
2,4-Dimethylphenol	29	29	--	--
2-Methylphenol (o-Cresol)	63	63	--	--
4-Methylphenol (p-Cresol)	670	670	--	--
Benzoic acid	650	650	--	--
Benzyl alcohol	57	73	--	--
Polycyclic Aromatic Hydrocarbons	(mg/kg-OC)		(µg/kg-dw)	
2-Methylnaphthalene	38	64	670	670
Acenaphthene	16	57	500	500
Acenaphthylene	66	66	1300	1300
Anthracene	220	1200	960	960
Benzo(a)anthracene	110	270	1300	1600
Benzo(a)pyrene	99	210	1600	1600
Benzo(g,h,i)perylene	31	78	670	720
Chrysene	110	460	1400	2800
Dibenzo(a,h)anthracene	12	33	230	230
Fluoranthene	160	1200	1700	2500
Fluorene	23	79	540	540
Indeno(1,2,3-c,d)pyrene	34	88	600	690
Naphthalene	99	170	2100	2100
Phenanthrene	100	480	1500	1500
Pyrene	1000	1400	2600	3300
Total Benzofluoranthenes (b,j,k)	230	450	3200	3600
Total HPAH	370	780	5200	5200
Total LPAH	960	5300	12000	17000
Total cPAH TEQ	--	--	--	--
Dioxin Furans	**--**		--	
Total Dioxin/Furan TEQ 2005 (Mammal)	--	--	--	--
PCB Aroclors	(mg/kg-OC)		(µg/kg-dw)	
Total PCB Aroclors	12	65	130	1000

Notes:
1 = Dry weight normalize Apparent Effects Thresholds (AETs) can be used when total organic carbon is outside the recommended range (0.5% to 5% for Budd Inlet).

Table 5-3
Budd Inlet Surface Grab Sediment Statistics

	Count Results	Count Detects	Percent Detected	Min Detected Result	Max Detected Result	Average Detected Result	Average Nondetected Result
Conventional Parameters (pct)							
Total organic carbon	106	106	100	0.57	9.4	3.66	--
Total solids	106	106	100	18.7	85.6	41.1	--
Metals (mg/kg)							
Arsenic	31	9	29.03	1.34	20	10.9	10.5
Cadmium	31	31	100	0.07	4.2	1.80	--
Chromium	31	31	100	11.6	41	29.1	--
Copper	31	31	100	10.2	126	59.7	--
Lead	31	31	100	3	45	18.6	--
Mercury	31	31	100	0.014	0.51	0.119	--
Silver	31	4	12.9	0.03	0.61	0.420	0.682
Zinc	31	31	100	42	182	98.2	--
Semivolatile Organics (µg/kg)							
1,2,4-Trichlorobenzene	36	0	0	--	--	--	11.0
1,2-Dichlorobenzene	36	4	11.1	2.6	11	5.15	11.4
1,4-Dichlorobenzene	36	16	44.4	2.5	17	6.14	15.4
2,4-Dimethylphenol	36	18	50	3.5	18	8.62	76.4
2-Methylphenol (o-Cresol)	31	17	54.8	2.4	18	8.78	5.41
4-Methylphenol (p-Cresol)	31	31	100	5	420	125	--
Benzoic acid	36	20	55.6	110	780	277	642
Benzyl alcohol	36	13	36.1	7	70	28.8	38.3
bis(2-Ethylhexyl)phthalate	36	35	97.2	18	2300	226	24
Butylbenzyl phthalate	36	26	72.2	3.3	86	21.9	22.4
Di-n-butyl phthalate	31	5	16.1	44	610	160	24.3
Di-n-octyl phthalate	36	2	5.56	19	79	49	27.6
Dibenzofuran	70	50	71.4	10	140	30.2	28.7
Diethyl phthalate	36	3	8.33	38	130	70	25.1
Dimethyl phthalate	36	13	36.1	3	44	15.1	13.7
Hexachlorobenzene	36	0	0	--	--	--	11.0
n-Nitrosodiphenylamine	36	3	8.33	2.4	17	7.97	27.2
Pentachlorophenol	36	9	25	16	160	41.4	130
Phenol	36	28	77.8	14	520	90.9	54.6
Hexachlorobutadiene	5	0	0	--	--	--	41.8
Polycyclic Aromatic Hydrocarbons (µg/kg)							
2-Methylnaphthalene	70	36	51.4	10	150	33.2	25.0
Acenaphthene	70	48	68.6	12	830	59.4	24.0
Acenaphthylene	70	36	51.4	2	110	26.3	26.4
Anthracene	70	63	90	3.7	240	49.6	28.1
Benzo(a)anthracene	70	68	97.1	11	1100	103	19
Benzo(a)pyrene	70	68	97.1	12	2100	127	19
Benzo(b)fluoranthene	5	5	100	22	190	119	--
Benzo(k)fluoranthene	5	4	80	7.9	62	42.5	84
Benzo(g,h,i)perylene	70	65	92.9	11	1700	87	32
Chrysene	70	69	98.6	13	1400	173	19

Table 5-3
Budd Inlet Surface Grab Sediment Statistics

	Count Results	Count Detects	Percent Detected	Min Detected Result	Max Detected Result	Average Detected Result	Average Nondetected Result
Dibenzo(a,h)anthracene	70	51	72.9	2.9	340	30.4	24.6
Fluoranthene	70	70	100	17	1900	315	--
Fluorene	70	49	70	11	330	35.6	26.1
Indeno(1,2,3-c,d)pyrene	70	67	95.7	10	1300	72.6	19
Naphthalene	70	66	94.3	12	1200	111	48.2
Phenanthrene	70	69	98.6	11	650	149	19
Pyrene	70	70	100	23	1900	334	--
Total Benzofluoranthenes (b,j,k)	70	70	100	12	3000	259	--
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2) (EMPC included)	70	70	100	13.6	2690	170	--
Total HPAH	70	70	100	52	14800	1480	--
Total LPAH	70	70	100	16.7	2380	376	--
Dioxin Furans (ng/kg)							
2,3,7,8-TCDD	105	62	59.1	0.237	1.86	0.778	0.441
1,2,3,7,8-PeCDD	105	99	94.3	0.15	12.8	3.63	1.11
1,2,3,4,7,8-HxCDD	105	101	96.2	0.34	24.6	5.05	3.19
1,2,3,6,7,8-HxCDD	105	104	99.1	0.85	130	24.1	3.19
1,2,3,7,8,9-HxCDD	105	102	97.1	0.6	54.5	12.0	10.3
1,2,3,4,6,7,8-HpCDD	105	105	100	17	3490	540	--
1,2,3,4,6,7,8,9-OCDD	105	105	100	120	27100	4170	--
2,3,7,8-TCDF	105	99	94.3	0.12	6.82	2.18	1.14
1,2,3,7,8-PeCDF	105	97	92.4	0.23	7.49	2.16	0.591
2,3,4,7,8-PeCDF	105	105	100	0.13	15	2.75	--
1,2,3,4,7,8-HxCDF	105	105	100	0.21	47.2	9.43	--
1,2,3,6,7,8-HxCDF	105	102	97.1	0.31	17.7	4.44	0.764
1,2,3,7,8,9-HxCDF	105	93	88.6	0.161	15	2.31	0.566
2,3,4,6,7,8-HxCDF	105	104	99.1	0.18	31.2	6.59	2.3
1,2,3,4,6,7,8-HpCDF	105	105	100	3.2	529	142	--
1,2,3,4,7,8,9-HpCDF	105	103	98.1	0.465	3100	36.5	0.61
1,2,3,4,6,7,8,9-OCDF	105	105	100	12	1600	292	--
Total Dioxin/Furan TEQ 1998 (mammal, Van den Berg et al.) (U = 0)	2	2	100	19.957	24.7	22.3	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	105	105	100	0.649	98.9	19.5	--
PCB Aroclors (µg/kg)							
Aroclor 1016	32	0	0	--	--	--	17.7
Aroclor 1221	32	0	0	--	--	--	19.9
Aroclor 1232	32	0	0	--	--	--	19.8
Aroclor 1242	32	0	0	--	--	--	17.7
Aroclor 1248	32	1	3.13	58	58	58	19.4
Aroclor 1254	32	16	50	5.7	120	27.1	21.1
Aroclor 1260	32	2	6.25	21	44	32.5	18.0
Total PCB Aroclors	32	16	50	5.7	222	34.8	23.9

Table 5-3
Budd Inlet Surface Grab Sediment Statistics

	Count Results	Count Detects	Percent Detected	Min Detected Result	Max Detected Result	Average Detected Result	Average Nondetected Result
Grain Size (pct)							
Total Clay	65	65	100	2.1	38.2	21.3	--
Total Fines (silt + clay)	65	65	100	7.8	98.9	63.4	--
Total Gravel	65	49	75.4	0.1	63.2	10.8	0.1
Total Sand	65	65	100	1	91.8	28.5	--
Total Silt	65	65	100	5.7	64.6	42.1	--

Notes:
Statistics on totals may include slightly different summation rules based on historical data limitations
CAEPA = California Environmental Protection Agency
cPAH = carcinogenic polyaromatic hydrocarbon
EMPC = estimated maximum potential concentration
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon
LPAH = low-molecular-weight polycyclic aromatic hydrocarbon
Max - maximum
mg/kg = milligrams per kilogram
Min = minimum
PCB = polychlorinated biphenyl
pct = percent
TEQ = Toxic Equivalents Quotient
U = non-detect value qualifier
µg/kg = micrograms per kilogram

Table 5-4
Budd Inlet Subsurface Sediment Statistics

	Count Results	Count Detects	Percent Detected	Min Detected Result	Max Detected Result	Average Detected Result	Average Nondetected Result
Conventional Parameters (pct)							
Total organic carbon	206	206	100	0.069	28.5	2.74	--
Total solids	208	208	100	18.5	96.2	59.1	--
Metals (mg/kg)							
Arsenic	43	10	23.3	5.56	22	10.0	11.3
Cadmium	43	43	100	0.4	8	1.69	--
Chromium	43	43	100	18	63.2	34.1	--
Copper	43	43	100	9.7	155	51.9	--
Lead	43	37	86.1	5	373	68.1	4.33
Mercury	44	39	88.6	0.03	3.17	0.360	0.04
Silver	43	21	48.8	0.4	18.1	2.29	0.691
Zinc	43	43	100	26	449	108	--
Semivolatile Organics (µg/kg)							
1,2,4-Trichlorobenzene	49	10	20.4	2.8	200	31.0	16.0
1,2-Dichlorobenzene	49	12	24.5	2.7	180	26.4	15.2
1,4-Dichlorobenzene	49	27	55.1	2.7	850	94.6	22.2
2,4-Dimethylphenol	49	29	59.2	3.4	270	36.5	117
2-Methylphenol (o-Cresol)	45	15	33.3	3.6	230	31.9	7.07
4-Methylphenol (p-Cresol)	45	38	84.4	2.8	7600	646	51.5
Benzoic acid	49	12	24.5	120	1300	341	1020
Benzyl alcohol	49	19	38.8	3.3	37	14.6	40.2
bis(2-Ethylhexyl)phthalate	49	31	63.3	15	2000	376	242
Butylbenzyl phthalate	49	28	57.1	5.5	130	42.2	25.5
Di-n-butyl phthalate	37	1	2.7	340	340	340	45.8
Di-n-octyl phthalate	49	2	4.08	110	170	140	58
Dibenzofuran	54	40	74.1	12	22000	870	70.6
Diethyl phthalate	49	10	20.4	6.2	140	29.0	44.2
Dimethyl phthalate	49	10	20.4	3.4	140	26.6	17.1
Hexachlorobenzene	49	0	0	--	--	--	12.8
n-Nitrosodiphenylamine	49	13	26.5	4.5	630	137	28.1
Pentachlorophenol	49	12	24.5	16	73	30.6	163
Phenol	49	34	69.4	3.7	360	81.3	136
Hexachlorobutadiene	12	0	0	--	--	--	36.5
Polycyclic Aromatic Hydrocarbons (µg/kg)							
2-Methylnaphthalene	54	42	77.8	11	10000	863	86.3
Acenaphthene	54	39	72.2	12	30000	1770	67.1
Acenaphthylene	54	26	48.2	11	850	133	56.6
Anthracene	54	49	90.7	13	5600	556	24
Benzo(a)anthracene	54	48	88.9	13	6400	684	19
Benzo(a)pyrene	54	46	85.2	9.9	2600	437	28.1
Benzo(b)fluoranthene	12	12	100	64	1500	520	NA
Benzo(k)fluoranthene	12	11	91.7	36	2000	602	110
Benzo(g,h,i)perylene	54	43	79.6	16	1200	197	39.6
Chrysene	54	49	90.7	11	4800	755	19.2

Table 5-4
Budd Inlet Subsurface Sediment Statistics

	Count Results	Count Detects	Percent Detected	Min Detected Result	Max Detected Result	Average Detected Result	Average Nondetected Result
Dibenzo(a,h)anthracene	54	36	66.7	2.7	610	90.3	53.0
Fluoranthene	54	52	96.3	20	44000	2840	18.5
Fluorene	54	41	75.9	13	24000	1250	68.5
Indeno(1,2,3-c,d)pyrene	54	43	79.6	14	1400	189	39.6
Naphthalene	54	44	81.5	13	13000	1340	80.8
Phenanthrene	54	52	96.3	11	87000	3160	18.5
Pyrene	54	52	96.3	16	31000	2180	18.5
Total Benzofluoranthenes (b,j,k)	54	47	87.0	22	4400	927	59.7
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2) (EMPC included)	54	49	90.7	13.7	3470	567	19.2
Total HPAH	54	52	96.3	47	92400	7960	36.5
Total LPAH	54	52	96.3	24	160000	7190	18.5
Dioxin Furans (ng/kg)							
2,3,7,8-TCDD	212	142	66.98	0.064	33	1.5	0.414
1,2,3,7,8-PeCDD	212	164	77.4	0.0704	126	6.1	0.236
1,2,3,4,7,8-HxCDD	212	166	78.3	0.045	151	8.0	0.180
1,2,3,6,7,8-HxCDD	212	186	87.7	0.111	3130	71.1	0.143
1,2,3,7,8,9-HxCDD	212	185	87.3	0.065	413	18.9	0.236
1,2,3,4,6,7,8-HpCDD	212	208	98.1	0.343	46700	1320	0.637
1,2,3,4,6,7,8,9-OCDD	196	195	99.5	2.7	402000	11900	0.26
2,3,7,8-TCDF	212	160	75.5	0.057	280	6.2	0.290
1,2,3,7,8-PeCDF	212	167	78.8	0.031	925	11.9	0.168
2,3,4,7,8-PeCDF	212	162	76.4	0.036	3140	34.0	0.125
1,2,3,4,7,8-HxCDF	212	176	83.02	0.035	14900	146	3.11
1,2,3,6,7,8-HxCDF	212	164	77.4	0.025	2320	32.6	0.588
1,2,3,7,8,9-HxCDF	212	154	72.6	0.057	239	14.4	0.121
2,3,4,6,7,8-HxCDF	212	167	78.8	0.056	976	28.8	0.131
1,2,3,4,6,7,8-HpCDF	212	196	92.5	0.048	31600	770	0.435
1,2,3,4,7,8,9-HpCDF	212	164	77.4	0.065	3730	55.1	0.225
1,2,3,4,6,7,8,9-OCDF	196	177	90.3	0.124	60400	1710	3.35
Total Dioxin/Furan TEQ 1998 (mammal, Van den Berg et al.) (U = 0)	27	27	100	0.004	52.6	11.3	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2) (EMPC included)	212	212	100	0.004	4206	65	--
PCB Aroclors (µg/kg)							
Aroclor 1016	44	0	0	--	--	--	22.0
Aroclor 1221	44	0	0	--	--	--	23.2
Aroclor 1232	44	0	0	--	--	--	22.0
Aroclor 1242	44	0	0	--	--	--	22.0
Aroclor 1248	44	5	11.4	19	370	160	60.6
Aroclor 1254	44	32	72.7	11	1800	286	93.6
Aroclor 1260	44	13	29.6	18	600	155	59.1
Total PCB Aroclors	44	33	75	11	2400	363	54.8

Table 5-4
Budd Inlet Subsurface Sediment Statistics

	Count Results	Count Detects	Percent Detected	Min Detected Result	Max Detected Result	Average Detected Result	Average Nondetected Result
Grain Size (pct)							
Total Clay	75	74	98.7	0.7	46.4	19.3	1.7
Total Fines (silt + clay)	75	74	98.7	2.8	100	55.6	1.7
Total Gravel	75	64	85.3	0.1	48.7	9.33	0.1
Total Sand	75	75	100	0.1	96.3	37.1	--
Total Silt	75	74	98.7	1.3	85.2	36.4	1.7

Notes:
Statistics on totals may include slightly different summation rules based on historical data limitations
CAEPA = California Environmental Protection Agency
cPAH = carcinogenic polyaromatic hydrocarbon
EMPC = estimated maximum potential concentration
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon
LPAH = low-molecular-weight polycyclic aromatic hydrocarbon
Max - maximum
mg/kg = milligrams per kilogram
Min = minimum
PCB = polychlorinated biphenyl
pct = percent
TEQ = Toxic Equivalents Quotient
U = non-detect value qualifier
µg/kg = micrograms per kilogram

Table 6-1
City Catch Basin Solids Dioxin/Furan and cPAH Results

				Task	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**	**Budd Inlet Sediment Site**
				Location ID	**EBCB05**	**EBCB06**	**EBCB07**	**EBCB08**	**EBCB09**	**WBCB01**	**WBCB02**	**WBCB04**
				City CB ID	**CB 8515**	**CB 7937**	**CB 7812**	**CB 12461**	**CB 8755**	**CB 10163**	**CB 10171**	**CB 10906**
				Sample ID	**POBI-EB-CB05-20140213**	**POBI-EB-CB06-20140213**	**POBI-EB-CB07-20140213**	**POBI-EB-CB08-20140213**	**POBI-EB-CB09-20140213**	**POBI-WB-CB01-20140213**	**POBI-WB-CB02-20140213**	**POBI-WB-CB04-20140213**
				Sample Date	**02/13/2014**	**02/13/2014**	**02/13/2014**	**02/13/2014**	**02/13/2014**	**02/13/2014**	**02/13/2014**	**02/13/2014**
				Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
				Matrix	**Catch Basin Solids**	**Catch Basin Solids**	**Catch Basin Solids**	**Catch Basin Solids**	**Catch Basin Solids**	**Catch Basin Solids**	**Catch Basin Solids**	**Catch Basin Solids**
	SCO	**CSL**	**LAET**	**2LAET**								
Conventional Parameters (pct)												
Total organic carbon					**5.53 J**	**15.3 J**	**5.84 J**	**3.81 J**	**15.3 J**	**8.96 J**	**8.32 J**	**9.26 J**
Total solids					**58.3**	**45.21**	**43.69**	**54.35**	**23.65**	**71.69**	**49.2**	**40.24**
Polycyclic Aromatic Hydrocarbons (µg/kg)												
2-Methylnaphthalene			670	670	100 U	310 U	**96 J**	140 U	530 U	200 U	300 U	390 U
Acenaphthene			500	500	100 U	310 U	**200**	140 U	530 U	200 U	300 U	390 U
Acenaphthylene			1300	1300	100 U	310 U	160 U	140 U	530 U	200 U	300 U	390 U
Anthracene			960	960	100 U	310 U	**150 J**	140 U	530 U	200 U	300 U	390 U
Benzo(a)anthracene			1300	1600	100 U	**170 J**	**300**	**96 J**	530 U	200 U	300 U	390 U
Benzo(a)pyrene			1600	1600	100 U	**200 J**	**260**	**130 J**	530 U	**130 J**	300 U	390 U
Benzo(g,h,i)perylene			670	720	100 U	**260 J**	**260**	**180**	**450 J**	**210**	**180 J**	390 U
Chrysene			1400	2800	100 U	**370**	**470**	**180**	**370 J**	**170 J**	**260 J**	390 U
Dibenzo(a,h)anthracene			230	230	100 U	310 U	160 U	140 U	530 U	200 U	300 U	390 U
Fluoranthene			1700	2500	100 U	**420**	**1400**	140 U	**420 J**	**210**	300 U	390 U
Fluorene			540	540	100 U	310 U	**210**	140 U	530 U	200 U	300 U	390 U
Indeno(1,2,3-c,d)pyrene			600	690	100 U	310 U	**170**	**89 J**	530 U	200 U	300 U	390 U
Naphthalene			2100	2100	100 U	310 U	**160**	140 U	530 U	200 U	300 U	390 U
Phenanthrene			1500	1500	100 U	**260 J**	**1100**	**120 J**	**400 J**	**140 J**	300 U	390 U
Pyrene			2600	3300	100 U	**430**	**1200**	**320**	**710**	**230**	**180 J**	390 U
Total Benzofluoranthenes (b,j,k) (U = 0)			3200	3600	200 U	**450 J**	**550**	**230 J**	**420 J**	**190 J**	**210 J**	770 U
Total LPAH (SMS) (U = 0)			5200	5200	100 U	**260 J**	**1820 J**	**120 J**	**400 J**	**140 J**	300 U	390 U
Total PAH (SMS) (U = 0)			12000	17000	200 U	**2560 J**	**6430 J**	**1345 J**	**2770 J**	**1280 J**	**830 J**	770 U
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)					100 U	**265.7 J**	**366.7**	**173.3 J**	**45.7 J**	**150.7 J**	**23.6 J**	390 U
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)					100 U	**296.7 J**	**374.7**	**180.3 J**	**390.2 J**	**180.7 J**	**218.6 J**	390 U
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)												
2-Methylnaphthalene	38	64			1.808 U	2.026 U	**1.644 J**	3.675 U	3.464 U	2.232 U	3.606 U	4.212 U
Acenaphthene	16	57			1.808 U	2.026 U	**3.425**	3.675 U	3.464 U	2.232 U	3.606 U	4.212 U
Acenaphthylene	66	66			1.808 U	2.026 U	2.74 U	3.675 U	3.464 U	2.232 U	3.606 U	4.212 U
Anthracene	220	1200			1.808 U	2.026 U	**2.568 J**	3.675 U	3.464 U	2.232 U	3.606 U	4.212 U
Benzo(a)anthracene	110	270			1.808 U	**1.111 J**	**5.137**	**2.52 J**	3.464 U	2.232 U	3.606 U	4.212 U
Benzo(a)pyrene	99	210			1.808 U	**1.307 J**	**4.452**	**3.412 J**	3.464 U	**1.451 J**	3.606 U	4.212 U
Benzo(g,h,i)perylene	31	78			1.808 U	**1.699 J**	**4.452**	**4.724**	**2.941 J**	**2.344**	**2.163 J**	4.212 U
Chrysene	110	460			1.808 U	**2.418**	**8.048**	**4.724**	**2.418 J**	**1.897 J**	**3.125 J**	4.212 U
Dibenzo(a,h)anthracene	12	33			1.808 U	2.026 U	2.74 U	3.675 U	3.464 U	2.232 U	3.606 U	4.212 U
Fluoranthene	160	1200			1.808 U	**2.745**	**23.973**	3.675 U	**2.745 J**	**2.344**	3.606 U	4.212 U
Fluorene	23	79			1.808 U	2.026 U	**3.596**	3.675 U	3.464 U	2.232 U	3.606 U	4.212 U
Indeno(1,2,3-c,d)pyrene	34	88			1.808 U	2.026 U	**2.911**	**2.336 J**	3.464 U	2.232 U	3.606 U	4.212 U
Naphthalene	99	170			1.808 U	2.026 U	**2.74**	3.675 U	3.464 U	2.232 U	3.606 U	4.212 U
Phenanthrene	100	480			1.808 U	**1.699 J**	**18.836**	**3.15 J**	**2.614 J**	**1.563 J**	3.606 U	4.212 U
Pyrene	1000	1400			1.808 U	**2.81**	**20.548**	**8.399**	**4.641**	**2.567**	**2.163 J**	4.212 U
Total Benzofluoranthenes (b,j,k) (U = 0)	230	450			3.617 U	**2.941 J**	**9.418**	**6.037 J**	**2.745 J**	**2.121 J**	**2.524 J**	8.315 U
Total HPAH (SMS) (U = 0)	370	780			3.617 U	**15.033 J**	**78.938**	**32.152 J**	**15.49 J**	**12.723 J**	**9.976 J**	8.315 U
Total LPAH (SMS) (U = 0)	960	5300			1.808 U	**1.699 J**	**31.164 J**	**3.15 J**	**2.614 J**	**1.563 J**	3.606 U	4.212 U

Table 6-1
City Catch Basin Solids Dioxin/Furan and cPAH Results

	SCO	CSL	LAET	2LAET								
				Task	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site	Budd Inlet Sediment Site
				Location ID	EBCB05	EBCB06	EBCB07	EBCB08	EBCB09	WBCB01	WBCB02	WBCB04
				City CB ID	CB 8515	CB 7937	CB 7812	CB 12461	CB 8755	CB 10163	CB 10171	CB 10906
				Sample ID	POBI-EB-CB05-20140213	POBI-EB-CB06-20140213	POBI-EB-CB07-20140213	POBI-EB-CB08-20140213	POBI-EB-CB09-20140213	POBI-WB-CB01-20140213	POBI-WB-CB02-20140213	POBI-WB-CB04-20140213
				Sample Date	02/13/2014	02/13/2014	02/13/2014	02/13/2014	02/13/2014	02/13/2014	02/13/2014	02/13/2014
				Sample Type	N	N	N	N	N	N	N	N
				Matrix	Catch Basin Solids	Catch Basin Solids	Catch Basin Solids	Catch Basin Solids	Catch Basin Solids	Catch Basin Solids	Catch Basin Solids	Catch Basin Solids
Dioxin Furans (ng/kg)												
2,3,7,8-TCDD					**0.561 EMPC**	1.52 U	**0.844 EMPC**	**0.873 EMPC**	**12**	**0.678 EMPC**	**0.598 EMPC**	**0.652 EMPC**
1,2,3,7,8-PeCDD					**2.63**	**14.7**	**6.55**	**4.33**	**195**	**7.33**	**5.17**	**5.09**
1,2,3,4,7,8-HxCDD					**4.42**	**24.9**	**13.5**	**6.24**	**398**	**11.1**	**8.05**	**8.66**
1,2,3,6,7,8-HxCDD					**15.7**	**57.6**	**44.7**	**21.6**	**1460**	**43.3**	**27.7**	**32.3**
1,2,3,7,8,9-HxCDD					**9.21**	**54.6**	**28.1**	**12.6**	**877**	**26.3**	**20.1**	**16**
1,2,3,4,6,7,8-HpCDD					**329**	**1310**	**1260**	**555**	**23600**	**694**	**491**	**509**
1,2,3,4,6,7,8,9-OCDD					**2490**	**11100 J**	**10300 J**	**5050 J**	**116000 J**	**4340 J**	**3170**	**3170**
2,3,7,8-TCDF					**0.738 EMPC**	**1.27**	**1.64**	**1.43 EMPC**	**18.2**	**1.37 JEMPC**	**0.848 EMPC**	**1.12**
1,2,3,7,8-PeCDF					**1.05 J**	**2.58**	**1.83 J**	**1.65 J**	**62.8**	**3.14 EMPC**	**2.55**	**2.94**
2,3,4,7,8-PeCDF					**0.925 J**	**2.29**	**1.88**	**2.18**	**51**	**3.76**	**4.58**	**2.62**
1,2,3,4,7,8-HxCDF					**3.23**	**10.5**	**12.1**	**7.49**	**162**	**13**	**17.9**	**5.45**
1,2,3,6,7,8-HxCDF					**2.53**	**9.04**	**8.63**	**4.61**	**174**	**6.09**	**5.15**	**4.87**
1,2,3,7,8,9-HxCDF					**1.16 J**	**2.57 J**	**2.06 J**	**2.18 J**	**67.1 J**	**4.28 J**	**4.06 J**	**3.22 J**
2,3,4,6,7,8-HxCDF					**3.7**	**12.1**	**11.9**	**6.42**	**193**	**6.97**	**6.4**	**5.6**
1,2,3,4,6,7,8-HpCDF					**64.3**	**261**	**297**	**111**	**2380**	**79.1**	**57.6**	**68.4**
1,2,3,4,7,8,9-HpCDF					**7.94**	**19.9**	**21.5**	**6.38**	**78**	**3.14 EMPC**	**3.13**	**2.44**
1,2,3,4,6,7,8,9-OCDF					**410**	**1410**	**1460**	**372**	**2100**	**69.3**	**45.7**	**67.8**
Total Tetrachlorodibenzo-p-dioxin (TCDD)					**11.9 EMPC**	**130 EMPC**	**9.85 EMPC**	**19.9 EMPC**	**60.4 EMPC**	**4.12 EMPC**	**4.07 EMPC**	**3.87 EMPC**
Total Pentachlorodibenzo-p-dioxin (PeCDD)					**18.5**	**62.4**	**34.2 EMPC**	**41.6 EMPC**	**666 EMPC**	**30.8 EMPC**	**23.6 EMPC**	**19.5 EMPC**
Total Hexachlorodibenzo-p-dioxin (HxCDD)					**83.6**	**411**	**276 EMPC**	**166 EMPC**	**6900**	**248 EMPC**	**166**	**153 EMPC**
Total Heptachlorodibenzo-p-dioxin (HpCDD)					**542**	**2280**	**2370**	**1210**	**39500**	**1210**	**861**	**893**
Total Tetrachlorodibenzofuran (TCDF)					**13.7 EMPC**	**17.1 EMPC**	**23.4 EMPC**	**24.9 EMPC**	**186 EMPC**	**10.5 JEMPC**	**8.93 EMPC**	**8.28 EMPC**
Total Pentachlorodibenzofuran (PeCDF)					**34.8 EMPC**	**80.7 EMPC**	**71.4 EMPC**	**62.4 EMPC**	**1540 EMPC**	**65.7 EMPC**	**67 EMPC**	**65 EMPC**
Total Hexachlorodibenzofuran (HxCDF)					**80.7 JEMPC**	**314 JEMPC**	**287 JEMPC**	**174 JEMPC**	**4430 JEMPC**	**205 J**	**181 JEMPC**	**215 JEMPC**
Total Heptachlorodibenzofuran (HpCDF)					**250**	**916**	**951**	**378**	**4670 EMPC**	**189.0 EMPC**	**149**	**195 EMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC = U)					**11.8 JEMPC**	**52.4 J**	**38.7 JEMPC**	**19.5 JEMPC**	**855.1 J**	**28.6 JEMPC**	**22.0 JEMPC**	**20.5 JEMPC**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC = U)					**12.1 JEMPC**	**53.1 J**	**39.2 JEMPC**	**20.0 JEMPC**	**855.1 J**	**29.1 JEMPC**	**22.4 JEMPC**	**20.8 JEMPC**
Total D/F TEQ 2005 (Mammal) (U = 0) (EMPC included)					**12.5 JEMPC**	**52.4 J**	**39.6 JEMPC**	**20.5 JEMPC**	**855.1 J**	**29.6 JEMPC**	**22.7 JEMPC**	**21.1 JEMPC**
Total D/F TEQ 2005 (Mammal) (U = 1/2) (EMPC included)					**12.5 JEMPC**	**53.1 J**	**39.6 JEMPC**	**20.5 JEMPC**	**855.1 J**	**29.6 JEMPC**	**22.7 JEMPC**	**21.1 JEMPC**

Notes:
All PAH screening levels come from SCUM II guidance (Ecology 2012b)
Dioxin/Furan TEQ Concentration (ng/kg dry weight)
0-5
5.01-10
10.01-20
20.01-40
40.01-100
100.01-500
>500
Bold = Detected result
City CB ID = City catch basin identification number
D/F = dioxin and furans
EMPC = Estimated Maximum Possible Concentration
J = Estimated value
TEQ= toxic equivalency quotient reported in ng/kg, values over 1 ng/kg were rounded to one decimal place
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit

Table 6-2
Port Catch Basin Solids Dioxin/Furan Results (2010, 2012, and 2013)

Basin	Basin A						Basin B	
Location	A08CB			A02CB			B27CB[1]	
Sample ID	SBA-SHALLOW	A08CB-20120126	A08CB-201361223	SBA-TERMINUS	A02CB-20120126	A02CB-201361223	SBB-SHALLOW	B27CB-20120126
Sample Date	8/9/2010	1/26/2012	12/23/2013	8/9/2010	1/26/2012	12/23/2013	8/9/2010	1/26/2012
Conventional Parameters (percent)								
Total organic carbon	1.63	14.6 J	3.66	5.88	R	12.7	9.64	33.1
Total solids	59	40.4	70	37.1	19.1	17	44.9	18.1
Dioxin Furans (ng/kg)								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1.96	2.43	0.911	15.3	3.97	14.2	18.9	5.87
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	38.4	40	12.9	169	42.8	238	223	78.2
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	76.6	85.8	22.7	601	114	549	738	212
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	229	231	78.2	2690 J	349	2780	2410 J	458
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	182	183	51.9	2240 J	218	1100	2360 J	401
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	5040	3870	1590	75200 J	8130	52300	71400 J	12800
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	24600 J	20300	12600	687000 J	64900	393000	627000 J	109000
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	7.39	6.22	2.21	9.07	3.05	34.7	15.6	4.27
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	18	14.2	4.9	33.3	9.62	120	93.5	19.5
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	13.3	13.6	5.36	27.1	9.09	120	83.4	23.4
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	34.3	28.8	9.72	310	59.7	322	643	157
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	23	23.2	6.96	177	41.8	252	272	88
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	1.67 J	11.3	2.12	8.27	17.7	374	18.2	35.4
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	18.3	30.9	9.31	112	61.8	49.4	149	120
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	387	469	108	14700 J	1640	4660	14900	3050
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	18.6	24.1	5.71	789	134	335	853	274
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	1190 J	1360	213	115000 J	8760	20600	107000 J	17100
2005 WHO, ND = 0	164	157	54.8	1960	257	1530	2020	438
Percent Reduction in Dioxin/Furan TEQ (compared to 2010)	NA	4.3%	66.6%	NA	87%	22%	NA	78%

Notes:

1 = Catch Basin B27 did not have enough accumulated sediment to sample in 2013.

ng/kg = nanograms per kilogram

R = Data result rejected; dryweight corrected. TOC result was elevated due to an artifact associated with dryweight measurement.

TEQ = Toxic Equivalency

Table 6-3
City Stormwater Dioxin/Furan Results (2012 and 2013)

Sample Location	A01SW			B01SW		
Sample ID	A01SW-20120131	A01SW-20120411	A01SW20131001	B01SW-20120131	B01SW-20120411	B01SW20131001
Sample Date	1/31/2012	4/11/2012	10/1/2013	1/31/2012	4/11/2012	10/1/2013
Sample Type	Water	Water	Water	Water	Water	Water
Conventional Parameters (mg/L)						
Total suspended solids	**49.8**	**17**	10 U	**58**	**35.3**	**15**
Conventional Parameters (NTU)						
Turbidity	**13.1**	**9.8**	**6.5**	**85**	**54**	**26.3**
Dioxin (pg/L)						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	**1.10 J**	1.11 U	0.587 U	**0.206 EMPC**	1.74 U	0.7 U

Sample Location	Equipment Blanks			Field Blanks		
Sample ID	E01SW-20120131	E01SW-20120411	E01SW20131001	F01SW-20120131	F01SW-20120411	F01SW20131001
Sample Date	1/31/2012	4/11/2012	10/1/2013	1/31/2012	4/11/2012	10/1/2013
Sample Type	Water	Water	Water	Water	Water	Water
Conventional Parameters (mg/L)						
Total suspended solids	1.1 U	1 U	--[1]	1.1 U	1 U	--[1]
Conventional Parameters (NTU)						
Turbidity	0.05 U	0.05 U	--[1]	0.05 U	0.05 U	--[1]
Dioxin (pg/L)						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1.63 U	1.22 U	0.618 U	0.129 U	1.37 U	0.501 U

Notes:
1 = Turbidity and TSS were not analyzed on the 2013 field QC.
Bold = Detected Result. Results meet all data acceptance criteria.
EMPC = Estimated maximum potential concentration. Analytes that have a signal-to-noise ratio greater than 2.5 for the quantitation and confirmation ions but ion ratios are not within method limits are qualified as EMPC. Because not all of the identification criteria have been met and therefore the presence of the analyte cannot be confirmed, these results are treated as non-detects at the EMPC level reported.
J = Estimated value
mg/L = milligrams per liter
NTU = nephelometric turbidity units
pg/L = picograms per liter
U = Compound analyzed, but not detected above detection limit

Table 7-1
Summary of Pb-210 Results

Station ID	Study	Sedimentation Rate (cm/yr)	Mass Sedimentation Rate ($g/cm^2/yr$)[a]	Station Location Description
GC-01	Anchor QEA 2013	1.0	1.6	Southern end of Study Area in West Bay
GC-02	Anchor QEA 2013	1.1	1.8	Underpier at southern end of Marine Terminal
GC-03	Anchor QEA 2013	0.7	1.1	Northern end of Study Area in West Bay
GC-04	Anchor QEA 2013	0.9	1.5	Near Swantown Boatworks in East Bay
C6	Landau 1993	0.13	0.21	Cascade Pole area
E6	Landau 1993	0.12	0.19	Cascade Pole area
H4	Landau 1993	0.13	0.20	Cascade Pole area
BI-D1 (post-1951)	SAIC 2008	0.26	0.45	Northern end of Study Area in West Bay
BI-D1 (pre-1951)	SAIC 2008	0.39	0.68	Northern end of Study Area in West Bay
BI-D2	SAIC 2008	0.35	0.60	Southern end of Study Area in East Bay
BI-D3 (post-1951)	SAIC 2008	0.14	0.24	Northern Inlet Area outside of Study Area
BI-D3 (pre-1951)	SAIC 2008	0.17	0.29	Northern Inlet Area outside of Study Area

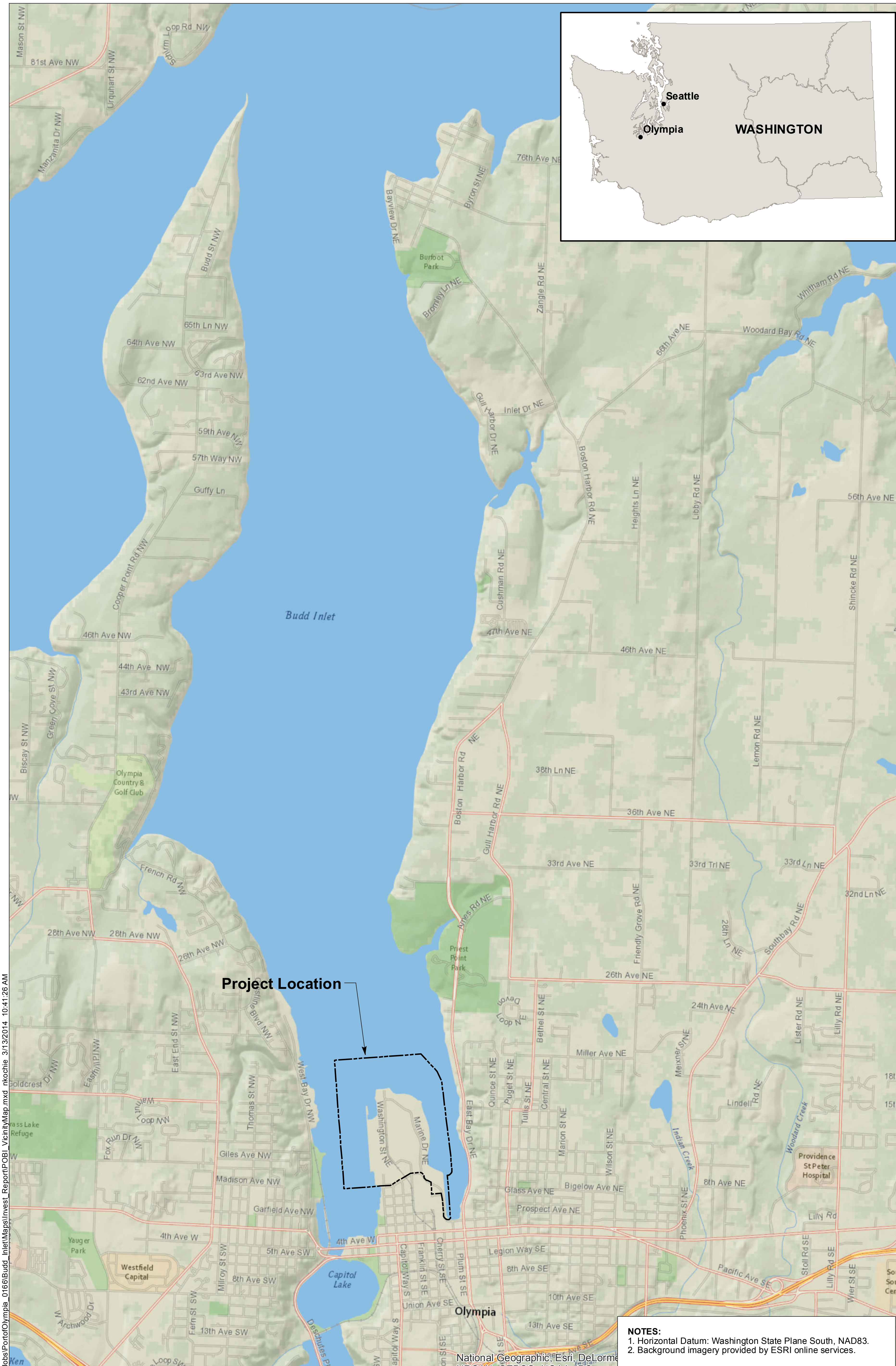
Notes:
a Bulk densities used in mass sedimentation rates:
Anchor QEA 2013 & Landau 1993 = 1.60 g/cm^3
SAIC 2008 = 1.73 g/cm^3
cm/yr = centimeters per year
$g/cm^2/yr$ = grams per square centimeters per year
g/cm^3 = grams per cubic centimeters

Table 7-2
Results of Reoccupied Stations from the Interim Action Cleanup Action Pilot Study

Station ID	Ecology 2007 Study	Post-Cover (March 2009)	June 2009	December 2009	June 2010	December 2010	Average of Station Result
Ambient Stations							
AM-28	--	23.3	23.8	21	1.7	20	18
AM-50	--	--	--	--	14	25.4	19.7
AM-51	--	--	--	--	6	6.8	6.4
BI-C16	19.2	24.7	21.3	22.7	3.9	8.4	16.7
BI-S37	15.2	23.3	22.9	21.7	2.1	7.8	15.5
Average	17.2	23.8	22.7	21.8	5.5	13.7	15.3
Berth Area Stations							
BA-24	--	0.07	4.7	11.7	5.9	5.9	5.7
BA-25	--	0.51	1.9	4.6	2.8	6.3	3.2
BA-26	--	0.03	1.5	1.1	6	2	2.1
BA-27B	--	0.04	1.7	17.1	7.4	4.6	6.2
Average		0.2	2.5	8.6	5.5	4.7	4.3
Under Pier Stations							
UP-20	--	39.4	39	33.4	13.4	24.1	29.9
UP-21	--	46	37.3	43.9	8.9	9.9	29.2
UP-22	--	32.3	36.2	32.1	16	15.5	26.4
UP-23B	--	37.8	36	37.4	28	13.9	30.6
Average		38.9	37.1	36.7	16.6	15.9	29.0

Notes:
Data results are in total dioxin/furan TEQ 2005 (Mammal) EMPC included and U=0
Samples are surface grabs collected from 0 to 10 centimeters

FIGURES



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ANCHOR QEA

Figure 1-1
Vicinity Map
Budd Inlet Investigation Report
Port of Olympia

Contaminated Sites
Federal Navigation Channel
Study Area
Historical Wood Waste Burner

NOTES:
1. Horizontal Datum: Washington State Plane South, NAD83.
2. Background imagery provided by ESRI online services.

Feet
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ANCHOR QEA

Figure 1-2
Site Features
Budd Inlet Investigation Report
Port of Olympia

Sediment Grab
Core (Subsurface Sediment)
Geochronology
Geotechnical
Cascade Pole Cleanup Boundary
Federal Navigation Channel
Study Area

NOTES:
1. Horizontal Datum: Washington State Plane South, NAD83.
2. Background imagery provided by ESRI online services.

Feet
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Figure 2-1
2013 Sample Locations (1 of 2)
Budd Inlet Investigation Report
Port of Olympia

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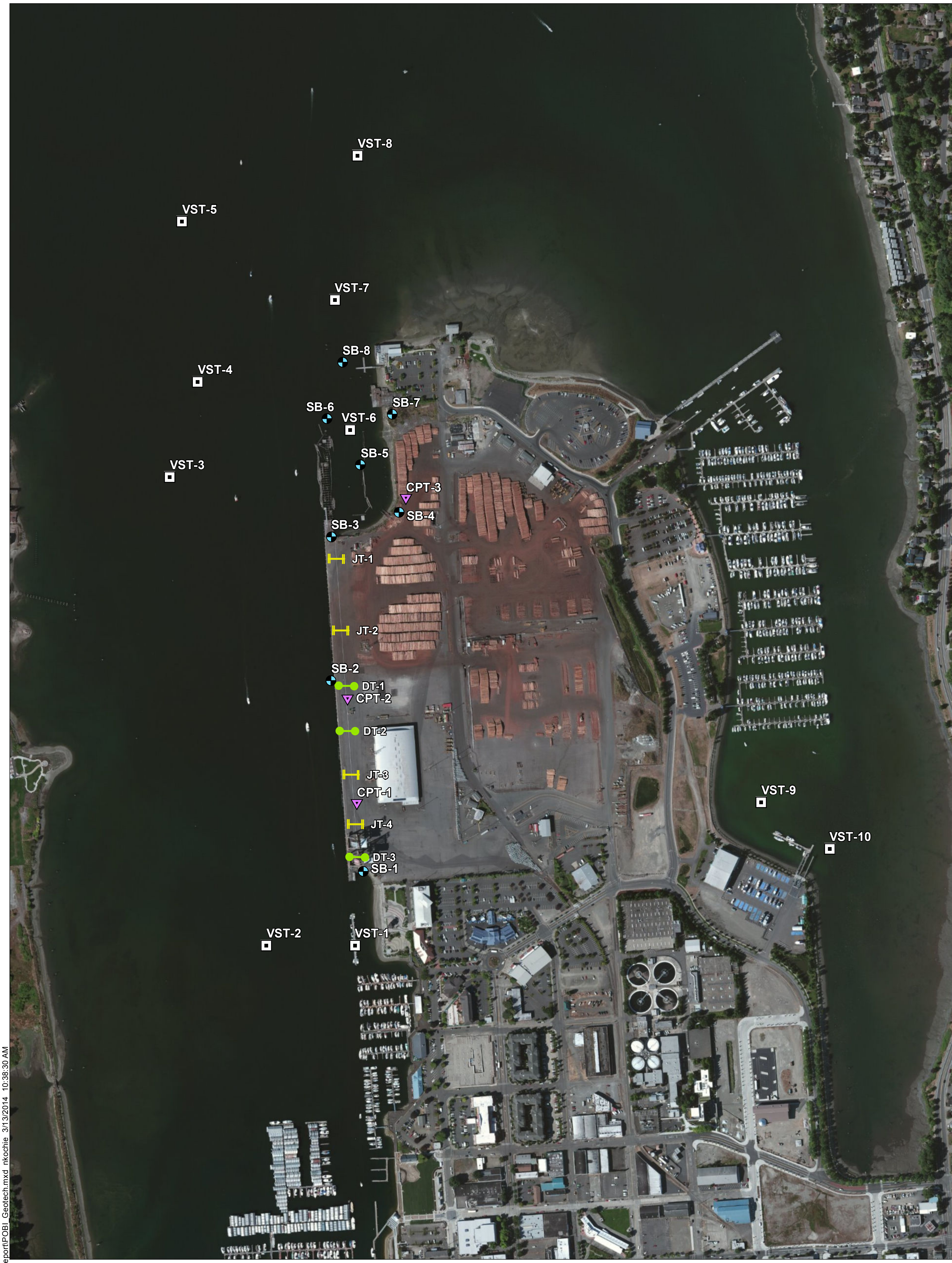
Figure 2-1
2013 Sample Locations (2 of 2)
Budd Inlet Investigation Report
Port of Olympia



Cone Penetration Test
Soil Boring
Vane Shear Test
Jet Probe and Debris Observation Only
Debris Observation Transect

NOTES:
1. Transects depicted for debris observation transects (DT) and jet probe transects (JT) are an approximation of the actual length. The results for debris observations and jet probing are presented in Appendix A.
2. Locations shown for debris observation transects (DT) and jet probe transects (JT) represent the starting point of the transect. The full length of transects performed varies and are not shown graphically on the figure.

Feet
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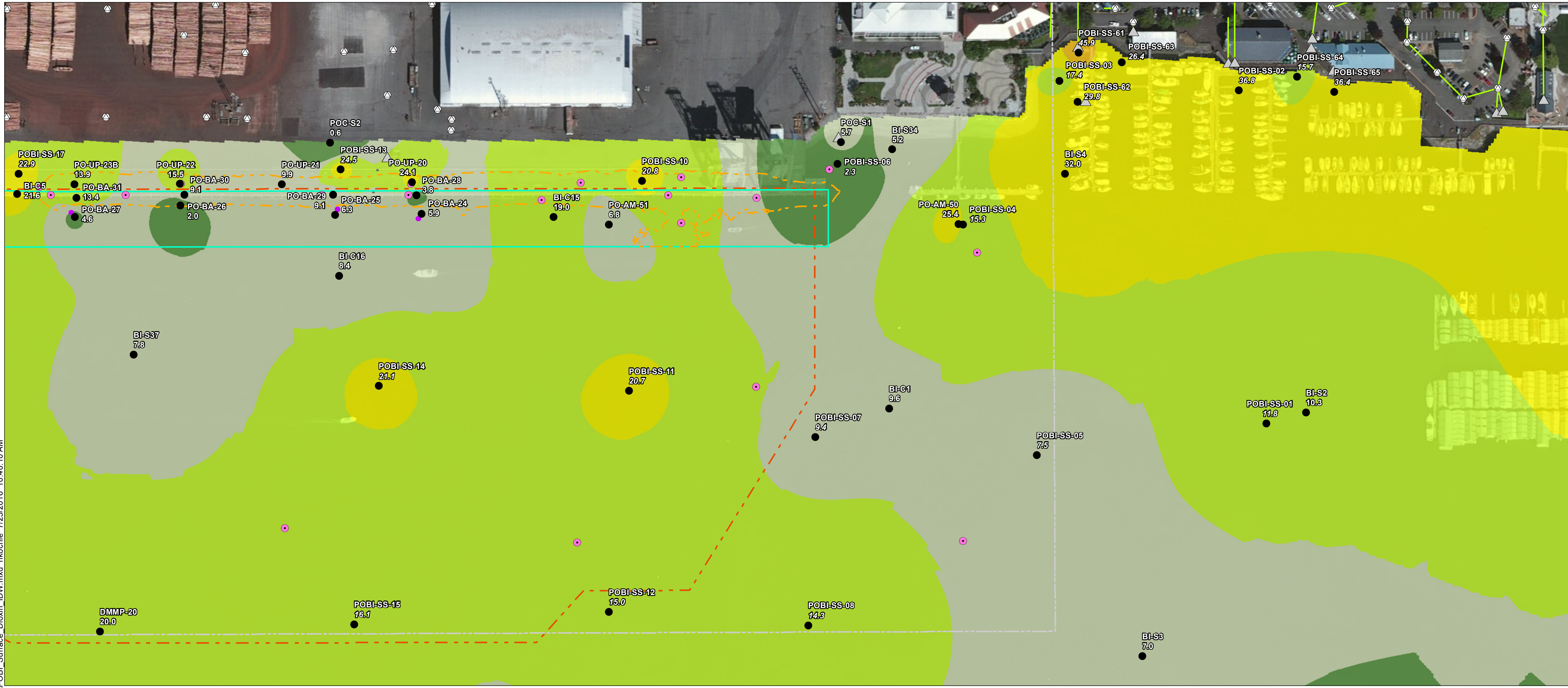
ANCHOR QEA

Figure 2-2
Geotechnical Exploration Locations
Budd Inlet Investigation Report
Port of Olympia



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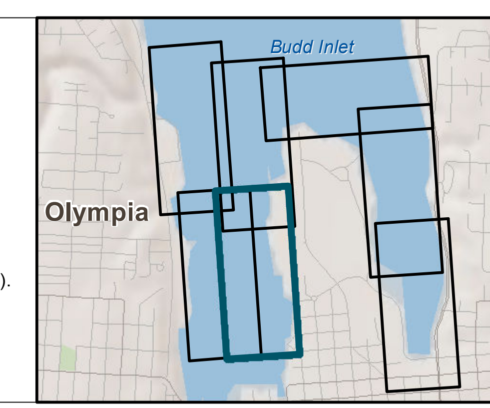
Surface Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)

- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- > 500

- Surface Sediment Grab
- Sediment Core Location
- Catch Basin
- Outfall
- Active City of Olympia Stormdrain
- Proposed City of Olympia Stormdrain
- City of Olympia Combined Storm/Sewer
- Port of Olympia Stormdrain
- City of Olympia Abandoned Main
- 2013/2014 Dredge Area
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Study Area
- Federal Navigation Channel
- Stream

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. Interpolated surface concentrations are based on data collected between 2005 and 2013; ranging from 0.65 to 98.9 ng/kg-TEQ; averaging 19.5 ng/kg-TEQ.
3. Total Dioxin/Furan TEQ Concentrations calculated using an Inverse Distance Weighting interpolator.
4. Background imagery provided by ESRI online services.



ANCHOR QEA

Feet
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Figure 4-1
Surface Sediment Dioxin/Furan Concentrations (1 of 7)
Budd Inlet Investigation Report
Port of Olympia

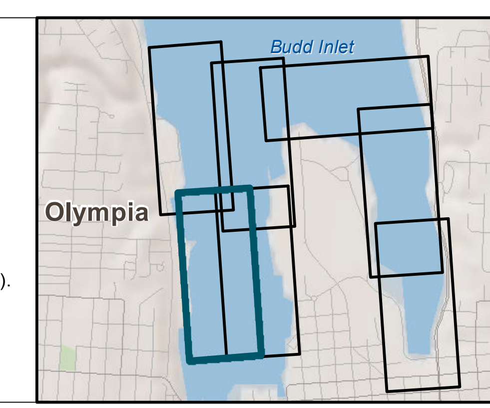
Surface Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)

- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- > 500

- Surface Sediment Grab
- Sediment Core Location
- Catch Basin
- Outfall
- Active City of Olympia Stormdrain
- Proposed City of Olympia Stormdrain
- City of Olympia Combined Storm/Sewer
- Port of Olympia Stormdrain
- City of Olympia Abandoned Main

- 2013/2014 Dredge Area
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Study Area
- Federal Navigation Channel
- Stream

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. Interpolated surface concentrations are based on data collected between 2005 and 2013; ranging from 0.65 to 98.9 ng/kg-TEQ; averaging 19.5 ng/kg-TEQ.
3. Total Dioxin/Furan TEQ Concentrations calculated using an Inverse Distance Weighting interpolator.
4. Background imagery provided by ESRI online services.



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Feet
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Figure 4-1
Surface Sediment Dioxin/Furan Concentrations (2 of 7)
Budd Inlet Investigation Report
Port of Olympia

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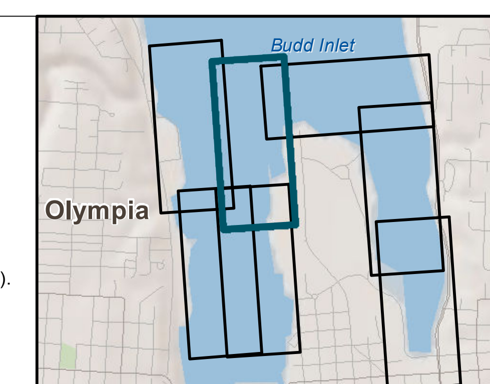
Surface Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)

- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- > 500

- Surface Sediment Grab
- Sediment Core Location
- Catch Basin
- Outfall
- Active City of Olympia Stormdrain
- Proposed City of Olympia Stormdrain
- City of Olympia Combined Storm/Sewer
- Port of Olympia Stormdrain
- City of Olympia Abandoned Main

- 2013/2014 Dredge Area
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Study Area
- Federal Navigation Channel
- Stream

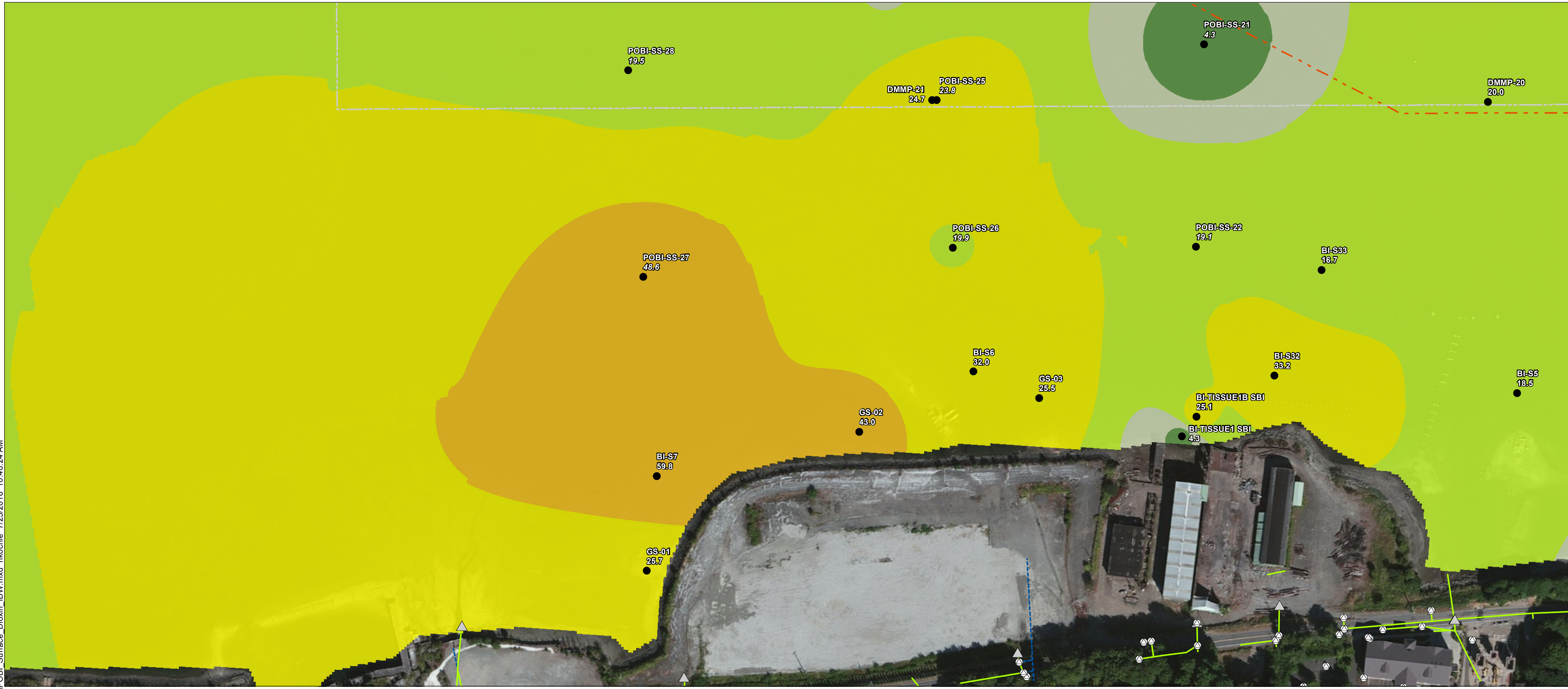
NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. Interpolated surface concentrations are based on data collected between 2005 and 2013; ranging from 0.65 to 98.9 ng/kg-TEQ; averaging 19.5 ng/kg-TEQ.
3. Total Dioxin/Furan TEQ Concentrations calculated using an Inverse Distance Weighting interpolator.
4. Background imagery provided by ESRI online services.



ANCHOR QEA

Feet
0 100 200 300 400

Figure 4-1
Surface Sediment Dioxin/Furan Concentrations (3 of 7)
Budd Inlet Investigation Report
Port of Olympia



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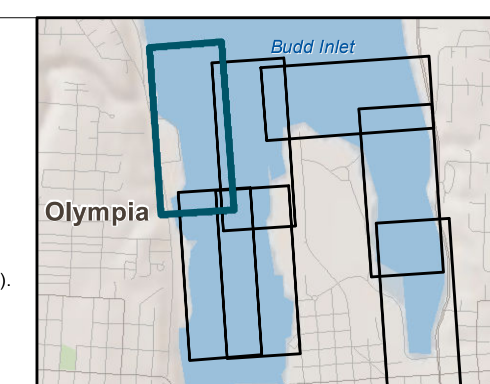
Surface Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)

- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- > 500

- Surface Sediment Grab
- Sediment Core Location
- Catch Basin
- Outfall
- Active City of Olympia Stormdrain
- Proposed City of Olympia Stormdrain
- City of Olympia Combined Storm/Sewer
- Port of Olympia Stormdrain
- City of Olympia Abandoned Main

- 2013/2014 Dredge Area
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Study Area
- Federal Navigation Channel
- Stream

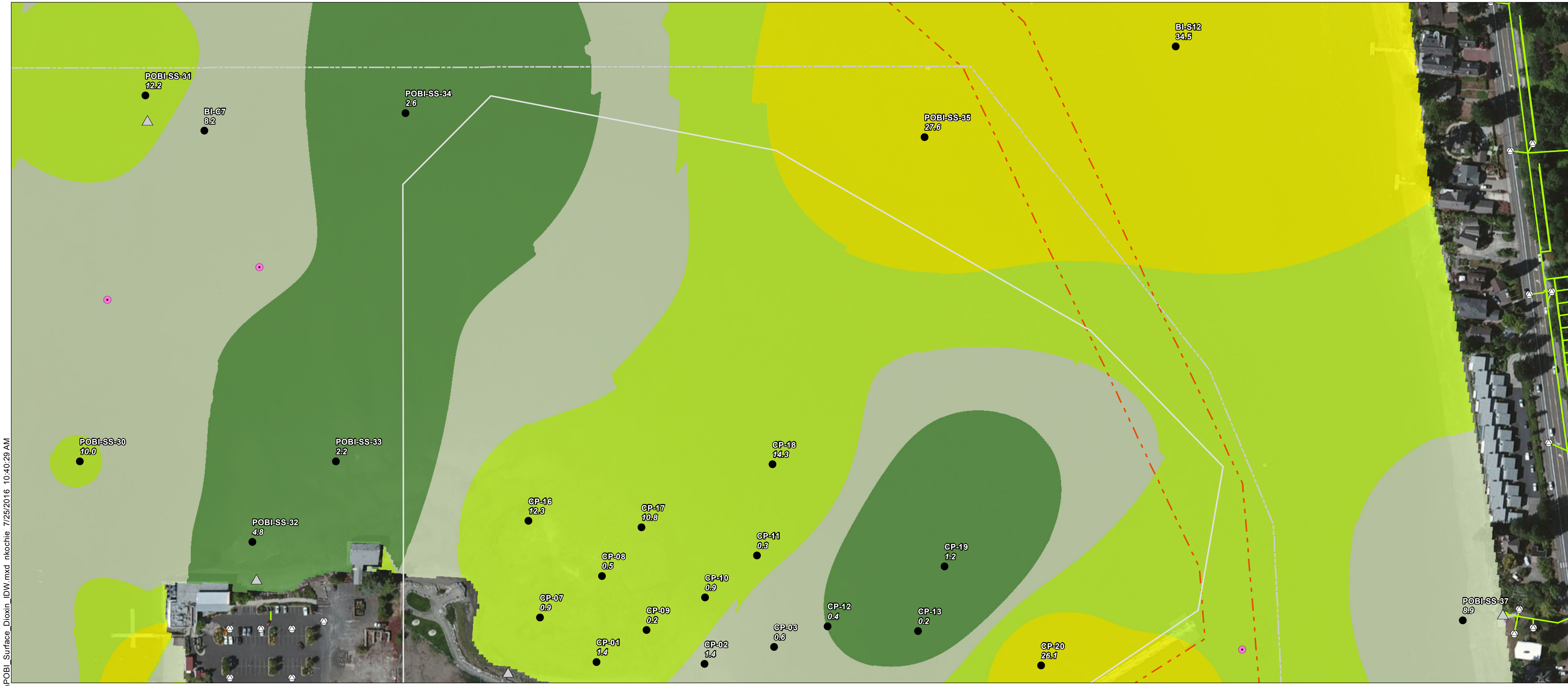
NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. Interpolated surface concentrations are based on data collected between 2005 and 2013; ranging from 0.65 to 98.9 ng/kg-TEQ; averaging 19.5 ng/kg-TEQ.
3. Total Dioxin/Furan TEQ Concentrations calculated using an Inverse Distance Weighting interpolator.
4. Background imagery provided by ESRI online services.



ANCHOR QEA

Feet
0 100 200 300 400

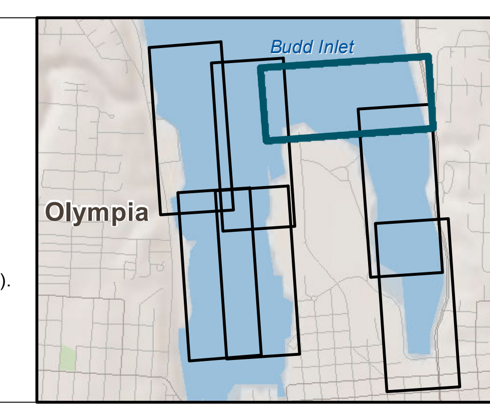
Figure 4-1
Surface Sediment Dioxin/Furan Concentrations (4 of 7)
Budd Inlet Investigation Report
Port of Olympia



Surface Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)
- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- > 500

- Surface Sediment Grab
- Sediment Core Location
- Catch Basin
- Outfall
- Active City of Olympia Stormdrain
- Proposed City of Olympia Stormdrain
- City of Olympia Combined Storm/Sewer
- Port of Olympia Stormdrain
- City of Olympia Abandoned Main
- 2013/2014 Dredge Area
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Study Area
- Federal Navigation Channel
- Stream

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. Interpolated surface concentrations are based on data collected between 2005 and 2013; ranging from 0.65 to 98.9 ng/kg-TEQ; averaging 19.5 ng/kg-TEQ.
3. Total Dioxin/Furan TEQ Concentrations calculated using an Inverse Distance Weighting interpolator.
4. Background imagery provided by ESRI online services.



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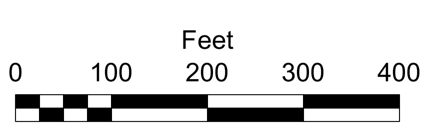
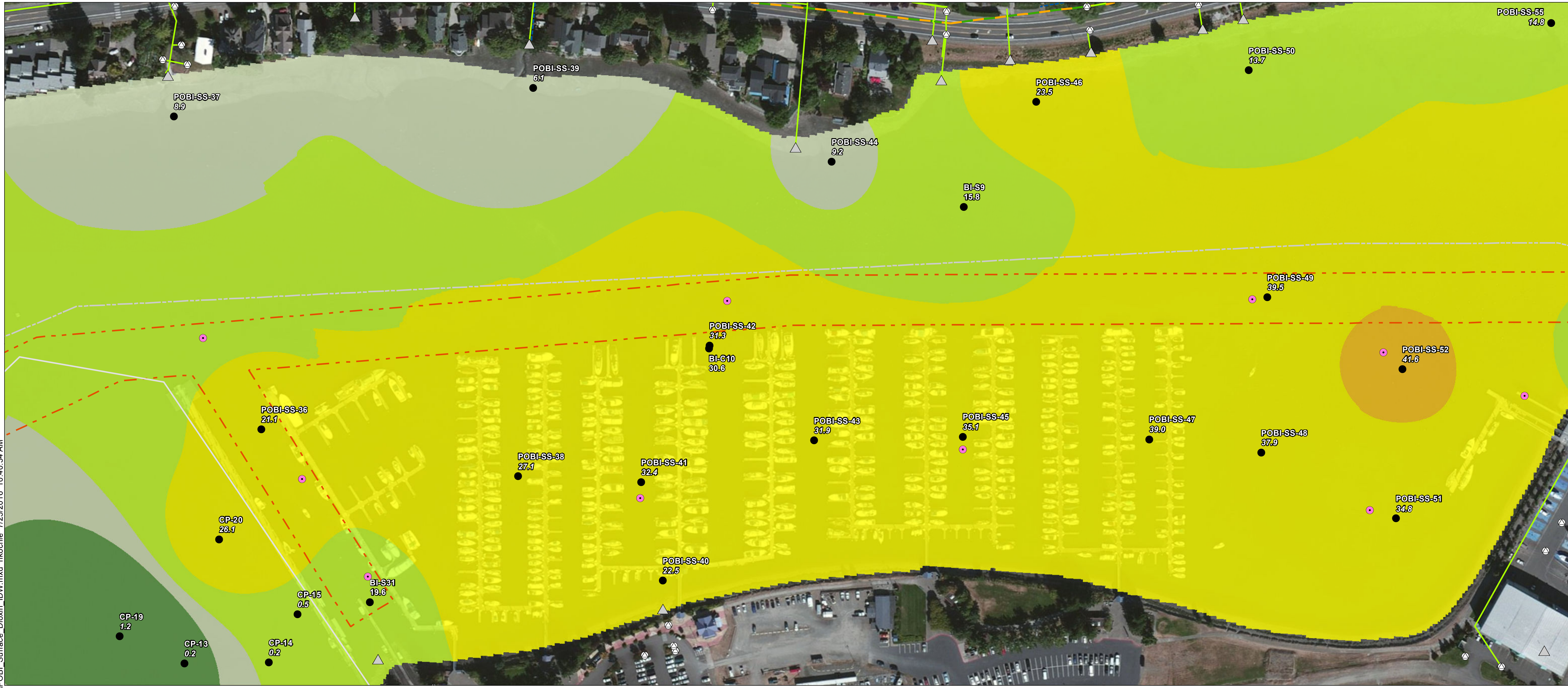


Figure 4-1
Surface Sediment Dioxin/Furan Concentrations (5 of 7)
Budd Inlet Investigation Report
Port of Olympia



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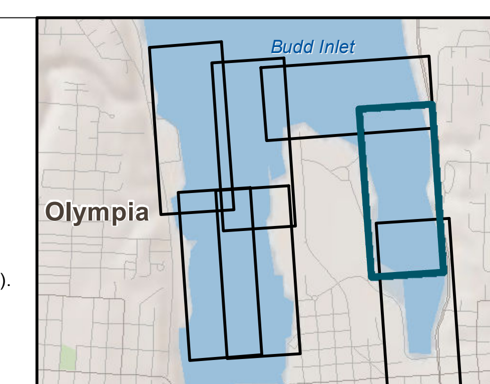
Surface Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)
- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- > 500

- Surface Sediment Grab
- Sediment Core Location
- Catch Basin
- Outfall
- Active City of Olympia Stormdrain
- Proposed City of Olympia Stormdrain
- City of Olympia Combined Storm/Sewer
- Port of Olympia Stormdrain
- City of Olympia Abandoned Main

- 2013/2014 Dredge Area
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Study Area
- Federal Navigation Channel
- Stream

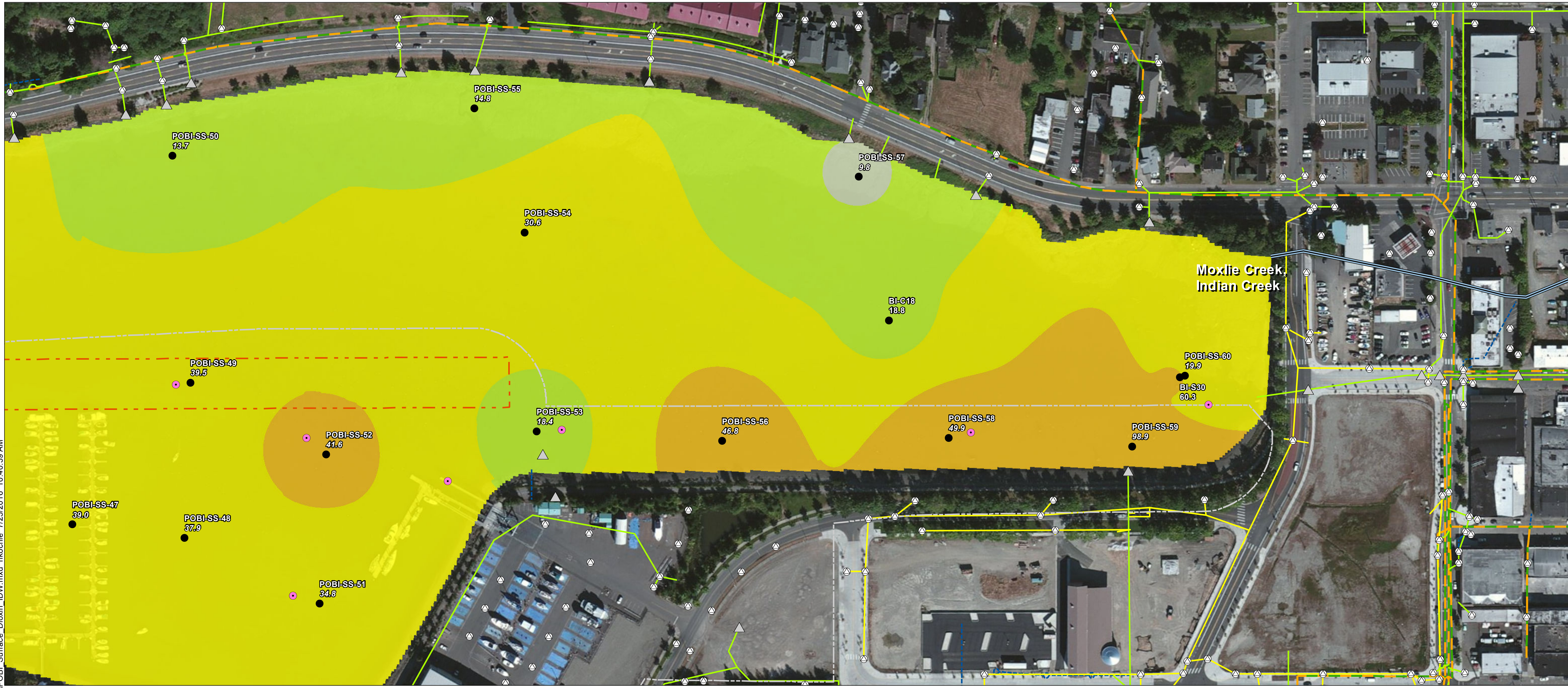
NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. Interpolated surface concentrations are based on data collected between 2005 and 2013; ranging from 0.65 to 98.9 ng/kg-TEQ; averaging 19.5 ng/kg-TEQ.
3. Total Dioxin/Furan TEQ Concentrations calculated using an Inverse Distance Weighting interpolator.
4. Background imagery provided by ESRI online services.



ANCHOR QEA

Feet
0 100 200 300 400

Figure 4-1
Surface Sediment Dioxin/Furan Concentrations (6 of 7)
Budd Inlet Investigation Report
Port of Olympia



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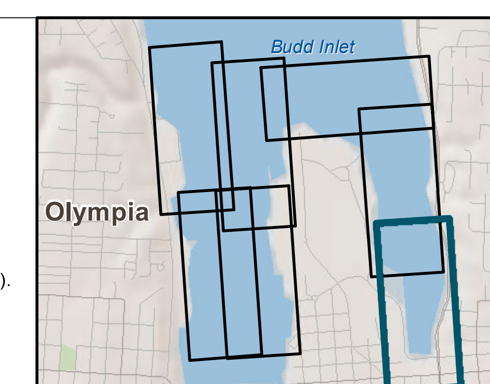
Surface Dioxin/Furan TEQ Conc.
(ng/kg Dry Weight)

- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- > 500

- Surface Sediment Grab
- Sediment Core Location
- Catch Basin
- Outfall
- Active City of Olympia Stormdrain
- Proposed City of Olympia Stormdrain
- City of Olympia Combined Storm/Sewer
- Port of Olympia Stormdrain
- City of Olympia Abandoned Main

- 2013/2014 Dredge Area
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Study Area
- Federal Navigation Channel
- Stream

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. Interpolated surface concentrations are based on data collected between 2005 and 2013; ranging from 0.65 to 98.9 ng/kg-TEQ; averaging 19.5 ng/kg-TEQ.
3. Total Dioxin/Furan TEQ Concentrations calculated using an Inverse Distance Weighting interpolator.
4. Background imagery provided by ESRI online services.



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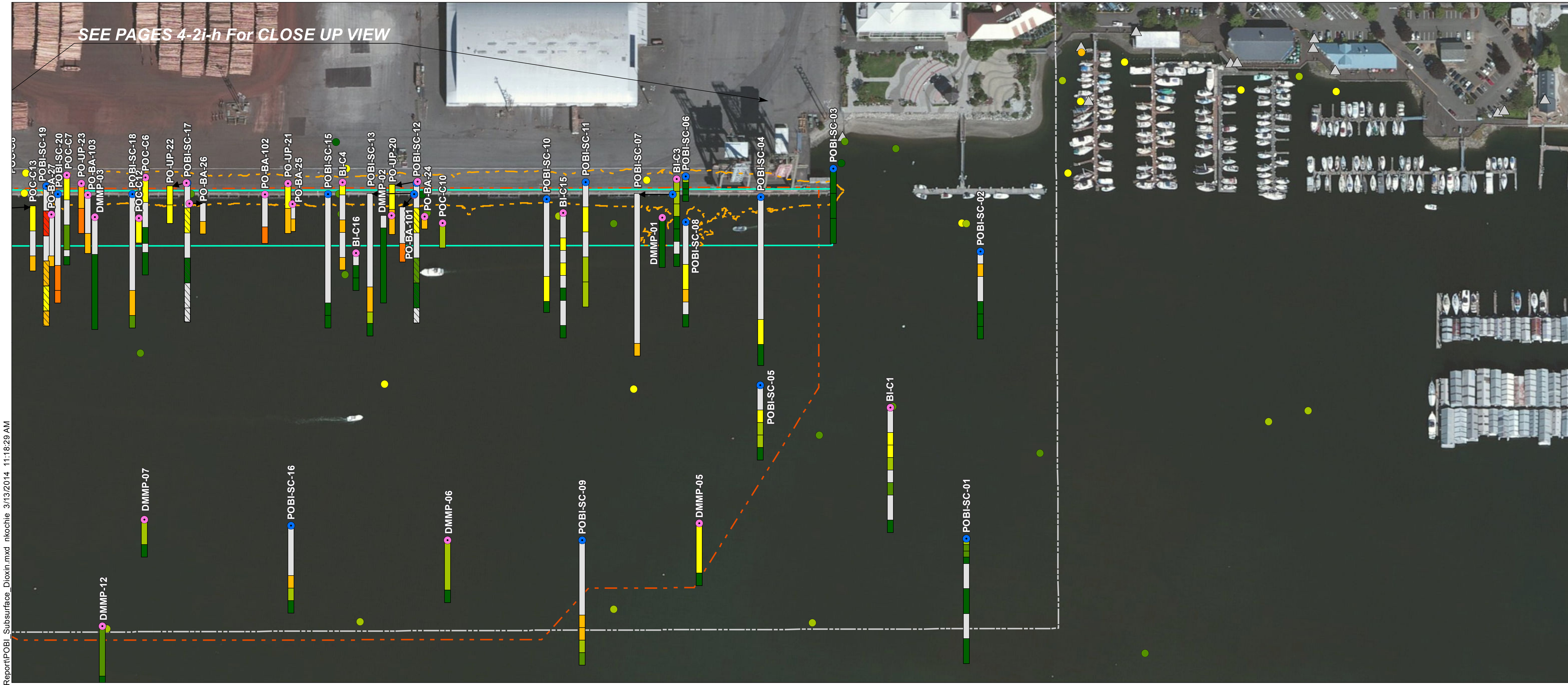
Feet
0 100 200 300 400

Figure 4-1
Surface Sediment Dioxin/Furan Concentrations (7 of 7)
Budd Inlet Investigation Report
Port of Olympia



Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500
- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet: 0, 1, 2, 3, 4, 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet: 0, 100, 200, 300, 400

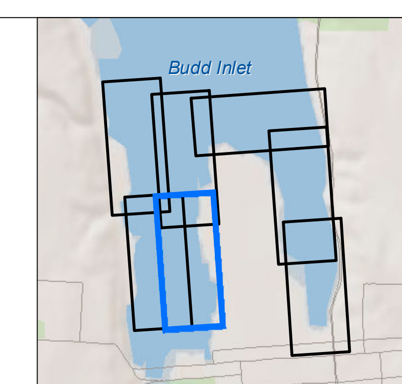


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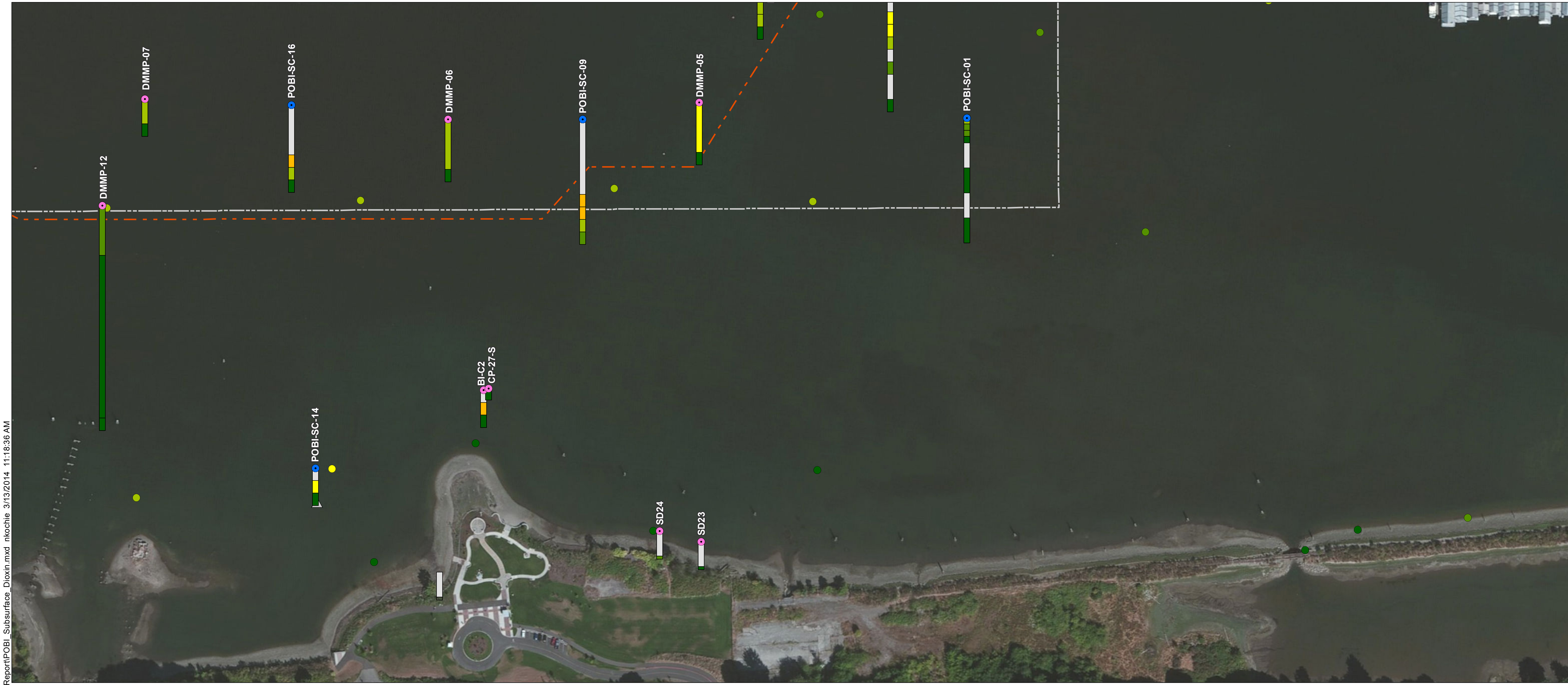
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (1 of 9)
Budd Inlet Investigation Report
Port of Olympia



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Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500

- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet: 0, 1, 2, 3, 4, 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet: 0, 100, 200, 300, 400

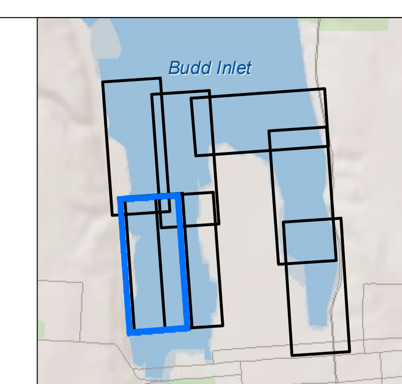

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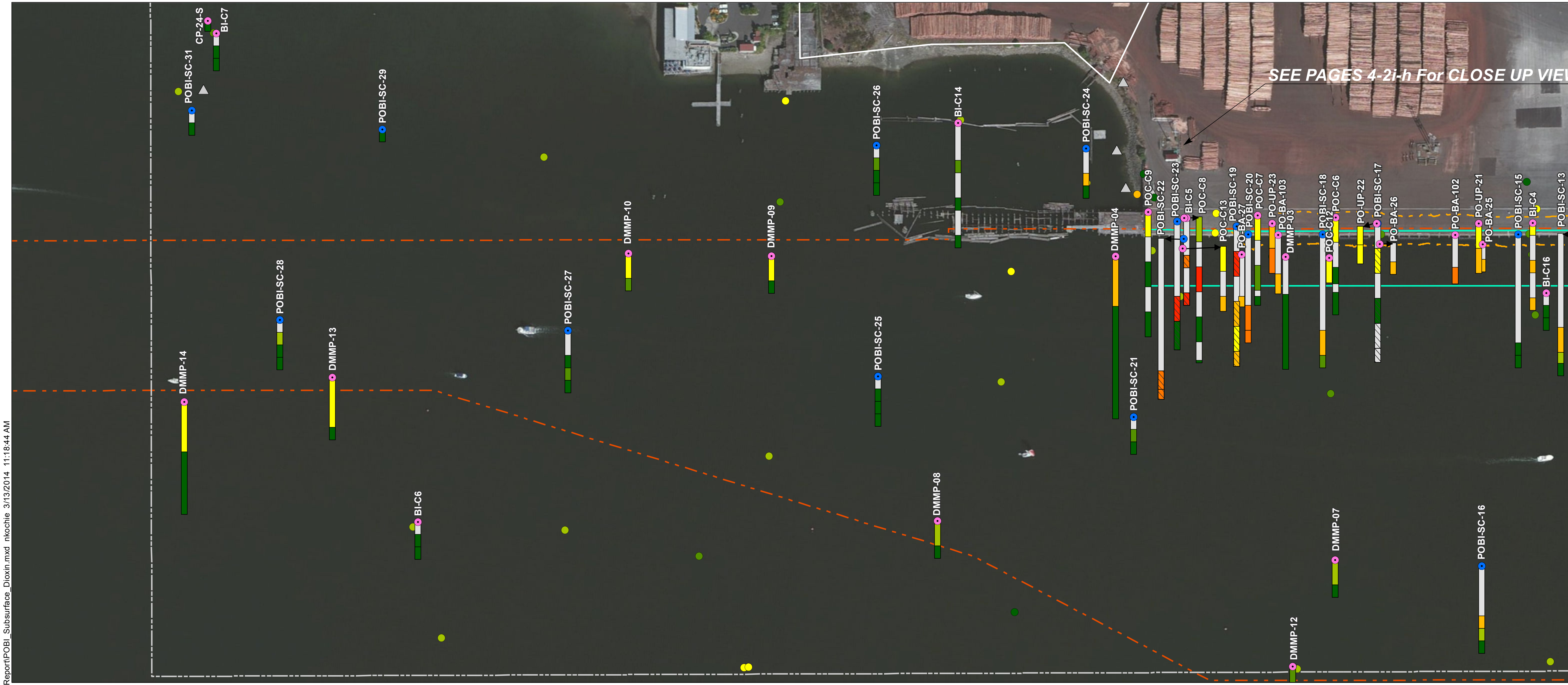
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (2 of 9)
Budd Inlet Investigation Report
Port of Olympia



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Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500
- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet: 0, 1, 2, 3, 4, 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet: 0, 100, 200, 300, 400

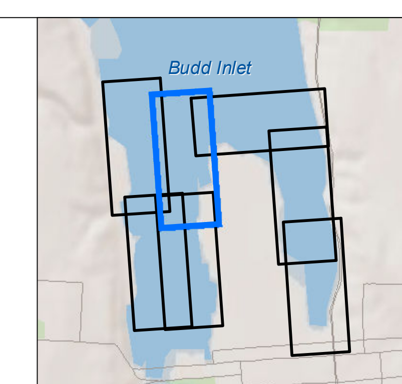

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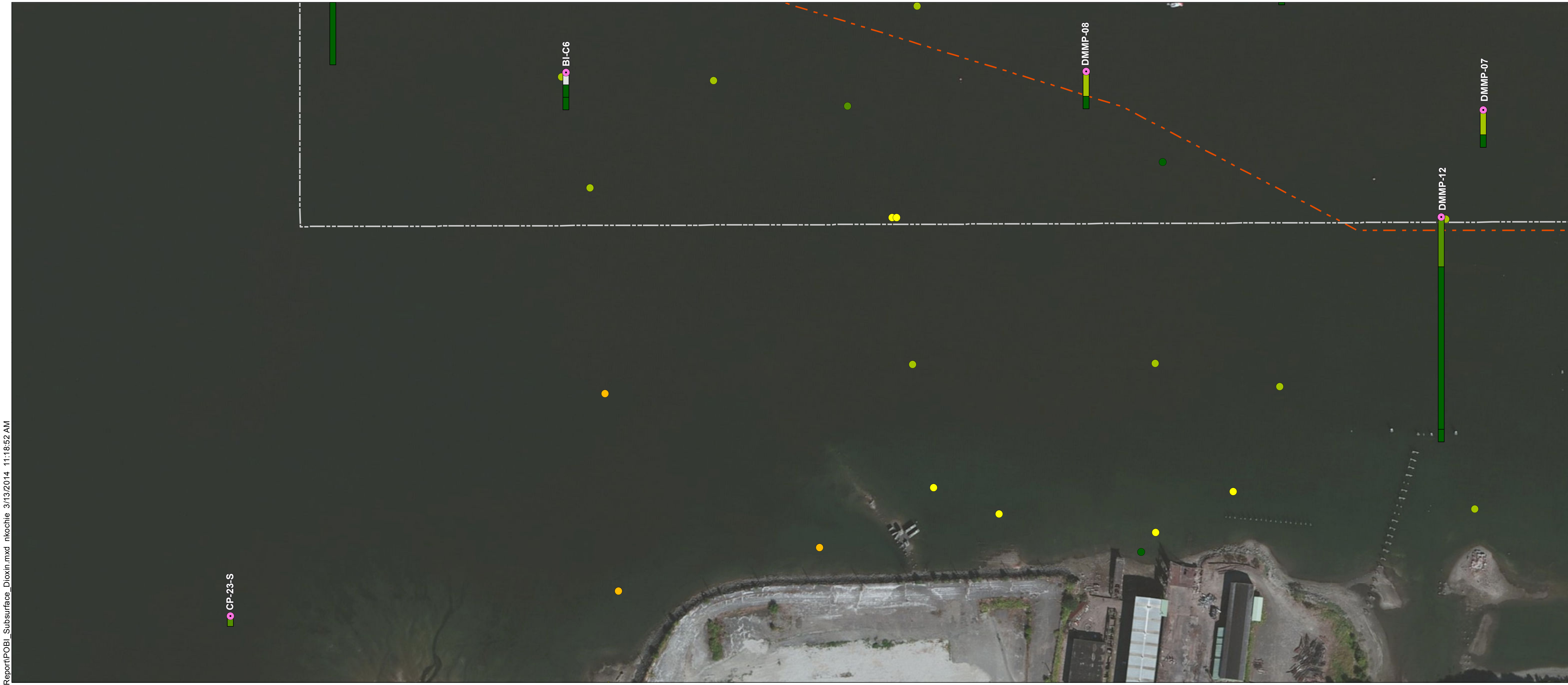
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (3 of 9)
Budd Inlet Investigation Report
Port of Olympia



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Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500
- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet: 0, 1, 2, 3, 4, 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet: 0, 100, 200, 300, 400

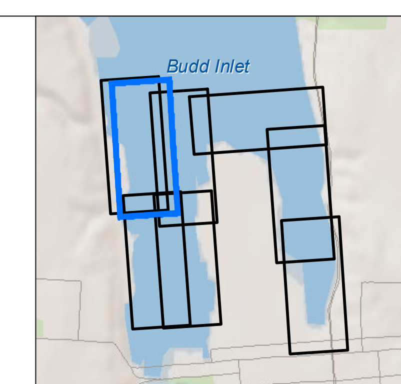

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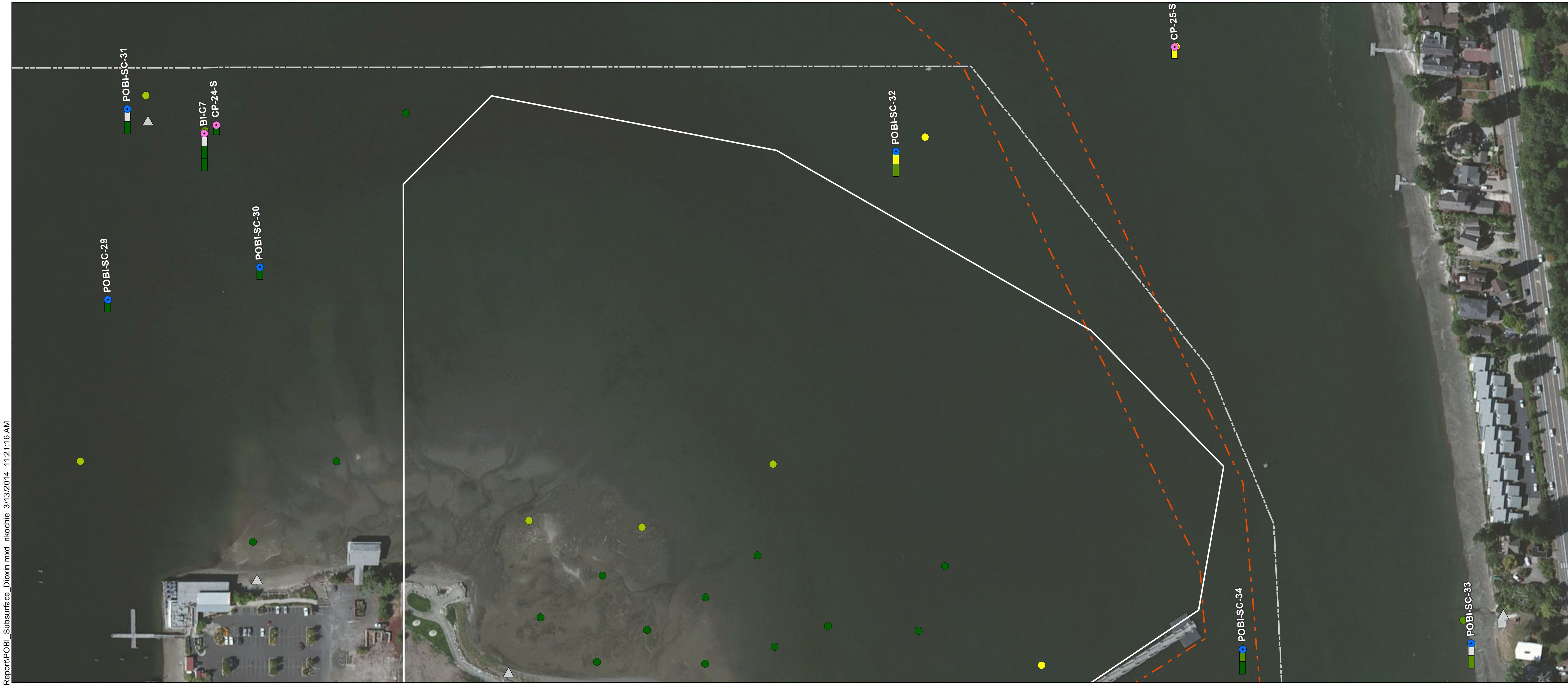
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (4 of 9)
Budd Inlet Investigation Report
Port of Olympia



Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500
- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet
0 1 2 3 4 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet
0 100 200 300 400

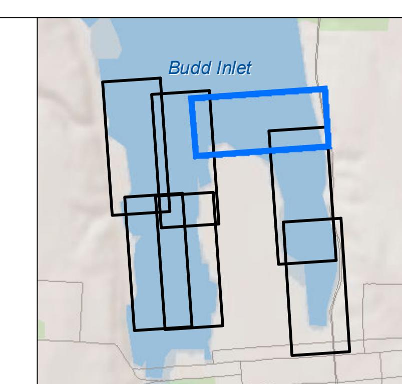


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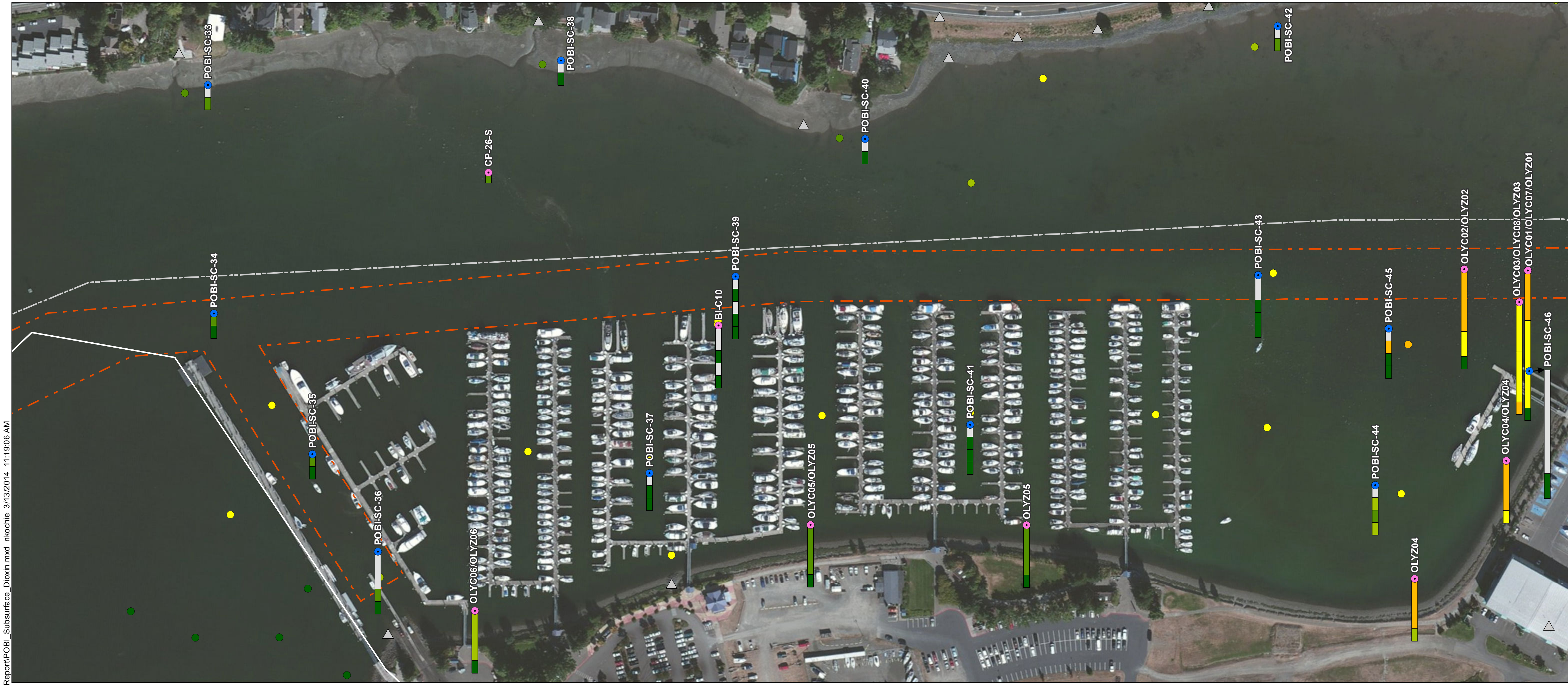
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (5 of 9)
Budd Inlet Investigation Report
Port of Olympia



Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500
- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet: 0, 1, 2, 3, 4, 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet: 0 100 200 300 400

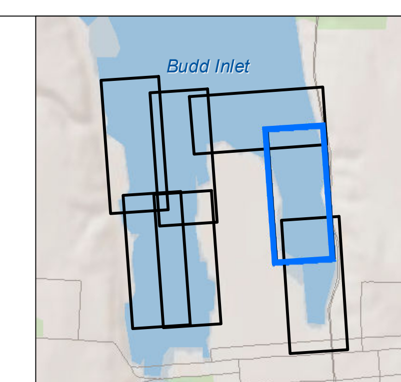


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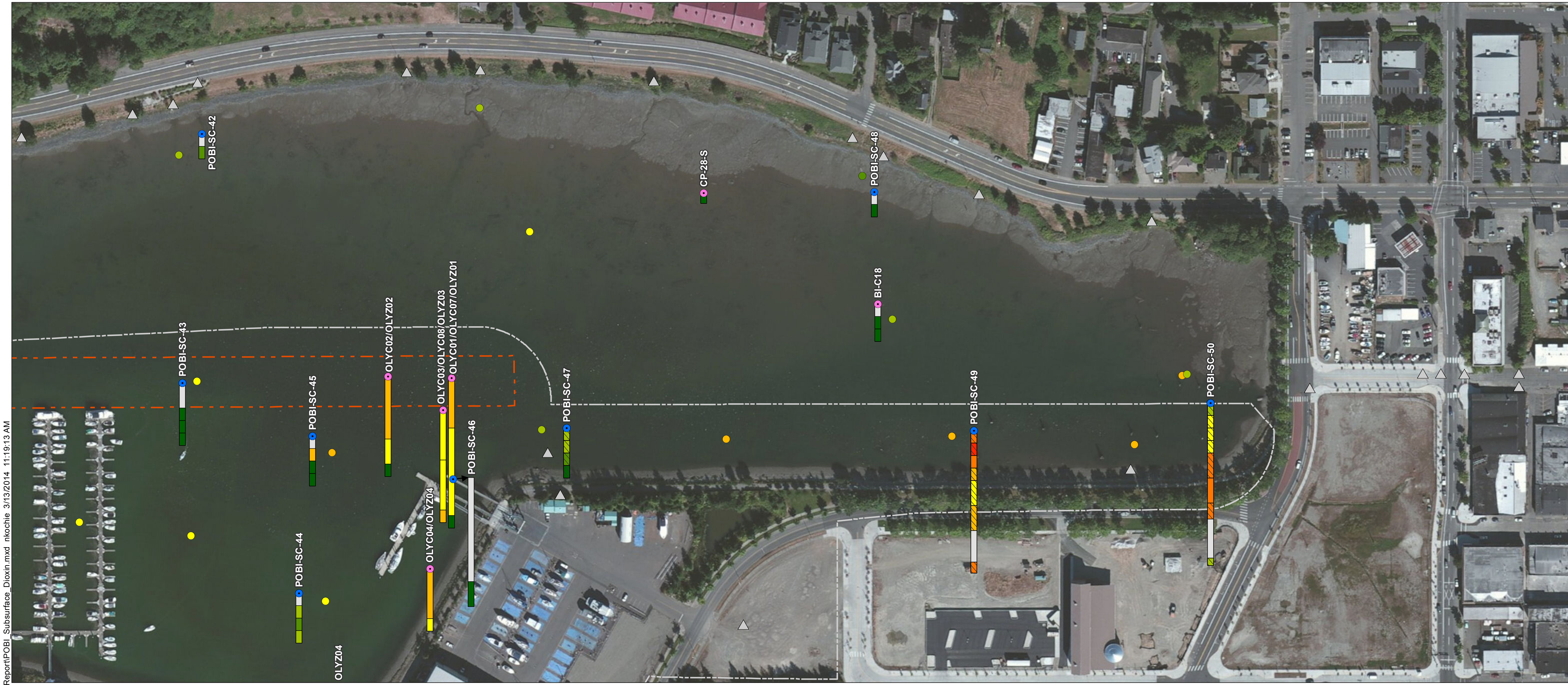
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (6 of 9)
Budd Inlet Investigation Report
Port of Olympia



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Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500
- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet: 0, 1, 2, 3, 4, 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet: 0, 100, 200, 300, 400

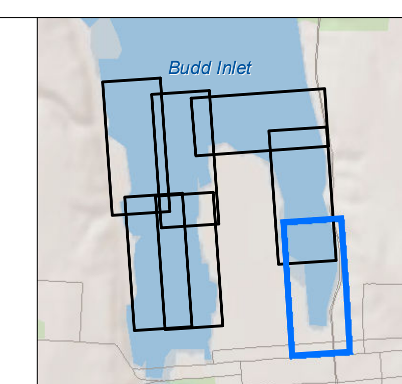

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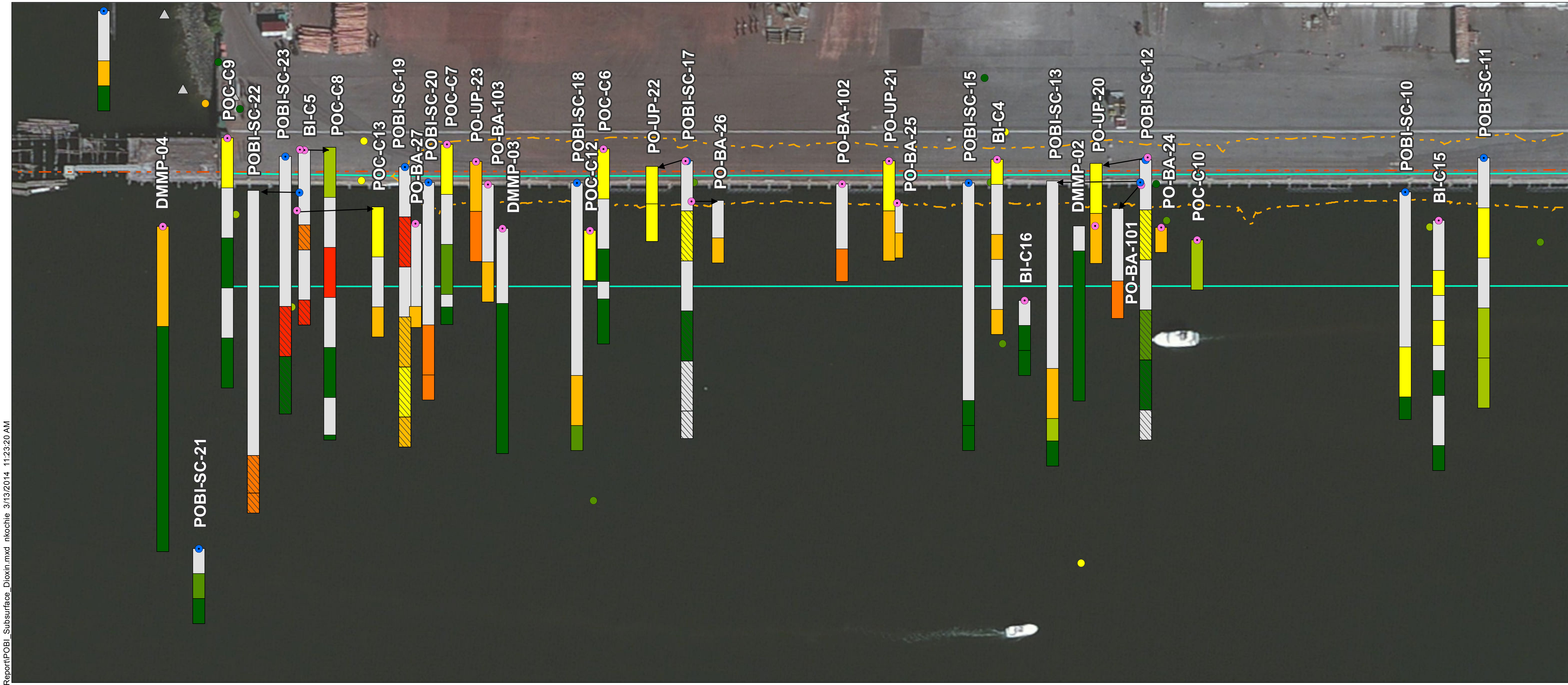
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (7 of 9)
Budd Inlet Investigation Report
Port of Olympia



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Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500

- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet: 0, 1, 2, 3, 4, 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet: 0, 50, 100, 150, 200

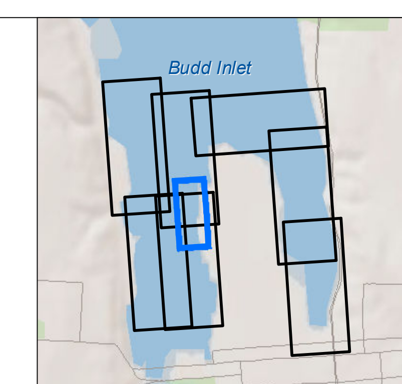

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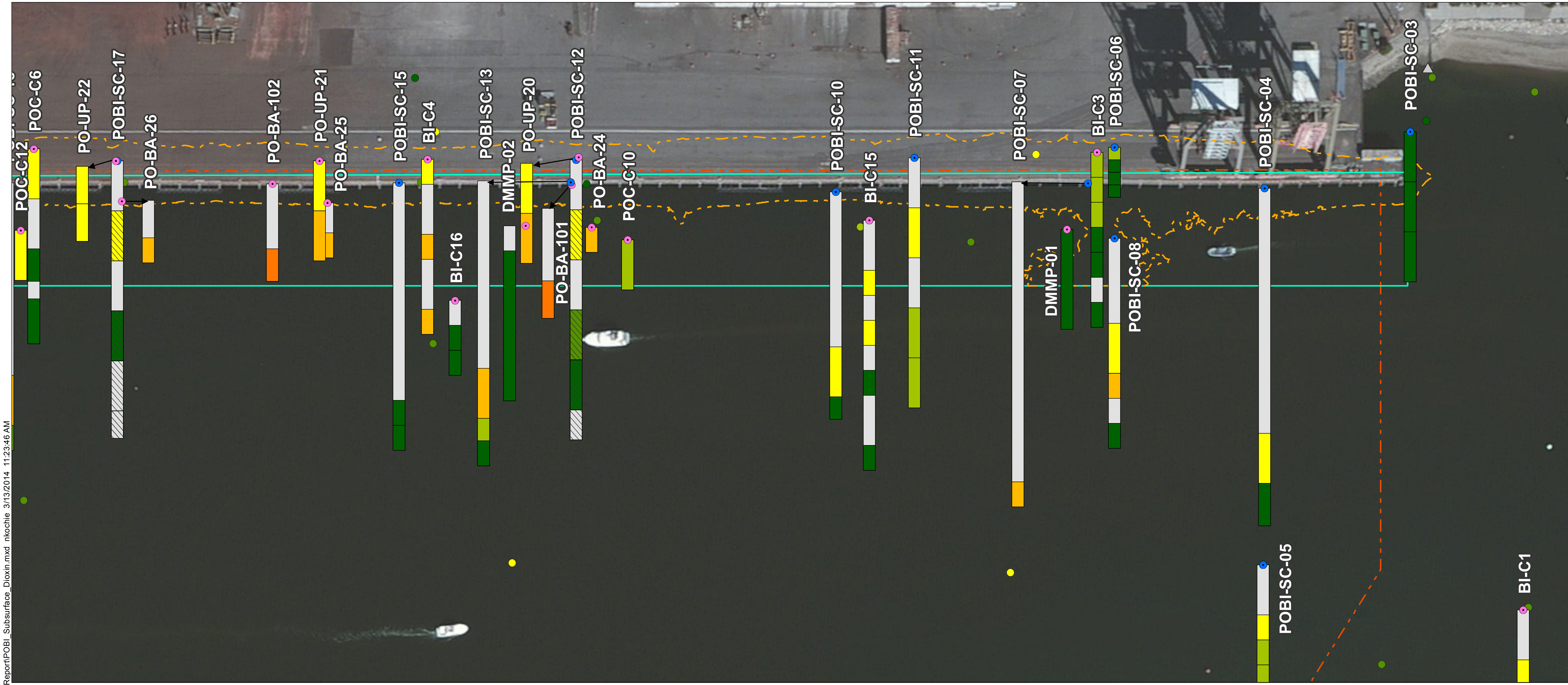
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (8 of 9)
Budd Inlet Investigation Report
Port of Olympia



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Dioxin/Furan TEQ Conc. (ng/kg Dry Weight)[1]

- 0–5
- 5.01–10
- 10.01–20
- 20.01–40
- 40.01–100
- 100.01–500
- > 500
- No Data For Interval
- Sample Interval where SMS Exceedance was Reported[2]
- 2013 Core Location
- Historical Core Location
- Surface Sample Location

Core Depth in Feet: 0, 1, 2, 3, 4, 5

- Federal Navigation Channel
- StudyArea
- Berth Area Boundary
- 2013/2014 Dredge Area
- Outfall

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. One or more Sediment Management Standard chemical(s) exceed the applicable screening criteria.
3. Only laboratory analyzed core sample results are shown. For some core locations, archive samples extend to deeper depths than are indicated by the core representations on this map.
4. Background imagery provided by ESRI online services.

Feet: 0, 50, 100, 150, 200

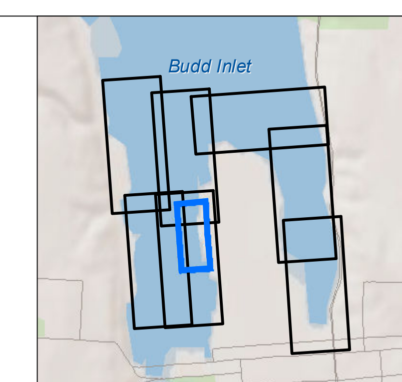

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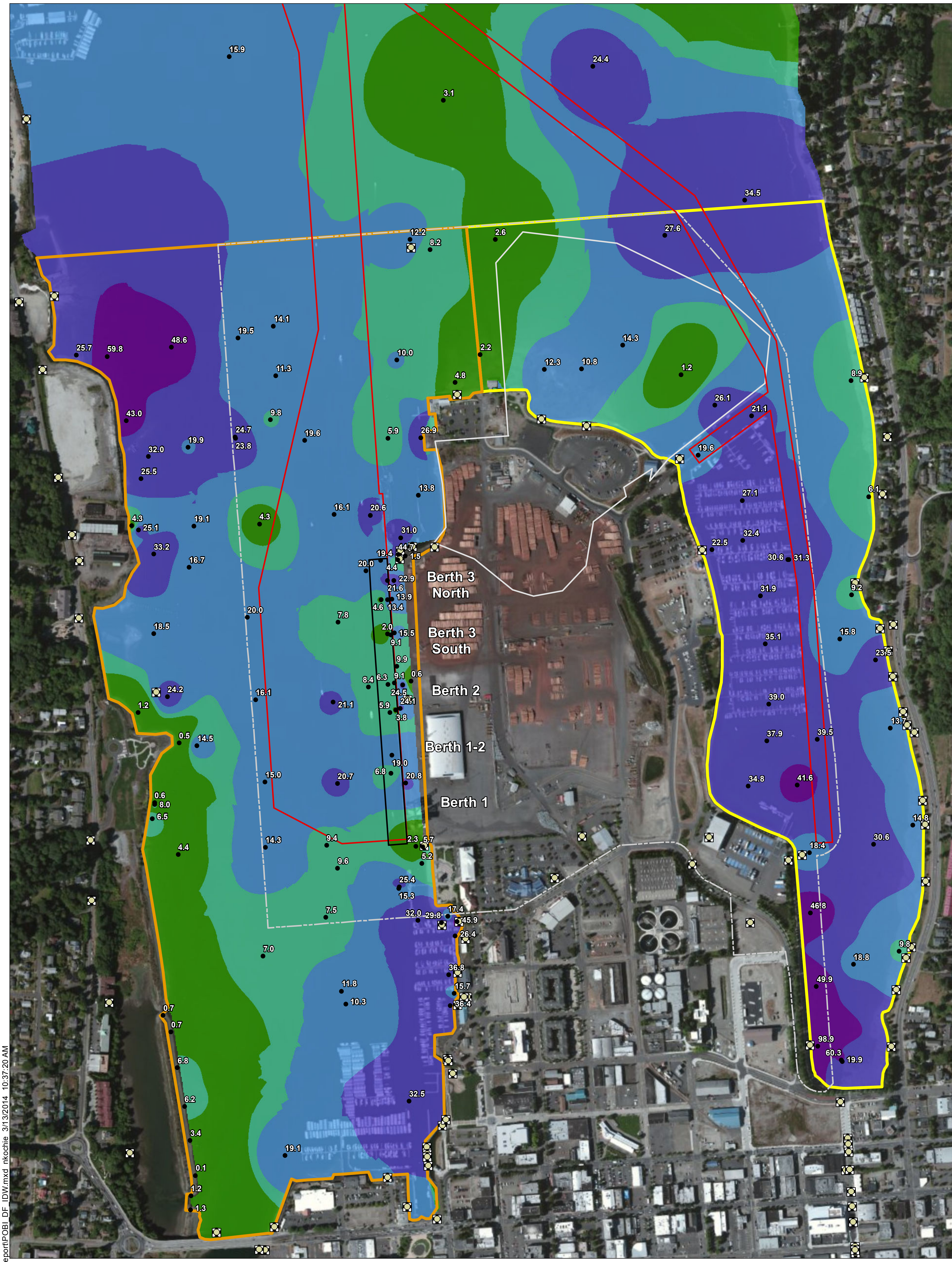
Figure 4-2
Subsurface Sediment Dioxin/Furan Concentrations (9 of 9)
Budd Inlet Investigation Report
Port of Olympia



Dioxin/Furan TEQ (ng/kg)
- < 5
- 5 - 10
- 10 - 20
- 20 - 40
- > 40

- Surface Grab Location
- Outfall
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Federal Navigation Channel
- Study Area

SWAC Areas
- East Bay
- West Bay

NOTES:
1. Total Dioxin/Furan TEQ Concentrations, (2005-Mammal, U = 0, EMPC included).
2. Total Dioxin/Furan TEQ Concentrations calculated using an Inverse Distance Weighting interpolator.
2. Background imagery provided by ESRI online services.

Feet
0 300 600 900 1,200

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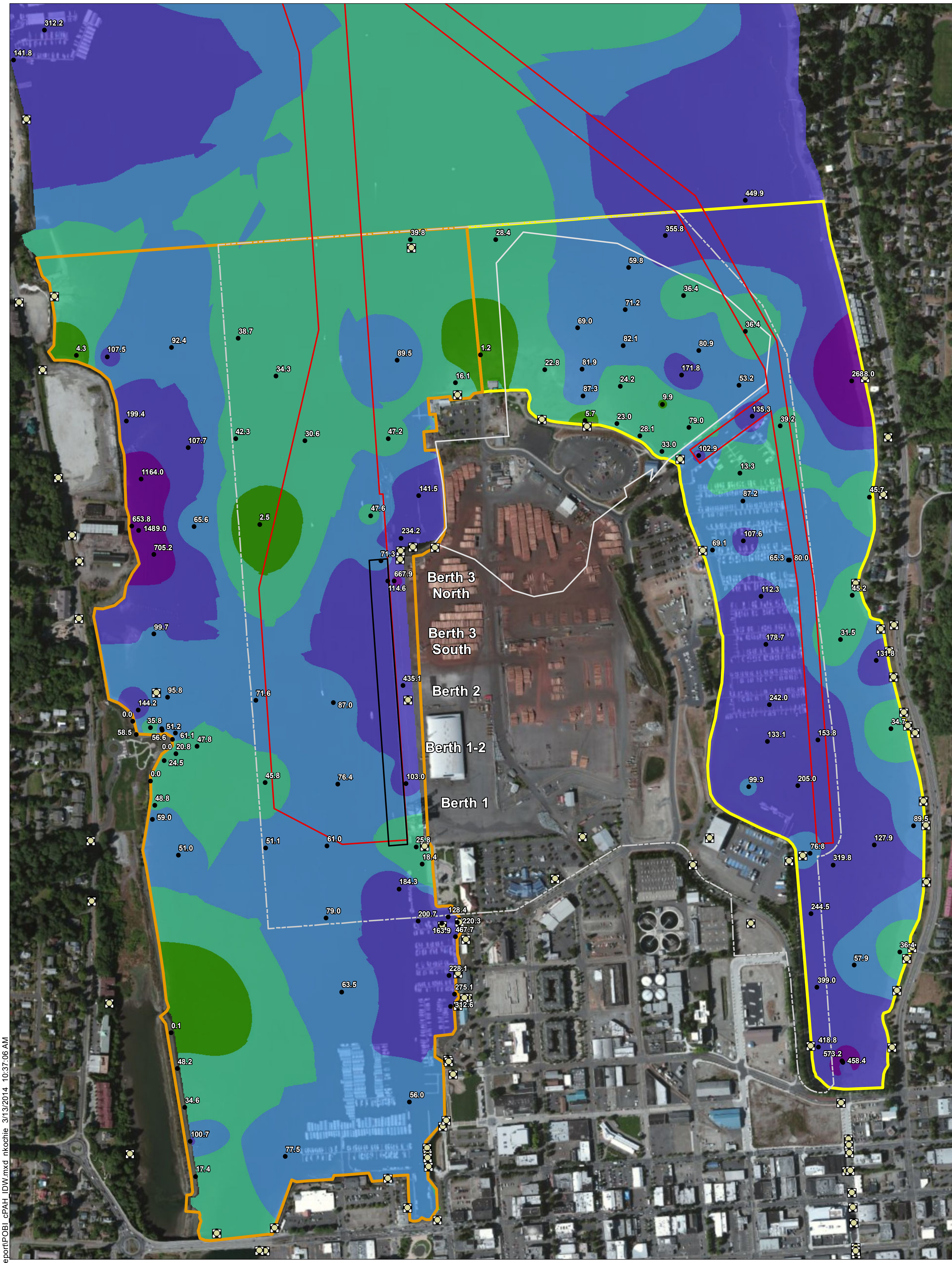
ANCHOR QEA

Figure 5-1
Interpolated Surface Sediment Dioxin/Furan Concentrations
Budd Inlet Investigation Report
Port of Olympia



Total cPAH TEQ (µg/kg)
- < 10
- 10 - 50
- 50 - 100
- 100 - 500
- > 500

- Surface Grab Location
- Outfall
- Cascade Pole Cleanup Boundary
- Berth Area Boundary
- Federal Navigation Channel
- Study Area

SWAC Areas
- East Bay
- West Bay

NOTES:
1. Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0).
2. Background imagery provided by ESRI online services.

Feet
0 300 600 900 1,200

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Figure 5-2
Interpolated Surface Sediment Total cPAH Concentrations
Budd Inlet Investigation Report
Port of Olympia

K:\Projects\0166-Port of Olympia\Budd Inlet Interim Action\0166-RP-043 (Chemical XS_2).dwg F5-3a

Mar 19, 2014 3:16pm chewett

SOURCE: Aerial from ESRI. Bathymetry from eTrac, dated 21 August, 2013 and Puget Sound DEM survey, dated 2005.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

LEGEND:

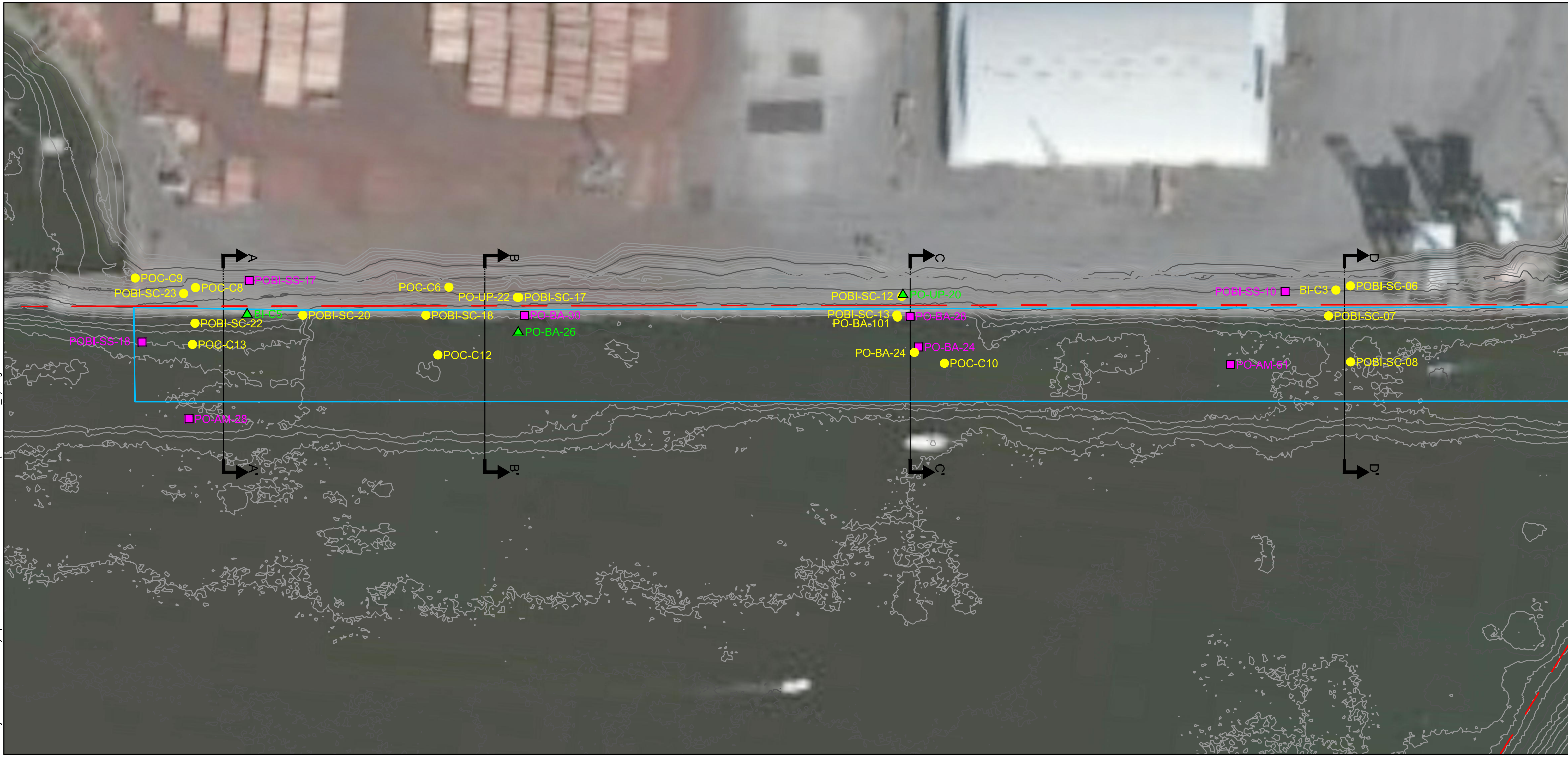
- Federal Navigation Channel
- Sheet Boundary
- Study Area
- Berth Area Boundary

0 500
Scale in Feet

ANCHOR QEA

Figure 5-3a
Cross-section Locations and Sheet Extents
2013 and Historical Dioxin/Furan TEQ Concentration Cross-sections
Port of Olympia Budd Inlet Sediment Site

K:\Projects\0166-Port of Olympia\Budd Inlet Interim Action\0166-RP-043 (Chemical XS_2).dwg F5-3b



Oct 09, 2013 9:24am chewett

SOURCE: Aerial from ESRI. Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

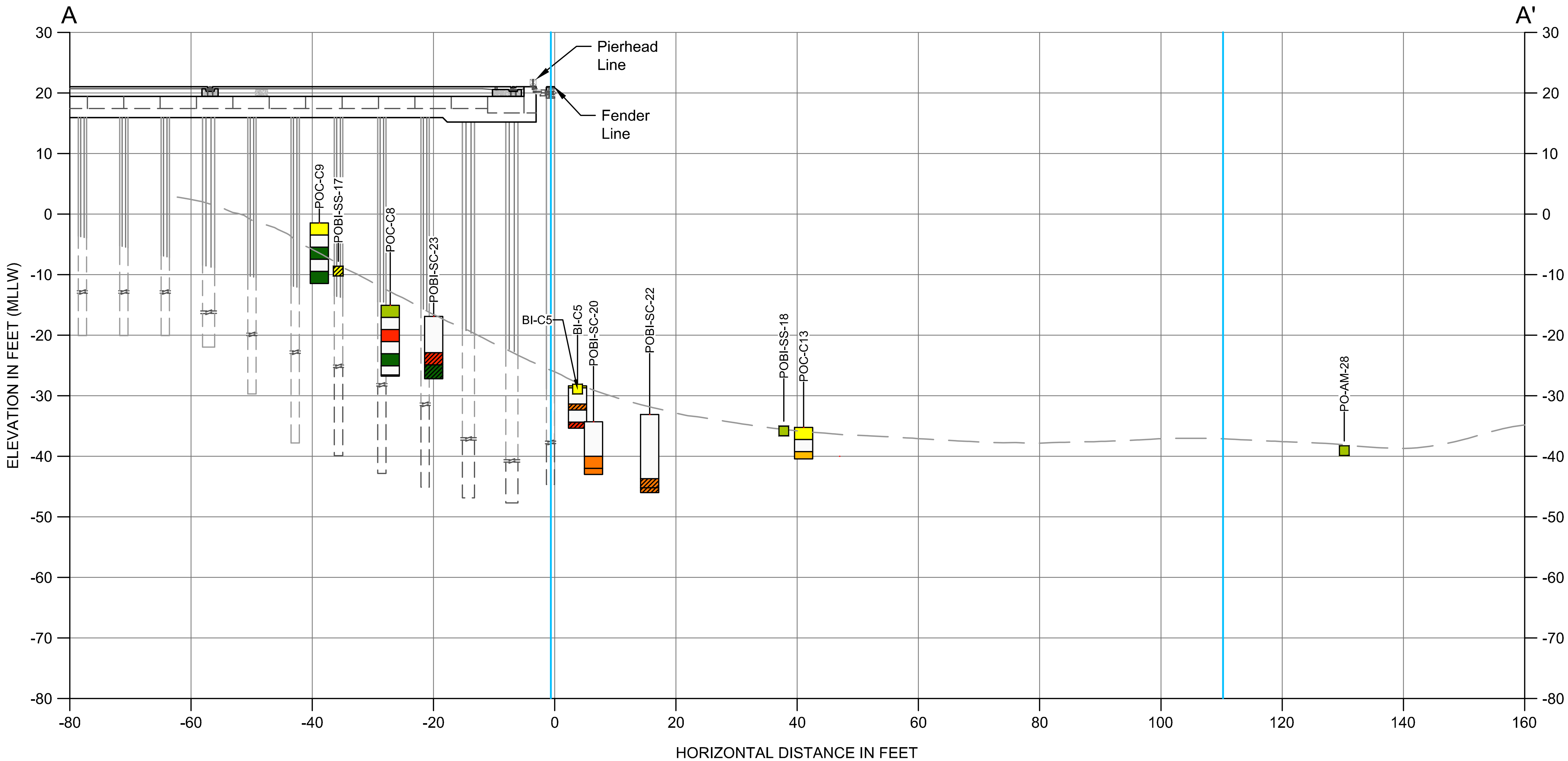
LEGEND:

- Federal Navigation Channel
- Berth Area Boundary
- Existing Bathymetry (2' and 10' Contours)
- Core Sampling Location
- Surface Sampling Location
- Co-located Core and Surface Sampling Locations

0 120
Scale in Feet

ANCHOR QEA

Figure 5-3b
Overview - Marine Terminal Cross-section Locations
2013 and Historical Dioxin/Furan TEQ Concentration Cross-sections
Port of Olympia Budd Inlet Sediment Site



K:\Projects\0166-Port of Olympia\Budd Inlet Interim Action\0166-RP-043 (Chemical XS_2).dwg F5-3c-A-A'

Oct 09, 2013 9:24am chewett

SOURCE: Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES: Core and surface sample locations are projected to the cross section and do not always line up with the mudline elevation at the cross section.

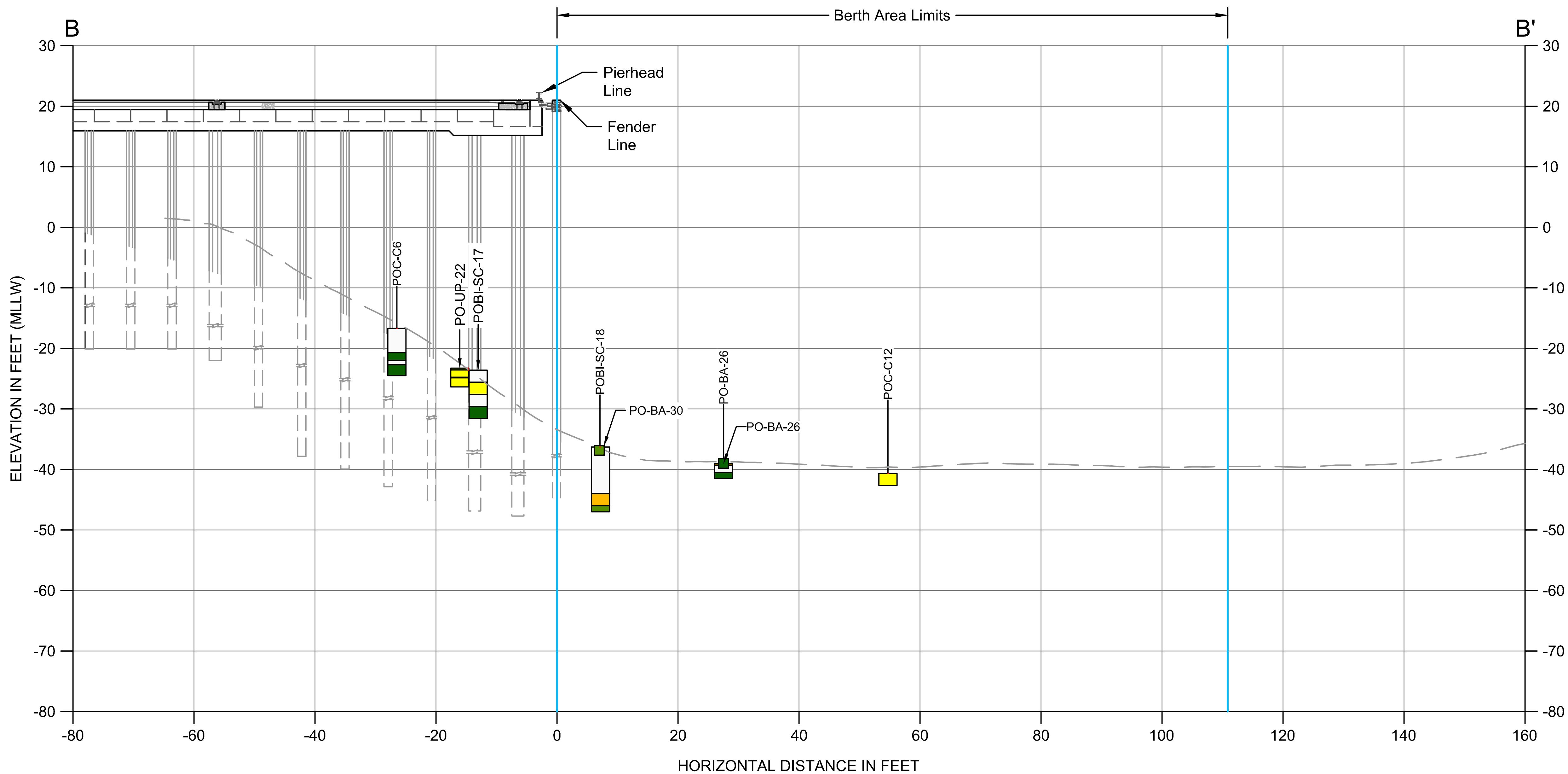
LEGEND:
- Existing Mudline
- Berth Area Boundary
- Surface Sample Location
- Core Sampling Location

Dioxin/Furan TEQ Concentration (ng/kg Dry Weight):
- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- >500
- No Data For Interval
- Sample Interval with SQS Exceedance

0 20
Scale in Feet

ANCHOR QEA

Figure 5-3c
Cross-section A-A' (Marine Terminal)
2013 and Historical Dioxin/Furan TEQ Concentration Cross-sections
Port of Olympia Budd Inlet Sediment Site



SOURCE: Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES: Core and surface sample locations are projected to the cross section and do not always line up with the mudline elevation at the cross section.

LEGEND:
- Existing Mudline
- Berth Area Boundary
- Surface Sample Location
- Core Sampling Location

Dioxin/Furan TEQ Concentration (ng/kg Dry Weight):
- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- >500
- No Data For Interval

0 20
Scale in Feet

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Oct 09, 2013 9:25am chewett

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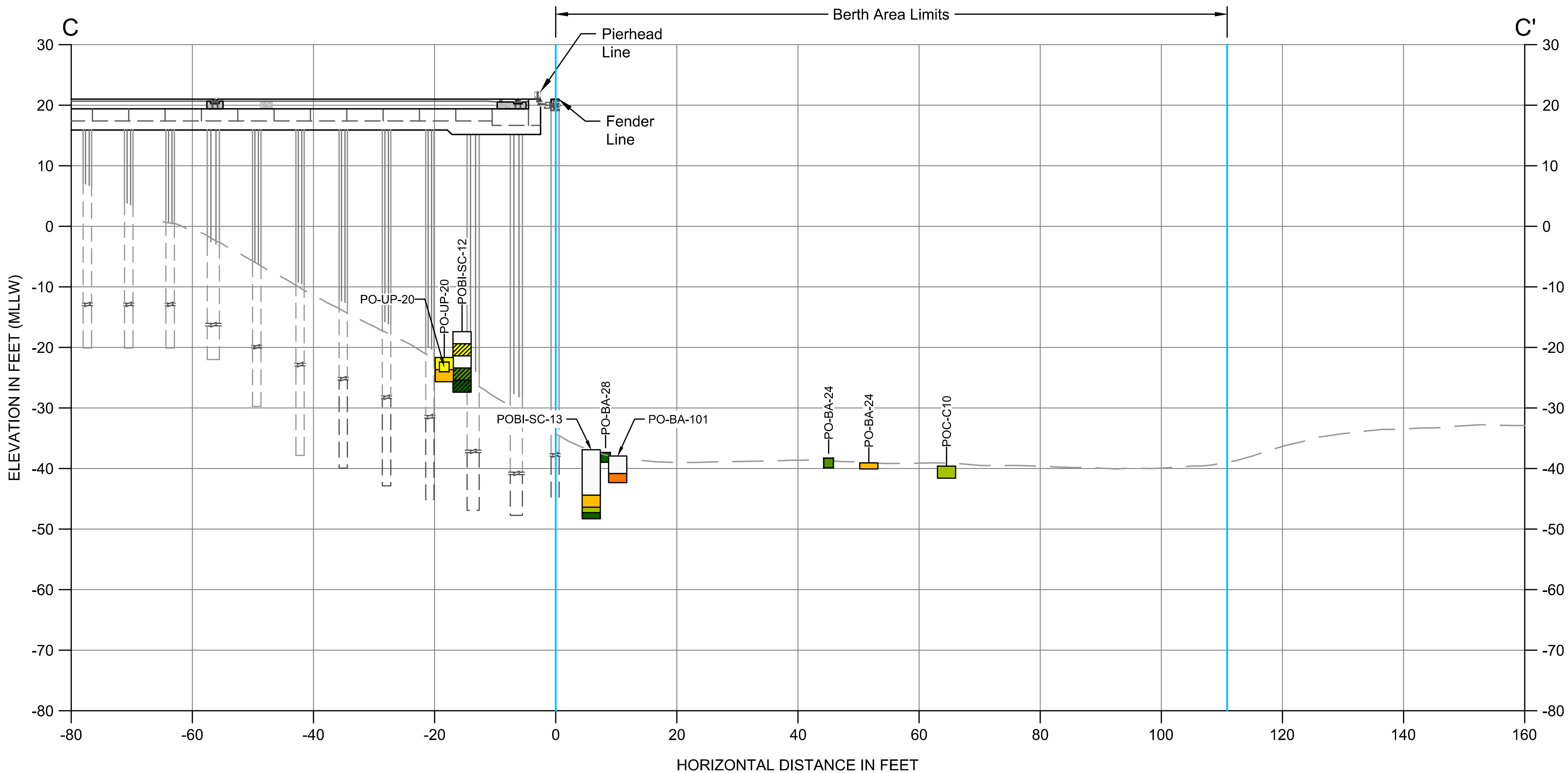
Figure 5-3d
Cross-section B-B' (Marine Terminal)
2013 and Historical Dioxin/Furan TEQ Concentration Cross-sections
Port of Olympia Budd Inlet Sediment Site



K:\Projects\0166-Port of Olympia\Budd Inlet Interim Action\0166-RP-043 (Chemical XS_2).dwg F5-3e-C-C'

Oct 09, 2013 9:25am chewett

SOURCE: Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES: Core and surface sample locations are projected to the cross section and do not always line up with the mudline elevation at the cross section.

LEGEND:

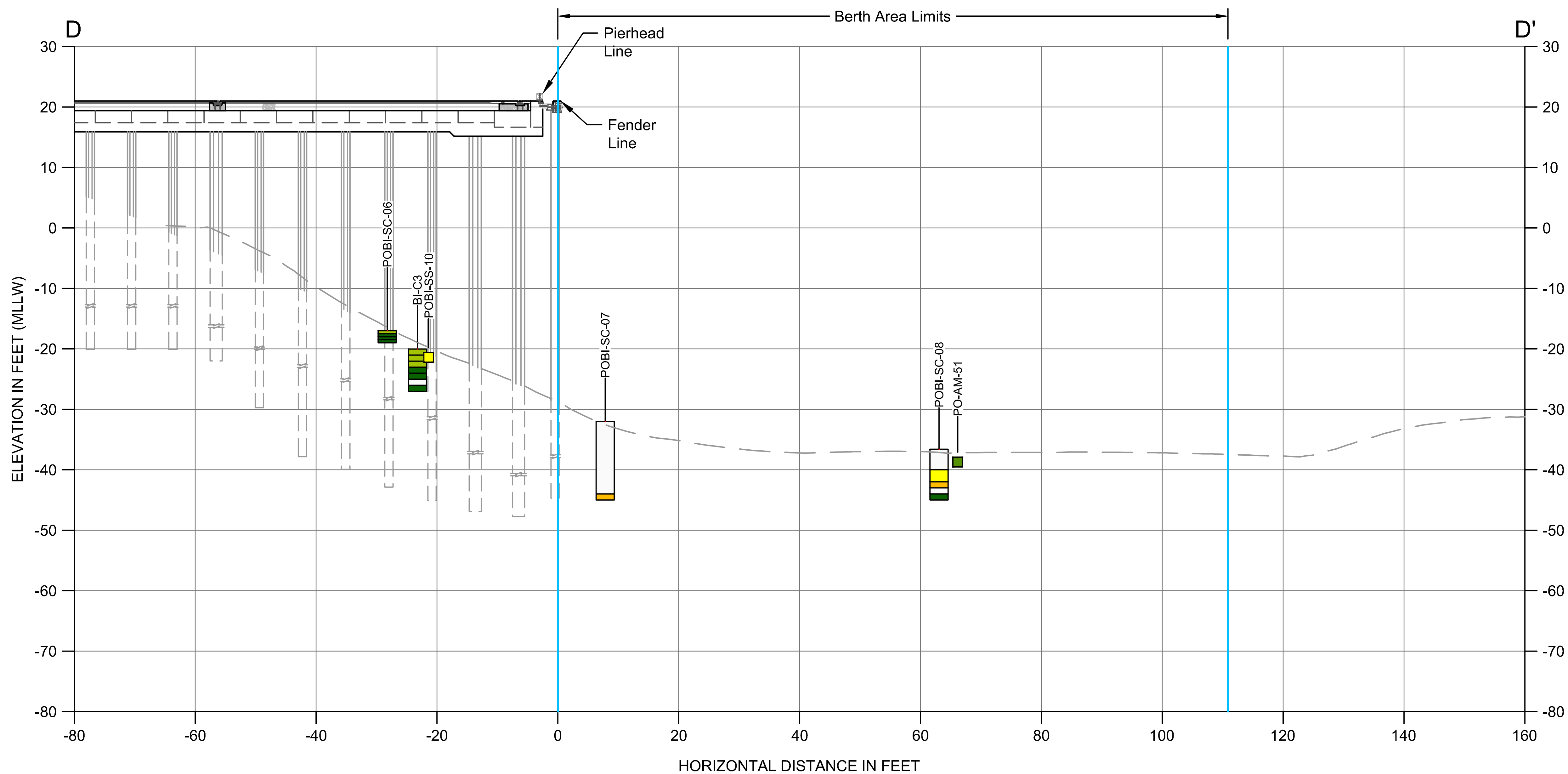
- Existing Mudline
- Berth Area Boundary
- Surface Sample Location
- Core Sampling Location

Dioxin/Furan TEQ Concentration (ng/kg Dry Weight):

- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- >500
- No Data For Interval
- Sample Interval with SQS Exceedance

0 20
Scale in Feet

Figure 5-3e
Cross-section C-C' (Marine Terminal)
2013 and Historical Dioxin/Furan TEQ Concentration Cross-sections
Port of Olympia Budd Inlet Sediment Site



K:\Projects\0166-Port of Olympia\Budd Inlet Interim Action\0166-RP-043 (Chemical XS_2).dwg F5-3f-D-D'

Oct 09, 2013 9:25am chewett

SOURCE: Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES: Core and surface sample locations are projected to the cross section and do not always line up with the mudline elevation at the cross section.

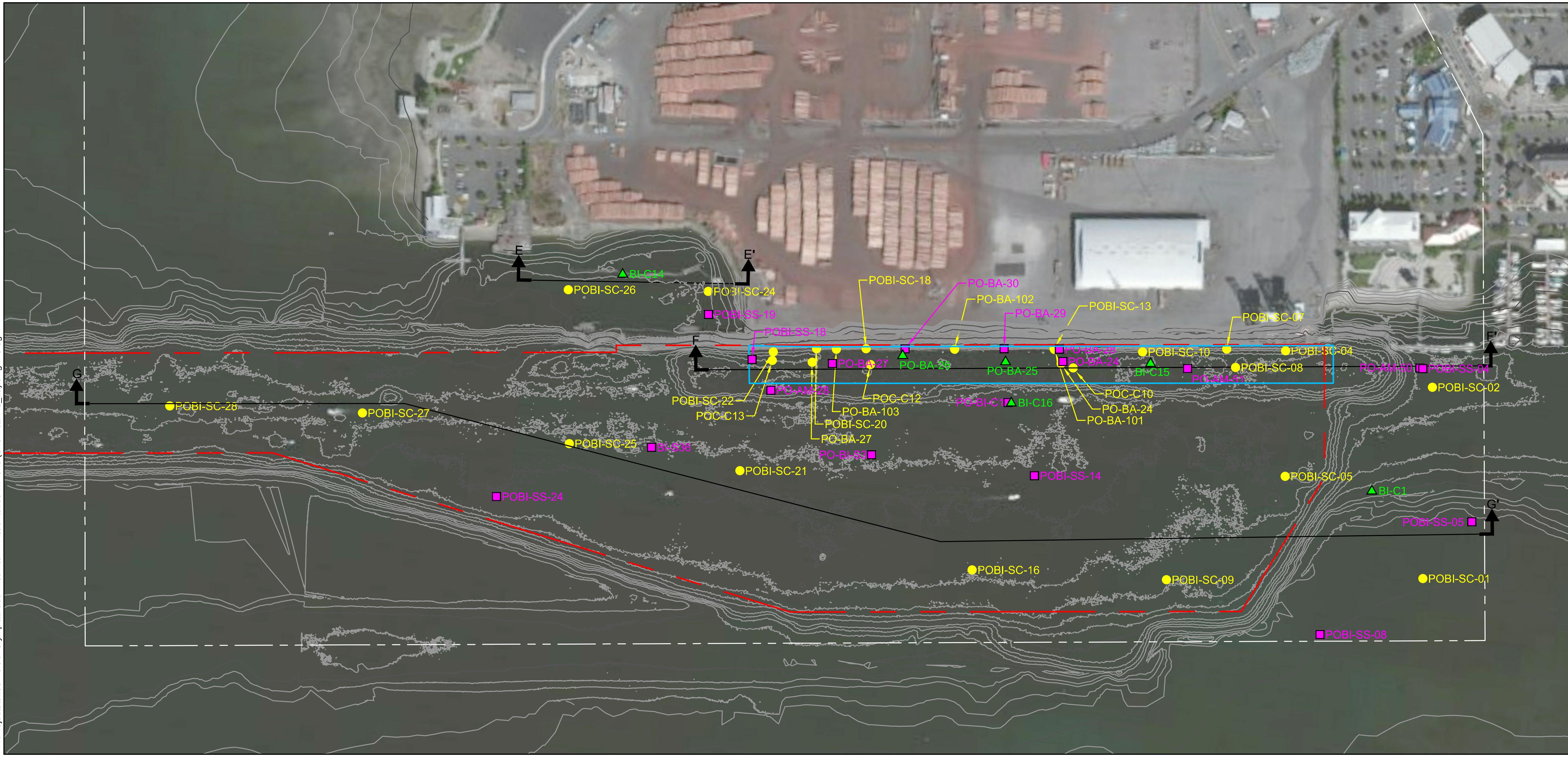
LEGEND:
- Existing Mudline
- Berth Area Boundary
- Surface Sample Location
- Core Sampling Location

Dioxin/Furan TEQ Concentration (ng/kg Dry Weight):
- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- >500
- No Data For Interval

0 20
Scale in Feet

ANCHOR QEA

Figure 5-3f
Cross-section D-D' (Marine Terminal)
2013 and Historical Dioxin/Furan TEQ Concentration Cross-sections
Port of Olympia Budd Inlet Sediment Site



K:\Projects\0166-Port of Olympia\Budd Inlet Interim Action\0166-RP-046 (Chemical XS_2a).dwg F5-3g

Mar 19, 2014 3:26pm chewett

SOURCE: Aerial from ESRI. Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

LEGEND:

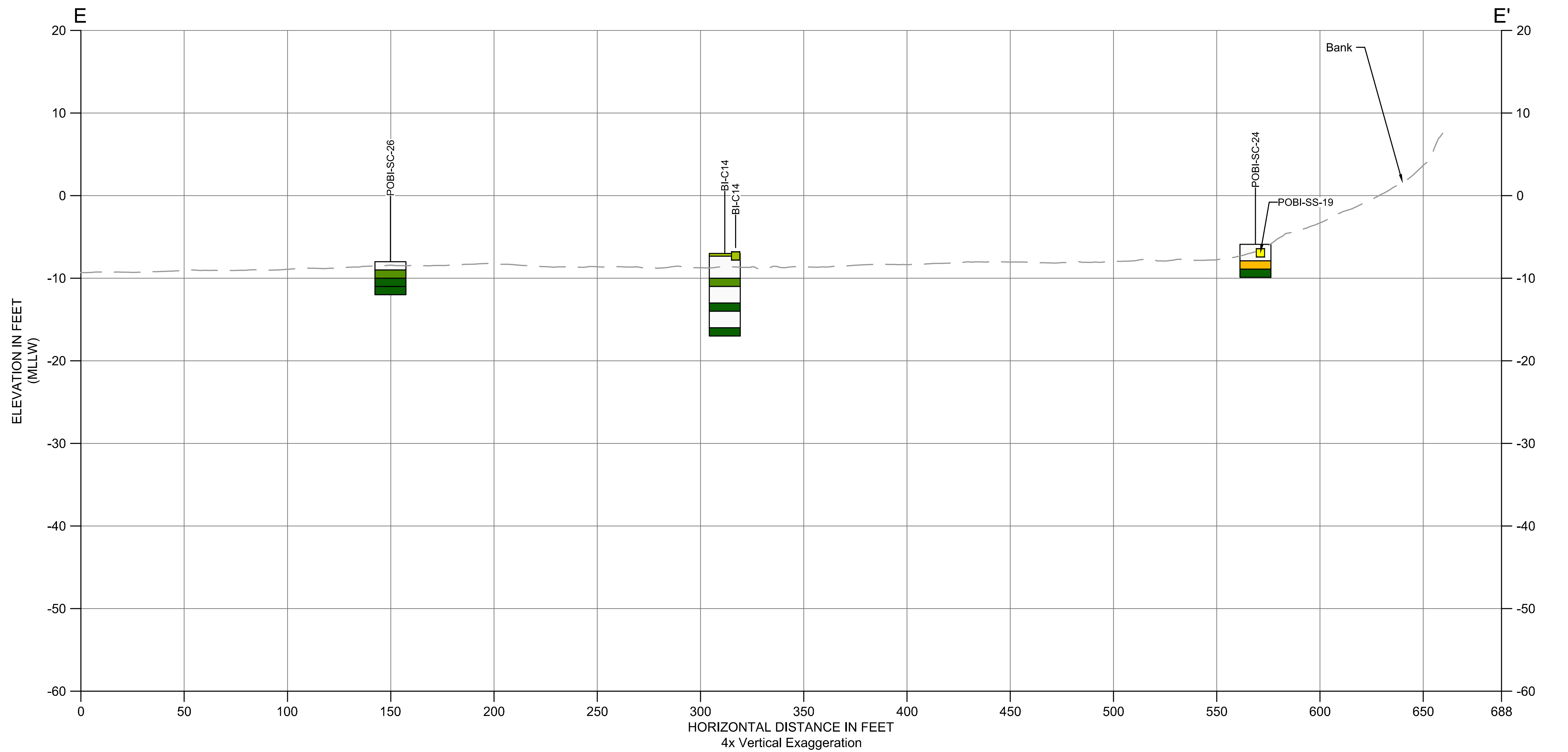
- Federal Navigation Channel
- Berth Area Boundary
- Study Area Boundary
- Existing Bathymetry (2' and 10' Contours)
- Core Sampling Location
- Surface Sampling Location
- Co-located Core and Surface Sampling Location

0 300
Scale in Feet

ANCHOR QEA

Figure 5-3g
Overview - West Bay
2013 and Historical Dioxin/Furan TEQ Concentration Cross-Sections
Port of Olympia Budd Inlet Sediment Site

K:\Projects\0166-Port of Olympia\Budd Inlet Interim Action\0166-RP-046 (Chemical XS_2a).dwg F5-3h-E-E'



Oct 09, 2013 9:28am chewett

SOURCE: Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES: Core and surface sample locations are projected to the cross section and do not always line up with the mudline elevation at the cross section.

LEGEND:

Existing Mudline

Surface Sample Location

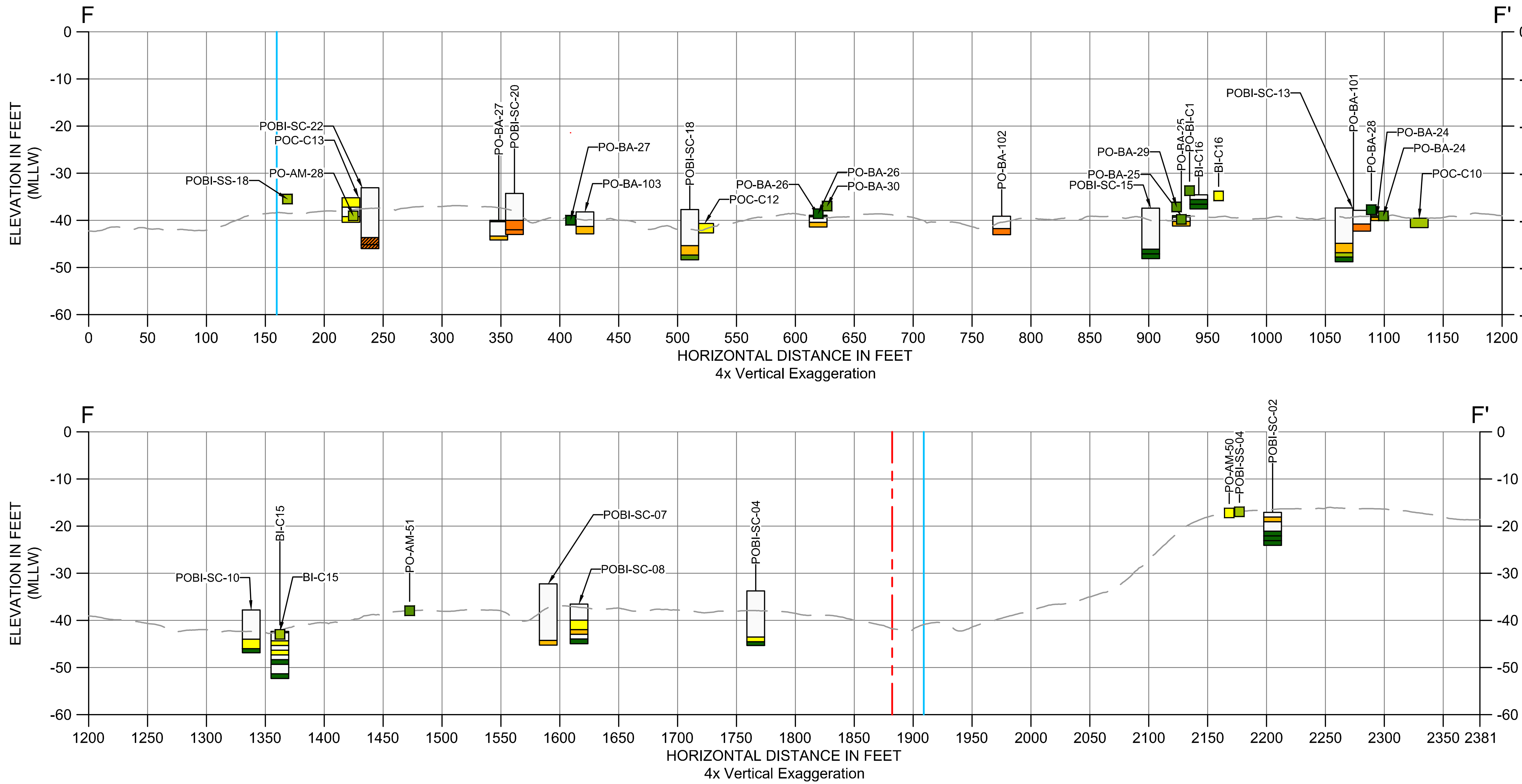
Core Sampling Location

Dioxin/Furan TEQ Concentration (ng/kg Dry Weight):

0-5
5.01-10
10.01-20
20.01-40
40.01-100
100.01-500
>500
No Data For Interval

0 50
Scale in Feet

Figure 5-3h
Cross-section E-E' (West Bay)
2013 and Historical Dioxin/Furan TEQ Concentration Cross-Sections
Port of Olympia Budd Inlet Sediment Site



SOURCE: Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES: Core and surface sample locations are projected to the cross section and do not always line up with the mudline elevation at the cross section.

LEGEND:
- Existing Mudline
- Federal Navigation Channel
- Berth Area Boundary
- Surface Sampling Location
- Core Sampling Location

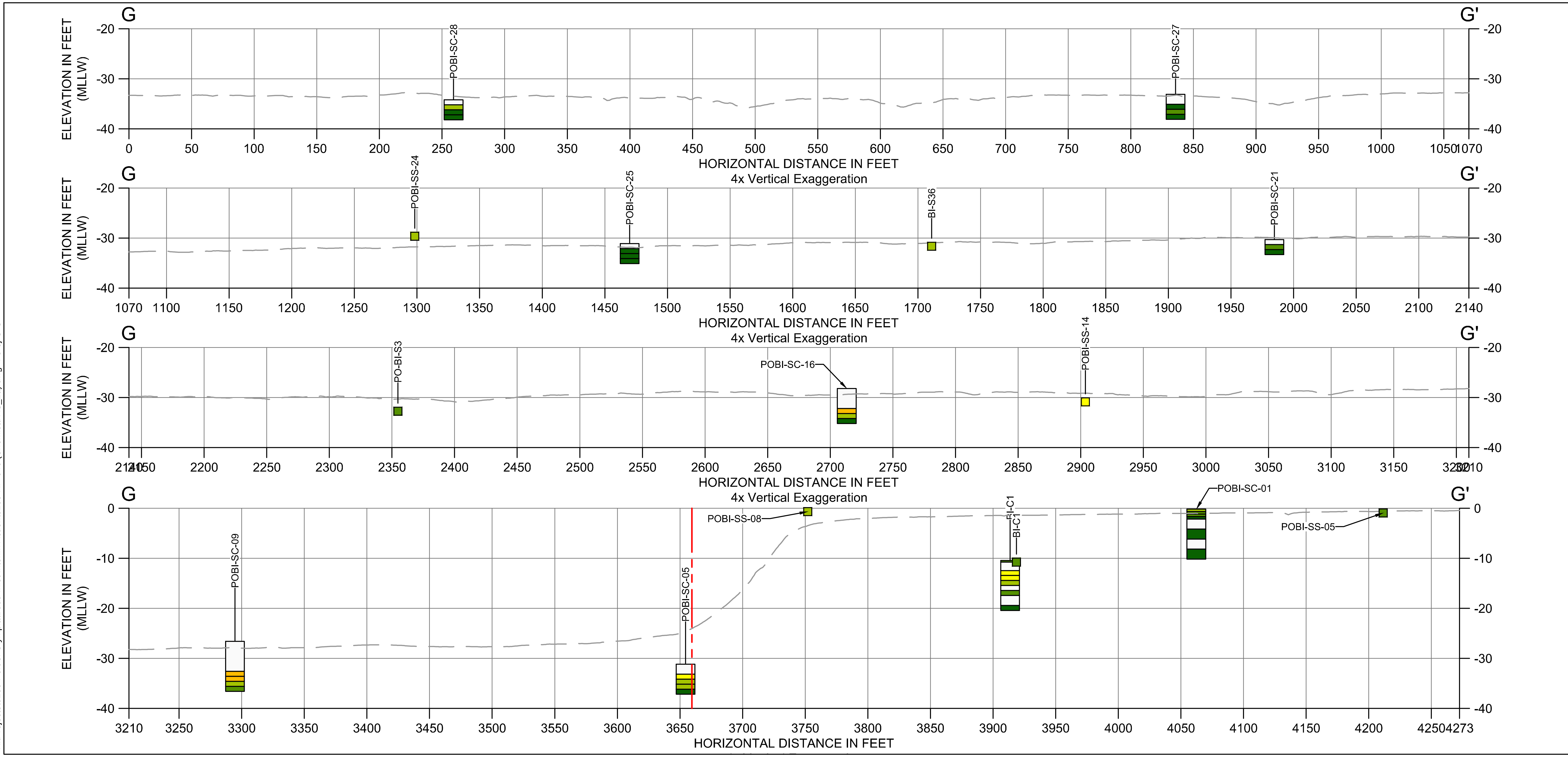
Dioxin/Furan TEQ Concentration (ng/kg Dry Weight):
- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- >500
- No Data For Interval

Sample Interval with SQS Exceedance

0 100
Scale in Feet

ANCHOR QEA

Figure 5-3i
Cross-section F-F' (West Bay)
2013 and Historical Dioxin/Furan TEQ Concentration Cross-Sections
Port of Olympia Budd Inlet Sediment Site



SOURCE: Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

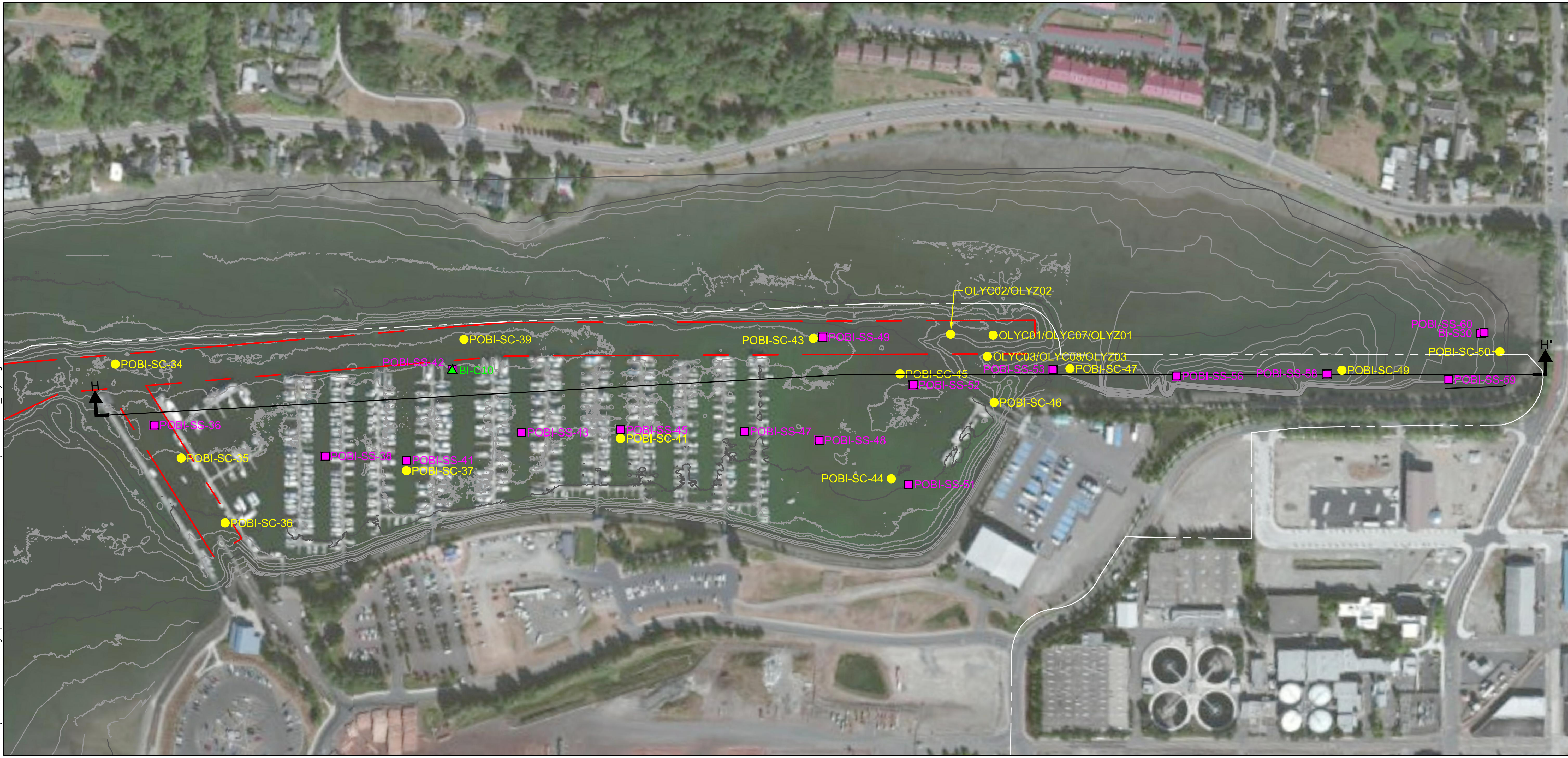
NOTES: Core and surface sample locations are projected to the cross section and do not always line up with the mudline elevation at the cross section.

LEGEND:
- Existing Mudline
- Federal Navigation Channel
- Surface Sampling Location
- Core Sampling Location

Dioxin/Furan TEQ Concentration (ng/kg Dry Weight):
- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- >500
- No Data For Interval

ANCHOR QEA

Figure 5-3j
Cross-section G-G' (West Bay)
2013 and Historical Dioxin/Furan TEQ Concentration Cross-Sections
Port of Olympia Budd Inlet Sediment Site



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Mar 19, 2014 3:26pm chewett

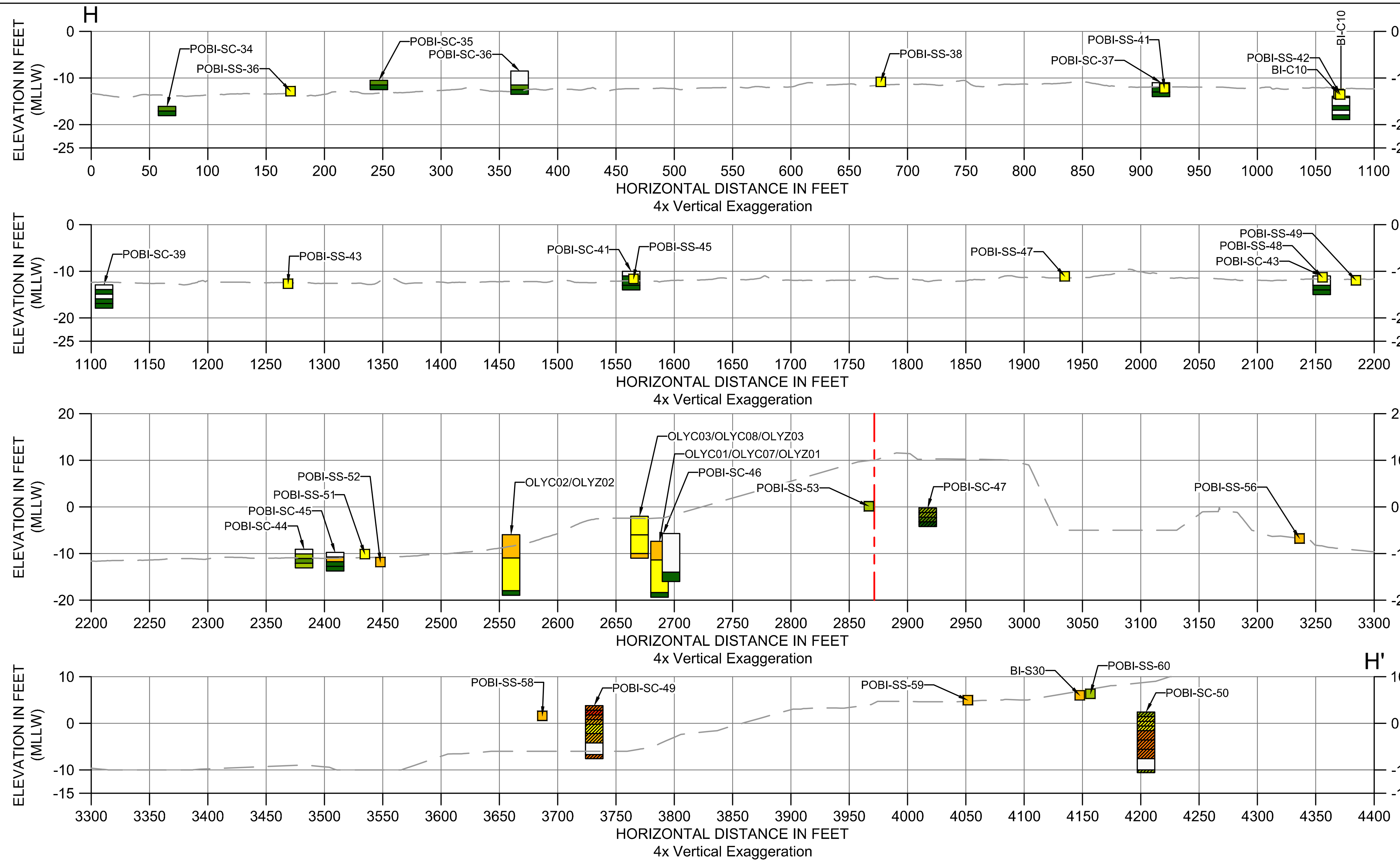
SOURCE: Aerial from ESRI.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

LEGEND:

- Existing Bathymetry (2' and 10' Contours)
- Federal Navigation Channel
- Core Sampling Location
- Surface Sampling Location
- Co-located Core and Surface Sampling Location

0 300
Scale in Feet

Figure 5-3k
Overview - East Bay
2013 and Historical Dioxin/Furan TEQ Concentration Cross-Sections
Port of Olympia Budd Inlet Sediment Site



SOURCE: Bathymetry from eTrac, dated 21 August, 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

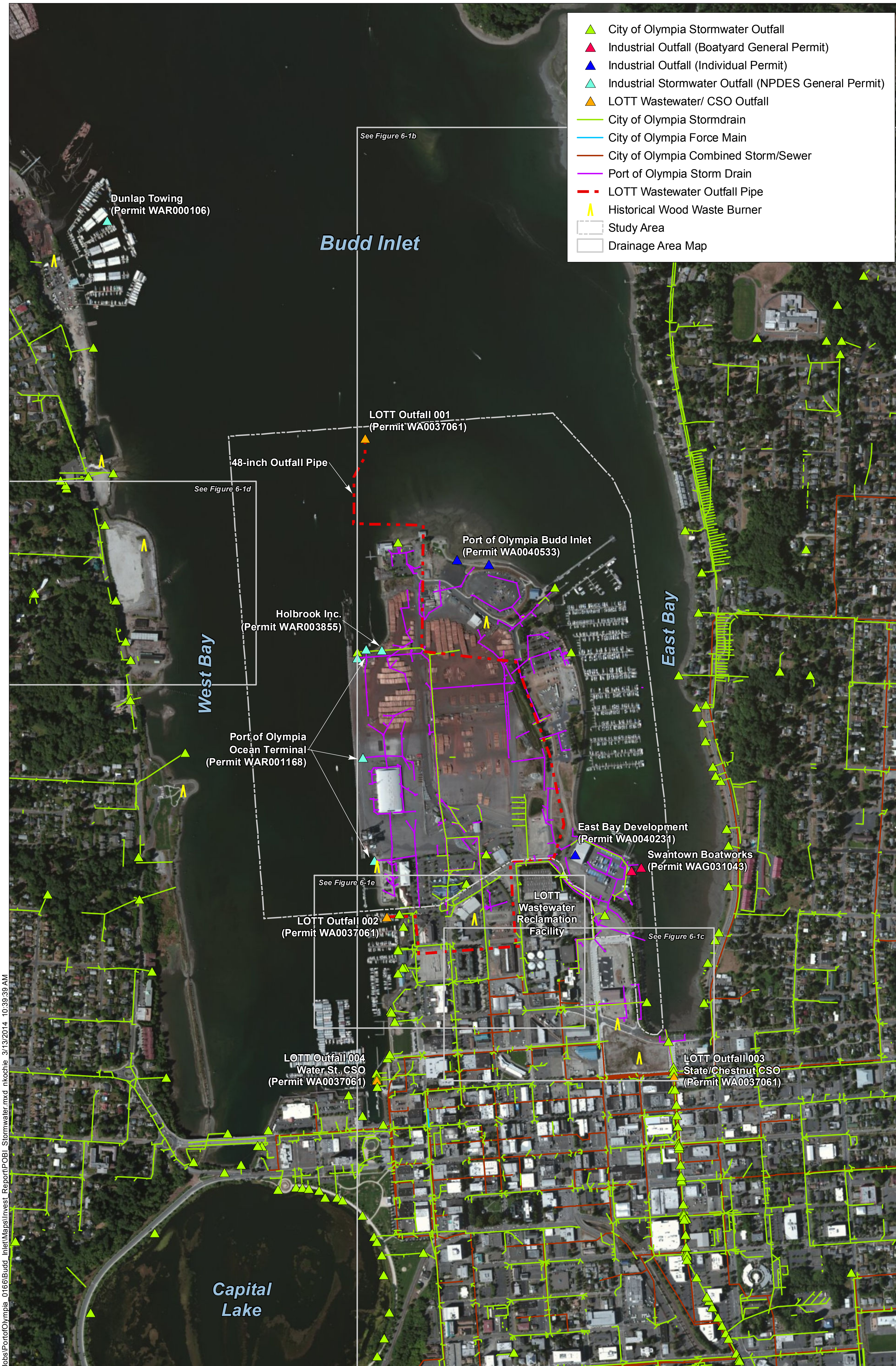
NOTES: Core and surface sample locations are projected to the cross section and do not always line up with the mudline elevation at the cross section.

LEGEND:
- Existing Mudline
- Surface Sample Location
- Core Sampling Location

Dioxin/Furan TEQ Concentration (ng/kg Dry Weight):
- 0-5
- 5.01-10
- 10.01-20
- 20.01-40
- 40.01-100
- 100.01-500
- >500
- No Data For Interval
- Sample Interval with SQS Exceedance

0 100
Scale in Feet

Figure 5-3I
Cross-section H-H' (East Bay)
2013 and Historical Dioxin/Furan TEQ Concentration Cross-Sections
Port of Olympia Budd Inlet Sediment Site



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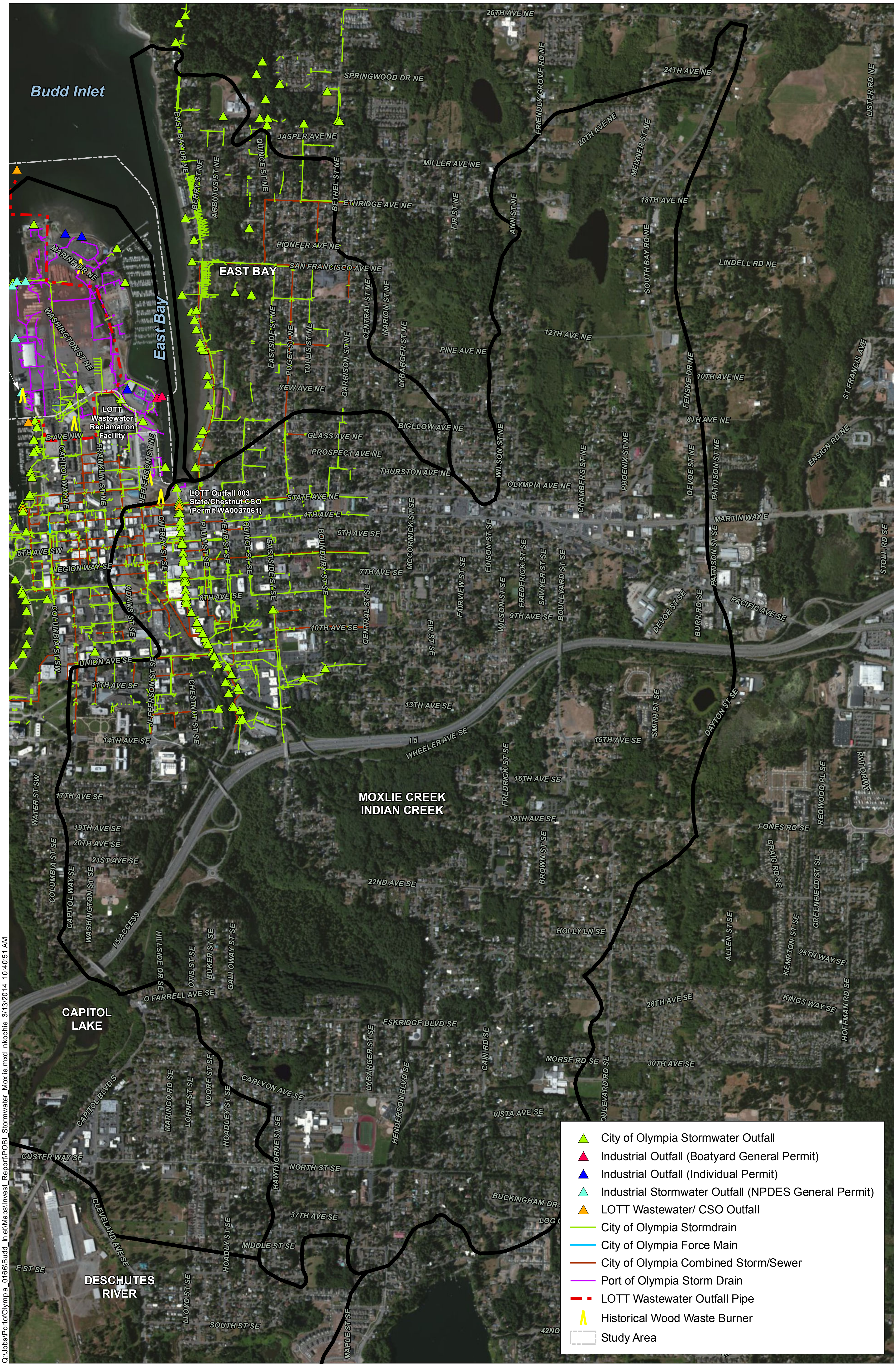
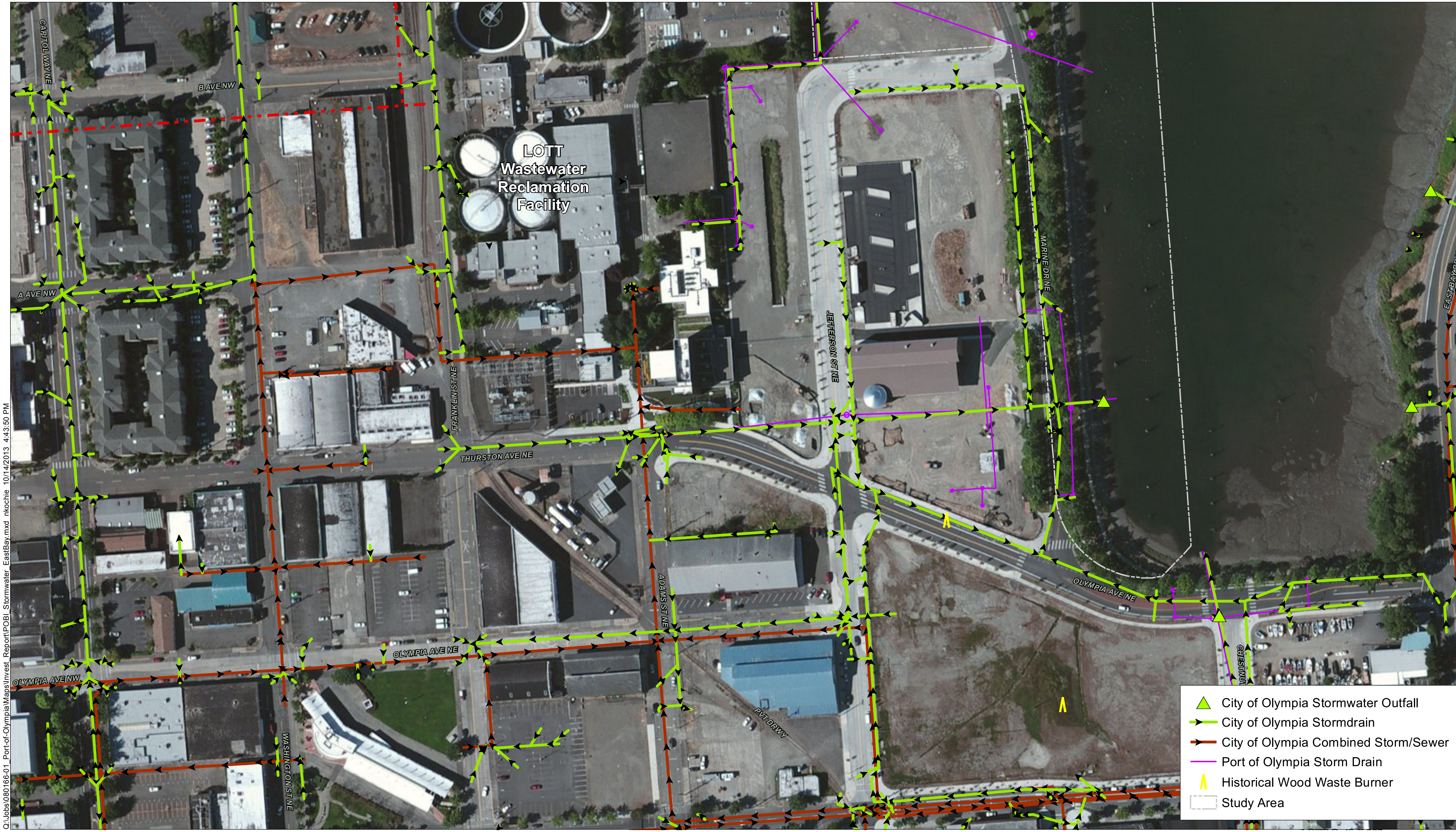
ANCHOR QEA

Figure 6-1a
Stormwater/CSO and Natural Drainage Locations
Budd Inlet Investigation Report
Port of Olympia



ANCHOR QEA

Figure 6-1b
Drainage Area for Moxlie/Indian Creek
Budd Inlet Investigation Report
Port of Olympia



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ANCHOR QEA

Feet
0 75 150 225 300

Figure 6-1c
Drainage Area for Outfall Adjacent to East Bay Redevelopment Site
Budd Inlet Investigation Report
Port of Olympia

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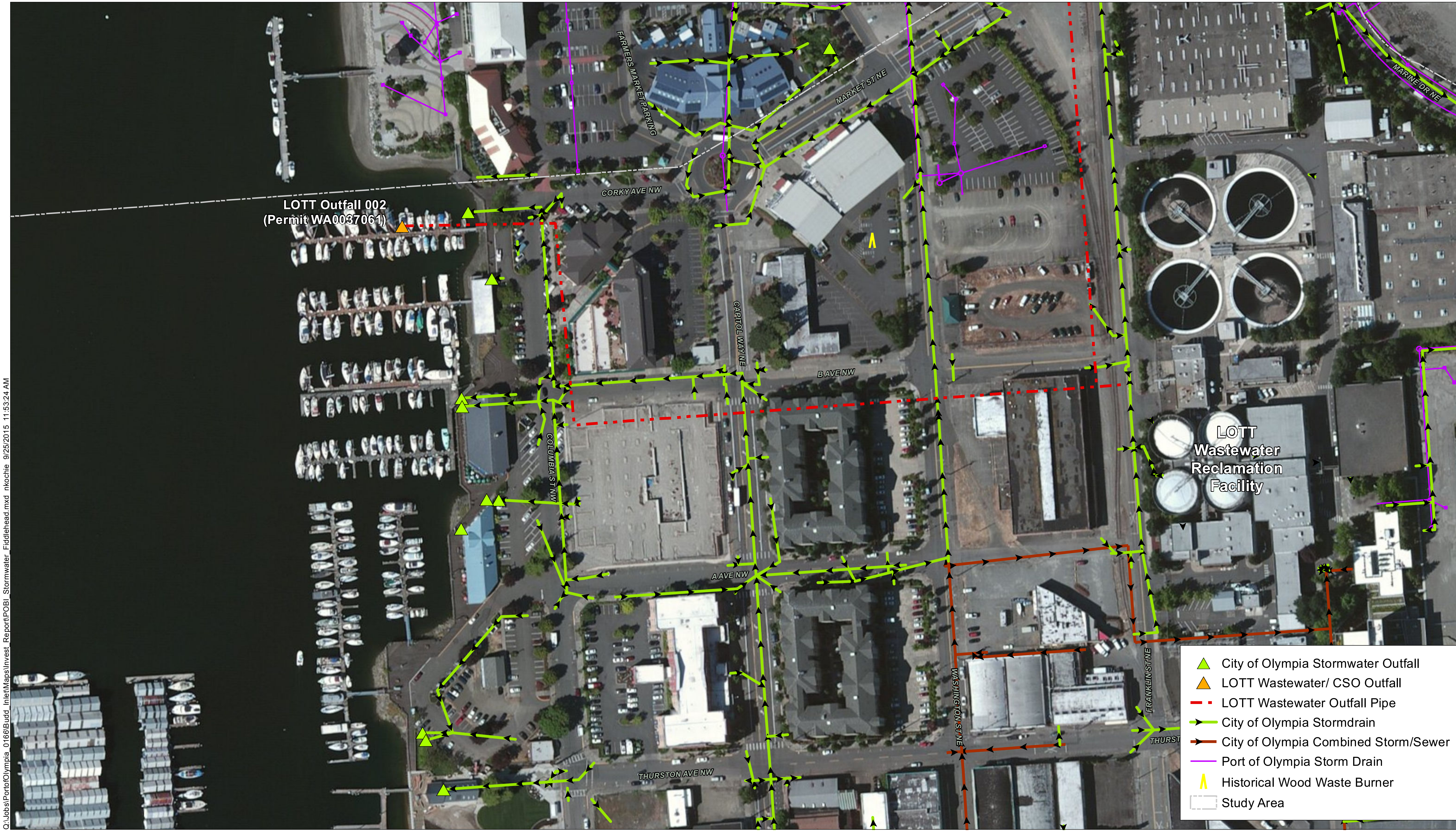
ANCHOR QEA

Feet
0 100 200 300 400

Figure 6-1d
Drainage Area for Outfalls Adjacent to Hardel Mutual Plywood
Budd Inlet Investigation Report
Port of Olympia



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ANCHOR QEA

Feet
0 75 150 225 300

Figure 6-1e
Drainage Area for Outfalls Near Fiddlehead Marina
Budd Inlet Investigation Report
Port of Olympia

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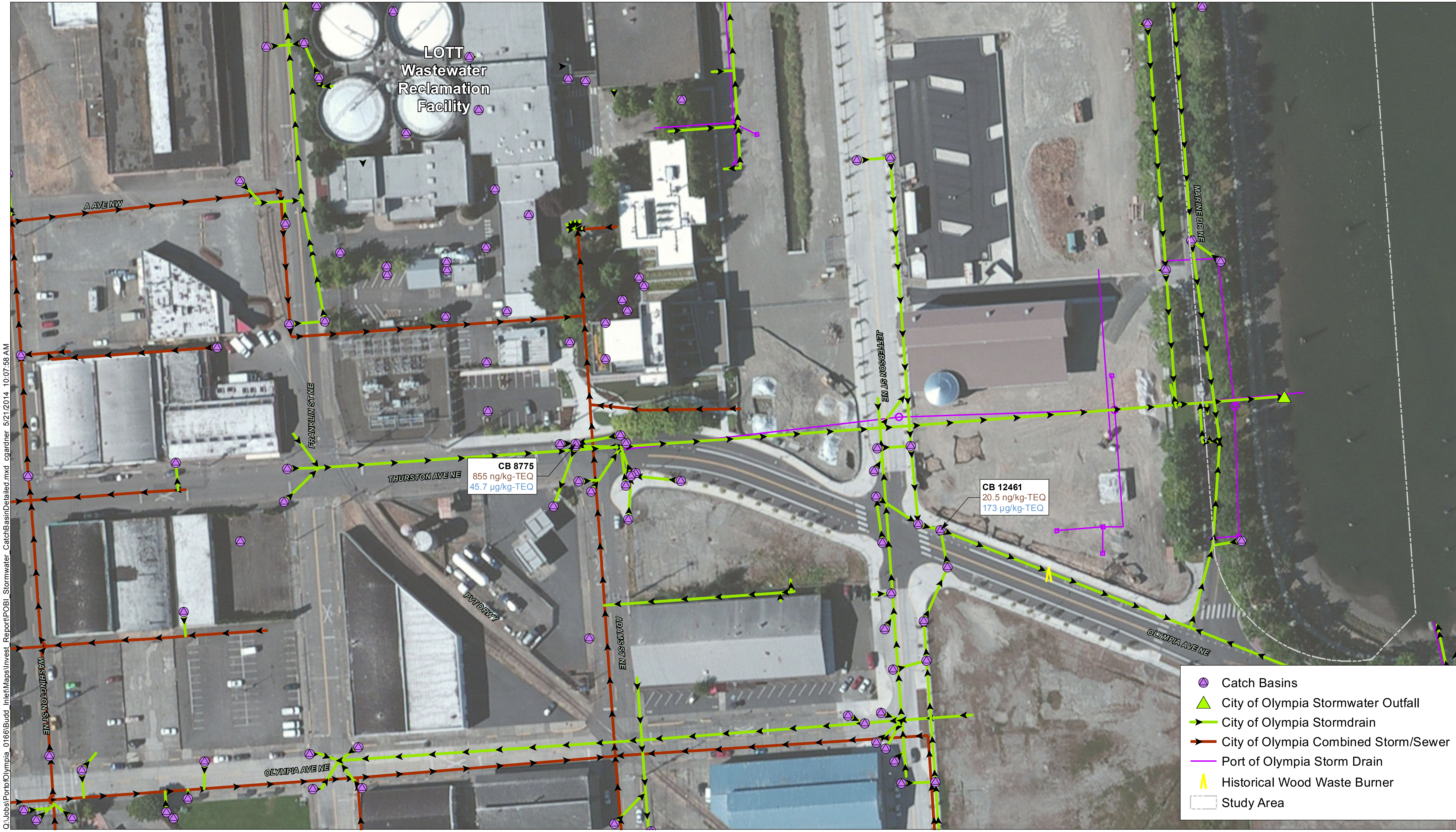
Feet
0 500 1,000 1,500 2,000

NOTES:
1. Dioxin/Furan concentrations shown in brown.
2. cPAH concentrations shown in blue.

Figure 6-2a
Catch Basin Sampling Overview
Budd Inlet Investigation Report
Port of Olympia



ANCHOR QEA

Feet
0 50 100 150 200

NOTES:
1. Dioxin/Furan concentrations shown in brown.
2. cPAH concentrations shown in blue.

Figure 6-2b
Catch Basin Sampling Detail - East Bay near East Bay Redevelopment Site
Budd Inlet Sediment Site
Port of Olympia

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ANCHOR QEA

Feet
0 50 100 150 200

NOTES:
1. Dioxin/Furan concentrations shown in brown.
2. cPAH concentrations shown in blue.

Figure 6-2c
Catch Basin Sampling Detail - East Bay near Moxlie Creek Outfall
Budd Inlet Sediment Site
Port of Olympia

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ANCHOR QEA

Feet
0 50 100 150 200

NOTES:
1. Dioxin/Furan concentrations shown in brown.
2. cPAH concentrations shown in blue.

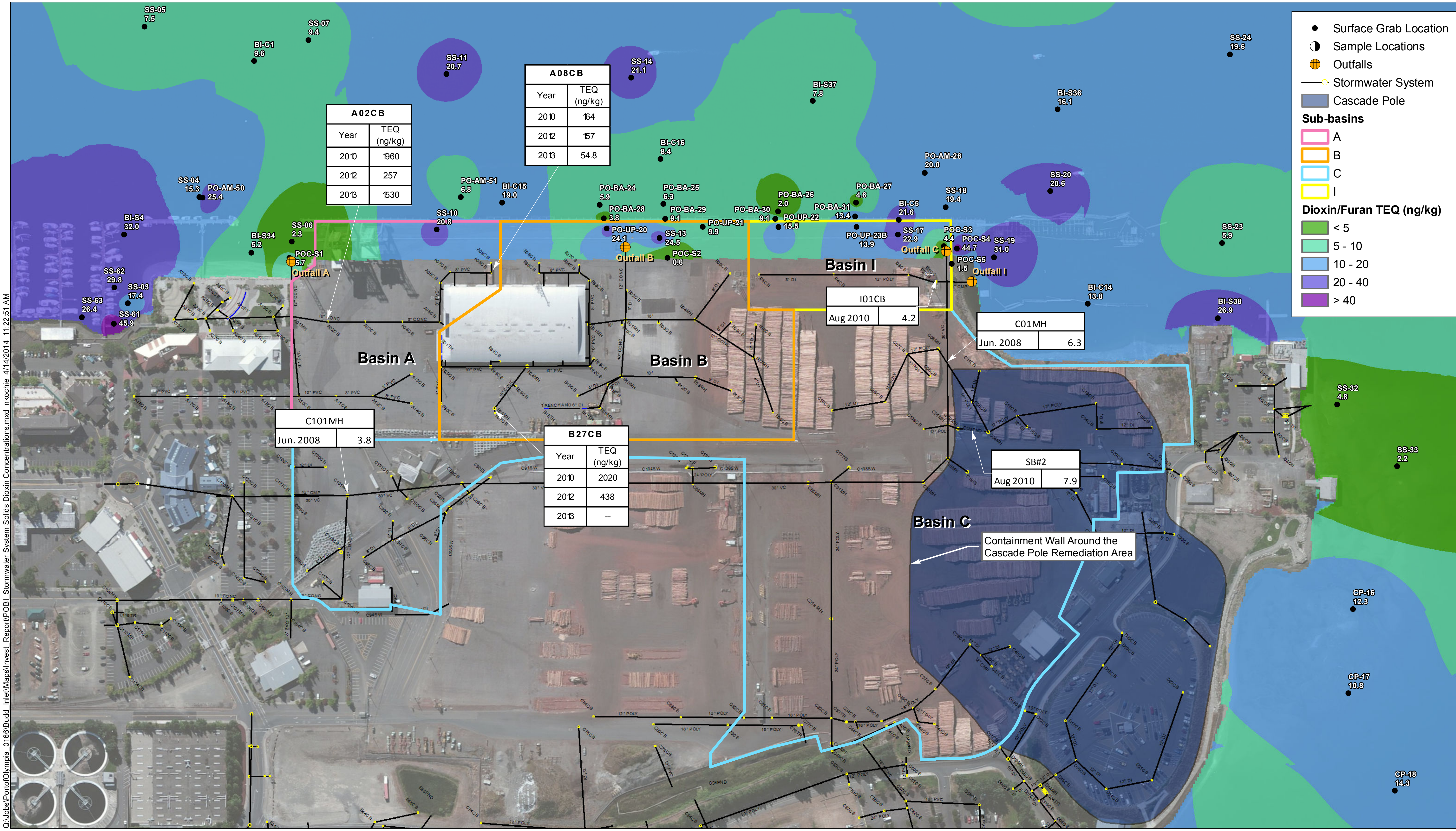
Figure 6-2d
Catch Basin Sampling Detail - West Bay near West Bay Park
Budd Inlet Sediment Site
Port of Olympia

ANCHOR QEA

Feet
0 50 100 150 200

NOTES:
1. Dioxin/Furan concentrations shown in brown.
2. cPAH concentrations shown in blue.

Figure 6-2e
Catch Basin Sampling Detail - West Bay near Hardel Mutual Plywood
Budd Inlet Sediment Site
Port of Olympia



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ANCHOR QEA

Data are total Dioxin/Furan TEQ (Mammal, U=0) in ng/kg.
Sample from C01MH was taken out of the storm drain line that drains to outfall C.

Feet
0 125 250 375 500

Figure 6-3
Stormwater System Layout and Dioxin/Furan Concentrations
Budd Inlet Investigation Report
Port of Olympia

Source: Unknown

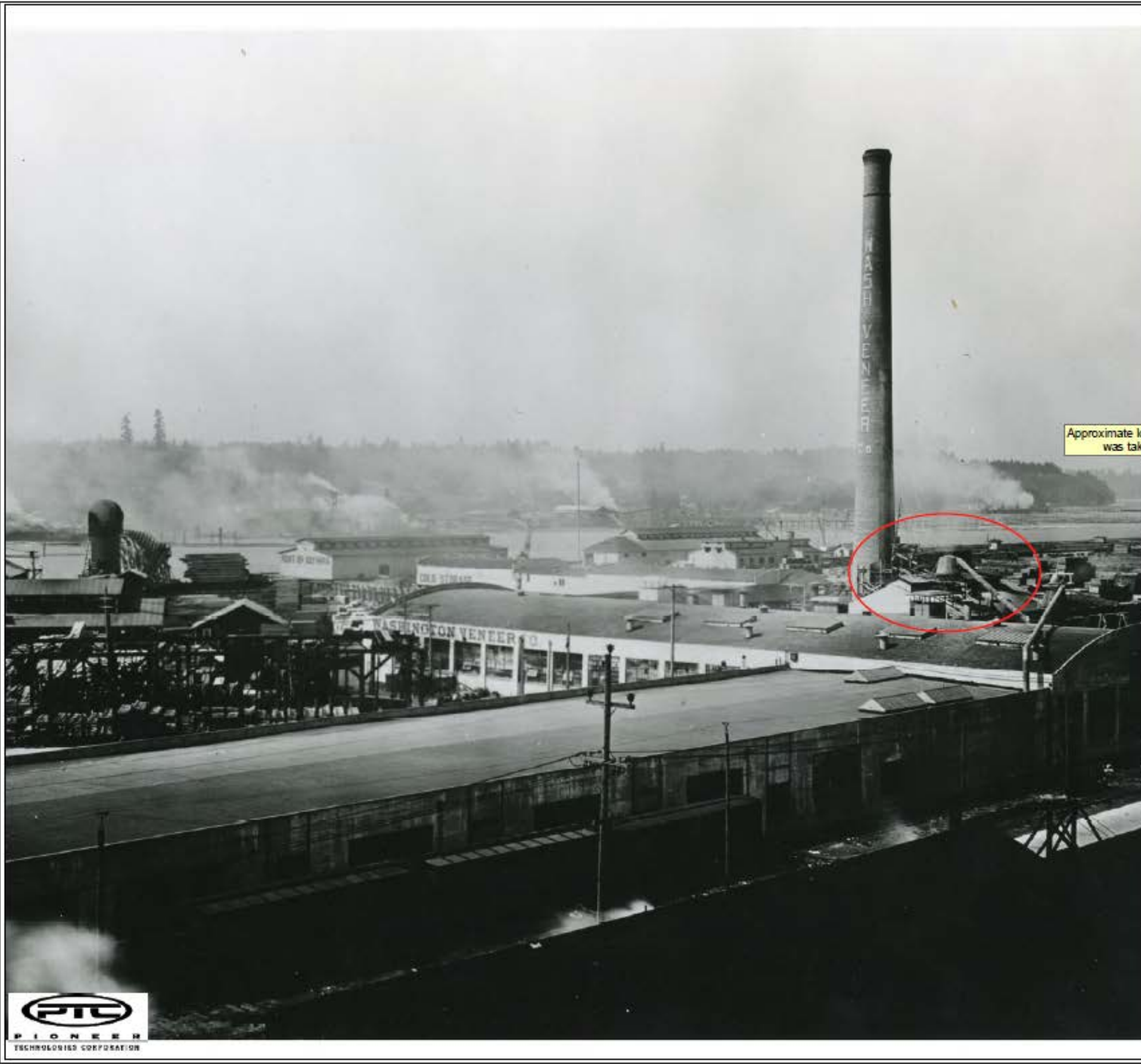
\\Fuji\d\Anchor\Projects\Port of Olympia\Budd Inlet Cleanup\Investigation_Report\Figures\Fig6-4a_Aerial Photograph of Solid Wood Inc.docx

Figure 6-4a
Historic Photograph of Wood Waste Burner – Solid Wood, Inc.
Budd Inlet Investigation Report
Port of Olympia

Source: http://www.delsonlumber.com/about.html, 2013

ANCHOR QEA

Figure 6-4b
Historic Photograph of Wood Waste Burner – Delson Lumber Mill on West Bay Drive, circa 1970
Budd Inlet Investigation Report
Port of Olympia



Notes:

This photo is not of the East Bay Site but of the former Washington Veneer Company which was about 1000 feet northwest of the Site.

Photo from the Washington State Archives.

Historical Aerial Photograph of Site Vicinity Looking Northwest
East Bay Site Boundary Technical Memorandum

Port of Olympia
November 2010

Figure B-1

Source: Pioneer, 2010b

Figure 6-4c
Historic Photograph of Wood Waste Burner – Washington Veneer
Budd Inlet Investigation Report
Port of Olympia

Notes:

Photo from the Washington State Archives

Historical Aerial Photograph of Site Vicinity Looking Northeast
East Bay Site Boundary Technical Memorandum

Port of Olympia
November 2010

Figure B-2

Source: Pioneer, 2010b

\\Fuji\d\Anchor\Projects\Port of Olympia\Budd Inlet Cleanup\Investigation_Report\Figures\Fig6-4d_East Bay Redevelopment Site.docx

Figure 6-4d
Historic Photograph of Wood Waste Burner – East Bay Redevelopment Site
Budd Inlet Investigation Report
Port of Olympia

Notes:

The East Bay Site is not in this photo. It is located about 1000 ft to the southeast.

Photo is from the Washington State Archives.

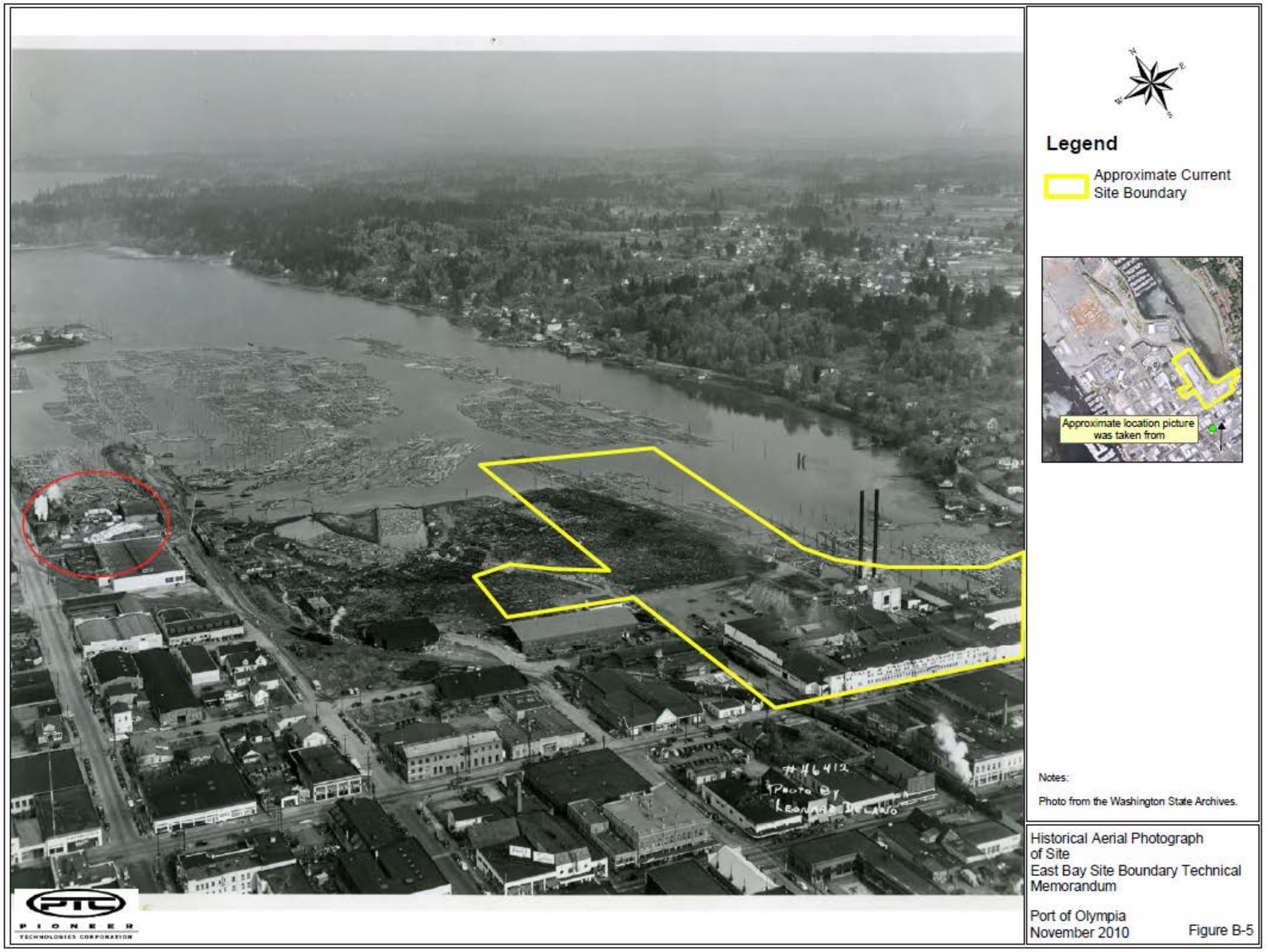
Historical Aerial Photograph of Site Vicinity Looking East
East Bay Site Boundary Technical Memorandum

Port of Olympia
November 2010

Figure B-4

Source: Pioneer, 2010b

Figure 6-4e
Historic Photograph of Wood Waste Burner – Cascade Pole Site
Budd Inlet Investigation Report
Port of Olympia



Source: Pioneer, 2010b

Figure 6-4f
Historic Photograph of Wood Waste Burner – Unknown Operator Site
Budd Inlet Investigation Report
Port of Olympia

Source: Source: Aero-Metric, Seattle

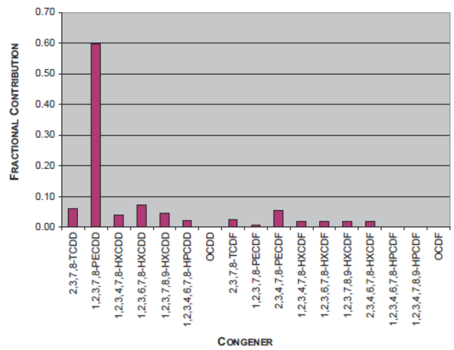
\\Fuji\d\Anchor\Projects\Port of Olympia\Budd Inlet Cleanup\Investigation_Report\Figures\Fig6-5a_Historic_Photos_1946.docx

Figure 6-5a
Historic Photograph of Northern Berth Area Pit, circa 1946
Budd Inlet Investigation Report
Port of Olympia

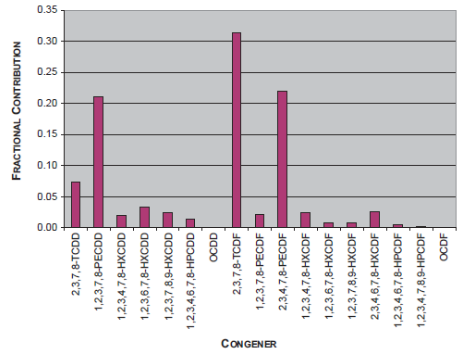
Source: Aero-Metric, Seattle

\\Fuji\d\Anchor\Projects\Port of Olympia\Budd Inlet Cleanup\Investigation_Report\Figures\Fig6-5b_Historic_Photos_1960.docx

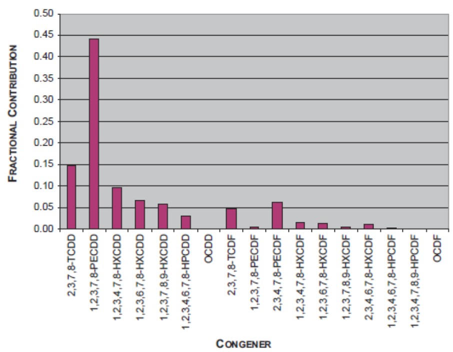
Figure 6-5b
Historic Photograph of Northern Berth Area Pit, circa 1960
Budd Inlet Investigation Report
Port of Olympia



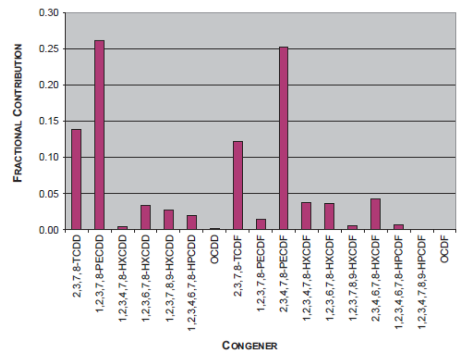
Rayonier Hog Fuel Boiler – 1995(a)



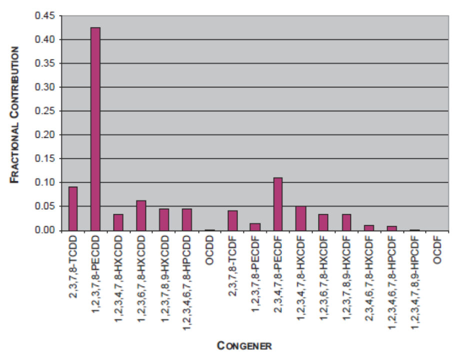
Rayonier Hog Fuel Boiler – 1995(b)



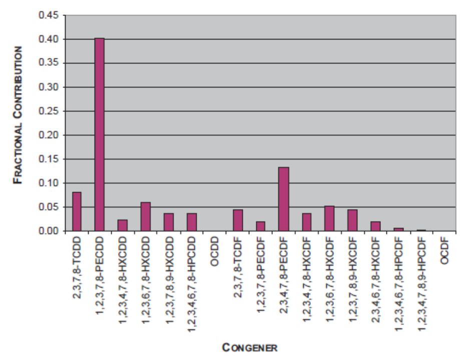
Rayonier Hog Fuel Boiler Ash - 1989



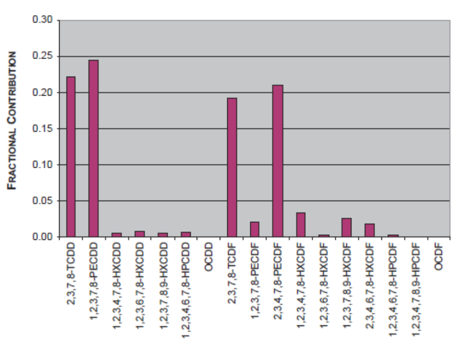
Nippon Hog Fuel Boiler Ash - 2009



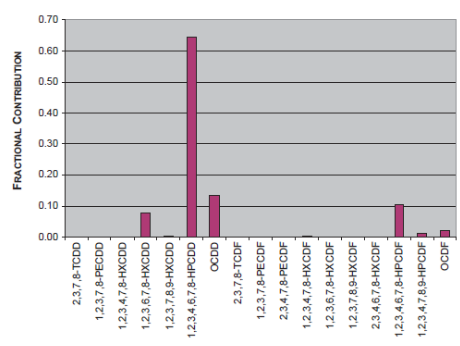
Canadian Hog Fuel Boiler 1 - 2007



Canadian Hog Fuel Boiler 2 - 2007



Canadian Hog Fuel Boiler 3 - 2007



Pentachlorophenol

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Source: Rayonier Mill Off-Property Soil Dioxin Study, Prepared by Ecology and Environment, Inc., for Washington State Department of Ecology Toxics Cleanup Program, June 2011.

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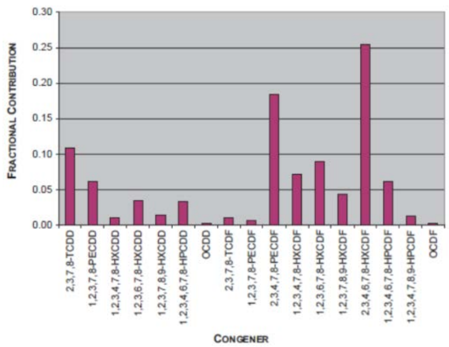
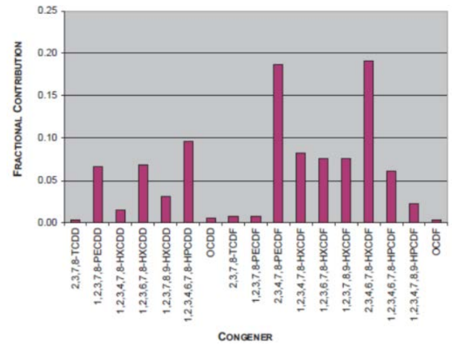
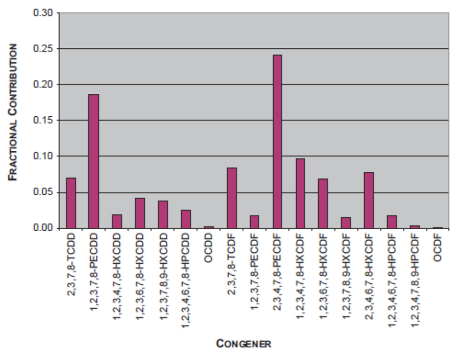


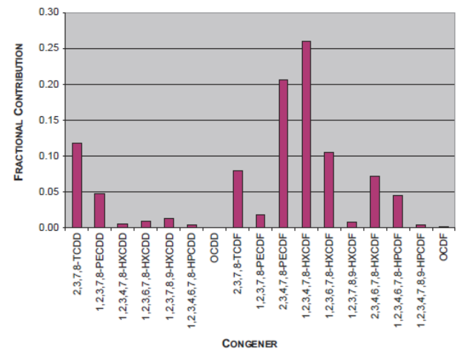
WA Medical Waste



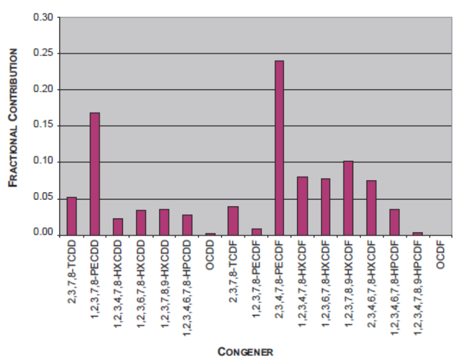
WA Medical Waste



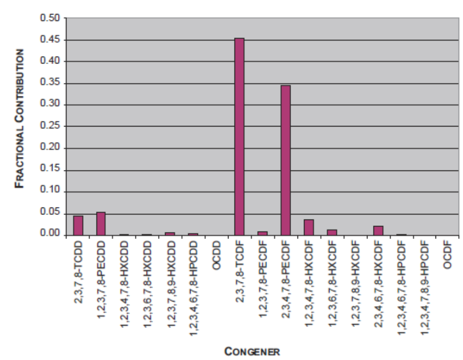
Municipal Waste Incinerator



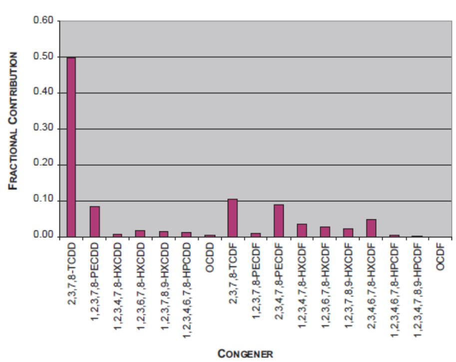
Hazardous Waste Incinerator



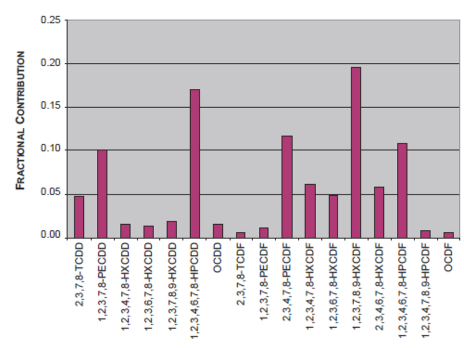
Crematorium



Sewage Sludge Incinerator



Tire Combustion



Truck Diesel

Source: Rayonier Mill Off-Property Soil Dioxin Study, Prepared by Ecology and Environment, Inc., for Washington State Department of Ecology Toxics Cleanup Program, June 2011.

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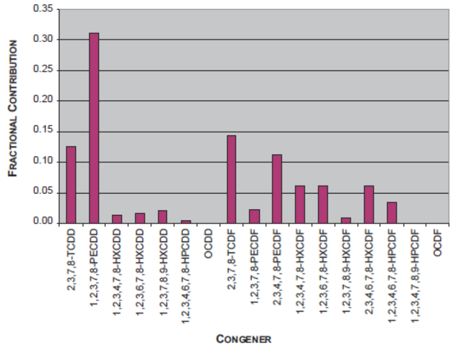
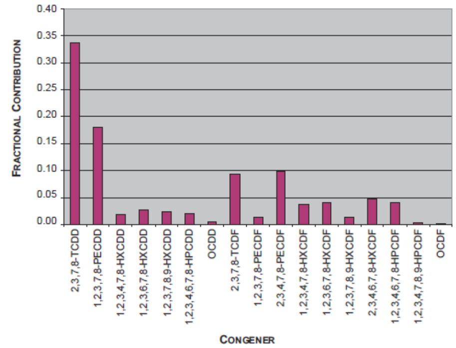
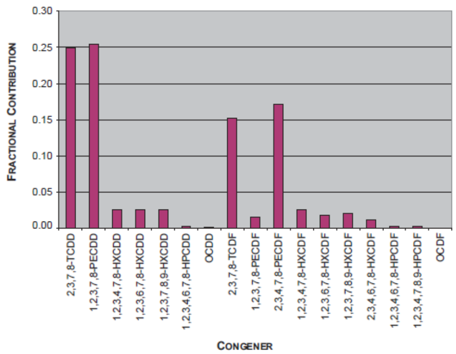


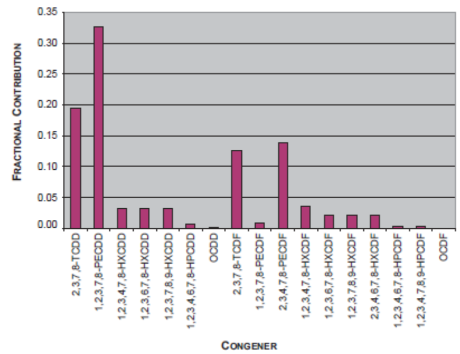
Car Leaded Gas



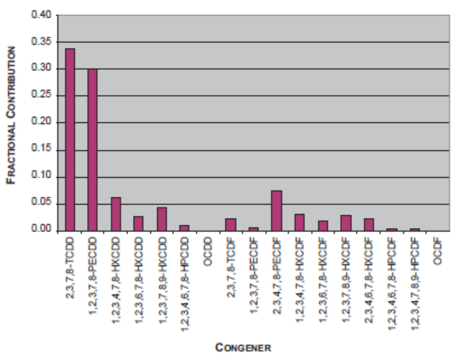
Car Unleaded Gas, Catalytic Converter



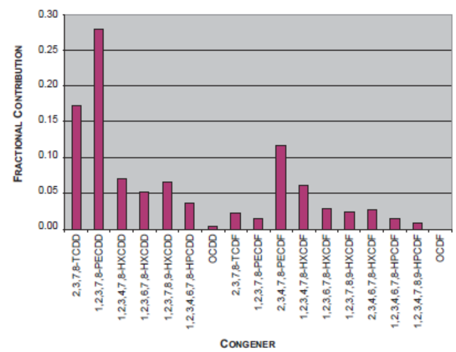
Residential Wood Burning 1



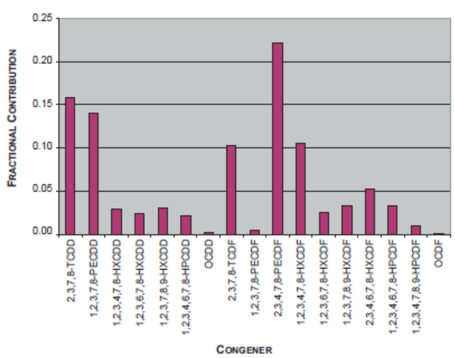
Residential Wood Burning 2



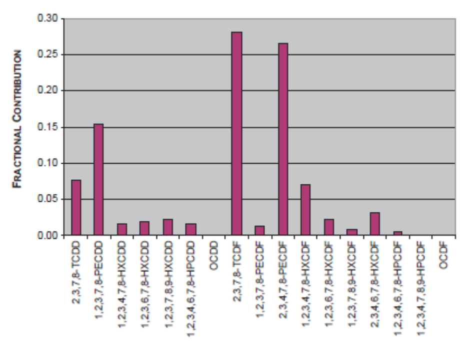
Oil-fired Boiler 1



Oil-fired Boiler 2



Coal Utility/Industrial Boiler



Cement Kiln

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Source: Rayonier Mill Off-Property Soil Dioxin Study, Prepared by Ecology and Environment, Inc., for Washington State Department of Ecology Toxics Cleanup Program, June 2011.

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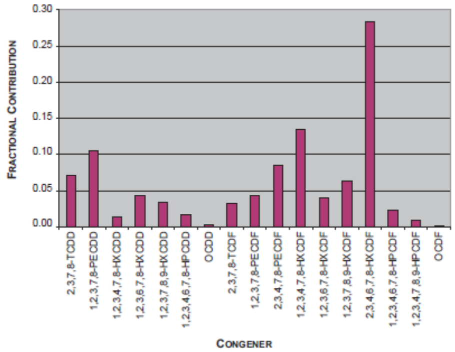
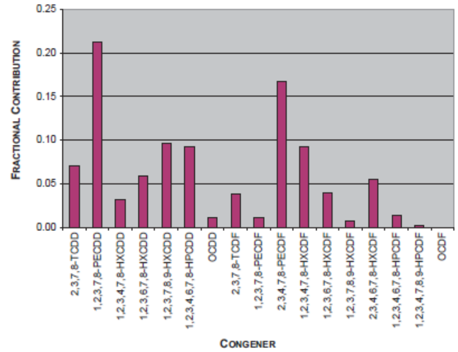
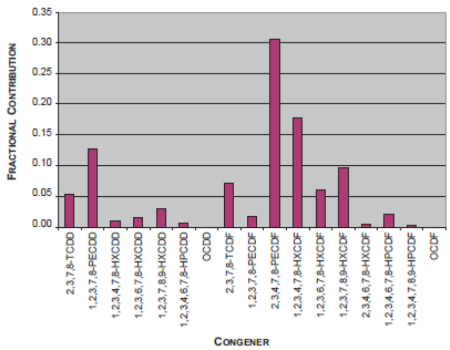


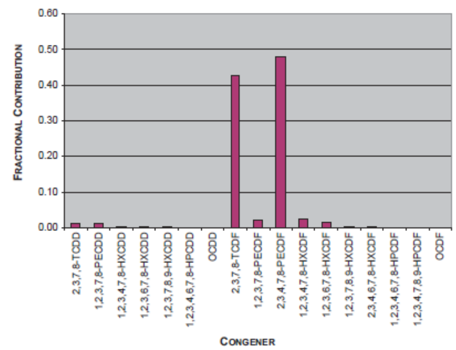
Asphalt Plant



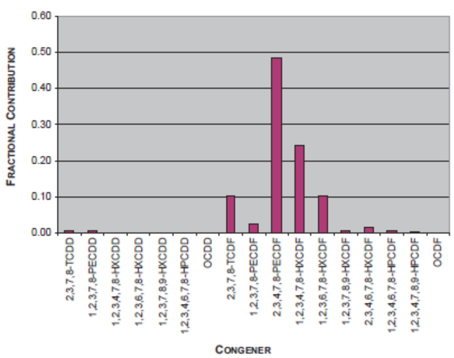
Forest Fire



Household Burn Barrel



PCB 1248



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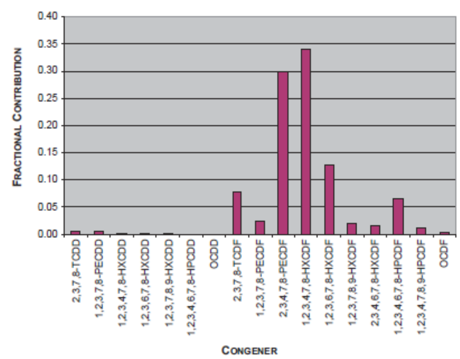

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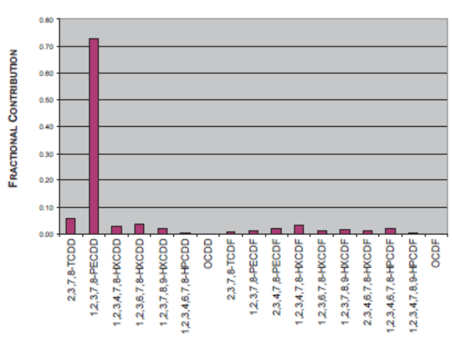

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Source: Rayonier Mill Off-Property Soil Dioxin Study, Prepared by Ecology and Environment, Inc., for Washington State Department of Ecology Toxics Cleanup Program, June 2011.

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Reference Profiles
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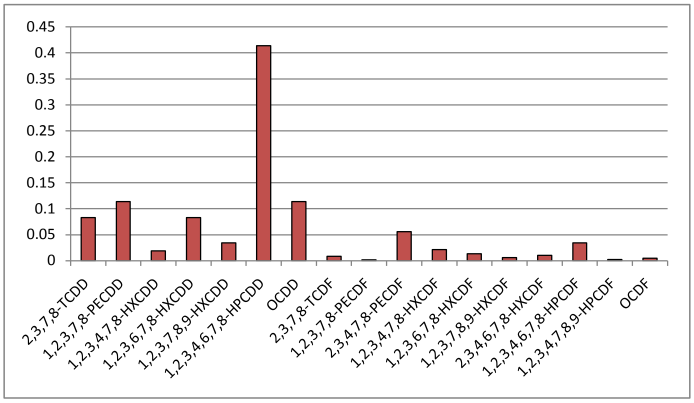

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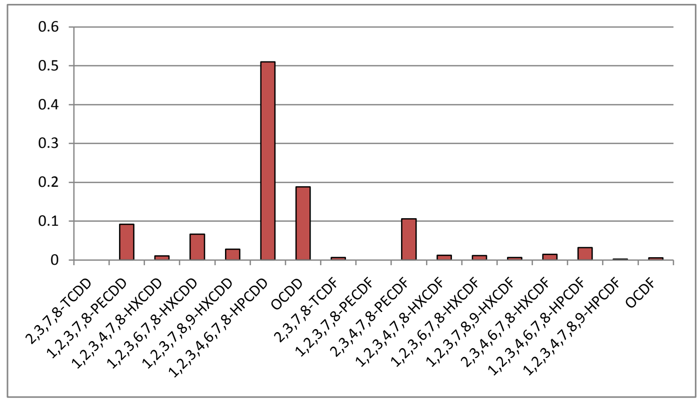
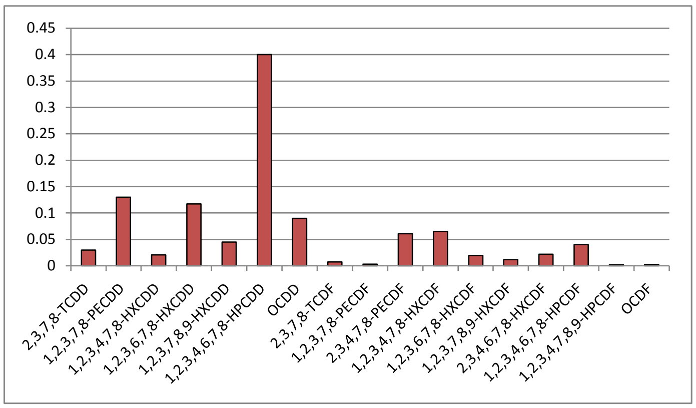


SP16Zone2-2009



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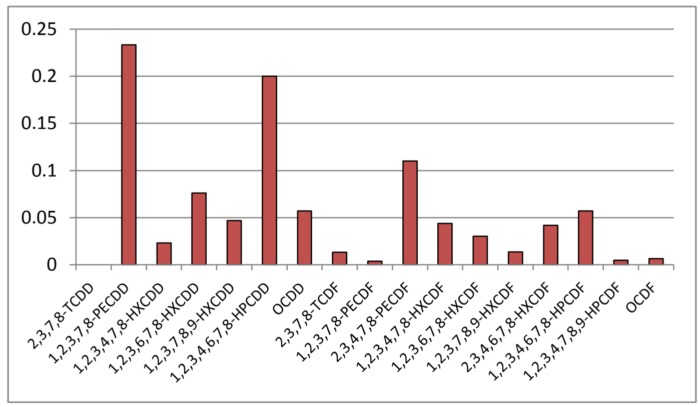
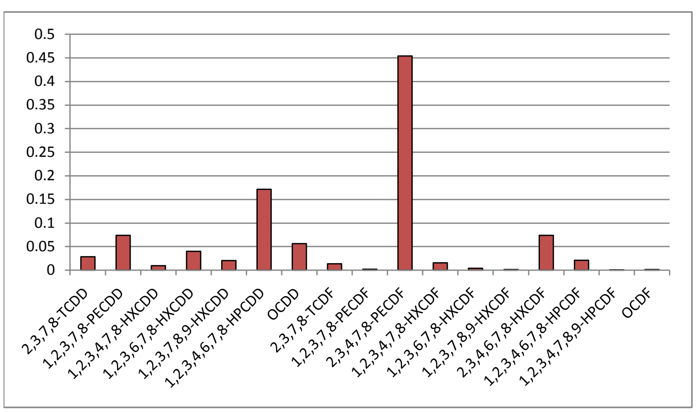
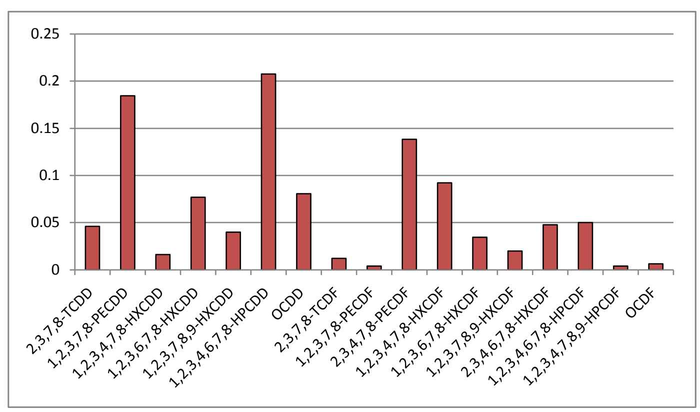


SP02-Zone2-061509



SP07-Zone2-2009



SP03-Zone2-061609

Note: y-axis is fractional contribution

Source: PIONEER, 2010b. *Site Boundary Technical Memorandum for East Bay Redevelopment Site*. Prepared for the Port of Olympia. November, 2010.

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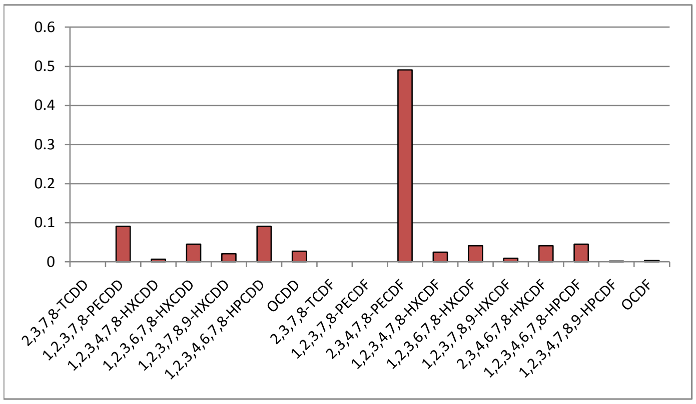
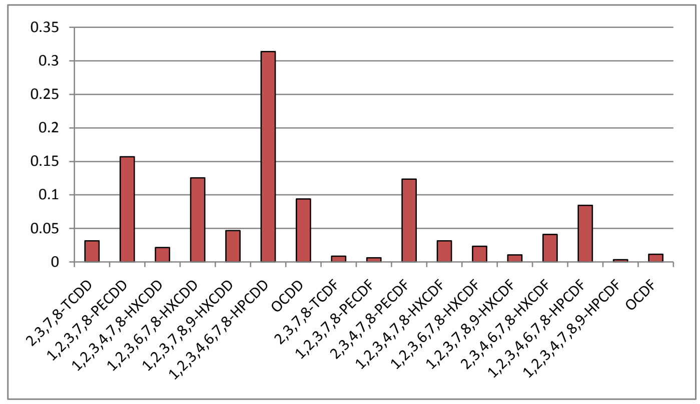
Figure 6-6b (1 of 3)

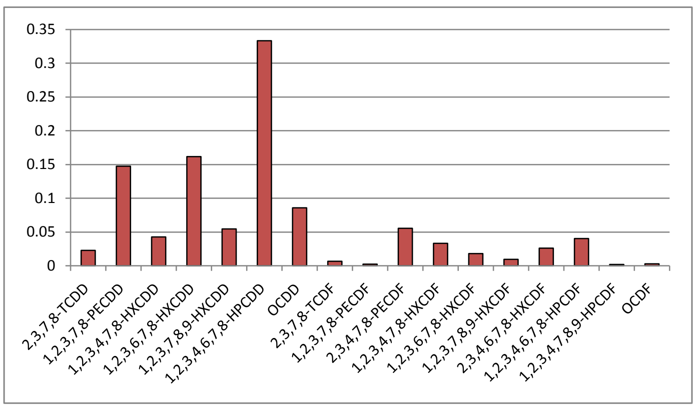
Reference Profiles - East Bay Redevelopment Site Upland Soils



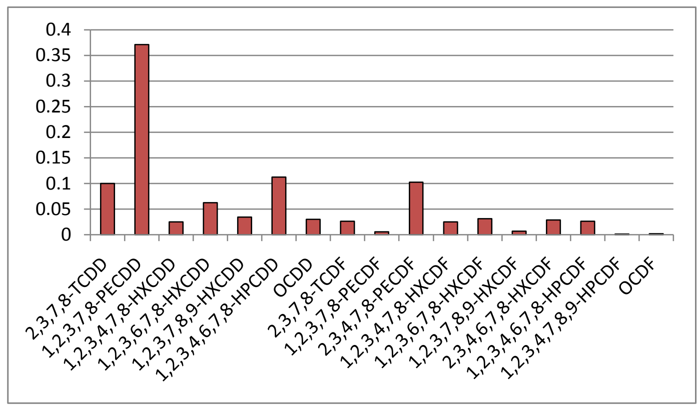
SP10-Zone2-072909



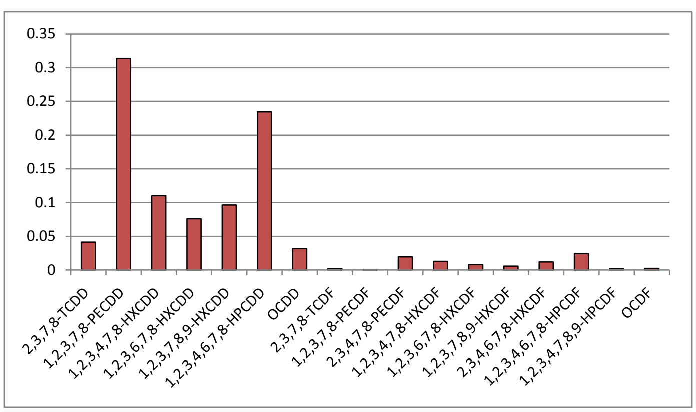
SP24-2-Zone2-092309-2



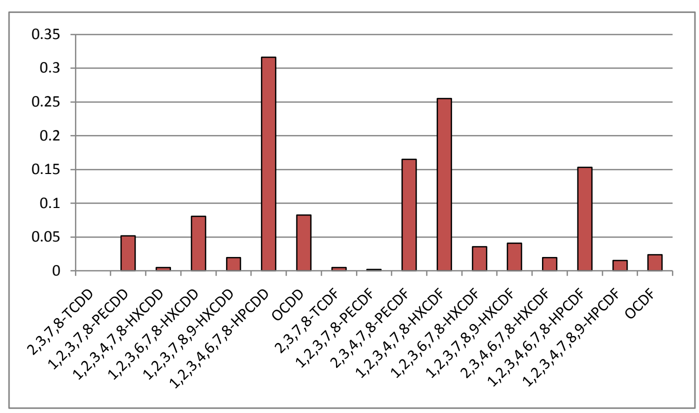
SP28-Zone2-101509



SP22-Zone3-091509



SP05-Zone4-062309



SP17-Zone4-082709

Note: y-axis is fractional contribution

Source: PIONEER, 2010b. *Site Boundary Technical Memorandum for East Bay Redevelopment Site*.
Prepared for the Port of Olympia. November, 2010.

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Figure 6-6b (2 of 3)
Reference Profiles - East Bay Redevelopment Site Upland Soils
Budd Inlet Investigation Report
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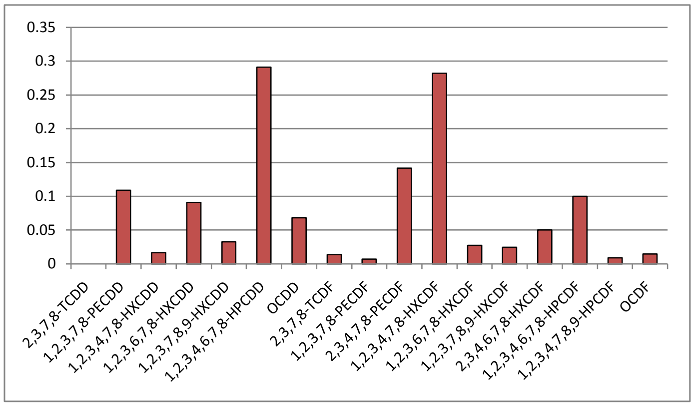

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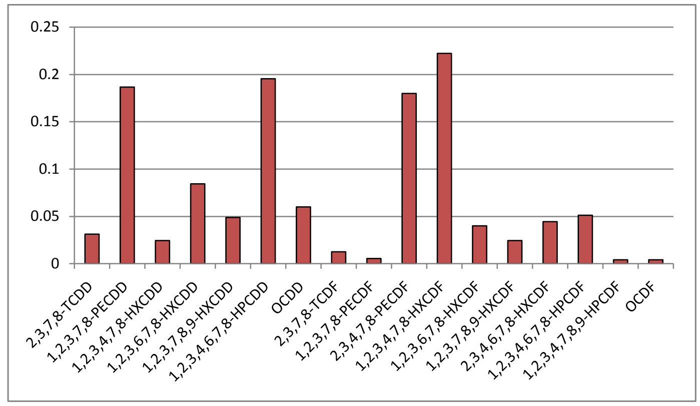

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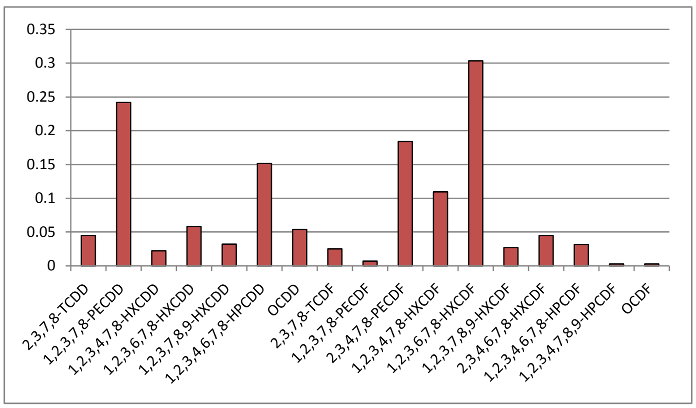

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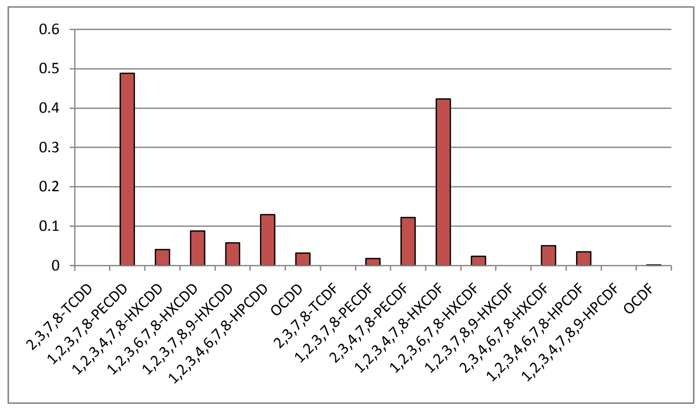

DP-39-061009-3-5

Note: y-axis is fractional contribution

Source: PIONEER, 2010b. *Site Boundary Technical Memorandum for East Bay Redevelopment Site*. Prepared for the Port of Olympia. November, 2010..

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Figure 6-6b (3 of 3)
Reference Profiles - East Bay Redevelopment Site Upland Soils
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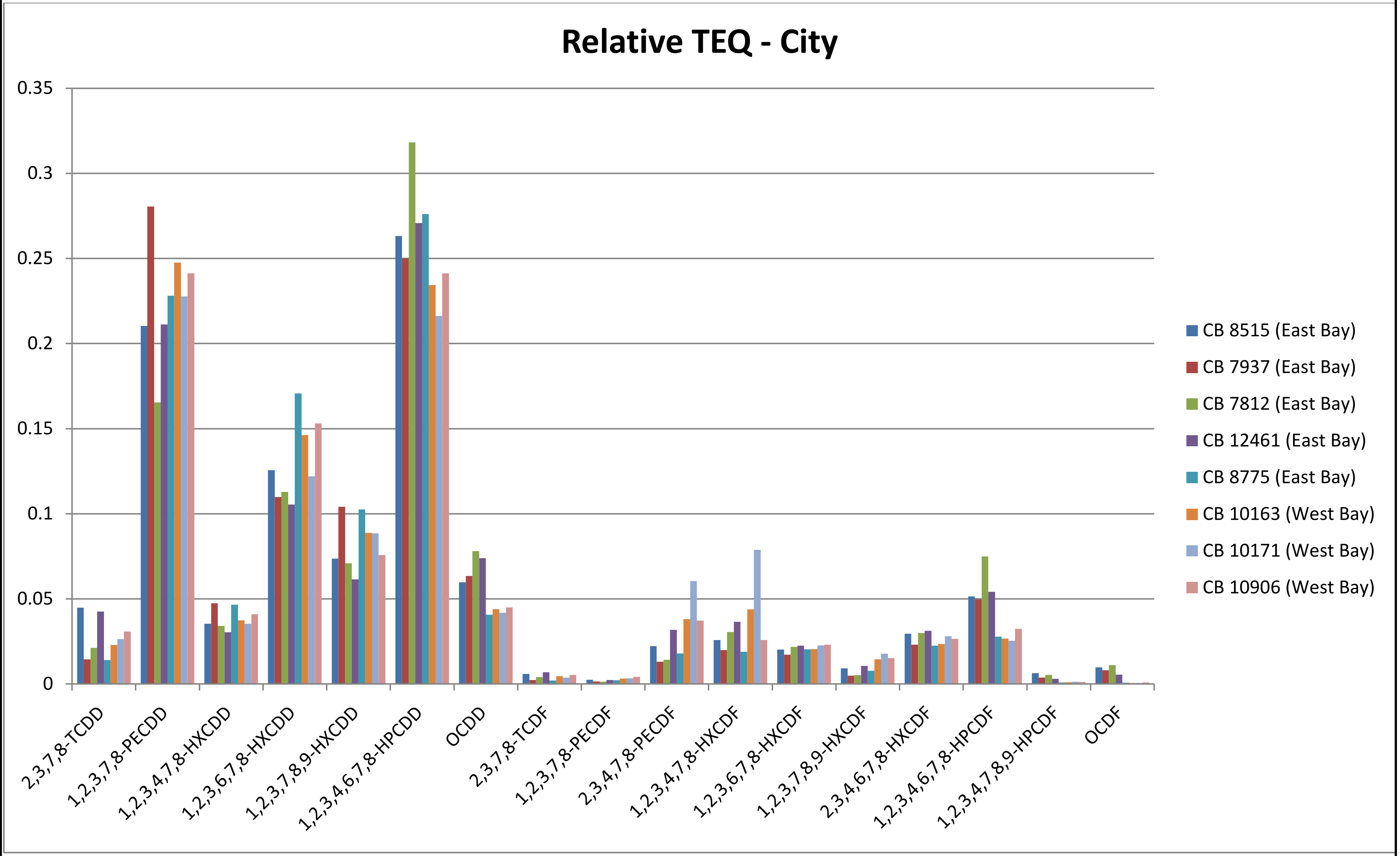

Note: y-axis is fractional contribution

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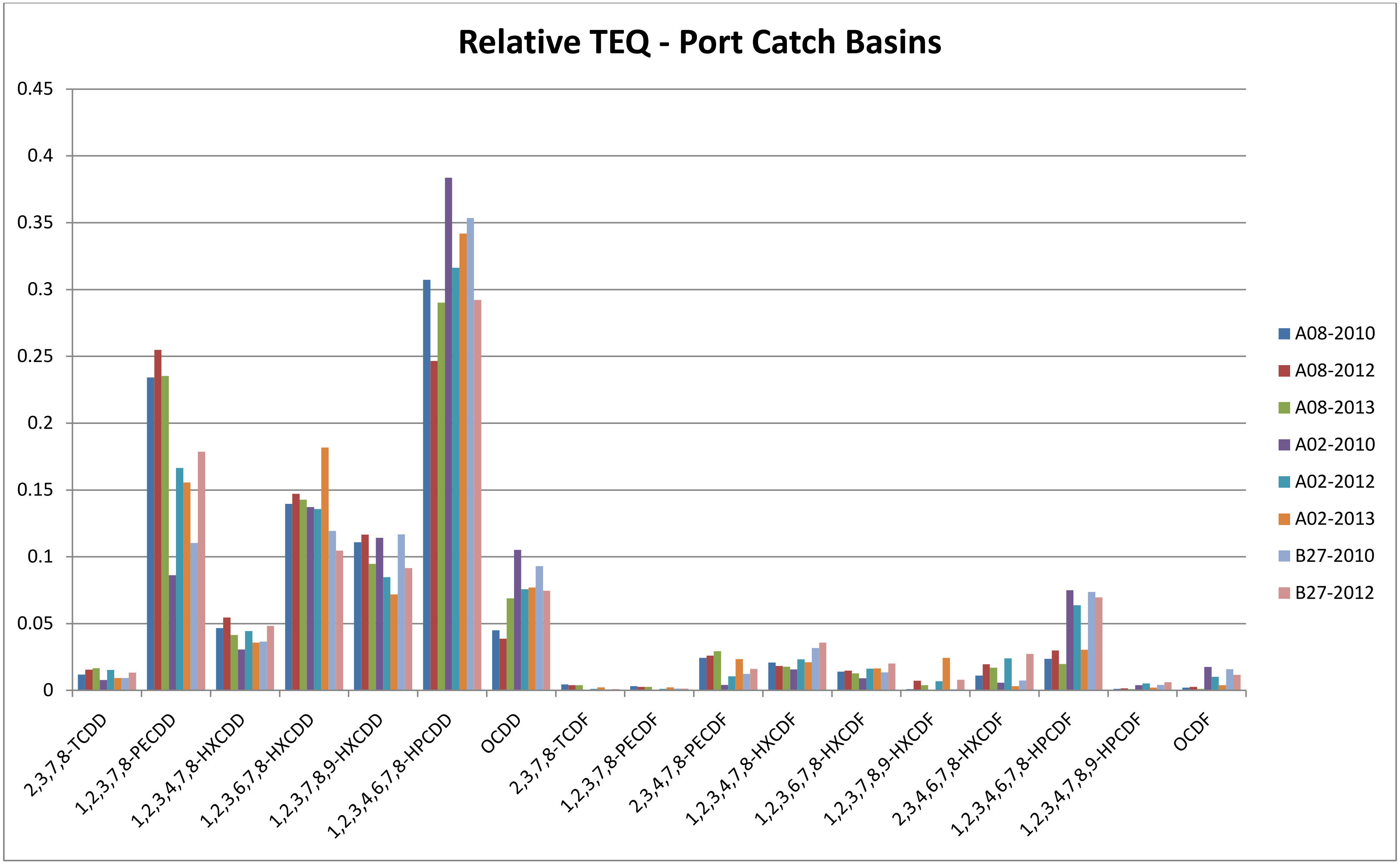
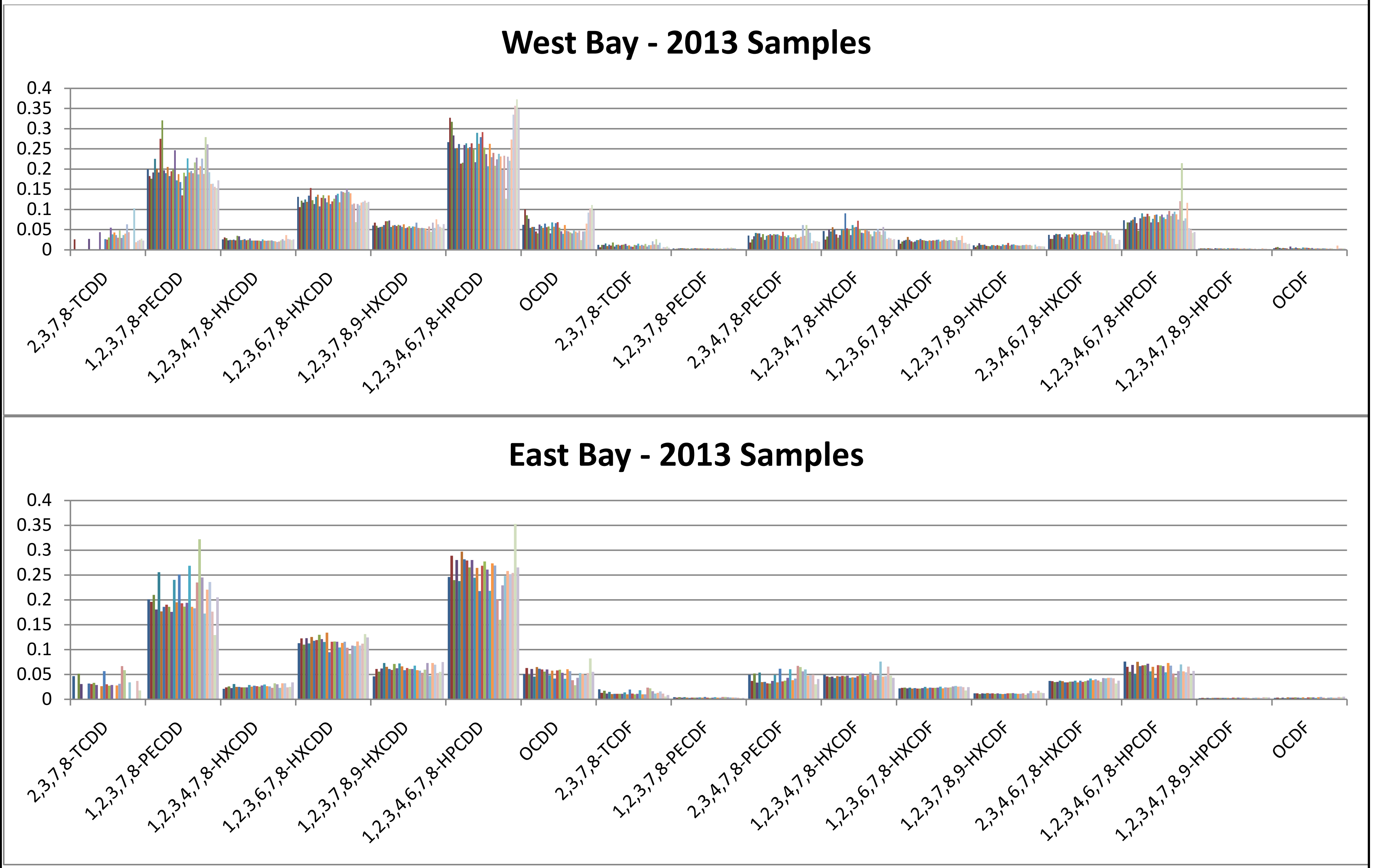
Figure 6-6c
Reference Profiles – Catch Basin Solids (City and Port)
Budd Inlet Investigation Report
Port of Olympia



Note: y-axis is fractional contribution

Figure 6-6c
Reference Profiles – Catch Basin Solids (City and Port)
Budd Inlet Investigation Report
Port of Olympia



Note: y-axis is fractional contribution

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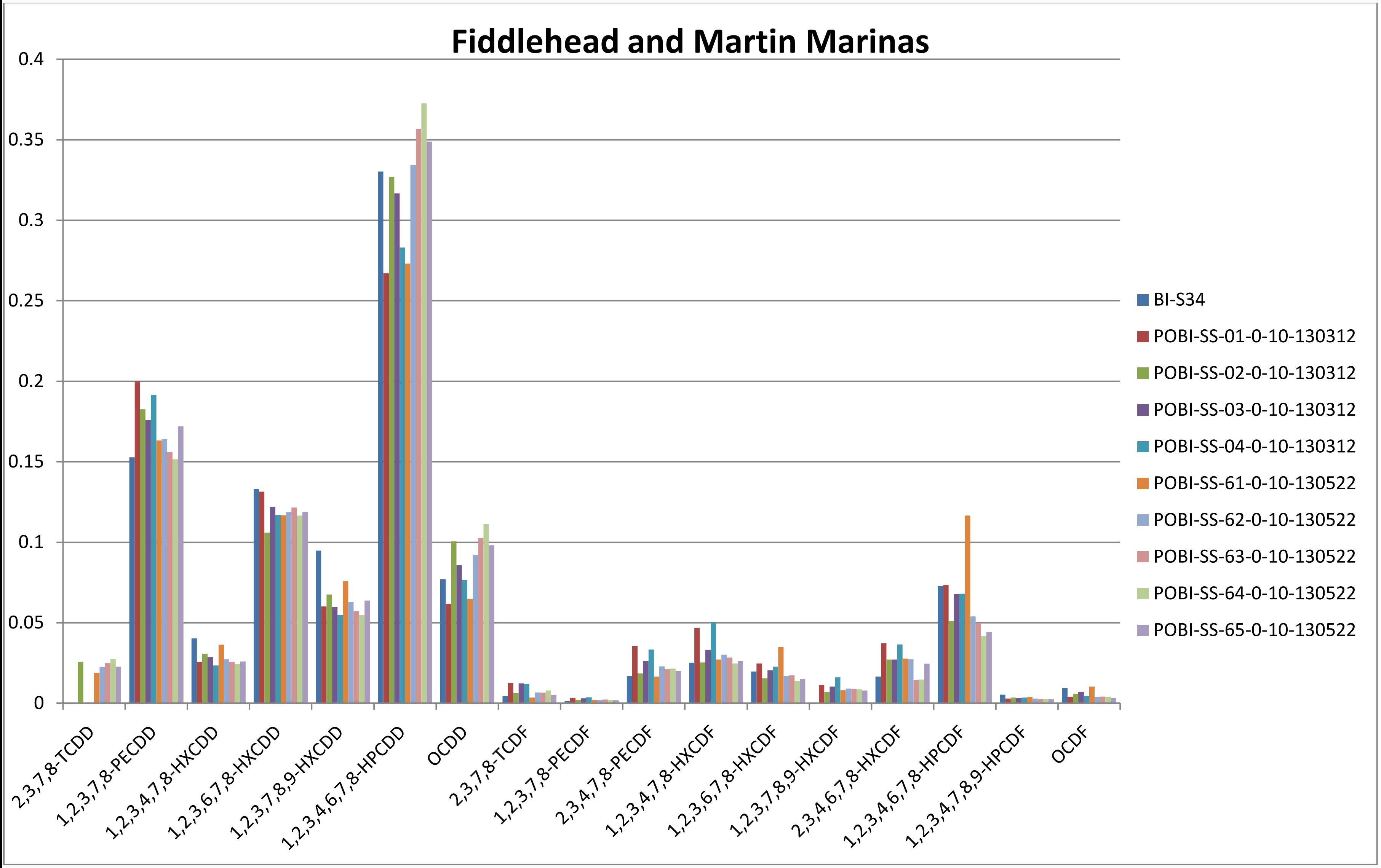
Figure 6-7a
Surface Grab Relative TEQ Profiles – West Bay and East Bay – 2013 Samples
Budd Inlet Investigation Report
Port of Olympia



Note: y-axis is fractional contribution

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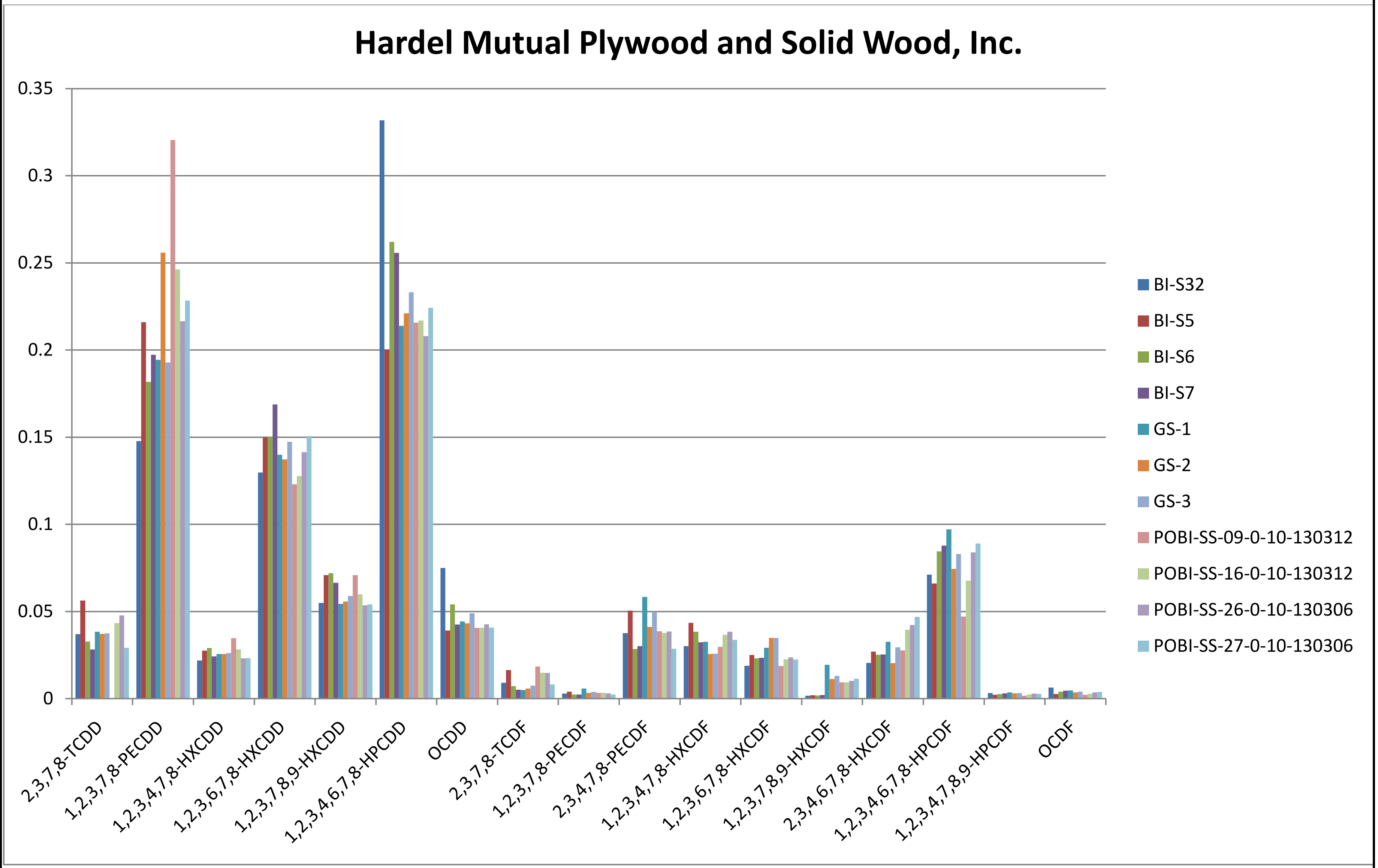
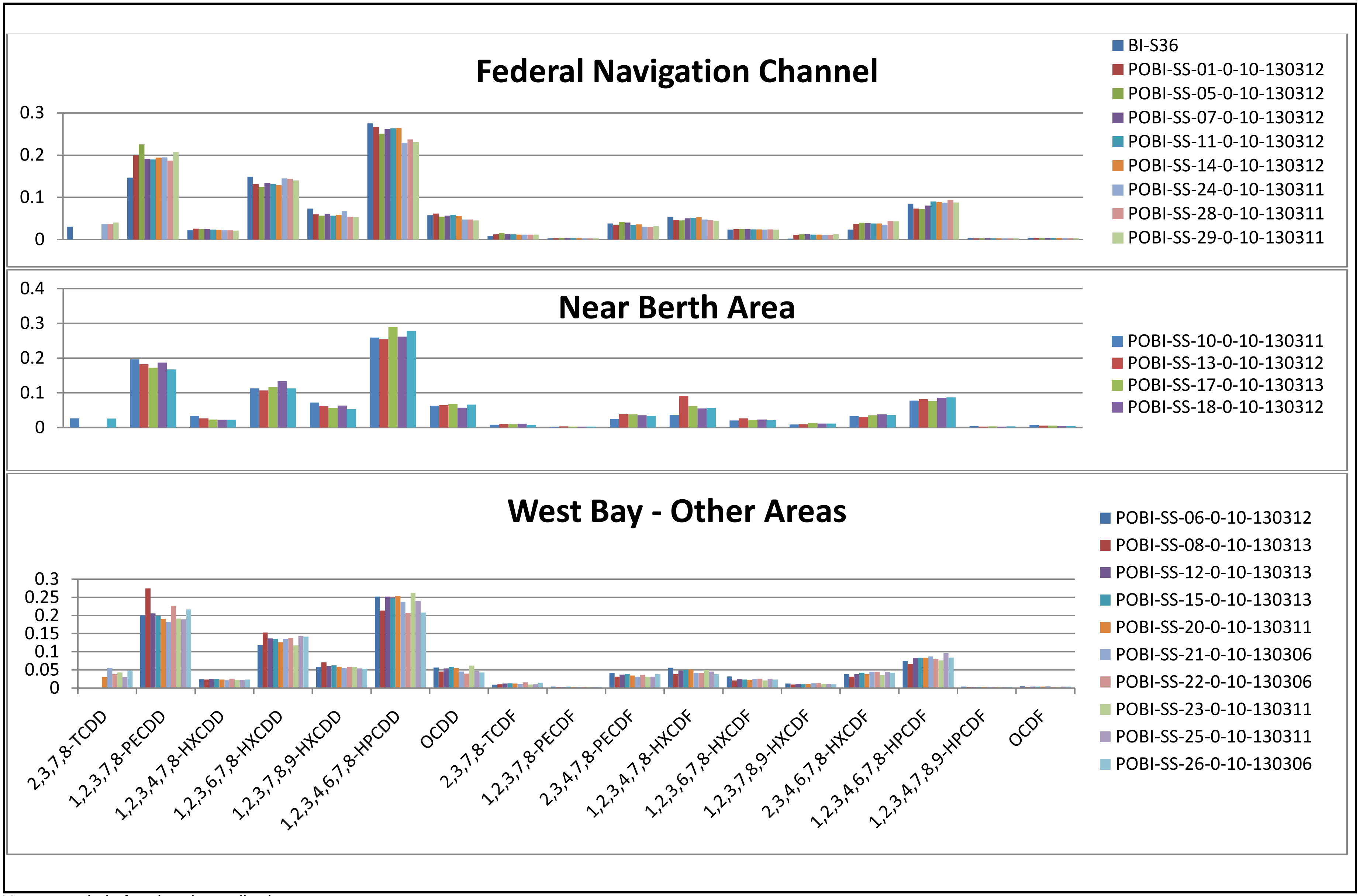
Figure 6-7b
Surface Grab Relative TEQ Profiles - Fiddlehead and Martin Marinas
Budd Inlet Investigation Report
Port of Olympia



Note: y-axis is fractional contribution

Figure 6-7c
Surface Grab Relative TEQ Profiles – Hardel Mutual Plywood and Solid Wood, Inc.
Budd Inlet Investigation Report
Port of Olympia



Note: y-axis is fractional contribution

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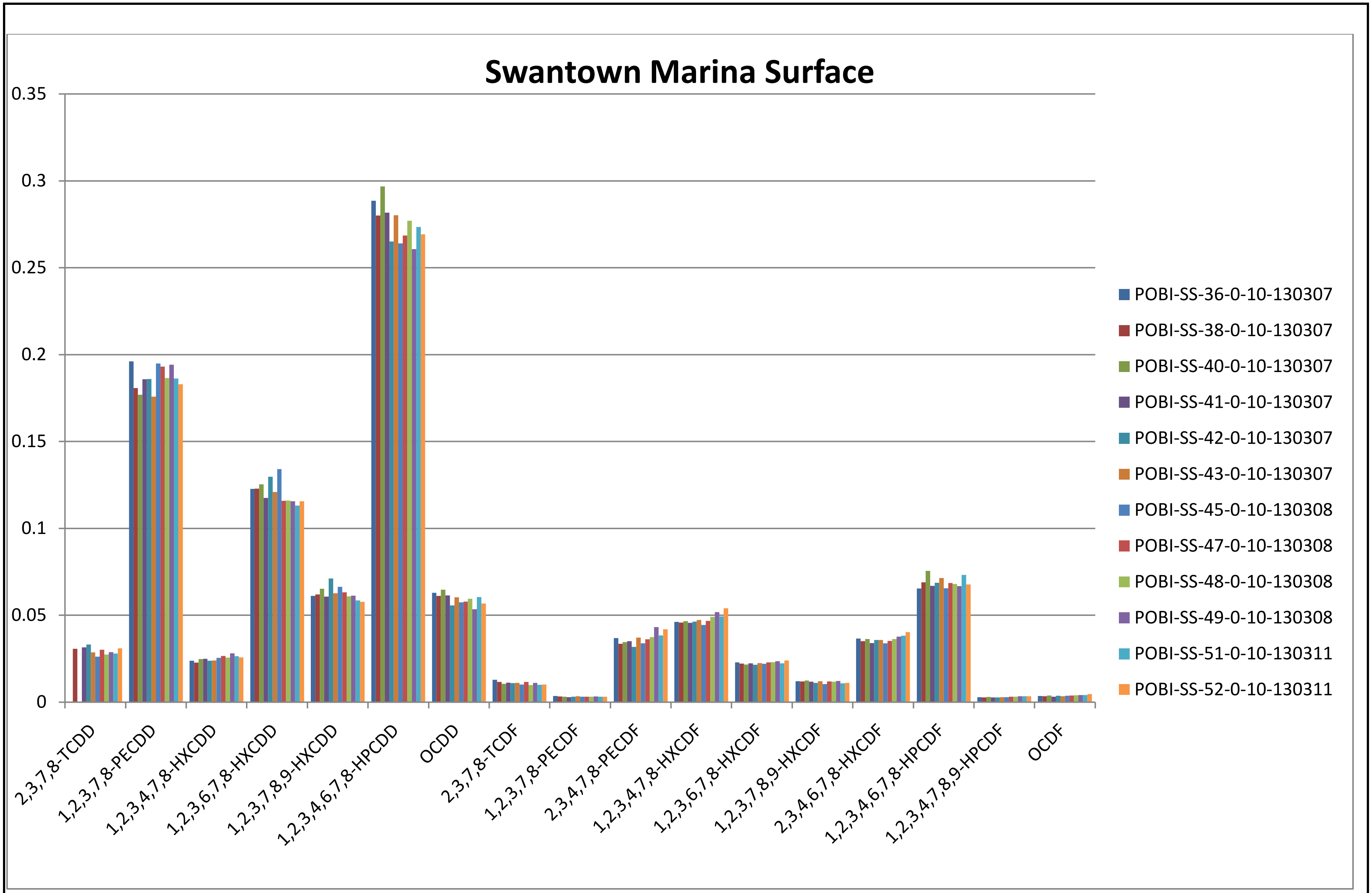
Figure 6-7d
Surface Grab Relative TEQ Profiles – Federal Navigation Channel, Near Berth Area, and West Bay – Other Areas
Budd Inlet Investigation Report
Port of Olympia



Note: y-axis is fractional contribution

Figure 6-7e
Surface Grab Relative TEQ Profiles – Swantown Marina
Budd Inlet Investigation Report
Port of Olympia

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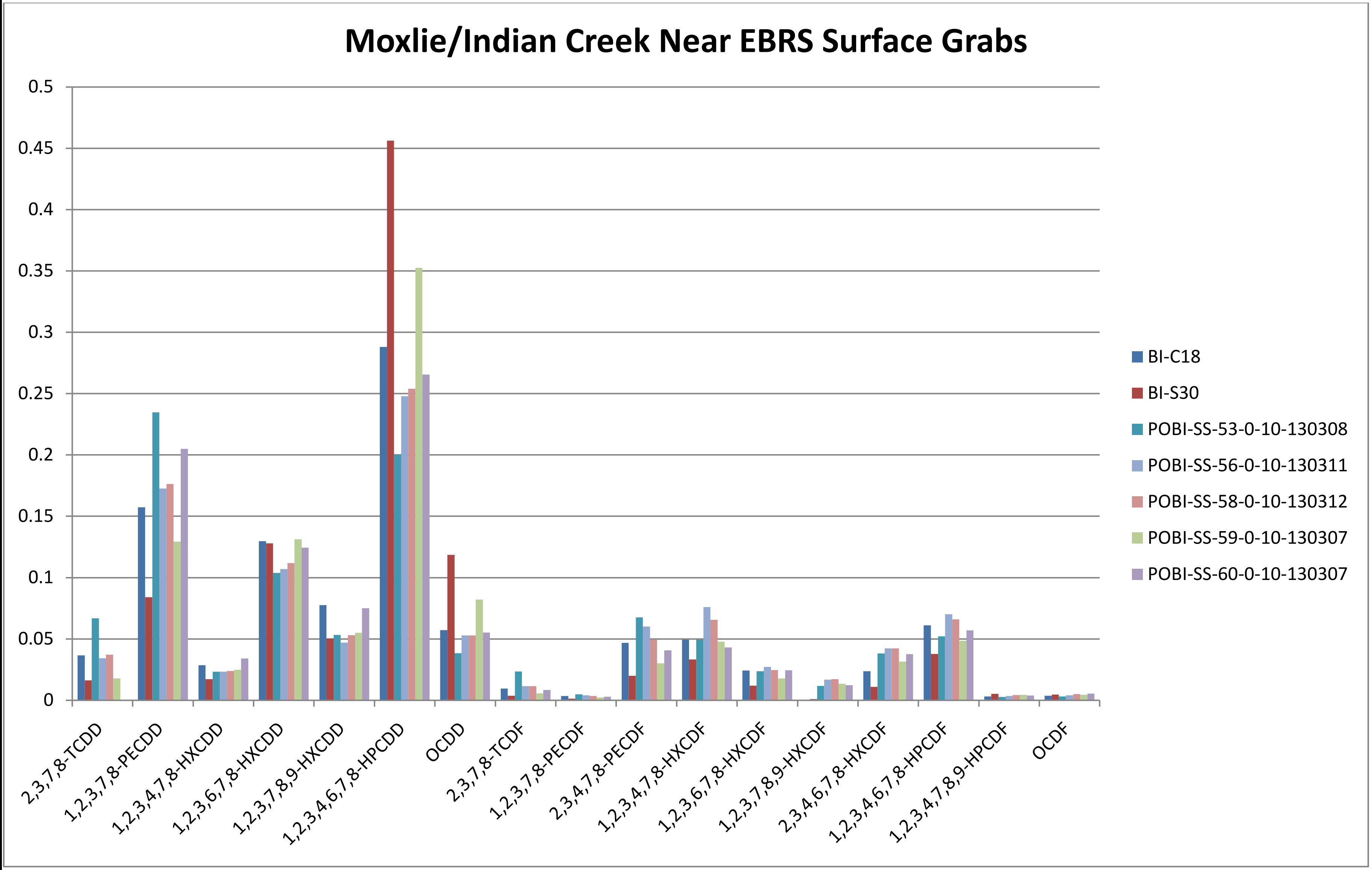

Note: y-axis is fractional contribution

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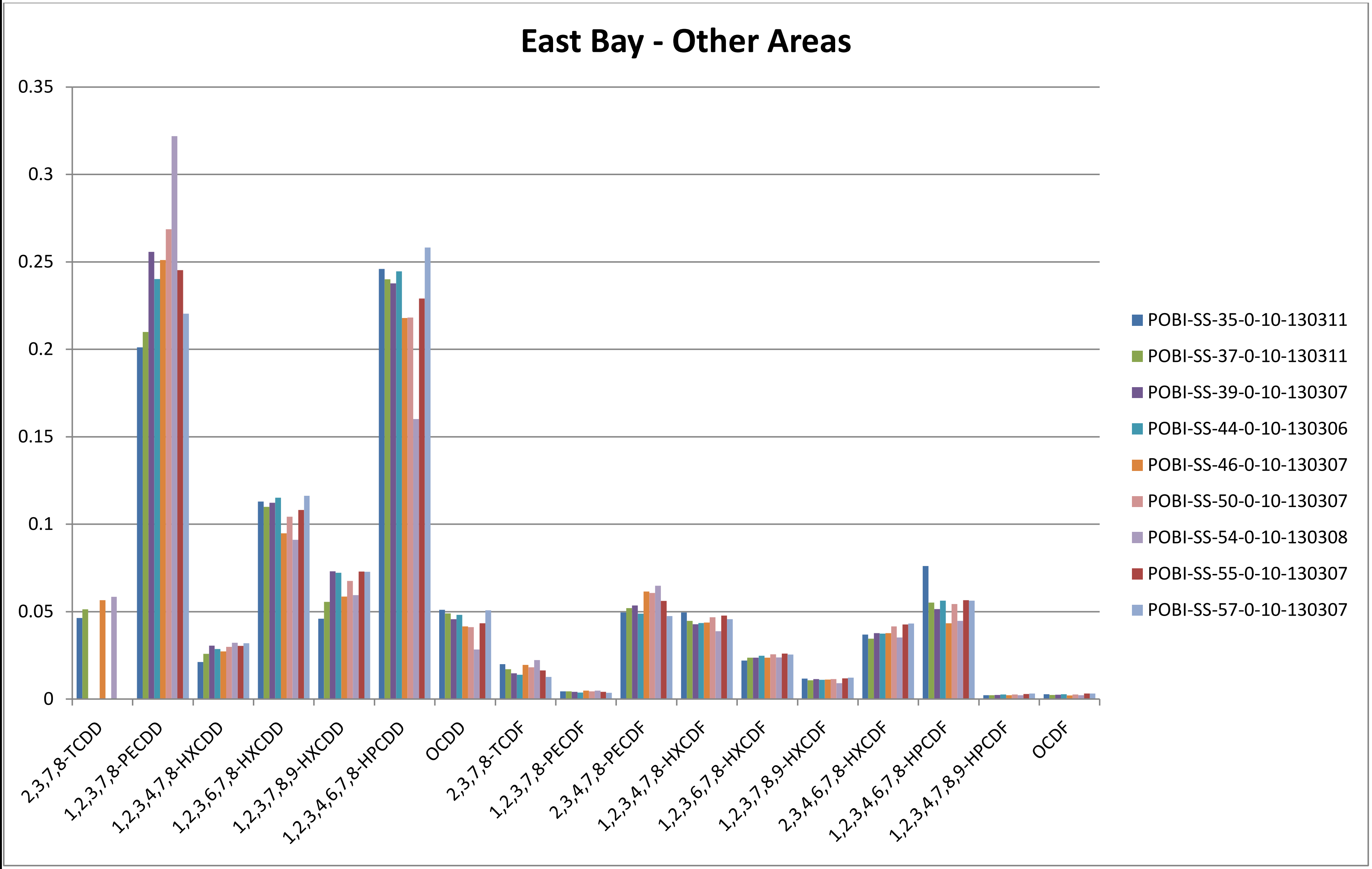
Figure 6-7f
Surface Grab Relative TEQ Profiles – Moxlie-Indian Creek Near East Bay Redevelopment Site
Budd Inlet Investigation Report
Port of Olympia



Note: y-axis is fractional contribution

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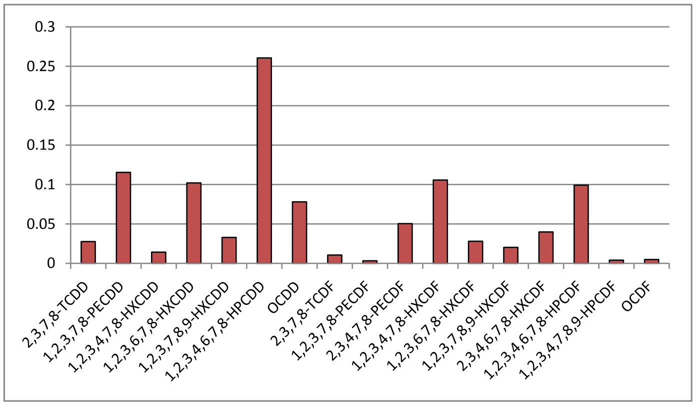
Figure 6-7g
Surface Grab Relative TEQ Profiles – East Bay – Other Areas
Budd Inlet Investigation Report
Port of Olympia



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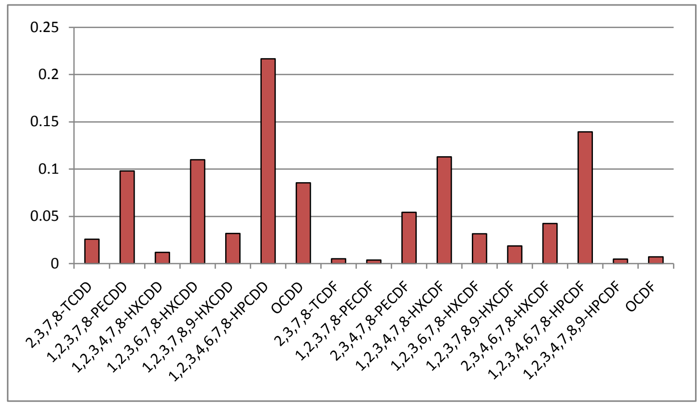

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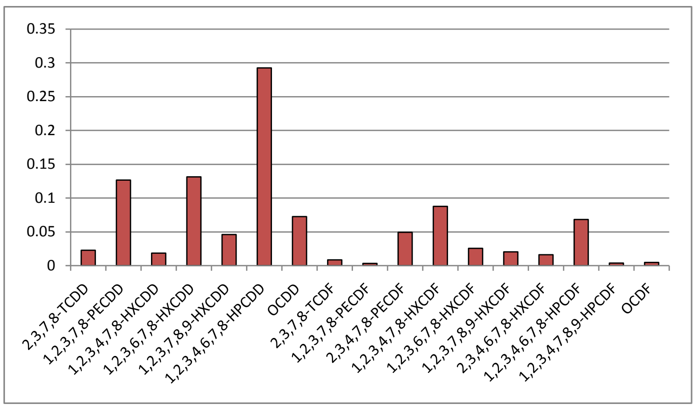

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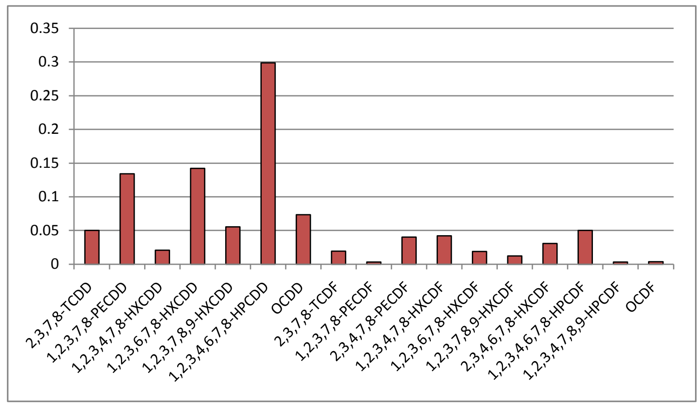

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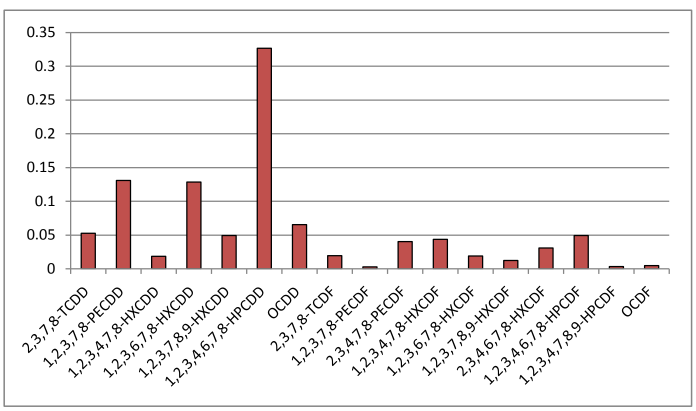

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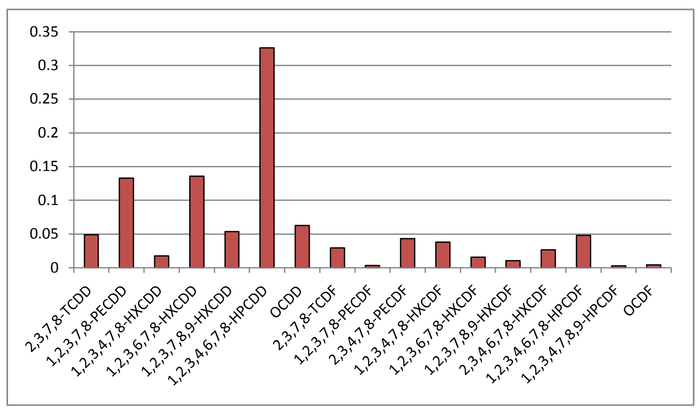

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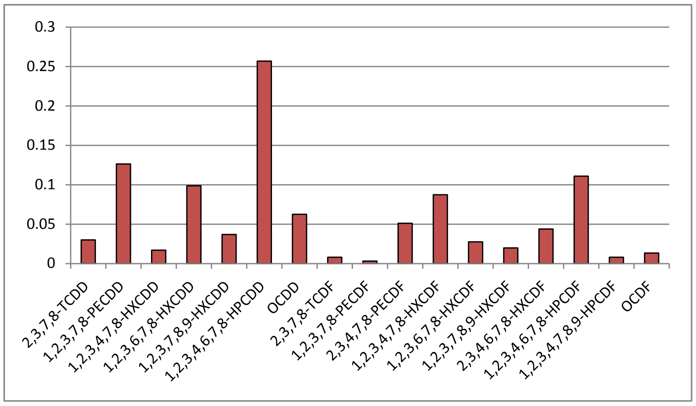
Note: y-axis is fractional contribution

Figure 6-8a (1 of 3)

Subsurface Sample Relative TEQ Profiles - Moxlie Creek/Indian Creek and EBRS



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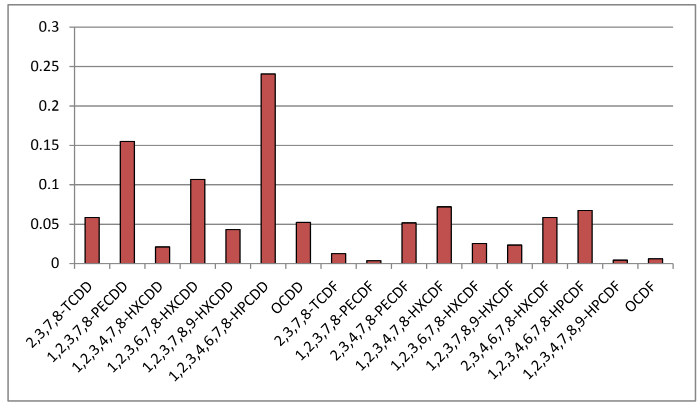

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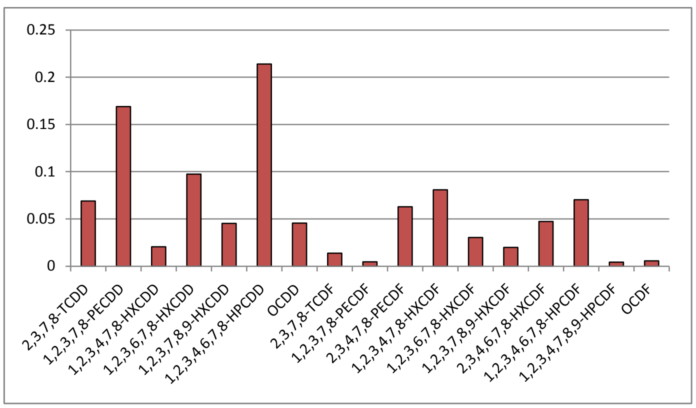

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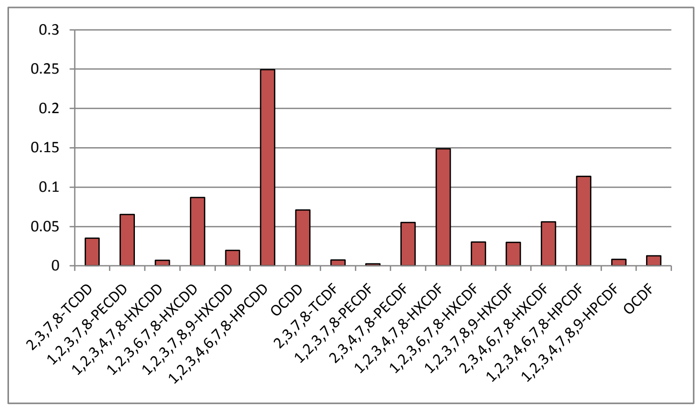

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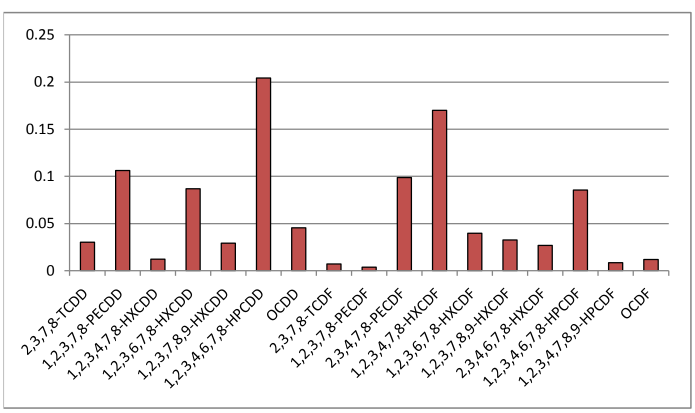

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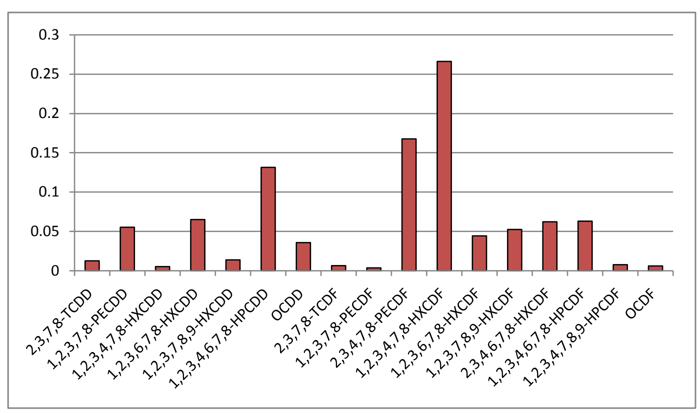
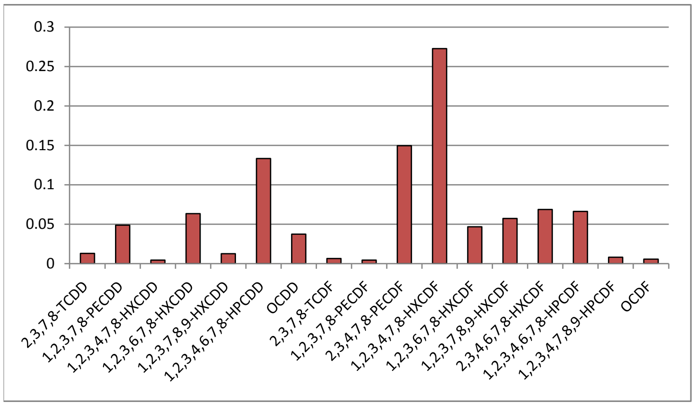


POBI-SC-50-4-6-130301

Note: y-axis is fractional contribution

Figure 6-8a (2 of 3)
Subsurface Sample Relative TEQ Profiles - Moxlie Creek/Indian Creek and EBRS



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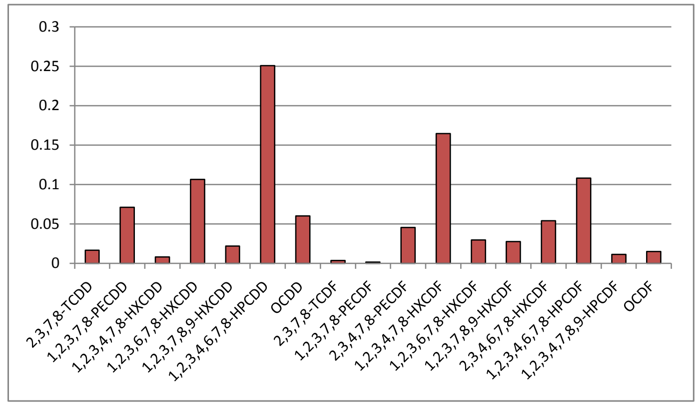

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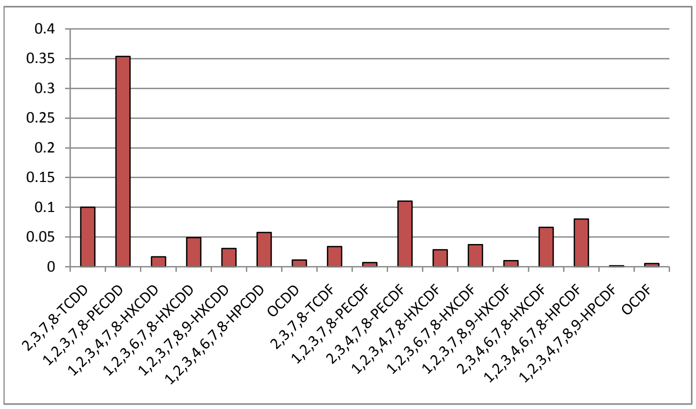

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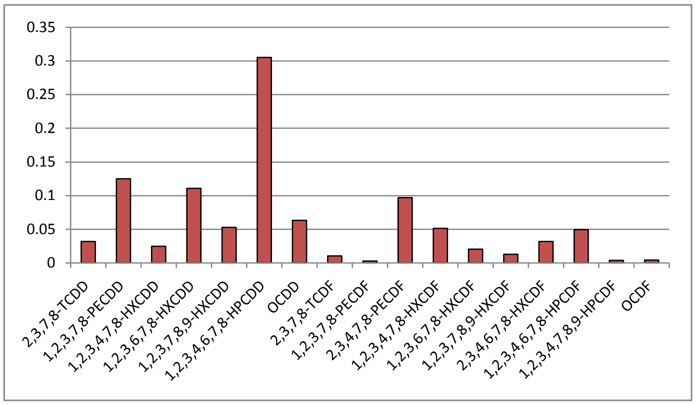
Note: y-axis is fractional contribution

ANCHOR QEA

Figure 6-8a (3 of 3)
Subsurface Sample Relative TEQ Profiles - Moxlie Creek/Indian Creek and EBRS
Budd Inlet Investigation Report
Port of Olympia



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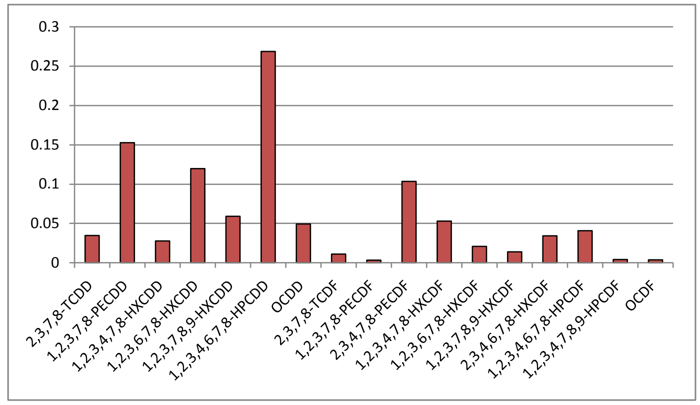

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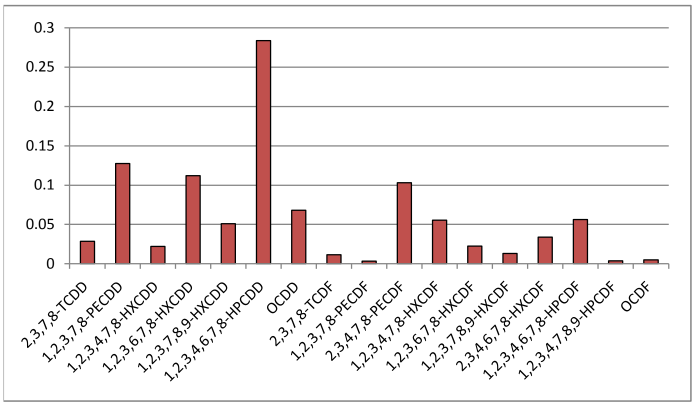

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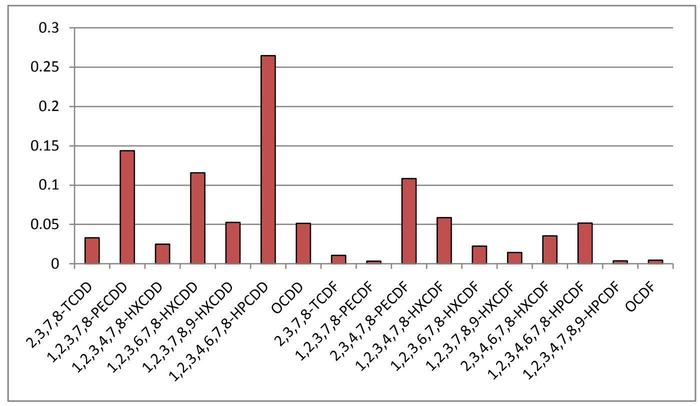

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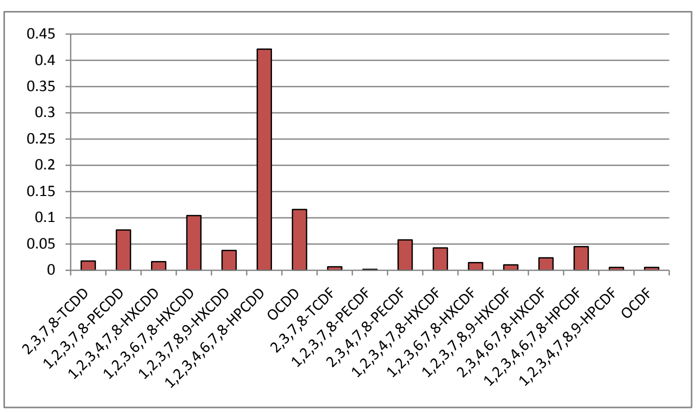

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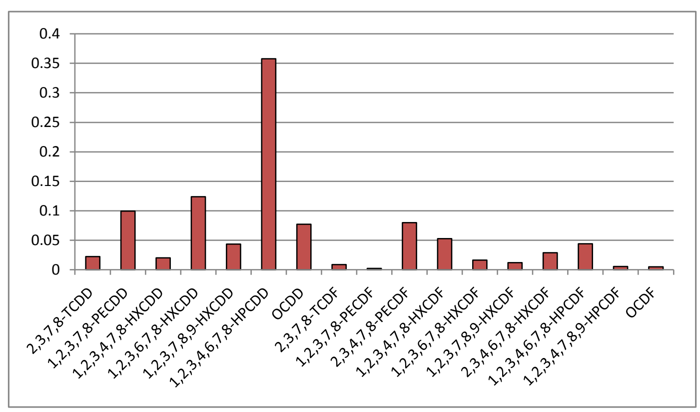
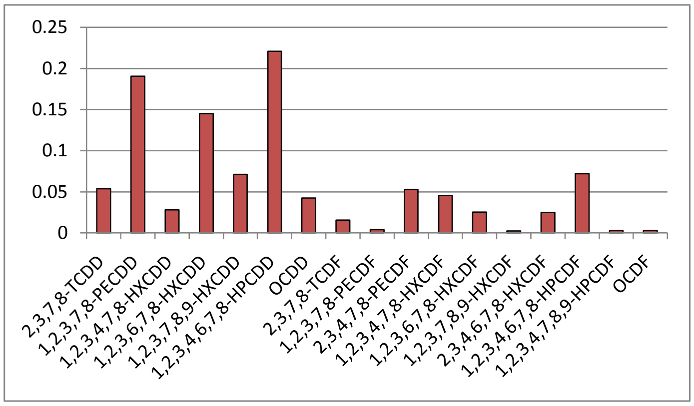


OLYZ03-1

Note: y-axis is fractional contribution

Figure 6-8b
Subsurface Sample Relative TEQ Profiles - Swantown Boatworks
Budd Inlet Investigation Report
Port of Olympia

ANCHOR QEA



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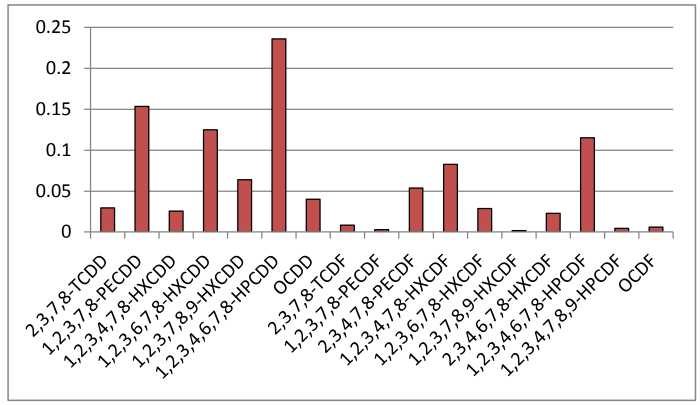
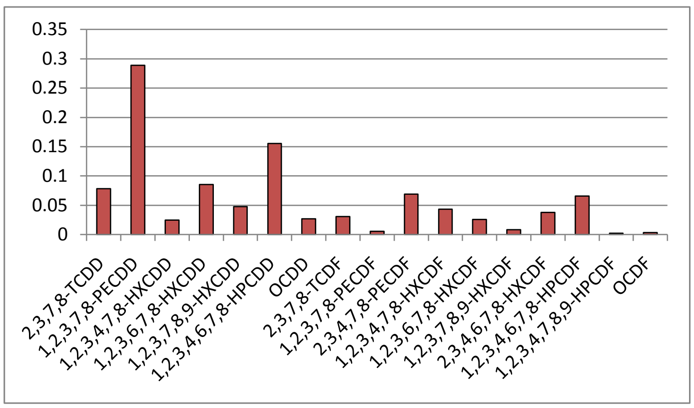


BI-C2-1-2FT



POBI-SC-14-1-2-130306

Note: y-axis is fractional contribution

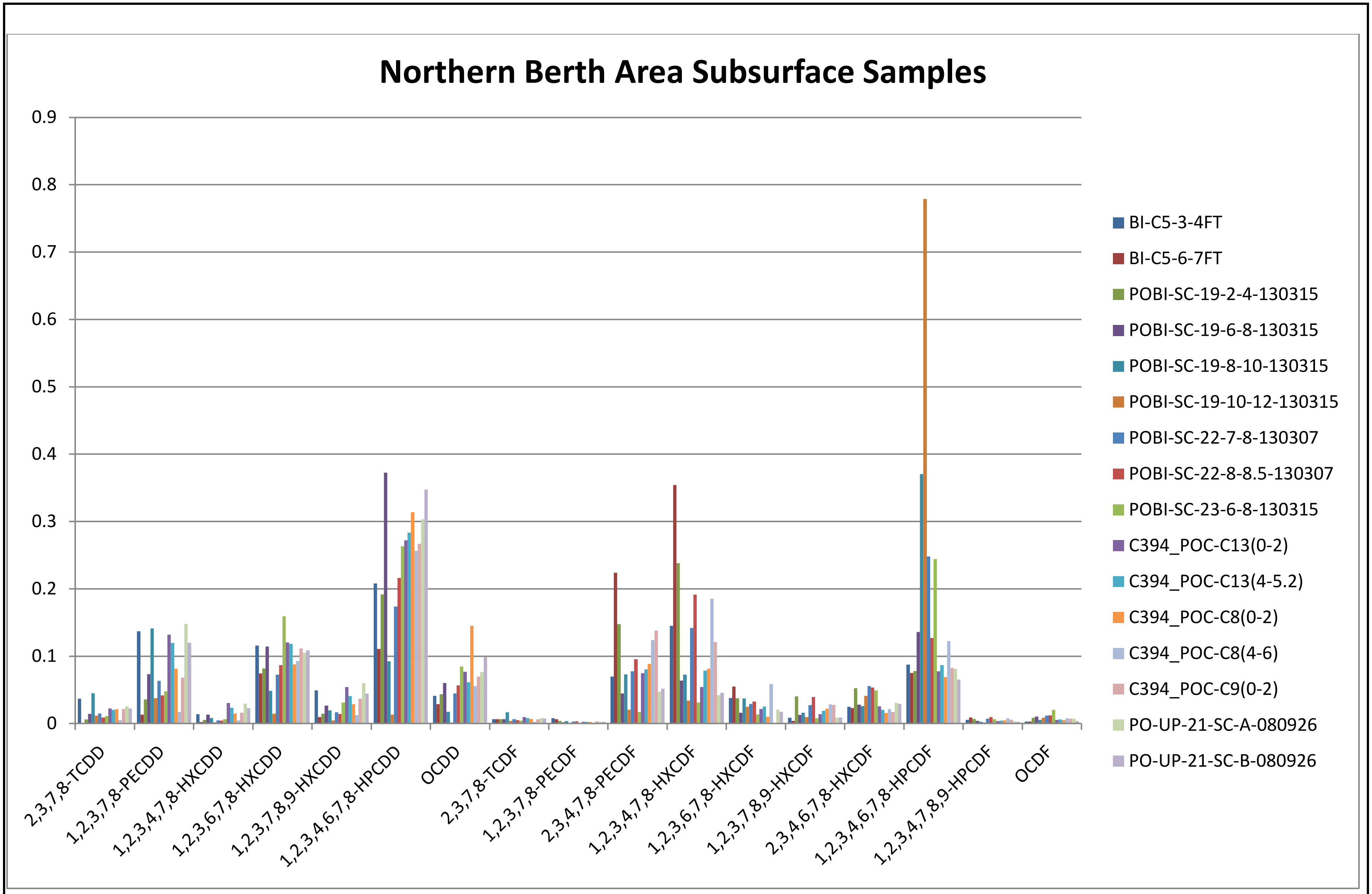
ANCHOR QEA

Figure 6-8c

Subsurface Sample Relative TEQ Profiles - Solid Wood, Inc.

Budd Inlet Investigation Report

Port of Olympia



Note: y-axis is fractional contribution

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ANCHOR QEA

Figure 6-8d
Subsurface Samples Relative TEQ Profiles – Northern Berth Area
Budd Inlet Investigation Report
Port of Olympia

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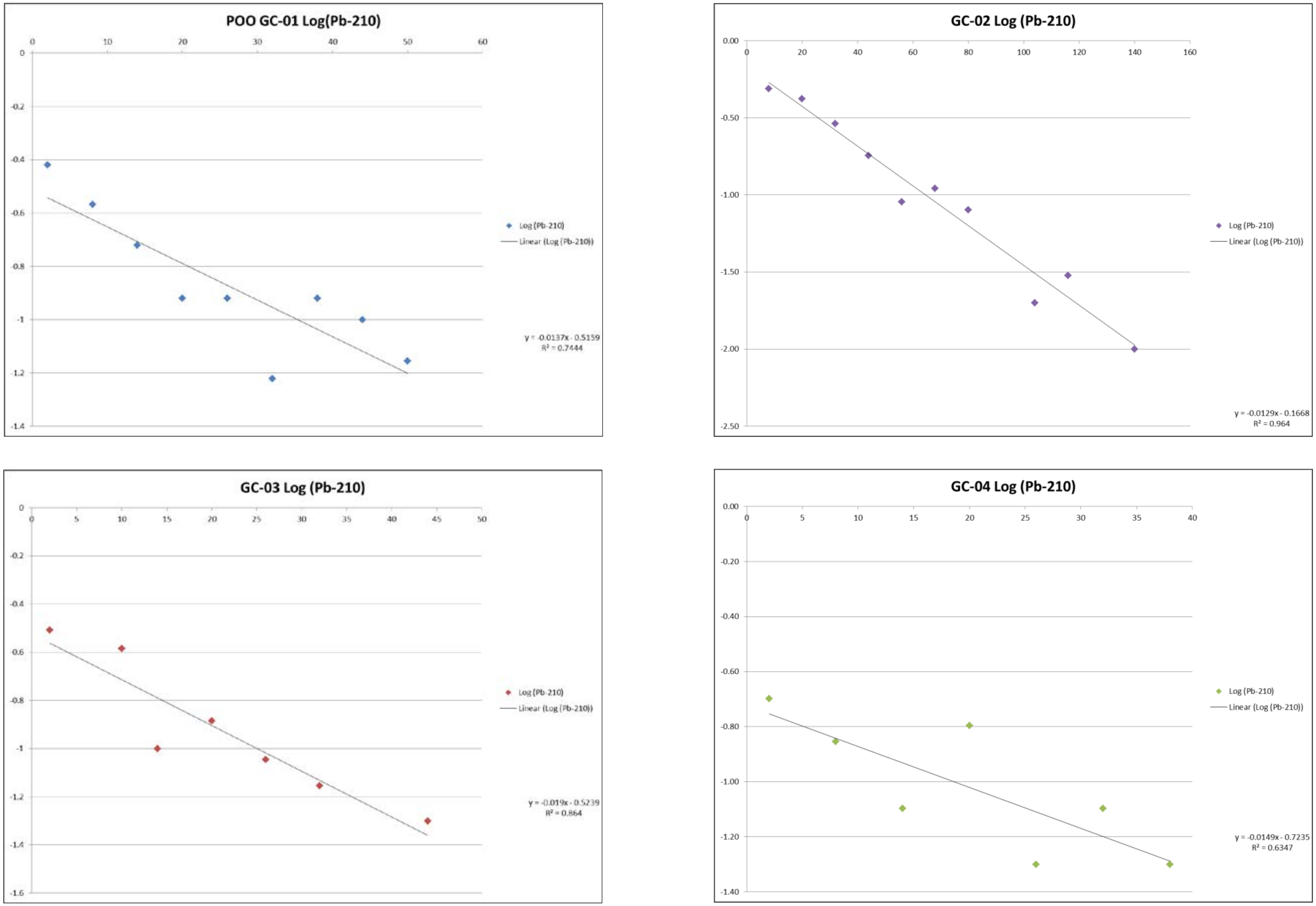

Figure 7-1
PB-210 Profiles
Budd Inlet Investigation Report
Port of Olympia

APPENDIX A
FIELD DATA

(on DVD)

APPENDIX B
LABORATORY DATA REPORTS

(on DVD)

APPENDIX C
DATA VALIDATION REPORTS

(on DVD)

APPENDIX D
DIOXIN AND FURAN SOURCE EVALUATIONS

CHEMOMETRICS SOURCE INVESTIGATION
PORT OF OLYMPIA BUDD INLET SEDIMENT SITE

Prepared for

Port of Olympia

Prepared by

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Portland, Oregon 97204

August 2016

Foreword

This foreword was prepared by the Department of Ecology for inclusion in Appendix D. This Budd Inlet Sediment Dioxin Source Study documents the chemometric evaluation and interpretations of Budd Inlet sediment dioxin/furan congener data. The chemometric process involves the analysis of dioxin/furan data from sediment samples using a multivariate approach. There are numerous multivariate approaches that can be used by themselves or with others.

The Department of Ecology and the Port of Olympia conducted separate dioxin/furan chemometric analyses of Budd Inlet sediment data. Using different but, similar in function multivariate analyses and similar data sets, both analyses resulted in the identification of three nearly identical congener factor profiles. The primary difference between the two reports is the interpretation of the factor profiles.

Table 1. Differences in interpretation of Factor profiles by Ecology and Port of Olympia.

Department of Ecology (Newfields 2015)	Port of Olympia (Appendix D)
Factor – 1 Hog fuel burning.	Factor – 3 Hog fuel burning.
Factor – 2 Pentachlorophenol (PCP). Historical use Current contamination	Factor – 2 Mixed urban source Regional sediment profiles Urban background Sewage Nearby catch basins.
Factor – 3 Polychlorinated biphenyls (PCBs). Historical use at and around the Port Peninsula	Factor – 1 Mixed combustion source Truck diesel, highway Asphalt burn barrels Medical waste

The Department of Ecology, after consultation with regional experts, disagrees with the Port of Olympia's chemometric analysis for the following reasons:

- The Port's interpretation cannot explain the presence of dioxin/furan contamination hot-spots.
- The primary sources/factors identified by the Port of Olympia's analysis were only diffuse sources (Table 1)
- The Port of Olympia's source factor profiles are not supported by their own site investigation data and site history.
- The Port of Olympia does not address historical dioxin/furan contamination and the dispersion and mixing pattern of the sediments.

As the Department of Ecology moves forward with the cleanup of Budd Inlet sediments we will base all future decisions on the results and interpretation found in the Ecology study (*Budd Inlet Sediment Dioxin Source Study Olympia, WA* (Newfields 2015)).

NewFields L.L.C, 2015. Technical Memorandum: Budd Inlet Sediment Chemometrics – Profile Interpretation and Lines of Evidence. Prepared by Newfields, LLC for the Washington Department of Ecology

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LIST OF ACRONYMS AND ABBREVIATIONS

City	City of Olympia
CP	Cascade Pole
D/F	dioxin and furan
dioxin	polychlorinated dibenzodioxin
Ecology	Washington State Department of Ecology
EMPC	Estimated Maximum Possible Concentration
FA	factor analysis
furan	polychlorinated dibenzofuran
HCA	hierarchical cluster analysis
HCDF	1,2,3,7,8,9-hexachlorodibenzofuran
HFB	hog fuel burning
ng/kg	nanograms per kilogram
OCDD	octachlorodibenzo-p-dioxin
PAH	polycyclic aromatic hydrocarbons
PC	principal component
PCA	principal components analysis
PCB	polychlorinated biphenyl
PMF	positive matrix factorization
Port	Port of Olympia
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEF	Toxicity Equivalency Factor
TEQ	Toxic Equivalents Quotient
USEPA	U.S. Environmental Protection Agency

1 INTRODUCTION

This report summarizes the methodology, data sources, and results of the chemometrics evaluation (multivariate statistical analysis) for the Port of Olympia (Port) Budd Inlet Study Area source investigation. The evaluation was conducted to support the conceptual site model for sources of sediment contamination in the vicinity of Budd Inlet, as discussed in the main Investigation Report. Multivariate analysis of the variations in relative dioxin/furan (D/F) congener concentrations was used to assess patterns in sample composition. Specific dioxin-like congeners measured at the site included seven polychlorinated dibenzodioxin (dioxin) and ten polychlorinated dibenzofuran (furan) congeners.

Chemometrics, the multivariate statistical analysis of chemical datasets, has been applied to a variety of environmental studies. These applications include source allocation in sediments (Evers et al. 1989; Sundquist et al. 2010; Newfields 2013; Ecology and Environment 2011; Infometrix 2011), exposure sources for aquatic animals (Ross et al. 2004), and tracking impact of individual sources (e.g., Schuhmacher and Domingo 2006). As described in Section 6.1 of the Investigation Report, D/Fs are produced as byproducts in a variety of processes, such as waste incineration or automobile emissions, and these different processes produce differing congener compositions (e.g., Cleverly et al. 1997). This relationship between source and congener profiles provides the basis for D/F source evaluation, and multivariate evaluation can be essential because many sources have only subtle differences in relative congener concentrations.

This chemometrics evaluation of Budd Inlet sediment identified three main sources to the sediment:

1. Mixed combustion source (with relatively elevated furan concentrations). This source was identified in many high-concentration subsurface samples (referred to as 'end-member' samples) and is most similar to truck diesel, highway, asphalt, and burn barrel reference profiles. Given the heavy industrial history of the peninsula, various combustion/incineration sources were likely present.
2. Mixed urban source. This source was strongest in surface sediments and nearby upland catch basin samples located within the City of Olympia (City) and the Port

property and is similar to regional sediment profiles and urban background reference profiles.

3. Hog fuel burning (HFB). This source was identified in low-concentration subsurface samples (i.e., the historical background). As described in the Investigation Report (Section 6.4), at least nine hog fuel burners were identified near the Study Area.

Site samples from within and near the Study Area appear to be a mixture of these three sources with more similarity among surface samples and more distinction in subsurface samples depending on location and depth.

An additional distinct historical source was identified in select high-concentration subsurface samples. This source is similar to Cascade Pole (CP) source profiles and pentachlorophenol (PCP) reference profiles; however, this source has low similarity to the majority of the surface and subsurface sediment site samples and was not identified as one of the main sources to Budd Inlet listed above. As described in the Investigation Report, the CP site was a former wood-treating facility with upland groundwater and sediment contamination that have been addressed under separate cleanups required by the Washington State Department of Ecology (Ecology). Post-cleanup investigations have indicated that the removal and capping of contaminated sediments and the isolation of the upland contamination with a bentonite slurry wall have been effective at preventing ongoing contributions of D/F contamination to Budd Inlet.

2 CHEMOMETRICS OVERVIEW

Chemometrics, the application of statistical analysis to chemical data, has been successfully applied to many systems to identify underlying patterns in complex datasets. Applications include, but are not limited to, organism phylogeny, microbial community structure, and petroleum product identification, as well as source allocation of complex mixtures including heavy metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxin-like compounds in environmental media (Davis and Sampson 2002; Murphy and Morrison 2006). Chemometrics is based on multivariate statistical analysis. Multivariate statistical techniques identify underlying patterns in complex data matrices. For example, as discussed in *Introduction to Environmental Forensics* (Murphy and Morrison 2007), an artificial dataset was created by generating samples representing mixtures of several PCB aroclors (each with a known PCB congener concentration). Multivariate statistics was then performed and was able to recreate the composition of the underlying factors (in this case, two formulations of Aroclor 1254 and Aroclor 1268) and identify the mixture (factor contribution) in each of the samples, with the sample mixtures reflected in proximity on factor plots (i.e., the samples most like a single aroclor are at the edges, and the mixtures appear in between these points).

Chemometrics may be based on several multivariate statistical methods. This chemometrics evaluation relied on hierarchical cluster analysis (HCA), principal components analysis (PCA), factor analysis (FA), and positive matrix factorization (PMF). These methods are discussed in detail in Section 4.1.

Chemometrics has been applied to D/F characterization and source identification in many studies, including the following:

- Evers et al. (1989) identified several sources based on underlying factor composition (PCA) and spatial distribution, indicating that sediments spatially proximal to former HFB activities were closely associated on factor biplots and also to source samples.
- Evers et al. (1993) identified the relative proportion of sediment from several rivers using multivariate statistics, and the underlying factors identified were consistent with known industries in the watersheds. Proximity on factor biplots was used to illustrate the degree of relationship of the mixed sediment to single-river samples.

- Buekens et al. (2000) evaluated various smelter and waste incineration sources. Proximity on factor biplots was used to identify the most similar and most disparate source profiles.
- Sundquist et al. (2010) used PMF analysis of sediment from the Baltic Sea to identify air deposition as the dominant D/F source.
- Statistical analyses have also been performed for sediment during the Rayonier Mill/Port Angeles Harbor study in Port Angeles, Washington (Newfields 2013; Infometrix 2011). The same reference profile library used in that study was also used in this one.

3 DATA SOURCES AND PROCESSING

Analytical results for the 65 surface and 132 subsurface sediment samples collected during the 2013 investigation were included in the chemometrics evaluation. Figure 1 shows the collection locations of 2013 surface and subsurface sediment samples. Complete data records were available for D/F congeners in all 197 samples. The next most frequent parameter group (semivolatiles) was analyzed in approximately 50% of the samples. Therefore, the chemometrics analysis was restricted to D/F congeners. PMF analysis of a subset of the data with complete records for D/F congeners and priority PAHs was evaluated in the sensitivity analysis included as Attachment A of this report. Multivariate statistical techniques cannot be performed on datasets with any blank values, requiring restriction of either samples or analytes to include only samples with complete data records. A variable list of organic, inorganic, and physical parameters was analyzed in the sediment samples.

The 17 priority D/F congeners were analyzed in all samples, and the detection frequency in the surface samples was 100% for all congeners except 2,3,7,8-Tetrachlorodibenzodioxin (TCDD), present in 43 of 69 surface samples, and 1,2,3,7,8,9-hexachlorodibenzofuran (HCDF), with a single non-detect in the surface samples. The detection frequency was lower in the subsurface samples, with the lowest detection frequency for TCDD, detected in 95 of the 138 subsurface samples. Only 1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin (OCDD) had a 100% detection frequency in the subsurface samples. Probability distribution plots for each congener were examined prior to analysis to confirm that non-detect values greater than the lowest detected value were excluded from the analysis, with data censored at the highest detection limit, i.e., all non-detect samples to which that detection limit was assigned. Historical D/F data collected for the source investigation were also incorporated into the chemometrics analysis. D/F congener data were available for 322 historical samples representing study area and background sediment samples. To minimize the impact of non-detect data, samples with six or more congeners below the detection limit were excluded. Additionally, to minimize the impact of estimated values, samples with eight or more congeners flagged as estimated values were also excluded. After data quality review, 119 of the historical samples were incorporated into the dataset.

A total of 16 catch basin solids samples was incorporated into the dataset. Eight samples were collected from City catch basins (adjacent to East Bay and West Bay in 2014), and eight samples were collected from the Port Marine Terminal (between 2010 and 2013).

Figures 2a through 2d show the spatial distribution (in percentiles) of the sum congener concentration and Toxic Equivalents Quotient (TEQ) for the 2013 surface sediment samples, 2013 subsurface sediment samples, historical sediment samples, and City and Port catch basins, respectively. Surface sediment samples have a comparatively narrow concentration range across the site, with sum congener concentrations and TEQ elevated along the west shore of East Bay, the southeastern shore of West Bay, and near Hardel Mutual Plywood. The concentration range is much greater for the subsurface sediment samples, with high-concentration samples at three areas (historical samples from CP, adjacent to Berth 3 North, and adjacent to the East Bay Redevelopment Site) and much lower concentrations for the rest of the site.

The basis for the chemometric evaluation is that different sources generate differing congener composition profiles. A wide variety of environmental sources has been identified for D/F congeners, especially high-temperature industrial and anthropogenic processes, including various combustion processes, metal smelting, and chemical manufacturing. Natural sources have also been identified, such as forest fires. Potential historical and ongoing sources of D/Fs to the site are discussed in Section 6 of the Investigation Report. A library of 317 D/F reference source profiles has been provided by Reference (see Attachment B). Following PCA analysis, 217 reference profiles were included in the dataset. The reference profiles removed were highly dissimilar to the site data and plotted as extreme values on component biplots. Select congener profiles from the D/F reference profile library provided by Ecology, many of which illustrate the similarity of several sources that are dominated by select congeners (e.g., OCDD), are shown in Figures 3a through 3f.
Data handling for analytical results that are lower than the method detection or reporting limit is a recurring problem in statistical analysis of environmental data. Frequently, non-detects are replaced by substitution, either with half of the detection limit or with a value of zero. There is a wide variety of methods for handling data with non-detect values, none of which is ideal, as covered extensively by Helsel (2005 and 2006). For the chemometrics analysis, non-detects were substituted with a value of half the detection limit because

EPA PMF 3.0 does not process data that include null values. Sensitivity analyses comparing results with non-detects substituted with a value of zero indicated that substitution with one-half of the detection limit was appropriate for non-detect values (see Attachment A). Comparison of the results with a subset of the data that excluded samples or analytes indicated that the results were similar, providing further support that substitution with one-half of the detection limit does not significantly skew the analytical results.

A second potential data quality issue is noted for the high frequency of result values flagged as Estimated Maximum Possible Concentration (EMPC), a laboratory qualifier indicative of uncertainty in the relevant quality control sample. An explanation of EMPC-flagged data use may be found in Section 3.3.3 of the Investigation Report. The frequency of EMPC-flagged data is especially noted for the OCDD results. The flagged data are skewed to high concentrations, with an order-of-magnitude greater average concentration for EMPC-flagged OCDD results than for un-flagged samples. EMPC-flagged data results were included as the reported value for the chemometrics evaluation. Sensitivity analysis, performed by comparison of PCA results for the full dataset, and a subset of the data excluding samples with EMPC-flagged values, indicated that overall results were not sensitive to inclusion or exclusion of EMPC-flagged data (Attachment A).

The individual congeners have widely varying concentrations in environmental samples. For example, in the complete dataset used for the chemometrics evaluation, the average concentration of TCDD is 1.0 nanograms per kilogram (ng/kg; including non-detects at half of the detection limit), while that of OCDD is 8,900 ng/kg. Additionally, the concentrations of individual congeners in environmental datasets are unlikely to be normally distributed. The significant difference in typical congener concentrations, and the large range observed for individual congeners in different samples, requires data transformation prior to performing multivariate statistical analysis; otherwise, the high-concentration samples and compounds will skew the results. Each sample was scaled by transforming the congener concentration to a Toxicity Equivalency Factor (TEF) and dividing it by the sample TEQ to minimize the variability between congeners and to remove the effect of concentration. Variance scaling was also performed and did not significantly change the results of the chemometrics analysis (see Attachment A).

4 ANALYTICAL METHODOLOGY

This section provides a general overview and discusses the typical analytical configuration of the methods utilized in the chemometrics evaluation.

4.1 Multivariate Statistical Analyses

Standard statistical techniques allow comparison of a limited number of explanatory variables; however, environmental data matrices typically include many variables. Multivariate statistics can transform the many variables into a small set of representative variables, allowing visualization and analysis of spatial and temporal patterns for all variables of interest in a single analysis.

4.1.1 Hierarchical Cluster Analysis

HCA was performed in R-3.0.1 using the *hclust* package. HCA is based on stepwise transformations of a similarity matrix. The first step generates a similarity matrix (i.e., the correlation coefficient of all congeners for the two samples compared) for each sample compared to each other sample. The most similar samples (strongest correlation coefficient) are then grouped, and a new, smaller matrix is generated to compare the similarity of the groups. This is repeated until all samples have been grouped, and the dissimilarity between individual samples is used to cluster related samples, with longer distances (branch length) between clusters reflecting greater dissimilarity. The HCA cluster dendrogram is generated by plotting the groupings and branch lengths, similar to a phylogenetic tree. In addition to the groupings shown on the dendrogram, the *hclust* package can be used to generate a numerical cluster assignment for each sample, which can then be compared to other sample characteristics (i.e., sum D/F concentration, sample location). The cluster assignments are generated by "cutting," or transecting, the dendrogram at a specific height and assigning all samples attached to each branch transected to the same cluster (regardless of lower or higher branch points). Thus, many levels could be generated, with transects at a greater height on the dendrogram generating fewer, more dissimilar clusters). The analytical output generated for HCA included a sample dendrogram and a graphic of the spatial distribution of samples in each cluster.

4.1.2 Principal Components Analysis

PCA separates the data matrix into a set of underlying variables (some combination of the variables included in the data matrix) and the individual sample contributions that allow the individual sample composition to be represented as some combination of the underlying factors (technically, an eigenvalue/eigenvector matrix decomposition of the data covariance or correlation matrix). This generates two matrices that could be recombined into the original data matrix: a matrix of individual sample contributions (the contribution of each factor needed to generate the original composition of that sample) and the matrix of factor loadings (new variables composed of varying contributions of all the analytes in the dataset). Although PCA generates as many variables as are present in the original matrix, typically a small number of components account for nearly 100% of the total variance in the data. This allows representation of the data with a few variables rather than the total number of analytes. The number of variables needed to recreate the original data matrix to an acceptable level of error is determined from PCA results, because PCA generates as many variables as the original dataset, as well as the significance of each variable. Typically, PCA components are considered significant if they account for a minimum of 5% of the total variability in the dataset.

PCA was performed in R-statistical using the *prcomp* package, with no scaling beyond the previously noted percent-rank scaling by compound. Analytical output from PCA includes the loading of the individual congeners to each component (underlying factor), the proportion of variance accounted for by each component, and the component contribution for each sample. The loadings reflect the proportion of each congener accounted for by the component. The contributions reflect the strength of the relationship between a sample and each component. Scree plots, which graphically illustrate the cumulative proportion of the total variance accounted for by each component, were used to determine the number of significant components. Sample factor contribution biplots were generated to visualize the relationship of site samples and the explanatory underlying components determined by PCA, and of the relationship between concentration and factor contribution strength. Graphical representation of the spatial distribution of components was visualized by plotting latitude/longitude as x/y coordinates and scaling the symbol to component strength.

4.1.3 Factor Analysis

FA is similar to PCA, in that the data matrix is separated into underlying factors (both PCA and PMF are variations of FA). As with the components generated by PCA, these factors are some combination of the original parameters included in the data matrix. However, the number of factors is an input parameter for FA, and is determined by the number of significant components in the PCA analysis.

FA was performed in R-statistical using the *factanal* package. Factor analysis was performed on the same dataset as PCA and PMF, i.e., the "complete" dataset with all 2013 samples and select historical samples. As with PCA and PMF, the data were prepared by compound scaling. Three factors were indicated by the PCA results. FA was performed using the "varimax" rotation, in which parameter loadings (concentrations) are assigned to the factors to maximize the variance accounted for by each factor sequentially. The factor congener loadings and the proportion of variance assigned to each factor were generated by FA, for comparison to the PMF results.

4.1.4 Positive Matrix Factorization

PMF is a variant of FA performed by EPA PMF 3.0, a computer program provided by the U.S. Environmental Protection Agency (USEPA) for FA of multivariate data. EPA PMF 3.0 performs a variation of FA based on the multi-linear engine technique developed by Paatero (1999). The matrix decomposition is performed multiple times (the default setting of 20 "base runs" was used). The base run that minimizes the error between the original data matrix and recreation of the data matrix from the generated factor loadings and sample contributions is selected. The selected base run is further subjected to error analysis by "bootstrapping" and "Fpeak" models in PMF 3.0. The bootstrapping analysis assesses the robustness of the determined factor loadings and contributions by repeating the analysis on randomly selected subsets of the data. The Fpeak model assesses the stability of the factor rotations to determine if the solution is unique.

The number of factors was determined by PCA. PCA was performed prior to PMF analysis for each data configuration to confirm the number of significant factors. Analytical uncertainty, a required input parameter, was assigned as 5%, and data scaling was performed by compound scaling as previously discussed. The output from PMF includes the factor congener loadings, individual sample contributions, and bootstrapping/Fpeak graphical representations of the robustness of the solution.

PMF provides the primary basis of this chemometrics analysis, for several reasons. PMF forces positive factor loadings, allowing direct comparison to sample congener profiles. Individual sample contributions are generated for analysis of spatial and concentration trends, and the extensive error analysis allows for a high degree of confidence in the analytical results.

4.2 Graphical Data Exploration

Critical interpretation of results includes the spatial distribution of D/Fs in sample contributions and factor biplots by sum concentration. Histogram plots of congener loadings, end-member samples, and potential sources were also critical in interpreting the chemometrics results. Graphics were generated in Microsoft Excel, R 3.0.1, and PMF 3.0.

4.3 Sensitivity Analysis

In addition to the error/sensitivity analysis associated with PMF, a variety of sensitivity analyses were performed to assess the robustness of the underlying factors as well as of the spatial and concentration trends observed. Sensitivity analysis included the following:

- Analysis on a dataset that excluded the upper and lower 10th percentiles of the data
- Substitution of non-detects with zero rather than half of the method detection limit
- Analysis excluding samples with EMPC-flagged data OCDD values
- Analysis with variance scaling
- Analysis on samples with complete records for D/F congeners and priority PAHs
- Analysis with site data only
- Analysis with historical and sediment samples without catch basin data
- Analysis with a wide variety of reference congener profiles (as provided by Ecology from the Rayonier Chemometrics Evaluation [2011])

Additional information on these analyses can be found in Attachment A of this report.

5 RESULTS AND DISCUSSION

The chemometrics evaluation focused on the factor congener loadings and individual sample contributions generated by PMF, with other multivariate tools (PCA, FA, HCA) supporting interpretation of the PMF results. Discussion will focus on the results of PMF analysis performed on the complete dataset, which included the 2013 sediment samples (69 surface and 89 subsurface samples), 119 historical samples, 16 catch basin samples, and 217 reference profiles, for a total of 510 data points after sample selection to minimize the influence of non-detects and estimated values. Additional PMF analyses were performed on various subsets of these data: only the 2013 sediment data, with the end-member subsurface samples excluded, or with the reference profiles excluded, as discussed in Attachment A.

The chemometrics analyses consistently identified three significant factors (or components), including a factor with greater relative contribution from dioxin congeners, a factor with greater relative contribution of furan congeners, and a factor with greater relative contribution of less chlorinated congeners.

5.1 Positive Matrix Factorization

PMF was performed on the TEF/TEQ-scaled chemometrics dataset. Three main factors were identified:

- Factor 1 has a greater relative loading of furans than dioxins.
- Factor 2 has a greater relative loading of dioxins than furans.
- Factor 3 has a greater relative loading of the less chlorinated D/F congeners.

The PMF factor congener loadings are shown in Figure 4 as the PMF loadings (equivalent to TEF-scaled concentration), as percent of dioxins or furans, and as congener percentage of the total D/F. PMF factor output for factor congener loadings is included in Table 1. Reference profiles with a greater "relative concentration"[1] of furan congeners, similar to Factor 1, include diesel trucks, burn barrels, and highways. HFB has a greater relative contribution of less chlorinated dioxin and furan congeners, similar to Factor 2. Reference profiles with

[1]A reference profile with "relatively greater 2,3,7,8-TCDD contributions" is likely to have a TCDD concentration much lower than the concentrations of the more chlorinated dioxins, but the concentration compared to the other congeners is greater than typically observed.

relatively greater dioxin congener concentrations similar to Factor 3 include residential background profiles, residential soot, and USEPA urban profiles.

Figure 5 shows the factor biplots, with the magnitude of the factor contributions of Factors 1, 2, and 3 in each sample in the chemometrics dataset. Factor biplots are a graphical representation of how closely related the samples are to each other and of the sample relationship to the underlying factors. Samples of similar composition (i.e., mixture of the underlying factors) will group on the biplots, while more dissimilar samples will have greater separation. Typically, biplots are given for Factor 1 versus Factor 2, Factor 1 versus Factor 3, and Factor 2 versus Factor 3 (and continuing as needed to show all factor relationships if additional factors are included). On the factor biplots, symbol size is scaled to sample TEQ for the 2013 site samples, historical samples, and catch basins to illustrate the relationship between TEQ and factor contributions (reference sample symbol size is arbitrary).

Factor 1 has the greatest contributions in reference profiles for highways, truck diesel, and medical waste incineration, as well as very strong contributions in the end-member samples, especially SC-50 (located at the outlet of Moxlie Creek). End-member samples refer to high-concentration subsurface samples from the south end of East Bay and adjacent to Berth 3 North. These samples group with truck diesel and highway reference profiles, and have minimal Factor 2 and Factor 3 contributions. Factor 2 has the greatest contributions for the catch basin samples, as well as select surface samples along the southeastern shore of West Bay. Factor 3 has the greatest contributions in reference profiles for HFB, and many of the low-concentration 2013 subsurface sediment samples have very strong Factor 3 contributions. 2013 surface samples group on the factor biplots, and plot as a mixture of Factor 1, Factor 2, and Factor 3 contributions. The moderate-concentration 2013 subsurface samples also appear to be a mixture of contributions from the three factors; however, mixing trends are apparent because increasing TEQ is associated with an increase in Factors 1 and 2 relative to Factor 3 (HFB). High-concentration subsurface samples are associated with increasing Factor 1 strength, with the exception of a few samples that group with the high-concentration CP samples.

Spatially, Factor 1 has the strongest sample contributions at the south end of East Bay and adjacent to Berth 3 North. Factor 2 is relatively uniform in its spatial distribution, with slightly stronger contributions observed along the southeastern shore of West Bay. Factor 3 has the strongest sample contributions in the southern portions of both East and West Bay, with moderately strong contributions along the northeastern shore of West Bay and the eastern shore of East Bay. The overall spatial distribution of the factor contributions is shown in Figures 6a-1 through 6a-3, and a complete table of sample contributions is included as Attachment C.

Figure 6b shows the approximate spatial distribution of all three factor contributions to further illustrate areas of interest delineated by the factor combinations. The relative strength of the three factors illustrates that factor contributions are distinct between East Bay and West Bay, between the eastern and western shore of each bay, and also between the southern and northern end of each bay. Many of the samples across the middle of both bays, and to the north of West Bay, have a fairly uniform mixture of factor contributions. Factor 1 is very strong in subsurface sediment in the southern part of East Bay and adjacent to Berth 3 North. Factor 2 has strong factor contributions across the site but clearly dominates the factor contributions along the southeastern shore of West Bay and city catch basins along the southern portion of East Bay. Factor 3 is dominant in subsurface samples in the southern channel of both bays and along the eastern shore of East Bay.

Figure 7a shows the congener profiles for the three site samples with the greatest factor contribution for each factor: a high-concentration subsurface sample from the south end of East Bay (SC-50-6-8) for Factor 1, a moderate-concentration historical surface sample from the southeastern shore of West Bay (BI-S34) for Factor 2, and a low-concentration subsurface sample from the southern part of West Bay (SC-02-4-5) for Factor 3. Figure 7b shows the individual congener profiles for the three factors as concentration and percent dioxins or furans. The concentration profiles are similar for the factors and the samples with strong factor contributions.

Figures 8a-1 through 8a-3 show factor contributions in the 2013 surface samples. There is little variability in the strength of the three factors. The surface samples have highly uniform spatial distribution of the factor contributions, with the exception of Factor 2, which is strongest on the western shore of West Bay, northeastern West Bay, and eastern shore of East Bay. The combined factor spatial distribution is shown in Figure 8b.

Figures 9a-1 through 9a-3 map the factor contributions in the 2013 subsurface samples. The subsurface samples have much stronger Factor 1 contributions along the eastern shore of West Bay and the southern shore of East Bay. Factor 2 contributions are fairly uniform in the subsurface samples, with stronger contributions in the southern portion of West Bay and along the western shore of East Bay. Factor 3 contributions are much greater in the southern channel of East and West Bay, and are elevated along the eastern shore of East Bay and to the north of the peninsula.

Figure 9b shows the approximate spatial distribution of an overlay of the three factors in the 2013 subsurface samples. The factor contributions have much greater spatial variability in the subsurface than in the surface samples. The southeastern shoreline of West Bay has mixed Factor 2/Factor 3 contributions, with weaker Factor 1 contributions, while the northeastern shoreline has a mixture of Factor 1/Factor 2 contributions with weaker Factor 3 contributions. The south end of East Bay has mixed contributions of all three factors, with very strong Factor 1 contributions at the southernmost point. Samples in the middle portion of East Bay have mixed contributions of all three factors; however, these samples have a much greater Factor 3 contribution. The varying factor mixtures observed in the subsurface samples suggest that sources were historically more localized than the ongoing (surface) D/F inputs.

5.2 Hierarchical Cluster Analysis

The HCA dendrogram maps the level of relationship between samples. Samples separated by short branches are quite similar, while samples separated by long branches are dissimilar. Figure 10 shows the HCA dendrogram for all samples in the chemometrics dataset. The samples fall into four primary clusters, or dendrogram branches, including the following:

- A cluster that contains the majority of the 2013 sediment samples, historical samples, and catch basin samples as well as regional sediment reference profiles
- A cluster that contains the PCP reference profiles, high-concentration historical samples from CP, a small number of historical samples, and one high-concentration 2013 subsurface sample (SC-19 6-8ft)

- A cluster that contains the HFB reference profiles, the Port Angeles soil and ash reference profiles, and several low-concentration subsurface samples previously noted as closely associated with the HFB signature on the PMF biplots
- The end-member samples identified by PMF, a selection of reference profiles including medical waste incineration, and high-concentration historical sample BI-C5 6-7ft

The patterns observed in the cluster dendrogram are consistent with the PMF results.

5.3 Principal Components Analysis

PCA was performed to identify the appropriate number of factors for inclusion in the PMF analysis, and for additional support of the relationship between samples. PCA identified three significant principal components (PCs), accounting for 82% of the total variance in the dataset (see Table 2). PCs were considered significant if they accounted for a minimum of 5% of the variance in the dataset. The PCA results support selection of three factors for inclusion in FA/PMF analysis. The component biplots for the three significant factors are shown in Figure 11. These three principal components are not equivalent to the three factors identified by PMF because the variance accounted for by the first component is much greater than for the succeeding components and the PCA rotations allow for negative congener loadings; however, as with the factor biplots and cluster dendrogram, the component biplots are a graphical representation of the similarity of the individual samples. The sample groupings are consistent with PMF and HCA results with distinct groups for HFB; PCP/high-concentration CP samples; the end-member samples and associated combustion signatures; and the 2013 sediment samples, catch basins, and regional sediment.

5.4 Factor Analysis

FA was performed to determine the relative proportion of variance assigned to each factor. PCA maximizes the variance assigned to each component in turn, while FA and PMF distribute the variance between the assigned factors. FA was performed to confirm that the three-factor model results in three equally relevant factors. The variance was assigned at 28.1%, 27.5%, and 25.0% for the three factors, respectively, indicating that the factors are of equivalent importance in the three-factor model.

6 CONCLUSIONS

The chemometrics evaluation indicates that multiple sources have contributed D/F to site sediment. Three factors were consistently identified as significant, indicating contributions from three distinct sources or source mixtures. The three factors varied from each other in the relative contribution of dioxin versus furan congeners, and in the relative contribution of the less chlorinated congeners. Differing factor strength and spatial distribution were observed in surface samples as compared to subsurface samples, which suggests a change in D/F source contributions over time; however, the underlying factor congener profiles are consistent, likely reflecting a change in the magnitude of the contribution from the various sources rather than a change in source profiles.

The underlying factors and sample groupings are consistent for the multivariate analyses, and the sediment D/Fs are consistent with mixtures of three underlying factors:

1. Mixed Combustion Sources. This underlying factor is associated with several elevated furan combustion sources, including diesel combustion, highway, asphalt, and burn barrel reference profiles. Factor contributions are strongest in high-concentration subsurface samples along the southwestern shoreline of East Bay and the eastern shoreline of West Bay (PMF Factor 1 and HCA Cluster 4, labeled on the PCA biplots).
2. Mixed Urban Sources. The underlying factor is associated with the catch basins, as well as a variety of residential background, sewage, and regional sediment reference profiles. Source contribution is observed in mid-concentration surface and subsurface samples, while low-concentration subsurface samples are dominated by HFB and high-concentration subsurface samples are dominated by the mixed combustion sources (PMF Factor 2 and HCA cluster 2, labeled 'catch-basins' on the PCA biplots).
3. Hog Fuel Burning. The HFB signature is clear in the PMF, PCA, and cluster analysis. Strong contributions are seen for this factor in low-concentration subsurface samples, especially from the southern portions of East and West Bay, and also in lower-concentration surface samples (PMF Factor 3 and HCA Cluster 3, labeled on the PCA biplots).

PMF factor loadings are shown in Figure 4, HCA clusters are shown in Figure 10, and PCA biplots are shown in Figure 11.

Spatially distinct areas with differing mixtures of sources were identified, including the following:

1. The eastern shore of East Bay, mid-channel of West Bay, and north of the peninsula, which have lower D/F sum concentrations and strong Factor 3 (HFB) contributions but low factor contributions for Factors 1 (mixed combustion sources) and 2 (mixed urban sources)
2. The area in West Bay, adjacent to Fiddlehead Marina, with greater Factor 2 contributions (mixed urban sources)
3. The Berthing Area south of Berth 3 North, where samples have very strong Factor 1 contributions (mixed combustion sources) and moderately elevated Factor 2 contributions (mixed urban sources)
4. Along the western shore of West Bay (adjacent to Solid Wood Inc. and Hardel Mutual Plywood), where samples have moderate contributions from Factor 2 (mixed urban sources)
5. Catch basins on the Port marine terminal and along the southern shore of East Bay (City catch basins), with strong Factor 2 contributions (mixed urban sources)
6. City catch basins to the west of West Bay and west of the East Bay Redevelopment Site, with strong Factor 1 contributions (mixed combustion sources)

A small number of elevated-concentration subsurface samples near Berth 3 North (e.g., SC19-6-8, BI-C4-6-7) are consistent with PCP reference source profiles and historical high-concentration CP samples. PCP and the high-concentration CP samples had weak factor contributions on all three factors, indicating that they are not main underlying or ongoing sources to sediment.

In summary, this analysis suggests a consistent mixture of D/F sources to both subsurface and surface sediments. Subsurface samples exhibit spatially and temporally variable contributions from distinct, elevated-concentration sources, and surface samples exhibit a fairly uniform mixture of HFB, urban, and combustion sources.

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TABLES

Table 1
PMF Factor Loadings

Congener	Factor 1	Factor 2	Factor 3
2,3,7,8-TCDD	0.001	0.003	0.039
1,2,3,7,8-PeCDD	0.006	0.046	0.122
1,2,3,4,7,8-HxCDD	0.000	0.010	0.009
1,2,3,6,7,8-HxCDD	0.008	0.060	0.018
1,2,3,7,8,9-HxCDD	0.000	0.027	0.014
1,2,3,4,6,7,8-HpCDD	0.010	0.150	0.006
1,2,3,4,6,7,8,9-OCDD	0.002	0.033	0.000
2,3,7,8-TCDF	0.001	0.000	0.016
1,2,3,7,8-PeCDF	0.001	0.000	0.004
2,3,4,7,8-PeCDF	0.016	0.000	0.047
1,2,3,4,7,8-HxCDF	0.027	0.008	0.005
1,2,3,6,7,8-HxCDF	0.013	0.002	0.010
1,2,3,7,8,9-HxCDF	0.011	0.000	0.000
2,3,4,6,7,8-HxCDF	0.019	0.005	0.006
1,2,3,4,6,7,8-HpCDF	0.010	0.032	0.001
1,2,3,4,7,8,9-HpCDF	0.001	0.001	0.000
1,2,3,4,6,7,8,9-OCDF	0.000	0.002	0.000

Table 2

Principal Components Analysis – Eigen Values

	PC1	PC2	PC3	PC4
Standard Deviation	0.180	0.087	0.053	0.048
Proportion of Variance	62.1%	14.6%	5.4%	4.4%
Cumulative Proportion	0.621	0.767	0.821	0.865

FIGURES

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- Sample Location
- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

NOTE:
Approximate location of 2013 sediment samples and historic samples, generated as an Excel scatterplot with latitude/longitude as the x,y coordinates for each sample. Surface sample locations are noted with an SS prefix and then a two digit number identifying the location, and subsurface samples have an SC prefix. Historical data are from Cascade Pole (CP), East Bay Redevelopment Site (EBRS), Hardel Mutual Plywood (HMP) and Reliable Steel (RS).

Visualization of spatial patterns for the chemometrics evaluation utilized Excel plots with the Longitude/Latitude of each point as the x,y coordinate, and symbol characteristics to visualize the results.

Feet
0 350 700 1,050 1,400

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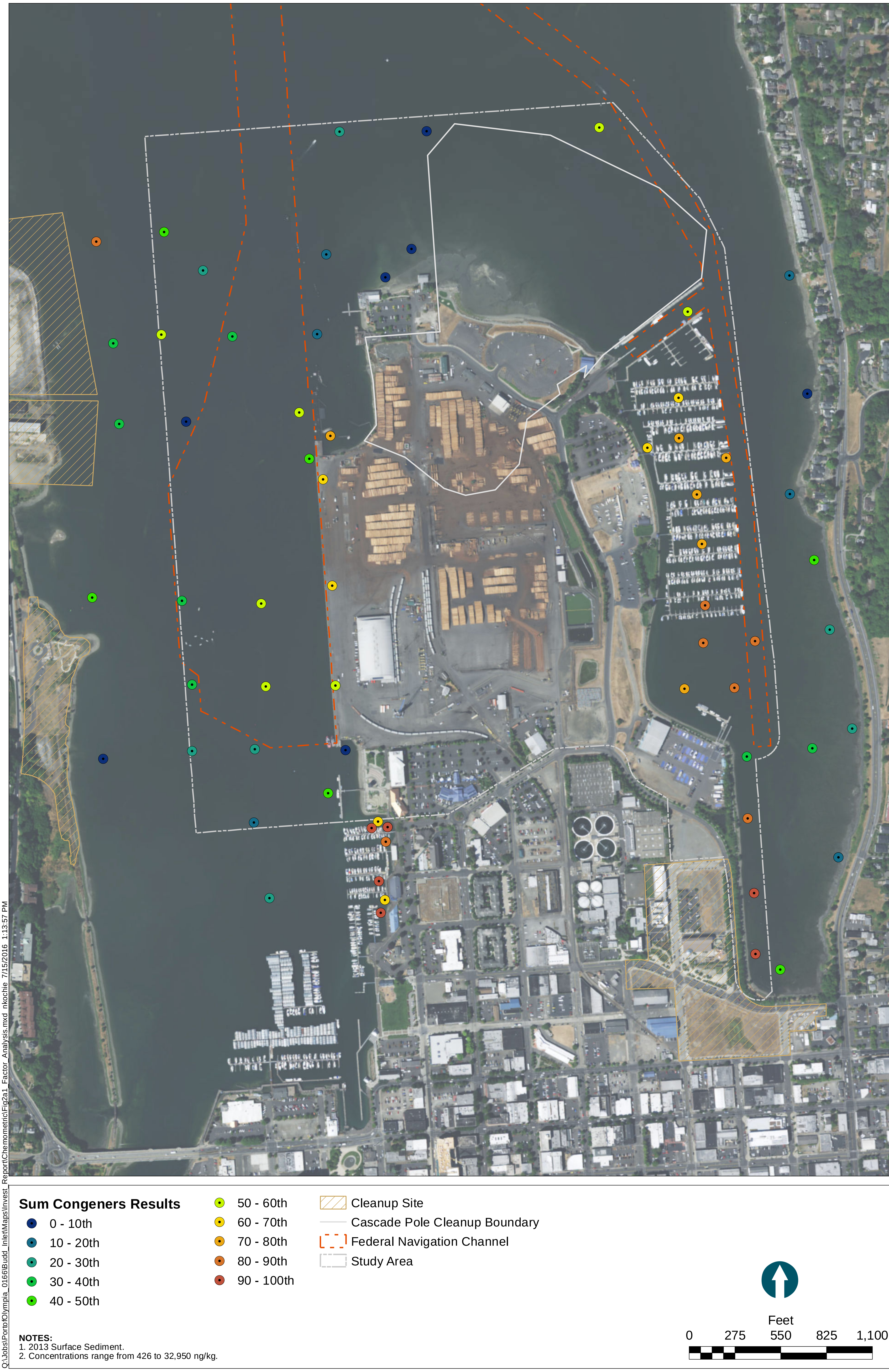
Figure 1
Sample Locations
Chemometrics Source Investigation
Budd Inlet Investigation Report



NOTES:
1. 2013 Surface Sediment.
2. Concentrations range from 426 to 32,950 ng/kg.

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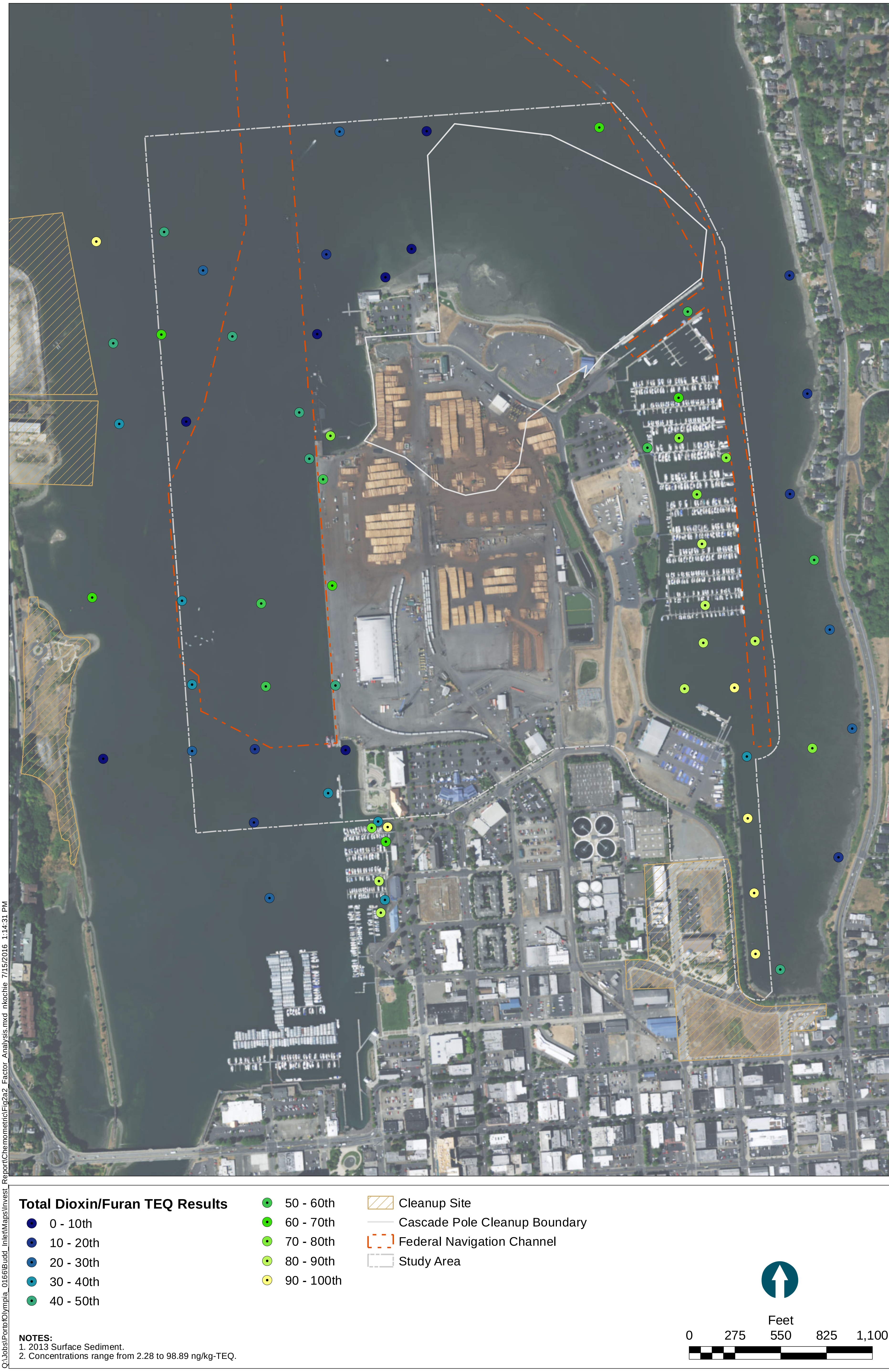
Figure 2a-1
Spatial Distribution of Surface Sample Concentration
Chemometrics Source Investigation
Budd Inlet Investigation Report



NOTES:
1. 2013 Surface Sediment.
2. Concentrations range from 2.28 to 98.89 ng/kg-TEQ.

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Figure 2a-2
Spatial Distribution of Surface Sample TEQ
Chemometrics Source Investigation
Budd Inlet Investigation Report

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NOTES:
1. 2013 Subsurface Sediment.
2. Concentrations range from 25.1 to 448,855 ng/kg.

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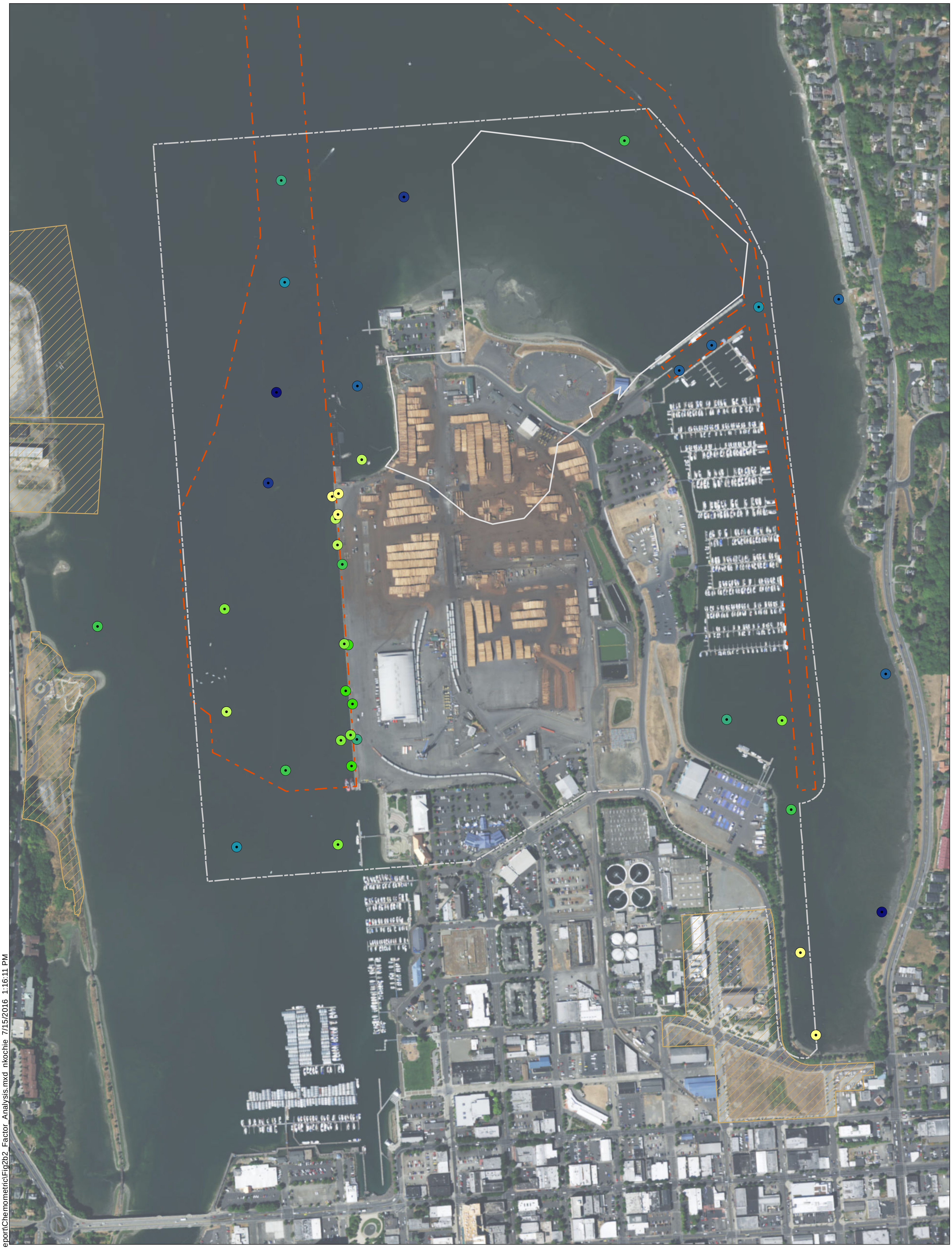
Figure 2b-1
Spatial Distribution of Subsurface Sample Concentration
Chemometrics Source Investigation
Budd Inlet Investigation Report



Total Dioxin/Furan TEQ Results

- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet
0 275 550 825 1,100

NOTES:
1. 2013 Subsurface Sediment.
2. Concentrations range from 0.31 to 1,283 ng/kg-TEQ.

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Figure 2b-2
Spatial Distribution of Subsurface Sample TEQ
Chemometrics Source Investigation
Budd Inlet Investigation Report

Sum Congeners Results
- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet
0 275 550 825 1,100

NOTES:
1. Historical Data including Surface Sediment, Subsurface Sediment, and Upland Soils.
2. Concentrations range from 401 to 552,735 ng/kg.

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Figure 2c-1
Spatial Distribution of Historical Sample Concentration
Chemometrics Source Investigation
Budd Inlet Investigation Report

Total Dioxin/Furan TEQ Results

- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet
0 275 550 825 1,100

NOTES:
1. Historical Data including Surface Sediment, Subsurface Sediment, and Upland Soils.
2. Concentrations range from 1.62 to 4,213 ng/kg-TEQ.

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Figure 2c-2
Spatial Distribution of Historical Sample TEQ
Chemometrics Source Investigation
Budd Inlet Investigation Report

Sum Congeners Results

- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet
0 275 550 825 1,100

NOTES:
1. Port and City Catch Basin Solids.
2. Concentrations range from 3,347 to 899,081 ng/kg.

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Figure 2d-1
Spatial Distribution of Catch Basin Sample Concentration
Chemometrics Source Investigation
Budd Inlet Investigation Report

Total Dioxin/Furan TEQ Results

- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet
0 350 700 1,050 1,400

NOTES:
1. Port and City Catch Basin Solids.
2. Concentrations range from 12.45 to 2,022 ng/kg-TEQ.

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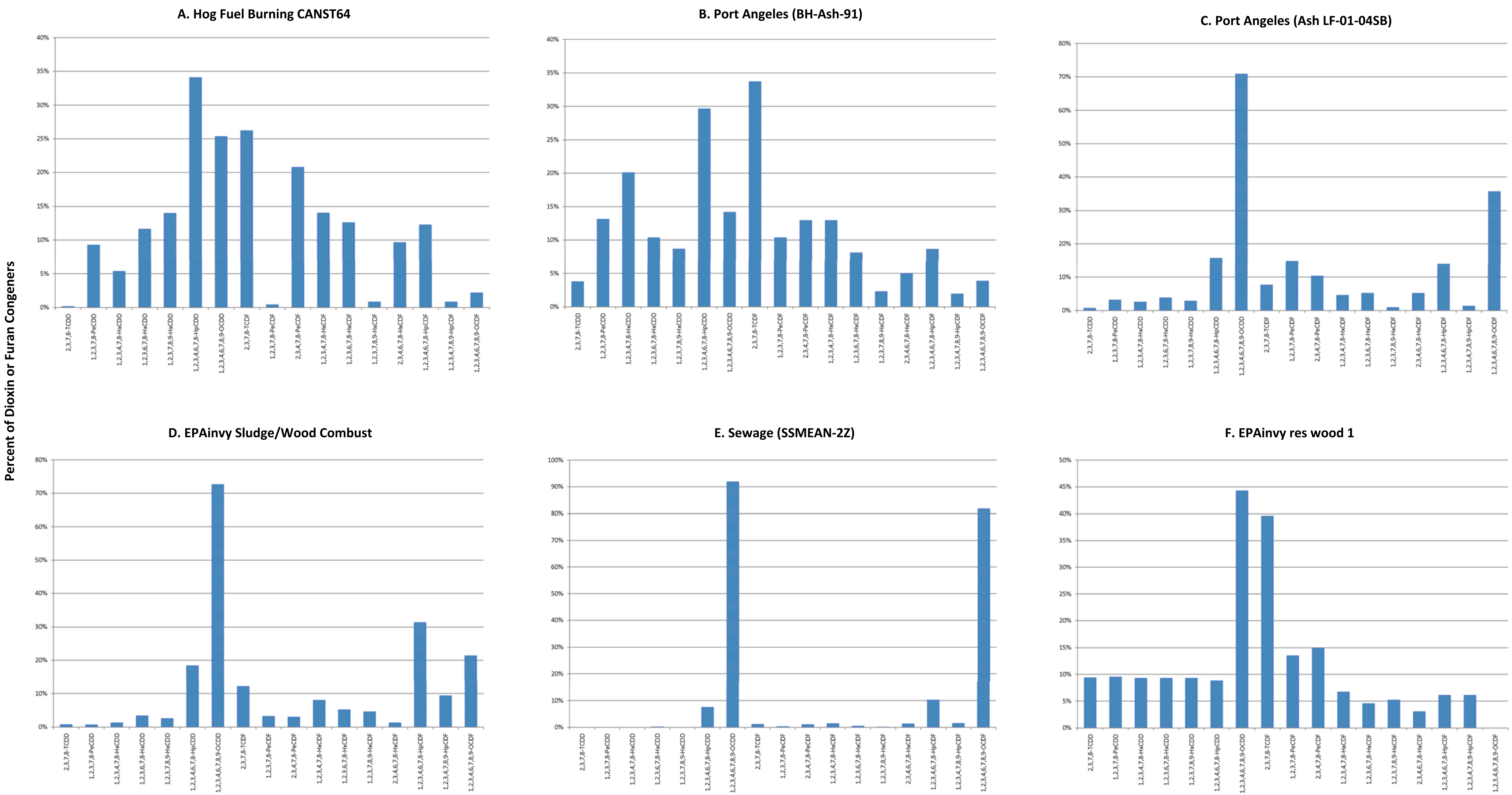
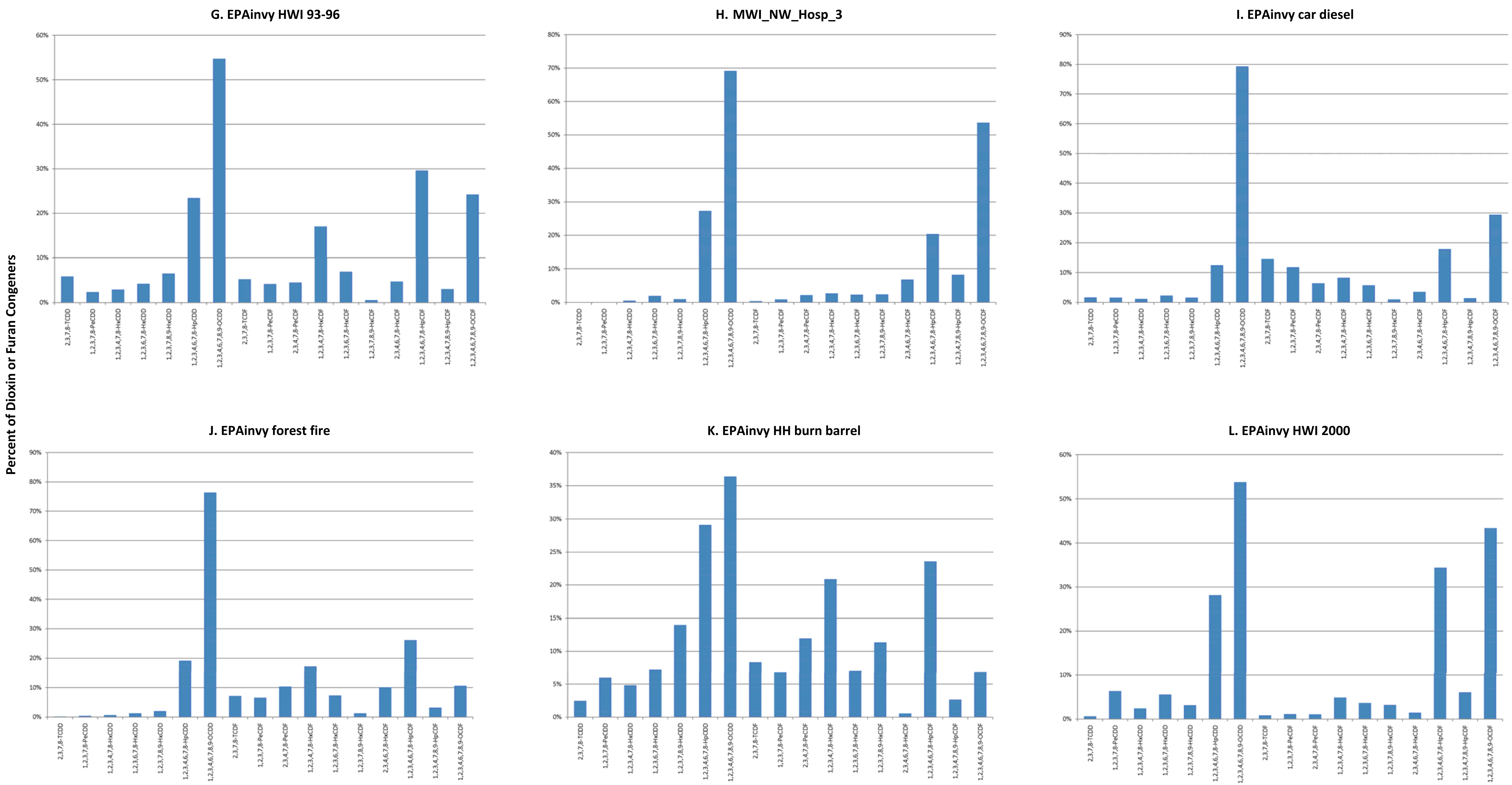
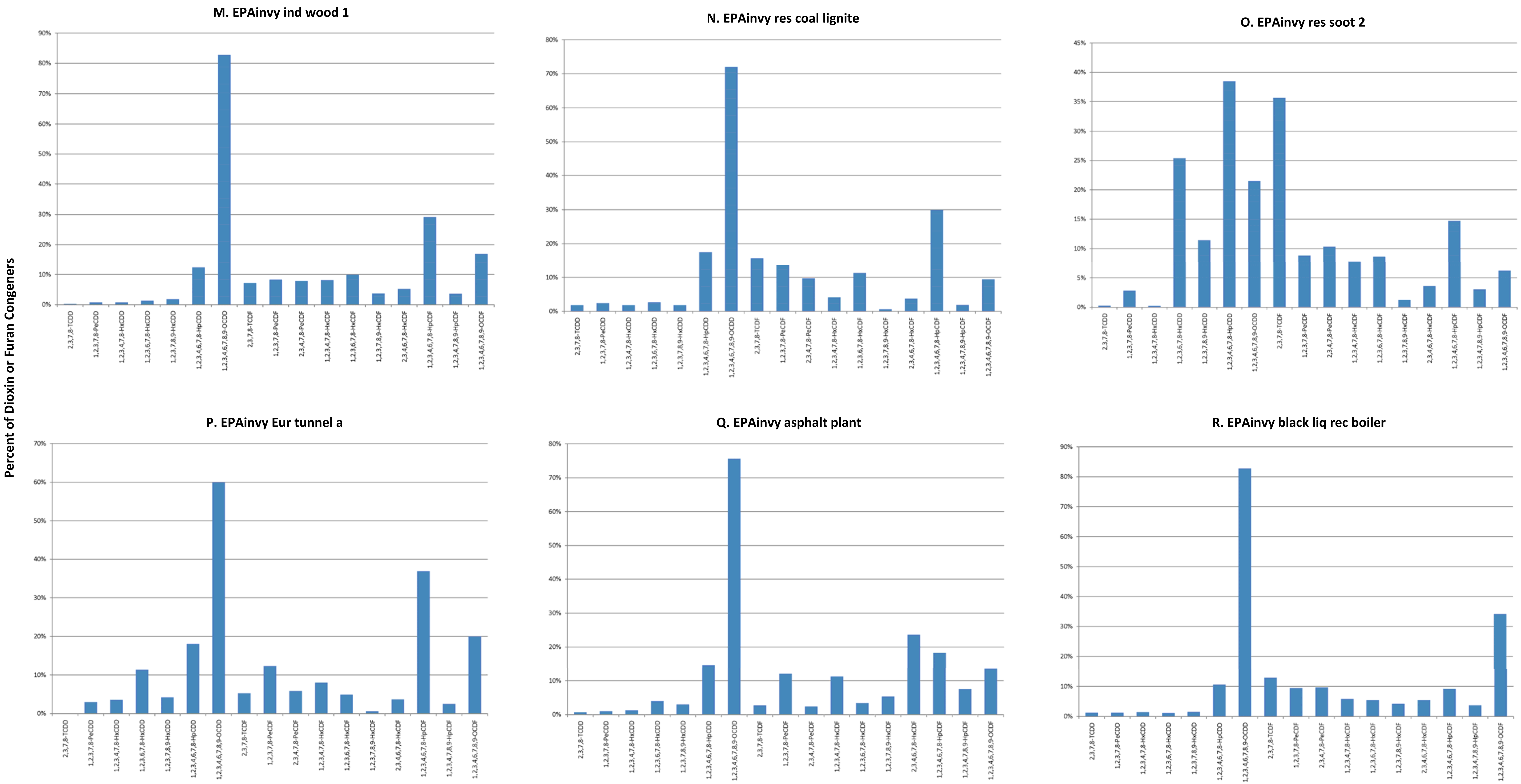
Figure 2d-2
Spatial Distribution of Catch Basin Sample TEQ
Chemometrics Source Investigation
Budd Inlet Investigation Report



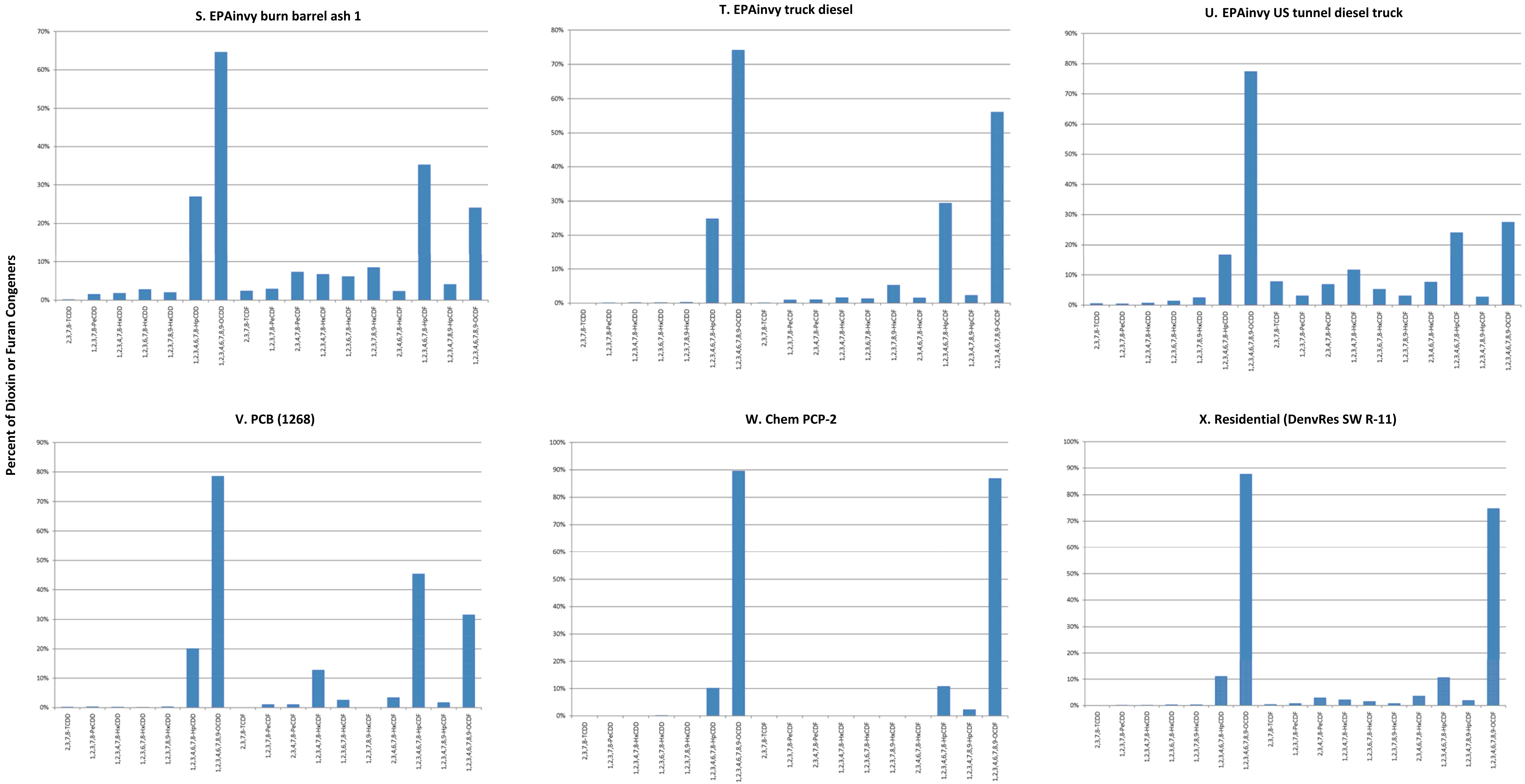
Congener profiles from Rayonier Mill study (Ecology 2011). Congeners are graphed as a percentage of either sum dioxins or furans, respectively.



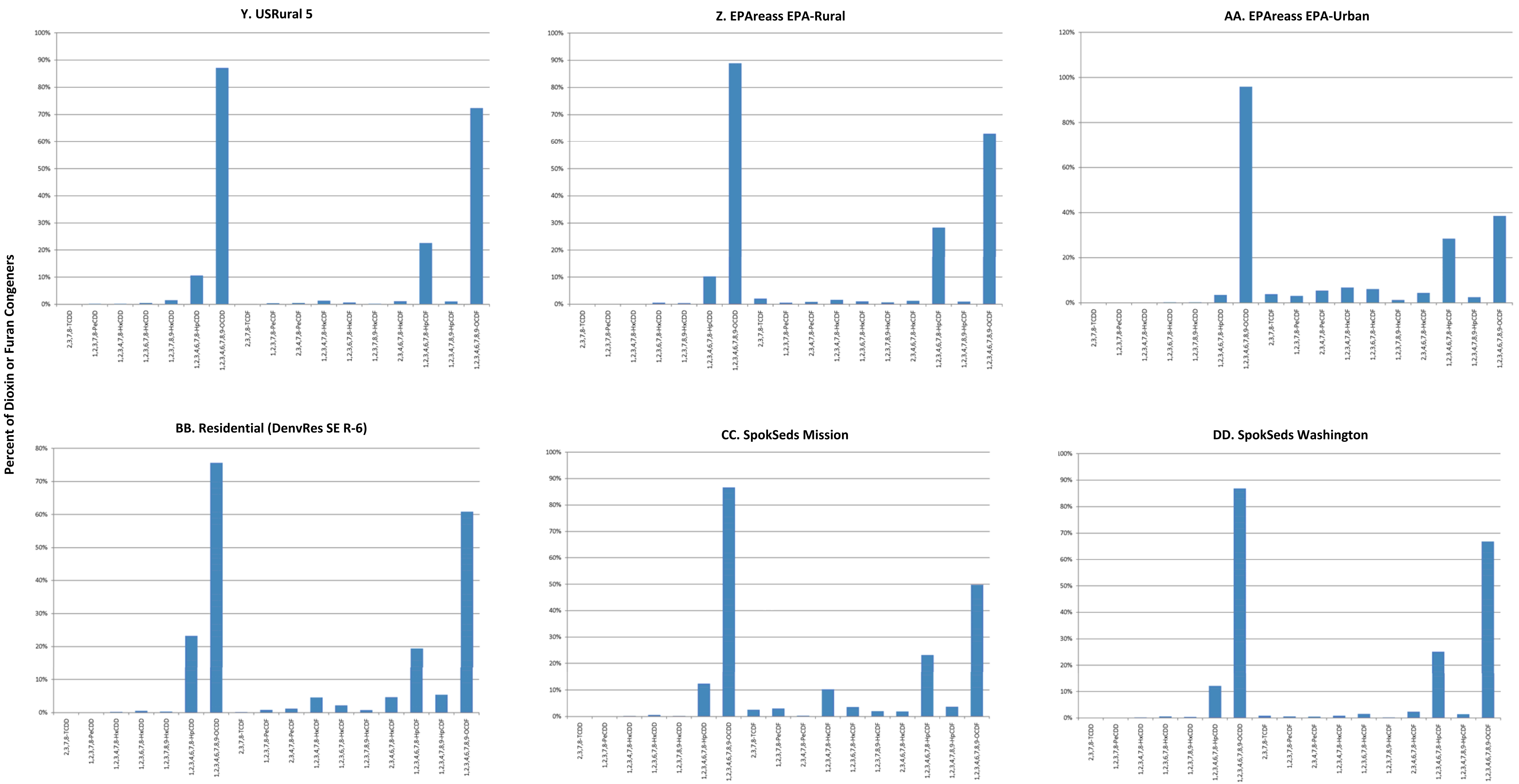
Congener profiles from Rayonier Mill study (Ecology 2011). Congeners are graphed as a percentage of either sum dioxins or furans, respectively.



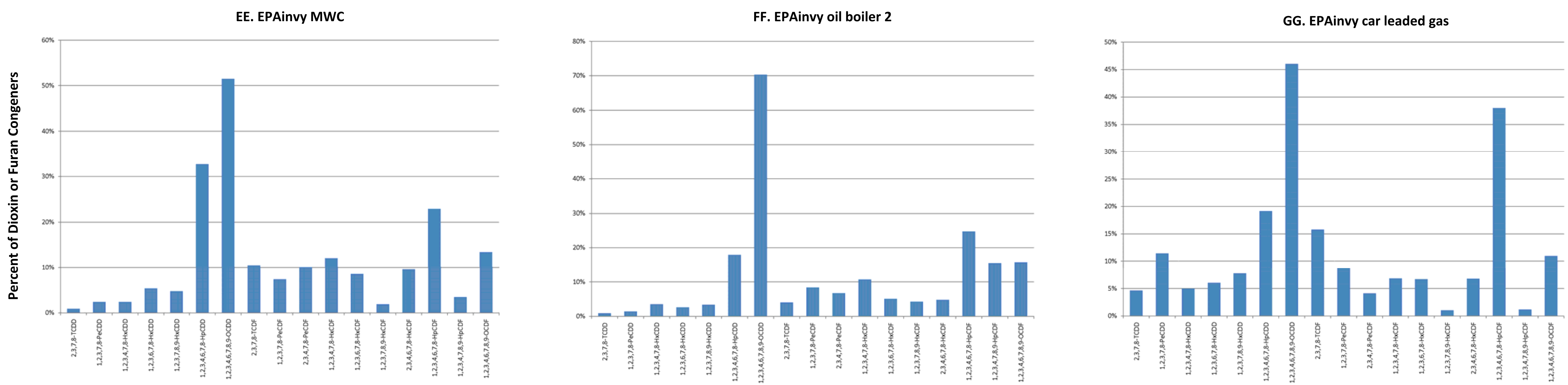
Congener profiles from Rayonier Mill study (Ecology 2011). Congeners are graphed as a percentage of either sum dioxins or furans, respectively.



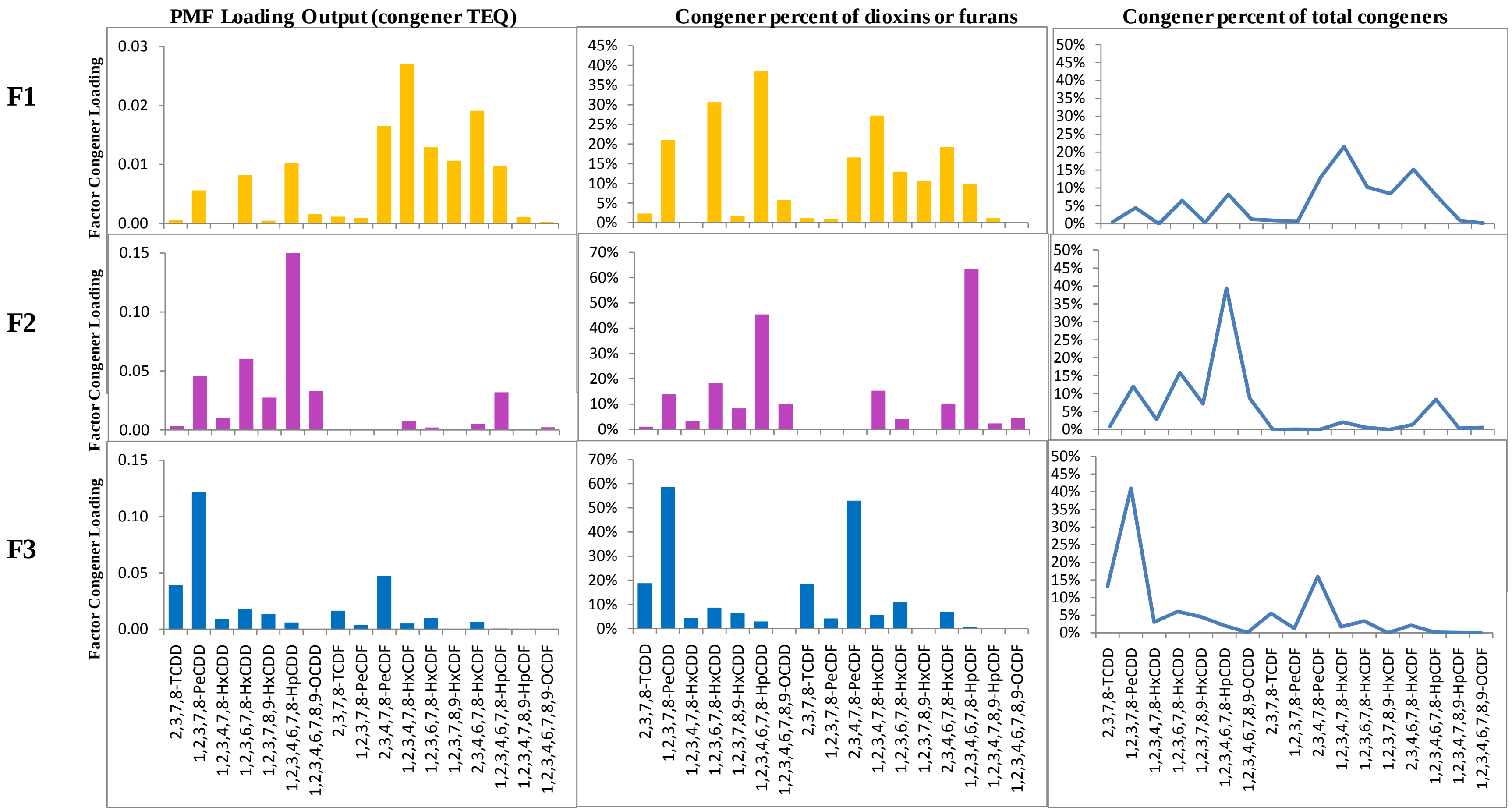
Congener profiles from Rayonier Mill study (Ecology 2011). Congeners are graphed as a percentage of either sum dioxins or furans, respectively.



Congener profiles from Rayonier Mill study (Ecology 2011). Congeners are graphed as a percentage of either sum dioxins or furans, respectively.



Congener profiles from Rayonier Mill study (Ecology 2011). Congeners are graphed as a percentage of either sum dioxins or furans, respectively.



Shown above are the EPA PMF factor loadings for the complete chemometrics dataset, presented as raw loading values from PMF (left), percent of dioxin or furan congeners (middle), and percent of total (right). The factors vary in the relative proportions of dioxin and furan congeners, and of the less chlorinated congeners. A summary is as follows:

- F1 has a greater contribution of furans than dioxins.
- F2 has a greater contribution of dioxins than furans.
- F3 reflects a greater contribution of the less chlorinated congeners of both dioxins and furans.

Figure 4
PMF Factor Loadings
Chemometrics Source Investigation
Budd Inlet Investigation Report

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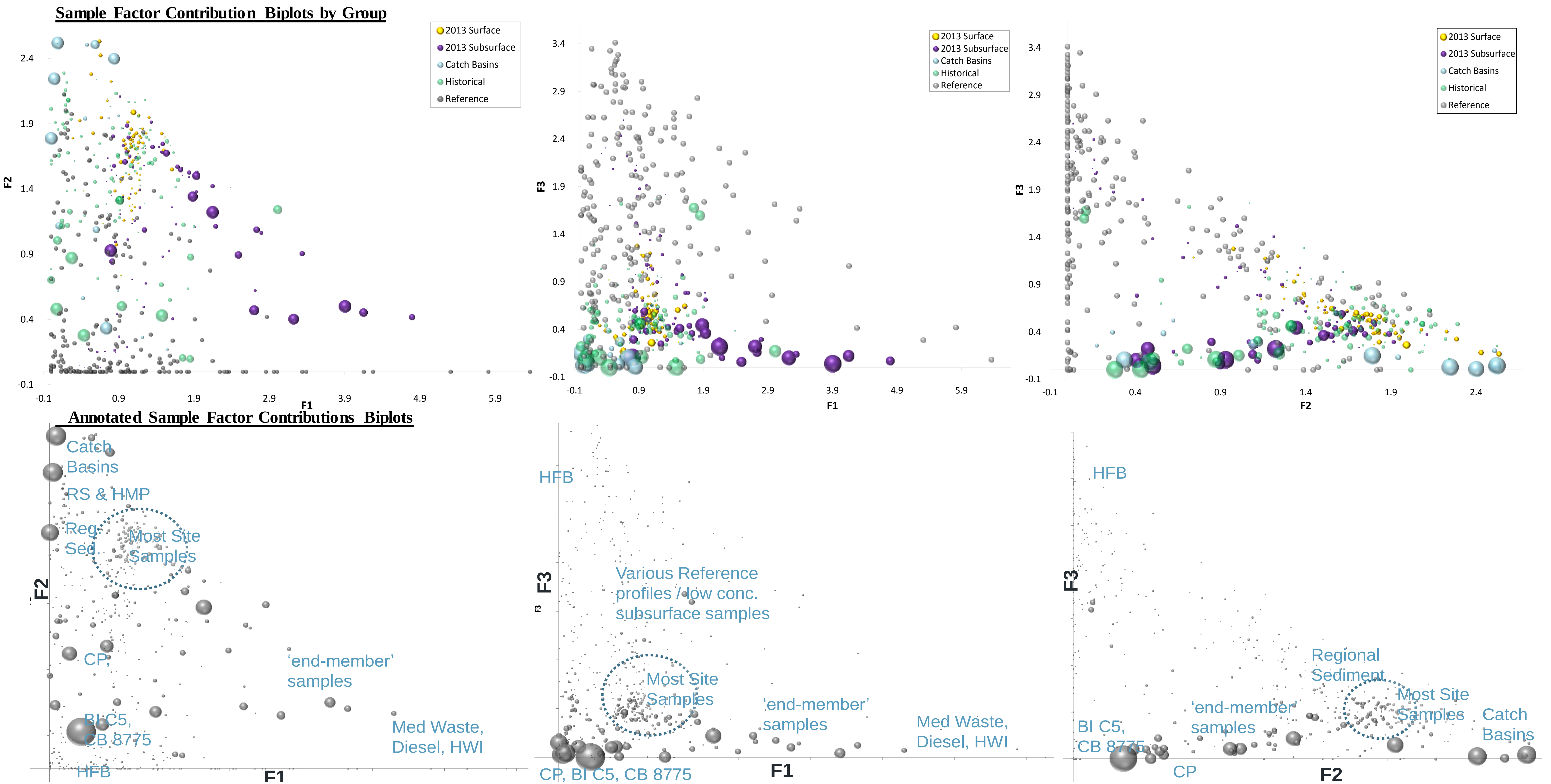

Shown above are factor (F) biplots for the individual sample contributions, with the symbol size scaled to sample TEQ. Select samples are identified, including the 2013 surface samples, which plot closely on the factor biplots. Factor 1 has strong factor contributions in subsurface samples from the southern end of East Bay (notably SC-50) and moderate factor contributions in high-concentration subsurface samples near Berth 3 North (high-concentration subsurface samples from these two areas are referred to as 'end-member' samples for brevity), and reference profiles that have strong factor contributions include a variety of combustion sources, including truck diesel, highway (presumably cars and trucks), and medical waste incineration. Factor 2 has strong factor contributions in the catch basin samples and historical samples from Reliable Steel and Hardel Plywood, as well as historical surface sediment shoreline samples. Factor 3 has strong factor contributions for hog fuel burning and Port Angeles reference profiles, as well as for low-concentration subsurface samples. High-concentration Cascade Pole samples and pentachlorophenol reference profiles do not have strong factor contributions.

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Figure 5
PMF Factor Biplots
Chemometrics Source Investigation
Budd Inlet Investigation Report

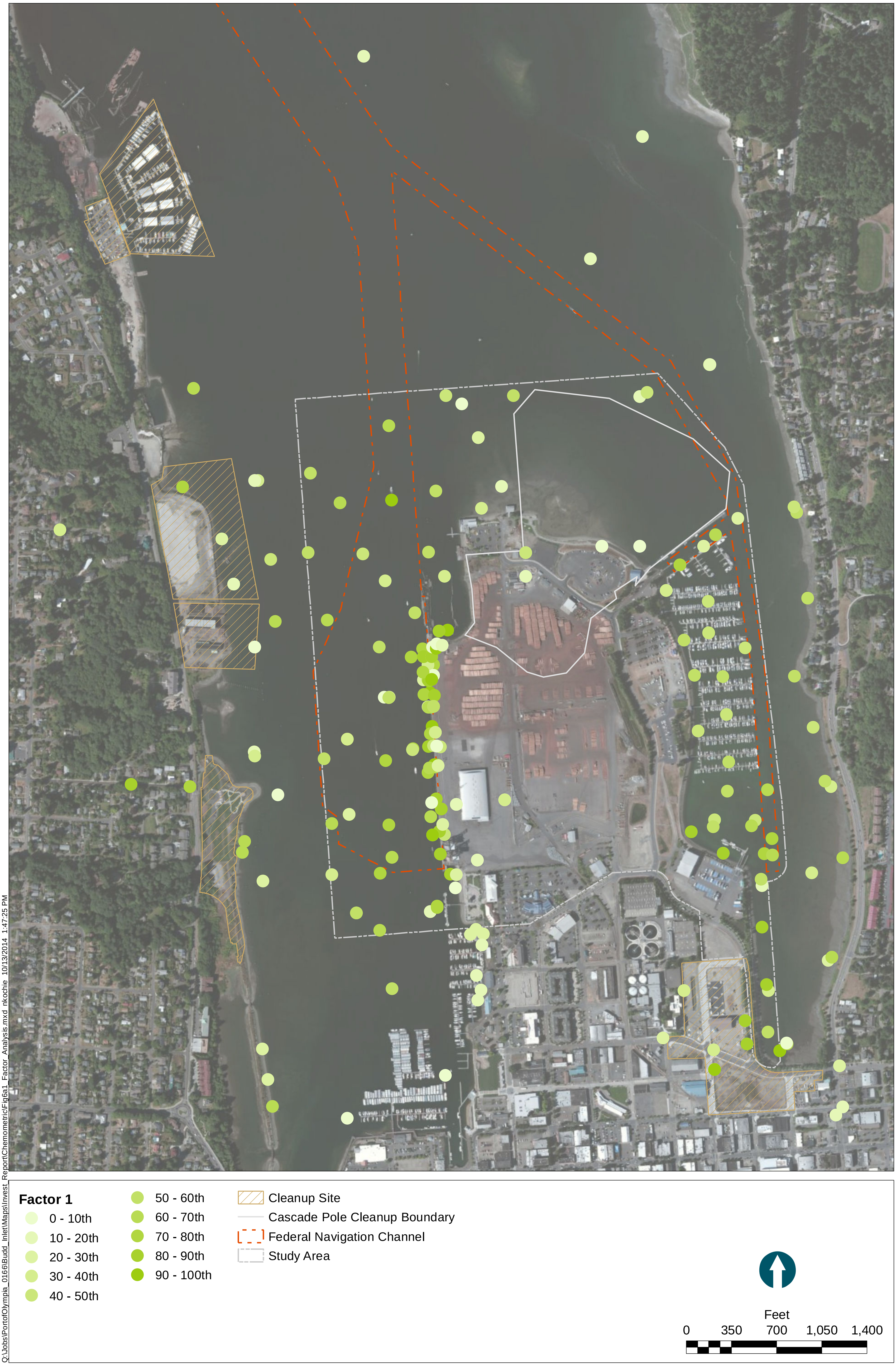

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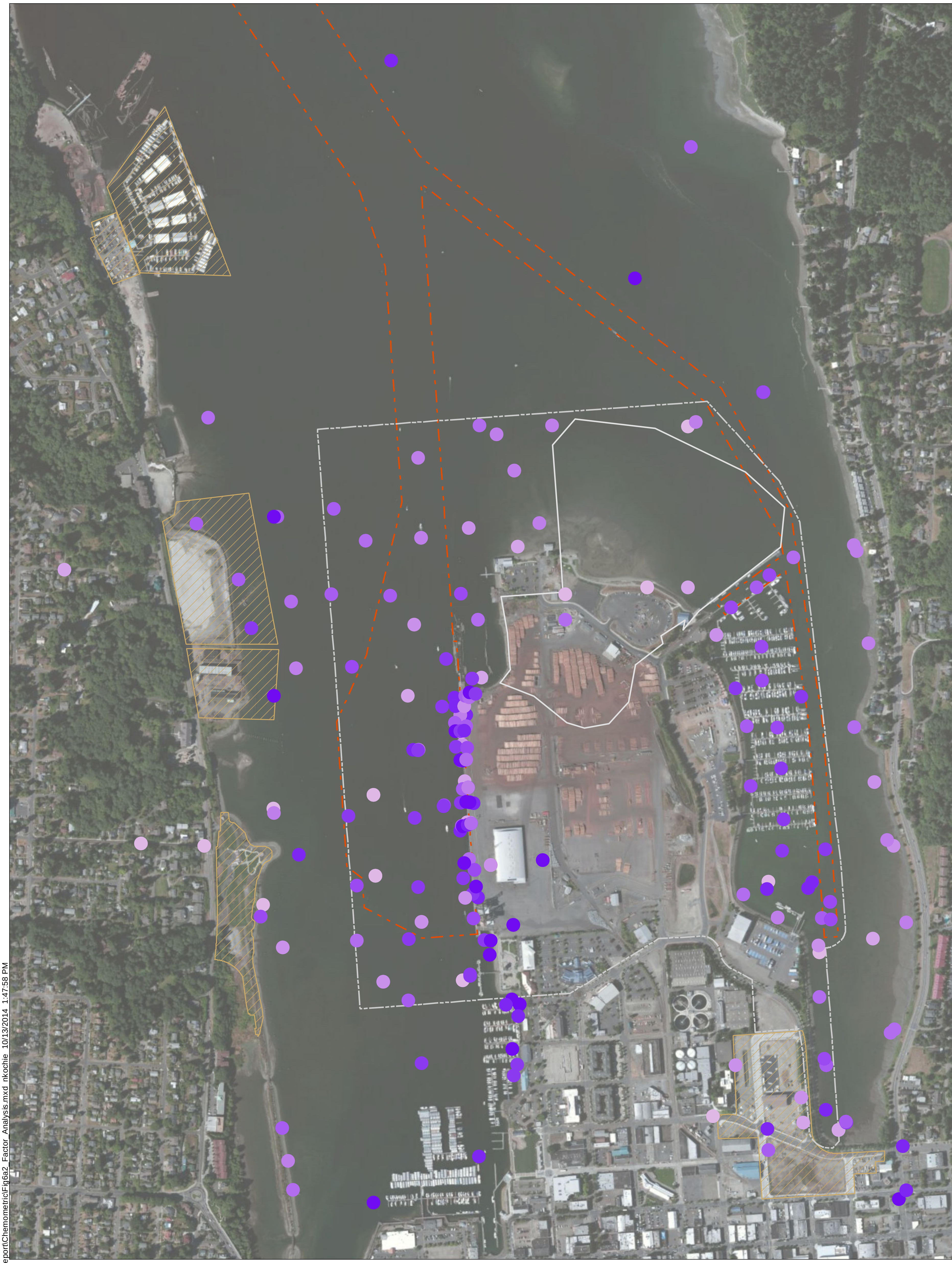
Figure 6a-1
Spatial Distribution of Factor 1 Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report



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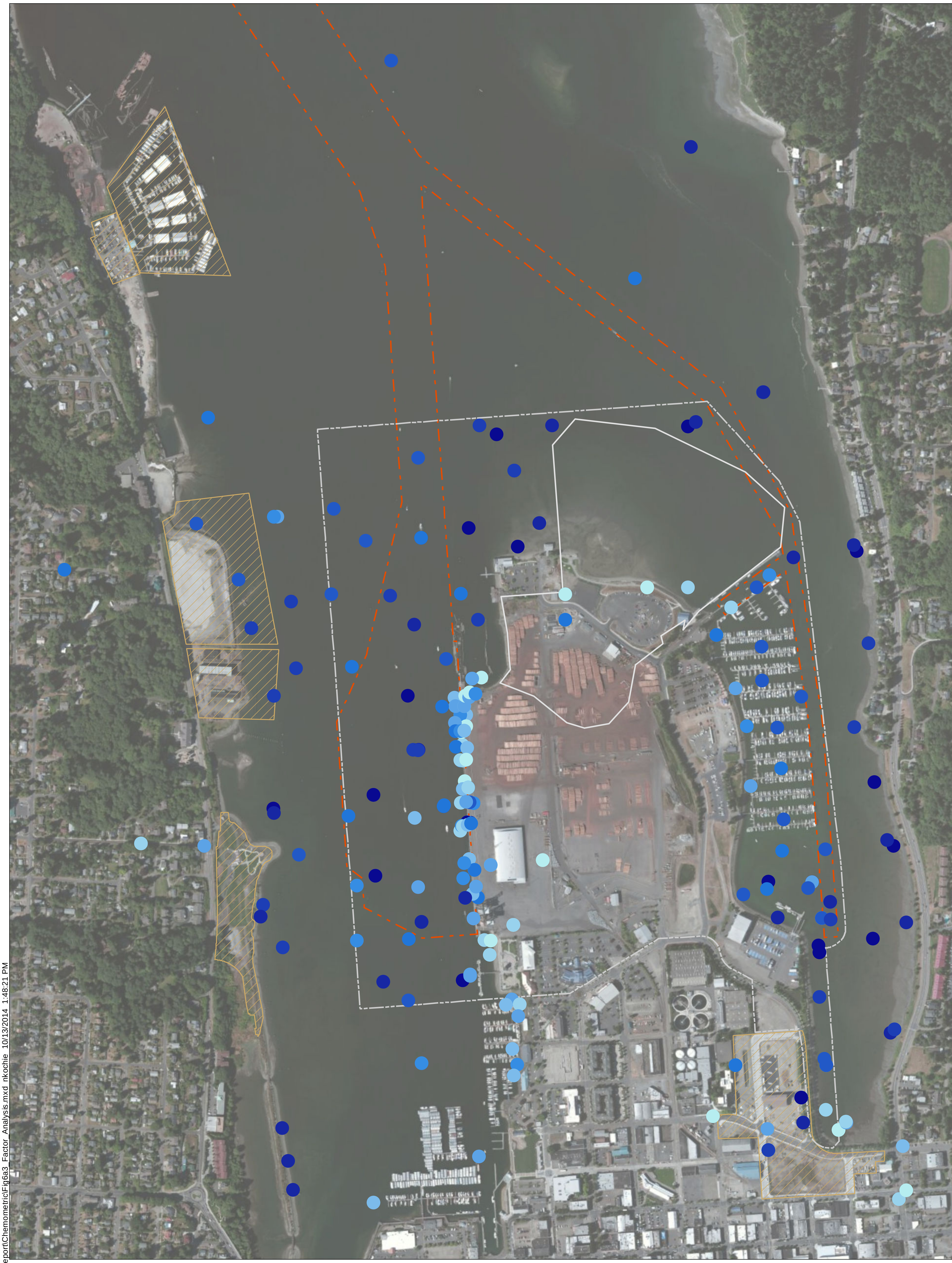
Factor 2
- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet
0 350 700 1,050 1,400

ANCHOR QEA

Figure 6a-2
Spatial Distribution of Factor 2 Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report



Factor 3

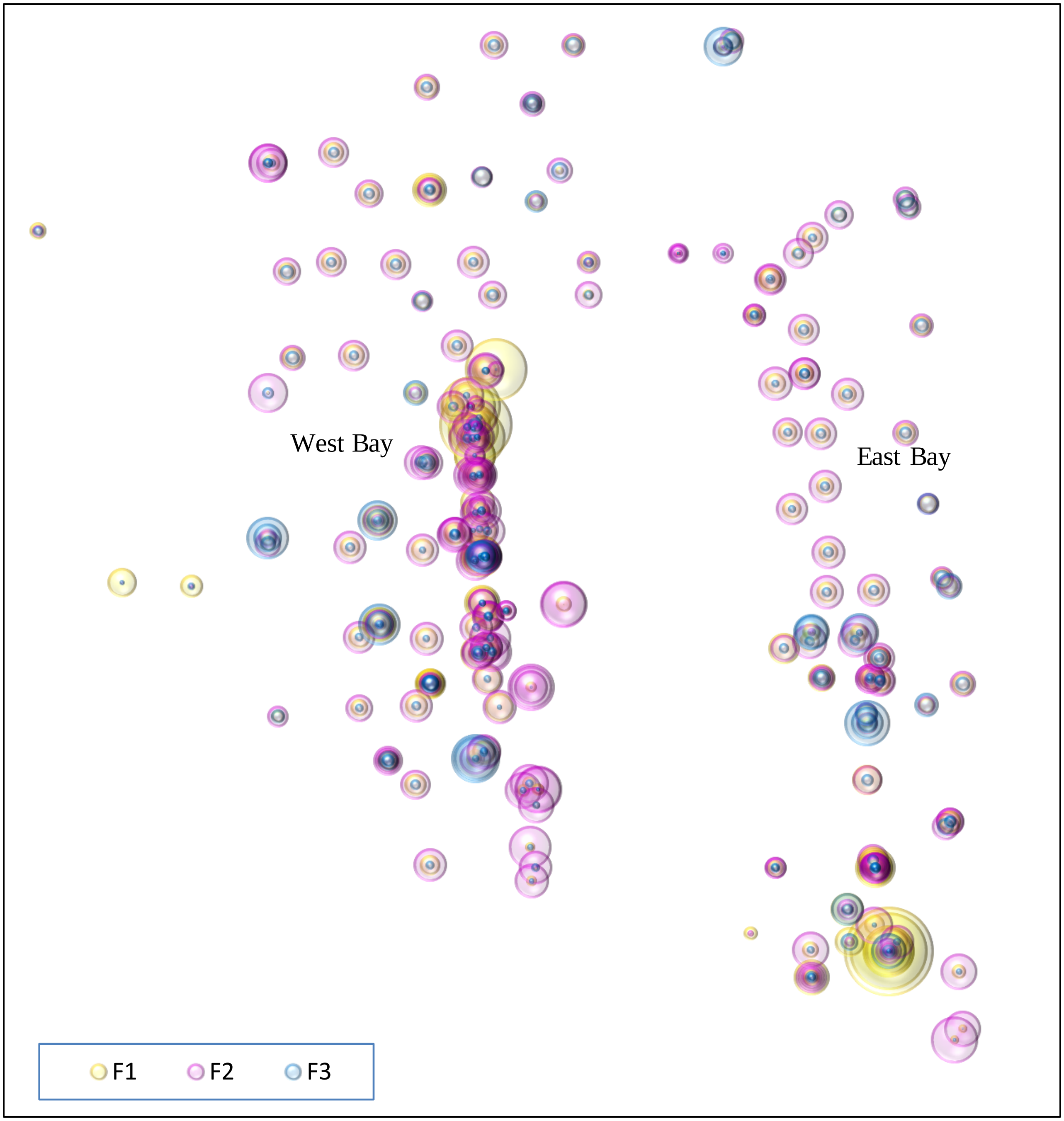
- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet
0 350 700 1,050 1,400

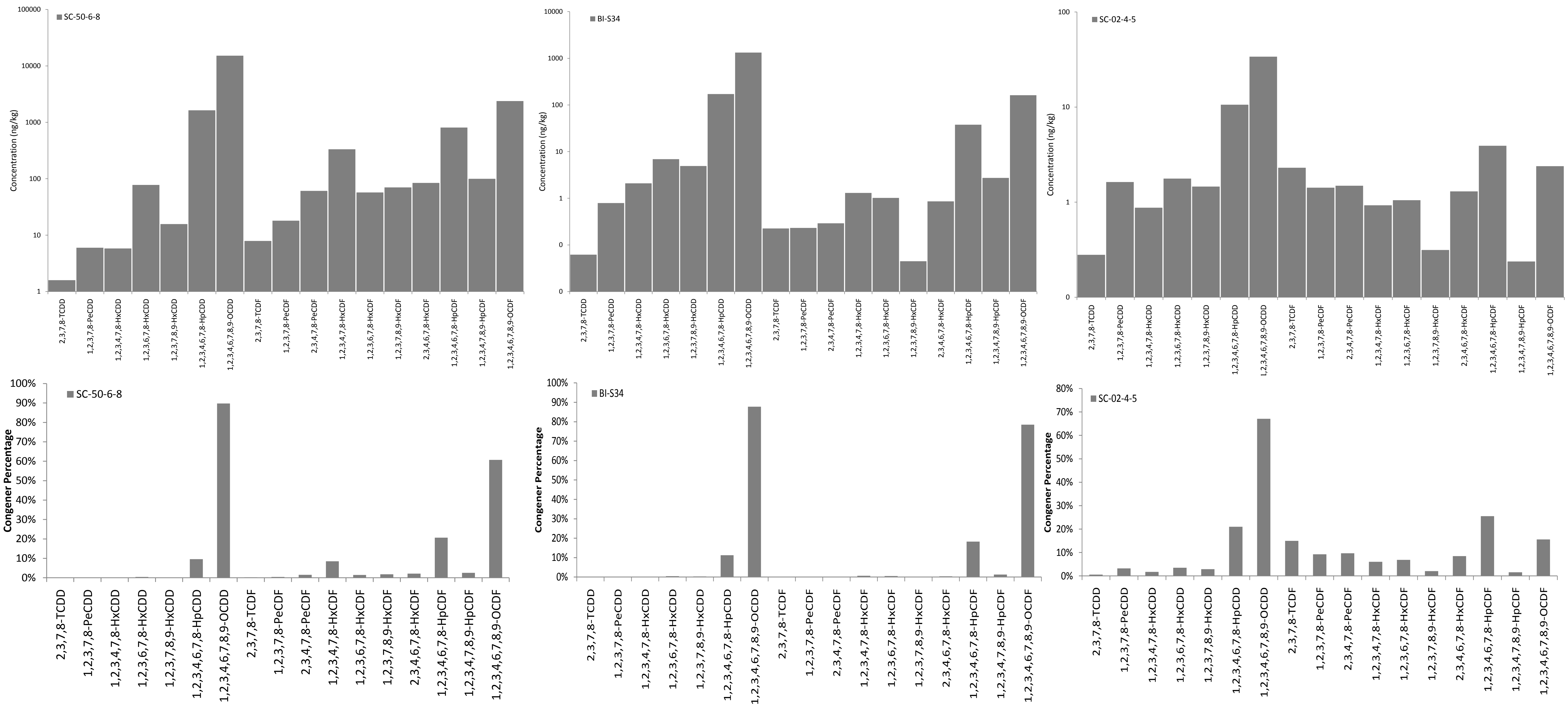
ANCHOR QEA

Figure 6a-3
Spatial Distribution of Factor 3 Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report

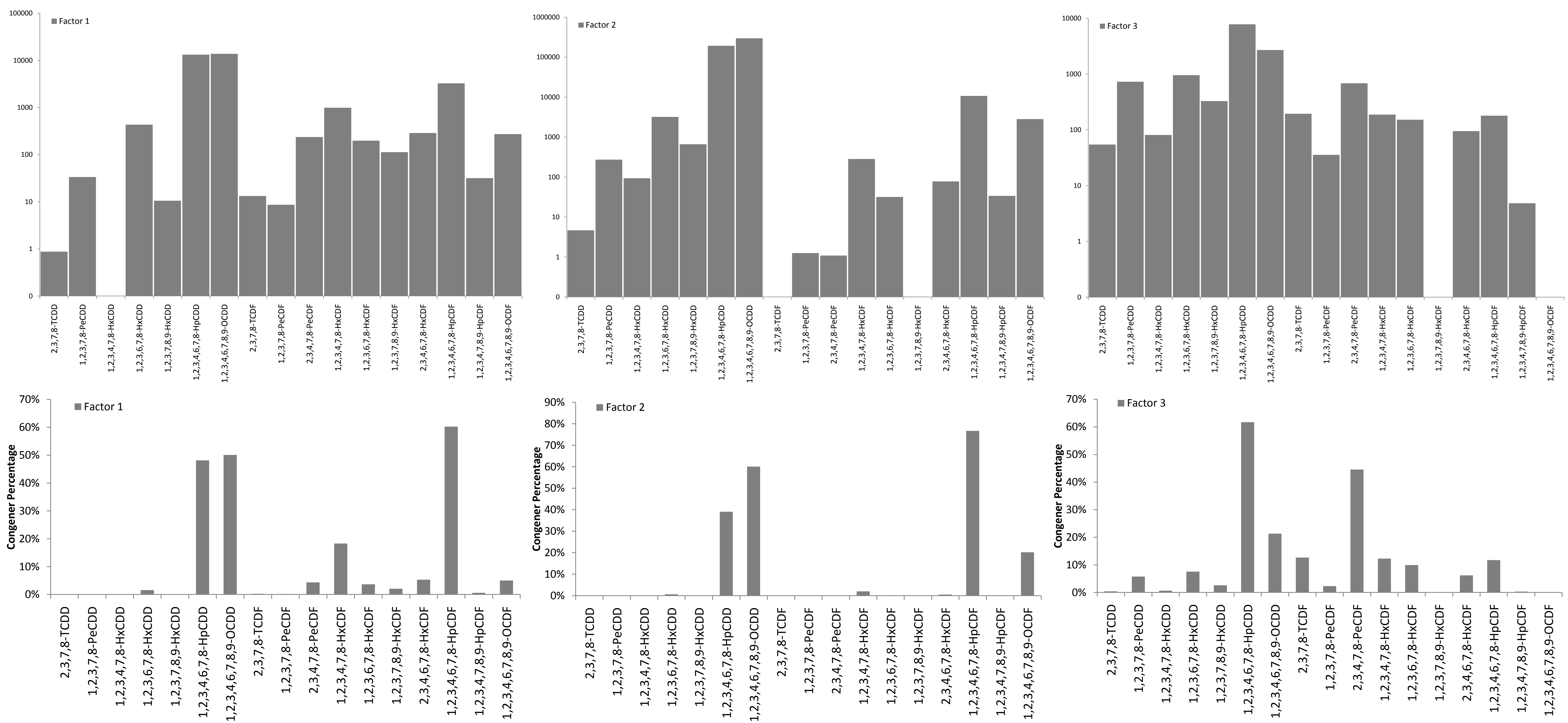


The above shows the spatial variability in factor contributions by sample, where symbol color identifies each factor and symbol size is scaled to the value of the factor contribution for each sample. This figure includes surface, subsurface, historical, and catch basin samples. Patterns are apparent in the combined factor contributions, including the previously identified Factor 1 'end-member' sample areas along the southern shore of East Bay and near Berth 3 North, the relatively strong Factor 2 contribution along the southeastern shore of West Bay and along the northwestern shore of West Bay, and strong Factor 3 contributions mid-channel of West Bay and along the eastern shore of East Bay. The other notable pattern is that many of the samples have mixed Factor 1, 2, and 3 contributions.

Figure 6b
Combined Factor Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report



Shown above are plots of the individual congener concentrations for the site samples with the greatest contributions for each factor. The upper panel shows the congener concentrations, and the bottom panel shows congeners as a percent of the total dioxin or furan congeners. The site sample with the strongest factor contribution for Factor 1 is SC-50-6-8. The site sample with the greatest Factor 2 contribution is a historical surface sediment sample collected in 2007, BI-S34. The site sample with the greatest Factor 3 contribution is SC-02-4-5. The TEQ varies widely between these samples, ranging from 1.93 for SC-02-4-5 to 122.2 for SC50-6-8. Factor biplots show that several high-concentration samples have strong Factor 1 contributions, while samples with strong Factor 3 loadings are the lowest-concentration site samples, and no clear relationship is observed between Factor 2 and concentration.



PMF factor loadings are shown above as congener concentrations (congener loadings divided by TEF value and multiplied by the sum TEF-corrected concentration). Factor congener loadings are shown both as concentration (top) and as a percentage of the total dioxins or furans (bottom). The uncorrected congener loadings show greater relative furan congeners for Factor 1, greater relative furan congener loadings for Factor 2, and relatively greater concentrations of the less chlorinated congeners for Factor 3.

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Figure 7b
PMF Factor Congener Profiles
Chemometrics Source Investigation
Budd Inlet Investigation Report

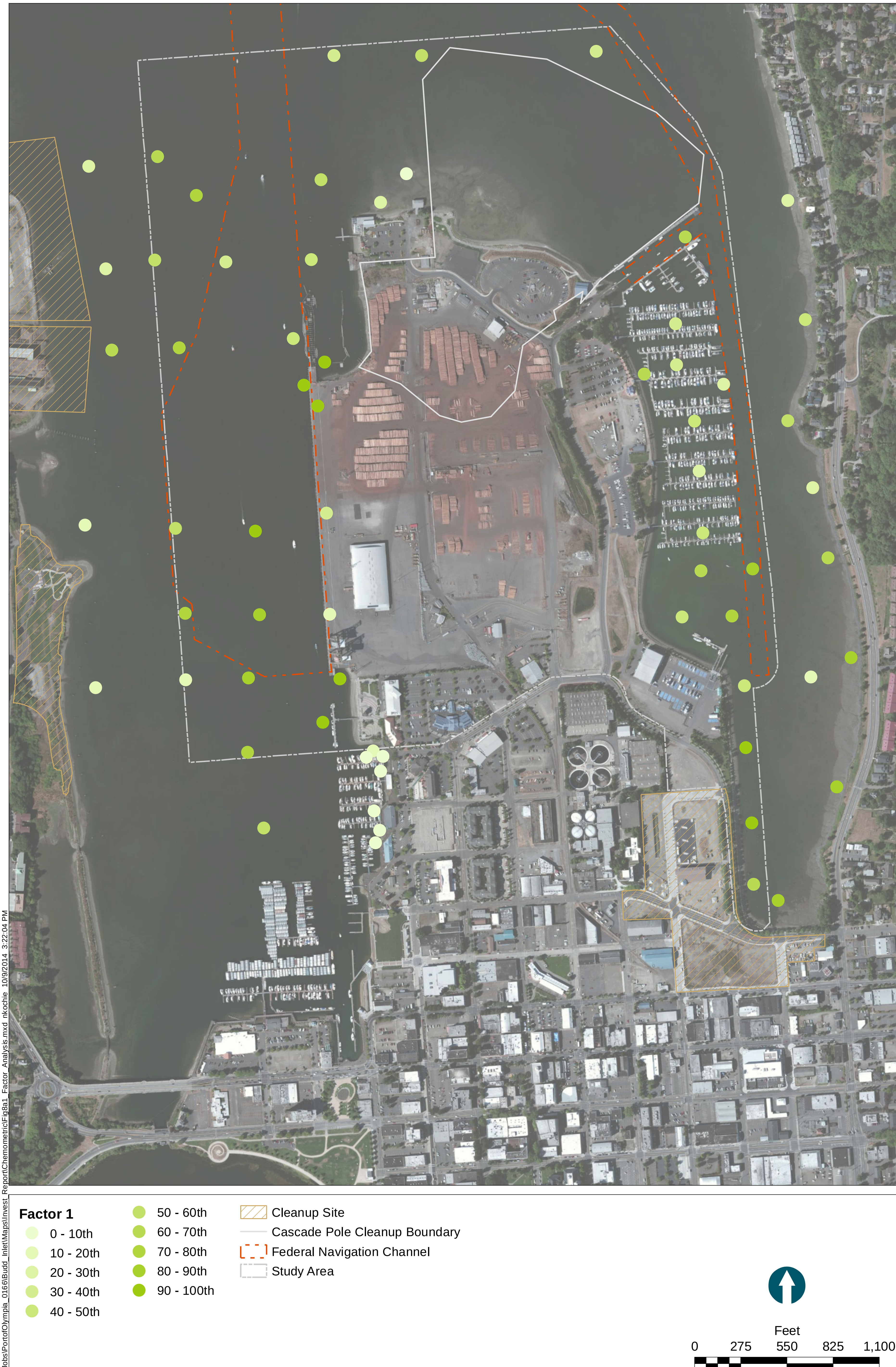

Figure 8a-1
Spatial Distribution of Factor 1 Surface Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report

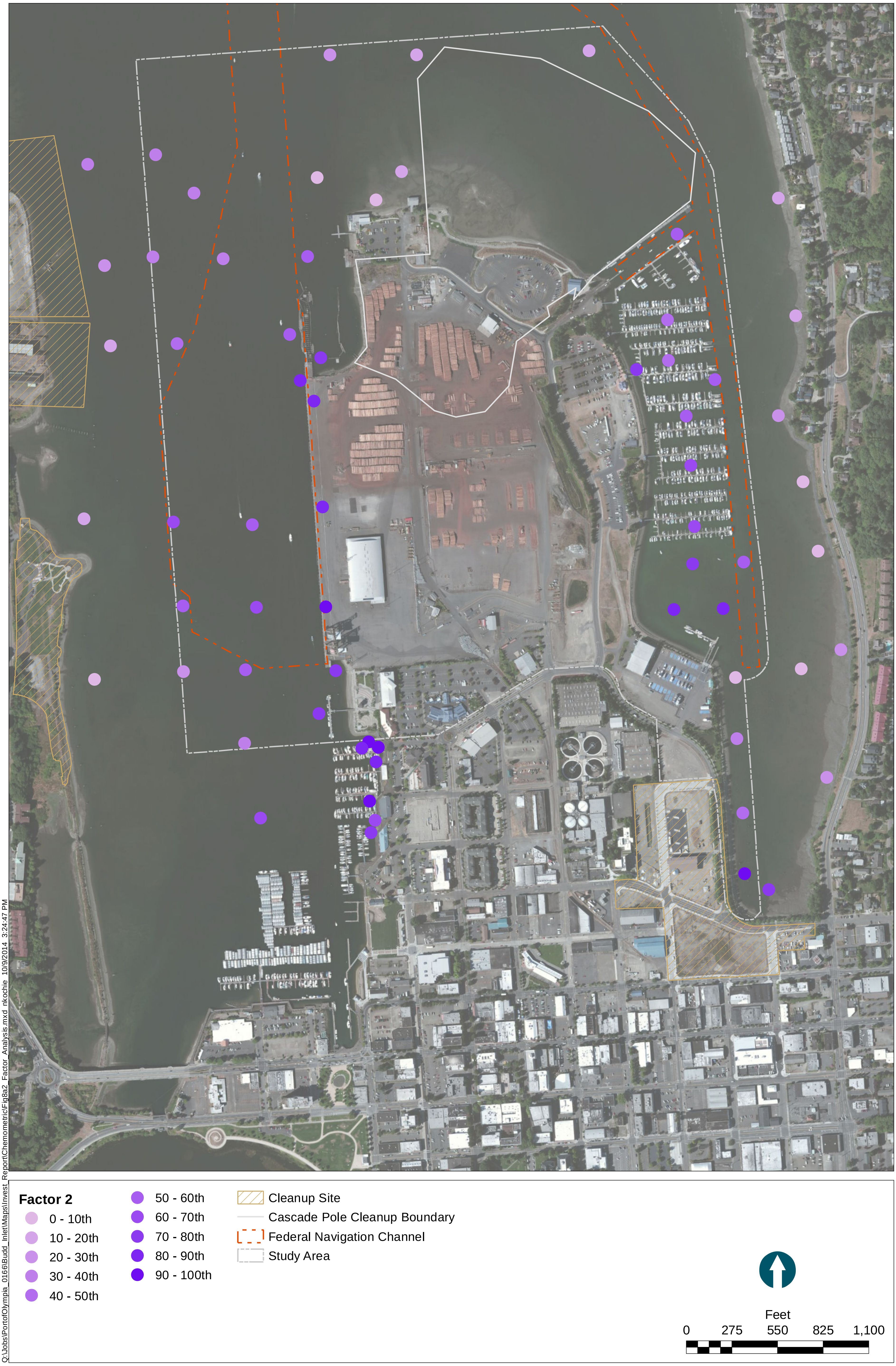

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Figure 8a-2
Spatial Distribution of Factor 2 Surface Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report

Factor 3

- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet

0 275 550 825 1,100

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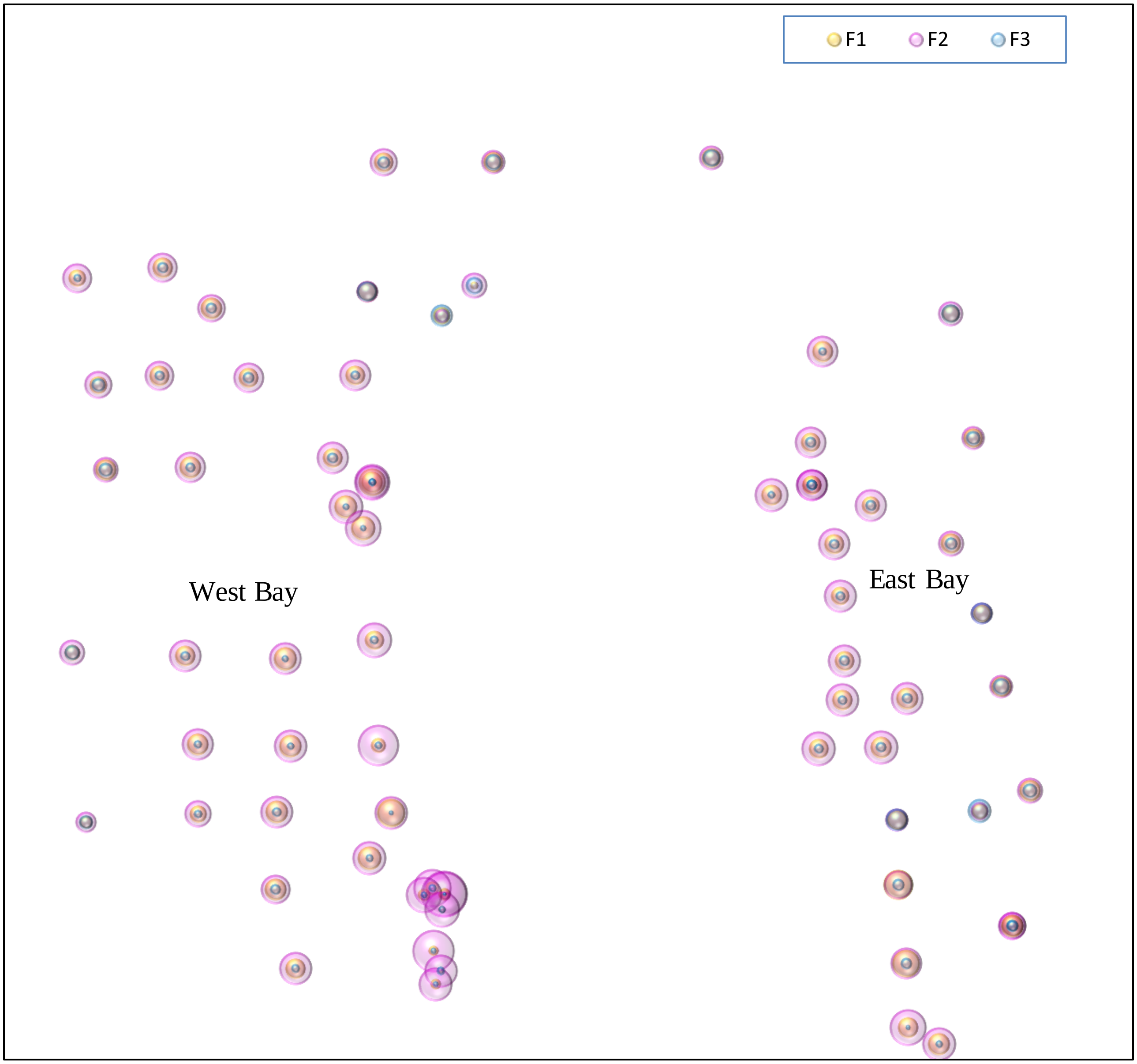
Figure 8a-3
Spatial Distribution of Factor 3 Surface Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report



Shown above is the spatial variability in factor contributions by sample, where symbol color identifies each factor and symbol size is scaled to the value of the factor contribution for each sample. This figure includes only the 2013 surface samples. The majority of samples have a consistent mixture of contributions from the three factors, with Factor 2 slightly greater than Factor 1, and with less Factor 3 contribution. The southernmost portion of the eastern shoreline of West Bay is an exception, as Factor 2 is much stronger than either Factor 1 or Factor 3. Samples along the eastern shoreline of East Bay, the western shoreline of West Bay, and to the north of the peninsula also vary, with very strong Factor 3 contributions.

Factor 1
- 0 - 10th
- 10 - 20th
- 20 - 30th
- 30 - 40th
- 40 - 50th
- 50 - 60th
- 60 - 70th
- 70 - 80th
- 80 - 90th
- 90 - 100th

- Cleanup Site
- Cascade Pole Cleanup Boundary
- Federal Navigation Channel
- Study Area

Feet
0 275 550 825 1,100

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Figure 9a-1
Spatial Distribution of Factor 1 Subsurface Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report

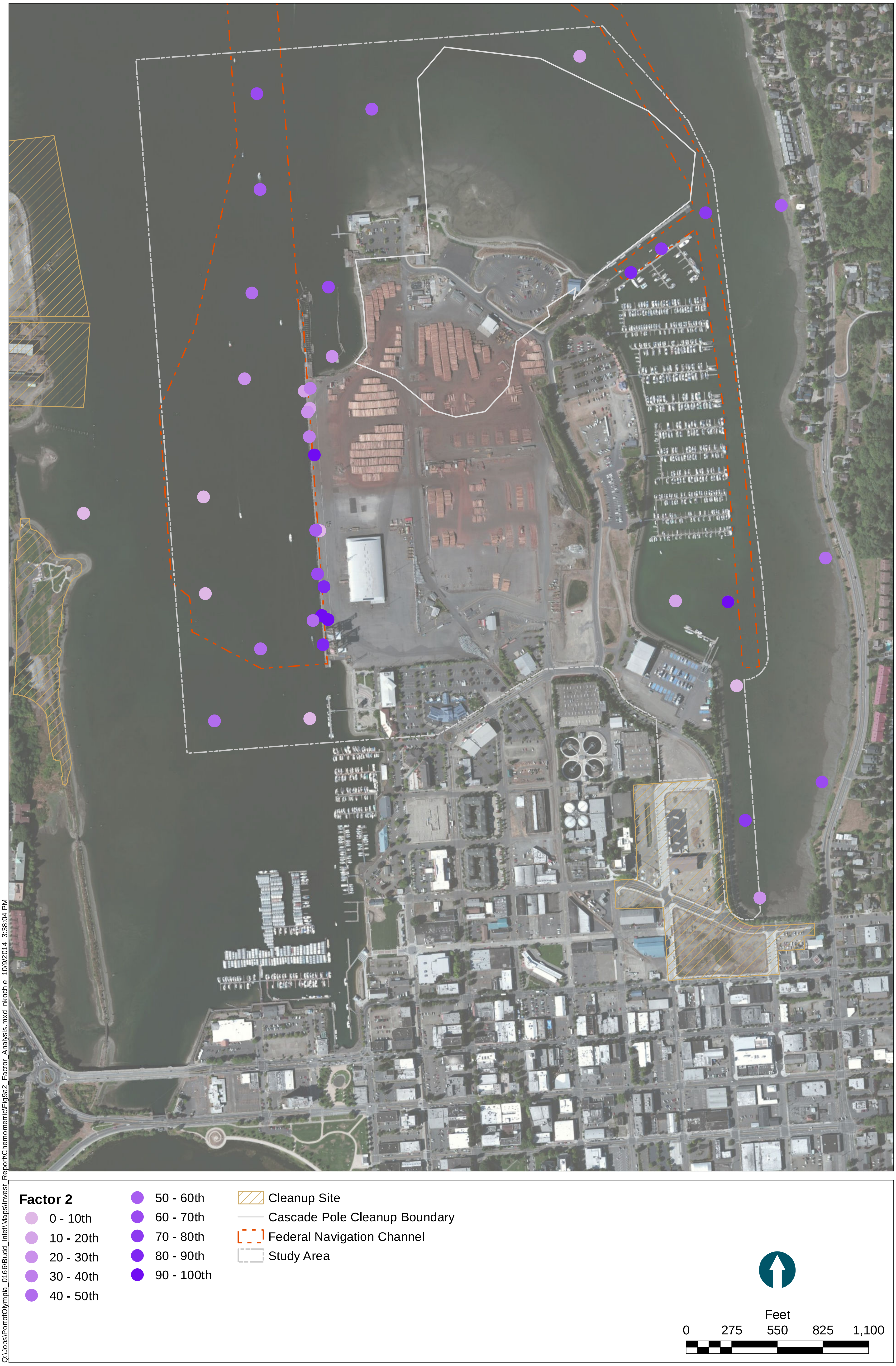

Figure 9a-2
Spatial Distribution of Factor 2 Subsurface Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report

ANCHOR QEA

Factor 3
0 - 10th
10 - 20th
20 - 30th
30 - 40th
40 - 50th
50 - 60th
60 - 70th
70 - 80th
80 - 90th
90 - 100th
Cleanup Site
Cascade Pole Cleanup Boundary
Federal Navigation Channel
Study Area

Feet
0 275 550 825 1,100

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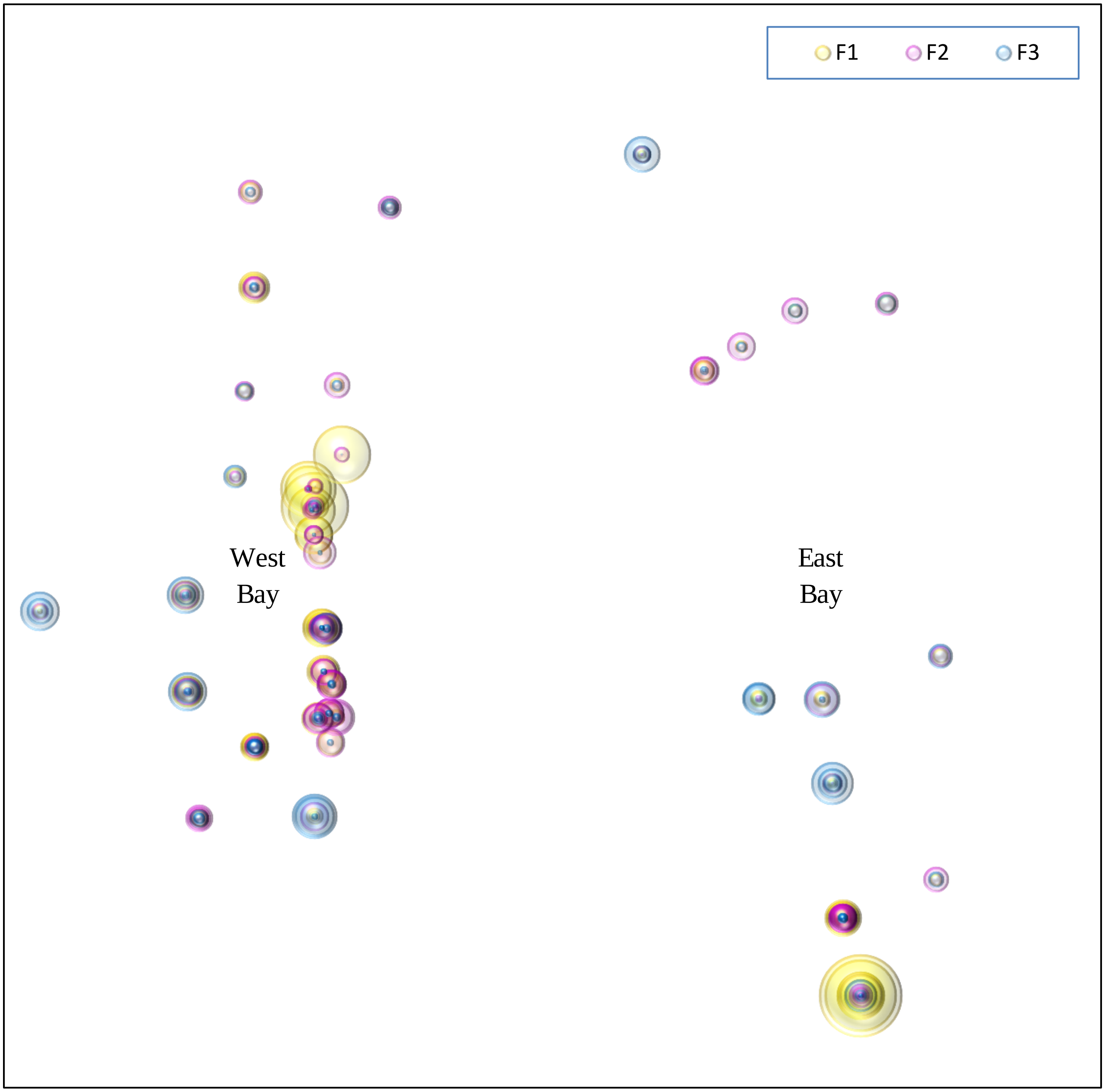
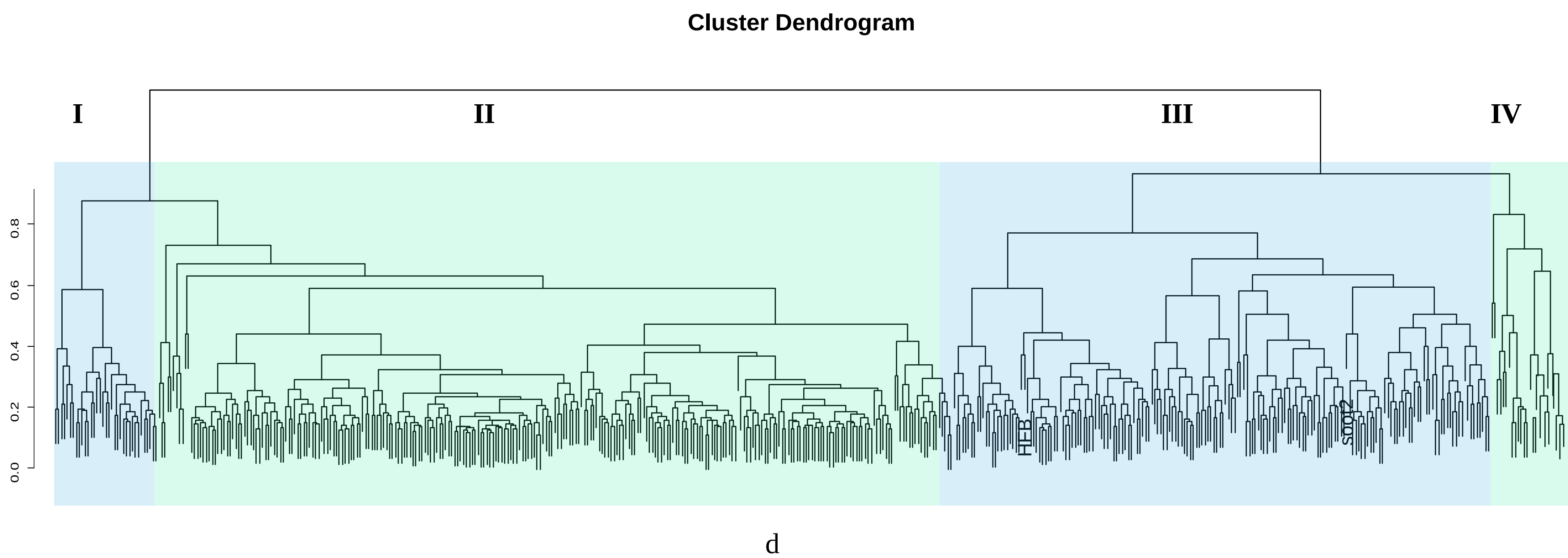
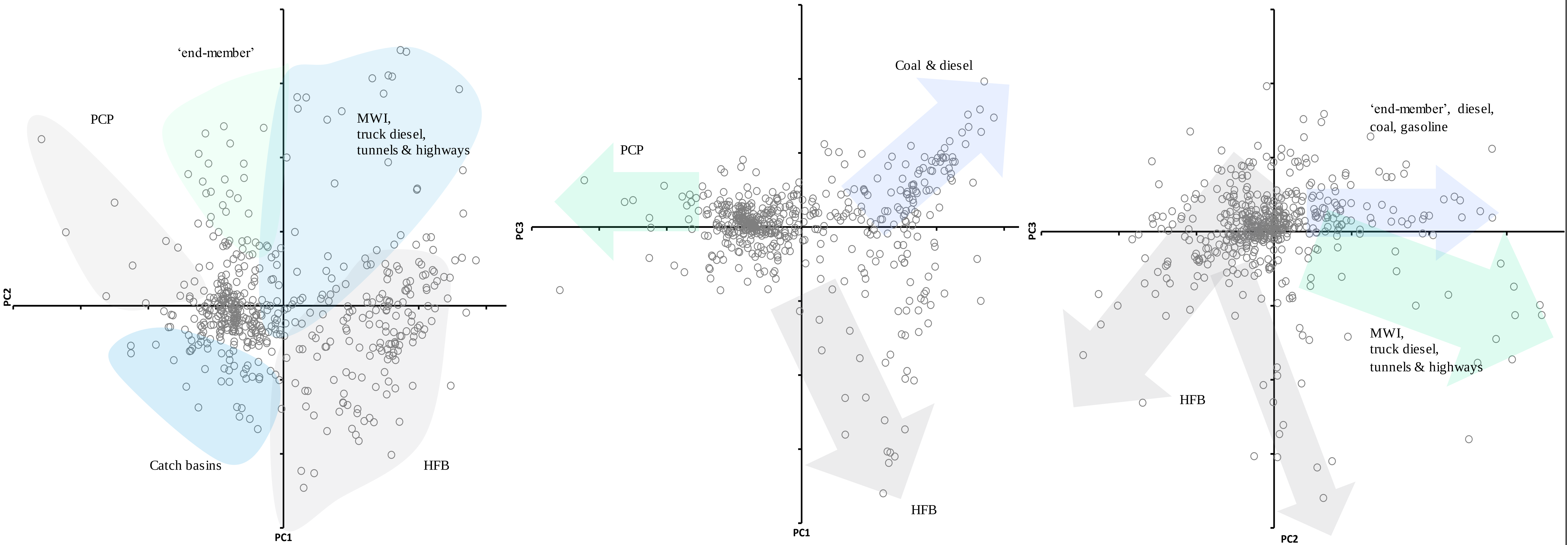
Figure 9a-3
Spatial Distribution of Factor 3 Subsurface Sample Contributions
Chemometrics Source Investigation
Budd Inlet Investigation Report



Shown above is the spatial variability in factor contributions by sample, where symbol color identifies each factor and symbol size is scaled to the value of the factor contribution for each sample. This figure includes only the 2013 subsurface samples. Factor 1 is strongest in the subsurface at the south end of East Bay and adjacent to Berth 3 North, and Factor 2 is strong for samples along the eastern shore of West Bay, as well as at points on the northern and southern shoreline of East Bay. Factor 3 is strongest in the southern portion of both bays. The mixture of contributions varies, such that the eastern part of West Bay has strong contributions from both Factor 1 and Factor 2, the western side of West Bay has strong Factor 2 and Factor 3 contributions, and East Bay has strong Factor 3 contributions to the south, strong Factor 2 contributions to the north, and strong Factor 3 contributions in the middle. This spatial variability suggests that historical D/F were localized compared to the ongoing contributions (surface samples).



The annotated HCA dendrogram from R-statistical of the full chemometrics dataset showing the grouping of samples by multivariate similarity is shown above. Branch length on the dendrogram illustrates the level of similarity, and samples separated by short branches have greater similarity than samples separated by longer branches. Four primary data clusters are identified by HCA, including, from left to right, (I) reference profiles for PCP as well has high-concentration historical samples from Cascade Pole, (II) the majority of the 2013 site sediments, catch basin samples, regional sediment profiles, and various urban background signatures, (III) reference profiles for HFB as well as Port Angeles soil and ash profiles, and (IV) subsurface 'end-member' samples, high-concentration historical subsurface sample BI-C5, and reference profiles that include medical waste incineration. Cluster II includes the samples with the greatest PMF Factor 2 contributions, Cluster III includes the samples with the greatest Factor 3 contributions, and Cluster IV includes the samples with the greatest contributions for Factor 1.



The component biplots from PCA analysis are shown above, illustrating the individual component loading for each sample for the three significant components. PCA was used to identify the number of significant factors that could be extracted from the data, and provides a third line of evidence for the underlying sample relationships when evaluated with the PMF and HCA results. PCA, FA, and PMF all evaluate the underlying relationships between samples (based on correlation or covariance matrices); however, components are assigned to maximize the variance accounted for by the first component, and negative component space, factors, and components are not directly comparable, though the identified sample groupings are comparable. The majority of site samples and reference profiles fall into a tight grouping near the factor axes; however, notable component loadings are observed for HFB, catch basins, end-member subsurface samples; PCP (and high-concentration historical samples from Cascade Pole); and several reference profiles, including truck diesel and medical waste incineration.

ATTACHMENTS

ATTACHMENT A
CHEMOMETRICS SENSITIVITY ANALYSIS

TABLE OF CONTENTS

List of Figures

LIST OF ACRONYMS AND ABBREVIATIONS

D/F	dioxin and furan
Ecology	Washington State Department of Ecology
EMPC	Estimated Maximum Possible Concentration
HCA	hierarchical cluster analysis
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PMF	positive matrix factorization
TEF	Toxicity Equivalency Factor
TEQ	Toxic Equivalents Quotient
USEPA	U.S. Environmental Protection Agency

1 INTRODUCTION

Many data-handling decisions are required prior to multivariate statistical analysis. Some examples include which parameters to include, data scaling methodology, handling of non-detects and other data flags, uncertainty levels, and significance levels. For the Budd Inlet Study Area chemometrics evaluation, these decisions were based on analytical experience, standard methods, and program requirements. The appropriateness of these decisions was then assessed by performing sensitivity analyses with alternate processing choices selected. This attachment summarizes the results of these analyses, as well as the sensitivity analysis associated with the positive matrix factorization (PMF) output. Extensive sensitivity tests indicate that the general conclusions of the chemometrics analysis are robust. They also support the analytical approach taken to maximize the information obtained through the chemometrics analysis.

2 SOURCE LIBRARY REFINEMENT

Site data inclusion in the chemometrics dataset was based on non-detect and flagging frequency, as described in Section 3, and the full reference library provided by the Washington State Department of Ecology (Ecology) was incorporated into the dataset (317 reference profiles compiled as part of their previous work for the Rayonier Uplands site in Port Angeles, Washington). Initial principal components analysis (PCA) component cross-plots show a relatively close relationship to all site data and many reference profiles, with a small set of reference profiles mapping as very different from the site data and defining the component space (Figure A1). In order to optimize the dataset, these outlier reference profiles were removed to improve separation of site data. Only reference profiles that had much greater component loadings than any site data were excluded from the final chemometrics dataset (217 reference profiles).

3 CONGENER SCALING

The concentrations of individual dioxin and furan (D/F) congeners typically range over several orders of magnitude in a single sample. Multivariate statistical analysis is sensitive to data extremes, and typically data are variance-scaled, i.e., each value is scaled such that the greatest concentration is 1 and the least concentration is zero. D/F data are often scaled by the Toxicity Equivalency Factor (TEF), and this scaling is applied to determine the sample Toxic Equivalents Quotient (TEQ). There is a generally inverse relationship between toxicity and abundance, and TEF scaling minimizes the magnitude of the congener concentration differences. Further scaling the samples by dividing the TEF value by the sum of the congener TEF values (TEQ) removes sample concentration effects. PMF analysis was performed on the same dataset in two ways to evaluate sensitivity to scaling: 1) with TEF-TEQ scaling; and 2) with variance scaling. PMF was performed on the full chemometrics dataset scaled to equally weight the variance of all samples and congeners. In addition to congener scaling such that all congener concentrations ranged from 0 to 1 (with data preparation performed prior to all PMF analyses), each sample was scaled such that the sum D/F congener concentration equaled 1 to remove concentration effects from the analysis. The results of the analysis for the variance-scaled dataset were compared to the TEF/TEQ-scaled dataset used in the primary PMF analysis. Factor profiles, sample grouping on biplots, and spatial distribution were very similar between the two scaling methods (Figures A2 and A3).

4 CONGENER CORRELATIONS

Inclusion of collinear variables (i.e., variables with a correlation coefficient of 1) can skew the results of multivariate analyses. To evaluate collinearity of the congeners, cross-plots were generated in R-3.0.1. Although there was a general correlation between congeners, no exact correlations were noted (Figure A4). In addition, PCA results with the 2013 site data excluding a subset of congeners were consistent with the results when the full congener list was included.

5 POSITIVE MATRIX FACTORIZATION SENSITIVITY

U.S. Environmental Protection Agency (USEPA) PMF 3.0 has several built-in error estimating functions. The initial PMF run is performed 50 times with a different randomly selected starting point for the matrix decomposition into factors and contributions. The resulting model run with the least error (i.e., the one that would most accurately recreate the data matrix by multiplying the factor and contribution matrices) is indicated by the program and automatically selected for the bootstrapping model runs. In bootstrapping, the PMF was repeated 200 times, and each run included a different randomly assigned subset of the complete dataset. The assignment of variables (congeners in this case) to each factor is compared between each bootstrapping model run as well as the base run with the full dataset. Finally, the uniqueness of the solution is tested by the Fpeak model runs because the factor rotations are forced to determine if other solutions are possible with different factor loadings that still fit the data matrix.

PMF output includes the variability of the factor congener loadings for each congener in the 200 bootstrapping model runs. The factor loading for each congener in the base run (the full dataset analysis, presented as PMF results) was also very similar to the median value for congener loading for that factor in the 200 bootstrapping solutions. The factor congener profiles are generally quite stable, as indicated by the narrow congener loading range between the 25th and 75th percentiles (Figure A5) The Fpeak analysis indicates that the factors are rotationally stable (Figure A6). Bootstrapping and Fpeak analysis indicate that the PMF solution is analytically robust.

6 ANALYSIS OF DATA SUBSETS

PMF and hierarchical cluster analysis (HCA) performed on the complete chemometrics dataset were compared to analyses performed on a subset with only site data (including historical and 2013 samples, but without reference profiles or catch basin samples), and to a further subset of site data that also excluded the 'end-member' samples. The consistency between the results for these datasets indicates that the analysis is not being skewed by inclusion of the reference profiles and catch basin samples in the full chemometrics dataset.

6.1 Site Only

The chemometrics dataset of 2013 surface (69), subsurface (89), historical (119), and catch basin (16) samples, but no reference profiles, was analyzed by HCA. The site samples generated the same basic clusters with and without the reference profiles (Figure A7). The PMF results (3-factor model) were also consistent with and without the reference profiles (Figure A8).

6.2 Exclusion of End-member Samples

The high-concentration subsurface samples from the south end of East Bay (e.g., SC-49 and SC-50) and near Berth 3 North (e.g., SC-19 and SC-20) consistently have very strong factor loadings on the factor that has a greater relative furan than dioxin congener loading. The site-only PMF was performed excluding site samples with elevated contributions on this factor (Factor 1 for the primary PMF analysis). Factor biplots and spatial distribution are consistent between analyses with and without the end-member samples (Figure A9).

7 2013 SITE SEDIMENT DATA ANALYSIS

A series of sensitivity analyses was performed on variance-scaled 2013 sediment data to evaluate the effect of concentration extremes, non-detect values. and Estimated Maximum Possible Concentration (EMPC) flagging.

7.1 Non-detect Handling

PCA was performed with a value of zero substituted for non-detects, as well as with a value of half of the method detection limit. The resulting factors and spatial distribution were not impacted. Therefore, half of the detection limit was used in all subsequent analyses to maintain a consistent dataset while accommodating the inability of USEPA PMF 3.0 to incorporate null data into the analysis.

The relative factor contribution strengths were very similar for all samples with this data transformation; however, the factor loadings and spatial distribution of sample factor contributions (Figure A5) were quite similar with and without scaling of the sample concentrations. Although the sample factor contributions are all on a similar scale with this weighting, the same end-member samples were identified, and the factor biplots (Figure A6) illustrate a linear trend from low- to high-concentration samples (though concentration influence was removed by scaling).

7.2 Estimated Data

PCA performed with and without samples for which the OCDD result was flagged with EMPC had similar factors and spatial distribution of contributions; however, exclusion of many of the high-concentration samples that define end-members resulted in weaker definition of the different areas, as was observed with mid-range-only samples. EMPC values were included in the final analysis.

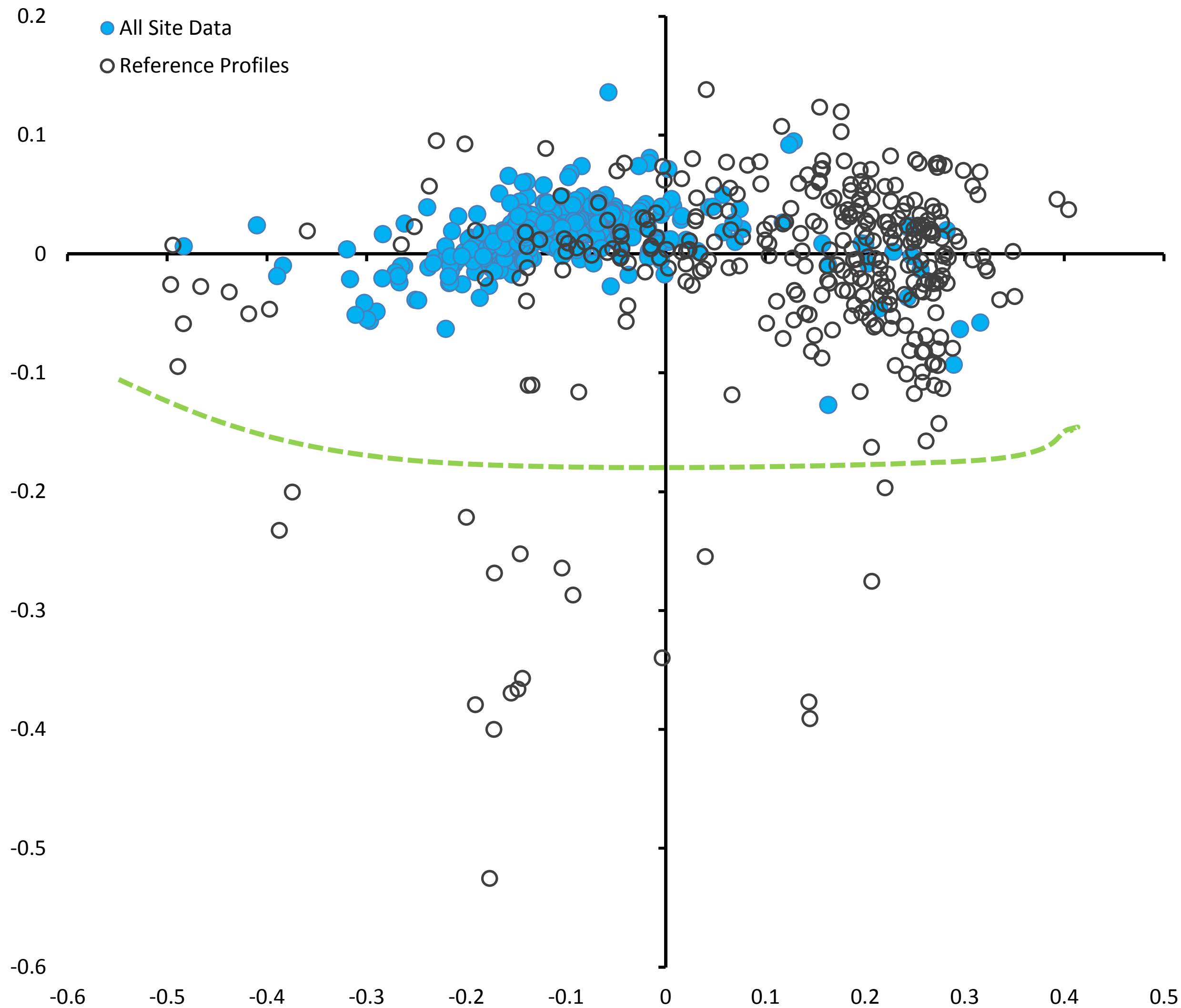
7.3 Inclusion of Additional Parameters

A subset of the samples had additional analyses conducted, including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), metals, and other Sediment Management Standards parameters. A total of 107 complete records with PAHs was available (all of the surface sediment samples and select subsurface sediment samples), and fewer complete records were available with either metals or PCBs. PCA was performed on the samples with complete data records for dioxins, furans, and PAHs (107 total samples). Similar spatial patterns were noted as determined with only the D/Fs. The restricted dataset, including removal of the potential source term from Cascade Pole as well as the dominance of PAH signatures in the factor loadings, complicated interpretation of the results (Figure A10); however, results are consistent with the D/F-only analyses.

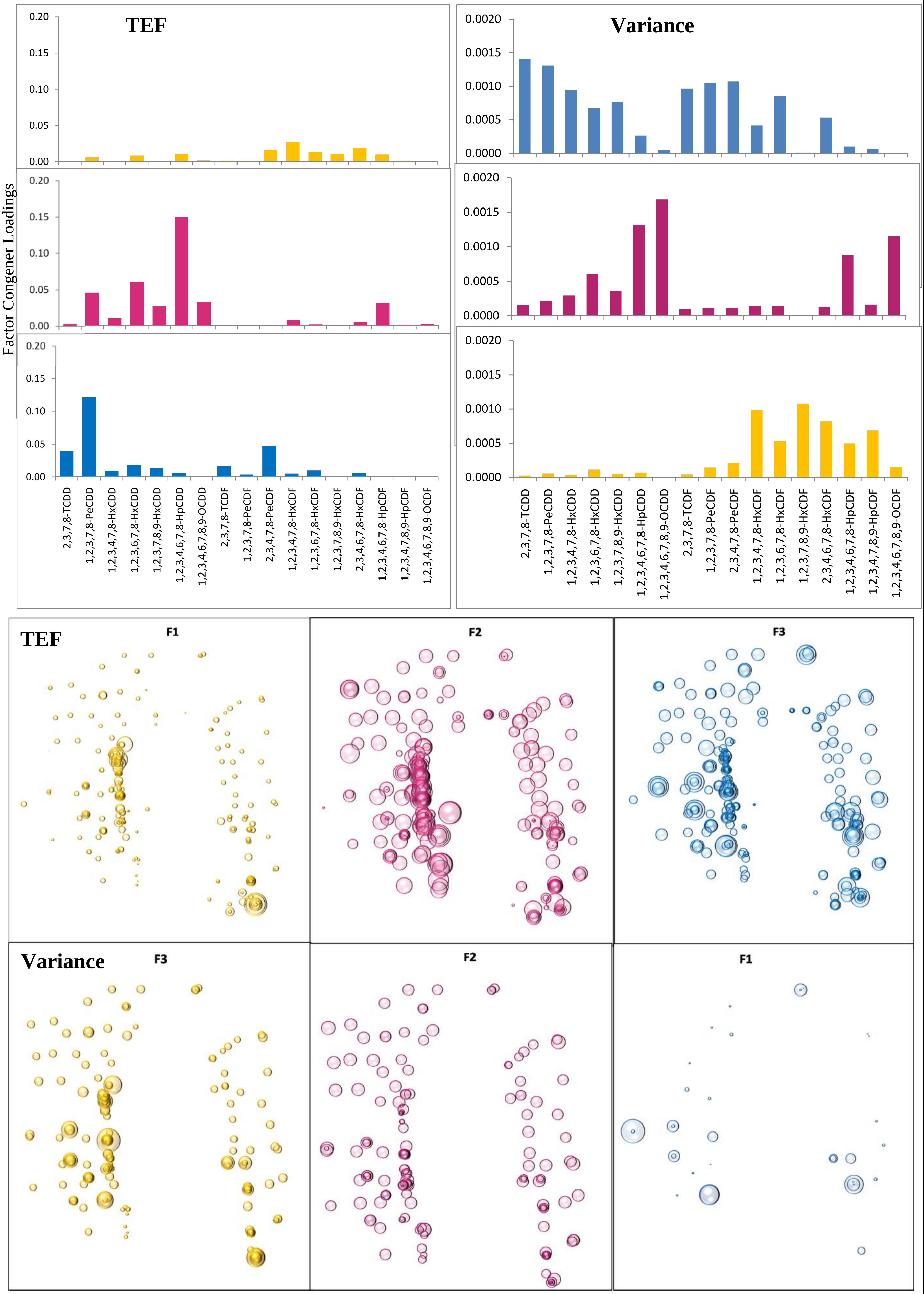
8 REFERENCES

Ecology, 2011. *Rayonier Mill Off-Property Soil Dioxin Study. Final Project Report, Public Review Draft.* June 2011.

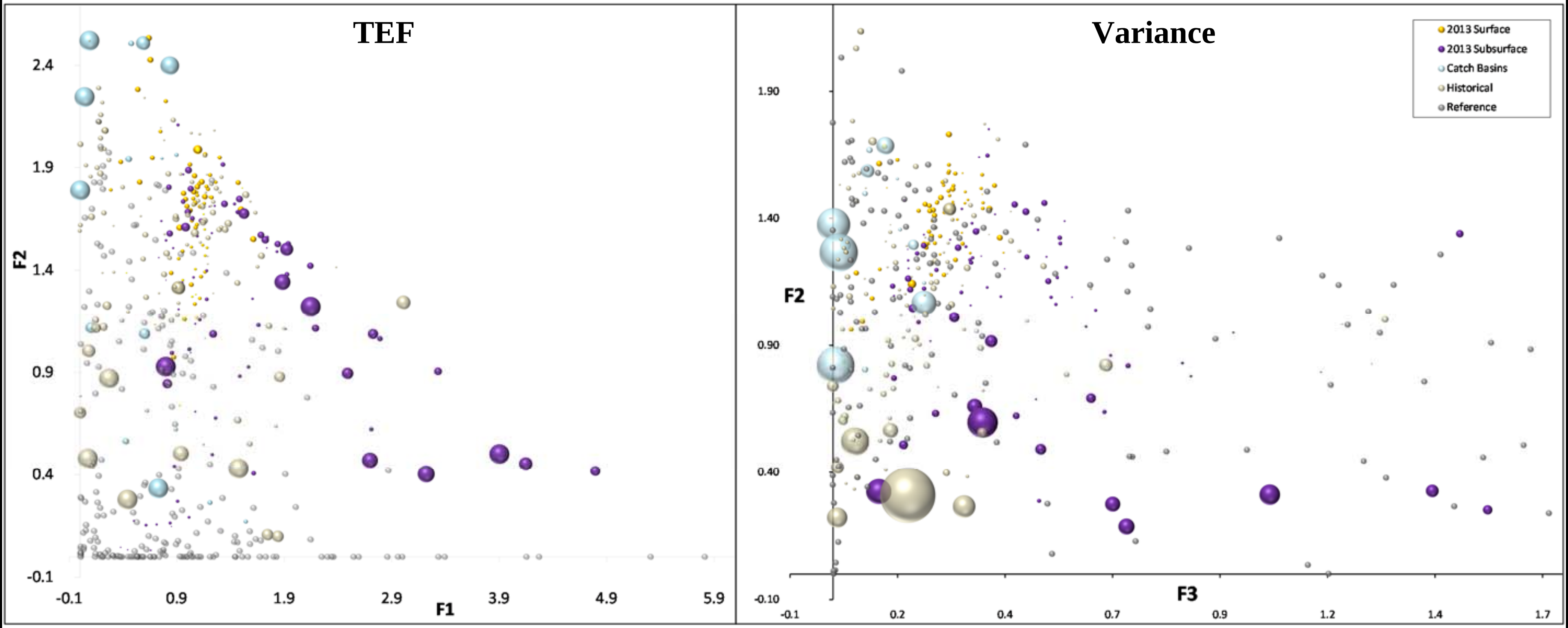
FIGURES



The above shows an example PCA component biplot of the chemometrics dataset with the complete reference library included. Many of the reference profiles define unique components that are dissimilar to all site samples. Inclusion of overly distinct reference profiles (from site samples) artificially clusters the site samples near the origin.



The above shows the factor congener profiles for TEF/TEQ-scaled data (left) and variance-scaled data (right) PMF analysis. Both data scaling approaches result in a factor with greater contributions of less chlorinated congeners, a factor with greater dioxin contributions, and a factor with greater furan contributions. The spatial distribution of the sample factor contributions is also similar for TEF/TEQ- and variance-scaled data. The three factors for TEF scaling are in the top panel, and the variance-scaled factors that represent the corresponding congener loading profile (but not the same factor number) are shown in the bottom panel (with the symbol scaled to the strength of the factor contribution in each sample).



The above shows factor contribution biplots for each sample for TEF-scaled data (left) and variance-scaled data (right). In both cases, the biplot compares the "elevated-furan" factor (i.e., Factor 1 for TEF/TEQ-scaled data and Factor 3 for variance-scaled data) to the "elevated dioxin" factor (i.e., Factor 2 for both scaling methods), as the third factor (HFB) only provides minimal separation of the site samples. Yellow symbols represent 2013 surface sediment, purple symbols the 2013 subsurface sediment, blue symbols the catch basin samples, green symbols the historical samples, and gray symbols the reference profiles. All symbols, except for the reference profiles, are scaled to sample TEQ.

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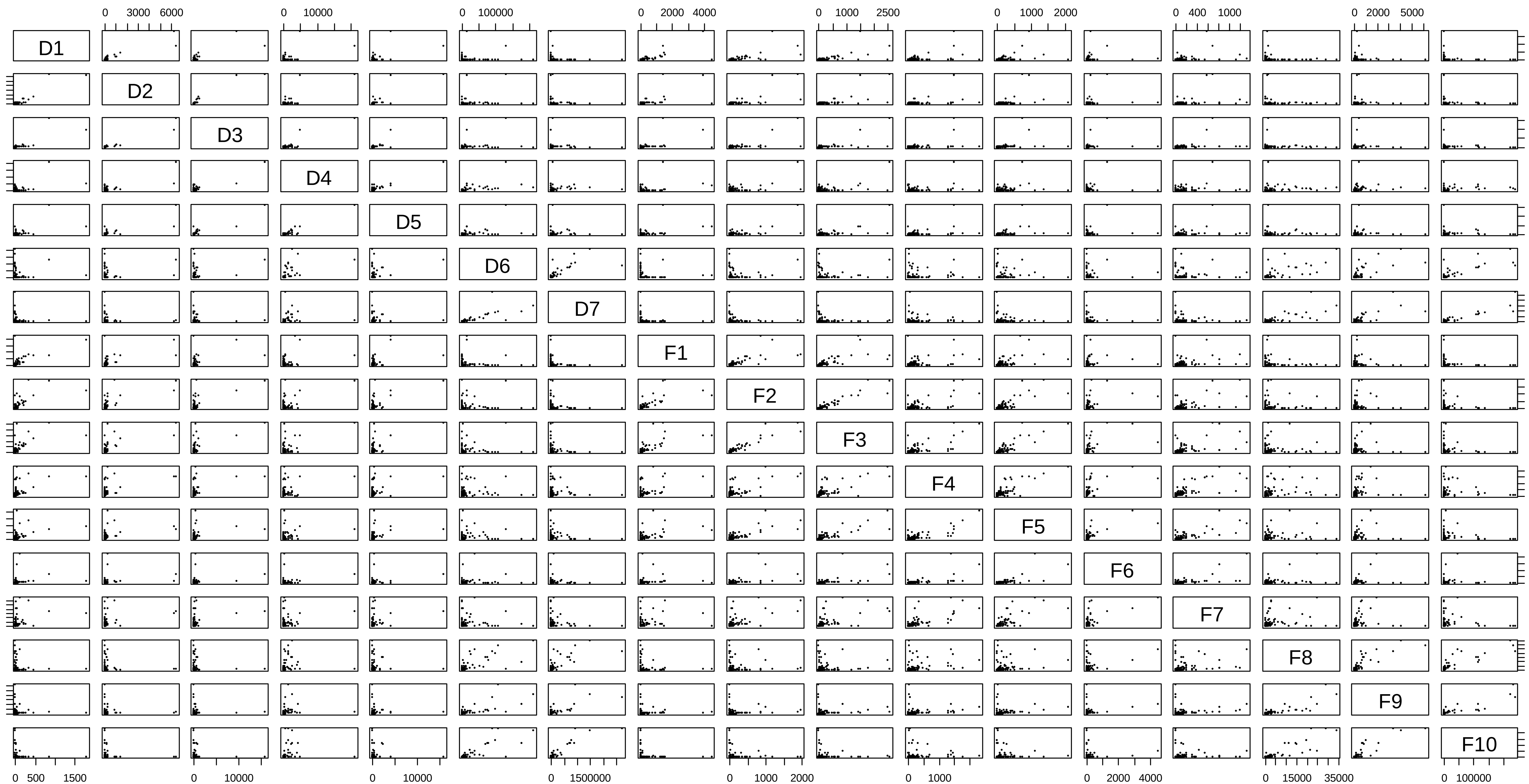
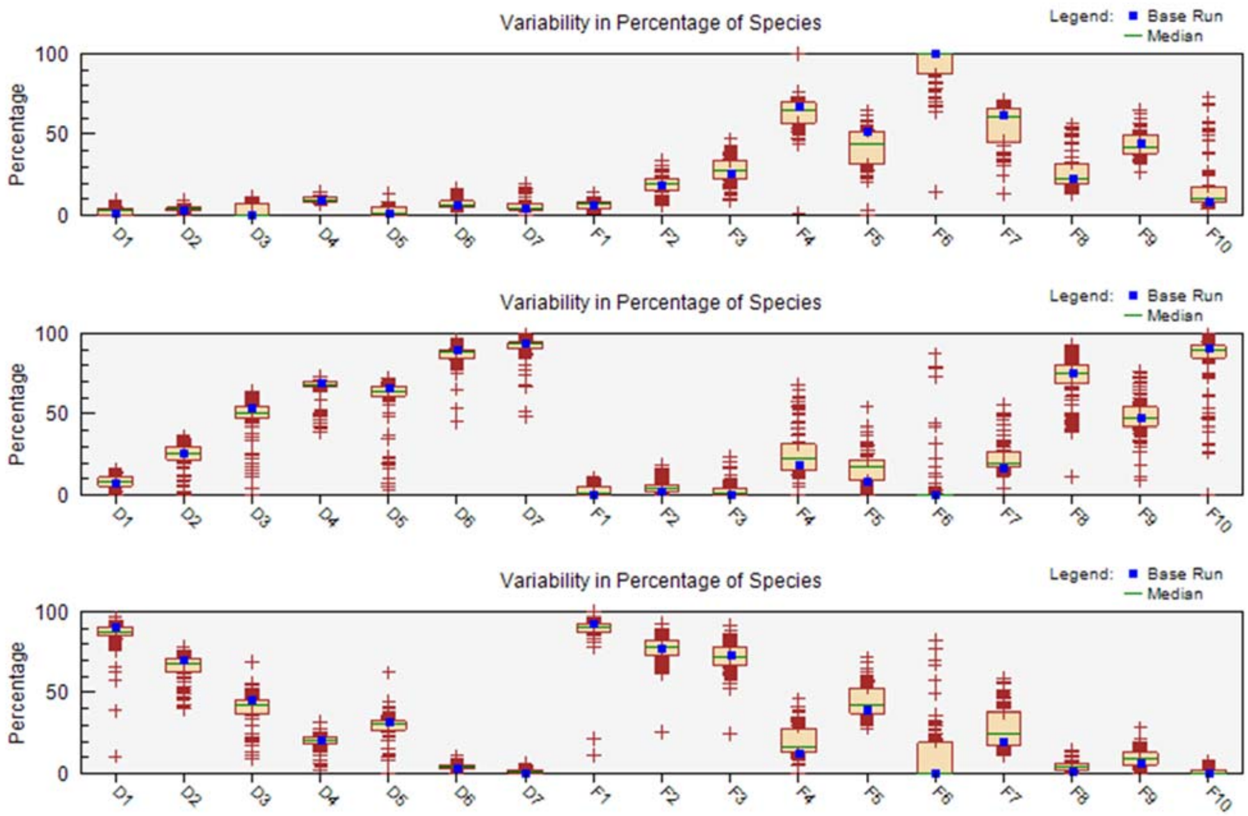
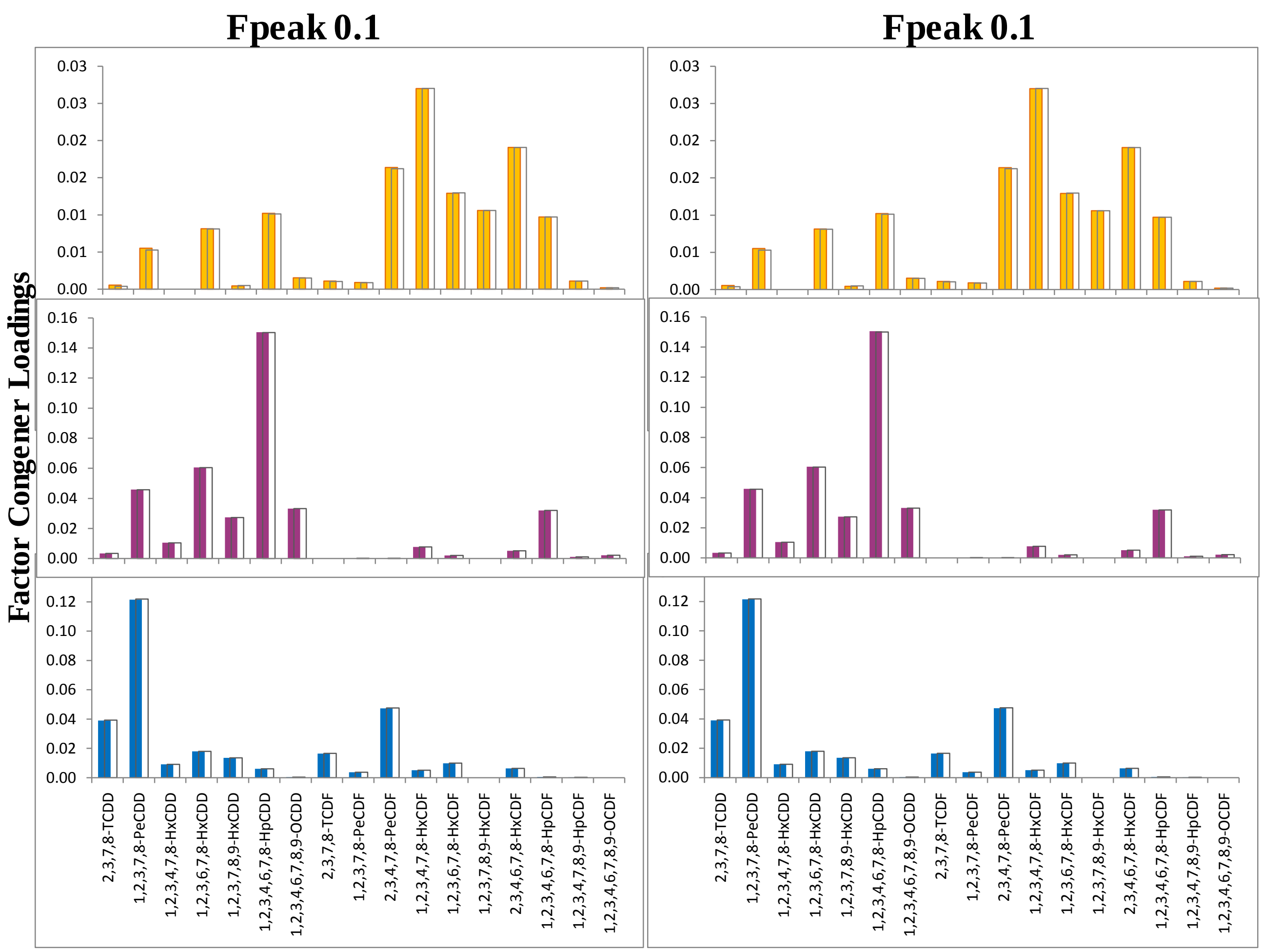
Figure A3
Comparison of Biplots for TEF and Variance Scaling
Chemometrics Sensitivity Analysis
Budd Inlet Investigation Report



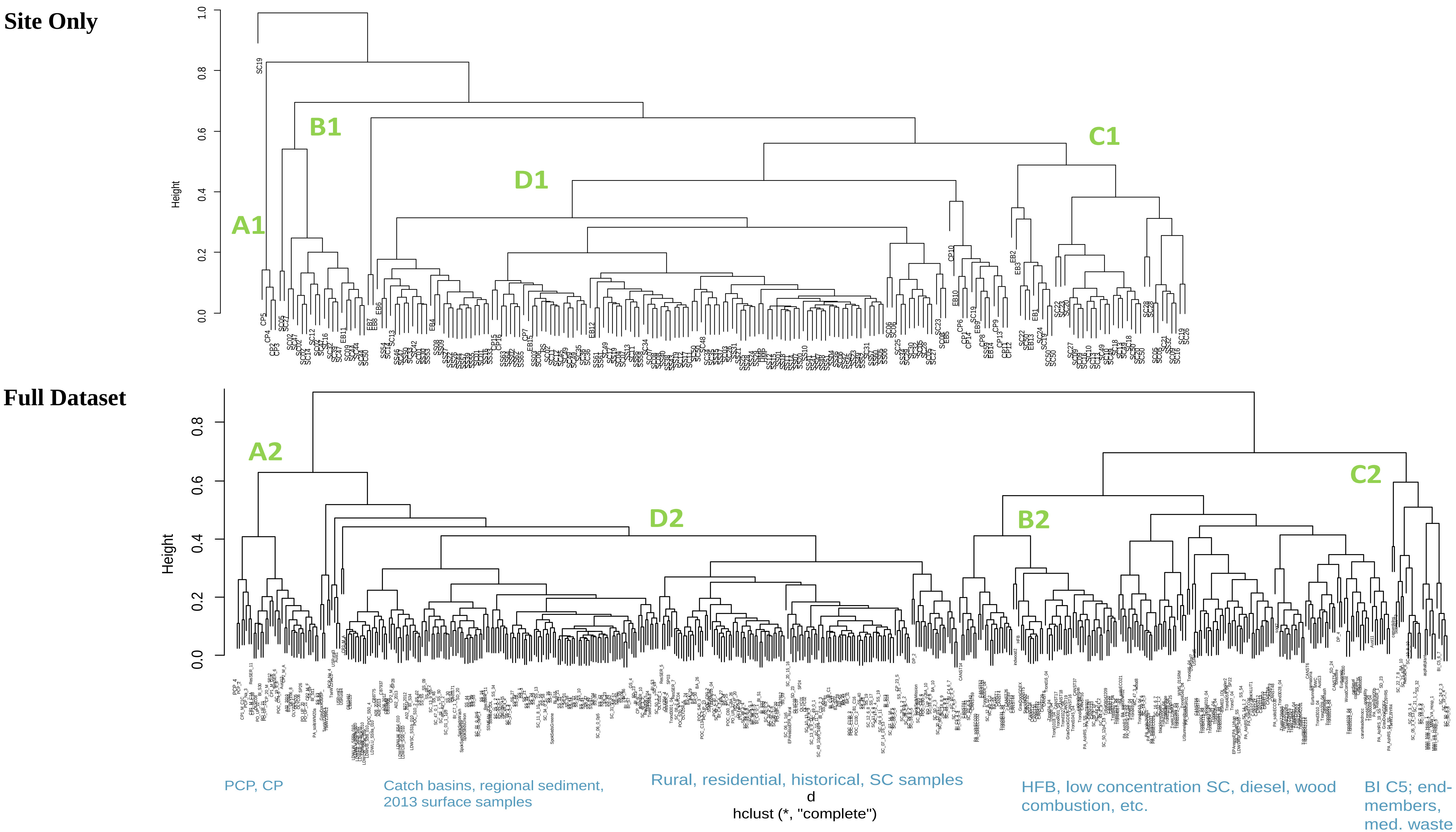
The above shows congener crossplots illustrating the correlation between the individual dioxin and furan congeners (D1-D7: 2,3,7,8-TCDD; 1,2,3,7,8-PeCDD; 1,2,3,4,7,8-HxCDD; 1,2,3,6,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 1,2,3,4,6,7,8-HpCDD; 1,2,3,4,6,7,8,9-OCDD, respectively; F1-F10: 2,3,7,8-TCDF; 1,2,3,7,8-PeCDF; 2,3,4,7,8-PeCDF; 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDF; 1,2,3,7,8,9-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,7,8,9-HpCDF; 1,2,3,4,6,7,8,9-OCDF, respectively).



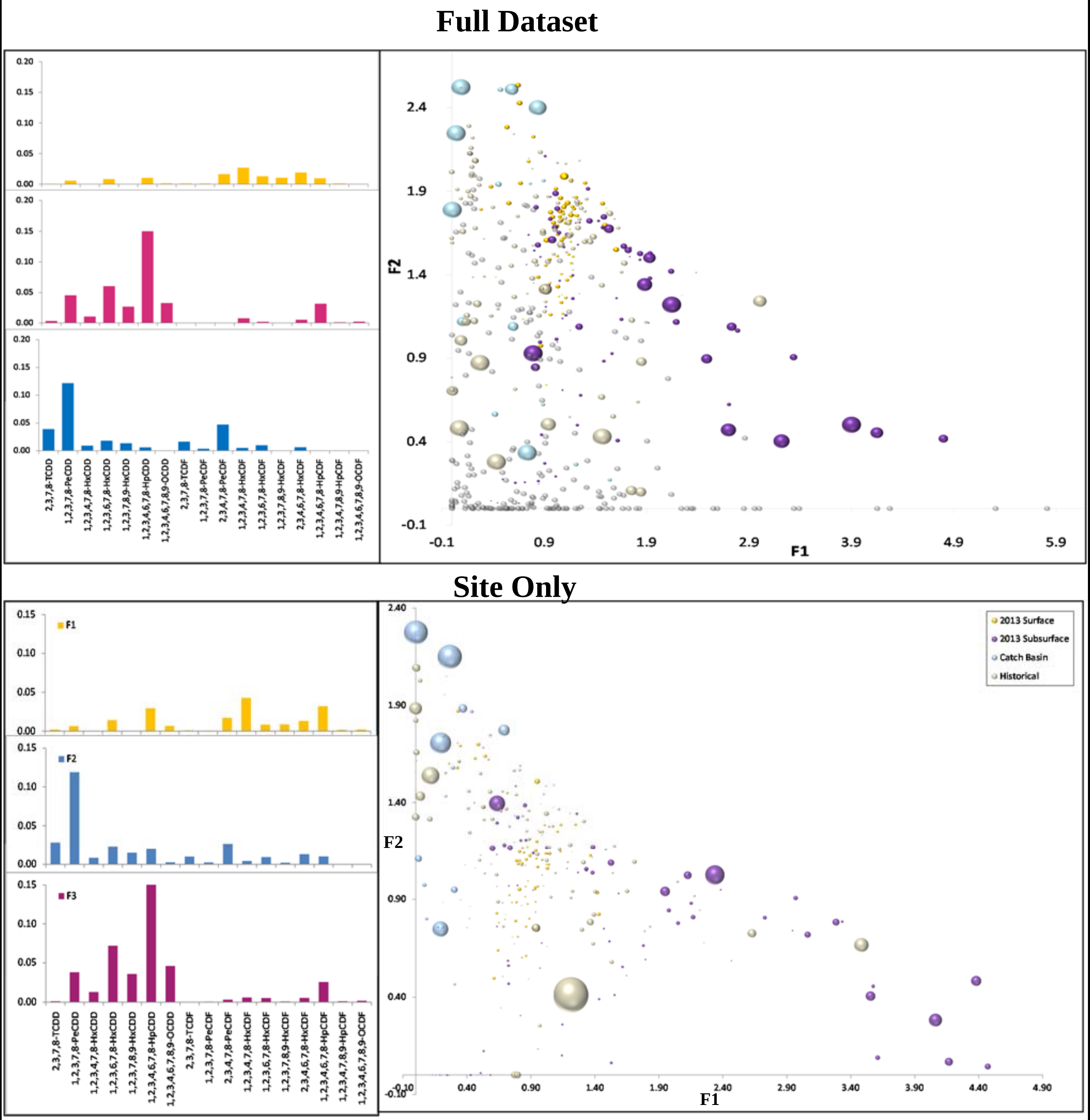
The results of 200 bootstrapping model runs, performing PMF on a randomly selected subset of the data in each run, are illustrated graphically in the bootstrap model results shown above. The yellow box illustrates the mid-range (25th to 75th percentile) factor loading for each congener, the green line is the median congener loading, and the blue square is the base run. The complete model run is presented in the PMF results (see profiles in Figure 4 of the Chemometrics Source Investigation). The factor congener loadings are very stable. The most consistent results are for the very limited dioxin congeners to Factor 1, as well as the very limited contributions of the more chlorinated congeners to Factor 3. The furan contributions to the factor profiles are generally more variable than the dioxin profiles. All base run values fall near the median value and within the mid-range values, and are supported by the bootstrapping analysis.



The Fpeak sensitivity model tests the rotational stability of the PMF solution. In multivariate analysis, there may be more than one rotation that accounts for an equal amount of the data variance (i.e., the possibility of assigning a different set of congener profiles to the three factors and having that work as well), which is referred to as rotational ambiguity. Rotational ambiguity would be observed in factor biplots as an "edge" to the data that did not correspond to the factor axes. To test if the PMF model solution is unique, the Fpeak model attempts to force rotation within the non-negativity constraint. The Fpeak model results are very similar to the PMF base run, indicating that the solution is not sensitive to rotation and that the factors determined by PMF are the true underlying explanatory factors for the dataset.



The cluster dendrograms for site samples only (top) and the full chemometrics dataset (bottom) show the same groupings for site samples regardless of the inclusion of reference profiles. Group A includes the high-concentration historical samples from Cascade Pole, which cluster with PCP profiles when the full dataset is analyzed. Group B includes low-concentration subsurface samples that cluster with hog fuel burning reference profiles when the full dataset is analyzed. Group C includes the "end-member" high-concentration subsurface samples that cluster with various combustion profiles (diesel, medical waste, asphalt) when the full dataset is analyzed. Group D includes the majority of site samples, the catch basin samples, and many regional sediment and urban background reference profiles when the full dataset is analyzed.



The above shows the factor congener loadings for the full dataset PMF analysis (top) and for the analysis performed on a subset with all reference profiles excluded. The three factors are consistent: a greater relative furan contribution, a greater relative dioxin contribution, and a greater contribution of the less chlorinated congeners. Factor biplots show a consistent grouping of the site samples.

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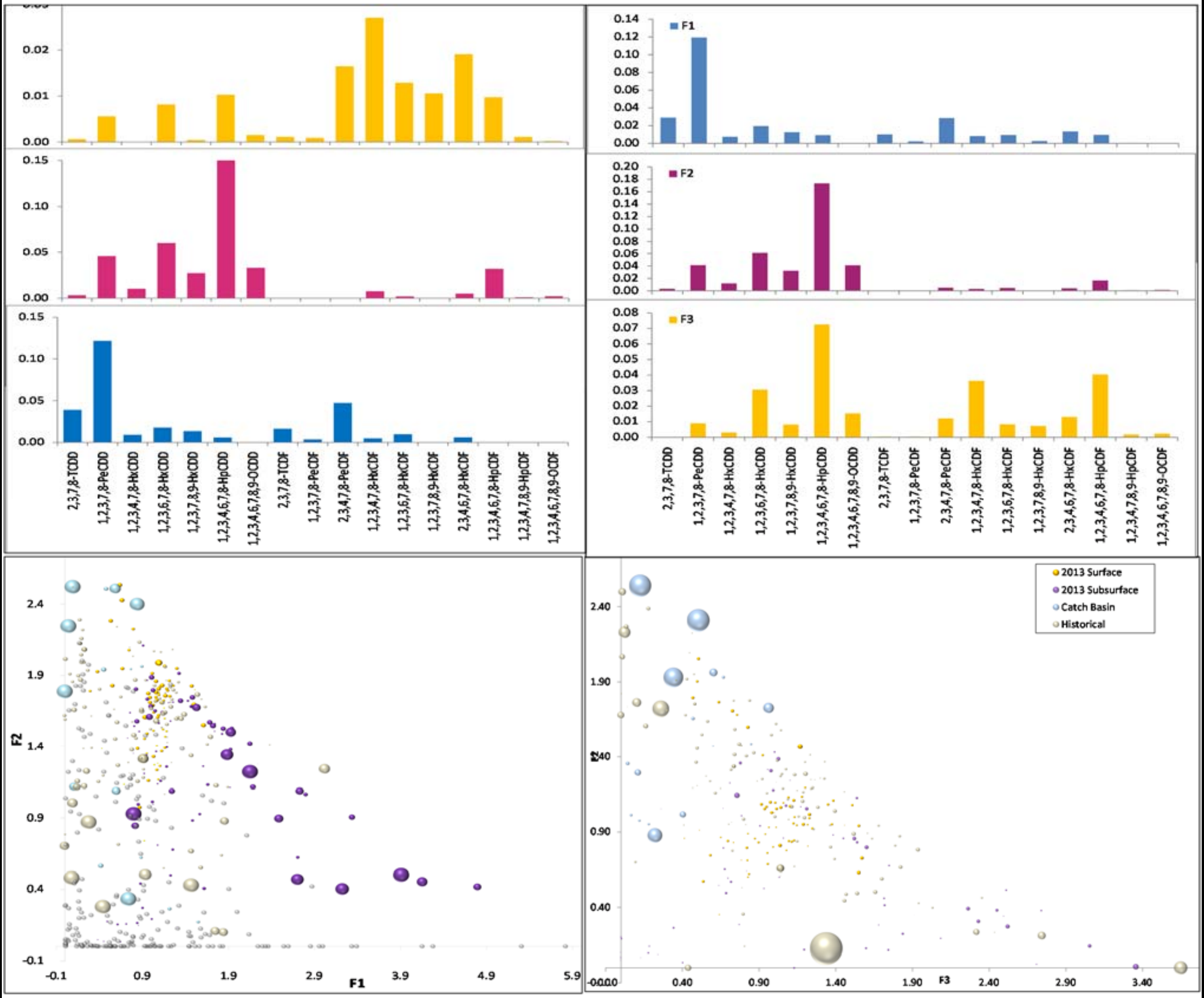
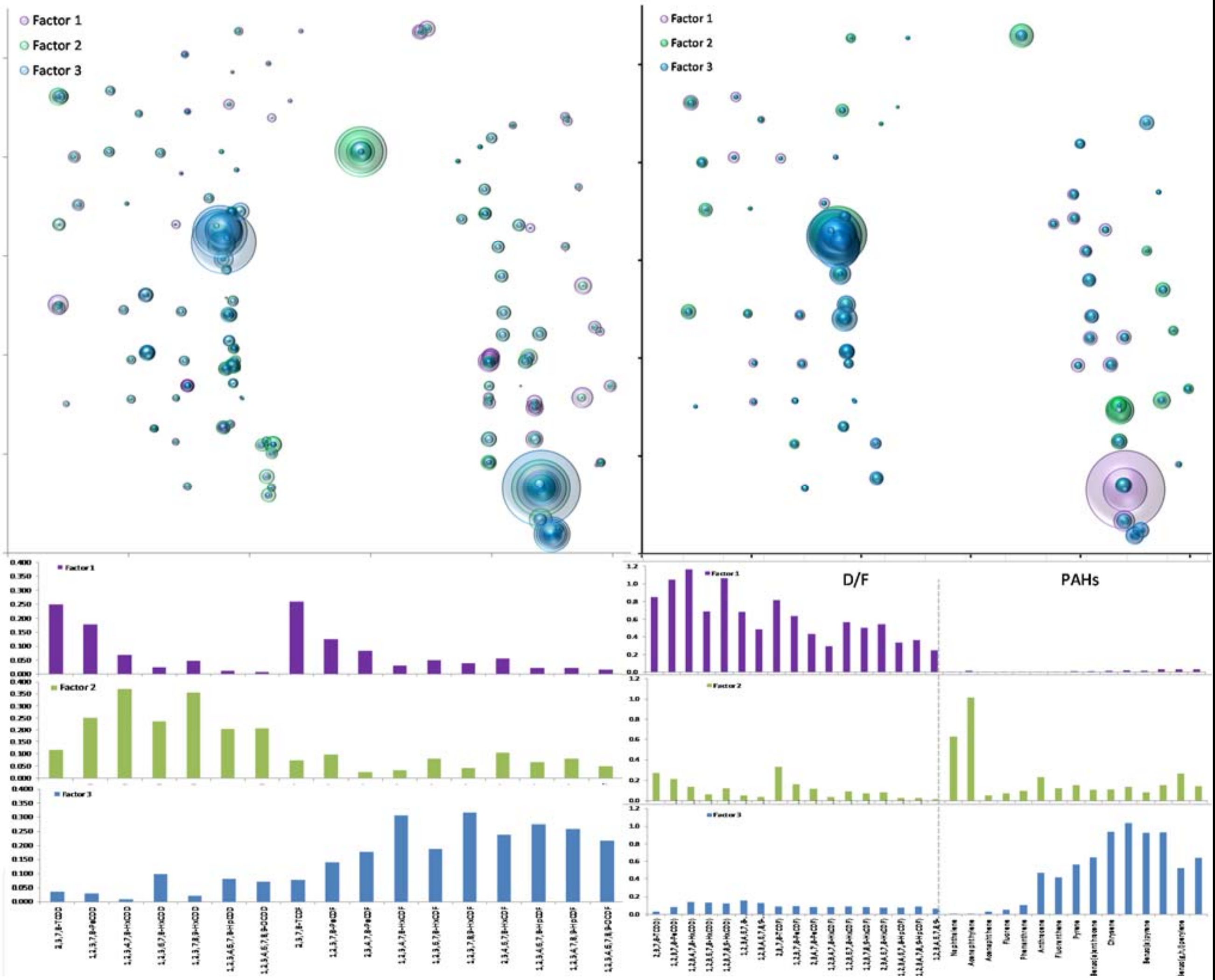
ANCHOR QEA

Figure A8
PMF Comparison for Site Only Analysis
Chemometrics Sensitivity Analysis
Budd Inlet Investigation Report



The above shows the factor congener loadings for the full dataset PMF analysis and for the analysis performed on a subset excluding the reference profiles and “end-member” samples. The three factors are consistent: a greater relative furan contribution, a greater relative dioxin contribution, and a greater contribution of the less chlorinated congeners. Factor biplots show a consistent grouping of the site samples.



The above shows PMF results for the complete data set (left) and for the subset of samples with PAHs (the most frequent analyte group after D/F congeners). Note the absence of the historical samples for PMF with D/F congeners and priority PAHs (e.g., the gap at Cascade Pole). Factors 1 and 2 are similar for both analyses (though reversed in order), reflecting a greater contribution by less chlorinated congeners and a greater relative contribution of dioxins than furans. Factor 3 for the PAH analysis reflects a greater PAH contribution, rather than a greater furan contribution. It is notable that Factor 2 for the analysis with PAHs has a greater contribution of the less chlorinated D/F congeners and of the “lighter” PAHs, likely reflecting less weathered samples.

The combined factor contributions generate a similar spatial pattern for the two analyses, with the end-member samples near B3N and EBRS distinguished by both analyses, and delineating East Bay from the eastern and western shorelines of West Bay, as well as the east and west sides of East Bay.

Preservation of the factor congener loadings and sample contribution spatial patterns indicates that the ability to distinguish the samples is not lost by performing the analysis on the D/F congeners only.

ATTACHMENT B
REFERENCE PROFILE LIBRARY

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration											
	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCDD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF	2,3,4,7,8-PECDF	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDF
Aust 1	0.05	0.899999976	0.170000002	1	0.949999988	1.799999952	1.950000048	0.09	0.017999999	0.239999995	0.25	0.75999999
Aust 2	0.11	0.50999999	0.119999997	0.209999993	0.25	0.699999988	2.38499999	0.037	0.0054	0.071999997	0.017999999	0.061000001
Aust 3	0.80000001	0.660000026	0.068999998	0.150000006	0.029999999	0.460000008	1.508999944	0.089	0.0141	0.243000001	0.035	0.044
Aust 4	0.16	1.799999952	0.300000012	0.699999988	0.689999998	1.700000048	5.699999809	0.17	0.048	0.689999998	0.219999999	0.180000007
Aust 5	0.2	1.799999952	0.289999992	0.689999998	0.75999999	2	5.28000021	0.16	0.039000001	0.660000026	0.25999999	0.180000007
Aust 6	0.18000001	0.670000017	0.100000001	0.200000003	0.189999998	1.100000024	3.599999905	0.032	0.0078	0.101999998	0.029999999	0.039000001
Aust 7	0.2	1.100000024	0.200000003	0.360000014	0.310000002	1.600000024	12.60000038	0.081	0.021600001	0.273000002	0.025	0.088
Aust 8+A10:A259	0.5	3.5	1.100000024	1.399999976	1.899999976	6.800000191	19.79999924	0.063	0.020099999	0.273000002	0.100000001	0.109999999
Aust 9	0.045	0.469999999	0.109999999	0.200000003	0.270000011	0.680000007	2.568000078	0.04	0.0129	0.171000004	0.081	0.056000002
Aust10	0.04	0.939999998	0.239999995	0.569999993	0.319999993	1.600000024	3.299999952	0.23999999	0.029999999	0.419999987	0.050000001	0.109999999
Aust11	0.22	0.550000012	0.035	0.129999995	0.170000002	0.280000001	0.584999979	0.25	0.035999998	0.50999999	0.150000006	0.109999999
Aust12	0.15000001	2.599999905	0.639999986	8.399999619	1.899999976	16.29999924	4.650000095	0.70999998	0.131999999	0.810000002	0.5	1
Aust13	0.18000001	0.699999988	0.068000004	0.150000006	0.119999997	0.159999996	0.111000001	0.15000001	0.035999998	0.50999999	0.150000006	0.150000006
BC-avg	0	0.159999996	0.02	1.312999964	0.342000008	1.412999988	0.203072995	0.32100001	0.0093	0.054000001	0.108999997	0.061999999
CABST46	3.3499999	27	3.700000048	8.399999619	7.599999905	5.199999809	0.180000007	7.5	0.50999999	6.300000191	1.5	1.5
CABST47	3.6500001	32	3.599999905	9.199999809	8.600000381	6.199999809	0.218999997	7	0.540000021	8.100000381	1.100000024	1.700000048
CANST1	0.0857	0.404511005	0.031399898	0.0582183	0.041680299	0.042127281	0.001344274	0.037881	0.01310751	0.1035861	0.047379199	0.0324056
CANST10	0.033	0.370000005	0.030999999	0.140000001	0.090000004	0.093999997	0.0042	0.014	0.0072	0.098999999	0.029999999	0.037999999
CANST11	0.0391	0.521000028	0.069899999	0.157000005	0.157000005	0.086000003	0.003	0.0181	0.00918	0.1347	0.041200001	0.053599998
CANST12	0.082	0.689999998	0.109999999	0.319999993	0.25	0.200000003	0.0057	0.041	0.0207	0.330000013	0.129999995	0.097000003
CANST13	0.033	0.200000003	0.029999999	0.079000004	0.063000001	0.041000001	0.00108	0.021	0.0069	0.101999998	0.034000002	0.025
CANST14	0.007	0.150000006	0.0097	0.016000001	0.014	0.0069	0.000141	0.0023	0.00096	0.039000001	0.0062	0.0072
CANST15	0.01	0.239999995	0.014	0.035999998	0.022	0.018999999	0.00063	0.0031	0.00204	0.063000001	0.016000001	0.016000001
CANST16	0.0088	0.056000002	0.0023	0.0044	0.0037	0.0024	7.2E-05	0.013	0.00222	0.0288	0.012	0.0076
CANST17	0.0087	0.043000001	0.0034	0.0045	0.0034	0.0029	7.8E-05	0.01	0.00264	0.0273	0.012	0.0069
CANST18	0.016	0.093999997	0.0076	0.022	0.013	0.015	0.0006	0.01	0.00249	0.057	0.012	0.014
CANST19	0.034	0.200000003	0.012	0.026000001	0.014	0.014	0.00048	0.023	0.0072	0.093000002	0.017000001	0.018999999
CANST2	0.000535	0.034412	0.0017126	0.0036903	0.0047508	0.00095542	1.98027E-05	0.0086381	0.00080184	0.0083508	0.0014951	0.0015588
CANST20	0.0096	0.033	0.003	0.0078	0.0042	0.0051	0.000207	0.0055	0.00111	0.0138	0.0038	0.0042
CANST21	0.015	0.07	0.0069	0.015	0.0088	0.009	0.00036	0.0073	0.00213	0.0273	0.0074	0.0086
CANST22	0.044	0.100000001	0.0071	0.013	0.015	0.0056	0.000138	0.023	0.0048	0.059999999	0.0085	0.011
CANST23	0	0.063000001	0.0043	0.0083	0.011	0.0028	6.9E-05	0.01	0.00234	0.026699999	0.0059	0.0061
CANST24	0.0365	0.078500003	0.00492	0.00954	0.0102	0.00312	8.07E-05	0.0176	0.00411	0.049800001	0.00921	0.0103
CANST25	0.0114	0.0209	0.00139	0.00327	0.00359	0.00158	6.06E-05	0.00484	0.000993	0.01152	0.00252	0.00265
CANST26	0.0266	0.080600001	0.00537	0.0118	0.0151	0.00536	0.0002331	0.0071	0.002265	0.029069999	0.00824	0.00879
CANST27	0.0418	0.096299998	0.00605	0.00999	0.0107	0.00332	9.24E-05	0.0231	0.00522	0.058499999	0.0108	0.0121
CANST28	0.0103	0.0231	0.00159	0.00344	0.00378	0.00141	4.65E-05	0.00286	0.000768	0.01077	0.00234	0.00277
CANST29	0.0641	0.187000006	0.0118	0.021600001	0.021199999	0.00618	0.0001212	0.037	0.00867	0.128099993	0.0176	0.020300001
CANST3	0.019	0.021	0.0005	0.0007	0.0004	0.00064	2.97E-05	0.0165	0.00177	0.017999999	0.0029	0.0002
CANST30	0.0419	0.098200001	0.00581	0.0107	0.00989	0.00308	6.93E-05	0.0208	0.00468	0.061500002	0.011	0.0125
CANST31	0.037	0.091399997	0.00623	0.0126	0.0124	0.00439	0.0001059	0.0181	0.00432	0.058200002	0.00913	0.012
CANST32	0.12800001	0.264999986	0.0139	0.0308	0.0298	0.00741	0.0001164	0.0787	0.01749	0.188999996	0.0359	0.035

Attachment B

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	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCDD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF	2,3,4,7,8-PECDF	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDF
CANST33	0.0202	0.041299999	0.00273	0.00657	0.00733	0.00269	7.23E-05	0.00599	0.001839	0.021120001	0.00387	0.00473
CANST34	0.34	0.180000007	0.059	0.063000001	0.082000002	0.018999999	0.00039	0.13	0.029999999	0.50999999	0.150000006	0.067000002
CANST35	0.016	0.014	0.0057	0.0081	0.011	0.0048	0.000162	0.013	0.003	0.033	0.017000001	0.0088
CANST36	0.01	0.046	0.0019	0.0037	0.0031	0.0012	3.3E-05	0.0062	0.00072	0.0075	0.003	0.0029
CANST37	0.018	0.046	0.0023	0.0033	0.002	0.0013	4.8E-05	0.011	0.00222	0.0195	0.0054	0.006
CANST38	0.13	0.400000006	0.013	0.018999999	0.014	0.0044	5.1E-05	0.088	0.015900001	0.207000002	0.028000001	0.02
CANST39	0.021	0.064999998	0.0029	0.0033	0.0024	0.00089	1.71E-05	0.011	0.00261	0.033	0.0052	0.004
CANST4	0.02	0.100000001	0.006	0.015	0.009	0.0092	0.000339	0.011	0.0048	0.033	0.009	0.013
CANST40	0.001	0.002	0.0021	0.00066	0.0002	0.00031	2.25E-06	0.0053	0.00189	0.016799999	0.0015	0.00074
CANST41	0.0082	0.024	0.0011	0.0014	0.00051	0.00049	4.5E-06	0.031	0.0045	0.068999998	0.0045	0.006
CANST42	0.22	1.200000048	0.071000002	0.140000001	0.119999997	0.093000002	0.00285	0.086	0.029999999	0.389999986	0.097000003	0.089000002
CANST43	0.1	0.430000007	0.029999999	0.050999999	0.039999999	0.037	0.00099	0.034	0.0129	0.177000001	0.039000001	0.035999998
CANST44	0.087	0.300000012	0.02	0.030999999	0.026000001	0.017000001	0.00045	0.039	0.0084	0.114	0.024	0.018999999
CANST45	0.14	0.529999971	0.043000001	0.074000001	0.064000003	0.050999999	0.0015	0.076	0.0174	0.233999997	0.064000003	0.041000001
CANST48	4.30000019	24	5	11	8.5	8	0.237000003	3.5999999	0.237000003	3.599999905	0.800000012	0.810000002
CANST49	2	12	2.200000048	4.800000191	3.900000095	3.099999905	0.104999997	1.60000002	0.116999999	1.679999948	0.460000008	0.419999987
CANST5	0.06	0.209999993	0.012	0.013	0.01	0.0038	0.000102	0.04	0.0102	0.135000005	0.033	0.021
CANST50	51	150	8.600000381	16	24	7.900000095	0.218999997	52	2.220000029	42	19	9.699999809
CANST51	0	23	5.099999905	6.699999809	6.099999905	11	0.50999999	5.30000019	0	6	1.600000024	0.959999979
CANST52	0.5	5.599999905	0.569999993	1.100000024	1.100000024	0.680000007	0.0288	0.40000001	0.158999994	3.299999952	0.100000001	0.810000002
CANST53	0.5	8.300000191	1.100000024	2	1.799999952	1.700000048	0.098999999	0.43000001	0.167999998	3.299999952	0.100000001	0.100000001
CANST54	0.5	17	2.099999905	3.400000095	3.400000095	4.300000191	0.449999988	4.5999999	2.039999962	11.39999962	9.300000191	4.300000191
CANST55	18	45	4.400000095	6.699999809	7.099999905	6.599999905	0.540000021	6.5999999	2.190000057	18.29999924	7.599999905	5.099999905
CANST56	0.5	22	9.449999809	14.69999981	11.69999981	17.60000038	0.342000008	2.04999995	0.467999995	5.039999962	0.781000018	2.210000038
CANST57	0.5	21	6.449999809	12.39999962	10.69999981	15	0.393000007	1.78999996	0.338999987	5.070000172	0.86500001	1.919999957
CANST58	39.2000008	235	29.79999924	59.40000153	63.29999924	40.79999924	1.449000001	20.6000004	5.159999847	56.09999847	12.80000019	13.80000019
CANST59	17	79	4.829999924	10.5	14.10000038	3.890000105	0.100500003	10.1999998	2.27699995	23.76000023	6.980000019	5.199999809
CANST6	0.024043	0.216441005	0.021909799	0.042092599	0.0222585	0.01354104	0.001394785	0.0109839	0.00965391	0.178283393	0.080283202	0.068742998
CANST60	1.14999998	254	22.39999962	42.09999847	40.59999847	15.60000038	0.244800001	26.3999996	5.730000019	75	16.60000038	15.60000038
CANST61	2.5	152	10.89999962	23.79999924	25.20000076	9.369999886	0.235499993	18.2000008	3.930000067	51.90000153	11.19999981	10.5
CANST62	0.5	90.90000153	8.470000267	19.5	15.60000038	8.449999809	0.164700001	6.73000002	1.779000044	24.69000053	5.829999924	5.380000114
CANST63	1.21500003	122	10.89999962	24.10000038	20.70000076	10.10000038	0.189600006	13.8000002	2.963999987	42.29999924	9.56000042	8.460000038
CANST64	0.5	23	1.340000033	2.890000105	3.470000029	0.845000029	0.01887	2.99000001	0.015	7.110000134	1.600000024	1.440000057
CANST65	0.50999999	41.90000153	1.889999986	4.070000172	5.489999771	0.957000017	0.018479999	13.3000002	1.496999979	8.640000343	1.220000029	1.5
CANST7	0.184672	0.805570006	0.027431101	0.040843502	0.0364714	0.01326206	0.000326964	0.0414041	0.01508373	0.221224204	0.0397508	0.040110402
CANST8	0.028	0.079999998	0.0066	0.014	0.013	0.0069	0.000201	0.012	0.0036	0.059999999	0.01	0.011
CANST9	0.022	0.119999997	0.011	0.039000001	0.029999999	0.024	0.00117	0.0092	0.003	0.045000002	0.011	0.012
Chem 24D-AVG	0.06	0.779999971	0.030999999	0.039000001	0.024	0.0021	0	0.007	0.0114	0.021	0.035999998	0.011
Chem CH-42	0	0	0	0	0	0	0.032099999	137.600006	3.839999914	41.09999847	2.829999924	1.210000038
Chem CH-56	0	0	0	0	0	0	0	108.199997	2.220000029	150.8999939	43	7.539999962
Chem Fal-1268	0.02	0.029999999	0.0025	0.0015	0.003	0.018999999	0.00222	0.50999999	3.299999952	33	130	26
Chem Kod-1254-1	1	1	0.100000001	0.100000001	0.100000001	0.01	0.0003	12.9899998	8.850000381	246.3000031	163.8099976	73.37000275

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration											
	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCDD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF	2,3,4,7,8-PECDF	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDF
Chem Kod-1254-2	1	1	0.100000001	0.100000001	0.100000001	0.01	0.0003	35.0099983	57.60599899	1214.76001	457.1400146	319.0499878
Chem PCP-1	0.025	0.5	0.600000024	256.5	4.400000095	2100	442.5	0.025	0.015	0.150000006	4.900000095	0.5
Chem PCP-2	0.025	0.5	0.800000012	153.1999969	2.799999952	1060	279	0.025	0.015	0.150000006	3.400000095	0.400000006
Chem PCP-3	0.015	1	0.050000001	83.09999847	2.799999952	780	219.8999939	0.005	0.015	0.449999988	12.5	0.050000001
Chem PCP-4	0.025	2	0.050000001	148	5.300000191	999	237	0.005	0.006	0.270000011	16.29999924	0.050000001
Chem PCP-5	0.025	0.5	0.800000012	60	1.299999952	890	816.9000244	0.025	0.015	0.150000006	6.699999809	0.200000003
Chem PCP-Na-1	0.23	18.20000076	2.829999924	203.3999939	28.20000076	91	12.47999954	0.18000001	0.246000007	1.980000019	4.800000191	6.900000095
Chem PCP-Na-2	0.50999999	3.200000048	1.330000043	5.300000191	1.899999976	38	9.720000267	0.079	0.057	0.330000013	0.460000008	0.129999995
Chem PCP-Na-3	0.076	18.70000076	9.600000381	441	32.79999924	1754	263.7000122	0.05	0.059999999	0.600000024	2.75999999	2.190000057
Chem PCP-Na-4	0.69999999	28.29999924	0.305000007	405	0.07	338	24.29999924	14.8999996	9.569999695	97.19999695	0.140000001	22.5
Chem SSMEAN-2DL	2.72000003	10.89999962	1.110000014	3.380000114	2.019999981	9.81000042	3.566999912	1.27999997	0.32100001	4.710000038	2.039999962	3.039999962
Chem SSMEAN-2Z	1.71000004	3.339999914	0.602999985	3.220000029	1.700000048	9.81000042	3.566999912	1.11000001	0.105899997	3.150000095	1.399999976	0.513000011
Chem SSMED-1DL	6.86000013	9.840000153	2.25	2.730000019	2.799999952	3.349999905	0.995999992	1.70000005	0.287999988	3.119999886	2.799999952	1.799999952
Chem SSMED-1Z	0	0	0	0	0	3.349999905	0.995999992	0.38999999	0	0	0	0
Chem SSMED-2DL	1.95000005	8.229999542	0.524999976	2.559999943	1.230000019	6.420000076	1.988999963	0.75300002	0.237299994	2.910000086	1.149999976	1.399999976
Chem SSMED-2Z	0	0	0	2.470000029	0.948000014	6.420000076	1.988999963	0.62800002	0	0	0	0
Chem Wak-1248	1	1	0.100000001	0.100000001	0.100000001	0.01	0.0003	31.3999996	1.590000033	35.40000153	1.799999952	1.100000024
Chem Wak-1254	1	1	0.100000001	0.100000001	0.100000001	0.01	0.0003	16.5	3.839999914	78.59999847	39.20000076	16.29999924
Chem Wak-1260	1	1	0.100000001	0.100000001	0.100000001	0.01	0.0003	12.8999996	4.199999809	49.79999924	56.59999847	21
DenvRes NE R-1	0.648	4.139999866	0.572000027	1.299999952	1.039999962	3.289999962	0.795000017	0.205	0.081299998	4.079999924	0.616999984	0.555000007
DenvRes NE R-10	0.46399999	1.470000029	0.561999977	0.688000023	0.349999994	1.75	0.504000008	0.0685	0.162900001	0.3495	0.778999984	0.386000007
DenvRes NE R-2	0.175	1.409999967	0.264999986	0.598999977	0.400000006	1.50999999	0.375	0.04415	0.000894	0.890999973	0.230000004	0.218999997
DenvRes NE R-5	0.528	1.690000057	0.112000003	0.777999997	0.51700002	1.840000033	0.470999986	0.0925	0.104999997	0.486000001	0.419	0.208000004
DenvRes NW R-10	6.07000017	0.497999996	0.184	0.331	0.261000007	0.684000015	0.146400005	0.0461	0.008655	0.300000012	0.123000003	0.128000006
DenvRes NW R-11	11.6000004	0.303499997	0.029899999	0.316000015	0.127000004	0.802999973	0.151199996	0.062	0.027179999	0.389999986	0.197999999	0.337000012
DenvRes NW R-3	19.2999992	3.644999981	0.697000027	2.849999905	1.789999962	7.150000095	1.508999944	0.70999998	0.116700001	1.718999982	0.694000006	0.444999993
DenvRes SE R-11	0.375	3.559999943	1.100000024	2.25	1.309999943	18.29999924	1.764000058	0.0238	0.007635	0.582000017	0.458999991	0.196999997
DenvRes SE R-5	0.29300001	4.480000019	1.00999999	1.99000001	0.911000013	7.840000153	2.184000015	0.0635	0.016349999	2.802000046	0.620000005	0.488999993
DenvRes SE R-6	0.67900002	4.420000076	1.070000052	3.00999999	1.820000052	12.89999962	1.25999999	0.02065	0.0306	0.449999988	0.556999981	0.267500013
DenvRes SE R-7	1.14999998	22.10000038	5.840000153	18	11.5	32.40000153	2.315999985	0.4395	0.906000018	19.22999954	7.699999809	4.809999943
DenvRes SE R-8	0.01075	1.090000033	0.241999999	0.610000014	0.541000009	1.559999943	0.354000002	0.0073	0.01047	0.115199998	0.25999999	0.180000007
DenvRes SW R-11	0.616	2.940000057	0.331	0.862999976	0.853999972	2.329999924	0.551999986	0.059	0.032699998	1.139999986	0.284000009	0.201000005
EPAinvy asphalt plant	9.52999973	14.06000042	1.909999967	5.900000095	4.449999809	2.180000067	0.338999987	4.4000001	5.849999905	11.46000004	18.10000038	5.440000057
EPAinvy black liq rec boiler	0.016	0.016000001	0.0018	0.0015	0.0019	0.00135	0.0003162	0.0049	0.00108	0.0111	0.0022	0.0021
EPAinvy burn barrel ash 1	31	230	27	42	30	40	2.880000114	83	30	750	230	210
EPAinvy burn barrel ash 2	9	53	4.400000095	7.400000095	5.599999905	6.300000191	0.207000002	22	8.100000381	207	48	49
EPAinvy car diesel	11.3999996	10.60000038	0.819999993	1.519999981	1.059999943	0.850000024	0.162	8.84000015	2.148000002	11.57999992	4.989999771	3.49000001
EPAinvy car leaded gas	68	168	7.300000191	8.899999619	11.39999962	2.809999943	0.202800006	77.4000015	12.75	60.59999847	33.40000153	32.90000153
EPAinvy car unleaded cc	5.5999999	3	0.319999993	0.449999988	0.379999995	0.338	0.0801	1.57000005	0.224999994	1.649999976	0.620000005	0.660000026
EPAinvy car unleaded no cc	14.8000002	15.10000038	2.130000114	4.190000057	2.029999971	1.059999943	0.233400002	10.3999996	1.952999949	20.37000084	6.920000076	4.760000229
EPAinvy cement kiln ash	0.42899999	0.885999978	0.103	0.236000001	0.246999994	0.177000001	0.0063	0.465	0.031199999	0.77700001	0.213	0.086900003
EPAinvy cement kilns	0.02	0.039999999	0.004	0.005	0.006	0.0039	0.000192	0.073	0.0033	0.068999998	0.017999999	0.006

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration											
	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCDD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF	2,3,4,7,8-PECDF	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDF
EPAinvy coal utility	0.018	0.016000001	0.0034	0.0028	0.0035	0.00241	0.0001932	0.0117	0.00063	0.0252	0.012	0.003
EPAinvy crematoria	20.5	66.80000305	9.100000381	13.60000038	14	11.03999996	0.517650008	15.6000004	3.494999886	95.09999847	31.89999962	30.79999924
EPAinvy Eur tunnel a	0.005	0.310000002	0.037	0.119000003	0.044	0.018999999	0.00189	0.017	0.012	0.057	0.026000001	0.016000001
EPAinvy Eur tunnel c	0.002	0.025	0.0025	0.0042	0.003	0.00468	0.000657	0.0013	0.00429	0.0117	0.0073	0.0093
EPAinvy Eur tunnel d	0.02	0.180000007	0.006	0.028999999	0.025	0.0141	3E-05	0.058	0.024900001	0.233999997	0.079000004	0.061999999
EPAinvy forest fire	1.27999997	3.829999924	0.568000019	1.070000052	1.733999968	1.662700057	0.199101001	0.69800001	0.190500006	3.032999992	1.674000025	0.716000021
EPAinvy HH burn barrel	3.4000001	8.199999809	0.660000026	0.99000001	1.909999967	0.398000002	0.01491	4.55999994	1.116000056	19.55999947	11.38000011	3.849999905
EPAinvy HWI 2000	0.0615	0.614099979	0.023469999	0.054079998	0.030370001	0.02729	0.0015633	0.06931	0.028217999	0.263999999	0.408499986	0.30309999
EPAinvy HWI 93-96	0.44	0.180000007	0.022	0.032000002	0.048999999	0.0177	0.001239	0.296	0.070799999	0.768000007	0.971000016	0.395000011
EPAinvy ind wood 1	0.016	0.054000001	0.0055	0.0096	0.0132	0.00905	0.0018078	0.0673	0.023700001	0.222299993	0.076800004	0.094099998
EPAinvy ind wood 2	0.068	0.112000003	0.018300001	0.019300001	0.0524	0.00637	0.0003951	0.0719	0.00447	0.049199998	0.0111	0.0073
EPAinvy ind wood 3	0.046	0.083999999	0.0123	0.0143	0.034200002	0.00748	9.87E-05	0.069	0.01227	0.117600001	0.037900001	0.041900001
EPAinvy landfill flare	0.02	0.090000004	0.007	0.007	0.026000001	0.0076	0.001323	1.40699995	0.0117	0.342000008	0.145999998	0.041999999
EPAinvy MWC	0.006	0.016000001	0.0016	0.0036	0.0032	0.00219	0.0001035	0.0072	0.00153	0.0207	0.0083	0.0059
EPAinvy oil boiler 1	117	104	21.5	9.699999809	14.89999962	3.589999914	0.123899996	8.30000019	2.309999943	25.79999924	10.89999962	6.800000191
EPAinvy oil boiler 2	26.6000004	43.09999847	10.80000019	7.929999828	10.19999981	5.460000038	0.64230001	3.56999993	2.217000008	17.87999916	9.489999771	4.519999981
EPAinvy res coal lignite	0.06	0.079999998	0.006	0.009	0.006	0.0059	0.000726	0.05	0.0129	0.093000002	0.013	0.035999998
EPAinvy res coal salt lignite	0.57999998	0.730000019	0.063000001	0.059999999	0.039999999	0.032400001	0.004857	0.249	0.067199998	0.626999974	0.037999999	0.186000004
EPAinvy res soot 1	150	70	3.5	6	3	0.899999976	0.027000001	93	16.79999924	177	33	40
EPAinvy res soot 2	6	70	0.5	62.5	28.10000038	9.479999542	0.158999994	23.5	1.74000001	20.39999962	5.099999905	5.699999809
EPAinvy res wood 1	212	216	21	21	21	2	0.300000012	129	13.19999981	145.8000031	22	15
EPAinvy res wood 10	63	54	7	7	7	1	0	27	3	32.40000153	16	4
EPAinvy res wood 11	70	78	7	7	7	2	0.300000012	16	1.200000048	10.19999981	7	7
EPAinvy res wood 12	66	82	10	10	10	1	0	18	3	19.79999924	18	8
EPAinvy res wood 2	214	276	16	16	16	2	0	134	14.39999962	222.6000061	31	18
EPAinvy res wood 3	256	234	17	17	17	2	0	127	13.80000019	210	23	20
EPAinvy res wood 4	82	82	10	10	10	1	0	95	7.199999809	111.5999985	12	8
EPAinvy res wood 5	110	132	18	18	18	2	0	47	7.800000191	89.40000153	13	13
EPAinvy res wood 6	91	114	14	14	14	2	0	55	10.19999981	181.1999969	23	15
EPAinvy res wood 7	68	68	8	8	8	1	0	28	3.599999905	51	27	10
EPAinvy res wood 8	75	112	13	13	13	1	0.300000012	38	2.400000095	46.79999924	11	8
EPAinvy res wood 9	56	94	9	9	9	2	0.300000012	36	2.400000095	39.59999847	10	6
EPAinvy Sludge/Wood Combust	0.013	0.012	0.0022	0.0056	0.0043	0.00302	0.0003576	0.0107	0.00087	0.0081	0.0071	0.0046
EPAinvy SS Incin	0.25999999	0.300000012	0.011	0.017000001	0.035	0.025900001	0.003948	2.54099989	0.057599999	1.940999985	0.210999995	0.077
EPAinvy Tire Combust	0.149	0.026000001	0.0023	0.0062	0.0048	0.00379	0.0012468	0.0319	0.00354	0.0273	0.0111	0.009
EPAinvy truck diesel	107	231	36.70000076	30.70000076	44.59999847	387.3099976	34.6106987	14.8000002	24.56999969	266.1000061	139.6999969	111.9000015
EPAinvy US tunnel diesel truck	34.2999992	29	4.079999924	8	14.65999985	9.602999687	1.330379963	8.64999962	1.034999967	22.92000008	12.94999981	5.880000114
EPAreass EPA-Rural	0.017	0.280000001	0.052999999	0.370000005	0.239999995	0.720000029	0.188999996	0.13	0.0102	0.156000003	0.100000001	0.066
EPAreass EPA-Urban	0.87	2.400000095	0.270000011	0.529999971	0.50999999	0.99000001	0.810000002	0.23	0.054000001	0.959999979	0.400000006	0.360000014
GravDock GDEX-1/2	0.77999997	1.25	0.104999997	1	0.330000013	1.100000024	0.284999996	0.46000001	0.126000002	1.230000019	0.469999999	0.340000004
GravDock GDEX-3/7	1.5	6.400000095	0.349999994	0.620000005	0.409999996	0.280000001	0.021	0.91000003	0.237000003	2.940000057	0.529999971	0.600000024
GravDock GDEX-4/8	0.61000001	3	0.109999999	0.449999988	0.119999997	0.209999993	0.012	0.87	0.243000001	2.970000029	0.620000005	0.560000002

Attachment B
Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration											
	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCDD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF	2,3,4,7,8-PECDF	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDF
GravDock GDSP-1/10	3.70000005	31	2.099999905	75	9.699999809	48	4.5	1.89999998	0.360000014	5.099999905	4.099999905	6.199999809
HFB	0.003	0.026000001	0.0019	0.0036	0.0024	0.00134	4.68E-05	0.0177	0.00114	0.012	0.0009	0.0009
LDW DRD-SS7-010	0.23899999	0.763000011	0.086900003	0.199000001	0.186000004	0.416999996	0.094800003	0.0254	0.01725	0.197699994	0.112000003	0.0682
LDW EB-SS2a-010	0.48300001	2.799999952	0.481999993	1.519999981	1.200000048	3.839999914	0.828000009	0.127	0.02916	0.405000001	0.397000015	0.305999994
LDW EB-SS2b-010	0.73799998	3.789999962	0.717000008	2.180000067	1.769999981	5.070000172	1.154999971	0.193	0.045299999	0.600000024	0.555999994	0.449999988
LDW LU-SS9a-010	0.32800001	1.320000052	0.148000002	0.583999991	0.344999999	1.379999995	0.300000012	0.0443	0.02004	0.226199999	0.143000007	0.155000001
LDW LU-SS9b-010	1.08000004	5.269999981	0.713999987	3.019999981	1.99000001	7.550000191	1.697999954	0.36399999	0.076200001	1.049999952	0.762000024	0.513000011
LDW LW-SS3-010	0.49900001	2.309999943	0.442000002	1.940000057	1.200000048	4.25	0.882000029	0.127	0.038699999	0.425999999	0.360000014	0.284999996
LDW LW-SS4-010	0.926	2.619999886	0.476000011	1.700000048	1.100000024	4.289999962	0.924000025	0.315	0.0735	0.728999972	0.40200001	0.261000007
LDW LW-SS5a-010	0.77899998	3.059999943	0.528999984	1.649999976	1.25999999	3.529999971	0.75	0.12899999	0.054900002	0.611999989	0.393000007	0.300000012
LDW LW-SS5b-010	0.69499999	3.099999905	0.572000027	1.799999952	1.25999999	3.789999962	0.908999979	0.12899999	0.049199998	0.513000011	0.409000009	0.333000004
LDW LW-SS6-010	0.398	2.24000001	0.418000013	1.820000052	1.149999976	3.809999943	0.795000017	0.132	0.038699999	0.474000007	0.354999989	0.263999999
LDW SB-SS6-010	0.125	0.481000006	0.076800004	0.254000008	0.202999994	0.523999989	0.108900003	0.0284	0.00795	0.108000003	0.086400002	0.062700003
LDW SC-SS1a-010	1.25999999	6.639999866	3.549999952	8.670000076	8.840000153	87.40000153	62.40000153	0.66299999	0.119099997	1.863000035	1.799999952	0.966000021
LDW SC-SS1b-010	2.04999995	9.600000381	1.840000033	6.300000191	5.21999979	19.89999962	6	1.25999999	0.206400007	3.029999971	1.700000048	1.629999995
LDW UB-SS8-010	3.00999999	11.80000019	2.119999886	6.260000229	5.099999905	13.19999981	2.483999968	0.61400002	0.140699998	2.028000116	1.5	1.440000057
MWI_NW_Hosp_1	0.004	0.086000003	0.020199999	0.088699996	0.0405	0.125	0.00747	0.0103	0.00933	0.242699996	0.105999999	0.098099999
MWI_NW_Hosp_2	0.004	0.064000003	0.0099	0.034699999	0.0173	0.052000001	0.00393	0.0059	0.00504	0.126300007	0.0495	0.0471
MWI_NW_Hosp_3	0.002	0.0045	0.0051	0.018100001	0.0092	0.025599999	0.001947	0.0025	0.00183	0.0462	0.019099999	0.0164
MWI_VA_Hosp_1	34.2999992	19.53000069	3.303999901	11.26900005	4.361000061	10.4993	1.081431031	3.15700006	1.984500051	58.5870018	22.53899956	28.55800056
MWI_VA_Hosp_2	5.30000019	38.50999832	5.130000114	14.57800007	7.218999863	13.01910019	0.865338027	3.68700004	2.876699924	76.94400024	35.31499863	44.90399933
MWI_VA_Hosp_3	3.79999995	25.15999985	4.249000072	11.05099964	5.197000027	10.22999954	0.660839975	4.09200001	2.078700066	47.26800156	23.59600067	29.94300079
PAash BH-Ash-91	1800	6200	950	490	410	140	2.00999999	390	36	450	150	94
PAash CC_Ash-91	40	120	26	18	16	8.100000381	0.141000003	13	1.289999962	16.79999924	4.099999905	3.799999952
PAash F-Ash-89	460	1400	100	64	15	19	0.540000021	150	26.10000038	360	67	51
PAash F-Ash-93	850	6400	1600	2100	1600	1300	26.39999962	140	57	780	150	75
PAash HFB-Ash-89	40	120	26	18	16	8.100000381	0.141000003	13	1.289999962	16.79999924	4.099999905	3.799999952
PA-Ash LF-01-04SB	15	64	5.099999905	7.699999809	5.800000191	3.099999905	0.419999987	2.79999995	1.620000005	11.39999962	1.700000048	1.899999976
PA-Ash LF-01-08SB	11	41	2.599999905	6.699999809	3.5	3.5	0.389999986	3	1.25999999	8.699999809	1.299999952	1.100000024
PA-Ash RS-01-SS	0.61000001	1.200000048	0.074000001	0.579999983	0.170000002	0.289999992	0.050999999	0.2	0.029100001	0.228	0.119999997	0.048
PA-Ash RS-04-SS	0.57999998	1.299999952	0.180000007	0.810000002	0.409999996	1	0.194999993	0.22	0.025800001	0.540000021	0.170000002	0.209999993
PA-Ash RS-09-SS	0.55000001	1.299999952	0.140000001	0.340000004	0.200000003	0.600000024	0.209999993	0.25	0.0261	0.540000021	0.066	0.097000003
PA-Ash RS-12-SS	0.73000002	2	0.170000002	0.360000014	0.289999992	0.409999996	0.086999997	0.28999999	0.0261	0.629999995	0.209999993	0.150000006
PA-Ash RS-13-SS	0.41	0.980000019	0.109999999	0.270000011	0.180000007	0.209999993	0.035999998	0.12	0.023399999	0.167999998	0.129999995	0.119999997
PA-Ash RS-18-SS	0.31999999	1.399999976	0.150000006	0.560000002	0.25999999	0.519999981	0.128999993	0.23999999	0.021299999	0.300000012	0.046	0.209999993
PA-Ash RS-19-SS	0.72000003	3.299999952	0.389999986	1.299999952	0.699999988	2.200000048	0.50999999	0.5	0.101999998	2.789999962	1.200000048	0.810000002
PAash SA-01-SS	190	1100	130	230	180	89	1.950000048	35	10.19999981	165	22	26
PA-soils ECO20	0.27500001	1.669999957	0.143999994	0.284000009	0.374000013	0.162200004	0.012972	0.227	0.0207	0.540000021	0.059	0.071999997
PA-soils ECO21	0.79000002	1.029999971	0.039999999	0.225999996	0.202999994	0.240700006	0.044886	0.09	0.0174	0.100500003	0.061999999	0.0185
PA-soils ECO22	1.88999999	6.579999924	0.558000028	1.286999941	1.25999999	0.697899997	0.065192997	0.47400001	0.051899999	1.343999982	0.333999991	0.209000006
PA-soils ECO23	0.245	1.929999948	0.170000002	0.412999988	0.400999993	0.238000005	0.028937999	0.229	0.01395	0.324000001	0.097000003	0.056000002
PA-soils ECO26	0.20999999	1.230000019	0.131999999	0.409000009	0.381000012	0.537800014	0.114771001	0.131	0.015900001	0.407999992	0.102499999	0.088

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration											
	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCDD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF	2,3,4,7,8-PECDF	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDF
PA-soils ECO27	2.13000011	4.869999886	0.404000014	1.052999973	0.987999976	0.908599973	0.071217	0.62699997	0.062399998	1.565999985	0.185000002	0.238999993
PA-soils ECO28	1.58000004	4.21999979	0.335999995	0.904999971	0.949999988	0.659300029	0.097782001	0.53600001	0.048300002	1.164000034	0.156000003	0.182999998
PA-soils ECO29	0.62	1.49000001	0.130999997	0.330000013	0.323000014	0.233199999	0.026355	0.204	0.0189	0.479999989	0.111000001	0.068999998
PA-soils ECO30	1.19000006	5.090000153	0.456	2.082999945	1.177000046	1.26699996	0.102576002	0.42300001	0.0495	1.175999999	0.170499995	0.195999995
PA-soils ECO31	0.23999999	1.450000048	0.137999997	0.261000007	0.252999991	0.122900002	0.013032	0.127	0.00885	0.224999994	0.063000001	0.017000001
PA-soils ECO32	0.96499997	6.349999905	0.575999975	1.00999999	1.080000043	0.633899987	0.060819	1.023	0.072750002	1.871999979	0.233500004	0.275999993
PA-soils ECO33	11.1800003	41.08000183	3.424000025	13.22500038	8.394000053	13.18159962	2.097438097	7.63700008	0.422250003	4.518000126	1.574499965	1.585000038
PA-soils ENR02	2.29999995	3.299999952	0.400000006	0.980000019	0.74000001	1.5	0.26699999	0.47	0.033	0.839999974	0.319999993	0.115000002
PA-soils JNR01	5.0999999	12	1.5	2.200000048	2.5	1.399999976	0.093000002	1.89999998	0.147	3.900000095	0.889999986	0.569999993
PA-soils JWR02	8.89999962	6	0.469999999	1	1.100000024	1.100000024	0.296999991	1	0.066	1.590000033	0.469999999	0.319999993
PA-soils LY20	1.78999996	8.579999924	0.797999978	1.745000005	1.792000055	1.226400018	0.161321998	0.484	0.065099999	1.659000039	0.294499993	0.326999992
PA-soils LY21a	220.130005	985.1199951	91.14900208	174.0460052	166.3320007	126.9215012	16.12560081	39.0540009	6.268050194	179.25	19.93199921	23.99799919
PA-soils LY21b	6.32499981	43.54999924	4.520999908	11.40499973	6.893000126	6.367800236	0.495081007	3.11400008	0.59009999	4.627500057	0.976000011	1.406999946
PA-soils LY22	0.37	3.109999895	0.138999999	0.760999978	0.488999993	0.557099998	0.085580997	0.25999999	0.031500001	0.328500003	0.118000001	0.118000001
PA-soils MSR01	1.70000005	1.450000048	0.379999995	0.709999979	0.720000029	0.550000012	0.071999997	0.73000002	0.046500001	1.110000014	0.280000001	0.085000001
PA-soils SL20	1.65999997	10.84000015	1.110999942	4.156000137	3.969000101	5.555500031	0.950037003	0.51099998	0.068099998	1.664999962	0.458999991	0.412999988
PA-soils SL21	6.26000023	22.42000008	2.644999981	7.236999989	6.274000168	15.4144001	3.81022501	0.33199999	0.093450002	1.824000001	0.764999986	1.498000026
PA-soils TBS01	3.5	9	1.100000024	1.899999976	2.099999905	1.399999976	0.093000002	1.70000005	0.330000013	4.800000191	1.399999976	1.299999952
PA-soils WM20a	1.94000006	23.20000076	3.150000095	20.89999962	9.340000153	53.90000153	19.64999962	2.30999994	0.584999979	7.230000019	5.760000229	1.99000001
PA-soils WM20b	4.8499999	24.60000038	2.410000086	9.199999809	4.230000019	16.79999924	5.21999979	7.9000001	0.58950001	23.19000053	3.309999943	1.582000017
PA-soils ZMR02	4.0999999	10	1.200000048	1.600000024	2	0.75	0.050999999	0.88	0.068999998	1.830000043	0.194999993	0.135000005
SpokSeds Greene	0.38	1.590000033	0.42899999	1.070000052	0.802999973	2.440000057	0.584999979	0.096	0.065399997	0.629999995	0.365999997	0.335999995
SpokSeds Mission	0.51999998	2.299999952	0.293000013	0.954999983	0.374000013	2.24000001	0.470999986	0.71499997	0.256799996	0.224999994	2.900000095	1.00999999
SpokSeds Superior	0.56999999	4.570000172	0.703000009	1.75	1.24000001	3.650000095	0.93900001	0.39700001	0.064499997	0.64200002	0.44600001	0.524999976
SpokSeds Union	0.63	4.239999771	0.372000009	1.419999957	1.360000014	3.630000114	1.008000016	0.336	0.1008	0.704999983	0.606999993	0.479000002
SpokSeds Washington	0.50999999	3.119999886	0.361000001	1.429999948	0.926999986	3.230000019	0.699000001	0.317	0.060899999	0.497999996	0.294	0.533999979
Stack LUT1	10	186	50.20000076	31.79999924	48.90000153	15.28999996	0.119400002	47.7999992	3.299999952	49.20000076	24.39999962	8.600000381
Stack LUT2	0.60000002	0.400000006	0.100000001	362.1000061	404.6000061	150	1.340999961	443.399994	25.82999992	436.7999878	0.100000001	68.59999847
Stack YAS1	332	929	49.40000153	50	50.5	21	0.411000013	155	59.09999847	543	177	137
Tribal '08042201	0.146	0.275999993	0.0252	0.289000005	0.082699999	0.202999994	0.035399999	0.0806	0.00564	0.068400003	0.035799999	0.034699999
Tribal '08042209	1.13999999	3.069999933	0.213	0.869000018	0.513999999	0.528999984	0.077100001	1.16999996	0.095700003	1.103999972	0.407999992	0.30399999
Tribal '08042213	0.35800001	1.019999981	0.075999998	1.059999943	0.317999989	0.690999985	0.046799999	0.31900001	0.02379	0.308999985	0.095799997	0.0973
Tribal '08042214	0.29300001	0.867999971	0.060400002	0.940999985	0.294999987	0.563000023	0.048300002	0.24699999	0.019200001	0.2667	0.101999998	0.092399999
Trond 12-04	0.1	1.100000024	0.016000001	0.023	0.012	0.018999999	0.0078	0.022	0.0063	0.096000001	0.037999999	0.021
Trond 16-04	0.06	0.389999986	0.140000001	0.032000002	0.021	0.071000002	0.0108	0.068	0.0138	0.182999998	0.050999999	0.041999999
Trond 7-04	0.23999999	0.910000026	0.096000001	0.159999996	0.100000001	0.310000002	0.188999996	0.071	0.0189	0.275999993	0.109999999	0.096000001
Trond 8-04	0.41	1.700000048	0.079000004	0.129999995	0.086999997	0.159999996	0.033	0.43000001	0.081	1.200000048	0.289999992	0.25999999
Trond 1009-04	0.43000001	2.400000095	0.129999995	0.310000002	0.230000004	0.319999993	0.041999999	0.89999998	0.165000007	1.649999976	0.870000005	0.600000024
Trond 1018-04	0.5	1.899999976	0.078000002	0.140000001	0.109999999	0.100000001	0.016799999	0.40000001	0.083999999	1.25999999	0.319999993	0.310000002
Trond 1027-04	0.12	0.949999988	0.057	0.150000006	0.086000003	0.100000001	0.0063	0.1	0.029999999	0.50999999	0.170000002	0.170000002
Trond 1036-04	0.14	0.230000004	0.006	0.017000001	0.021	0.037999999	0.0084	0.07	0.0129	0.188999996	0.006	0.035999998
Trond 1045-04	0.12	0.860000014	0.023	0.024	0.052000001	0.044	0.0066	0.23999999	0.033	0.479999989	0.119999997	0.090999998

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration											
	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCDD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF	2,3,4,7,8-PECDF	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDF
Trond 1054-04	0.07	0.07	0.007	0.007	0.007	0.0036	0.00099	0.008	0.0021	0.045000002	0.007	0.007
Trond 1063-04	0.07	0.170000002	0.035999998	0.035999998	0.045000002	0.02	0.00063	0.008	0.00195	0.039000001	0.018999999	0.018999999
Trond 1069-04	0.07	0.129999995	0.015	0.017000001	0.006	0.022	0.0045	0.018	0.0045	0.071999997	0.006	0.017000001
Trond 1072-04	0.1	0.209999993	0.02	0.024	0.022	0.028999999	0.0072	0.027	0.0081	0.128999993	0.033	0.024
Trond 1078-04	0.2	0.670000017	0.043000001	0.035999998	0.041000001	0.109999999	0.035999998	0.12	0.025800001	0.300000012	0.109999999	0.094999999
Trond 2001-04	0.15000001	0.379999995	0.092	0.094999999	0.119999997	0.033	0.006	0.077	0.0144	0.218999997	0.048	0.045000002
Trond 3001-04	0.11	0.389999986	0.079000004	0.140000001	0.119999997	0.419999987	0.108000003	0.041	0.019200001	0.279000014	0.083999999	0.119999997
Trond 3010-04	0.63999999	2.5	0.439999998	0.5	0.560000002	0.159999996	0.026699999	0.64999998	0.192000002	3	0.959999979	0.50999999
Trond 3028-04	0.11	0.319999993	0.035	0.469999999	0.140000001	0.159999996	0.020400001	0.052	0.0138	0.257999986	0.083999999	0.066
Trond 3037-04	0.12	0.170000002	0.028000001	0.200000003	0.034000002	0.119999997	0.0276	0.035	0.0069	0.075000003	0.037999999	0.030999999
Trond 34-04	0.12	0.400000006	0.026000001	0.050000001	0.025	0.050000001	0.0063	0.083	0.017999999	0.243000001	0.064999998	0.057999998
Trond 4001-04	0.15000001	0.930000007	0.055	0.055	0.037	0.100000001	0.0099	0.14	0.035999998	0.540000021	0.180000007	0.150000006
Trond 4004-04	0.36000001	0.860000014	0.289999992	0.300000012	0.340000004	0.067000002	0.0063	0.032	0.021600001	0.252000004	0.129999995	0.129999995
Trond 4010-04	0.2	0.610000014	0.159999996	0.159999996	0.180000007	0.180000007	0.035999998	0.031	0.0144	0.182999998	0.077	0.077
Trond 4016-04	0.12	0.349999994	0.074000001	0.074000001	0.093999997	0.75999999	0.137999997	0.043	0.0051	0.111000001	0.090999998	0.094999999
Trond 4019-04	0.23999999	0.289999992	0.075999998	0.083999999	0.082000002	0.056000002	0.0102	0.075	0.021299999	0.330000013	0.085000001	0.071999997
Trond 4028-04	0.05	0.055	0.026000001	0.027000001	0.029999999	0.014	0.00162	0.008	0.00165	0.045000002	0.014	0.014
Trond 4031-04	0.13	0.819999993	0.078000002	0.074000001	0.100000001	0.032000002	0.0153	0.084	0.0243	0.330000013	0.109999999	0.074000001
Trond 4037-04	0.28999999	0.610000014	0.230000004	0.239999995	0.280000001	0.023	0.0075	0.036	0.017999999	0.207000002	0.119999997	0.119999997
Trond 4043-04	0.18000001	0.239999995	0.017000001	0.017000001	0.017000001	0.012	0.00237	0.042	0.0093	0.111000001	0.015	0.021
Trond 4046-04	0.08	0.055	0.011	0.037	0.017999999	0.0086	0.00252	0.009	0.00165	0.041999999	0.0055	0.0055
Trond 4059-04	0.17	1.299999952	0.074000001	0.077	0.150000006	0.560000002	0.059999999	0.13	0.039000001	0.540000021	0.200000003	0.25
Trond 4066-04	0.08	0.360000014	0.083999999	0.089000002	0.100000001	0.054000001	0.0105	0.14	0.027899999	0.330000013	0.07	0.072999999
Trond 4072-04	0.05	0.25	0.028999999	0.028999999	0.029999999	0.061999999	0.0135	0.045	0.0087	0.114	0.013	0.028000001
Trond 4078-04	0.31	0.49000001	0.086000003	0.097999997	0.096000001	0.048	0.015900001	0.50999999	0.081	1.230000019	0.330000013	0.219999999
Trond 4079-04	0.16	0.680000007	0.074000001	0.079999998	0.092	0.025	0.0084	0.088	0.0195	0.287999988	0.059	0.057999998
Trond 4084-04	0.28	0.49000001	0.100000001	0.100000001	0.109999999	0.041999999	0.0033	0.032	0.0075	0.083999999	0.046	0.050999999
Trond 4087-04	0.13	0.400000006	0.041000001	0.041000001	0.052000001	0.027000001	0.0093	0.085	0.0156	0.203999996	0.032000002	0.037
Trond 4100-04	0.11	0.209999993	0.02	0.021	0.021	0.028999999	0.0072	0.038	0.0087	0.086999997	0.017999999	0.007
Trond 41-04	0.08	0.129999995	0.032000002	0.061000001	0.023	0.170000002	0.048	0.017	0.0042	0.057	0.024	0.017000001
Trond 4119-04	0.09	0.200000003	0.039000001	0.039999999	0.048999999	0.017000001	0.0069	0.035	0.0063	0.096000001	0.027000001	0.023
Trond 42-04	0.15000001	0.340000004	0.100000001	0.100000001	0.129999995	0.027000001	0.00285	0.047	0.0129	0.128999993	0.052000001	0.052000001
Trond 45-04	0.04	0.055	0.0055	0.0055	0.0055	0.0018	0.00036	0.002	0.00165	0.0165	0.0055	0.0055
Trond 46-04	0.22	0.25	0.048999999	0.046999998	0.400000006	0.015	0.0033	0.018	0.006	0.123000003	0.028999999	0.025
Trond 49-04	0.04	0.059999999	0.006	0.006	0.006	0.0012	0.0018	0.007	0.0018	0.017999999	0.006	0.006
Trond 5004-04	0.06	0.289999992	0.052999999	0.052999999	0.063000001	0.013	0.00168	0.012	0.0099	0.101999998	0.025	0.029999999
Trond 5013-04	0.28	0.449999988	0.078000002	0.090000004	0.109999999	0.028999999	0.0117	0.046	0.0093	0.123000003	0.064000003	0.050000001
Trond 5022-04	0.05	0.050000001	0.021	0.023	0.027000001	0.01	0.003	0.012	0.0036	0.041999999	0.01	0.013
Trond 6008-04	0.06	0.059999999	0.016000001	0.02	0.017999999	0.008	0.0018	0.036	0.0051	0.068999998	0.017999999	0.006
Trond 6014-04	0.07	0.319999993	0.050000001	0.054000001	0.064999998	0.043000001	0.0096	0.091	0.0162	0.216000006	0.028000001	0.027000001
TseWZ J94K3	0.63099998	1.450000048	0.193000004	3.519999981	0.675999999	2.170000076	0.395999998	0.331	0.064800002	0.875999987	0.312999994	0.32100001
TseWZ J94K4	0.41999999	0.82099998	0.111000001	0.921000004	0.233999997	0.601999998	0.124499999	0.16599999	0.036600001	0.405000001	0.122000001	0.120999999

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration											
	2,3,7,8-TCDD	1,2,3,7,8-PECDD	1,2,3,4,7,8-HXCDD	1,2,3,6,7,8-HXCDD	1,2,3,7,8,9-HXCDD	1,2,3,4,6,7,8-HPCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PECDF	2,3,4,7,8-PECDF	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDF
TseWZ J94K5	0.37400001	0.625	0.074500002	0.763999999	0.204999998	0.586000025	0.144899994	0.111	0.02196	0.270900011	0.0898	0.086999997
TseWZ J94K6	0.49599999	0.841000021	0.080700003	0.768000007	0.233999997	0.596000016	0.141000003	0.17399999	0.035700001	0.398999989	0.109999999	0.105999999
TseWZ J94K7	0.99599999	1.480000019	0.202999994	1.99000001	0.460999995	1.639999986	0.476999998	0.36000001	0.065700002	0.753000021	0.199000001	0.216999993
TseWZ J94K8	4.19000006	6.159999847	0.56400001	1.110000014	0.722000003	0.563000023	0.066299997	1.71000004	0.342000008	3.630000114	0.663999975	0.708999991
TseWZ J94K9	0	0.307000011	0.046599999	0.195999995	0.090099998	0.160999998	0.043200001	0.101	0.01485	0.180299997	0.045000002	0.045400001
TseWZ J94L0	0.58899999	1.730000019	0.316000015	8.170000076	1.129999995	7.789999962	2.505000114	0.505	0.0801	1.539000034	0.432000011	0.479000002
TseWZ J94L1	0	0.287	0.0473	0.488999993	0.103	0.328999996	0.064199999	0.0704	0.01863	0.222299993	0.059599999	0.061500002
TseWZ J94L2	0.36199999	0.806999981	0.126000002	1.690000057	0.43900001	1.110000014	0.263099998	0.156	0.032400001	0.456	0.155000001	0.157000005
TseWZ J94L3	0.38499999	0.619000018	0.078599997	0.5	0.164000005	0.83099997	0.398999989	0.191	0.031500001	0.365999997	0.0964	0.112999998
TseWZ J94N4	0.28400001	0.488999993	0.0766	0.384000003	0.116999999	0.405999988	0.124799997	0.133	0.0228	0.262800008	0.062600002	0.066299997
TseWZ J94N5	0.34999999	0.648000002	0.109999999	1.090000033	0.25999999	0.796999991	0.171900004	0.126	0.02403	0.288899988	0.112999998	0.114
TseWZ J9YR2	0.83600003	1.460000038	0.188999996	2.200000048	0.470999986	1.409999967	0.191699997	0.257	0.054900002	0.492000014	0.250999987	0.272000015
TseWZ J9YR3	0.48199999	0.990999997	0.108999997	1.070000052	0.280999988	0.922999978	0.222599998	0.124	0.0306	0.32100001	0.155000001	0.171000004
TseWZ J9YR4	1.21000004	2.380000114	0.303000003	1.779999971	0.462000012	1.730000019	0.414000005	0.43200001	0.118500002	1.223999977	0.467999995	0.460000008
TseWZ J9YR5	2.26999998	4.309999943	0.453000009	2.549999952	0.739000022	1.789999962	0.2421	0.78799999	0.201900005	2.157000065	0.759000003	0.68599999
TseWZ J9YR6	0	0.588	0.0669	0.31099999	0.118000001	0.261999995	0.084299996	0.117	0.024359999	0.1875	0.074000001	0.0669
USRural 1	0.07	0.300000012	0.063000001	0.093000002	0.155000001	0.537699997	1.940534949	0.03	0.009	0.128999993	0.090000004	0.048
USRural 2	0.1	0.479999989	0.079000004	0.147	0.31099999	0.543600023	0.454854012	0.011	0.0015	0.027000001	0.039999999	0.024
USRural 3	0.27000001	0.860000014	0.211999997	0.499000013	0.509000003	2.138499975	2.734673977	0.018	0.0042	0.050999999	0.104999997	0.071999997
USRural 4	0.1	0.400000006	0.055	0.194999993	0.264999986	0.648699999	0.459111005	0.014	0.0027	0.033	0.041999999	0.024
USRural 5	0.18000001	0.75	0.048	0.158000007	0.518000007	0.37529999	0.092454001	0.002	0.0042	0.054000001	0.056000002	0.028000001
USRural 6	0.16	0.920000017	0.213	0.444999993	0.51700002	1.801499963	3.274590015	0.099	0.0222	0.201000005	0.107000001	0.052999999
USRural 7	0.025	0.115000002	0.011	0.029999999	0.185000002	0.061299998	0.020637	0.0025	0.0048	0.034499999	0.055	0.012

Notes:

1 Reference Profile Library provided by Ecology

Ecology = Washington State Department of Ecology

TEF = Toxicity Equivalency Factor

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration				
	1,2,3,7,8,9-HXCDF	2,3,4,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	OCDF
Aust 1	0.079999998	0.150000006	0.159999996	0.026000001	0.0093
Aust 2	0.01	0.018999999	0.015	0.0005	0.00075
Aust 3	0.01	0.030999999	0.032000002	0.0024	0.00156
Aust 4	0.170000002	0.189999998	0.129999995	0.012	0.0072
Aust 5	0.01	0.219999999	0.200000003	0.011	0.0069
Aust 6	0.0025	0.041000001	0.026000001	0.0022	0.00081
Aust 7	0.012	0.079000004	0.050999999	0.0034	0.00219
Aust 8+A10:A259	0.052999999	0.100000001	0.150000006	0.011	0.012
Aust 9	0.075999998	0.039000001	0.024	0.0017	0.00072
Aust10	0.017999999	0.097000003	0.159999996	0.011	0.0093
Aust11	0.005	0.097000003	0.057999998	0.0038	0.00168
Aust12	0.25	0.639999986	5.400000095	0.430000007	0.819000006
Aust13	0.039999999	0.140000001	0.052000001	0.0044	0.00132
BC-avg	0.035999998	0.017000001	0.422600001	0.015900001	0.023178
CABST46	0.335000008	0.335000008	0.170000002	0.039500002	0.000855
CABST47	0.310000002	1	0.170000002	0.031500001	0.00087
CANST1	0.032953098	0.0091965	0.00801201	0.00112302	7.17393E-05
CANST10	0.012	0.023	0.0061	0.0033	9.3E-05
CANST11	0.00945	0.048599999	0.00879	0.00261	9.45E-05
CANST12	0.067000002	0.035999998	0.011	0.0056	0.000102
CANST13	0.016000001	0.004	0.0024	0.0011	2.1E-05
CANST14	0.0014	0.01	0.0012	0.00025	1.8E-05
CANST15	0.0024	0.017999999	0.0035	0.00069	4.5E-05
CANST16	0.0002	0.0089	0.0014	0.00026	5.7E-06
CANST17	0.0041	0.0076	0.0012	0.00023	6.3E-06
CANST18	0.0067	0.016000001	0.0023	0.0011	3.6E-05
CANST19	0.0086	0.024	0.0028	0.00094	4.2E-05
CANST2	0.000106	0.001124	0.00011966	1.06E-05	7.953E-07
CANST20	0.0019	0.0048	0.00068	0.0003	8.7E-06
CANST21	0.0036	0.0097	0.0014	0.00054	1.68E-05
CANST22	0.0014	0.01	0.0015	0.00029	1.29E-05
CANST23	0.00057	0.0057	0.001	0.00014	7.8E-06
CANST24	0.00134	0.0071	0.00138	0.000224	9.78E-06
CANST25	0.00035	0.00221	0.00049	7.6E-05	3.48E-06
CANST26	0.00124	0.00778	0.00158	0.000374	1.836E-05
CANST27	0.00157	0.00735	0.00141	0.000274	8.49E-06
CANST28	0.00028	0.00213	0.000426	8E-05	4.29E-06
CANST29	0.00321	0.0137	0.00179	0.000506	1.404E-05
CANST3	0.0022	0.0016	0.00026	2E-05	4.2E-06
CANST30	0.0013	0.00839	0.00164	0.000265	1.026E-05
CANST31	0.00161	0.00913	0.00147	0.000294	1.137E-05
CANST32	0.0044	0.021299999	0.00355	0.00067	2.16E-05

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration				
	1,2,3,7,8,9-HXCDF	2,3,4,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	OCDF
CANST33	0.00062	0.00413	0.000713	0.000143	7.98E-06
CANST34	0.025	0.082000002	0.0068	0.0013	5.7E-05
CANST35	0.003	0.01	0.0015	0.00037	1.77E-05
CANST36	0.00094	0.0026	0.0004	7.6E-05	5.1E-06
CANST37	0.0015	0.0056	0.00099	0.00016	1.02E-05
CANST38	0.0077	0.023	0.0017	0.00043	9E-06
CANST39	0.00077	0.0034	0.00052	4.5E-05	0
CANST4	0.011	0.005	0.0016	0.0006	2.4E-05
CANST40	0.0002	0.0024	0.00062	1E-05	3E-07
CANST41	0.0002	0.0068	2E-05	2E-05	2.25E-06
CANST42	0.0098	0.097000003	0.015	0.0031	0.000159
CANST43	0.0031	0.045000002	0.0067	0.00082	6.6E-05
CANST44	0.01	0.022	0.0042	0.00084	4.2E-05
CANST45	0.021	0.050999999	0.011	0.0023	0.000102
CANST48	0.159999996	0.569999993	0.098999999	0.032000002	0.00186
CANST49	0.100000001	0.319999993	0.061999999	0.017999999	0.00114
CANST5	0.017000001	0.008	0.0026	0.0003	2.4E-05
CANST50	0	9.899999619	1.700000048	0.100000001	0
CANST51	0	0	0	0	0
CANST52	0.100000001	1	0.01	0.050999999	0.00222
CANST53	0.100000001	1.100000024	0.159999996	0.052999999	0.00297
CANST54	0.689999998	1.299999952	0.720000029	0.25999999	0.0117
CANST55	0.819999993	2.799999952	0.779999971	0.230000004	0.0102
CANST56	0.100000001	0.837000012	0.165999994	0.030300001	0.00306
CANST57	0.100000001	0.925000012	0.130999997	0.0295	0.001923
CANST58	1.679999948	10.19999981	1.659999967	0.331999987	0.00831
CANST59	0.381000012	4.440000057	0.640999973	0.082900003	0.002463
CANST6	0.0275885	0.126942098	0.0159238	0.00591954	0.000292158
CANST60	1.139999986	11.5	1.799999952	0.230000004	0.00576
CANST61	0.920000017	8.010000229	1.25	0.199000001	0.0054
CANST62	0.100000001	3.799999952	0.556999981	0.086499996	0.002334
CANST63	0.875999987	6.179999828	0.875	0.166999996	0.00354
CANST64	0.100000001	1.100000024	0.140000001	0.01	0.00075
CANST65	0.100000001	1.019999981	0.085699998	0.01	0.00075
CANST7	0.0046437	0.0358417	0.00507674	0.00054495	2.21874E-05
CANST8	0.0018	0.0075	0.0012	0.0003	1.05E-05
CANST9	0.0033	0.0087	0.0021	0.00083	2.85E-05
Chem 24D-AVG	0.016000001	0.014	0.0217	0.0018	0
Chem CH-42	0	0	0.103	0.082999997	0.048
Chem CH-56	0	2.539999962	0.287999988	0.108000003	0.01107
Chem Fal-1268	0.870000005	35	46	1.799999952	0.959999979
Chem Kod-1254-1	0.100000001	21.32999992	5.81799984	5.333000183	0.106799997

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration				
	1,2,3,7,8,9-HXCDF	2,3,4,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	OCDF
Chem Kod-1254-2	0.100000001	133.3300018	15.06499958	14.59399986	0.283679992
Chem PCP-1	0.5	0.050000001	340	41	66.59999847
Chem PCP-2	0.050000001	0.050000001	290	62	69.90000153
Chem PCP-3	3.200000048	0.050000001	112.8000031	6.369999886	35.40000153
Chem PCP-4	14.60000038	0.050000001	199.3999939	9.800000191	41.09999847
Chem PCP-5	0.050000001	0.050000001	220	34	71.09999847
Chem PCP-Na-1	0.050000001	8.699999809	6.989999771	6.75	11.15999985
Chem PCP-Na-2	0.129999995	0.460000008	1.970000029	0.360000014	1.274999976
Chem PCP-Na-3	0.980000019	10.30000019	96.5	20.79999924	34.38000107
Chem PCP-Na-4	48	19.25	61.90000153	1.539999962	10.80000019
Chem SSMEAN-2DL	1.110000014	2.180000067	2.230000019	0.270999998	0.235799998
Chem SSMEAN-2Z	0.156000003	1.360000014	0.975000024	0.150000006	0.232500002
Chem SSMED-1DL	1.799999952	1.799999952	0.569999993	0.230000004	0.033
Chem SSMED-1Z	0	0	0.360000014	0	0.024
Chem SSMED-2DL	0.753000021	0.985000014	0.916999996	0.116999999	0.0858
Chem SSMED-2Z	0	0	0.317999989	0	0.084299996
Chem Wak-1248	0.050000001	0.100000001	0.025	0.025	0.0024
Chem Wak-1254	1.100000024	2.400000095	0.920000017	0.689999998	0.0033
Chem Wak-1260	3.400000095	2.700000048	10.89999962	1.799999952	0.606000006
DenvRes NE R-1	0.187000006	1.840000033	0.823000014	0.045600001	0.044100001
DenvRes NE R-10	0.137999997	0.113499999	0.481999993	0.056400001	0.031800002
DenvRes NE R-2	0.081	0.416999996	0.542999983	0.024599999	0.031199999
DenvRes NE R-5	0.096000001	0.187999994	0.331999987	0.035300002	0.019859999
DenvRes NW R-10	0.075000003	0.185000002	0.209000006	0.00971	0.01236
DenvRes NW R-11	0.071199998	0.388000011	1.799999952	0.013	0.0339
DenvRes NW R-3	0.229000002	0.575999975	1.139999986	0.067500003	0.071999997
DenvRes SE R-11	0.084200002	0.460000008	0.417499989	0.080499999	0.1998
DenvRes SE R-5	0.179000005	3.309999943	1.190000057	0.095399998	0.177300006
DenvRes SE R-6	0.088699996	0.564999998	0.23725	0.0656	0.022290001
DenvRes SE R-7	3.039999962	8.649999619	4.480000019	0.26699999	0.068700001
DenvRes SE R-8	0.055199999	0.272500008	1.440000057	0.066699997	0.154499993
DenvRes SW R-11	0.099799998	0.455000013	0.134749994	0.0243	0.02832
EPAinvy asphalt plant	8.619999886	38.09999847	2.950000048	1.220000029	0.065399997
EPAinvy black liq rec boiler	0.0016	0.0021	0.00035	0.00014	3.9E-05
EPAinvy burn barrel ash 1	290	81	120	14	2.460000038
EPAinvy burn barrel ash 2	67	15	21	1.700000048	0.167999998
EPAinvy car diesel	0.629999995	2.140000105	1.082000017	0.088	0.053580001
EPAinvy car leaded gas	5	33.20000076	18.61000061	0.579999983	0.160799995
EPAinvy car unleaded cc	0.230000004	0.790000021	0.689999998	0.027000001	0.023399999
EPAinvy car unleaded no cc	3.390000105	5.690000057	1.350000024	0.238000005	0.100199997
EPAinvy cement kiln ash	0.052299999	0.214000002	0.0184	0.00739	0.000429
EPAinvy cement kilns	0.002	0.008	0.0014	0.0002	7.2E-05

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration				
	1,2,3,7,8,9-HXCDF	2,3,4,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	OCDF
EPAinvy coal utility	0.0038	0.006	0.00385	0.00112	8.43E-05
EPAinvy crematoria	40.15000153	30.04999924	13.88000011	1.38499999	0.158849999
EPAinvy Eur tunnel a	0.002	0.012	0.012	0.0008	0.000195
EPAinvy Eur tunnel c	0.0143	0.0004	0.00499	0.00074	7.5E-05
EPAinvy Eur tunnel d	0.004	0.074000001	0.0178	0.0022	0.000486
EPAinvy forest fire	0.119999997	0.985000014	0.253899992	0.031199999	0.003096
EPAinvy HH burn barrel	6.190000057	0.300000012	1.286000013	0.145999998	0.01125
EPAinvy HWI 2000	0.2667	0.121799998	0.287400007	0.050560001	0.010881
EPAinvy HWI 93-96	0.030999999	0.270000011	0.168699995	0.0174	0.004137
EPAinvy ind wood 1	0.035	0.0491	0.027489999	0.00344	0.000477
EPAinvy ind wood 2	0.0067	0.0017	0.00074	0.0002	1.8E-05
EPAinvy ind wood 3	0.018300001	0.0209	0.01155	0.00152	0.0002043
EPAinvy landfill flare	0.011	0.068000004	0.0122	0.0007	0.000192
EPAinvy MWC	0.0013	0.0066	0.00157	0.00024	2.76E-05
EPAinvy oil boiler 1	10.39999962	8.600000381	1.690000057	1.789999962	0.0537
EPAinvy oil boiler 2	3.769999981	4.21999979	2.180000067	1.370000005	0.041700002
EPAinvy res coal lignite	0.002	0.012	0.0095	0.0006	9E-05
EPAinvy res coal salt lignite	0.007	0.101000004	0.025900001	0.0025	0.000189
EPAinvy res soot 1	7	20	4.900000095	0.400000006	0.021
EPAinvy res soot 2	0.800000012	2.400000095	0.970000029	0.200000003	0.0123
EPAinvy res wood 1	17	10	2	2	0
EPAinvy res wood 10	4	4	1	0	0
EPAinvy res wood 11	7	7	1	1	0
EPAinvy res wood 12	8	8	1	1	0
EPAinvy res wood 2	17	10	1	1	0
EPAinvy res wood 3	14	11	2	1	0
EPAinvy res wood 4	8	8	1	1	0
EPAinvy res wood 5	13	13	2	2	0
EPAinvy res wood 6	10	10	2	2	0
EPAinvy res wood 7	7	4	2	1	0
EPAinvy res wood 8	8	8	2	1	0.300000012
EPAinvy res wood 9	6	6	1	1	0
EPAinvy Sludge/Wood Combust	0.0041	0.0012	0.00275	0.00083	5.64E-05
EPAinvy SS Incin	0.003	0.122000001	0.0146	0.0017	0.000351
EPAinvy Tire Combust	0.0068	0.0148	0.00166	0.00095	0.0002268
EPAinvy truck diesel	446.8999939	132.5	246.3600006	19.60000038	14.09430027
EPAinvy US tunnel diesel truck	3.420000076	8.520000458	2.667000055	0.30399999	0.091499999
EPAreass EPA-Rural	0.039999999	0.077	0.180000007	0.0059	0.012
EPAreass EPA-Urban	0.075000003	0.25999999	0.170000002	0.015	0.0069
GravDock GDEX-1/2	0.014	0.129999995	0.319999993	0.007	0.033
GravDock GDEX-3/7	0.0285	0.49000001	0.170000002	0.008	0.00291
GravDock GDEX-4/8	0.0305	0.400000006	0.109999999	0.0055	0.000465

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration				
	1,2,3,7,8,9-HXCDF	2,3,4,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	OCDF
GravDock GDSP-1/10	0.085000001	5.599999905	28	0.569999993	0.720000029
HFB	0.0009	0.0009	0.00026	9E-05	5.4E-06
LDW DRD-SS7-010	0.033599999	0.062399998	0.073100001	0.00882	0.00573
LDW EB-SS2a-010	0.023499999	0.27700001	0.829999983	0.039299998	0.066299997
LDW EB-SS2b-010	0.036600001	0.407000005	1.019999981	0.0515	0.084299996
LDW LU-SS9a-010	0.030300001	0.125	0.225999996	0.064499997	0.01983
LDW LU-SS9b-010	0.070699997	0.569000006	1.200000048	0.097499996	0.1197
LDW LW-SS3-010	0.030999999	0.273000002	0.555999994	0.0339	0.0429
LDW LW-SS4-010	0.0295	0.263999999	0.485000014	0.038199998	0.033300001
LDW LW-SS5a-010	0.0253	0.289000005	0.617999971	0.039799999	0.062399998
LDW LW-SS5b-010	0.018999999	0.289999992	0.587000012	0.044399999	0.0396
LDW LW-SS6-010	0.027000001	0.252999991	0.524999976	0.031800002	0.0372
LDW SB-SS6-010	0.0063	0.052099999	0.088600002	0.00625	0.00615
LDW SC-SS1a-010	0.028000001	0.741999984	1.620000005	0.155000001	0.214200005
LDW SC-SS1b-010	0.071099997	1.350000024	2.589999914	0.136000007	0.207599998
LDW UB-SS8-010	0.0858	1.080000043	2.220000029	0.128000006	0.155100003
MWI_NW_Hosp_1	0.099600002	0.248999998	0.079400003	0.0296	0.00444
MWI_NW_Hosp_2	0.0471	0.115999997	0.034699999	0.0124	0.002007
MWI_NW_Hosp_3	0.0167	0.047800001	0.0143	0.0058	0.001128
MWI_VA_Hosp_1	13.64900017	81.19499969	19.52869987	4.059700012	0.632058024
MWI_VA_Hosp_2	20.81500053	112.2600021	30.48180008	6.096399784	0.673563004
MWI_VA_Hosp_3	15.75599957	80.64499664	23.59609985	4.405600071	0.613797009
PAash BH-Ash-91	27	58	10	2.299999952	0.135000005
PAash CC_Ash-91	1.399999976	3.099999905	0.569999993	0.109999999	0.006
PAash F-Ash-89	21	3.099999905	3.099999905	0.550000012	0.071999997
PAash F-Ash-93	130	68	15	4.300000191	0.111000001
PAash HFB-Ash-89	1.399999976	3.099999905	0.569999993	0.109999999	0.006
PA-Ash LF-01-04SB	0.360000014	1.899999976	0.50999999	0.052000001	0.039000001
PA-Ash LF-01-08SB	0.400000006	1.200000048	0.449999988	0.071000002	0.0243
PA-Ash RS-01-SS	0.055	0.100000001	0.052000001	0.017999999	0.0036
PA-Ash RS-04-SS	0.075000003	0.270000011	0.589999974	0.033	0.050999999
PA-Ash RS-09-SS	0.079000004	0.150000006	0.109999999	0.013	0.0066
PA-Ash RS-12-SS	0.109999999	0.180000007	0.100000001	0.028999999	0.0069
PA-Ash RS-13-SS	0.119999997	0.140000001	0.098999999	0.017000001	0.00264
PA-Ash RS-18-SS	0.109999999	0.209999993	0.209999993	0.011	0.0129
PA-Ash RS-19-SS	0.349999994	1.299999952	0.75	0.050999999	0.075000003
PAash SA-01-SS	9.100000381	30	2.400000095	0.540000021	0.0174
PA-soils ECO20	0.006	0.041499998	0.033300001	0.00165	0.001074
PA-soils ECO21	0.0065	0.018999999	0.044500001	0.00175	0.001995
PA-soils ECO22	0.018999999	0.113499999	0.104099996	0.0062	0.006021
PA-soils ECO23	0.01	0.0285	0.034299999	0.00305	0.001746
PA-soils ECO26	0.018999999	0.0515	0.101000004	0.0057	0.008439

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration				
	1,2,3,7,8,9-HXCDF	2,3,4,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	OCDF
PA-soils ECO27	0.008	0.126000002	0.113899998	0.0038	0.004743
PA-soils ECO28	0.005	0.0995	0.115000002	0.0031	0.006819
PA-soils ECO29	0.007	0.083999999	0.046399999	0.00275	0.00228
PA-soils ECO30	0.024499999	0.294999987	0.472200006	0.0117	0.012084
PA-soils ECO31	0.011	0.037999999	0.018200001	0.0014	0.000768
PA-soils ECO32	0.0085	0.148499995	0.104800001	0.0039	0.00483
PA-soils ECO33	0.194999993	0.873000026	1.869600058	0.0999	0.154193997
PA-soils ENR02	0.018999999	0.090000004	0.379999995	0.01	0.029999999
PA-soils JNR01	0.035	0.219999999	0.180000007	0.009	0.0075
PA-soils JWR02	0.0405	0.319999993	0.289999992	0.008	0.016799999
PA-soils LY20	0.016000001	0.156499997	0.146799996	0.0076	0.005706
PA-soils LY21a	4.602000237	15.59200001	11.98939991	1.083400011	0.987522006
PA-soils LY21b	0.055500001	1.411000013	0.00425	0.038800001	0.024966
PA-soils LY22	0.0055	0.134000003	0.077399999	0.0027	0.006528
PA-soils MSR01	0.022500001	0.064999998	0.071000002	0.0029	0.0033
PA-soils SL20	0.033	0.25850001	0.513499975	0.0119	0.016377
PA-soils SL21	0.021	0.741999984	1.945899963	0.184200004	0.163892999
PA-soils TBS01	0.048500001	1.100000024	0.569999993	0.037	0.0096
PA-soils WM20a	0.327499986	3.319999933	6.010000229	0.492000014	0.839999974
PA-soils WM20b	0.075000003	1.164999962	2.049999952	0.151999995	0.29429999
PA-soils ZMR02	0.018999999	0.119999997	0.061999999	0.00395	0.00111
SpokSeds Greene	0.075000003	0.501999974	0.633000016	0.037999999	0.0429
SpokSeds Mission	0.545000017	0.541999996	0.656000018	0.104000002	0.042300001
SpokSeds Superior	0.158000007	0.93599999	0.986999989	0.0407	0.094800003
SpokSeds Union	0.180999994	1.100000024	0.916999996	0.052999999	0.164100006
SpokSeds Washington	0.075000003	0.843999982	0.904999971	0.050999999	0.072300002
Stack LUT1	1	13.19999981	1.080000043	0.280000001	0.0078
Stack LUT2	0.100000001	0.100000001	13.25	2.640000105	0.071699999
Stack YAS1	33.20000076	119	28.20000076	6.789999962	0.324000001
Tribal '08042201	0.00492	0.035599999	0.104000002	0.0036	0.00426
Tribal '08042209	0.0184	0.250999987	0.218999997	0.0114	0.00624
Tribal '08042213	0.0056	0.087899998	0.144999996	0.00529	0.00498
Tribal '08042214	0.0075	0.089400001	0.135000005	0.00614	0.00432
Trond 12-04	0.0055	0.028000001	0.017000001	0.0012	0.00057
Trond 16-04	0.014	0.046	0.023	0.0012	0.00066
Trond 7-04	0.024	0.109999999	0.071999997	0.0059	0.0081
Trond 8-04	0.079999998	0.319999993	0.119999997	0.0085	0.0039
Trond 1009-04	0.219999999	0.560000002	0.25	0.041999999	0.009
Trond 1018-04	0.081	0.349999994	0.100000001	0.0098	0.00198
Trond 1027-04	0.034000002	0.25999999	0.071000002	0.0054	0.00111
Trond 1036-04	0.006	0.052000001	0.025	0.0037	0.00147
Trond 1045-04	0.029999999	0.129999995	0.039000001	0.011	0.00078

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration				
	1,2,3,7,8,9-HXCDF	2,3,4,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	OCDF
Trond 1054-04	0.007	0.007	0.0041	0.0025	0.000135
Trond 1063-04	0.045000002	0.027000001	0.011	0.02	0.00072
Trond 1069-04	0.006	0.022	0.0084	0.0035	0.000129
Trond 1072-04	0.026000001	0.034000002	0.02	0.0079	0.000288
Trond 1078-04	0.046999998	0.129999995	0.059999999	0.015	0.0012
Trond 2001-04	0.098999999	0.072999999	0.030999999	0.025	0.00192
Trond 3001-04	0.090999998	0.119999997	0.066	0.017999999	0.0054
Trond 3010-04	0.49000001	0.930000007	0.460000008	0.086000003	0.0198
Trond 3028-04	0.057	0.035999998	0.170000002	0.015	0.00135
Trond 3037-04	0.026000001	0.017999999	0.032000002	0.011	0.00177
Trond 34-04	0.021	0.063000001	0.035999998	0.0012	0.00072
Trond 4001-04	0.050999999	0.150000006	0.056000002	0.014	0.00135
Trond 4004-04	0.270000011	0.180000007	0.034000002	0.055	0.00138
Trond 4010-04	0.180000007	0.109999999	0.064999998	0.030999999	0.0063
Trond 4016-04	0.072999999	0.048999999	0.150000006	0.021	0.0135
Trond 4019-04	0.109999999	0.129999995	0.041000001	0.028999999	0.00102
Trond 4028-04	0.032000002	0.02	0.005	0.0086	0.0003
Trond 4031-04	0.078000002	0.100000001	0.016000001	0.030999999	0.00168
Trond 4037-04	0.289999992	0.170000002	0.059	0.037	0.00144
Trond 4043-04	0.025	0.029999999	0.0076	0.0046	0.000267
Trond 4046-04	0.017999999	0.016000001	0.016000001	0.0058	0.000285
Trond 4059-04	0.072999999	0.289999992	0.129999995	0.017000001	0.0117
Trond 4066-04	0.093000002	0.082000002	0.026000001	0.017000001	0.00051
Trond 4072-04	0.028000001	0.017000001	0.028000001	0.02	0.00072
Trond 4078-04	0.129999995	0.077	0.021	0.041999999	0.00156
Trond 4079-04	0.109999999	0.079000004	0.032000002	0.021	0.00054
Trond 4084-04	0.129999995	0.081	0.017000001	0.032000002	0.0009
Trond 4087-04	0.055	0.052000001	0.018999999	0.016000001	0.0006
Trond 4100-04	0.022	0.022	0.014	0.008	0.00084
Trond 41-04	0.006	0.028999999	0.035999998	0.0026	0.00192
Trond 4119-04	0.054000001	0.035	0.011	0.015	0.00078
Trond 42-04	0.119999997	0.075999998	0.013	0.025	0.00063
Trond 45-04	0.0055	0.0055	0.0022	0.0012	9.3E-05
Trond 46-04	0.046	0.033	0.021	0.014	0.00117
Trond 49-04	0.006	0.006	0.0068	0.0006	0.00033
Trond 5004-04	0.059	0.035999998	0.0066	0.012	0.00063
Trond 5013-04	0.100000001	0.066	0.017000001	0.024	0.00072
Trond 5022-04	0.024	0.013	0.0049	0.0098	0.00123
Trond 6008-04	0.017999999	0.013	0.0029	0.0054	0.000144
Trond 6014-04	0.066	0.057999998	0.032000002	0.022	0.00075
TseWZ J94K3	0.112999998	0.522000015	0.762000024	0.0276	0.036600001
TseWZ J94K4	0.045499999	0.184	0.291999996	0.0108	0.0156

Attachment B

Reference Profile Library[1]

Ecology Sample ID	TEF-scaled Concentration				
	1,2,3,7,8,9-HXCDF	2,3,4,6,7,8-HXCDF	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	OCDF
TseWZ J94K5	0.0317	0.143000007	0.228	0.00859	0.01254
TseWZ J94K6	0.039799999	0.152999997	0.187999994	0.00932	0.01143
TseWZ J94K7	0.069399998	0.328000009	0.495999992	0.0196	0.049800001
TseWZ J94K8	0.153999999	0.66900003	0.148000002	0.0167	0.00468
TseWZ J94K9	0	0.056600001	0.050700001	0.00314	0.00402
TseWZ J94L0	0.195999995	1.029999971	1.889999986	0.0691	0.299100012
TseWZ J94L1	0	0.104999997	0.171000004	0.00577	0.00825
TseWZ J94L2	0.057300001	0.256999999	0.345999986	0.0136	0.023189999
TseWZ J94L3	0.0264	0.118000001	0.188999996	0.00915	0.068700001
TseWZ J94N4	0	0.082400002	0.098999999	0.00495	0.01602
TseWZ J94N5	0.035799999	0.192000002	0.368000001	0.0121	0.01749
TseWZ J9YR2	0.0867	0.375999987	0.654999971	0.0229	0.023399999
TseWZ J9YR3	0.045600001	0.246000007	0.377999991	0.0136	0.01818
TseWZ J9YR4	0.116999999	0.568000019	0.921999991	0.034299999	0.038699999
TseWZ J9YR5	0.160999998	0.760999978	0.984000027	0.036200002	0.0438
TseWZ J9YR6	0	0.081900001	0.0592	0.00308	0.00744
USRural 1	0.027000001	0.056000002	0.042800002	0.0049	0.00261
USRural 2	0.002	0.024	0.064400002	0.0038	0.005646
USRural 3	0.004	0.071999997	0.354999989	0.0143	0.032403
USRural 4	0.004	0.025	0.075199999	0.0034	0.005601
USRural 5	0.009	0.048	0.093900003	0.0042	0.00903
USRural 6	0.013	0.052000001	0.095899999	0.0046	0.007644
USRural 7	0.013	0.016000001	0.021199999	0.0011	0.001803

Notes:

1 Reference Profile Library provided by Ecology

Ecology = Washington State Department of Ecology

TEF = Toxicity Equivalency Factor

ATTACHMENT C
PMF CONTRIBUTIONS BY SAMPLE

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
2013 Surface	POBI-SS-01-0-10-130312	1040484.685	634671.358	1.08	1.78	0.46
2013 Surface	POBI-SS-02-0-10-130312	1041142.330	634772.559	0.53	2.28	0.33
2013 Surface	POBI-SS-03-0-10-130312	1041136.411	635129.173	0.75	2.08	0.42
2013 Surface	POBI-SS-04-0-10-130312	1040836.938	635301.228	1.26	1.83	0.42
2013 Surface	POBI-SS-05-0-10-130312	1040389.309	635122.716	1.16	1.60	0.57
2013 Surface	POBI-SS-06-0-10-130312	1040940.180	635558.547	1.51	1.80	0.27
2013 Surface	POBI-SS-07-0-10-130312	1040394.790	635564.974	1.20	1.76	0.52
2013 Surface	POBI-SS-08-0-10-130313	1040020.248	635552.878	0.92	1.46	0.44
2013 Surface	POBI-SS-09-0-10-130312	1039485.410	635506.159	0.69	1.13	0.75
2013 Surface	POBI-SS-10-0-10-130311	1040879.840	635945.020	0.80	2.23	0.41
2013 Surface	POBI-SS-11-0-10-130312	1040461.063	635941.339	1.19	1.80	0.39
2013 Surface	POBI-SS-12-0-10-130313	1040018.808	635950.649	1.15	1.72	0.45
2013 Surface	POBI-SS-13-0-10-130312	1040860.220	636545.000	1.02	1.91	0.47
2013 Surface	POBI-SS-14-0-10-130312	1040435.565	636439.033	1.22	1.75	0.38
2013 Surface	POBI-SS-15-0-10-130313	1039959.262	636454.493	1.08	1.76	0.53
2013 Surface	POBI-SS-16-0-10-130312	1039420.607	636473.817	0.85	1.39	0.80
2013 Surface	POBI-SS-17-0-10-130313	1040806.790	637183.770	1.30	1.95	0.33
2013 Surface	POBI-SS-18-0-10-130312	1040724.143	637306.684	1.21	1.86	0.37
2013 Surface	POBI-SS-19-0-10-130311	1040849.805	637446.312	1.16	1.97	0.41
2013 Surface	POBI-SS-19-0-10-130311DUP	1040849.805	637446.312	1.47	1.83	0.39
2013 Surface	POBI-SS-20-0-10-130311	1040661.848	637584.684	1.05	1.75	0.59
2013 Surface	POBI-SS-21-0-10-130306	1039983.616	637530.411	1.15	1.67	0.54
2013 Surface	POBI-SS-22-0-10-130306	1039580.868	637517.544	1.12	1.37	0.76
2013 Surface	POBI-SS-23-0-10-130311	1040768.932	638055.283	1.05	1.71	0.53
2013 Surface	POBI-SS-24-0-10-130311	1040260.619	638041.975	1.04	1.64	0.62
2013 Surface	POBI-SS-25-0-10-130311	1039836.142	638053.484	1.08	1.61	0.55
2013 Surface	POBI-SS-26-0-10-130306	1039545.282	638001.136	0.95	1.49	0.73
2013 Surface	POBI-SS-27-0-10-130306	1039444.653	638610.901	0.93	1.61	0.43
2013 Surface	POBI-SS-28-0-10-130311	1039851.782	638669.911	1.09	1.62	0.60
2013 Surface	POBI-SS-29-0-10-130311	1040084.009	638438.530	1.14	1.52	0.61
2013 Surface	POBI-SS-30-0-10-130311	1040825.521	638532.837	1.08	1.17	1.07
2013 Surface	POBI-SS-31-0-10-130306	1040904.854	639271.017	1.03	1.51	0.67
2013 Surface	POBI-SS-32-0-10-130308	1041181.037	638395.862	0.92	0.74	1.19
2013 Surface	POBI-SS-33-0-10-130308	1041335.766	638567.750	0.43	1.39	0.92
2013 Surface	POBI-SS-34-0-10-130311	1041426.489	639272.562	1.08	1.28	0.87
2013 Surface	POBI-SS-35-0-10-130311	1042464.983	639296.334	1.03	1.33	0.93
2013 Surface	POBI-SS-36-0-10-130307	1042995.740	638191.489	1.11	1.71	0.46
2013 Surface	POBI-SS-37-0-10-130311	1043605.418	638407.706	0.95	1.35	1.00
2013 Surface	POBI-SS-38-0-10-130307	1042938.621	637674.297	1.02	1.69	0.59
2013 Surface	POBI-SS-39-0-10-130307	1043712.302	637698.588	1.04	1.27	0.75
2013 Surface	POBI-SS-40-0-10-130307	1042751.907	637372.862	1.11	1.82	0.41
2013 Surface	POBI-SS-41-0-10-130307	1042943.784	637429.909	0.99	1.71	0.56
2013 Surface	POBI-SS-41-0-10-130307DUP	1042943.784	637429.909	1.01	1.69	0.58
2013 Surface	POBI-SS-42-0-10-130307	1043225.138	637313.168	0.98	1.75	0.58
2013 Surface	POBI-SS-43-0-10-130307	1043050.797	637091.994	1.07	1.73	0.56
2013 Surface	POBI-SS-44-0-10-130306	1043607.132	637095.707	1.07	1.41	0.67
2013 Surface	POBI-SS-45-0-10-130308	1043079.028	636796.977	0.96	1.77	0.52
2013 Surface	POBI-SS-46-0-10-130307	1043754.091	636698.627	0.97	1.16	1.18
2013 Surface	POBI-SS-47-0-10-130308	1043099.952	636427.016	1.05	1.78	0.58
2013 Surface	POBI-SS-48-0-10-130308	1043089.357	636202.872	1.09	1.81	0.52
2013 Surface	POBI-SS-49-0-10-130308	1043398.432	636212.697	1.16	1.76	0.59
2013 Surface	POBI-SS-50-0-10-130307	1043846.507	636280.399	1.11	1.26	0.88
2013 Surface	POBI-SS-51-0-10-130311	1042976.618	635926.067	1.06	1.86	0.53
2013 Surface	POBI-SS-52-0-10-130311	1043274.362	635933.559	1.13	1.83	0.56
2013 Surface	POBI-SS-53-0-10-130308	1043349.384	635518.959	1.07	1.24	1.20
2013 Surface	POBI-SS-54-0-10-130308	1043743.091	635569.701	0.87	0.97	1.28
2013 Surface	POBI-SS-55-0-10-130307	1043982.565	635686.736	1.16	1.39	0.78
2013 Surface	POBI-SS-56-0-10-130311	1043355.818	635149.256	1.60	1.55	0.65
2013 Surface	POBI-SS-57-0-10-130307	1043899.324	634914.794	1.18	1.51	0.60
2013 Surface	POBI-SS-57-0-10-130307DUP	1043899.324	634914.794	1.17	1.47	0.66
2013 Surface	POBI-SS-58-0-10-130312	1043393.549	634700.092	1.50	1.70	0.61
2013 Surface	POBI-SS-59-0-10-130307	1043402.241	634334.882	1.09	1.99	0.26
2013 Surface	POBI-SS-60-0-10-130307	1043550.332	634239.953	1.17	1.81	0.39
2013 Surface	POBI-SS-161-0-10-130522	1041194.161	635095.758	0.64	2.53	0.17
2013 Surface	POBI-SS-61-0-10-130522	1041194.161	635095.758	0.66	2.43	0.18
2013 Surface	POBI-SS-62-0-10-130522	1041096.467	635090.578	0.67	1.95	0.35
2013 Surface	POBI-SS-63-0-10-130522	1041181.968	635008.039	0.38	1.93	0.39
2013 Surface	POBI-SS-64-0-10-130522	1041176.761	634658.143	0.29	1.79	0.44
2013 Surface	POBI-SS-65-0-10-130522	1041151.839	634582.792	0.56	1.83	0.29
2013 Subsurface	POBI-SC-01-0-0.5-130306	1040209.030	635257.269	1.09	1.57	0.66
2013 Subsurface	POBI-SC-01-0.5-1-130306	1040209.030	635257.269	0.95	1.34	0.70
2013 Subsurface	POBI-SC-01-1-1.5-130306	1040209.030	635257.269	1.08	1.14	1.05
2013 Subsurface	POBI-SC-02-1-2-130305	1040782.996	635268.879	1.00	1.68	0.39
2013 Subsurface	POBI-SC-02-4-5-130305	1040782.996	635268.879	0.65	0.03	2.60
2013 Subsurface	POBI-SC-02-5-6-130305	1040782.996	635268.879	0.38	0.05	2.31
2013 Subsurface	POBI-SC-04-9-11-130226	1040861.739	635714.983	1.47	1.68	0.41

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
2013 Subsurface	POBI-SC-05-2-3-130306	1040485.891	635689.904	1.66	1.13	0.79
2013 Subsurface	POBI-SC-05-3-4-130306	1040485.891	635689.904	1.48	0.88	0.87
2013 Subsurface	POBI-SC-05-3-4-130306DUP	1040485.891	635689.904	1.57	0.93	0.98
2013 Subsurface	POBI-SC-05-4-5-130306	1040485.891	635689.904	1.18	1.26	0.90
2013 Subsurface	POBI-SC-06-0-0.5-130313	1040892.150	635867.360	0.91	2.11	0.37
2013 Subsurface	POBI-SC-06-1-1.5-130313	1040892.150	635867.360	0.96	1.87	0.51
2013 Subsurface	POBI-SC-07-14-16-130226	1040854.351	635891.084	1.35	1.72	0.43
2013 Subsurface	POBI-SC-07-14-16-130226DUP	1040854.351	635891.084	1.48	1.75	0.38
2013 Subsurface	POBI-SC-08-3-5-130226	1040801.100	635860.903	0.96	1.73	0.55
2013 Subsurface	POBI-SC-08-5-6-130226	1040801.100	635860.903	1.03	1.80	0.50
2013 Subsurface	POBI-SC-08-7-8-130226	1040801.100	635860.903	1.92	1.11	0.79
2013 Subsurface	POBI-SC-09-6-7-130227	1040151.987	636022.964	1.84	1.53	0.48
2013 Subsurface	POBI-SC-09-7-8-130227	1040151.987	636022.964	1.72	1.55	0.36
2013 Subsurface	POBI-SC-09-8-9-130227	1040151.987	636022.964	1.22	0.50	1.39
2013 Subsurface	POBI-SC-09-9-10-130227	1040151.987	636022.964	0.71	0.16	2.22
2013 Subsurface	POBI-SC-10-11-13-130227	1040828.088	636141.955	1.93	1.53	0.38
2013 Subsurface	POBI-SC-10-13-14-130227	1040828.088	636141.955	1.74	1.51	0.37
2013 Subsurface	POBI-SC-11-2-4-130313	1040867.450	636065.950	1.13	1.64	0.37
2013 Subsurface	POBI-SC-11-6-8-130313	1040867.450	636065.950	1.43	1.72	0.46
2013 Subsurface	POBI-SC-11-8-10-130313	1040867.450	636065.950	1.46	1.68	0.52
2013 Subsurface	POBI-SC-12-2-4-130313	1040841.940	636402.800	0.82	1.80	0.48
2013 Subsurface	POBI-SC-12-6-8-130313	1040841.940	636402.800	1.25	1.71	0.50
2013 Subsurface	POBI-SC-12-8-10-130313	1040841.940	636402.800	1.31	0.13	1.82
2013 Subsurface	POBI-SC-13-6-8-130227	1040819.302	636407.070	2.14	1.42	0.29
2013 Subsurface	POBI-SC-13-8-9-130227	1040819.302	636407.070	1.74	1.56	0.30
2013 Subsurface	POBI-SC-13-8-9-130227DUP	1040819.302	636407.070	1.83	1.49	0.33
2013 Subsurface	POBI-SC-13-9-10-130227	1040819.302	636407.070	2.24	1.28	0.21
2013 Subsurface	POBI-SC-14-1-2-130306	1039419.179	636507.308	0.86	1.00	1.52
2013 Subsurface	POBI-SC-14-2-3-130306	1039419.179	636507.308	0.31	0.01	2.25
2013 Subsurface	POBI-SC-16-4-5-130228	1040140.810	636605.483	1.68	1.57	0.44
2013 Subsurface	POBI-SC-16-5-6-130228	1040140.810	636605.483	1.26	0.68	1.19
2013 Subsurface	POBI-SC-16-6-7-130228	1040140.810	636605.483	0.85	0.15	2.13
2013 Subsurface	POBI-SC-17-2-4-130315	1040809.110	636860.290	1.33	1.91	0.29
2013 Subsurface	POBI-SC-18-6-8-130228	1040779.652	636968.321	2.19	1.12	0.10
2013 Subsurface	POBI-SC-18-8-9-130228	1040779.652	636968.321	2.20	1.11	0.25
2013 Subsurface	POBI-SC-19-2-4-130315	1040783.500	637141.370	3.90	0.50	0.04
2013 Subsurface	POBI-SC-19-6-8-130315	1040783.500	637141.370	1.24	1.09	0.25
2013 Subsurface	POBI-SC-19-8-10-130315	1040783.500	637141.370	1.61	0.41	0.79
2013 Subsurface	POBI-SC-20-13-15-130227	1040769.427	637116.777	2.73	1.09	0.16
2013 Subsurface	POBI-SC-20-15-16-130227	1040769.427	637116.777	0.81	0.85	0.30
2013 Subsurface	POBI-SC-21-1-2-130301	1040388.654	637320.209	1.07	0.71	1.34
2013 Subsurface	POBI-SC-22-7-8-130307	1040750.812	637244.934	2.70	0.47	0.22
2013 Subsurface	POBI-SC-22-8-8.5-130307	1040750.812	637244.934	3.22	0.40	0.10
2013 Subsurface	POBI-SC-23-6-8-130315	1040785.400	637260.930	0.79	0.93	0.11
2013 Subsurface	POBI-SC-24-2-3-130306	1040918.273	637452.311	3.33	0.91	0.14
2013 Subsurface	POBI-SC-25-1-2-130228	1040434.266	637835.376	0.84	1.16	0.98
2013 Subsurface	POBI-SC-26-1-2-130307	1040894.459	637870.530	0.86	1.51	0.63
2013 Subsurface	POBI-SC-27-3-4-130306	1040482.512	638459.990	1.61	1.26	0.63
2013 Subsurface	POBI-SC-27-4-5-130306	1040482.512	638459.990	1.82	1.35	0.49
2013 Subsurface	POBI-SC-28-1-2-130307	1040463.129	639036.558	1.18	1.40	0.62
2013 Subsurface	POBI-SC-30-0-1-130307	1041156.406	638944.127	1.03	1.00	1.04
2013 Subsurface	POBI-SC-31-1-2-130307	1041156.406	638944.127	0.80	1.35	0.73
2013 Subsurface	POBI-SC-32-0-1-130304	1042409.166	639263.369	1.02	1.01	1.08
2013 Subsurface	POBI-SC-32-1-2-130304	1042409.166	639263.369	0.50	0.18	2.09
2013 Subsurface	POBI-SC-33-1-2-130305	1043624.842	638363.087	1.05	1.37	1.08
2013 Subsurface	POBI-SC-34-0-1-130304	1043169.581	638319.936	0.80	1.55	0.84
2013 Subsurface	POBI-SC-35-0-1-130228	1042902.881	638103.517	0.75	1.64	0.61
2013 Subsurface	POBI-SC-36-3-4-130305	1042718.444	637958.853	1.23	1.58	0.51
2013 Subsurface	POBI-SC-36-4-5-130305	1042718.444	637958.853	1.20	1.71	0.24
2013 Subsurface	POBI-SC-42-1-2-130228	1043891.840	636237.548	0.92	1.21	1.41
2013 Subsurface	POBI-SC-44-1-2-130301	1042989.330	635979.197	0.87	0.44	1.80
2013 Subsurface	POBI-SC-44-2-3-130301	1042989.330	635979.197	1.01	0.19	1.92
2013 Subsurface	POBI-SC-44-3-4-130301	1043304.078	635974.496	0.84	0.16	2.07
2013 Subsurface	POBI-SC-45-1-2-130305	1043304.078	635974.496	1.01	1.89	0.38
2013 Subsurface	POBI-SC-47-0-1-130227	1043355.423	635468.725	1.11	1.16	1.04
2013 Subsurface	POBI-SC-47-1-2-130227	1043355.423	635468.725	0.61	0.15	2.44
2013 Subsurface	POBI-SC-47-3-4-130227	1043355.423	635468.725	0.44	0.03	1.71
2013 Subsurface	POBI-SC-48-1-2-130301	1043869.580	634887.966	0.73	1.46	0.91
2013 Subsurface	POBI-SC-49-0-1-130301	1043407.642	634656.364	1.88	1.34	0.45
2013 Subsurface	POBI-SC-49-1-2-130301	1043407.642	634656.364	2.14	1.22	0.22
2013 Subsurface	POBI-SC-49-10.5-11.4-130301	1043407.642	634656.364	1.93	1.50	0.36
2013 Subsurface	POBI-SC-49-2-3-130301	1043407.642	634656.364	1.53	1.68	0.41
2013 Subsurface	POBI-SC-49-3-4-130301	1043407.642	634656.364	0.98	1.61	0.59
2013 Subsurface	POBI-SC-49-4-6-130301	1043407.642	634656.364	1.04	1.65	0.50
2013 Subsurface	POBI-SC-49-6-8-130301	1043407.642	634656.364	0.83	1.58	0.60
2013 Subsurface	POBI-SC-50-1-2-130301	1043495.850	634188.395	1.93	1.38	0.71

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
2013 Subsurface	POBI-SC-50-12.4-13-130301	1043495.850	634188.395	0.91	0.27	1.88
2013 Subsurface	POBI-SC-50-2-3-130301	1043495.850	634188.395	2.71	0.62	0.19
2013 Subsurface	POBI-SC-50-3-4-130301	1043495.850	634188.395	2.79	1.07	0.30
2013 Subsurface	POBI-SC-50-4-6-130301	1043495.850	634188.395	4.15	0.45	0.12
2013 Subsurface	POBI-SC-50-6-8-130301	1043495.850	634188.395	4.79	0.42	0.07
2013 Subsurface	POBI-SC-50-8-10-130301	1043495.850	634188.395	2.49	0.90	0.06
Catch Basin	CB 8515 (EB)	1043957.619	634072.835	0.76	1.94	0.34
Catch Basin	CB 7937 (EB)	1043982.452	633752.916	0.45	1.94	0.13
Catch Basin	CB 7812 (EB)	1043929.454	633690.527	0.47	2.51	0.20
Catch Basin	CB 12461 (EB)	1042982.714	634195.122	0.89	1.96	0.40
Catch Basin	CB 8775 (EB)	1042590.044	634288.149	0.73	0.33	0.10
Catch Basin	CB 10163 (WB)	1038917.659	636236.603	1.21	0.26	0.40
Catch Basin	CB 10171 (WB)	1038463.279	636255.932	1.54	0.17	0.26
Catch Basin	CB 10906 (WB)	1037910.475	638229.808	0.89	0.62	0.52
Catch Basin	A08-2010	1040984.832	636098.297	0.10	1.12	0.30
Catch Basin	A08-2012	1040984.832	636098.297	0.60	1.09	0.27
Catch Basin	A08-2013	1040984.832	636098.297	0.42	0.56	0.39
Catch Basin	A02-2010	1041147.803	635669.476	0.04	2.25	0.03
Catch Basin	A02-2012	1041147.803	635669.476	0.58	2.51	0.04
Catch Basin	A02-2013	1041147.803	635669.476	0.00	1.79	0.15
Catch Basin	B27-2010	1041362.167	636135.159	0.09	2.52	0.04
Catch Basin	B27-2012	1041362.167	636135.159	0.83	2.40	0.01
Historical	Reliable Steel, SEDIMENT, 0-10 cm, DOE 2008, BI Sed Characterization Study; BI-S32	1039420.607	637320.209	0.18	2.12	0.63
Historical	Hardel Mutual Plywod, SEDIMENT, 0-10 cm, middle of property near outfalls, DOE 2008, BI Sed Characterization Study; BI-S6	1039420.607	638610.901	0.19	2.04	0.53
Historical	Hardel Mutual Plywod, SEDIMENT, 0-10 cm, north end of property near outfalls, DOE 2008, BI Sed Characterization Study; BI-S7	1039420.607	638610.901	0.23	2.08	0.48
Historical	Cascade Pole, SEDIMENT, Surface to 10 cm, near NPDES outfall and log treatment facility, Landau Assoc. 1993, Cascade Pole RI, Appendix C; CP1-M-C1A	1042114.363	638103.517	0.08	1.01	0.15
Historical	Cascade Pole, SEDIMENT, 10-55 cm, near NPDES outfall and log treatment facility, Landau Assoc. 1993, Cascade Pole RI, Appendix C; CP1-M-C1B	1042114.363	638103.517	0.27	0.87	0.11
Historical	Cascade Pole, SEDIMENT, 55-100 cm, near NPDES outfall and log treatment facility, Landau Assoc. 1993, Cascade Pole RI, Appendix C; CP1-M-C1C	1042114.363	638103.517	0.07	0.48	0.08
Historical	Cascade Pole, SEDIMENT, 0-10 cm, near NPDES outfall and log treatment facility, Landau Assoc. 1993, Cascade Pole RI, Appendix C; CP1-M-D1A	1042114.363	638103.517	0.22	1.12	0.15
Historical	Cascade Pole; CP-20-M2Dup	1041524.757	637870.530	0.58	1.45	0.50
Historical	Cascade Pole, SEDIMENT, 0-10 cm, near shoreline and dock, Landau Assoc. 1993, Cascade Pole RI, Appendix C; CP2-M-A2A	1042409.166	638103.517	0.14	1.12	0.31
Historical	Cascade Pole, SEDIMENT, 10-55 cm, near shoreline and dock, Landau Assoc. 1993, Cascade Pole RI, Appendix C; CP2-M-A2B Surf	1042409.166	638103.517	0.00	0.70	0.22
Historical	Cascade Pole, SEDIMENT, 0-10 cm, near shoreline, Landau Assoc. 1993, Cascade Pole RI, Appendix C; CP2-M-F1A	1041524.757	638053.484	0.94	0.50	0.11
Historical	Cascade Pole, SEDIMENT, 0-10 cm, away from shoreline, Landau Assoc. 1993, Cascade Pole RI, Appendix C; CP2-M-H7A Surf	1041524.757	638053.484	0.25	1.23	0.57

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
Historical	EBRS DP-26-061009-1-2	1043225.138	634422.3795	1.76	1.13	0.59
Historical	EBRS DP-42-061009-1-2	1043238.591	634239.953	1.58	0.55	0.95
Historical	EBRS SP03-Zone2-061609	1042989.330	634041.908	1.89	1.12	0.64
Historical	EBRS SP12-Zone1-081209	1042751.907	634656.364	0.39	1.15	0.44
Historical	EBRS SP22-Zone3-091509	1043225.138	634422.3795	0.62	0.71	1.72
Historical	EBRS SP24-2-Zone2-092309-2	1042989.330	634041.908	0.89	1.65	0.47
Historical	EBRS SP26-Zone1-092309	1042751.907	634656.364	0.85	1.16	0.51
Historical	EBRS SP28-Zone2-101509	1042989.330	634041.908	0.78	1.38	0.41
Historical	Surface - Study; B1-C16-090313 /B1-C16-090313; 3/13/2009	1040647	636525	1.04	1.83	0.50
Historical	Surface - Study; B1-S37-090313 /B1-S37-090313; 3/13/2009	1040462	636928	1.10	1.74	0.65
Historical	Subsurface - Study; BI-C15 /BI-C15 SBI, PO berth; 4/3/2007	-122.905863	47.05258	0.19	2.16	0.48
Historical	Surface - Study; BI-C16-091204 /BI-C16-091204; 12/4/2009	1040647.3	636524.4	0.06	1.91	0.63
Historical	Subsurface - Background; BI-C2 /BI-C2 SBI, WB; 4/2/2007	-122.9107	47.052687	0.19	1.87	0.60
Historical	Subsurface - Study; BI-C4 /BI-C4 SBI, PO berth; 4/4/2007	-122.905797	47.0538	0.17	2.29	0.48
Historical	Subsurface - Study; BI-C4 /BI-C4 SBI, PO berth; 4/4/2007	-122.905797	47.0538	0.19	1.99	0.49
Historical	Subsurface - Study; BI-C4 /BI-C4 SBI, PO berth; 4/4/2007	-122.905797	47.0538	0.14	1.16	0.61
Historical	Subsurface - Study; BI-C5 /BI-C5 SBI, PO berth; 4/3/2007	-122.906038	47.055692	0.91	1.31	0.46
Historical	Subsurface - Study; BI-C5 /BI-C5 SBI, PO berth; 4/3/2007	-122.906038	47.055692	0.91	1.31	0.46
Historical	Subsurface - Study; BI-C5 /BI-C5 SBI, PO berth; 4/3/2007	-122.906038	47.055692	0.43	0.28	0.00
Historical	Subsurface - Study; BI-C7 /BI-C7 SBI, north of peninsula; 4/3/2007	-122.905342	47.061085	0.21	1.39	1.28
Historical	Surface - Background; BI-S1-0-10cm /BI-S1-0-10cm SBI, inner WB; 4/11/2007	-122.90822	47.045835	0.21	2.22	0.32
Historical	Surface - Background; BI-S11-0-10cm /BI-S11-0-10cm SBI, inner WB; 4/13/2007	-122.905217	47.046807	0.16	1.90	0.42
Historical	Surface - Background; BI-S12-0-10cm /BI-S12-0-10cm SBI, north of Cascade Pole; 4/13/2007	-122.897652	47.062093	0.22	1.68	0.86
Historical	Surface - Background; BI-S13-0-10cm /BI-S13-0-10cm SBI, north of peninsula; 4/11/2007	-122.901477	47.064262	0.22	1.99	0.50
Historical	Surface - Background; BI-S15-0-10cm /BI-S15-0-10cm SBI, near Priest Pt. Park; 4/14/2007	-122.899965	47.0669	0.31	1.62	1.04
Historical	Surface - Background; BI-S18-0-10cm /BI-S18-0-10cm SBI; 4/14/2007	-122.908713	47.06842	0.26	1.94	0.57
Historical	Surface - Background; BI-S30 /BI-S30 SBI, Moxlie Creek; 6/15/2007	-122.894633	47.047717	0.10	1.66	0.25
Historical	Surface - Background; BI-S32-0-10cm /BI-S32-0-10cm SBI, Reliable Steel; 4/14/2007	-122.911893	47.05585	0.18	2.12	0.63
Historical	Surface - Study; BI-S34 /BI-S34 SBI, Park south of PO; 4/6/2007	-122.905083	47.0508	0.08	2.52	0.26
Historical	Surface - Study; BI-S37-091204 /BI-S37-091204; 12/4/2009	1040426.8	636930.1	0.09	1.86	0.67
Historical	Surface - Background; BI-S7-0-10cm /BI-S7-0-10cm SBI, near Hardel; 4/12/2007	-122.913183	47.059147	0.23	2.08	0.48
Historical	Subsurface - Study; C394_POC-C10 /POC-C10; 8/26/2007	-122.9060387	47.05323306	1.32	1.85	0.24
Historical	Subsurface - Study; C394_POC-C12 /POC-C12; 8/26/2007	-122.9062432	47.0548908	1.26	1.80	0.50

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
Historical	Subsurface - Study; C394_POC-C13 /POC-C13; 8/26/2007	-122.9062826	47.05569679	1.16	1.96	0.43
Historical	Subsurface - Study; C394_POC-C13 /POC-C13; 8/26/2007	-122.9062826	47.05569679	1.54	1.77	0.34
Historical	Subsurface - Study; C394_POC-C6 /POC-C6; 8/26/2007	-122.9059139	47.05487715	1.63	1.68	0.37
Historical	Subsurface - Study; C394_POC-C7 /POC-C7; 8/26/2007	-122.9059588	47.05530568	0.00	1.62	0.09
Historical	Subsurface - Study; C394_POC-C7 /POC-C7; 8/26/2007	-122.9059588	47.05530568	0.00	0.78	0.13
Historical	Subsurface - Study; C394_POC-C8 /POC-C8; 8/26/2007	-122.9060372	47.05570498	0.45	1.20	0.38
Historical	Subsurface - Study; C394_POC-C8 /POC-C8; 8/26/2007	-122.9060372	47.05570498	1.47	0.43	0.00
Historical	Subsurface - Study; C394_POC-C9 /POC-C9; 8/26/2007	-122.9060203	47.05590519	0.00	1.59	0.03
Historical	Surface - Study; C394_POC-S1 /POC-S1; 8/26/2007	-122.9050664	47.05108385	0.60	2.24	0.12
Historical	Surface - Study; C394_POC-S3 /POC-S3; 8/26/2007	-122.9058983	47.05587901	2.38	1.41	0.39
Historical	Surface - Study; C394_POC-S4 /POC-S4; 8/26/2007	-122.9058903	47.05597489	0.00	2.02	0.00
Historical	Surface - Study; C394_POC-S5 /POC-S5; 8/26/2007	-122.9057205	47.05595048	0.23	1.80	0.46
Historical	Subsurface - Background; CASMON03CP-23-S /CP-23-S; 4/11/2002	-122.9136948	47.06125128	1.12	1.54	0.53
Historical	Subsurface - Background; CASMON03CP-25-S /CP-25-S; 4/11/2002	-122.8976632	47.06208794	0.64	1.75	0.75
Historical	Surface - Background; C396_HRDL_GS-01 /GS-01; 8/13/2007	-122.9139454	47.05915063	1.31	1.61	0.56
Historical	Surface - Background; C396_HRDL_GS-02 /GS-02; 8/13/2007	-122.912672	47.05807277	0.61	1.57	0.60
Historical	Surface - Background; C396_HRDL_GS-02 /GS-02; 8/13/2007	-122.912672	47.05807277	1.00	1.67	0.66
Historical	Surface - Background; C396_HRDL_GS0-3 /GS-03; 8/13/2007	-122.9122603	47.05711353	0.40	1.80	0.69
Historical	Subsurface - Study; OLYC01 /Swantown Marina; 11/8/2005	1043439.15	635705.17	1.13	1.71	0.55
Historical	Subsurface - Study; OLYC02 /Swantown Marina; 11/8/2005	1043433.5	635832.38	1.23	1.68	0.54
Historical	Subsurface - Study; OLYC03 /Swantown Marina; 11/8/2005	1043374.81	635717.97	1.29	1.60	0.60
Historical	Subsurface - Study; OLYC04 /Swantown Marina; 11/7/2005	1043056.57	635721.29	1.46	1.34	0.74
Historical	Subsurface - Study; OLYC05 /Swantown Marina; 11/7/2005	1042832.55	637100.06	1.04	1.57	0.47
Historical	Subsurface - Study; OLYC06 /Swantown Marina; 11/7/2005	1042613.53	637757.82	0.91	1.24	0.42
Historical	Subsurface - Study; OLYC07 /Swantown Marina; 11/8/2005	1043439.15	635705.17	1.19	1.56	0.64
Historical	Subsurface - Study; OLYC08 /Swantown Marina; 11/8/2005	1043374.81	635717.97	0.88	1.32	0.26
Historical	Subsurface - Study; OLYZ02 /Swantown Marina; 11/8/2005	1043433.5	635832.38	1.24	1.29	0.95
Historical	Subsurface - Study; OLYZ03 /Swantown Marina; 11/8/2005	1043374.81	635717.97	1.06	1.58	0.39
Historical	Subsurface - Study; OLYZ04 /Swantown Marina; 11/7/2005	1043056.57	635721.29	0.91	1.18	0.97
Historical	Subsurface - Study; OLYZ04 /Swantown Marina; 11/7/2005	1042808.46	635887.51	1.65	1.42	0.55
Historical	Subsurface - Study; OLYZ05 /Swantown Marina; 11/7/2005	1042861.22	636669.16	1.02	1.70	0.40

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
Historical	Subsurface - Study; OLYZ06 /Swantown Marina; 11/7/2005	1042613.53	637757.82	0.75	1.21	0.53
Historical	Surface - Study; PO-AM-28-A1-101209 /PO-AM-28-A1-101209; 12/9/2010	1040636	637244	1.24	1.73	0.53
Historical	Surface - Study; PO-AM-50-A1-101209 /PO-AM-50-A1-101209; 12/9/2010	1040838	635310	1.22	1.82	0.42
Historical	Surface - Study; PO-AM-51-A1-101209 /PO-AM-51-A1-101209; 12/9/2010	1040788	636004	1.17	1.78	0.44
Historical	Subsurface - Study; PO-BA-101-100617 /PO-BA-101-100617; 6/17/2010	1040817	636406	1.75	0.11	1.68
Historical	Subsurface - Study; PO-BA-101-100617 /PO-BA-101-100617; 6/17/2010	1040817	636406	1.82	0.64	0.16
Historical	Subsurface - Study; PO-BA-101-100617 /PO-BA-101-100617; 6/17/2010	1040817	636406	1.84	0.10	1.60
Historical	Subsurface - Study; PO-BA-102-100617 /PO-BA-102-100617; 6/17/2010	1040797	636704	1.85	0.88	0.09
Historical	Subsurface - Study; PO-BA-103-100617 /PO-BA-103-100617; 6/17/2010	1040772	637057	1.46	0.67	0.08
Historical	Subsurface - Study; PO-BA-24-080926 /PO-BA-24-080926; 9/26/2008	1040776	636383	1.16	1.64	0.48
Historical	Surface - Study; PO-BA-24-A1-101208 /PO-BA-24-A1-101208; 12/8/2010	1040783	636378	1.25	2.08	0.19
Historical	Subsurface - Study; PO-BA-25-080926 /PO-BA-25-080926; 9/26/2008	1040782	636648	1.38	1.63	0.34
Historical	Surface - Study; PO-BA-25-A1-101208 /PO-BA-25-A1-101208; 12/8/2010	1040769	636549	1.58	1.73	0.26
Historical	Subsurface - Study; PO-BA-26-080926 /PO-BA-26-080926; 9/26/2008	1040769	636853	1.14	1.63	0.45
Historical	Surface - Study; PO-BA-26-A1-101208 /PO-BA-26-A1-101208; 12/8/2010	1040767	636858	0.75	2.10	0.26
Historical	Surface - Study; PO-BA-27B-A1-101208 /PO-BA-27B-A1-101208; 12/8/2010	1040729	637066	0.78	2.04	0.51
Historical	Subsurface - Study; PO-BA-27-080926 /PO-BA-27-080926; 9/26/2008	1040728	637127	1.34	1.60	0.41
Historical	Surface - Study; PO-BA-28-A1-101208 /PO-BA-28-A1-101208; 12/8/2010	1040819	636391	1.18	1.87	0.29
Historical	Surface - Study; PO-BA-29-A1-101208 /PO-BA-29-A1-101208; 12/8/2010	1040809	636556	1.03	2.07	0.40
Historical	Surface - Study; PO-BA-30-A1-101208 /PO-BA-30-A1-101208; 12/8/2010	1040788	636852	1.11	2.06	0.19
Historical	Surface - Study; PO-BA-31-A1-101208 /PO-BA-31-A1-101208; 12/8/2010	1040767	637066	1.30	1.78	0.45
Historical	Surface - Study; PO-BI-C16-A1-101209 /PO-BI-C16-A1-101209; 12/9/2010	1040649	636533	1.22	1.71	0.51
Historical	Surface - Study; PO-BI-S37-A1-101209 /PO-BI-S37-A1-101209; 12/9/2010	1040464	636930	0.92	1.34	0.93
Historical	Subsurface - Study; PO-UP-20-080926 /PO-UP-20-080926; 9/26/2008	1040845	636401	0.82	1.87	0.53
Historical	Subsurface - Study; PO-UP-20-080926 /PO-UP-20-080926; 9/26/2008	1040845	636401	0.80	1.48	0.44

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
Historical	Surface - Study; PO-UP-20-A1-101208 /PO-UP-20-A1-101208; 12/8/2010	1040845	636401	0.83	1.46	0.54
Historical	Subsurface - Study; PO-UP-21-080926 /PO-UP-21-080926; 9/26/2008	1040823	636659	0.86	2.13	0.46
Historical	Subsurface - Study; PO-UP-21-080926 /PO-UP-21-080926; 9/26/2008	1040823	636659	0.88	1.66	0.42
Historical	Surface - Study; PO-UP-21-A1-101208 /PO-UP-21-A1-101208; 12/8/2010	1040823	636659	0.31	1.39	0.19
Historical	Subsurface - Study; PO-UP-22-080926 /PO-UP-22-080926; 9/26/2008	1040809	636862	0.61	1.27	0.24
Historical	Subsurface - Study; PO-UP-22-080926 /PO-UP-22-080926; 9/26/2008	1040809	636862	1.05	1.72	0.44
Historical	Surface - Study; PO-UP-22-A1-101208 /PO-UP-22-A1-101208; 12/8/2010	1040809	636862	0.99	1.52	0.10
Historical	Surface - Study; PO-UP-23B-A1-101208 /PO-UP-23B-A1-101208; 12/8/2010	1040794	637071	0.94	1.87	0.37
Historical	Subsurface - Study; PO-UP-23-080926 /PO-UP-23-080926; 9/26/2008	1040794	637071	1.69	1.47	0.32
Historical	Subsurface - Study; PO-UP-23-080926 /PO-UP-23-080926; 9/26/2008	1040794	637071	3.01	1.24	0.17
Historical	Surface - Background; WB1577SD19 /SD19; 6/2/2008	-122.9105573	47.04603636	1.18	1.43	0.97
Historical	Surface - Background; WB1577SD20 /SD20; 6/2/2008	-122.9107232	47.04660618	0.73	1.29	1.04
Historical	Surface - Background; WB1577SD21 /SD21; 6/2/2008	-122.9109278	47.04725005	0.78	1.58	0.93
Historical	Surface - Background; WB1577SD23 /SD23; 6/2/2008	-122.9117318	47.05141639	1.18	1.47	0.72
Historical	Subsurface - Background; WB1577SD23 /SD23; 6/2/2008	-122.9117318	47.05141639	1.16	1.07	1.77
Historical	Surface - Background; WB1577SD23 /SD23; 6/2/2008	-122.9117318	47.05141639	0.57	1.66	0.87
Historical	Subsurface - Background; WB1577SD24 /SD24; 6/2/2008	-122.9116818	47.05164934	1.15	0.55	0.70
Historical	Study; WMS-01 SRM /WMS-01 SRM; 1/1/2000	–	–	1.18	0.21	1.21
Ray Uplands Ref	Aust 1	–	–	0.91	0.43	0.16
Ray Uplands Ref	Aust11	–	–	0.16	0.26	1.94
Ray Uplands Ref	Aust12	–	–	0.46	1.44	0.00
Ray Uplands Ref	Aust13	–	–	1.44	0.10	2.68
Ray Uplands Ref	CABST46	–	–	0.03	0.05	1.66
Ray Uplands Ref	CABST47	–	–	0.19	0.00	1.70
Ray Uplands Ref	CANST1	–	–	0.35	0.00	2.63
Ray Uplands Ref	CANST10	–	–	0.99	0.00	0.97
Ray Uplands Ref	CANST11	–	–	0.77	0.01	0.91
Ray Uplands Ref	CANST12	–	–	0.51	0.03	1.16
Ray Uplands Ref	CANST13	–	–	0.00	0.04	2.07
Ray Uplands Ref	CANST14	–	–	0.58	0.00	0.71
Ray Uplands Ref	CANST16	–	–	0.13	0.00	1.97
Ray Uplands Ref	CANST17	–	–	1.45	0.00	2.53
Ray Uplands Ref	CANST18	–	–	1.23	0.00	2.38
Ray Uplands Ref	CANST19	–	–	0.99	0.00	2.66
Ray Uplands Ref	CANST20	–	–	0.96	0.00	2.93
Ray Uplands Ref	CANST21	–	–	1.05	0.00	2.74
Ray Uplands Ref	CANST22	–	–	0.45	0.00	3.33
Ray Uplands Ref	CANST24	–	–	0.55	0.00	3.24
Ray Uplands Ref	CANST25	–	–	0.53	0.00	3.41
Ray Uplands Ref	CANST26	–	–	0.65	0.00	2.95
Ray Uplands Ref	CANST27	–	–	0.53	0.00	3.08
Ray Uplands Ref	CANST28	–	–	0.47	0.00	3.14

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
Ray Uplands Ref	CANST29	–	–	0.53	0.00	2.98
Ray Uplands Ref	CANST30	–	–	0.47	0.00	3.09
Ray Uplands Ref	CANST31	–	–	0.57	0.00	3.29
Ray Uplands Ref	CANST32	–	–	0.50	0.00	2.79
Ray Uplands Ref	CANST33	–	–	0.52	0.00	3.18
Ray Uplands Ref	CANST35	–	–	1.80	0.00	2.83
Ray Uplands Ref	CANST37	–	–	1.10	0.00	2.50
Ray Uplands Ref	CANST4	–	–	0.69	0.00	2.68
Ray Uplands Ref	CANST42	–	–	0.39	0.00	2.89
Ray Uplands Ref	CANST43	–	–	0.31	0.00	2.95
Ray Uplands Ref	CANST44	–	–	0.68	0.00	2.94
Ray Uplands Ref	CANST45	–	–	0.94	0.00	3.00
Ray Uplands Ref	CANST48	–	–	0.19	0.01	1.00
Ray Uplands Ref	CANST5	–	–	0.37	0.00	2.40
Ray Uplands Ref	CANST52	–	–	0.00	0.05	1.60
Ray Uplands Ref	CANST53	–	–	0.03	0.12	0.63
Ray Uplands Ref	CANST54	–	–	1.02	0.02	0.19
Ray Uplands Ref	CANST55	–	–	0.53	0.00	3.21
Ray Uplands Ref	CANST56	–	–	0.12	0.04	0.16
Ray Uplands Ref	CANST57	–	–	0.14	0.01	0.19
Ray Uplands Ref	CANST58	–	–	0.26	0.03	2.13
Ray Uplands Ref	CANST59	–	–	0.20	0.00	2.97
Ray Uplands Ref	CANST6	–	–	2.96	0.00	0.76
Ray Uplands Ref	CANST61	–	–	0.30	0.00	0.21
Ray Uplands Ref	CANST63	–	–	0.34	0.00	0.11
Ray Uplands Ref	CANST8	–	–	0.65	0.00	3.07
Ray Uplands Ref	CANST9	–	–	0.77	0.03	2.18
Ray Uplands Ref	Chem PCP-2	–	–	0.00	0.02	0.00
Ray Uplands Ref	Chem PCP-4	–	–	0.00	0.01	0.00
Ray Uplands Ref	Chem PCP-Na-3	–	–	0.03	0.04	0.00
Ray Uplands Ref	Chem PCP-Na-4	–	–	0.00	0.00	0.02
Ray Uplands Ref	Chem SSMEAN-2DL	–	–	1.70	1.02	1.27
Ray Uplands Ref	Chem SSMEAN-2Z	–	–	0.48	1.36	0.75
Ray Uplands Ref	Chem SSMED-1DL	–	–	1.61	0.24	1.75
Ray Uplands Ref	Chem SSMED-2DL	–	–	1.05	0.88	1.42
Ray Uplands Ref	DenvRes NE R-1	–	–	0.86	1.05	0.76
Ray Uplands Ref	DenvRes NE R-10	–	–	1.05	1.48	0.50
Ray Uplands Ref	DenvRes NE R-2	–	–	0.71	1.82	0.00
Ray Uplands Ref	DenvRes NE R-5	–	–	1.14	1.18	0.77
Ray Uplands Ref	DenvRes SE R-11	–	–	0.22	1.47	0.03
Ray Uplands Ref	DenvRes SE R-5	–	–	0.51	1.62	0.09
Ray Uplands Ref	DenvRes SE R-6	–	–	0.59	0.35	0.01
Ray Uplands Ref	DenvRes SE R-7	–	–	2.00	0.24	0.13
Ray Uplands Ref	DenvRes SE R-8	–	–	1.36	1.39	0.00
Ray Uplands Ref	DenvRes SW R-11	–	–	0.77	1.13	0.47
Ray Uplands Ref	EPAinvy asphalt plant	–	–	2.59	0.00	1.42
Ray Uplands Ref	EPAinvy black liq rec boiler	–	–	0.91	0.08	2.37
Ray Uplands Ref	EPAinvy car diesel	–	–	1.26	0.01	1.44
Ray Uplands Ref	EPAinvy car leaded gas	–	–	1.03	0.00	1.89
Ray Uplands Ref	EPAinvy car unleaded no cc	–	–	2.36	0.00	1.81
Ray Uplands Ref	EPAinvy cement kiln ash	–	–	1.08	0.00	2.46
Ray Uplands Ref	EPAinvy cement kilns	–	–	0.73	0.00	1.70
Ray Uplands Ref	EPAinvy coal utility	–	–	2.85	0.00	1.12
Ray Uplands Ref	EPAinvy crematoria	–	–	3.33	0.00	1.54
Ray Uplands Ref	EPAinvy Eur tunnel c	–	–	0.00	0.29	0.78
Ray Uplands Ref	EPAinvy Eur tunnel d	–	–	0.53	0.00	0.87
Ray Uplands Ref	EPAinvy forest fire	–	–	0.75	0.03	2.52
Ray Uplands Ref	EPAinvy HWI 2000	–	–	4.15	0.00	1.07
Ray Uplands Ref	EPAinvy ind wood 2	–	–	0.00	0.02	2.07
Ray Uplands Ref	EPAinvy ind wood 3	–	–	2.55	0.00	2.26

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
Ray Uplands Ref	EPAinvy MWC	–	–	2.30	0.00	2.15
Ray Uplands Ref	EPAinvy oil boiler 2	–	–	1.00	0.05	2.08
Ray Uplands Ref	EPAinvy res coal lignite	–	–	0.79	0.01	1.68
Ray Uplands Ref	EPAinvy res coal salt lignite	–	–	0.23	0.02	2.16
Ray Uplands Ref	EPAinvy res soot 2	–	–	0.37	0.00	0.50
Ray Uplands Ref	EPAinvy res wood 8	–	–	0.59	0.00	2.35
Ray Uplands Ref	EPAinvy Sludge/Wood Combust	–	–	0.13	0.13	2.33
Ray Uplands Ref	EPAinvy truck diesel	–	–	2.86	0.42	0.49
Ray Uplands Ref	EPAinvy US tunnel diesel truck	–	–	1.58	0.12	1.87
Ray Uplands Ref	EPAreass EPA-Rural	–	–	1.22	1.84	0.01
Ray Uplands Ref	EPAreass EPA-Urban	–	–	0.85	0.33	2.01
Ray Uplands Ref	GravDock GDEX-1/2	–	–	0.17	0.93	1.30
Ray Uplands Ref	GravDock GDEX-3/7	–	–	0.19	0.01	2.97
Ray Uplands Ref	GravDock GDEX-4/8	–	–	0.30	0.01	1.37
Ray Uplands Ref	GravDock GDSP-1/10	–	–	0.04	1.22	0.42
Ray Uplands Ref	HFB	–	–	0.26	0.00	1.23
Ray Uplands Ref	LDW DRD-SS7-010	–	–	1.03	0.96	1.18
Ray Uplands Ref	LDW EB-SS2a-010	–	–	0.17	2.13	0.58
Ray Uplands Ref	LDW EB-SS2b-010	–	–	0.19	2.00	0.65
Ray Uplands Ref	LDW LU-SS9a-010	–	–	0.50	1.62	0.72
Ray Uplands Ref	LDW LU-SS9b-010	–	–	0.27	1.97	0.80
Ray Uplands Ref	LDW LW-SS3-010	–	–	0.22	1.85	0.64
Ray Uplands Ref	LDW LW-SS4-010	–	–	0.19	1.52	1.19
Ray Uplands Ref	LDW LW-SS5a-010	–	–	0.18	1.83	0.92
Ray Uplands Ref	LDW LW-SS5b-010	–	–	0.13	1.83	0.79
Ray Uplands Ref	LDW LW-SS6-010	–	–	0.21	1.79	0.70
Ray Uplands Ref	LDW SB-SS6-010	–	–	0.29	1.49	0.97
Ray Uplands Ref	LDW SC-SS1b-010	–	–	0.11	1.70	0.87
Ray Uplands Ref	LDW UB-SS8-010	–	–	0.16	1.53	0.77
Ray Uplands Ref	MWI_NW_Hosp_1	–	–	6.76	0.00	0.00
Ray Uplands Ref	MWI_NW_Hosp_2	–	–	6.36	0.00	0.09
Ray Uplands Ref	MWI_VA_Hosp_1	–	–	4.27	0.00	0.42
Ray Uplands Ref	MWI_VA_Hosp_2	–	–	5.30	0.00	0.29
Ray Uplands Ref	MWI_VA_Hosp_3	–	–	5.81	0.00	0.42
Ray Uplands Ref	PA-Ash RS-01-SS	–	–	0.60	0.36	1.77
Ray Uplands Ref	PA-Ash RS-04-SS	–	–	0.98	0.98	1.43
Ray Uplands Ref	PA-Ash RS-09-SS	–	–	0.00	0.71	2.10
Ray Uplands Ref	PA-Ash RS-12-SS	–	–	0.74	0.40	2.25
Ray Uplands Ref	PA-Ash RS-13-SS	–	–	1.32	0.29	2.03
Ray Uplands Ref	PA-Ash RS-18-SS	–	–	0.00	1.04	1.60
Ray Uplands Ref	PA-Ash RS-19-SS	–	–	2.11	0.78	1.25
Ray Uplands Ref	PA-soils ECO20	–	–	0.14	0.09	1.79
Ray Uplands Ref	PA-soils ECO21	–	–	0.17	0.39	0.69
Ray Uplands Ref	PA-soils ECO26	–	–	0.39	0.82	1.47
Ray Uplands Ref	PA-soils ECO27	–	–	0.05	0.15	2.01
Ray Uplands Ref	PA-soils ECO28	–	–	0.04	0.27	1.81
Ray Uplands Ref	PA-soils ECO29	–	–	0.16	0.20	2.45
Ray Uplands Ref	PA-soils ECO30	–	–	0.15	0.31	1.58
Ray Uplands Ref	PA-soils ECO32	–	–	0.06	0.13	1.84
Ray Uplands Ref	PA-soils ENR02	–	–	0.14	0.80	0.78
Ray Uplands Ref	PA-soils JNR01	–	–	0.10	0.08	1.67
Ray Uplands Ref	PA-soils MSR01	–	–	0.21	0.20	1.35
Ray Uplands Ref	PA-soils TBS01	–	–	0.16	0.07	3.35
Ray Uplands Ref	PA-soils WM20a	–	–	0.21	1.91	0.51
Ray Uplands Ref	PA-soils WM20b	–	–	0.06	0.94	1.25
Ray Uplands Ref	SpokSeds Greene	–	–	0.79	1.79	0.76
Ray Uplands Ref	SpokSeds Mission	–	–	1.59	1.06	0.00
Ray Uplands Ref	SpokSeds Superior	–	–	0.70	1.55	0.75
Ray Uplands Ref	SpokSeds Union	–	–	0.93	1.48	0.92
Ray Uplands Ref	SpokSeds Washington	–	–	0.48	1.71	0.87

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
Ray Uplands Ref	Stack LUT1	–	–	0.21	0.00	1.55
Ray Uplands Ref	Stack LUT2	–	–	0.00	0.02	0.01
Ray Uplands Ref	Stack YAS1	–	–	1.44	0.00	2.61
Ray Uplands Ref	Tribal '08042201	–	–	0.36	1.05	1.06
Ray Uplands Ref	Tribal '08042209	–	–	0.19	0.24	2.63
Ray Uplands Ref	Tribal '08042213	–	–	0.12	0.45	1.60
Ray Uplands Ref	Tribal '08042214	–	–	0.19	0.47	1.54
Ray Uplands Ref	Trond 16-04	–	–	1.19	0.17	1.74
Ray Uplands Ref	Trond 7-04	–	–	0.89	0.65	1.78
Ray Uplands Ref	Trond 8-04	–	–	1.63	0.09	1.78
Ray Uplands Ref	Trond 1009-04	–	–	3.00	0.00	1.72
Ray Uplands Ref	Trond 1018-04	–	–	1.56	0.00	2.04
Ray Uplands Ref	Trond 1027-04	–	–	1.72	0.00	2.19
Ray Uplands Ref	Trond 1036-04	–	–	0.00	0.28	1.12
Ray Uplands Ref	Trond 1045-04	–	–	1.67	0.00	1.47
Ray Uplands Ref	Trond 1054-04	–	–	0.78	0.07	2.02
Ray Uplands Ref	Trond 1063-04	–	–	1.83	0.00	0.77
Ray Uplands Ref	Trond 1069-04	–	–	0.63	0.10	2.52
Ray Uplands Ref	Trond 1072-04	–	–	1.44	0.07	2.42
Ray Uplands Ref	Trond 1078-04	–	–	2.14	0.08	2.30
Ray Uplands Ref	Trond 2001-04	–	–	0.89	0.06	2.42
Ray Uplands Ref	Trond 3001-04	–	–	1.84	1.00	1.20
Ray Uplands Ref	Trond 3010-04	–	–	3.39	0.00	1.67
Ray Uplands Ref	Trond 3028-04	–	–	1.12	0.24	1.46
Ray Uplands Ref	Trond 3037-04	–	–	0.85	0.73	1.49
Ray Uplands Ref	Trond 34-04	–	–	1.58	0.06	2.35
Ray Uplands Ref	Trond 4001-04	–	–	2.24	0.00	1.91
Ray Uplands Ref	Trond 4004-04	–	–	1.50	0.00	1.11
Ray Uplands Ref	Trond 4010-04	–	–	1.20	0.45	1.35
Ray Uplands Ref	Trond 4016-04	–	–	0.73	1.81	0.67
Ray Uplands Ref	Trond 4019-04	–	–	1.68	0.08	2.64
Ray Uplands Ref	Trond 4028-04	–	–	1.46	0.07	1.31
Ray Uplands Ref	Trond 4031-04	–	–	1.31	0.13	2.52
Ray Uplands Ref	Trond 4037-04	–	–	2.33	0.00	0.96
Ray Uplands Ref	Trond 4043-04	–	–	0.57	0.05	2.46
Ray Uplands Ref	Trond 4046-04	–	–	0.31	0.22	1.45
Ray Uplands Ref	Trond 4059-04	–	–	1.91	0.40	1.74
Ray Uplands Ref	Trond 4066-04	–	–	1.49	0.03	2.03
Ray Uplands Ref	Trond 4072-04	–	–	0.11	0.44	2.63
Ray Uplands Ref	Trond 4079-04	–	–	0.79	0.06	2.68
Ray Uplands Ref	Trond 4084-04	–	–	1.01	0.01	1.14
Ray Uplands Ref	Trond 4087-04	–	–	0.53	0.17	2.91
Ray Uplands Ref	Trond 4100-04	–	–	0.56	0.29	2.41
Ray Uplands Ref	Trond 41-04	–	–	0.78	1.20	1.24
Ray Uplands Ref	Trond 4119-04	–	–	0.86	0.21	2.42
Ray Uplands Ref	Trond 42-04	–	–	1.12	0.00	2.13
Ray Uplands Ref	Trond 45-04	–	–	1.21	0.00	1.79
Ray Uplands Ref	Trond 46-04	–	–	0.78	0.03	1.09
Ray Uplands Ref	Trond 49-04	–	–	0.95	0.23	2.22
Ray Uplands Ref	Trond 5004-04	–	–	0.92	0.00	1.99
Ray Uplands Ref	Trond 5013-04	–	–	1.08	0.12	1.71
Ray Uplands Ref	Trond 5022-04	–	–	0.88	0.19	2.40
Ray Uplands Ref	Trond 6008-04	–	–	0.70	0.09	3.00
Ray Uplands Ref	Trond 6014-04	–	–	0.49	0.22	2.20
Ray Uplands Ref	TseWZ J94K3	–	–	0.84	1.03	1.11
Ray Uplands Ref	TseWZ J94K4	–	–	0.83	0.84	1.71
Ray Uplands Ref	TseWZ J94K5	–	–	0.72	1.11	1.26
Ray Uplands Ref	TseWZ J94K6	–	–	0.76	0.91	1.59
Ray Uplands Ref	TseWZ J94K7	–	–	0.60	1.14	1.34
Ray Uplands Ref	TseWZ J94K8	–	–	0.61	0.04	2.79

Attachment C
PMF Contributions by Sample

Group	Location ID	X Coordinate	Y Coordinate	Factor 1	Factor 2	Factor 3
Ray Uplands Ref	TseWZ J94L0	–	–	0.65	1.19	0.43
Ray Uplands Ref	TseWZ J94L2	–	–	0.76	1.17	1.15
Ray Uplands Ref	TseWZ J94L3	–	–	0.59	1.01	1.47
Ray Uplands Ref	TseWZ J94N5	–	–	0.68	1.19	1.19
Ray Uplands Ref	TseWZ J9YR2	–	–	0.86	0.89	1.26
Ray Uplands Ref	TseWZ J9YR3	–	–	0.76	1.17	1.15
Ray Uplands Ref	TseWZ J9YR4	–	–	0.96	0.89	1.81
Ray Uplands Ref	TseWZ J9YR5	–	–	0.91	0.39	2.30
Ray Uplands Ref	USRural 2	–	–	0.08	1.30	0.23
Ray Uplands Ref	USRural 3	–	–	0.04	1.66	0.12
Ray Uplands Ref	USRural 4	–	–	0.16	1.23	0.28
Ray Uplands Ref	USRural 5	–	–	0.45	1.22	0.02
Ray Uplands Ref	USRural 7	–	–	1.24	0.83	0.21

Notes:
cm = centimeter
EB = East Bay
Landau Assoc. 1993 = Landau Associates, 1993. *Remedial Investigation Report, Sediments Operable Unit, Cascade Pole Company Site* . Prepared for the Washington State Department of Ecology. January 1993.
NPDES = National Pollutant Discharge Elimination System
PO = Port of Olympia
RI = Remedial Investigation
WB = West Bay