ECOLOGY REVIEW DRAFT
WESTERN PORT ANGELES HARBOR RI/FS

Data Report for 2013 Field Program

Prepared for
Western Port Angeles Harbor Group, consisting of
City of Port Angeles
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WPAHG
Western Port Angeles Harbor Group

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ACRONYMS AND ABBREVIATIONS

Agreed Order	Agreed Order No. DE9781
Alpha	Alpha Analytical
ALS	ALS Environmental
AXYS	AXYS Analytical Services
cm	centimeter
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
G&A	Germano & Associates
GAC	granular activated carbon
GPS	global positioning system
Integral	Integral Consulting Inc.
K_{ow}	octanol–water partition coefficient
m	meter
MTCA	Model Toxics Control Act
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PDMS	polydimethylsiloxane
PRC	performance reference compounds
QA/QC	quality assurance and quality control
RI/FS	remedial investigation and feasibility study
SAP	sampling and analysis plan
SGS	SGS Analytical Perspectives
SMS	Washington State Sediment Management Standards
SPI/PV	sediment profile imaging and plan view
SPME	solid-phase microextraction
SVOC	semivolatile organic compound
TOC	total organic carbon
TVS	total volatile sulfides

WAC	Washington Administrative Code
WPAH Group	Western Port Angeles Harbor Group

1 INTRODUCTION

Port Angeles Harbor, Washington, has been identified as a priority environmental cleanup and restoration project by the Washington State Department of Ecology (Ecology) as part of the Puget Sound Initiative. Under Agreed Order No. DE9781 (Agreed Order) effective May 28, 2013, the Western Port Angeles Harbor Group[1] (WPAH Group) has agreed to perform a remedial investigation and feasibility study (RI/FS) of Western Port Angeles Harbor (Figure 1-1). Ecology and the WPAH Group have the mutual objective of completing the RI/FS called for under the Agreed Order by January 2015. The Western Port Angeles Harbor RI/FS work plan (WPAHG 2013) is Exhibit B to the Agreed Order, and describes data gaps and data collection to complete the RI/FS report.

A supplemental sampling and analysis plan (SAP) was prepared in accordance with the Agreed Order and RI/FS work plan that describes the data collection tasks and associated methods to fill the remaining data gaps and allow completion of the RI/FS report (Integral et al. 2013). The SAP followed the requirements of the Washington State Model Toxics Control Act (MTCA) Chapter 173-340 Washington Administrative Code (WAC) (Ecology 2001) and the guidance for SAP development provided in Ecology (2008). The types of analyses conducted are listed in Table 4-3 of the SAP (Integral et al. 2013).

The field program involved the following types of data collection:

1. Sediment collection—Depending on the particular location, surface sediments were collected for one or more of the following types of analyses:
   a. Sediment chemistry (conventional parameters and chemicals of potential concern)
   b. Porewater analyses for ammonia and sulfides
   c. Sediment toxicity bioassays
   d. Laboratory bioaccumulation
   e. Porewater chemistry as determined using solid phase microextraction (SPME) devices
   f. Treatability studies using granular activated carbon (GAC)
2. Photographic images
   a. Sediment profile images
   b. Plan view images

The remainder of the data report contains the following information:

[1] Members of the WPAH Group include City of Port Angeles, Georgia-Pacific LLC, Merrill & Ring, Nippon Paper Industries USA Co., Ltd., and Port of Port Angeles.

- Overview of the field program, including any modifications from the SAP
- The chemical, biological testing, and photographic data and documentation of the data quality review process for all data
- Results of sediment chemical, bioassay, bioaccumulation, SPME, and sediment profile image/plan view (SPI/PV) analyses
- References.

2 FIELD PROGRAM OVERVIEW

This data collection effort (described in Integral et al. 2013) was conducted to fill specific remaining data gaps that were identified in the RI/FS work plan (WPAHG 2013), and to provide additional information for use in the feasibility study. Surface sediment grab samples (0–10 centimeters [cm]) were collected from 52 stations in Port Angeles Harbor from June 25 through July 9, 2013, and from 2 stations at the reference area (Carr Inlet) on June 25, 2013. Samples were collected at all surface sediment sampling stations that were proposed in the SAP (Integral et al. 2013). Actual station locations and the types of analyses conducted at each location are shown in Figure 2-1.

WPAH and reference area sediments were collected for conventional parameter analysis, which included total organic carbon (TOC), black carbon, total solids, and sediment grain size. Total volatile solids (TVS) were also analyzed in all of the WPAH sediment samples. Samples for porewater ammonia and sulfides analysis were collected at all bioassay stations. Metals, semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and dioxin and furans were analyzed in sediments collected from a subset of WPAH stations to fill sediment chemistry data gaps on a station-by-station basis in accordance with the SAP (Integral et al. 2013).

A summary of field observations made during the surface sediment collection is presented in Table 2-1. The actual station coordinates for the surface sediment grab samples are provided in Table 2-2. Additional field observations, including sampling times, weather conditions, water conditions, sample composition and other noteworthy information are included in the field notes (Appendix A). Photographs documenting each sample collected are presented in Appendix B.

SPI/PV images were collected from July 15 through 18, 2013. Images were collected from a total of 97 stations (Figure 2-2). These locations were either the same as those sampled for surface sediments or were either reoccupied historical SPI locations or additional data gap stations. The actual station coordinates for the SPI/PV stations are listed in Table 2-3. The 97 stations sampled include the 92 proposed in the SAP (Integral et al. 2013) plus five new stations that were added to the study as a result of a preliminary review of images conducted with Ecology during the SPI/PV survey. A brief summary of this SPI/PV image review process and the results of the survey effort are included in Section 4 of this data report.

2.1 MODIFICATIONS FROM THE SAP

Sediment sample and SPI data collection followed the methods and sampling design presented in the SAP (Integral et al. 2013). During the course of the field event, the following minor modifications to the SAP were made:

- The specific stations where some field quality control samples were collected were changed during the surface grab sediment sampling because better sediment recovery was achieved at the alternative locations. Field quality control samples were collected as follows:
  - Field split sample was collected at Station WPAH013 instead of at WPAH015
  - Field split sample was collected at Station WPAH040 instead of at WPAH039
  - Field split sample was collected at Station WPAH046 instead of at WPAH047
- Station WPAH020 was moved 50 meters (m) west from the target location because of multiple failed attempts at the target location due to logs and large wood debris at the proposed station coordinate
- Station SPI08 was moved to the northwest because a log boom was present at the target location
- Station SPI047 was moved 52 m offshore because cobble and rocks at the original location prevented the grab from closing
- Station SPI061 was moved to the west because a log boom was present at the target location.
- Five new SPI stations (SPI101 to SPI105, see Figure 2-2) were added to the survey per Ecology request based on the preliminary review of the images collected during the survey.

None of these changes to the sampling program were material deviations that affected meeting the requirements of the SAP.

3 DATA AND DATA QUALITY REVIEW

3.1 FIELD DATA

Information on sampling locations, dates, water depths, equipment, and other conditions, and sample identifiers were entered into the WPAH project database, which includes data from 2002 through the current RI collection activities. One hundred percent of hand-entered data was verified based on hard copy records. Quality assurance checks on 100 percent of the electronic field data (e.g., global positioning system [GPS] coordinates from the navigation system) were also conducted following data compilation.

3.2 CHEMICAL ANALYSES

The specific analyses and conventional parameters measured, the laboratories (ALS Environmental [ALS], Alpha Analytical [Alpha], AXYS Analytical Services, Ltd. [AXYS], and SGS Analytical Perspectives [SGS]) performing the analyses, and the analytical methods used are detailed in Section 5 of the SAP (Integral et al. 2013). ALS analyzed all sediment samples for grain size, TVS, metals, SVOCs, and PAHs. ALS also measured ammonia and sulfides in porewater extracted from sediment samples in the laboratory. AXYS measured dioxin/furans and PCB congeners in sediments. Alpha measured sediment TOC and black carbon. SPME and tissue samples from the bioaccumulation tests were analyzed for dioxin/furans and PCB congeners by SGS. SGS also analyzed tissue samples for percent lipids.

3.2.1 Data Validation

Analytical data received from ALS, Alpha, AXYS, and SGS were validated by EcoChem, Inc. Approximately 10 percent of the data was fully validated (Stage 3 validation), and the remaining 90 percent of the data was subjected to Stage 2B validation, which includes the evaluation and assessment of the sample results and applicable quality control results reported by the laboratories.

The data were reviewed using guidance and quality control criteria documented in the analytical methods and the following project and guidance documents:

- *Sampling and Analysis Plan – Western Port Angeles Harbor RI/FS* (Integral et al. 2013)
- *USEPA National Functional Guidelines for Organic Data Review* (USEPA 2008)
- *USEPA National Functional Guidelines for Inorganic Data Review* (USEPA 2004)
- *USEPA National Functional Guidelines for Chlorinated Dioxin/Furan Data Review* (USEPA 2005)

Data qualifiers were assigned during data validation if applicable control limits were not met, in accordance with U.S. Environmental Protection Agency (EPA) data validation guidelines and the quality control requirements included in the referenced methods. The data validation qualifiers and definitions are summarized in Table 3-1.

The following laboratory deliverables were reviewed during Stage 2B and Stage 3 data validation:

- The case narrative discussing analytical procedures and problems (if any)
- Chain-of-custody documentation and laboratory sample receipt logs
- Instrument calibration results
- Method blank results
- Results for laboratory quality control samples required by the referenced method, including laboratory control sample/laboratory control sample duplicate analyses, matrix spike/matrix spike duplicate analyses, surrogate recoveries, and other method specific quality control samples (e.g., serial dilutions for inductively coupled plasma analyses)
- Results for field quality control samples (i.e., equipment blanks and field duplicates)
- Analytical results.

In addition to the review and assessment of the documentation identified above, data packages subjected to Stage 3 (full) validation included verification of reported concentrations for the field and quality control samples, verification of intermediate transcriptions, and review of instrument data such as mass spectra to verify analyte identification procedures.

3.2.2 Data Qualification

A total of 23,989 data points were reported. Of these, 1,312 (5 percent) were estimated (J/UJ qualified), 1,182 (5 percent) were restated as non-detect (U qualified), and 7 (0.03 percent) were rejected (R qualified). The number of results qualified is summarized by data qualification reason in Table 3-2. Completeness was > 99 percent.

Results were estimated (J/UJ-qualified) due to the following reasons:

- Samples analyzed outside of their respective hold times
- Matrix spike recovery outliers
- Precision (all replicates)
- Surrogate spike recovery outliers

- Other
- Instrument performance
- Compound identification.

Results were restated as non-detected (U-qualified) due to the following reasons:

- Field and/or laboratory blank contamination
- Surrogate spike recovery outliers
- Compound identification.

Seven results were rejected during data validation. Two results for benzoic acid in samples SD0003 and SD0015 were rejected due to low matrix spike/matrix spike duplicate recoveries (%R <10%). Seven porewater results for sulfide were rejected due to the samples being analyzed more than three times the holding time criterion of 7 days.

3.2.3 Data Usability

The bulk sediment and porewater sampling and analysis data collected in 2013 meet the criteria set forth in the referenced quality assurance documents, with the exceptions noted above. All results are acceptable for their intended use in the RI/FS, with the exception of the rejected data. Ecology approval of the data for use in the RI/FS was received on December 20, 2013 (Groven 2013, pers. comm.). The data validation reports for each analytical chemistry laboratory are provided in Appendices C through F. The complete validated 2013 sediment chemistry data set is compiled in Appendix G.

3.3 BIOLOGICAL TESTING

Bioassay and bioaccumulation testing was performed by NewFields, Port Gamble, Washington. Sediment bioassays included the 10-day amphipod test using *Eohaustorius estuarius*, the larval development bioassay with the resuspension protocol (Kendall et al. 2012) using the mussel *Mytilus galloprovincialis*, and the 20-day *Neanthes* sp. growth test. All bioassay data were validated by Integral Consulting Inc. (Integral) by comparing methods, positive and negative control results, and water quality monitoring data to Puget Sound Estuary Program protocols (USEPA 1997) and Ecology (2008) method requirements. The results of the bioassays are summarized in Tables 3-3 through 3-8. The complete laboratory bioassay testing report prepared by NewFields is provided in Appendix H.

The bioaccumulation tests exposed adult bivalves (*Macoma nasuta*) and adult polychaetes (*Nephtys caecoides*) to sediments for 45 days followed by chemical analysis of the tissues for dioxin/furan and PCB congeners. All bioaccumulation data were validated by Integral by comparing methods and water quality monitoring data to Dredged Material Management Program guidelines (Corps 2013; Lee et al. 1989, with modifications as provided in Kendall and McMillan 2009). The survival results of the bioaccumulation tests are provided in Table 3-9. The NewFields laboratory bioaccumulation testing report is included in Appendix H.

The validated, analytical tissue results from the bioaccumulation testing are included in Appendix G, and data validation of the tissue chemistry data is discussed above in Section 3.2.

The biological testing data from the Western Port Angeles Harbor RI/FS were complete with respect to the data requirements outlined in the SAP (Integral et al. 2013). The data meet the criteria set forth in the referenced quality assurance documents, with the exceptions noted in the data validation reports that are provided as part of Appendix H.

Despite several minor deviations from the established protocols in the bioassay tests and minor water quality deviations in the larval test and bioaccumulation test as noted in Appendix H, the data provided for the bioassays and bioaccumulation tests are acceptable for use in the RI/FS.

3.4 SPI/PV

Germano & Associates (G&A; Bellevue, Washington) conducted the SPI/PV survey, analyzed all images selected for analysis per the methods detailed in the SAP, conducted a quality assurance review of the data set, and prepared a detailed technical report, which is provided in Appendix I. The quality assurance and quality control (QA/QC) methods used during SPI/PV image collection and analysis are detailed in Appendix I. The image analysis approach included importing the jpeg images into Sigmascan Pro® (Aspire Software International) for image calibration and analysis. Color calibration information was determined by measuring 1-cm gradations from the Kodak® Color Separation Guide. This calibration information was applied to all SPI images analyzed. Linear and area measurements were recorded as number of pixels and converted to scientific units using the calibration information. SPI/PV measurements or observational features were recorded on a Microsoft® Excel spreadsheet by an experienced G&A image analyst. Following the analysis of all images, G&A's senior scientist (Dr. J. Germano) visually checked 100 percent of the images for the data recorded for each image as an independent QA/QC review of the measurements. A subset of measured parameters was revised based on this senior QA/QC review and all SPI/PV data were approved for use by Dr. Germano before final data interpretation/reporting was conducted.

4 RESULTS

4.1 SEDIMENT CHEMISTRY

Conventional parameters, including TOC, black carbon, total solids, TVS, and sediment grain size were analyzed at all sediment sampling locations. Porewater ammonia and porewater sulfides were analyzed at all bioassay stations. A subset of chemicals was analyzed at stations in accordance with the SAP (Integral et al. 2013) to address existing data gaps as determined through the DQO process (WPAHG 2013).

Chemicals measured in surface (0–10 cm) sediments, as well as some sediment conventional parameters, are mapped in Figures 4-1 through 4-27. Ecology's preliminary sediment cleanup objectives (NewFields 2013) are used in these maps for screening purposes only and will be further refined in the WPAH RI/FS. These maps include both the data generated by the 2013 RI/FS sampling event conducted by the WPAH Group as well as other recent and validated surface sediment data that will be used in the RI/FS, consistent with the Ecology-approved RI/FS work plan (see Table 3 in WPAHG 2013). Contouring methods followed the conventions used in NewFields (2013).

4.2 SEDIMENT TOXICITY

Full suite bioassay testing (i.e., amphipod survival, larval development, and polychaete growth) was conducted at 15 stations and, when combined with other recent and validated data, provides a robust sediment toxicity data set with 63 sample locations for use in the RI/FS. In addition, the larval test was performed at 27 previously tested locations using the recently improved resuspension protocol (Kendall et al. 2012).

Sediment toxicity data were evaluated according to SMS Table IV (WAC 173-204 Table IV) to determine whether each sediment sample exceeded sediment cleanup objective or cleanup screening level biological criteria. Evaluation results are provided for each test in Tables 4-1, 4-2, and 4-3a,b. Table 4-4 summarizes the SMS pass/fail outcomes for each station across all tests. Figure 4-28 summarizes the final SMS pass/fail designation for the 2013 toxicity testing data set. Figure 4-29 summarizes the final SMS pass/fail designation for all data that will be used in the RI/FS.

4.3 TISSUE CHEMISTRY

Bioaccumulation testing was performed at 15 locations, and the resulting tissue samples were analyzed for dioxin/furan and PCB congeners and for percent lipids. Tissue concentrations of dioxin/furan and PCB congeners are reported in Table 4-5a. At two locations, WPAH050 and WPAH051, bioaccumulation exposures were conducted a second time after GAC was mixed into the sediment at a concentration of approximately 4 percent (dry weight basis) 48 hours prior to organism exposure. The goal of this treatability testing was to evaluate whether GAC addition affected the uptake of dioxins/furans and PCBs into the test organisms. Tissue concentrations following GAC treatment are provided in Table 4-5b.

4.4 SPME CHEMISTRY AND ESTIMATED POREWATER CONCENTRATIONS

SPME fibers exposed to porewater during the bioaccumulation exposures were analyzed for PCB and dioxin/furan congeners. These data were then used to estimate porewater concentrations using the following approach.

Uptake of hydrophobic organic compounds including PCB and dioxin/furan congeners onto SPME fibers coated with polydimethylsiloxane (PDMS) is described by the fiber–water partition coefficient, or K_F. At equilibrium, dissolved porewater concentrations of PCB and dioxin/furan congeners can be estimated from measured concentrations sorbed onto the fiber and the PDMS-water partition coefficient as shown by Equation 1.

$$C_w = C_F / K_F \ (Eq. 1)$$

where:

C_W	=	concentration in porewater (pg/L)
C_F	=	concentration measured in the PDMS coating on the fiber (pg/L)
K_F	=	PDMS–water partition coefficient (L/L)

To evaluate uptake kinetics and estimate the fraction to steady state achieved over the 45 day deployment in the bioaccumulation test chambers, the SPME fibers were pre-impregnated with a range of ^{13}C-labeled performance reference compounds (PRCs), as described in the SAP. The PRC data verified that equilibrium had been achieved or very nearly achieved during the deployment for all PCB and dioxin/furan congeners. Thus, Equation 1 was used to estimate porewater concentrations.

PDMS-water partition coefficients for PCB congeners were estimated from a correlation with literature-based octanol–water partition coefficients (K_{ow}) as shown by Equation 2 (Smedes et al. 2009). A similar correlation was developed for dioxin/furan congeners with the partition coefficients of seven dioxin-like PCB congeners averaged from three measurements (Hsieh et al. 2011; Smedes et al. 2009; Ter Laak et al. 2008) (Equation 3).

$$logK_F = 0.943 * logK_{OW} + 0.0059 \qquad PCBs \quad (Eq.2)$$
$$logK_F = 1.04 * logK_{OW} - 0.93 \qquad Dioxins/Furans \quad (Eq.3)$$

Tables 4-6 and 4-7 present a summary of log K_{OW}, log K_F, measured C_F, and calculated C_W values for PCB and dioxin/furan congeners, respectively.

4.5 SEDIMENT PROFILE/PLAN VIEW IMAGING

SPI/PV images (at least three replicate images per station) were collected at 97 locations in Port Angeles Harbor from July 15 through 18, 2013. Five stations were added to the 92 locations proposed in the SAP (Integral et al. 2013) based on the daily review of all images collected the previous day by Integral and Ecology scientists. These five stations, WPAH101 through WPAH105, are located across the northern portion of the harbor and were situated to help define onshore-offshore gradients in benthic conditions (Figure 2-2).

The SAP specified analysis of images from a total of 92 stations (one replicate plus a second replicate at 20 percent of the stations), and so images from five stations (WPAH029, WPAH040, WPAH041, WPAH044, and WPAH072) were not fully analyzed as part of this effort. These stations were selected by Integral and Ecology scientists based on a post-survey review of the preliminary SPI/PV results mapped during the preliminary image review.

G&A conducted the SPI/PV survey and prepared a detailed technical report, which is provided as Appendix I. The report includes maps of key SPI parameters measured and a detailed discussion of the survey results. Summary tables of a subset of key parameters for each SPI and PV image analyzed are provided in Tables 4-8 and 4-9. Full data tables of all SPI and PV image parameters measured and associated metadata are provided in Appendix J. A DVD with jpegs of all SPI/PV images collected in 2013 is also included with this report (Appendix K).

4.6 SUMMARY

The 2013 data generation effort met the requirements of the project SAP (Integral et al. 2013), and the resulting high quality data were approved for use in the WPAH RI/FS by Ecology (Groven 2013). These data, in concert with the historical data identified in the Ecology-approved project work plan (WPAHG 2012), are sufficient to complete the WPAH RI/FS. The WPAH data set will be used to conduct the analyses needed to complete the RI/FS including the establishment of sediment management areas.

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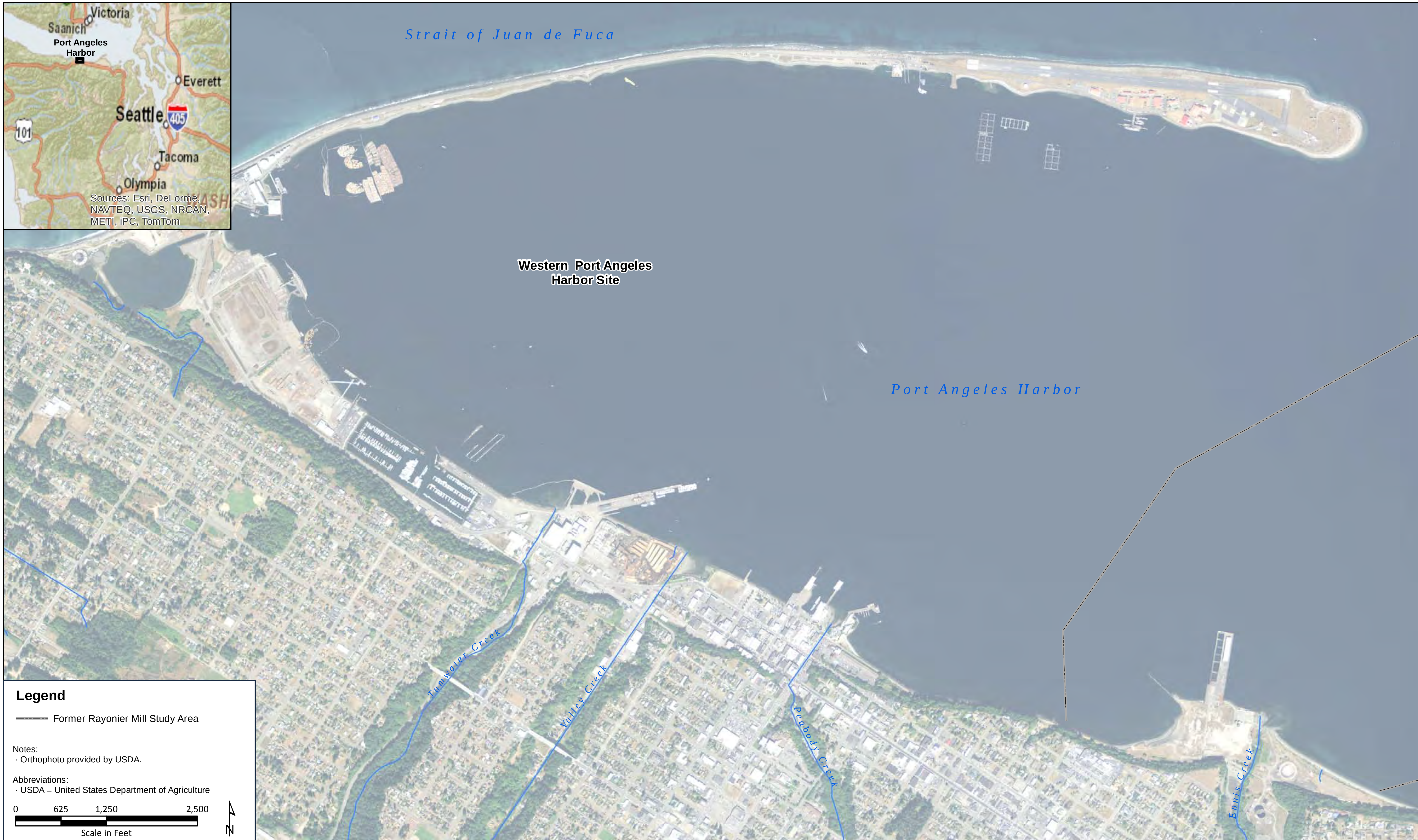
FIGURES



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General Location of Western Port Angeles Harbor Site
Western Port Angeles Harbor RI/FS
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Figure 1-1

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Legend

- Chemistry, Bioaccumulation
- Chemistry, Bioaccumulation, Treatability
- Chemistry, Full Suite Bioassay
- Chemistry, Full Suite Bioassay, Bioaccumulation
- Chemistry, Larval Retest
- Chemistry, Larval Retest, Bioaccumulation
- Former Rayonier Mill Study Area

Notes:
· Chemical analyses varied by station.
· Orthophoto provided by USDA.

Abbreviations:
· USDA = United States Department of Agriculture

0 625 1,250 2,500
Scale in Feet

N

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Sediment Locations Sampled in 2013
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

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Figure 2-1

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WPAHG
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SPI Locations Sampled in 2013
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

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Figure 2-2

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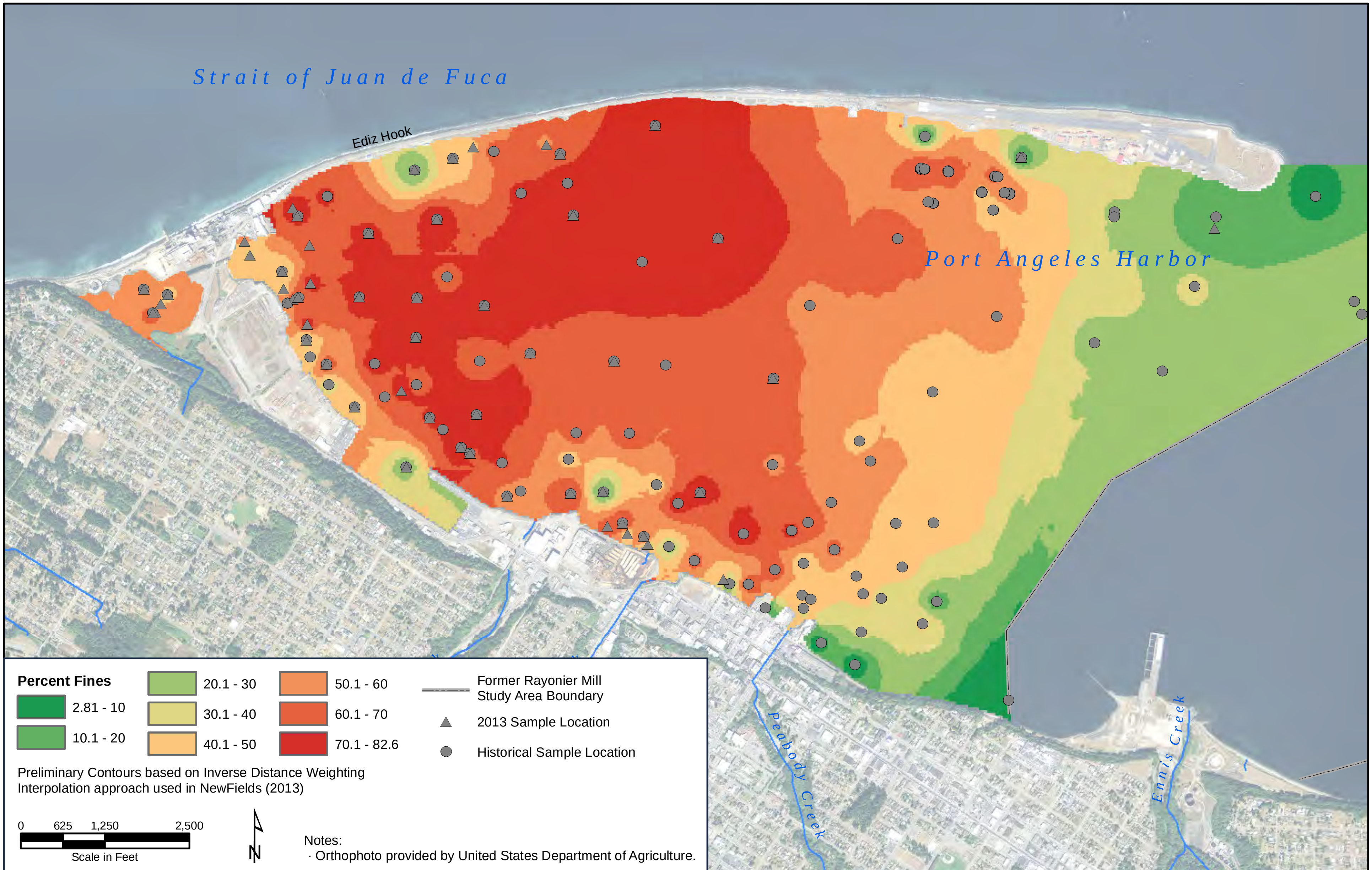

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Percent Fines in Surface Sediment
Western Port Angeles Harbor RI/FS
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Figure 4-1

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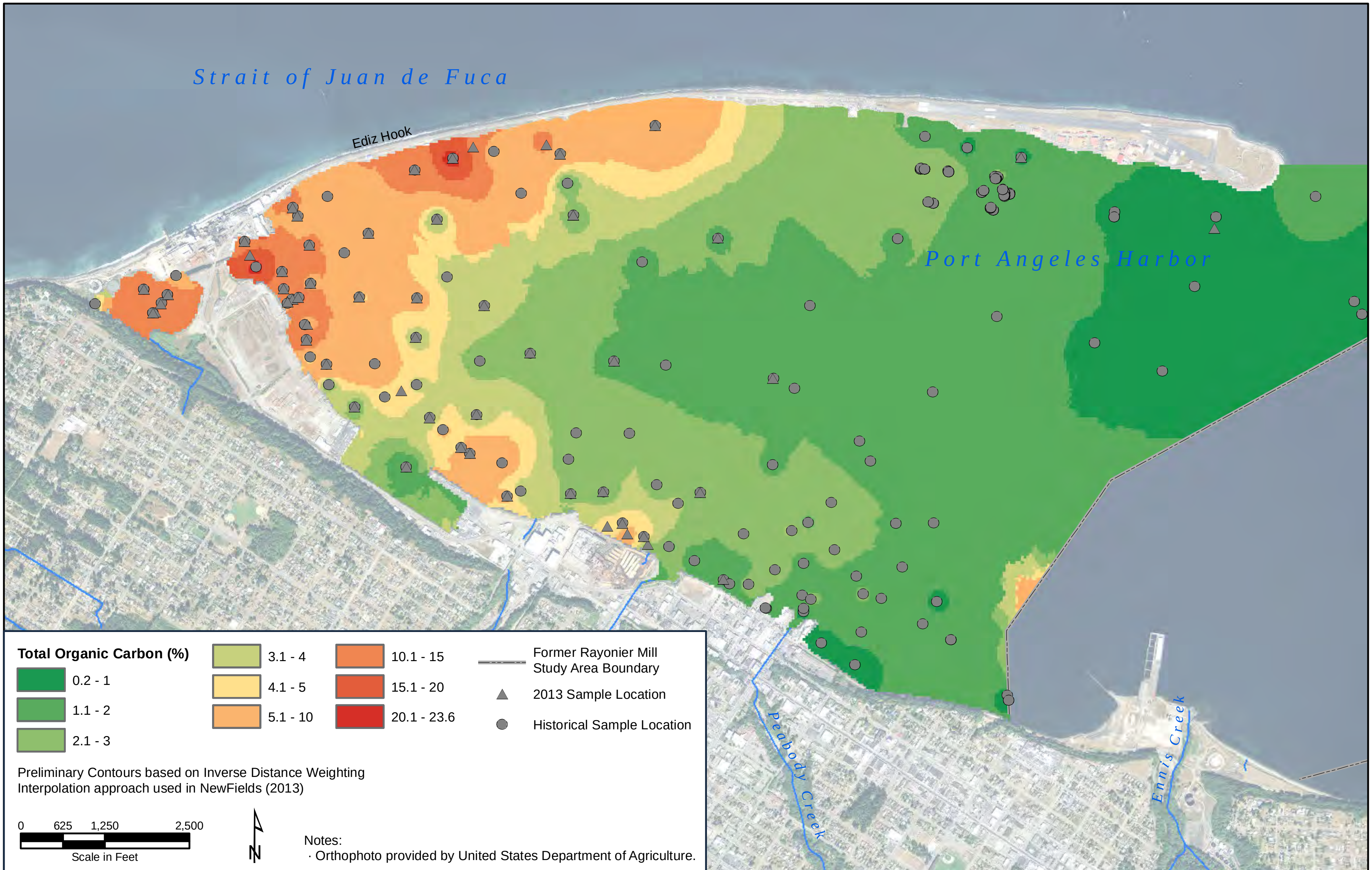

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Total Organic Carbon in Surface Sediment
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Figure 4-2

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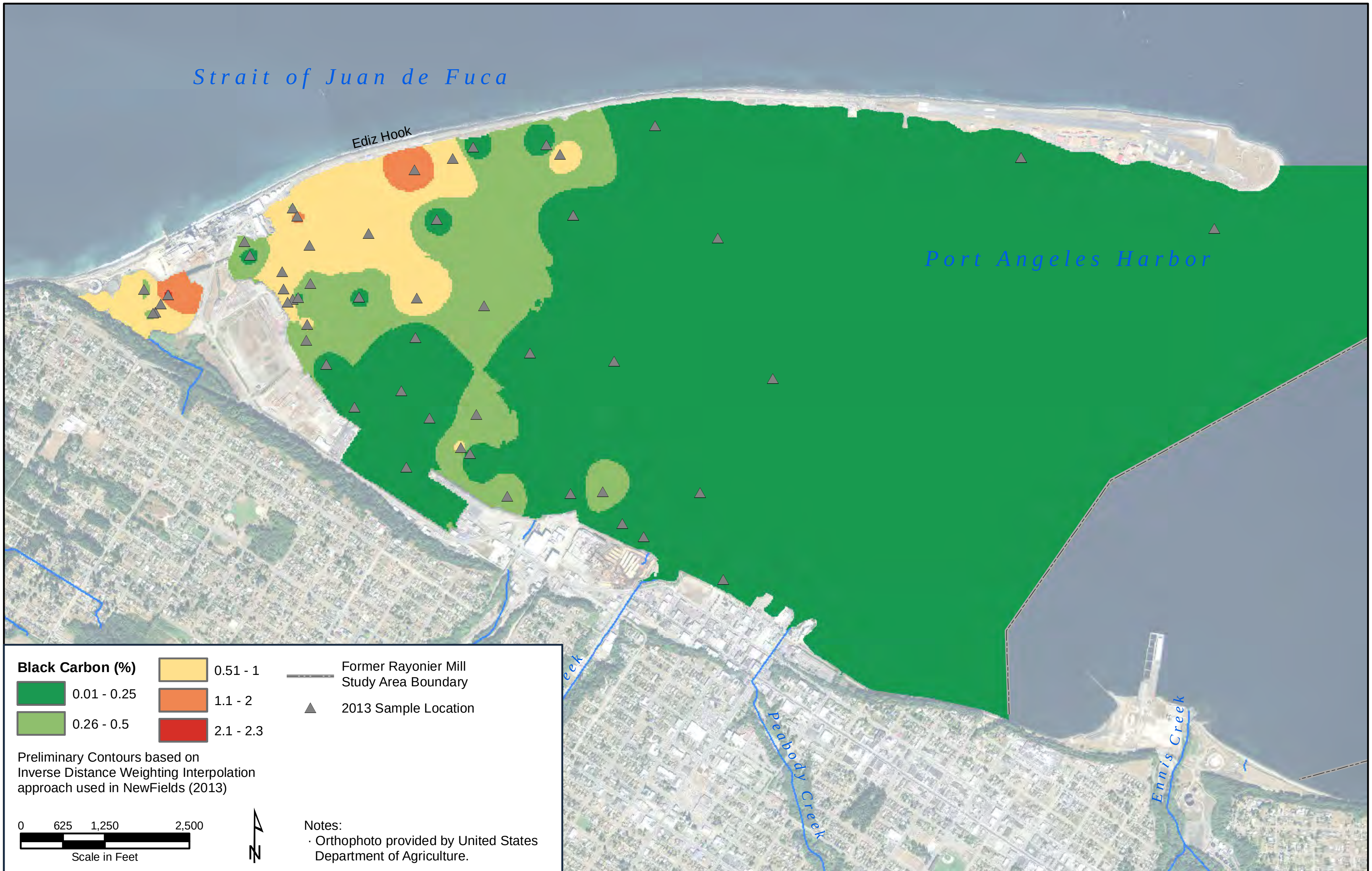

WPAHG

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Black Carbon in Surface Sediment
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Figure 4-3

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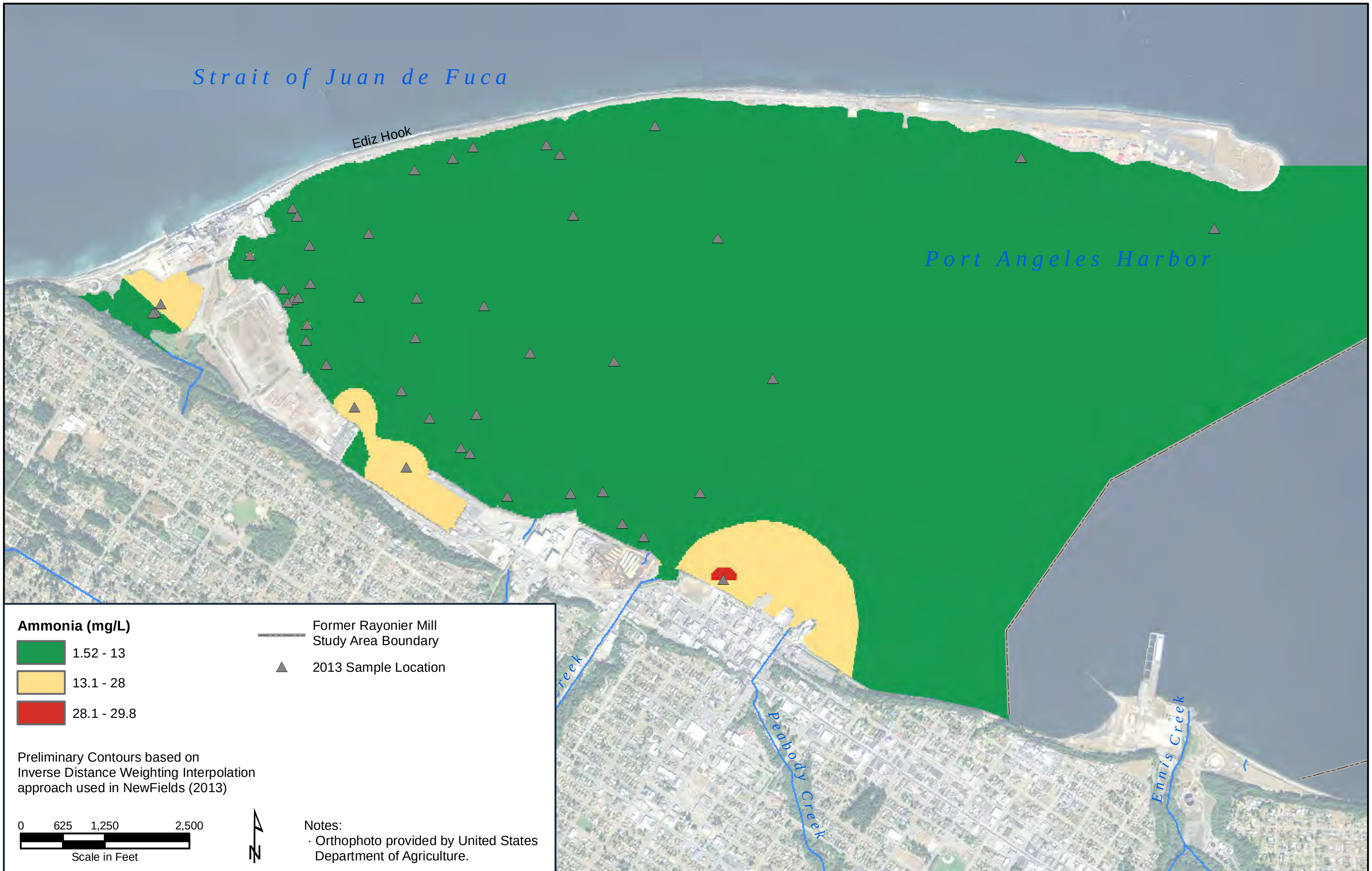

WPAHG

Western Port Angeles Harbor Group

Ammonia in Surface Sediment Porewater
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT
ECOLOGY REVIEW DRAFT

Figure 4-4

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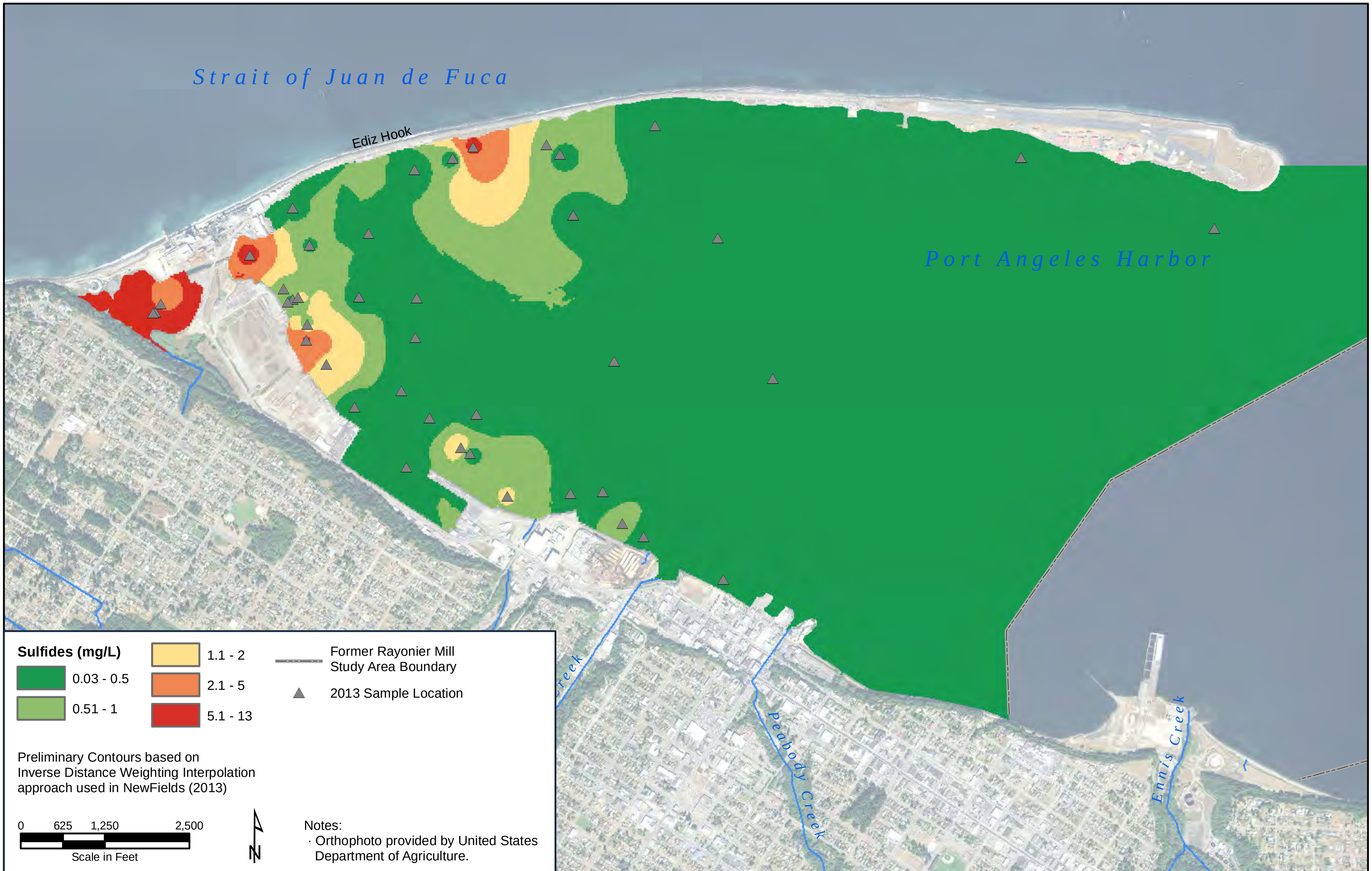


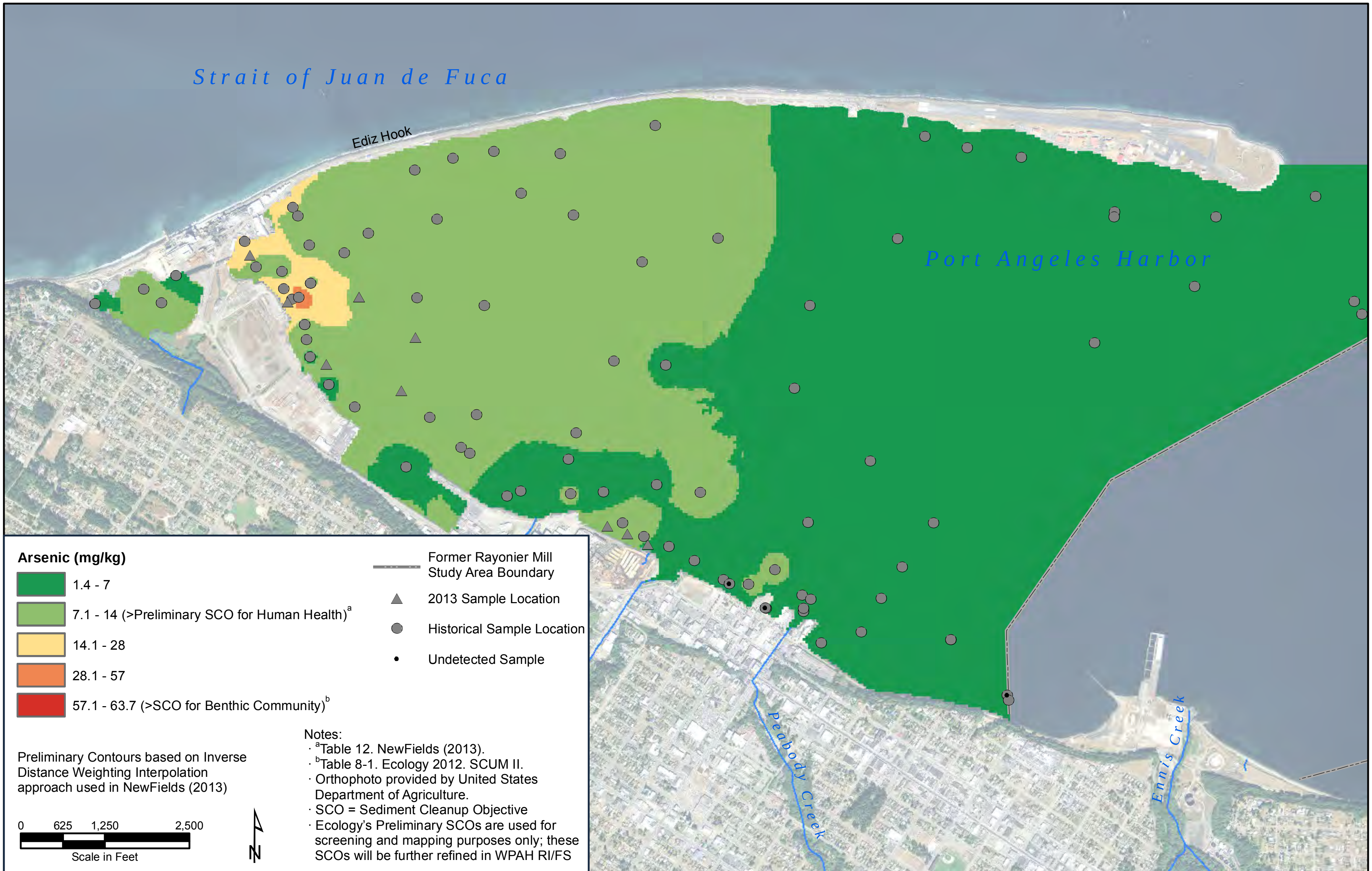
WPAHG
Western Port Angeles Harbor Group

Sulfides in Surface Sediment Porewater
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT
ECOLOGY REVIEW DRAFT

Figure 4-5

N:\GIS\Projects\C1102_PAHarbor_WPAHG\Working_MXDs\DataRpt\Figure_4_05_Sulfides_v10.mxd
2/3/2014



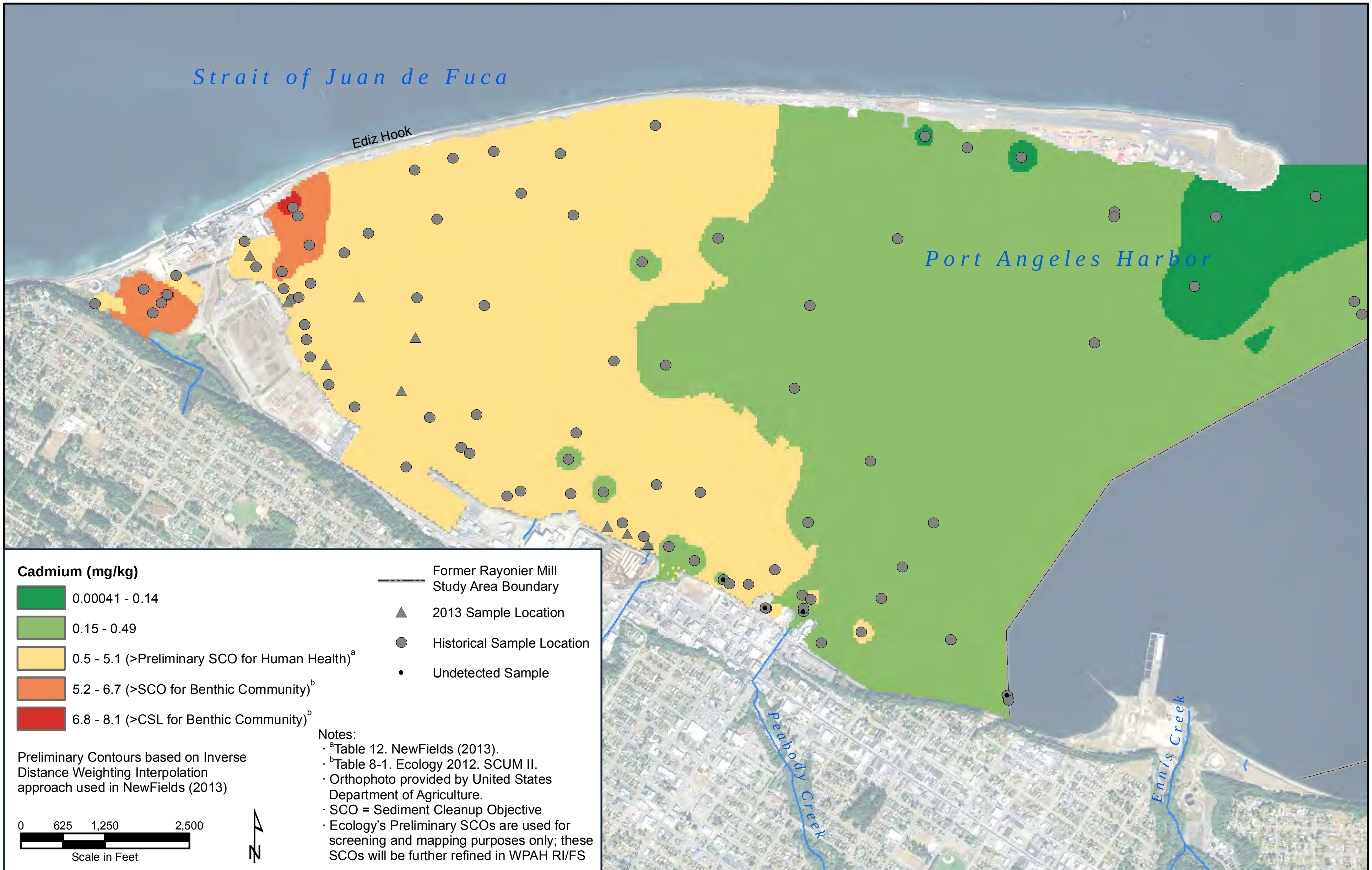
WPAHG
Western Port Angeles Harbor Group

Arsenic in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT
ECOLOGY REVIEW DRAFT

Figure 4-6

N:\GIS\Projects\C1102_PAHarbor_WPAHG\Working_MXDs\DataRpt\Figure_4_06_Arsenic_v10.mxd
2/4/2014

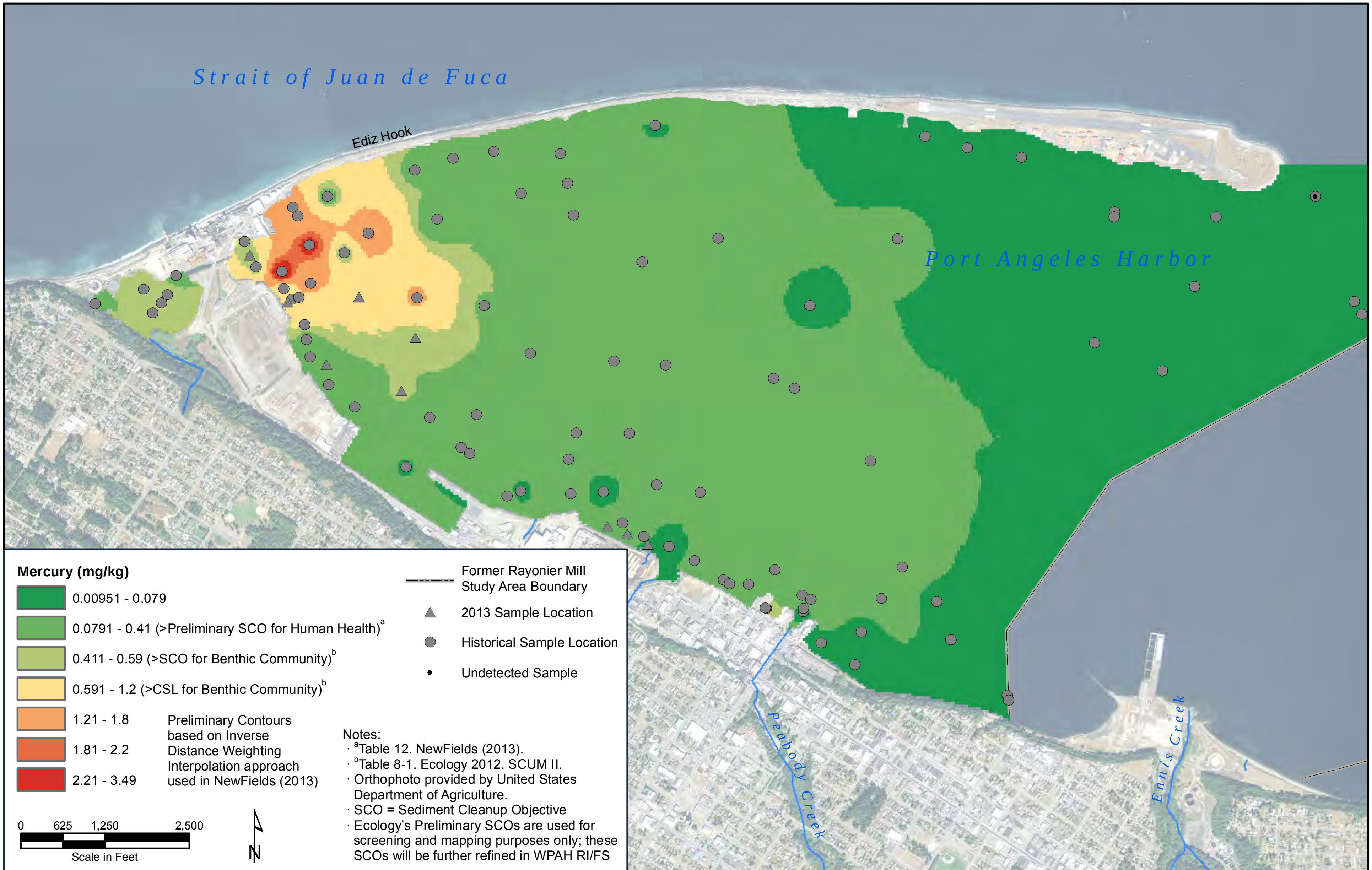


WPAHG
Western Port Angeles Harbor Group

Cadmium in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT
ECOLOGY REVIEW DRAFT

Figure 4-7



WPAHG
Western Port Angeles Harbor Group

Mercury in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT
ECOLOGY REVIEW DRAFT

Figure 4-8

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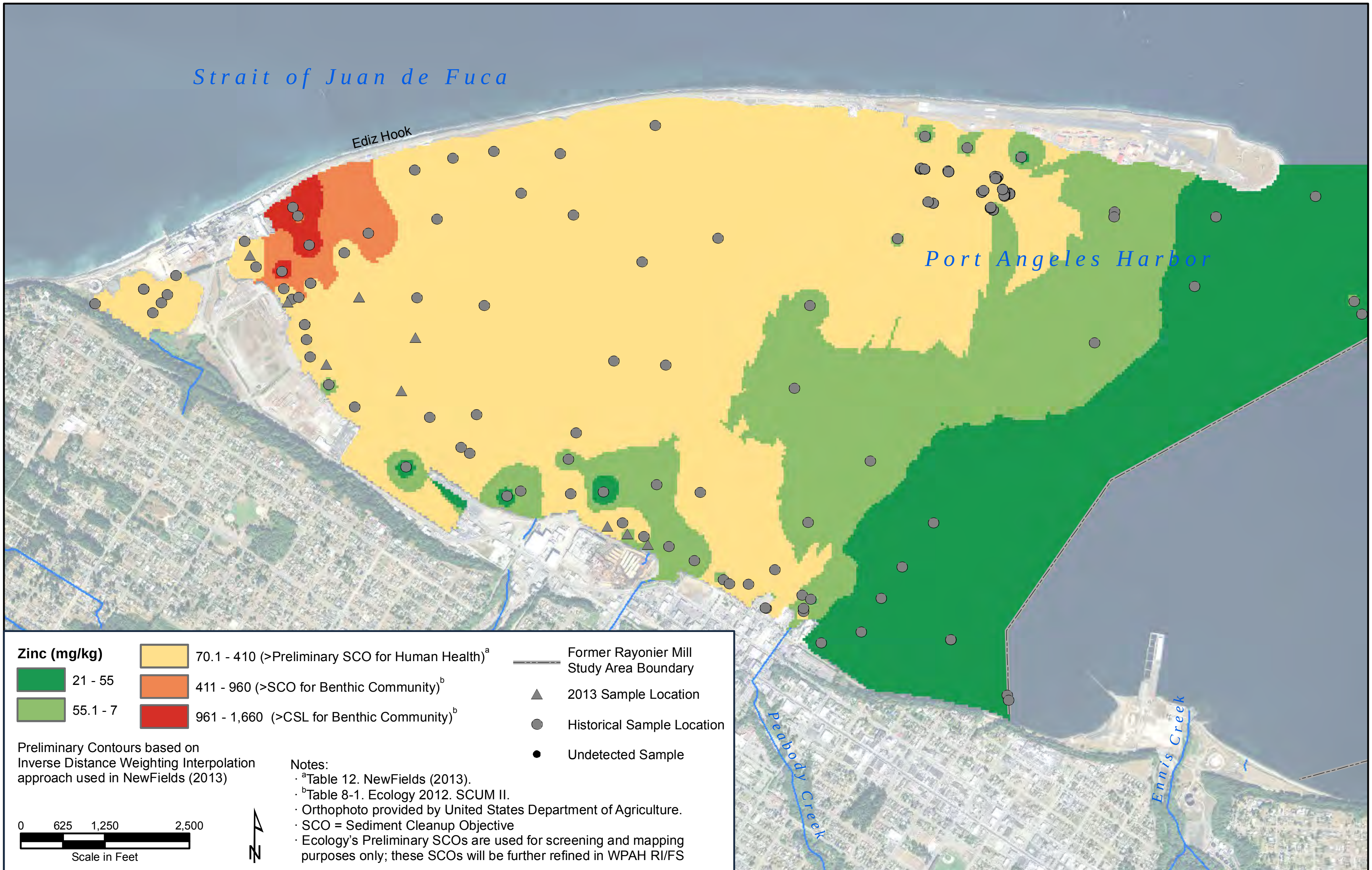

WPAHG
Western Port Angeles Harbor Group

Zinc in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-9
ECOLOGY REVIEW DRAFT

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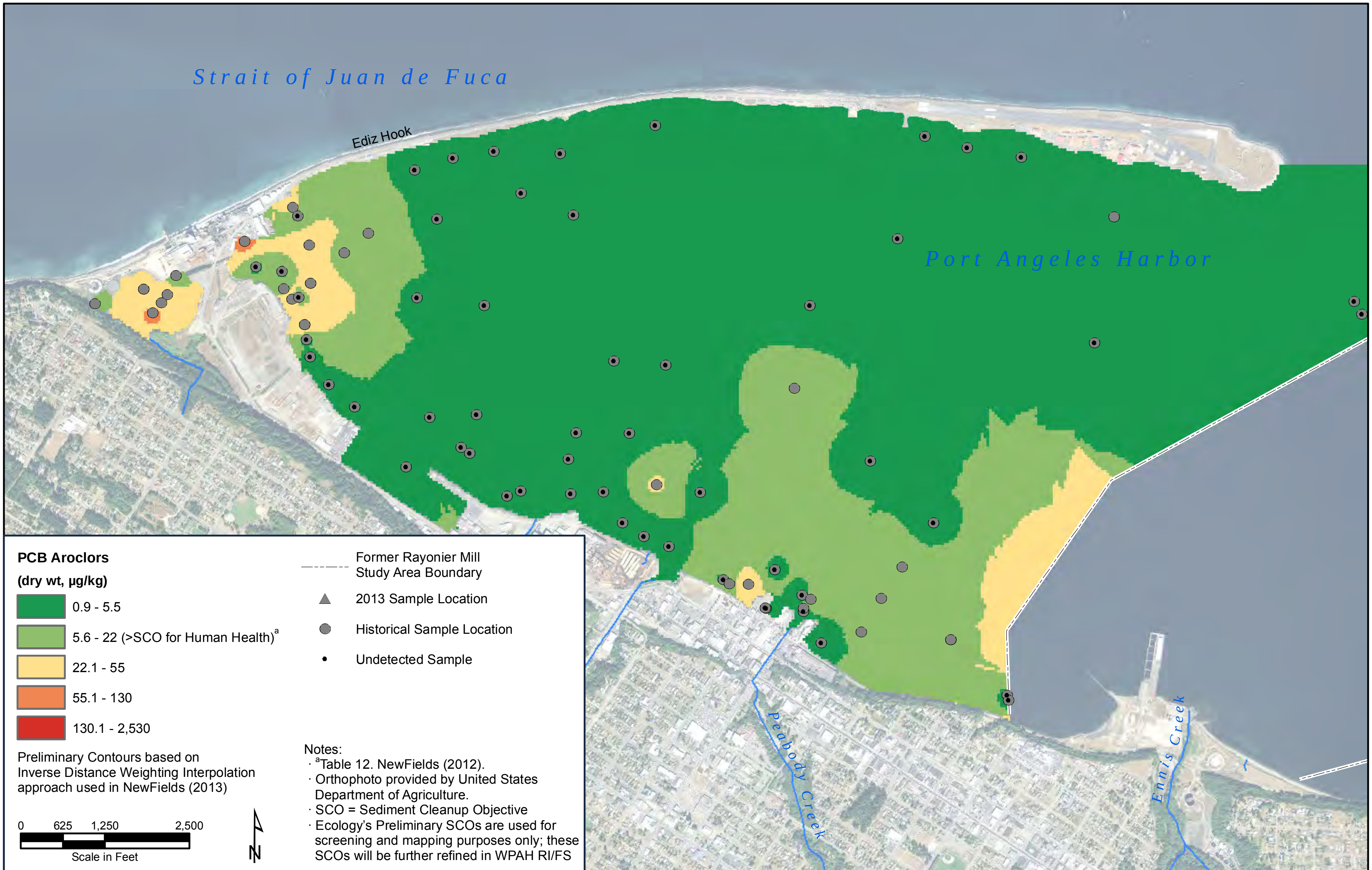

WPAHG
Western Port Angeles Harbor Group

PCB Aroclors (dry wt) in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-10
ECOLOGY REVIEW DRAFT

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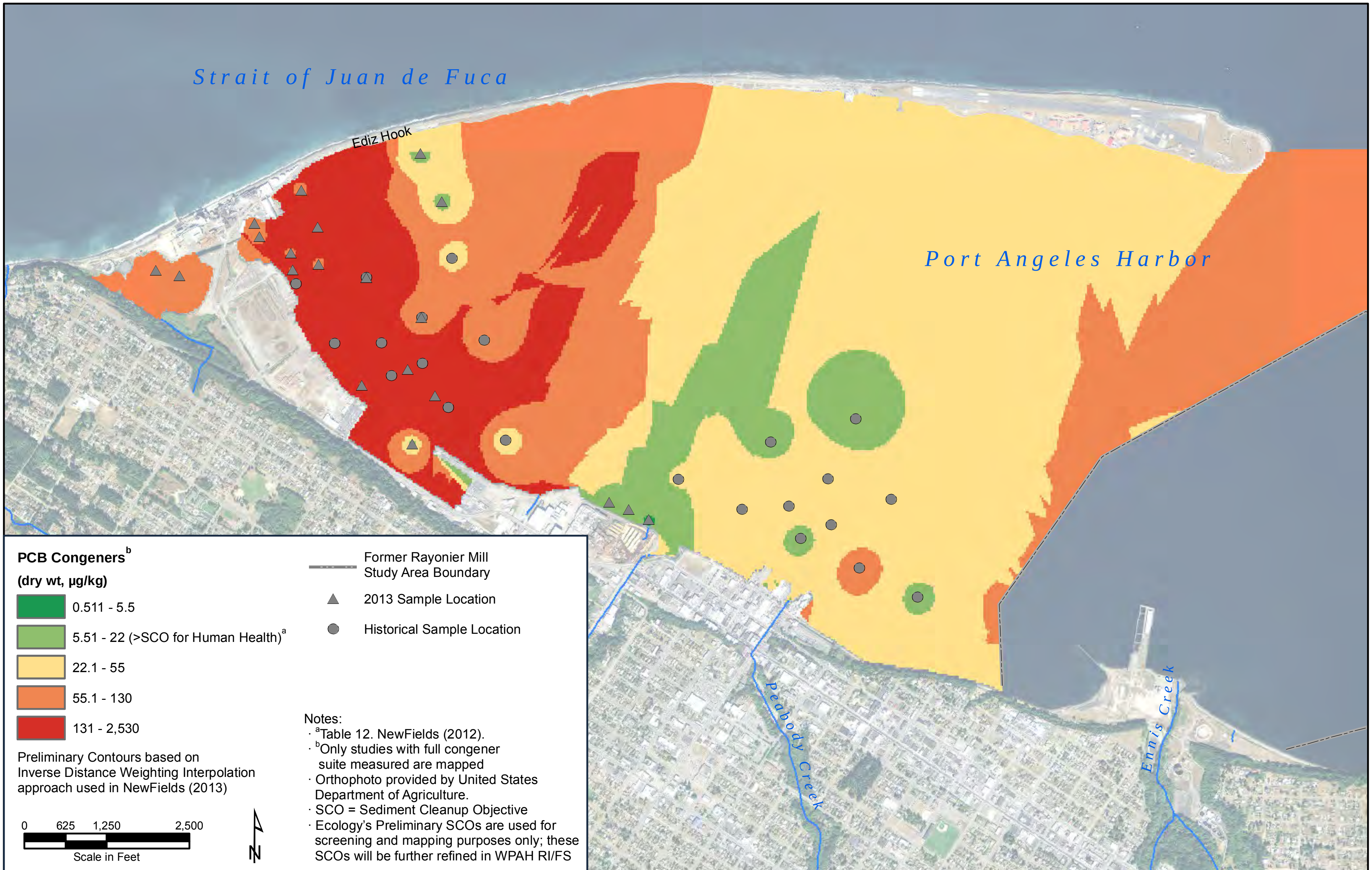

WPAHG
Western Port Angeles Harbor Group

PCB Congeners (dry wt) in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-11
ECOLOGY REVIEW DRAFT

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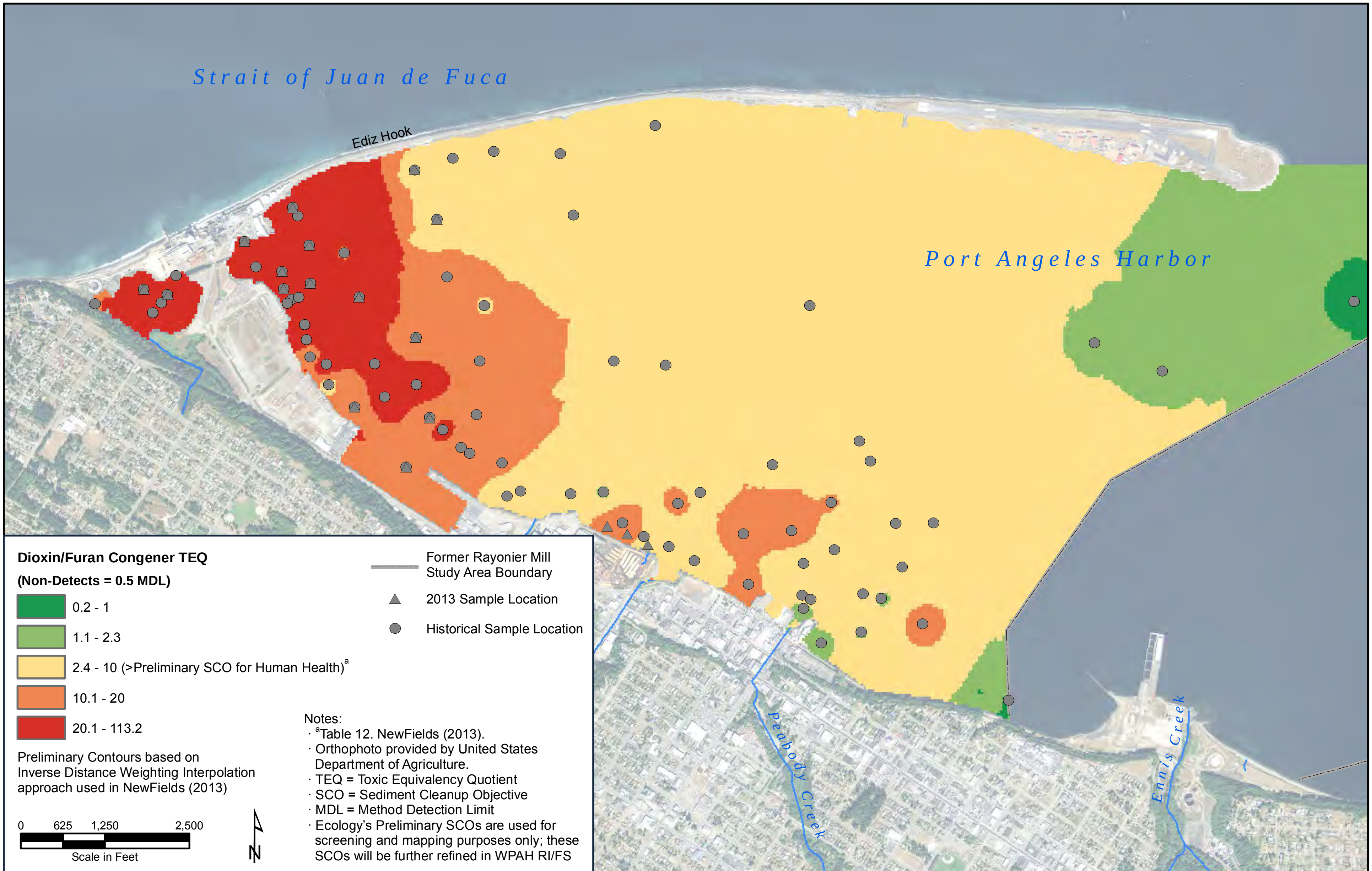

WPAHG
Western Port Angeles Harbor Group

Dioxin/FuranTEQ in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-12a
ECOLOGY REVIEW DRAFT

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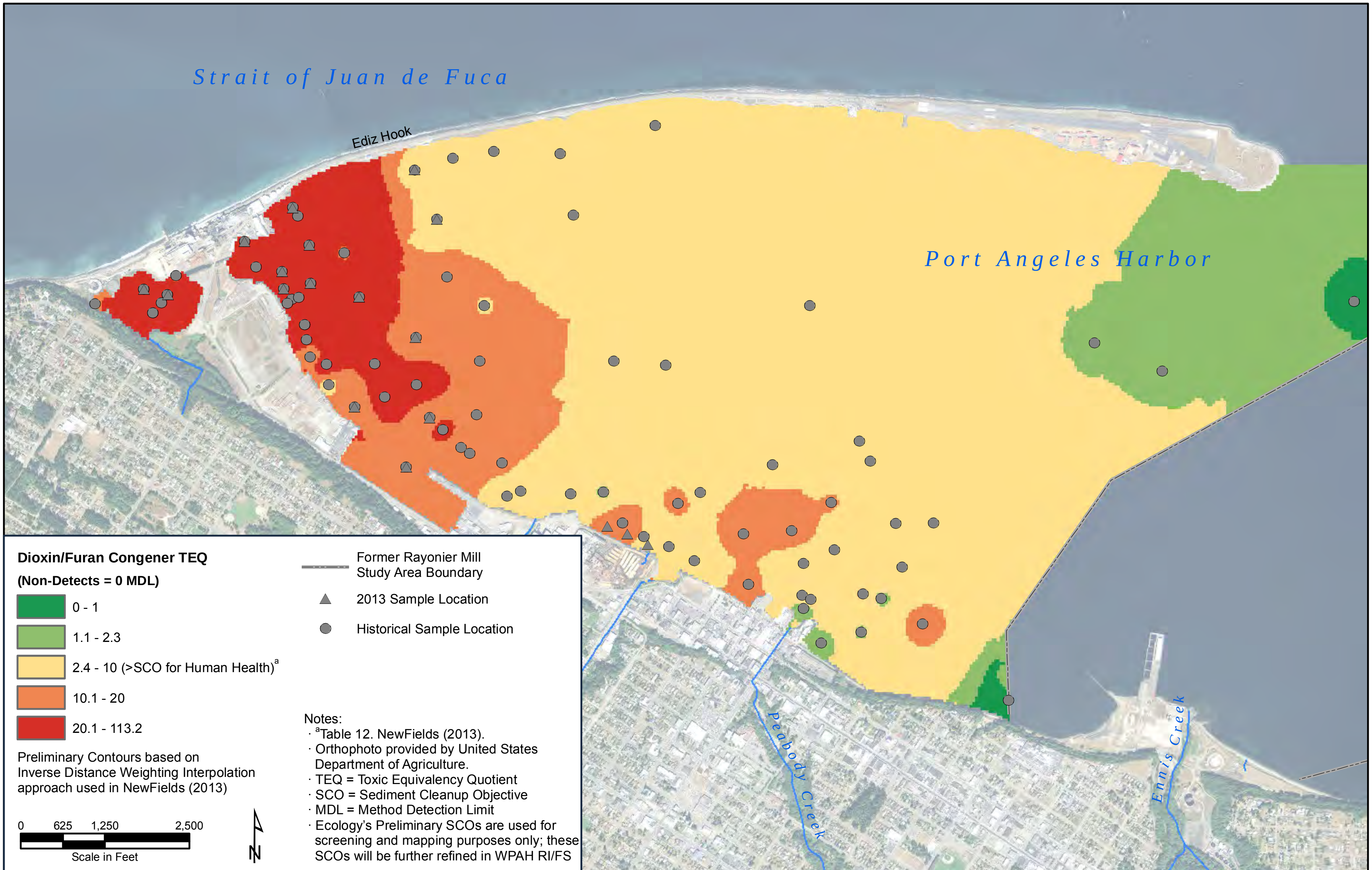

WPAHG

Western Port Angeles Harbor Group

Dioxin/Furan TEQ in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-12b

ECOLOGY REVIEW DRAFT

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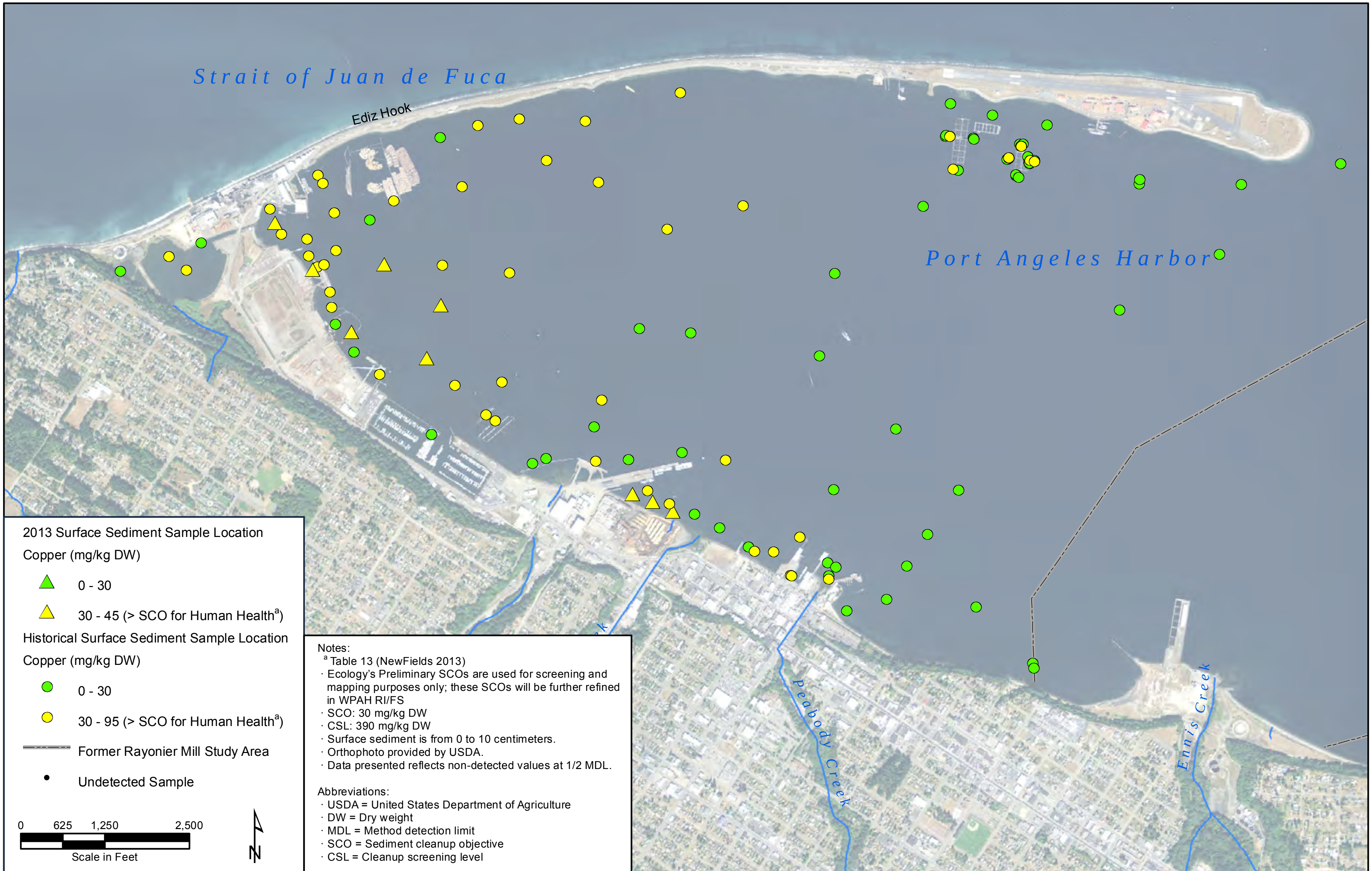

Notes:
[a] Table 13 (NewFields 2013)
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS
· SCO: 30 mg/kg DW
· CSL: 390 mg/kg DW
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· DW = Dry weight
· MDL = Method detection limit
· SCO = Sediment cleanup objective
· CSL = Cleanup screening level

WPAHG
Western Port Angeles Harbor Group

Copper in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-13
ECOLOGY REVIEW DRAFT

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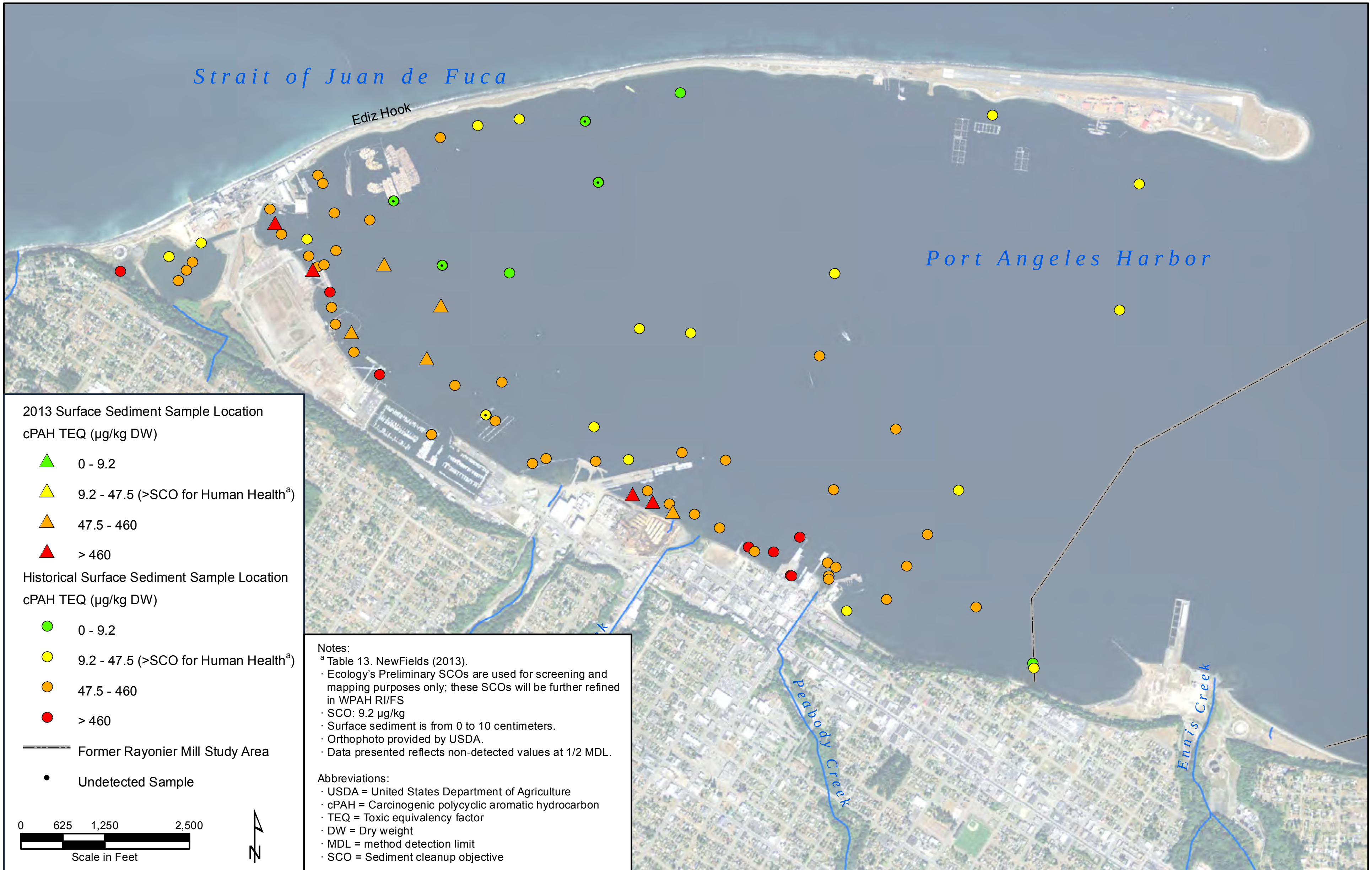
2/4/2014



Notes:
[a] Table 13. NewFields (2013).
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS
· SCO: 9.2 µg/kg
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· cPAH = Carcinogenic polycyclic aromatic hydrocarbon
· TEQ = Toxic equivalency factor
· DW = Dry weight
· MDL = method detection limit
· SCO = Sediment cleanup objective

WPAHG
Western Port Angeles Harbor Group

cPAH TEQ in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-14
ECOLOGY REVIEW DRAFT

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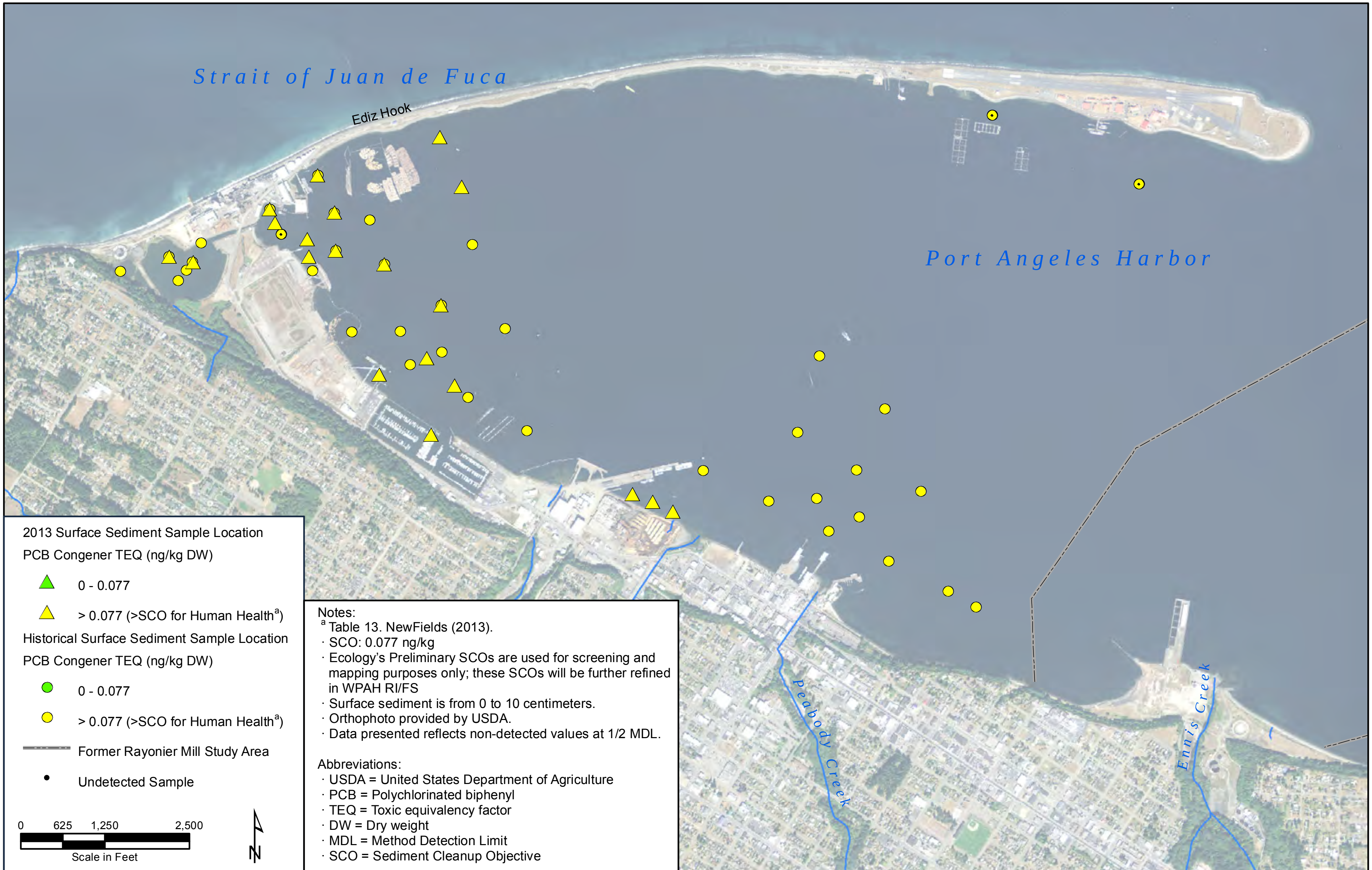
1/31/2014



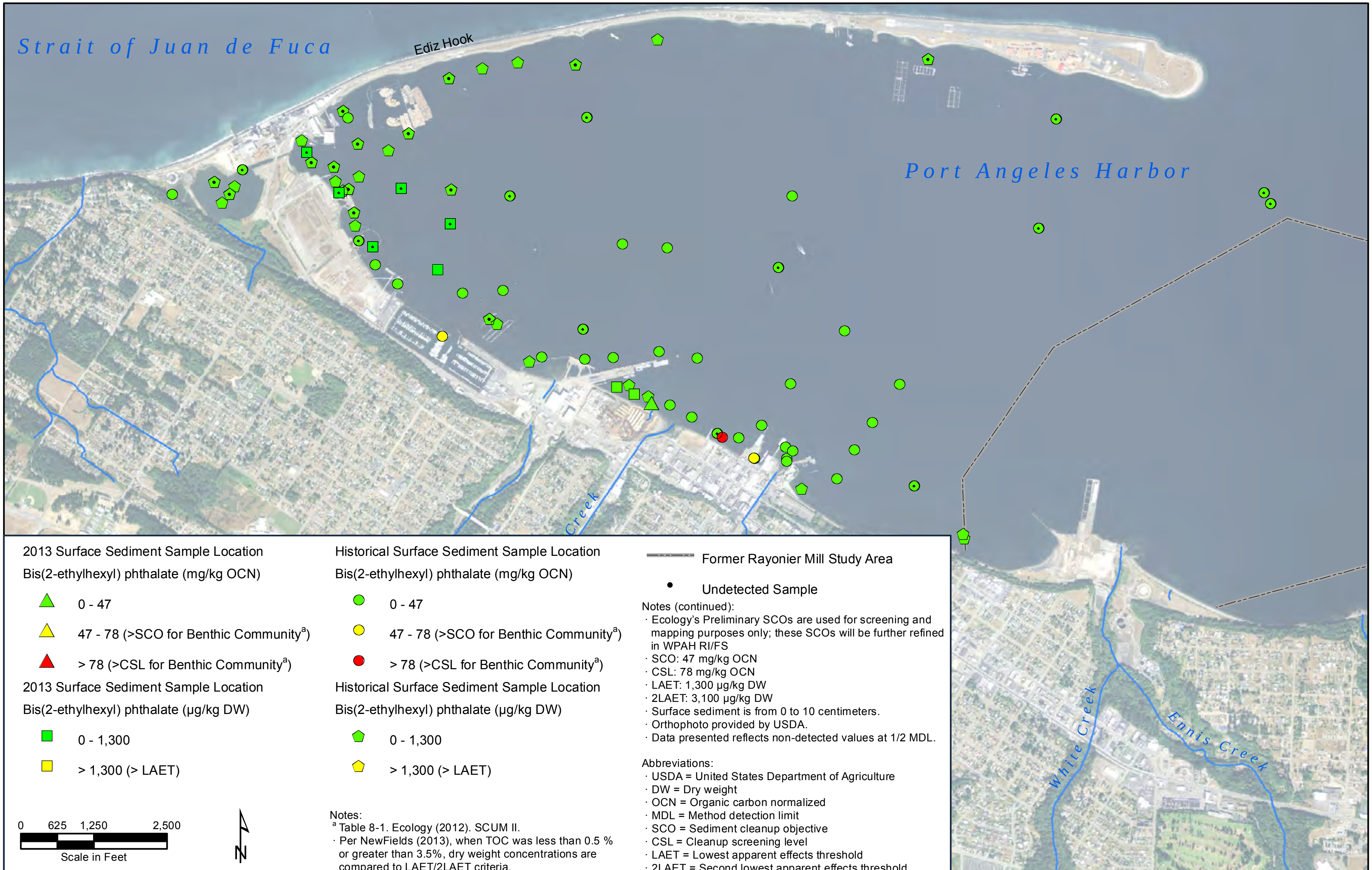
Notes:
[a] Table 13. NewFields (2013).
- SCO: 0.077 ng/kg
- Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS
- Surface sediment is from 0 to 10 centimeters.
- Orthophoto provided by USDA.
- Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
- USDA = United States Department of Agriculture
- PCB = Polychlorinated biphenyl
- TEQ = Toxic equivalency factor
- DW = Dry weight
- MDL = Method Detection Limit
- SCO = Sediment Cleanup Objective

WPAHG
Western Port Angeles Harbor Group

PCB Congener TEQ in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-15
ECOLOGY REVIEW DRAFT



WPAHG
Western Port Angeles Harbor Group

Bis(2-ethylhexyl)phthalate in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-16
ECOLOGY REVIEW DRAFT

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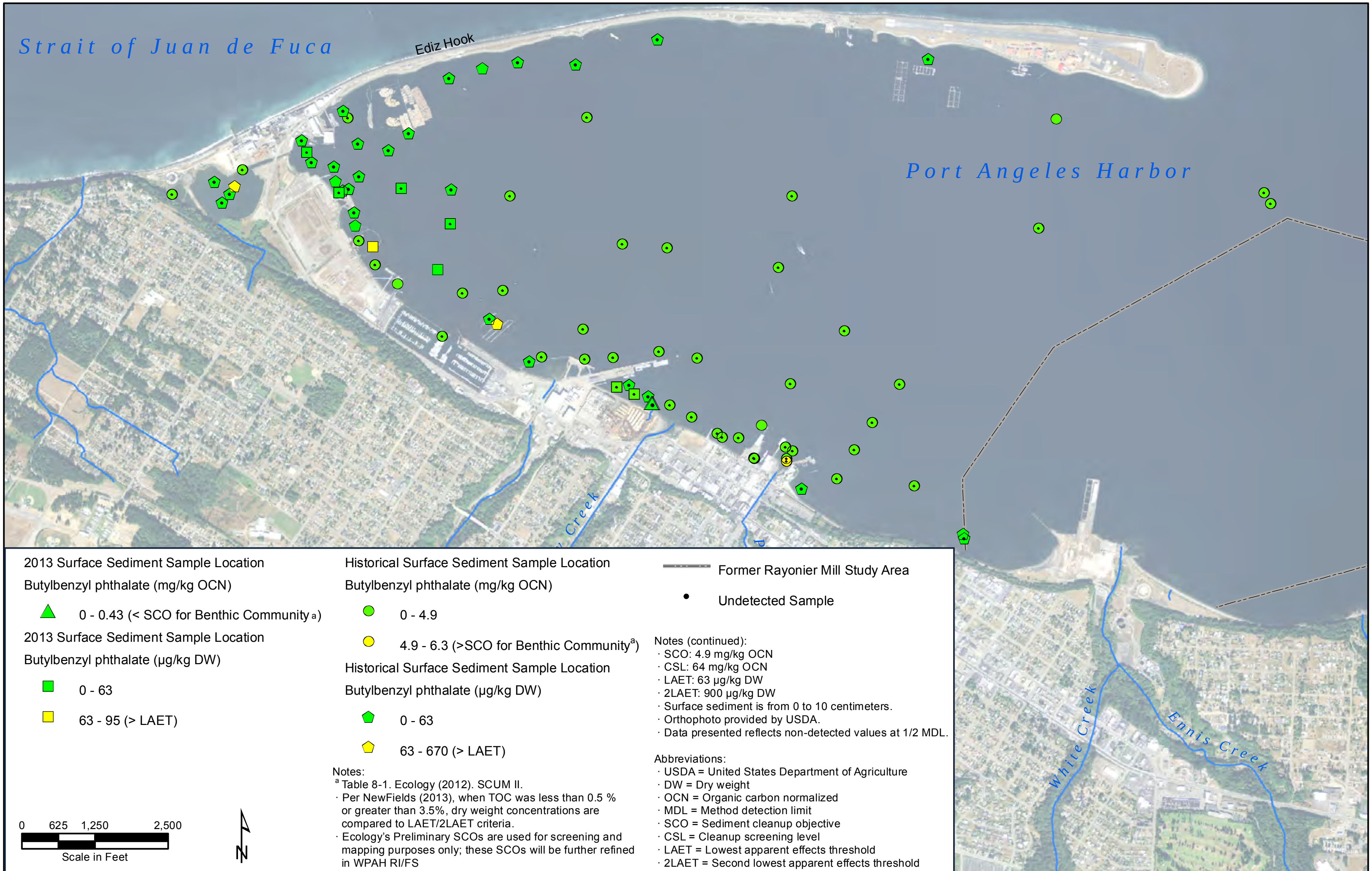

2013 Surface Sediment Sample Location
Butylbenzyl phthalate (mg/kg OCN)
- 0 - 0.43 (< SCO for Benthic Community [a])

2013 Surface Sediment Sample Location
Butylbenzyl phthalate (µg/kg DW)
- 0 - 63
- 63 - 95 (> LAET)

Historical Surface Sediment Sample Location
Butylbenzyl phthalate (mg/kg OCN)
- 0 - 4.9
- 4.9 - 6.3 (>SCO for Benthic Community[a])

Historical Surface Sediment Sample Location
Butylbenzyl phthalate (µg/kg DW)
- 0 - 63
- 63 - 670 (> LAET)

Former Rayonier Mill Study Area

Undetected Sample

0 625 1,250 2,500
Scale in Feet

N

Notes:
[a] Table 8-1. Ecology (2012). SCUM II.
· Per NewFields (2013), when TOC was less than 0.5 % or greater than 3.5%, dry weight concentrations are compared to LAET/2LAET criteria.
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS

Notes (continued):
· SCO: 4.9 mg/kg OCN
· CSL: 64 mg/kg OCN
· LAET: 63 µg/kg DW
· 2LAET: 900 µg/kg DW
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· DW = Dry weight
· OCN = Organic carbon normalized
· MDL = Method detection limit
· SCO = Sediment cleanup objective
· CSL = Cleanup screening level
· LAET = Lowest apparent effects threshold
· 2LAET = Second lowest apparent effects threshold

WPAHG
Western Port Angeles Harbor Group

Butylbenzyl Phthalate in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-17
ECOLOGY REVIEW DRAFT

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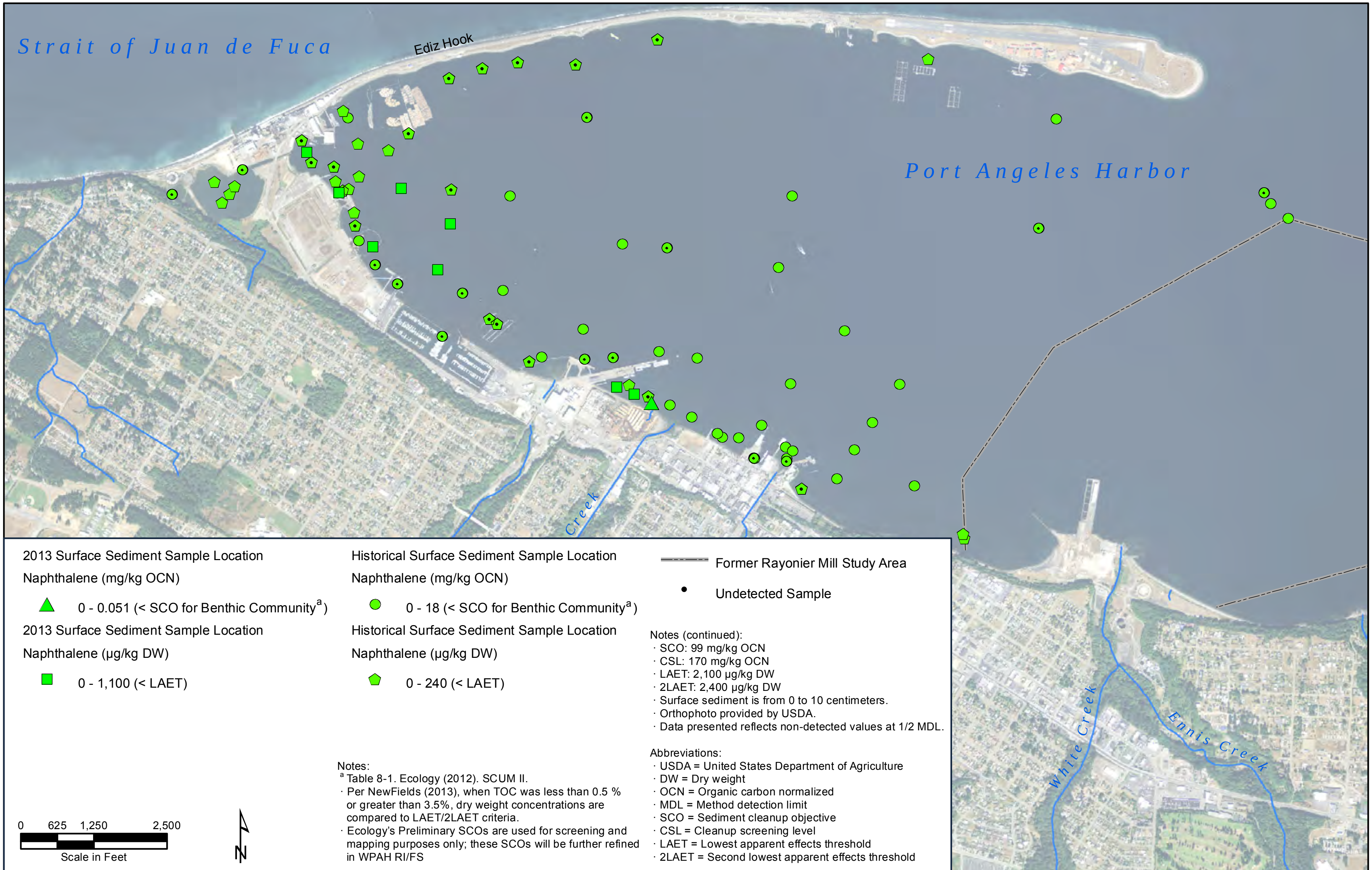

2013 Surface Sediment Sample Location
Naphthalene (mg/kg OCN)
- 0 - 0.051 (< SCO for Benthic Community[a])

2013 Surface Sediment Sample Location
Naphthalene (µg/kg DW)
- 0 - 1,100 (< LAET)

Historical Surface Sediment Sample Location
Naphthalene (mg/kg OCN)
- 0 - 18 (< SCO for Benthic Community[a])

Historical Surface Sediment Sample Location
Naphthalene (µg/kg DW)
- 0 - 240 (< LAET)

Former Rayonier Mill Study Area

Undetected Sample

0 625 1,250 2,500
Scale in Feet

N

Notes:
[a] Table 8-1. Ecology (2012). SCUM II.
· Per NewFields (2013), when TOC was less than 0.5 % or greater than 3.5%, dry weight concentrations are compared to LAET/2LAET criteria.
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS

Notes (continued):
· SCO: 99 mg/kg OCN
· CSL: 170 mg/kg OCN
· LAET: 2,100 µg/kg DW
· 2LAET: 2,400 µg/kg DW
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· DW = Dry weight
· OCN = Organic carbon normalized
· MDL = Method detection limit
· SCO = Sediment cleanup objective
· CSL = Cleanup screening level
· LAET = Lowest apparent effects threshold
· 2LAET = Second lowest apparent effects threshold

WPAHG
Western Port Angeles Harbor Group

Naphthalene in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-18
ECOLOGY REVIEW DRAFT

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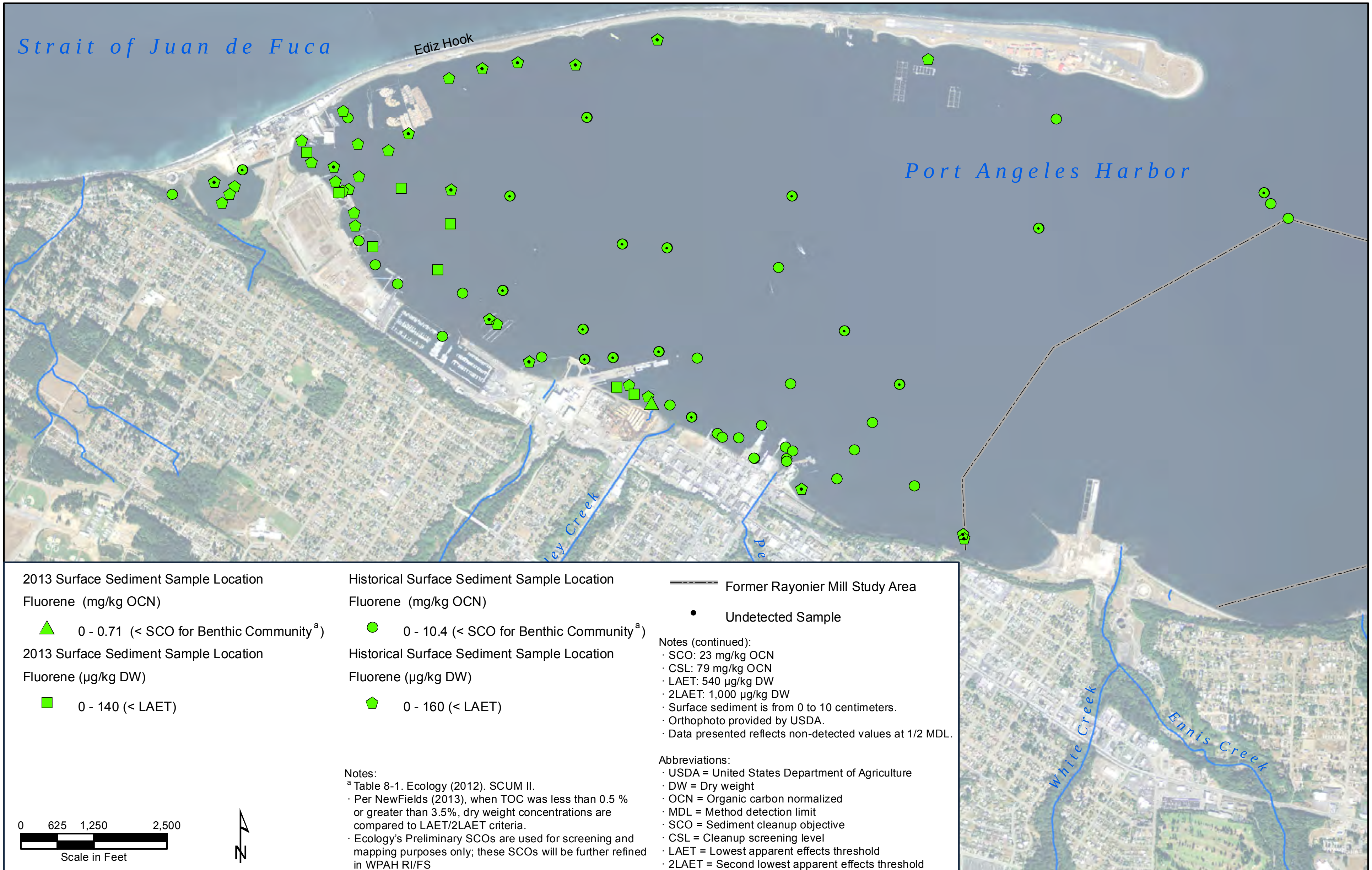

WPAHG
Western Port Angeles Harbor Group

Fluorene in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-19
ECOLOGY REVIEW DRAFT

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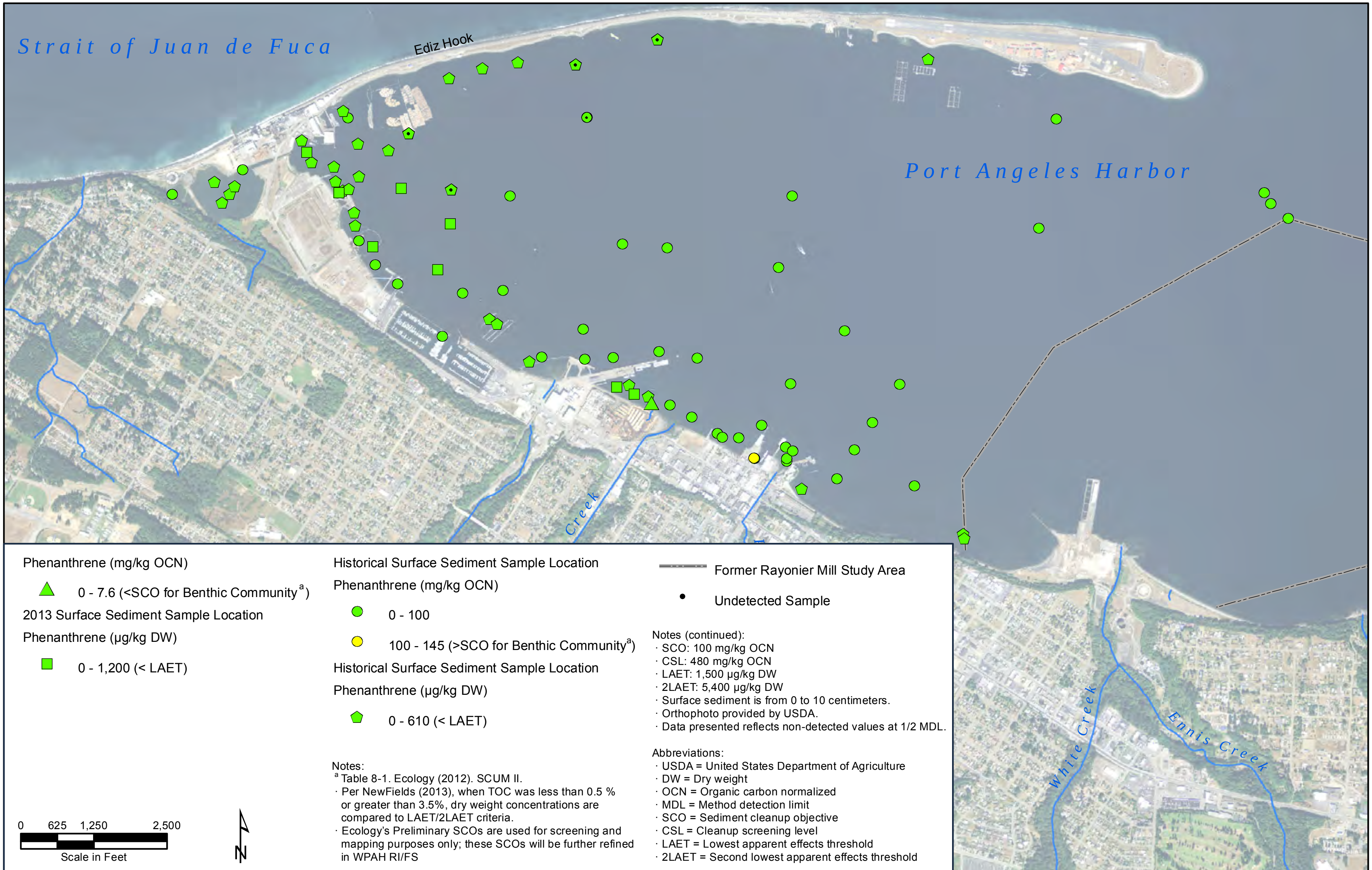
2/4/2014



WPAHG
Western Port Angeles Harbor Group

Phenanthrene in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-20
ECOLOGY REVIEW DRAFT

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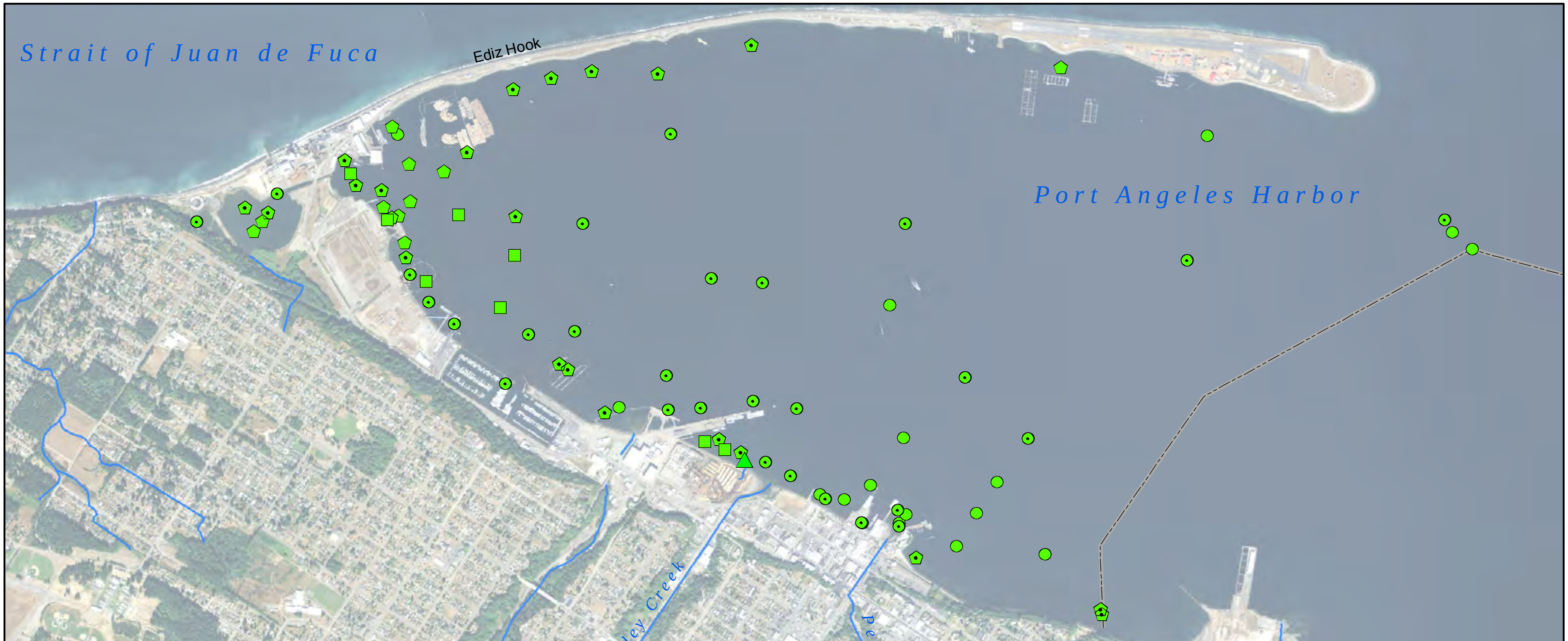
2/4/2014



2013 Surface Sediment Sample Location
2-Methylnaphthalene (mg/kg OCN)
- 0 - 0.24 (< SCO for Benthic Community[a])

2013 Surface Sediment Sample Location
2-Methylnaphthalene (µg/kg DW)
- 0 - 68 (< LAET)

Historical Surface Sediment Sample Location
2-Methylnaphthalene (mg/kg OCN)
- 0 - 5.2 (< SCO for Benthic Community[a])

Historical Surface Sediment Sample Location
2-Methylnaphthalene (µg/kg DW)
- 0 - 140 (< LAET)

Former Rayonier Mill Study Area

Undetected Sample

0 625 1,250 2,500
Scale in Feet

N

Notes:
[a] Table 8-1. Ecology (2012). SCUM II.
· Per NewFields (2013), when TOC was less than 0.5 % or greater than 3.5%, dry weight concentrations are compared to LAET/2LAET criteria.
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS

Notes (continued):
· SCO: 38 mg/kg OCN
· CSL: 64 mg/kg OCN
· LAET: 670 µg/kg DW
· 2LAET: 1,400 µg/kg DW
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· DW = Dry weight
· OCN = Organic carbon normalized
· MDL = Method detection limit
· SCO = Sediment cleanup objective
· CSL = Cleanup screening level
· LAET = Lowest apparent effects threshold
· 2LAET = Second lowest apparent effects threshold

WPAHG
Western Port Angeles Harbor Group

2-Methylnaphthalene in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-21
ECOLOGY REVIEW DRAFT

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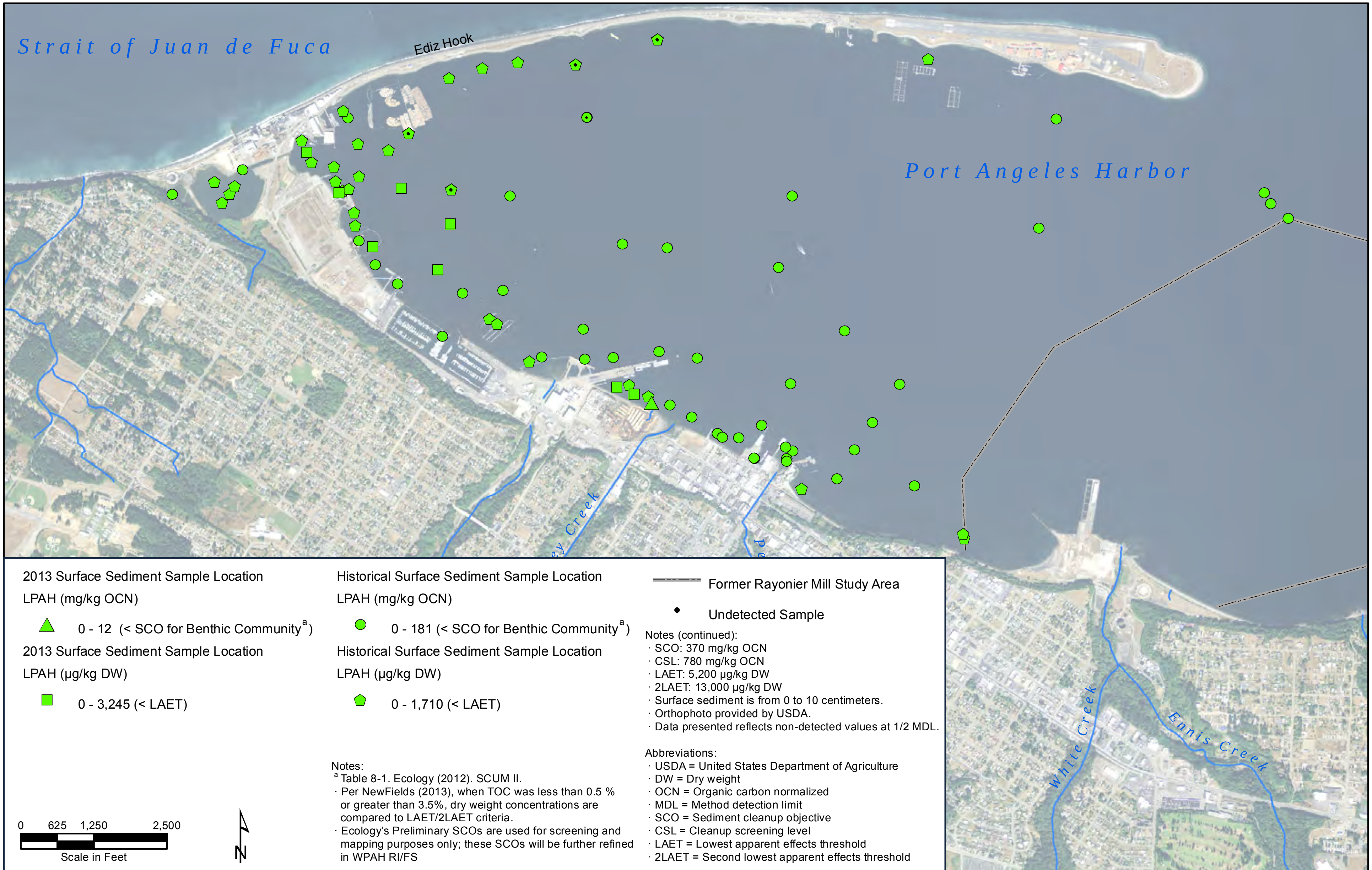

2013 Surface Sediment Sample Location
LPAH (mg/kg OCN)
0 - 12 (< SCO for Benthic Community[a])

2013 Surface Sediment Sample Location
LPAH (µg/kg DW)
0 - 3,245 (< LAET)

Historical Surface Sediment Sample Location
LPAH (mg/kg OCN)
0 - 181 (< SCO for Benthic Community[a])

Historical Surface Sediment Sample Location
LPAH (µg/kg DW)
0 - 1,710 (< LAET)

Former Rayonier Mill Study Area

Undetected Sample

0 625 1,250 2,500
Scale in Feet

N

Notes:
[a] Table 8-1. Ecology (2012). SCUM II.
· Per NewFields (2013), when TOC was less than 0.5 % or greater than 3.5%, dry weight concentrations are compared to LAET/2LAET criteria.
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS

Notes (continued):
· SCO: 370 mg/kg OCN
· CSL: 780 mg/kg OCN
· LAET: 5,200 µg/kg DW
· 2LAET: 13,000 µg/kg DW
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· DW = Dry weight
· OCN = Organic carbon normalized
· MDL = Method detection limit
· SCO = Sediment cleanup objective
· CSL = Cleanup screening level
· LAET = Lowest apparent effects threshold
· 2LAET = Second lowest apparent effects threshold

WPAHG
Western Port Angeles Harbor Group

LPAH in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-22
ECOLOGY REVIEW DRAFT

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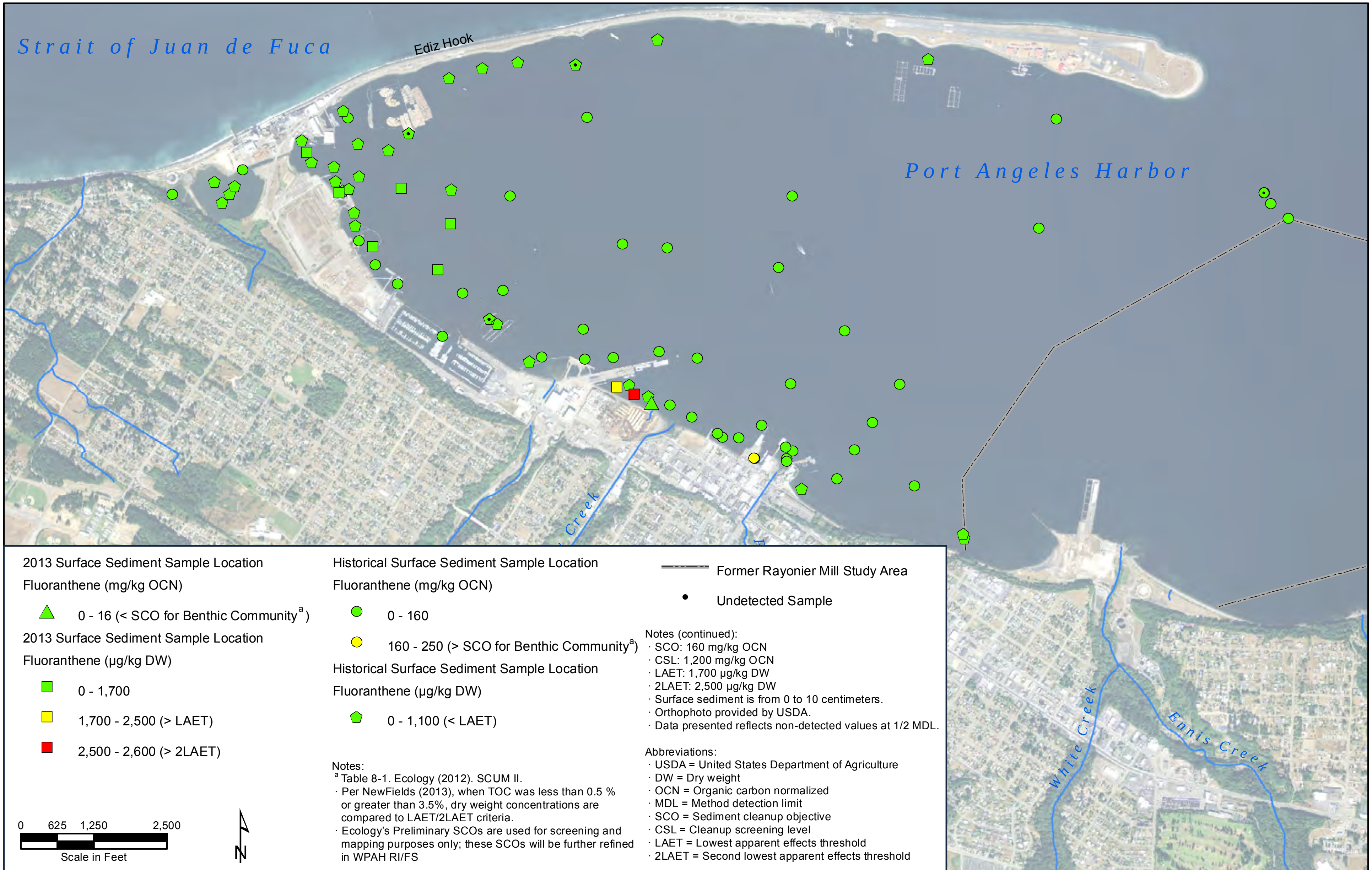

2013 Surface Sediment Sample Location
Fluoranthene (mg/kg OCN)
- 0 - 16 (< SCO for Benthic Community[a])

2013 Surface Sediment Sample Location
Fluoranthene (µg/kg DW)
- 0 - 1,700
- 1,700 - 2,500 (> LAET)
- 2,500 - 2,600 (> 2LAET)

Historical Surface Sediment Sample Location
Fluoranthene (mg/kg OCN)
- 0 - 160
- 160 - 250 (> SCO for Benthic Community[a])

Historical Surface Sediment Sample Location
Fluoranthene (µg/kg DW)
- 0 - 1,100 (< LAET)

Former Rayonier Mill Study Area

Undetected Sample

0 625 1,250 2,500
Scale in Feet

N

Notes:
[a] Table 8-1. Ecology (2012). SCUM II.
· Per NewFields (2013), when TOC was less than 0.5 % or greater than 3.5%, dry weight concentrations are compared to LAET/2LAET criteria.
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS

Notes (continued):
· SCO: 160 mg/kg OCN
· CSL: 1,200 mg/kg OCN
· LAET: 1,700 µg/kg DW
· 2LAET: 2,500 µg/kg DW
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· DW = Dry weight
· OCN = Organic carbon normalized
· MDL = Method detection limit
· SCO = Sediment cleanup objective
· CSL = Cleanup screening level
· LAET = Lowest apparent effects threshold
· 2LAET = Second lowest apparent effects threshold

WPAHG
Western Port Angeles Harbor Group

Fluoranthene in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-23
ECOLOGY REVIEW DRAFT

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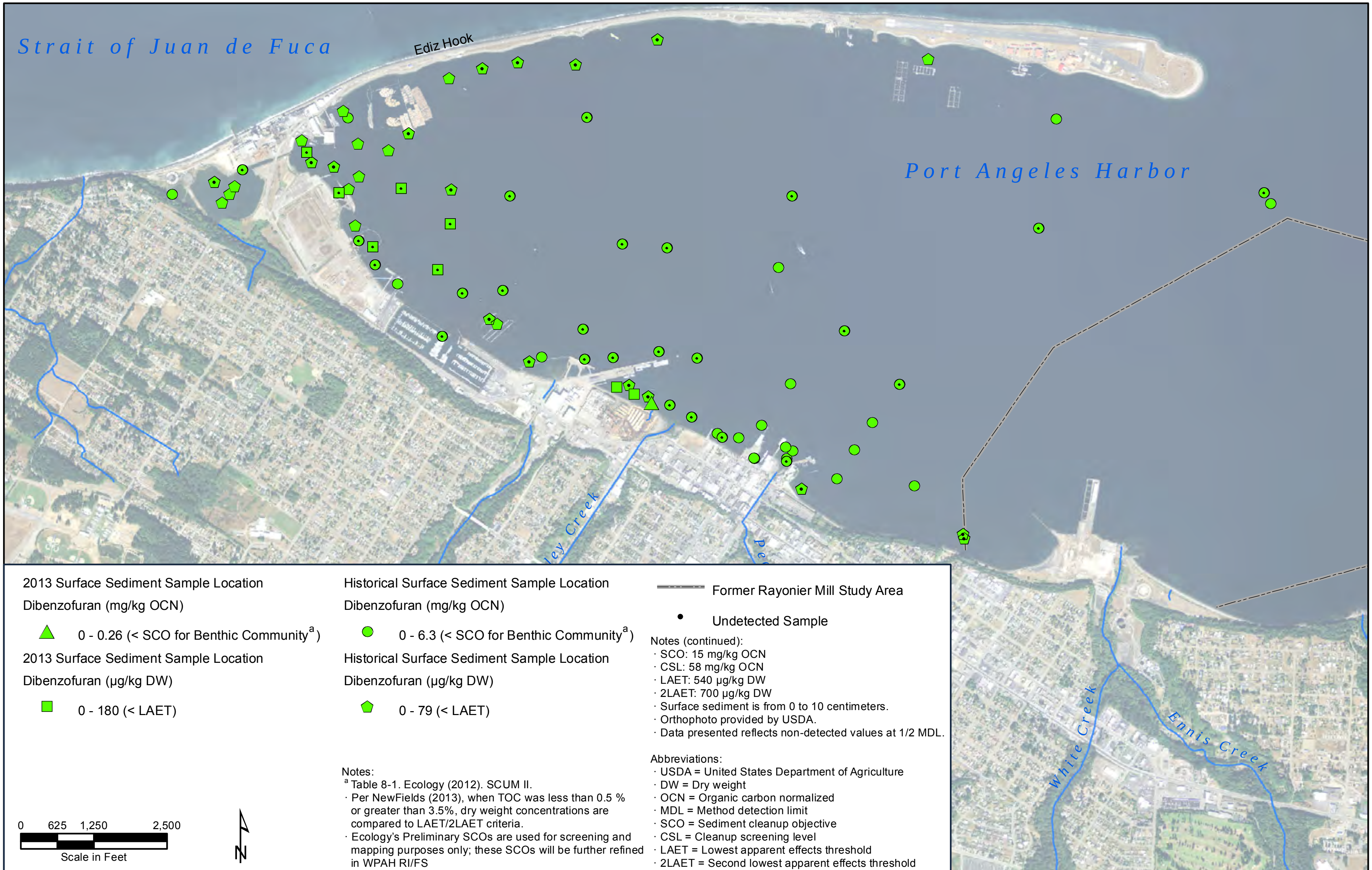

2013 Surface Sediment Sample Location
Dibenzofuran (mg/kg OCN)
0 - 0.26 (< SCO for Benthic Community[a])

2013 Surface Sediment Sample Location
Dibenzofuran (µg/kg DW)
0 - 180 (< LAET)

Historical Surface Sediment Sample Location
Dibenzofuran (mg/kg OCN)
0 - 6.3 (< SCO for Benthic Community[a])

Historical Surface Sediment Sample Location
Dibenzofuran (µg/kg DW)
0 - 79 (< LAET)

Former Rayonier Mill Study Area

Undetected Sample

0 625 1,250 2,500
Scale in Feet

N

Notes:
[a] Table 8-1. Ecology (2012). SCUM II.
- Per NewFields (2013), when TOC was less than 0.5 % or greater than 3.5%, dry weight concentrations are compared to LAET/2LAET criteria.
- Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS

Notes (continued):
- SCO: 15 mg/kg OCN
- CSL: 58 mg/kg OCN
- LAET: 540 µg/kg DW
- 2LAET: 700 µg/kg DW
- Surface sediment is from 0 to 10 centimeters.
- Orthophoto provided by USDA.
- Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
- USDA = United States Department of Agriculture
- DW = Dry weight
- OCN = Organic carbon normalized
- MDL = Method detection limit
- SCO = Sediment cleanup objective
- CSL = Cleanup screening level
- LAET = Lowest apparent effects threshold
- 2LAET = Second lowest apparent effects threshold

WPAHG
Western Port Angeles Harbor Group

Dibenzofuran in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-24
ECOLOGY REVIEW DRAFT

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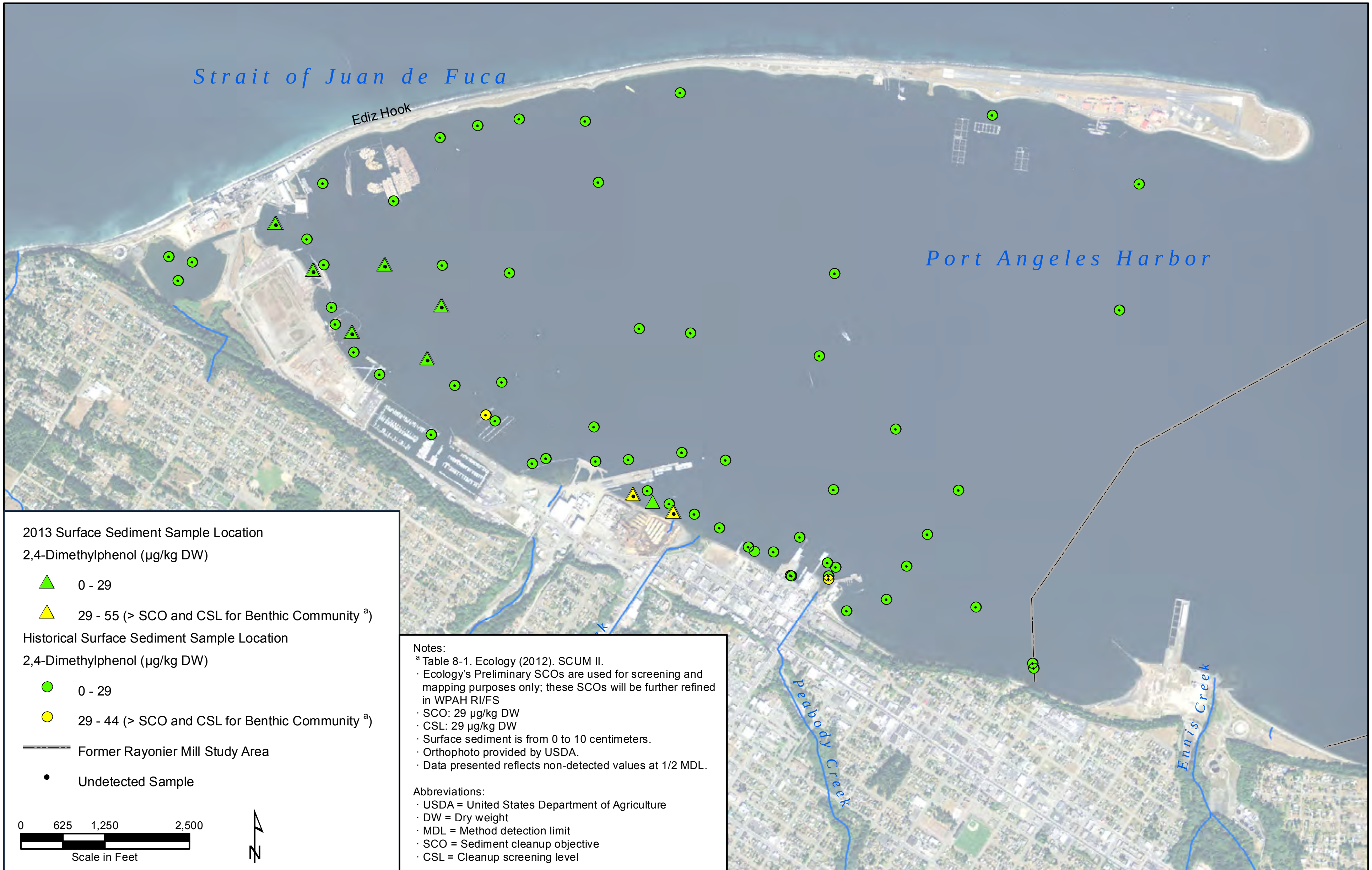
2/4/2014



2013 Surface Sediment Sample Location
2,4-Dimethylphenol (µg/kg DW)

- 0 - 29
- 29 - 55 (> SCO and CSL for Benthic Community [a])

Historical Surface Sediment Sample Location
2,4-Dimethylphenol (µg/kg DW)

- 0 - 29
- 29 - 44 (> SCO and CSL for Benthic Community [a])

Former Rayonier Mill Study Area

Undetected Sample

0 625 1,250 2,500
Scale in Feet

N

Notes:
[a] Table 8-1. Ecology (2012). SCUM II.
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS
· SCO: 29 µg/kg DW
· CSL: 29 µg/kg DW
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· DW = Dry weight
· MDL = Method detection limit
· SCO = Sediment cleanup objective
· CSL = Cleanup screening level

WPAHG
Western Port Angeles Harbor Group

2,4-Dimethylphenol in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-25
ECOLOGY REVIEW DRAFT

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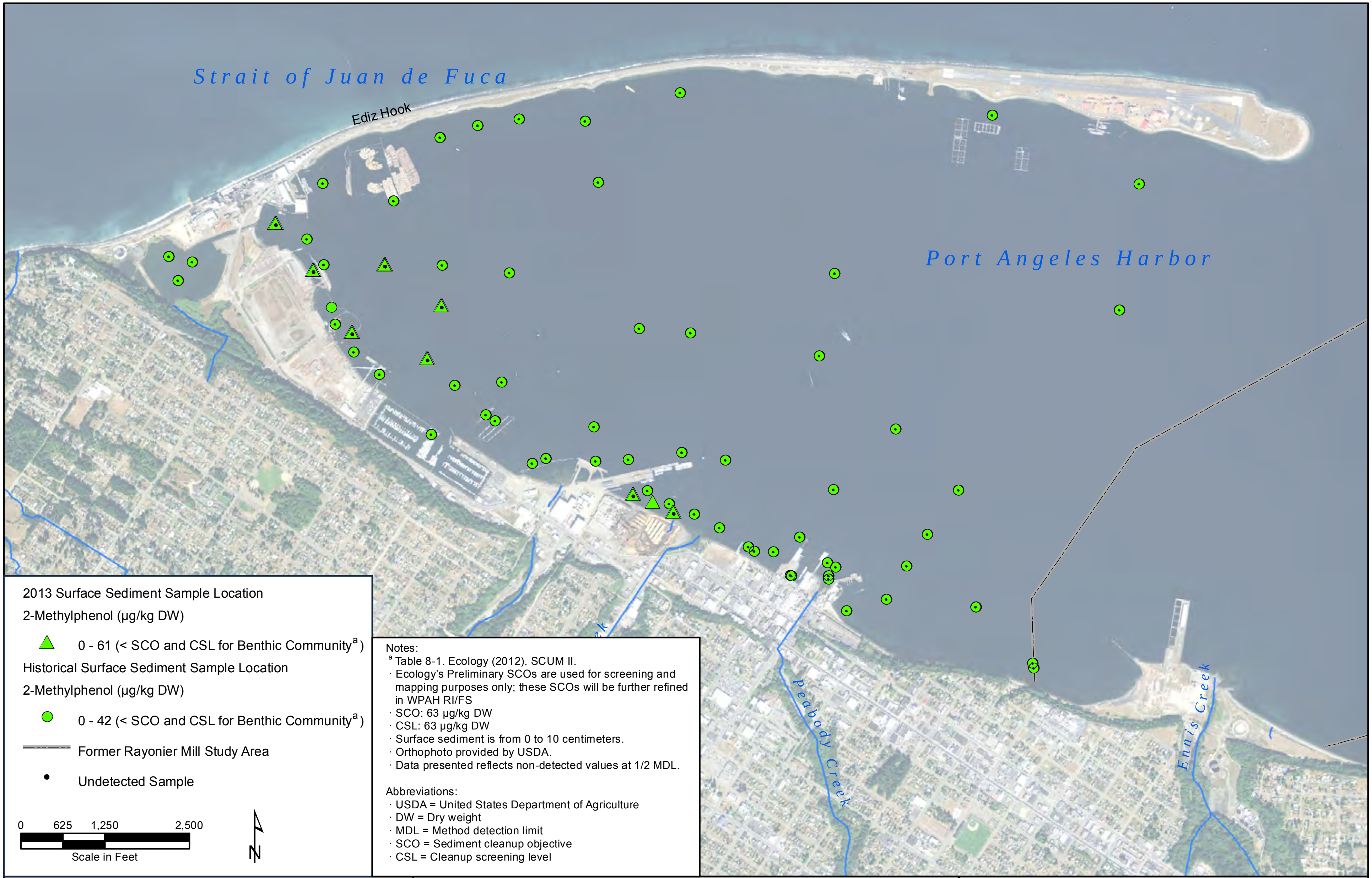
2/4/2014



Notes:
[a] Table 8-1. Ecology (2012). SCUM II.
· Ecology's Preliminary SCOs are used for screening and mapping purposes only; these SCOs will be further refined in WPAH RI/FS
· SCO: 63 µg/kg DW
· CSL: 63 µg/kg DW
· Surface sediment is from 0 to 10 centimeters.
· Orthophoto provided by USDA.
· Data presented reflects non-detected values at 1/2 MDL.

Abbreviations:
· USDA = United States Department of Agriculture
· DW = Dry weight
· MDL = Method detection limit
· SCO = Sediment cleanup objective
· CSL = Cleanup screening level

WPAHG
Western Port Angeles Harbor Group

2-Methylphenol in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-26
ECOLOGY REVIEW DRAFT

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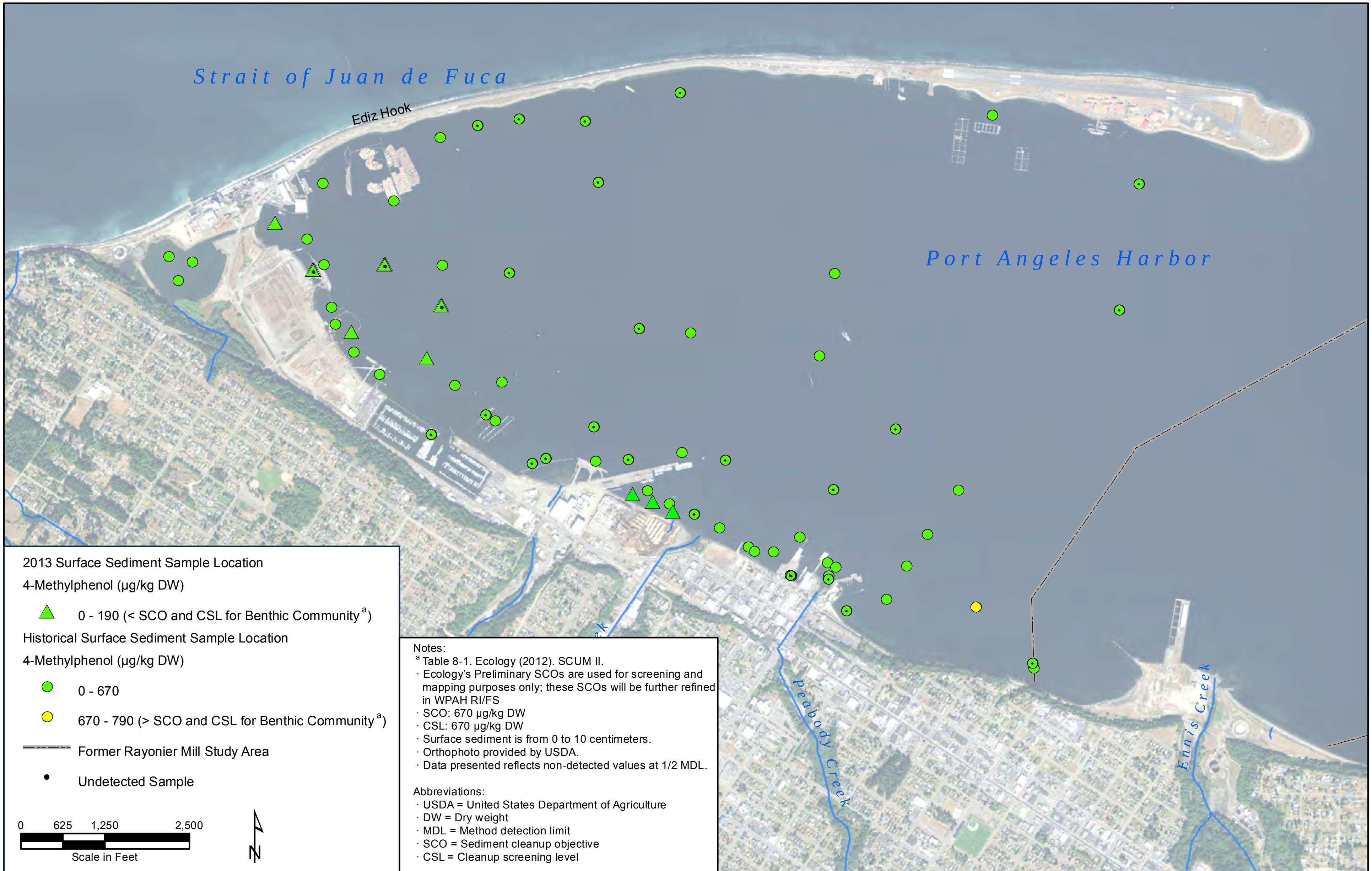
2/4/2014



WPAHG
Western Port Angeles Harbor Group

4-Methylphenol in Surface Sediment
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-27
ECOLOGY REVIEW DRAFT

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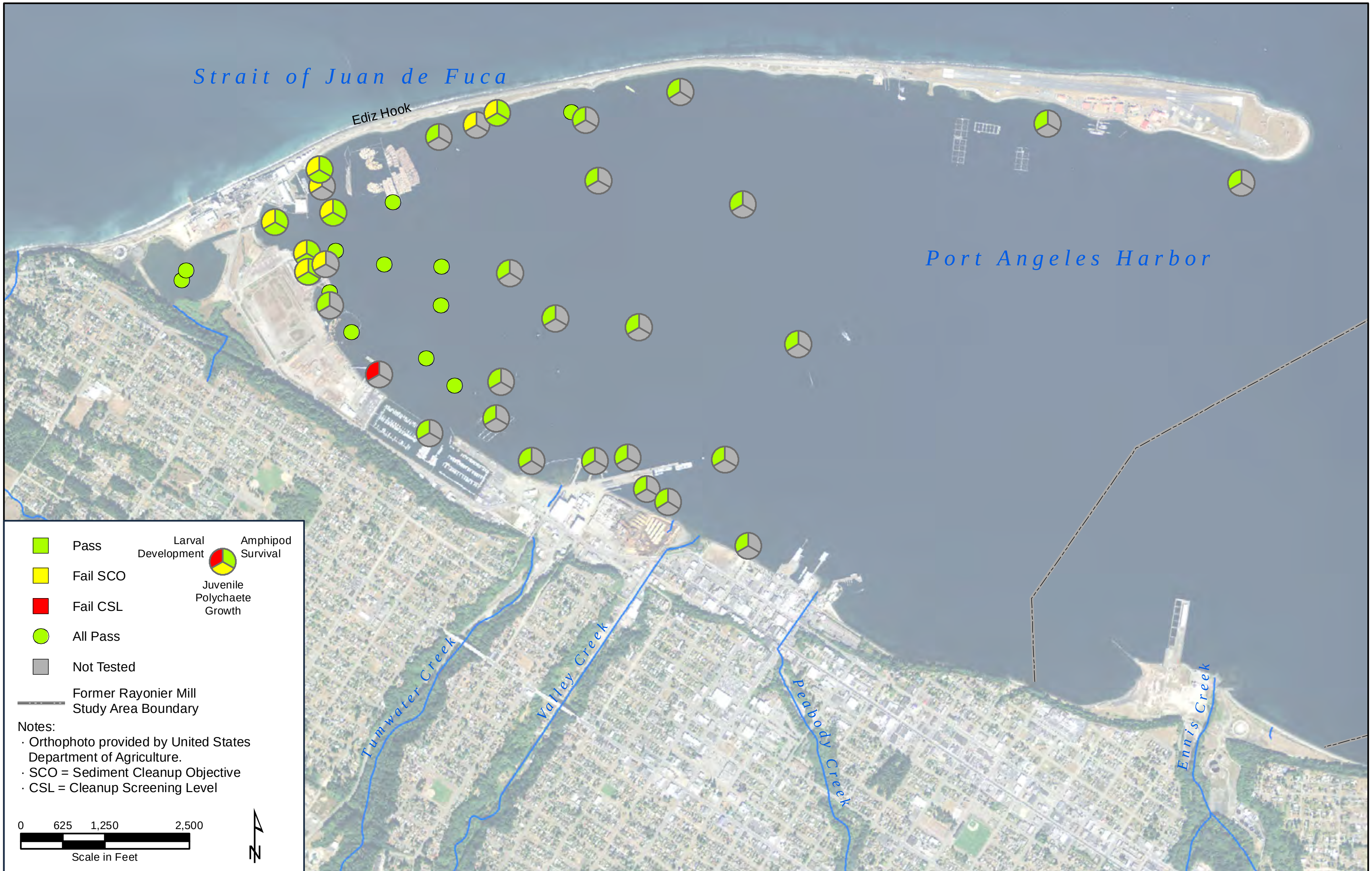
2/4/2014

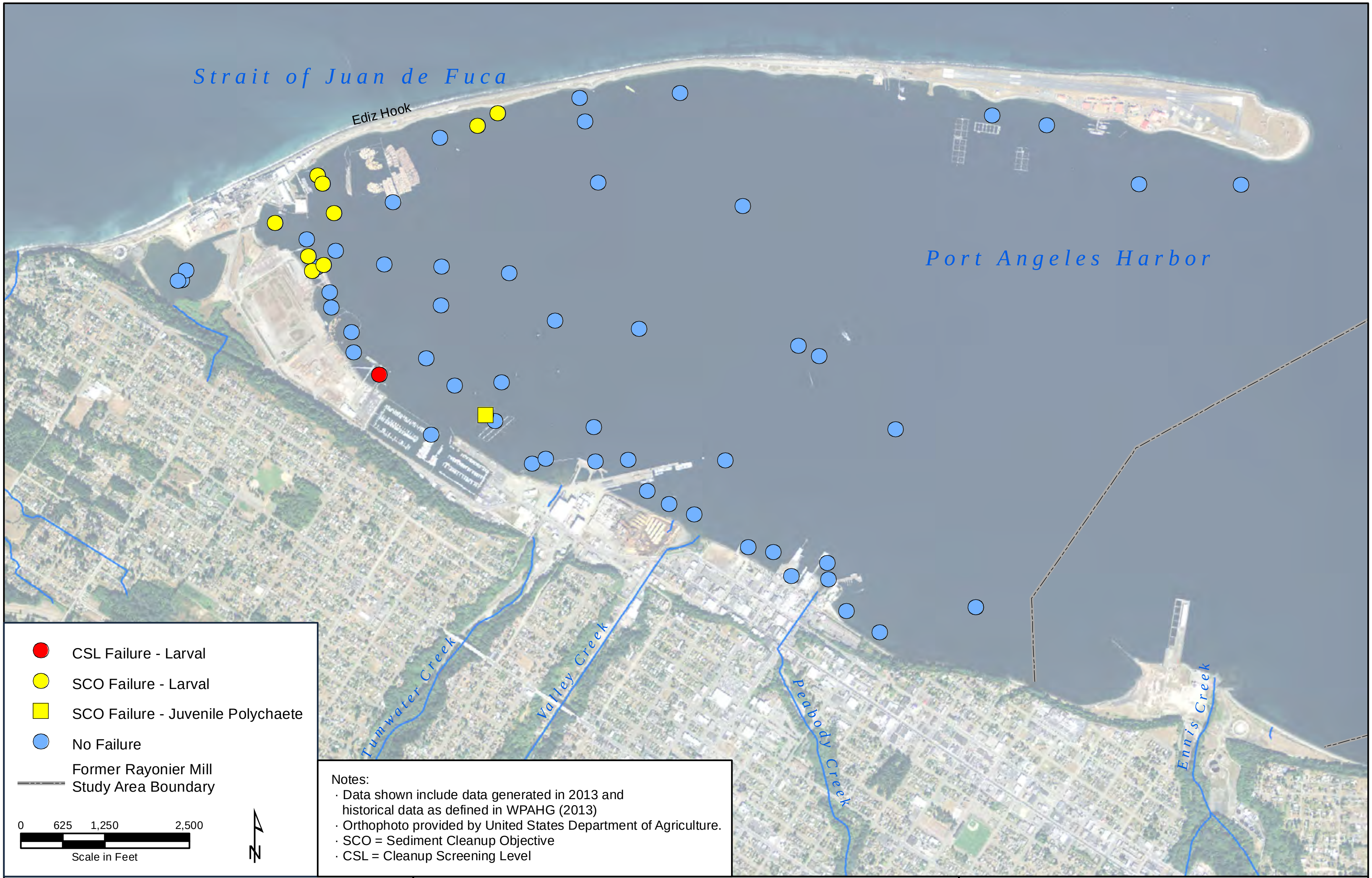


WPAHG
Western Port Angeles Harbor Group

2013 Toxicity Test Results
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-28
ECOLOGY REVIEW DRAFT

N:\GIS\Projects\C1102_PAHarbor_WPAHG\Working_MXDs\DataRpt\Figure_4_28_2013_Tox_Test_Results_8x11_v10.mxd
2/3/2014



Notes:
· Data shown include data generated in 2013 and historical data as defined in WPAHG (2013)
· Orthophoto provided by United States Department of Agriculture.
· SCO = Sediment Cleanup Objective
· CSL = Cleanup Screening Level

WPAHG
Western Port Angeles Harbor Group

Historical and 2013 Toxicity Test Results
Western Port Angeles Harbor RI/FS
Data Report for 2013 Field Program

PRELIMINARY DRAFT Figure 4-29
ECOLOGY REVIEW DRAFT

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2/3/2014

TABLES

Table 2-1. Summary of Field Notes and Observations from Surface Sediment Collection in Western Port Angeles Harbor

Station	Sample No.	Date	Time PDT	Bottom Depth (m) MLLW	Penetration Depth (cm)	Substrate	Color [a]	Odor	Field Collected Grain Size (% Fines) < 0.062 mm	Wood Debris (%)	Collection Method	Grab Attempts	Comments and Notes
WPAH001	SD0001	7/3/2013	12:15	1.7 [b]	15	Silt	7.5 YR 2.5/1	No	80	40	Ekman	1	40-50% moisture. Fine wood particles throughout sample. Seaweed on surface of grabs.
WPAH002	SD0002	7/3/2013	14:35	1.5 [b]	15	Silt	7.5 YR 2.5/1	No	65	30	Ekman	1	40% moisture. Fine wood particles throughout sample. Seaweed on surface of grabs.
WPAH003	SD0003	7/1/2013	11:11	3.2	14	Silt with wood debris	7.5 YR 2.5/1	No	103	80	van Veen	5	20% moisture. Coarse wood particles throughout sample. Grain size result confounded by wood particles. Small eel, crabs, juvenile spot prawn. 8 in. crab claw
WPAH004	SD0004	7/2/2013	9:40	6.3	16	Silt with wood debris	5 Y 2.5/2	No	42.5	70	van Veen	7	30% moisture. Wood debris, coarse sawdust. Juvenile shrimp, shell fragments, red worms.
WPAH005	SD0005	6/27/2013	14:26	11.7	16	Sandy silt	10 YR 4/1	Faint sulfide	50	5	van Veen	3	20-30% moisture. Juvenile crabs, clam shell fragments. 2 grabs were collected for bioaccumulation samples. Station moved 4 m east due to log boom
WPAH006	SD0006	6/27/2013	15:46	6.6	17	Silt	10 YR 2/1	Faint sulfide	42.5	5	van Veen	3	30% moisture. Some larger pieces of bark and small coarse sawdust. Shell fragments. Moved 6 m toward shoreline.
WPAH007	SD0007	6/27/2013	16:52	12.4	13	Sandy silt	7.5 YR 2.5/1	Sulfide	68	< 5	van Veen	3	15% moisture. Moved station 10 m east due to log boom. Shell fragment and spot prawn. Sediment covered by large piece of kelp.
WPAH008	SD0008	7/9/2013	10:15	9	16	Silt	5 y 2.5/2	Sulfide	46	40	van Veen	6	Large pieces of bark throughout sample, small crabs and mussel shell.
WPAH009	SD0009	7/1/2013	9:40	8.6	17	Silt	2.5 Y 3/2	No	35	< 5	van Veen	5	20% moisture, shell fragments, barnacle on piece of bark. Few large pieces of bark, organic debris.
WPAH010	SD0010	7/1/2013	15:34	14.9	17	Silt with some sand	5 Y 2.5/2	No	50	15	van Veen	7	30-40% moisture. Some white fiberous material, similar to what was seen at WPAH050 10 YR 6/3.
WPAH011	SD0011	7/1/2013	14:06	15.2	17	Silt	7.5 YR 4/1	No	53	< 5	van Veen	7	50% moisture, few large pieces of bark, worms.
WPAH012	SD0012	7/1/2013	11:01	26.7	15	Silt with wood debris	7.5 YR 4/1	NA	63	30	van Veen	6	20% moisture. Worms and bark in multiple grabs.
WPAH013	SD0013	7/8/2013	9:19	17.1	16	Silt with some sand	2.5 Y 3/2	No	55	< 5	van Veen	4	Split sample. Few shell fragments, few worm tubes.
WPAH014	SD0014	6/28/2013	8:41	20.4	17	Sandy silt	10 YR 2/2	Sulfide	48	Trace	van Veen	3	20% moisture. Worm and large piece of bark.
WPAH015	SD0015	7/8/2013	10:46	18.9	16	Silt with some sand	7.5 YR 4/1	No	60	<5	van Veen	4	30% moisture. Small piece of red plastic, shell fragments and worms. Few pieces of bark (2-3 in.)
WPAH016	SD0017	6/28/2013	9:25	14.7	16.5	Sandy silt	10 YR 4/1	No	45	Trace	van Veen	2	Shell fragments and worm tubes, trace wood.
WPAH017	SD0018	7/9/2013	8:43	14.2	16	Silt with some clay and sand	2.5 Y 3/2	No	60	0	van Veen	4	20% moisture. Few shell fragments and worms.
WPAH018	SD0019	6/28/2013	10:46	11.4	14	Silt	10 YR 2/1	Sulfide	60	30	van Veen	3	10-15% moisture. Bark and wood throughout sample interval. Large pieces of bark on top of substrate.
WPAH019	SD0020	6/28/2013	11:43	11.8	17	Silt	10 YR 2/1	Sulfide	33	50	van Veen	3	Coarse wood chips and shell fragments.
WPAH020	SD0021	7/8/2013	13:05	12.7	17	Silt with some clay	10 YR 2/1	Faint Sulfide	15	70	van Veen	6	Moved station 50 m west. Attempted this station on 6/28. 30% moisture. Hermit crab and eel.
WPAH021	SD0022	7/3/2013	10:45	1.3 [b]	15	Silt	7.5 YR 2.5/1	No	68	30	Ekman	1	40% moisture, large (6 in.) worm, very fine wood particles (sawdust) throughout sample.
WPAH022	SD0023	6/26/2013	8:12	11.5	13	Silt with little sand	10 YR 5/1	Sulfide	35	< 5	van Veen	1	10% moisture, large pieces of bark, clam shell, small crab. Some terrestrial grass on surface.
WPAH023	SD0024	6/26/2013	8:56	5.7	12	Silt with wood debris	NA	Strong Sulfide	5	80	van Veen	3	Wood debris is like sawdust, abundant shell frags, sea lettuce on surface
WPAH024	SD0025	6/27/2013	9:09	5.1	16	Silt with little sand	10 YR 2/2	Sulfide	37.5	0	van Veen	2	Two grabs were collected for bioaccumulation samples. Eel and crabs in sample. Small amount of organic debris
WPAH025	SD0026	6/27/2013	11:17	5.1	16	Sandy silt	10 YR 4/1	Sulfide	45	0	van Veen	3	Three grabs were collected for bioaccumulation samples. Crab, mussel attached to kelp, mussel shell fragments.
WPAH026	SD0027	6/25/2013	9:13	12.5	17	Silt with wood debris	10 YR 5/2	Sulfide	50	10	van Veen	4	60-70% moisture
WPAH027	SD0028	6/27/2013	12:48	3.1	16	Silt	7.5 YR 4/2	no	5	50	van Veen	6	Six grabs were collected for bioaccumulation samples. Spot prawns, juvenile prawns, seaweed, worms.
WPAH028	SD0029	6/27/2013	8:38	10.6	16	Silt with wood debris	10 YR 4/1	Sulfide	50	50	van Veen	1	Worm in grab, sea lettuce on surface of substrate. Wood debris throughout sample. With wood debris 97.5% fines
WPAH029	SD0030	6/25/2013	9:54	24.3	17	Silt with wood debris	10 YR 5/2	Sulfide	47.5	< 10	van Veen	1	50% moisture
WPAH030	SD0031	6/25/2013	10:26	22.5	15	Silty with clay	10 YR 5/1	No	62.5	< 5	van Veen	1	30% moisture, small shell fragments, few pieces of bark
WPAH031	SD0032	6/25/2013	11:00	16	11	Clayey silt	10 YR 5/1	No	60	< 5	van Veen	1	30% moisture
WPAH032	SD0033	6/25/2013	11:34	13.1	13	Clayey silt	10 YR 5/1	No	62.5	20	van Veen	1	40% moisture, large (2 in.) pieces of wood/bark
WPAH033	SD0034	6/25/2013	13:02	10.9	14	Clayey silt with sand	10 YR 5/1	Faint sulfide	18	10	van Veen	1	With wood fines, percent fines = 55%
WPAH034	SD0035	6/25/2013	13:30	13.7	15	Silt with some sand	10 YR 5/1	No	46	10	van Veen	4	10% moisture, live clam, 3 (6 in.) worms, sculpin, crab and eel
WPAH035	SD0036	6/25/2013	14:38	14.4	11	Mostly silt, with gravel surface	10 YR 2/2	No	35	5	van Veen	5	10% moisture, sand in upper 1cm, remainder silt, large piece of bark
WPAH036	SD0037	6/25/2013	15:14	9.6	16	Silt with some sand	7.5 YR 2.5/1	No	62.5	< 5	van Veen	1	10% moisture, few pieces bark, bark in grab's jaws, shell frags.
WPAH037	SD0038	6/25/2013	15:45	10.3	16.5	Silt with some sand	10 YR 5/1	Sulfide	45	< 5	van Veen	1	12 small (0.5 cm) crabs, 2% shell frags, mix of bark milled wood frags.
WPAH038	SD0039	6/25/2013	17:14	4.3	11	Clayey silt	10 YR 4/1	No	50	0	van Veen	4	Sample collected from 3 grabs, sloped surface 3-11 cm penetration, lots of kelp. Shell fragments. Live clam (*Clinocardium*)
WPAH039	SD0040	6/26/2013	17:11	27.2	17	Silt	10 YR 4/1	Sulfide	40	20	van Veen	2	20% moisture, large worm (5-6 in.) on outside of Van Veen
WPAH040	SD0042	6/26/2013	9:27	40.2	16	Silt	7.5 YR 2.5/1	Sulfide	75	0	van Veen	1	Field split. 10% moisture.
WPAH041	SD0043	6/26/2013	10:22	23.8	16	Silt	7.5 YR 4/1	No	62.5	0	van Veen	1	15% moisture, thin red worms.
WPAH042	SD0044	6/25/2013	17:39	14.7	16	Clayey silt	10 YR 4/1	No	65	0	van Veen	1	< 10% moisture, several worms and small crabs
WPAH043	SD0045	6/26/2013	10:52	24.6	16	Silt with wood debris	7.5 YR 2.5/1	No	50	40	van Veen	1	10% moisture, large pieces (5 in.) of bark on surface and within sample interval.
WPAH044	SD0046	6/26/2013	11:21	40.3	11	Silt with clay	7.5 YR 4/1	No	90	0	van Veen	1	10% moisture, few particles of organic debris, worms.
WPAH045	SD0047	6/26/2013	12:37	24.3	15	Silt with some sand	10 YR 4/1	No	60	< 5	van Veen	1	20% moisture, small sticks and reed like grasses, few worms.
WPAH046	SD0048	6/26/2013	14:43	15.2	11	Silt with some sand	10 YR 4/1	No	9	0	Power grab	6	Rocks throughout sample interval and some shell fragments.
WPAH047	SD0049	6/26/2013	16:38	44.9	7.5	Fine sand with silt	5 Y 2.5/2	No	16	< 3	Power grab	4	10% moisture, few shell fragments. Moved station 50 m south.
WPAH048	SD0051	7/3/2013	15:50	1.4 [b]	15	Silt	7.5 YR 2.5/1	Sulfide	NA	10	Ekman	1	Large pieces of bark (2-4 in.) throughout sample. Seaweed on surface of sample. No photo.
WPAH049	SD0052	7/1/2013	13:09	4.3	17	Silt with wood debris	10 YR 2/2	Sulfide	35	10	van Veen	4	20% moisture. White fiberous material in sample. Small crabs.
WPAH050	SD0053	7/1/2013	14:26	8.8	17	Silt	7.5 YR 2.5/1	Sulfide	50	30	van Veen	4	30% moisture. White fiberous material, oatmeal like texture. Small crabs. Layer from 4-5 cm 10 YR 6/3. Rat fish egg case.
WPAH051	SD0054	7/3/2013	17:14	1.5 [b]	15	Silt	NA	No	NA	20	Ekman	1	60% moisture. Sea slugs, small eel, small crab and small amphipods.
WPAH052	SD0055	7/8/2013	14:16	34.4	17	Silt with some clay	7.5 YR 4/2	Sulfide	69	69	van Veen	4	20% moisture

Notes:

% = percent
cm = centimeter
ID = identification
m = meter
MLLW = mean low low water
mm = millimeter
NA = not available
PDT = Pacific Daylight Time

[a] The Globe Program. 2004. The Globe soil color book. A pocket guide for the identification of soil colors.
[b] Lagoon stations, bottom depth not corrected for MLLW

Table 2-2. Sediment Sampling Station Coordinates

Station	Description	Longitude	Latitude
WPAH003	Sediment	-123.4633125	48.13465958
WPAH004	Sediment	-123.4611905	48.13333024
WPAH005	Sediment	-123.4606175	48.13292583
WPAH006	Sediment	-123.4609267	48.132805
WPAH007	Sediment	-123.4596958	48.13192917
WPAH008	Sediment	-123.4584394	48.13032833
WPAH009	Sediment	-123.4608233	48.13664567
WPAH010	Sediment	-123.4597204	48.13514583
WPAH011	Sediment	-123.4595754	48.13360083
WPAH012	Sediment	-123.45616	48.13570333
WPAH013	Sediment	-123.4565971	48.13311042
WPAH014	Sediment	-123.4530956	48.133145
WPAH015	Sediment	-123.45308	48.13153958
WPAH016	Sediment	-123.45383	48.12935583
WPAH017	Sediment	-123.4520725	48.12829667
WPAH018	Sediment	-123.4495511	48.12691167
WPAH019	Sediment	-123.4499908	48.139365
WPAH020	Sediment	-123.4455361	48.13956556
WPAH022	Sediment	-123.4602883	48.13301
WPAH023	Sediment	-123.4597217	48.131285
WPAH024	Sediment	-123.4566567	48.12862333
WPAH025	Sediment	-123.4533806	48.12626055
WPAH026	Sediment	-123.4605133	48.13631667
WPAH027	Sediment	-123.4534942	48.13835667
WPAH028	Sediment	-123.45119	48.13888167
WPAH029	Sediment	-123.44899	48.13293667
WPAH030	Sediment	-123.446095	48.13106667
WPAH031	Sediment	-123.4492467	48.12849667
WPAH032	Sediment	-123.4501083	48.12713333
WPAH033	Sediment	-123.447195	48.12522167
WPAH034	Sediment	-123.443355	48.12542667
WPAH035	Sediment	-123.4413983	48.12553667
WPAH036	Sediment	-123.44015	48.12427667
WPAH037	Sediment	-123.4388183	48.123765
WPAH038	Sediment	-123.4339156	48.12213389
WPAH039	Sediment	-123.4446933	48.13919333
WPAH040	Sediment	-123.443765	48.13674
WPAH041	Sediment	-123.440985	48.13085667
WPAH042	Sediment	-123.435495	48.12564
WPAH043	Sediment	-123.4389767	48.14049
WPAH044	Sediment	-123.4349367	48.13600333
WPAH045	Sediment	-123.4313083	48.13037667
WPAH046	Sediment	-123.416685	48.13968833
WPAH047	Sediment	-123.4048083	48.13706667
WPAH049	Sediment	-123.4636592	48.1352025
WPAH050	Sediment	-123.4613233	48.13403333
WPAH052	Sediment	-123.4520525	48.13636917
WPAH001	Sediment	-123.4689427	48.13221838
WPAH002	Sediment	-123.4686079	48.13256533
WPAH021	Sediment	-123.4690761	48.13217884
WPAH048	Sediment	-123.4696667	48.13311913
WPAH051	Sediment	-123.4681973	48.13292975

Table 2-3. SPI Station Coordinates

Station	Description	Longitude	Latitude
SPI_WPAH003	SPI and Full Suite Bioassay Station	-123.4633388	48.13467125
SPI_WPAH004	SPI and Full Suite Bioassay Station	-123.4611879	48.13334417
SPI_WPAH005	SPI and Full Suite Bioassay Station	-123.4605438	48.13294125
SPI_WPAH006	SPI and Full Suite Bioassay Station	-123.4609229	48.13282958
SPI_WPAH007	SPI and Full Suite Bioassay Station	-123.4596944	48.13192542
SPI_WPAH008	SPI and Full Suite Bioassay Station	-123.4589388	48.13032625
SPI_WPAH009	SPI and Full Suite Bioassay Station	-123.4607973	48.1366775
SPI_WPAH010	SPI and Full Suite Bioassay Station	-123.4597421	48.13513208
SPI_WPAH011	SPI and Full Suite Bioassay Station	-123.4595821	48.13361625
SPI_WPAH012	SPI and Full Suite Bioassay Station	-123.4561731	48.135715
SPI_WPAH013	SPI and Full Suite Bioassay Station	-123.4566175	48.13311958
SPI_WPAH014	SPI and Full Suite Bioassay Station	-123.4531104	48.13316708
SPI_WPAH015	SPI and Full Suite Bioassay Station	-123.4531067	48.13154833
SPI_WPAH016	SPI and Full Suite Bioassay Station	-123.4538079	48.12935083
SPI_WPAH017	SPI and Full Suite Bioassay Station	-123.4521258	48.12831708
SPI_WPAH018	SPI and Full Suite Bioassay Station	-123.4495308	48.12690167
SPI_WPAH019	SPI and Full Suite Bioassay Station	-123.4500063	48.13933646
SPI_WPAH020	SPI and Full Suite Bioassay Station	-123.4455419	48.13955937
SPI_WPAH022	SPI and Larval Bioassay Re-test Station	-123.4602542	48.13298792
SPI_WPAH023	SPI and Larval Bioassay Re-test Station	-123.4597217	48.1313075
SPI_WPAH024	SPI and Larval Bioassay Re-test Station	-123.4566477	48.128615
SPI_WPAH025	SPI and Larval Bioassay Re-test Station	-123.4533204	48.12623917
SPI_WPAH026	SPI and Larval Bioassay Re-test Station	-123.4604846	48.13631208
SPI_WPAH027	SPI and Larval Bioassay Re-test Station	-123.4534517	48.13830625
SPI_WPAH028	SPI and Larval Bioassay Re-test Station	-123.4512304	48.13888917
SPI_WPAH029	SPI and Larval Bioassay Re-test Station	-123.4489646	48.13291167
SPI_WPAH030	SPI and Larval Bioassay Re-test Station	-123.4460625	48.13106583
SPI_WPAH031	SPI and Larval Bioassay Re-test Station	-123.4492392	48.12850167
SPI_WPAH032	SPI and Larval Bioassay Re-test Station	-123.4501017	48.12716333
SPI_WPAH033	SPI and Larval Bioassay Re-test Station	-123.4472179	48.12520917
SPI_WPAH034	SPI and Larval Bioassay Re-test Station	-123.4433438	48.12541417
SPI_WPAH035	SPI and Larval Bioassay Re-test Station	-123.4413796	48.1255075
SPI_WPAH036	SPI and Larval Bioassay Re-test Station	-123.4401617	48.12430833
SPI_WPAH037	SPI and Larval Bioassay Re-test Station	-123.4387975	48.12381708
SPI_WPAH038	SPI and Larval Bioassay Re-test Station	-123.4339133	48.1221825
SPI_WPAH039	SPI and Larval Bioassay Re-test Station	-123.4446667	48.139165
SPI_WPAH040	SPI and Larval Bioassay Re-test Station	-123.4437875	48.13673729
SPI_WPAH041	SPI and Larval Bioassay Re-test Station	-123.441015	48.13086292
SPI_WPAH042	SPI and Larval Bioassay Re-test Station	-123.4354896	48.12560417
SPI_WPAH043	SPI and Larval Bioassay Re-test Station	-123.4389925	48.14051333
SPI_WPAH044	SPI and Larval Bioassay Re-test Station	-123.4349373	48.13601417
SPI_WPAH045	SPI and Larval Bioassay Re-test Station	-123.4313508	48.1303725
SPI_WPAH046	SPI and Larval Bioassay Re-test Station	-123.4166525	48.13966875
SPI_WPAH047	SPI and Larval Bioassay Re-test Station	-123.4048125	48.13709208
SPI_WPAH053	SAIC 1999 Woodwaste Study SPI Station	-123.4620075	48.13467
SPI_WPAH054	SAIC 1999 Woodwaste Study SPI Station	-123.4600683	48.13318375
SPI_WPAH055	SAIC 1999 Woodwaste Study SPI Station	-123.4576446	48.13084125
SPI_WPAH056	SAIC 1999 Woodwaste Study SPI Station	-123.4564138	48.12933125
SPI_WPAH057	SAIC 1999 Woodwaste Study SPI Station	-123.46087	48.13586917
SPI_WPAH058	SAIC 1999 Woodwaste Study SPI Station	-123.4593463	48.13416833
SPI_WPAH059	SAIC 1999 Woodwaste Study SPI Station	-123.4581129	48.1328475
SPI_WPAH060	SAIC 1999 Woodwaste Study SPI Station	-123.4552025	48.12981708

Table 2-3. SPI Station Coordinates

Station	Description	Longitude	Latitude
SPI_WPAH061	SAIC 1999 Woodwaste Study SPI Station	-123.4594902	48.13672812
SPI_WPAH062	SAIC 1999 Woodwaste Study SPI Station	-123.4590067	48.13547833
SPI_WPAH063	SAIC 1999 Woodwaste Study SPI Station	-123.4560052	48.13468396
SPI_WPAH064	SAIC 1999 Woodwaste Study SPI Station	-123.4555288	48.13201021
SPI_WPAH065	SAIC 1999 Woodwaste Study SPI Station	-123.4540163	48.13088333
SPI_WPAH066	SAIC 1999 Woodwaste Study SPI Station	-123.4502463	48.12736708
SPI_WPAH067	SAIC 1999 Woodwaste Study SPI Station	-123.4495054	48.12784083
SPI_WPAH068	SAIC 1999 Woodwaste Study SPI Station	-123.4470158	48.1267925
SPI_WPAH069	SAIC 1999 Woodwaste Study SPI Station	-123.4445417	48.12633792
SPI_WPAH070	SAIC 1999 Woodwaste Study SPI Station	-123.4403438	48.12833292
SPI_WPAH071	SAIC 1999 Woodwaste Study SPI Station	-123.4397733	48.12619062
SPI_WPAH072	SAIC 1999 Woodwaste Study SPI Station	-123.4393317	48.12472333
SPI_WPAH073	SAIC 1999 Woodwaste Study SPI Station	-123.4376879	48.12500917
SPI_WPAH074	SAIC 1999 Woodwaste Study SPI Station	-123.4543442	48.13532729
SPI_WPAH075	SAIC 1999 Woodwaste Study SPI Station	-123.453981	48.13380976
SPI_WPAH076	SAIC 1999 Woodwaste Study SPI Station	-123.4525163	48.13199708
SPI_WPAH077	SAIC 1999 Woodwaste Study SPI Station	-123.450695	48.13099083
SPI_WPAH078	SAIC 1999 Woodwaste Study SPI Station	-123.4547076	48.13749905
SPI_WPAH079	SAIC 1999 Woodwaste Study SPI Station	-123.4522877	48.13652083
SPI_WPAH080	SAIC 1999 Woodwaste Study SPI Station	-123.4518204	48.1350225
SPI_WPAH081	SAIC 1999 Woodwaste Study SPI Station	-123.4506621	48.13364917
SPI_WPAH082	SAIC 1999 Woodwaste Study SPI Station	-123.4495304	48.13232
SPI_WPAH083	SAIC 1999 Woodwaste Study SPI Station	-123.4520358	48.13767542
SPI_WPAH084	SAIC 1999 Woodwaste Study SPI Station	-123.4499983	48.136695
SPI_WPAH085	SAIC 1999 Woodwaste Study SPI Station	-123.4488025	48.1354425
SPI_WPAH086	SAIC 1999 Woodwaste Study SPI Station	-123.4473225	48.13385583
SPI_WPAH087	SAIC 1999 Woodwaste Study SPI Station	-123.4496881	48.13866333
SPI_WPAH088	SAIC 1999 Woodwaste Study SPI Station	-123.4476446	48.1376525
SPI_WPAH089	SAIC 1999 Woodwaste Study SPI Station	-123.4453558	48.13767167
SPI_WPAH090	SAIC 1999 Woodwaste Study SPI Station	-123.4433671	48.1368275
SPI_WPAH091	SAIC 1999 Woodwaste Study SPI Station	-123.4403838	48.13597125
SPI_WPAH092	SAIC 1999 Woodwaste Study SPI Station	-123.4440088	48.13933708
SPI_WPAH093	SAIC 1999 Woodwaste Study SPI Station	-123.4407967	48.13970333
SPI_WPAH094	SAIC 1999 Woodwaste Study SPI Station	-123.4337758	48.13850583
SPI_WPAH095	SAIC 1999 Woodwaste Study SPI Station	-123.4316675	48.13765458
SPI_WPAH096	SAIC 1999 Woodwaste Study SPI Station	-123.4253346	48.13833375
SPI_WPAH097	SPI Only Station	-123.4596563	48.13747167
SPI_WPAH098	SPI Only Station	-123.4549033	48.13852958
SPI_WPAH099	SPI Only Station	-123.4402821	48.1409775
SPI_WPAH100	SPI Only Station	-123.4347042	48.14098917
SPI_WPAH101	SPI Stations Added During 2013 Quick Look	-123.4405875	48.13785667
SPI_WPAH102	SPI Stations Added During 2013 Quick Look	-123.4374217	48.13881208
SPI_WPAH103	SPI Stations Added During 2013 Quick Look	-123.4342425	48.1397975
SPI_WPAH104	SPI Stations Added During 2013 Quick Look	-123.4300371	48.139675
SPI_WPAH105	SPI Stations Added During 2013 Quick Look	-123.4238167	48.13840792

Notes:

SPI = sediment profile image

Table 3-1. Data Validation Qualifiers and Definitions

Data Qualifier	Definition	Explanation
J	Estimated	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	Estimated non-detect	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	Rejected	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	Non-detect	The sample was analyzed for the analyte, but the analyte was not detected above the reported sample quantitation limit.
EMPC	Estimated	Estimated maximum possible concentration
DNR	Do not report	Do not report; a more appropriate result is reported from another analysis or dilution.

Table 3-2. Summary of Qualified Data Points by Data Qualification Reason

Data Qualification Reason	Number of Data Points Estimated [a]	Number of Data Points Qualified Not-Detected	Number of Data Points Rejected
Calculated TOC result per memo "PM and Data Sum Rules memo 071013 FINAL.pdf".	171	57	
Improper sample handling or sample preservation; exceeded holding times	88		5
Field blank contamination		81	
Lab blank contamination	3	142	
Matrix spike (MS and/or MSD) recoveries - low bias	4		2
Precision (all replicates)	222		
Surrogate spike recoveries - high bias	154		
Surrogate spike recoveries - low bias	133	4	
Other (see DV report for details)	62		
Instrument performance	10		
Compound identification	500	898	
Totals [b]	**1,347**	**1,182**	**7**

Notes:
DV = data validation
MS = matrix spike
MSD = matrix spike duplicate

[a] Includes all J and UJ qualified results.

[b] Some results were assigned data qualifiers based on more than one data quality issue. Therefore, sums presented in this table may not be equal to the sums discussed in Section 3.2.2 of the report text.

Table 3-3. Test Results for the 10-Day Acute Toxicity Test Using *Eohaustorius estuarius*

Lab	Station	Treatment/ Sample Number	Replicate	Number Initiated	Number Surviving	Number Missing or Dead	Percentage Survival	Mean Percentage Survival	SD
NewFields			1	20	17	3	85		
			2	20	19	1	95		
	NA	Control	3	20	20	0	100	96	7
			4	20	20	0	100		
			5	20	20	0	100		
NewFields			1	20	20	0	100		
			2	20	19	1	95		
	CR-12	CR-12	3	20	19	1	95	96	2
			4	20	19	1	95		
			5	20	19	1	95		
NewFields			1	20	18	2	90		
			2	20	19	1	95		
	CARR-20	CARR-20	3	20	19	1	95	93	3
			4	20	19	1	95		
			5	20	18	2	90		
NewFields			1	20	20	0	100		
			2	20	20	0	100		
	CR-02	CR-02	3	20	20	0	100	98	4
			4	20	18	2	90		
			5	20	20	0	100		
NewFields			1	20	20	0	100		
			2	20	18	2	90		
	WPAH001	SD0001	3	20	18	2	90	93	4
			4	20	19	1	95		
			5	20	18	2	90		
NewFields			1	20	16	4	80		
			2	20	19	1	95		
	WPAH002	SD0002	3	20	20	0	100	95	9
			4	20	20	0	100		
			5	20	20	0	100		

Table 3-3. Test Results for the 10-Day Acute Toxicity Test Using *Eohaustorius estuarius*

Lab	Station	Treatment/ Sample Number	Replicate	Number Initiated	Number Surviving	Number Missing or Dead	Percentage Survival	Mean Percentage Survival	SD
NewFields			1	20	19	1	95		
			2	20	18	2	90		
	WPAH003	SD0003	3	20	18	2	90	94	4
			4	20	20	0	100		
			5	20	19	1	95		
NewFields			1	20	19	1	95		
			2	20	19	1	95		
	WPAH004	SD0004	3	20	20	0	100	96	4
			4	20	18	2	90		
			5	20	20	0	100		
NewFields			1	20	20	0	100		
			2	20	20	0	100		
	WPAH005	SD0005	3	20	20	0	100	100	0
			4	20	20	0	100		
			5	20	20	0	100		
NewFields			1	20	20	0	100		
			2	20	20	0	100		
	WPAH006	SD0006	3	20	19	1	95	96	7
			4	20	17	3	85		
			5	20	20	0	100		
NewFields			1	20	19	1	95		
			2	20	18	2	90		
	WPAH007	SD0007	3	20	14	6	70	90	12
			4	20	20	0	100		
			5	20	19	1	95		
NewFields			1	20	20	0	100		
			2	20	20	0	100		
	WPAH008	SD0008	3	20	20	0	100	98	4
			4	20	18	2	90		
			5	20	20	0	100		

Table 3-3. Test Results for the 10-Day Acute Toxicity Test Using *Eohaustorius estuarius*

Lab	Station	Treatment/ Sample Number	Replicate	Number Initiated	Number Surviving	Number Missing or Dead	Percentage Survival	Mean Percentage Survival	SD
NewFields			1	20	20	0	100		
			2	20	19	1	95		
	WPAH009	SD0009	3	20	20	0	100	99	2
			4	20	20	0	100		
			5	20	20	0	100		
NewFields			1	20	20	0	100		
			2	20	20	0	100		
	WPAH010	SD0010	3	20	20	0	100	99	2
			4	20	19	1	95		
			5	20	20	0	100		
NewFields			1	20	17	3	85		
			2	20	20	0	100		
	WPAH011	SD0011	3	20	17	3	85	92	8
			4	20	18	2	90		
			5	20	20	0	100		
NewFields			1	20	20	0	100		
			2	20	19	1	95		
	WPAH012	SD0012	3	20	19	1	95	96	4
			4	20	20	0	100		
			5	20	18	2	90		
NewFields			1	20	19	1	95		
			2	20	20	0	100		
	WPAH013	SD0013	3	20	20	0	100	98	3
			4	20	19	1	95		
			5	20	20	0	100		
NewFields			1	20	19	1	95		
			2	20	20	0	100		
	WPAH014	SD0014	3	20	20	0	100	97	3
			4	20	19	1	95		
			5	20	19	1	95		

Table 3-3. Test Results for the 10-Day Acute Toxicity Test Using *Eohaustorius estuarius*

Lab	Station	Treatment/ Sample Number	Replicate	Number Initiated	Number Surviving	Number Missing or Dead	Percentage Survival	Mean Percentage Survival	SD
NewFields			1	20	19	1	95		
			2	20	19	1	95		
	WPAH015	SD0015	3	20	20	0	100	95	4
			4	20	18	2	90		
			5	20	19	1	95		
NewFields			1	20	19	1	95		
			2	20	20	0	100		
	WPAH016	SD0017	3	20	19	1	95	98	3
			4	20	20	0	100		
			5	20	20	0	100		
NewFields			1	20	17	3	85		
			2	20	20	0	100		
	WPAH017	SD0018	3	20	19	1	95	95	6
			4	20	20	0	100		
			5	20	19	1	95		
NewFields			1	20	19	1	95		
			2	20	19	1	95		
	WPAH018	SD0019	3	20	19	1	95	94	2
			4	20	19	1	95		
			5	20	18	2	90		
NewFields			1	20	20	0	100		
			2	20	20	0	100		
	WPAH019	SD0020	3	20	17	3	85	96	7
			4	20	19	1	95		
			5	20	20	0	100		
NewFields			1	20	20	0	100		
			2	20	20	0	100		
	WPAH020	SD0021	3	20	18	2	90	94	7
			4	20	17	3	85		
			5	20	19	1	95		

Notes:
NA = not applicable
SD = standard deviation

Table 3-4. Initial Biomass for 20-Day Chronic Toxicity Test with *Neanthes arenaceodentata*

Lab	Rep	Number Weighed	Tare Weight (mg)	End Weight (mg)	Total Biomass (mg)	Biomass per Individual (mg)	Mean Individual Biomass (mg)	SD	Ashed Weight (mg)	Biomass Ashed (mg)	Biomass per Individual Ashed (mg)	Mean Individual Ashed Biomass (mg)	SD
NewFields	1	5	51.28	54.54	3.26	0.652	0.547	0.09	52.06	2.48	0.496	0.445	0.05
	2	5	51.46	53.98	2.52	0.504			51.84	2.14	0.428		
	3	5	51.39	53.82	2.43	0.486			51.77	2.05	0.410		

Notes:
mg = milligram
SD = standard deviation

Table 3-5. Test Results for the 20-Day Chronic Toxicity Test Using *Neanthes arenaceodentata* (dry weight)

Lab	Station	Treatment/ Sample Number	Replicate	Number Alive	Number Dead or Missing	Percent Survival	Mean Percent Survival	SD	Tare Weight (mg)	End Weight (mg)	Total Biomass (mg)	Biomass per Individual (mg)	Individual Growth Rate (mg/ind/d)	Mean Total Biomass (mg)	SD	Mean Individual Biomass (mg)	SD	Individual Growth Rate (mg/ind/d)	SD
NewFields			1	5	0	100			152.84	196.50	43.66	8.732	0.409						
			2	5	0	100			146.92	200.82	53.90	10.780	0.512						
	NA	Control	3	5	0	100			165.03	228.59	63.56	12.712	0.608						
			4	5	0	100			120.84	167.02	46.18	9.236	0.434						
			5	5	0	100	100	0.0	133.14	196.05	62.91	12.582	0.602	54.04	9.2	10.81	1.8	0.513	0.092
NewFields			1	5	0	100			148.72	215.06	66.34	13.268	0.636						
			2	5	0	100			156.53	225.47	68.94	13.788	0.662						
	CR-12	CR-12	3	5	0	100			148.46	219.26	70.80	14.160	0.681						
			4	5	0	100			140.98	204.44	63.46	12.692	0.607						
			5	5	0	100	100	0.0	138.89	200.22	61.33	12.266	0.586	66.17	3.9	13.23	0.8	0.634	0.039
NewFields			1	5	0	100			141.75	209.21	67.46	13.492	0.647						
			2	5	0	100			151.12	216.24	65.12	13.024	0.624						
	CARR-20	CARR-20	3	5	0	100			152.35	224.05	71.70	14.34	0.690						
			4	5	0	100			148.54	199.41	50.87	10.174	0.481						
			5	5	0	100	100	0.0	155.97	212.52	56.55	11.31	0.538	62.34	8.5	12.47	1.7	0.596	0.085
NewFields			1	5	0	100			144.98	192.26	47.28	9.456	0.445						
			2	5	0	100			145.33	190.22	44.89	8.978	0.422						
	CR-02	CR-02	3	5	0	100			133.92	167.24	33.32	6.664	0.306						
			4	5	0	100			131.09	168.47	37.38	7.476	0.346						
			5	5	0	100	100	0.0	122.42	181.78	59.36	11.872	0.566	44.45	10.1	8.89	2.0	0.417	0.101
NewFields			1	5	0	100			135.78	195.31	59.53	11.906	0.568						
			2	5	0	100			143.85	194.38	50.53	10.106	0.478						
	WPAH001	SD0001	3	5	0	100			124.63	185.24	60.61	12.122	0.579						
			4	5	0	100			133.27	204.51	71.24	14.248	0.685						
			5	5	0	100	100	0.0	130.79	186.14	55.35	11.07	0.526	59.45	7.7	11.89	1.5	0.567	0.077
NewFields			1	5	0	100			142.06	209.82	67.76	13.552	0.650						
			2	5	0	100			132.46	186.36	53.90	10.78	0.512						
	WPAH002	SD0002	3	5	0	100			139.10	198.19	59.09	11.818	0.564						
			4	5	0	100			133.59	194.28	60.69	12.138	0.580						
			5	5	0	100	100	0.0	140.70	211.91	71.21	14.242	0.685	62.53	6.9	12.51	1.4	0.598	0.069
NewFields			1	5	0	100			157.53	223.64	66.11	13.222	0.634						
			2	5	0	100			142.33	210.18	67.85	13.57	0.651						
	WPAH003	SD0003	3	5	0	100			144.70	214.22	69.52	13.904	0.668						
			4	5	0	100			135.65	218.76	83.11	16.622	0.804						
			5	5	0	100	100	0.0	143.80	230.47	86.67	17.334	0.839	74.65	9.5	14.93	1.9	0.719	0.095
NewFields			1	5	0	100			152.94	225.77	72.83	14.566	0.701						
			2	5	0	100			128.99	197.25	68.26	13.652	0.655						
	WPAH004	SD0004	3	5	0	100			118.21	189.51	71.30	14.26	0.686						
			4	5	0	100			124.61	194.48	69.87	13.974	0.671						
			5	5	0	100	100	0.0	137.63	213.39	75.76	15.152	0.730	71.60	2.9	14.32	0.6	0.689	0.029
NewFields			1	5	0	100			136.81	204.72	67.91	13.582	0.652						
			2	5	0	100			162.65	240.18	77.53	15.506	0.748						
	WPAH005	SD0005	3	5	0	100			131.15	213.04	81.89	16.378	0.792						
			4	5	0	100			129.49	191.59	62.10	12.42	0.594						
			5	5	0	100	100	0.0	136.45	211.11	74.66	14.932	0.719	72.82	7.9	14.56	1.6	0.701	0.079

Table 3-5. Test Results for the 20-Day Chronic Toxicity Test Using *Neanthes arenaceodentata* (dry weight)

Lab	Station	Treatment/ Sample Number	Replicate	Number Alive	Number Dead or Missing	Percent Survival	Mean Percent Survival	SD	Tare Weight (mg)	End Weight (mg)	Total Biomass (mg)	Biomass per Individual (mg)	Individual Growth Rate (mg/ind/d)	Mean Total Biomass (mg)	SD	Mean Individual Biomass (mg)	SD	Individual Growth Rate (mg/ind/d)	SD
NewFields			1	5	0	100			150.15	229.04	78.89	15.778	0.762						
			2	5	0	100			154.22	232.92	78.70	15.74	0.760						
	WPAH006	SD0006	3	5	0	100			136.08	209.78	73.70	14.74	0.710						
			4	6	0	100			130.20	219.59	89.39	14.89833	0.718						
			5	5	0	100	100	0.0	140.39	230.13	89.74	17.948	0.870	82.08	7.1	15.82	1.3	0.764	0.064
NewFields			1	5	0	100			143.02	223.70	80.68	16.136	0.779						
			2	5	0	100			138.19	215.56	77.37	15.474	0.746						
	WPAH007	SD0007	3	5	0	100			148.00	209.43	61.43	12.286	0.587						
			4	5	0	100			123.64	186.37	62.73	12.546	0.600						
			5	5	0	100	100	0.0	142.58	216.74	74.16	14.832	0.714	71.27	8.7	14.25	1.7	0.685	0.087
NewFields			1	5	0	100			128.81	188.62	59.81	11.962	0.571						
			2	5	0	100			131.58	209.02	77.44	15.488	0.747						
	WPAH008	SD0008	3	5	0	100			130.96	203.13	72.17	14.434	0.694						
			4	5	0	100			124.30	185.75	61.45	12.29	0.587						
			5	5	0	100	100	0.0	142.23	198.76	56.53	11.306	0.538	65.48	8.9	13.10	1.8	0.627	0.089
NewFields			1	5	0	100			145.31	215.10	69.79	13.958	0.671						
			2	5	0	100			155.40	234.38	78.98	15.796	0.762						
	WPAH009	SD0009	3	5	0	100			149.08	220.72	71.64	14.328	0.689						
			4	5	0	100			141.15	214.76	73.61	14.722	0.709						
			5	5	0	100	100	0.0	146.32	223.88	77.56	15.512	0.748	74.32	3.9	14.86	0.8	0.716	0.039
NewFields			1	5	0	100			152.79	232.87	80.08	16.016	0.773						
			2	5	0	100			146.89	215.52	68.63	13.726	0.659						
	WPAH010	SD0010	3	5	0	100			148.67	222.57	73.90	14.78	0.712						
			4	5	0	100			151.93	230.56	78.63	15.726	0.759						
			5	5	0	100	100	0.0	164.69	253.17	88.48	17.696	0.857	77.94	7.4	15.59	1.5	0.752	0.074
NewFields			1	5	0	100			132.33	169.27	36.94	7.388	0.342						
			2	5	0	100			164.16	235.31	71.15	14.23	0.684						
	WPAH011	SD0011	3	5	0	100			143.42	207.87	64.45	12.89	0.617						
			4	5	0	100			144.26	211.04	66.78	13.356	0.640						
			5	5	0	100	100	0.0	131.10	196.19	65.09	13.018	0.624	60.88	13.6	12.18	2.7	0.581	0.136
NewFields			1	5	0	100			148.20	223.24	75.04	15.008	0.723						
			2	5	0	100			145.12	219.94	74.82	14.964	0.721						
	WPAH012	SD0012	3	5	0	100			136.77	212.94	76.17	15.234	0.734						
			4	5	0	100			145.19	223.79	78.60	15.72	0.759						
			5	5	0	100	100	0.0	146.60	213.89	67.29	13.458	0.646	74.38	4.2	14.88	0.8	0.716	0.042
NewFields			1	5	0	100			141.22	202.04	60.82	12.164	0.581						
			2	5	0	100			133.86	195.81	61.95	12.39	0.592						
	WPAH013	SD0013	3	5	0	100			139.64	210.40	70.76	14.152	0.680						
			4	5	0	100			148.15	226.47	78.32	15.664	0.756						
			5	5	0	100	100	0.0	149.34	224.77	75.43	15.086	0.727	69.46	7.9	13.89	1.6	0.667	0.079
NewFields			1	5	0	100			135.97	208.92	72.95	14.59	0.702						
			2	5	0	100			134.67	192.60	57.93	11.586	0.552						
	WPAH014	SD0014	3	5	0	100			140.82	219.97	79.15	15.83	0.764						
			4	5	0	100			146.05	213.55	67.50	13.5	0.648						
			5	5	0	100	100	0.0	126.45	192.44	65.99	13.198	0.633	68.70	7.9	13.74	1.6	0.660	0.079

Table 3-5. Test Results for the 20-Day Chronic Toxicity Test Using *Neanthes arenaceodentata* (dry weight)

Lab	Station	Treatment/ Sample Number	Replicate	Number Alive	Number Dead or Missing	Percent Survival	Mean Percent Survival	SD	Tare Weight (mg)	End Weight (mg)	Total Biomass (mg)	Biomass per Individual (mg)	Individual Growth Rate (mg/ind/d)	Mean Total Biomass (mg)	SD	Mean Individual Biomass (mg)	SD	Individual Growth Rate (mg/ind/d)	SD
NewFields			1	5	0	100			117.63	197.34	79.71	15.942	0.770						
			2	5	0	100			127.13	181.61	54.48	10.896	0.517						
	WPAH015	SD0015	3	5	0	100			125.15	204.36	79.21	15.842	0.765						
			4	5	0	100			124.22	183.53	59.31	11.862	0.566						
			5	5	0	100	100	0.0	125.76	185.84	60.08	12.016	0.573	66.56	12.0	13.31	2.4	0.638	0.120
NewFields			1	5	0	100			129.08	204.98	75.90	15.18	0.732						
			2	5	0	100			141.33	220.76	79.43	15.886	0.767						
	WPAH016	SD0017	3	5	0	100			119.83	196.28	76.45	15.29	0.737						
			4	5	0	100			133.78	218.70	84.92	16.984	0.822						
			5	5	0	100	100	0.0	132.40	222.64	90.24	18.048	0.875	81.39	6.1	16.28	1.2	0.787	0.061
NewFields			1	5	0	100			130.12	207.20	77.08	15.416	0.743						
			2	5	0	100			124.05	192.07	68.02	17.005 [a]	0.823						
	WPAH017	SD0018	3	5	0	100			123.49	195.26	71.77	14.354	0.690						
			4	5	0	100			126.07	214.81	88.74	17.748	0.860						
			5	5	0	100	100	0.0	111.40	174.50	63.10	12.62	0.604	73.74	9.8	15.43	2.1	0.744	0.103
NewFields			1	5	0	100			123.20	187.88	64.68	12.936	0.619						
			2	5	0	100			131.78	194.94	63.16	12.632	0.604						
	WPAH018	SD0019	3	5	0	100			139.81	214.35	74.54	14.908	0.718						
			4	5	0	100			136.85	229.90	93.05	18.61	0.903						
			5	5	0	100	100	0.0	137.02	221.78	84.76	16.952	0.820	76.04	12.9	15.21	2.6	0.733	0.129
NewFields			1	5	0	100			146.04	222.09	76.05	15.21	0.733						
			2	5	0	100			142.92	202.79	59.87	11.974	0.571						
	WPAH019	SD0020	3	5	0	100			135.74	217.77	82.03	16.406	0.793						
			4	5	0	100			135.02	207.16	72.14	14.428	0.694						
			5	5	0	100	100	0.0	138.86	218.64	79.78	15.956	0.770	73.97	8.7	14.79	1.7	0.712	0.087
NewFields			1	5	0	100			144.02	224.55	80.53	16.106	0.778						
			2	5	0	100			138.22	210.06	71.84	14.368	0.691						
	WPAH020	SD0021	3	5	0	100			127.75	208.78	81.03	16.206	0.783						
			4	5	0	100			173.95	255.83	81.88	16.376	0.791						
			5	5	0	100	100	0.0	152.70	232.10	79.40	15.88	0.767	78.94	4.1	15.79	0.8	0.762	0.041

Notes:
d = day
ind = individual
mg = milligram
NA = not applicable
SD = standard deviation

[a] A worm was lost by the testing laboratory from Sample SD0018, Replicate 2 during transit to the balance; five worms were removed from the test chamber, but only four worms were in the weigh boat prior to weighing.

Table 3-6. Test Results for the 20-Day Chronic Toxicity Test Using *Neanthes arenaceodentata* (ash free dry weight)

Lab	Station	Treatment/ Sample Number	Replicate	Number Alive	Number Dead or Missing	Percent Survival	Mean Percent Survival	SD	End Ash Weight (mg)	Gut Content (mg)	Mean Gut Content	Biomass per Individual of Ashed Specimen (mg)	Mean Biomass per Individual of Ashed Specimen (mg)	Individual Growth Rate-ashed (mg/ind/d)	Mean Individual Growth Rate-ashed (mg/ind/d)	SD
NewFields			1	5	0	100			163.89	11.05		6.52		0.304		
			2	5	0	100			164.58	17.66		7.25		0.340		
	NA	Control	3	5	0	100			186.06	21.03		8.51		0.403		
			4	5	0	100			137.67	16.83		5.87		0.271		
			5	5	0	100	100	0.0	152.39	19.25	17.16	8.73	7.38	0.414	0.347	0.062
NewFields			1	5	0	100			173.61	24.89		8.29		0.392		
			2	5	0	100			179.72	23.19		9.15		0.435		
	CR-12	CR-12	3	5	0	100			174.36	25.90		8.98		0.427		
			4	5	0	100			162.23	21.25		8.44		0.400		
			5	5	0	100	100	0.0	161.86	22.97	23.64	7.67	8.51	0.361	0.403	0.029
NewFields			1	5	0	100			165.94	24.19		8.65		0.410		
			2	5	0	100			174.86	23.74		8.28		0.392		
	CARR-20	CARR-20	3	5	0	100			179.42	27.07		8.93		0.424		
			4	5	0	100			159.71	11.17		7.94		0.375		
			5	5	0	100	100	0.0	173.30	17.33	20.70	7.84	8.33	0.370	0.394	0.023
NewFields			1	5	0	100			158.66	13.68		6.72		0.314		
			2	5	0	100			159.66	14.33		6.11		0.283		
	CR-02	CR-02	3	5	0	100			145.51	11.59		4.35		0.195		
			4	5	0	100			141.19	10.10		5.46		0.251		
			5	5	0	100	100	0.0	137.62	15.20	12.98	8.83	6.29	0.419	0.292	0.083
NewFields			1	5	0	100			145.16	9.38		10.03		0.479		
			2	5	0	100			152.91	9.06		8.29		0.392		
	WPAH001	SD0001	3	5	0	100			136.57	11.94		9.73		0.464		
			4	5	0	100			147.02	13.75		11.50		0.553		
			5	5	0	100	100	0.0	140.32	9.53	10.73	9.16	9.74	0.436	0.465	0.059
NewFields			1	5	0	100			152.63	10.57		11.44		0.550		
			2	5	0	100			143.53	11.07		8.57		0.406		
	WPAH002	SD0002	3	5	0	100			149.92	10.82		9.65		0.460		
			4	5	0	100			144.33	10.74		9.99		0.477		
			5	5	0	100	100	0.0	154.15	13.45	11.33	11.55	10.24	0.555	0.490	0.063
NewFields			1	5	0	100			165.91	8.38		11.55		0.555		
			2	5	0	100			151.35	9.02		11.77		0.566		
	WPAH003	SD0003	3	5	0	100			154.82	10.12		11.88		0.572		
			4	5	0	100			147.20	11.55		14.31		0.693		
			5	5	0	100	100	0.0	154.85	11.05	10.02	15.12	12.93	0.734	0.624	0.083
NewFields			1	5	0	100			163.14	10.20		12.53		0.604		
			2	5	0	100			138.61	9.62		11.73		0.564		
	WPAH004	SD0004	3	5	0	100			126.87	8.66		12.53		0.604		
			4	5	0	100			133.94	9.33		12.11		0.583		
			5	5	0	100	100	0.0	149.74	12.11	9.98	12.73	12.32	0.614	0.594	0.020

Table 3-6. Test Results for the 20-Day Chronic Toxicity Test Using *Neanthes arenaceodentata* (ash free dry weight)

Lab	Station	Treatment/ Sample Number	Replicate	Number Alive	Number Dead or Missing	Percent Survival	Mean Percent Survival	SD	End Ash Weight (mg)	Gut Content (mg)	Mean Gut Content	Biomass per Individual of Ashed Specimen (mg)	Mean Biomass per Individual of Ashed Specimen (mg)	Individual Growth Rate-ashed (mg/ind/d)	Mean Individual Growth Rate-ashed (mg/ind/d)	SD
NewFields			1	5	0	100			148.98	12.17		11.15		0.535		
			2	5	0	100			176.79	14.14		12.68		0.612		
	WPAH005	SD0005	3	5	0	100			146.93	15.78		13.22		0.639		
			4	5	0	100			137.61	8.12		10.80		0.518		
			5	5	0	100	100	0.0	147.41	10.96	12.23	12.74	12.12	0.615	0.584	0.054
NewFields			1	5	0	100			162.00	11.85		13.41		0.648		
			2	5	0	100			165.76	11.54		13.43		0.649		
	WPAH006	SD0006	3	5	0	100			147.64	11.56		12.43		0.599		
			4	6	0	100			144.45	14.25		12.52		0.604		
			5	5	0	100	100	0.0	154.99	14.60	12.76	15.03	13.36	0.729	0.646	0.052
NewFields			1	5	0	100			158.41	15.39		13.06		0.631		
			2	5	0	100			150.85	12.66		12.94		0.625		
	WPAH007	SD0007	3	5	0	100			157.79	9.79		10.33		0.494		
			4	5	0	100			133.46	9.82		10.58		0.507		
			5	5	0	100	100	0.0	154.26	11.68	11.87	12.50	11.88	0.603	0.572	0.066
NewFields			1	5	0	100			136.96	8.15		10.33		0.494		
			2	5	0	100			145.23	13.65		12.76		0.616		
	WPAH008	SD0008	3	5	0	100			143.07	12.11		12.01		0.578		
			4	5	0	100			134.36	10.06		10.28		0.492		
			5	5	0	100	100	0.0	150.24	8.01	10.40	9.70	11.02	0.463	0.529	0.065
NewFields			1	5	0	100			155.25	9.94		11.97		0.576		
			2	5	0	100			169.34	13.94		13.01		0.628		
	WPAH009	SD0009	3	5	0	100			161.33	12.25		11.88		0.572		
			4	5	0	100			153.04	11.89		12.34		0.595		
			5	5	0	100	100	0.0	155.53	9.21	11.45	13.67	12.57	0.661	0.606	0.038
NewFields			1	5	0	100			166.96	14.17		13.18		0.637		
			2	5	0	100			158.99	12.10		11.31		0.543		
	WPAH010	SD0010	3	5	0	100			159.97	11.30		12.52		0.604		
			4	5	0	100			163.80	11.87		13.35		0.645		
			5	5	0	100	100	0.0	177.62	12.93	12.47	15.11	13.09	0.733	0.632	0.069
NewFields			1	5	0	100			137.94	5.61		6.27		0.291		
			2	5	0	100			174.69	10.53		12.12		0.584		
	WPAH011	SD0011	3	5	0	100			155.20	11.78		10.53		0.504		
			4	5	0	100			155.82	11.56		11.04		0.530		
			5	5	0	100	100	0.0	143.23	12.13	10.32	10.59	10.11	0.507	0.483	0.112
NewFields			1	5	0	100			160.53	12.33		12.54		0.605		
			2	5	0	100			158.22	13.10		12.34		0.595		
	WPAH012	SD0012	3	5	0	100			151.18	14.41		12.35		0.595		
			4	5	0	100			156.38	11.19		13.48		0.652		
			5	5	0	100	100	0.0	158.59	11.99	12.60	11.06	12.36	0.531	0.596	0.043

Table 3-6. Test Results for the 20-Day Chronic Toxicity Test Using *Neanthes arenaceodentata* (ash free dry weight)

Lab	Station	Treatment/ Sample Number	Replicate	Number Alive	Number Dead or Missing	Percent Survival	Mean Percent Survival	SD	End Ash Weight (mg)	Gut Content (mg)	Mean Gut Content	Biomass per Individual of Ashed Specimen (mg)	Mean Biomass per Individual of Ashed Specimen (mg)	Individual Growth Rate-ashed (mg/ind/d)	Mean Individual Growth Rate-ashed (mg/ind/d)	SD
NewFields			1	5	0	100			154.03	12.81		9.60		0.458		
			2	5	0	100			146.13	12.27		9.94		0.475		
	WPAH013	SD0013	3	5	0	100			152.99	13.35		11.48		0.552		
			4	5	0	100			162.13	13.98		12.87		0.621		
			5	5	0	100	100	0.0	162.63	13.29	13.14	12.43	11.26	0.599	0.541	0.073
NewFields			1	5	0	100			150.70	14.73		11.64		0.560		
			2	5	0	100			143.90	9.23		9.74		0.465		
	WPAH014	SD0014	3	5	0	100			155.71	14.89		12.85		0.620		
			4	5	0	100			158.46	12.41		11.02		0.529		
			5	5	0	100	100	0.0	138.31	11.86	12.62	10.83	11.22	0.519	0.539	0.057
NewFields			1	5	0	100			136.48	18.85		12.17		0.586		
			2	5	0	100			142.14	15.01		7.89		0.372		
	WPAH015	SD0015	3	5	0	100			142.79	17.64		12.31		0.593		
			4	5	0	100			140.73	16.51		8.56		0.406		
			5	5	0	100	100	0.0	138.42	12.66	16.13	9.48	10.08	0.452	0.482	0.103
NewFields			1	5	0	100			144.06	14.98		12.18		0.587		
			2	5	0	100			156.38	15.05		12.88		0.622		
	WPAH016	SD0017	3	5	0	100			131.55	11.72		12.95		0.625		
			4	5	0	100			149.37	15.59		13.87		0.671		
			5	5	0	100	100	0.0	150.10	17.70	15.01	14.51	13.28	0.703	0.642	0.046
NewFields			1	5	0	100			144.65	14.53		12.51		0.603		
			2	5	0	100			134.25	10.20		11.56		0.556		
	WPAH017	SD0018	3	5	0	100			137.82	14.33		11.49		0.552		
			4	5	0	100			141.97	15.90		14.57		0.706		
			5	5	0	100	100	0.0	125.45	14.05	13.80	9.81	11.99	0.468	0.577	0.087
NewFields			1	5	0	100			136.24	13.04		10.33		0.494		
			2	5	0	100			144.83	13.05		10.02		0.479		
	WPAH018	SD0019	3	5	0	100			157.03	17.22		11.46		0.551		
			4	5	0	100			160.23	23.38		13.93		0.674		
			5	5	0	100	100	0.0	155.83	18.81	17.10	13.19	11.79	0.637	0.567	0.086
NewFields			1	5	0	100			166.02	19.98		11.21		0.538		
			2	5	0	100			155.72	12.80		9.41		0.448		
	WPAH019	SD0020	3	5	0	100			154.04	18.30		12.75		0.615		
			4	5	0	100			150.68	15.66		11.30		0.543		
			5	5	0	100	100	0.0	155.11	16.25	16.60	12.71	11.48	0.613	0.552	0.068
NewFields			1	5	0	100			157.83	13.81		13.34		0.645		
			2	5	0	100			152.61	14.39		11.49		0.552		
	WPAH020	SD0021	3	5	0	100			142.87	15.12		13.18		0.637		
			4	5	0	100			190.02	16.07		13.16		0.636		
			5	5	0	100	100	0.0	168.64	15.94	15.07	12.69	12.77	0.612	0.616	0.038

Notes:

d = day
ind = individual
mg = milligram
NA = not applicable
SD = standard deviation

Table 3-7a. Test Results for the Larval Development Test *Mytilus galloprovencialis* Using the Resuspension Protocol,[a] Batch 1 [b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields		Control	1	215	8	223	5	1	4							95		
			2	237	8	245	0	0	3							100		
	NA		3	225	8	233	1	0	3							99		
			4	255	19	274	0	0	7							100		
			5	250	4	254	0	0	2	1.1	2.2	0.3	0.6	3.8	2.0	100	98.9	2.2
			Mean	236.4														
NewFields		CR-12	1	182	3	185	23	22	2							77		
			2	245	8	253	0	0	3							100		
	CR-12		3	182	3	185	23	22	2							77		
			4	180	15	195	24	18	8							76		
			5	193	3	196	18	17	2	17.6	10.1	15.6	9.0	3.1	2.6	82	82.4	10.1
			Mean	196.4														
NewFields		CARR-20	1	206	5	211	13	11	2							87		
			2	174	18	192	26	19	9							74		
	CARR-20		3	188	21	209	20	12	10							80		
			4	176	29	205	26	13	14							74		
			5	201	10	211	15	11	5	20.1	6.1	13.0	3.4	8.1	4.6	85	79.9	6.1
			Mean	189														
NewFields		CR-02	1	201	9	210	15	11	4							85		
			2	159	12	171	33	28	7							67		
	CR-02		3	181	4	185	23	22	2							77		
			4	168	12	180	29	24	7							71		
			5	202	8	210	15	11	4	22.9	8.2	19.1	7.6	4.8	2.0	85	77.1	8.2
			Mean	182.2														
NewFields		SD0005	1	155	7	162	34	31	4							66		
			2	139	3	142	41	40	2							59		
	WPAH005		3	161	7	168	32	29	4							68		
			4	168	5	173	29	27	3							71		
			5	171	4	175	28	26	2	32.8	5.4	30.6	5.6	3.2	1.0	72	67.2	5.4
			Mean	158.8														
NewFields		SD0006	1	142	6	148	40	37	4							60		
			2	129	9	138	45	42	7							55		
	WPAH006		3	134	14	148	43	37	9							57		
			4	167	10	177	29	25	6							71		
			5	138	10	148	42	37	7	39.9	6.3	35.8	6.2	6.5	2.0	58	60.1	6.3
			Mean	142														
NewFields		SD0007	1	180	7	187	24	21	4							76		
			2	170	5	175	28	26	3							72		
	WPAH007		3	173	3	176	27	26	2							73		
			4	132	7	139	44	41	5							56		
			5	160	11	171	32	28	6	31.0	7.9	28.3	7.7	4.0	1.8	68	69.0	7.9
			Mean	163														

Table 3-7a. Test Results for the Larval Development Test *Mytilus galloprovencialis* Using the Resuspension Protocol,[a] Batch 1 [b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields	WPAH022	SD0023	1	137	10	147	42	38	7							58		
			2	139	21	160	41	32	13							59		
			3	147	3	150	38	37	2							62		
			4	154	17	171	35	28	10							65		
			5	158	8	166	33	30	5	37.8	3.9	32.8	4.3	7.3	4.3	67	62.2	3.9
			Mean	147														
NewFields	WPAH023	SD0024	1	149	8	157	37	34	5							63		
			2	162	10	172	31	27	6							69		
			3	158	4	162	33	31	2							67		
			4	176	8	184	26	22	4							74		
			5	145	2	147	39	38	1	33.2	5.1	30.5	6.0	3.8	1.9	61	66.8	5.1
			Mean	158														
NewFields	WPAH024	SD0025	1	138	18	156	42	34	12							58		
			2	133	19	152	44	36	13							56		
			3	145	23	168	39	29	14							61		
			4	101	35	136	57	42	26							43		
			5	97	25	122	59	48	20	48.1	9.4	37.9	7.6	16.8	6.1	41	51.9	9.4
			Mean	122.8														
NewFields	WPAH025	SD0026	1	182	3	185	23	22	2							77		
			2	177	2	179	25	24	1							75		
			3	161	4	165	32	30	2							68		
			4	166	5	171	30	28	3							70		
			5	219	3	222	7	6	1	23.4	9.7	22.0	9.5	1.9	0.8	93	76.6	9.7
			Mean	181														
NewFields	WPAH026	SD0027	1	138	1	139	42	41	1							58		
			2	126	6	132	47	44	5							53		
			3	166	10	176	30	26	6							70		
			4	122	10	132	48	44	8							52		
			5	111	11	122	53	48	9	43.9	8.9	40.7	8.8	5.5	3.2	47	56.1	8.9
			Mean	132.6														
NewFields	WPAH027	SD0028	1	171	10	181	28	23	6							72		
			2	178	10	188	25	20	5							75		
			3	172	12	184	27	22	7							73		
			4	183	8	191	23	19	4							77		
			5	172	15	187	27	21	8	25.9	2.2	21.2	1.6	5.9	1.4	73	74.1	2.2
			Mean	175.2														
NewFields	WPAH028	SD0029	1	157	4	161	34	32	2							66		
			2	137	22	159	42	33	14							58		
			3	164	4	168	31	29	2							69		
			4	114	15	129	52	45	12							48		
			5	137	25	162	42	31	15	40.0	8.3	34.1	6.5	9.2	6.3	58	60.0	8.3
			Mean	141.8														

Table 3-7a. Test Results for the Larval Development Test *Mytilus galloprovencialis* Using the Resuspension Protocol,[a] Batch 1 [b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields		SD0030	1	156	2	158	34	33	1							66		
			2	166	3	169	30	29	2							70		
	WPAH029		3	172	5	177	27	25	3							73		
			4	156	3	159	34	33	2							66		
			5	152	3	155	36	34	2	32.1	3.5	30.8	3.9	1.9	0.6	64	67.9	3.5
			Mean	160.4														
NewFields		SD0031	1	154	0	154	35	35	0							65		
			2	190	10	200	20	15	5							80		
	WPAH030		3	164	14	178	31	25	8							69		
			4	156	3	159	34	33	2							66		
			5	167	4	171	29	28	2	29.7	6.1	27.1	7.7	3.4	3.1	71	70.3	6.1
			Mean	166.2														
NewFields		SD0032	1	169	4	173	29	27	2							71		
			2	184	11	195	22	18	6							78		
	WPAH031		3	181	9	190	23	20	5							77		
			4	216	4	220	9	7	2							91		
			5	192	16	208	19	12	8	20.3	7.4	16.6	7.6	4.4	2.4	81	79.7	7.4
			Mean	188.4														
NewFields		SD0033	1	186	8	194	21	18	4							79		
			2	179	6	185	24	22	3							76		
	WPAH032		3	175	5	180	26	24	3							74		
			4	108	13	121	54	49	11							46		
			5	155	6	161	34	32	4	32.1	13.4	28.8	12.3	4.9	3.3	66	67.9	13.4
			Mean	160.6														
NewFields		SD0034	1	159	6	165	33	30	4							67		
			2	162	13	175	31	26	7							69		
	WPAH033		3	156	15	171	34	28	9							66		
			4	131	4	135	45	43	3							55		
			5	181	9	190	23	20	5	33.2	7.6	29.3	8.6	5.5	2.5	77	66.8	7.6
			Mean	157.8														
NewFields		SD0035	1	164	9	173	31	27	5							69		
			2	185	3	188	22	20	2							78		
	WPAH034		3	194	2	196	18	17	1							82		
			4	192	4	196	19	17	2							81		
			5	151	2	153	36	35	1	25.0	8.0	23.4	7.8	2.2	1.7	64	75.0	8.0
			Mean	177.2														
NewFields		SD0036	1	179	11	190	24	20	6							76		
			2	201	11	212	15	10	5							85		
	WPAH035		3	170	6	176	28	26	3							72		
			4	200	7	207	15	12	3							85		
			5	167	6	173	29	27	3	22.4	6.9	19.0	7.5	4.2	1.2	71	77.6	6.9
			Mean	183.4														

Table 3-7a. Test Results for the Larval Development Test *Mytilus galloprovencialis* Using the Resuspension Protocol,[a] Batch 1 [b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields	WPAH036	SD0037	1	184	4	188	22	20	2							78		
			2	190	4	194	20	18	2							80		
			3	168	3	171	29	28	2							71		
			4	155	8	163	34	31	5							66		
			5	184	4	188	22	20	2	25.5	6.1	23.5	5.6	2.6	1.3	78	74.5	6.1
			Mean	176.2														
NewFields	WPAH037	SD0038	1	190	15	205	20	13	7							80		
			2	165	12	177	30	25	7							70		
			3	186	25	211	21	11	12							79		
			4	231	15	246	2	0	6							98		
			5	166	8	174	30	26	5	20.6	11.3	15.1	10.9	7.3	2.7	70	79.4	11.3
			Mean	187.6														
NewFields	WPAH038	SD0039	1	161	56	217	32	8	26							68		
			2	154	52	206	35	13	25							65		
			3	169	31	200	29	15	16							71		
			4	167	31	198	29	16	16							71		
			5	152	45	197	36	17	23	32.1	3.2	13.9	3.5	21.0	5.1	64	67.9	3.2
			Mean	160.6														
NewFields	WPAH039	SD0040	1	189	4	193	20	18	2							80		
			2	180	4	184	24	22	2							76		
			3	178	2	180	25	24	1							75		
			4	180	6	186	24	21	3							76		
			5	164	7	171	31	28	4	24.6	3.8	22.7	3.4	2.5	1.1	69	75.4	3.8
			Mean	178.2														
NewFields	WPAH040	SD0042	1	170	16	186	28	21	9							72		
			2	174	2	176	26	26	1							74		
			3	145	9	154	39	35	6							61		
			4	183	13	196	23	17	7							77		
			5	179	3	182	24	23	2	28.0	6.3	24.4	6.6	4.8	3.3	76	72.0	6.3
			Mean	170.2														
NewFields	WPAH041	SD0043	1	221	2	223	7	6	1							93		
			2	203	8	211	14	11	4							86		
			3	175	9	184	26	22	5							74		
			4	193	10	203	18	14	5							82		
			5	205	8	213	13	10	4	15.7	7.2	12.5	6.2	3.7	1.6	87	84.3	7.2
			Mean	199.4														
NewFields	WPAH042	SD0044	1	167	8	175	29	26	5							71		
			2	196	5	201	17	15	2							83		
			3	181	4	185	23	22	2							77		
			4	ND	ND	ND	ND	ND	ND							100		
			5	217	4	221	8	7	2	19.5	9.1	17.3	8.5	2.8	1.2	92	84.4	11.7
			Mean	190.25														

Table 3-7a. Test Results for the Larval Development Test *Mytilus galloprovencialis* Using the Resuspension Protocol,[a] Batch 1[b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields		SD0045	1	186	6	192	21	19	3							79		
			2	154	3	157	35	34	2							65		
	WPAH043		3	163	6	169	31	29	4							69		
			4	155	12	167	34	29	7							66		
			5	147	3	150	38	37	2	31.9	6.4	29.4	6.7	3.6	2.1	62	68.1	6.4
			Mean	161														
NewFields		SD0046	1	193	11	204	18	14	5							82		
			2	171	10	181	28	23	6							72		
	WPAH044		3	211	6	217	11	8	3							89		
			4	212	7	219	10	7	3							90		
			5	196	6	202	17	15	3	16.8	7.1	13.5	6.4	4.0	1.4	83	83.2	7.1
			Mean	196.6														
NewFields		SD0047	1	166	3	169	30	29	2							70		
			2	186	4	190	21	20	2							79		
	WPAH045		3	194	7	201	18	15	3							82		
			4	220	10	230	7	3	4							93		
			5	159	5	164	33	31	3	21.7	10.2	19.3	11.3	3.0	1.0	67	78.3	10.2
			Mean	185														
NewFields		SD0048	1	192	8	200	19	15	4							81		
			2	215	14	229	9	3	6							91		
	WPAH046		3	193	10	203	18	14	5							82		
			4	209	11	220	12	7	5							88		
			5	200	14	214	15	9	7	14.6	4.2	9.8	5.1	5.3	1.0	85	85.4	4.2
			Mean	201.8														
NewFields		SD0049	1	220	3	223	7	6	1							93		
			2	212	5	217	10	8	2							90		
	WPAH047		3	214	7	221	9	7	3							91		
			4	198	7	205	16	13	3							84		
			5	185	6	191	22	19	3	12.9	6.0	10.6	5.7	2.7	0.9	78	87.1	6.0
			Mean	205.8														

Notes:

NA = not applicable

SD = standard deviation

[a] Kendall et al. (2012)

[b] Due to holding time requirements, the larval development bioassay was performed in two batches.

Table 3-7b. Test Results for the Larval Development Test with *Mytilus galloprovencialis* Using the Resuspension Protocol,[a] Batch 2[b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields	NA	Control	1	351	17	368	8	3	5							92		
			2	326	11	337	14	11	3							86		
			3	331	5	336	13	12	1							87		
			4	319	11	330	16	13	3							84		
			5	357	9	366	6	4	2	11.4	4.3	8.6	4.8	3.0	1.2	94	88.6	4.3
			Mean	336.8														
NewFields	CR-12	CR-12	1	265	2	267	21	21	1							79		
			2	281	5	286	17	15	2							83		
			3	306	9	315	9	6	3							91		
			4	297	6	303	12	10	2							88		
			5	296	8	304	12	10	3	14.2	4.8	12.4	5.6	2.0	0.8	88	85.8	4.8
			Mean	289														
NewFields	CARR-20	CARR-20	1	274	15	289	19	14	5							81		
			2	289	31	320	14	5	10							86		
			3	281	15	296	17	12	5							83		
			4	277	14	291	18	14	5							82		
			5	250	24	274	26	19	9	18.6	4.4	12.7	5.0	6.7	2.3	74	81.4	4.4
			Mean	274.2														
NewFields	CR-02	CR-02	1	278	16	294	17	13	5							83		
			2	278	13	291	17	14	4							83		
			3	272	20	292	19	13	7							81		
			4	264	7	271	22	20	3							78		
			5	267	15	282	21	16	5	19.3	1.9	15.1	2.8	4.9	1.6	79	80.7	1.9
			Mean	271.8														
NewFields	WPAH001	SD0001	1	207	16	223	39	34	7							61		
			2	210	32	242	38	28	13							62		
			3	278	11	289	17	14	4							83		
			4	247	31	278	27	17	11							73		
			5	219	46	265	35	21	17	31.1	8.9	23.0	8.0	10.5	5.3	65	68.9	8.9
			Mean	232.2														
NewFields	WPAH002	SD0002	1	276	16	292	18	13	5							82		
			2	245	26	271	27	20	10							73		
			3	197	43	240	42	29	18							58		
			4	228	26	254	32	25	10							68		
			5	203	31	234	40	31	13	31.8	9.6	23.3	7.0	11.3	4.6	60	68.2	9.6
			Mean	229.8														
NewFields	WPAH003	SD0003	1	168	25	193	50	43	13							50		
			2	227	32	259	33	23	12							67		
			3	226	49	275	33	18	18							67		
			4	240	38	278	29	17	14							71		
			5	198	36	234	41	31	15	37.1	8.6	26.4	10.5	14.4	2.2	59	62.9	8.6
			Mean	211.8														

Table 3-7b. Test Results for the Larval Development Test with *Mytilus galloprovincialis* Using the Resuspension Protocol,[a] Batch 2[b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields		SD0004	1	199	33	232	41	31	14							59		
			2	194	43	237	42	30	18							58		
	WPAH004		3	210	58	268	38	20	22							62		
			4	209	47	256	38	24	18							62		
			5	192	41	233	43	31	18	40.4	2.5	27.2	4.8	18.0	2.6	57	59.6	2.5
			Mean	200.8														
NewFields		SD0008	1	259	11	270	23	20	4							77		
			2	236	6	242	30	28	2							70		
	WPAH008		3	247	10	257	27	24	4							73		
			4	265	6	271	21	20	2							79		
			5	265	11	276	21	18	4	24.5	3.8	21.9	4.1	3.3	0.9	79	75.5	3.8
			Mean	254.4														
NewFields		SD0009	1	229	29	258	32	23	11							68		
			2	233	13	246	31	27	5							69		
	WPAH009		3	190	7	197	44	42	4							56		
			4	236	6	242	30	28	2							70		
			5	230	12	242	32	28	5	33.6	5.6	29.6	6.9	5.5	3.4	68	66.4	5.6
			Mean	223.6														
NewFields		SD0010	1	215	17	232	36	31	7							64		
			2	232	6	238	31	29	3							69		
	WPAH010		3	220	13	233	35	31	6							65		
			4	180	17	197	47	42	9							53		
			5	202	11	213	40	37	5	37.7	5.9	33.9	5.1	5.8	2.3	60	62.3	5.9
			Mean	209.8														
NewFields		SD0011	1	243	7	250	28	26	3							72		
			2	256	12	268	24	20	4							76		
	WPAH011		3	265	15	280	21	17	5							79		
			4	244	20	264	28	22	8							72		
			5	235	20	255	30	24	8	26.2	3.5	21.8	3.5	5.6	2.1	70	73.8	3.5
			Mean	248.6														
NewFields		SD0012	1	266	9	275	21	18	3							79		
			2	270	8	278	20	17	3							80		
	WPAH012		3	261	7	268	23	20	3							77		
			4	245	14	259	27	23	5							73		
			5	265	12	277	21	18	4	22.4	2.9	19.4	2.4	3.7	1.2	79	77.6	2.9
			Mean	261.4														
NewFields		SD0013	1	233	13	246	31	27	5							69		
			2	246	9	255	27	24	4							73		
	WPAH013		3	274	7	281	19	17	2							81		
			4	260	11	271	23	20	4							77		
			5	278	10	288	17	14	3	23.3	5.6	20.4	5.2	3.8	1.0	83	76.7	5.6
			Mean	258.2														

Table 3-7b. Test Results for the Larval Development Test with *Mytilus galloprovencialis* Using the Resuspension Protocol,[a] Batch 2[b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields		SD0014	1	270	9	279	20	17	3							80		
			2	225	13	238	33	29	5							67		
	WPAH014		3	217	7	224	36	33	3							64		
			4	229	13	242	32	28	5							68		
			5	222	5	227	34	33	2	30.9	6.3	28.1	6.5	3.9	1.5	66	69.1	6.3
			Mean	232.6														
NewFields		SD0015	1	213	6	219	37	35	3							63		
			2	223	14	237	34	30	6							66		
	WPAH015		3	269	14	283	20	16	5							80		
			4	270	14	284	20	16	5							80		
			5	243	17	260	28	23	7	27.7	7.7	23.8	8.5	5.0	1.4	72	72.3	7.7
			Mean	243.6														
NewFields		SD0017	1	239	11	250	29	26	4							71		
			2	222	14	236	34	30	6							66		
	WPAH016		3	267	15	282	21	16	5							79		
			4	243	14	257	28	24	5							72		
			5	272	11	283	19	16	4	26.2	6.2	22.3	6.1	5.0	0.8	81	73.8	6.2
			Mean	248.6														
NewFields		SD0018	1	274	9	283	19	16	3							81		
			2	304	4	308	10	9	1							90		
	WPAH017		3	290	5	295	14	12	2							86		
			4	275	6	281	18	17	2							82		
			5	258	15	273	23	19	5	16.8	5.2	14.5	4.1	2.8	1.7	77	83.2	5.2
			Mean	280.2														
NewFields		SD0019	1	234	4	238	31	29	2							69		
			2	276	6	282	18	16	2							82		
	WPAH018		3	278	5	283	17	16	2							83		
			4	283	9	292	16	13	3							84		
			5	259	18	277	23	18	6	21.0	5.9	18.5	6.3	3.0	2.0	77	79.0	5.9
			Mean	266														
NewFields		SD0020	1	203	21	224	40	33	9							60		
			2	248	14	262	26	22	5							74		
	WPAH019		3	202	21	223	40	34	9							60		
			4	227	16	243	33	28	7							67		
			5	221	44	265	34	21	17	34.6	5.6	27.7	5.9	9.5	4.4	66	65.4	5.6
			Mean	220.2														
NewFields		SD0021	1	255	14	269	24	20	5							76		
			2	294	6	300	13	11	2							87		
	WPAH020		3	331	9	340	2	0	3							98		
			4	304	27	331	10	2	8							90		
			5	294	7	301	13	11	2	12.2	8.1	8.7	8.1	4.1	2.6	87	87.8	8.1
			Mean	295.6														

Table 3-7b. Test Results for the Larval Development Test with *Mytilus galloprovincialis* Using the Resuspension Protocol,[a] Batch 2[b]

Lab	Station	Treatment/ Sample Number	Replicate	Normal	Abnormal	Total	Percent Combined Mortality	Percent Mortality	Percent Abnormal	Mean Percentage Combined Mortality	SD	Mean Percentage Mortality	SD	Mean Percentage Abnormal	SD	Normal Survivorship	Mean Normal Survivorship	SD
NewFields	WPAH021	SD0022	1	244	7	251	28	25	3							72		
			2	266	12	278	21	17	4							79		
			3	262	7	269	22	20	3							78		
			4	279	2	281	17	17	1							83		
			5	273	9	282	19	16	3	21.4	4.0	19.2	3.8	2.7	1.3	81	78.6	4.0
			Mean	264.8														

Notes:
NA = not applicable
SD = standard deviation

[a] Kendall et al. (2012)

[b] Due to holding time requirements, the larval development bioassay was performed in two batches.

Table 3-8. Survival Summary for 45-Day Bioaccumulation Test Using *Macoma nasuta* and *Nephtys caecoides*

					Macoma nasuta						*Nephtys caecoides*					
Lab	Station	Treatment/ Sample Number	Replicate	Pos	Initial Number	Number Survived	Number Dead	Percent Survival	Mean Percent Survial	SD	Initial Number	Number Survived	Number Dead	Percent Survival	Mean Percent Survial	SD
NewFields	NA	Control	1	13	30	28	2	93			70	69	1	99		
			2	4	30	29	1	97	97	3	70	66	4	94	97	2
			3	24	30	30	0	100			70	68	2	97		
	WPAH004	SD0004	1	17	30	24	6	80			70	64	6	91		
			2	12	30	23	7	77	84	11	70	60	10	86	89	3
			3	21	30	29	1	97			70	63	7	90		
	WPAH009	SD0009	1	18	30	24	6	80	NA [a]	--	70	69	1	99	NA [a]	--
	WPAH010	SD0010	1	7	30	25	5	83	NA [a]	--	70	61	9	87	NA [a]	--
	WPAH011	SD0011	1	22	30	29	1	97	NA [a]	--	70	61	9	87	NA [a]	--
	WPAH013	SD0013	1	20	30	27	3	90	NA [a]	--	70	67	3	96	NA [a]	--
	WPAH015	SD0015	1	19	30	28	2	93	NA [a]	--	70	66	4	94	NA [a]	--
	WPAH017	SD0018	1	3	30	29	1	97	NA [a]	--	70	69	1	99	NA [a]	--
	WPAH024	SD0025	1	1	30	27	3	90	NA [a]	--	70	60	10	86	NA [a]	--
	WPAH025	SD0026	1	11	30	30	0	100	NA [a]	--	70	35	35	50	NA [a]	--
	WPAH027	SD0028	1	8	30	27	3	90	NA [a]	--	70	68	2	97	NA [a]	--
	WPAH048	SD0051	1	6	30	23	7	77	NA [a]	--	70	61	9	87	NA [a]	--
	WPAH049	SD0052	1	23	30	28	2	93	NA [a]	--	70	61	9	87	NA [a]	--
	WPAH050	SD0053	1	9	30	24	6	80			70	64	6	91		
			2	15	30	25	5	83	83	3	70	62	8	89	93	6
			3	16	30	26	4	87			70	70	0	100		
	WPAH050	SD0053-AC	1	5	30	24	6	80	NA [a]	--	70	58	12	83	NA [a]	--
	WPAH051	SD0054	1	2	30	26	4	87	NA [a]	--	70	68	2	97	NA [a]	--
	WPAH051	SD0054-AC	1	10	30	22	8	73	NA [a]	--	70	66	4	94	NA [a]	--
	WPAH052	SD0055	1	14	30	29	1	97	NA [a]	--	70	65	5	93	NA [a]	--

Notes:
-- = not calculable
AC = sediment treated with activated carbon
NA = not applicable
SD = standard deviation

[a] Single replicate only.

Table 4-1. SMS Comparison for the Benthic Amphipod Test with *Eohaustorius estuarius*

Station	Treatment/ Sample Number	Mean Mortality (%)	Reference	Statistically More than Reference?	Mortality Comparison to Reference $M_T - M_R$ (%)	Fails SCO? >25% [a]	Fails CSL? >30% [b]
--	Control	4	--	--	--	--	--
CR-12	CR-12 Reference	4	--	--	--	--	--
CARR-20	CARR-20 Reference	7	--	--	--	--	--
CR-02	CR-02 Reference	2	--	--	--	--	--
WPAH001	SD0001	7	CR-02	Yes	5	No	No
WPAH002	SD0002	5	CR-02	No	3	No	No
WPAH003	SD0003	6	CARR-20	No	-1	No	No
WPAH004	SD0004	4	CARR-20	No	-3	No	No
WPAH005	SD0005	0	CR-02	No	-2	No	No
WPAH006	SD0006	4	CR-02	No	2	No	No
WPAH007	SD0007	10	CR-02	No	8	No	No
WPAH008	SD0008	2	CR-02	No	0	No	No
WPAH009	SD0009	1	CR-02	No	-1	No	No
WPAH010	SD0010	1	CR-02	No	-1	No	No
WPAH011	SD0011	8	CR-02	No	6	No	No
WPAH012	SD0012	4	CR-02	No	2	No	No
WPAH013	SD0013	2	CR-02	No	0	No	No
WPAH014	SD0014	3	CR-02	No	1	No	No
WPAH015	SD0015	5	CR-02	No	3	No	No
WPAH016	SD0017	2	CR-02	No	0	No	No
WPAH017	SD0018	5	CR-02	No	3	No	No
WPAH018	SD0019	6	CR-02	No	4	No	No
WPAH019	SD0020	4	CR-02	No	2	No	No
WPAH020	SD0021	6	CR-02	No	4	No	No

Notes:

No = Meets criteria; Yes = Does not meet criteria

M = Mortality, T = Test Sediment, R = Reference Sediment

-- = not applicable

CSL = cleanup screening level

SCO = sediment cleanup objective

SMS = sediment management standards

[a] SCO: Statistical Significance and $M_T - M_R$ >25%

[b] CSL: Statistical significance and $M_T - M_R$ >30%

Table 4-2. SMS Comparison for the Juvenile Polychaete Test with *Neanthes arenaceodentata*

Station	Treatment/ Sample Number	MIG (mg/ind/day) AFDW	Reference	AFDW Statistically More than Reference?	Comparison to Reference MIG_T / MIG_R	Fails SCO? >70% [a]	Fails CSL? >50% [b]
--	Control	0.347	--	--	--	--	--
CR-12	CR-12 Reference	0.403	--	--	--	--	--
CARR-20	CARR-20 Reference	0.394	--	--	--	--	--
CR-02	CR-02 Reference	0.292	--	--	--	--	--
WPAH001	SD0001	0.465	CR-02	No	159	No	No
WPAH002	SD0002	0.490	CR-02	No	167	No	No
WPAH003	SD0003	0.624	CARR-20	No	158	No	No
WPAH004	SD0004	0.594	CARR-20	No	151	No	No
WPAH005	SD0005	0.584	CR-02	No	200	No	No
WPAH006	SD0006	0.646	CR-02	No	221	No	No
WPAH007	SD0007	0.572	CR-02	No	196	No	No
WPAH008	SD0008	0.529	CR-02	No	181	No	No
WPAH009	SD0009	0.606	CR-02	No	207	No	No
WPAH010	SD0010	0.632	CR-02	No	216	No	No
WPAH011	SD0011	0.483	CR-02	No	165	No	No
WPAH012	SD0012	0.596	CR-02	No	204	No	No
WPAH013	SD0013	0.541	CR-02	No	185	No	No
WPAH014	SD0014	0.539	CR-02	No	184	No	No
WPAH015	SD0015	0.482	CR-02	No	165	No	No
WPAH016	SD0017	0.642	CR-02	No	219	No	No
WPAH017	SD0018	0.577	CR-02	No	197	No	No
WPAH018	SD0019	0.567	CR-02	No	194	No	No
WPAH019	SD0020	0.552	CR-02	No	189	No	No
WPAH020	SD0021	0.616	CR-02	No	211	No	No

Notes:

No = Meets criteria; Yes = Does not meet criteria

N = Normal Survivorship, C = Negative Control, R = Reference Sediment, T = Test Sediment

-- = not applicable

AFDW = ash-free dry weight

CSL = cleanup screening level

d = day

ind = individual

mg = milligram

MIG = mean individual growth

SMS = sediment management standards

SCO = sediment cleanup objective

[a] SCO: Statistical Significance and $(N_T/N_C)/(N_R/N_C) < 0.70$

[b] CSL: Statistical Significance and $(N_T/N_C)/(N_R/N_C) < 0.50$

Table 4-3a. SMS Comparison for the Benthic Larval Test with *Mytilus galloprovincialis,* Test Batch 1

Station	Treatment/ Sample Number	Mean Normal Survival (%)	Reference	Statistically Less than Reference?	Normal Survival Comparison to Reference $(N_T/N_C)/(N_R/N_C)$	Fails SCO? < 85% [a]	Fails CSL? < 70% [b]
--	Control	236	--	--	--	--	--
CR-12	CR-12 Reference	196	--	--	--	--	--
CARR-20	CARR-20 Reference	189	--	--	--	--	--
CR-02	CR-02 Reference	182	--	--	--	--	--
WPAH005	SD0005	159	--	--	--	--	--
WPAH006	SD0006	142	--	--	--	--	--
WPAH007	SD0007	163	--	--	--	--	--
WPAH022	SD0023	147	CARR-20	**Yes**	78	**Yes**	No
WPAH023	SD0024	158	CR-02	**Yes**	87	No	No
WPAH024	SD0025	123	CARR-20	**Yes**	65	**Yes**	**Yes**
WPAH025	SD0026	181	CR-02	No	99	No	No
WPAH026	SD0027	133	CARR-20	**Yes**	70	**Yes**	No
WPAH027	SD0028	175	CR-02	No	96	No	No
WPAH028	SD0029	142	CR-02	**Yes**	78	**Yes**	No
WPAH029	SD0030	160	CR-02	**Yes**	88	No	No
WPAH030	SD0031	166	CR-02	No	91	No	No
WPAH031	SD0032	188	CR-02	No	103	No	No
WPAH032	SD0033	161	CR-02	No	88	No	No
WPAH033	SD0034	158	CR-02	**Yes**	87	No	No
WPAH034	SD0035	177	CARR-20	No	94	No	No
WPAH035	SD0036	183	CR-02	No	101	No	No
WPAH036	SD0037	176	CR-02	No	97	No	No
WPAH037	SD0038	188	CR-02	No	103	No	No
WPAH038	SD0039	161	CR-02	**Yes**	88	No	No
WPAH039	SD0040	178	CR-02	No	98	No	No
WPAH040	SD0042	170	CR-02	No	93	No	No
WPAH041	SD0043	199	CR-02	No	109	No	No
WPAH042	SD0044	190	CR-02	No	104	No	No
WPAH043	SD0045	161	CR-02	No	88	No	No
WPAH044	SD0046	197	CR-12	No	100	No	No
WPAH045	SD0047	185	CR-12	No	94	No	No
WPAH046	SD0048	202	CR-02	No	111	No	No
WPAH047	SD0049	206	CR-02	No	113	No	No

Notes:

No = Meets criteria; Yes = Does not meet criteria

N = Normal Survivorship, C = Negative Control, R = Reference Sediment, T = Test Sediment

-- = not applicable

CSL = cleanup screening level

SCO = sediment cleanup objective

SMS = sediment management standards

[a] SCO: Statistical Significance and $(N_T/N_C)/(N_R/N_C) < 0.85$

[b] CSL: Statistical Significance and $(N_T/N_C)/(N_R/N_C) < 0.70$

Table 4-3b. SMS Comparison for the Benthic Larval Test with *Mytilus galloprovincialis,* Test Batch 2

Station	Treatment/ Sample Number	Mean Normal Survival (%)	Reference	Statistically Less than Reference?	Normal Survival Comparison to Reference $(N_T/N_C)/(N_R/N_C)$	Fails SCO? < 85% [a]	Fails CSL? < 70% [b]
--	Control	337	--	--	--	--	--
CR-12	CR-12 Reference	289	--	--	--	--	--
CARR-20	CARR-20 Reference	274	--	--	--	--	--
CR-02	CR-02 Reference	272	--	--	--	--	--
WPAH001	SD0001	232	CR-02	**Yes**	85	No	No
WPAH002	SD0002	230	CR-02	**Yes**	85	No	No
WPAH003	SD0003	212	CARR-20	**Yes**	77	**Yes**	No
WPAH004	SD0004	201	CARR-20	**Yes**	73	**Yes**	No
WPAH008	SD0008	254	CR-02	**Yes**	94	No	No
WPAH009	SD0009	224	CR-02	**Yes**	82	**Yes**	No
WPAH010	SD0010	210	CR-02	**Yes**	77	**Yes**	No
WPAH011	SD0011	249	CR-02	**Yes**	91	No	No
WPAH012	SD0012	261	CR-02	**Yes**	96	No	No
WPAH013	SD0013	258	CR-02	No	95	No	No
WPAH014	SD0014	233	CR-02	**Yes**	86	No	No
WPAH015	SD0015	244	CR-02	**Yes**	90	No	No
WPAH016	SD0017	249	CR-02	**Yes**	91	No	No
WPAH017	SD0018	280	CR-02	No	103	No	No
WPAH018	SD0019	266	CR-02	No	98	No	No
WPAH019	SD0020	220	CR-02	**Yes**	81	**Yes**	No
WPAH020	SD0021	296	CR-02	No	109	No	No
WPAH021	SD0022	265	CR-02	No	97	No	No

Notes:

No = Meets criteria; Yes = Does not meet criteria

N = Normal Survivorship, C = Negative Control, R = Reference Sediment, T = Test Sediment

% = percent

-- = not applicable

CSL = cleanup screening level

SCO = sediment cleanup objective

SMS = sediment management standards

[a] SCO: Statistical Significance and $(N_T/N_C)/(N_R/N_C) < 0.85$

[b] CSL: Statistical Significance and $(N_T/N_C)/(N_R/N_C) < 0.70$

Table 4-4. Summary of SMS Comparisons for Western Port Angeles Harbor Samples

Station	Treatment/ Sample Number	Grain Size [a]	Reference Comparison	Amphipod	Juvenile Polychaete	Benthic Larval
WPAH001	SD0001	53	CR-02	Pass	Pass	Pass
WPAH002	SD0002	48	CR-02	Pass	Pass	Pass
WPAH003	SD0003	38	CARR-20	Pass	Pass	**Fails SCO**
WPAH004	SD0004	39	CARR-20	Pass	Pass	**Fails SCO**
WPAH005	SD0005	78	CR-02	Pass	Pass	Pass
WPAH006	SD0006	56	CR-02	Pass	Pass	**Fails SCO**
WPAH007	SD0007	80	CR-02	Pass	Pass	Pass
WPAH008	SD0008	66	CR-02	Pass	Pass	Pass
WPAH009	SD0009	71	CR-02	Pass	Pass	**Fails SCO**
WPAH010	SD0010	67	CR-02	Pass	Pass	**Fails SCO**
WPAH011	SD0011	79	CR-02	Pass	Pass	Pass
WPAH012	SD0012	82	CR-02	Pass	Pass	Pass
WPAH013	SD0013	77	CR-02	Pass	Pass	Pass
WPAH014	SD0014	77	CR-02	Pass	Pass	Pass
WPAH015	SD0015	77	CR-02	Pass	Pass	Pass
WPAH016	SD0017	70	CR-02	Pass	Pass	Pass
WPAH017	SD0018	78	CR-02	Pass	Pass	Pass
WPAH018	SD0019	50	CR-02	Pass	Pass	Pass
WPAH019	SD0020	56	CR-02	Pass	Pass	**Fails SCO**
WPAH020	SD0021	64	CR-02	Pass	Pass	Pass
WPAH021	SD0022	65	CR-02	NT [b]	NT	Pass
WPAH022	SD0023	31	CARR-20	NT	NT	**Fails SCO**
WPAH023	SD0024	44	CR-02	NT	NT	Pass
WPAH024	SD0025	24	CARR-20	NT	NT	**Fails CSL**
WPAH025	SD0026	77	CR-02	NT	NT	Pass
WPAH026	SD0027	20	CARR-20	NT	NT	**Fails SCO**
WPAH027	SD0028	45	CR-02	NT	NT	Pass
WPAH028	SD0029	73	CR-02	NT	NT	**Fails SCO**
WPAH029	SD0030	73	CR-02	NT	NT	Pass
WPAH030	SD0031	84	CR-02	NT	NT	Pass
WPAH031	SD0032	81	CR-02	NT	NT	Pass
WPAH032	SD0033	59	CR-02	NT	NT	Pass
WPAH033	SD0034	71	CR-02	NT	NT	Pass
WPAH034	SD0035	28	CARR-20	NT	NT	Pass
WPAH035	SD0036	76	CR-02	NT	NT	Pass
WPAH036	SD0037	60	CR-02	NT	NT	Pass
WPAH037	SD0038	63	CR-02	NT	NT	Pass
WPAH038	SD0039	71	CR-02	NT	NT	Pass
WPAH039	SD0040	85	CR-02	NT	NT	Pass
WPAH040	SD0042	75	CR-02	NT	NT	Pass

Table 4-4. Summary of SMS Comparisons for Western Port Angeles Harbor Samples

Station	Treatment/ Sample Number	Grain Size [a]	Reference Comparison	Amphipod	Juvenile Polychaete	Benthic Larval
WPAH041	SD0043	77	CR-02	NT	NT	Pass
WPAH042	SD0044	91	CR-02	NT	NT	Pass
WPAH043	SD0045	62	CR-02	NT	NT	Pass
WPAH044	SD0046	12	CR-12	NT	NT	Pass
WPAH045	SD0047	14	CR-12	NT	NT	Pass
WPAH046	SD0048	64	CR-02	NT	NT	Pass
WPAH047	SD0049	52	CR-02	NT	NT	Pass

Notes:

CSL = cleanup screening level

NT = not tested

SCO = sediment cleanup objective

SMS = sediment management standards

[a] Percent fines (∑ silt and clay)

[b] Treatment evaluated with the larval test only

Table 4-5a. Tissue Concentrations of Dioxins/Furans and PCB Congeners from Bioaccumulation Tests

Test Organism	Station	Treatment/ Sample Number	Laboratory Replicate	Dioxin/Furan TEQ [a] (pg/g, ww)	PCB Congeners (pg/g, ww)
Macoma nasuta					
	--	Pretest [a]	--	0.137	--
	--	Pretest [a]	--	--	488
	WPAH004	Mn SD0004	1	0.830	--
	WPAH004	Mn SD0004	2	0.741	--
	WPAH004	Mn SD0004	3	0.964	--
	WPAH004	Mn SD0004	1	--	10,700
	WPAH004	Mn SD0004	2	--	11,100
	WPAH004	Mn SD0004	3	--	11,300
	WPAH009	Mn SD0009	--	1.52	--
	WPAH009	Mn SD0009	--	--	12,500
	WPAH010	Mn SD0010	--	1.89	--
	WPAH010	Mn SD0010	--	--	20,500
	WPAH011	Mn SD0011	--	0.798	--
	WPAH011	Mn SD0011	--	--	13,100
	WPAH013	Mn SD0013	--	0.755	--
	WPAH013	Mn SD0013	--	--	20,500
	WPAH015	Mn SD0015	--	0.347	--
	WPAH015	Mn SD0015	--	--	14,400
	WPAH017	Mn SD0018	--	0.474	--
	WPAH017	Mn SD0018	--	--	29,400
	WPAH024	Mn SD0025	--	0.491	--
	WPAH024	Mn SD0025	--	--	46,200
	WPAH025	Mn SD0026	--	1.02	--
	WPAH025	Mn SD0026	--	--	22,600
	WPAH027	Mn SD0028	--	0.258	--
	WPAH027	Mn SD0028	--	--	4,340
	WPAH048	Mn SD0051	--	0.657	--
	WPAH048	Mn SD0051	--	--	8,230
	WPAH049	Mn SD0052	--	0.473	--
	WPAH049	Mn SD0052	--	--	11,200
	WPAH050	Mn SD0053	1	1.89	--
	WPAH050	Mn SD0053	2	2.51	--
	WPAH050	Mn SD0053	3	3.16	--
	WPAH050	Mn SD0053	1	--	20,200
	WPAH050	Mn SD0053	2	--	19,400
	WPAH050	Mn SD0053	3	--	22,900
	WPAH051	Mn SD0054	--	1.29	--
	WPAH051	Mn SD0054	--	--	15,700
	WPAH052	Mn SD0055	--	0.156	--
	WPAH052	Mn SD0055	--	--	3,180

Table 4-5a. Tissue Concentrations of Dioxins/Furans and PCB Congeners from Bioaccumulation Tests

Test Organism	Station	Treatment/ Sample Number	Laboratory Replicate	Dioxin/Furan TEQ [a] (pg/g, ww)	PCB Congeners (pg/g, ww)
Nephtys caecoides	--	Pretest [a]	--	0.172	--
	--	Pretest [a]	--	--	820
	WPAH004	Nc SD0004	1	0.250	--
	WPAH004	Nc SD0004	2	0.331	--
	WPAH004	Nc SD0004	3	0.312	--
	WPAH004	Nc SD0004	1	--	8,200
	WPAH004	Nc SD0004	2	--	7,430
	WPAH004	Nc SD0004	3	--	8,100
	WPAH009	Nc SD0009	--	0.863	--
	WPAH009	Nc SD0009	--	--	9,420
	WPAH010	Nc SD0010	--	2.89	--
	WPAH010	Nc SD0010	--	--	15,000
	WPAH011	Nc SD0011	--	0.276	--
	WPAH011	Nc SD0011	--	--	8,980
	WPAH013	Nc SD0013	--	0.347	--
	WPAH013	Nc SD0013	--	--	12,500
	WPAH015	Nc SD0015	--	0.233	--
	WPAH015	Nc SD0015	--	--	12,200
	WPAH017	Nc SD0018	--	0.274	--
	WPAH017	Nc SD0018	--	--	16,700
	WPAH024	Nc SD0025	--	0.188	--
	WPAH024	Nc SD0025	--	--	29,800
	WPAH025	Nc SD0026	--	0.597	--
	WPAH025	Nc SD0026	--	--	14,300
	WPAH027	Nc SD0028	--	0.173	--
	WPAH027	Nc SD0028	--	--	3,130
	WPAH048	Nc SD0051	--	0.549	--
	WPAH048	Nc SD0051	--	--	6,660
	WPAH049	Nc SD0052	--	0.193	--
	WPAH049	Nc SD0052	--	--	6,360
	WPAH050	Nc SD0053	1	0.742	--
	WPAH050	Nc SD0053	2	0.812	--
	WPAH050	Nc SD0053	3	0.755	--
	WPAH050	Nc SD0053	1	--	13,600
	WPAH050	Nc SD0053	2	--	13,500
	WPAH050	Nc SD0053	3	--	13,300
	WPAH051	Nc SD0054	--	0.584	--
	WPAH051	Nc SD0054	--	--	8,890
	WPAH052	Nc SD0055	--	0.131	--
	WPAH052	Nc SD0055	--	--	2,100

Notes:

-- = not applicable

PCB = polychlorinated biphenyl

pg/g = picograms per gram

TEQ = toxicity equivalent

ww = wet weight

[a] One-half the detection limit was used for TEQ calculation.

Table 4-5b. Tissue Concentrations of Dioxins/Furans and PCB Congeners from Bioaccumulation Tests With and Without GAC Treatment

		With GAC Treatment			Without GAC Treatment		
Test Organism	Station	Treatment/ Sample/Replicate Number	Dioxin/Furan TEQ [a] (pg/g, ww)	PCB Congeners (pg/g, ww)	Treatment/ Sample/Replicate Number	Dioxin/Furan TEQ [a] (pg/g, ww)	PCB Congeners (pg/g, ww)
Macoma nasuta							
	--	Pretest [a]	0.137	488	Pretest [a]	0.137	488
	WPAH050	Mn SD0053-AC-1	2.22	14,600	Mn SD0053-1	1.89	20,200
					Mn SD0053-2	2.51	19,400
					Mn SD0053-3	3.16	22,900
	WPAH051	Mn SD0054-AC-1	0.916	9,030	Mn SD0054-1	1.29	15,700
Nephyts caecoides	WPAH050	Nc SD0053-AC-1	0.575	8,190	Nc SD0053-1	0.742	13,600
					Nc SD0053-2	0.812	13,500
					Nc SD0053-3	0.755	13,300
	WPAH051	Nc SD0054-AC-1	0.430	5,640	Nc SD0054-1	0.584	8,890

Notes:
-- = not applicable
GAC = granular activated carbon
PCB = polychlorinated biphenyl
pg/g = picograms per gram
TEQ = toxicity equivalent
ww = wet weight

[a] One-half the detection limit was used for TEQ calculation.

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD0025			SD0018			SD0051			SD0010			SD0028			SD0026		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-1	4.46	4.21	4.16E+00	2.56E+02		8.15E-03	5.01E-01	U	1.19E-02	7.28E-01	U	9.40E-03	5.77E-01	U	5.39E-02	3.31E+00	J	8.38E-03	5.15E-01	U
PCB-2	4.69	4.43	1.11E-01	4.14E+00		1.06E-02	3.93E-01	U	1.46E-02	5.44E-01	U	1.15E-02	4.29E-01	U	9.00E-03	3.35E-01	U	1.02E-02	3.79E-01	U
PCB-3	4.69	4.43	8.09E-01	3.02E+01		9.80E-03	3.65E-01	U	1.36E-02	5.05E-01	U	1.07E-02	3.97E-01	U	8.35E-03	3.11E-01	U	9.69E-03	3.61E-01	U
PCB-4	4.65	4.39	1.15E+00	4.68E+01		2.35E-01	9.55E+00		9.33E-02	3.79E+00		3.88E-01	1.58E+01		1.81E-01	7.36E+00	EMPC	9.73E-02	3.96E+00	
PCB-10	4.84	4.57	1.24E-01	3.34E+00		2.96E-02	7.97E-01	J	3.32E-02	8.94E-01	U	2.12E-02	5.69E-01	U	2.30E-02	6.18E-01	U	2.24E-02	6.03E-01	U
PCB-9	5.06	4.78	3.07E-01	5.12E+00		2.94E-02	4.90E-01	U	3.29E-02	5.49E-01	J	3.30E-02	5.51E-01	J	3.24E-02	5.41E-01	J	1.62E-02	2.71E-01	J
PCB-7	5.07	4.79	2.67E-01	4.36E+00		4.44E-02	7.25E-01	J	3.21E-02	5.24E-01	U	1.98E-02	3.23E-01	J	2.34E-02	3.82E-01	J	1.66E-02	2.72E-01	J
PCB-6	5.06	4.78	6.67E-01	1.11E+01		5.86E-02	9.78E-01	J	5.85E-02	9.77E-01	J	1.76E-01	2.94E+00		6.10E-02	1.02E+00	J	6.53E-02	1.09E+00	J
PCB-5	4.97	4.69	1.74E-01	3.53E+00		2.79E-02	5.66E-01	U	3.50E-02	7.09E-01	U	2.67E-02	5.41E-01	U	2.92E-02	5.92E-01	U	2.39E-02	4.85E-01	U
PCB-8	5.07	4.79	2.80E+00	4.57E+01		3.93E-01	6.42E+00		2.40E-01	3.92E+00		7.72E-01	1.26E+01		2.55E-01	4.17E+00		2.80E-01	4.58E+00	
PCB-14	5.28	4.98	2.34E-02	2.42E-01	U	2.29E-02	2.37E-01	U	2.87E-02	2.97E-01	U	2.19E-02	2.26E-01	U	2.39E-02	2.47E-01	U	1.98E-02	2.05E-01	U
PCB-11	5.28	4.98	2.37E-01	2.45E+00		1.06E-01	1.10E+00	EMPC	3.95E-01	4.09E+00		1.02E-01	1.06E+00		1.11E-01	1.15E+00		1.92E-01	1.99E+00	EMPC
PCB-13/12	5.26	4.97	2.15E-01	2.32E+00	[a]	2.71E-02	2.92E-01	U	3.39E-02	3.66E-01	U	4.64E-02	5.02E-01	J [a]	2.83E-02	3.05E-01	U	2.34E-02	2.53E-01	U
PCB-15	5.3	5.00	5.29E-01	5.24E+00		7.67E-02	7.60E-01	J	6.37E-02	6.31E-01	J	1.43E-01	1.42E+00		4.78E-02	4.74E-01	J	8.67E-02	8.59E-01	
PCB-19	5.02	4.74	5.62E-01	1.02E+01		2.76E-01	5.03E+00		1.02E-01	1.86E+00		4.30E-01	7.83E+00		6.87E-02	1.25E+00	J	7.52E-02	1.37E+00	J
PCB-30/18	5.34	5.04	8.65E+00	7.86E+01	[a]	2.78E+00	2.53E+01	[a]	1.02E+00	9.27E+00	[a]	4.90E+00	4.45E+01	[a]	4.65E-01	4.23E+00	[a]	9.27E-01	8.43E+00	[a]
PCB-17	5.25	4.96	3.56E+00	3.93E+01		1.36E+00	1.50E+01		5.19E-01	5.73E+00		2.06E+00	2.28E+01		2.78E-01	3.07E+00		5.19E-01	5.74E+00	
PCB-27	5.44	5.14	4.80E-01	3.51E+00		2.85E-01	2.08E+00		7.96E-02	5.82E-01	J	3.21E-01	2.35E+00		6.96E-02	5.09E-01	J	8.77E-02	6.41E-01	
PCB-24	5.35	5.05	1.47E-02	1.31E-01	U	1.40E-02	1.25E-01	U	1.68E-02	1.49E-01	U	5.03E-02	4.47E-01	J	1.17E-02	1.04E-01	U	1.07E-02	9.53E-02	U
PCB-16	5.16	4.87	2.96E+00	3.98E+01		1.03E+00	1.38E+01		4.60E-01	6.18E+00		2.03E+00	2.73E+01		1.82E-01	2.45E+00		3.39E-01	4.56E+00	
PCB-32	5.44	5.14	2.95E+00	2.16E+01		1.10E+00	8.05E+00		3.34E-01	2.44E+00		1.56E+00	1.14E+01		1.78E-01	1.30E+00		3.81E-01	2.78E+00	
PCB-34	5.66	5.34	1.71E-02	7.73E-02	U	1.50E-02	6.78E-02	U	1.75E-02	7.92E-02	U	1.20E-02	5.44E-02	U	1.26E-02	5.72E-02	U	1.04E-02	4.71E-02	U
PCB-23	5.57	5.26	1.68E-02	9.24E-02	U	1.47E-02	8.08E-02	U	1.71E-02	9.43E-02	U	1.18E-02	6.48E-02	U	1.24E-02	6.81E-02	U	1.02E-02	5.65E-02	U
PCB-26/29	5.63	5.31	1.66E+00	8.04E+00	[a]	3.17E-01	1.53E+00	[a]	2.76E-01	1.34E+00	[a]	7.30E-01	3.53E+00	[a]	7.86E-02	3.81E-01	J [a]	3.20E-01	1.55E+00	[a]
PCB-25	5.67	5.35	6.41E-01	2.85E+00		1.89E-01	8.39E-01		1.02E-01	4.53E-01		2.86E-01	1.27E+00		2.45E-02	1.09E-01	J	1.51E-01	6.71E-01	
PCB-31	5.67	5.35	1.31E+01	5.82E+01		2.40E+00	1.07E+01		1.30E+00	5.77E+00		4.44E+00	1.97E+01		3.77E-01	1.67E+00		1.46E+00	6.47E+00	
PCB-28/20	5.62	5.31	1.16E+01	5.74E+01	[a]	2.56E+00	1.27E+01	[a]	1.37E+00	6.78E+00	[a]	4.04E+00	2.00E+01	[a]	4.41E-01	2.18E+00	[a]	1.77E+00	8.77E+00	[a]
PCB-21/33	5.55	5.24	5.29E+00	3.05E+01	[a]	1.25E+00	7.20E+00	[a]	6.53E-01	3.76E+00	[a]	2.38E+00	1.37E+01	[a]	1.94E-01	1.12E+00	[a]	7.28E-01	4.19E+00	[a]
PCB-22	5.58	5.27	3.93E+00	2.12E+01		6.85E-01	3.70E+00		5.21E-01	2.81E+00		1.54E+00	8.31E+00		1.32E-01	7.12E-01		4.30E-01	2.32E+00	
PCB-36	5.88	5.55	1.65E-02	4.63E-02	U	1.44E-02	4.05E-02	U	1.69E-02	4.74E-02	U	1.16E-02	3.25E-02	U	1.22E-02	3.42E-02	U	9.82E-03	2.76E-02	U
PCB-39	5.89	5.56	1.01E-01	2.78E-01		4.35E-02	1.20E-01	J	1.64E-02	4.52E-02	U	1.13E-02	3.10E-02	U	1.19E-02	3.26E-02	U	9.48E-03	2.61E-02	U
PCB-38	5.76	5.44	1.75E-02	6.37E-02	U	1.53E-02	5.59E-02	U	1.79E-02	6.52E-02	U	1.23E-02	4.49E-02	U	1.29E-02	4.71E-02	U	1.06E-02	3.86E-02	U
PCB-35	5.82	5.49	8.02E-02	2.57E-01	J	1.64E-02	5.26E-02	U	1.92E-02	6.14E-02	U	1.32E-02	4.23E-02	U	1.39E-02	4.44E-02	U	1.14E-02	3.66E-02	U
PCB-37	5.83	5.50	1.51E+00	4.74E+00		2.16E-01	6.77E-01	EMPC	2.05E-01	6.43E-01		5.49E-01	1.72E+00		1.55E-02	4.85E-02	U	2.12E-01	6.64E-01	
PCB-54	5.21	4.92	5.85E-02	7.05E-01	J	2.62E-02	3.16E-01	J	1.07E-02	1.29E-01	U	8.55E-03	1.03E-01	U	7.80E-03	9.40E-02	U	7.01E-03	8.45E-02	U
PCB-50/53	5.625	5.31	2.85E+00	1.39E+01	[a]	1.74E+00	8.52E+00	[a]	3.19E-01	1.56E+00	[a]	1.29E+00	6.31E+00	[a]	1.29E-01	6.31E-01	J [a]	6.43E-01	3.15E+00	[a]
PCB-45	5.53	5.22	3.20E+00	1.93E+01		1.80E+00	1.08E+01		3.00E-01	1.80E+00		1.37E+00	8.24E+00		1.37E-01	8.24E-01		4.27E-01	2.57E+00	
PCB-51	5.63	5.31	6.84E-01	3.31E+00		3.91E-01	1.89E+00		7.84E-02	3.80E-01	J	3.32E-01	1.61E+00		2.46E-02	1.19E-01	J	2.09E-01	1.01E+00	
PCB-46	5.53	5.22	1.15E+00	6.92E+00		6.37E-01	3.83E+00		1.41E-01	8.48E-01		5.57E-01	3.35E+00		4.53E-02	2.73E-01	J	2.12E-01	1.27E+00	
PCB-52	5.84	5.51	3.10E+01	9.51E+01		1.30E+01	3.99E+01		3.94E+00	1.21E+01		1.22E+01	3.74E+01		1.35E+00	4.14E+00		9.41E+00	2.89E+01	
PCB-73	6.04	5.70	9.90E-03	1.97E-02	U	1.08E-02	2.15E-02	U	1.21E-02	2.41E-02	U	1.17E-02	2.33E-02	U	9.30E-03	1.85E-02	U	9.55E-03	1.90E-02	U
PCB-43	5.75	5.43	8.35E-01	3.12E+00		4.10E-01	1.53E+00		9.35E-02	3.49E-01		3.27E-01	1.22E+00		1.47E-02	5.47E-02	U	1.35E-01	5.04E-01	
PCB-69/49	5.95	5.62	1.45E+01	3.50E+01	[a]	6.73E+00	1.63E+01	[a]	1.44E+00	3.48E+00	[a]	4.53E+00	1.09E+01	[a]	6.19E-01	1.50E+00	[a]	4.58E+00	1.11E+01	[a]
PCB-48	5.78	5.46	4.39E+00	1.53E+01		1.91E+00	6.68E+00		4.63E-01	1.62E+00		1.72E+00	6.01E+00		1.29E-01	4.51E-01		7.65E-01	2.68E+00	
PCB-44/47/65	5.82	5.49	2.21E+01	7.08E+01	[a]	8.98E+00	2.88E+01	[a]	2.22E+00	7.12E+00	[a]	7.83E+00	2.51E+01	[a]	8.89E-01	2.85E+00	[a]	4.80E+00	1.54E+01	[a]
PCB-59/62/75	5.96	5.63	1.70E+00	4.02E+00	[a]	7.55E-01	1.79E+00	[a]	1.85E-01	4.38E-01	J [a]	6.02E-01	1.42E+00	[a]	5.42E-02	1.28E-01	J EMPC [a]	3.71E-01	8.77E-01	[a]
PCB-42	5.76	5.44	5.61E+00	2.05E+01		2.35E+00	8.58E+00		5.75E-01	2.10E+00		1.83E+00	6.68E+00		1.80E-01	6.57E-01		1.13E+00	4.14E+00	
PCB-41	5.69	5.37	1.71E+00	7.27E+00		5.29E-01	2.25E+00		2.40E-01	1.02E+00		8.35E-01	3.55E+00		6.21E-02	2.64E-01	J	2.34E-01	9.93E-01	
PCB-71/40	5.82	5.49	8.33E+00	2.67E+01	[a]	3.54E+00	1.13E+01	[a]	9.06E-01	2.90E+00	[a]	3.25E+00	1.04E+01	[a]	2.71E-01	8.69E-01	[a]	1.69E+00	5.42E+00	[a]
PCB-64	5.95	5.62	9.21E+00	2.23E+01		3.61E+00	8.72E+00		9.17E-01	2.22E+00		3.10E+00	7.49E+00		2.93E-01	7.08E-01		1.72E+00	4.15E+00	
PCB-72	6.26	5.91	1.63E-02	2.01E-02	U	9.01E-02	1.11E-01	EMPC	1.45E-02	1.79E-02	U	1.79E-02	2.21E-02	U	1.25E-02	1.53E-02	U	1.02E-01	1.26E-01	

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

Chemicals	log K_{ow}	log K_F	SD0025			SD0018			SD0051			SD0010			SD0028			SD0026		
			C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-68	6.26	5.91	1.29E-02	1.59E-02	U	6.55E-02	8.08E-02	J EMPC	1.15E-02	1.41E-02	U	1.42E-02	1.74E-02	U	9.90E-03	1.22E-02	U	5.28E-02	6.51E-02	J
PCB-57	6.17	5.82	1.02E-01	1.53E-01		1.23E-02	1.84E-02	U	1.27E-02	1.90E-02	U	1.57E-02	2.35E-02	U	1.09E-02	1.63E-02	U	1.50E-02	2.26E-02	U
PCB-58	6.17	5.82	1.41E-02	2.11E-02	U	1.21E-02	1.81E-02	U	1.25E-02	1.87E-02	U	1.54E-02	2.31E-02	U	1.08E-02	1.61E-02	U	1.50E-02	2.26E-02	U
PCB-67	6.2	5.85	5.39E-01	7.57E-01		1.90E-01	2.67E-01		1.21E-02	1.70E-02	U	1.26E-01	1.77E-01	EMPC	1.05E-02	1.47E-02	U	1.16E-01	1.63E-01	
PCB-63	6.17	5.82	7.02E-01	1.05E+00		2.74E-01	4.11E-01		4.27E-02	6.40E-02	J EMPC	1.70E-01	2.55E-01		9.70E-03	1.45E-02	U	1.80E-01	2.70E-01	
PCB-61/70/74/76	6.14	5.80	3.07E+01	4.91E+01	[a]	9.05E+00	1.45E+01	[a]	3.00E+00	4.80E+00	[a]	9.78E+00	1.56E+01	[a]	9.85E-01	1.58E+00	[a]	7.67E+00	1.23E+01	[a]
PCB-66	6.2	5.85	1.51E+01	2.12E+01		4.32E+00	6.07E+00		1.30E+00	1.83E+00		4.33E+00	6.08E+00		4.41E-01	6.19E-01		3.96E+00	5.56E+00	
PCB-55	6.11	5.77	3.43E-01	5.86E-01		1.30E-02	2.21E-02	U	1.34E-02	2.28E-02	U	1.65E-02	2.82E-02	U	1.15E-02	1.96E-02	U	7.15E-02	1.22E-01	J
PCB-56	6.11	5.77	7.78E+00	1.33E+01		2.16E+00	3.69E+00		6.28E-01	1.07E+00		2.20E+00	3.76E+00		2.16E-01	3.69E-01		1.50E+00	2.56E+00	
PCB-60	6.11	5.77	4.24E+00	7.24E+00		9.04E-01	1.54E+00		3.05E-01	5.21E-01		1.24E+00	2.12E+00		8.91E-02	1.52E-01	EMPC	6.22E-01	1.06E+00	
PCB-80	6.48	6.12	1.29E-02	9.83E-03	U	1.11E-02	8.45E-03	U	1.14E-02	8.72E-03	U	1.41E-02	1.08E-02	U	9.80E-03	7.49E-03	U	1.39E-02	1.07E-02	U
PCB-79	6.42	6.06	1.52E-01	1.32E-01		8.44E-02	7.35E-02	EMPC	1.14E-02	9.93E-03	U	6.17E-02	5.37E-02	J	9.80E-03	8.54E-03	U	1.07E-01	9.36E-02	
PCB-78	6.35	5.99	1.60E-02	1.62E-02	U	1.37E-02	1.39E-02	U	1.42E-02	1.44E-02	U	1.75E-02	1.77E-02	U	1.22E-02	1.24E-02	U	1.72E-02	1.75E-02	U
PCB-81	6.36	6.00	6.28E-02	6.23E-02	J	1.35E-02	1.33E-02	U	1.39E-02	1.38E-02	U	1.72E-02	1.70E-02	U	1.20E-02	1.19E-02	U	1.68E-02	1.66E-02	U
PCB-77	6.36	6.00	7.14E-01	7.08E-01		1.52E-01	1.51E-01		8.74E-02	8.67E-02		1.88E-01	1.87E-01		1.31E-02	1.30E-02	U	2.31E-01	2.29E-01	
PCB-104	5.81	5.48	7.95E-03	2.60E-02	U	7.75E-03	2.54E-02	U	1.07E-02	3.50E-02	U	8.05E-03	2.64E-02	U	8.15E-03	2.67E-02	U	1.63E-02	5.33E-02	U
PCB-96	5.71	5.39	2.21E-01	8.99E-01		1.57E-01	6.39E-01		2.90E-02	1.18E-01	J	1.17E-01	4.76E-01		9.00E-03	3.66E-02	U	9.12E-02	3.71E-01	EMPC
PCB-103	6.22	5.87	1.80E-01	2.42E-01	EMPC	2.10E-01	2.82E-01		3.12E-02	4.19E-02	U	2.34E-02	3.15E-02	U	1.73E-02	2.32E-02	U	1.83E-01	2.46E-01	
PCB-94	6.13	5.79	1.43E-01	2.34E-01		2.87E-02	4.68E-02	U	3.29E-02	5.37E-02	U	2.47E-02	4.04E-02	U	1.82E-02	2.98E-02	U	1.90E-02	3.10E-02	U
PCB-95	6.13	5.79	1.56E+01	2.55E+01		1.11E+01	1.81E+01		3.95E+00	6.46E+00		8.76E+00	1.43E+01		1.61E+00	2.63E+00		1.06E+01	1.73E+01	
PCB-100/93	6.14	5.80	2.29E-01	3.66E-01	[a]	2.64E-02	4.22E-02	U	3.02E-02	4.83E-02	U	2.27E-02	3.63E-02	U	1.68E-02	2.68E-02	U	1.78E-02	2.85E-02	U
PCB-102	6.16	5.81	6.63E-01	1.02E+00		4.75E-01	7.28E-01		2.72E-02	4.17E-02	U	2.84E-01	4.35E-01		1.51E-02	2.31E-02	U	3.57E-01	5.47E-01	
PCB-98	6.13	5.79	1.98E-02	3.23E-02	U	2.74E-02	4.48E-02	U	3.15E-02	5.14E-02	U	2.36E-02	3.86E-02	U	1.74E-02	2.84E-02	U	1.80E-02	2.94E-02	U
PCB-88	6.07	5.73	2.33E-02	4.33E-02	U	3.23E-02	6.01E-02	U	3.70E-02	6.88E-02	U	2.78E-02	5.18E-02	U	2.05E-02	3.82E-02	U	2.15E-02	4.01E-02	U
PCB-91	6.13	5.79	2.51E+00	4.10E+00		1.69E+00	2.76E+00		5.07E-01	8.29E-01		1.15E+00	1.88E+00		1.86E-01	3.04E-01		1.55E+00	2.54E+00	
PCB-84	6.04	5.70	5.59E+00	1.11E+01		3.96E+00	7.87E+00		1.21E+00	2.41E+00		3.14E+00	6.24E+00		5.39E-01	1.07E+00		3.52E+00	6.99E+00	
PCB-89	6.07	5.73	2.96E-01	5.51E-01		1.88E-01	3.50E-01		3.36E-02	6.25E-02	U	1.12E-01	2.09E-01		1.86E-02	3.46E-02	U	1.44E-01	2.69E-01	
PCB-121	6.64	6.27	1.41E-02	7.59E-03	U	1.95E-02	1.05E-02	U	2.24E-02	1.21E-02	U	1.68E-02	9.08E-03	U	1.24E-02	6.70E-03	U	1.26E-02	6.83E-03	U
PCB-92	6.35	5.99	3.39E+00	3.44E+00		2.34E+00	2.37E+00		7.99E-01	8.10E-01		1.64E+00	1.66E+00		3.06E-01	3.10E-01		2.64E+00	2.68E+00	
PCB-113/90/101	6.43	6.07	2.00E+01	1.70E+01	[a]	1.24E+01	1.06E+01	[a]	4.54E+00	3.87E+00	[a]	9.10E+00	7.76E+00	[a]	1.78E+00	1.52E+00	[a]	1.46E+01	1.24E+01	[a]
PCB-83	6.26	5.91	1.25E+00	1.54E+00		6.37E-01	7.85E-01		2.64E-01	3.25E-01		4.95E-01	6.10E-01		6.89E-02	8.49E-02	J	6.88E-01	8.49E-01	
PCB-99	6.39	6.03	9.20E+00	8.55E+00		6.27E+00	5.83E+00		2.18E+00	2.03E+00		3.91E+00	3.64E+00		1.00E+00	9.30E-01		7.54E+00	7.01E+00	
PCB-112	6.45	6.09	1.47E-02	1.20E-02	U	2.04E-02	1.66E-02	U	2.34E-02	1.91E-02	U	1.76E-02	1.43E-02	U	1.30E-02	1.06E-02	U	1.33E-02	1.09E-02	U
PCB-108/119/86/97/125/87	6.44	6.08	1.32E+01	1.10E+01	[a]	6.85E+00	5.71E+00	[a]	3.15E+00	2.63E+00	[a]	6.41E+00	5.35E+00	[a]	9.55E-01	7.96E-01	[a]	7.78E+00	6.49E+00	[a]
PCB-117	6.46	6.10	5.05E-01	4.03E-01		3.28E-01	2.62E-01		2.59E-02	2.07E-02	U	1.95E-02	1.56E-02	U	3.94E-02	3.15E-02	J EMPC	4.19E-01	3.35E-01	
PCB-116/85	6.32	5.97	3.00E+00	3.25E+00	[a]	1.72E+00	1.86E+00	[a]	8.48E-01	9.18E-01	[a]	1.58E+00	1.71E+00	[a]	1.99E-01	2.15E-01	[a]	1.83E+00	1.98E+00	[a]
PCB-110	6.48	6.12	2.07E+01	1.58E+01		1.29E+01	9.86E+00		5.67E+00	4.34E+00		1.12E+01	8.56E+00		1.83E+00	1.40E+00		1.55E+01	1.19E+01	
PCB-115	6.49	6.13	1.38E-02	1.03E-02	U	1.91E-02	1.43E-02	U	2.19E-02	1.63E-02	U	1.65E-02	1.23E-02	U	1.21E-02	9.05E-03	U	1.28E-02	9.56E-03	U
PCB-82	6.2	5.85	2.51E+00	3.53E+00		1.17E+00	1.64E+00		5.43E-01	7.63E-01		1.17E+00	1.64E+00		1.75E-01	2.46E-01		1.28E+00	1.80E+00	
PCB-111	6.76	6.38	1.38E-02	5.72E-03	U	1.91E-02	7.95E-03	U	2.19E-02	9.10E-03	U	1.65E-02	6.85E-03	U	1.22E-02	5.06E-03	U	1.28E-02	5.32E-03	U
PCB-120	6.79	6.41	1.41E-02	5.48E-03	U	1.95E-02	7.61E-03	U	2.24E-02	8.72E-03	U	1.68E-02	6.55E-03	U	1.24E-02	4.84E-03	U	1.28E-02	4.98E-03	U
PCB-107/124	6.72	6.34	5.16E-01	2.34E-01	[a]	2.18E-01	9.90E-02	[a]	1.71E-01	7.76E-02	[a]	2.71E-01	1.23E-01	[a]	1.36E-02	6.15E-03	U	3.63E-01	1.65E-01	[a]
PCB-109	6.48	6.12	8.64E-01	6.61E-01		5.03E-01	3.85E-01		2.56E-01	1.96E-01		3.78E-01	2.89E-01		9.44E-02	7.22E-02		7.76E-01	5.94E-01	
PCB-123	6.74	6.36	2.11E-01	9.17E-02	EMPC	2.12E-02	9.22E-03	U	2.43E-02	1.06E-02	U	1.18E-01	5.13E-02		1.35E-02	5.85E-03	U	1.47E-01	6.39E-02	
PCB-106	6.64	6.27	1.50E-02	8.08E-03	U	2.07E-02	1.12E-02	U	2.38E-02	1.28E-02	U	1.79E-02	9.64E-03	U	1.32E-02	7.10E-03	U	1.44E-02	7.79E-03	U
PCB-118	6.74	6.36	1.24E+01	5.39E+00		6.12E+00	2.66E+00		3.10E+00	1.35E+00		5.96E+00	2.59E+00		9.81E-01	4.27E-01		9.98E+00	4.34E+00	
PCB-122	6.64	6.27	1.19E-01	6.43E-02	EMPC	2.47E-02	1.33E-02	U	2.62E-02	1.41E-02	U	9.39E-02	5.07E-02	EMPC	1.50E-02	8.08E-03	U	1.55E-02	8.39E-03	U
PCB-114	6.65	6.28	2.52E-01	1.33E-01		2.20E-02	1.16E-02	U	2.33E-02	1.23E-02	U	1.67E-01	8.83E-02	EMPC	1.33E-02	7.03E-03	U	1.59E-01	8.43E-02	
PCB-105	6.65	6.28	5.35E+00	2.83E+00		2.27E+00	1.20E+00		1.36E+00	7.19E-01		2.56E+00	1.35E+00	EMPC	4.10E-01	2.17E-01		3.48E+00	1.84E+00	
PCB-127	6.95	6.56	1.81E-02	4.99E-03	U	2.44E-02	6.72E-03	U	2.63E-02	7.23E-03	U	1.95E-02	5.37E-03	U	1.40E-02	3.86E-03	U	1.39E-02	3.82E-03	U
PCB-126	6.89	6.50	1.41E-02	4.41E-03	U	1.53E-02	4.79E-03	U	1.54E-02	4.83E-03	U	1.55E-02	4.85E-03	U	1.12E-02	3.52E-03	U	1.27E-02	3.99E-03	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

Chemicals	log K_{ow}	log K_F	SD0025 C_F, pg/µL	SD0025 C_w, pg/L	SD0025 Qualifier	SD0018 C_F, pg/µL	SD0018 C_w, pg/L	SD0018 Qualifier	SD0051 C_F, pg/µL	SD0051 C_w, pg/L	SD0051 Qualifier	SD0010 C_F, pg/µL	SD0010 C_w, pg/L	SD0010 Qualifier	SD0028 C_F, pg/µL	SD0028 C_w, pg/L	SD0028 Qualifier	SD0026 C_F, pg/µL	SD0026 C_w, pg/L	SD0026 Qualifier
PCB-155	6.41	6.05	7.40E-03	6.59E-03	U	8.65E-03	7.70E-03	U	1.09E-02	9.70E-03	U	7.90E-03	7.03E-03	U	7.35E-03	6.54E-03	U	6.60E-03	5.88E-03	U
PCB-152	6.22	5.87	7.85E-03	1.06E-02	U	9.20E-03	1.24E-02	U	1.16E-02	1.56E-02	U	8.40E-03	1.13E-02	U	7.80E-03	1.05E-02	U	7.08E-03	9.52E-03	U
PCB-150	6.32	5.97	7.75E-03	8.39E-03	U	9.10E-03	9.85E-03	U	1.15E-02	1.24E-02	U	8.30E-03	8.98E-03	U	7.70E-03	8.33E-03	U	6.87E-03	7.44E-03	U
PCB-136	6.22	5.87	1.38E+00	1.86E+00		1.65E+00	2.22E+00		5.37E-01	7.22E-01		1.11E+00	1.49E+00		2.95E-01	3.97E-01		1.50E+00	2.01E+00	
PCB-145	6.25	5.90	8.25E-03	1.04E-02	U	9.70E-03	1.22E-02	U	1.22E-02	1.54E-02	U	8.85E-03	1.12E-02	U	8.20E-03	1.03E-02	U	7.35E-03	9.26E-03	U
PCB-148	6.73	6.35	1.07E-02	4.75E-03	U	1.20E-02	5.33E-03	U	1.58E-02	7.02E-03	U	1.27E-02	5.64E-03	U	1.03E-02	4.55E-03	U	1.02E-02	4.52E-03	U
PCB-151/135	6.64	6.27	3.79E+00	2.05E+00	[a]	3.79E+00	2.05E+00	[a]	1.15E+00	6.21E-01	[a]	2.37E+00	1.28E+00	[a]	7.13E-01	3.85E-01	[a]	3.57E+00	1.93E+00	[a]
PCB-154	6.76	6.38	9.95E-03	4.14E-03	U	1.72E-01	7.16E-02		1.47E-02	6.10E-03	U	4.52E-02	1.88E-02	J EMPC	3.72E-02	1.55E-02	J EMPC	1.54E-01	6.41E-02	
PCB-144	6.67	6.30	5.78E-01	2.93E-01		5.12E-01	2.59E-01		2.32E-01	1.17E-01		3.56E-01	1.80E-01		1.15E-01	5.82E-02		5.00E-01	2.53E-01	
PCB-147/149	6.655	6.28	9.54E+00	4.99E+00	[a]	9.35E+00	4.89E+00	[a]	2.85E+00	1.49E+00	[a]	5.80E+00	3.03E+00	[a]	1.68E+00	8.79E-01	[a]	9.32E+00	4.87E+00	[a]
PCB-134	6.55	6.18	8.28E-01	5.44E-01		7.24E-01	4.76E-01		3.18E-01	2.09E-01		4.89E-01	3.21E-01		1.19E-01	7.82E-02		9.15E-01	6.01E-01	
PCB-143	6.6	6.23	1.10E-02	6.48E-03	U	1.24E-02	7.28E-03	U	1.63E-02	9.58E-03	U	1.31E-02	7.69E-03	U	1.06E-02	6.22E-03	U	1.01E-02	5.95E-03	U
PCB-139/140	6.67	6.30	1.71E-01	8.66E-02	[a]	1.71E-01	8.66E-02	[a]	9.80E-02	4.96E-02	J [a]	1.19E-01	6.02E-02	J [a]	1.02E-02	5.16E-03	U	2.46E-01	1.24E-01	[a]
PCB-131	6.58	6.21	1.27E-02	7.82E-03	U	1.39E-01	8.55E-02		1.87E-02	1.15E-02	U	1.26E-01	7.75E-02		1.22E-02	7.48E-03	U	1.94E-01	1.19E-01	
PCB-142	6.51	6.14	1.28E-02	9.17E-03	U	1.44E-02	1.03E-02	U	1.89E-02	1.35E-02	U	1.52E-02	1.09E-02	U	1.23E-02	8.78E-03	U	1.19E-02	8.52E-03	U
PCB-132	6.58	6.21	4.03E+00	2.48E+00		3.60E+00	2.22E+00		1.30E+00	8.00E-01		2.56E+00	1.58E+00		5.86E-01	3.61E-01		4.09E+00	2.52E+00	
PCB-133	6.86	6.47	7.55E-02	2.53E-02	J EMPC	1.33E-01	4.46E-02		1.71E-02	5.73E-03	U	9.23E-02	3.09E-02		1.11E-02	3.72E-03	U	1.47E-01	4.93E-02	
PCB-165	7.05	6.65	9.25E-03	2.05E-03	U	1.04E-02	2.31E-03	U	1.37E-02	3.03E-03	U	1.10E-02	2.44E-03	U	8.85E-03	1.96E-03	U	8.73E-03	1.94E-03	U
PCB-146	6.89	6.50	1.47E+00	4.61E-01		1.47E+00	4.61E-01		5.28E-01	1.66E-01		8.56E-01	2.69E-01		2.96E-01	9.29E-02		1.65E+00	5.18E-01	
PCB-161	7.08	6.68	8.80E-03	1.83E-03	U	9.85E-03	2.05E-03	U	1.30E-02	2.70E-03	U	1.05E-02	2.17E-03	U	8.45E-03	1.76E-03	U	8.18E-03	1.70E-03	U
PCB-153/168	7.01	6.62	8.25E+00	2.00E+00	[a]	7.76E+00	1.88E+00	[a]	2.53E+00	6.12E-01	[a]	4.66E+00	1.13E+00	[a]	1.58E+00	3.82E-01	[a]	8.71E+00	2.11E+00	[a]
PCB-141	6.82	6.44	1.83E+00	6.69E-01		1.21E+00	4.42E-01		5.73E-01	2.09E-01		1.19E+00	4.35E-01		2.65E-01	9.68E-02		1.40E+00	5.12E-01	
PCB-130	6.8	6.42	6.55E-01	2.50E-01		5.69E-01	2.17E-01		2.85E-01	1.09E-01		4.09E-01	1.56E-01		1.06E-01	4.05E-02	EMPC	6.68E-01	2.55E-01	EMPC
PCB-137	6.83	6.45	3.87E-01	1.38E-01		2.62E-01	9.37E-02		1.99E-01	7.12E-02		3.05E-01	1.09E-01		7.51E-02	2.69E-02	J	4.78E-01	1.71E-01	
PCB-164	7.02	6.63	6.68E-01	1.58E-01		6.18E-01	1.46E-01		2.33E-01	5.52E-02		4.35E-01	1.03E-01		1.20E-01	2.84E-02		6.94E-01	1.64E-01	
PCB-163/138/129	6.85	6.47	1.16E+01	3.97E+00	[a]	9.50E+00	3.25E+00	[a]	3.50E+00	1.20E+00	[a]	6.59E+00	2.26E+00	[a]	1.74E+00	5.96E-01	[a]	1.10E+01	3.78E+00	[a]
PCB-160	6.93	6.54	9.10E-03	2.62E-03	U	1.02E-02	2.94E-03	U	1.34E-02	3.86E-03	U	1.08E-02	3.09E-03	U	8.70E-03	2.50E-03	U	8.73E-03	2.51E-03	U
PCB-158	7.02	6.63	1.16E+00	2.75E-01		7.25E-01	1.72E-01		3.50E-01	8.29E-02	EMPC	6.97E-01	1.65E-01		1.82E-01	4.31E-02		1.11E+00	2.62E-01	
PCB-128/166	6.47	6.11	1.56E+00	1.22E+00	[a]	1.17E+00	9.14E-01	[a]	5.61E-01	4.38E-01	EMPC [a]	9.50E-01	7.42E-01	[a]	1.73E-01	1.35E-01	[a]	1.65E+00	1.29E+00	[a]
PCB-159	7.24	6.83	1.23E-02	1.81E-03	U	1.29E-02	1.89E-03	U	1.84E-02	2.70E-03	U	1.52E-02	2.22E-03	U	1.38E-02	2.02E-03	U	3.59E-02	5.27E-03	J
PCB-162	7.24	6.83	1.21E-02	1.78E-03	U	1.28E-02	1.87E-03	U	1.82E-02	2.66E-03	U	1.50E-02	2.19E-03	U	1.36E-02	1.99E-03	U	1.22E-02	1.79E-03	U
PCB-167	7.27	6.86	2.97E-01	4.09E-02		2.05E-01	2.82E-02		1.21E-01	1.66E-02		1.53E-01	2.10E-02		4.41E-02	6.07E-03	J	3.20E-01	4.40E-02	
PCB-156/157	7.18	6.78	9.42E-01	1.58E-01	[a]	5.97E-01	9.98E-02	[a]	3.12E-01	5.22E-02	[a]	5.56E-01	9.30E-02	[a]	1.13E-01	1.89E-02	J [a]	8.57E-01	1.43E-01	[a]
PCB-169	7.42	7.00	1.67E-02	1.65E-03	U	1.85E-02	1.84E-03	U	2.63E-02	2.61E-03	U	2.03E-02	2.02E-03	U	1.80E-02	1.79E-03	U	1.55E-02	1.54E-03	U
PCB-188	6.82	6.44	8.90E-03	3.25E-03	U	7.50E-03	2.74E-03	U	1.17E-02	4.28E-03	U	8.80E-03	3.22E-03	U	7.00E-03	2.56E-03	U	6.21E-03	2.27E-03	U
PCB-179	6.73	6.35	6.21E-01	2.76E-01		9.67E-01	4.30E-01		2.97E-01	1.32E-01		5.64E-01	2.51E-01		1.73E-01	7.69E-02		6.57E-01	2.92E-01	
PCB-184	6.85	6.47	1.08E-02	3.68E-03	U	9.10E-03	3.12E-03	U	1.42E-02	4.85E-03	U	1.07E-02	3.65E-03	U	8.45E-03	2.89E-03	U	7.42E-03	2.54E-03	U
PCB-176	6.76	6.38	1.67E-01	6.95E-02		2.96E-01	1.23E-01		7.39E-02	3.08E-02	J	1.46E-01	6.08E-02	EMPC	5.15E-02	2.14E-02	J	2.01E-01	8.35E-02	
PCB-186	6.69	6.31	1.05E-02	5.06E-03	U	8.85E-03	4.29E-03	U	1.38E-02	6.66E-03	U	1.04E-02	5.02E-03	U	8.20E-03	3.97E-03	U	7.01E-03	3.40E-03	U
PCB-178	7.14	6.74	2.74E-01	5.00E-02		4.13E-01	7.53E-02		1.41E-01	2.57E-02		2.68E-01	4.89E-02		9.29E-02	1.69E-02		3.00E-01	5.46E-02	
PCB-175	7.17	6.77	1.85E-02	3.15E-03	U	6.10E-02	1.04E-02	J	2.18E-02	3.72E-03	U	1.66E-02	2.84E-03	U	1.50E-02	2.56E-03	U	5.70E-02	9.75E-03	J EMPC
PCB-187	7.17	6.77	1.47E+00	2.51E-01		2.31E+00	3.95E-01		7.90E-01	1.35E-01		1.21E+00	2.07E-01		5.20E-01	8.89E-02		1.81E+00	3.10E-01	
PCB-182	7.2	6.80	1.60E-02	2.55E-03	U	1.67E-02	2.67E-03	U	1.88E-02	3.01E-03	U	1.44E-02	2.30E-03	U	1.30E-02	2.07E-03	U	1.24E-02	1.98E-03	U
PCB-183	7.2	6.80	6.54E-01	1.05E-01		9.38E-01	1.50E-01		3.31E-01	5.30E-02		5.04E-01	8.07E-02		2.33E-01	3.73E-02		7.54E-01	1.21E-01	
PCB-185	7.11	6.71	8.76E-02	1.71E-02		1.56E-01	3.04E-02		2.19E-02	4.26E-03	U	1.40E-01	2.73E-02		1.51E-02	2.94E-03	U	7.52E-02	1.46E-02	J
PCB-174	7.11	6.71	1.21E+00	2.36E-01		1.83E+00	3.56E-01		6.15E-01	1.20E-01		1.14E+00	2.22E-01		3.25E-01	6.33E-02		1.23E+00	2.39E-01	
PCB-177	7.08	6.68	6.19E-01	1.29E-01		1.08E+00	2.24E-01		3.11E-01	6.46E-02		5.94E-01	1.23E-01		2.22E-01	4.61E-02		7.89E-01	1.64E-01	
PCB-181	7.11	6.71	1.78E-02	3.46E-03	U	1.86E-02	3.61E-03	U	2.09E-02	4.07E-03	U	1.60E-02	3.11E-03	U	1.44E-02	2.80E-03	U	1.35E-02	2.62E-03	U
PCB-171/173	7.065	6.67	3.71E-01	7.96E-02	[a]	4.96E-01	1.06E-01	[a]	1.51E-01	3.24E-02	J [a]	3.11E-01	6.68E-02	[a]	1.17E-01	2.51E-02	J [a]	4.45E-01	9.56E-02	[a]
PCB-172	7.33	6.92	1.49E-01	1.80E-02		2.43E-01	2.93E-02		5.60E-02	6.76E-03	J	1.38E-01	1.67E-02		1.56E-02	1.88E-03	U	1.92E-01	2.32E-02	
PCB-192	7.52	7.10	1.56E-02	1.24E-03	U	1.63E-02	1.30E-03	U	1.83E-02	1.46E-03	U	1.40E-02	1.12E-03	U	1.26E-02	1.01E-03	U	1.13E-02	9.01E-04	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD0025			SD0018			SD0051			SD0010			SD0028			SD0026		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-180/193	7.44	7.02	1.97E+00	1.87E-01	[a]	2.40E+00	2.28E-01	[a]	9.14E-01	8.69E-02	[a]	1.80E+00	1.71E-01	[a]	5.86E-01	5.57E-02	[a]	2.12E+00	2.01E-01	[a]
PCB-191	7.55	7.13	1.47E-02	1.10E-03	U	6.08E-02	4.55E-03	J EMPC	1.74E-02	1.30E-03	U	1.33E-02	9.92E-04	U	1.20E-02	8.95E-04	U	5.35E-02	4.00E-03	J
PCB-170	7.27	6.86	8.74E-01	1.20E-01		1.24E+00	1.71E-01		3.34E-01	4.59E-02		7.31E-01	1.01E-01		2.07E-01	2.85E-02		9.56E-01	1.32E-01	
PCB-190	7.46	7.04	1.54E-01	1.40E-02		2.37E-01	2.16E-02		5.19E-02	4.73E-03	J EMPC	1.25E-01	1.14E-02		1.26E-02	1.14E-03	U	1.58E-01	1.44E-02	
PCB-189	7.71	7.28	3.02E-02	1.60E-03	J	2.23E-02	1.18E-03	U	1.62E-02	8.57E-04	U	1.41E-02	7.46E-04	U	1.06E-02	5.61E-04	U	9.82E-03	5.20E-04	U
PCB-202	7.24	6.83	1.01E-01	1.48E-02		1.30E-01	1.91E-02		4.85E-02	7.12E-03	J	9.68E-02	1.42E-02		3.46E-02	5.08E-03	J	8.84E-02	1.30E-02	
PCB-201	7.62	7.19	8.45E-03	5.44E-04	U	6.81E-02	4.38E-03	J	1.56E-02	1.00E-03	U	6.93E-02	4.46E-03	J	1.30E-02	8.33E-04	U	3.98E-02	2.56E-03	J EMPC
PCB-204	7.3	6.89	9.05E-03	1.17E-03	U	1.08E-02	1.39E-03	U	1.67E-02	2.15E-03	U	1.17E-02	1.51E-03	U	1.39E-02	1.79E-03	U	1.06E-02	1.36E-03	U
PCB-197	7.3	6.89	7.80E-03	1.01E-03	U	9.35E-03	1.21E-03	U	1.44E-02	1.86E-03	U	1.01E-02	1.30E-03	U	1.20E-02	1.55E-03	U	9.27E-03	1.20E-03	U
PCB-200	7.27	6.86	9.50E-03	1.31E-03	U	7.30E-02	1.00E-02	J EMPC	1.75E-02	2.40E-03	U	1.23E-02	1.69E-03	U	1.46E-02	2.00E-03	U	1.11E-02	1.52E-03	U
PCB-198/199	7.41	6.99	3.62E-01	3.67E-02	[a]	6.80E-01	6.90E-02	[a]	2.06E-01	2.09E-02	[a]	4.12E-01	4.18E-02	[a]	1.32E-01	1.34E-02	J EMPC [a]	3.79E-01	3.85E-02	[a]
PCB-196	7.65	7.22	1.51E-01	9.10E-03		3.20E-01	1.93E-02		9.87E-02	5.95E-03	EMPC	2.10E-01	1.27E-02		1.86E-02	1.12E-03	U	1.69E-01	1.02E-02	
PCB-203	7.65	7.22	1.74E-01	1.05E-02	EMPC	3.48E-01	2.10E-02		1.44E-01	8.68E-03	EMPC	1.98E-01	1.19E-02		1.79E-02	1.08E-03	U	1.72E-01	1.04E-02	EMPC
PCB-195	7.56	7.13	7.60E-02	5.57E-03	J	1.61E-01	1.18E-02		3.10E-02	2.27E-03	U	1.16E-01	8.50E-03		2.61E-02	1.91E-03	U	8.89E-02	6.52E-03	
PCB-194	7.8	7.36	1.83E-01	7.96E-03		3.87E-01	1.68E-02		1.40E-01	6.09E-03		2.61E-01	1.14E-02		6.32E-02	2.75E-03	J	2.53E-01	1.10E-02	
PCB-205	8	7.55	1.50E-02	4.21E-04	U	1.50E-02	4.23E-04	U	2.04E-02	5.75E-04	U	1.31E-02	3.68E-04	U	1.72E-02	4.85E-04	U	1.52E-02	4.28E-04	U
PCB-208	7.71	7.28	1.51E-02	7.96E-04	U	4.96E-02	2.62E-03	J	2.00E-02	1.06E-03	U	1.36E-02	7.17E-04	U	1.34E-02	7.06E-04	U	1.57E-02	8.32E-04	U
PCB-207	7.74	7.30	1.47E-02	7.26E-04	U	1.20E-02	5.95E-04	U	1.95E-02	9.67E-04	U	1.32E-02	6.54E-04	U	1.30E-02	6.45E-04	U	1.53E-02	7.56E-04	U
PCB-206	8.09	7.63	2.07E-02	4.80E-04	U	1.12E-01	2.60E-03		2.74E-02	6.35E-04	U	6.36E-02	1.47E-03		1.98E-02	4.59E-04	U	1.10E-01	2.54E-03	
PCB-209	8.18	7.72	1.54E-02	2.93E-04	U	1.58E-02	3.00E-04	U	2.03E-02	3.86E-04	U	1.64E-02	3.13E-04	U	1.68E-02	3.20E-04	U	4.08E-02	7.78E-04	J

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD0055			SD009			SD0015			SD0013			SD0011			SD0052		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-1	4.46	4.21	5.35E-03	3.29E-01	U	5.35E-03	3.29E-01		7.75E-03	4.76E-01	U	8.00E-03	4.91E-01	U	6.40E-03	3.93E-01	U	8.30E-03	5.10E-01	U
PCB-2	4.69	4.43	6.50E-03	2.42E-01	U	6.50E-03	2.42E-01	U	9.65E-03	3.60E-01	U	1.01E-02	3.75E-01	U	7.80E-03	2.91E-01	U	1.03E-02	3.84E-01	U
PCB-3	4.69	4.43	6.20E-03	2.31E-01	U	6.20E-03	2.31E-01	J EMPC	9.20E-03	3.43E-01	U	9.50E-03	3.54E-01	U	7.40E-03	2.76E-01	U	9.80E-03	3.65E-01	U
PCB-4	4.65	4.39	1.18E-01	4.80E+00	EMPC	1.18E-01	4.80E+00		1.00E-01	4.07E+00		1.24E-01	5.04E+00		1.54E-01	6.26E+00		2.06E-01	8.38E+00	
PCB-10	4.84	4.57	1.28E-02	3.43E-01	U	1.28E-02	3.43E-01		1.75E-02	4.71E-01	U	2.09E-02	5.63E-01	U	1.49E-02	4.01E-01	U	1.75E-02	4.70E-01	U
PCB-9	5.06	4.78	1.60E-02	2.66E-01	U	1.60E-02	2.66E-01		2.08E-02	3.46E-01	U	2.15E-02	3.59E-01	U	1.88E-02	3.14E-01	U	2.09E-02	3.48E-01	U
PCB-7	5.07	4.79	1.40E-02	2.28E-01	U	1.40E-02	2.28E-01		1.83E-02	2.99E-01	U	1.90E-02	3.10E-01	U	1.66E-02	2.71E-01	U	1.84E-02	3.01E-01	U
PCB-6	5.06	4.78	2.94E-02	4.91E-01	J	2.94E-02	4.91E-01		3.27E-02	5.46E-01	J	3.47E-02	5.79E-01	J	5.05E-02	8.43E-01	J	2.00E-01	3.34E+00	
PCB-5	4.97	4.69	1.50E-02	3.03E-01	U	1.50E-02	3.03E-01	J	1.95E-02	3.96E-01	U	2.03E-02	4.11E-01	U	1.77E-02	3.59E-01	U	1.97E-02	3.99E-01	U
PCB-8	5.07	4.79	1.00E-01	1.63E+00		1.00E-01	1.63E+00		1.36E-01	2.22E+00		1.36E-01	2.22E+00		2.12E-01	3.46E+00		5.53E-01	9.03E+00	
PCB-14	5.28	4.98	1.24E-02	1.28E-01	U	1.24E-02	1.28E-01	U	1.62E-02	1.67E-01	U	1.68E-02	1.73E-01	U	1.47E-02	1.52E-01	U	1.63E-02	1.68E-01	U
PCB-11	5.28	4.98	7.59E-02	7.86E-01	J	7.59E-02	7.86E-01		8.01E-02	8.29E-01	J	9.26E-02	9.59E-01		1.19E-01	1.23E+00		3.28E-01	3.40E+00	
PCB-13/12	5.26	4.97	1.46E-02	1.58E-01	U	1.46E-02	1.58E-01	J EMPC [a]	1.92E-02	2.08E-01	U	1.99E-02	2.15E-01	U	1.74E-02	1.88E-01	U	1.94E-02	2.09E-01	U
PCB-15	5.3	5.00	1.44E-02	1.43E-01	U	1.44E-02	1.43E-01		1.95E-02	1.93E-01	U	2.03E-02	2.01E-01	U	4.69E-02	4.65E-01	J	1.61E-01	1.60E+00	
PCB-19	5.02	4.74	4.19E-02	7.63E-01	J	4.19E-02	7.63E-01		1.80E-01	3.28E+00		2.39E-01	4.35E+00		1.76E-01	3.20E+00		1.51E-01	2.75E+00	EMPC
PCB-30/18	5.34	5.04	4.03E-01	3.66E+00	[a]	4.03E-01	3.66E+00	[a]	1.25E+00	1.14E+01	[a]	1.94E+00	1.76E+01	[a]	1.57E+00	1.43E+01	[a]	1.57E+00	1.43E+01	[a]
PCB-17	5.25	4.96	1.88E-01	2.08E+00		1.88E-01	2.08E+00		4.97E-01	5.49E+00		7.91E-01	8.74E+00		7.18E-01	7.93E+00		9.08E-01	1.00E+01	
PCB-27	5.44	5.14	3.23E-02	2.36E-01	J	3.23E-02	2.36E-01		1.08E-01	7.90E-01		1.79E-01	1.31E+00		1.46E-01	1.07E+00		1.54E-01	1.13E+00	
PCB-24	5.35	5.05	8.60E-03	7.65E-02	U	8.60E-03	7.65E-02	J EMPC	1.01E-02	8.98E-02	U	1.08E-02	9.56E-02	U	1.02E-02	9.07E-02	U	9.60E-03	8.54E-02	U
PCB-16	5.16	4.87	1.68E-01	2.26E+00		1.68E-01	2.26E+00		4.66E-01	6.26E+00		6.97E-01	9.36E+00		6.08E-01	8.17E+00		5.59E-01	7.51E+00	
PCB-32	5.44	5.14	1.25E-01	9.14E-01		1.25E-01	9.14E-01		4.47E-01	3.27E+00		6.48E-01	4.74E+00		5.18E-01	3.79E+00		6.17E-01	4.51E+00	
PCB-34	5.66	5.34	7.65E-03	3.47E-02	U	7.65E-03	3.47E-02	U	1.23E-02	5.58E-02	U	1.20E-02	5.42E-02	U	1.13E-02	5.10E-02	U	1.34E-02	6.06E-02	U
PCB-23	5.57	5.26	7.60E-03	4.19E-02	U	7.60E-03	4.19E-02	U	1.21E-02	6.65E-02	U	1.18E-02	6.48E-02	U	1.10E-02	6.07E-02	U	1.31E-02	7.23E-02	U
PCB-26/29	5.63	5.31	5.61E-02	2.72E-01	J [a]	5.61E-02	2.72E-01	[a]	1.44E-01	6.97E-01	J [a]	2.22E-01	1.07E+00	[a]	2.19E-01	1.06E+00	[a]	5.06E-01	2.45E+00	[a]
PCB-25	5.67	5.35	3.15E-02	1.40E-01	J	3.15E-02	1.40E-01	EMPC	7.29E-02	3.24E-01	J	1.17E-01	5.19E-01		9.20E-02	4.08E-01		2.45E-01	1.09E+00	
PCB-31	5.67	5.35	2.63E-01	1.17E+00		2.63E-01	1.17E+00		1.14E+00	5.06E+00		1.39E+00	6.17E+00		1.27E+00	5.64E+00		2.38E+00	1.06E+01	
PCB-28/20	5.62	5.31	2.75E-01	1.36E+00	[a]	2.75E-01	1.36E+00	[a]	1.09E+00	5.39E+00	[a]	1.35E+00	6.68E+00	[a]	1.19E+00	5.89E+00	[a]	2.70E+00	1.34E+01	[a]
PCB-21/33	5.55	5.24	1.45E-01	8.35E-01	J [a]	1.45E-01	8.35E-01	[a]	5.87E-01	3.38E+00	[a]	6.95E-01	4.00E+00	[a]	6.82E-01	3.93E+00	[a]	8.62E-01	4.97E+00	[a]
PCB-22	5.58	5.27	9.04E-02	4.88E-01		9.04E-02	4.88E-01		3.29E-01	1.78E+00		4.29E-01	2.32E+00		4.52E-01	2.44E+00		7.89E-01	4.26E+00	
PCB-36	5.88	5.55	7.25E-03	2.04E-02	U	7.25E-03	2.04E-02	U	1.18E-02	3.32E-02	U	1.15E-02	3.24E-02	U	1.08E-02	3.04E-02	U	1.29E-02	3.62E-02	U
PCB-39	5.89	5.56	7.05E-03	1.94E-02	U	7.05E-03	1.94E-02	U	1.15E-02	3.15E-02	U	3.54E-02	9.75E-02	J EMPC	1.05E-02	2.88E-02	U	1.25E-02	3.43E-02	U
PCB-38	5.76	5.44	7.80E-03	2.85E-02	U	7.80E-03	2.85E-02	U	1.21E-02	4.40E-02	U	1.18E-02	4.29E-02	U	1.11E-02	4.03E-02	U	1.31E-02	4.78E-02	U
PCB-35	5.82	5.49	8.45E-03	2.71E-02	U	8.45E-03	2.71E-02	J	1.35E-02	4.33E-02	U	1.32E-02	4.21E-02	U	1.23E-02	3.94E-02	U	1.47E-02	4.70E-02	U
PCB-37	5.83	5.50	9.45E-03	2.96E-02	U	9.45E-03	2.96E-02		1.33E-01	4.17E-01		1.25E-01	3.92E-01	EMPC	1.13E-01	3.54E-01		4.55E-01	1.43E+00	
PCB-54	5.21	4.92	5.20E-03	6.27E-02	U	5.20E-03	6.27E-02	U	5.25E-03	6.33E-02	U	6.90E-03	8.32E-02	U	4.29E-03	5.16E-02	U	4.95E-03	5.97E-02	U
PCB-50/53	5.625	5.31	1.38E-01	6.75E-01	J [a]	1.38E-01	6.75E-01	[a]	1.25E+00	6.12E+00	[a]	1.32E+00	6.46E+00	[a]	5.95E-01	2.91E+00	[a]	4.39E-01	2.15E+00	[a]
PCB-45	5.53	5.22	1.43E-01	8.60E-01		1.43E-01	8.60E-01		1.18E+00	7.10E+00		1.25E+00	7.52E+00		5.50E-01	3.31E+00		4.04E-01	2.43E+00	
PCB-51	5.63	5.31	3.60E-02	1.74E-01	J	3.60E-02	1.74E-01		3.44E-01	1.67E+00		3.19E-01	1.54E+00		1.70E-01	8.23E-01		9.86E-02	4.77E-01	
PCB-46	5.53	5.22	4.74E-02	2.85E-01	J	4.74E-02	2.85E-01		4.94E-01	2.97E+00		5.39E-01	3.24E+00		2.32E-01	1.40E+00		1.53E-01	9.20E-01	
PCB-52	5.84	5.51	1.00E+00	3.07E+00		1.00E+00	3.07E+00		7.30E+00	2.24E+01		8.92E+00	2.74E+01		5.77E+00	1.77E+01		4.78E+00	1.47E+01	
PCB-73	6.04	5.70	6.15E-03	1.22E-02	U	6.15E-03	1.22E-02	U	6.50E-03	1.29E-02	U	9.05E-03	1.80E-02	U	6.15E-03	1.22E-02	U	6.45E-03	1.28E-02	U
PCB-43	5.75	5.43	9.15E-03	3.41E-02	U	9.15E-03	3.41E-02		2.36E-01	8.81E-01		2.76E-01	1.03E+00		1.43E-01	5.34E-01		8.55E-02	3.19E-01	EMPC
PCB-69/49	5.95	5.62	4.56E-01	1.10E+00	[a]	4.56E-01	1.10E+00	[a]	3.20E+00	7.73E+00	[a]	3.97E+00	9.59E+00	[a]	2.47E+00	5.97E+00	[a]	2.03E+00	4.91E+00	[a]
PCB-48	5.78	5.46	1.49E-01	5.21E-01		1.49E-01	5.21E-01		1.13E+00	3.95E+00		1.28E+00	4.47E+00		6.82E-01	2.38E+00		5.78E-01	2.02E+00	
PCB-44/47/65	5.82	5.49	6.46E-01	2.07E+00	[a]	6.46E-01	2.07E+00	[a]	5.21E+00	1.67E+01	[a]	5.96E+00	1.91E+01	[a]	3.48E+00	1.12E+01	[a]	2.92E+00	9.36E+00	[a]
PCB-59/62/75	5.96	5.63	5.33E-02	1.26E-01	J [a]	5.33E-02	1.26E-01	[a]	4.09E-01	9.67E-01	[a]	4.76E-01	1.13E+00	[a]	2.51E-01	5.94E-01	[a]	2.38E-01	5.63E-01	J [a]
PCB-42	5.76	5.44	1.52E-01	5.55E-01		1.52E-01	5.55E-01		1.35E+00	4.93E+00		1.52E+00	5.55E+00		8.28E-01	3.02E+00		7.25E-01	2.65E+00	
PCB-41	5.69	5.37	4.90E-02	2.08E-01	J	4.90E-02	2.08E-01		3.37E-01	1.43E+00		4.24E-01	1.80E+00		2.22E-01	9.44E-01		1.86E-01	7.91E-01	
PCB-71/40	5.82	5.49	2.45E-01	7.85E-01	[a]	2.45E-01	7.85E-01	[a]	2.44E+00	7.82E+00	[a]	2.49E+00	7.98E+00	[a]	1.40E+00	4.49E+00	[a]	1.13E+00	3.62E+00	[a]
PCB-64	5.95	5.62	2.32E-01	5.61E-01		2.32E-01	5.61E-01		2.08E+00	5.03E+00		2.37E+00	5.73E+00		1.34E+00	3.24E+00		1.13E+00	2.73E+00	
PCB-72	6.26	5.91	8.35E-03	1.03E-02	U	8.35E-03	1.03E-02	U	1.16E-02	1.42E-02	U	3.94E-02	4.86E-02	J	1.09E-02	1.34E-02	U	1.11E-02	1.36E-02	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD0055			SD009			SD0015			SD0013			SD0011			SD0052		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-68	6.26	5.91	6.95E-03	8.57E-03	U	6.95E-03	8.57E-03	U	9.65E-03	1.19E-02	U	1.13E-02	1.39E-02	U	9.05E-03	1.12E-02	U	9.20E-03	1.13E-02	U
PCB-57	6.17	5.82	7.50E-03	1.12E-02	U	7.50E-03	1.12E-02	U	1.09E-02	1.63E-02	U	1.28E-02	1.91E-02	U	1.02E-02	1.53E-02	U	1.04E-02	1.56E-02	U
PCB-58	6.17	5.82	7.50E-03	1.12E-02	U	7.50E-03	1.12E-02	U	1.05E-02	1.57E-02	U	1.23E-02	1.84E-02	U	9.85E-03	1.48E-02	U	1.01E-02	1.51E-02	U
PCB-67	6.2	5.85	7.20E-03	1.01E-02	U	7.20E-03	1.01E-02		6.58E-02	9.24E-02	J EMPC	7.57E-02	1.06E-01	J EMPC	5.85E-02	8.22E-02	J EMPC	7.86E-02	1.10E-01	J EMPC
PCB-63	6.17	5.82	6.95E-03	1.04E-02	U	6.95E-03	1.04E-02		1.09E-01	1.63E-01	EMPC	1.52E-01	2.28E-01		8.88E-02	1.33E-01		8.22E-02	1.23E-01	J
PCB-61/70/74/76	6.14	5.80	5.27E-01	8.43E-01	[a]	5.27E-01	8.43E-01	[a]	4.76E+00	7.62E+00	[a]	5.61E+00	8.98E+00	[a]	3.76E+00	6.02E+00	[a]	4.18E+00	6.69E+00	[a]
PCB-66	6.2	5.85	2.44E-01	3.43E-01		2.44E-01	3.43E-01		2.18E+00	3.06E+00		2.54E+00	3.57E+00		1.68E+00	2.36E+00		2.10E+00	2.95E+00	
PCB-55	6.11	5.77	8.00E-03	1.37E-02	U	8.00E-03	1.37E-02	J	2.70E-02	4.61E-02	J EMPC	1.31E-02	2.23E-02	U	1.05E-02	1.78E-02	U	1.07E-02	1.82E-02	U
PCB-56	6.11	5.77	9.77E-02	1.67E-01		9.77E-02	1.67E-01		1.19E+00	2.03E+00		1.33E+00	2.27E+00		8.39E-01	1.43E+00		8.76E-01	1.50E+00	
PCB-60	6.11	5.77	7.35E-02	1.26E-01	J	7.35E-02	1.26E-01		5.83E-01	9.95E-01		6.31E-01	1.08E+00		4.21E-01	7.19E-01		4.75E-01	8.11E-01	
PCB-80	6.48	6.12	6.95E-03	5.31E-03	U	6.95E-03	5.31E-03	U	9.45E-03	7.23E-03	U	1.11E-02	8.45E-03	U	8.85E-03	6.77E-03	U	9.00E-03	6.88E-03	U
PCB-79	6.42	6.06	6.80E-03	5.92E-03	U	6.80E-03	5.92E-03	J	5.11E-02	4.45E-02	J	4.09E-02	3.56E-02	J	4.44E-02	3.87E-02	J	9.25E-03	8.06E-03	U
PCB-78	6.35	5.99	8.60E-03	8.72E-03	U	8.60E-03	8.72E-03	U	1.18E-02	1.19E-02	U	1.38E-02	1.39E-02	U	1.10E-02	1.12E-02	U	1.12E-02	1.14E-02	U
PCB-81	6.36	6.00	8.40E-03	8.33E-03	U	8.40E-03	8.33E-03	U	1.20E-02	1.19E-02	U	1.40E-02	1.39E-02	U	1.12E-02	1.11E-02	U	1.15E-02	1.14E-02	U
PCB-77	6.36	6.00	8.20E-03	8.14E-03	U	8.20E-03	8.14E-03		8.71E-02	8.64E-02		9.00E-02	8.93E-02		6.81E-02	6.76E-02	J EMPC	1.19E-01	1.18E-01	
PCB-104	5.81	5.48	4.36E-03	1.43E-02	U	4.36E-03	1.43E-02	U	5.70E-03	1.87E-02	U	6.20E-03	2.03E-02	U	3.84E-03	1.26E-02	U	4.44E-03	1.45E-02	U
PCB-96	5.71	5.39	4.77E-03	1.94E-02	U	4.77E-03	1.94E-02	J	1.38E-01	5.62E-01		9.59E-02	3.90E-01		5.63E-02	2.29E-01	J	2.60E-02	1.06E-01	J EMPC
PCB-103	6.22	5.87	9.95E-03	1.34E-02	U	9.95E-03	1.34E-02	J	6.73E-02	9.05E-02	J EMPC	7.67E-02	1.03E-01	J	1.75E-02	2.35E-02	U	1.38E-02	1.85E-02	U
PCB-94	6.13	5.79	1.10E-02	1.79E-02	U	1.10E-02	1.79E-02	U	1.33E-02	2.17E-02	U	2.05E-02	3.35E-02	U	1.89E-02	3.09E-02	U	1.49E-02	2.43E-02	U
PCB-95	6.13	5.79	9.31E-01	1.52E+00		9.31E-01	1.52E+00		6.17E+00	1.01E+01		7.70E+00	1.26E+01		5.66E+00	9.25E+00		3.92E+00	6.41E+00	
PCB-100/93	6.14	5.80	1.03E-02	1.64E-02	U	1.03E-02	1.64E-02	J [a]	1.15E-02	1.83E-02	U	1.77E-02	2.83E-02	U	1.63E-02	2.61E-02	U	1.28E-02	2.05E-02	U
PCB-102	6.16	5.81	9.30E-03	1.42E-02	U	9.30E-03	1.42E-02		3.24E-01	4.96E-01		3.19E-01	4.89E-01		1.75E-01	2.68E-01		1.36E-02	2.08E-02	U
PCB-98	6.13	5.79	1.04E-02	1.70E-02	U	1.04E-02	1.70E-02	U	1.20E-02	1.95E-02	U	1.85E-02	3.02E-02	U	1.70E-02	2.78E-02	U	1.34E-02	2.18E-02	U
PCB-88	6.07	5.73	1.25E-02	2.32E-02	U	1.25E-02	2.32E-02	U	1.54E-02	2.87E-02	U	2.39E-02	4.44E-02	U	2.20E-02	4.09E-02	U	1.73E-02	3.21E-02	U
PCB-91	6.13	5.79	0.163	2.67E-01	EMPC	0.163	2.67E-01		9.71E-01	1.59E+00		1.04E+00	1.70E+00		6.71E-01	1.10E+00		5.18E-01	8.47E-01	
PCB-84	6.04	5.70	3.63E-01	7.22E-01		3.63E-01	7.22E-01		2.44E+00	4.85E+00		2.72E+00	5.41E+00		1.86E+00	3.70E+00		1.27E+00	2.52E+00	
PCB-89	6.07	5.73	1.13E-02	2.10E-02	U	1.13E-02	2.10E-02		1.47E-01	2.74E-01		6.45E-02	1.20E-01	J EMPC	6.75E-02	1.26E-01	J EMPC	1.49E-02	2.77E-02	U
PCB-121	6.64	6.27	7.30E-03	3.94E-03	U	7.30E-03	3.94E-03	U	8.60E-03	4.65E-03	U	1.33E-02	7.19E-03	U	1.23E-02	6.62E-03	U	9.65E-03	5.21E-03	U
PCB-92	6.35	5.99	2.43E-01	2.46E-01		2.43E-01	2.46E-01		1.14E+00	1.16E+00		1.50E+00	1.52E+00		1.06E+00	1.07E+00		8.03E-01	8.14E-01	
PCB-113/90/101	6.43	6.07	1.20E+00	1.02E+00	[a]	1.20E+00	1.02E+00	[a]	6.35E+00	5.41E+00	[a]	7.88E+00	6.72E+00	[a]	6.17E+00	5.26E+00	[a]	4.40E+00	3.75E+00	[a]
PCB-83	6.26	5.91	5.93E-02	7.31E-02	J EMPC	5.93E-02	7.31E-02		3.56E-01	4.39E-01		3.82E-01	4.71E-01		2.56E-01	3.16E-01		2.34E-01	2.88E-01	EMPC
PCB-99	6.39	6.03	5.70E-01	5.30E-01		5.70E-01	5.30E-01		3.09E+00	2.87E+00		3.60E+00	3.35E+00		2.87E+00	2.67E+00		2.02E+00	1.88E+00	
PCB-112	6.45	6.09	7.70E-03	6.28E-03	U	7.70E-03	6.28E-03	U	9.40E-03	7.67E-03	U	1.46E-02	1.19E-02	U	1.35E-02	1.10E-02	U	1.06E-02	8.61E-03	U
PCB-108/119/86/97/125/87	6.44	6.08	6.16E-01	5.14E-01	[a]	6.16E-01	5.14E-01	[a]	3.99E+00	3.33E+00	[a]	4.66E+00	3.89E+00	[a]	3.65E+00	3.04E+00	[a]	2.79E+00	2.33E+00	[a]
PCB-117	6.46	6.10	2.05E-02	1.64E-02	J EMPC	2.05E-02	1.64E-02		8.75E-03	6.99E-03	U	1.17E-01	9.34E-02		1.25E-02	9.98E-03	U	9.80E-03	7.83E-03	U
PCB-116/85	6.32	5.97	1.61E-01	1.74E-01	J [a]	1.61E-01	1.74E-01	[a]	1.25E+00	1.35E+00	[a]	1.25E+00	1.35E+00	[a]	9.84E-01	1.06E+00	[a]	8.07E-01	8.73E-01	[a]
PCB-110	6.48	6.12	1.12E+00	8.56E-01		1.12E+00	8.56E-01		6.38E+00	4.88E+00		7.67E+00	5.86E+00		5.98E+00	4.57E+00		4.72E+00	3.61E+00	
PCB-115	6.49	6.13	7.40E-03	5.54E-03	U	7.40E-03	5.54E-03		9.50E-03	7.11E-03	U	1.47E-02	1.10E-02	U	1.36E-02	1.01E-02	U	1.07E-02	7.97E-03	U
PCB-82	6.2	5.85	8.59E-02	1.21E-01	EMPC	8.59E-02	1.21E-01		8.38E-01	1.18E+00		7.93E-01	1.11E+00		6.58E-01	9.24E-01		4.56E-01	6.40E-01	
PCB-111	6.76	6.38	7.35E-03	3.06E-03	U	7.35E-03	3.06E-03	U	8.60E-03	3.58E-03	U	1.33E-02	5.54E-03	U	1.23E-02	5.10E-03	U	9.60E-03	4.00E-03	U
PCB-120	6.79	6.41	7.40E-03	2.89E-03	U	7.40E-03	2.89E-03	U	8.70E-03	3.39E-03	U	1.35E-02	5.25E-03	U	1.24E-02	4.84E-03	U	9.75E-03	3.80E-03	U
PCB-107/124	6.72	6.34	8.15E-03	3.70E-03	U	8.15E-03	3.70E-03	[a]	1.67E-01	7.58E-02	J [a]	1.36E-01	6.18E-02	J EMPC [a]	1.32E-01	5.99E-02	J EMPC [a]	1.25E-01	5.68E-02	J [a]
PCB-109	6.48	6.12	5.06E-02	3.87E-02	J	5.06E-02	3.87E-02		2.92E-01	2.23E-01		3.01E-01	2.30E-01		2.64E-01	2.02E-01		2.12E-01	1.62E-01	
PCB-123	6.74	6.36	8.30E-03	3.61E-03	U	8.30E-03	3.61E-03	EMPC	8.82E-02	3.83E-02	EMPC	7.35E-02	3.20E-02	J	6.31E-02	2.74E-02	J	4.42E-02	1.92E-02	J EMPC
PCB-106	6.64	6.27	8.35E-03	4.51E-03	U	8.35E-03	4.51E-03	U	9.45E-03	5.11E-03	U	1.47E-02	7.91E-03	U	1.35E-02	7.29E-03	U	1.06E-02	5.73E-03	U
PCB-118	6.74	6.36	5.25E-01	2.28E-01		5.25E-01	2.28E-01		3.29E+00	1.43E+00		4.11E+00	1.79E+00		3.68E+00	1.60E+00		3.08E+00	1.34E+00	
PCB-122	6.64	6.27	8.80E-03	4.75E-03	U	8.80E-03	4.75E-03	EMPC	1.15E-02	6.19E-03	U	1.73E-02	9.35E-03	U	1.55E-02	8.35E-03	U	4.78E-02	2.58E-02	J
PCB-114	6.65	6.28	7.90E-03	4.18E-03	U	7.90E-03	4.18E-03		1.01E-01	5.34E-02	EMPC	7.57E-02	4.00E-02	J EMPC	7.07E-02	3.74E-02	J	6.34E-02	3.35E-02	J
PCB-105	6.65	6.28	2.22E-01	1.17E-01		2.22E-01	1.17E-01		1.48E+00	7.82E-01		1.64E+00	8.67E-01		1.48E+00	7.82E-01		1.22E+00	6.45E-01	
PCB-127	6.95	6.56	8.00E-03	2.20E-03	U	8.00E-03	2.20E-03	U	1.08E-02	2.96E-03	U	1.66E-02	4.56E-03	U	1.49E-02	4.09E-03	U	1.13E-02	3.10E-03	U
PCB-126	6.89	6.50	6.75E-03	2.12E-03	U	6.75E-03	2.12E-03	U	1.08E-02	3.39E-03	U	1.26E-02	3.96E-03	U	6.65E-03	2.09E-03	U	8.60E-03	2.70E-03	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

Chemicals	log K_{ow}	log K_F	SD0055			SD009			SD0015			SD0013			SD0011			SD0052		
			C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-155	6.41	6.05	5.45E-03	4.85E-03	U	5.45E-03	4.85E-03	U	4.75E-03	4.22E-03	U	6.25E-03	5.56E-03	U	4.77E-03	4.25E-03	U	4.90E-03	4.36E-03	U
PCB-152	6.22	5.87	5.80E-03	7.80E-03	U	5.80E-03	7.80E-03	U	5.10E-03	6.86E-03	U	6.70E-03	9.01E-03	U	5.10E-03	6.86E-03	U	5.25E-03	7.06E-03	U
PCB-150	6.32	5.97	5.65E-03	6.11E-03	U	5.65E-03	6.11E-03	U	5.15E-03	5.57E-03	U	6.80E-03	7.36E-03	U	5.15E-03	5.57E-03	U	5.30E-03	5.74E-03	U
PCB-136	6.22	5.87	2.69E-01	3.62E-01		2.69E-01	3.62E-01		1.04E+00	1.40E+00		1.37E+00	1.84E+00		8.80E-01	1.18E+00		4.79E-01	6.44E-01	
PCB-145	6.25	5.90	6.05E-03	7.62E-03	U	6.05E-03	7.62E-03	U	5.45E-03	6.87E-03	U	7.20E-03	9.07E-03	U	5.50E-03	6.93E-03	U	5.60E-03	7.06E-03	U
PCB-148	6.73	6.35	8.60E-03	3.82E-03	U	8.60E-03	3.82E-03	U	6.50E-03	2.89E-03	U	8.80E-03	3.91E-03	U	6.95E-03	3.09E-03	U	7.25E-03	3.22E-03	U
PCB-151/135	6.64	6.27	6.65E-01	3.59E-01	[a]	6.65E-01	3.59E-01	[a]	2.21E+00	1.19E+00	[a]	2.91E+00	1.57E+00	[a]	1.84E+00	9.94E-01	[a]	1.16E+00	6.27E-01	[a]
PCB-154	6.76	6.38	7.75E-03	3.23E-03	U	7.75E-03	3.23E-03	U	9.15E-02	3.81E-02		9.16E-02	3.81E-02		6.95E-02	2.89E-02	J	3.71E-02	1.54E-02	J
PCB-144	6.67	6.30	8.78E-02	4.44E-02		8.78E-02	4.44E-02		3.13E-01	1.58E-01	EMPC	4.57E-01	2.31E-01		2.88E-01	1.46E-01		1.51E-01	7.64E-02	EMPC
PCB-147/149	6.655	6.28	1.64E+00	8.58E-01	[a]	1.64E+00	8.58E-01	[a]	5.21E+00	2.72E+00	[a]	6.91E+00	3.61E+00	[a]	4.56E+00	2.38E+00	[a]	2.95E+00	1.54E+00	[a]
PCB-134	6.55	6.18	1.20E-02	7.85E-03	U	1.20E-02	7.85E-03		4.21E-01	2.77E-01		5.49E-01	3.61E-01		3.13E-01	2.06E-01		2.61E-01	1.71E-01	
PCB-143	6.6	6.23	8.50E-03	5.01E-03	U	8.50E-03	5.01E-03	U	6.35E-03	3.74E-03	U	8.55E-03	5.04E-03	U	6.75E-03	3.98E-03	U	7.00E-03	4.12E-03	U
PCB-139/140	6.67	6.30	8.60E-03	4.35E-03	U	8.60E-03	4.35E-03	J [a]	1.16E-01	5.87E-02	J EMPC [a]	9.89E-02	5.01E-02	J [a]	8.10E-02	4.10E-02	J [a]	6.39E-02	3.23E-02	J EMPC [a]
PCB-131	6.58	6.21	9.95E-03	6.12E-03	U	9.95E-03	6.12E-03	EMPC	1.06E-01	6.52E-02		1.00E-01	6.15E-02		8.19E-02	5.04E-02	J	5.57E-02	3.43E-02	J
PCB-142	6.51	6.14	1.00E-02	7.16E-03	U	1.00E-02	7.16E-03	U	7.65E-03	5.48E-03	U	1.04E-02	7.41E-03	U	8.15E-03	5.84E-03	U	8.45E-03	6.05E-03	U
PCB-132	6.58	6.21	4.83E-01	2.97E-01		4.83E-01	2.97E-01		2.12E+00	1.30E+00		2.61E+00	1.61E+00		1.85E+00	1.14E+00		1.22E+00	7.51E-01	
PCB-133	6.86	6.47	9.10E-03	3.05E-03	U	9.10E-03	3.05E-03		7.28E-02	2.44E-02	J EMPC	7.38E-02	2.47E-02	J	4.26E-02	1.43E-02	J EMPC	5.21E-02	1.75E-02	J
PCB-165	7.05	6.65	7.35E-03	1.63E-03	U	7.35E-03	1.63E-03	U	5.60E-03	1.24E-03	U	7.60E-03	1.69E-03	U	6.00E-03	1.33E-03	U	6.20E-03	1.38E-03	U
PCB-146	6.89	6.50	2.77E-01	8.70E-02		2.77E-01	8.70E-02		8.96E-01	2.81E-01		1.02E+00	3.20E-01		6.15E-01	1.93E-01		4.73E-01	1.48E-01	
PCB-161	7.08	6.68	6.90E-03	1.43E-03	U	6.90E-03	1.43E-03	U	5.10E-03	1.06E-03	U	6.90E-03	1.43E-03	U	5.45E-03	1.13E-03	U	5.65E-03	1.17E-03	U
PCB-153/168	7.01	6.62	1.47E+00	3.56E-01	[a]	1.47E+00	3.56E-01	[a]	5.15E+00	1.25E+00	[a]	5.55E+00	1.34E+00	[a]	3.69E+00	8.93E-01	[a]	2.50E+00	6.05E-01	[a]
PCB-141	6.82	6.44	1.84E-01	6.72E-02		1.84E-01	6.72E-02		9.92E-01	3.63E-01		1.19E+00	4.35E-01		7.78E-01	2.84E-01		4.87E-01	1.78E-01	
PCB-130	6.8	6.42	8.19E-02	3.13E-02	J	8.19E-02	3.13E-02		4.18E-01	1.60E-01		4.26E-01	1.63E-01		2.96E-01	1.13E-01		2.32E-01	8.85E-02	
PCB-137	6.83	6.45	2.87E-02	1.03E-02	J EMPC	2.87E-02	1.03E-02		3.11E-01	1.11E-01		2.05E-01	7.33E-02		1.58E-01	5.65E-02		1.56E-01	5.58E-02	
PCB-164	7.02	6.63	7.09E-02	1.68E-02	J EMPC	7.09E-02	1.68E-02		4.11E-01	9.73E-02		5.00E-01	1.18E-01		3.30E-01	7.81E-02		2.31E-01	5.47E-02	
PCB-163/138/129	6.85	6.47	1.55E+00	5.31E-01	[a]	1.55E+00	5.31E-01	[a]	6.33E+00	2.17E+00	[a]	6.52E+00	2.23E+00	[a]	4.69E+00	1.61E+00	[a]	3.43E+00	1.17E+00	[a]
PCB-160	6.93	6.54	7.35E-03	2.12E-03	U	7.35E-03	2.12E-03	U	5.80E-03	1.67E-03	U	7.85E-03	2.26E-03	U	6.20E-03	1.78E-03	U	6.40E-03	1.84E-03	U
PCB-158	7.02	6.63	1.03E-01	2.44E-02		1.03E-01	2.44E-02		6.28E-01	1.49E-01		6.15E-01	1.46E-01		4.55E-01	1.08E-01		3.54E-01	8.38E-02	
PCB-128/166	6.47	6.11	1.88E-01	1.47E-01	[a]	1.88E-01	1.47E-01	[a]	9.96E-01	7.78E-01	[a]	9.11E-01	7.12E-01	[a]	7.12E-01	5.56E-01	[a]	5.86E-01	4.58E-01	[a]
PCB-159	7.24	6.83	8.25E-03	1.21E-03	U	8.25E-03	1.21E-03	J	4.41E-02	6.47E-03	J	6.26E-02	9.19E-03	J EMPC	2.92E-02	4.29E-03	J	8.75E-03	1.28E-03	U
PCB-162	7.24	6.83	8.35E-03	1.23E-03	U	8.35E-03	1.23E-03	U	1.08E-02	1.59E-03	U	1.29E-02	1.89E-03	U	8.45E-03	1.24E-03	U	8.70E-03	1.28E-03	U
PCB-167	7.27	6.86	4.15E-02	5.71E-03	J	4.15E-02	5.71E-03	EMPC	2.81E-01	3.87E-02		1.80E-01	2.48E-02		1.46E-01	2.01E-02		1.03E-01	1.42E-02	EMPC
PCB-156/157	7.18	6.78	9.74E-02	1.63E-02	J [a]	9.74E-02	1.63E-02	[a]	8.11E-01	1.36E-01	[a]	4.34E-01	7.26E-02	[a]	3.82E-01	6.39E-02	[a]	3.03E-01	5.07E-02	[a]
PCB-169	7.42	7.00	1.23E-02	1.22E-03	U	1.23E-02	1.22E-03	U	1.57E-02	1.55E-03	U	1.77E-02	1.75E-03	U	1.16E-02	1.15E-03	U	1.13E-02	1.12E-03	U
PCB-188	6.82	6.44	4.00E-03	1.46E-03	U	4.00E-03	1.46E-03	U	4.84E-03	1.77E-03	U	5.55E-03	2.03E-03	U	5.20E-03	1.90E-03	U	5.25E-03	1.92E-03	U
PCB-179	6.73	6.35	2.61E-01	1.16E-01		2.61E-01	1.16E-01		7.08E-01	3.15E-01		8.24E-01	3.66E-01		4.40E-01	1.96E-01		1.58E-01	7.02E-02	EMPC
PCB-184	6.85	6.47	4.77E-03	1.63E-03	U	4.77E-03	1.63E-03	U	5.50E-03	1.88E-03	U	6.35E-03	2.17E-03	U	5.95E-03	2.04E-03	U	6.00E-03	2.05E-03	U
PCB-176	6.76	6.38	7.29E-02	3.03E-02	J	7.29E-02	3.03E-02	EMPC	1.90E-01	7.91E-02		2.16E-01	8.99E-02		1.10E-01	4.58E-02		5.53E-02	2.30E-02	J
PCB-186	6.69	6.31	4.50E-03	2.18E-03	U	4.50E-03	2.18E-03	U	5.45E-03	2.64E-03	U	6.25E-03	3.03E-03	U	5.90E-03	2.86E-03	U	5.95E-03	2.88E-03	U
PCB-178	7.14	6.74	1.36E-01	2.48E-02		1.36E-01	2.48E-02		3.55E-01	6.48E-02		3.90E-01	7.11E-02		1.63E-01	2.97E-02	EMPC	1.02E-01	1.86E-02	
PCB-175	7.17	6.77	1.28E-02	2.19E-03	U	1.28E-02	2.19E-03	J	7.62E-02	1.30E-02	J	7.45E-02	1.27E-02	J EMPC	1.03E-02	1.75E-03	U	1.23E-02	2.09E-03	U
PCB-187	7.17	6.77	7.88E-01	1.35E-01		7.88E-01	1.35E-01		1.72E+00	2.94E-01		1.85E+00	3.16E-01		1.05E+00	1.79E-01		5.63E-01	9.62E-02	
PCB-182	7.2	6.80	1.14E-02	1.83E-03	U	1.14E-02	1.83E-03	U	8.60E-03	1.38E-03	U	1.19E-02	1.91E-03	U	9.00E-03	1.44E-03	U	1.07E-02	1.71E-03	U
PCB-183	7.2	6.80	2.81E-01	4.50E-02		2.81E-01	4.50E-02		8.70E-01	1.39E-01		8.60E-01	1.38E-01		4.82E-01	7.72E-02		2.54E-01	4.07E-02	
PCB-185	7.11	6.71	3.56E-02	6.93E-03	J EMPC	0.0356	6.93E-03	J	9.65E-03	1.88E-03	U	0.0904	1.76E-02	EMPC	0.0829	1.61E-02	J EMPC	1.21E-02	2.35E-03	U
PCB-174	7.11	6.71	5.12E-01	9.97E-02		5.12E-01	9.97E-02		1.54E+00	3.00E-01		1.50E+00	2.92E-01		8.69E-01	1.69E-01		4.11E-01	8.00E-02	
PCB-177	7.08	6.68	3.17E-01	6.59E-02	EMPC	3.17E-01	6.59E-02		8.38E-01	1.74E-01		8.69E-01	1.81E-01		4.57E-01	9.50E-02		2.22E-01	4.61E-02	
PCB-181	7.11	6.71	1.24E-02	2.41E-03	U	1.24E-02	2.41E-03	U	9.35E-03	1.82E-03	U	1.30E-02	2.52E-03	U	9.80E-03	1.91E-03	U	1.17E-02	2.27E-03	U
PCB-171/173	7.065	6.67	1.46E-01	3.13E-02	J [a]	1.46E-01	3.13E-02	[a]	4.39E-01	9.42E-02	[a]	4.03E-01	8.65E-02	[a]	2.46E-01	5.28E-02	[a]	1.16E-01	2.49E-02	J [a]
PCB-172	7.33	6.92	6.20E-02	7.49E-03	J	6.20E-02	7.49E-03	EMPC	2.10E-01	2.54E-02		2.14E-01	2.58E-02		9.71E-02	1.17E-02		5.34E-02	6.45E-03	J
PCB-192	7.52	7.10	1.04E-02	8.27E-04	U	1.04E-02	8.27E-04	U	8.00E-03	6.39E-04	U	1.11E-02	8.87E-04	U	8.40E-03	6.71E-04	U	1.00E-02	7.99E-04	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD0055			SD009			SD0015			SD0013			SD0011			SD0052		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-180/193	7.44	7.02	6.63E-01	6.31E-02	[a]	6.63E-01	6.31E-02	[a]	2.29E+00	2.18E-01	[a]	2.08E+00	1.98E-01	[a]	1.31E+00	1.25E-01	[a]	6.83E-01	6.50E-02	[a]
PCB-191	7.55	7.13	1.00E-02	7.49E-04	U	1.00E-02	7.49E-04	U	7.80E-03	5.84E-04	U	1.08E-02	8.09E-04	U	8.15E-03	6.10E-04	U	9.70E-03	7.26E-04	U
PCB-170	7.27	6.86	3.46E-01	4.76E-02		3.46E-01	4.76E-02		1.36E+00	1.87E-01		1.05E+00	1.44E-01		6.21E-01	8.54E-02		2.89E-01	3.98E-02	
PCB-190	7.46	7.04	6.90E-02	6.28E-03	J	6.90E-02	6.28E-03		1.93E-01	1.76E-02	EMPC	2.15E-01	1.96E-02		1.34E-01	1.22E-02		3.39E-02	3.09E-03	J EMPC
PCB-189	7.71	7.28	7.35E-03	3.89E-04	U	7.35E-03	3.89E-04	U	5.61E-02	2.97E-03	J	1.11E-02	5.87E-04	U	1.98E-02	1.05E-03	J	8.25E-03	4.37E-04	U
PCB-202	7.24	6.83	5.59E-02	8.21E-03	J	5.59E-02	8.21E-03		9.17E-02	1.35E-02		9.16E-02	1.34E-02	EMPC	4.41E-02	6.47E-03	J EMPC	3.98E-02	5.84E-03	J
PCB-201	7.62	7.19	3.17E-02	2.04E-03	J EMPC	3.17E-02	2.04E-03	J	5.26E-02	3.38E-03	J EMPC	7.40E-02	4.76E-03	J	3.01E-02	1.94E-03	J	7.10E-03	4.57E-04	U
PCB-204	7.3	6.89	7.05E-03	9.09E-04	U	7.05E-03	9.09E-04	U	7.70E-03	9.92E-04	U	8.60E-03	1.11E-03	U	6.95E-03	8.96E-04	U	7.45E-03	9.60E-04	U
PCB-197	7.3	6.89	6.20E-03	7.99E-04	U	6.20E-03	7.99E-04	U	7.25E-03	9.34E-04	U	8.15E-03	1.05E-03	U	6.55E-03	8.44E-04	U	7.05E-03	9.09E-04	U
PCB-200	7.27	6.86	7.35E-03	1.01E-03	U	7.35E-03	1.01E-03	J	5.37E-02	7.39E-03	J EMPC	6.46E-02	8.89E-03	J	7.00E-03	9.63E-04	U	7.50E-03	1.03E-03	U
PCB-198/199	7.41	6.99	2.12E-01	2.15E-02	EMPC [a]	2.12E-01	2.15E-02	[a]	5.17E-01	5.25E-02	[a]	5.42E-01	5.50E-02	[a]	2.87E-01	2.91E-02	EMPC [a]	1.41E-01	1.43E-02	J [a]
PCB-196	7.65	7.22	1.02E-01	6.15E-03		1.02E-01	6.15E-03		2.30E-01	1.39E-02		1.68E-01	1.01E-02	EMPC	1.23E-01	7.41E-03		4.83E-02	2.91E-03	J EMPC
PCB-203	7.65	7.22	9.85E-02	5.94E-03	EMPC	9.85E-02	5.94E-03		2.52E-01	1.52E-02	EMPC	2.46E-01	1.48E-02		1.38E-01	8.32E-03		7.27E-02	4.38E-03	J
PCB-195	7.56	7.13	4.30E-02	3.15E-03	J	4.30E-02	3.15E-03		1.91E-01	1.40E-02		1.48E-01	1.08E-02		7.51E-02	5.50E-03	J	1.57E-02	1.15E-03	U
PCB-194	7.8	7.36	1.37E-01	5.96E-03		1.37E-01	5.96E-03		3.64E-01	1.58E-02		3.29E-01	1.43E-02		1.66E-01	7.22E-03		8.63E-02	3.76E-03	
PCB-205	8	7.55	1.08E-02	3.04E-04	U	1.08E-02	3.04E-04	U	9.85E-03	2.78E-04	U	1.31E-02	3.68E-04	U	1.02E-02	2.88E-04	U	1.07E-02	3.02E-04	U
PCB-208	7.71	7.28	9.65E-03	5.11E-04	U	9.65E-03	5.11E-04	U	3.77E-02	1.99E-03	J	1.36E-02	7.20E-04	U	1.22E-02	6.46E-04	U	1.25E-02	6.61E-04	U
PCB-207	7.74	7.30	9.40E-03	4.66E-04	U	9.40E-03	4.66E-04	U	9.35E-03	4.64E-04	U	1.32E-02	6.54E-04	U	1.19E-02	5.87E-04	U	1.21E-02	6.00E-04	U
PCB-206	8.09	7.63	4.63E-02	1.07E-03	J	4.63E-02	1.07E-03	J EMPC	9.43E-02	2.19E-03		1.07E-01	2.48E-03	J EMPC	6.29E-02	1.46E-03	J EMPC	1.80E-02	4.17E-04	U
PCB-209	8.18	7.72	1.13E-02	2.15E-04	U	1.13E-02	2.15E-04	J EMPC	1.12E-02	2.13E-04	U	3.47E-02	6.62E-04	J	1.12E-02	2.13E-04	U	1.04E-02	1.97E-04	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

Chemicals	log K_{ow}	log K_F	SD004-1			SD004-2			SD004-3			SD0054			SD0054-AC			SD0053-1		
			C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-1	4.46	4.21	5.37E-02	3.30E+00	J	4.35E-02	2.67E+00	J	5.01E-02	3.08E+00	J	9.45E-03	5.80E-01	U	6.30E-03	3.87E-01	U	9.55E-03	5.87E-01	U
PCB-2	4.69	4.43	7.10E-03	2.65E-01	U	1.04E-02	3.88E-01	U	8.60E-03	3.21E-01	U	1.16E-02	4.31E-01	U	7.55E-03	2.82E-01	U	1.21E-02	4.51E-01	U
PCB-3	4.69	4.43	6.75E-03	2.52E-01	U	9.90E-03	3.69E-01	U	8.15E-03	3.04E-01	U	1.08E-02	4.01E-01	U	7.19E-03	2.68E-01	U	1.12E-02	4.17E-01	U
PCB-4	4.65	4.39	1.37E-01	5.57E+00		1.50E-01	6.10E+00		1.58E-01	6.42E+00		1.27E-01	5.16E+00		2.14E-02	8.69E-01	U	3.25E-01	1.32E+01	
PCB-10	4.84	4.57	1.22E-02	3.27E-01	U	1.90E-02	5.10E-01	U	1.72E-02	4.62E-01	U	2.39E-02	6.42E-01	U	1.36E-02	3.66E-01	U	2.28E-02	6.14E-01	U
PCB-9	5.06	4.78	3.06E-02	5.11E-01	J	2.70E-02	4.51E-01	J	3.21E-02	5.36E-01	J	4.22E-02	7.04E-01	U	1.95E-02	3.25E-01	U	4.42E-02	7.38E-01	J
PCB-7	5.07	4.79	2.31E-02	3.77E-01	J	1.89E-02	3.09E-01	J	2.83E-02	4.62E-01	J	3.69E-02	6.03E-01	U	1.70E-02	2.78E-01	U	2.55E-02	4.17E-01	J
PCB-6	5.06	4.78	6.84E-02	1.14E+00	J	6.33E-02	1.06E+00	J	6.32E-02	1.05E+00	J	4.57E-02	7.63E-01	J	1.84E-02	3.06E-01	U	1.63E-01	2.72E+00	
PCB-5	4.97	4.69	1.55E-02	3.15E-01	J	2.03E-02	4.12E-01	U	1.52E-02	3.07E-01	U	4.02E-02	8.15E-01	U	1.82E-02	3.69E-01	U	3.11E-02	6.30E-01	U
PCB-8	5.07	4.79	3.26E-01	5.32E+00		3.30E-01	5.39E+00		3.13E-01	5.11E+00		1.98E-01	3.23E+00		4.16E-02	6.80E-01	J	8.80E-01	1.44E+01	
PCB-14	5.28	4.98	1.20E-02	1.24E-01	U	1.68E-02	1.73E-01	U	1.25E-02	1.29E-01	U	3.29E-02	3.41E-01	U	1.51E-02	1.56E-01	U	2.55E-02	2.63E-01	U
PCB-11	5.28	4.98	1.49E-01	1.54E+00		1.72E-01	1.78E+00		1.52E-01	1.57E+00		3.20E-01	3.31E+00		1.08E-01	1.11E+00		9.54E-02	9.88E-01	
PCB-13/12	5.26	4.97	1.42E-02	1.53E-01	U	1.98E-02	2.14E-01	U	1.49E-02	1.61E-01	U	3.89E-02	4.21E-01	U	1.78E-02	1.92E-01	U	3.01E-02	3.25E-01	U
PCB-15	5.3	5.00	7.44E-02	7.38E-01	J	9.04E-02	8.96E-01		7.75E-02	7.68E-01		7.47E-02	7.40E-01	J	1.75E-02	1.74E-01	U	1.74E-01	1.72E+00	
PCB-19	5.02	4.74	1.18E-01	2.15E+00		1.66E-01	3.02E+00		1.29E-01	2.35E+00		1.24E-01	2.26E+00	EMPC	3.55E-02	6.45E-01	J	4.13E-01	7.52E+00	
PCB-30/18	5.34	5.04	1.40E+00	1.27E+01	[a]	1.40E+00	1.27E+01	[a]	1.44E+00	1.31E+01	[a]	1.31E+00	1.19E+01	[a]	3.65E-01	3.32E+00	[a]	5.15E+00	4.68E+01	[a]
PCB-17	5.25	4.96	6.46E-01	7.14E+00		6.31E-01	6.97E+00		6.81E-01	7.52E+00		6.59E-01	7.28E+00		1.92E-01	2.12E+00		2.04E+00	2.25E+01	
PCB-27	5.44	5.14	1.04E-01	7.61E-01	EMPC	1.36E-01	9.95E-01		1.24E-01	9.07E-01		1.22E-01	8.92E-01		1.98E-02	1.44E-01	J EMPC	2.89E-01	2.11E+00	
PCB-24	5.35	5.05	7.55E-03	6.71E-02	U	1.26E-02	1.12E-01	U	7.90E-03	7.03E-02	U	1.57E-02	1.40E-01	U	9.21E-03	8.19E-02	U	1.23E-02	1.09E-01	U
PCB-16	5.16	4.87	5.27E-01	7.08E+00		5.30E-01	7.12E+00		5.31E-01	7.13E+00		6.54E-01	8.79E+00		1.62E-01	2.18E+00		2.07E+00	2.78E+01	
PCB-32	5.44	5.14	4.49E-01	3.28E+00		4.98E-01	3.64E+00		4.97E-01	3.64E+00		4.68E-01	3.42E+00		1.30E-01	9.49E-01		1.56E+00	1.14E+01	
PCB-34	5.66	5.34	9.90E-03	4.49E-02	U	1.36E-02	6.15E-02	U	1.22E-02	5.53E-02	U	1.74E-02	7.89E-02	U	9.03E-03	4.10E-02	U	1.56E-02	7.05E-02	U
PCB-23	5.57	5.26	9.75E-03	5.38E-02	U	1.34E-02	7.39E-02	U	1.20E-02	6.62E-02	U	1.71E-02	9.40E-02	U	8.96E-03	4.94E-02	U	1.53E-02	8.41E-02	U
PCB-26/29	5.63	5.31	2.69E-01	1.30E+00	[a]	2.81E-01	1.36E+00	[a]	2.75E-01	1.33E+00	[a]	3.00E-01	1.45E+00	[a]	9.73E-02	4.71E-01	J [a]	7.40E-01	3.58E+00	[a]
PCB-25	5.67	5.35	1.05E-01	4.66E-01		1.24E-01	5.50E-01		1.17E-01	5.19E-01		1.38E-01	6.13E-01		4.75E-02	2.11E-01	J	2.97E-01	1.32E+00	
PCB-31	5.67	5.35	1.68E+00	7.46E+00		1.87E+00	8.30E+00		1.82E+00	8.08E+00		1.47E+00	6.53E+00		5.32E-01	2.36E+00		5.18E+00	2.30E+01	
PCB-28/20	5.62	5.31	1.70E+00	8.41E+00	[a]	1.84E+00	9.10E+00	[a]	1.81E+00	8.96E+00	[a]	1.46E+00	7.22E+00	[a]	5.17E-01	2.56E+00	[a]	4.72E+00	2.34E+01	[a]
PCB-21/33	5.55	5.24	7.63E-01	4.40E+00	[a]	8.16E-01	4.70E+00	[a]	8.31E-01	4.79E+00	[a]	6.88E-01	3.96E+00	[a]	2.44E-01	1.41E+00	[a]	2.74E+00	1.58E+01	[a]
PCB-22	5.58	5.27	5.72E-01	3.09E+00		6.03E-01	3.25E+00		6.04E-01	3.26E+00		5.36E-01	2.89E+00		1.91E-01	1.03E+00		1.74E+00	9.39E+00	
PCB-36	5.88	5.55	9.35E-03	2.63E-02	U	1.29E-02	3.62E-02	U	1.18E-02	3.31E-02	U	1.68E-02	4.73E-02	U	8.55E-03	2.41E-02	U	1.50E-02	4.22E-02	U
PCB-39	5.89	5.56	9.05E-03	2.49E-02	U	1.25E-02	3.43E-02	U	1.14E-02	3.14E-02	U	1.64E-02	4.50E-02	U	8.29E-03	2.28E-02	U	1.46E-02	4.02E-02	U
PCB-38	5.76	5.44	1.01E-02	3.69E-02	U	1.39E-02	5.06E-02	U	1.20E-02	4.38E-02	U	1.78E-02	6.50E-02	U	9.21E-03	3.36E-02	U	1.60E-02	5.82E-02	U
PCB-35	5.82	5.49	1.09E-02	3.49E-02	U	1.50E-02	4.79E-02	U	1.34E-02	4.29E-02	U	1.91E-02	6.12E-02	U	9.95E-03	3.19E-02	U	1.71E-02	5.48E-02	U
PCB-37	5.83	5.50	2.02E-01	6.34E-01	EMPC	2.20E-01	6.90E-01		2.48E-01	7.78E-01		1.77E-01	5.55E-01		5.98E-02	1.87E-01	J EMPC	6.55E-01	2.05E+00	
PCB-54	5.21	4.92	4.92E-03	5.92E-02	U	6.85E-03	8.26E-02	U	5.50E-03	6.63E-02	U	8.85E-03	1.07E-01	U	5.60E-03	6.75E-02	U	8.55E-03	1.03E-01	U
PCB-50/53	5.625	5.31	5.02E-01	2.46E+00	[a]	5.54E-01	2.71E+00	[a]	6.04E-01	2.96E+00	[a]	4.93E-01	2.41E+00	[a]	2.12E-01	1.04E+00	[a]	1.42E+00	6.95E+00	[a]
PCB-45	5.53	5.22	5.03E-01	3.03E+00		6.01E-01	3.62E+00		5.23E-01	3.15E+00		5.22E-01	3.14E+00		2.49E-01	1.50E+00		1.52E+00	9.14E+00	
PCB-51	5.63	5.31	1.25E-01	6.05E-01		1.26E-01	6.10E-01		1.53E-01	7.41E-01		8.06E-02	3.90E-01	J	5.66E-02	2.74E-01	J	2.31E-01	1.12E+00	
PCB-46	5.53	5.22	1.91E-01	1.15E+00		2.13E-01	1.28E+00		2.18E-01	1.31E+00		1.96E-01	1.18E+00		9.51E-02	5.72E-01		5.51E-01	3.31E+00	
PCB-52	5.84	5.51	5.06E+00	1.55E+01		5.56E+00	1.71E+01		5.73E+00	1.76E+01		5.49E+00	1.68E+01		2.96E+00	9.07E+00		1.54E+01	4.73E+01	
PCB-73	6.04	5.70	6.05E-03	1.20E-02	U	8.70E-03	1.73E-02	U	6.50E-03	1.29E-02	U	1.38E-02	2.73E-02	U	7.00E-03	1.39E-02	U	9.00E-03	1.79E-02	U
PCB-43	5.75	5.43	1.17E-01	4.37E-01		1.47E-01	5.48E-01	EMPC	1.22E-01	4.55E-01	EMPC	1.53E-01	5.71E-01		5.22E-02	1.95E-01	J	2.70E-01	1.01E+00	EMPC
PCB-69/49	5.95	5.62	2.24E+00	5.41E+00	[a]	2.44E+00	5.90E+00	[a]	2.58E+00	6.24E+00	[a]	2.38E+00	5.75E+00	[a]	1.28E+00	3.10E+00	[a]	4.87E+00	1.18E+01	[a]
PCB-48	5.78	5.46	6.01E-01	2.10E+00		6.53E-01	2.28E+00		6.95E-01	2.43E+00		6.68E-01	2.34E+00		3.39E-01	1.19E+00		1.61E+00	5.63E+00	
PCB-44/47/65	5.82	5.49	3.25E+00	1.04E+01	[a]	3.58E+00	1.15E+01	[a]	3.64E+00	1.17E+01	[a]	3.24E+00	1.04E+01	[a]	1.76E+00	5.65E+00	[a]	8.87E+00	2.84E+01	[a]
PCB-59/62/75	5.96	5.63	2.38E-01	5.63E-01	J [a]	2.39E-01	5.65E-01	J [a]	2.48E-01	5.87E-01	J [a]	2.40E-01	5.68E-01	J EMPC [a]	1.26E-01	2.98E-01	J [a]	5.07E-01	1.20E+00	[a]
PCB-42	5.76	5.44	7.36E-01	2.69E+00		7.85E-01	2.87E+00		8.60E-01	3.14E+00		8.42E-01	3.07E+00		4.37E-01	1.60E+00		1.77E+00	6.46E+00	
PCB-41	5.69	5.37	2.20E-01	9.35E-01		2.20E-01	9.35E-01		2.40E-01	1.02E+00		2.90E-01	1.23E+00		1.44E-01	6.11E-01		7.83E-01	3.33E+00	
PCB-71/40	5.82	5.49	1.18E+00	3.78E+00	[a]	1.30E+00	4.17E+00	[a]	1.36E+00	4.36E+00	[a]	1.27E+00	4.07E+00	[a]	6.65E-01	2.13E+00	[a]	3.32E+00	1.06E+01	[a]
PCB-64	5.95	5.62	1.25E+00	3.02E+00		1.30E+00	3.14E+00		1.41E+00	3.41E+00		1.28E+00	3.09E+00		6.74E-01	1.63E+00		3.22E+00	7.78E+00	
PCB-72	6.26	5.91	1.01E-02	1.25E-02	U	1.15E-02	1.42E-02	U	1.10E-02	1.35E-02	U	2.00E-02	2.46E-02	U	7.81E-03	9.63E-03	U	1.62E-02	2.00E-02	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

Chemicals	log K_{ow}	log K_F	SD004-1			SD004-2			SD004-3			SD0054			SD0054-AC			SD0053-1		
			C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-68	6.26	5.91	8.40E-03	1.04E-02	U	9.55E-03	1.18E-02	U	9.15E-03	1.13E-02	U	1.58E-02	1.95E-02	U	6.49E-03	8.00E-03	U	1.28E-02	1.58E-02	U
PCB-57	6.17	5.82	9.10E-03	1.36E-02	U	1.04E-02	1.55E-02	U	1.04E-02	1.55E-02	U	1.75E-02	2.62E-02	U	7.04E-03	1.06E-02	U	1.42E-02	2.12E-02	U
PCB-58	6.17	5.82	9.10E-03	1.36E-02	U	1.04E-02	1.55E-02	U	9.95E-03	1.49E-02	U	1.72E-02	2.58E-02	U	7.04E-03	1.06E-02	U	1.40E-02	2.09E-02	U
PCB-67	6.2	5.85	5.48E-02	7.70E-02	J EMPC	6.21E-02	8.72E-02	J	6.29E-02	8.83E-02	J	7.34E-02	1.03E-01	J EMPC	3.57E-02	5.01E-02	J	1.23E-01	1.73E-01	
PCB-63	6.17	5.82	8.10E-02	1.21E-01	J	8.00E-02	1.20E-01	J	8.69E-02	1.30E-01	J	6.71E-02	1.01E-01	J EMPC	4.27E-02	6.40E-02	J	1.77E-01	2.65E-01	
PCB-61/70/74/76	6.14	5.80	4.24E+00	6.78E+00	[a]	4.50E+00	7.20E+00	[a]	4.72E+00	7.55E+00	[a]	4.32E+00	6.91E+00	[a]	2.40E+00	3.84E+00	[a]	1.13E+01	1.81E+01	[a]
PCB-66	6.2	5.85	1.92E+00	2.70E+00		1.98E+00	2.78E+00		2.08E+00	2.92E+00		1.85E+00	2.60E+00		1.02E+00	1.43E+00		4.66E+00	6.54E+00	
PCB-55	6.11	5.77	9.65E-03	1.65E-02	U	1.10E-02	1.88E-02	U	1.06E-02	1.81E-02	U	1.84E-02	3.14E-02	U	7.48E-03	1.28E-02	U	1.05E-01	1.79E-01	
PCB-56	6.11	5.77	9.19E-01	1.57E+00		9.45E-01	1.61E+00		1.02E+00	1.74E+00		8.44E-01	1.44E+00		4.89E-01	8.36E-01		2.32E+00	3.96E+00	
PCB-60	6.11	5.77	4.89E-01	8.35E-01		5.03E-01	8.59E-01		5.50E-01	9.39E-01		4.49E-01	7.67E-01		2.56E-01	4.37E-01		1.23E+00	2.10E+00	
PCB-80	6.48	6.12	8.40E-03	6.42E-03	U	9.60E-03	7.34E-03	U	8.95E-03	6.84E-03	U	1.57E-02	1.20E-02	U	6.52E-03	4.99E-03	U	1.28E-02	9.75E-03	U
PCB-79	6.42	6.06	8.20E-03	7.14E-03	U	3.73E-02	3.25E-02	J	1.84E-02	1.60E-02	J	1.57E-02	1.37E-02	U	2.93E-02	2.55E-02	J EMPC	6.11E-02	5.32E-02	J
PCB-78	6.35	5.99	1.05E-02	1.06E-02	U	1.19E-02	1.20E-02	U	1.12E-02	1.13E-02	U	1.96E-02	1.98E-02	U	8.07E-03	8.18E-03	U	1.59E-02	1.61E-02	U
PCB-81	6.36	6.00	1.02E-02	1.01E-02	U	1.16E-02	1.15E-02	U	1.14E-02	1.13E-02	U	1.91E-02	1.90E-02	U	7.85E-03	7.79E-03	U	1.55E-02	1.54E-02	U
PCB-77	6.36	6.00	1.05E-01	1.04E-01		9.07E-02	9.00E-02		1.00E-01	9.92E-02		9.70E-02	9.62E-02		5.28E-02	5.24E-02	J	1.99E-01	1.97E-01	
PCB-104	5.81	5.48	5.00E-03	1.64E-02	U	7.30E-03	2.39E-02	U	4.79E-03	1.57E-02	U	1.26E-02	4.11E-02	U	5.09E-03	1.67E-02	U	7.15E-03	2.34E-02	U
PCB-96	5.71	5.39	4.79E-02	1.95E-01	J	5.59E-02	2.28E-01	J	5.12E-02	2.08E-01	J	6.22E-02	2.53E-01	J	4.02E-02	1.63E-01	J	1.24E-01	5.05E-01	EMPC
PCB-103	6.22	5.87	1.67E-02	2.24E-02	U	4.90E-02	6.59E-02	J EMPC	4.12E-02	5.54E-02	J EMPC	2.47E-02	3.32E-02	U	1.51E-02	2.04E-02	U	2.20E-02	2.96E-02	U
PCB-94	6.13	5.79	1.84E-02	3.00E-02	U	2.06E-02	3.37E-02	U	1.24E-02	2.02E-02	U	2.61E-02	4.26E-02	U	1.67E-02	2.73E-02	U	2.32E-02	3.79E-02	U
PCB-95	6.13	5.79	3.67E+00	6.00E+00		4.31E+00	7.05E+00		4.76E+00	7.78E+00		5.70E+00	9.32E+00		3.93E+00	6.42E+00		1.06E+01	1.73E+01	
PCB-100/93	6.14	5.80	1.72E-02	2.75E-02	U	1.93E-02	3.09E-02	U	1.07E-02	1.70E-02	U	2.40E-02	3.83E-02	U	1.56E-02	2.50E-02	U	8.36E-02	1.34E-01	J [a]
PCB-102	6.16	5.81	1.34E-01	2.05E-01		1.23E-01	1.88E-01		1.55E-01	2.37E-01		1.86E-01	2.85E-01		1.11E-01	1.70E-01		3.31E-01	5.07E-01	
PCB-98	6.13	5.79	1.75E-02	2.85E-02	U	1.96E-02	3.20E-02	U	1.12E-02	1.82E-02	U	2.49E-02	4.07E-02	U	1.58E-02	2.59E-02	U	2.22E-02	3.63E-02	U
PCB-88	6.07	5.73	2.08E-02	3.87E-02	U	2.34E-02	4.35E-02	U	1.44E-02	2.68E-02	U	2.93E-02	5.46E-02	U	1.89E-02	3.53E-02	U	2.61E-02	4.86E-02	U
PCB-91	6.13	5.79	5.84E-01	9.55E-01		5.70E-01	9.32E-01		6.35E-01	1.04E+00		8.01E-01	1.31E+00		5.31E-01	8.68E-01		1.38E+00	2.26E+00	
PCB-84	6.04	5.70	1.33E+00	2.64E+00		1.46E+00	2.90E+00		1.56E+00	3.10E+00		1.93E+00	3.84E+00		1.30E+00	2.58E+00		4.06E+00	8.07E+00	
PCB-89	6.07	5.73	1.89E-02	3.51E-02	U	4.64E-02	8.64E-02	J EMPC	2.47E-02	4.60E-02	J EMPC	8.04E-02	1.50E-01	J	1.72E-02	3.20E-02	U	1.58E-01	2.94E-01	
PCB-121	6.64	6.27	1.22E-02	6.59E-03	U	1.37E-02	7.40E-03	U	8.05E-03	4.35E-03	U	1.77E-02	9.56E-03	U	1.11E-02	5.99E-03	U	1.58E-02	8.51E-03	U
PCB-92	6.35	5.99	8.38E-01	8.50E-01		8.80E-01	8.92E-01		9.23E-01	9.36E-01		1.17E+00	1.19E+00		8.55E-01	8.67E-01		1.81E+00	1.84E+00	
PCB-113/90/101	6.43	6.07	4.84E+00	4.13E+00	[a]	5.11E+00	4.36E+00	[a]	5.40E+00	4.60E+00	[a]	6.76E+00	5.76E+00	[a]	4.90E+00	4.18E+00	[a]	1.08E+01	9.21E+00	[a]
PCB-83	6.26	5.91	2.86E-01	3.53E-01		2.30E-01	2.84E-01	EMPC	2.69E-01	3.32E-01	EMPC	3.61E-01	4.45E-01		2.41E-01	2.97E-01		5.63E-01	6.94E-01	
PCB-99	6.39	6.03	2.50E+00	2.32E+00		2.54E+00	2.36E+00		2.76E+00	2.57E+00		3.28E+00	3.05E+00		2.21E+00	2.06E+00		4.51E+00	4.19E+00	
PCB-112	6.45	6.09	1.29E-02	1.05E-02	U	1.45E-02	1.18E-02	U	8.80E-03	7.18E-03	U	1.86E-02	1.51E-02	U	1.17E-02	9.56E-03	U	1.65E-02	1.35E-02	U
PCB-108/119/86/97/125/87	6.44	6.08	2.89E+00	2.41E+00	[a]	2.97E+00	2.48E+00	[a]	3.21E+00	2.68E+00	[a]	4.34E+00	3.62E+00	[a]	2.89E+00	2.41E+00	[a]	7.76E+00	6.47E+00	[a]
PCB-117	6.46	6.10	1.55E-01	1.24E-01		6.32E-02	5.05E-02	J EMPC	1.33E-01	1.06E-01		1.99E-01	1.59E-01		1.08E-01	8.59E-02		2.75E-01	2.20E-01	
PCB-116/85	6.32	5.97	6.60E-01	7.14E-01	[a]	9.39E-01	1.02E+00	[a]	8.83E-01	9.56E-01	[a]	9.54E-01	1.03E+00	[a]	7.33E-01	7.93E-01	[a]	1.67E+00	1.81E+00	[a]
PCB-110	6.48	6.12	5.43E+00	4.15E+00		5.72E+00	4.37E+00		5.54E+00	4.24E+00		7.97E+00	6.09E+00		5.56E+00	4.25E+00		1.34E+01	1.02E+01	
PCB-115	6.49	6.13	1.24E-02	9.24E-03	U	1.39E-02	1.04E-02	U	8.90E-03	6.66E-03	U	1.74E-02	1.30E-02	U	1.12E-02	8.41E-03	U	1.55E-02	1.16E-02	U
PCB-82	6.2	5.85	5.71E-01	8.02E-01		5.37E-01	7.54E-01		6.06E-01	8.51E-01		7.81E-01	1.10E+00		5.84E-01	8.21E-01		1.50E+00	2.11E+00	
PCB-111	6.76	6.38	1.24E-02	5.14E-03	U	1.39E-02	5.77E-03	U	8.00E-03	3.33E-03	U	1.74E-02	7.22E-03	U	1.12E-02	4.66E-03	U	1.55E-02	6.43E-03	U
PCB-120	6.79	6.41	1.24E-02	4.82E-03	U	1.39E-02	5.40E-03	U	8.10E-03	3.16E-03	U	1.78E-02	6.92E-03	U	1.12E-02	4.38E-03	U	1.58E-02	6.16E-03	U
PCB-107/124	6.72	6.34	1.30E-01	5.90E-02	J [a]	1.28E-01	5.81E-02	J [a]	1.64E-01	7.45E-02	J [a]	2.60E-01	1.18E-01	[a]	1.61E-01	7.30E-02	[a]	3.47E-01	1.58E-01	[a]
PCB-109	6.48	6.12	2.53E-01	1.93E-01		2.33E-01	1.78E-01		2.54E-01	1.94E-01		4.02E-01	3.07E-01		2.53E-01	1.93E-01		4.77E-01	3.65E-01	
PCB-123	6.74	6.36	5.18E-02	2.25E-02	J EMPC	3.66E-02	1.59E-02	J EMPC	6.08E-02	2.64E-02	J EMPC	1.01E-01	4.39E-02	EMPC	6.22E-02	2.70E-02	EMPC	1.31E-01	5.70E-02	
PCB-106	6.64	6.27	1.40E-02	7.54E-03	U	1.57E-02	8.45E-03	U	8.80E-03	4.75E-03	U	1.89E-02	1.02E-02	U	1.27E-02	6.85E-03	U	1.68E-02	9.05E-03	U
PCB-118	6.74	6.36	3.25E+00	1.41E+00		3.41E+00	1.48E+00		3.68E+00	1.60E+00		4.37E+00	1.90E+00		2.88E+00	1.25E+00		7.28E+00	3.17E+00	
PCB-122	6.64	6.27	1.53E-02	8.27E-03	U	1.66E-02	8.94E-03	U	3.02E-02	1.63E-02	U	2.16E-02	1.16E-02	U	6.05E-02	3.27E-02	J	1.09E-01	5.89E-02	
PCB-114	6.65	6.28	6.23E-02	3.29E-02	J EMPC	4.32E-02	2.28E-02	J EMPC	6.77E-02	3.58E-02	J EMPC	1.92E-02	1.01E-02	U	7.12E-02	3.76E-02	EMPC	1.96E-01	1.04E-01	EMPC
PCB-105	6.65	6.28	1.32E+00	6.98E-01		1.45E+00	7.67E-01		1.48E+00	7.82E-01		1.87E+00	9.89E-01		1.25E+00	6.62E-01		3.54E+00	1.87E+00	EMPC
PCB-127	6.95	6.56	1.44E-02	3.97E-03	U	1.63E-02	4.49E-03	U	1.03E-02	2.84E-03	U	2.12E-02	5.84E-03	U	1.41E-02	3.89E-03	U	1.82E-02	5.02E-03	U
PCB-126	6.89	6.50	6.90E-03	2.17E-03	U	9.95E-03	3.12E-03	U	1.09E-02	3.41E-03	U	1.13E-02	3.53E-03	U	7.19E-03	2.26E-03	U	1.54E-02	4.83E-03	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD004-1			SD004-2			SD004-3			SD0054			SD0054-AC			SD0053-1		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-155	6.41	6.05	5.05E-03	4.50E-03	U	6.85E-03	6.10E-03	U	3.99E-03	3.55E-03	U	7.10E-03	6.32E-03	U	6.41E-03	5.71E-03	U	7.20E-03	6.41E-03	U
PCB-152	6.22	5.87	5.40E-03	7.26E-03	U	7.30E-03	9.82E-03	U	4.28E-03	5.75E-03	U	7.50E-03	1.01E-02	U	6.85E-03	9.22E-03	U	7.65E-03	1.03E-02	U
PCB-150	6.32	5.97	5.25E-03	5.68E-03	U	7.15E-03	7.74E-03	U	4.32E-03	4.68E-03	U	7.45E-03	8.06E-03	U	6.67E-03	7.22E-03	U	7.55E-03	8.17E-03	U
PCB-136	6.22	5.87	5.59E-01	7.52E-01		5.66E-01	7.61E-01		6.25E-01	8.40E-01		7.87E-01	1.06E+00		6.17E-01	8.30E-01		1.04E+00	1.40E+00	
PCB-145	6.25	5.90	5.65E-03	7.12E-03	U	7.65E-03	9.64E-03	U	4.58E-03	5.76E-03	U	7.90E-03	9.95E-03	U	7.15E-03	9.01E-03	U	8.05E-03	1.01E-02	U
PCB-148	6.73	6.35	6.80E-03	3.02E-03	U	1.01E-02	4.47E-03	U	6.50E-03	2.89E-03	U	1.16E-02	5.15E-03	U	9.58E-03	4.26E-03	U	1.03E-02	4.55E-03	U
PCB-151/135	6.64	6.27	1.25E+00	6.75E-01	[a]	1.27E+00	6.86E-01	[a]	1.34E+00	7.24E-01	[a]	1.70E+00	9.18E-01	[a]	1.32E+00	7.13E-01	[a]	1.94E+00	1.05E+00	[a]
PCB-154	6.76	6.38	6.23E-02	2.59E-02	J	5.60E-02	2.33E-02	J	4.68E-02	1.95E-02	J	1.08E-02	4.48E-03	U	4.59E-02	1.91E-02	J EMPC	9.50E-03	3.95E-03	U
PCB-144	6.67	6.30	1.88E-01	9.52E-02	EMPC	2.05E-01	1.04E-01		2.05E-01	1.04E-01		3.27E-01	1.66E-01		2.24E-01	1.13E-01		3.19E-01	1.61E-01	
PCB-147/149	6.655	6.28	3.05E+00	1.59E+00	[a]	3.05E+00	1.59E+00	[a]	3.45E+00	1.80E+00	[a]	4.46E+00	2.33E+00	[a]	3.34E+00	1.75E+00	[a]	4.88E+00	2.55E+00	[a]
PCB-134	6.55	6.18	2.83E-01	1.86E-01		2.34E-01	1.54E-01	EMPC	3.14E-01	2.06E-01	EMPC	4.56E-01	3.00E-01		2.61E-01	1.71E-01		4.76E-01	3.13E-01	
PCB-143	6.6	6.23	6.75E-03	3.98E-03	U	9.95E-03	5.86E-03	U	6.30E-03	3.71E-03	U	1.19E-02	7.01E-03	U	9.51E-03	5.60E-03	U	1.06E-02	6.22E-03	U
PCB-139/140	6.67	6.30	6.49E-02	3.28E-02	J EMPC [a]	7.01E-02	3.55E-02	J EMPC [a]	1.04E-01	5.26E-02	J EMPC [a]	1.46E-01	7.39E-02	J [a]	8.84E-02	4.48E-02	J [a]	1.27E-01	6.43E-02	J [a]
PCB-131	6.58	6.21	6.16E-02	3.79E-02	J EMPC	5.89E-02	3.62E-02	J EMPC	7.02E-02	4.32E-02	J EMPC	1.40E-01	8.62E-02		8.18E-02	5.03E-02		1.16E-01	7.14E-02	
PCB-142	6.51	6.14	7.95E-03	5.70E-03	U	1.17E-02	8.38E-03	U	7.65E-03	5.48E-03	U	1.39E-02	9.92E-03	U	1.12E-02	8.00E-03	U	1.23E-02	8.78E-03	U
PCB-132	6.58	6.21	1.20E+00	7.38E-01		1.30E+00	8.00E-01		1.33E+00	8.18E-01		1.98E+00	1.22E+00		1.43E+00	8.80E-01		2.46E+00	1.51E+00	
PCB-133	6.86	6.47	4.15E-02	1.39E-02	J	2.57E-02	8.61E-03	J EMPC	4.98E-02	1.67E-02	J EMPC	1.08E-01	3.62E-02	EMPC	5.56E-02	1.86E-02	J	5.33E-02	1.79E-02	J
PCB-165	7.05	6.65	5.85E-03	1.30E-03	U	8.60E-03	1.91E-03	U	5.60E-03	1.24E-03	U	1.00E-02	2.22E-03	U	8.22E-03	1.82E-03	U	8.85E-03	1.96E-03	U
PCB-146	6.89	6.50	4.63E-01	1.45E-01		5.00E-01	1.57E-01		4.98E-01	1.56E-01		8.16E-01	2.56E-01		5.61E-01	1.76E-01		6.87E-01	2.16E-01	
PCB-161	7.08	6.68	5.45E-03	1.13E-03	U	8.05E-03	1.67E-03	U	5.10E-03	1.06E-03	U	9.55E-03	1.98E-03	U	7.70E-03	1.60E-03	U	8.45E-03	1.76E-03	U
PCB-153/168	7.01	6.62	2.64E+00	6.39E-01	[a]	2.71E+00	6.56E-01	[a]	2.95E+00	7.14E-01	[a]	3.77E+00	9.12E-01	[a]	2.73E+00	6.62E-01	[a]	3.88E+00	9.39E-01	[a]
PCB-141	6.82	6.44	5.47E-01	2.00E-01		5.36E-01	1.96E-01		6.15E-01	2.25E-01		9.33E-01	3.41E-01		6.43E-01	2.35E-01		1.01E+00	3.69E-01	
PCB-130	6.8	6.42	2.22E-01	8.47E-02	EMPC	1.94E-01	7.40E-02	EMPC	2.48E-01	9.47E-02	EMPC	4.39E-01	1.68E-01		2.35E-01	8.97E-02	EMPC	3.45E-01	1.32E-01	
PCB-137	6.83	6.45	1.31E-01	4.68E-02	EMPC	1.64E-01	5.86E-02		1.80E-01	6.44E-02		2.78E-01	9.94E-02	EMPC	1.50E-01	5.35E-02		3.50E-01	1.25E-01	
PCB-164	7.02	6.63	2.45E-01	5.80E-02		2.38E-01	5.63E-02		2.44E-01	5.78E-02		3.29E-01	7.79E-02		2.90E-01	6.87E-02		3.45E-01	8.17E-02	
PCB-163/138/129	6.85	6.47	3.37E+00	1.15E+00	[a]	3.37E+00	1.15E+00	[a]	3.74E+00	1.28E+00	[a]	5.37E+00	1.84E+00	[a]	3.71E+00	1.27E+00	[a]	6.19E+00	2.12E+00	[a]
PCB-160	6.93	6.54	5.80E-03	1.67E-03	U	8.60E-03	2.48E-03	U	5.80E-03	1.67E-03	U	9.85E-03	2.83E-03	U	8.18E-03	2.35E-03	U	8.70E-03	2.50E-03	U
PCB-158	7.02	6.63	3.33E-01	7.88E-02		3.48E-01	8.24E-02		3.96E-01	9.37E-02		6.39E-01	1.51E-01		4.09E-01	9.68E-02		6.17E-01	1.46E-01	
PCB-128/166	6.47	6.11	4.92E-01	3.84E-01	[a]	5.47E-01	4.27E-01	[a]	6.13E-01	4.79E-01	[a]	8.59E-01	6.71E-01	[a]	5.93E-01	4.63E-01	[a]	9.65E-01	7.54E-01	[a]
PCB-159	7.24	6.83	9.20E-03	1.35E-03	U	1.23E-02	1.81E-03	U	7.80E-03	1.15E-03	U	1.63E-02	2.39E-03	U	8.51E-03	1.25E-03	U	1.76E-02	2.58E-03	U
PCB-162	7.24	6.83	9.30E-03	1.37E-03	U	1.24E-02	1.82E-03	U	7.75E-03	1.14E-03	U	1.61E-02	2.36E-03	U	8.59E-03	1.26E-03	U	1.74E-02	2.55E-03	U
PCB-167	7.27	6.86	9.49E-02	1.31E-02		8.27E-02	1.14E-02	J	1.25E-01	1.72E-02	J	1.96E-01	2.70E-02		1.18E-01	1.62E-02		1.60E-01	2.20E-02	
PCB-156/157	7.18	6.78	2.71E-01	4.53E-02	[a]	3.20E-01	5.35E-02	[a]	3.44E-01	5.75E-02	[a]	4.99E-01	8.35E-02	[a]	3.29E-01	5.51E-02	[a]	5.75E-01	9.62E-02	[a]
PCB-169	7.42	7.00	1.19E-02	1.18E-03	U	1.55E-02	1.53E-03	U	1.09E-02	1.08E-03	U	2.24E-02	2.22E-03	U	1.25E-02	1.24E-03	U	2.31E-02	2.29E-03	U
PCB-188	6.82	6.44	6.10E-03	2.23E-03	U	5.75E-03	2.10E-03	U	4.60E-03	1.68E-03	U	8.20E-03	3.00E-03	U	5.09E-03	1.86E-03	U	6.70E-03	2.45E-03	U
PCB-179	6.73	6.35	2.38E-01	1.06E-01		2.79E-01	1.24E-01		2.85E-01	1.27E-01		4.15E-01	1.84E-01		2.83E-01	1.26E-01		4.47E-01	1.99E-01	
PCB-184	6.85	6.47	7.25E-03	2.48E-03	U	6.85E-03	2.35E-03	U	5.25E-03	1.80E-03	U	9.95E-03	3.41E-03	U	6.04E-03	2.07E-03	U	8.10E-03	2.77E-03	U
PCB-176	6.76	6.38	6.78E-02	2.82E-02	J	7.05E-02	2.94E-02	J	7.81E-02	3.25E-02	J	1.39E-01	5.79E-02		6.97E-02	2.90E-02		1.25E-01	5.20E-02	
PCB-186	6.69	6.31	6.85E-03	3.32E-03	U	6.45E-03	3.13E-03	U	5.20E-03	2.52E-03	U	9.65E-03	4.68E-03	U	5.71E-03	2.77E-03	U	7.90E-03	3.83E-03	U
PCB-178	7.14	6.74	9.59E-02	1.75E-02		1.24E-01	2.26E-02		1.46E-01	2.66E-02		2.27E-01	4.14E-02		1.16E-01	2.12E-02		1.94E-01	3.54E-02	
PCB-175	7.17	6.77	1.20E-02	2.05E-03	U	1.33E-02	2.27E-03	U	2.05E-02	3.50E-03	U	2.34E-02	4.00E-03	U	3.60E-02	6.16E-03	J	1.65E-02	2.81E-03	U
PCB-187	7.17	6.77	6.94E-01	1.19E-01		7.17E-01	1.23E-01		7.49E-01	1.28E-01		9.46E-01	1.62E-01		8.33E-01	1.42E-01		9.87E-01	1.69E-01	
PCB-182	7.2	6.80	1.07E-02	1.71E-03	U	1.19E-02	1.90E-03	U	8.40E-03	1.35E-03	U	2.03E-02	3.24E-03	U	9.51E-03	1.52E-03	U	1.42E-02	2.27E-03	U
PCB-183	7.2	6.80	2.79E-01	4.47E-02		3.28E-01	5.25E-02		3.46E-01	5.54E-02		4.08E-01	6.53E-02		3.65E-01	5.84E-02		4.56E-01	7.30E-02	
PCB-185	7.11	6.71	5.17E-02	1.01E-02	J	0.0331	6.44E-03	J EMPC	0.0354	6.89E-03	J EMPC	2.36E-02	4.59E-03	U	3.46E-02	6.73E-03	J EMPC	7.94E-02	1.55E-02	J
PCB-174	7.11	6.71	5.29E-01	1.03E-01		5.11E-01	9.95E-02		5.72E-01	1.11E-01		6.78E-01	1.32E-01		6.05E-01	1.18E-01		8.71E-01	1.70E-01	
PCB-177	7.08	6.68	2.95E-01	6.13E-02		3.02E-01	6.28E-02		3.38E-01	7.02E-02		4.03E-01	8.37E-02		3.11E-01	6.46E-02		4.45E-01	9.25E-02	
PCB-181	7.11	6.71	1.16E-02	2.26E-03	U	1.29E-02	2.51E-03	U	9.15E-03	1.78E-03	U	2.25E-02	4.38E-03	U	1.03E-02	2.01E-03	U	1.58E-02	3.08E-03	U
PCB-171/173	7.065	6.67	1.63E-01	3.50E-02	J [a]	1.38E-01	2.96E-02	J EMPC [a]	1.49E-01	3.20E-02	J EMPC a	1.85E-01	3.97E-02	[a]	1.46E-01	3.13E-02	[a]	2.33E-01	5.00E-02	[a]
PCB-172	7.33	6.92	6.05E-02	7.31E-03	J	6.89E-02	8.32E-03	J	9.79E-02	1.18E-02	J	8.88E-02	1.07E-02	EMPC	7.74E-02	9.35E-03		7.84E-02	9.47E-03	J
PCB-192	7.52	7.10	9.70E-03	7.75E-04	U	1.08E-02	8.59E-04	U	7.85E-03	6.27E-04	U	1.97E-02	1.57E-03	U	8.62E-03	6.89E-04	U	1.39E-02	1.11E-03	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD004-1			SD004-2			SD004-3			SD0054			SD0054-AC			SD0053-1		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-180/193	7.44	7.02	8.36E-01	7.95E-02	[a]	8.48E-01	8.06E-02	[a]	9.08E-01	8.64E-02	[a]	1.12E+00	1.07E-01	[a]	9.51E-01	9.04E-02	[a]	1.42E+00	1.35E-01	[a]
PCB-191	7.55	7.13	9.35E-03	7.00E-04	U	1.04E-02	7.79E-04	U	7.65E-03	5.73E-04	U	1.87E-02	1.40E-03	U	8.33E-03	6.24E-04	U	1.31E-02	9.81E-04	U
PCB-170	7.27	6.86	3.36E-01	4.62E-02		3.63E-01	4.99E-02		3.79E-01	5.21E-02		4.25E-01	5.85E-02	EMPC	3.73E-01	5.13E-02		5.56E-01	7.65E-02	
PCB-190	7.46	7.04	6.82E-02	6.21E-03	J	5.90E-02	5.37E-03	J	8.33E-02	7.59E-03	J	5.28E-02	4.81E-03	J	6.99E-02	6.36E-03		1.19E-01	1.08E-02	
PCB-189	7.71	7.28	1.15E-02	6.09E-04	U	9.30E-03	4.92E-04	U	7.35E-03	3.89E-04	U	1.32E-02	6.96E-04	U	8.40E-03	4.45E-04	U	1.50E-02	7.91E-04	U
PCB-202	7.24	6.83	5.21E-02	7.65E-03	J	3.99E-02	5.86E-03	J	4.57E-02	6.71E-03	J	6.16E-02	9.04E-03	J EMPC	5.05E-02	7.41E-03	J EMPC	8.52E-02	1.25E-02	
PCB-201	7.62	7.19	3.23E-02	2.08E-03	J	1.05E-02	6.76E-04	U	9.90E-03	6.37E-04	U	1.69E-02	1.09E-03	U	2.86E-02	1.84E-03	J EMPC	6.31E-02	4.06E-03	J
PCB-204	7.3	6.89	1.15E-02	1.48E-03	U	1.12E-02	1.44E-03	U	7.30E-03	9.41E-04	U	1.81E-02	2.33E-03	U	7.26E-03	9.36E-04	U	1.01E-02	1.30E-03	U
PCB-197	7.3	6.89	1.01E-02	1.30E-03	U	9.80E-03	1.26E-03	U	6.90E-03	8.89E-04	U	1.57E-02	2.02E-03	U	6.38E-03	8.22E-04	U	8.75E-03	1.13E-03	U
PCB-200	7.27	6.86	1.20E-02	1.65E-03	U	1.17E-02	1.60E-03	U	7.35E-03	1.01E-03	U	1.90E-02	2.61E-03	U	7.55E-03	1.04E-03	U	1.06E-02	1.46E-03	U
PCB-198/199	7.41	6.99	1.91E-01	1.94E-02	[a]	1.72E-01	1.75E-02	[a]	2.29E-01	2.32E-02	[a]	2.70E-01	2.74E-02	[a]	2.00E-01	2.03E-02	EMPC [a]	3.96E-01	4.02E-02	[a]
PCB-196	7.65	7.22	9.23E-02	5.56E-03		6.31E-02	3.80E-03	J EMPC	6.33E-02	3.82E-03	J EMPC	1.02E-01	6.15E-03		9.14E-02	5.51E-03		1.82E-01	1.10E-02	
PCB-203	7.65	7.22	9.97E-02	6.01E-03		9.95E-02	6.00E-03		1.13E-01	6.81E-03		1.21E-01	7.29E-03	EMPC	1.06E-01	6.40E-03		2.11E-01	1.27E-02	
PCB-195	7.56	7.13	1.63E-02	1.19E-03	U	2.02E-02	1.48E-03	U	2.67E-02	1.95E-03	U	6.95E-02	5.09E-03	J	1.89E-02	1.39E-03	U	1.19E-01	8.72E-03	
PCB-194	7.8	7.36	1.02E-01	4.44E-03	EMPC	9.34E-02	4.06E-03		1.12E-01	4.87E-03		1.40E-01	6.09E-03		1.33E-01	5.77E-03		2.58E-01	1.12E-02	
PCB-205	8	7.55	1.15E-02	3.23E-04	U	1.42E-02	4.00E-04	U	1.01E-02	2.83E-04	U	1.68E-02	4.72E-04	U	1.33E-02	3.75E-04	U	1.71E-02	4.82E-04	U
PCB-208	7.71	7.28	1.25E-02	6.61E-04	U	1.47E-02	7.75E-04	U	1.10E-02	5.82E-04	U	1.73E-02	9.13E-04	U	9.62E-03	5.09E-04	U	1.56E-02	8.23E-04	U
PCB-207	7.74	7.30	1.22E-02	6.02E-04	U	1.43E-02	7.06E-04	U	1.07E-02	5.30E-04	U	1.68E-02	8.33E-04	U	9.36E-03	4.64E-04	U	1.52E-02	7.51E-04	U
PCB-206	8.09	7.63	7.31E-02	1.69E-03	J EMPC	2.01E-02	4.66E-04	U	1.54E-02	3.56E-04	U	2.35E-02	5.45E-04	U	3.76E-02	8.72E-04	J	1.10E-01	2.55E-03	
PCB-209	8.18	7.72	1.33E-02	2.54E-04	U	1.52E-02	2.89E-04	U	1.11E-02	2.12E-04	U	1.74E-02	3.32E-04	U	1.03E-02	1.97E-04	U	4.79E-02	9.13E-04	J EMPC

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

Chemicals	log K_{ow}	log K_F	SD0053-2 C_F, pg/µL	SD0053-2 C_w, pg/L	SD0053-2 Qualifier	SD0053-3 C_F, pg/µL	SD0053-3 C_w, pg/L	SD0053-3 Qualifier	SD0053-AC C_F, pg/µL	SD0053-AC C_w, pg/L	SD0053-AC Qualifier
PCB-1	4.46	4.21	6.65E-03	4.08E-01	U	8.80E-03	5.41E-01	U	8.35E-03	5.13E-01	U
PCB-2	4.69	4.43	7.80E-03	2.91E-01	U	1.05E-02	3.91E-01	U	1.07E-02	3.99E-01	U
PCB-3	4.69	4.43	7.45E-03	2.78E-01	U	1.00E-02	3.73E-01	U	9.95E-03	3.71E-01	U
PCB-4	4.65	4.39	3.35E-01	1.36E+01		3.35E-01	1.36E+01		3.76E-02	1.53E+00	
PCB-10	4.84	4.57	1.23E-02	3.30E-01	U	1.58E-02	4.24E-01	U	2.14E-02	5.76E-01	U
PCB-9	5.06	4.78	3.49E-02	5.83E-01	J	3.74E-02	6.24E-01	J	5.41E-02	9.03E-01	J
PCB-7	5.07	4.79	2.26E-02	3.69E-01	J	2.25E-02	3.68E-01	J	4.72E-02	7.71E-01	J
PCB-6	5.06	4.78	1.60E-01	2.67E+00		1.56E-01	2.60E+00		2.69E-02	4.49E-01	
PCB-5	4.97	4.69	1.50E-02	3.04E-01	U	1.81E-02	3.67E-01	U	2.57E-02	5.22E-01	U
PCB-8	5.07	4.79	8.75E-01	1.43E+01		8.70E-01	1.42E+01		1.25E-01	2.04E+00	
PCB-14	5.28	4.98	1.24E-02	1.28E-01	U	1.50E-02	1.55E-01	U	2.11E-02	2.18E-01	U
PCB-11	5.28	4.98	9.68E-02	1.00E+00		1.31E-01	1.36E+00		6.35E-02	6.57E-01	
PCB-13/12	5.26	4.97	1.47E-02	1.58E-01	U	1.77E-02	1.91E-01	U	2.49E-02	2.69E-01	U
PCB-15	5.3	5.00	1.64E-01	1.63E+00		1.59E-01	1.58E+00		3.97E-02	3.94E-01	
PCB-19	5.02	4.74	4.39E-01	7.99E+00		4.16E-01	7.57E+00		1.10E-01	2.00E+00	
PCB-30/18	5.34	5.04	5.39E+00	4.90E+01	[a]	5.06E+00	4.60E+01	[a]	1.75E+00	1.59E+01	[a]
PCB-17	5.25	4.96	2.01E+00	2.22E+01		1.94E+00	2.14E+01		7.13E-01	7.88E+00	
PCB-27	5.44	5.14	2.93E-01	2.14E+00		2.82E-01	2.06E+00		1.15E-01	8.41E-01	
PCB-24	5.35	5.05	3.62E-02	3.22E-01	J	6.60E-03	5.87E-02	U	1.13E-02	1.00E-01	U
PCB-16	5.16	4.87	2.04E+00	2.74E+01		2.03E+00	2.73E+01		6.52E-01	8.76E+00	
PCB-32	5.44	5.14	1.58E+00	1.16E+01		1.50E+00	1.10E+01		5.49E-01	4.02E+00	
PCB-34	5.66	5.34	8.40E-03	3.81E-02	U	1.06E-02	4.79E-02	U	1.29E-02	5.83E-02	U
PCB-23	5.57	5.26	8.30E-03	4.58E-02	U	1.05E-02	5.76E-02	U	1.26E-02	6.95E-02	U
PCB-26/29	5.63	5.31	7.23E-01	3.50E+00	[a]	7.08E-01	3.43E+00	[a]	2.78E-01	1.35E+00	[a]
PCB-25	5.67	5.35	2.85E-01	1.27E+00		2.80E-01	1.24E+00		9.20E-02	4.08E-01	
PCB-31	5.67	5.35	5.19E+00	2.30E+01		4.86E+00	2.16E+01		1.94E+00	8.61E+00	
PCB-28/20	5.62	5.31	4.77E+00	2.36E+01	[a]	4.48E+00	2.22E+01	[a]	1.79E+00	8.86E+00	[a]
PCB-21/33	5.55	5.24	2.74E+00	1.58E+01	[a]	2.55E+00	1.47E+01	[a]	1.02E+00	5.88E+00	[a]
PCB-22	5.58	5.27	1.77E+00	9.55E+00		1.68E+00	9.07E+00		6.41E-01	3.46E+00	
PCB-36	5.88	5.55	7.95E-03	2.24E-02	U	1.00E-02	2.81E-02	U	1.24E-02	3.49E-02	U
PCB-39	5.89	5.56	7.70E-03	2.12E-02	U	3.97E-02	1.09E-01	J	2.42E-02	6.66E-02	J
PCB-38	5.76	5.44	8.60E-03	3.14E-02	U	1.08E-02	3.94E-02	U	1.32E-02	4.80E-02	U
PCB-35	5.82	5.49	9.25E-03	2.96E-02	U	1.17E-02	3.73E-02	U	1.41E-02	4.52E-02	U
PCB-37	5.83	5.50	6.78E-01	2.13E+00		6.52E-01	2.04E+00		2.74E-01	8.59E-01	
PCB-54	5.21	4.92	1.49E-02	1.80E-01	J EMPC	1.38E-02	1.66E-01	J	1.51E-02	1.82E-01	J
PCB-50/53	5.625	5.31	1.32E+00	6.46E+00	[a]	1.16E+00	5.68E+00	[a]	6.47E-01	3.17E+00	[a]
PCB-45	5.53	5.22	1.46E+00	8.78E+00		1.25E+00	7.52E+00		7.10E-01	4.27E+00	
PCB-51	5.63	5.31	2.96E-01	1.43E+00		2.58E-01	1.25E+00		1.51E-01	7.31E-01	
PCB-46	5.53	5.22	5.74E-01	3.45E+00		4.45E-01	2.68E+00		2.69E-01	1.62E+00	
PCB-52	5.84	5.51	1.46E+01	4.48E+01		1.25E+01	3.84E+01		8.19E+00	2.51E+01	
PCB-73	6.04	5.70	6.35E-03	1.26E-02	U	7.75E-03	1.54E-02	U	8.45E-03	1.68E-02	U
PCB-43	5.75	5.43	2.84E-01	1.06E+00		2.30E-01	8.58E-01		1.55E-01	5.78E-01	
PCB-69/49	5.95	5.62	4.67E+00	1.13E+01	[a]	4.04E+00	9.76E+00	[a]	2.67E+00	6.45E+00	[a]
PCB-48	5.78	5.46	1.47E+00	5.14E+00		1.31E+00	4.58E+00		8.47E-01	2.96E+00	
PCB-44/47/65	5.82	5.49	8.40E+00	2.69E+01	[a]	7.30E+00	2.34E+01	[a]	4.76E+00	1.53E+01	[a]
PCB-59/62/75	5.96	5.63	5.02E-01	1.19E+00	[a]	4.24E-01	1.00E+00	[a]	2.72E-01	6.43E-01	[a]
PCB-42	5.76	5.44	1.71E+00	6.24E+00		1.48E+00	5.40E+00		9.99E-01	3.65E+00	
PCB-41	5.69	5.37	7.10E-01	3.02E+00		6.15E-01	2.61E+00		3.87E-01	1.64E+00	
PCB-71/40	5.82	5.49	3.14E+00	1.01E+01	[a]	2.71E+00	8.69E+00	[a]	1.73E+00	5.54E+00	[a]
PCB-64	5.95	5.62	3.06E+00	7.40E+00		2.64E+00	6.38E+00		1.75E+00	4.23E+00	
PCB-72	6.26	5.91	9.65E-03	1.19E-02	U	1.33E-02	1.63E-02	U	1.24E-02	1.52E-02	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD0053-2			SD0053-3			SD0053-AC		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-68	6.26	5.91	8.00E-03	9.86E-03	U	1.10E-02	1.36E-02	U	9.80E-03	1.21E-02	U
PCB-57	6.17	5.82	8.65E-03	1.30E-02	U	1.20E-02	1.79E-02	U	1.08E-02	1.62E-02	U
PCB-58	6.17	5.82	8.65E-03	1.30E-02	U	1.20E-02	1.79E-02	U	1.07E-02	1.60E-02	U
PCB-67	6.2	5.85	1.18E-01	1.66E-01		9.00E-02	1.26E-01	EMPC	5.71E-02	8.02E-02	EMPC
PCB-63	6.17	5.82	1.65E-01	2.47E-01		1.35E-01	2.02E-01		9.15E-02	1.37E-01	
PCB-61/70/74/76	6.14	5.80	1.06E+01	1.70E+01 [a]		9.18E+00	1.47E+01 [a]		6.44E+00	1.03E+01 [a]	
PCB-66	6.2	5.85	4.22E+00	5.93E+00		3.64E+00	5.11E+00		2.61E+00	3.67E+00	
PCB-55	6.11	5.77	7.58E-02	1.29E-01	J	7.47E-02	1.28E-01	J	2.27E-02	3.88E-02	U
PCB-56	6.11	5.77	2.06E+00	3.52E+00		1.89E+00	3.23E+00		1.26E+00	2.15E+00	
PCB-60	6.11	5.77	1.12E+00	1.91E+00		1.00E+00	1.71E+00		6.84E-01	1.17E+00	
PCB-80	6.48	6.12	8.00E-03	6.12E-03	U	1.11E-02	8.45E-03	U	9.75E-03	7.46E-03	U
PCB-79	6.42	6.06	6.22E-02	5.42E-02	J	4.64E-02	4.04E-02	J EMPC	5.30E-02	4.62E-02	J EMPC
PCB-78	6.35	5.99	9.95E-03	1.01E-02	U	1.37E-02	1.39E-02	U	1.21E-02	1.23E-02	U
PCB-81	6.36	6.00	9.65E-03	9.58E-03	U	1.33E-02	1.32E-02	U	1.19E-02	1.18E-02	U
PCB-77	6.36	6.00	1.84E-01	1.83E-01		1.87E-01	1.86E-01		9.45E-02	9.38E-02	
PCB-104	5.81	5.48	4.34E-03	1.42E-02	U	5.25E-03	1.72E-02	U	6.45E-03	2.11E-02	U
PCB-96	5.71	5.39	9.79E-02	3.98E-01		9.10E-02	3.70E-01		6.22E-02	2.53E-01	
PCB-103	6.22	5.87	4.06E-02	5.46E-02	J	1.35E-02	1.82E-02	U	2.31E-02	3.11E-02	U
PCB-94	6.13	5.79	4.30E-02	7.03E-02	J EMPC	1.49E-02	2.43E-02	U	2.44E-02	3.99E-02	U
PCB-95	6.13	5.79	9.63E+00	1.57E+01		7.91E+00	1.29E+01		6.48E+00	1.06E+01	
PCB-100/93	6.14	5.80	6.03E-02	9.65E-02	J [a]	1.39E-02	2.22E-02	U	2.25E-02	3.59E-02	U
PCB-102	6.16	5.81	2.95E-01	4.52E-01		2.37E-01	3.63E-01		1.95E-01	2.99E-01	
PCB-98	6.13	5.79	1.05E-02	1.71E-02	U	1.41E-02	2.31E-02	U	2.34E-02	3.82E-02	U
PCB-88	6.07	5.73	1.25E-02	2.33E-02	U	1.69E-02	3.14E-02	U	2.75E-02	5.11E-02	U
PCB-91	6.13	5.79	1.23E+00	2.01E+00		1.03E+00	1.68E+00		8.19E-01	1.34E+00	
PCB-84	6.04	5.70	3.41E+00	6.78E+00		3.10E+00	6.16E+00		2.39E+00	4.75E+00	
PCB-89	6.07	5.73	1.17E-01	2.18E-01		1.08E-01	2.01E-01		6.60E-02	1.23E-01	
PCB-121	6.64	6.27	7.35E-03	3.97E-03	U	9.90E-03	5.35E-03	U	1.66E-02	8.97E-03	U
PCB-92	6.35	5.99	1.56E+00	1.58E+00		1.36E+00	1.38E+00		1.12E+00	1.14E+00	
PCB-113/90/101	6.43	6.07	9.75E+00	8.31E+00 [a]		8.53E+00	7.27E+00 [a]		6.78E+00	5.78E+00 [a]	
PCB-83	6.26	5.91	4.85E-01	5.98E-01		4.52E-01	5.57E-01		3.05E-01	3.76E-01	
PCB-99	6.39	6.03	3.97E+00	3.69E+00		3.40E+00	3.16E+00		2.96E+00	2.75E+00	
PCB-112	6.45	6.09	7.75E-03	6.32E-03	U	1.05E-02	8.53E-03	U	1.74E-02	1.42E-02	U
PCB-108/119/86/97/125/87	6.44	6.08	6.75E+00	5.63E+00 [a]		5.84E+00	4.87E+00 [a]		4.75E+00	3.96E+00 [a]	
PCB-117	6.46	6.10	1.97E-01	1.57E-01		2.04E-01	1.63E-01		2.36E-01	1.88E-01	
PCB-116/85	6.32	5.97	1.64E+00	1.77E+00 [a]		1.42E+00	1.54E+00 [a]		9.77E-01	1.06E+00 [a]	
PCB-110	6.48	6.12	1.22E+01	9.33E+00		1.06E+01	8.11E+00		8.55E+00	6.54E+00	
PCB-115	6.49	6.13	7.40E-03	5.54E-03	U	1.00E-02	7.48E-03	U	1.63E-02	1.22E-02	U
PCB-82	6.2	5.85	1.30E+00	1.83E+00		1.15E+00	1.62E+00		9.00E-01	1.26E+00	
PCB-111	6.76	6.38	7.40E-03	3.08E-03	U	1.00E-02	4.16E-03	U	1.63E-02	6.77E-03	U
PCB-120	6.79	6.41	7.40E-03	2.89E-03	U	1.00E-02	3.90E-03	U	1.66E-02	6.47E-03	U
PCB-107/124	6.72	6.34	2.67E-01	1.21E-01 [a]		2.28E-01	1.04E-01 [a]		1.77E-01	8.04E-02 [a]	
PCB-109	6.48	6.12	4.14E-01	3.17E-01		3.35E-01	2.56E-01		2.91E-01	2.23E-01	
PCB-123	6.74	6.36	1.40E-01	6.09E-02		7.72E-02	3.36E-02	J EMPC	9.13E-02	3.97E-02	J EMPC
PCB-106	6.64	6.27	8.35E-03	4.51E-03	U	1.13E-02	6.10E-03	U	1.77E-02	9.54E-03	U
PCB-118	6.74	6.36	6.80E+00	2.96E+00		5.50E+00	2.39E+00		4.57E+00	1.99E+00	
PCB-122	6.64	6.27	9.77E-02	5.28E-02		7.53E-02	4.07E-02	J EMPC	4.17E-02	2.25E-02	J EMPC
PCB-114	6.65	6.28	1.72E-01	9.09E-02	EMPC	1.23E-01	6.50E-02	EMPC	1.32E-01	6.98E-02	EMPC
PCB-105	6.65	6.28	3.13E+00	1.65E+00	EMPC	2.59E+00	1.37E+00	EMPC	2.21E+00	1.17E+00	EMPC
PCB-127	6.95	6.56	8.40E-03	2.31E-03	U	1.12E-02	3.07E-03	U	1.95E-02	5.37E-03	U
PCB-126	6.89	6.50	1.04E-02	3.26E-03	U	1.35E-02	4.24E-03	U	1.40E-02	4.39E-03	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

			SD0053-2			SD0053-3			SD0053-AC		
Chemicals	log K_{ow}	log K_F	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier	C_F, pg/µL	C_w, pg/L	Qualifier
PCB-155	6.41	6.05	4.48E-03	3.98E-03	U	6.05E-03	5.39E-03	U	6.65E-03	5.92E-03	U
PCB-152	6.22	5.87	4.78E-03	6.42E-03	U	6.45E-03	8.67E-03	U	7.05E-03	9.48E-03	U
PCB-150	6.32	5.97	4.66E-03	5.04E-03	U	6.30E-03	6.82E-03	U	7.00E-03	7.58E-03	U
PCB-136	6.22	5.87	9.53E-01	1.28E+00		8.23E-01	1.11E+00		7.25E-01	9.75E-01	
PCB-145	6.25	5.90	4.99E-03	6.28E-03	U	6.75E-03	8.50E-03	U	7.45E-03	9.39E-03	U
PCB-148	6.73	6.35	6.20E-03	2.75E-03	U	7.65E-03	3.40E-03	U	8.55E-03	3.80E-03	U
PCB-151/135	6.64	6.27	1.64E+00	8.86E-01 [a]		1.38E+00	7.46E-01 [a]		1.24E+00	6.70E-01 [a]	
PCB-154	6.76	6.38	3.02E-02	1.26E-02	J EMPC	2.50E-02	1.04E-02	J	2.59E-02	1.08E-02	J
PCB-144	6.67	6.30	2.76E-01	1.40E-01		1.99E-01	1.01E-01		2.04E-01	1.03E-01	
PCB-147/149	6.655	6.28	4.33E+00	2.26E+00 [a]		3.56E+00	1.86E+00 [a]		3.25E+00	1.70E+00 [a]	
PCB-134	6.55	6.18	4.20E-01	2.76E-01		3.38E-01	2.22E-01		2.53E-01	1.66E-01	
PCB-143	6.6	6.23	6.15E-03	3.62E-03	U	7.55E-03	4.45E-03	U	8.75E-03	5.16E-03	U
PCB-139/140	6.67	6.30	8.75E-02	4.43E-02	J EMPC [a]	5.19E-02	2.63E-02	J [a]	6.40E-02	3.24E-02	J [a]
PCB-131	6.58	6.21	8.83E-02	5.43E-02	EMPC	4.93E-02	3.03E-02	J	7.71E-02	4.74E-02	J
PCB-142	6.51	6.14	7.20E-03	5.16E-03	U	8.90E-03	6.38E-03	U	1.02E-02	7.31E-03	U
PCB-132	6.58	6.21	2.11E+00	1.30E+00		1.73E+00	1.06E+00		1.58E+00	9.72E-01	
PCB-133	6.86	6.47	5.42E-02	1.82E-02	J	3.30E-02	1.11E-02	J EMPC	3.11E-02	1.04E-02	J EMPC
PCB-165	7.05	6.65	5.30E-03	1.18E-03	U	6.55E-03	1.45E-03	U	7.35E-03	1.63E-03	U
PCB-146	6.89	6.50	6.13E-01	1.92E-01		4.79E-01	1.50E-01		4.71E-01	1.48E-01	
PCB-161	7.08	6.68	4.97E-03	1.03E-03	U	6.15E-03	1.28E-03	U	7.00E-03	1.45E-03	U
PCB-153/168	7.01	6.62	3.46E+00	8.37E-01 [a]		2.87E+00	6.94E-01 [a]		2.63E+00	6.36E-01 [a]	
PCB-141	6.82	6.44	9.29E-01	3.40E-01		7.52E-01	2.75E-01		7.08E-01	2.59E-01	
PCB-130	6.8	6.42	3.61E-01	1.38E-01		2.46E-01	9.39E-02		2.49E-01	9.50E-02	
PCB-137	6.83	6.45	2.95E-01	1.05E-01		2.29E-01	8.19E-02		1.84E-01	6.58E-02	
PCB-164	7.02	6.63	3.60E-01	8.52E-02		3.03E-01	7.17E-02		2.62E-01	6.20E-02	
PCB-163/138/129	6.85	6.47	5.25E+00	1.80E+00 [a]		4.40E+00	1.51E+00 [a]		4.17E+00	1.43E+00 [a]	
PCB-160	6.93	6.54	5.30E-03	1.53E-03	U	6.55E-03	1.89E-03	U	7.25E-03	2.09E-03	U
PCB-158	7.02	6.63	5.43E-01	1.29E-01		4.48E-01	1.06E-01		4.32E-01	1.02E-01	
PCB-128/166	6.47	6.11	8.80E-01	6.88E-01 [a]		6.72E-01	5.25E-01 [a]		6.49E-01	5.07E-01 [a]	
PCB-159	7.24	6.83	3.11E-02	4.57E-03	J	1.31E-02	1.92E-03	U	1.63E-02	2.39E-03	U
PCB-162	7.24	6.83	1.34E-02	1.96E-03	U	1.32E-02	1.94E-03	U	1.61E-02	2.36E-03	U
PCB-167	7.27	6.86	1.48E-01	2.04E-02		9.15E-02	1.26E-02	EMPC	1.03E-01	1.42E-02	EMPC
PCB-156/157	7.18	6.78	5.29E-01	8.85E-02 [a]		4.28E-01	7.16E-02 [a]		3.82E-01	6.39E-02 [a]	
PCB-169	7.42	7.00	1.69E-02	1.67E-03	U	1.66E-02	1.65E-03	U	2.00E-02	1.98E-03	U
PCB-188	6.82	6.44	4.25E-03	1.55E-03	U	5.50E-03	2.01E-03	U	6.30E-03	2.30E-03	U
PCB-179	6.73	6.35	3.64E-01	1.62E-01		3.22E-01	1.43E-01		3.07E-01	1.36E-01	
PCB-184	6.85	6.47	5.05E-03	1.73E-03	U	6.55E-03	2.24E-03	U	7.60E-03	2.60E-03	U
PCB-176	6.76	6.38	9.78E-02	4.07E-02		7.19E-02	2.99E-02	J EMPC	9.87E-02	4.11E-02	J EMPC
PCB-186	6.69	6.31	4.79E-03	2.32E-03	U	6.15E-03	2.98E-03	U	7.40E-03	3.59E-03	U
PCB-178	7.14	6.74	1.72E-01	3.14E-02		1.08E-01	1.97E-02	EMPC	1.20E-01	2.19E-02	EMPC
PCB-175	7.17	6.77	3.24E-02	5.54E-03	J EMPC	1.41E-02	2.41E-03	U	1.50E-02	2.56E-03	U
PCB-187	7.17	6.77	9.54E-01	1.63E-01		7.26E-01	1.24E-01		6.64E-01	1.13E-01	
PCB-182	7.2	6.80	9.30E-03	1.49E-03	U	1.26E-02	2.01E-03	U	1.30E-02	2.07E-03	U
PCB-183	7.2	6.80	4.44E-01	7.11E-02		3.16E-01	5.06E-02		3.39E-01	5.43E-02	
PCB-185	7.11	6.71	0.0504	9.81E-03	J EMPC	0.0691	1.35E-02	J EMPC	0.0302	5.88E-03	J EMPC
PCB-174	7.11	6.71	8.16E-01	1.59E-01		6.63E-01	1.29E-01		5.96E-01	1.16E-01	
PCB-177	7.08	6.68	3.85E-01	8.00E-02		3.03E-01	6.30E-02	EMPC	3.12E-01	6.48E-02	EMPC
PCB-181	7.11	6.71	1.01E-02	1.97E-03	U	1.37E-02	2.66E-03	U	1.44E-02	2.80E-03	U
PCB-171/173	7.065	6.67	1.99E-01	4.27E-02 [a]		1.83E-01	3.93E-02 [a]		1.53E-01	3.28E-02 [a]	
PCB-172	7.33	6.92	9.74E-02	1.18E-02		7.82E-02	9.44E-03	J	5.67E-02	6.85E-03	J
PCB-192	7.52	7.10	8.40E-03	6.71E-04	U	1.14E-02	9.11E-04	U	1.26E-02	1.01E-03	U

Table 4-6. Summary of log K_{ow}, log K_F, Measured C_F, and Calculated C_w Values for PCB Congeners

Chemicals	log K_{ow}	log K_F	SD0053-2 C_F, pg/µL	SD0053-2 C_w, pg/L	SD0053-2 Qualifier	SD0053-3 C_F, pg/µL	SD0053-3 C_w, pg/L	SD0053-3 Qualifier	SD0053-AC C_F, pg/µL	SD0053-AC C_w, pg/L	SD0053-AC Qualifier
PCB-180/193	7.44	7.02	1.35E+00	1.28E-01	[a]	1.13E+00	1.07E-01	[a]	1.01E+00	9.61E-02	[a]
PCB-191	7.55	7.13	8.15E-03	6.10E-04	U	1.10E-02	8.24E-04	U	1.20E-02	8.95E-04	U
PCB-170	7.27	6.86	5.17E-01	7.11E-02		4.67E-01	6.42E-02		3.95E-01	5.43E-02	
PCB-190	7.46	7.04	9.60E-02	8.74E-03		9.55E-02	8.70E-03		8.98E-02	8.18E-03	
PCB-189	7.71	7.28	1.08E-02	5.69E-04	U	1.15E-02	6.09E-04	U	1.18E-02	6.24E-04	U
PCB-202	7.24	6.83	7.07E-02	1.04E-02	J EMPC	4.86E-02	7.14E-03	J	6.78E-02	9.95E-03	J
PCB-201	7.62	7.19	4.75E-02	3.06E-03	J EMPC	3.13E-02	2.01E-03	J	3.17E-02	2.04E-03	J
PCB-204	7.3	6.89	5.55E-03	7.15E-04	U	1.08E-02	1.39E-03	U	1.14E-02	1.46E-03	U
PCB-197	7.3	6.89	1.44E-02	1.86E-03	J EMPC	9.45E-03	1.22E-03	U	9.80E-03	1.26E-03	U
PCB-200	7.27	6.86	4.01E-02	5.52E-03	J EMPC	1.12E-02	1.54E-03	U	2.19E-02	3.01E-03	U
PCB-198/199	7.41	6.99	3.57E-01	3.62E-02	[a]	3.02E-01	3.07E-02	[a]	3.23E-01	3.28E-02	[a]
PCB-196	7.65	7.22	1.60E-01	9.64E-03		1.49E-01	8.98E-03	EMPC	1.36E-01	8.20E-03	EMPC
PCB-203	7.65	7.22	2.05E-01	1.24E-02		1.99E-01	1.20E-02		1.55E-01	9.34E-03	
PCB-195	7.56	7.13	8.29E-02	6.08E-03	J EMPC	8.36E-02	6.13E-03	J	8.64E-02	6.33E-03	J
PCB-194	7.8	7.36	2.71E-01	1.18E-02		2.04E-01	8.88E-03		1.36E-01	5.92E-03	
PCB-205	8	7.55	9.15E-03	2.58E-04	U	1.48E-02	4.16E-04	U	1.22E-02	3.44E-04	U
PCB-208	7.71	7.28	4.62E-02	2.44E-03	J EMPC	3.20E-02	1.69E-03	J EMPC	2.96E-02	1.57E-03	J EMPC
PCB-207	7.74	7.30	6.40E-03	3.17E-04	U	1.05E-02	5.21E-04	U	1.44E-02	7.14E-04	U
PCB-206	8.09	7.63	1.18E-01	2.74E-03	EMPC	1.38E-01	3.20E-03	EMPC	9.16E-02	2.12E-03	EMPC
PCB-209	8.18	7.72	7.85E-02	1.50E-03	J	5.76E-02	1.10E-03	J	3.50E-02	6.67E-04	J

Notes:

C_F = concentration measured in the polydimethylsiloxane (PDMS) coating on the fiber

C_w = concentration in porewater

K_{ow} = octanol-water partition coefficient

K_F = PDMS fiber–water partition coefficient (L/L)

PCB = polychlorinated biphenyl

pg/L = picogram per liter

Data Qualifiers:

EMPC = estimated

J = estimated

U = non-detect

[a] Two or more congeners co-elute

Table 4-7. Summary of log K_F, Measured C_f, and Calculated C_w Values for Dioxin/Furan Congeners

		SD0025			SD0054			SD0054-AC			SD0018			SD0053-1			SD0053-2		
Chemicals	log K_F	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier
2378-TCDD	6.31	3.10E-03	1.52E-03	U	3.21E-03	1.58E-03	U	3.11E-03	1.53E-03	U	2.95E-03	1.45E-03	U	3.01E-02	1.48E-02	EMPC	3.78E-02	1.86E-02	
12378-PeCDD	6.87	6.45E-03	8.70E-04	U	7.85E-03	1.06E-03	U	5.65E-03	7.62E-04	U	5.50E-03	7.42E-04	U	1.29E-02	1.74E-03	U	1.20E-02	1.61E-03	U
123478-HxCDD	7.33	3.66E-03	1.72E-04	U	5.12E-02	2.41E-03	J	3.69E-02	1.74E-03	J EMPC	5.15E-03	2.42E-04	U	1.58E-02	7.43E-04	U	1.17E-02	5.50E-04	U
123678-HxCDD	7.37	3.65E-03	1.56E-04	U	3.42E-02	1.46E-03	J	1.33E-02	5.68E-04	J	5.15E-03	2.20E-04	U	5.10E-02	2.18E-03	J	4.57E-02	1.95E-03	J EMPC
123789-HxCDD	7.37	9.18E-03	3.92E-04	J	6.30E-03	2.69E-04	U	1.09E-02	4.66E-04	J	5.15E-03	2.20E-04	U	1.58E-02	6.73E-04	U	1.15E-02	4.89E-04	U
1234678-HpCDD	7.81	3.68E-02	5.75E-04	J	9.28E-02	1.45E-03	J	6.15E-02	9.61E-04	J	5.38E-02	8.41E-04	J	1.04E+00	1.63E-02		1.02E+00	1.59E-02	
OCDD	8.17	6.58E-02	4.45E-04	J	1.70E-01	1.15E-03	J	1.13E-01	7.64E-04	J	8.64E-02	5.84E-04	J	1.00E+01	6.76E-02		1.05E+01	7.10E-02	
2378-TCDF	5.79	2.75E-03	4.47E-03	U	4.17E-03	6.78E-03	U	2.49E-03	4.05E-03	U	3.18E-03	5.18E-03	U	5.05E-03	8.22E-03	U	7.05E-03	1.15E-02	U
12378-PeCDF	6.34	3.45E-03	1.58E-03	U	4.24E-03	1.94E-03	U	4.88E-03	2.23E-03	U	3.82E-03	1.75E-03	U	1.06E-02	4.85E-03	U	1.26E-02	5.74E-03	U
23478-PeCDF	6.46	3.29E-03	1.13E-03	U	4.04E-03	1.39E-03	U	4.77E-03	1.64E-03	U	3.65E-03	1.25E-03	U	1.01E-02	3.47E-03	U	1.23E-02	4.20E-03	U
123478-HxCDF	6.90	1.74E-03	2.18E-04	U	3.18E-03	3.99E-04	U	2.80E-03	3.51E-04	U	3.94E-03	4.95E-04	J EMPC	1.15E-02	1.44E-03	U	1.50E-02	1.88E-03	U
123678-HxCDF	6.94	1.67E-03	1.91E-04	U	3.06E-03	3.49E-04	U	2.72E-03	3.10E-04	U	1.08E-02	1.23E-03	J	7.29E-02	8.32E-03	J	1.46E-02	1.66E-03	U
234678-HxCDF	7.14	1.68E-03	1.22E-04	U	3.07E-03	2.22E-04	U	2.70E-03	1.95E-04	U	2.16E-03	1.56E-04	U	1.10E-02	7.96E-04	U	1.45E-02	1.05E-03	U
123789-HxCDF	7.03	1.98E-03	1.86E-04	U	3.62E-03	3.41E-04	U	3.03E-03	2.85E-04	U	2.55E-03	2.40E-04	U	1.31E-02	1.23E-03	U	1.63E-02	1.53E-03	U
1234678-HpCDF	7.40	3.37E-02	1.34E-03	J	5.50E-02	2.19E-03	J	4.53E-02	1.80E-03	J	5.09E-02	2.02E-03	J	4.26E-01	1.69E-02		4.91E-01	1.95E-02	
1234789-HpCDF	7.63	1.97E-03	4.61E-05	U	2.99E-03	7.01E-05	U	2.75E-03	6.46E-05	U	2.55E-03	5.99E-05	U	1.95E-02	4.58E-04	U	2.99E-03	7.01E-05	U
OCDF	8.01	2.47E-03	2.39E-05	U	1.15E-02	1.11E-04	J EMPC	3.51E-03	3.39E-05	U	3.33E-03	3.22E-05	U	2.46E-01	2.38E-03		2.19E-01	2.12E-03	

Table 4-7. Summary of log K_F, Measured C_f, and Calculated C_w Values for Dioxin/Furan Congeners

Chemicals	log K_F	SD0053-3			SD0053-AC			SD0051			SD0010			SD0028			SD0026		
		C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier
2378-TCDD	6.31	3.53E-02	1.74E-02		8.44E-03	4.15E-03	J EMPC	2.55E-03	1.25E-03	U	3.64E-03	1.79E-03	U	2.76E-03	1.35E-03	U	3.17E-03	1.56E-03	U
12378-PeCDD	6.87	1.26E-02	1.70E-03	U	8.35E-03	1.13E-03	U	6.50E-03	8.77E-04	U	1.10E-02	1.48E-03	U	5.60E-03	7.55E-04	U	7.80E-03	1.05E-03	U
123478-HxCDD	7.33	1.27E-02	5.95E-04	U	6.45E-03	3.03E-04	U	2.03E-02	9.55E-04	J	1.12E-02	5.24E-04	U	4.31E-03	2.02E-04	U	4.54E-03	2.13E-04	U
123678-HxCDD	7.37	4.85E-02	2.07E-03	J	4.04E-02	1.73E-03	J	1.88E-02	8.03E-04	J	4.27E-02	1.82E-03	J	4.30E-03	1.84E-04	U	1.48E-02	6.33E-04	J
123789-HxCDD	7.37	1.24E-02	5.28E-04	U	6.40E-03	2.74E-04	U	3.88E-03	1.66E-04	U	1.11E-02	4.74E-04	U	7.61E-03	3.25E-04	J EMPC	0.00929	3.97E-04	J EMPC
1234678-HpCDD	7.81	1.12E+00	1.75E-02		8.35E-01	1.31E-02		9.10E-02	1.42E-03	J	7.69E-01	1.20E-02		1.46E-02	2.28E-04	J	5.93E-02	9.27E-04	J
OCDD	8.17	1.00E+01	6.76E-02		6.52E+00	4.41E-02		1.82E-01	1.23E-03	J	3.82E+00	2.58E-02		3.07E-02	2.08E-04	J	1.10E-01	7.44E-04	J
2378-TCDF	5.79	5.15E-03	8.38E-03	U	3.45E-03	5.62E-03	U	2.23E-03	3.62E-03	U	4.09E-03	6.65E-03	U	3.14E-03	5.11E-03	U	3.71E-03	6.03E-03	U
12378-PeCDF	6.34	9.55E-03	4.37E-03	U	6.30E-03	2.88E-03	U	3.74E-03	1.71E-03	U	6.20E-03	2.84E-03	U	3.24E-03	1.48E-03	U	3.92E-03	1.79E-03	U
23478-PeCDF	6.46	9.30E-03	3.19E-03	U	6.00E-03	2.06E-03	U	3.56E-03	1.22E-03	U	5.90E-03	2.03E-03	U	3.09E-03	1.06E-03	U	3.83E-03	1.31E-03	U
123478-HxCDF	6.90	1.47E-02	1.84E-03	U	7.00E-03	8.79E-04	U	3.49E-03	4.38E-04	U	6.45E-03	8.10E-04	U	2.44E-03	3.06E-04	U	3.47E-03	4.35E-04	U
123678-HxCDF	6.94	1.42E-02	1.62E-03	U	6.75E-03	7.70E-04	U	3.36E-03	3.83E-04	U	6.20E-03	7.07E-04	U	2.35E-03	2.68E-04	U	3.37E-03	3.84E-04	U
234678-HxCDF	7.14	1.41E-02	1.02E-03	U	6.80E-03	4.92E-04	U	3.37E-03	2.44E-04	U	6.20E-03	4.49E-04	U	2.35E-03	1.70E-04	U	3.35E-03	2.42E-04	U
123789-HxCDF	7.03	3.03E-03	2.85E-04	U	2.55E-03	2.40E-04	U	3.98E-03	3.74E-04	U	7.35E-03	6.92E-04	U	2.78E-03	2.61E-04	U	3.76E-03	3.54E-04	U
1234678-HpCDF	7.40	4.51E-01	1.79E-02		3.47E-01	1.38E-02		5.03E-02	2.00E-03	J	4.29E-01	1.71E-02		1.47E-02	5.85E-04	J	3.91E-02	1.56E-03	J
1234789-HpCDF	7.63	2.75E-03	6.46E-05	U	2.55E-03	5.99E-05	U	4.19E-03	9.84E-05	U	1.09E-02	2.56E-04	U	2.95E-03	6.93E-05	U	2.37E-03	5.57E-05	U
OCDF	8.01	2.32E-01	2.25E-03		1.29E-01	1.25E-03	J	8.96E-03	8.68E-05	J EMPC	1.05E-01	1.02E-03	J	3.43E-03	3.32E-05	U	2.21E-03	2.14E-05	U

Table 4-7. Summary of log K_F, Measured C_f, and Calculated C_w Values for Dioxin/Furan Congeners

Chemicals	*log K_F*	SD004-01			SD004-2			SD004-3			SD0055			SD009			SD0015		
		C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier	C_F (pg/µL)	C_w(pg/L)	Qualifier
2378-TCDD	6.31	4.35E-03	2.14E-03	U	3.45E-03	1.69E-03	U	2.71E-03	1.33E-03	U	3.44E-03	1.69E-03	U	3.75E-03	1.84E-03	U	4.76E-03	2.34E-03	U
12378-PeCDD	6.87	8.55E-03	1.15E-03	U	6.70E-03	9.04E-04	U	5.50E-03	7.42E-04	U	6.05E-03	8.16E-04	U	7.55E-03	1.02E-03	U	9.55E-03	1.29E-03	U
123478-HxCDD	7.33	1.47E-02	6.91E-04	J	1.58E-02	7.43E-04	J EMPC	2.07E-02	9.74E-04	J	4.83E-03	2.27E-04	U	9.65E-03	4.54E-04	U	7.70E-03	3.62E-04	U
123678-HxCDD	7.37	8.33E-03	3.56E-04	J	1.00E-02	4.27E-04	J	1.32E-02	5.64E-04	J	4.83E-03	2.06E-04	U	2.12E-02	9.06E-04	J	7.70E-03	3.29E-04	J
123789-HxCDD	7.37	8.25E-03	3.53E-04	U	6.05E-03	2.59E-04	U	5.95E-03	2.54E-04	U	4.72E-03	2.02E-04	U	9.40E-03	4.02E-04	U	7.55E-03	3.23E-04	U
1234678-HpCDD	7.81	6.00E-02	9.38E-04	J	5.99E-02	9.36E-04	J EMPC	6.69E-02	1.05E-03	J	8.57E-03	1.34E-04	J EMPC	2.29E-01	3.58E-03		4.53E-02	7.08E-04	J
OCDD	8.17	1.57E-01	1.06E-03	J	1.53E-01	1.03E-03	J	1.52E-01	1.03E-03	J	1.38E-02	9.33E-05	J EMPC	9.21E-01	6.23E-03		1.04E-01	7.03E-04	J
2378-TCDF	5.79	4.37E-03	7.11E-03	J	3.99E-03	6.49E-03	U	2.77E-03	4.51E-03	U	3.31E-03	5.38E-03	U	4.68E-03	7.62E-03	U	4.83E-03	7.85E-03	U
12378-PeCDF	6.34	5.65E-03	2.58E-03	U	4.77E-03	2.18E-03	U	4.84E-03	2.21E-03	U	3.74E-03	1.71E-03	U	7.40E-03	3.39E-03	U	6.40E-03	2.93E-03	U
23478-PeCDF	6.46	5.50E-03	1.89E-03	U	4.66E-03	1.60E-03	U	4.73E-03	1.62E-03	U	3.65E-03	1.25E-03	U	7.25E-03	2.49E-03	U	6.30E-03	2.16E-03	U
123478-HxCDF	6.90	4.43E-03	5.56E-04	U	2.77E-03	3.47E-04	U	3.14E-03	3.94E-04	U	2.79E-03	3.50E-04	U	4.99E-03	6.26E-04	U	4.63E-03	5.81E-04	U
123678-HxCDF	6.94	4.30E-03	4.91E-04	U	2.69E-03	3.06E-04	U	3.08E-03	3.51E-04	U	2.71E-03	3.09E-04	U	4.85E-03	5.53E-04	U	4.49E-03	5.12E-04	U
234678-HxCDF	7.14	4.28E-03	3.09E-04	U	2.68E-03	1.94E-04	U	3.02E-03	2.18E-04	U	2.69E-03	1.95E-04	U	4.82E-03	3.49E-04	U	4.47E-03	3.24E-04	U
123789-HxCDF	7.03	4.80E-03	4.52E-04	U	3.00E-03	2.83E-04	U	3.43E-03	3.23E-04	U	3.02E-03	2.84E-04	U	5.40E-03	5.09E-04	U	5.00E-03	4.71E-04	U
1234678-HpCDF	7.40	6.68E-02	2.66E-03	J	6.22E-02	2.47E-03	J	6.85E-02	2.72E-03	J	3.13E-03	1.24E-04	U	1.91E-01	7.60E-03		4.19E-02	1.67E-03	J EMPC
1234789-HpCDF	7.63	6.20E-03	1.46E-04	U	5.75E-03	1.35E-04	U	2.88E-03	6.75E-05	U	3.73E-03	8.75E-05	U	4.52E-03	1.06E-04	U	5.20E-03	1.22E-04	U
OCDF	8.01	8.65E-03	8.38E-05	U	3.25E-03	3.14E-05	U	6.61E-03	6.40E-05	J EMPC	2.65E-03	2.57E-05	U	4.53E-02	4.39E-04	J EMPC	4.47E-03	4.32E-05	U

Table 4-7. Summary of log K_F, Measured C_f, and Calculated C_w Values for Dioxin/Furan Congeners

Chemicals	log K_F	SD0013 C_F (pg/µL)	SD0013 C_w(pg/L)	SD0013 Qualifier	SD0011 C_F (pg/µL)	SD0011 C_w(pg/L)	SD0011 Qualifier	SD0052 C_F (pg/µL)	SD0052 C_w(pg/L)	SD0052 Qualifier
2378-TCDD	6.31	3.37E-03	1.65E-03	U	4.10E-03	2.02E-03	U	3.27E-03	1.61E-03	U
12378-PeCDD	6.87	7.75E-03	1.05E-03	U	7.65E-03	1.03E-03	U	7.35E-03	9.91E-04	U
123478-HxCDD	7.33	7.95E-03	3.74E-04	U	6.35E-03	2.99E-04	U	1.35E-02	6.35E-04	J
123678-HxCDD	7.37	8.05E-03	3.44E-04	U	2.42E-02	1.03E-03	J	8.99E-03	3.84E-04	J
123789-HxCDD	7.37	7.85E-03	3.35E-04	U	6.25E-03	2.67E-04	U	7.58E-03	3.24E-04	J
1234678-HpCDD	7.81	7.63E-02	1.19E-03	J	8.72E-02	1.36E-03	J	1.93E-02	3.02E-04	J
OCDD	8.17	1.55E-01	1.05E-03	J	2.24E-01	1.51E-03	J	4.39E-02	2.97E-04	J
2378-TCDF	5.79	4.51E-03	7.33E-03	U	3.67E-03	5.97E-03	U	4.46E-03	7.25E-03	U
12378-PeCDF	6.34	4.21E-03	1.92E-03	U	5.95E-03	2.72E-03	U	3.90E-03	1.78E-03	U
23478-PeCDF	6.46	4.11E-03	1.41E-03	U	5.80E-03	1.99E-03	U	3.81E-03	1.31E-03	U
123478-HxCDF	6.90	3.29E-03	4.12E-04	U	4.44E-03	5.57E-04	U	2.77E-03	3.47E-04	U
123678-HxCDF	6.94	3.23E-03	3.68E-04	U	4.35E-03	4.96E-04	U	2.72E-03	3.10E-04	U
234678-HxCDF	7.14	3.16E-03	2.28E-04	U	4.26E-03	3.08E-04	U	2.66E-03	1.92E-04	U
123789-HxCDF	7.03	3.59E-03	3.38E-04	U	4.84E-03	4.55E-04	U	3.02E-03	2.84E-04	U
1234678-HpCDF	7.40	7.81E-02	3.11E-03	J	8.00E-02	3.18E-03	J	3.10E-02	1.23E-03	J
1234789-HpCDF	7.63	2.62E-03	6.15E-05	U	4.06E-03	9.52E-05	U	2.68E-03	6.28E-05	U
OCDF	8.01	9.58E-03	9.28E-05	J	1.14E-02	1.10E-04	U	3.51E-03	3.40E-05	U

Notes:

C_F = concentration measured in the polydimethylsiloxane (PDMS) coating on the fiber

C_w = concentration in porewater

K_F = PDMS fiber–water partition coefficient

pg/L =picogram per liter

pg/µL = picogram per microliter

Data Qualifiers:

EMPC = estimated

J = estimated

U = non-detect

Table 4-8. Key SPI Parameters Measured in Each Replicate Image

Station	Rep	Water Depth (m)	Grain Size Major Mode (phi)	Mean RPD (cm)	Wood Debris	Successional Stage
WPAH003	D	4.6	4-3	IND	High	Stage 2 on 3
WPAH004	A	8.8	>4	2.91	High	Stage 3
WPAH004	D	8.2	>4	IND	High	Stage 1 on 3
WPAH005	A	13.0	>4	5.69	Trace	Stage 2 → 3
WPAH005	B	13.0	>4	3.35	Trace	Stage 2 → 3
WPAH006	C	7.6	>4	IND	High	Stage 2 on 3
WPAH007	D	12.0	>4	1.55	High	Stage 1 on 3
WPAH008	A	6.8	>4	1.90	Med	Stage 1 on 3
WPAH008	D	8.2	>4	0.20	High	IND
WPAH009	A	8.6	>4	1.18	Trace	Stage 1 on 3
WPAH009	D	9.6	>4	2.05	Med	Stage 1 on 3
WPAH010	C	16.0	>4	0.44	Med	Stage 1 on 3
WPAH011	B	16.4	>4	3.31	Low	Stage 1 on 3
WPAH012	B	27.4	>4	3.43	Low	Stage 1 on 3
WPAH012	C	27.4	>4	3.37	High	Stage 1 on 3
WPAH013	A	17.8	>4	2.87	None	Stage 1 on 3
WPAH014	A	21.2	>4	2.65	Low	Stage 1 on 3
WPAH015	A	19.6	>4	2.82	Trace	Stage 1 on 3
WPAH016	A	16.0	>4	2.04	Trace	Stage 1 on 3
WPAH017	A	15.4	>4	2.21	None	Stage 1 on 3
WPAH018	A	12.2	>4	2.35	Low	Stage 1 on 3
WPAH019	C	14.0	4-3	0.10	High	Stage 1 on 3
WPAH020	B	14.6	>4	1.08	Med	Stage 1 on 3
WPAH022	B	12.6	>4	2.50	Low	Stage 2 → 3
WPAH022	C	12.8	>4	3.30	Med	Stage 1 on 3
WPAH023	A	7.4	>4	IND	High	IND
WPAH024	F	5.6	>4	0.10	None	IND
WPAH025	A	6.8	>4	0.00	None	Stage 1
WPAH026	A	13.6	>4	1.99	None	Stage 2 → 3
WPAH027	A	4.8	3-2	1.18	High	Stage 1 on 3
WPAH027	C	4.6	2-1	0.56	High	Stage 1 on 3
WPAH028	A	11.4	>4	0.10	High	Stage 1 on 3
WPAH030	A	23.6	>4	2.40	None	Stage 1 on 3
WPAH030	B	23.6	>4	2.30	None	Stage 1 on 3
WPAH031	A	17.6	>4	2.86	None	Stage 1 on 3
WPAH032	B	14.0	>4	4.38	Med	Stage 2 → 3
WPAH033	A	10.6	>4	2.82	Trace	Stage 1 on 3
WPAH034	A	14.8	>4	2.38	Trace	Stage 1 on 3
WPAH035	A	15.8	4-3	1.62	None	Stage 1 on 3
WPAH035	D	16.0	4-3	1.58	None	IND
WPAH036	A	11.8	>4	6.87	None	Stage 1 on 3
WPAH037	A	10.2	>4	4.46	Trace	Stage 1 on 3

Table 4-8. Key SPI Parameters Measured in Each Replicate Image

Station	Rep	Water Depth (m)	Grain Size Major Mode (phi)	Mean RPD (cm)	Wood Debris	Successional Stage
WPAH038	A	7.0	4-3	1.24	None	Stage 1 on 3
WPAH038	D	5.8	4-3	1.36	None	Stage 2 → 3
WPAH039	A	31.2	>4	3.40	None	Stage 1 on 3
WPAH042	A	15.8	>4	2.36	None	Stage 1 on 3
WPAH043	A	26.4	>4	2.98	High	Stage 1 on 3
WPAH045	A	25.4	>4	2.36	None	Stage 2 → 3
WPAH046	A	16.8	4-3	4.26	Med	IND
WPAH046	B	16.2	4-3	2.94	Trace	Stage 1 on 3
WPAH047	A	46.0	3-2	IND	None	Stage 1 on 3
WPAH053	D	6.4	-3	IND	None	IND
WPAH054	A	13.2	>4	2.95	None	Stage 1 on 3
WPAH055	A	14.4	>4	1.80	None	Stage 2 → 3
WPAH056	A	12.8	>4	4.27	None	Stage 1 on 3
WPAH057	B	14.0	>4	2.00	Low	Stage 1 on 3
WPAH058	C	17.0	>4	3.76	None	Stage 1 on 3
WPAH059	A	17.2	>4	2.80	None	Stage 1 on 3
WPAH060	A	15.0	>4	3.27	Trace	Stage 1 on 3
WPAH061	B	14.8	>4	3.43	None	Stage 1 on 2
WPAH061	E	13.0	>4	3.11	Trace	Stage 1 on 2
WPAH062	B	18.6	>4	2.61	None	Stage 2 → 3
WPAH063	A	19.6	>4	2.84	None	Stage 1 on 3
WPAH064	A	18.0	>4	2.73	Trace	Stage 1 on 3
WPAH065	A	18.2	>4	2.22	None	Stage 1 on 3
WPAH065	B	18.2	>4	2.27	None	Stage 1 on 3
WPAH066	A	14.2	>4	2.25	Med	Stage 1 on 3
WPAH067	A	15.6	>4	3.38	None	Stage 1 on 3
WPAH068	A	13.0	>4	3.35	High	Stage 1 on 3
WPAH069	A	14.0	>4	3.31	Med	Stage 1 on 3
WPAH070	A	20.4	>4	2.26	Low	Stage 1 on 3
WPAH071	A	15.8	4-3	1.84	Trace	Stage 1 on 3
WPAH073	A	14.6	>4	3.49	None	Stage 1 on 3
WPAH074	A	29.0	>4	2.58	Med	Stage 1 on 3
WPAH074	B	29.2	>4	3.22	None	Stage 1 on 3
WPAH075	A	21.0	>4	3.16	Low	Stage 1 on 3
WPAH076	A	20.4	>4	3.97	None	Stage 1 on 3
WPAH076	B	20.4	>4	3.06	None	Stage 1 on 3
WPAH077	A	21.2	>4	2.44	Trace	Stage 1 on 3
WPAH078	B	16.8	>4	1.85	Trace	Stage 1 on 3
WPAH079	D	34.2	>4	2.51	None	Stage 1 on 3
WPAH079	E	33.6	>4	2.92	Trace	Stage 1 on 3
WPAH080	A	26.0	>4	3.77	Trace	Stage 1 on 3
WPAH080	B	28.0	>4	3.34	None	Stage 1 on 3

Table 4-8. Key SPI Parameters Measured in Each Replicate Image

Station	Rep	Water Depth (m)	Grain Size Major Mode (phi)	Mean RPD (cm)	Wood Debris	Successional Stage
WPAH081	A	25.0	>4	4.34	None	Stage 1 on 3
WPAH082	A	23.6	>4	3.12	None	Stage 1 on 3
WPAH083	A	26.6	>4	2.60	Med	Stage 1 on 3
WPAH084	A	41.0	>4	2.78	None	Stage 1 on 3
WPAH084	B	41.6	>4	3.26	None	Stage 1 on 3
WPAH085	B	31.2	>4	2.99	None	Stage 1 on 3
WPAH086	B	29.2	>4	4.46	Trace	Stage 1 on 3
WPAH087	C	24.6	>4	2.97	Trace	Stage 1 on 3
WPAH088	A	45.6	>4	1.70	None	Stage 1 on 3
WPAH089	A	49.6	>4	2.71	Trace	Stage 1 on 3
WPAH090	A	41.8	>4	3.29	None	Stage 2 → 3
WPAH091	A	39.0	>4	4.05	None	Stage 1 on 3
WPAH092	A	28.4	>4	2.73	High	Stage 1 on 3
WPAH093	A	39.6	>4	2.78	None	Stage 1 on 3
WPAH093	B	38.4	>4	4.06	Low	Stage 1 on 3
WPAH094	A	53.8	>4	5.36	None	Stage 1 on 3
WPAH095	B	49.6	>4	3.32	None	Stage 1 on 3
WPAH096	A	58.4	>4	2.86	None	Stage 1 on 3
WPAH097	A	7.8	>4	3.02	Trace	Stage 1 on 3
WPAH098	A	3.4	4-3	IND	Med	IND
WPAH099	A	9.4	>4	IND	High	Stage 1 on 3
WPAH100	A	8.2	4-3	0.00	IND	IND
WPAH101	A	45.6	>4	3.32	None	Stage 1 on 3
WPAH102	A	51.6	>4	3.67	None	Stage 1 on 3
WPAH103	A	37.4	>4	3.25	None	Stage 1 on 3
WPAH104	A	37.0	>4	2.61	None	Stage 1 on 3
WPAH105	A	59.2	>4	1.89	None	Stage 2 → 3
KSS-1	A	9.2	>4	3.02	Low	Stage 1 on 3
KSS-2	A	8.0	>4	2.48	Trace	Stage 1 on 3
KSS-3	E	9.6	>4	1.84	None	Stage 1 on 3

Notes:
cm = centimeter
IND = indeterminate
m = meter
RPD = redox potential discontinuity
SPI = sediment profile image
Successional Stage - See Appendix I for description of successional stage criteria and interpretation

Wood Debris Categories

None	=	0
Trace	=	> 5%
Low	=	5-20%
Med	=	21-50%
High	=	> 50%

Table 4-9. Key Plan View Parameters Measured in Each Replicate Image

Station	Rep	Field of View Imaged Calc. (m^2)	Sediment Type	Lebensspuren [a]	Epifauna	Wood Debris
WPAH003	D	0.24	Wood and silt	None	No	High
WPAH004	A	0.26	Wood and silt	Low	Yes	High
WPAH004	D	0.15	Wood and silt	Low	Yes	High
WPAH005	A	0.18	Silt	Low	Yes	Low
WPAH005	B	0.19	Silt	Low	Yes	Trace
WPAH006	C	0.27	Wood and silt	Low	No	High
WPAH007	D	0.22	Wood and silt	Low	Yes	High
WPAH008	A	0.21	Silt	Med	Yes	Med
WPAH008	D	0.24	Wood and silt	Med	Yes	High
WPAH009	B	0.14	Silt	Low	Yes	Low
WPAH009	C	0.11	Silt	Med	Yes	Trace
WPAH010	C	0.14	Silt	Med	Yes	Trace
WPAH011	B	0.15	Silt	Med	No	None
WPAH012	E	0.18	Silt	Med	Yes	Low-Med
WPAH012	F	0.26	Silt	Med	Yes	Med
WPAH013	A	0.19	Silt	Med	Yes	Trace
WPAH014	A	0.16	Silt	Med	Yes	Low
WPAH015	B	0.22	Silt	Low	Yes	Trace-Low
WPAH016	A	0.23	Silt	Med	Yes	Trace
WPAH017	A	0.20	Silt	Med	Yes	Trace
WPAH018	A	0.25	Silt	Low	Yes	Med
WPAH019	C	0.15	Silty sand	Low	No	Low
WPAH020	C	0.11	Ind	None	No	Ind
WPAH022	B	0.23	Silt	Med	Yes	Low
WPAH022	C	0.25	Silt	Med	No	Trace
WPAH023	A	0.11	Wood	None	Yes	High
WPAH024	F	0.25	IND	None	Yes	High
WPAH025	A	0.20	Silt	Low	Yes	None
WPAH026	A	0.11	Silt	Low	Yes	None
WPAH027	C	0.27	Wood and silty sand	None	Yes	High
WPAH027	D	0.24	Wood and silty sand	Low	No	High
WPAH028	A	0.10	Wood and silt	None	Yes	High
WPAH030	A	0.23	Silt	Med	Yes	None
WPAH030	B	0.25	Silt	Med	No	None
WPAH031	A	0.28	Silt	Med	Yes	None
WPAH032	B	0.22	Silt	Med	Yes	Trace
WPAH033	A	0.11	Silt	Low	Yes	Trace
WPAH034	A	0.20	Silt	Low	Yes	Trace
WPAH035	A	0.26	Silt	Med	Yes	Trace-Low
WPAH035	C	0.21	Silt with rocks	Med	Yes	None
WPAH036	A	0.29	Silt	Med	Yes	Trace
WPAH037	A	0.21	Silt	High	No	Med

Table 4-9. Key Plan View Parameters Measured in Each Replicate Image

Station	Rep	Field of View Imaged Calc. (m^2)	Sediment Type	Lebensspuren [a]	Epifauna	Wood Debris
WPAH038	A	IND	IND	IND	IND	None
WPAH038	D	0.20	Sandy silt	Med	No	Trace
WPAH039	A	0.09	Silt	Med	Yes	Med
WPAH042	A	0.23	Silt	Med	Yes	Low
WPAH043	A	0.21	Wood and silt	Med	Yes	High
WPAH045	A	0.26	Silt	Med	Yes	None
WPAH046	A	0.38	Silty sand	Med	No	Med
WPAH046	B	0.47	Silty sand	Med	No	Low
WPAH047	A	0.22	Sand	Med	Yes	Trace
WPAH053	D	0.20	Gravel	Low	Yes	Low
WPAH054	A	0.16	Silt	Med	No	Trace
WPAH055	A	0.22	Silt	Med	Yes	Low
WPAH056	A	0.22	Silt	Med	No	None
WPAH057	D	0.17	Silt	Med	Yes	Low
WPAH058	A	0.13	Silt	Med	No	None
WPAH059	A	0.18	Silt	Med	No	Trace
WPAH060	A	0.19	Sandy silt	Med	Yes	Trace
WPAH061	B	0.16	Silt	Med	Yes	Trace
WPAH061	E	0.17	Silt	Low	Yes	Trace
WPAH062	B	0.17	Silt	Med	Yes	Trace
WPAH063	E	0.24	Silt	Med	Yes	Low
WPAH064	C	0.22	Silt	Med-High	Yes	Low
WPAH065	A	0.21	Silt	Med	Yes	None
WPAH065	D	0.16	Silt	Med	No	Trace
WPAH066	A	0.20	Silt	Med	No	Med
WPAH067	A	0.22	Silt	Med	Yes	Trace
WPAH068	B	0.25	Silt	Med	Yes	Med
WPAH069	A	0.24	Silt	Med	Yes	High
WPAH070	A	0.18	Silt	Med	Yes	Low
WPAH071	A	0.25	Silt	Med-High	Yes	Trace
WPAH073	C	0.22	Silt	Med	Yes	Trace
WPAH074	C	0.22	Sandy silt	Med	Yes	None
WPAH074	E	0.26	Sandy silt	Med	Yes	None
WPAH075	E	0.15	Silt	Med	Yes	None
WPAH076	A	IND	Silt	IND	Yes	IND
WPAH076	B	IND	Silt	IND	Yes	IND
WPAH077	B	0.22	Silt	Med	No	None
WPAH078	A	0.21	Silt	Med-High	No	Low
WPAH079	D	0.24	Sandy silt	Med	Yes	None
WPAH079	E	0.16	Sandy silt	Med	Yes	None
WPAH080	A	0.21	Silt	Med	Yes	None
WPAH080	B	0.24	Silt	Med	Yes	None

Table 4-9. Key Plan View Parameters Measured in Each Replicate Image

Station	Rep	Field of View Imaged Calc. (m^2)	Sediment Type	Lebensspuren [a]	Epifauna	Wood Debris
WPAH081	A	0.24	Silt	Med	Yes	Trace
WPAH082	A	0.20	Silt	Med	Yes	Trace
WPAH083	A	0.21	Silt	Med	Yes	Med
WPAH084	A	0.32	Silt	Med	Yes	Trace
WPAH084	B	0.23	Silt	Med	Yes	None
WPAH085	B	0.19	Silt	Low-Med	Yes	Trace
WPAH086	A	0.24	Silt	Low-Med	Yes	None
WPAH087	C	0.17	Silt	Med	No	Low
WPAH088	A	0.25	Silt	Med	Yes	Trace
WPAH089	A	0.22	Silt	Med	Yes	Trace
WPAH090	A	0.15	Silt	Low-Med	Yes	None
WPAH091	A	0.16	Silt	Low	Yes	Trace
WPAH092	A	0.44	Silt	Low	Yes	High
WPAH093	A	0.30	Silt	Low	Yes	None
WPAH093	B	0.34	Silt	Med	Yes	None
WPAH094	A	0.26	Silt	Med	Yes	None
WPAH095	B	0.22	Silt	Med	Yes	Trace
WPAH096	A	0.24	Silt	Med-High	Yes	None
WPAH097	B	0.12	IND	None	Yes	Ind
WPAH098	A	0.11	Silt	None	No	Ind
WPAH099	A	0.38	Silt	Low	No	High
WPAH100	C	0.12	Silt	None	No	Ind
WPAH101	A	0.24	Silt	Med	Yes	None
WPAH102	A	0.27	Silt	Med	Yes	None
WPAH103	A	0.17	Silt	Med-High	No	None
WPAH104	A	0.11	Silt	Med	No	None
WPAH105	A	0.20	Silt	Low	Yes	Trace
KSS-1	A	0.26	Silt	Med	Yes	Trace
KSS-2	A	0.25	Silt	Low	Yes	Trace
KSS-3	B	0.22	Silt	Low	Yes	None

Notes:
IND = indeterminate
m^2 = square meter

[a] *Lebensspuren* are biologically formed, sedimentary structures found in sediments, including tracks, trails, burrows, borings, and fecal casts.

Wood Debris Categories

None	=	0
Trace	=	> 5%
Low	=	5-20%
Med	=	21-50%
High	=	> 50%

APPENDIX A

FIELD NOTES

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CONTENTS

PAGE	REFERENCE	DATE

Tuesday, June 25, 2013
Weather: calm, 55°F, overcast
Crew: Sexton (field lead), Wodzicki, Estella
Eaton, Putnam
Derek Beery, City of Port Angeles.
0745 Meet at boat dock; mob gear for day
0800 H&S briefing
0816 Underway
0848 First grab at Station $\boxed{\text{WPAH026}}$
overpenetration, silt little bark debris
0855 Second grab at Station WPAH026
overpenetration, silt little bark debris
remove weights from van Veen.
0907 Third grab - overpenetration
0913 Fourth attempt okay; 60-70% moisture
silt with <10% wood debris 3/4 vV; 17cm
10YR 5/1 sulfide odor; surface 10YR 5/2
redox layer g-s = ~~70~~ AFEW 6/25/13 ~~55%~~ FINES
0954 1st attempt at Station $\boxed{\text{WPAH029}}$ ~~47.5%~~ 50%
1/2 vV acceptable, 17cm pen.
silt with <10% wood debris
10YR 5/1 sulfide odor, stronger sulfide odor
than Station WPAH026, high 50% moisture
lighter brown redox layer 10 YR 5/2
g-s = 47.5%

1026 1st attempt at Station $\boxed{\text{WPAH030}}$
Perfect grabs - Full vV pen depth =
less moisture content 30%, a little more
clay in silt 10YR5/1, no odor, liter brown
redox layer 10 YR 5/2, 13 cm pen.
g-s = 62.5% FINES <5% wood debris
1100 1st attempt at Station $\boxed{\text{WPAH031}}$
sloped surface 7-11 cm, only collected
from 11 cm side, ≈ 30% moisture content
clayey silt. 10 YR 5/1, no odor, lighter
brown redox layer 10YR 5/2, 1cm small
shell fragments, little bark debris, 12+ worms removed
g-s = 60% <5% wood / bark debris
1134 1st attempt at Station $\boxed{\text{WPAH032}}$
13 cm pen. lots of large pieces of wood
debris & bark ≈ 40% moisture. large
pieces of wood removed (after scraping)
from sample >2 inches in length. No odor
clayey silt 10 YR 5/1; redox layer
slightly greener at 5YR 5/2 20% wood
g-s = 62.5% FINES. bark in g-s sample
1200 lunch break (1 hr)
1302 1st grab at Station $\boxed{\text{WPAH033}}$
14cm pen. 10YR 5/1 with lighter 10YR 5/2
on surface redox layer cont. next pg.

(Station WPAH033 cont.)
clayey silt with sand, approx 10% wood debris + bark, 1 lg stick removed.
no odor in grab, but composite had faint sulfide odor 10% moisture content
g.-s = 18% FINES (bark fines clogging sieve) 55% w/ wood fines.

1330 1st attempt at Station WPAH034
van Veen flipped - empty
1332 2nd attempt - water only
1335 3rd attempt - carpet w/ mud; garbage after rinsing off - off station
crab 1/2"
sculpin 3"
eel 2" in compst
1343 4th attempt reposition 2.5 m N
15 cm penetration, shell fragments
10% moisture content
10YR 5/1 with lighter surface 10YR 5/2.
live (photo) clam, 5m piece of slate removed (1x2")
silt with some sand, no odor, 10% wood debris/bark, 3 lg worms (6") observed & removed
g-s = 46% FINES

1421 1st grab at Station WPAH035
wash out
1425 2nd attempt - gravel + large (3x5") piece of bark
1429 3rd attempt 2.5 m N - inadequate pen. 3 1/2 inch only.

1433 4th attempt 5 M N. washed out gravel, rock, barnacles.
1438 5th attempt : little west of 3rd attempt.
10YR 2/2 with lighter surface g-s = 35% FINES
10YR 5/2. large pieces of wood debris (bark) removed (≥ >2in) normal odor
rocks, gravel on surface (removed) 11 cm
sand in upper 1 inch with lower 3 inches mostly silt. ≈ 10% moisture, 5% wood

1514 1st grab at Station WPAH036
16 cm pen. 7.5YR 2.5/1 with lighter surface 10YR 4/3. Few lg pieces of bark, bark in jaws, shell frags.
normal odor 10% moisture <5% bark
silt with little sand. little sheen 1/2" dia.
g-s = 62.5% FINES

1545 1st grab at Station WPAH037
16.5 cm pen. 10YR 5/1 with lighter surface (redox) 10YR 5/2 no odor
silt w/ little sand. 12 small (0.5 cm) crabs removed from sample. 1-2% shell frags and <5% wood debris (mix of bark + milled wood) sulfide odor in composite
g-s = 45% FINES

1612 Break per captain request.
1648 1st attempt at Station $\boxed{\text{WPAH038}}$
3 cm pen.
1651 2nd grab. sloped surface 4-11 cm pen
some sediment collected from 11 cm end
of van Veen. normal odor, shell frag <5%,
10YR 4/1 through out. No visible wood.
debris. Kelp on surface & in jaws.
1701 3rd grab same description as previous
only more Kelp on surface of sediment
TVS sample taken from this grab
Clinocardium clam in sample, returned
to harbor. Also small crabs, removed.
1714 4th grab same description as previous
except more clay than silt and lots of
worms, very thin worms mixed throughout
g-s = 50%
1739 1st grab at Station $\boxed{\text{WPAH042}}$
16 cm pen. several worms & crabs removed
from sample. clayey silt with less clay
than Station WPAH038 but more than
previous Stations. 10 YR 4/1 with lighter
surface redox layer 10YR 4/2 <10% moisture
no wood debris, no shell frags, no odor
g-s = 65% FINES

1808 Return to Dock; demob gear
1817 Depart Kittiwake
1900 Take samples to field storage facility
re ice & mob gear for tomorrow.
End of Day

J. Sexton
6/25/13

X

Wednesday, June 26
Weather: Light rain, cloudy overcast, 50-55°F
Crew: Sexton, Wodzicki, Estella (Integral)
Eaton, Putman (BioMarine)

0730 Meet at boat; mob gear + decon; H&S meeting
0806 Underway
0812 1st grab at Station WPAH022
10YR 5/1 with lighter surface 10YR 5/2
10% moisture content, large pieces of bark
sparse throughout (<5%) clam shell
sm crab (removed) sulfide odor
silt with little sand, some terrestrial
straw like grass on surface. 13 cm pen
g-s= 35% FINES
0835 1st grab at Station WPAH023
inadequate penetration only 3 inches.
switch to vV with weights
0847 2nd grab - inadequate penetration
green seaweed on surface. (sea lettuce)
0856 3rd grab - 12 cm penetration
Lots of small ~~bark~~ wood(??) debris (eg. coarse sawdust)
and bark fragments, about 80%.
10% moisture content, sulfide odor
(strong) lots of shell hash sm piece of
sea lettuce on surface ≈ 3 in dia.
g-s = 85% FINES

0927 1st grab at Station WPAH040. 16 cm pen.
Homogeneous silt 7.5YR 2.5/1 with
lighter redox layer 10YR 5/2, 10% moisture
sulfide odor, no wood or shell frags
very little fine grain sand. g-s = 75% FINE
0946 Collect split sample from station
WPAH040. Deviation from proposed
location in SAP (Integral 2013) due to
perfectly filled grab with sufficient
sediment for split. ± 283' N of station 39.
~~1st grab at Station WPAH041~~ JES 6/26/13
1010 Break
1022 1st grab at Station WPAH041
7.5 YR 4/1 with lighter surface
redox layer 2.5Y 4/2. Homogeneous
silt, no wood debris or shell, thin red
worms, approx 10-15% moisture
16 cm pen. Barely any sand.
g-s = 62.5% FINES
1052 1st grab at Station WPAH043
sloped surface 14-16 cm pen.
silt w/ ≈ 30-40% sm. wood debris
normal odor, no shell, lg. pieces 5" long
of bark on surface + some lg. bark in
(cont. next pg.)

(Station WPAH043 cont.)
in sampling interval. 7.5 YR 2.5/1 with
lighter redox layer 2.5Y 4/2 10% moisture
g-s = 50% FINES
1121 1st grab at Station $\boxed{\text{WPAH044}}$
11 cm pen. Lighter surface layer redox 1-1.5cm
2.5Y 5/2, 7.5YR 4/1 below. Lighter
colored layer consistency of mousse and
1.5-10 cm has more clay. Worms removed
from sample (photo), no odor. Silt. few
particles of organic debris. no shell. 10%
moisture g-s = 90% FINES
1145 Lunch break
1237 1st grab at Station $\boxed{\text{WPAH045}}$
silt with very little sand 20% moisture
<5% wood debris (sm sticks, reed like grass)
10 YR 4/1 and lighter thin redox layer
10YR 5/2. No odor. Few worms (removed)
g-s = 60% FINES
1310 1st attempt at Station $\boxed{\text{WPAH047}}$ FAILED ATTEMPT
inadequate pen. lots of sand.
1316 2nd attempt – wash out, rock in jaws of vV
1321 3rd attempt – inadeq. pen in sand
1328 4th attempt – inadeq. pen more sand
leaving station will retry at end of day
with power grab.

1340 Collect equipment filter wipe FW0001 on vV
Ghost wipe lot # Jan 4 2011 / Exp. July 2014
for metals. (supplied by ALS)
Whatman Filter papers for Hg, SVOCs,
PCBs, PCDD/Fs. (supplied by ALS)
1350 Collect filter paper blank FB0001
Ghost wipe lot # Jan 4 2011 / Exp. July 2014
for metals. (supplied by ALS)
Whatman Filter papers for Hg, SVOCs,
PCBs, PCDD/Fs. (supplied by ALS).
1403 1st grab at Station $\boxed{\text{WPAH046}}$
inadequate pen. 6 cm sand + bark
1408 2nd grab – inadequate pen. 6 cm
switching to power grab.
1434 3rd attempt rock in jaws
1443 4th attempt 11 cm penetration
10 YR 4/1 throughout lots of
rocks throughout and some broken
clam shells. Silt with some
sand normal odor. Will switch
and do $\boxed{\text{Split sample}}$ here due to
rocks + more sand at Station 47
and difficulty meeting penetration
depth at Station WPAH047.
% FINES = 9% FINES

1503 5th attempt. Same description as previous grab but 12 cm pen.

1516 6th attempt. 12.5 cm pen Same description sloped surface. Split collected

1553 1st attempt at Station WPAH047 with Power grab wash out

1606 2nd attempt w/ Power grab - washed out; rock in the jaws.

1619 3rd attempt - wash out rocks in jaws lots of rocks in grab

1638 Moved ≈ 50 meters south. 7.5 cm recovery, per SAP collecting sample normal odor 5Y 2.5/2. little wood <3%, fine sand with a little silt. 10% moisture content, few shell frags.
g-s = 16% FINES

1705 1st grab at Station WPAH039 over penetration

1711 2nd grab at Station 39 pen. 17 cm 10YR 4/1 with redox layer at 10YR 5/2 ≈ 20% wood debris, lg worm (≈5-6 in) on outside of vV 20% moisture content sulfide odor. homogeneous silt.
g-s = 40% FINES

1734 Return to Dock

1830 Take samples to field storage facility re ice samples & mob gear for tomorrow.
End of Day

J. Sexton
6/26/13

Rite in the Rain

Thursday, June 27, 2013
Weather: Light rain, overcast, 50-55°F
Crew: Same as previous day

0730 Meet at boat; mob gear + decon; H&S meeting
0816 Underway
0838 1st grab at Station $\boxed{\text{WPAH028}}$ 16 cm pen 10YR 4/1 with thin redox layer on surface 10YR 4/2. lg pieces of bark on surface with approx. 50% wood debris throughout sample, sulfur odor, worm in grab, sea lettuce on surface no shell g-s = 50% FINES wood throughout not precise 97.5% w/wood
0909 1st grab at Station $\boxed{\text{WPAH024}}$ 10YR 2/2 no visible redox layer due to Sea lettuce on top of most of surface of grab – removed prior to sample collection 16 cm pen sulfur odor. crabs + eel observed in grab. silt with little Sandy (little) silt with small amount of organic debris. no visible bark; 20% moisture
0933 2nd grab – additional vol. needed for bioaccumulation station. Same description as previous, but no eel g-s = 37.5% FINES

1020 Break
1047 1st grab at Station $\boxed{\text{WPAH025}}$ just SE of new dock addition. 10YR 4/1 with lighter 10YR 4/2 redox layer. 14 cm pen. sandy silt with sulfide odor no wood debris, crab (remove), piece of Kelp attached to mussel shell (approx 2") removed from surface. 20% moisture.
1106 2nd grab – additional volume for bioacc. same description as previous grab except surface was sloped 13-15 cm pen, no crab, no kelp, but mussel shell frag.
1117 3rd grab – additional volume for bioacc. Same description as previous grab but 16 cm pen & 2 larger crabs (1-2 in) removed from sample g-s = 45% FINES.
1200 Lunch break
1241 1st attempt at Station $\boxed{\text{WPAH027}}$ Only sea lettuce, Kelp, and 1 spot prawn. trace sediment
1248 2nd grab – 12-16 cm 7.5YR. Grab + cable covered with Kelp + Ulva went it came out of water. Kelp + Ulva on surface

continued next pg →

(Station WPAH027 continued)

of grab. 2 sm spot prawns removed.
silt with 50% shell hash, trace
wood debris, normal odor, 10% moisture
g-s = 5% FINES (results confounded by wood)

1304 3rd grab. Just seaweed (assorted)

1306 4th grab. 1/2 vanVeen with 12 cm pen
bark chips on surface. Same description
as grab #1, but ≃ 20% sawdust (coarse)

1313 5th grab. 15 cm pen. ≃ 50% wood
(coarse sawdust) debris. 7.5 YR 4/2
eel in VanVeen, cap cap worms (removed)

1323 6th grab. 15 cm pen. Same description
as 5th grab, but with lots of very
juvenile shrimp, large worm (removed)

1401 1st attempt at Station $\boxed{\text{WPAH005}}$
overpenetration. Switching no no weight VV

1412 4 M east of station due to permanent
log boom protecting pier
16.5 cm penetration. 10YR 4/1 with
thin redox layer 10 YR 5/2. slight sulfide
odor. sandy silt with 5-10% bark
many juvenile crabs. 20-30% moisture

1426 3rd grab - 16 cm penetration
same description as previous clam shell
less wood < 5%. normal odor, no crabs.
g-s = 50% FINES.

1526 1st grab at $\boxed{\text{WPAH006}}$ - inadequate
penetration. 8 cm

1531 2nd grab - rock in jaws

1533 moved 2 m E 3rd grab inadequate pen.

1542 switched to heavy VV. rock & piece of
bark. May have hit submerged log.

1546 Moved 6 m ~~toward~~ parallel to shore.
17 cm pen. 10YR 2/1 with lighter redox
layer 10YR 4/2. Some larger pieces of
bark (≃5%) smaller coarse sawdust
moisture content 30%, shell fragments
faint sulfide odor, large pieces of bark
removed from sample
g-s = 42.5% FINES

1643 Log boom on station, moved 3 M East
1st attempt at Station $\boxed{\text{WPAH007}}$
washed out, large pieces of bark, jaws
open, scant sediment.

1648 move 40 meters east of station coordinate
(drifted back) wash out, wood in jaws
a little more sediment in grab, jaws open

1652 move 10 meters east from original
coordinate, 13 cm pen. Sediment
covered ~~like~~ by large piece of kelp.

(Station WPAH007 cont.)
7.5 YR 2.5/1 with lighter redox layer
5 Y 4/2. sandy silt <5% wood
debris + bark. sulfide odor 15%
moisture content. clam shell (broken)
spot prawn removed. g-s = 68% FINES
1710 lg piece of bark, wash out but
sediment in grab - not collected
1713 17 cm penetration
1740 Return to dock, demob gear
1805 Depart Kittiwake. Send Stefan + Zach
to dinner. Work on COCs
1815-1915 Stefan + Zach @ dinner
1915-2130 Work on COCs + sample QA. Stefan
+ Zach leave
2130-2230 Sexton takes ice packets to
offsite freezer. Ice packets to be used
for tomorrow's shipment of samples
2400 End of Day for Sexton

J. Sexton
6/27/13

Friday, June 28, 2013
Weather: overcast, calm 55°F
Crew: same as previous day.
0730 Meet at boat; mob gear + decon; H&S
meeting
0806 Underway. Stations WPAH008 + WPAH012
are under logs.
0815 1st grab at Station $\boxed{\text{WPAH014}}$ - over pen
0819 17 cm pen. 10YR 2/2 with 2.5Y 4/2
from ∅-5 cm. sulfide odor. sandy silt
20% moisture with very little (trace)
wood/bark. worm removed. g-s = 48% FINE
0831 17 cm pen. same description as previous
grab. no worm + 1 lg piece of bark
1" x 4". only collected from 1/2 vV due to
over penetration in 1/2 of vV
0841 17 cm pen. Same description as first grab
only collected 1/2 vV due to over penetration
on 1/2 (other side not collected).
0907 1st grab at Station $\boxed{\text{WPAH016}}$
16.5 cm pen. Sandy Silt (very fine grain)
10YR 4/1 with thin redox layer
2.5Y 4/2 some shell frags + worm
tubes. normal odor 30-40% moisture
trace wood worm removed. g-s = 45% FINE

0925 2nd grab at Station WPAH016. 16.5cm
pen. Same description as previous grab.
1016 1st grab at Station WPAH018 12-14cm pen
Lots of lg pieces of bark on surface + through
out sample 30% lg. wood pieces 20% smaller
wood, strong sulfide odor, 10-15% mozonne
10YR 2/1 with lighter green tint redox
layer on surface 2.5Y 5/4, silt.
Majority of upper sediment in bark which
is carefully scraped and bark discarded
1034 2nd grab at Station WPAH018.
same description as previous grab but
10 cm pen.
1046 3rd grab same description. 12cm pen
g-s = 60% FINES
1122 1st grab at Station WPAH019 Need to
try to obtain 40ft MLLW near this
station coordinate. 1st attempt in 8 Meters
water depth (MLLW). Grab a wash out.
1127 2nd grab - 12 meters MLLW (40ft).
17cm pen. 10YR 2/1 throughout.
bark 10YR 2/1 50% coarse wood chip
1143 3rd grab 1/2 @ 17cm. 1/2 discarded (1130 12.1M)
(descrip continued for both grabs) →

(sample descrip @ Station WPAH019):
trace shell frags and some larger
pieces of bark 1-2". strong sulfide
odor. g-s = 33% FINES
1210 Lunch break
1225 1st attempt at Station WPAH020 (12.2M)
Wash out lots of bark + wood in jaws
1231 2nd attempt - washed out + inadequate
penetration (12.2M) switching to weighted
Van Veen
1241 3rd attempt - washed out 12.2M water
depth MLLW inadequate penetration
more wood + bark in jaws. Moving
50 M east
1246 VV came upside down back to surface
on 4th attempt hit log?
1250 5th attempt - VV upside down again.
1300 Back at dock, demob gear + store
for weekend.
1330 Begin packaging samples for shipment
1700 Samples at FedEx for ALS-Kelso
Samples picked up by courier from
NewFields. Stefan leaves for Bellingham
1730 Zach leaves for Seattle after ice run
1830 End of Day. Clean up coolers/supplies.
J. Sexton
6/28/13

Monday, July 1, 2013
Weather: Foggy, overcast, slight wind 55°
humid
Crew: Sexton, Wodzicki, Estella (Integral)
Charlie Eaton + Chris Eaton (BioMarine)
0730 Meet at boat; mob gear + decon sampler
H&S meeting
0822 Underway. Checked out Stations
WPAH008 & 012. Blocked by logs
Call Mike at Port of Port Angeles
360-460-2304 to coordinate a
date & time to open the boom sticks
to gain access to
0843 1st grab at Station $\boxed{\text{WPAH009}}$. 2.5Y 3/2
with lighter redox layer 5Y 5/2, no odor
12 cm; normal odor 20% moisture
organic debris, shell frags. Scant
bark (<5%), barnacle on piece of bark
0905 2nd attempt - washed out.
0919 3rd grab 17 cm pen. same description
as first grab; only collected 1/2 V
0930 4th grab 17 cm pen. same description
as first grab with more shells, crabshell
0940 5th grab 16 cm pen. same description
as first grab.
g-s = 35% FINES

1022 1st grab at Station $\boxed{\text{WPAH003}}$. 12 cm pen
7.5YR 2.5/1 throughout no visible
redox layer due to layer of 1-2" bark +
sea lettuce on surface. 80% coarse
sawdust wood particles throughout
sm crab (removed) lots of Ulva in
jaws of vanVeen. switch to weighted
vanVeen. 20% moisture g-s = 103% confounded by wood
1042 2nd grab. 14 cm penetration. sm eel (2")
(removed) 4 small crabs. Large piece of bark
on surface ~3x10" Ulva on surface and in
jaws of grab. Same description as previous
grab. juvenile (larval) spot prawn?
amphipod?
1054 3rd grab. Inadequate penetration
1100 4th grab. Stick in side jaws but
held together - no wash out. Same
description as first grab. no crabs or
juvenile larvae observed, 13 cm pen
1110 5th grab. 14 cm pen. lg decomposed crab
molt 8" claw to claw removed from grab
(red rock crab). Same description, % wood
% moisture as first grab.
1147 lunch break

1238 1st grab at Station $\boxed{\text{WPAH049}}$ -
overpenetration, Kelp on surface
1244 2nd grab - overpenetration, switch to
VV w/ no weight
1256 3rd grab. 17 cm penetration Kelp +
Ulva on surface also white fibers on
edges of Ulva (photo) 10YR 2/2 throughout
little organic debris 20% moisture 10% wood
1309 4th grab 17 cm penetration. Same descrip
as previous grab, but no white fibers
visible. sulfide odor - strong.
g-s = 35% FINES
1343 1st grab at Station $\boxed{\text{WPAH050}}$
7.5 YR 2.5/1 with lighter redox
layer 2.5Y 5/2. Also 10YR 6/3 layer
from 4-6 cm with oatmeal like texture
sulfide odor 25-30% wood, 20-30%
moisture, small crab (removed). 17 cm
penetration. g-S = 50% FINES
1401 2nd grab. 17 cm penetration. Same
description as previous grab including
crab (removed) but 10YR 6/3 layer
was from 4-5cm.

(cont next pg.)

1412 3rd grab. 17 cm penetration, same description
as first grab, but 10YR 6/3 layer from 3-10 cm
1426 4th grab. 17 cm pen. Same description as
first grab, but 10YR 6/3 layer from 2-10 cm
+ found part of a ratfish ~~skate~~ egg case in grab
1534 1st grab at Station $\boxed{\text{WPAH010}}$.
17 cm penetration 30-40% moisture
sm. crab (removed) 5Y 2.5/2 throughout
with thin redox layer 5Y 6/2.
~~none~~ odor. silt with little sandy.
10-15% wood debris.
1549 2nd grab - over penetration
1554 3rd grab - overpenetration
1559 4th grab - overpenetration
1606 5th grab - 17 cm pen. same description
as 1st grab, but observed sm crab
(removed) some of the lighter 10YR
6/3 previously seen at Station WPAH050
was interspersed throughout grab (15%)
1618 6th grab - 17 cm pen. same description
as 5th grab but with less 10YR 6/3
(5-10%)
1630 7th grab - 17 cm. 1/2 vV overpen. not
collected. g-s = 50% FINES.

1706 1st grab at Station WPAH011. over penetration. Return to dock.
1724 Back at dock, demob gear
1800 To field storage facility, pick up ice, make ice bags for offsite freezer storage, mobilize gear for tomorrow
1900 End of Day

J. Sexton
7/1

Tuesday, July 2, 2013
Weather: Overcast, windy (gale force winds expected today) 55-60°F
Crew: same as previous day
0730 Meet at boat; mob gear, decon sampling equip.; H&S meeting
0803 Underway.
0822 1st grab at Station WPAH004 15 cm pen. Ulva on surface 5Y 2.5/2 with lighter redox layer 5Y 5/2. normal odor. 70% wood debris (coarse sawdu[st]) dock shrimp (removed). no shell 30% moisture content
0838 2nd grab at 16 cm pen. Same descrip[tion] as previous, but also worm tube, bi[g] red worm (removed), very small clam (0.5 cm), shrimp juvenile (small), sea shell fragments.
0850 3rd grab 1/2 vV acceptable. 1/2 vV not used. Same description as first gra[b] but no organisms.
0859 4th grab. slightly sloped surface full vV 15-13 cm. Same descripti[on] as first grab but no organisms.
0913 5th grab. 15 cm pen. same as first gr[ab] red worm

0925 . 6th grab. 16 cm pen. Same description as first grab, crab

0940 ~~0938~~ 7th grab 16-14 cm. same description as first grab with no Ulva + worm tubes on surface. g-s = 42.5% FINES

1014 1st attempt at Station on $\boxed{\text{WPAH012}}$ under penetration. switch to weighted vV.

1027 2nd grab 15 cm. pen. piece of cable + large pieces of bark in jaws of grab. No wash out though. 30 M West of discontinued disposal area, silt 7.5 YR 4/1 with thin redox 2.5Y 5/2 no odor 50% wood debris, few shell fragments, 20% moisture worm (removed), lg bark 1/2 vV surface

1042 3rd attempt - wash out, bark in jaws

1045 4th attempt - wash out, bark in jaws 5" sq.

1051 5th attempt - 15 cm penetration. no bark on surface. Same description as #1 but no bark in jaws, 15-20% wood more clay content in silt, same color no shell frags. no worm.

1101 6th attempt 1/2 vV only. 1/2 vV over pen. & not used. same descrip as previous grab. 15 cm pen. g-s = 63% FINES

1130 lunch break

1234 Collect equipment filter wipe FW0002 on vV Ghost wipe lot # Jan 4, 2011 / Exp. July 2014 for metals. Whatman filter papers for Hg, SVOCs PCBs, PCDD/Fs. (all wipe papers supplied by ALS)

1300 1st attempt at Station on $\boxed{\text{WPAH011}}$. overpenetration

1306 2nd grab - 1/2 vV over pen. 1/2 vV 17 cm pen. 7.5 YR 4/1 with lighter redox layer (≈ 1 cm thick) 10YR 5/3 silt 50% moisture, no wood debris or bark, no shell. Silt

1319 3rd grab - 17 cm pen. same descrip as previous grab, but 5% larger bark pieces

1334 4th grab - overpenetration

1340 5th grab - overpenetration

1347 6th grab - 17 cm pen. same description as grab #2, bark in jaws <5% wood bark.

1406 7th grab - 17 cm pen. description same as previous grab, worms observed. in silty sediment g-s = 53% FINES

1432 Back at dock

1500 Integral team picks up ice + goes back to field facility

cont. next pg.

(cont. from previous page)
QA of samples collected yesterday (7/1) + today (7/2). Package samples for FedEx shipment to ALS. Reice samples for overnight storage.

1700 FedEx and errands

1730 End of Day for Wodzicki + Estella
Dinner break

1830 Pick up rope for power + anchors at hardware store. Work on boat anchors, gear, towing strap, lights, etc.

2130 End of Day for Sexton

J. Sexton
7/2/13

Wednesday, July 3, 2013
Weather: sunny, cold ≈ 50°F very windy about 10-15 mph. Expected winds to increase as day goes on.

Crew: Sexton, Wodzicki, Estella

0800 Meet at field storage facility; reice samples.

0815 Meet Paul Perlwitz at Nippon. Carry boat to beach on harbor side of Lagoon. Wodzicki + Estella row boat up access channel to lagoon. Anchor boat on shore. Safety briefing with Perlwitz. Decon gear + set up sample processing area. Several calls from Port (Jesse + Dean) regarding access to Station WPAH08

1000 Underway to Station WPAH021. Wind making it difficult to station boat at coordinate. Samples to be collected by Wodzicki + Estella using Ekman at lagoon.

1010 Derek Beery (City of Port Angeles) called he won't be coming to observe today + is busy next week at another site.

1045 Wind making it difficult to get to station. Sample collected at $\boxed{\text{WPAH021}}$ description taken of composite sample

Wind blew page turn
Delete pg.

J. Sexton
7/3/13

Wind blew page turn
Delete pg.

J. Sexton
7/3/13

(cont. from pg 31)
normal odor. large pieces of clam shell
(removed). scant organic debris
7.5 YR 2.5/1. No bark. 40% moisture
silt. lg worm 6" long (photo)
Very fine wood particles (e.g. sawdust
throughout sample (≈30%) g-s = 68% FINES
4.1 H2O depth WPAH21A GPS coordinate
1215 Crab carapace, sea slug, worms, WPAH001
wood debris, seaweed on surface on
all grabs 7.5 YR 2.5/1 no odor, ~~TBS~~ from pot,
40-50% moisture very fine wood
particles throughout (≈30-40%) g-s = 80% FIN
5.5 H2O depth. One coordinate collected.
1435 clam shells, sea slug, worms, very
fine wood particles throughout (≈30%)
normal odor. seaweed grass on surface
of all grabs. 40% moisture 7.5 YR 2.5/1
5 ft water depth. one coordinate collected
WPAH002 g-s = 65% FINES
1550 Sample collected at Station WPAH048
Color 7.5 YR 2.5/1. sulfide odor (strong)
large pieces of bark throughout sample
(2-4"), no organisms observed. seaweed
grass on surface but more sparse than
(cont next pg) ⟶

(cont. from pg. 34)
previous station. Some shell frag.
4.6 ft water depth. one coordinate collected.
g-s = (photo missed.
1628 Collect equipment filter wipe FW0003 on
Ekman. Ghost wipe Lot# Jan 4, 2011 / Exp. July
2014 for metals. Whatman filter papers for
Hg, SVOCs, PCBs, PCDD/Fs (all wipe papers
supplied by ALS)
1717 Collect sample at Station WPAH051,
per coordinates Station 51 + Station 1 are
approx. 7 ft. apart called Integral PM
B. Day. Collecting extra sediment as backup
will hold until decision is made.
Sea slugs, small eel, 1 sm. crab, sm.
amphipods. Very high moisture content 50-60%
larger pieces of bark 15-20%, no odor
silt
1800 Row boat out of lagoon. Trailer boat
back to field storage facility.
1900 Reice samples. End of Day for Wodzicki &
Estella
2200 Work on anchors, rigging, lights etc.
Wash down boat. QA samples for
Newfields delivery tomorrow. End of Day
for Sexton
J. Sexton 7/3/13

Monday, July 8, 2013
Weather: clear, 60°F, calm, slight wind
Crew: Sexton, Wodzicki, Estella (Integral)
Charlie Eaton + Chris Eaton (BioMarine)
Pete Striplin (WA Ecology)

0730 Meet at boat; mob gear + decon sampling equipment, H&S meeting
0816 Depart Dock.
0836 1st grab at Station WAPH013. Silt w/ little sand 2.5Y 3/2 throughout 10YR 4/1 thin redox layer, 15 cm pen. trace wood <5% few shell frags. no odor

Split sample collected at Station 13.

0856 2nd grab 16 cm pen. Same description as previous grab. Collect split from Station 13.
0908 3rd grab 16 cm pen. Same description as previous grab. 30% moisture g-s = 55% FINE
0919 4th grab. 16 cm pen. Same description but few mud worm tubes on surface
1004 1st grab at Station WPAH015. Silt with little sand 7.5YR 4/1 with 10YR 4/1 very little wood/organic debris <5% 30% moisture. worms in sample (removed) sm. red piece of plastic (photo) removed no shell frags. normal odor. 14.6
1020 2nd grab. 15.5 cm pen. Station is surrounded by crab pots. (cont. next pg)

(2nd grab at Station WPAH015)
Same description as previous grab, but also shell fragments + larger pieces of clam shells. A couple of pieces of bark ≅ 2-3" removed. More worms in this grab (removed when seen) also amphipods (removed) no red plastic.
1031 3rd grab. Caught line from abandoned crab pot in jaws of vV. opened grab pot + returned to bottom. Started surface 15.5 - 17 cm. slightly darker than 1st grab 2.5Y 5/2, but same % wood + moisture. few larger pieces of bark ≅ 2-3" removed. Worms (one bright blue) removed. Shell frags (trace). Line not in sample coll. zone
1046 4th grab. 16 cm pen. Same description as 3rd grab, but no bright blue worms. g-s ≅ 60% FINES.
1130 Lunch break at marina.
1222 1st grab at Station WPAH020. overpenetration First attempted this station on 6/28. moved today 50M west. 14.2 water depth.
1225 2nd grab 13.4 M water depth will move in shore slightly to get closer to 14 M water depth. 1/2 vV over pen and 1/2 vV 16 cm pen. - this 1/2 saved for possible use.

Rite in the Rain

1236 Moved a little closer to shore. Water depth 12.2M. Nothing in grab but water + seaweed (mostly Ulva) trace sediment. discarded. Switching to vV with no weights + moving a little further out.

1247 ~~4th~~ attempt back at 13.4M. Full vV 17 cm pen. 10YR 2/1 throughout with thin + "spotty" layer on surface 10YR 4/2 hermit crab, eel, both removed. strong sulfide odor. 70% wood debris no large bark pieces. no shell frags. 30% moisture content. g-s = 15/~~89~~% fines on bottom

1301 5th attempt. Water depth = 13.8M overpenetration

5% fines confounded by wood!

1305 6th attempt. Water depth = 13.4M. 17cm pen. same description as 4th grab but no eel or crab + with shell frags.

1337 1st attempt at Station $\boxed{\text{WPAH052}}$. Inadequate penetration.

1348 2nd attempt 17 cm pen 7.5YR 2.5/1 throughout 2.5Y 4/2. silt with some clay. slight sulfide odor no organic debris in sample 20% moisture content. no shell. no organisms observed g-s = 69% FINES

1401 3rd attempt 16.5 cm penetration. same description as previous

1416 4th attempt. vV flipped

1438 Return to dock.

1500 Transfer samples to offsite field storage facility. QA samples for ALS shipment. Make ice bags.

1730 FedEx sent. Samples re-iced. End of Day

J. Sexton
7/8/13

Tuesday, July 9, 2013
Weather: Cool (55°), foggy, slight wind
Crew: Sexton, Wodzicki, Estella (Integral)
Charlie Eaton & Chris Eaton (BioMarine)

0700 Meet at boat, mob gear & decon sampling equipment, H&S meeting.

0725 Depart dock.

0730 Arrive at boom sticks blocking WPAH 008 Prearranged meeting time with Port to let us in to area through boom sticks. Called Port; no answer at cell phone number provided for Port contact. Called Jesse at Port. He can get someone else here in an hour or so.

0806 1st grab at Station $\boxed{\text{WPAH017}}$, silt with some clay and trace sand. normal odor. no wood debris. few shell fragments. worms. 10YR 5/2 redox layer on surface 2.5Y 3/2 throughout, 16 cm pen. 20% moisture content

0822 2nd grab. Same description as first grab 16 cm pen.

0832 3rd grab. 16 cm pen. same descrip as previous

0843 4th grab. 16 cm pen. same descrip as previous g-s = 60% FINES

0920 Log barge arrives to open boom sticks at WPAH008.

0934 1st attempt at Station $\boxed{\text{WPAH008}}$. Water only with little sediment; switching to heavy van Veen

0944 2nd grab. 5Y 2.5/2 throughout with 2.5Y 4/2 redox layer (thin) on surface ≃ 30% wood debris, slight sulfide odor larger pieces of bark on surface (2-4") also mussel shell on surface. 20% moisture. 17 cm

0958 3rd grab - water only.

1002 4th grab, 16 cm pen. same color & moisture content, but more wood debris ≃ 40% and more larger pieces of bark throughout sample. 2 small crabs. slight sulfide odor.

1013 5th grab - water only

1015 6th grab - 12-16 cm pen; sloped surface. Same description as grab 4. g-s = 46% FINES (lots of wood waste)

1030 End of Sample collection for WPAH.

1530-1730 Reice samples and demob gear off Kittiwake. End of Day

J. Sexton
7/9/13

Table 4-3. Field Sample Collection Matrix

Station Number / Site	Sample Number	Sample Type	Sediment Chemistry Samples						Archive	Bioassay Samples – Sediment			Bioaccumulation Samples	Treatability Test Samples	Ghost Wipes	Filter Wipe Blanks and Filter Paper Blanks – Whatman Filter Papers			
			Alpha	CAS	CAS 7day	CAS	Axys	CAS	CAS										
			TOC, Black Carbon	TS, Grain size	TVS (No headspace)	Metals, SVOCs, PAHs	PCB congeners, Dioxin and Furans	Ammonia and Sulfides (Porewater to be analyzed at lab)	TBD	10-day amphipod (*Eohaustorius estuarius*)	Larval development (*Mytilus galloprovincialis*) with resuspension	20-day *Neanthes* sp.	Bioaccumulation Test -- 45-day adult bivalve [*Macoma nasuta*] and adult polychaete [*Nephtys caecoides*]	Treatability Study -- 45-day adult bivalve [*Macoma nasuta*] and adult polychaete [*Nephtys caecoides*]	Metals	Mercury	SVOCs	PCB Congeners	Dioxins and Furans
			4 oz WMG [a]	8 oz WMG [a]	4 oz WMG [a]	8 oz WMG [a]	8 oz WMG [a]	16 oz WMG [a]	8 oz WMG [a]	1-gallon bucket with Teflon bag [a]	1, 1-L WMG [a]	1-gallon bucket with Teflon bag [a]	2, 1-gallon buckets with Teflon bags [a,e]	2, 1-gallon buckets with Teflon bags [a,e]	4 oz WMG [a]	4 oz WMG [a]	4 oz WMG [a]	4 oz WMG [a]	4 oz WMG [a]
			10 g Refrigerated	110 g Refrigerated	5 g Refrigerated	22.5 g Refrigerated	10 g Refrigerated	100 mL (porewater) Refrigerated	NA Frozen	4 L Refrigerated	1 L Refrigerated	4 L Refrigerated	6 L Refrigerated	6 L Refrigerated	NA Refrigerated	NA Refrigerated	NA Refrigerated	NA Refrigerated	NA Refrigerated
☐ WPAH001	SD0001	Normal	Tag # 21429	Tag # 21430	Tag # 21431	NA	NA	Tag # 21432	Tag # 21433	Tag # 21434	Tag # 21435	Tag # 21436	NA	NA	NA	NA	NA	NA	NA
☐ WPAH002	SD0002	Normal	Tag # 21437	Tag # 21438	Tag # 21439	NA	NA	Tag # 21440	Tag # 21441	Tag # 21442	Tag # 21443	Tag # 21444	NA	NA	NA	NA	NA	NA	NA
☐ WPAH003	SD0003	Normal	Tag # 21364	Tag # 21365	Tag # 21366	Tag # 21367	Tag # 21368	Tag # 21369	Tag # 21370	Tag # 21371	Tag # 21372	Tag # 21373	NA	NA	NA	NA	NA	NA	NA
☐ WPAH004	SD0004	Normal	Tag # 21395	Tag # 21396	Tag # 21397	NA	Tag # 21398	Tag # 21399	Tag # 21400	Tag # ←	combined	Tag # →	Tag # →	2 5gal buckets 21401 21402 NA	NA	NA	NA	NA	NA
		Laboratory Triplicate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 additional gallons of sediment for laboratory triplicate analysis at WPAH004	NA	NA	NA	NA	NA	NA
☐ WPAH005	SD0005	Normal	Tag # 21290	Tag # 21291	Tag # 21292	NA	NA	Tag # 21293	Tag # 21294	Tag # 21295	Tag # 21296	Tag # 21297	NA	NA	NA	NA	NA	NA	NA
☐ WPAH006	SD0006	Normal	Tag # 21298	Tag # 21299	Tag # 21300	Tag # 21301	NA	Tag # 21302	Tag # 21303	Tag # 21304	Tag # 21305	Tag # 21306	NA	NA	NA	NA	NA	NA	NA
☐ WPAH007	SD0007	Normal	Tag # 21307	Tag # 21308	Tag # 21309	NA	NA	Tag # 21310	Tag # 21311	Tag # 21312	Tag # 21313	Tag # 21314	NA	NA	NA	NA	NA	NA	NA
☐ WPAH008	SD0008	Normal	Tag # 21499	Tag # 21500	Tag # 21501	Tag # 21502	NA	Tag # 21503	Tag # 21504	Tag # 21505	Tag # 21506	Tag # 21507	NA	NA	NA	NA	NA	NA	NA
☐ WPAH009	SD0009	Normal	Tag # 21357	Tag # 21358	Tag # 21359	NA	Tag # 21360	Tag # 21361	Tag # 21362	Tag # ←	combined	Tag # →	Tag # 21363	5gal bucket	NA	NA	NA	NA	NA
☐ WPAH010	SD0010	Normal	Tag # 21388	Tag # 21389	Tag # 21390	NA	Tag # 21391	Tag # 21392	Tag # 21393	Tag # ←	combined	Tag # →	Tag # 21394	5gal bucket	NA	NA	NA	NA	NA
☐ WPAH011	SD0011	Normal	Tag # 21416	Tag # 21417	Tag # 21418	NA	Tag # 21419	Tag # 21420	Tag # ~~[illegible]~~ 21421	Tag # ←	combined	Tag # →	Tag # 21422	5gal bucket	NA	NA	NA	NA	NA
☐ WPAH012	SD0012	Normal	Tag # 21403	Tag # 21404	Tag # 21405	NA	NA	Tag # 21406	Tag # 21407	Tag # 21408	Tag # 21409	Tag # 21410	NA	NA	NA	NA	NA	NA	NA
☐ WPAH013	SD0013	Normal	Tag # 21463	Tag # 21464	Tag # 21465	Tag # 21466	Tag # 21467	Tag # 21468	Tag # 21469	Tag # ←	combined	Tag # →	Tag # 21470	5gal bucket	NA	NA	NA	NA	NA
☐ WPAH014	SD0014	Normal	Tag # 21315	Tag # 21316	Tag # 21317	NA	NA	Tag # 21318	Tag # 21319	Tag # 21320	Tag # 21321	Tag # 21322	NA	NA	NA	NA	NA	NA	NA
☐ WPAH015	SD0015	Normal	Tag # 21477	Tag # 21478	Tag # 21479	Tag # 21480	Tag # 21481	Tag # 21482	Tag # 21483	Tag # ←	combined	Tag # →	Tag # 21484	5gal bucket	NA	NA	NA	NA	NA
98 7/8/13 Split from Sta. 13 ☐ WPAH01~~6~~/3	SD0016	Field Split [b]	Tag # 21471	Tag # 21472	Tag # 21473	Tag # 21474	Tag # 21475	Tag # 21476	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7/2/13 ☐ FW Blank	FW000/2	Equipment filter wipe blank [c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Tag # 21415	Tag # 21411	Tag # 21412	Tag # 21413	Tag # 21414
☐ WPAH016	SD0017	Normal	Tag # 21323	Tag # 21324	Tag # 21325	Tag # 21326	Tag # 21327	Tag # 21328	Tag # 21329	Tag # 21330	Tag # 21331	Tag # 21332	NA	NA	NA	NA	NA	NA	NA
☐ WPAH017	SD0018	Normal	21492 Tag # ~~21322~~ 98	Tag # 21493	Tag # 21494	NA	Tag # 21495	Tag # 21496	Tag # 21497	Tag # ←	combined	Tag # →	Tag # 21498	5gal bucket	NA	NA	NA	NA	NA
☐ WPAH018	SD0019	Normal	Tag # 21333	Tag # 21334	Tag # 21335	NA	NA	Tag # 21336	Tag # 21337	Tag # 21338	Tag # 21339	Tag # 21340	NA	NA	NA	NA	NA	NA	NA
☐ WPAH019	SD0020	Normal	Tag # 21341	Tag # 21342	Tag # 21343	NA	NA	Tag # 21344	Tag # 21345	Tag # 21346	Tag # 21347	Tag # 21348	NA	NA	NA	NA	NA	NA	NA
☐ WPAH020	SD0021	Normal	Tag # 21349	Tag # 21350	Tag # 21351	NA	NA	Tag # 21352	Tag # 21353	Tag # 21354	Tag # 21355	Tag # 21356	NA	NA	NA	NA	NA	NA	NA
☐ WPAH021	SD0022	Normal	Tag # 21423	Tag # 21424	Tag # 21425	NA	NA	Tag # 21426	Tag # 21427	NA	Tag # 21428	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-3. Field Sample Collection Matrix

Station Number	Sample Number	Sample Type	Sediment Chemistry Samples						Archive	Bioassay Samples Sediment			Bioaccumulation Samples	Treatability Test Samples	Filter Wipe Blanks and Filter Paper Blanks: Ghost Wipes	Whatman Filter Papers			
			TOC, Black Carbon	TS, Grain size	TVS (No headspace)	Metals, SVOCs, PAHs	PCB congeners, Dioxin and Furans	Ammonia and Sulfides (Porewater to be analyzed at lab)	TBD	10-day amphipod (*Eohaustorius estuarius*)	Larval development (*Mytilus galloprovincialis*) with resuspension	20-day *Neanthes* sp.	Bioaccumulation Test -- 45-day adult bivalve [*Macoma nasuta*] and adult polychaete [*Nephtys caecoides*]	Treatability Study -- 45-day adult bivalve [*Macoma nasuta*] and adult polychaete [*Nephtys caecoides*]	Metals	Mercury	SVOCs	PCB Congeners	Dioxins and Furans
			4 oz WMG [a]	8 oz WMG [a]	4 oz WMG [a]	8 oz WMG [a]	8 oz WMG [a]	16 oz WMG [a]	8 oz WMG [a]	1-gallon bucket with Teflon bag [a]	1, 1-L WMG [a]	1-gallon bucket with Teflon bag [a]	2, 1-gallon buckets with Teflon bags [a,e]	2, 1-gallon buckets with Teflon bags [a,e]	4 oz WMG [a]	4 oz WMG [a]	4 oz WMG [a]	4 oz WMG [a]	4 oz WMG [a]
			10 g Refrigerated	110 g Refrigerated	5 g Refrigerated	22.5 g Refrigerated	10 g Refrigerated	100 mL (porewater) Refrigerated	NA Frozen	4 L Refrigerated	1 L Refrigerated	4 L Refrigerated	6 L Refrigerated	6 L Refrigerated	NA Refrigerated	NA Refrigerated	NA Refrigerated	NA Refrigerated	NA Refrigerated
☐ WPAH022	SD0023	Normal	Tag # 21185	Tag # 21186	Tag # 21187	NA	NA	Tag # 21188	Tag # 21189	NA	Tag # 21190	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH023	SD0024	Normal	Tag # 21191	Tag # 21192	Tag # 21193	NA	NA	Tag # 21194	Tag # 21195	NA	Tag # 21196	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH024	SD0025	Normal	Tag # 21269	Tag # 21270	Tag # 21271	NA	Tag # 21272	Tag # 21273	Tag # 21274	NA	Tag #	combined	Tag # 21275	NA	NA	NA	NA	NA	NA
☐ WPAH025	SD0026	Normal	Tag # 21276	Tag # 21277	Tag # 21278	NA	Tag # 21279	Tag # 21280	Tag # 21281	NA	Tag # ~~21282~~	combined ~~NA~~	Tag # 21282	NA	NA	NA	NA	NA	NA
☐ WPAH026	SD0027	Normal	Tag # 21113	Tag # 21114	Tag # 21115	NA	NA	Tag # 21116	Tag # 21117	NA	Tag # 21118	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH027	SD0028	Normal	Tag # 21283	Tag # 21284	Tag # 21285	NA	Tag # 21286	Tag # 21287	Tag # 21288	NA	Tag #	combined ~~NA~~	Tag # 21289	NA	NA	NA	NA	NA	NA
☐ WPAH028	SD0029	Normal	Tag # 21263	Tag # 21264	Tag # 21265	NA	NA	Tag # 21266	Tag # 21267	NA	Tag # 21268	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH029	SD0030	Normal	Tag # 21119	Tag # 21120	Tag # 21121	NA	NA	Tag # 21122	Tag # 21123	NA	Tag # 21124	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH030	SD0031	Normal	Tag # 21125	Tag # 21126	Tag # 21127	NA	NA	Tag # 21128	Tag # 21129	NA	Tag # 21130	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH031	SD0032	Normal	Tag # 21131	Tag # 21132	Tag # 21133	NA	NA	Tag # 21134	Tag # 21135	NA	Tag # 21136	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH032	SD0033	Normal	Tag # 21137	Tag # 21138	Tag # 21139	NA	NA	Tag # 21140	Tag # 21141	NA	Tag # 21142	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH033	SD0034	Normal	Tag # 21143	Tag # 21144	Tag # 21145	NA	NA	Tag # 21146	Tag # 21147	NA	Tag # 21148	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH034	SD0035	Normal	Tag # 21149	Tag # 21150	Tag # 21151	NA	NA	Tag # 21152	Tag # 21153	NA	Tag # 21154	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH035	SD0036	Normal	Tag # 21155	Tag # 21156	Tag # 21157	NA	NA	Tag # 21158	Tag # 21159	NA	Tag # 21160	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH036	SD0037	Normal	Tag # 21161	Tag # 21162	Tag # 21163	NA	NA	Tag # 21164	Tag # 21165	NA	Tag # 21166	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH037	SD0038	Normal	Tag # 21167	Tag # 21168	Tag # 21169	NA	NA	Tag # 21170	Tag # 21171	NA	Tag # 21172	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH038	SD0039	Normal	Tag # 21173	Tag # 21174	Tag # 21175	NA	NA	Tag # 21176	Tag # 21177	NA	Tag # 21178	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH039	SD0040	Normal	Tag # 21257	Tag # 21258	Tag # 21259	NA	NA	Tag # 21260	Tag # 21261	NA	Tag # 21262	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH0~~39~~40	SD0041	Field Split [b]	Tag # 21203	Tag # 21204	Tag # 21205	NA	NA	Tag # 21206	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
☐ FW Blank	FW000~~2~~3	Equipment filter wipe blank [c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Tag # 21452	Tag # 21453	Tag # 21454	Tag # ~~21456~~ 21455 gs	Tag # 21456
☐ WPAH040	SD0042	Normal	Tag # 21197	Tag # 21198	Tag # 21199	NA	NA	Tag # 21200	Tag # 21201	NA	Tag # 21202	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH041	SD0043	Normal	Tag # 21207	Tag # 21208	Tag # 21209	NA	NA	Tag # 21210	Tag # 21211	NA	Tag # 21212	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH042	SD0044	Normal	Tag # 21179	Tag # 21180	Tag # 21181	NA	NA	Tag # 21182	Tag # 21183	NA	Tag # 21184	NA	NA	NA	NA	NA	NA	NA	NA

ges 6-26-13

gs 7/3/13

Table 4-3. Field Sample Collection Matrix

Station Number	Sample Number	Sample Type	Sediment Chemistry Samples: TOC, Black Carbon; 4 oz WMG [a]; 10 g; Refrigerated	Sediment Chemistry Samples: TS, Grain size; 8 oz WMG [a]; 110 g; Refrigerated	Sediment Chemistry Samples: TVS (No headspace); 4 oz WMG [a]; 5 g; Refrigerated	Sediment Chemistry Samples: Metals, SVOCs, PAHs; 8 oz WMG [a]; 22.5 g; Refrigerated	Sediment Chemistry Samples: PCB congeners, Dioxin and Furans; 8 oz WMG [a]; 10 g; Refrigerated	Sediment Chemistry Samples: Ammonia and Sulfides (Porewater to be analyzed at lab); 16 oz WMG [a]; 100 mL (porewater); Refrigerated	Sediment Chemistry Samples: Archive: TBD; 8 oz WMG [a]; NA; Frozen	Bioassay Samples, Sediment: 10-day amphipod (*Eohaustorius estuarius*); 1-gallon bucket with Teflon bag [a]; 4 L; Refrigerated	Bioassay Samples, Sediment: Larval development (*Mytilus galloprovincialis*) with resuspension; 1, 1-L WMG [a]; 1 L; Refrigerated	Bioassay Samples, Sediment: 20-day *Neanthes* sp.; 1-gallon bucket with Teflon bag [a]; 4 L; Refrigerated	Bioaccumulation Samples: Bioaccumulation Test -- 45-day adult bivalve [*Macoma nasuta*] and adult polychaete [*Nephtys caecoides*]; 2, 1-gallon buckets with Teflon bags [a,e]; 6 L; Refrigerated	Treatability Test Samples: Treatability Study -- 45-day adult bivalve [*Macoma nasuta*] and adult polychaete [*Nephtys caecoides*]; 2, 1-gallon buckets with Teflon bags [a,e]; 6 L; Refrigerated	Filter Wipe Blanks and Filter Paper Blanks: Ghost Wipes: Metals; 4 oz WMG [a]; NA; Refrigerated	Whatman Filter Papers: Mercury; 4 oz WMG [a]; NA; Refrigerated	Whatman Filter Papers: SVOCs; 4 oz WMG [a]; NA; Refrigerated	Whatman Filter Papers: PCB Congeners; 4 oz WMG [a]; NA; Refrigerated	Whatman Filter Papers: Dioxins and Furans; 4 oz WMG [a]; NA; Refrigerated
☐ WPAH043	SD0045	Normal	Tag # 21213	Tag # 21214	Tag # 21215	NA	NA	Tag # 21216	Tag # 21217	NA	Tag # 21218	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH044	SD0046	Normal	Tag # 21219	Tag # 21220	Tag # 21221	NA	NA	Tag # 21222	Tag # 21223	NA	Tag # 21224	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH045	SD0047	Normal	Tag # 21225	Tag # 21226	Tag # 21227	NA	NA	Tag # 21228	Tag # 21229	NA	Tag # 21230	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH046	SD0048	Normal	Tag # 21247	Tag # 21248	Tag # 21249	NA	NA	Tag # 21250	Tag # 21251	NA	Tag # 21252	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH047	SD0049	Normal	Tag # 21231	Tag # 21232	Tag # 21233	NA	NA	Tag # 21234	Tag # 21235	NA	Tag # 21236	NA	NA	NA	NA	NA	NA	NA	NA
☐ WPAH04~~7~~6	SD0050	Field Split [b]	Tag # 21253	Tag # 21254	Tag # 21255	NA	NA	Tag # 21256	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
☐ FW Blank	FW000~~3~~1	Equipment filter wipe blank [c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Tag # 21237	Tag # 21238	Tag # 21239	Tag # 21240	Tag # 21241
☐ Filter Paper	FB0001	Filter Paper Blank [d]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Tag # 21242	Tag # 21243	Tag # 21244	Tag # 21245	Tag # 21246
☐ WPAH048	SD0051	Normal	Tag # 21445	Tag # 21446	Tag # 21447	NA	Tag # 21448	NA	Tag # 21449	NA	NA	NA	Tag # 21450 1 of 2 21451 2 of 2	NA	NA	NA	NA	NA	NA
☐ WPAH049	SD0052	Normal	Tag # 21374	Tag # 21375	Tag # 21376	NA	Tag # 21377	NA	Tag # 21378	NA	NA	NA	Tag # 21379 1 of 2 21380 2 of 2	NA	NA	NA	NA	NA	NA
☐ WPAH050	SD0053	Normal	Tag # 21381	Tag # 21382	Tag # 21383	NA	Tag # 21384	NA	Tag # 21385	NA	NA	NA	Tag # 21386 1 of 2	Tag # 21387 2 of 2 4 gals each	NA	NA	NA	NA	NA
		Laboratory Triplicate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 additional gallons of sediment for laboratory triplicate analysis at WPAH050	NA	NA	NA	NA	NA	NA
☐ WPAH051	SD0054	Normal	Tag # 21457	Tag # 21458	Tag # 21459	NA	Tag # 21460	NA	Tag # 21461	NA	NA	NA	Tag # combined	Tag # 21462	NA	NA	NA	NA	NA
☐ WPAH052	SD0055	Normal	Tag # 21485	Tag # 21486	Tag # 21487	NA	Tag # 21488	NA	Tag # 21489	NA	NA	NA	Tag # 21490 1 of 2 21491 2 of 2	4 gal total in one bucket	NA	NA	NA	NA	NA
Reference Area																			
☐ CR02	SD0056	Normal	Tag #____	Tag #____	NA	NA	NA	NA	Tag #____	Tag #____	Tag #____	Tag #____	NA	NA	NA	NA	NA	NA	NA
☐ CR-12	SD0057	Normal	Tag #____	Tag #____	NA	NA	NA	NA	Tag #____	Tag #____	Tag #____	Tag #____	NA	NA	NA	NA	NA	NA	NA
☐ CR23W	SD0058	Normal	Tag #____	Tag #____	NA	NA	NA	NA	Tag #____	Tag #____	Tag #____	Tag #____	NA	NA	NA	NA	NA	NA	NA

Notes:

NA = not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
TBD = to be determined
TOC = total organic carbon
TS = total solids
TVS = total volatile solids
WMG = wide mouth glass

[a] The size and number of containers may be modified.
[b] Blind field split samples will be collected at a minimum frequency of 1 field split sample per 20 sediment samples.
[c] A filter wipe blank sample will be collected at a minimum frequency of 1 per 20 sediment samples.
[d] Filter paper blanks are prepared in the field to evaluate potential background concentration present in filter paper used for the equipment filter wipe blank. Filter paper blanks will be collected at a minimum frequency of one for each lot number of filter papers used for collecting the equipment wipe blank. The filter lot number will be clearly noted in the field logbook.
[e] The sediment at bioaccumulation replicate stations, treatability stations and in combination with full suite bioassay stations may be combined into 5-gallon bucket rather than 5, 1-gallon buckets.

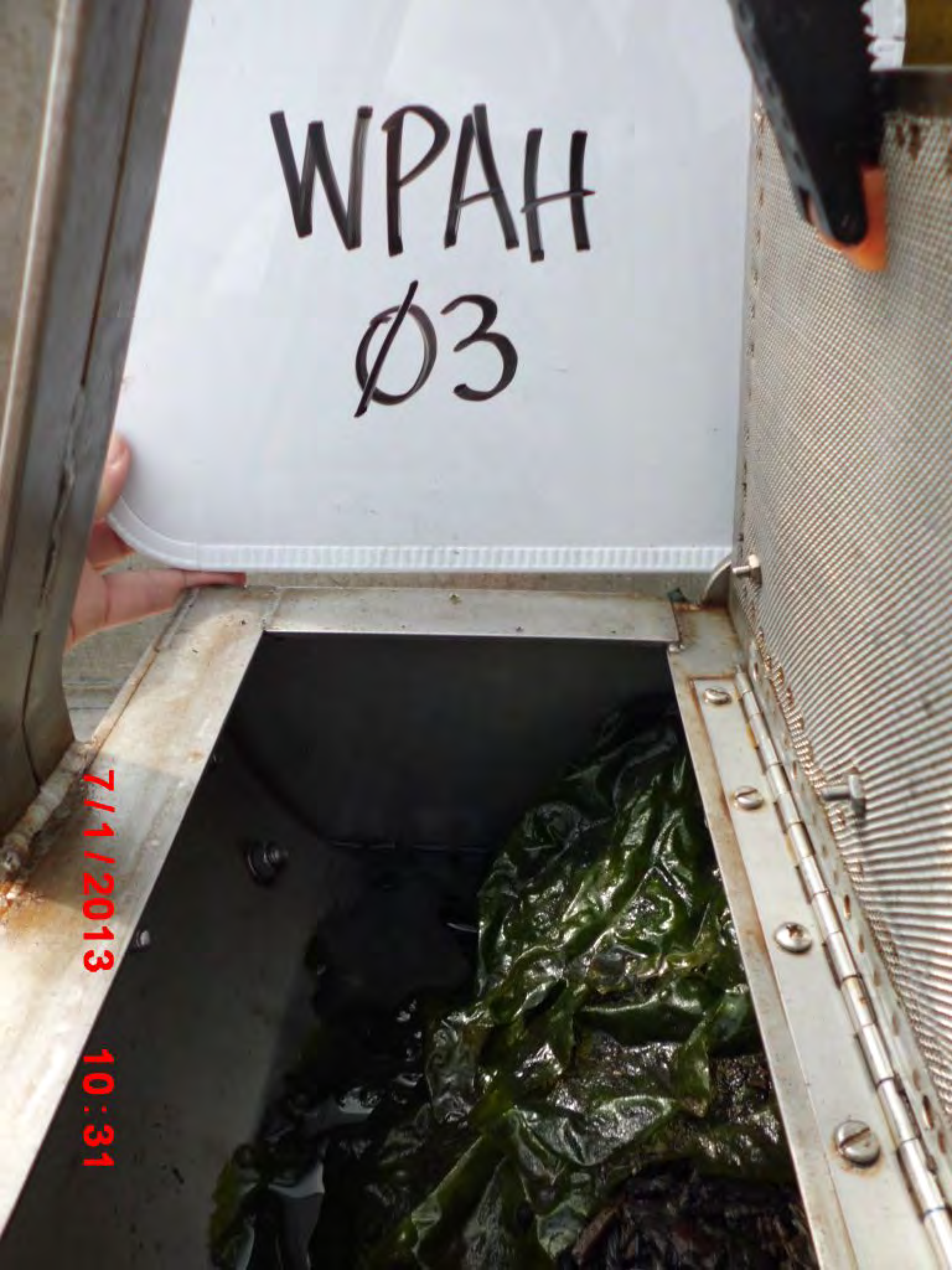
PCBs only
TOC only

APPENDIX B

SEDIMENT SAMPLE PHOTOS


WPAH
1
MIXED
7/3/2013 12:45


WPAH
2
S/S JAR
32 OZ.
MIXED
7/3/2013 14:57


WPAH
Ø3
7/1/2013 10:31


WPAH
Ø4
7/2/2013 8:25


WPAH
Ø4
7/2/2013 8:25


WPAH
5
6/27/2013 14:16


WPAH
6
6/27/2013 15:47


WPAH
7
6/27/2013 16:57


WPAH
8
7/9/2013 9:45

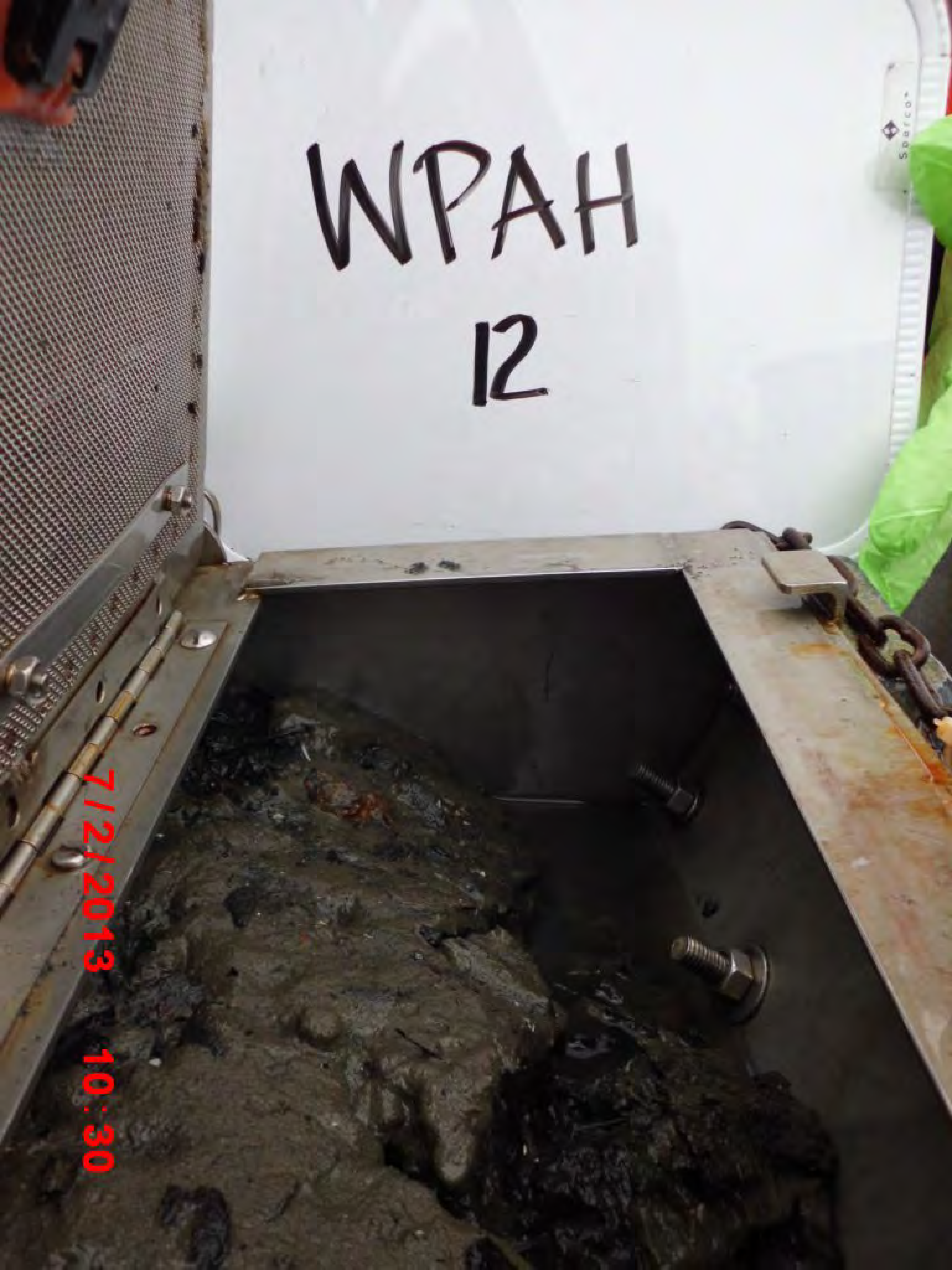

WPAHØ9
7/1/2013 8:51


WPAH
10
7/1/2013 15:37

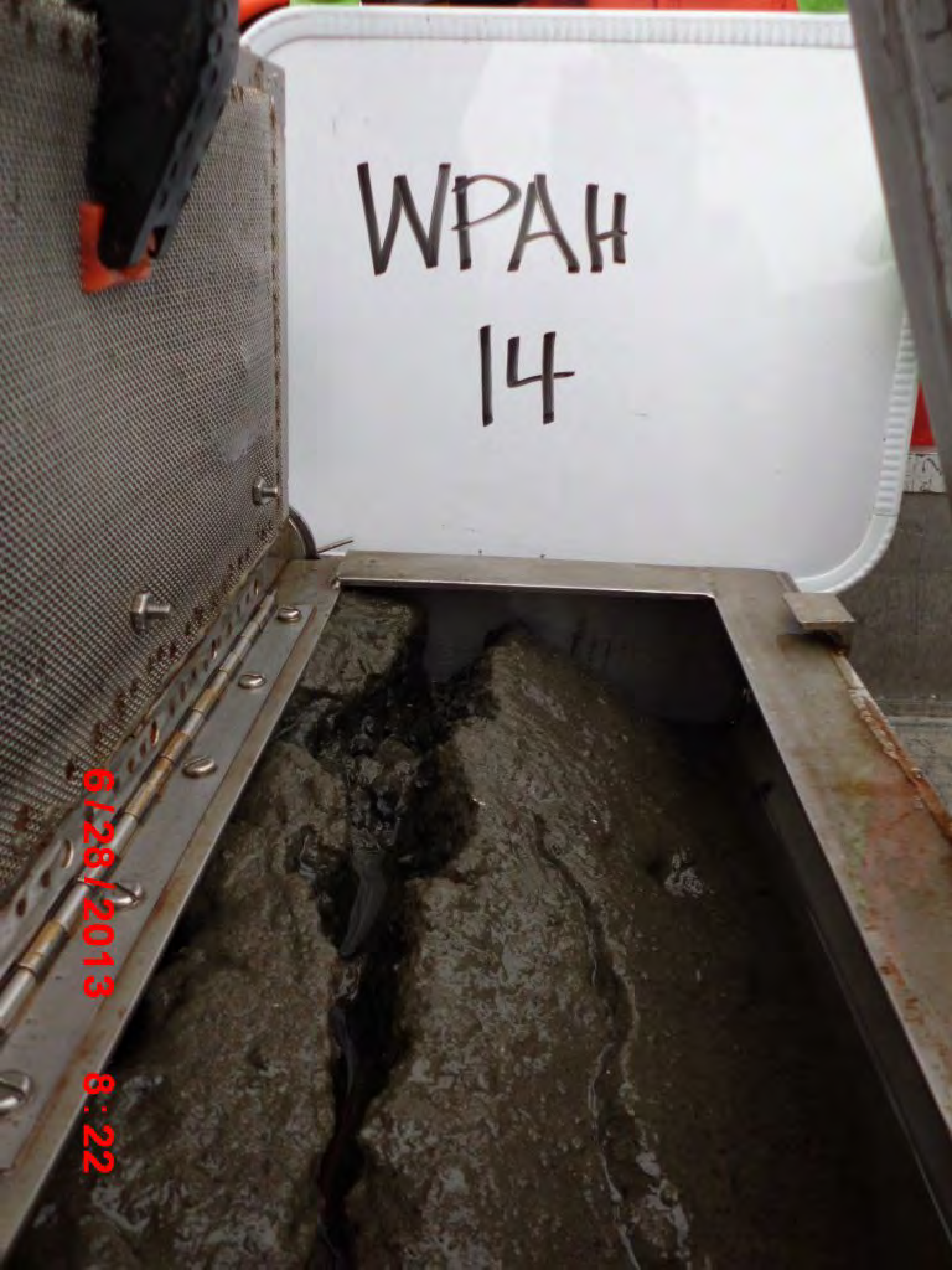

WPAH
10
7/1/2013 15:37


WPAH
11
7/2/2013 13:09


WPAH
12
7/2/2013 10:30


WPAH
12
7/2/2013 10:30


WPAH
13
7/8/2013 8:44

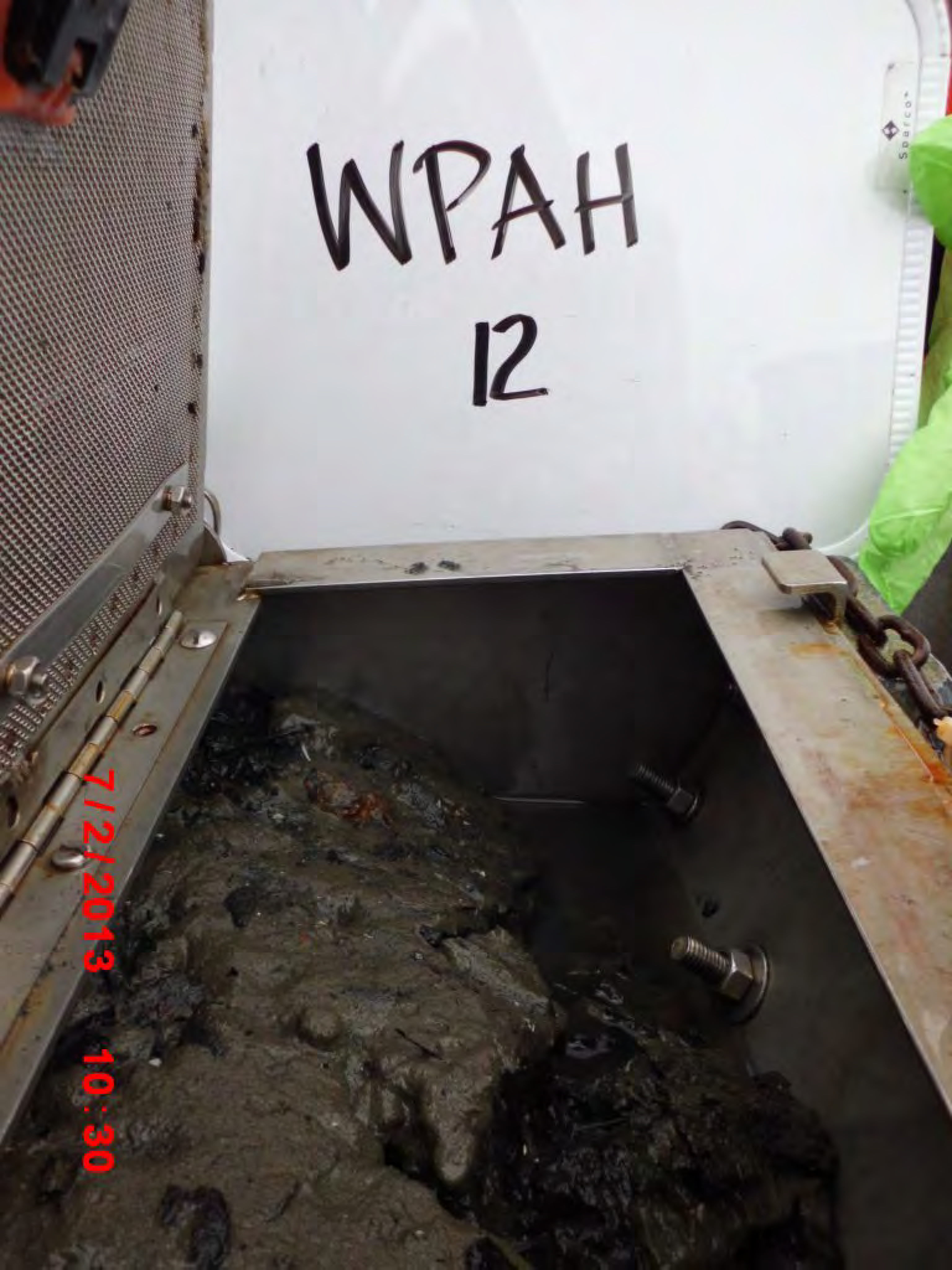

WPAH
14
6/28/2013 8:22


WPAH
15
7/8/2013 10:07

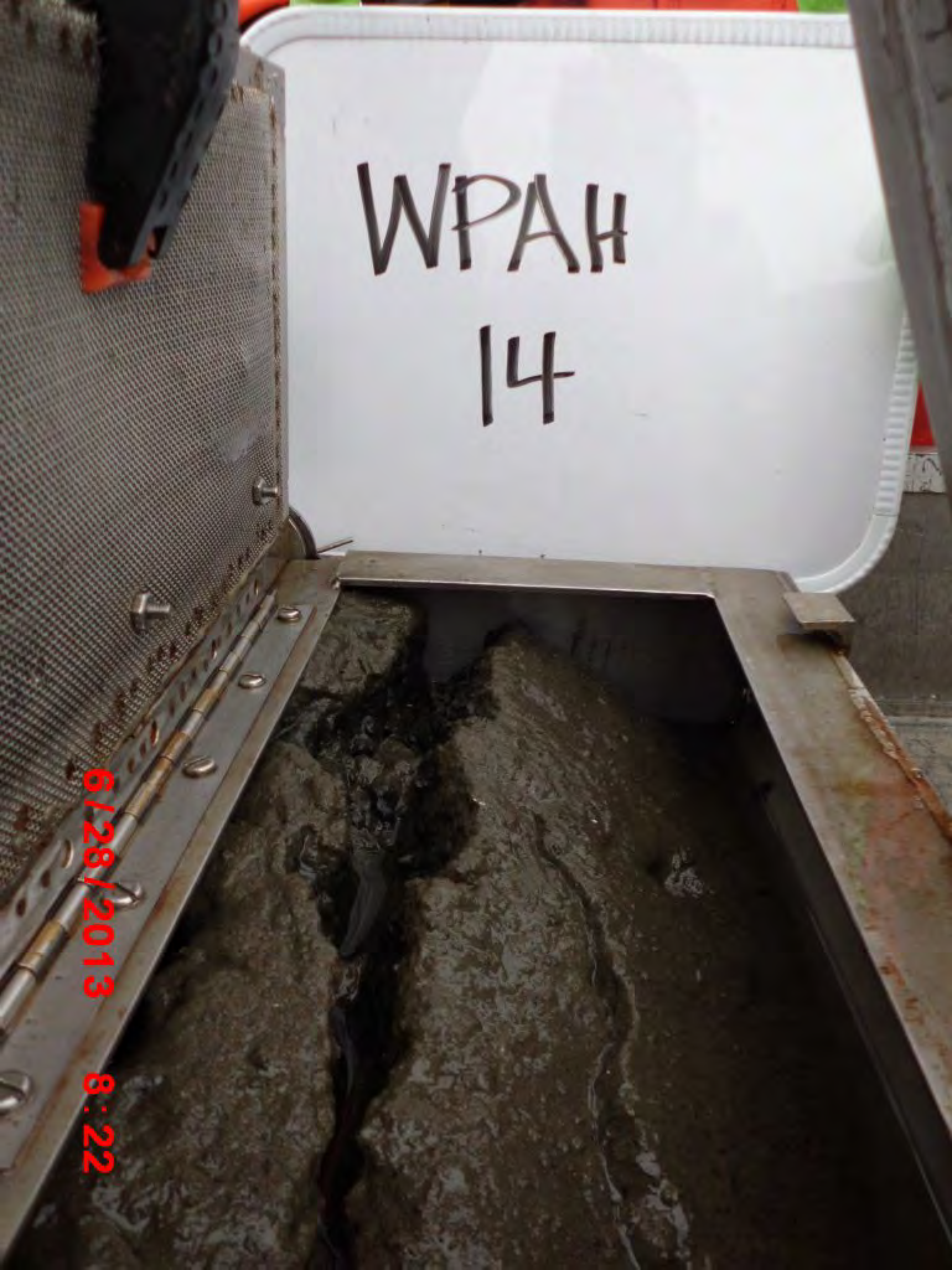

WPAH
16
6/28/2013 9:11


WPAH
17
7/9/2013 8:09


WPAH
18
6/28/2013 10:20


WPAH
12
7/2/2013 10:30


WPAH
13
7/8/2013 8:44


WPAH
14
6/28/2013 8:22


WPAH
15
7/8/2013 10:07


WPAH
16
6/28/2013 9:11

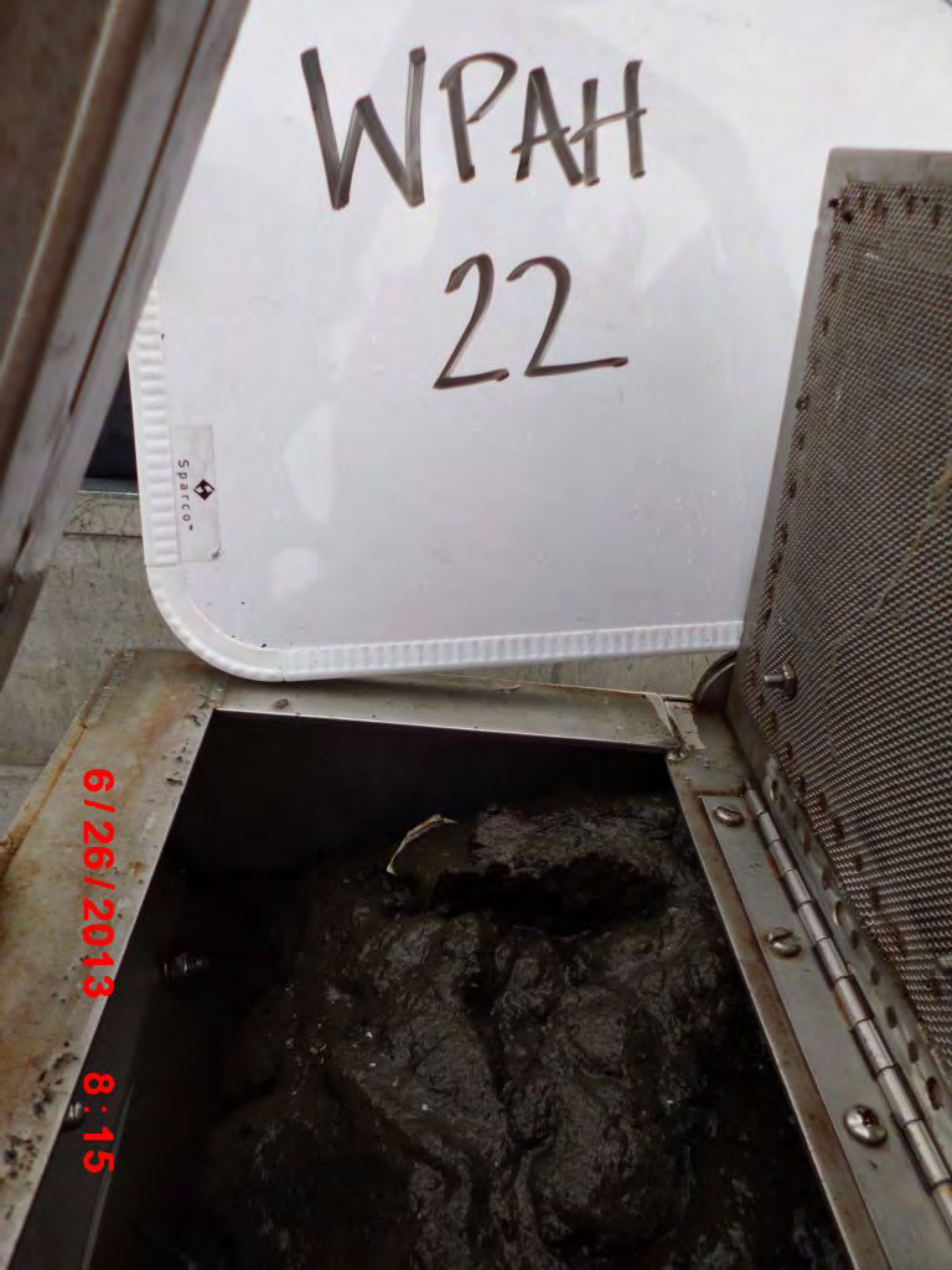

WPAH
17
7/9/2013 8:09


WPAH
18
6/28/2013 10:20

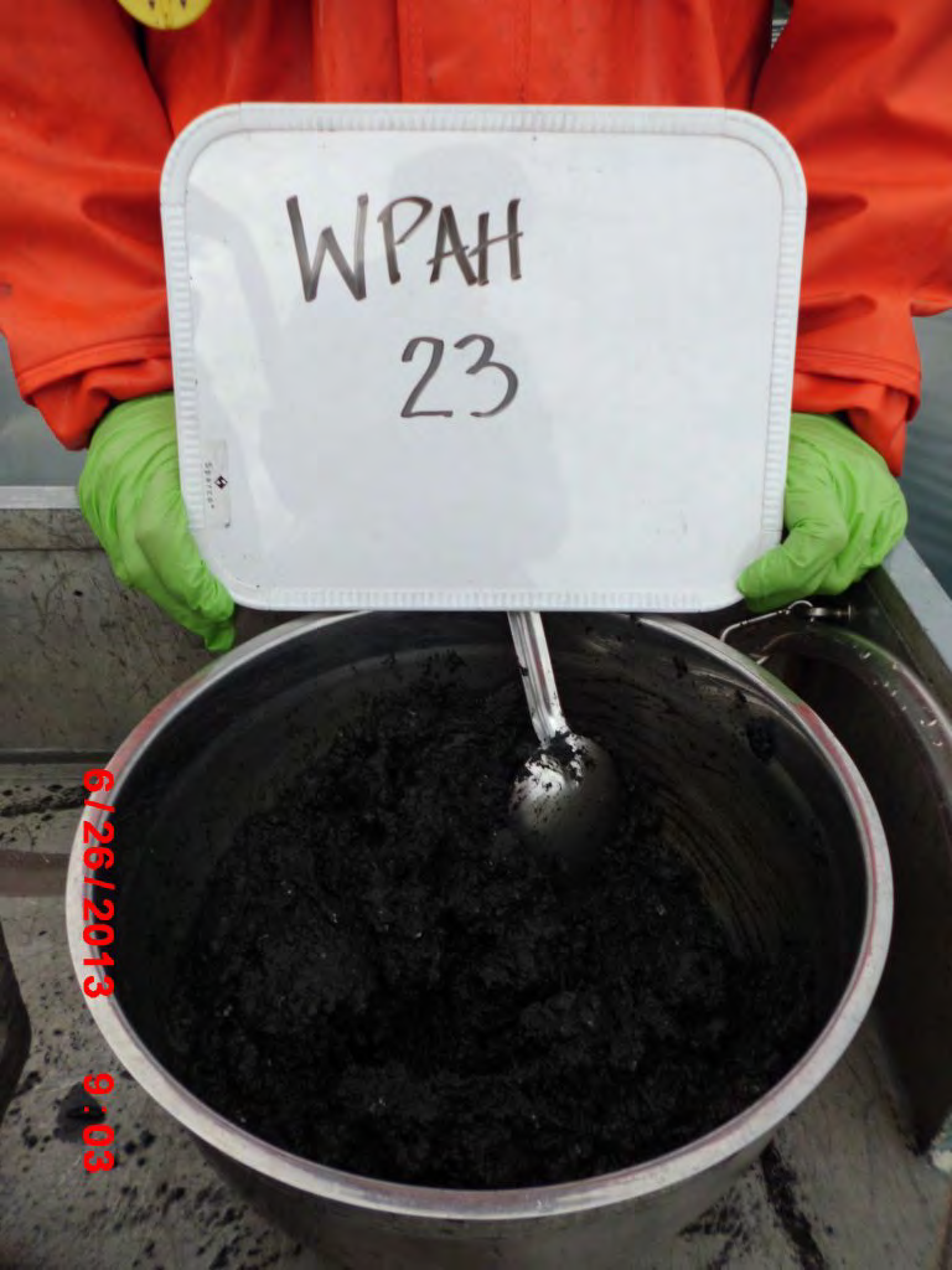

WPAH
19
6/28/2013 11:30

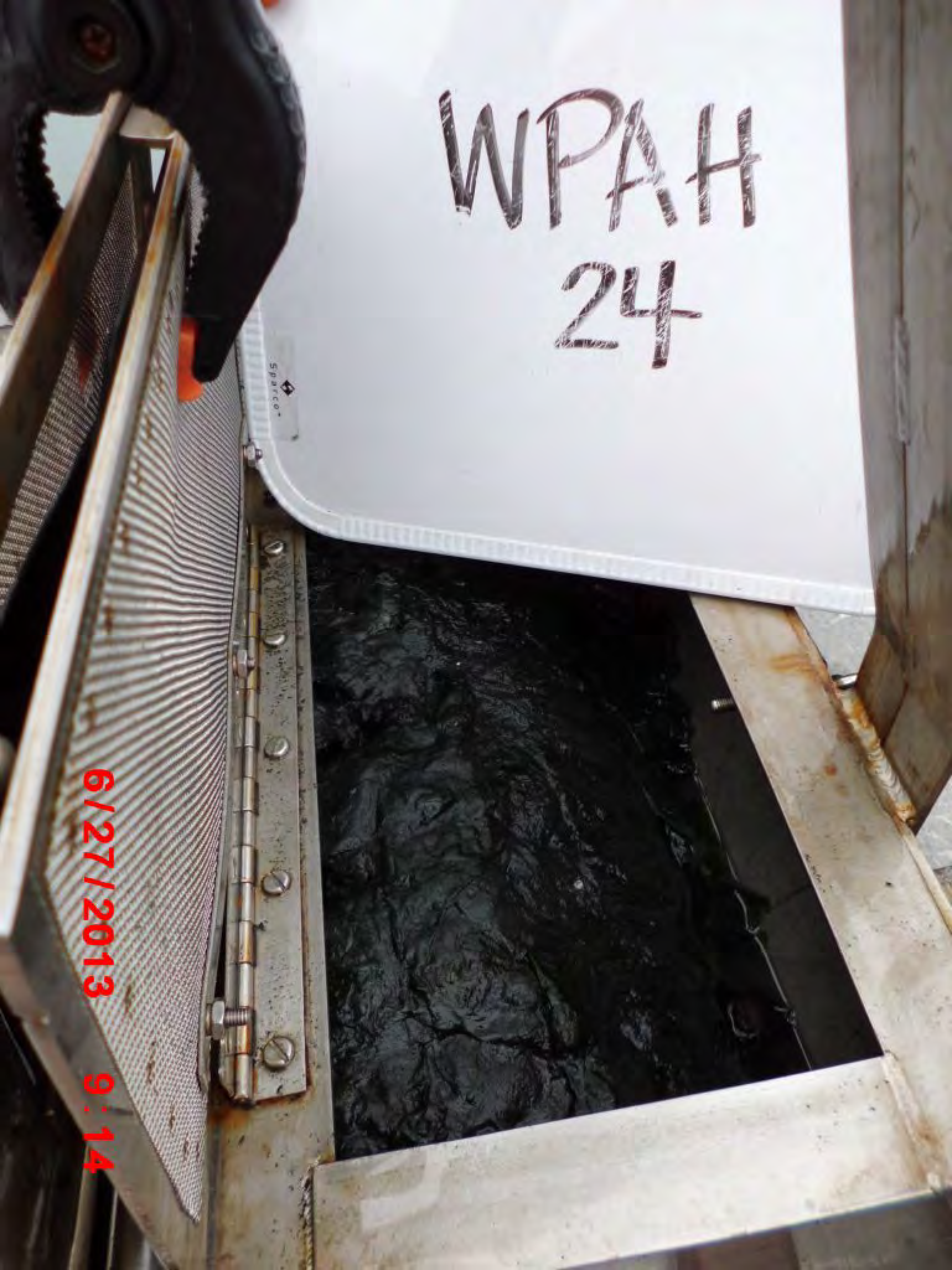

WPAH
2Ø
7/8/2013 12:31

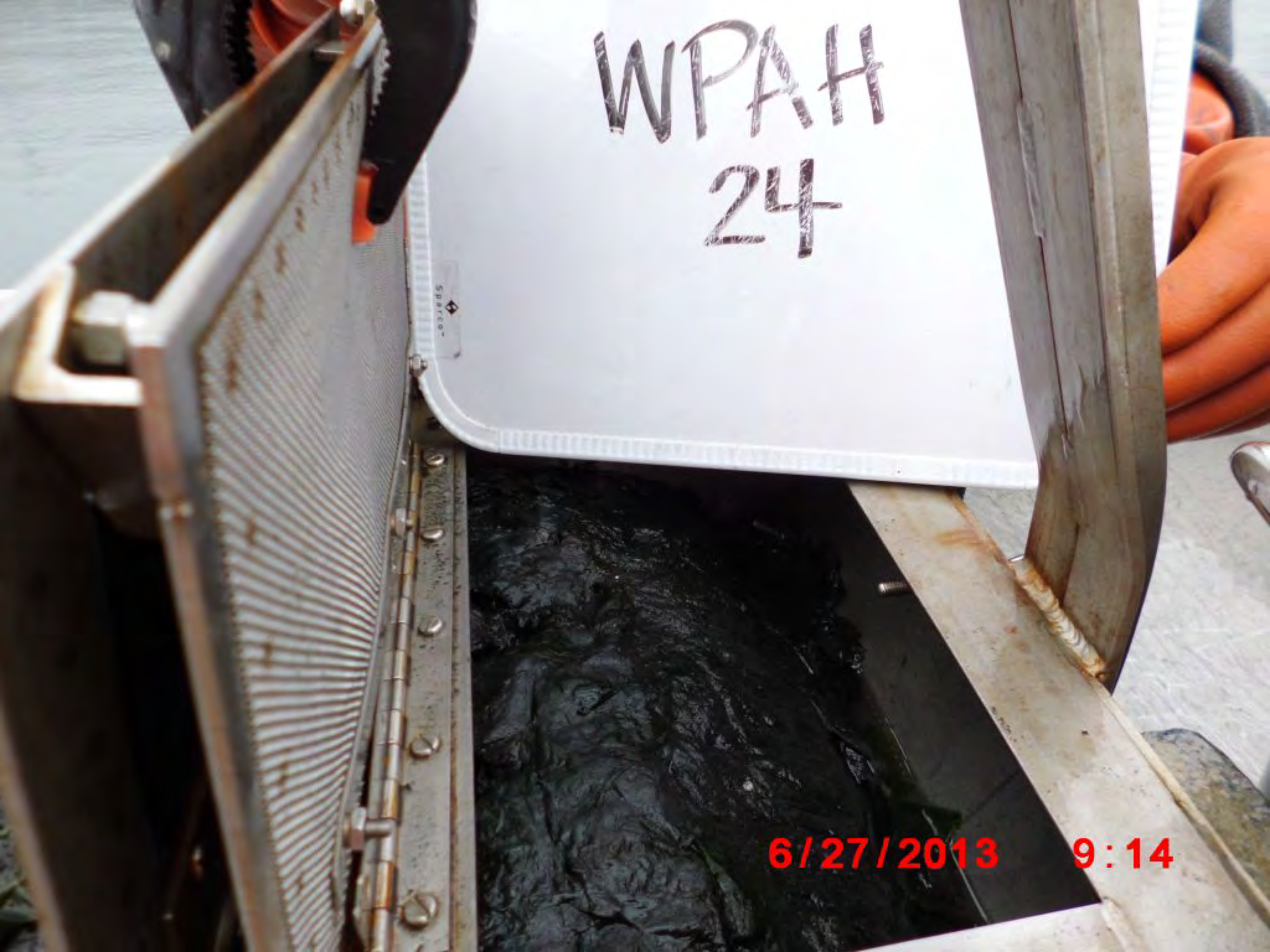

WPAH
21
7/3/2013 11:42


WPAH
22
Sparco
6/26/2013 8:15

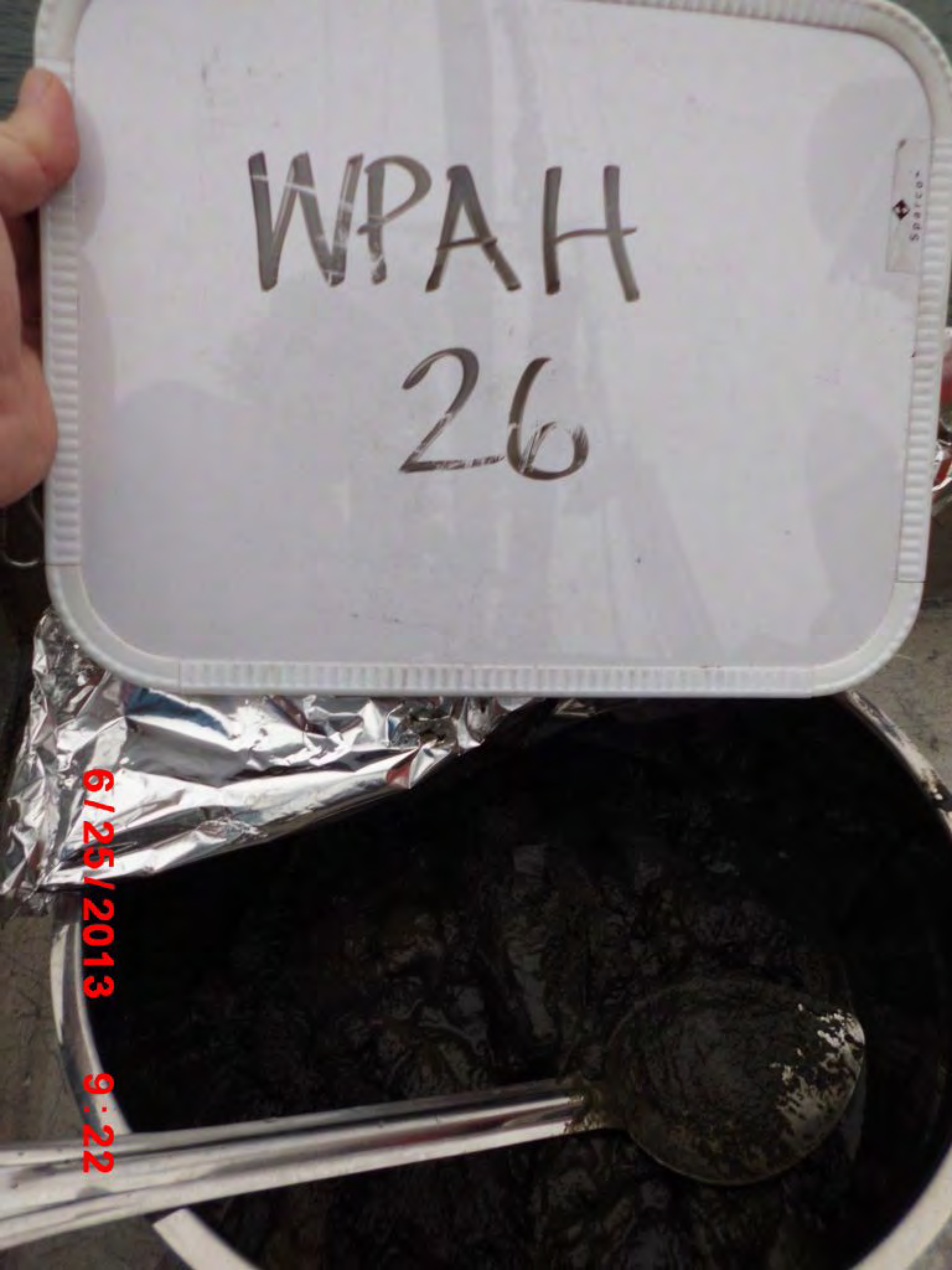

23
6/26/2013 9:03


WPAH
23
6/26/2013 9:03


WPAH
24
6/27/2013 9:14


WPAH
24
6/27/2013 9:14


WPAH
25
6/27/2013 10:50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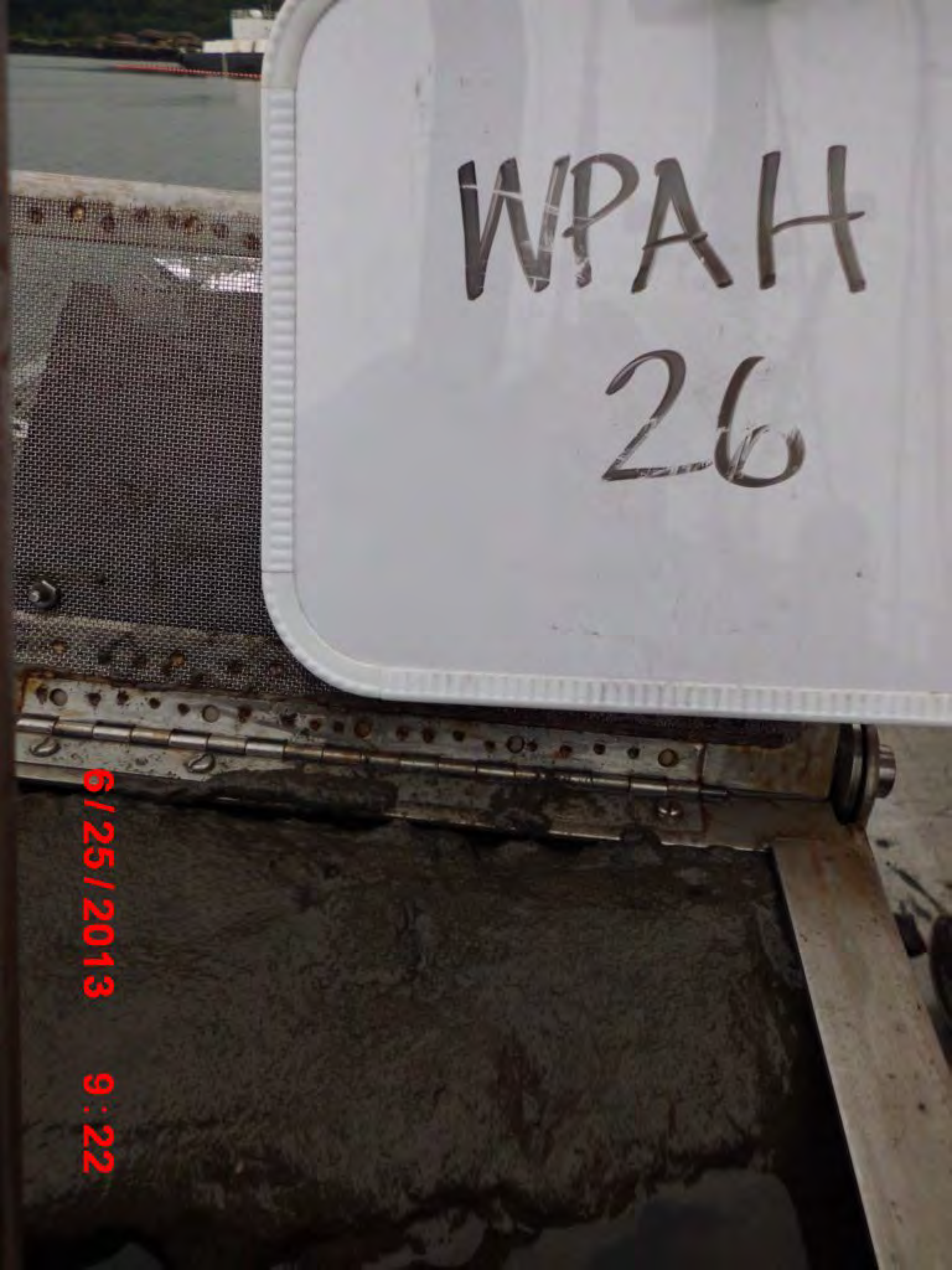
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6/25/2013 9:22


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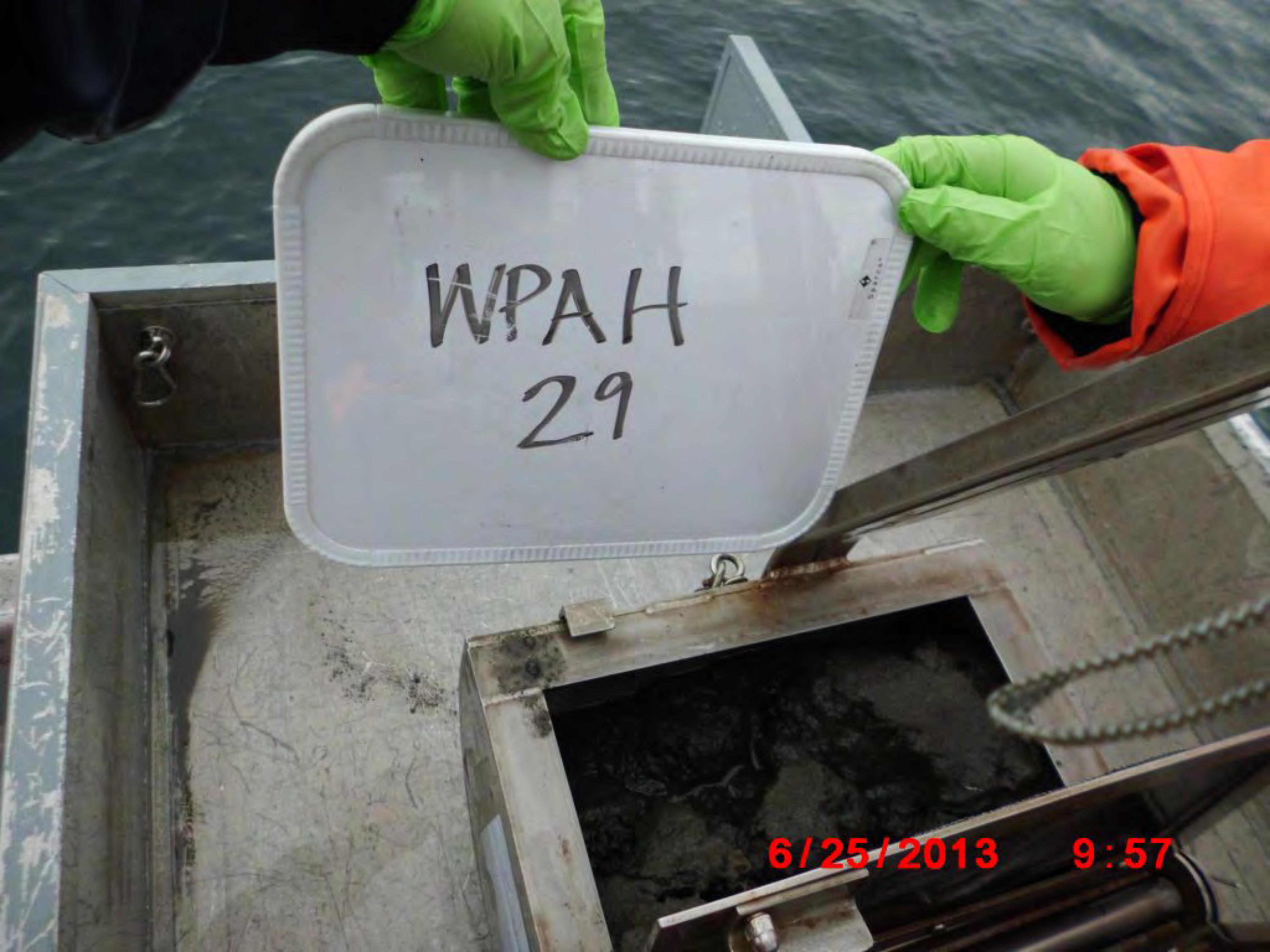
27
6/27/2013 12:52


WPAH
28
6/27/2013 8:42


WPAH
28
6/27/2013 8:42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WPAH
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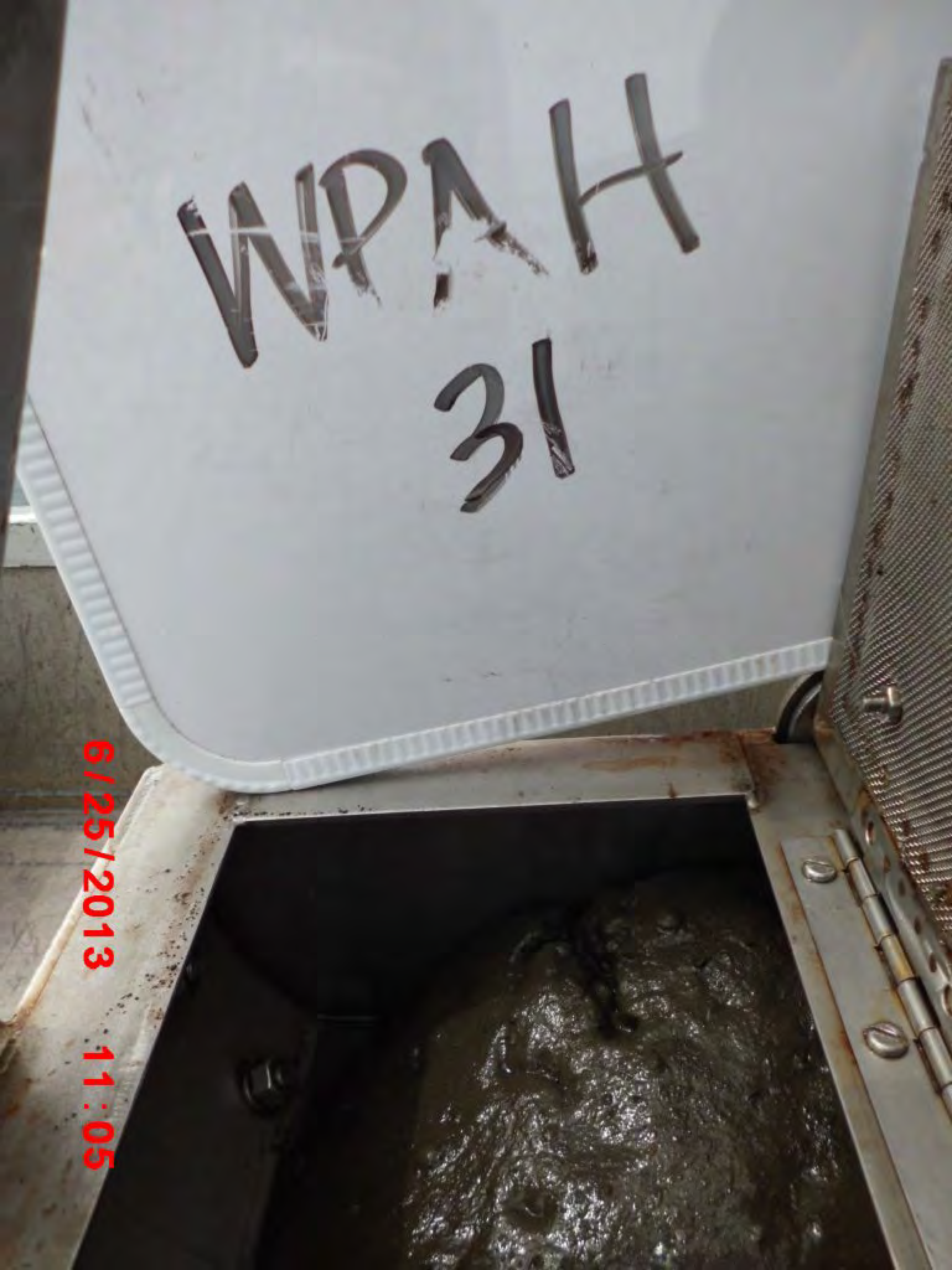
6/25/2013 10:31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6/25/2013 11:05


WPAH
32
6/25/2013 11:39


WPAH
33
6/25/2013 13:05


WPAH
34
6/25/2013 13:46


WPAH
35
6/25/2013 14:43


WPAH
36
6/25/2013 15:18


WPAH
37
6/25/2013 15:54


38
6/25/2013 17:03

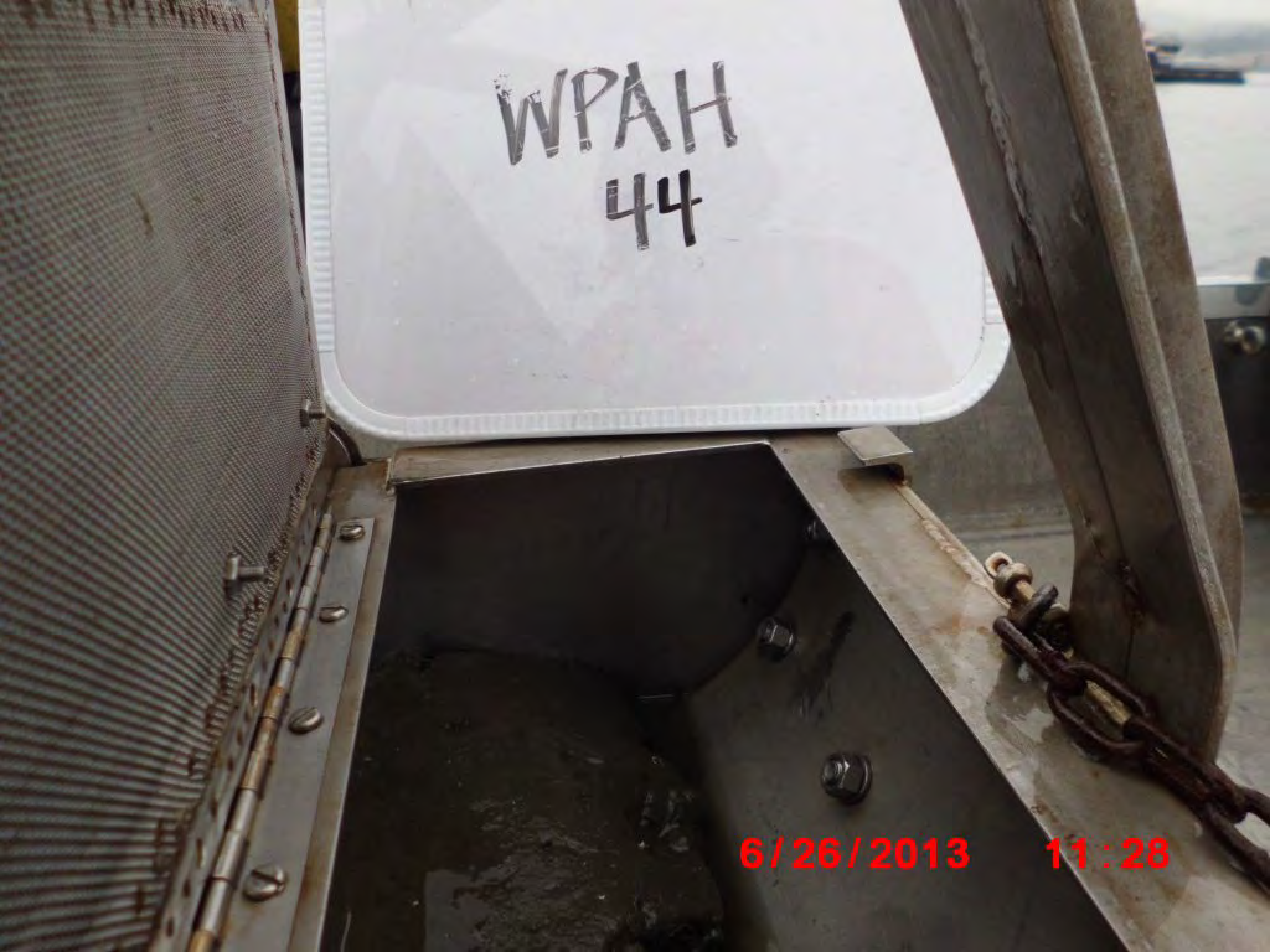

WPAH
39
6/26/2013 17:15


WPAH
4Ø
Sparco
6/26/2013 9:29


WPAH
41
6/26/2013 10:25


WPAH
42
6/25/2013 17:41


WPAH
43
6/26/2013 10:58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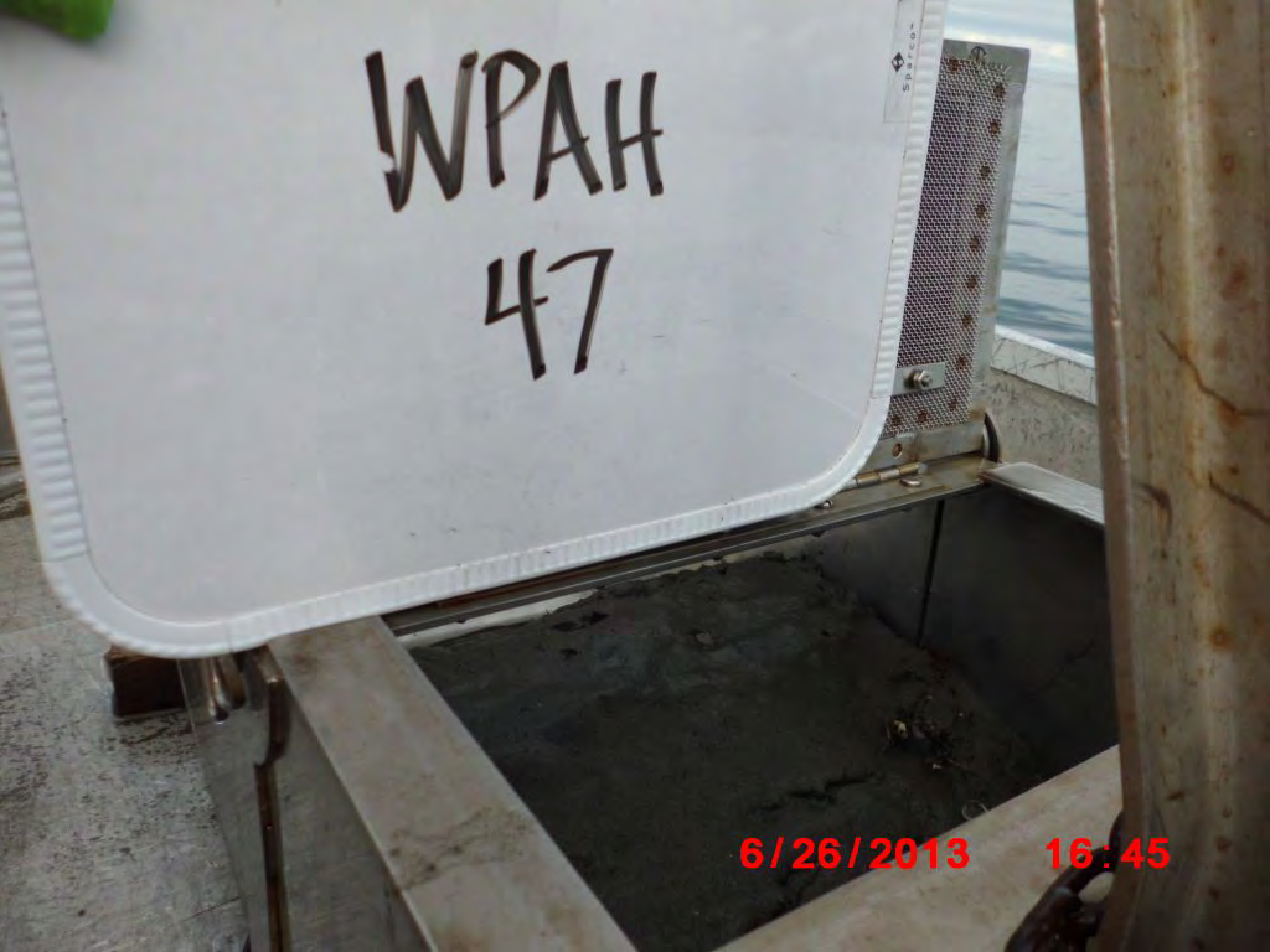
6/26/2013 11:28


WPAH
45
6/26/2013 12:41


46
6/26/2013 15:19


NPAH
47
Sparco
6/26/2013 16:46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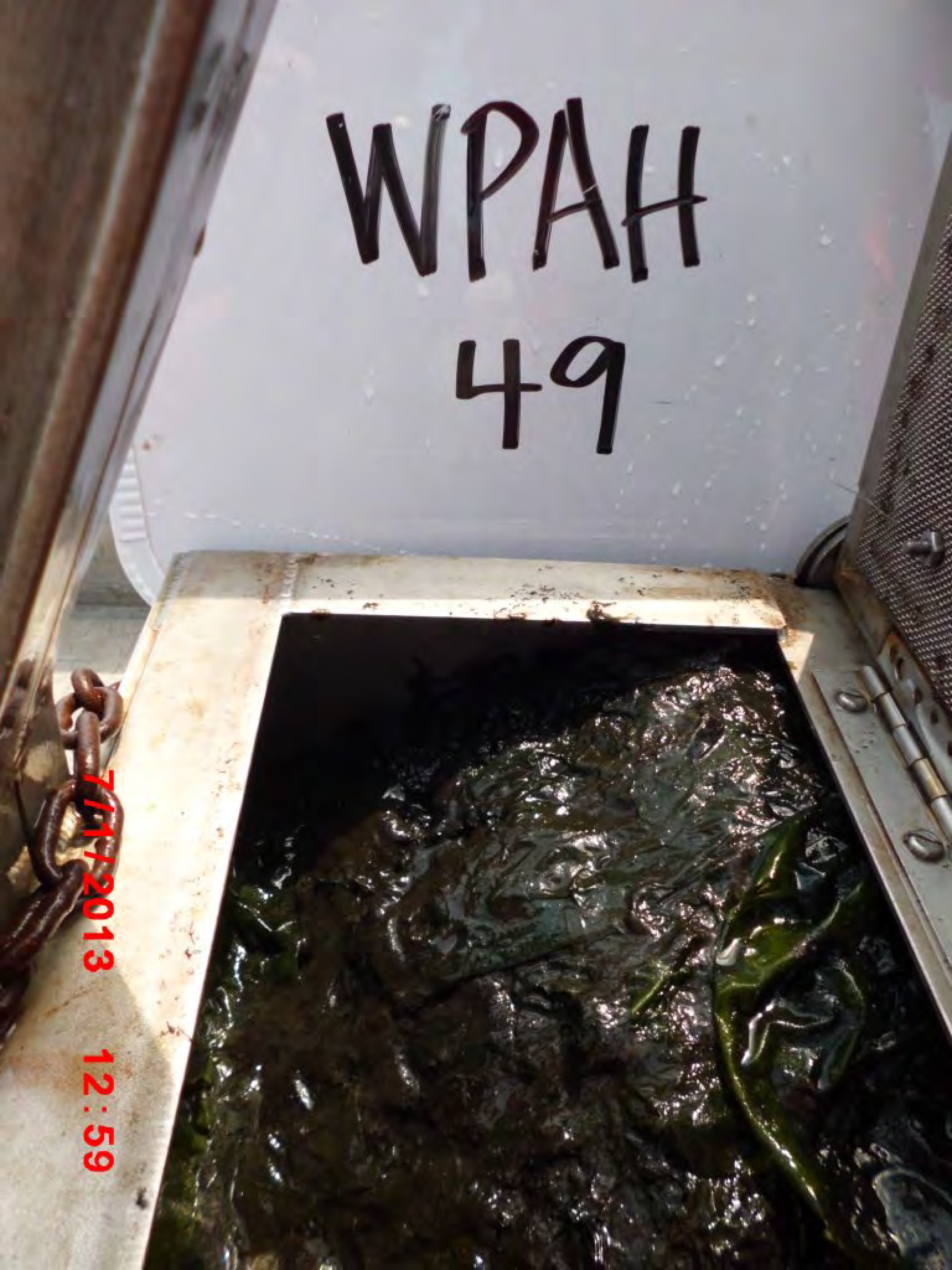
47
6/26/2013 16:45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7/1/2013 12:59


WPAH
49
7/1/2013 12:57


WPAH
50
7/1/2013 13:44


WPAH
51
7/3/2013 17:36


WPAH
52
7/8/2013
13:52

APPENDIX C

DATA VALIDATION REPORT FOR ANALYSES BY ALPHA ANALYTICAL

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT
WESTERN PORT ANGELES HARBOR RI/FS

Prepared for:

Floyd|Snider
601 Union Street, Suite 600
Seattle, WA 98101

Prepared by:

EcoChem, Inc.
1011 Western Ave. Suite 1011
Seattle, WA 98104

EcoChem Project: C15217-1

October 11, 2013

Approved for Release

Melissa Swanson
Project Manager

Basis for Data Validation

This report summarizes the results of validation (Stage 2B & 3) performed on sediment, and quality control (QC) sample data for the Western Port Angeles Harbor RI/FS. Field sample ID, laboratory sample ID, and requested analyses are provided in the **Sample Indices**. Laboratory batch ID numbers and associated level of validation are provided at the beginning of each technical section.

Samples were analyzed by Alpha Analytical, Mansfield, Massachusetts. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method of Analysis	Primary Review	Secondary Review
Total Organic Carbon	SW 846 9060	Y. Hida	C. Ransom
Black Carbon (Soot)	Gustafson (et. al.), 1997		

The data were reviewed using guidance and quality control criteria documented in the analytical methods and the following project and guidance documents:

- Sampling and Analysis Plan - *Western Port Angeles Harbor RI/FS* (Integral/Anchor QEA/Exponent/Floyd | Snider, June 2013)
- *USEPA National Functional Guidelines for Organic Data Review* (USEPA 2008)
- *USEPA National Functional Guidelines for Inorganic Data Review* (USEPA October 2004).

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **Appendix A**. The qualified data summary table is included as **Appendix B.** Data Validation Worksheets will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) was also submitted with this report.

Sample Index
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	TOC	Soot
L1312943	SD0027	L1312943-01	✓	✓
L1312943	SD0030	L1312943-02	✓	✓
L1312943	SD0031	L1312943-03	✓	✓
L1312943	SD0032	L1312943-04	✓	✓
L1312943	SD0033	L1312943-05	✓	✓
L1312943	SD0034	L1312943-06	✓	✓
L1312943	SD0035	L1312943-07	✓	✓
L1312943	SD0036	L1312943-08	✓	✓
L1312943	SD0037	L1312943-09	✓	✓
L1312943	SD0038	L1312943-10	✓	✓
L1312943	SD0039	L1312943-11	✓	✓
L1312943	SD0044	L1312943-12	✓	✓
L1312943	SD0023	L1312943-13	✓	✓
L1312943	SD0024	L1312943-14	✓	✓
L1312943	SD0042	L1312943-15	✓	✓
L1312943	SD0043	L1312943-16	✓	✓
L1312943	SD0045	L1312943-17	✓	✓
L1312943	SD0046	L1312943-18	✓	✓
L1313024	SD0047	L1313024-01	✓	✓
L1313024	SD0049	L1313024-02	✓	✓
L1313024	SD0048	L1313024-03	✓	✓
L1313024	SD0040	L1313024-04	✓	✓
L1313024	SD0029	L1313024-05	✓	✓
L1313024	SD0025	L1313024-06	✓	✓
L1313024	SD0026	L1313024-07	✓	✓
L1313024	SD0028	L1313024-08	✓	✓
L1313024	SD0005	L1313024-09	✓	✓
L1313024	SD0006	L1313024-10	✓	✓
L1313024	SD0007	L1313024-11	✓	✓
L1313024	SD0014	L1313024-12	✓	✓
L1313024	SD0017	L1313024-13	✓	✓
L1313024	SD0019	L1313024-14	✓	✓
L1313024	SD0020	L1313024-15	✓	✓
L1313024	SD0050	L1313024-16	✓	✓
L1313024	SD0041	L1313024-17	✓	✓
L1313024	SD0003	L1313024-18	✓	✓
L1313028	SD0053	L1313028-01	✓	✓
L1313028	SD0010	L1313028-02	✓	✓
L1313028	SD0009	L1313028-03	✓	✓
L1313028	SD0052	L1313028-04	✓	✓
L1313028	SD0004	L1313028-05	✓	✓
L1313028	SD0012	L1313028-06	✓	✓
L1313028	SD0011	L1313028-07	✓	✓
L1313028	SD0051	L1313028-08	✓	✓
L1313028	SD0022	L1313028-09	✓	✓

Sample Index
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	TOC	Soot
L1313028	SD0002	L1313028-10	✓	✓
L1313028	SD0054	L1313028-11	✓	✓
L1313028	SD0001	L1313028-12	✓	✓
L1313028	SD0013	L1313028-13	✓	✓
L1313028	SD0055	L1313028-14	✓	✓
L1313028	SD0016	L1313028-15	✓	✓
L1313028	SD0015	L1313028-16	✓	✓
L1313028	SD0021	L1313028-17	✓	✓
L1313028	SD0008	L1313028-18	✓	✓
L1313028	SD0018	L1313028-19	✓	✓
L1313613	SD0056	L1313613-01	✓	
L1313613	SD0057	L1313613-02	✓	
L1313613	SD0058	L1313613-03	✓	

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
Conventional Parameters

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Alpha Analytical, Mansfield, Massachusetts. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
L1312943	18 Sediment	Stage 3
L1313024	18 Sediment	Stage 2B
L1313028	19 Sediment	Stage 2B
L1313613	3 Sediment	Stage 2B

The analytical tests that were performed are summarized below.

Parameter	Method
Total Organic Carbon	SW-846 9060
Black Carbon (Soot)	Gustafson (et. al.), 1997

I. DATA PACKAGE COMPLETENESS

With the exceptions noted below, the laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDGs L1312943, L1313024, and L1313028: The laboratory did not include sufficient information for full validation. The following items were requested and submitted by the laboratory: sample preparation logs, raw data, and instrument printouts. The laboratory was unable to provide instrument calibration verification summaries. Evaluation of the calibration verification and instrument blanks was done using the raw data.

II. VERIFICATION OF EDD TO LABORATORY REPORT

Sample results and related quality control data were received as an electronic data deliverable (EDD) and laboratory report. The EDD was verified against the laboratory report; no errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed in the following table.

2	Sample Receipt, Preservation, and Holding Times	1	Field Duplicates
1	Laboratory Blanks	✓	Matrix Spikes
✓	Laboratory Control Samples (LCS)	✓	Reported Results
2	Laboratory Replicates	✓	Reporting Limits

✓Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

SDG L1313024: Samples SD0049 and SD0048 were analyzed for black carbon outside the 28-day holding time. The black carbon results for these samples were estimated (J-1).

SDG L1313613: All three samples in this data package were analyzed for total organic carbon (TOC) outside the 28 day holding time. All TOC results were estimated (J-1).

Laboratory Blanks

SDG L1312943: A positive result for TOC was reported in an instrument blank. The TOC results for the associated samples were greater than the action level of 5x the blank concentration; no data were qualified.

Laboratory Replicates

The laboratory analyzed replicate burns for TOC and black carbon for all samples. The relative percent difference (RPD) control limit for replicate burns is 25%.

SDG L1313024: The RPD values for the replicate burns of TOC for Sample SD0028 and black carbon for Sample SD0019 were greater than the control limit. These results were estimated (J-9).

SDG L1313028: The RPD value for the replicate burns for black carbon in Sample SD0008 was greater than the control limit. These results were estimated (J-9).

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) control limit is 50% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the difference between the sample and replicate must be less than 2x the RL. No data were qualified based on field replicate precision outliers. Data users should consider the impact of field precision outliers on the reported results. With the exceptions noted below, field precision was acceptable

SDG L1313024: Two sets of field duplicates were submitted, Samples SD0040 & SD0041 and Samples SD0049 & SD0050. For the pair SD0040 & SD0041 the RPD values for TOC and black carbon were greater than the control limit. For the pair SD0049 & SD0050 the RPD value for black carbon and was greater than the control limit.

SDG L1313028: One set of field duplicates, Samples SD0015 & SD0016, were submitted with this data package. The RPD value for black carbon was greater than the control limit.

IV. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. Accuracy was acceptable as demonstrated by the laboratory control sample, reference material, and matrix spike recoveries. With the exceptions noted above, precision was acceptable as demonstrated by the laboratory duplicate RPD, laboratory replicate %RSD, and field duplicate RPD values.

Data were estimated based on holding time outliers and replicate burn RPD outliers.

All data, as qualified, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS, REASON CODES, AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler temperature, pH, summa canister pressure); Exceeded Holding Times
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown)
	5A	Initial Calibration (RF, %RSD, r^2)
	5B	Calibration Verification (ICV, CCV, CCAL; RF, %D, %R) Use bias flags (H,L)[1] where appropriate
Blank Contamination	6	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
	7	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)[1] for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS &/or MSD) Recoveries Use bias flags (H,L)[1] where appropriate
	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)[1] where appropriate
	12	Reference Material Use bias flags (H,L)[1] where appropriate
	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)[1] where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)[1] where appropriate
	19	Internal Standard Performance (i.e., area, retention time, recovery)
	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
	3	2nd column confirmation (RPD or %D)
	4	Tentatively Identified Compound (TIC) (associated with NJ only)
	20	Calibration Range or Linear Range Exceeded
	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, re-extractions, etc. Associated with “R” and “DNR” only)
	14	Other (See DV report for details)
	26	Method QC information not provided

[1] H = high bias indicated
L = low bias indicated

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Conventional Chemistry Analysis
(Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
L1313024	SD0049	L1313024-02	ALPHA91_Soot	Soot	0.032	percent	v	J	1
L1313024	SD0049	L1313024-02	ALPHA91_Soot	Soot	0.041	percent	v	J	1
L1313024	SD0048	L1313024-03	ALPHA91_Soot	Soot	0.096	percent	v	J	1
L1313024	SD0048	L1313024-03	ALPHA91_Soot	Soot	0.078	percent	v	J	1
L1313024	SD0028	L1313024-08	EPA9060	TOC	9.31	percent	v	J	9
L1313024	SD0028	L1313024-08	EPA9060	TOC	6.86	percent	v	J	9
L1313024	SD0019	L1313024-14	ALPHA91_Soot	Soot	0.042	percent	v	J	9
L1313024	SD0019	L1313024-14	ALPHA91_Soot	Soot	0.061	percent	v	J	9
L1313028	SD0008	L1313028-18	ALPHA91_Soot	Soot	0.413	percent	v	J	9
L1313028	SD0008	L1313028-18	ALPHA91_Soot	Soot	0.167	percent	v	J	9
L1313613	SD0056	L1313613-01	EPA9060	TOC	0.58	percent	v	J	1
L1313613	SD0056	L1313613-01	EPA9060	TOC	0.591	percent	v	J	1
L1313613	SD0057	L1313613-02	EPA9060	TOC	0.169	percent	v	J	1
L1313613	SD0057	L1313613-02	EPA9060	TOC	0.163	percent	v	J	1
L1313613	SD0058	L1313613-03	EPA9060	TOC	0.289	percent	v	J	1
L1313613	SD0058	L1313613-03	EPA9060	TOC	0.26	percent	v	J	1

APPENDIX D

DATA VALIDATION REPORT FOR
ANALYSES BY
ALS ENVIRONMENTAL

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

WESTERN PORT ANGELES HARBOR RI/FS

Prepared for:

Floyd|Snider
601 Union Street, Suite 600
Seattle, WA 98101

Prepared by:

EcoChem, Inc.
1011 Western Ave. Suite 1011
Seattle, WA 98104

EcoChem Project: C15217-1

October 28, 2013

Approved for Release

Melissa Swanson
Project Manager

Basis for Data Validation

This report summarizes the results of validation (Stage 2A, 2B, 3, & 4) performed on sediment, pore water, and quality control (QC) sample data for the Western Port Angeles Harbor RI/FS. Field sample ID, laboratory sample ID, and requested analyses are provided in the **Sample Indices**. Laboratory batch ID numbers and associated level of validation are provided at the beginning of each technical section.

Samples were analyzed by Samples were analyzed by ALS Environmental, Kelso, Washington. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method of Analysis	Primary Review	Secondary Review
Semivolatile Organic Compounds	SW8270D	M. Failor	M. Swanson
Polycyclic Aromatic Hydrocarbons	SW8270D-SIM		
Metals	SW6020A, 7470A, 7471B	Y. Hida	C. Ransom/ M. Swanson
Grain Size	PSEP		
Ammonia	SM4500NH3H		
Sulfide	SW9030M		
Totals Solids/Total Volatile Solids	EPA160.3, 160.4		

The data were reviewed using guidance and quality control criteria documented in the analytical methods and the following project and guidance documents:

- Sampling and Analysis Plan - *Western Port Angeles Harbor RI/FS* (Integral/Anchor QEA/Exponent/Floyd|Snider, June 2013)
- *USEPA National Functional Guidelines for Organic Data Review* (USEPA 2008)
- *USEPA National Functional Guidelines for Inorganic Data Review* (USEPA October 2004)

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **Appendix A**. The qualified data summary table is included as **Appendix B.** Data Validation Worksheets and the associated communication records will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) was also submitted with this report.

Sample Index
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	SVOC	PAH	Metals	Grain Size	Ammonia	Sulfide	Total Volatile Solids	Total Solids
K1306341	SD0027	K1306341-001				✓			✓	✓
K1306341	SD0030	K1306341-002				✓			✓	✓
K1306341	SD0031	K1306341-003				✓			✓	✓
K1306341	SD0032	K1306341-004				✓			✓	✓
K1306341	SD0033	K1306341-005				✓			✓	✓
K1306341	SD0034	K1306341-006				✓			✓	✓
K1306341	SD0035	K1306341-007				✓			✓	✓
K1306341	SD0036	K1306341-008				✓			✓	✓
K1306341	SD0037	K1306341-009				✓			✓	✓
K1306341	SD0038	K1306341-010				✓			✓	✓
K1306341	SD0039	K1306341-011				✓			✓	✓
K1306341	SD0044	K1306341-012				✓			✓	✓
K1306341	SD0023	K1306341-013				✓			✓	✓
K1306341	SD0024	K1306341-014				✓			✓	✓
K1306341	SD0042	K1306341-015				✓			✓	✓
K1306341	SD0041	K1306341-016				✓			✓	✓
K1306341	SD0043	K1306341-017				✓			✓	✓
K1306341	SD0045	K1306341-018				✓			✓	✓
K1306341	SD0046	K1306341-019				✓			✓	✓
K1306341	SD0047	K1306341-020				✓			✓	✓
K1306341	SD0049	K1306341-021				✓			✓	✓
K1306341	FW0001	K1306341-022	✓		✓					
K1306341	FB0001	K1306341-023	✓		✓					
K1306341	SD0048	K1306341-024				✓			✓	✓
K1306341	SD0050	K1306341-025				✓			✓	✓
K1306341	SD0040	K1306341-026				✓			✓	✓
K1306341	SD0029	K1306341-027				✓			✓	✓
K1306341	SD0025	K1306341-028				✓			✓	✓
K1306341	SD0026	K1306341-029				✓			✓	✓
K1306341	SD0028	K1306341-030				✓			✓	✓
K1306341	SD0005	K1306341-031				✓			✓	✓
K1306341	SD0006	K1306341-032	✓	✓	✓	✓			✓	✓
K1306341	SD0007	K1306341-033				✓			✓	✓
K1306341	SD0014	K1306341-034				✓			✓	✓
K1306341	SD0017	K1306341-035	✓	✓	✓	✓			✓	✓
K1306341	SD0019	K1306341-036				✓			✓	✓
K1306341	SD0020	K1306341-037				✓			✓	✓
K1306341	SD0027	K1306341-038					✓	✓		
K1306341	SD0030	K1306341-039					✓	✓		
K1306341	SD0031	K1306341-040					✓	✓		

Sample Index
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	SVOC	PAH	Metals	Grain Size	Ammonia	Sulfide	Total Volatile Solids	Total Solids
K1306341	SD0032	K1306341-041					✓	✓		
K1306341	SD0033	K1306341-042					✓	✓		
K1306341	SD0034	K1306341-043					✓	✓		
K1306341	SD0035	K1306341-044					✓	✓		
K1306341	SD0036	K1306341-045					✓	✓		
K1306341	SD0037	K1306341-046					✓	✓		
K1306341	SD0038	K1306341-047					✓	✓		
K1306341	SD0039	K1306341-048					✓	✓		
K1306341	SD0044	K1306341-049					✓	✓		
K1306341	SD0023	K1306341-050					✓	✓		
K1306341	SD0024	K1306341-051					✓	✓		
K1306341	SD0042	K1306341-052					✓	✓		
K1306341	SD0041	K1306341-053					✓	✓		
K1306341	SD0043	K1306341-054					✓	✓		
K1306341	SD0045	K1306341-055					✓	✓		
K1306341	SD0046	K1306341-056					✓	✓		
K1306341	SD0047	K1306341-057					✓	✓		
K1306341	SD0049	K1306341-058					✓	✓		
K1306341	SD0048	K1306341-059					✓	✓		
K1306341	SD0050	K1306341-060					✓	✓		
K1306341	SD0040	K1306341-061					✓	✓		
K1306341	SD0029	K1306341-062					✓	✓		
K1306341	SD0025	K1306341-063					✓	✓		
K1306341	SD0026	K1306341-064					✓	✓		
K1306341	SD0028	K1306341-065					✓	✓		
K1306341	SD0005	K1306341-066					✓	✓		
K1306341	SD0006	K1306341-067					✓	✓		
K1306341	SD0007	K1306341-068					✓	✓		
K1306341	SD0014	K1306341-069					✓	✓		
K1306341	SD0017	K1306341-070					✓	✓		
K1306341	SD0019	K1306341-071					✓	✓		
K1306341	SD0020	K1306341-072					✓	✓		
K1306505	SD0009	K1306505-001				✓			✓	✓
K1306505	SD0003	K1306505-002	✓	✓	✓	✓			✓	✓
K1306505	SD0052	K1306505-003				✓			✓	✓
K1306505	SD0053	K1306505-004				✓			✓	✓
K1306505	SD0010	K1306505-005				✓			✓	✓
K1306505	SD0004	K1306505-006				✓			✓	✓
K1306505	SD0012	K1306505-007				✓			✓	✓
K1306505	SD0013	K1306505-008				✓			✓	✓
K1306505	SD0009	K1306505-009					✓	✓		
K1306505	SD0003	K1306505-010					✓	✓		

Sample Index
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	SVOC	PAH	Metals	Grain Size	Ammonia	Sulfide	Total Volatile Solids	Total Solids
K1306505	SD0010	K1306505-011					✓	✓		
K1306505	SD0004	K1306505-012					✓	✓		
K1306505	SD0012	K1306505-013					✓	✓		
K1306505	SD0011	K1306505-014					✓	✓		
K1306618	SD0013	K1306618-001	✓	✓	✓	✓			✓	✓
K1306618	SD0015	K1306618-002	✓	✓	✓	✓			✓	✓
K1306618	SD0021	K1306618-003				✓			✓	✓
K1306618	SD0055	K1306618-004				✓			✓	✓
K1306618	SD0016	K1306618-005	✓	✓	✓	✓			✓	✓
K1306618	SD0022	K1306618-006							✓	
K1306618	SD0001	K1306618-007							✓	
K1306618	SD0002	K1306618-008							✓	
K1306618	SD0051	K1306618-009							✓	
K1306618	SD0054	K1306618-010							✓	
K1306618	SD0013	K1306618-011					✓	✓		
K1306618	SD0015	K1306618-012					✓	✓		
K1306618	SD0021	K1306618-013					✓	✓		
K1306618	SD0016	K1306618-014					✓	✓		
K1306618	SD0022	K1306618-015					✓	✓		
K1306618	SD0001	K1306618-016					✓	✓		
K1306618	SD0002	K1306618-017					✓	✓		
K1306758	SD0018	K1306758-001				✓			✓	✓
K1306758	SD0008	K1306758-002	✓	✓	✓	✓			✓	✓
K1306758	FW0002	K1306758-003	✓		✓					
K1306758	FW0003	K1306758-004	✓		✓					
K1306758	SD0018	K1306758-005					✓	✓		
K1306758	SD0008	K1306758-006					✓	✓		
K1307013	SD0056	K1307013-001				✓				✓
K1307013	SD0057	K1307013-002				✓				✓
K1307013	SD0058	K1307013-003				✓				✓

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
Semivolatile Organic Compounds by Method SW8270D

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by ALS Environmental, Kelso, Washington. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
K1306341	2 Sediment 2 Filter Wipes	Stage 2B Stage 2A
K1306505	1 Sediment	Stage 4
K1306618	3 Sediment	Stage 2B
K1306758	1 Sediment 2 Filter Wipes	Stage 2B Stage 2A

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG K1306758: On the chain of custody (COC), analysis for filter wipe Sample FW0003 were not requested for semivolatile organic compounds (SVOC). The lab analyzed and reported results for this sample.

II. VERIFICATION OF EDD TO LABORATORY REPORT

Sample results and related quality control data were received as an electronic data deliverable (EDD) and laboratory report. The EDD was verified against the laboratory report; no errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	1	Laboratory Control Samples (LCS/LCSD)
✓	GC/MS Instrument Performance Check	1	Field Replicates
✓	Initial Calibration (ICAL)	✓	Internal Standards
✓	Continuing Calibration (CCAL)	✓	Target Analyte List
2	Laboratory Blanks	1	Reporting Limits (MDL and MRL)
1	Field Blanks	✓	Compound Identification
✓	Surrogate Compounds	✓	Reported Results
2	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)	1	Calculation Verification (Full validation only)

✓Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that sample shipping coolers should arrive at the laboratory within the advisory temperature range of 2° to 6°C. The laboratory received several sample coolers with temperatures less than the lower limit, the lowest at 0.2 °C. These outliers did not impact data quality; no data were qualified.

Laboratory Blanks

Laboratory (method) blanks were analyzed at the appropriate frequency. To assess the impact of each blank contaminant on the reported sample results, an action level is established at five times (5x; 10x for phthalates) the concentration detected in the blank. If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified as not detected (U-7) at the reported concentration to indicate an elevation of the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results.

SDG K1306341: A positive result for bis (2-ethylhexyl) phthalate was reported in the filter wipe method blank. This analyte was not detected in the associated samples; no data were qualified.

SDG K1306758: A positive result for bis (2-ethylhexyl) phthalate was reported in the filter wipe method blank. The results for bis (2-ethylhexyl) phthalate were qualified as not detected (U-7) in Samples FW0002 and FW0003.

Field Blanks

The field blanks for this project are filter wipe samples. To evaluate the effect on the sample data, action levels of 5x (10x for phthalates) the blank concentrations were established. If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified (U-6) at the reported concentration to indicate an elevation of the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results.

SDG K1306341: Two filter wipes, FW0001 and FB0001, were submitted with this data package. No target analytes were detected in these samples

SDG K1306758: Two filter wipes, FW0002 and FW0003, were submitted with this data package. After qualification due to method blank contamination, there were positive results remaining for benzyl n-butyl phthalate, dibenzofuran, diethyl phthalate, dimethyl phthalate, di-n-butyl phthalate, n-nitrosodiphenylamine, and phenol in Sample FW0002 and positive results for benzyl n-butyl phthalate, diethyl phthalate, and di-n-butyl phthalate in Sample FW0003. All associated results were greater than the action levels or not detected; no data were qualified.

Matrix Spikes/ Matrix Spike Duplicate

Matrix spike/matrix spike duplicates (MS/MSD) were analyzed at the proper frequency. For MS/MSD %R values that were less than the lower control limit, positive results and/or non-detects in the associated samples were estimated (J/UJ-8L) to indicate a potential low bias. For %R values greater than the upper control limit, only positive results in the associated samples were estimated (J-8H) to indicate a potential high bias. If the %R values are less than 10%, positive results were estimated (J-8L) and reporting limits were rejected (R-8L). No action was taken if only one of the MS or MSD recovery values was outside of the control limit and greater than 10% or if the native sample concentration is greater than 4x the spike level.

SDG K1306341: The MS/MSD analyses were performed using Sample SD0017. Benzoic acid was not recovered in the MS. The MSD %R value was acceptable. The reporting limit for benzoic acid was estimated (UJ-8L) in the parent sample to indicate a potential low bias. The RPD value for benzoic acid was greater than the control limit, benzoic acid was not detected in the parent sample; no data were qualified.

For filter wipe samples MS/MSD analyses were not performed. Precision and accuracy were evaluated using the laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses.

SDG K1306505: The MS/MSD analyses were performed using Sample SD0003. Benzoic acid was not recovered. This analyte was not detected in the parent sample, the reporting limit was rejected (R-8L) to indicate a potentially very low bias.

SDG K1306618: The MS/MSD analyses were performed using sample SD0015. Benzoic acid was not recovered. This analyte was not detected in the parent sample, the reporting limit was rejected (R-8L) to indicate a potentially very low bias.

SDG K1306758: The MS/MSD analyses were performed using a batch QC sample.

For filter wipe samples MS/MSD analyses were not performed. Precision and accuracy were evaluated using the LCS/LCSD analyses.

Laboratory Control Samples

Laboratory control sample/laboratory control sample duplicates (LCS/LCSD) were analyzed at the proper frequency. For LCS/LCSD recovery values that were less than the lower control limit, positive results and/or non-detects in the associated samples were estimated (J/UJ-10L) to indicate a potential low bias. For recovery values greater than the upper control limit, only positive results in the associated samples were estimated (J-10H) to indicate a potential high bias. No action was taken if only one of the LCS or LCSD recovery values was outside of the control limit. The relative percent difference (RPD) value control limit is 40%. For RPD values greater than the control limit, positive results in the associated samples were estimated (J-9).

SDG K1306341: The %R values for di-n-butyl-phthalate were greater than the upper control limit for the sediment LCS/LCSD. This analyte was not detected in the associated samples; no data were qualified.

Field Replicates

To evaluate field precision, the relative percent difference (RPD) is calculated for results greater than 5x the reporting limits (RL). If either result is less than 5x the RL, the difference between the results is calculated. The RPD control limit is 50% and the calculated difference control limit is 2x the RL for sediment samples.

SDG K1306618: One set of field replicates, SD0015 & SD0016, were submitted. Field precision was acceptable.

Reporting Limits

ALL SDG: The reporting limits (RL) specified by the sampling and analysis plan (SAP) were not met for one or more analytes. The RL were elevated due to reduced sample aliquot and/or high moisture content. No data were qualified.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the surrogate, LCS/LCSD, and MS/MSD recovery values. With the exceptions noted above, precision was also acceptable as demonstrated by the LCS/LCSD, MS/MSD, and field duplicate RPD values.

Data were qualified as not detected due to method blank contamination. One data point was estimated based MS/MSD %R outliers.

Two data points were rejected due to MS/MSD %R outliers. Data that were rejected should not be used for any purpose.

All other data, as qualified, are acceptable for use

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
Polynuclear Aromatic Hydrocarbons by Method SW8270D-SIM

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by ALS Environmental, Kelso, Washington. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
K1306341	2 Sediment	Stage 2B
K1306505	1 Sediment	Stage 4
K1306618	3 Sediment	Stage 2B
K1306758	1 Sediment	Stage 2B

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG K1306505: Analyte concentrations were reported on a wet weight basis in the original PDF and electronic data deliverable (EDD) reports. The laboratory was contacted and resubmitted the data adjusted for percent moisture content, no further action was necessary.

II. VERIFICATION OF EDD TO LABORATORY REPORT

Sample results and related quality control data were received as an electronic data deliverable (EDD) and laboratory report. The EDD was verified against the laboratory report; no errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	✓	Laboratory Control Samples (LCS/LCSD)
✓	GC/MS Instrument Performance Check	1	Field Replicates
✓	Initial Calibration (ICAL)	✓	Internal Standards
✓	Continuing Calibration (CCAL)	✓	Target Analyte List
1	Laboratory Blanks	1	Reporting Limits (MDL and MRL)
1	Field Blanks	✓	Compound Identification
✓	Surrogate Compounds	✓	Reported Results
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)	1	Calculation Verification

✓ ***Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.***
[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that sample shipping coolers should arrive at the laboratory within the advisory temperature range of 2° to 6°C. The laboratory received several sample coolers with temperatures less than the lower control limit, the lowest at 0.2 °C. These outliers did not impact data quality; no data were qualified.

Laboratory Blanks

Laboratory (method) blanks were analyzed at the appropriate frequency. To assess the impact of each blank contaminant on the reported sample results, an action level is established at five times (5x) the concentration detected in the blank. If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified as not detected (U-7) at the reported concentration to indicate an elevation of the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results.

SDG K1306341: A positive result for naphthalene was reported in the method blank. Results in the associated samples were greater than the action level. No data were qualified.

SDG K1306505: A positive result for benzo(g,h,i)perylene was reported in the method blank. The result in the associated sample was greater than the action level. No data were qualified.

Field Blanks

No field blanks were submitted.

Matrix Spike/Matrix Spike Duplicates

SDGs K1306341, K1306618, and K1306758: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using a batch QC sample. Precision and accuracy were acceptable.

Field Replicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) control limit is 50% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 2x the RL. No data were qualified based on field replicate precision outliers. Data users should consider the impact of field precision outliers on the reported results. With the exceptions noted below, field precision was acceptable.

SDG K1306618: One set of field replicates, SD0015 & SD0016, were submitted. The RPD values for benzo(a)anthracene and naphthalene were greater than the control limit.

Reporting Limits

SDGs K1306341 and K1306618: The reporting limits (RL) specified by the sampling and analysis plan (SAP) were not met for one or more analytes. The RL were elevated due to reduced sample aliquot and/or high moisture content. No data were qualified.

Calculation Verification

Several results were verified by recalculation from the raw data.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate and LCS/LCSD and MS/MSD recovery values. With the exceptions noted above, precision was acceptable as demonstrated by the LCS/LCSD and field replicate RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
Metals by Methods SW6020A and SW7470A/SW7471B

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. ALS Environmental, Kelso, Washington, analyzed the samples. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
K1306341	2 Sediment & 2 Filter Wipe	Stage 2B Stage 2A
K1306505	1 Sediment	Stage 3
K1306618	3 Sediment	Stage 2B
K1306758	1 Sediment & 2 Filter Wipe	Stage 2B Stage 2A

I. DATA PACKAGE COMPLETENESS

With the exception noted below, the laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG K1306758: The case narrative noted an incorrect number of samples and the SDG number was incorrect. The laboratory was contacted and the case narrative was corrected.

II. VERIFICATION OF EDD TO LABORATORY REPORT

Sample results and related quality control data were received as an electronic data deliverable (EDD) and laboratory report. The EDD was verified against the laboratory report; no errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	✓	Matrix Spike Samples
✓	Initial Calibration	2	Laboratory Duplicates
✓	Continuing Calibration Verification	1	Field Replicates
✓	ICP-MS Tune	✓	Interference Check Samples
✓	CRDL Standards	✓	ICP Serial Dilutions
2	Laboratory Blanks	✓	ICP-MS Internal Standards
2	Field Blanks	✓	Reporting Limits (MDL and MRL)
✓	Laboratory Control Samples (LCS/LCSD)	✓	Reported Results
✓	Reference Materials	1	Calculation Verification (Stage 3 only)

✓ ***Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.***
[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Receipt, Preservation, and Holding Times

As stated in validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 2° to 6°C. The laboratory received several sample coolers with temperatures less than the lower limit, the lowest at 0.2°C. These outliers did not impact data quality; no data were qualified.

Laboratory Blanks

To assess the impact of any blank contaminant on the reported sample results, an action level is established at five times (5x) the concentration reported in the blank. If a contaminant is reported in an associated field sample and the concentration is less than the action level, the result is qualified as not detected (U-7). No action is taken if the sample result is greater than the action level, or for non-detected results.

Laboratory blanks were analyzed at the appropriate frequency. Various target analytes were detected in the method and instrument blanks, however only the following analytes required qualification in the samples listed:

SDG K1306341: Positive results for arsenic, cadmium, chromium, copper, lead, and silver were reported in the filter wipe method blank. Results for copper and silver were qualified as not detected (U-7) in Sample FB0001. Results for cadmium, copper, and silver were qualified as not detected (U-7) in Sample FW0001.

SDG K136758: Positive result for chromium was reported in the method blank. The result for chromium was qualified as not detected (U-7) in Sample FW0002.

Field Blanks

To evaluate the effect on the sample data, action levels of 5x the blank concentrations were established. If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified (U-6) at the reported concentration to indicate an elevation of the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results. All sediment results were greater than the action levels; no sediment data were qualified.

SDG K1306341: Two filter blanks, FB0001 and FW0001, were submitted with this data package. After qualification due to method blank and instrument blank contamination, positive results for cadmium, chromium, lead, and zinc remained in Sample FB0001.

In Sample FW0001 the results for chromium, lead, and zinc were qualified as not detected (U-6) due to contamination from Sample FB0001. No positive results remained in this sample. In Sample FW0002 the results for lead and zinc were qualified as not detected (U-6) due to contamination from Sample FB0001. A positive result for copper remained in this sample. In Sample FW0003 the results for chromium, lead, and zinc were qualified as not detected (U-6) due to contamination from Sample FB0001. A positive result for copper remained in this sample.

SDG K1306758: Two filter blanks, FW0002 and FW0003, were submitted with this data package. After qualification due to method blank and instrument blank contamination, and contamination due to Sample FB0001, positive results for copper remained in Samples FW0002 and FW0003. All associated results were detected at concentrations greater than the action level; no data were qualified.

Laboratory Duplicates

Laboratory duplicates were analyzed at the proper frequency. The laboratory duplicate relative percent difference (RPD) control limit is 20% for results greater than five times (5x) the reporting limit (RL). For results less than the RL, the difference between the sample and duplicate must be less than the RL.

For RPD or difference values greater than the control limits, associated positive results and non-detects were estimated (J/UJ-9). The following outliers were noted:

SDG K1306505: SD0003: lead (28.4%)

SDGs K1306758 and K1306618: Batch QC: lead (28.4%)

Field Duplicates

The field duplicate RPD control limit is 50% for results greater than five times (5x) the RL. For results less than 5x the RL, the difference between the sample and duplicate must be less than 2x the RL. No data were qualified based on field replicate precision outliers. Data users should consider the impact of field precision outliers on the reported results. With the exceptions noted below, field precision was acceptable.

SDG K1306618: One set of field duplicates were submitted, SD0015 & SD0016, with this data set. The RPD values for cadmium, mercury, and zinc were greater than the control limit.

Calculation Verification

SDG K1306505: Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. Accuracy was acceptable as demonstrated by the laboratory control sample and matrix spike percent recovery values. Precision was also acceptable as demonstrated by the laboratory duplicate relative percent difference values.

Data were qualified as not detected based on laboratory and field blank contamination. Data were estimated based on laboratory duplicate RPD outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
Conventional Parameters

This report documents the review of analytical data from the analyses of pore water samples and the associated laboratory quality control (QC) samples. ALS Environmental, Kelso, Washington, analyzed the samples. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples	Validation Level
K1306341	35 Pore Water	Stage 2B
K1306505	6 Pore Water	Stage 3
K1306618	7 Pore Water	Stage 2B
K1306758	2 Pore Water	Stage 2B

The analytical tests that were performed are summarized below.

Parameter	Method
Sulfide	EPA 9030B
Ammonia	EPA SM 45-NH3 E

I. DATA PACKAGE COMPLETENESS

With the exception noted below, the laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG K1306758: The case narrative noted seven pore water samples, there were two, and the SDG number noted on the case narrative was incorrect. The laboratory was contacted and the case narrative was corrected.

II. VERIFICATION OF EDD TO LABORATORY REPORT

Sample results and related quality control data were received as an electronic data deliverable (EDD) and laboratory report. The EDD was verified against the laboratory report; no errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed in the following table.

2	Sample Receipt, Preservation, and Holding Times	1	Field Replicates
1	Laboratory Blanks	✓	Reported Results
1	Field Blanks	✓	Reporting Limits
✓	Laboratory Control Samples (LCS)	1	Calculation Verification
✓	Laboratory Duplicates		

✓Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

As stated in validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 2° to 6°C. The laboratory received sample coolers with temperatures less than the lower limit, the lowest at 0.2°C. These preservation outliers did not impact data quality; no data were qualified.

SDG K1306341: The sediment samples were frozen prior to the extraction of the porewater, with the intention of extending the seven (7) day holding time. In addition, the preservation requirement for sulfide and ammonia analyses is cooling at 2° to 6°C. All sulfide analyses were performed 19 to 22 days after collection; four samples, SD0027, SD0030, SD0031, and SD0044, were analyzed more than three times the holding time criterion; sulfide was not detected. The sulfide results in these four samples were rejected (R-1). All other sulfide and all ammonia sample results were estimated (J/UJ-1) for this data package.

SDG K1306505: The samples for sulfide were analyzed at 23 or 24 days, more than three times the holding time criterion of seven days. All positive results for sulfide were estimated (J-1) and non-detected results were rejected (R-1).

SDG K1306618: Sulfide analyses were performed 17 to 22 days after sample collection, which is greater than the criterion of seven (7) days. All results for sulfide were estimated (J/UJ-1).

SDG K1306758: Sulfide analyses were performed 16 days after sample collection, which is greater than the criterion of seven (7) days. All results for sulfide results were estimated (J/UJ-1).

Laboratory Blanks

SDG K1306341: Positive results for ammonia were reported in several instrument and method blanks. All samples results were greater than the five times action level; no data were qualified.

Field Blanks

No field blanks were submitted with this matrix.

Field Replicates

The field duplicate relative percent difference (RPD) control limit is 35% for results greater than five times (5x) the RL. For results less than 5x the RL, the difference between the sample and duplicate must be less than the RL. No data were qualified based on field replicate precision outliers. Data users should consider the impact of field precision outliers on the reported results. With the exceptions noted below, field precision was acceptable.

SDG K1306341: Two sets of field replicates, SD0040 & SD0041 and SD0049 & SD0050, were submitted. The RPD or the difference values for ammonia in both sets of field replicates were greater than the control limit.

SDG K1306618: One set of field duplicates, SD0015 & SD0016, were submitted with this SDG. The RPD value for ammonia was greater than the control limit.

Calculation Verification

SDG K1306505: Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. Accuracy was acceptable as demonstrated by the laboratory control sample percent recovery values. Precision was acceptable as demonstrated by the laboratory duplicate relative percent difference values.

Data were estimated based holding time outliers.

Data were rejected due to analyses greater than three times the holding time criterion. Data that was rejected should not be used for any purpose.

All other data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
Conventional Parameters

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by ALS Environmental, Kelso, Washington. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
K1306341	35 Sediment	Stage 2B
K1306505	8 Sediment	Stage 3
K1306618	10 Sediment	Stage 2B
K1306758	2 Sediment	Stage 2B
K1307013	3 Sediment	Stage 2B

The analytical tests that were performed are summarized below.

Parameter	Method
Grain Size	PSEP
Total Volatile Solids	160.4
Total Solids	160.3
Total Organic Carbon	SW-846 9060

I. DATA PACKAGE COMPLETENESS

With the exceptions noted below, the laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG K1306618: Sample SD0015 was reanalyzed for total solids (TS), there was no mention in the case narrative of this reanalysis. A note on the bench sheet stated that the incorrect sample was analyzed and that the correct sample would be reanalyzed. The laboratory was contacted and the case narrative was revised. The revised case narrative incorrectly noted the analysis method as 160.4M, the correct method is 160.3M.

SDG K1306758: The case narrative noted an incorrect SDG number and number of samples. The laboratory was requested to provide a corrected case narrative.

II. VERIFICATION OF EDD TO LABORATORY REPORT

Sample results and related quality control data were received as an electronic data deliverable (EDD) and laboratory report. The EDD was verified against the laboratory report; with the exceptions noted below no errors were found.

SDG K1306618: In the EDD, the incorrect result for TS in Sample SD0015 was reported. This result was flagged do-not-report (DNR-11) in favor of the correct result which had been reported as a laboratory duplicate value with the laboratory ID K1306618-002DUP. This laboratory ID was changed from K1306618-002DUP to K1306618-002.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed in the following table.

2	Sample Receipt, Preservation, and Holding Times	✓	Matrix Spikes
✓	Laboratory Blanks	1	Reported Results
✓	Laboratory Control Samples (LCS)	✓	Reporting Limits
✓	Laboratory Replicates	1	Calculation Verification
1	Field Duplicates		

✓Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

As stated in validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 2° to 6°C. The laboratory received several sample coolers with temperatures less than the lower limit, the lowest at 0.2°C. These outliers did not impact data quality; no data were qualified.

SDG K1306341: Due to a broken crucible, Sample SD0048 was reanalyzed for total volatile solids (TVS) 12 days after sample collection, which is greater than the TVS holding time criterion of seven (7) days. The TVS result was estimated (J-1).

SDG K1306758: Samples SD0008 and SD0018 were reanalyzed for TVS eight (8) days after sample collection, which is greater than the TVS holding time criterion of seven (7) days. These results were estimated (J-1).

Field Duplicates

The field duplicate RPD control limit is 50% for results greater than five times (5x) the RL. For results less than 5x the RL, the difference between the sample and duplicate must be less than 2x the RL. No data were qualified based on field replicate precision outliers. Data users should consider the impact of field precision outliers on the reported results. With the exceptions noted below, field precision was acceptable.

SDG K1306341: Two sets of field duplicates, SD0040 & SD0041 and SD0049 & SD0050, were submitted. For the pair using Samples SD0049 & SD0050 the grain size RPD value for very fine sand was greater than the control limit.

SDG K1306618: One set of field duplicates, SD0015 & SD0016, were submitted. The RPD value for total volatile solids was greater than the control limit.

Reported Results

SDG K1306758: The first analysis of the laboratory duplicates of Samples SD0008 and SD0018 for total solids were flagged do-not-report (DNR-11) in favor of the re-analysis results.

Calculation Verification

SDG K1306505: Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. Accuracy was acceptable as demonstrated by the laboratory control sample, reference material, and matrix spike recoveries. With the exceptions noted above, precision was acceptable as demonstrated by the laboratory duplicate RPD, laboratory replicate %RSD, and field duplicate RPD values.

Data were estimated based on holding time outliers. Data were also flagged as do-not-report (DNR) to indicate which result should not be used from multiple reported analyses.

Data that were flagged DNR are not useable for any purpose. All other data, as qualified, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS, REASON CODES, AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler temperature, pH, summa canister pressure); Exceeded Holding Times
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown, lock-mass)
	5A	Initial Calibration (RF, %RSD, r^2)
	5B	Calibration Verification (ICV, CCV, CCAL; RF, %D, %R) Use bias flags (H,L)[1] where appropriate
Blank Contamination	6	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
	7	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)[1] for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS &/or MSD) Recoveries Use bias flags (H,L)[1] where appropriate
	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)[1] where appropriate
	12	Reference Material Use bias flags (H,L)[1] where appropriate
	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)[1] where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)[1] where appropriate
	19	Internal Standard Performance (i.e., area, retention time, recovery)
	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
	3	2nd column confirmation (RPD or %D)
	4	Tentatively Identified Compound (TIC) (associated with NJ only)
	20	Calibration Range or Linear Range Exceeded
	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, re-extractions, etc. Associated with "R" and "DNR" only)
	14	Other (See DV report for details)
	26	Method QC information not provided

[1] H = high bias indicated
L = low bias indicated

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS
(Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	<u>Water</u>: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) <u>Solids/Wastes</u>: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS
(Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS low conc. H2O SVOA	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

EcoChem Validation Guidelines for Mercury Analysis by CVAA
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	28 days from date sampled Frozen tissues: HT extended to 6 months	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + 4 standards, one at RL r > 0.995	J(+)/UJ(-) if r<0.995	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±20% of true value	J(+)/UJ(-) if %R = 65%-79% J(+) if %R = 121-135% R(+/-) if %R < 65% R(+) if %R > 135%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±20% of true value	J(+)/UJ(-) if %R = 65%-79% J(+) if %R = 121-135% R(+/-) if %R < 65% R(+) if %R > 135%	5B

Initial and Continuing Calibration Blanks (ICB/CCB)	after each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to **TM-02** for additional details
			7

Reporting Limit Standard (CRA)	conc at RL - analyzed beginning of run %R = 70-130%	R(-),(+)<2xRL if %R <50% J(+)<2x RL, UJ(-) if %R 50-69% J(+) <2x RL if %R 130-180% R(+)<2x RL if %R>180%	14
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch		10
	Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 5% frequency 75-125% for samples less than 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% all samples in batch	8
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff ≤ RL for samples >RL and < 5x RL (Diff ≤ 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Mercury Analysis by CVAA
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5x RL: Water: Diff<RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must be less than 110% of high standard	J values over range	20

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
K1306341	SD0017	K1306341-035	SW8270D_3541	Benzoic acid	0.3	mg/kg	U	UJ	8L
K1306505	SD0003	K1306505-002	SW8270D_3541	Benzoic acid	0.53	mg/kg	U	R	8L
K1306618	SD0015	K1306618-002	SW8270D_3541	Benzoic acid	0.26	mg/kg	U	R	8L
K1306758	FW0002	K1306758-003	SW8270D_3541	bis(2-Ethylhexyl)phthalate	0.19	ug	J	U	7
K1306758	FW0003	K1306758-004	SW8270D_3541	bis(2-Ethylhexyl)phthalate	0.2	ug	J	U	7
K1306505	SD0003	K1306505-002	SW6020A_3050B	Lead	15.1	mg/kg	*	J	9
K1306505	SD0003	K1306505-002DUP	SW6020A_3050B	Lead	20.1	mg/kg		J	9
K1306618	SD0013	K1306618-001	SW6020A_3050B	Lead	22.4	mg/kg	*	J	9
K1306618	SD0015	K1306618-002	SW6020A_3050B	Lead	16.7	mg/kg	*	J	9
K1306618	SD0016	K1306618-005	SW6020A_3050B	Lead	23.9	mg/kg	*	J	9
K1306341	FW0001	K1306341-022	SW6020A_CLFAA	Cadmium	0.003	ug	J	U	7
K1306341	FW0001	K1306341-022	SW6020A_CLFAA	Chromium	0.56	ug		U	6
K1306341	FW0001	K1306341-022	SW6020A_CLFAA	Copper	0.13	ug		U	7
K1306341	FW0001	K1306341-022	SW6020A_CLFAA	Lead	0.023	ug		U	6
K1306341	FW0001	K1306341-022	SW6020A_CLFAA	Silver	0.008	ug	J	U	7
K1306341	FW0001	K1306341-022	SW6020A_CLFAA	Zinc	0.42	ug		U	6
K1306341	FB0001	K1306341-023	SW6020A_CLFAA	Copper	0.12	ug		U	7
K1306341	FB0001	K1306341-023	SW6020A_CLFAA	Silver	0.007	ug	J	U	7
K1306758	SD0008	K1306758-002	SW6020A_CLFAA	Lead	17.8	mg/kg	*	J	9
K1306758	FW0002	K1306758-003	SW6020A_CLFAA	Chromium	0.44	ug		U	7
K1306758	FW0002	K1306758-003	SW6020A_CLFAA	Lead	0.019	ug	J	U	6
K1306758	FW0002	K1306758-003	SW6020A_CLFAA	Zinc	0.46	ug	J	U	6
K1306758	FW0003	K1306758-004	SW6020A_CLFAA	Chromium	0.5	ug		U	6
K1306758	FW0003	K1306758-004	SW6020A_CLFAA	Lead	0.027	ug	J	U	6
K1306758	FW0003	K1306758-004	SW6020A_CLFAA	Zinc	0.59	ug		U	6
K1306618	SD0015	K1306618-002	EPA_160.3	Solids	92.7	percent		DNR	11
K1306758	SD0018	K1306758-001DUP	EPA_160.3	Solids	39.9	percent		DNR	11
K1306758	SD0008	K1306758-002DUP	EPA_160.3	Solids	31.3	percent		DNR	11
K1306341	SD0048	K1306341-024	EPA_160.4	Total Volatile Solids	3.19	percent		J	1
K1306758	SD0018	K1306758-001	EPA_160.4	Total Volatile Solids	11.7	percent		J	1
K1306758	SD0008	K1306758-002	EPA_160.4	Total Volatile Solids	23.7	percent		J	1

Qualified Data Summary Table
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
K1306341	SD0027	K1306341-038	SM4500NH3H	Ammonia as Nitrogen	3.12	mg/L		J	1
K1306341	SD0030	K1306341-039	SM4500NH3H	Ammonia as Nitrogen	1.52	mg/L		J	1
K1306341	SD0031	K1306341-040	SM4500NH3H	Ammonia as Nitrogen	7.5	mg/L		J	1
K1306341	SD0032	K1306341-041	SM4500NH3H	Ammonia as Nitrogen	6	mg/L		J	1
K1306341	SD0033	K1306341-042	SM4500NH3H	Ammonia as Nitrogen	4.76	mg/L		J	1
K1306341	SD0034	K1306341-043	SM4500NH3H	Ammonia as Nitrogen	4.5	mg/L		J	1
K1306341	SD0035	K1306341-044	SM4500NH3H	Ammonia as Nitrogen	5.18	mg/L		J	1
K1306341	SD0036	K1306341-045	SM4500NH3H	Ammonia as Nitrogen	4.3	mg/L		J	1
K1306341	SD0037	K1306341-046	SM4500NH3H	Ammonia as Nitrogen	6.97	mg/L		J	1
K1306341	SD0038	K1306341-047	SM4500NH3H	Ammonia as Nitrogen	6.57	mg/L		J	1
K1306341	SD0039	K1306341-048	SM4500NH3H	Ammonia as Nitrogen	29.9	mg/L		J	1
K1306341	SD0044	K1306341-049	SM4500NH3H	Ammonia as Nitrogen	6.85	mg/L		J	1
K1306341	SD0023	K1306341-050	SM4500NH3H	Ammonia as Nitrogen	3.78	mg/L		J	1
K1306341	SD0024	K1306341-051	SM4500NH3H	Ammonia as Nitrogen	5.55	mg/L		J	1
K1306341	SD0042	K1306341-052	SM4500NH3H	Ammonia as Nitrogen	8.61	mg/L		J	1
K1306341	SD0041	K1306341-053	SM4500NH3H	Ammonia as Nitrogen	9.05	mg/L		J	1
K1306341	SD0043	K1306341-054	SM4500NH3H	Ammonia as Nitrogen	5.74	mg/L		J	1
K1306341	SD0045	K1306341-055	SM4500NH3H	Ammonia as Nitrogen	3.48	mg/L		J	1
K1306341	SD0046	K1306341-056	SM4500NH3H	Ammonia as Nitrogen	12.5	mg/L		J	1
K1306341	SD0047	K1306341-057	SM4500NH3H	Ammonia as Nitrogen	5.68	mg/L		J	1
K1306341	SD0049	K1306341-058	SM4500NH3H	Ammonia as Nitrogen	4.9	mg/L		J	1
K1306341	SD0048	K1306341-059	SM4500NH3H	Ammonia as Nitrogen	11.4	mg/L		J	1
K1306341	SD0050	K1306341-060	SM4500NH3H	Ammonia as Nitrogen	11.3	mg/L		J	1
K1306341	SD0040	K1306341-061	SM4500NH3H	Ammonia as Nitrogen	4.54	mg/L		J	1
K1306341	SD0029	K1306341-062	SM4500NH3H	Ammonia as Nitrogen	5.95	mg/L		J	1
K1306341	SD0025	K1306341-063	SM4500NH3H	Ammonia as Nitrogen	18.2	mg/L		J	1
K1306341	SD0026	K1306341-064	SM4500NH3H	Ammonia as Nitrogen	21.6	mg/L		J	1
K1306341	SD0028	K1306341-065	SM4500NH3H	Ammonia as Nitrogen	11.3	mg/L		J	1
K1306341	SD0005	K1306341-066	SM4500NH3H	Ammonia as Nitrogen	7.55	mg/L		J	1
K1306341	SD0006	K1306341-067	SM4500NH3H	Ammonia as Nitrogen	5.05	mg/L		J	1
K1306341	SD0007	K1306341-068	SM4500NH3H	Ammonia as Nitrogen	13.4	mg/L		J	1

Qualified Data Summary Table
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
K1306341	SD0014	K1306341-069	SM4500NH3H	Ammonia as Nitrogen	3.93	mg/L		J	1
K1306341	SD0017	K1306341-070	SM4500NH3H	Ammonia as Nitrogen	8.79	mg/L		J	1
K1306341	SD0019	K1306341-071	SM4500NH3H	Ammonia as Nitrogen	4.13	mg/L		J	1
K1306341	SD0020	K1306341-072	SM4500NH3H	Ammonia as Nitrogen	4.09	mg/L		J	1
K1306341	SD0027	K1306341-038	SW9030M_9030B	Sulfide	0.03	mg/L	U	R	1
K1306341	SD0030	K1306341-039	SW9030M_9030B	Sulfide	0.03	mg/L	U	R	1
K1306341	SD0031	K1306341-040	SW9030M_9030B	Sulfide	0.03	mg/L	U	R	1
K1306341	SD0032	K1306341-041	SW9030M_9030B	Sulfide	0.08	mg/L	J	J	1
K1306341	SD0033	K1306341-042	SW9030M_9030B	Sulfide	1.89	mg/L		J	1
K1306341	SD0034	K1306341-043	SW9030M_9030B	Sulfide	1.05	mg/L		J	1
K1306341	SD0035	K1306341-044	SW9030M_9030B	Sulfide	0.44	mg/L		J	1
K1306341	SD0036	K1306341-045	SW9030M_9030B	Sulfide	0.08	mg/L	J	J	1
K1306341	SD0037	K1306341-046	SW9030M_9030B	Sulfide	0.88	mg/L		J	1
K1306341	SD0038	K1306341-047	SW9030M_9030B	Sulfide	0.2	mg/L		J	1
K1306341	SD0039	K1306341-048	SW9030M_9030B	Sulfide	0.06	mg/L	J	J	1
K1306341	SD0044	K1306341-049	SW9030M_9030B	Sulfide	0.03	mg/L	U	R	1
K1306341	SD0023	K1306341-050	SW9030M_9030B	Sulfide	1.32	mg/L		J	1
K1306341	SD0024	K1306341-051	SW9030M_9030B	Sulfide	5.56	mg/L		J	1
K1306341	SD0042	K1306341-052	SW9030M_9030B	Sulfide	0.54	mg/L		J	1
K1306341	SD0041	K1306341-053	SW9030M_9030B	Sulfide	0.15	mg/L		J	1
K1306341	SD0043	K1306341-054	SW9030M_9030B	Sulfide	0.03	mg/L	U	UJ	1
K1306341	SD0045	K1306341-055	SW9030M_9030B	Sulfide	0.17	mg/L		J	1
K1306341	SD0046	K1306341-056	SW9030M_9030B	Sulfide	0.04	mg/L	J	J	1
K1306341	SD0047	K1306341-057	SW9030M_9030B	Sulfide	0.05	mg/L	J	J	1
K1306341	SD0049	K1306341-058	SW9030M_9030B	Sulfide	0.04	mg/L	U	UJ	1
K1306341	SD0048	K1306341-059	SW9030M_9030B	Sulfide	0.05	mg/L	U	UJ	1
K1306341	SD0050	K1306341-060	SW9030M_9030B	Sulfide	0.04	mg/L	U	UJ	1
K1306341	SD0040	K1306341-061	SW9030M_9030B	Sulfide	0.24	mg/L		J	1
K1306341	SD0029	K1306341-062	SW9030M_9030B	Sulfide	0.03	mg/L	U	UJ	1
K1306341	SD0025	K1306341-063	SW9030M_9030B	Sulfide	0.03	mg/L	U	UJ	1
K1306341	SD0026	K1306341-064	SW9030M_9030B	Sulfide	0.06	mg/L	J	J	1

Qualified Data Summary Table
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
K1306341	SD0028	K1306341-065	SW9030M_9030B	Sulfide	0.04	mg/L	U	UJ	1
K1306341	SD0005	K1306341-066	SW9030M_9030B	Sulfide	0.03	mg/L	J	J	1
K1306341	SD0006	K1306341-067	SW9030M_9030B	Sulfide	0.57	mg/L		J	1
K1306341	SD0007	K1306341-068	SW9030M_9030B	Sulfide	0.49	mg/L		J	1
K1306341	SD0014	K1306341-069	SW9030M_9030B	Sulfide	0.09	mg/L	J	J	1
K1306341	SD0017	K1306341-070	SW9030M_9030B	Sulfide	0.12	mg/L		J	1
K1306341	SD0019	K1306341-071	SW9030M_9030B	Sulfide	0.11	mg/L		J	1
K1306341	SD0020	K1306341-072	SW9030M_9030B	Sulfide	5.8	mg/L		J	1
K1306505	SD0009	K1306505-009	SW9030M_9030B	Sulfide	0.18	mg/L		J	1
K1306505	SD0003	K1306505-010	SW9030M_9030B	Sulfide	5.86	mg/L		J	1
K1306505	SD0010	K1306505-011	SW9030M_9030B	Sulfide	0.41	mg/L		J	1
K1306505	SD0004	K1306505-012	SW9030M_9030B	Sulfide	0.76	mg/L		J	1
K1306505	SD0012	K1306505-013	SW9030M_9030B	Sulfide	0.03	mg/L	J	J	1
K1306505	SD0011	K1306505-014	SW9030M_9030B	Sulfide	0.03	mg/L	U	R	1
K1306618	SD0013	K1306618-011	SW9030M_9030B	Sulfide	0.1	mg/L		J	1
K1306618	SD0015	K1306618-012	SW9030M_9030B	Sulfide	0.03	mg/L	U	UJ	1
K1306618	SD0021	K1306618-013	SW9030M_9030B	Sulfide	1	mg/L		J	1
K1306618	SD0016	K1306618-014	SW9030M_9030B	Sulfide	0.13	mg/L		J	1
K1306618	SD0022	K1306618-015	SW9030M_9030B	Sulfide	0.79	mg/L		J	1
K1306618	SD0001	K1306618-016	SW9030M_9030B	Sulfide	14.7	mg/L		J	1
K1306618	SD0002	K1306618-017	SW9030M_9030B	Sulfide	1.78	mg/L		J	1
K1306758	SD0018	K1306758-005	SW9030M_9030B	Sulfide	0.03	mg/L	U	UJ	1
K1306758	SD0008	K1306758-006	SW9030M_9030B	Sulfide	1.75	mg/L		J	1

APPENDIX E

DATA VALIDATION REPORT FOR ANALYSES BY AXYS ANALYTICAL SERVICES, LTD.

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

WESTERN PORT ANGELES HARBOR RI/FS

Prepared for:

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Prepared by:

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EcoChem Project: C15217-1

November 13, 2013

Approved for Release

Melissa Swanson
Project Manager

Basis for Data Validation

This report summarizes the results of validation (Stage 2A, 2B, & 4) performed on sediment and quality control (QC) sample data for the Western Port Angeles Harbor RI/FS. Field sample ID, laboratory sample ID, and requested analyses are provided in the **Sample Indices**. Laboratory batch ID numbers and associated level of validation are provided at the beginning of each technical section.

Samples were analyzed by Samples were analyzed by Axys Analytical Services, Ltd. of Sidney, British Columbia, Canada. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method of Analysis	Primary Review	Secondary Review
Dioxin Furan Compounds	EPA1613B	M. Swanson	E. Strout
Polychlorinated Biphenyls	EPA1668A		

The data were reviewed using guidance and quality control criteria documented in the analytical methods and the following project and guidance documents:

- Sampling and Analysis Plan - *Western Port Angeles Harbor RI/FS* (Integral/Anchor QEA/Exponent/Floyd|Snider, June 2013)
- *USEPA National Functional Guidelines for Organic Data Review* (USEPA 2008)
- *USEPA National Functional Guidelines for Chlorinated Dioxin/Furan Data Review* (USEPA, September 2005)

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **Appendix A**. The qualified data summary table is included as **Appendix B.** Data Validation Worksheets and the associated communication records will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) was also submitted with this report.

Sample Index
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	PCB	Dioxin
WG44236	SD0003	L19905-1	✓	
WG44197	SD0004	L19905-2	✓	✓
WG44197	SD0009	L19905-3	✓	✓
WG44197	SD0010	L19905-4	✓	✓
WG44197	SD0011	L19905-5	✓	✓
WG44197	SD0013	L19905-6	✓	✓
WG44197	SD0015	L19905-7	✓	✓
WG44197	SD0016	L19905-8	✓	✓
WG44236	SD0017	L19905-9	✓	✓
WG44197	SD0052	L19905-10	✓	✓
WG44197	SD0018	L19905-11	✓	✓
WG44197	SD0025	L19905-12	✓	✓
WG44197	SD0026	L19905-13	✓	✓
WG44197	SD0028	L19905-14	✓	✓
WG44197	SD0051	L19905-15	✓	✓
WG44197	SD0053	L19905-16	✓	✓
WG44197	SD0054	L19905-17	✓	✓
WG44197	SD0055	L19905-18	✓	✓
WG44198	FW0001	L19906-1	✓	✓
WG44198	FB0001	L19906-2	✓	✓
WG44198	FW0002	L19906-3	✓	✓
WG44198	FW0003	L19906-4	✓	✓
WG44197	SD0026	WG44197-103	✓	✓
WG44236	SD0017	WG44236-103	✓	

DATA VALIDATION REPORT
City of Port Angeles WPAHG
PCB Congeners by Axys Method MLA-010 (EPA 1668)

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Axys Analytical Services Ltd. of Sydney, British Columbia, Canada. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
WG44197	16 Sediment	EPA Stage 4
WG44198	4 Filter Wipes	EPA Stage 2A
WG44236	2 Sediment	EPA Stage 2B

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO LABORATORY REPORT PACKAGE VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the laboratory data package. No errors were noted.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

✓	Sample Receipt, Preservation, and Holding Times	✓	Ongoing Precision and Recovery (OPR)
✓	System Performance and Resolution Checks	1	Field Replicates
✓	Initial Calibration (ICAL)	2	Laboratory Duplicates
✓	Continuing Calibration (CCAL)	2	Reported Results
2	Method Blanks	1	Reporting Limits
2	Field Blanks	2	Compound Identification
2	Labeled Compound Recovery	1	Calculation Verification

✓Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Method Blanks

Method blanks were analyzed at the appropriate frequency. To assess the impact of each blank contaminant on the reported sample results, an action level was established at five times the concentration detected in the blank and the sample results were compared to these action levels. The laboratory assigned "K" flag to values when a peak was detected but did not meet identification criteria. These values cannot be considered as positive identifications, but are "estimated maximum possible concentrations". When these occurred in the method blank the results were considered as false positives. No action levels were established for these analytes.

SDGs WG44197 and WG44236: Many PCB congeners were detected in the method blanks; however, all associated sample results were either greater than the action levels or not-detected.

SDG WG44198: Many PCB congeners were detected in the method blank. The results for 39 congeners in one or more filter wipe samples were qualified as not detected (U-7).

Field Blanks

The field blanks for this project are filter wipe samples. To evaluate the effect on the sample data, action levels of 5x the blank concentrations were established. If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified (U-6) at the reported concentration to indicate an elevation of the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results.

SDG WG44198: Four filter wipes, FB0001, FW0001, FW0002, and FW0003 were submitted with this data package. After qualification due to method blank contamination, positive results remained for 22 PCB congeners in the master filter blank, FB0001. Results for one or more of these congeners were qualified as not detected (U-6) in filter wipes FW0001, FW0002, and FW0003.

After qualification based on method blank and Sample FB0001 contamination, positive results for nine (9) PCB congeners remained in Sample FW0001. No field samples were associated with this filter wipe.

After qualification based on method blank and Sample FB0001 contamination, positive results for nine (9) PCB congeners remained in Sample FW0002. All associated field sample results were greater than the action levels; no data were qualified.

After qualification based on method blank and Sample FB0001 contamination, positive results for 13 PCB congeners remained in Sample FW0003. All associated field sample results were greater than the action levels; no data were qualified.

Labeled Compound Recovery

Labeled compounds were added to all samples. The labeled compound percent recovery (%R) values were evaluated using the laboratory control limits.

SDG WG44197: The %R values for 13C-PCB 206 in Samples SD0009, SD0010, SD0011, SD0013, SD0016, SD0028, SD0051, and SD0054 were greater than the upper control limit, indicating a potential high bias; results for the associated congeners were estimated (J-13H) in these samples.

The %R value for 13C-PCB 169 was greater than the upper control limit in Sample SD0025, indicating a potential high bias; results for the associated congeners were estimated (J-13H) in this sample.

In Sample SD0026, the 13C-PCB 1 %R value was less than 10% and the 13C-PCB 4 %R value was less than the lower control limit. The associated congeners were all detected and were estimated (J-13L) due to the potential low bias.

SDG WG44236: The recovery value for 13C-PCB 206 in the laboratory duplicate for Sample SD0017 were greater than the upper control limit, indicating a potential high bias; no data were qualified for this QC sample.

Field Replicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) control limit is 50% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 2x the RL. No data were qualified based on field replicate precision outliers. Data users should consider the impact of field precision outliers on the reported results. With the exceptions noted below, field precision was acceptable.

SDG WG44197: One set of field replicates, SD0015 & SD0016, was submitted. The RPD values for 35 PCB congeners and three (3) homolog groups were greater than the control limit.

Laboratory Duplicates

SDG WG44197: Sample SD0026 was analyzed in duplicate. The RPD values for nine (9) PCB congeners were greater than the control limit. Results for these nine (9) PCB congeners were estimated (J-9) in this sample.

SDG WG44236: Sample SD0017 was analyzed in duplicate. The RPD values for 88 PCB congeners and four (4) homolog groups were greater than the control limit. Results for these 88 PCB congeners were estimated (J-9) in this sample; no qualifiers were applied to homolog groups.

Reported Results

Lock-mass interferences were present that affected the quantitation and/or resolution of one or more results in several samples. These samples were diluted and re-analyzed, the laboratory reported only the most appropriate result for each congener. The laboratory assigned a "G" flag to results affected by lock-mass disturbances. These "G" flagged results were estimated (J/UJ-24).

SDG WG44197: The laboratory noted that labeled congener 13C-PCB 206 was impacted by interferences in all samples in this SDG. The target analytes PCB 206 and PCB 207 are normally quantitated using the response from 13C-PCB 206 (or an average of 13C-PCB 206 & 13C-PCB 208), but due to the interference were quantitated using 13C-PCB 208 only. The results for PCB 206 and PCB 207 were estimated (J/UJ-14) in these samples.

The %R value for the labeled congener 13C-PCB 169 was impacted by interferences in Sample SD0025. The hexa-substituted PCB target analytes, normally quantitated against 13C-PCB 169, were quantitated against 13C-PCB 155, 13C-PCB 156/157, and 13C-PCB 167. The associated congeners were estimated (J/UJ-14) in this sample.

SDG WG44236: Although the %R values for all labeled compounds were within control limits, the laboratory noted that labeled congener 13C-PCB 206 was impacted by interferences in Sample SD0017. The target analytes PCB 206 and PCB 207 are normally quantitated using the response from 13C-PCB 206 (or an average of 13C-PCB 206 & 13C-PCB 208), but due to the interference were quantitated using 13C-PCB 208 only. The results for PCB 206 and PCB 207 were estimated (J-14) in this sample.

Reporting Limits

SDG WG44197: All samples in this SDG were reanalyzed at dilution (5x, 6x, 10x, and/or 20x) due matrix interferences. Reporting limits were elevated accordingly.

Compound Identification

The laboratory assigned a "K" flag to one or more analytes in all samples to indicate the ion ratio criterion were not met. Since the ion abundance ratio is the primary identification criterion for high resolution mass spectroscopy, an outlier indicates that the reported result may be a false positive. These "K" flagged results were qualified as not-detected (U-25) at elevated detection limits.

Calculation Verification

SDG WG44197: Several results were verified by recalculation from the raw data. No transcription or calculation errors were found.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the labeled compound and OPR recoveries and precision was acceptable as demonstrated by the RPD values for the laboratory and field duplicates.

Data were estimated due to lock-mass interferences, labeled compound interferences, labeled compound accuracy outliers, and laboratory duplicate precision outliers. Detection limits were elevated due to ion ratio outliers, method blank, and field blank contamination.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
City of Port Angeles WPAHG
Dioxin & Furan Compounds by Axys Method MLA-017 (EPA 1613B)

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Axys Analytical Services, Ltd. of Sidney, British Columbia, Canada. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
WG44197	14 Sediment	EPA Stage 4
WG44198	3 Filter Wipes	EPA Stage 2A
WG44408	1 Filter Wipe	EPA Stage 2A
WG44533	2 Sediment	EPA Stage 2B

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO LABORATORY REPORT PACKAGE VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the laboratory data package. No errors were noted.

III. TECHNICAL DATA VALIDATION

The QC requirements reviewed are summarized in the following table:

✓	Sample Receipt, Preservation, and Holding Time	✓	Ongoing Precision and Recovery (OPR)
✓	System Performance and Resolution Checks	2	Field Replicates
✓	Initial Calibration (ICAL)	1	Laboratory Duplicates
✓	Calibration Verification (CVER)	✓	Target Analyte List
2	Method Blanks	2	Reported Results
1	Field Blanks	2	Compound Identification
2	Labeled Compound Recovery	1	Calculation Verification

✓ ***Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.***
[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Method Blanks

In order to assess the impact of blank contamination on the reported sample results, action levels are established at five times the blank concentrations. If the concentrations in the associated field samples are less than the action levels, the results are qualified as not detected (U-7).

The laboratory assigned K-flags to dioxin and furan values when a peak was detected but did not meet identification criteria. These values cannot be considered as positive identifications, but are "estimated maximum possible concentrations". When these occurred in the method blank the results were considered as false positives. No action levels were established for these analytes.

SDG WG44198: The analyte OCDD was detected in the method blank. The OCDD results in Samples FB0001 and FW0002 were qualified as not detected (U-7).

SDG WG44533: The analyte OCDD was detected in the method blank. The OCDD results in associated samples were greater than the action level; no data were qualified.

Field Blanks

The field blanks for this project are filter wipe samples. To evaluate the effect on the sample data, action levels of 5x the blank concentrations were established. If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified (U-6) at the reported concentration to indicate an elevation of the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results.

SDGs WG44198 and WG44408: Three filter wipes, FB0001, FW0002, and FW0003 were submitted in SDG WG44198. After qualification due to method blank contamination a positive result remained for 2,3,7,8-TCDF (from the DB225 column) in Sample FB0001, the master blank. The 2,3,7,8-TCDF results in Samples FW0001 (SDG WG44408) and FW0003 were qualified as not detected (U-6) due to contamination from FB0001.

After qualification based on Sample FB0001, positive results remained for OCDD and OCDF in Sample FW0001 (SDG WG44408). No field samples were associated with this field blank. No data were qualified.

After qualification based on Sample FB0001, positive results remained for five dioxin compounds and nine furan compounds in Sample FW0002. All associated sample results were either not detected or detected at concentrations greater than the action levels. No data were qualified.

After qualification due to method blank and Sample FB0001 contamination, positive results for 1,2,3,4,6,7,8-HpCDD, OCDD, and OCDF remained in Sample FW0003. All associated results were either not detected or detected at concentrations greater than the action levels. No data were qualified.

Labeled Compound Recovery

SDG WG44197: The percent recovery (%R) for the labeled compound $^{13}C_{12}$-1,2,3,4,7,8-HxCDD was less than the lower control limit in Sample SD0025. The 1,2,3,4,7,8-HxCDD result for this sample was estimated (J-13L) to indicate a potential low bias.

Field Replicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) control limit is 50% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 2x the RL. No data were qualified based on field replicate precision outliers. Data users should consider the impact of field precision outliers on the reported results. With the exceptions noted below, field precision was acceptable.

SDG WG44197: One set of field replicates, SD0015 & SD0016, were submitted. The RPD values for 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDD, OCDD, 1,2,3,4,6,7,8-HpCDF, OCDF, total TCDD, total PeCDD, total HpCDD, total HxCDF, and total HpCDF were greater than the control limit.

Laboratory Duplicates

SDG WG44197: Sample SD0026 was analyzed in duplicate. The RPD value for total TCDD was greater than the control limit. No qualifiers were applied to homolog groups.

Reported Results

All results for 2,3,7,8-TCDF were confirmed on a DB-225 column as required by the method. The 2,3,7,8-TCDF results from both columns were reported. The 2,3,7,8-TCDF results from the DB-5 column were qualified do-not-report (DNR-11).

SDG WG44197: The results for OCDD in Samples SD0004, SD0010, SD0011, and SD0053 and the result for 1,2,3,4,6,7,8-HpCDD in Sample SD0010 exceeded the calibrated range of the instrument. These samples were reanalyzed at dilution (10x). The result for 2,3,7,8-TCDF in Sample SD0013 from the DB225 column was reanalyzed at dilution (3x) due to chromatographic interferences.

SDG WG44533: The result for OCDD in Sample SD0009 exceeded the linear calibration range. This sample was reanalyzed at dilution (3x).

Compound Identification

The laboratory assigned a" K" flag to one or more analytes in all samples to indicate the ion ratio criterion were not met. Since the ion abundance ratio is the primary identification criterion for high resolution mass spectroscopy, an outlier indicates that the reported result may be a false positive. All “K” flagged results were qualified as not detected (U-25) at the reported concentration.

Calculation Verification

SDG WG44197: Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the labeled compound, reference material, and on-going precision and recovery standard recoveries and precision was acceptable as demonstrated by the laboratory and field duplicate RPD values.

Detection limits were elevated based on ion ratio outliers, method blank contamination, and field blank contamination. Data were estimated due to labeled compound recovery outliers.

Results for 2,3,7,8-TCDF on the DB-5 column were qualified do-not-report (DNR). Since a usable result remains for this compound in all samples; completeness was unaffected. Data that have been flagged DNR are not useable for any purpose.

All other data, as qualified, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS, REASON CODES, AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler temperature, pH, summa canister pressure); Exceeded Holding Times
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown, lock-mass)
	5A	Initial Calibration (RF, %RSD, r^2)
	5B	Calibration Verification (ICV, CCV, CCAL; RF, %D, %R) Use bias flags (H,L)[1] where appropriate
Blank Contamination	6	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
	7	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)[1] for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS &/or MSD) Recoveries Use bias flags (H,L)[1] where appropriate
	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)[1] where appropriate
	12	Reference Material Use bias flags (H,L)[1] where appropriate
	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)[1] where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)[1] where appropriate
	19	Internal Standard Performance (i.e., area, retention time, recovery)
	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
	3	2nd column confirmation (RPD or %D)
	4	Tentatively Identified Compound (TIC) (associated with NJ only)
	20	Calibration Range or Linear Range Exceeded
	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, re-extractions, etc. Associated with “R” and “DNR” only)
	14	Other (See DV report for details)
	26	Method QC information not provided

[1] H = high bias indicated
L = low bias indicated

EcoChem Validation Guidelines for PCB Congener Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 1, 12/1995 & EPA SW-846, Method 1668)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids <4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Samples: Up to one year if stored in the dark & temp as above. Extracts: Up to 1 year if stored at <-10°C and in the dark	J(+)/UJ(-) if HT > 1 year EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 330.9792 <5 ppm deviation from each m/z listed in Table 7 of method. Analyzed prior to ICAL and at the beginning and end of each 12 hr. shift	R(+/-) if not met	14
Column Resolution 209 Congener Solution	Mix of all 209 PCBs run prior to each ICAL and each 12 hour shift RT of PCB209 must be > 55 min PCB 156 & 157 must coelute w/in 2 sec PCB34 & 23 and PCB187 & 182 must be resolved where ((x/y)*100%) < 40% x = ht. of valley and y = ht of shortest peak	J(+) if valley >40%	5A (ICAL) 5B (CCAL)
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD < 35% for labeled compounds	J(+) natives if %RSD > 20%	5A
	Ion Abundance ratios within QC limits (Method 1668, Table 8) in CS1 std.	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	
Continuing Calibration	Every 12 hours: Concentrations must meet criteria specified in Method 1668, Table 6	J(+)/(UJ(-) natives if %D = 30% - 50% J(+)/R(-) natives if %D > 75%	5B
	Absolute RT of all Labelled Compounds and Window Defining Congeners must be +/- 15 sec of RT in ICAL RRT of all compounds must meet Table 2 of method.	EcoChem PJ, see ICAL section of TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
	Ion Abundance ratios must meet criteria specified in Method 1668, Table 8	EcoChem PJ, see TM-05	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7

EcoChem Validation Guidelines for PCB Congener Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 1, 12/1995 & EPA SW-846, Method 1668)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Rinse/Field Blank (if required)	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	One per matrix per batch %R Values w/in limits specified in Method 1668, Table 6	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (if required)	Accuracy: %R values within laboratory limits	Qualify parent sample only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
	Precision: RPD < 20%	J(+) in parent sample if RPD > 20%	9
Duplicate (if required)	RPD <25%	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	%R must meet limits specified in Method 1668, Table 6.	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 Ion abundance (IA ratios) must meet limits stated in Table 8 of Method 1668 Relative retention times (RRT) must be w/in limits stated in Table 2 of Method 1668	If RT criteria not met, use PJ (see TM-05) J(+) if S/N criteria not met if unlabelled ion abundance not met, change to EMPC J(+) if labelled ion abundance not met.	21
Interferences	Lock masses must not deviate +/- 20%	Change result to EMPC	14
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used to avoid reporting two results for one sample	11

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids < 4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Extraction - Water: 30 days from collection *Note:* Under CWA, SDWA, and RCRA the HT for H_2O is 7 days* Extraction - Soil: 30 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext > 30 days J(+)/UJ(-) if analysis > 40 Days EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 304.9824 Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift	R(+/-) if not met	14
Window Defining Mix and Column Performance Mix	Window defining mixture/Isomer specificity std run before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) x = ht. of TCDD y = baseline to bottom of valley For all isomers eluting near 2378-TCDD/TCDF isomers (TCDD only for 8290)	J(+) if valley > 25%	5A (ICAL) 5B (CCAL
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD <35% for labeled compounds under 1613b)	J(+) natives if %RSD > 20%	5A
	Abs. RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 >15 min on DB-225	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Continuing Calibration	Analyzed at the start and end of each 12 hour shift. %D+/-20% for native compounds %D +/-30% for labeled compounds (Must meet limits in Table 6, Method 1613B) (If %Ds in the closing CCAL are w/in 25%/35% the avg RF from the two CCAL may be used to calculate samples per Method 8290, Section 8.3.2.4)	Do not qualify labeled compounds. Narrate in report for labeled compound %D outliers. For native compound %D outliers: 8290: J(+)/UJ(-) if %D = 20% - 75% J(+)/R(-) if %D > 75% 1613: J(+)/UJ(-) if %D is outside Table 6 limits J(+)/R(-) if %D is +/- 75% of Table 6 limit	5B
	Abs. RT of $^{13}C_{12}$-1234-TCDD and ^{13}C12-123789-HxCDD +/- 15 sec of ICAL.	EcoChem PJ, see ICAL section of TM-05	
	RRT of all other compounds must meet Table 2 of 1613B.	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7
Field Blanks (Not Required)	No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	Concentrations must meet limits in Table 6, Method 1613B or lab limits.	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (recovery)	May not analyze MS/MSD %R should meet lab limits.	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	May not analyze MS/MSD RPD < 20%	J(+) in parent sample if RPD > CL	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Lab Duplicate	RPD <25% if present.	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	*Method 8290:* %R = 40% - 135% in all samples ------------------------------ *Method 1613B:* %R must meet limits specified in Table 7, Method 1613	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 IA ratios meet limits in Table 9 of 1613B or Table 8 of 8290 RRTs w/in limits in Table 2 of 1613B	If RT criteria not met, use PJ (see TM-05) If S/N criteria not met, J(+). if unlabelled ion abundance not met, change to EMPC If labelled ion abundance not met, J(+).	21
EMPC (estimated maximum possible concentration)	If quantitation idenfication criteria are not met, laboratory should report an EMPC value.	If laboratory correctly reported an EMPC value, qualify with U to indicate that the value is a detection limit.	14
Interferences	PCDF interferences from PCDPE	If both detected, change PCDF result to EMPC	14
Second Column Confirmation	All 2378-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC specs in this table must be met for the confirmation analysis.	Report lower of the two values. If not performed use PJ (see TM-05).	3
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used	11

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44533	SD0052	L19905-10	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	14.2	pg/g		DNR	11
WG44197	SD0018	L19905-11	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	8.87	pg/g		DNR	11
WG44197	SD0025	L19905-12	1613B by MLA017	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.11	pg/g	K J	U	25
WG44197	SD0025	L19905-12	1613B by MLA017	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2	pg/g	J	J	13L
WG44197	SD0025	L19905-12	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	3.66	pg/g		DNR	11
WG44197	SD0026	L19905-13	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	1.81	pg/g		DNR	11
WG44197	SD0028	L19905-14	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	4.46	pg/g		DNR	11
WG44197	SD0028	L19905-14	1613B by MLA017	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.437	pg/g	K B J	U	25
WG44197	SD0051	L19905-15	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	12.1	pg/g		DNR	11
WG44197	SD0053	L19905-16	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	19.3	pg/g		DNR	11
WG44197	SD0054	L19905-17	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	17.9	pg/g		DNR	11
WG44197	SD0055	L19905-18	1613B by MLA017	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.789	pg/g	K J	U	25
WG44197	SD0055	L19905-18	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	2.18	pg/g		DNR	11
WG44197	SD0055	L19905-18	1613B by MLA017	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.385	pg/g	K B J	U	25
WG44197	SD0004	L19905-2	1613B by MLA017	1,2,3,7,8,9-Hexachlorodibenzofuran	0.377	pg/g	K J	U	25
WG44197	SD0004	L19905-2	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	13.8	pg/g		DNR	11
WG44533	SD0009	L19905-3	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	15	pg/g		DNR	11
WG44197	SD0010	L19905-4	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	24.4	pg/g		DNR	11
WG44197	SD0011	L19905-5	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	11.7	pg/g		DNR	11
WG44197	SD0013	L19905-6	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	20.3	pg/g		DNR	11
WG44197	SD0015	L19905-7	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	9.01	pg/g		DNR	11
WG44197	SD0016	L19905-8	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	11.3	pg/g		DNR	11
WG44408	FW0001	L19906-1	1613B by MLA017	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.848	pg	K B J	U	25
WG44408	FW0001	L19906-1	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	0.982	pg	K J	DNR	11
WG44408	FW0001	L19906-1	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	0.791	pg	J	U	6
WG44408	FW0001	L19906-1	1613B by MLA017	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.576	pg	K J	U	25
WG44198	FB0001	L19906-2	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	1.29	pg	B J	DNR	11
WG44198	FB0001	L19906-2	1613B by MLA017	Octachlorodibenzo-p-dioxin	2.65	pg	B J	U	7
WG44198	FW0002	L19906-3	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	1.59	pg	B J	DNR	11
WG44198	FW0002	L19906-3	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	1.53	pg	K B J	U	25
WG44198	FW0002	L19906-3	1613B by MLA017	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.843	pg	K J	U	25

Qualified Data Summary Table
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FW0002	L19906-3	1613B by MLA017	Octachlorodibenzo-p-dioxin	5.93	pg	B J	U	7
WG44198	FW0003	L19906-4	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	1.32	pg	B J	DNR	11
WG44198	FW0003	L19906-4	1613B by MLA017	2,3,7,8-Tetrachlorodibenzofuran	0.939	pg	B J	U	6
WG44236	SD0003	L19905-1	1668A by MLA010	2,3,4',6-Tetrachlorobiphenyl	1020	pg/g	G	J	24
WG44236	SD0003	L19905-1	1668A by MLA010	2,2',3,5,5'-Pentachlorobiphenyl	334	pg/g	G	J	24
WG44236	SD0003	L19905-1	1668A by MLA010	Coelution of PCB 093 and 095 and 098 and 100 and 102	1350	pg/g	C B G	J	24
WG44197	SD0052	L19905-10	1668A by MLA010	3,5-Dichlorobiphenyl	4.32	pg/g	K D J	U	25
WG44197	SD0052	L19905-10	1668A by MLA010	2,2',4,6,6'-Pentachlorobiphenyl	0.322	pg/g	K D J	U	25
WG44197	SD0052	L19905-10	1668A by MLA010	2,3',4,5,5'-Pentachlorobiphenyl	2.52	pg/g	K D J	U	25
WG44197	SD0052	L19905-10	1668A by MLA010	2,2',3,4,6,6'-Hexachlorobiphenyl	1.32	pg/g	K D J	U	25
WG44197	SD0052	L19905-10	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	148	pg/g	D T	J	14
WG44197	SD0052	L19905-10	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	23.8	pg/g	D T	J	14
WG44197	SD0018	L19905-11	1668A by MLA010	2,3,6-Trichlorobiphenyl	19.5	pg/g	K D J	U	25
WG44197	SD0018	L19905-11	1668A by MLA010	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	0.497	pg/g	K D J	U	25
WG44197	SD0018	L19905-11	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	358	pg/g	D T	J	14
WG44197	SD0018	L19905-11	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	42.8	pg/g	D T	J	14
WG44197	SD0025	L19905-12	1668A by MLA010	2,3',4,5,5'-Pentachlorobiphenyl	1.84	pg/g	K D J	U	25
WG44197	SD0025	L19905-12	1668A by MLA010	Coelution of PCB 128 and 166	368	pg/g	C B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	Coelution of PCB 129, 138, 160, and 163	2200	pg/g	C B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,3',4,5'-Hexachlorobiphenyl	133	pg/g	B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,3',4,6-Hexachlorobiphenyl	27.8	pg/g	D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,3',4,6'-Hexachlorobiphenyl	613	pg/g	B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,3',5,5'-Hexachlorobiphenyl	27.1	pg/g	D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	Coelution of PCB 134 and 143	108	pg/g	C D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	Coelution of PCB 135, 151, and 154	486	pg/g	C B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,3',6,6'-Hexachlorobiphenyl	155	pg/g	B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,4,4',5-Hexachlorobiphenyl	110	pg/g	D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	Coelution of PCB 139 and 140	37.7	pg/g	C D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,4,5,5'-Hexachlorobiphenyl	372	pg/g	B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,4,5,6-Hexachlorobiphenyl	1.72	pg/g	U D	UJ	14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,4,5',6-Hexachlorobiphenyl	84.3	pg/g	D	J	13H,14

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,4,6,6'-Hexachlorobiphenyl	1.03	pg/g	U D	UJ	14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,4',5,5'-Hexachlorobiphenyl	247	pg/g	B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	Coelution of PCB 147 and 149	1410	pg/g	C B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,4',5,6'-Hexachlorobiphenyl	1.34	pg/g	D J	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,4',6,6'-Hexachlorobiphenyl	2.27	pg/g	K D J	UJ	14,25
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,5,6,6'-Hexachlorobiphenyl	1.44	pg/g	D J	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	Coelution of PCB 153 and 168	1620	pg/g	C B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,3,3',4,4',6-Hexachlorobiphenyl	253	pg/g	B D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,3,3',4,5,5'-Hexachlorobiphenyl	18.8	pg/g	D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,3,3',4,5',6-Hexachlorobiphenyl	1.25	pg/g	U D	UJ	14
WG44197	SD0025	L19905-12	1668A by MLA010	2,3,3',4',5,5'-Hexachlorobiphenyl	7.57	pg/g	D J	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,3,3',4',5',6-Hexachlorobiphenyl	145	pg/g	D	J	13H,14
WG44197	SD0025	L19905-12	1668A by MLA010	2,3,3',5,5',6-Hexachlorobiphenyl	1.4	pg/g	U D	J	14
WG44197	SD0025	L19905-12	1668A by MLA010	3,3',4,4',5,5'-Hexachlorobiphenyl	2.39	pg/g	U D	UJ	14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	110	pg/g	D T	J	14
WG44197	SD0025	L19905-12	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	11	pg/g	D T	J	14
WG44197	SD0026	L19905-13	1668A by MLA010	2-Chlorobiphenyl	17.9	pg/g	D J	J	9,13L
WG44197	SD0026	L19905-13	1668A by MLA010	3-Chlorobiphenyl	11.4	pg/g	D J	J	9,13L
WG44197	SD0026	L19905-13	1668A by MLA010	2,2'-Dichlorobiphenyl	10.1	pg/g	D J	J	9,13L
WG44197	SD0026	L19905-13	1668A by MLA010	2,3-Dichlorobiphenyl	2.6	pg/g	U D	J	13L
WG44197	SD0026	L19905-13	1668A by MLA010	2,3'-Dichlorobiphenyl	11.5	pg/g	D J	J	13L
WG44197	SD0026	L19905-13	1668A by MLA010	2,4-Dichlorobiphenyl	3.17	pg/g	D J	J	13L
WG44197	SD0026	L19905-13	1668A by MLA010	2,4'-Dichlorobiphenyl	63.7	pg/g	D	J	13L
WG44197	SD0026	L19905-13	1668A by MLA010	2,5-Dichlorobiphenyl	3.05	pg/g	D J	J	13L
WG44197	SD0026	L19905-13	1668A by MLA010	2,6-Dichlorobiphenyl	2.25	pg/g	U D	J	13L
WG44197	SD0026	L19905-13	1668A by MLA010	3,3'-Dichlorobiphenyl	35.4	pg/g	D	J	13L
WG44197	SD0026	L19905-13	1668A by MLA010	Coelution of PCB 012 and 013	12.9	pg/g	C D J	J	9,13L
WG44197	SD0026	L19905-13	1668A by MLA010	3,5-Dichlorobiphenyl	2.36	pg/g	U D	J	13L
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',6-Trichlorobiphenyl	4.39	pg/g	B D J	J	9
WG44197	SD0026	L19905-13	1668A by MLA010	Coelution of PCB 045 and 051	27.8	pg/g	C B D	J	9
WG44197	SD0026	L19905-13	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	1.72	pg/g	K D J	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44197	SD0026	L19905-13	1668A by MLA010	2,3',4,5,5'-Pentachlorobiphenyl	2.47	pg/g	K D J	U	25
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',3,4',6,6'-Hexachlorobiphenyl	1.33	pg/g	D J	J	9
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',4,4',6,6'-Hexachlorobiphenyl	0.114	pg/g	K D J	U	25
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',3,4,4',5,6-Heptachlorobiphenyl	1.98	pg/g	D J	J	9
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.224	pg/g	U D	J	9
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',3,4,4',6,6'-Heptachlorobiphenyl	0.304	pg/g	K D J	U	25
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	0.131	pg/g	K D J	U	25
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	51.2	pg/g	D T	J	14
WG44197	SD0026	L19905-13	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	7.92	pg/g	D J T	J	14
WG44197	SD0028	L19905-14	1668A by MLA010	3,4',5-Trichlorobiphenyl	2.62	pg/g	K B D J	U	25
WG44197	SD0028	L19905-14	1668A by MLA010	2,3',4,5'-Tetrachlorobiphenyl	1.35	pg/g	K B D J	U	25
WG44197	SD0028	L19905-14	1668A by MLA010	2,3',4,5,5'-Pentachlorobiphenyl	1.96	pg/g	K D J	U	25
WG44197	SD0028	L19905-14	1668A by MLA010	2,2',3,4,6,6'-Hexachlorobiphenyl	0.365	pg/g	K D J	U	25
WG44197	SD0028	L19905-14	1668A by MLA010	2,2',3,4',5,6'-Hexachlorobiphenyl	1.39	pg/g	K D J	U	25
WG44197	SD0028	L19905-14	1668A by MLA010	2,3,3',4',5,5'-Hexachlorobiphenyl	2.46	pg/g	K D J	U	25
WG44197	SD0028	L19905-14	1668A by MLA010	2,2',3,4,4',6,6'-Heptachlorobiphenyl	0.347	pg/g	K D J	U	25
WG44197	SD0028	L19905-14	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	51.2	pg/g	D T	J	13H,14
WG44197	SD0028	L19905-14	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	6.94	pg/g	D J T	J	13H,14
WG44197	SD0051	L19905-15	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	4.06	pg/g	K D J	U	25
WG44197	SD0051	L19905-15	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	275	pg/g	D T	J	13H,14
WG44197	SD0051	L19905-15	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	43.3	pg/g	D T	J	13H,14
WG44197	SD0053	L19905-16	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	4.37	pg/g	K D J	U	25
WG44197	SD0053	L19905-16	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	455	pg/g	D T	J	14
WG44197	SD0053	L19905-16	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	59.4	pg/g	D T	J	14
WG44197	SD0054	L19905-17	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	10.4	pg/g	K D J	U	25
WG44197	SD0054	L19905-17	1668A by MLA010	2,2',3,5,6,6'-Hexachlorobiphenyl	3.21	pg/g	K D J	U	25
WG44197	SD0054	L19905-17	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	342	pg/g	D T	J	13H,14
WG44197	SD0054	L19905-17	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	54.1	pg/g	D T	J	13H,14
WG44197	SD0055	L19905-18	1668A by MLA010	3,4',5-Trichlorobiphenyl	1.21	pg/g	K B D J	U	25
WG44197	SD0055	L19905-18	1668A by MLA010	2,3,3',4,5,5'-Hexachlorobiphenyl	6.23	pg/g	K D J	U	25
WG44197	SD0055	L19905-18	1668A by MLA010	2,3,3',4',5,5'-Hexachlorobiphenyl	1.85	pg/g	K D J	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44197	SD0055	L19905-18	1668A by MLA010	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	0.093	pg/g	K D J	U	25
WG44197	SD0055	L19905-18	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	36.9	pg/g	D T	J	14
WG44197	SD0055	L19905-18	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	4.95	pg/g	D J T	J	14
WG44197	SD0004	L19905-2	1668A by MLA010	2,3,6-Trichlorobiphenyl	4.79	pg/g	K D J	U	25
WG44197	SD0004	L19905-2	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	4.85	pg/g	K D J	U	25
WG44197	SD0004	L19905-2	1668A by MLA010	2,2',4,4',6,6'-Hexachlorobiphenyl	0.262	pg/g	K D J	U	25
WG44197	SD0004	L19905-2	1668A by MLA010	2,2',3,4',5,6,6'-Heptachlorobiphenyl	0.968	pg/g	K D J	U	25
WG44197	SD0004	L19905-2	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	122	pg/g	D T	J	14
WG44197	SD0004	L19905-2	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	19.4	pg/g	D J T	J	14
WG44197	SD0009	L19905-3	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	4.87	pg/g	K D J	U	25
WG44197	SD0009	L19905-3	1668A by MLA010	2,2',3,4',5,6'-Hexachlorobiphenyl	4.18	pg/g	K D J	U	25
WG44197	SD0009	L19905-3	1668A by MLA010	2,2',3,4,4',6,6'-Heptachlorobiphenyl	1.15	pg/g	K D J	U	25
WG44197	SD0009	L19905-3	1668A by MLA010	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	0.33	pg/g	K D J	U	25
WG44197	SD0009	L19905-3	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	372	pg/g	D T	J	13H,14
WG44197	SD0009	L19905-3	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	55.5	pg/g	D T	J	13H,14
WG44197	SD0010	L19905-4	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	12.8	pg/g	K D J	U	25
WG44197	SD0010	L19905-4	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	4880	pg/g	D T	J	13H,14
WG44197	SD0010	L19905-4	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	770	pg/g	D T	J	13H,14
WG44197	SD0011	L19905-5	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	3	pg/g	K D J	U	25
WG44197	SD0011	L19905-5	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	173	pg/g	D T	J	13H,14
WG44197	SD0011	L19905-5	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	23.8	pg/g	D T	J	13H,14
WG44197	SD0013	L19905-6	1668A by MLA010	2,2',3,4,6,6'-Hexachlorobiphenyl	9.55	pg/g	K D J	U	25
WG44197	SD0013	L19905-6	1668A by MLA010	2,2',3,4',5,6'-Hexachlorobiphenyl	4.42	pg/g	K D J	U	25
WG44197	SD0013	L19905-6	1668A by MLA010	2,3,3',4',5,5'-Hexachlorobiphenyl	16.3	pg/g	K D J	U	25
WG44197	SD0013	L19905-6	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	356	pg/g	D T	J	13H,14
WG44197	SD0013	L19905-6	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	45.5	pg/g	D T	J	13H,14
WG44197	SD0015	L19905-7	1668A by MLA010	2,3,6-Trichlorobiphenyl	6.45	pg/g	K D J	U	25
WG44197	SD0015	L19905-7	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	4.22	pg/g	K D J	U	25
WG44197	SD0015	L19905-7	1668A by MLA010	2,3',4,5,5'-Pentachlorobiphenyl	1.15	pg/g	K D J	U	25
WG44197	SD0015	L19905-7	1668A by MLA010	2,2',3,4,6,6'-Hexachlorobiphenyl	1.32	pg/g	K D J	U	25
WG44197	SD0015	L19905-7	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	725	pg/g	D T	J	14

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WG44197	SD0015	L19905-7	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	111	pg/g	D T	J	14
WG44197	SD0016	L19905-8	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	5.22	pg/g	K D J	U	25
WG44197	SD0016	L19905-8	1668A by MLA010	2,2',4,6,6'-Pentachlorobiphenyl	0.35	pg/g	K D J	U	25
WG44197	SD0016	L19905-8	1668A by MLA010	2,3',4,5,5'-Pentachlorobiphenyl	2.64	pg/g	K D J	U	25
WG44197	SD0016	L19905-8	1668A by MLA010	2,3,3',4,5,5',6-Heptachlorobiphenyl	0.984	pg/g	K D J	U	25
WG44197	SD0016	L19905-8	1668A by MLA010	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	0.234	pg/g	K D J	U	25
WG44197	SD0016	L19905-8	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	151	pg/g	D T	J	13H,14
WG44197	SD0016	L19905-8	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	21.9	pg/g	D T	J	13H,14
WG44236	SD0017	L19905-9	1668A by MLA010	2-Chlorobiphenyl	239	pg/g	B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 018 and 030	1020	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,6-Trichlorobiphenyl	6.92	pg/g	K	U	25
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4'-Tetrachlorobiphenyl	2460	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',5-Tetrachlorobiphenyl	17.9	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,4,4'-Tetrachlorobiphenyl	1480	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 061, 070, 074, and 076	9770	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,4',5-Tetrachlorobiphenyl	207	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3',4,4'-Tetrachlorobiphenyl	4450	pg/g	B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3',4,5-Tetrachlorobiphenyl	123	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	3,3',4,4'-Tetrachlorobiphenyl	367	pg/g	B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	3,3',4,5'-Tetrachlorobiphenyl	88.8	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	23.1	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4-Pentachlorobiphenyl	1240	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 083 and 099	4370	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',6-Pentachlorobiphenyl	1870	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 085, 116, and 117	1690	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 086, 087, 097, 108, 119, and 125	5150	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 088 and 091	1140	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,6'-Pentachlorobiphenyl	182	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 090, 101, and 113	6160	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,5,5'-Pentachlorobiphenyl	1060	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 093 and 095 and 098 and 100 and 102	4640	pg/g	C B	J	9

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,5,6'-Pentachlorobiphenyl	49.6	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,6,6'-Pentachlorobiphenyl	78.5	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',4,5',6-Pentachlorobiphenyl	41.7	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4,4'-Pentachlorobiphenyl	3200	pg/g	B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 107 and 124	266	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4,6-Pentachlorobiphenyl	505	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 110 and 115	7160	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,4,4',5-Pentachlorobiphenyl	237	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3',4,4',5-Pentachlorobiphenyl	6050	pg/g	B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4',5'-Pentachlorobiphenyl	143	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3',4,4',5'-Pentachlorobiphenyl	148	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	3,3',4,4',5-Pentachlorobiphenyl	17.2	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	3,3',4,5,5'-Pentachlorobiphenyl	11.9	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 128 and 166	958	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 129, 138, 160, and 163	6060	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,5'-Hexachlorobiphenyl	359	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,6-Hexachlorobiphenyl	83.7	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,6'-Hexachlorobiphenyl	1990	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',5,5'-Hexachlorobiphenyl	72.9	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 134 and 143	287	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 135, 151, and 154	1700	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',6,6'-Hexachlorobiphenyl	567	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,4',5-Hexachlorobiphenyl	301	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 139 and 140	100	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,5,5'-Hexachlorobiphenyl	1190	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,5',6-Hexachlorobiphenyl	359	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,6,6'-Hexachlorobiphenyl	4.44	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4',5,5'-Hexachlorobiphenyl	782	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 147 and 149	4310	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4',5,6'-Hexachlorobiphenyl	3.97	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4',6,6'-Hexachlorobiphenyl	6.23	pg/g		J	9

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,5,6,6'-Hexachlorobiphenyl	5.7	pg/g	K	U	25
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 153 and 168	5380	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 156 and 157	708	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4,4',6-Hexachlorobiphenyl	733	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4,5,5'-Hexachlorobiphenyl	88.5	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4',5,5'-Hexachlorobiphenyl	17.7	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4',5',6-Hexachlorobiphenyl	430	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3',4,4',5,5'-Hexachlorobiphenyl	235	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,4',5-Heptachlorobiphenyl	1870	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 171 and 173	790	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,5,5'-Heptachlorobiphenyl	424	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,5,6'-Heptachlorobiphenyl	1980	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,5',6-Heptachlorobiphenyl	142	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,6,6'-Heptachlorobiphenyl	337	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,5',6'-Heptachlorobiphenyl	1040	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',5,5',6-Heptachlorobiphenyl	399	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',5,6,6'-Heptachlorobiphenyl	772	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 180 and 193	5010	pg/g	C B	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,4',5,6-Heptachlorobiphenyl	22.3	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,4',5,6'-Heptachlorobiphenyl	17	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 183 and 185	2110	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,4',6,6'-Heptachlorobiphenyl	1.92	pg/g	J	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4',5,5',6-Heptachlorobiphenyl	2620	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4',5,6,6'-Heptachlorobiphenyl	2.57	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4,4',5,5'-Heptachlorobiphenyl	103	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4,4',5,6-Heptachlorobiphenyl	528	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4,4',5',6-Heptachlorobiphenyl	145	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	1550	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,4',5,6-Octachlorobiphenyl	697	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	1010	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 197 and 200	329	pg/g	C	J	9

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44236	SD0017	L19905-9	1668A by MLA010	Coelution of PCB 198 and 199	1630	pg/g	C	J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	245	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	348	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,4',5,5',6-Octachlorobiphenyl	1320	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	2.01	pg/g	K	U	25
WG44236	SD0017	L19905-9	1668A by MLA010	2,3,3',4,4',5,5',6-Octachlorobiphenyl	115	pg/g		J	9
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	879	pg/g	T	J	14
WG44236	SD0017	L19905-9	1668A by MLA010	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	146	pg/g	T	J	14
WG44198	FW0001	L19906-1	1668A by MLA010	2-Chlorobiphenyl	27.6	pg	D J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	3-Chlorobiphenyl	78.6	pg	D J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	4-Chlorobiphenyl	68.2	pg	B D J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,2'-Dichlorobiphenyl	4.81	pg	K J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,3'-Dichlorobiphenyl	5.97	pg	K J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,4-Dichlorobiphenyl	63.1	pg	K	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,4'-Dichlorobiphenyl	13.4	pg	K J G	UJ	24,25
WG44198	FW0001	L19906-1	1668A by MLA010	2,5-Dichlorobiphenyl	5.71	pg	K J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	3,3'-Dichlorobiphenyl	48.1	pg	B	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 012 and 013	5.15	pg	C K J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	4,4'-Dichlorobiphenyl	8.73	pg	J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3-Trichlorobiphenyl	4.16	pg	B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',4-Trichlorobiphenyl	5.25	pg	B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 018 and 030	9.53	pg	C B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 020 and 028	20.5	pg	C B	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 021 and 033	8.39	pg	C B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,3,4'-Trichlorobiphenyl	6.61	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 026 and 029	2.84	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,4',5-Trichlorobiphenyl	13.1	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,4',6-Trichlorobiphenyl	4.2	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	3,4,4'-Trichlorobiphenyl	5.32	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 040, 041, and 071	6.03	pg	C B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,4'-Tetrachlorobiphenyl	2.96	pg	K B J	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 045 and 051	7.77	pg	C B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,6'-Tetrachlorobiphenyl	0.851	pg	J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',4,5-Tetrachlorobiphenyl	2	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 049 and 069	6.45	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 050 and 053	1.9	pg	C K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',5,5'-Tetrachlorobiphenyl	11.3	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,3,3',4'-Tetrachlorobiphenyl	3.87	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 059, 062, and 075	1.51	pg	C B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,3,4,4'-Tetrachlorobiphenyl	2.73	pg	B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 061, 070, 074, and 076	14.3	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,3,4',6-Tetrachlorobiphenyl	4.62	pg	B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,3',4,4'-Tetrachlorobiphenyl	7.85	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	3,3',4,4'-Tetrachlorobiphenyl	1.34	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4-Pentachlorobiphenyl	0.819	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 083 and 099	4.3	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',6-Pentachlorobiphenyl	1.89	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 085, 116, and 117	1.72	pg	C K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 086, 087, 097, 108, 119, and 125	5.32	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 090, 101, and 113	5.49	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 093 and 095 and 098 and 100 and 102	7.2	pg	C K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,3,3',4,4'-Pentachlorobiphenyl	2.15	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 107 and 124	0.5	pg	C K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 110 and 115	5.99	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,3,4,4',5-Pentachlorobiphenyl	1.54	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,3',4,4',5-Pentachlorobiphenyl	4.56	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,3',4,4',5'-Pentachlorobiphenyl	0.56	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	3,3',4,4',5-Pentachlorobiphenyl	1.42	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 128 and 166	1.27	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 129, 138, 160, and 163	5.24	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4,6'-Hexachlorobiphenyl	1.67	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 135, 151, and 154	2.21	pg	C K B J	U	25

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WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',6,6'-Hexachlorobiphenyl	0.687	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,4,5,5'-Hexachlorobiphenyl	1.07	pg	B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 147 and 149	5.23	pg	C K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 153 and 168	5.04	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 156 and 157	2	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,3,3',4,4',6-Hexachlorobiphenyl	0.516	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,3',4,4',5,5'-Hexachlorobiphenyl	0.815	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4,4',5-Heptachlorobiphenyl	1.9	pg	K B J G	UJ	24,25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 171 and 173	0.829	pg	C K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4,5,6'-Heptachlorobiphenyl	1.38	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4,5',6'-Heptachlorobiphenyl	0.947	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',5,6,6'-Heptachlorobiphenyl	0.638	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 180 and 193	3.53	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.746	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 183 and 185	1.35	pg	C B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,4',5,5',6-Heptachlorobiphenyl	2.83	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,3,3',4,4',5,5'-Heptachlorobiphenyl	0.606	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.504	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	Coelution of PCB 198 and 199	1.51	pg	C K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	0.913	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.926	pg	K B J	U	25
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.532	pg	B J	U	7
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	0.902	pg	B J	U	6
WG44198	FW0001	L19906-1	1668A by MLA010	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	1.87	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3'-Dichlorobiphenyl	5.57	pg	K J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,4'-Dichlorobiphenyl	10.7	pg	K J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 012 and 013	3.32	pg	C K J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',6-Trichlorobiphenyl	2.69	pg	K J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 020 and 028	17.6	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3,4'-Trichlorobiphenyl	5.65	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3',4-Trichlorobiphenyl	1.12	pg	K J	U	25

Qualified Data Summary Table
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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 026 and 029	2.36	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3',6-Trichlorobiphenyl	0.769	pg	K J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,4',5-Trichlorobiphenyl	11.5	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,4',6-Trichlorobiphenyl	3.84	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	3,4,4'-Trichlorobiphenyl	6.26	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 044, 047, and 065	11.8	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',4,5-Tetrachlorobiphenyl	1.88	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 049 and 069	6.45	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 050 and 053	1.78	pg	C K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',5,5'-Tetrachlorobiphenyl	10.3	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3,3',4'-Tetrachlorobiphenyl	4.99	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 061, 070, 074, and 076	16.6	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3',4,4'-Tetrachlorobiphenyl	10.2	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	0.621	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',4-Pentachlorobiphenyl	1.14	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 083 and 099	4.49	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',6-Pentachlorobiphenyl	1.81	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 085, 116, and 117	2.08	pg	C K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 086, 087, 097, 108, 119, and 125	5.89	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 088 and 091	1.42	pg	C K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 090, 101, and 113	6.64	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,5,5'-Pentachlorobiphenyl	1.11	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 093 and 095 and 098 and 100 and 102	9.43	pg	C K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',4,6,6'-Pentachlorobiphenyl	0.8	pg	K J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,3,3',4,4'-Pentachlorobiphenyl	2.94	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 110 and 115	7.6	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3,4,4',5-Pentachlorobiphenyl	2.04	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,3',4,4',5-Pentachlorobiphenyl	6.79	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3',4,4',5'-Pentachlorobiphenyl	0.766	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	3,3',4,4',5-Pentachlorobiphenyl	1.7	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 128 and 166	1.24	pg	C B J G	UJ	7,24

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 129, 138, 160, and 163	6.74	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 135, 151, and 154	2.33	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',6,6'-Hexachlorobiphenyl	0.856	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,4',5,5'-Hexachlorobiphenyl	1.16	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 147 and 149	5.97	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 153 and 168	5.41	pg	C K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 156 and 157	1.96	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,3,3',4,4',6-Hexachlorobiphenyl	0.763	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,3',4,4',5,5'-Hexachlorobiphenyl	0.54	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 171 and 173	0.783	pg	C K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',4,5,6'-Heptachlorobiphenyl	1.61	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',5,6,6'-Heptachlorobiphenyl	0.904	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 180 and 193	4.14	pg	C B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.516	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 183 and 185	1.33	pg	C K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,4',5,5',6-Heptachlorobiphenyl	3.13	pg	B J G	UJ	7,24
WG44198	FB0001	L19906-2	1668A by MLA010	2,3,3',4,4',5,6-Heptachlorobiphenyl	0.612	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	1.03	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',4,4',5,6-Octachlorobiphenyl	0.51	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.737	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	Coelution of PCB 197 and 200	1.12	pg	C K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	0.825	pg	K B J	U	25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,4,4',5,5',6-Octachlorobiphenyl	1.25	pg	K B J G	UJ	24,25
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1.56	pg	B J	U	7
WG44198	FB0001	L19906-2	1668A by MLA010	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	1.8	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2-Chlorobiphenyl	109	pg	D J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	3-Chlorobiphenyl	445	pg	D	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	4-Chlorobiphenyl	372	pg	B D	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,2'-Dichlorobiphenyl	8.65	pg	J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,3'-Dichlorobiphenyl	19.8	pg	K J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,4'-Dichlorobiphenyl	25.3	pg	K	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FW0002	L19906-3	1668A by MLA010	3,3'-Dichlorobiphenyl	67.2	pg	B	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	4,4'-Dichlorobiphenyl	27.8	pg		U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3-Trichlorobiphenyl	5.61	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',4-Trichlorobiphenyl	5.94	pg	B J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 018 and 030	11.9	pg	C B J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',6-Trichlorobiphenyl	1.52	pg	K J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 020 and 028	22	pg	C B	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 021 and 033	9.13	pg	C B J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,3,4'-Trichlorobiphenyl	6.84	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,3',4-Trichlorobiphenyl	1.41	pg	K J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 026 and 029	1.98	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,3',6-Trichlorobiphenyl	0.879	pg	K J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,4',6-Trichlorobiphenyl	4.6	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	3,4,4'-Trichlorobiphenyl	5.62	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 040, 041, and 071	7.01	pg	C B J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,4'-Tetrachlorobiphenyl	3.24	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,5-Tetrachlorobiphenyl	0.794	pg	K J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 044, 047, and 065	15.2	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 045 and 051	4.45	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',4,5-Tetrachlorobiphenyl	2.32	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 049 and 069	7.4	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 050 and 053	1.87	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',5,5'-Tetrachlorobiphenyl	15.2	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',6,6'-Tetrachlorobiphenyl	0.813	pg	J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,3,3',4'-Tetrachlorobiphenyl	5.17	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 059, 062, and 075	1.57	pg	C B J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,3,4,4'-Tetrachlorobiphenyl	3.12	pg	B J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 061, 070, 074, and 076	17.7	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,3,4',6-Tetrachlorobiphenyl	5.89	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,3',4,4'-Tetrachlorobiphenyl	9.78	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	3,3',4,4'-Tetrachlorobiphenyl	2.82	pg	B J	U	6

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FW0002	L19906-3	1668A by MLA010	3,4,4',5-Tetrachlorobiphenyl	1.83	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 083 and 099	5.3	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',6-Pentachlorobiphenyl	3.38	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 086, 087, 097, 108, 119, and 125	9.57	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 088 and 091	1.35	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 090, 101, and 113	9.77	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',4,6,6'-Pentachlorobiphenyl	0.654	pg	K J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,3,3',4,4'-Pentachlorobiphenyl	4.5	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 110 and 115	10.3	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,3',4,4',5-Pentachlorobiphenyl	8.2	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,3',4,4',5'-Pentachlorobiphenyl	1.92	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	3,3',4,4',5-Pentachlorobiphenyl	1.96	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 128 and 166	1.62	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 129, 138, 160, and 163	8.71	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',4,6'-Hexachlorobiphenyl	2.69	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 135, 151, and 154	3.48	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',6,6'-Hexachlorobiphenyl	1.52	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,4,5,5'-Hexachlorobiphenyl	1.79	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,4',5,5'-Hexachlorobiphenyl	1.09	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 147 and 149	6.31	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 153 and 168	5.57	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',4,4',6,6'-Hexachlorobiphenyl	1.19	pg	K J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 156 and 157	5.71	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,3',4,4',5,5'-Hexachlorobiphenyl	1.99	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',4,4',5-Heptachlorobiphenyl	3.27	pg	B J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',4,5',6'-Heptachlorobiphenyl	1.49	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',5,6,6'-Heptachlorobiphenyl	1.4	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 180 and 193	6.21	pg	C B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,4,4',5,6'-Heptachlorobiphenyl	2.13	pg	B J	U	7
WG44198	FW0002	L19906-3	1668A by MLA010	Coelution of PCB 183 and 185	2.36	pg	C K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,4',5,5',6-Heptachlorobiphenyl	5.03	pg	K B J	U	25

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,4',5,6,6'-Heptachlorobiphenyl	1.07	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,3,3',4,4',5,5'-Heptachlorobiphenyl	3.74	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.77	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	1.81	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,4,4',5,5',6-Octachlorobiphenyl	1.16	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,3,3',4,4',5,5',6-Octachlorobiphenyl	1.72	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	2.16	pg	K B J	U	25
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	2.92	pg	B J	U	6
WG44198	FW0002	L19906-3	1668A by MLA010	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	2.66	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2-Chlorobiphenyl	78.6	pg	D J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	3-Chlorobiphenyl	342	pg	D	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	4-Chlorobiphenyl	307	pg	B D	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,2'-Dichlorobiphenyl	7.45	pg	J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,3'-Dichlorobiphenyl	21.7	pg	K D J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,4'-Dichlorobiphenyl	27.6	pg	K D J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	3,3'-Dichlorobiphenyl	71.7	pg	B D J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3-Trichlorobiphenyl	6.41	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',4-Trichlorobiphenyl	7.69	pg	B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 018 and 030	13.4	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 021 and 033	11.4	pg	C B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 026 and 029	3.23	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,3',6-Trichlorobiphenyl	1	pg	K J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	3,3',4-Trichlorobiphenyl	1.3	pg	K J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	3,4,4'-Trichlorobiphenyl	6.72	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 040, 041, and 071	8.92	pg	C B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,4'-Tetrachlorobiphenyl	4.1	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 044, 047, and 065	19	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 045 and 051	5.62	pg	C B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,6'-Tetrachlorobiphenyl	1.29	pg	K J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',4,5-Tetrachlorobiphenyl	3.4	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 049 and 069	10.1	pg	C B J	U	7

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 050 and 053	2.79	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',5,5'-Tetrachlorobiphenyl	17.9	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,3,3',4'-Tetrachlorobiphenyl	5.93	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 059, 062, and 075	1.88	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,3,4,4'-Tetrachlorobiphenyl	3.25	pg	B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 061, 070, 074, and 076	19.5	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,3,4',6-Tetrachlorobiphenyl	7.62	pg	B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,3',4,4'-Tetrachlorobiphenyl	10.9	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	3,3',4,4'-Tetrachlorobiphenyl	1.66	pg	B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4-Pentachlorobiphenyl	1.94	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 083 and 099	7.04	pg	C B J G	UJ	7,24
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',6-Pentachlorobiphenyl	4.15	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 085, 116, and 117	2.08	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 086, 087, 097, 108, 119, and 125	9.73	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 090, 101, and 113	10.8	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 093 and 095 and 098 and 100 and 102	15.7	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,3,3',4,4'-Pentachlorobiphenyl	4.26	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,3,3',4,6-Pentachlorobiphenyl	0.686	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 110 and 115	10.2	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,3,4,4',5-Pentachlorobiphenyl	1.7	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,3',4,4',5-Pentachlorobiphenyl	8.25	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,3',4,4',5'-Pentachlorobiphenyl	0.701	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 128 and 166	1.28	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 129, 138, 160, and 163	8.35	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,5'-Hexachlorobiphenyl	0.747	pg	K J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,6'-Hexachlorobiphenyl	3.39	pg	B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 135, 151, and 154	3.39	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',6,6'-Hexachlorobiphenyl	1.56	pg	K B J G	UJ	24,25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,4,5,5'-Hexachlorobiphenyl	2.06	pg	B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,4,5',6-Hexachlorobiphenyl	0.502	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,4',5,5'-Hexachlorobiphenyl	1.17	pg	K B J	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 147 and 149	8.5	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 153 and 168	7.14	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 156 and 157	1.95	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,3,3',4,4',6-Hexachlorobiphenyl	0.733	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,3,3',4',5',6-Hexachlorobiphenyl	0.593	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,3',4,4',5,5'-Hexachlorobiphenyl	0.579	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,4',5-Heptachlorobiphenyl	1.94	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 171 and 173	0.598	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,5,5'-Heptachlorobiphenyl	0.64	pg	K J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,5',6'-Heptachlorobiphenyl	1.28	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',5,6,6'-Heptachlorobiphenyl	1.12	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 180 and 193	5.07	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.714	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 183 and 185	1.29	pg	C B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,4',5,5',6-Heptachlorobiphenyl	3.34	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,4',5,6-Octachlorobiphenyl	0.563	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.804	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	Coelution of PCB 198 and 199	2.42	pg	C K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	0.689	pg	K B J	U	25
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1.82	pg	B J	U	7
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	1.13	pg	B J	U	6
WG44198	FW0003	L19906-4	1668A by MLA010	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	1.19	pg	K B J	U	25