DATA MEMORANDUM

SEDIMENT REMEDIAL INVESTIGATION
LAKE RIVER INDUSTRIAL SITE

Prepared for

Port of Ridgefield

and

Union Pacific Railroad Company

Prepared by

Anchor QEA, LLC

1423 Third Avenue, Suite 300

Seattle, Washington 98101

and

Maul Foster & Alongi, Inc.

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LIST OF ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
%R	percent recovery
µg/kg	micrograms per kilogram
AO	Agreed Order
ASTM	American Society for Testing and Materials
BTAG	Biological Technical Assistance Group
City	City of Ridgefield
cm	centimeter(s)
COC	chain-of-custody
CSM	conceptual site model
Data Memorandum	Sediment RI Data Memorandum
DEQ	Oregon Department of Environmental Quality
DMMP	Dredged Material Management Program
DNR	Washington Department of Natural Resources
Ecology	Washington State Department of Ecology
FS	feasibility study
IHS	indicator hazardous substance
LPAH	low molecular weight polycyclic aromatic hydrocarbon
LRIS	Lake River Industrial Site
LWBZ	lower water-bearing zone
m&p-Cresol	3-methylphenol and 4-methylphenol
MFA	Maul Foster & Alongi, Inc.
mg/kg	milligrams per kilogram
MTCA	Model Toxics Control Act
NAD	North American Datum
ng/kg	nanograms per kilogram
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCP	pentachlorophenol

Port	Port of Ridgefield
PWT	Pacific Wood Treating Corporation
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RI	remedial investigation
RNWR	Ridgefield National Wildlife Refuge
RSET	Regional Sediment Evaluation Team
SAP	Sampling and Analysis Plan
SER	steam-enhanced remediation
SMS	Sediment Management Standards
SQV	sediment quality values
SVOC	semivolatile organic compound
TEQ	toxicity equivalent
TOC	total organic carbon
TS	total solids
TVS	total volatile solids
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UWBZ	upper water-bearing zone
WAC	Washington Administrative Code
Work Plan	Sediment RI Work Plan
WWTP	wastewater treatment plant

1 INTRODUCTION AND BACKGROUND

This Sediment Remedial Investigation (RI) Data Memorandum (Data Memorandum) describes the investigations completed to perform the RI for the sediments adjacent to the Lake River Industrial Site (LRIS) in Ridgefield, Washington. The LRIS comprises property formerly used by Pacific Wood Treating Corporation (PWT), which operated a wood-treating facility. This Data Memorandum has been prepared consistent with the Washington State Department of Ecology (Ecology) approved Sediment RI Work Plan (Work Plan; Anchor QEA and Maul Foster & Alongi, Inc. [MFA] 2009) and in coordination with ongoing upland RI and feasibility study (FS) activities being performed at the LRIS under an Agreed Order (AO) between the Port of Ridgefield (Port) and Ecology.

This document has been prepared under the authority of AO No. 01TCPSR-3119 to satisfy the requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D in the Revised Code of Washington, administered by Ecology under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC).

1.1 Purpose of Report

The purpose of the Sediment RI is to characterize the nature and extent of site-related indicator hazardous substances (IHSs) in sediment in Lake River and Carty Lake for the purpose of developing and evaluating cleanup action alternatives, if necessary. The Sediment RI is being conducted in a phased approach to perform surface and subsurface field sampling to characterize the nature and extent of sediment contamination as represented by IHSs. The results of Work Plan activities, including sediment sampling, are presented in this Data Memorandum, are incorporated into the conceptual site model (CSM) update, and will guide the evaluation of potential threats to human health and ecological receptors.

This report describes the Sediment RI activities performed during April 2010 and includes nearshore areas of the LRIS, as well as other aquatic areas adjacent to the LRIS in Carty Lake and Lake River. These activities satisfy data requirements of the approved Work Plan for a Sediment RI of the LRIS and for assessment of the status of sediment source control. This Data Memorandum provides the analytical results of the Sediment RI, updates the CSM presented in the Work Plan (Anchor QEA and MFA 2009) and presents data gaps and recommended next steps of the investigation.

1.2 Site Description and Background

The LRIS is owned by the Port and is located in Ridgefield, Washington, at 111 West Division (Figure 1) in Clark County. The property comprises 41 acres and is bounded on the north by the Ridgefield National Wildlife Refuge (RNWR), which includes Carty Lake; on the west by Lake River; on the east by the Burlington Northern Railroad tracks, which separate the LRIS from residential areas; and on the south by a public boat launch, which is owned by the Port. The boat launch property adjoins the privately owned Ridgefield Marina, which contains residential houseboats. The RNWR is also located on the west side of Lake River, across from the LRIS. The City of Ridgefield's (City's) wastewater treatment plant (WWTP) is located adjacent to Cells 1 and 4, and the City has a stormwater outfall located approximately 900 feet south of Cell 3.

The LRIS is the former location of the PWT facility. The Port owns the property, which PWT leased from approximately 1964 to 1993. PWT filed for bankruptcy in 1993 and abandoned the LRIS. The Port has established office spaces on the property and manages the property and its remaining assets. PWT's former operations involved pressure-treating wood products with oil-based treatment solutions containing creosote; pentachlorophenol (PCP); and a water-based mixture of copper, chromium, and arsenic or of copper, chromium, and zinc. A description of PWT's historical operations is included in Section 2 of the Work Plan and historical and current property features are presented in Figure 2.

Historical and current use of aquatic areas adjacent to and in the vicinity of the LRIS includes leases with Washington Department of Natural Resources (DNR) of state-owned property. The Port currently leases from DNR portions of aquatic areas adjacent to the property (Lease No. 20-09947 and 20-A09196).

1.2.1 LRIS Upland Remedial Status

Under the AO, four cells were established to perform RI/FS activities in the upland areas of the LRIS as described in the Work Plan. These cells are shown on Figure 2 and were established based on distinct historical property use and operations.

A steam-enhanced remediation (SER) system is operating as a MTCA Interim Action to remove nonaqueous-phase liquid in groundwater. The Port has completed an RI for Cell 3 that has been approved by Ecology. The Port has also completed a draft FS for Cell 3, a RI/FS for Cell 4, and has submitted and RI/FS for the remaining areas of the LRIS property (Cells 1 and 2).

During the summer and fall of 2010, an approved interim action was completed in Cells 3 and 4 consistent with the Cells 3 and 4 Interim Action Work Plan (MFA 2010). The interim action involved removal of soil with chemicals above remediation levels, capping cells with clean fill, and installing new stormwater conveyance systems. In Cell 3, part of the interim action included removing Outfall 1 and its stormwater collection and conveyance system, and installing two new outfalls (Outfall 5 and Outfall 6) per the approved NPDES permit. Stormwater runoff from Cells 3 and 4 is no longer in contact with impacted surface soil, and the Cell 3 bank is capped with clean fill. Contaminated media in Cells 3 and 4 have been remedied and are not a current source to Lake River or Carty Lake surface water or sediments.

The Port plans to conduct a similar interim action in Cells 1 and 2 in the summer of 2011 and 2012. The action will include removing historical structures and the stormwater system, removing impacted soil, and capping the cells with clean fill. After the remedial action is completed in 2011 and 2012, contaminated media in Cells 1 and 2 will not be a source of stormwater runoff impacts to Lake River or Carty Lake surface water or sediments.

1.2.2 LRIS Stormwater Status

Stormwater from the LRIS is currently conveyed from the collection system by gravity through a piping system to one of five outfalls (Figure 3). Historical stormwater practices are described in detail in the 2004 Work Plan (MFA 2004) and are also discussed below. The five outfalls discharge to Lake River and are permitted under the site-specific National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0041025. The stormwater permit applies to discharge of all water from the LRIS, including stormwater runoff and SER system effluent.

The following describes the function of each outfall:

- Outfall 5 and Outfall 6 receive drainage from Cell 3 (formerly the South Pole Yard). An interim action completed in 2010 covered Cell 3 with clean soil and installed the two new outfalls. Before the interim action, stormwater from Cell 3 discharged to Lake River through former Outfall 1 (Figure 3).
- Outfall 2 drains the west-central area of Cell 2. The stormwater system that drains to Outfall 2 consists of a series of trench drains, catch basins, and associated piping. Some of the trench drains are inside buildings.
- Outfall 3 drains the north and central parts of Cell 2 and all of Cells 1 and 4, including the area formerly occupied by the tank farm, retorts, and the concrete pond. Overland flow from Cell 4 (the North Pole Yard, formerly used by PWT to store poles and dimensional lumber before treatment) drains to newly installed catch basins, which direct stormwater south to Outfall 3. Other historical PWT operations in the drainage basin for Outfall 3 include the WWTP (demolished in summer 2001) and the wood-fired boiler. It has been reported that accidental direct discharge of process water related to the former treatment system in Cell 1 occurred intermittently to Lake River via Outfall 3 in the 1960s and 1970s. The west part of Outfall 3 was replaced as described in Section 1.2.1.
- Outfall 4 drains the southeast-central area of Cell 2, which was historically used to store treated dimensional wood and the drip pad. Outfall 4 consists of trench drains, catch basins, and piping.

Currently there is no point source discharge to Carty Lake from the LRIS. While there were no known direct (point source) discharges to RNWR (i.e., Carty Lake) from PWT activities, some overland flow from Cells 2 and 4 may have reached Carty Lake.

Stormwater for the LRIS is addressed under the stormwater plan dated June 29, 2010 (Group Mackenzie 2010). The stormwater plan was prepared to meet the requirements of work item

5 of AO No. 01TCPSR-3119 (between Ecology and the Port) and the NPDES permit. The Port has conducted interim actions and completed improvements to the stormwater system that have greatly reduced chemical concentrations in the stormwater.

1.2.3 Coordination with Area Comprehensive Planning

The Port is performing a comprehensive planning effort at the LRIS as part of the Lake River Property Redevelopment Master Plan. The Sediment RI and potential cleanup actions will consider development plans to the extent possible and practical.

1.3 Document Organization

The remainder of this Data Memorandum provides the details of the Sediment RI field sampling, a presentation of the testing results, and an assessment of data gaps and next steps to complete the Sediment RI. The report is organized as follows:

- **Section 2—Sediment Investigation Overview:** Provides an overview of the Sediment RI field sampling components, including any deviations from the Work Plan (Anchor QEA and MFA 2009) and accompanying Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP).
- **Section 3—Sediment Screening Criteria and Testing Results**: Presents the surface and subsurface sediment chemical and physical testing results for both Lake River and RNWR (i.e., Carty Lake).
- **Section 4—Conceptual Site Model Update:** A preliminary CSM included in the Work Plan provided a basis for assessing data gaps and data quality objectives for completion of the Sediment RI. The CSM is updated in this section, based on information and testing results from this phase of the Sediment RI. The updated CSM describes physical site characteristics, potential sources and release mechanisms, fate and transport processes, existing environmental quality, and potential receptors and exposure media.
- **Section 5—Data Gaps and Recommended Next Steps:** Presents the data gaps following this phase of the Sediment RI and recommended next steps to complete the Sediment RI.
- **Section 6—References:** References cited in development of this Data Memorandum are provided.

- **Appendices—**Appendices to the report contain the sampling data from this phase of the Sediment RI and associated backup information.

2 SEDIMENT REMEDIAL INVESTIGATION OVERVIEW

This section provides an overview of the Sediment RI components, which were performed to fulfill data gaps identified in Section 4 of the Work Plan and provide the necessary data to update the CSM.

The Sediment RI sample collection and testing were performed consistent with the Work Plan SAP and QAPP (Anchor QEA and MFA 2009). Sediment samples were tested using a tiered approach, with Tier 1 testing based on project area and field observations. The Work Plan SAP Tables B-1 and B-2 presented the Tier 1 sediment testing program. Tier 1 testing of subsurface sediment samples was performed at two depth intervals for all the nearshore cores, with archiving of other 1-foot sample intervals. Tier 2 testing was then conducted on archive samples selected based on the results of Tier 1 testing.

Tables 1 and 2 present a summary of the Sediment RI components associated with the surface and subsurface sediment collection method. Tier 2 testing is presented in Table 3 and was performed based on the review of Tier 1 analytical results. Figures 6 through 8 present the Sediment RI surface sediment and subsurface field locations, including Lake River, Carty Lake, and background locations.

Quality control measures implemented during the Sediment RI data collection efforts are also summarized in this section. Field sample collection observations and logs are presented in Appendix A. The project-specific sampling permits are provided in Appendix B and include the DNR right-of-entry permit and USFWS special-use permit for the RNWR.

2.1 Information Compilation

A comprehensive review of available investigation documents was completed to increase understanding of the LRIS and the adjacent Lake River and Carty Lake history, including aquatic lands leases and source control issues related to sediment chemical distributions. This review also provides a general understanding of where historical navigation dredging may have been performed.

Information from the U.S. Army Corps of Engineers (USACE) was compiled to document the history of dredging and shoreline modifications in the immediate vicinity of the LRIS. This information is used, along with the subsurface sediment data, in interpretation of sediment contamination patterns and sediment stability. The results of the information compilation are included in the update to the CSM presented in Section 4.

2.2 Reconnaissance Surveys

A reconnaissance survey was completed in conjunction with the information review to further develop the sediment sampling design. The reconnaissance survey included an inspection of shoreline conditions at a low water level to identify potential groundwater seeps, document shoreline conditions, and qualitatively evaluate sediment physical and biological characteristics. The reconnaissance survey also included documentation of existing utilities and shoreline and in-water structures. As part of the reconnaissance survey conducted at the time of sediment sampling, photographs were taken of the entire LRIS shoreline from an equal distance and compiled. The shoreline photograph compilation is presented in Figure 4 (1 of 2 and 2 of 2). The results of the reconnaissance surveys are included in the update to the CSM presented in Section 4.

2.3 Bathymetry and Base Map Development

Bathymetric information along the entire length of the Lake River adjacent to the upland portion of the LRIS is required to assess results of the Sediment RI and for use in fate and transport assessment. Recent bathymetry surveys performed by the Port in Lake River were used to develop a project base map. The project base map, presenting both bathymetry and topography surveys, is shown on Figure 5. The horizontal datum for the project base map is WA State Plane South High Accuracy Reference Network North American Datum (NAD83) in feet, and the vertical datum is National Geodetic Vertical Datum (NGVD29) in feet. The project base map is included on the subsequent sediment sampling location and results summary figures.

2.4 Sediment Stability and Hydrodynamics

The physical stability of sediments relevant to Sediment RI activities adjacent to the LRIS was evaluated using existing information and information compiled as part of the reconnaissance survey. The results of this evaluation are included in the update to the CSM presented in Section 4, and details of the sediment stability and hydrodynamics evaluation are presented in Section 4.2.2.

2.5 Surface Sediment Sampling

Surface sediment samples were collected using manual and Van Veen methodologies consistent with the Work Plan. Surface sediment samples were collected from locations in both Lake River and Carty Lake to define the horizontal nature and extent of contamination in surface sediment (0 to 10 centimeters [cm]). Surface sediment samples were also collected at four background areas in the vicinity of the LRIS. Table 1 presents a summary of the surface sediment collection and testing details. Surface sediment field observations, including the presence of wood debris, is included in Appendix A. Figure 6 presents the surface sediment sampling locations in both Lake River and Carty Lake, and Figure 8 presents the background surface sediment sampling locations. Surface sampling included the following activities:

- **Lake River:** Twenty-eight surface sediment samples were collected from stations in Lake River in areas adjacent to Cell 2 and Cell 3. Surface sediment sampling was performed using Van Veen methodology. Chemical testing included conventionals, semivolatile organic compounds (SVOCs), metals, and selective testing for polychlorinated biphenyls (PCBs), diesel-range petroleum hydrocarbons, and dioxins/furans. Grain size was also tested at each station.
- **Carty Lake:** Seven surface sediment sampling stations were collected in Carty Lake in areas adjacent to Cell 2 and Cell 4. Surface sediment sampling was performed using manual methodology. Chemical testing included conventionals, SVOCs, metals, dioxins/furans, and selective diesel-range petroleum hydrocarbons. Grain size was also tested at each station.
- **Background Locations:** Four background samples were collected in the vicinity of the LRIS from areas at the north end of Carty Lake, south of the LRIS in Lake River, north of the LRIS, and in Bachelor Slough. Chemical testing included conventionals, SVOCs, PCBs, and dioxins/furans. Grain size was also tested at each station.

2.6 Subsurface Sediment Sampling

Subsurface sediment sampling was performed consistent with the Work Plan using a vibratory core sampler (vibracore) in Lake River to collect chemical and physical data to define the vertical nature and extent of contamination in subsurface sediment. Manual methodology—use of a hand auger—was used in Carty Lake. Table 2 presents a summary of the subsurface sediment collection and testing details. Subsurface sediment core logs are included in Appendix A. Figure 7 presents the subsurface sediment sampling locations in both Carty Lake and Lake River. Subsurface sampling included the following activities:

- **Lake River:** Fifteen subsurface sediment sampling stations were collected in Lake River in areas adjacent to Cell 2 and Cell 3. Subsurface sediment testing, including Tier 1 testing, was conducted at nearshore locations, and Tier 2 confirmation testing in the Lake River channel area was conducted on archived samples based on the results of the Tier 1 testing. Chemical testing included conventionals, SVOCs, metals, and selective testing for dioxins/furans. Grain size was also tested at each station.
- **Carty Lake:** Seven subsurface sediment sampling stations were collected in Carty Lake in areas adjacent to Cell 2 and Cell 4. These subsurface sediment samples were collected from a depth of 1 to 2 feet below mudline and were co-located with surface sediment samples in Carty Lake. Chemical testing included dioxins/furans and selective testing for conventionals, SVOCs, and metals. Grain size was also tested at two subsurface sediment stations.

2.7 Chemical and Physical Data Quality

The overall data quality assurance/quality control (QA/QC) program for the Sediment RI evaluation followed procedures presented in detail in the Work Plan and associated SAP and QAPP (Anchor QEA and MFA 2009). The data quality control criteria were met and the data are acceptable for use. Measures taken to ensure data quality employed current U.S. Environmental Protection Agency (USEPA), Ecology, and American Society for Testing and Materials (ASTM) protocols. Specific actions included field QA/QC, chain-of-custody (COC) procedures, and laboratory data review and validation. Appendix C provides the supporting quality control information and data validation reports, while the COC forms are included with the corresponding laboratory reports in Appendix D.

Chemical and physical testing was performed by Ecology-certified laboratories as presented in the Work Plan (Anchor QEA and MFA 2009), which included TestAmerica laboratories in three locations: Tacoma, Washington, which conducted most of the chemical and physical testing; West Sacramento, California, which conducted the dioxin testing; and Denver, Colorado, which conducted the sulfide testing.

2.7.1 Data Review and Validation

All chemical and physical data submitted in this report were validated by Anchor QEA personnel. All of the data were validated at Level 2, which is equivalent to a QA1 review. The primary data characteristics reviewed during Level 2 data validation include completeness, format, holding conditions, and QA sample results (e.g., matrix spikes, blanks). Data validation was performed consistent with procedures described in the QAPP. Data validation reports are provided in Appendix C. Samples are listed with their corresponding laboratory data package and validation report number in the LRIS Sample Tracking Table (Table D-1) in Appendix D. The data validations were performed under USEPA guidelines, as described in the project QAPP (Anchor QEA and MFA 2009) and the National Functional Guidelines for Data Review (USEPA 2004b, 2005, 2008).

Data validation verified the accuracy and precision of chemical and physical determinations performed during this investigation. Data qualifiers (and their definitions) assigned as a result of the data validation are shown on each of the respective analytical results tables.

Sediment RI data were determined to be usable as reported from the laboratory or as qualified in this Data Memorandum for the purposes of sediment characterization, with the following exceptions:

- Ammonia results were rejected in four background samples, five Lake River samples, and five Carty Lake samples. The results were rejected because the samples were analyzed past twice the hold time.
- Some SVOC non-detect results were rejected in two samples because of low or no surrogate percent recoveries (%Rs). Seventeen compounds were rejected for sample LRIS-LR-09-SB-1-2, and sixteen compounds were rejected for sample LRIS-LR-09-SB-4-5. Subsequent gel permeation chromatography cleanup and reanalysis of the

SVOC extracts for these two samples were requested from the laboratory. Similar to the initial analyses, some SVOC reanalysis results were rejected in two samples because of low or no surrogate %Rs. The results from the initial analyses were regarded as the final accepted results. The non-detect SVOC constituents that were rejected in these two samples are not considered a significant data gap because the associated detected constituents were below preliminary screening levels (with the exception of 3-methylphenol and 4-methylphenol [m&p-Cresol]) and these results were reported as non-detect values.

3 SEDIMENT SCREENING CRITERIA AND TESTING RESULTS

This section summarizes the results of surface sediment (0 to 10 cm) and subsurface sediment chemical and physical testing performed during the Sediment RI. The results from the latest testing corroborate the results of previous testing reported in the Work Plan (Anchor QEA and MFA 2009) and were used to delineate the horizontal and vertical nature and extent of contamination, based on comparison to sediment preliminary screening criteria.

This section first describes the sediment preliminary screening criteria and provides summary statistics of the chemical testing results, including those chemical detections exceeding the preliminary screening criteria. Also presented are those chemicals or chemical groups identified as sediment IHSs, based on the comparison to sediment preliminary screening criteria.

3.1 Sediment Preliminary Screening Criteria and IHS Identification

The surface and subsurface testing results are compared to preliminary screening criteria as first developed in the Work Plan (Anchor QEA and MFA 2009). The following subsections describe the development of the preliminary screening criteria and provide a summary of the LRIS sediment IHS's to be carried forward into a risk evaluation and possible remedial actions. CULs have not been selected for the LRIS at this time.

3.1.1 Sediment Preliminary Screening Criteria

A summary of the sediment preliminary screening criteria is presented in Table 4. These criteria were developed based on existing freshwater and marine promulgated and guidance sediment criteria. The Sediment RI data were compared with preliminary screening criteria to develop the site sediment IHSs. A hierarchy approach was used to apply the sediment preliminary screening criteria based on the availability of freshwater sediment criteria presented below. If criteria were not available for the first tier of screening, then criteria from the second tier were used and so forth:

- Tier I: Ecology 2010 Draft Freshwater Criteria (Avocet 2010)
- Tier II: Ecology 2003 Freshwater Criteria (Ecology 2003)
- Tier III: Sediment Evaluation Framework—Freshwater (Regional Sediment

Evaluation Team [RSET]/USACE et al. 2009)

- Tier IV: Sediment Management Standards (SMS)—Marine (Ecology 1995)
- Tier V: Dredged Material Management Program (DMMP) Screening Level—Marine (USACE 2008)
- Tier VI: USEPA Region III Biological Technical Assistance Group (BTAG)—Freshwater (USEPA 2007)

The first tier of the sediment preliminary screening criteria is the most recent freshwater sediment criteria developed as part of recent MTCA and SMS updates. Ecology is in the process of developing freshwater sediment quality values (SQVs) for the protection of benthic communities to reflect current science and new statutory requirements. Tier I screening levels used in this document are the draft 2010 update to the Ecology 2003 freshwater SQVs; Tier II is the 2003 Ecology freshwater SQVs.

The additional preliminary screening criteria hierarchy is based on regional and national freshwater and marine promulgated or guidance sediment criteria. Both Tier III and Tier V criteria are regional sediment disposal criteria for freshwater and marine sediment, respectively. Tier IV criteria are promulgated marine sediment criteria as provided in the current SMS. This tier applies only to the Sediment Quality Standards. The last tier, Tier VI, presents the EPA Region III BTAG Screening Benchmarks developed for use at Superfund Sites to facilitate consistency in screening level ecological risk assessments. Based on the tiered approach, Tiers I, II, and IV were applied as preliminary screening criteria.

There are currently no freshwater SQVs or SMS numeric criteria for dioxins/furans in sediment or tissue. As part of its coordinated, multiprogram strategy for control of these compounds, Ecology has stated that its long-term goal is to reduce environmental concentrations of dioxins/furans to natural background levels where possible (Ecology 2010). Ecology is developing methods for defining natural background and regional background concentrations for sediments, and is pursuing development of additional background tissue data to estimate natural background concentrations and regional background concentrations of these compounds in the food chain.

Ecology's strategy for management of low-level bioaccumulatives such as dioxins/furans is expected to be implemented over the coming decades through updates to multiple state regulations. Updates to the MTCA/SMS regulations, potentially including updates to procedures for addressing low-level dioxins/furans in urban bays, are anticipated to be completed in 2011 and 2012 (Ecology 2010).

The preliminary screening criteria approach described above is for the purpose of screening data to support development of site sediment IHSs. Risk-based criteria, background (ambient) levels, or cleanup levels will be developed as part of the Sediment RI/FS process.

3.1.2 Sediment IHS Identification

Extensive upland investigations have determined that the following chemicals are present on the site and have the potential to impact sediments (MFA 2004):

- PCP and associated chlorinated phenolics
- Polycyclic aromatic hydrocarbons (PAHs)
- Metals (arsenic, chromium, copper, and zinc)
- Dioxins/furans

The Sediment RI included chemical testing of these upland IHSs in both surface and subsurface sediment in areas of Lake River and Carty Lake, and preliminary sediment IHSs were presented in the Work Plan (Anchor QEA and MFA 2009), based on these upland IHSs and historical facility operations. Additional chemicals that are not known to be related to upland operations, such as PCBs, were analyzed at Ecology's request. The results of surface and subsurface sediment testing are presented in Tables 5a and 5b, respectively. Sediment IHSs include:

- Phenols (PCP, 3-Methylphenol and 4-methylphenol
- Phthalates (butylbenzyl phthalate)
- PAHs
- Metals (arsenic and chromium
- Dioxins/furans

The following sections present the results of surface and subsurface sediment testing in both Lake River and Carty Lake. In addition, the testing of background (outside the potential influence of LRIS) surface sediment is presented. The testing results are compared to the preliminary sediment screening criteria and support the basis for the identification of the sediment IHSs above.

3.2 Surface Sediment Quality

Surface sediment was collected from the presumed biologically active zone of 0 to 10 cm below mudline in Lake River and Carty Lake. Testing was performed to delineate the lateral extent of sediment impacts. Sample locations were selected to coincide with locations previously shown to contain chemical impacts and to delineate the boundaries of sediment impacts relative to preliminary sediment screening criteria.

3.2.1 Lake River

Twenty-eight surface sediment samples were collected from the Lake River area. The analytical results are summarized in Table 6, and the surface sediment locations are shown on Figure 6.

3.2.1.1 Conventionals

Surface sediment samples were analyzed for total organic carbon (TOC), total solids (TS), total volatile solids (TVS), ammonia, and sulfide. TOC ranged from 0.36 to 2.3%, TS ranged from 37 to 71%, and TVS ranged from 1.2 to 7.4%. Sulfide was below the detection limit in seven samples and was detected between 5.5 and 26 milligrams per kilogram (mg/kg) in 21 samples. Thirteen ammonia results were rejected, four were below the detection limit, and 12 were between 20 and 600 mg/kg. Ammonia results that were not rejected were qualified as estimated.

3.2.1.2 SVOCs

PAHs: PAH results did not exceed preliminary screening criteria for all surface sediment samples collected in Lake River. Total PAH concentrations ranged from 52.2 to 4,479 micrograms per kilogram (µg/kg). Concentrations were highest in samples collected along the nearshore areas of the LRIS and significantly decreased toward the channel areas of Lake River. The highest PAH detections were at stations LRIS-CL-05 and LRIS-CL-25, which are immediately adjacent to the former barge loading area and Outfalls 2 and 3, respectively.

Phenolics: Phenolics results did not exceed preliminary screening criteria in any surface sediment samples collected in Lake River. Phenol was detected in all but three surface sediment samples and ranged in concentration from 2.8 to 36 μg/kg. 2-Methylphenol was detected in five samples and ranged from 0.63 to 16 μg/kg. m&p-Cresol were detected in all but two samples and ranged from 2.3 to 220 μg/kg. PCP was detected in 20 samples and ranged from 2.8 to 740 μg/kg; detections were generally higher along the nearshore areas adjacent to outfalls. Spatial distribution of phenolics were similar to that of PAHs, with the highest concentrations observed along the nearshore areas of the LRIS and decreasing toward the Lake River channel area.

Phthalates: Phthalate results did not exceed freshwater preliminary screening criteria in any surface sediment samples collected in Lake River. Phthalates were detected at low levels in all samples and were all well below freshwater preliminary screening criteria.

3.2.1.3 Metals

All metals surface sediment results were below preliminary screening criteria. The highest arsenic concentration was detected at station LRIS-CL-25 at a concentration of 12 mg/kg. The preliminary screening criterion for arsenic is 14 mg/kg. The highest chromium concentration detected in Lake River was 28 mg/kg, which is well below the preliminary screening criterion of 72 mg/kg.

3.2.1.4 Polychlorinated Biphenyls

PCBs were not detected in any of the six surface sediment samples and all detection limits were below the preliminary screening criteria. The detection limits for PCB Aroclors ranged from 14 μg/kg to 25 μg/kg, resulting in detection limits below the preliminary screening criteria of 110 μg/kg for total PCBs.

3.2.1.5 Petroleum Hydrocarbons

Petroleum hydrocarbons were not detected in any of the nine surface sediment samples or were at very low concentrations below the preliminary screening criteria for both diesel-range and motor oil-range petroleum hydrocarbons. The surface sediment sample locations tested for diesel-range petroleum hydrocarbons were triggered as a Tier 2 analysis and based on the range of the Tier 1 PAH testing results.

3.2.1.6 Dioxins

Concentrations of dioxins/furans, reported as 2,3,7,8-toxicity equivalents (TEQ), ranged from 0.53 to 578 nanograms per kilogram (ng/kg) and are presented on Figure 9. Twenty-four surface sediment samples were analyzed for dioxins/furans in Lake River. Dioxin/furan TEQs were higher along the nearshore areas of Lake River and significantly decreased toward the Lake River channel area. The highest dioxin/furan TEQ (578 ng/kg TEQ) was detected at LRIS-LR-09, which is adjacent to Outfall 4. The Lake River channel area dioxin/furan TEQs ranged from 0.87 to 3.3 ng/kg TEQs.

3.2.2 Carty Lake

Seven surface sediment samples were collected in Carty Lake and results are summarized in Table 7. Surface sediment locations are presented on Figure 6.

3.2.2.1 Conventionals

Surface sediment samples were analyzed for TOC, TS, TVS, ammonia, and sulfide. TOC ranged from 1.7 to 5.4%, TS ranged from 34 to 56%, and TVS ranged from 4.5 to 17%. Sulfide was below the detection limit in three samples and was detected between 12 and 44 mg/kg in the other four samples. Five of seven ammonia results were rejected as a result of holding time exceedances (Appendix C). The two samples with valid ammonia results are LRIS-CL-01-SS and LRIS-CL-03-SS, which had detected concentrations of 29 and 25 mg/kg, respectively.

3.2.2.2 SVOCs

PAHs: PAH results did not exceed preliminary screening criteria in any surface sediment samples collected in Carty Lake. PAHs were generally detected at low-level concentrations, with the highest detections at station LRIS-CL-02, which is immediately adjacent to the upland area of Cell 2 (see Table 7). LRIS-CL-02 had a total PAH concentration of 840 µg/kg, well below the preliminary screening level of 17,000 µg/kg.

Phenolics: Phenolics results did not exceed preliminary screening criteria in any surface sediment samples collected in Carty Lake. Phenol was detected in three samples and ranged in concentration from 2.3 to 22 µg/kg. m&p-Cresol was detected in six samples and ranged from 3.5 to 110 µg/kg. PCP was detected in six samples and ranged from 8.9 to 880 µg/kg. The detection of phenolics was similar to PAH detections, with the highest concentration observed in the sample collected closest to Cell 2.

Phthalates: Phthalate results did not exceed preliminary screening criteria in any surface sediment samples collected in Carty Lake. Phthalates were detected at very low levels in all samples and were all well below preliminary screening criteria.

3.2.2.3 Metals

Only arsenic and chromium in surface sediment sample LRIS-CL-02 exceeded their respective preliminary screening criteria. The arsenic concentration at LRIS-CL-02 was 48 mg/kg, which exceeded the preliminary screening criterion of 14 mg/kg. The chromium concentration in this sample was 86 mg/kg, which exceeded the preliminary screening criterion of 72 mg/kg. This sample is nearest to Cell 2, co-located with the highest concentrations of PAHs and phenolics. All other metals were detected at concentrations below preliminary screening criteria.

3.2.2.4 Dioxins

Concentrations of dioxins/furans, reported as 2,3,7,8-TEQ, ranged from 2.1 to 1,402 ng/kg and are presented on Figure 9. Concentrations were highest at LRIS-CL-02, which is closest to Cell 2; elevated concentrations of PAHs, phenolics, and metals have also been observed at this sampling location. The dioxin/furan TEQs ranged between 22.0 and 31.8 ng/kg along the nearshore area of Cell 4. The lowest TEQ (2.1 ng/kg) was observed at LRIS-CL-05, which is between the areas adjacent to Cell 2 and Cell 4.

3.2.3 Background

Background surface sediment samples were collected from four locations: at the north end of Carty Lake, south of the LRIS in Lake River, north of the LRIS, and in Bachelor Slough. Figure 8 presents the locations of the background surface sediment stations.

3.2.3.1 Conventionals

Surface sediment samples in background areas were analyzed for TOC, TS, TVS, ammonia, and sulfide. TOC results ranged from 0.21 to 3.2%, TS results ranged from 37 to 71%, and TVS results ranged from 0.98 to 7.5%. A TOC concentration of 3.2% was detected in the Carty Lake background sample, and the Lake River and Bachelor Slough TOC measurements were all below 1.4%. Sulfide was below the detection limit in three samples and was detected at 6.2 mg/kg in sample LRIS-BKG-03. All four ammonia results were rejected because of holding time exceedances (Appendix C).

3.2.3.2 SVOCs

PAHs: PAH results did not exceed preliminary screening criteria for all background surface sediment samples. Total PAH results ranged from 15.1 to 149 µg/kg. The lowest concentration was observed at station LRIS-BKG-02, which is located in Bachelor Slough. The highest concentration was observed at LRIS-BKG-01, which is located south of the LRIS and immediately south of the boathouses in Lake River. Analysis for PAHs was not conducted on the sample collected from Carty Lake (LRIS-BKG-04).

Phenolics: Phenolics results did not exceed preliminary screening criteria in any background surface sediment samples. Phenolics concentrations in background surface sediment samples were mostly non-detect, with some low-level detections. Phenol was detected in the background samples between 4.5 and 13 µg/kg, and m&p-Cresol was detected in the background samples between 8.5 and 25 µg/kg. Sample LRIS-BKG-04 was analyzed only for PCP. PCP was not detected in any of the background surface sediment samples.

Phthalates: Phthalates results did not exceed preliminary screening criteria in any background surface sediment samples. Phthalates concentrations in background surface sediment samples were mostly non-detect, with some low-level detections.

3.2.3.3 PCBs

PCB concentrations in background surface sediment samples were non-detect, with the exception of background station LRIS-BKG-01. This station had low-level concentrations of Aroclor 1254 and Aroclor 1260, at 8.4 µg/kg and 8.5 µg/kg, respectively. Background station LRIS-BKG-01 is located to the south of the LRIS study area and immediately south of the boathouses in Lake River.

3.2.3.4 Dioxins

The dioxin/furan TEQs at background surface sediment stations ranged from 0.18 to 0.86 ng/kg in the background areas of Lake River and Bachelor Slough. The Carty Lake background surface sediment station had a dioxin/furan TEQ of 18.1 ng/kg. The background sediment dioxin/furan TEQs are presented on Figure 11.

3.3 Subsurface Sediment Quality

Subsurface sediment was sampled in 15 locations along the property in Lake River and in seven locations in Carty Lake, as shown in Figure 7. Testing results for subsurface sediment are presented for Lake River in Table 8 and Carty Lake in Table 7. Chemical concentrations that exceed the preliminary sediment screening criteria are present in a localized area of subsurface sediment in both Lake River and Carty Lake.

3.3.1 Lake River

Subsurface sediment was collected from 15 sample locations in Lake River. The eight nearshore locations and one offshore location (LRIS-LR-09) were analyzed in two discrete 1-foot sections. Subsurface sediment chemical testing results and comparisons to preliminary screening criteria are discussed below. Subsurface sediment testing results from Lake River are presented in Table 8. Subsurface sediment dioxin/furan results are shown in Figure 10.

3.3.1.1 Conventionals

Samples from the eight nearshore cores and one offshore core (LRIS-LR-09) were analyzed for TOC, TS, and TVS. TOC ranged from 0.13 to 3%, TS ranged from 59 to 82%, and TVS ranged from 0.95 to 9.4%.

3.3.1.2 SVOCs

PAHs: PAHs were analyzed in subsurface sediment samples from the eight nearshore cores and one offshore core (LRIS-LR-09). Total PAH concentrations exceeded the preliminary screening criteria of 17,000 µg/kg at one station (LRIS-LR-08) in the 1-to-2-foot interval (38,577 µg/kg). This subsurface station is located immediately offshore of the property to the west of Outfall 4, as shown in Figure 7. This sample interval also exceeds the preliminary screening criteria for total low weight PAH (LPAH) (10,447 µg/kg), phenanthrene (7,300 µg/kg), fluoranthene (12,000 µg/kg), and pyrene (8,900 µg/kg). This sample location is bounded vertically by a 3-to-4-foot sample interval, with PAH levels below the preliminary screening criteria and a total PAH value of 575 µg/kg.

Phenolics: Samples from the eight nearshore cores and one offshore core (LRIS-LR-09) were analyzed for phenolics. Two stations, LRIS-LR-08 and LRIS-LR-09, exceeded the preliminary screening criteria including PCP and m&p-Cresol, respectively. These stations are located directly offshore of the property to the west of Outfall 4. PCP concentrations exceeded the preliminary screening criterion of 1,200 µg/kg in one sample in Lake River: the 1-to-2-foot interval of station LRIS-LR-08 (3,100 µg/kg). This sample location is bounded vertically by the 3-to-4-foot sample interval (22 µg/kg). Station LRIS-LR-09 exceeded the m&p-Cresol screening criterion (260 µg/kg) in two sample intervals: the 1-to-2-foot (360 µg/kg) and the 4-to-5-foot (280 µg/kg).

Phthalates: Samples from the eight nearshore cores and one offshore core (LRIS-LR-09) were analyzed for phthalates. Phthalate concentrations were generally at non-detect concentrations in subsurface sediment samples and all were below the preliminary screening criteria.

3.3.1.3 Metals

Metals were analyzed in samples from the eight nearshore cores. In all subsurface sediment samples, metals were detected at concentrations below the preliminary screening criteria. Arsenic concentrations in subsurface sediment ranged from 0.98 mg/kg (LRIS–LR-05) to 7.7 mg/kg (LRIS-LR-12) and were below the preliminary screening criterion of 14 mg/kg. Chromium concentrations in subsurface sediment ranged from 8.1 mg/kg (LRIS–LR-05) to 43 mg/kg (LRIS-LR-12) and were below the preliminary screening criterion of 72 mg/kg.

3.3.1.4 Dioxins

Dioxins/furans were analyzed in six subsurface sediment samples and Figure 10 presents the results for Lake River subsurface sediment dioxin/furan testing. Additional Tier 2 subsurface sediment samples were triggered based on the results of Tier 1 surface and subsurface testing results. Stations selected for dioxin/furan analysis include LRIS-LR-01 (1-to-2-foot), LRIS-LR-05 (1-to-2-foot), LRIS-LR-08 (1-to-2-foot and 3-to-4-foot), LRIS-LR-09 (1-to-2-foot and 4-to-5-foot), LRIS-LR-10 (1-to-2-foot), and LRIS-LR-12 (1-to-2-foot).

Subsurface sediment TEQ concentrations were highest at stations LRIS-LR-08, adjacent to Outfall 4and LRIS-LR-10, adjacent to Outfall 2. Station LRIS-LR-08 in the 1-to-2-foot interval had a TEQ of 909 ng/kg, with the concentration significantly decreasing to 6.6 ng/kg in the deeper 3-to-4-foot interval. To the north of LRIS-LR-08, station LRIS-LR-10 had a dioxin/furan TEQ of 83.3 in the 1-to-2-foot interval. The other nearshore subsurface sediment dioxin/furan results ranged from 7.4 ng/kg (LRIS-LR-01, adjacent to Outfall 1) to 16.9 ng/kg (LRIS-LR-05, adjacent to the former barge loading area).

3.3.2 Carty Lake

Subsurface sediment was collected from 1 to 2 feet below mudline at seven sample locations in Carty Lake and analytical results from Carty Lake are presented in Table 7. Subsurface sediment dioxin/furan results are shown in Figure 10.

3.3.2.1 Conventionals

Subsurface samples from the two southeast Carty Lake sample locations, LRIS-CL-02 and LRIS-CL-04, were analyzed for TOC, TS, and TVS. TOC ranged from 1.4 to 2.8%, TS ranged from 57 to 64%, and TVS ranged from 3.6 to 6.2%.

3.3.2.2 SVOCs

PAHs: PAHs were analyzed in samples from the two southeast subsurface locations: LRIS-CL-02 and LRIS-CL-04. In these samples, PAHs were detected at concentrations well below the preliminary screening criteria. The total PAH concentrations for these two subsurface sediment samples were 342 and 20.7 µg/kg, respectively.

Phenolics: Phenolics were analyzed in samples from the two southeast subsurface locations: LRIS-CL-02 and LRIS-CL-04. In these samples, phenolics were detected at concentrations well below the preliminary screening criteria. Only m&p-Cresol and PCP were detected in these samples. m&p-Cresol was detected at a concentration of 7.6 and 2.1 µg/kg while PCP was detected at these two stations at concentrations of 270 and 11 µg/kg, respectively.

Phthalates: Phthalates were analyzed in samples from the two southeast subsurface locations: LRIS-CL-02 and LRIS-CL-04. In these subsurface sediment samples, phthalates were detected at low-level concentrations well below the preliminary screening criteria.

3.3.2.3 Metals

Subsurface samples from the two southeast Carty Lake sample locations, LRIS-CL-02 and LRIS-CL-04, were analyzed for metals. Metals concentrations were detected at station LRIS-CL-02 in the 1-to-2-foot interval for arsenic (15 mg/kg), which just exceeds the preliminary screening criterion value of 14 mg/kg. This subsurface station is located immediately offshore of the property to the north of Cell 2, as shown in Figure 6. All other metals were detected at concentrations below the preliminary screening criteria.

3.3.2.4 Dioxins

Dioxins/furans were analyzed in all seven subsurface sediment locations in Carty Lake and Figure 10 presents the subsurface sediment dioxin/furan testing results. TEQ concentrations were highest at station LRIS-CL-02 in the 1-to-2-foot sample interval (130 ng/kg), with the concentration decreasing from the surface (0 to 10 cm) interval (1,402 ng/kg). To the immediate west, station LRIS-CL-01 had a subsurface sediment dioxin/furan TEQ of 5.6 ng/kg, which is much lower than the surface concentration (141 ng/kg). To the north, subsurface sediment dioxin/furan TEQs significantly decrease to concentrations ranging from 0.31 ng/kg (LRIS-CL-06) to 1.2 ng/kg (LRIS-CL-03).

4 CONCEPTUAL SITE MODEL UPDATE

This section summarizes the updated Lake River and Carty Lake sediment CSM for the LRIS. The preliminary CSM was presented in the Work Plan (Anchor QEA and MFA 2009) and was based on existing information. This CSM has been updated to include information collected during the Sediment RI as described above.

Development of a CSM is an important step in assessing the nature and extent of contamination, the status of source control, and the potential need for future remedial actions. The CSM integrates investigation data at a site to develop a framework for assessing contaminants and their impact on potential human and environmental receptors.

4.1 Site Physical Characteristics

The physical characteristics of the LRIS discussed in this section include geology and hydrogeology (both regional and site-specific) and Lake River and Carty Lake hydrodynamics. The following provides a discussion of each of these components, based on information from the Sediment RI and available LRIS and regional information.

4.1.1 Topography and Bathymetry

The topography and bathymetry information is presented on the site base map on Figure 5. The topography of the upland site areas is relatively flat, ranging from approximately elevation 20 to 31 feet NGVD. Topography of the upland site areas was surveyed during environmental investigations and interim cleanup actions. The topography presented on Figure 5 does not include recent interim actions in Cells 3 and 4 performed during the summer and fall of 2010.

Recent information regarding bathymetry in Lake River is available from planning activities performed by the Port. Bathymetry surveys were conducted in 2004 and 2008. The bathymetry surveys included the entire length of Lake River adjacent to the upland portion of the LRIS. Surface sediment elevations were obtained during the sediment sampling activities at specific locations and were consistent with elevations from the bathymetry surveys. The shoreline along the western side of the LRIS predominately comprises armoring and vegetation, with limited areas of bulkhead.

In-water and overwater structures, including the Port's pump house, several piles, and a public access float dock, are located along the shoreline of the LRIS.

4.1.2 Geology and Hydrogeology

There are four primary geologic units underlying the LRIS relevant to the Sediment RI and to characterization of the nature and extent of contamination. The geologic units are described in detail in the upland RI documents (MFA 2007 and 2011). These are fill, younger alluvium, older alluvium, and the Troutdale Formation. From north to south across the upland areas of the LRIS, the lithology is generally relatively consistent. However, the lithology from west to east varies, as the younger alluvium (clayey silts, sandy silts, and sands) appears to be thicker to the west near Lake River, and the older alluvium (sandy gravel) appears to be thicker to the east.

There are two primary water-bearing zones underlying the LRIS. They have been termed upper and lower for purposes of discussion. The upper water-bearing zone (UWBZ) occurs in the silts and sands of the younger alluvium and the upper sandy gravels of the older alluvium. The lower water-bearing zone (LWBZ) occurs in the weakly cemented, sandy gravels of the Troutdale Formation. The UWBZ and LWBZ are separated by compact, iron-stained, silty, sandy gravel that forms an aquitard over much of the eastern half of the LRIS. Where the aquitard is not present, the UWBZ and the LWBZ likely are hydraulically connected.

The site hydrology and extent of groundwater contamination is described in detail in the upland RI documents (MFA 2007 and 2011). In general, groundwater in the upper portion of the UWBZ represents a local flow system generally flowing east to west and likely discharges to Lake River (MFA 2007 and 2011). However, in the northern portion of Cell 2 the shallow UWBZ flows towards the north. The deep UWBZ and LWBZ generally flow east to west and do not likely discharge to Lake River (MFA 2007 and 2011).

Groundwater investigations as part of the SER have shown that shallow groundwater does not discharge to Carty Lake. A low-permeability clay layer underlies Carty Lake. The clay layer prevents contamination from migrating into Carty Lake and hydraulically separates

Carty Lake from the UWBZ. In addition, surface water in Carty Lake and groundwater elevations in the UWBZ indicate a potential downward gradient (MFA 2007).

Groundwater beneath the LRIS is contaminated to varying degrees with metals and organic constituents. Arsenic, benzene, PCP, tetrachloroethene, and PAHs are the most common groundwater contaminants based on the upland RI findings. Source areas for the groundwater contaminants are generally associated with historical wood treatment operations and storage. Groundwater contamination plumes are generally distinct and traceable back to their respective source areas, consistent with the prevailing east-to-west groundwater flow at the site.

The sediment physical characteristics for both Lake River and Carty Lake were recorded and tested as part of the Sediment RI field program. Appendix A includes the field observations and sediment logging for both surface and subsurface sediment. Table A-1 presents the surface sediment observations, and the subsurface sediment logs are provided for each core. Surface and subsurface sediment were tested for grain size analysis; these data are included in the data summary tables (Tables 6, 7, and 8).

Lake River surface sediment is characterized as a fine sand and silt, the quantity of which varies with the different areas of Lake River. Subsurface sediment in Lake River varies based on the sampling location in Lake River. Generally, on the nearshore slope areas, the sediment is characterized as a fine sandy silt to a depth of approximately 5 feet below mudline that then transitions to a fine to medium sand. Subsurface sediment in the channel areas of Lake River is generally a very fine sandy silt from the length of the core up to 11 feet below mudline. Fine to medium sand was encountered in two cores (LRIS-LR-02 and LRIS-LR-13) in the Lake River channel area at a depth of approximately 6 to 7 feet below mudline. Figure 13 presents three generalized west-to-east cross sections showing the sediment characteristics in Lake River.

Surface sediment in Carty Lake is characterized as a very fine sandy silt with abundant vegetation, while the subsurface sediment (1 to 2 feet below mudline) is characterized as a stiff clayey silt with trace very fine sand.

As part of the sediment processing, wood debris was described and quantified in both surface and subsurface sediment samples. Table A-2 in Appendix A provides a summary of the wood debris observations for both Lake River and Carty Lake. Wood was intermittently observed and was characterized as naturally occurring wood fragments and twigs. The presence of anthropogenic wood (e.g., treated or dimensional) was not observed.

4.1.3 Lake River Hydrodynamics

The LRIS is located approximately 2 miles upstream from the mouth of Lake River. Lake River extends approximately 11.4 miles north from Vancouver Lake to its confluence with the Columbia River. Lake River is hydraulically connected to the Columbia River at its mouth, through Bachelor Island Slough approximately 1 mile upstream of the mouth, and through a tide gate/flushing structure along the western shoreline of Vancouver Lake. The hydrodynamic regime in Lake River is dominated by influence from the Columbia River, and to a lesser degree, by upland drainage through several small creeks that flow into Lake River upstream of the LRIS.

Lake River receives upland drainage from a basin comprising approximately 150 square miles. The basin includes Vancouver Lake, Burnt Bridge Creek (which drains to Vancouver Lake), Salmon Creek, Whipple Creek, Flume Creek, and other smaller sub-basins. Detailed hydrology for the Lake River system is not available; however, the estimated mean annual flow in Lake River is approximately 300 cubic feet per second (Bhagat and Orsborn 1971). Water from the Columbia River historically has been pumped into Vancouver Lake through a flushing channel during certain times of the year to facilitate flushing of the lake and Lake River. The flushing structure is composed of two 84-inch culverts with tide gate structures built under Lower River Road along the western shoreline of the lake (Gary Struthers Associates, Inc. 2005).

The flow direction in Lake River changes seasonally, depending on the flow (and water surface elevation) in the Columbia River and the flow into Lake River from upstream drainage (USEPA 1979). During the summer and early fall months, generally July through October, flow in Lake River reverses daily with the tides. During the winter months, generally November through March, net flow is typically toward the Columbia River because of the high volume of rain runoff from Salmon Creek and Burnt Bridge Creek. During the spring, generally April through June, snowmelt raises water levels in the Columbia River and net flow in Lake River is upstream toward Vancouver Lake.

Data regarding tides just upstream of the mouth of Lake River at St. Helens, Oregon, are available (National Oceanic and Atmospheric Administration Tide Station #9439201). The mean tidal excursion (difference between mean higher high water and mean lower low water based on gage data) at St. Helens is 3.3 feet. Water level data at St. Helens were compared to water levels taken during data collection in Lake River at the LRIS site. The water levels in Lake River were, on average, 1 foot higher than the St. Helens gage during low tides, but were otherwise close in value to those measured at St. Helens. Water level data collected in Lake River during a water quality study of Vancouver Lake (Bhagat and Orsborn 1971) showed similar trends.

Velocity data are not available for Lake River; however, velocities are assumed to be low because of minimal upstream freshwater input (on average) and backwatering from the Columbia River during periods of high flow and/or high tide. Evaluation of dredging records and current bathymetry show high deposition rates in Lake River (at the LRIS site), as shown in Figure 12. Sediment sampling indicates that the river bottom substrate consists of very fine sand and silt material. While local scouring may occur during large flood events, most evidence suggests that deposition occurs over most of Lake River's length because of the maintenance dredging in the marina and the complete filling of the historical turning basin created for barges off Cell 3. Deposition rates (as described in Section 4.2.2.2) provide additional evidence that Lake River is a low-velocity environment.

4.1.4 Carty Lake Hydrodynamics

Carty Lake is located on the RNWR north of Cell 2 and west of Cell 4 (Figure 5). During the rainy season, Gee Creek and Carty Lake can be hydraulically connected at the lake's northern end. During most of the year, Carty Lake has no outlet. Carty Lake has limited recreational uses (U.S. Fish and Wildlife Service [USFWS] 2008) (i.e., it is accessible by trails and fishing is allowed, but boating is not allowed). Water levels in Carty Lake vary seasonally and generally are higher during winter and spring and lower during summer and fall.

4.2 Sources and Release Mechanisms

Suspected historical sources of sediment impacts in Lake River and Carty Lake include wood-treating chemicals and other substances that were used as part of wood-treating operations. Potential historical sources include:

- Spills in the process areas that may have reached Lake River through the stormwater system in Cells 1 and 2
- Releases to the soil that may have been transported to Lake River via stormwater and/or erosion from Cells 2 and 3
- Stormwater having direct contact with treated wood and discharging to Lake River
- Overwater activities, such as barge loading adjacent to Cell 3

Mechanisms by which LRIS historical activities may have impacted sediment include historical stormwater discharge, direct discharge of wood-treating chemicals, and direct discharge resulting from overwater activities. Remedial actions completed in Cells 3 and 4 and planned for Cell 1 and 2 will eliminate any pathways from upland sources to sediment (see Section 1.2.1 for a description of remedial actions).

Other potential sources of contamination, such as non-LRIS stormwater and WWTP discharge, and groundwater are described below.

City WWTP and Stormwater Management

The City's WWTP is located north of Cell 1. The effluent from the WWTP is piped underground along the northern portion of Cell 2 and discharges into Lake River at the northern boundary of Cell 2. The line historically discharged from a pipe located at the bank. During the summer of 2006, the City upgraded its outfall and added a diffuser in Lake River. The WWTP outfall upgrade was performed under direction of Ecology and includes ongoing discharge monitoring as outlined in the associated NPDES permit.

The City has a stormwater outfall located approximately 900 feet south of Cell 3. This outfall discharges stormwater primarily from Pioneer Street. Stormwater from this area is collected in a ditch extending along the east side of the Burlington Northern railroad tracks. Stormwater is then routed to the north side of a private road used by the marina. A culvert redirects this water under the road to the west and into a vegetated swale. The swale is approximately 170 feet long and 10 feet wide. At the bank of Lake River, the stormwater in the swale enters a culvert and is discharged into Lake River. It appears that during large flow events, some water from the swale bypasses the culvert and flows over the bank directly into Lake River.

Groundwater Transport Pathway

As mentioned previously, groundwater in the upper portion of the UWBZ likely discharges to Lake River (MFA 2007). However, groundwater migration is not a significant process by which chemicals can be transported to sediment or surface water. In a Cell 3 RI report (MFA 2007) and a Cells 1 and 2 RI/FS report submitted to Ecology on January 19, 2011 (MFA 2011) the groundwater to surface water pathway was evaluated for those chemicals which exceeded surface water screening levels in monitoring wells within the shallow and deep UWBZ. The evaluation indicated that groundwater would not adversely impact Lake River or Carty Lake. Given the age of the chemical release at the LRIS, groundwater plumes are expected to have reached equilibrium, and concentrations are likely to be decreasing with time. Groundwater is monitored on the LRIS to confirm temporal trends.

4.2.1 Shoreline and Sediment Processes

Available information was compiled as part of the Sediment RI to describe shoreline and sediment processes that have the potential to disturb or contain sediments in Lake River and Carty Lake.

4.2.1.1 Erosion Potential

Processes that may result in sediment transport include:

- Wind and wave erosion
- Prop wash
- Water velocities

Wind waves are not anticipated to be a mechanism for erosion in Lake River. The limited straight line fetch distance (area in which waves are generated by wind) in Lake River, combined with the shallow depths of the river (average of 7 to 8 feet deep), limits wind wave production in Lake River. Wakes from passing vessels will be much larger and are a potential factor for sediment movement. Based on the use of methodology developed by Sorenson (1984) (and verified on several similar projects), wakes would likely range from 1 foot (for a 25-foot recreational vessel traveling at 8 mph) to 2.5 feet (for a 35-foot sport yacht). Erosion potential along the shoreline due to wakes is expected from approximately 4 feet below low water in Lake River (1.5 times the wave height) up to mean higher high water (USACE 2003).

Impacts from prop wash in Lake River from the largest expected vessels (35- to 40-foot recreation boats) were evaluated. Wakes from passing recreation vessels have the potential to resuspend fine materials in water depths of less than 8 feet (Sorenson 1984). A significant percent of Lake River is less than 8 feet in depth, except for the centerline of the navigation channel. The center of the channel may also be within 8 feet of water depth during low flow periods in the Columbia River. Therefore, significant portions of Lake River are potentially vulnerable to erosion from prop wash. Areas near the public boat launch just upstream of the site will be exposed to higher velocity prop wash because of launching and berthing activities in that area. It is anticipated that all areas (regardless of depth) in the vicinity of the boat launch and attached dock will be subject to bed erosion.

Data documenting flow and velocity in Lake River are limited; however, information found in previous available studies and review of data collected as part of the Sediment RI have been used to evaluate sediment transport potential in Lake River near the site. The following describes the general sediment transport potential, based on information collected during the Sediment RI:

- River currents are not anticipated to resuspend materials from the river bottom.
- Prop wash from passing vessels has the potential to resuspend material from a significant lateral portion of the bed in Lake River (areas with less than 8 feet of water depth).
- If material is resuspended from the bed of Lake River, fine sediments with low fall velocity (silts and clays) could be transported.
- Wakes will range from about 1 foot to 2.5 feet in Lake River. These waves can induce erosion of side slopes on either side of Lake River for most of its navigable length down to approximately 4 feet below low water.

- To limit the potential for erosion due to impact from boat wakes, side slopes along the banks of Lake River would likely require armoring. Because of fluctuating water levels in Lake River, side slope armor would most likely be required to extend to the toe of slope.

4.2.1.2 Sediment Deposition

Evaluations of historical USACE dredging records and existing bathymetry show relatively high deposition rates in Lake River in areas adjacent to the LRIS Site. Figure 12 presents the difference in Lake River mudline elevations from 1970 and the latest updated bathymetry surveys completed in 2008. Based on files provided by USACE, the deepest dredge in Lake River adjacent to the LRIS Site appears to be from 1970. The 1970 survey is a post-dredge survey and no maintenance dredging has occurred since then, based on available information. The sediment thickness contours shown on Figure 12 are approximate because of survey measurement resolution in 1970 and the lateral extent of available data from the 1970 condition survey. Based on this evaluation, deposition rates in Lake River vary by location and can be up to 0.3 foot per year (based on up to 12 feet over 40 years in high-deposition areas) in the channel areas.

4.3 Environmental Quality

Aquatic media in both Lake River and Carty Lake have been the subject of previous rounds of environmental investigation, including testing of sediment and vicinity fish tissue. The Sediment RI included surface and subsurface testing to address data gaps. The results of the Sediment RI are presented in Section 3; the following summarizes the sediment quality results for both Lake River and Carty Lake, as well as the fish tissue studies described in the Work Plan.

4.3.1 Lake River Sediment Quality

Analytical results showed chemical concentrations below preliminary screening criteria for those chemicals identified as upland chemicals of concern, with the exception of four subsurface sediment samples with exceedances of PAHs and chlorinated phenolics. In addition, dioxins/furans were detected in samples and although they do not have screening criteria, are elevated at some locations. Results of sediment testing performed during the

Sediment RI identified a limited area of PCP, m&p Cresol, and PAHs exceeding the preliminary screening criteria immediately adjacent to Outfall 4. The vertical extent of sediment impacts at this location was limited to the 1-to-2-foot sampling interval, with concentrations significantly decreasing in the 3-to-4-foot sampling interval. Two PAHs—acenaphthene and phenanthrene—exceeded screening levels once the data were normalized for organic carbon content. This area is just off the former barge loading area and the vertical extent is bound by the 9-to-10.5-foot sample interval. Lake River chemical and physical testing results are presented in Tables 6 and 8.

As discussed earlier, background samples collected from Lake River and Bachelor Slough detected dioxins/furans at relatively low TEQ concentrations (up to 0.86 ng/kg). The results of surface sediment dioxin/furan testing showed relatively elevated concentrations (up to 578 ng/kg TEQs) along the nearshore areas of Lake River. Surface sediment dioxin/furan results at locations in the Lake River channel and near the western bank were significantly lower, ranging from 0.53 ng/kg TEQ to 3.3 ng/kg TEQ, except for two samples LRIS-LR-13 adjacent to Outfall 3 (16.6 ng/kg) and LRIS-LR-09 adjacent to Outfall 4 (578 ng/kg). Subsurface sediment dioxin/furan results showed elevated concentrations at sampling depths of 1 to 2 feet directly adjacent to the site, with concentrations significantly decreasing in the 3-to-4-foot interval. The dioxin/furan results in Lake River are consistent with localized historical stormwater impacts to sediment adjacent to outfalls and along the nearshore areas of Lake River. These results also support the conceptual model for historical stormwater impacts, with the Lake River channel area (offshore of stormwater outfalls) showing low-level dioxin/furan concentrations. Interim actions performed or planned for the uplands will eliminate the possibility of sediment recontamination from upland LRIS sources.

4.3.2 Carty Lake Sediment Quality

Analytical results showed chemical concentrations below preliminary screening criteria for those chemicals identified as upland IHSs, with the exception of arsenic and chromium. In addition, dioxins/furans were detected in samples at elevated concentrations at some locations. Results of sediment testing performed during the Sediment RI identified an area of impacts exceeding the preliminary screening criteria. This area is limited to sediment collected from station LRIS-CL-02, immediately adjacent to the former wood-treating facility operations in Cell 2. Carty Lake chemical and physical testing results are presented in Table 7.

The background sample collected at the north end of Carty Lake (see Figure 8) did not detect IHSs above screening criteria, but did detect dioxins/furans at a TEQ concentration of 18.1 ng/kg. As discussed earlier, this concentration was elevated relative to the background samples collected from Lake River and Bachelor Slough.

Dioxins/furans were elevated (up to 1,402 ng/kg TEQ) in the area immediately adjacent to Cell 2 and likely related to historic wood treating operations. Surface sediment dioxin/furan concentrations significantly decreased to the north of this area at station LRIS-CL-05 at a TEQ of 2.1 ng/kg. Farther north and adjacent to Cell 4, dioxins/furans were detected in surface sediment at concentrations of 22.0 and 31.8 ng/kg TEQs. With the exception of station LRIS-CL-02, all subsurface sediment samples (1 to 2 feet below mudline) in Carty Lake showed relatively low-level dioxin/furan concentrations and ranged from 0.31 ng/kg TEQ to 5.6 ng/kg TEQs. Figures 9 and 10 present dioxin/furan testing results for the surface and subsurface sediment, respectively.

4.3.3 Lake River and Carty Lake Fish Tissue Testing

The USFWS conducted fish tissue (large-scale sucker) study in Lake River and Carty Lake in the summer of 1999, which showed that IHSs (arsenic, chromium, and PCP) were not found in tissues of fish collected next to the LRIS in Lake River or Carty Lake (USFWS 2000). Dioxin testing was not included as part of the USFWS studies. The studies found that most fish tissue concentrations of organochlorines (including total PCBs) and some metals were below detection limits or were generally similar to the reference site in Bachelor Slough.

In another study conducted by Oregon DEQ in 1991, dioxins were detected in carp, catfish, and crayfish tissue collected near the LRIS (Foster et al. 1999). A fish tissue study performed by Ecology in 2007 in the Lake Vancouver vicinity reported that PCBs, dioxins, and chlorinated pesticides were present in fish tissue (Ecology 2007).

4.4 Receptors of Potential Concern

The CSM describes potential chemical sources, release mechanisms, environmental transport processes, exposure routes, and receptors. The primary purpose of the CSM is to describe pathways by which human and ecological receptors may be exposed to site-related chemicals in the environment. According to the USEPA (1989), a complete exposure pathway consists of four necessary elements: 1) a source and mechanism of chemical release to the environment; 2) an environmental transport medium for a released chemical; 3) a point of potential contact with the impacted medium (referred to as the exposure point); and 4) an exposure route (e.g., incidental sediment ingestion) at the exposure point. Preliminary ecological and human health CSMs have been developed and are shown in Figures 14 and 15, respectively.

Generally, the principal receptors that have the potential to contact sediment offshore of the LRIS are:

- **Recreationists:** The water recreation scenario includes personal watercraft, water skiing, kayaking, and swimming. The primary exposure medium for these activities is water, but individuals may also come into contact with sediment while entering or exiting the water. Recreationists may be adults and children.
- **Fishers:** Fishers generally angle near the site by boat, using hook and line. Fish are caught for personal consumption. The primary exposure media for this scenario are aquatic biota, although individuals may also come in direct contact with surface water and sediment. Fishers may include adults and children.
- **Tribal Fishers/Shellfish Gathering:** Lake River is not a documented usual and accustomed (U&A) fishing ground for tribes, however the potential exists that subsistence fishing/shellfish gathering is a potential scenario. This scenario addresses fish and shellfish harvesting and it is assumed that the exposure pathways identified for the fisher scenario are applied. Adults and children are the receptors for the subsistence fish gathering scenario.
- **Water-Dependent Wildlife Receptors:** Aquatic receptors at offshore of the LRIS include:
  - Macrophytes
  - Benthic invertebrates

- Fish (piscivorous, omnivorous, and benthivorous)
- Piscivorous mammals such as river otters
- Piscivorous raptors such as bald eagles and osprey
- Shore birds including great blue heron, diving ducks such as mergansers, and dabbling ducks such as mallard

4.5 Summary of CSM

The CSM update presented in this section provides the framework for assessing contaminants and their impact on potential human and environmental receptors. This framework includes a description of the physical site characteristics, potential sources and release mechanisms, fate and transport processes, existing environmental quality, and potential receptors. The results of the Sediment RI showed elevated dioxin/furan concentrations (reported as 2,3,7,8-TEQ) in the nearshore areas of Lake River, adjacent to stormwater outfalls, and areas within Carty Lake, adjacent to Cell 2. The presence of dioxin/furans in these areas is consistent with impacts from stormwater discharge and surface soil erosion from upland areas. Other sediment IHSs identified include PAHs, chlorinated phenolics, and metals (arsenic and chromium), which are present in limited areas and co-located with elevated detections of dioxin/furans.

Ongoing Interim Actions and RI/FS work is being performed in all upland areas of the LRIS to control sources of contaminates to Lake River and Carty Lake surface water and sediments. An Interim Action was performed in Cell 3 and 4 during the summer of 2010 and it is anticipated that the Interim Action planned for Cells 1 and 2 will take place during 2011 and 2012. Upon completion of these Interim Actions and RI/FS work, upland sources of contamination from the LRIS will be eliminated. The testing results from the Sediment RI represent current conditions and the potential for additional sediment impacts is limited due to ongoing upland remedial work.

The sediment IHSs include known bioaccumulative chemicals, including dioxin/furans. Additional information is needed to inform the CSM and develop appropriate cleanup levels to address potential risks associated bioaccumulative chemicals. The development of cleanup levels will take into account background (ambient) conditions related to the presence of dioxin/furans.

5 DATA GAPS AND RECOMMENDED NEXT STEPS

This section presents data gaps and recommended next steps to complete the Sediment RI. Data gaps include nature and extent of contamination and development of cleanup levels.

5.1 Nature and Extent of Contamination

Sediment contamination has been defined during the Sediment RI as the following:

- Identification of sediment IHSs including:
  - Phenols (PCP, 3-Methylphenol and 4-methylphenol
  - Phthalates (butylbenzyl phthalate)
  - PAHs
  - Metals (arsenic and chromium
  - Dioxins/furans
- Sediment impacts are primarily in surface sediment (0-10 cm)
- Sediment impacts are primarily adjacent to the facility
- Lake River sediment nature and extent has been defined

The following data gaps warrant collection of additional Phase 2 sediment quality information in areas of Carty Lake and in background areas:

- **Surface Sediment Quality:** Additional surface sediment testing is necessary in Carty Lake to better define the lateral extent of dioxins/furans in vicinity of LRIS-CL-07. Data will also be used to evaluate the potential risk associated with sediment concentrations in Carty Lake.
- **Background Evaluation:** Additional background surface sediment testing is necessary to define area background concentrations of dioxins/furans to differentiate site-related dioxin/furan contamination from ambient conditions. The locations and number of background surface sediment samples will be coordinated with Ecology.

5.2 Cleanup Level Development

Preliminary sediment screening levels were used to identify potential impacts to sediment, based on the results of the Sediment RI as presented in Section 3. Sediment IHSs include bioaccumulative chemicals, including dioxins/furans. Cleanup levels for these contaminants may be developed through an exposure assessment and a site-specific risk assessment and/or evaluation of background/ambient conditions, as necessary.

5.3 Recommended Next Steps

This Sediment RI Data Memorandum and the associated appendices complete the phase of the Sediment RI as outlined in the Sediment RI Work Plan (Anchor QEA and MFA 2009). Based on the remaining activities to address data needs discussed above, the following next steps are recommended to complete the Sediment RI:

- **Phase 2 Sediment RI Work Plan:** A Phase 2 Sediment RI Work Plan will be developed to refine the nature and extent of dioxin/furan impacts in Carty Lake sediments. Nature and extent refinement will involve additional sampling in Carty Lake. In addition sampling and evaluation of background dioxin/furan concentrations will be conducted in Carty Lake and Lake River.
- **Sediment RI Report:** The Sediment RI report will be prepared following completion of the Phase 2 Sediment RI testing. Background dioxin/furan concentrations will be provided for comparison with near-site concentrations. Upon completion of the Sediment RI report, potential sediment cleanup requirements will be identified.

6 REFERENCES

Anchor QEA and MFA, 2009. Final Work Plan. Sediment Remedial Investigation. Lake River Industrial Site. Prepared for Port of Ridgefield and Union Pacific Railroad Company. Prepared by Anchor QEA, LLC and Maul Foster & Alongi, Inc. October.

Avocet, 2010. Development of Benthic SQVs for Freshwater Sediments in Washington, Oregon, and Idaho. Prepared for Washington Department of Ecology and Oregon Department of Environmental Quality. Prepared by Avocet Consulting. June 2010.

Bhagat, S.K. and Orsborn, J. F.1971. Water Quality and Quality Studies of Vancouver Lake, Washington. Washington State University, College of Engineering Research Division. July, 2971.

Ecology (Washington State Department of Ecology) 1995. Sediment Management Standards. Chapter 173-204 WAC. December 29, 1995.

Ecology 2003. Development of Freshwater Sediment Quality Values For Use In Washington State. Washington State Department of Ecology by Avocet Consulting. Publication No. 03-09088. September 2003.

Ecology 2007. Vancouver Lake PCBs, Chlorinated Pesticides, and Dioxins in Fish Tissue and Sediment. Publication No. 07-03-017. Ecology March 2007

Ecology. 2010. SMS Rule Revisions - Human Health and Background Issues, Summary of Advisory Group Feedback, April 2010. http://www.ecy.wa.gov/programs/tcp/regs/2009MTCA/AdvGrpMeetingInfo/mtg_100426/SedDiscus.pdf.

Foster, E.P., D. Drake, and R. Farlow. 1999. Polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran congener profiles in fish, crayfish, and sediment collected near a wood treating facility and a bleached kraft pulp mill. Environmental Contamination and Toxicology 62:239-246.

Gary Struthers Associates, Inc. 2005. Vancouver Lake Restoration History. Vancouver WA: Port of Vancouver.

Group Mackenzie. 2010. Stormwater Pollution Prevention Plan. Prepared for the Port of Ridgefield. Group Mackenzie, Vancouver, Washington. June 29, 2010.

MFA 2004. Remedial Investigation Work Plan Volume 1: Cells 1, 2, and 4. Port of Ridgefield Lake River Site (former Pacific Wood Treating, Inc.). Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. July 2, 2004.

MFA 2007. Cell 3 Remedial Investigation and Risk Assessment Report. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. February 23, 2007.

MFA 2010. Cells 3 and 4 Interim Action Work Plan. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. May 27, 2010.

MFA 2011, Draft Cells 1 and 2 Remedial Investigation and Feasibility Study Report. Prepared for the Port of Ridgefield. Prepared by Maul Foster & Alongi, Inc. January 19, 2011.

Port of Ridgefield, 1996. Work plan for the stormwater collection and drainage system, Lake River site (formerly Pacific Wood Treating site). Prepared for Washington State Department of Ecology. Port of Ridgefield, Washington. December 10.

PSEP. 1986. Recommended protocols for measuring conventional sediment variables in Puget Sound. Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

PSEP. 1997a. Puget Sound Estuary Program: Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissue in Puget Sound. Prepared for the U.S. Environmental Protection Agency Region 10, and the Puget Sound Water Quality Authority. Puget Sound Water Quality Authority, Olympia, Washington.

PSEP. 1997b. Puget Sound Estuary Program: Recommended Guidelines for Measuring Organic Compounds in Puget Sound Sediment and Tissue Samples. Prepared for the U.S. Environmental Protection Agency Region 10, and the Puget Sound Water Quality Authority. Puget Sound Water Quality Authority, Olympia, Washington.

Sorensen, R.M. and J.R. Weggel, "Development of Ship Wave Design Information," Proceedings of the 18th International Conference on Coastal Engineering, Houston, Texas, September, 1984.

USACE (U.S. Army Corps of Engineers). 2003. Coastal Engineering Manual. 2003.

U.S. Army Corps of Engineers (USACE). 2008. Dredge Material Evaluation and Disposal Procedures (User's Manual). Dredged Material Management Program, Corps of

Engineers, Seattle District, Environmental Protection Agency, Region 10, Washington State Department of Natural Resources, Washington State Department of Ecology, Prepared by Dredged Material Management Office, US Army Corps of Engineers, Seattle District. July 2008.

USACE et al. 2006. Interim final northwest regional sediment evaluation framework. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Washington State Department of Ecology, Washington State Department of Natural Resources, Oregon Department of Environmental Quality, Idaho Department of Environmental Quality, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. September.

USEPA. 1979. Final Environmental Impact Statement for Vancouver Lake Reclamation Study. EPA-10-WA-CLARK-POV-CL-77. June 13, 1979.

USEPA (U.S. Environmental Protection Agency). 1986. Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods, 3rd Edition. EPA SW-846, 1986.

USEPA. 1989. Risk assessment guidance for Superfund. Vol. I, Human health evaluation manual (Part A). Interim final. EPA/540/1A89/002. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. December.

USEPA. 2004a. National recommended water quality criteria. U.S. Environmental Protection Agency.

USEPA. 2004b. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA540-R-04-004, October 2004.

USEPA. 2005. National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review. OSWER 9240.1-51, EPA-540-R-05-001, September 2005.

USEPA. 2007. Ecological risk assessment. Freshwater sediment screening benchmarks. U.S. Environmental Protection Agency mid-Atlantic risk assessment. http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/screenbench.htm (March 7).

USEPA. 2008. USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review. EPA540/08-01, June 2008.

USFWS. 2000. Environmental contaminates program, on-refuge clean-up investigations sub-activity, WA—preliminary assessment to determine superfund site impacts on the

Ridgefield National Wildlife Refuge. Department of Interior, U.S. Fish and Wildlife Service. June 27.

USFWS. 2008. Visiting Ridgefield National Wildlife Refuge. Ridgefield National Wildlife Refuge complex. U.S. Fish and Wildlife Service—Pacific Region. http://www.fws.gov/ridgefieldrefuges/RNWRVisiting.htm (February 21).

TABLES

Table 1
Summary of Surface Sediment Chemical and Physical Testing

Station ID		Actual Coordinates[1,2] Easting (X)	Northing (Y)	Water Depth[3] (feet)	Mudline Elevation[1,2] (NGVD29)	Sampling Interval	Sediment Sample ID	Tier 1 Surface Sediment Testing Chemistry[4]	Physical[5]	Testing Chemistry[4]	Physical[5]
Lake River (LR)											
LR	LRIS-LR-01	1066507.92	184785.29	4.2	2.9	0 to 10 cm	LRIS-LR-01-SS	SVOCs, Metals, PCBs, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-02	1066405.49	184732.98	11.1	-4.3	0 to 10 cm	LRIS-LR-02-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-03	1066354.68	184998.26	4.25	2.5	0 to 10 cm	LRIS-LR-03-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	--	--
	LRIS-LR-04	1066255.50	184954.79	11.4	-4.9	0 to 10 cm	LRIS-LR-04-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-05	1066355.33	185146.38	5.4	0.7	0 to 10 cm	LRIS-LR-05-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-LR-06	1066257.02	185210.75	7.5	-1.7	0 to 10 cm	LRIS-LR-06-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx	--
	LRIS-LR-07	1066135.92	185202.31	12.4	-6.7	0 to 10 cm	LRIS-LR-07-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-08	1066161.19	185495.52	3.6	1.9	0 to 10 cm	LRIS-LR-08-SS	SVOCs, Metals, PCBs, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-09	1066104.28	185421.55	8.4	-3.0	0 to 10 cm	LRIS-LR-09-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-10	1066070.68	185702.40	3.4	1.8	0 to 10 cm	LRIS-LR-10-SS	SVOCs, Metals, PCBs, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-LR-11	1065985.27	185680.99	13.2	-5.9	0 to 10 cm	LRIS-LR-11-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-12	1065919.22	185971.85	4.4	2.8	0 to 10 cm	LRIS-LR-12-SS	SVOCs, Metals, PCBs, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-LR-13	1065869.78	185921.23	14.1	-7.2	0 to 10 cm	LRIS-LR-13-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-14	1065834.78	186277.84	5.2	1.7	0 to 10 cm	LRIS-LR-14-SS	SVOCs, Metals, PCBs, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-15	1065701.48	186192.10	15.2	-8.4	0 to 10 cm	LRIS-LR-15-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-16	1067014.51	183846.59	6.0	-0.6	0 to 10 cm	LRIS-LR-16-SS	SVOCs, Metals, PCBs, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-LR-17	1066670.90	184084.12	9.1	-3.9	0 to 10 cm	LRIS-LR-17-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-18	1066592.56	184401.44	6.6	-1.6	0 to 10 cm	LRIS-LR-18-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-19	1066581.73	184639.93	4.7	2.2	0 to 10 cm	LRIS-LR-19-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-LR-20	1066456.88	184908.13	4.6	2.4	0 to 10 cm	LRIS-LR-20-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-LR-21	1066179.54	184848.31	15.8	-8.7	0 to 10 cm	LRIS-LR-21-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-22	1066253.62	185347.21	4.7	2.4	0 to 10 cm	LRIS-LR-22-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx	--
	LRIS-LR-23	1065928.21	185382.49	9.8	-2.7	0 to 10 cm	LRIS-LR-23-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-24	1066162.33	185563.89	4.9	2.1	0 to 10 cm	LRIS-LR-24-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-25	1065992.55	185822.31	6.6	0.2	0 to 10 cm	LRIS-LR-25-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-LR-26	1065901.70	186088.77	3.6	3.1	0 to 10 cm	LRIS-LR-26-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	--	--
	LRIS-LR-27	1065681.20	186009.84	13.5	-7.0	0 to 10 cm	LRIS-LR-27-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-LR-28	1065679.08	186472.28	12.6	-6.2	0 to 10 cm	LRIS-LR-28-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
Carty Lake (CL)											
CL	LRIS-CL-01	1066530.46	186304.44	Above Water	--	0 to 10 cm	LRIS-CL-01-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-CL-02	1066652.47	186313.83	1.6	--	0 to 10 cm	LRIS-CL-02-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-CL-03	1066516.39	186426.44	Above Water	--	0 to 10 cm	LRIS-CL-03-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-CL-04	1066638.39	186407.67	1.3	--	0 to 10 cm	LRIS-CL-04-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	TPH-Dx, Dioxins	--
	LRIS-CL-05	1066604.21	186782.74	3.0	--	0 to 10 cm	LRIS-CL-05-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-CL-06	1066687.96	187269.28	2.7	--	0 to 10 cm	LRIS-CL-06-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
	LRIS-CL-07	1066706.55	187671.03	2.7	--	0 to 10 cm	LRIS-CL-07-SS	SVOCs, Metals, S_2, NH_3	GS, TS, TVS, TOC	Dioxins	--
Background Areas (BKG)											
BKG	LRIS-BKG-01	1068225.43	182533.80	17.8	-12.2	0 to 10 cm	LRIS-BKG-01-SS	Dioxins, SVOCs, PCBs, S_2, NH_3	GS, TS, TVS, TOC	--	--
	LRIS-BKG-02	1064431.78	185091.37	6.2	-0.1	0 to 10 cm	LRIS-BKG-02-SS	Dioxins, SVOCs, PCBs, S_2, NH_3	GS, TS, TVS, TOC	--	--
	LRIS-BKG-03	1064662.65	188909.21	8.1	-2.2	0 to 10 cm	LRIS-BKG-03-SS	Dioxins, SVOCs, PCBs, S_2, NH_3	GS, TS, TVS, TOC	--	--
	LRIS-BKG-04	1065978.56	188581.94	3.30	--	0 to 10 cm	LRIS-BKG-04-SS	Dioxins, PCP, PCBs, S_2, NH_3	GS, TS, TVS, TOC	--	--

Table 1
Summary of Surface Sediment Chemical and Physical Testing

Notes:

1 - Station IDs LRIS-LR-01 to LRIS-LR-15 are co-located surface and subsurface sediment stations. Actual coordinates and mudlines are presented for accepted surface sediment samples.

2 - Horizontal Datum is NAD83 HARN State Plane Washington South, US Survey feet. Vertical datum is NGVD29. Mudline determined from daily water level measurements from pump house casing (TOC=26.79 NGVD29).

3 - Water depth presented is at the time of sample collection. Water levels in Lake River are tidally and seasonally influenced.

4 - Chemical testing: SVOCs = semivolatile organic compunds, PCBs = polychloronated biphenyls, S_2 = sulfides, NH_3 = ammonia, TPH-Dx = diesel range total petroleum hydrocarbons

5 - Physical testing: GS = Grain Size (not frozen), TS = Total Solids, TVS = Total Volatile Solids, TOC = Total Organic Carbon

Table 2
Summary of Subsurface Sediment Chemical and Physical Testing

Station ID		Actual Coordinates[1,2]		Penetration (feet below mudline)	Core Recovery (%)	Water Depth[3] (feet)	Mudline Elevation (NGVD 29)[1,2]	Subsurface Sediment Sample ID	Sample Interval (Recovered)	Tier 1 Subsurface Sediment Testing		Tier 2 Subsurface Sediment Testing	
		Easting (X)	Northing (Y)							Chemistry[4]	Physical[5]	Chemistry[4]	Physical[5]
Lake River (LR)													
LR	LRIS-LR-01	1066513.70	184786.51	13.3	81%	2.7	2.8	LRIS-LR-01-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-01-SB-1-2	1-2 feet	SVOC, Metals	GS, TS, TVS, TOC	Dioxins	--
								LRIS-LR-01-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-01-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-01-SB-4-5	4-5 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-01-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-01-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-01-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-01-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-01-SB-9-10.3	9-10.3 feet	--	--	--	--
	LRIS-LR-02	1066408.33	184726.95	12.2	68%	9.1	-3.8	LRIS-LR-02-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-02-SB-1-2	1-2 feet	--	--	--	--
								LRIS-LR-02-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-02-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-02-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-02-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-02-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-02-SB-7-7.8	7-7.8 feet	--	--	--	--
	LRIS-LR-03	1066352.24	185002.28	13.2	80%	3.7	2.5	LRIS-LR-03-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-03-SB-1-2	1-2 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-03-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-03-SB-3-4	3-4 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-03-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-03-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-03-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-03-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-03-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-03-SB-9-10.3	9-10.3 feet	--	--	--	--
	LRIS-LR-04	1066252.04	184965.46	13.7	83%	10.6	-5.0	LRIS-LR-04-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-04-SB-1-2	1-2 feet	--	--	--	--
								LRIS-LR-04-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-04-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-04-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-04-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-04-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-04-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-04-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-04-SB-9-9.8	9-9.8 feet	--	--	--	--

Table 2
Summary of Subsurface Sediment Chemical and Physical Testing

Station ID		Actual Coordinates[1,2] Easting (X)	Actual Coordinates[1,2] Northing (Y)	Penetration (feet below mudline)	Core Recovery (%)	Water Depth[3] (feet)	Mudline Elevation (NGVD 29)[1,2]	Subsurface Sediment Sample ID	Sample Interval (Recovered)	Tier 1 Subsurface Sediment Testing Chemistry[4]	Tier 1 Subsurface Sediment Testing Physical[5]	Tier 2 Subsurface Sediment Testing Chemistry[4]	Tier 2 Subsurface Sediment Testing Physical[5]
LR	LRIS-LR-05	1066347.21	185152.68	13.5	80%	4.7	1.6	LRIS-LR-05-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-05-SB-1-2	1-2 feet	SVOC, Metals	GS, TS, TVS, TOC	Dioxins	--
								LRIS-LR-05-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-05-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-05-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-05-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-05-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-05-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-05-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-05-SB-9-10.5	9-10.5 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
	LRIS-LR-06	1066263.58	185217.32	11.7	78%	7.4	-0.9	LRIS-LR-06-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-06-SB-1-2	1-2 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-06-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-06-SB-3-4	3-4 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-06-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-06-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-06-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-06-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-06-SB-8-8.6	8-8.6 feet	--	--	--	--
	LRIS-LR-07	1066129.76	185205.69	13.4	84%	12.6	-6.3	LRIS-LR-07-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-07-SB-1-2	1-2 feet	--	--	--	--
								LRIS-LR-07-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-07-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-07-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-07-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-07-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-07-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-07-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-07-SB-9-10	9-10 feet	--	--	--	--
								LRIS-LR-07-SB-10-10.9	10-10.9 feet	--	--	--	--
	LRIS-LR-08	1066182.48	185479.09	13.0	78%	4.3	2.2	LRIS-LR-08-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-08-SB-1-2	1-2 feet	SVOC, Metals	GS, TS, TVS, TOC	Dioxins	--
								LRIS-LR-08-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-08-SB-3-4	3-4 feet	SVOC, Metals	GS, TS, TVS, TOC	Dioxins	--
								LRIS-LR-08-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-08-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-08-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-08-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-08-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-08-SB-9-9.7	9-9.7 feet	--	--	--	--

Table 2
Summary of Subsurface Sediment Chemical and Physical Testing

Station ID		Actual Coordinates[1,2] Easting (X)	Actual Coordinates[1,2] Northing (Y)	Penetration (feet below mudline)	Core Recovery (%)	Water Depth[3] (feet)	Mudline Elevation (NGVD 29)[1,2]	Subsurface Sediment Sample ID	Sample Interval (Recovered)	Tier 1 Subsurface Sediment Testing Chemistry[4]	Tier 1 Subsurface Sediment Testing Physical[5]	Tier 2 Subsurface Sediment Testing Chemistry[4]	Tier 2 Subsurface Sediment Testing Physical[5]
LR	LRIS-LR-09	1066072.47	185445.37	13.5	81%	12.0	-5.0	LRIS-LR-09-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-09-SB-1-2	1-2 feet	--	--	SVOC, Dioxins	GS, TS, TVS, TOC
								LRIS-LR-09-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-09-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-09-SB-4-5	4-5 feet	--	--	SVOC, Dioxins	GS, TS, TVS, TOC
								LRIS-LR-09-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-09-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-09-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-09-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-09-SB-9-10	9-10 feet	--	--	--	--
								LRIS-LR-09-SB-10-10.9	10-10.9 feet	--	--	--	--
	LRIS-LR-10	1066070.06	185702.50	12.8	76%	4.1	2.0	LRIS-LR-10-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-10-SB-1-2	1-2 feet	SVOC, Metals	GS, TS, TVS, TOC	Dioxins	--
								LRIS-LR-10-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-10-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-10-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-10-SB-5-6	5-6 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-10-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-10-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-10-SB-8-9.2	8-9.2 feet	--	--	--	--
	LRIS-LR-11	1065962.63	185654.50	13.6	79%	14.9	-7.7	LRIS-LR-11-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-11-SB-1-2	1-2 feet	--	--	--	--
								LRIS-LR-11-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-11-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-11-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-11-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-11-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-11-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-11-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-11-SB-9-10.3	9-10.3 feet	--	--	--	--
	LRIS-LR-12	1065925.32	185972.30	12.5	86%	4.0	2.8	LRIS-LR-12-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-12-SB-1-2	1-2 feet	SVOC, Metals	GS, TS, TVS, TOC	Dioxins	--
								LRIS-LR-12-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-12-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-12-SB-4-5	4-5 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-12-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-12-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-12-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-12-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-12-SB-9-10.2	9-10.2 feet	--	--	--	--

Table 2
Summary of Subsurface Sediment Chemical and Physical Testing

Station ID		Actual Coordinates[1,2] Easting (X)	Actual Coordinates[1,2] Northing (Y)	Penetration (feet below mudline)	Core Recovery (%)	Water Depth[3] (feet)	Mudline Elevation (NGVD 29)[1,2]	Subsurface Sediment Sample ID	Sample Interval (Recovered)	Tier 1 Subsurface Sediment Testing Chemistry[4]	Tier 1 Subsurface Sediment Testing Physical[5]	Tier 2 Subsurface Sediment Testing Chemistry[4]	Tier 2 Subsurface Sediment Testing Physical[5]
LR	LRIS-LR-13	1065846.92	185952.23	11.8	76%	14.2	-7.4	LRIS-LR-13-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-13-SB-1-2	1-2 feet	--	--	--	--
								LRIS-LR-13-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-13-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-13-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-13-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-13-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-13-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-13-SB-8-8.8	8-8.8 feet	--	--	--	--
	LRIS-LR-14	1065840.20	186268.91	13.5	78%	6.0	1.6	LRIS-LR-14-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-14-SB-1-2	1-2 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-14-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-14-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-14-SB-4-5	4-5 feet	SVOC, Metals	GS, TS, TVS, TOC	--	--
								LRIS-LR-14-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-14-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-14-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-14-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-14-SB-9-10.2	9-10.2 feet	--	--	--	--
	LRIS-LR-15	1065699.35	186200.61	13.5	83%	16.0	-8.6	LRIS-LR-15-SB-0-1	0-1 feet	--	--	--	--
								LRIS-LR-15-SB-1-2	1-2 feet	--	--	--	--
								LRIS-LR-15-SB-2-3	2-3 feet	--	--	--	--
								LRIS-LR-15-SB-3-4	3-4 feet	--	--	--	--
								LRIS-LR-15-SB-4-5	4-5 feet	--	--	--	--
								LRIS-LR-15-SB-5-6	5-6 feet	--	--	--	--
								LRIS-LR-15-SB-6-7	6-7 feet	--	--	--	--
								LRIS-LR-15-SB-7-8	7-8 feet	--	--	--	--
								LRIS-LR-15-SB-8-9	8-9 feet	--	--	--	--
								LRIS-LR-15-SB-9-10	9-10 feet	--	--	--	--
								LRIS-LR-15-SB-10-11	10-11 feet	--	--	--	--
Carty Lake (CL)													
CL	LRIS-CL-01	1066530.46	186304.44	2 feet	100 %	Above Water	--	LRIS-CL-01-SB-1-2	1-2 feet	--	--	Dioxins	--
	LRIS-CL-02	1066652.47	186313.83	2 feet	100 %	1.6	--	LRIS-CL-02-SB-1-2	1-2 feet	--	--	Dioxins, SVOC, Metals	GS, TS, TVS, TOC
	LRIS-CL-03	1066516.39	186426.44	2 feet	100 %	Above Water	--	LRIS-CL-03-SB-1-2	1-2 feet	--	--	Dioxins	--
	LRIS-CL-04	1066638.39	186407.67	2 feet	100 %	1.3	--	LRIS-CL-04-SB-1-2	1-2 feet	--	--	Dioxins, SVOC, Metals	GS, TS, TVS, TOC
	LRIS-CL-05	1066604.21	186782.74	2 feet	100 %	3.0	--	LRIS-CL-05-SB-1-2	1-2 feet	--	--	Dioxins	--
	LRIS-CL-06	1066687.96	187269.28	2 feet	100 %	2.7	--	LRIS-CL-06-SB-1-2	1-2 feet	--	--	Dioxins	--
	LRIS-CL-07	1066706.55	187671.03	2 feet	100 %	2.7	--	LRIS-CL-07-SB-1-2	1-2 feet	--	--	Dioxins	--

Notes:

1 - Station IDs LRIS-LR-01 to LRIS-LR-15 are co-located surface and subsurface sediment stations. Actual coordinates and mudlines are presented for accepted cores.

2 - Horizontal Datum is NAD83 HARN State Plane Washington South, US Survey feet. Vertical datum is NGVD29. Mudline determined from daily water level measurements from pump house casing (TOC=26.79 NGVD29).

3 - Water depth presented is at the time of sample collection. Water levels in Lake River are tidally and seasonally influenced.

4 - Chemical testing: SVOCs = Semivolatile Organic Compounds

5 - Physical testing: GS = Grain Size (not frozen), TS = Total Solids, TVS = Total Volatile Solids, TOC = Total Organic Carbon

Table 3
Summary of LRIS Sediment RI Tier 2 Testing

Tier 2 Testing Request Sample ID	Project Area	Surface/ Subsurface	Request Date	Sampling Interval	Tier 2 Testing		Tier 2 Testing Rationale
					Chemistry[1]	Physical[2]	
Carty Lake							
LRIS-CL-02-SB-1-2	Carty Lake	Subsurface	5/21/2010	1-2 feet	SVOCs, Metals	GS, TS, TVS, TOC	Surface sample PCP detection of 880 µg/kg.
LRIS-CL-04-SB-1-2	Carty Lake	Subsurface	5/21/2010	1-2 feet	SVOCs, Metals	GS, TS, TVS, TOC	Surface sample PCP detection of 210 µg/kg.
LRIS-CL-02-SS	Carty Lake	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	PCP detection of 880 µg/kg. Low to moderate PAH detections.
LRIS-CL-04-SS	Carty Lake	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	PCP detection of 880 µg/kg. Low to moderate PAH detections.
LRIS-CL-06-SS	Carty Lake	Surface	6/29/2010	0-10 cm	Dioxins	--	Carty Lake background dioxins at 18.1 ng/kg TEQ.
LRIS-CL-07-SS	Carty Lake	Surface	6/29/2010	0-10 cm	Dioxins	--	Carty Lake background dioxins at 18.1 ng/kg TEQ.
LRIS-CL-01-SS	Carty Lake	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-CL-03-SS	Carty Lake	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-CL-05-SS	Carty Lake	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-CL-01-SB-1-2	Carty Lake	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-CL-02-SB-1-2	Carty Lake	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-CL-03-SB-1-2	Carty Lake	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-CL-04-SB-1-2	Carty Lake	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-CL-05-SB-1-2	Carty Lake	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-CL-06-SB-1-2	Carty Lake	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-CL-07-SB-1-2	Carty Lake	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
Lake River							
LRIS-LR-01-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	Adjacent to former Outfall 1.
LRIS-LR-04-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	Historic dredge area (depositional)
LRIS-LR-05-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	Low to moderate PAH detections. Former barge loading.
LRIS-LR-06-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx	--	Low to moderate PAH detections.
LRIS-LR-08-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	PCP detection of 400 µg/kg.
LRIS-LR-10-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	Low to moderate PAH detections. Adjacent to Outfall 2.
LRIS-LR-12-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	Low to moderate PAH detections. Adjacent to Outfall 3.
LRIS-LR-14-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	Adjacent to wastewater treatment plant outfall.
LRIS-LR-16-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	Low to moderate PAH detections. Adjacent to City outfall.
LRIS-LR-19-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	Low to moderate PAH detections. PCP detection of 380 µg/kg.
LRIS-LR-20-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	Low to moderate PAH detections. PCP detection of 490 µg/kg.
LRIS-LR-21-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	West area of Lake River across from former Outfall 1.
LRIS-LR-22-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx	--	Low to moderate PAH detections.
LRIS-LR-23-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	West area of Lake River across from Outfall 4.
LRIS-LR-24-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	PCP detection of 510 µg/kg.
LRIS-LR-25-SS	Lake River	Surface	6/29/2010	0-10 cm	TPH-Dx, Dioxins	--	Low to moderate PAH detections. PCP detection of 740 µg/kg.
LRIS-LR-27-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	West area of Lake River across from Outfall 3.
LRIS-LR-28-SS	Lake River	Surface	6/29/2010	0-10 cm	Dioxins	--	Down river.
LRIS-LR-08-SB-1-2	Lake River	Subsurface	6/29/2010	1-2 feet	Dioxins	--	Adjacent to Outfall 4. PCP, PAH detections in 1-2 foot sample.
LRIS-LR-08-SB-3-4	Lake River	Subsurface	6/29/2010	3-4 feet	Dioxins	--	Adjacent to Outfall 4. PCP, PAH detections in 1-2 foot sample.
LRIS-LR-09-SB-1-2	Lake River	Subsurface	6/29/2010	1-2 feet	SVOCs	GS, TS, TVS, TOC	Adjacent to LRIS-LR-08-SB (PCP, PAH detections)
LRIS-LR-09-SB-4-5	Lake River	Subsurface	6/29/2010	4-5 feet	SVOCs	GS, TS, TVS, TOC	Adjacent to LRIS-LR-08-SB (PCP, PAH detections)
LRIS-LR-02-SS	Lake River	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-LR-07-SS	Lake River	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-LR-09-SS	Lake River	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation

Table 3
Summary of LRIS Sediment RI Tier 2 Testing

Tier 2 Testing Request Sample ID	Project Area	Surface/ Subsurface	Request Date	Sampling Interval	Tier 2 Testing		Tier 2 Testing Rationale
					Chemistry[1]	Physical[2]	
LRIS-LR-11-SS	Lake River	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-LR-13-SS	Lake River	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-LR-15-SS	Lake River	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-LR-17-SS	Lake River	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-LR-18-SS	Lake River	Surface	9/15/2010	0-10 cm	Dioxins	--	Dioxin/furan delineation
LRIS-LR-01-SB-1-2	Lake River	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-LR-05-SB-1-2	Lake River	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-LR-09-SB-1-2	Lake River	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-LR-09-SB-4-5	Lake River	Subsurface	9/15/2010	4-5 feet	Dioxins	--	Dioxin/furan delineation
LRIS-LR-10-SB-1-2	Lake River	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation
LRIS-LR-12-SB-1-2	Lake River	Subsurface	9/15/2010	1-2 feet	Dioxins	--	Dioxin/furan delineation

Note:

1 - Chemical testing: SVOCs = semivolatile organic compunds, PCBs = polychloronated biphenyls, S_2 = sulfides, NH_3 = ammonia, TPH-Dx = diesel range total petroleum hydrocarbons

2 - Physical testing: GS = Grain Size (not frozen), TS = Total Solids, TVS = Total Volatile Solids, TOC = Total Organic Carbon

PCP = pentachlorophenol

PAH = polycyclic aromatic hydrocarbons

TEQ = Toxic Equivalents

µg/kg = microgram per kilogram

ng/kg = nanogram per kilogram

Table 4
LRIS Preliminary Sediment Screening Criteria Development

Parameter	Freshwater Sediment Screening Criteria	Ecology 2010 Freshwater Criteria		Ecology 2003 Freshwater Criteria		Sediment Evaluation Framework		Sediment Management Standards Criteria		DMMP SL	USEPA Region III BTAG
		SQS/SL1	CSL/SL2	LAET	2LAET	SL1	SL2	SQS	CSL		
Phenols (µg/kg)											
Phenol	120	120	210	--	--	--	--	420	1,200	420	420
2-Methylphenol	63	---	---	--	--	--	--	63	63	63	--
4-Methylphenol	260	260	2,000	760	2,360	--	--	670	670	670	670
2,4-Dimethylphenol	29	---	---	--	--	--	--	29	29	29	29
Pentachlorophenol	1,200	1,200	>1,200	--	--	--	--	360	690	400	504
Metals (mg/kg)											
Arsenic	14	14	120	31.4	50.9	20	51	57	93	57	9.8
Cadmium	2.1	2.1	5.4	2.39	2.9	1.1	1.5	5.1	6.7	5.1	0.99
Chromium	72	72	82	95	133	95	100	260	270	---	43.4
Copper	400	400	1,200	619	829	80	830	390	390	390	31.6
Lead	360	360	>1,300	335	431	340	430	450	530	450	35.8
Mercury	0.66	0.66	0.8	0.8	3.04	0.28	0.75	0.41	0.59	0.41	0.18
Nickel	26	26	110	53.1	113	60	70	--	--	140	22.7
Silver	0.58	0.58	1.7	0.545	3.5	2.0	2.5	6.1	6.1	6.1	1.0
Zinc	3,200	3,200	>4,200	683	1,080	130	400	410	960	410	121
Aromatic Hydrocarbons (µg/kg)											
PAHs											
Total PAHs (U=1/2)	17,000	17,000	30,000	---	---	---	---	---	---	---	---
Total LPAH (U=0)	6,590	---	---	6,590	9,200	6,600	9,200	370 mg/kg OC	780 mg/kg OC	5,200	76
Naphthalene	529	---	---	529	1,310	500	1,300	99 mg/kg OC	170 mg/kg OC	2,100	176
Acenaphthylene	470	---	---	470	640	470	640	66 mg/kg OC	66 mg/kg OC	560	5.9
Acenaphthene	1,060	---	---	1,060	1,320	1,100	1,300	16 mg/kg OC	57 mg/kg OC	500	6.7
Fluorene	1,070	---	---	1,070	3,850	1,000	3,000	23 mg/kg OC	79 mg/kg OC	540	77.4
Phenanthrene	6,100	---	---	6,100	7,570	6,100	7,600	100 mg/kg OC	480 mg/kg OC	1,500	204
Anthracene	1,230	---	---	1,230	1,580	1,200	1,600	220 mg/kg OC	1,200 mg/kg OC	960	57.2
2-Methylnaphthalene[a]	469	---	---	469	555	470	560	38 mg/kg OC	64 mg/kg OC	670	20.2
Total HPAHs (U=0)	31,640	---	---	31,640	54,800	31,000	55,000	960 mg/kg OC	5,300 mg/kg OC	12,000	190
Fluoranthene	11,100	---	---	11,100	15,000	11,000	15,000	160 mg/kg OC	1,200 mg/kg OC	1,700	423
Pyrene	8,790	---	---	8,790	16,000	8,800	16,000	1,000 mg/kg OC	1,400 mg/kg OC	2,600	195
Benzo(a)anthracene	4,260	---	---	4,260	5,800	4,300	5,800	110 mg/kg OC	270 mg/kg OC	1,300	108
Chrysene	5,940	---	---	5,940	6,400	5,900	6,400	110 mg/kg OC	460 mg/kg OC	1,400	166
Total benzo(b+k)fluoranthenes	11,000	---	---	11,000	13,800	600	4,000	230 mg/kg OC	450 mg/kg OC	3,200	27.2
Benzo(a)pyrene	3,300	---	---	3,300	4,810	3,300	4,800	99 mg/kg OC	210 mg/kg OC	1,600	150
Indeno(1,2,3-cd)pyrene	4,120	---	---	4,120	5,300	4,100	5,300	34 mg/kg OC	88 mg/kg OC	600	17
Dibenz(a,h)anthracene	800	---	---	800	839	800	840	12 mg/kg OC	33 mg/kg OC	230	33
Benzo(g,h,i)perylene	4,020	---	---	4,020	5,200	4,000	5,200	31 mg/kg OC	78 mg/kg OC	670	170
Chlorinated Hydrocarbons (µg/kg)											
1,4-Dichlorobenzene	3.1 mg/kg OC	---	---	--	--	--	--	3.1 mg/kg OC	9 mg/kg OC	110	599
1,2-Dichlorobenzene	2.3 mg/kg OC	---	---	--	--	--	--	2.3 mg/kg OC	2.3 mg/kg OC	35	16.5
1,2,4-Trichlorobenzene	0.81 mg/kg OC	---	---	--	--	--	--	0.81 mg/kg OC	1.8 mg/kg OC	31	858
Hexachlorobenzene	0.38 mg/kg OC	---	---	--	--	--	--	0.38 mg/kg OC	2.3 mg/kg OC	22	20

Table 4
LRIS Preliminary Sediment Screening Criteria Development

Parameter	Freshwater Sediment Screening Criteria	Ecology 2010 Freshwater Criteria		Ecology 2003 Freshwater Criteria		Sediment Evaluation Framework		Sediment Management Standards Criteria		DMMP SL	USEPA Region III BTAG
		SQS/SL1	CSL/SL2	LAET	2LAET	SL1	SL2	SQS	CSL		
Phthalates (µg/kg)											
Dimethyl phthalate	311	---	---	311	436	46	440	53 mg/kg OC	53 mg/kg OC	71	--
Diethyl phthalate	61 mg/kg OC	---	---	--	--	--	--	61 mg/kg OC	110 mg/kg OC	200	603
Di-n-butyl phthalate	380	380	450	103	--	--	--	220 mg/kg OC	1,700 mg/kg OC	1,400	6,470
Butyl benzyl phthalate	260	---	---	260	366	260	370	4.9 mg/kg OC	64 mg/kg OC	63	10,900
Bis(2-ethylhexyl) phthalate	500	500	22,000	2,520	6,380	220	320	47 mg/kg OC	78 mg/kg OC	1,300	180
Di-n-octyl phthalate	39	39	>1,100	11	201	26	45	58 mg/kg OC	4,500 mg/kg OC	6,200	--
Miscellaneous Extractables (µg/kg)											
Benzyl Alcohol	57	---	---	--	--	--	--	57	73	57	--
Benzoic Acid	2,900	2,900	3,800	2,910	3790	--	--	650	650	650	650
Dibenzofuran	200	200	680	399	443	400	440	15 mg/kg OC	58 mg/kg OC	540	415
Hexachlorobutadiene	3.9 mg/kg OC	---	---	--	--	--	--	3.9 mg/kg OC	6.2 mg/kg OC	29	--
N-Nitrosodiphenylamine	11 mg/kg OC	---	---	--	--	--	--	11 mg/kg OC	11 mg/kg OC	28	2,680
Total Petroleum Hydrocarbons (mg/kg)											
Diesel range hydrocarbons	340	340	510	--	--	--	--	--	--	--	--
Motor oil range hydrocarbons	3,600	3,600	8,400	--	--	--	--	--	--	--	--
PCBs (µg/kg)											
Total PCB Aroclors	110	110	2,500	62	354	60	120	12 mg/kg OC	65 mg/kg OC	130	--
Dioxin/Furans (ng/kg)											
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--										
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	---	---	---	---
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	--	--	--	---	---	---	---
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	--	--	--	---	---	---	---
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	--	--	--	---	---	---	---
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	--	--	--	---	---	---	---
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	--	--	--	---	---	---	---

Notes:

All criteria presented as dry weight unless noted as OC (organic carbon normalized).

Highlighted value indicates the freshwater sediment screening criteria.

LRIS Sediment Screening Criteria Hierarchy:

Tier I: Ecology 2010 Draft Freshwater Criteria (Ecology 2010)
Tier II: Ecology 2003 Freshwater Criteria (Ecology 2003)
Tier III: Sediment Evaluation Framework – Freshwater (USACE 2006)
(Regional Sediment Evaluation Team [RSET] was updated in 2009; however, no freshwater criteria are presented)
Tier IV: Sediment Management Standards – Marine (Ecology 1995)
Tier V: Dredged Material Management Program Screening Level – Marine (USACE 2008)
Tier VI: EPA Region III BTAG – Freshwater (USEPA 2007)

SQS = sediment quality standards
CSL = cleanup screening levels
SL = screening level
LAET = lowest apparent effects threshold
2LAET = second lowest apparent effects threshold
DMMP = Dredged Material Management Program
BTAG = Biological Technical Assistance Group
mg/kg = milligram per kilogram
µg/kg = micrograms per kilogram
ng/kg = nanograms per kilogram

PAH = polycyclic aromatic hydrocarbon
HPAH = high molecular weight polycyclic aromatic hydrocarbon
LPAH = low molecular weight polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
TEQ = toxic equivalent

Table 5a
Surface Sediment Results Summary Statistics

Analyte	Detected	Above Preliminary Screening Criteria	Minimum Value	Maximum Value	Preliminary Screening Criteria	Maximum Exceedance Factor	Sediment IHS
Total organic carbon (%)	35 of 35	--	0.34	5.4	--	--	--
Total solids (%)	35 of 35	--	34	71	--	--	--
Total volatile solids (%)	35 of 35	--	0.87	17	--	--	--
Ammonia (mg/kg)	13 of 35	--	20 J	600 J	--	--	--
Sulfide (mg/kg)	25 of 35	--	4.3 J	44	--	--	--
Phenols (µg/kg)							
Phenol	29 of 35	0 of 35	2.3 J	54 U	120	--	--
2-Methylphenol (o-Cresol)	5 of 35	0 of 35	0.63 J	54 U	63	--	--
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	32 of 35	0 of 35	1.8 J	220	260	--	--
2,4-Dimethylphenol	0 of 35	1 of 35	7 U	54 U	29	1.9x (U)[1]	--
Pentachlorophenol	27 of 35	0 of 35	2.8 J	880	1,200	--	--
Metals (mg/kg)							
Arsenic	35 of 35	1 of 35	3.2	48	14	3.4x	Yes
Cadmium	33 of 35	0 of 35	0.02 J	0.96 J	2.1	--	--
Chromium	35 of 35	1 of 35	13	86	72	1.2x	Yes
Copper	35 of 35	0 of 35	8.5	75	400	--	--
Lead	35 of 35	0 of 35	5.2	42	360	--	--
Mercury	34 of 35	0 of 35	0.014 J	0.18 J	0.66	--	--
Nickel	35 of 35	0 of 35	10	21	26	--	--
Silver	35 of 35	0 of 35	0.051 J	0.17 J	0.58	--	--
Zinc	35 of 35	0 of 35	46	220 J	3,200	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)							
Total PAH (U = 1/2)	35 of 35	0 of 35	50.2	4,479	17,000	--	--
Total PAH (U = 0)	35 of 35	--	46.5	4,479	--	--	--
Total LPAH (U=1/2)	35 of 35	--	6.7	1,149	--	--	--
Total LPAH (U=0)	35 of 35	0 of 35	4.5	1,149	6,590	--	--
Naphthalene	33 of 35	0 of 35	0.46 J	260	529	--	--
Acenaphthylene	32 of 35	0 of 35	0.38 J	35	470	--	--
Acenaphthene	29 of 35	0 of 35	0.37 J	92	1,060	--	--
Fluorene	32 of 35	0 of 35	0.3 J	110	1,070	--	--
Phenanthrene	35 of 35	0 of 35	2.6	410	6,100	--	--
Anthracene	35 of 35	0 of 35	0.77 J	160	1,230	--	--
2-Methylnaphthalene	24 of 35	0 of 35	0.35 J	86	469	--	--
Total HPAH (U=1/2)	35 of 35	--	42.1	4,017	--	--	--
Total HPAH (U=0)	35 of 35	0 of 35	42.1	4,017	31,640	--	--
Fluoranthene	35 of 35	0 of 35	7.1	1,100	11,100	--	--
Pyrene	35 of 35	0 of 35	5.5	910	8,790	--	--
Benzo(a)anthracene	35 of 35	0 of 35	2.8	250	4,260	--	--
Chrysene	35 of 35	0 of 35	4.2	590	5,940	--	--
Benzofluoranthene	35 of 35	0 of 35	5.4	770	11,000	--	--
Benzo(a)pyrene	35 of 35	0 of 35	2.5	200	3,300	--	--
Indeno(1,2,3-c,d)pyrene	35 of 35	0 of 35	2 J	150	4,120	--	--
Dibenzo(a,h)anthracene	21 of 35	0 of 35	0.51 J	38	800	--	--

Table 5a
Surface Sediment Results Summary Statistics

Analyte	Detected	Above Preliminary Screening Criteria	Minimum Value	Maximum Value	Preliminary Screening Criteria	Maximum Exceedance Factor	Sediment IHS
Benzo(g,h,i)perylene	35 of 35	0 of 35	1.1 J	130	4,020	--	--
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)							
Total SMS LPAH (U = 0)	35 of 35	0 of 35	0.15	81.8	370	--	--
Naphthalene	33 of 35	0 of 35	0.015 J	20	99	--	--
Acenaphthylene	32 of 35	0 of 35	0.015 J	2.4	66	--	--
Acenaphthene	29 of 35	0 of 35	0.0109 J	7.8	16	--	--
Fluorene	32 of 35	0 of 35	0.04 U	8.5	23	--	--
Phenanthrene	35 of 35	0 of 35	0.075	31.5	100	--	--
Anthracene	35 of 35	0 of 35	0.0269 J	12.3	220	--	--
2-Methylnaphthalene	24 of 35	0 of 35	0.0078 J	6.6	38	--	--
Total SMS HPAH (U = 0)	35 of 35	0 of 35	1.2	232	960	--	--
Fluoranthene	35 of 35	0 of 35	0.1733	65.4	160	--	--
Pyrene	35 of 35	0 of 35	0.1911	53.1	1,000	--	--
Benzo(a)anthracene	35 of 35	0 of 35	0.0844	16.2	110	--	--
Chrysene	35 of 35	0 of 35	0.1389	32.8	110	--	--
Benzofluoranthene (unspecified)	35 of 35	0 of 35	0.2444	42.8	230	--	--
Benzo(a)pyrene	35 of 35	0 of 35	0.1289	13.1	99	--	--
Indeno(1,2,3-c,d)pyrene	35 of 35	0 of 35	0.0911	7.1	34	--	--
Dibenzo(a,h)anthracene	21 of 35	0 of 35	0.0113 J	2.7	12	--	--
Benzo(g,h,i)perylene	35 of 35	0 of 35	0.0786 J	6.7	31	--	--
Chlorinated Hydrocarbons (µg/kg)							
1,4-Dichlorobenzene	0 of 35	0 of 35	3.5 U	27 U	110	--	--
1,2-Dichlorobenzene	0 of 35	0 of 35	3.5 U	27 U	35	--	--
1,2,4-Trichlorobenzene	0 of 35	0 of 35	3.5 U	27 U	31	--	--
Hexachlorobenzene	0 of 35	1 of 35	3.5 U	27 U	22	1.2x (U)[1]	--
Chlorindated Hydrocarbons (mg/kg-OC)							
1,4-Dichlorobenzene	0 of 35	0 of 35	0.1 U	1.5 U	3.1	--	--
1,2-Dichlorobenzene	0 of 35	0 of 35	0.1 U	1.5 U	2.3	--	--
1,2,4-Trichlorobenzene	0 of 35	3 of 35	0.1 U	1.5 U	0.81	1.9x (U)[1]	--
Hexachlorobenzene	0 of 35	17 of 35	0.1 U	1.5 U	0.38	3.9x (U)[1]	--
Phthalates (µg/kg)							
Dimethyl phthalate	6 of 35	0 of 35	0.48 J	54 U	311	--	--
Diethyl phthalate	11 of 35	0 of 35	1.6 J	54 U	200	--	--
Di-n-butyl phthalate	28 of 35	0 of 35	1.9 J	51 U	380	--	--
Butylbenzyl phthalate	17 of 35	0 of 35	4.6 J	90	260	--	--
Bis(2-ethylhexyl) phthalate	31 of 35	0 of 35	13 J	220 U	500	--	--
Di-n-octyl phthalate	3 of 35	1 of 35	3.2 J	110 U	39	2.8x (U)[1]	--
Phthalates (mg/kg-OC)							
Dimethyl phthalate	6 of 35	0 of 35	0.0433 J	3.0 U	53	--	--
Diethyl phthalate	11 of 35	0 of 35	0.0528 J	3.0 U	61	--	--
Di-n-butyl phthalate	28 of 35	0 of 35	0.0844 J	4.3	220	--	--
Butylbenzyl phthalate	17 of 35	4 of 35	0.2 U	6.9	4.9	1.4x	--
Bis(2-ethylhexyl) phthalate	31 of 35	0 of 35	0.3111 J	32.4 U	47	--	--

Table 5a
Surface Sediment Results Summary Statistics

Analyte	Detected	Above Preliminary Screening Criteria	Minimum Value	Maximum Value	Preliminary Screening Criteria	Maximum Exceedance Factor	Sediment IHS
Di-n-octyl phthalate	3 of 35	0 of 35	0.1667 J	6.1 U	58	--	--
Miscellaneous Extractables (µg/kg)							
Benzyl alcohol	15 of 35	0 of 35	1.8 J	54 U	57	--	--
Benzoic acid	32 of 35	0 of 35	53 J	1,400 U	2,900	--	--
Dibenzofuran	29 of 35	0 of 35	0.24 J	83	200	--	--
Hexachlorobutadiene	0 of 35	0 of 35	3.5 U	27 U	29	--	--
N-Nitrosodiphenylamine	1 of 35	0 of 35	3.5 U	27 U	28	--	--
Miscellaneous Extractables (mg/kg-OC)							
Dibenzofuran	29 of 35	0 of 35	0.0053 J	6.4	15	--	--
Hexachlorobutadiene	0 of 35	0 of 35	0.1 U	1.5 U	3.9	--	--
N-Nitrosodiphenylamine	1 of 35	0 of 35	0.1 U	1.5 U	11	--	--
Total Petroleum Hydrocarbons (mg/kg)							
Diesel Range	3 of 11	0 of 11	8.3 J	67 U	340	--	--
Motor Oil Range	6 of 11	0 of 11	25 J	140	3,600	--	--
PCB Aroclors (µg/kg)							
Total PCB Aroclors (U = 0)	0 of 6	0 of 6	14 U	25 U	110	--	--
PCB Aroclors (mg/kg-OC)							
Total PCB Aroclors (U = 0)	0 of 6	0 of 6	0.78 U	3.9 U	12	--	--
PCB Aroclors (µg/kg)							
Aroclor 1016	0 of 6	--	14 U	25 U	--	--	--
Aroclor 1221	0 of 6	--	14 U	25 U	--	--	--
Aroclor 1232	0 of 6	--	14 U	25 U	--	--	--
Aroclor 1242	0 of 6	--	14 U	25 U	--	--	--
Aroclor 1248	0 of 6	--	14 U	25 U	--	--	--
Aroclor 1254	0 of 6	--	14 U	25 U	--	--	--
Aroclor 1260	0 of 6	--	14 U	25 U	--	--	--
Dioxin Furans (ng/kg)							
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	31 of 31	--	0.28	1,396	--	--	Yes
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	31 of 31	--	0.53	1,402	--	--	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	31 of 31	--	3.9 J	3500 J	--	--	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	31 of 31	--	96 J	220,000 J	--	--	Yes
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	31 of 31	--	1.7 J	6200 J	--	--	Yes
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	31 of 31	--	13 J	63,000 J	--	--	Yes
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	23 of 31	--	0.17 U	430	--	--	Yes
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	29 of 31	--	0.23 J	1,000	--	--	Yes
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	25 of 31	--	0.15 U	730 J	--	--	Yes
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	29 of 31	--	0.089 U	510	--	--	Yes
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	31 of 31	--	0.58 J	720	--	--	Yes
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	16 of 31	--	0.09 J	67 J	--	--	Yes
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	31 of 31	--	0.23 J	1,800	--	--	Yes
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	21 of 31	--	0.14 U	320	--	--	Yes
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	21 of 31	--	0.15 UJ	180	--	--	Yes
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	26 of 31	--	0.079 U	360	--	--	Yes

Table 5a
Surface Sediment Results Summary Statistics

Analyte	Detected	Above Preliminary Screening Criteria	Minimum Value	Maximum Value	Preliminary Screening Criteria	Maximum Exceedance Factor	Sediment IHS
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	20 of 31	--	0.15 U	390 J	--	--	Yes
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	29 of 31	--	0.15 U	120	--	--	Yes
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	13 of 31	--	0.084 U	15	--	--	Yes
Total Heptachlorodibenzofuran (HpCDF)	31 of 31	--	6.1	21,000	--	--	Yes
Total Heptachlorodibenzo-p-dioxin (HpCDD)	31 of 31	--	27 J	120,000 J	--	--	Yes
Total Hexachlorodibenzofuran (HxCDF)	31 of 31	--	2.9	21,000	--	--	Yes
Total Hexachlorodibenzo-p-dioxin (HxCDD)	31 of 31	--	3.2	15,000	--	--	Yes
Total Pentachlorodibenzofuran (PeCDF)	29 of 31	--	0.26	5,000	--	--	Yes
Total Pentachlorodibenzo-p-dioxin (PeCDD)	25 of 31	--	0.17	1,500	--	--	Yes
Total Tetrachlorodibenzofuran (TCDF)	30 of 31	--	0.15 U	440	--	--	Yes
Total Tetrachlorodibenzo-p-dioxin (TCDD)	23 of 31	--	0.11 U	190	--	--	Yes

Notes:
1. Maximim value is non-detect (U); however, is above the preliminary screening criteria.
IHS = Indicator Hazard Substance
PAH = polycyclic aromatic hydrocarbon
HPAH = high molecular weight polycyclic aromatic hydrocarbon
LPAH = low molecular weight polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
SMS = Sediment Management Standards
TEQ = toxic equivalent
mg/kg = milligram per kilogram
µg/kg = micrograms per kilogram
ng/kg = nanograms per kilogram
OC = organic carbon normalized
J = Estimated value
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit

Table 5b
Subsurface Sediment Results Summary Statistics

Analyte	Detected	Preliminary Screening Criteria	Minimum Value	Maximum Value	Preliminary Screening Criteria	Maximum Exceedance Factor	Sediment IHS
Total organic carbon (%)	20 of 20	--	0.3	3	--	--	--
Total solids (%)	20 of 20	--	57	82	--	--	--
Total volatile solids (%)	20 of 20	--	0.97	9.4	--	--	--
Phenols (µg/kg)							
Phenol	17 of 20	0 of 20	4.5 J	63	120	--	--
2-Methylphenol (o-Cresol)	2 of 20	0 of 20	1.9 J	43 U	63	--	--
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	13 of 20	2 of 20	2.1 J	360	260	1.4x	Yes
2,4-Dimethylphenol	0 of 20	1 of 20	6.1 U	43 U	29	1.5x (U)[1]	--
Pentachlorophenol	12 of 20	1 of 20	5.9 J	3,100	1,200	2.6x	Yes
Metals (mg/kg)							
Arsenic	18 of 18	1 of 18	0.98	15	14	1.1x	Yes
Cadmium	13 of 18	0 of 18	0.018 J	1.1 J	2.1	--	--
Chromium	18 of 18	0 of 18	8.1	43 J	72	--	--
Copper	18 of 18	0 of 18	7	35	400	--	--
Lead	18 of 18	0 of 18	2.7	33	360	--	--
Mercury	17 of 18	0 of 18	0.016 U	0.15	0.66	--	--
Nickel	18 of 18	0 of 18	10	25 J	26	--	--
Silver	18 of 18	0 of 18	0.047 J	0.21 J	0.58	--	--
Zinc	18 of 18	0 of 18	22	180	3,200	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)							
Total PAH (U = 1/2)	19 of 20	1 of 20	2.4 U	38,577	17,000	2.3x	Yes
Total PAH (U = 0)	19 of 20	--	1.7	38,577	--	--	--
Total LPAH (U=1/2)	19 of 20	--	1.2 U	10,447	--	--	--
Total LPAH (U=0)	19 of 20	1 of 20	1.2 U	10,447	6,590	1.6x	Yes
Naphthalene	16 of 20	0 of 20	0.52 J	110	529	--	--
Acenaphthylene	16 of 20	0 of 20	0.36 J	16	470	--	--
Acenaphthene	14 of 20	0 of 20	0.52 J	920	1,060	--	--
Fluorene	14 of 20	0 of 20	0.84 J	1,000	1,070	--	--
Phenanthrene	19 of 20	1 of 20	0.7 J	7,300	6,100	1.2x	Yes
Anthracene	16 of 20	0 of 20	0.6 J	1,200	1,230	--	--
2-Methylnaphthalene	18 of 20	0 of 20	0.34 J	20	469	--	--
Total HPAH (U=1/2)	18 of 20	--	2.4 U	28,140	--	--	--
Total HPAH (U=0)	18 of 20	0 of 20	0.14 J	28,140	31,640	--	--
Fluoranthene	16 of 20	1 of 20	1.2 U	12,000	11,100	1.1x	Yes
Pyrene	17 of 20	1 of 20	1.2 U	8,900	8,790	1.01x	Yes
Benzo(a)anthracene	16 of 20	0 of 20	0.69 J	2,100	4,260	--	--
Chrysene	18 of 20	0 of 20	0.14 J	2,100	5,940	--	--
Benzofluoranthenes	16 of 20	0 of 20	2.3 J	1,700	11,000	--	--
Benzo(a)pyrene	15 of 20	0 of 20	1.4 J	760	3,300	--	--
Indeno(1,2,3-c,d)pyrene	15 of 20	0 of 20	2.4 U	230	4,120	--	--
Dibenzo(a,h)anthracene	11 of 20	0 of 20	2.4 U	110	800	--	--
Benzo(g,h,i)perylene	16 of 20	0 of 20	0.52 J	230	4,020	--	--
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)							
Total SMS LPAH (U = 0)	19 of 20	1 of 20	0.03 J	870	370	2.4x	--
Naphthalene	16 of 20	0 of 20	0.03 J	4.6	99	--	--
Acenaphthylene	16 of 20	0 of 20	0.03 J	1.3	66	--	--
Acenaphthene	14 of 20	2 of 20	0.04 J	76.7	16	4.8x	--
Fluorene	14 of 20	1 of 20	0.08 J	83.3	23	3.6x	--
Phenanthrene	19 of 20	2 of 20	0.05 J	608	100	6.1x	--
Anthracene	16 of 20	0 of 20	0.04 J	100	220	--	--
2-Methylnaphthalene	18 of 20	0 of 20	0.03 J	0.83	38	--	--
Total SMS HPAH (U = 0)	18 of 20	1 of 20	0.02 J	1,000	960	1.04x	--
Fluoranthene	16 of 20	1 of 20	0.09 U	1,000	160	6.3x	--
Pyrene	17 of 20	0 of 20	0.09 U	742	1,000	--	--
Benzo(a)anthracene	16 of 20	1 of 20	0.05 J	175	110	1.6x	--
Chrysene	18 of 20	1 of 20	0.02 J	175	110	1.6x	--
Benzofluoranthene (unspecified)	16 of 20	0 of 20	0.16 J	142	230	--	--
Benzo(a)pyrene	15 of 20	0 of 20	0.13 U	63.3	99	--	--
Indeno(1,2,3-c,d)pyrene	15 of 20	0 of 20	0.17 J	19.2	34	--	--
Dibenzo(a,h)anthracene	11 of 20	0 of 20	0.11 U	9.2	12	--	--
Benzo(g,h,i)perylene	16 of 20	0 of 20	0.03 J	19.2	31	--	--
Chlorinated Hydrocarbons (µg/kg)							
1,4-Dichlorobenzene	0 of 20	0 of 20	3 U	22 U	110	--	--
1,2-Dichlorobenzene	0 of 20	0 of 20	3 U	22 UJ	35	--	--
1,2,4-Trichlorobenzene	0 of 20	0 of 20	3 U	22 U	31	--	--
Hexachlorobenzene	0 of 20	0 of 20	3 U	22 U	22	--	--
Chlorindated Hydrocarbons (mg/kg-OC)							
1,4-Dichlorobenzene	0 of 20	0 of 20	0.14 U	1.0 U	3.1	--	--
1,2-Dichlorobenzene	0 of 20	0 of 20	0.14 U	1.0 U	2.3	--	--
1,2,4-Trichlorobenzene	0 of 20	1 of 20	0.14 U	1.0 U	0.81	1.2x (U)[1]	--
Hexachlorobenzene	0 of 20	5 of 20	0.14 U	1.0 U	0.38	2.6x (U)[1]	--
Phthalates (µg/kg)							
Dimethyl phthalate	0 of 20	0 of 20	6.1 U	43 U	311	--	--
Diethyl phthalate	2 of 20	0 of 20	2.7 J	8.9 J	200	--	--

Table 5b
Subsurface Sediment Results Summary Statistics

Analyte	Detected	Preliminary Screening Criteria	Minimum Value	Maximum Value	Preliminary Screening Criteria	Maximum Exceedance Factor	Sediment IHS
Di-n-butyl phthalate	3 of 20	0 of 20	2.5 J	87 U	380	--	--
Butylbenzyl phthalate	2 of 20	0 of 20	3.2 J	43 U	260	--	--
Bis(2-ethylhexyl) phthalate	4 of 20	0 of 20	7.2 J	130 U	500	--	--
Bis(2-ethylhexyl) phthalate	4 of 20	0 of 20	7.2 J	130 UJ	500	--	--
Di-n-octyl phthalate	2 of 20	2 of 20	1.2 U	260 U	39	6.7x (U)[1]	--
Phthalates (mg/kg-OC)							
Dimethyl phthalate	0 of 20	0 of 20	0.28 J	2.0 U	53	--	--
Diethyl phthalate	2 of 20	0 of 20	0.19 J	2.0 U	61	--	--
Di-n-butyl phthalate	3 of 20	0 of 20	0.21 J	4.0 U	220	--	--
Butylbenzyl phthalate	2 of 20	0 of 20	0.25 J	2.0 U	4.9	--	--
Bis(2-ethylhexyl) phthalate	4 of 20	0 of 20	0.51 J	30.3 U	47	--	--
Di-n-octyl phthalate	2 of 20	0 of 20	0.09 J	21.7 U	58	--	--
Miscellaneous Extractables (µg/kg)							
Benzyl alcohol	9 of 20	0 of 20	1 J	43 U	57	--	--
Benzoic acid	11 of 20	0 of 20	55 J	1,100 U	2,900	--	--
Dibenzofuran	12 of 20	0 of 20	0.36 U	91	200	--	--
Hexachlorobutadiene	0 of 20	0 of 20	3 J	22 U	29	--	--
N-Nitrosodiphenylamine	1 of 20	0 of 20	1.9 J	22 U	28	--	--
Miscellaneous Extractables (mg/kg-OC)							
Dibenzofuran	12 of 20	0 of 20	0.03 U	7.6	15	--	--
Hexachlorobutadiene	0 of 20	0 of 20	0.14 J	1.0 U	3.9	--	--
N-Nitrosodiphenylamine	1 of 20	0 of 20	0.14 U	1.0 U	11	--	--
Dioxin Furans (ng/kg)							
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	15 of 15	--	0.16	909	--	--	Yes
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	15 of 15	--	0.31	909	--	--	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	12 of 15	--	0.43	1,400 J	--	--	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	15 of 15	--	37 U	260,000 J	--	--	Yes
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	13 of 15	--	0.49	4,100 J	--	--	Yes
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	15 of 15	--	5 U	30,000 J	--	--	Yes
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	9 of 15	--	0.11 J	200	--	--	Yes
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	14 of 15	--	0.067 J	1,300	--	--	Yes
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	14 of 15	--	0.13 U	70	--	--	Yes
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	12 of 15	--	0.064 J	380	--	--	Yes
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	15 of 15	--	0.35 U	1,200	--	--	Yes
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	7 of 15	--	0.069 J	48 J	--	--	Yes
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	15 of 15	--	0.21 U	120 J	--	--	Yes
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	8 of 15	--	0.16 U	200	--	--	Yes
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	7 of 15	--	0.091 U	15 J	--	--	Yes
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	11 of 15	--	0.061 U	190	--	--	Yes
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	10 of 15	--	0.14 U	410 J	--	--	Yes
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	13 of 15	--	0.11 U	93	--	--	Yes
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	9 of 15	--	0.057 U	4	--	--	Yes
Total Heptachlorodibenzofuran (HpCDF)	13 of 15	--	1	13,000	--	--	Yes
Total Heptachlorodibenzo-p-dioxin (HpCDD)	15 of 15	--	10	53,000 J	--	--	Yes
Total Hexachlorodibenzofuran (HxCDF)	14 of 15	--	1.1 U	16,000	--	--	Yes
Total Hexachlorodibenzo-p-dioxin (HxCDD)	15 of 15	--	2.1	4,500	--	--	Yes
Total Pentachlorodibenzofuran (PeCDF)	13 of 15	--	0.19 U	6,300	--	--	Yes
Total Pentachlorodibenzo-p-dioxin (PeCDD)	10 of 15	--	0.091 U	680	--	--	Yes
Total Tetrachlorodibenzofuran (TCDF)	11 of 15	--	0.11 U	1,300	--	--	Yes
Total Tetrachlorodibenzo-p-dioxin (TCDD)	13 of 15	--	0.13	280	--	--	Yes

Notes:

1. Maximim value is non-detect (U), however is above the preliminary screening criteria.

IHS = Indicator Hazard Substance
PAH = polycyclic aromatic hydrocarbon
HPAH = high molecular weight polycyclic aromatic hydrocarbon
LPAH = low molecular weight polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
SMS = Sediment Management Standards
TEQ = toxic equivalent
mg/kg = milligram per kilogram
µg/kg = micrograms per kilogram
ng/kg = nanograms per kilogram
OC = organic carbon normalized
J = Estimated value
U = Compound analyzed, but not detected above detection limit

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-01 LRIS-LR-01-SS 4/19/2010 0-10 cm	LRIS-LR-02 LRIS-LR-02-SS 4/19/2010 0-10 cm	LRIS-LR-03 LRIS-LR-03-SS 4/19/2010 0-10 cm	LRIS-LR-04 LRIS-LR-04-SS 4/19/2010 0-10 cm	LRIS-LR-05 LRIS-LR-05-SS 4/19/2010 0-10 cm	LRIS-LR-06 LRIS-LR-06-SS 4/19/2010 0-10 cm	LRIS-LR-07 LRIS-LR-07-SS 4/19/2010 0-10 cm	LRIS-LR-08 LRIS-LR-08-SS 4/19/2010 0-10 cm	LRIS-LR-09 LRIS-LR-09-SS 4/19/2010 0-10 cm	LRIS-LR-10 LRIS-LR-10-SS 4/19/2010 0-10 cm
Conventional Parameters												
Total organic carbon (pct)	--	--	1.3	1.9	1.1	2.1	1.8	1.6	0.87	0.84	1	1
Total solids (pct)	--	--	54	44	54	44	46	49	56	59	56	55
Total volatile solids (pct)	--	--	4.6	5.5	3.5	5.3	4.9	4.5	3.1	3.2	3.2	3.4
Ammonia (mg/kg)	--	--	-- R	-- R	-- R	600 J	-- R	-- R	-- R	-- R	-- R	-- R
Sulfide (mg/kg)	--	--	12	9.1 J	9.3 U	5.5 J	11 U	10 U	9 U	12	11	7.4 J
Grain Size (pct)												
Clay	--	--	6.4	11	7.6	11	11	9.2	8	5.9	6.6	0.96
Gravel	--	--	0	0	0	0	0	0	0	0	0	0
Sand, Coarse	--	--	0	0	0	0	0	0	0	0	0	0
Sand, Fine	--	--	32	18	31	29	18	28	54	76	40	50
Sand, Medium	--	--	0.8	0.5	0.6	0.5	0.7	0.8	0.5	1.3	0.7	0.7
Sand, Very Fine	--	--	9.7	9.8	13	11	9.5	11	14	5	14	7.5
Silt	--	--	51	61	48	49	61	52	23	12	39	41
Total Clay	--	--	6.4	11	7.6	11	11	9.2	8	5.9	6.6	0.96
Total Fines (silt + clay)	--	--	57.4	72	55.6	60	72	61.2	31	17.9	45.6	42.0
Total Gravel	--	--	0	0	0	0	0	0	0	0	0	0
Total Sand	--	--	42.5	28.3	44.6	40.5	28.2	39.8	68.5	82.3	54.7	58.2
Total Silt	--	--	51	61	48	49	61	52	23	12	39	41
Total Grain Size	--	--	99.9	100.3	100.2	100.5	100.2	101	99.5	100.2	100.3	100.2
Phenols (µg/kg)												
Phenol	120	1	4.4 J	5.9 J	9.3 U	7.1 J	54 U	9.7 J	16	25	3.7 J	20
2-Methylphenol (o-Cresol)	63	3	9.1 U	11 U	9.3 U	11 U	54 U	10 U	6.5 J	8.5 U	8.9 U	9.1 U
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	6.6 J	4.9 J	19 U	10 J	110 U	11 J	13 J	100	3 J	13 J
2,4-Dimethylphenol	29	3	9.1 U	11 U	9.3 U	11 U	54 U	10 U	8.9 U	8.5 U	8.9 U	9.1 U
Pentachlorophenol	1,200	1	180	17	15	11 U	91	68	12 U	400	8.9 U	140
Metals (mg/kg)												
Arsenic	14	1	4.8	5.2	4.8	6.2	6.1	5.3	5.1	9.9	4.9	9
Cadmium	2.1	1	0.2 J	0.3 J	0.24 J	0.12 J	0.24 J	0.27 J	0.045 J	0.13 J	0.19 J	0.17 J
Chromium	72	1	19	22	19	22	25	21	18	28	19	25
Copper	400	1	22	26	20	25	28	25	17	19	19	25
Lead	360	1	17	13	11	12	14	12	8.9	9.6	9.9	12
Mercury	0.66	1	0.055 J	0.067 J	0.18 J	0.016 J	0.063 J	0.056 J	0.035 J	0.031 J	0.041 J	0.11 J
Nickel	26	1	15	18	16	18	18	18	15	14	16	16
Silver	0.58	1	0.13 J	0.14 J	0.13 J	0.16 J	0.17 J	0.15 J	0.13 J	0.11 J	0.13 J	0.13 J
Zinc	3,200	1	80	89	81	89	100	91	70	120	77	120
Polycyclic Aromatic Hydrocarbons (PAH) (µg/kg)												
Total PAH (U = 1/2)	17,000	1	393	236	310	173	4,479	3,044	84.5	700	128	947
Total PAH (U = 0)	--	--	393	231	310	169	4,479	3,044	80.0	699	126	947
Total LPAH (U = 1/2)	--	--	39.8	39.9	31.4	26.9	462	333	13.6	77.8	16.1	119
Total LPAH (U = 0)	6,590	2	39.8	37.6	31.4	24.6	462	333	10.9	76.9	16.1	119
Naphthalene	529	2	1.7 J	1.6 J	0.97 J	1.9 J	5.2 J	4	1.8 U	3.2	1.6 J	11

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-01 LRIS-LR-01-SS 4/19/2010 0-10 cm	LRIS-LR-02 LRIS-LR-02-SS 4/19/2010 0-10 cm	LRIS-LR-03 LRIS-LR-03-SS 4/19/2010 0-10 cm	LRIS-LR-04 LRIS-LR-04-SS 4/19/2010 0-10 cm	LRIS-LR-05 LRIS-LR-05-SS 4/19/2010 0-10 cm	LRIS-LR-06 LRIS-LR-06-SS 4/19/2010 0-10 cm	LRIS-LR-07 LRIS-LR-07-SS 4/19/2010 0-10 cm	LRIS-LR-08 LRIS-LR-08-SS 4/19/2010 0-10 cm	LRIS-LR-09 LRIS-LR-09-SS 4/19/2010 0-10 cm	LRIS-LR-10 LRIS-LR-10-SS 4/19/2010 0-10 cm
Acenaphthylene	470	2	**6.1**	**2.1 J**	**2.1**	**1.8 J**	**24**	**22**	1.8 U	**10**	**1.2 J**	**6.5**
Acenaphthene	1,060	2	**1.2 J**	2.3 U	**1.7 J**	2.3 U	**17**	**14**	**0.69 J**	**3.4**	**0.83 J**	**4.7**
Fluorene	1,070	2	**2.5**	**4.1**	**3.1**	**4.2**	**20**	**24**	**2.1**	**6.3**	**1.9**	**7.2**
Phenanthrene	6,100	2	**14**	**23**	**15**	**12**	**330**	**220**	**6.8**	**30**	**7**	**57**
Anthracene	1,230	2	**13**	**6.8**	**7.6**	**4.7**	**62**	**45**	**1.3 J**	**24**	**2.5**	**28**
2-Methylnaphthalene	469	2	**1.3 J**	2.3 U	**0.94 J**	2.3 U	**3.7 J**	**3.6**	1.8 U	1.7 U	**1.1 J**	**4.7**
Total HPAH (U = 1/2)	--	--	**353**	**196**	**278**	**146**	**4,017**	**2,711**	**70.9**	**622**	**112**	**828**
Total HPAH (U = 0)	31,640	2	**353**	**194**	**278**	**144**	**4,017**	**2,711**	**69.1**	**622**	**110**	**828**
Fluoranthene	11,100	2	**56**	**46**	**58**	**36**	**1100**	**810**	**17**	**98**	**25**	**200**
Pyrene	8,790	2	**58**	**44**	**49**	**29**	**910**	**630**	**14**	**90**	**22**	**190**
Benzo(a)anthracene	4,260	2	**26**	**13**	**25**	**11**	**250**	**190**	**5.5**	**45**	**9.2**	**72**
Chrysene	5,940	2	**49**	**24**	**52**	**16**	**590**	**490**	**7.6**	**72**	**12**	**100**
Benzofluoranthene, Total	11,000	2	**84**	**34**	**51**	**28**	**770**	**390**	**11**	**180**	**23**	**160**
Benzo(a)pyrene	3,300	2	**28**	**14**	**20**	**11**	**200**	**120**	**5**	**68**	**10**	**56**
Indeno(1,2,3-c,d)pyrene	4,120	2	**22**	**9.4**	**9.6**	**6.3**	**85**	**36**	**3.7**	**29**	**5**	**21**
Dibenzo(a,h)anthracene	800	2	**6**	4.5 U	**3.8**	4.5 U	**29**	**12**	3.6 U	**11**	3.5 U	**7.6**
Benzo(g,h,i)perylene	4,020	2	**24**	**9.2**	**10**	**6.8**	**83**	**33**	**5.3**	**29**	**3.7**	**21**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)												
Total SMS LPAH (U = 0)	370	3	**3.0**	**2.0**	**2.8**	**1.2**	**25.5**	**20.6**	**1.3**	**9.2**	**1.5**	**11.4**
Naphthalene	99	3	**0.13 J**	**0.08 J**	**0.09 J**	**0.09 J**	**0.29 J**	**0.25**	0.21 U	**0.38**	**0.16 J**	**1.1**
Acenaphthylene	66	3	**0.47**	**0.11 J**	**0.19**	**0.09 J**	**1.3**	**1.4**	0.21 U	**1.2**	**0.12 J**	**0.65**
Acenaphthene	16	3	**0.09 J**	0.12 U	**0.15 J**	0.11 U	**0.94**	**0.88**	**0.08 J**	**0.40**	**0.08 J**	**0.47**
Fluorene	23	3	**0.19**	**0.22**	**0.28**	**0.20**	**1.1**	**1.5**	**0.24**	**0.75**	**0.19**	**0.72**
Phenanthrene	100	3	**1.1**	**1.2**	**1.4**	**0.57**	**18.3**	**13.8**	**0.78**	**3.6**	**0.70**	**5.7**
Anthracene	220	3	**1.0**	**0.36**	**0.69**	**0.22**	**3.4**	**2.8**	**0.15 J**	**2.9**	**0.25**	**2.8**
2-Methylnaphthalene	38	3	**0.10 J**	0.12 U	**0.09 J**	0.11 U	**0.21 J**	**0.23**	0.21 U	0.20 U	**0.11 J**	**0.47**
Total SMS HPAH (U = 0)	960	3	**27.2**	**10.2**	**25.3**	**6.9**	**223**	**169**	**7.9**	**74.0**	**11.0**	**82.8**
Fluoranthene	160	3	**4.3**	**2.4**	**5.3**	**1.7**	**61.1**	**50.6**	**2.0**	**11.7**	**2.5**	**20.0**
Pyrene	1,000	3	**4.5**	**2.3**	**4.5**	**1.4**	**50.6**	**39.4**	**1.6**	**10.7**	**2.2**	**19.0**
Benzo(a)anthracene	110	3	**2.0**	**0.68**	**2.3**	**0.52**	**13.9**	**11.9**	**0.63**	**5.4**	**0.92**	**7.2**
Chrysene	110	3	**3.8**	**1.3**	**4.7**	**0.76**	**32.8**	**30.6**	**0.87**	**8.6**	**1.2**	**10.0**
Benzofluoranthene (unspecified)	230	3	**6.5**	**1.8**	**4.6**	**1.3**	**42.8**	**24.4**	**1.3**	**21.4**	**2.3**	**16.0**
Benzo(a)pyrene	99	3	**2.2**	**0.74**	**1.8**	**0.52**	**11.1**	**7.5**	**0.57**	**8.1**	**1.0**	**5.6**
Indeno(1,2,3-c,d)pyrene	34	3	**1.7**	**0.49**	**0.87**	**0.30**	**4.7**	**2.3**	**0.43**	**3.5**	**0.50**	**2.1**
Dibenzo(a,h)anthracene	12	3	**0.46**	0.24 U	**0.35**	0.21 U	**1.6**	**0.75**	0.41 U	**1.3**	0.35 U	**0.76**
Benzo(g,h,i)perylene	31	3	**1.85**	**0.48**	**0.91**	**0.32**	**4.6**	**2.1**	**0.61**	**3.5**	**0.37**	**2.1**
Chlorinated Hydrocarbons (µg/kg)												
1,4-Dichlorobenzene	110	4	4.6 U	5.7 U	4.6 U	5.7 U	27 U	5.1 U	4.4 U	4.2 U	4.4 U	4.5 U
1,2-Dichlorobenzene	35	4	4.6 U	5.7 U	4.6 U	5.7 U	27 U	5.1 U	4.4 U	4.2 U	4.4 U	4.5 U
1,2,4-Trichlorobenzene	31	4	4.6 U	5.7 U	4.6 U	5.7 U	27 U	5.1 U	4.4 U	4.2 U	4.4 U	4.5 U
Hexachlorobenzene	22	4	4.6 U	5.7 U	4.6 U	5.7 U	27 U	5.1 U	4.4 U	4.2 U	4.4 U	4.5 U
Chlorindated Hydrocarbons (mg/kg-OC)												

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-01 LRIS-LR-01-SS 4/19/2010 0-10 cm	LRIS-LR-02 LRIS-LR-02-SS 4/19/2010 0-10 cm	LRIS-LR-03 LRIS-LR-03-SS 4/19/2010 0-10 cm	LRIS-LR-04 LRIS-LR-04-SS 4/19/2010 0-10 cm	LRIS-LR-05 LRIS-LR-05-SS 4/19/2010 0-10 cm	LRIS-LR-06 LRIS-LR-06-SS 4/19/2010 0-10 cm	LRIS-LR-07 LRIS-LR-07-SS 4/19/2010 0-10 cm	LRIS-LR-08 LRIS-LR-08-SS 4/19/2010 0-10 cm	LRIS-LR-09 LRIS-LR-09-SS 4/19/2010 0-10 cm	LRIS-LR-10 LRIS-LR-10-SS 4/19/2010 0-10 cm
1,4-Dichlorobenzene	3.1	3	0.35 U	0.30 U	0.42 U	0.27 U	1.5 U	0.32 U	0.51 U	0.50 U	0.44 U	0.45 U
1,2-Dichlorobenzene	2.3	3	0.35 U	0.30 U	0.42 U	0.27 U	1.5 U	0.32 U	0.51 U	0.50 U	0.44 U	0.45 U
1,2,4-Trichlorobenzene	0.81	3	0.35 U	0.30 U	0.42 U	0.27 U	1.5 U	0.32 U	0.51 U	0.50 U	0.44 U	0.45 U
Hexachlorobenzene	0.38	3	0.35 U	0.30 U	0.42 U	0.27 U	1.5 U	0.32 U	0.51 U	0.50 U	0.44 U	0.45 U
Phthalates (µg/kg)												
Dimethyl phthalate	311	2	9.1 U	11 U	9.3 U	11 U	54 U	10 U	8.9 U	8.5 U	8.9 U	9.1 U
Diethyl phthalate	200	4	**1.6 J**	**3.6 J**	**2.2 J**	11 U	54 U	**2.1 J**	**2.1 J**	8.5 U	**2.5 J**	9.1 U
Di-n-butyl phthalate	380	1	**3.7 J**	**7.4 J**	**12 J**	**21 J**	**20 J**	**12 J**	18 U	**33**	**3.2 J**	**3.6 J**
Butylbenzyl phthalate	260	2	9.1 U	11 U	16 U	**17**	**25 J**	11 U	9.2 U	8.5 U	8.9 U	9.1 U
Bis(2-ethylhexyl) phthalate	500	1	**19 J**	**32 J**	**29 J**	**45 J**	**80 J**	**27 J**	**13 J**	**45 J**	**26 J**	**46 J**
Di-n-octyl phthalate	39	1	18 U	23 U	19 U	23 U	110 U	20 U	18 U	17 U	18 U	18 U
Phthalates (mg/kg-OC)												
Dimethyl phthalate	53	3	0.70 U	0.58 U	0.85 U	0.52 U	3.0 U	0.63 U	1.0 U	1.0 U	0.89 U	0.91 U
Diethyl phthalate	61	3	**0.12 J**	**0.19 J**	**0.20 J**	0.52 U	3.0 U	**0.13 J**	**0.24 J**	1.0 U	**0.25 J**	0.91 U
Di-n-butyl phthalate	220	3	**0.28 J**	**0.39 J**	**1.1 J**	**1.0 J**	**1.1 J**	**0.75 J**	2.1 U	**3.9**	**0.32 J**	**0.36 J**
Butylbenzyl phthalate	4.9	3	0.70 U	0.58 U	1.5 U	**0.81**	**1.4 J**	0.69 U	1.1 U	1.0 U	0.89 U	0.91 U
Bis(2-ethylhexyl) phthalate	47	3	**1.5 J**	**1.7 J**	**2.6 J**	**2.1 J**	**4.4 J**	**1.7 J**	**1.5 J**	**5.4 J**	**2.6 J**	**4.6 J**
Di-n-octyl phthalate	58	3	1.4 U	1.2 U	1.7 U	1.1 U	6.1 U	1.3 U	2.1 U	2.0 U	1.8 U	1.8 U
Miscellaneous Extractables (µg/kg)												
Benzyl alcohol	57	3	**4.3 J**	11 U	9.3 U	**3.6 J**	54 U	10 U	**4.6 J**	**15**	8.9 U	**17**
Benzoic acid	2,900	1	**100 J**	**120 J**	**79 J**	**140 J**	1400 U	**160 J**	**120 J**	**320**	**72 J**	**130 J**
Dibenzofuran	200	1	**1.5 J**	**2.6 J**	**1 J**	**1.5 J**	**12 J**	**13**	**0.99 J**	**2.5 J**	**0.9 J**	**9.3**
Hexachlorobutadiene	29	4	4.6 U	5.7 U	4.6 U	5.7 U	27 U	5.1 U	4.4 U	4.2 U	4.4 U	4.5 U
N-Nitrosodiphenylamine	28	4	4.6 U	5.7 U	4.6 U	5.7 U	27 U	5.1 U	4.4 U	4.2 U	4.4 U	4.5 U
Miscellaneous Extractables (mg/kg-OC)												
Dibenzofuran	15	3	**0.12 J**	**0.14 J**	**0.09 J**	**0.07 J**	**0.67 J**	**0.81**	**0.11 J**	**0.30 J**	**0.09 J**	**0.93**
Hexachlorobutadiene	3.9	3	0.35 U	0.30 U	0.42 U	0.27 U	1.5 U	0.32 U	0.51 U	0.50 U	0.44 U	0.45 U
N-Nitrosodiphenylamine	11	3	0.35 U	0.30 U	0.42 U	0.27 U	1.5 U	0.32 U	0.51 U	0.50 U	0.44 U	0.45 U
Total Petroleum Hydrocarbons (mg/kg)												
Diesel #2 Range	340	1	--	--	--	--	50 U	**14 J**	--	--	--	42 U
Motor Oil Range	3,600	1	--	--	--	--	**30 J**	**32 J**	--	--	--	84 U
Polychlorinated Biphenyl (PCB) Aroclors (µg/kg)												
Total PCB Aroclors (U = 0)	110	1	18 U	--	--	--	--	--	--	16 U	--	17 U
PCB Aroclors (mg/kg-OC)												
Total PCB Aroclors (U = 0)	12	3	1.4 U	--	--	--	--	--	--	1.9 U	--	1.7 U
PCB Aroclors (µg/kg)												
Aroclor 1016	--	--	18 U	--	--	--	--	--	--	16 U	--	17 U
Aroclor 1221	--	--	18 U	--	--	--	--	--	--	16 U	--	17 U
Aroclor 1232	--	--	18 U	--	--	--	--	--	--	16 U	--	17 U
Aroclor 1242	--	--	18 U	--	--	--	--	--	--	16 U	--	17 U
Aroclor 1248	--	--	18 U	--	--	--	--	--	--	16 U	--	17 U
Aroclor 1254	--	--	18 U	--	--	--	--	--	--	16 U	--	17 U

Table 6
Lake River Surface Sediment Testing Results

	Preliminary Sediment Screening Criteria											
Location ID			LRIS-LR-01	LRIS-LR-02	LRIS-LR-03	LRIS-LR-04	LRIS-LR-05	LRIS-LR-06	LRIS-LR-07	LRIS-LR-08	LRIS-LR-09	LRIS-LR-10
Sample ID			LRIS-LR-01-SS	LRIS-LR-02-SS	LRIS-LR-03-SS	LRIS-LR-04-SS	LRIS-LR-05-SS	LRIS-LR-06-SS	LRIS-LR-07-SS	LRIS-LR-08-SS	LRIS-LR-09-SS	LRIS-LR-10-SS
Sample Date			4/19/2010	4/19/2010	4/19/2010	4/19/2010	4/19/2010	4/19/2010	4/19/2010	4/19/2010	4/19/2010	4/19/2010
Sample Depth			0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
Aroclor 1260	--	--	18 U	--	--	--	--	--	--	16 U	--	17 U
Dioxin Furans (ng/kg)												
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	37.1	3.2	--	1.1	30.3	--	1.1	218	578	56.8
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	37.1	3.3	--	1.7	30.3	--	1.5	218	578	56.8
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	470 J	38	--	13 J	300 J	--	21	640 J	250	180 J
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	13,000 J	1,000	--	420 J	9,700 J	--	360	120,000 J	2,100	15,000 J
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	190 J	16	--	6.2 J	140 J	--	8.1	770 J	180 J	150 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	1,400 J	100	--	45 J	1,100 J	--	40	8,700 J	5,400 J	1,600 J
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	13	1 J	--	0.59 U	9.9	--	0.58 J	47	140	10
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	14	1.5 J	--	0.72 J	21	--	0.93 J	190	45	27
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	5.8	0.86 J	--	0.46 U	3.4 J	--	0.29 U	14	730 J	11
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	7.5	0.75 J	--	0.46 J	6.2	--	0.5 J	55	31	10
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	70	4.9	--	2 J	45	--	1.9 J	240	720	69
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	0.94 J	0.09 J	--	0.4 U	0.68 J	--	0.17 U	4	16	0.75 J
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	13 J	1.8 J	--	1 J	10 J	--	0.68 J	45 J	1,800	51 J
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	5.2	0.41 J	--	0.38 U	5.2	--	0.42 U	30	6.1	5.7
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	2.8 J	0.41 J	--	0.68 UJ	2.5 J	--	0.41 U	8.5 J	180	11 J
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	6.5	0.49 J	--	0.36 U	4.7	--	0.22 J	39	5.3	11
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	5.9 J	0.66 J	--	0.45 U	7.7 J	--	0.55 U	56 J	0.87 U	9.7 J
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	2.4	0.7 J	--	0.81	2.5	--	0.45 J	7.4	0.38 U	2.9
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	0.28 J	0.12 U	--	0.19 U	0.44 J	--	0.19 U	0.59 J	5.2	2.3
Total Heptachlorodibenzofuran (HpCDF)	--	--	720	52	--	22	530	--	28	2,400	720	490
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	2,600 J	190	--	85 J	2,600 J	--	73	16,000 J	15,000	3,500 J
Total Hexachlorodibenzofuran (HxCDF)	--	--	370	20	--	11	320	--	6.4	2,200	350	350
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	240	24	--	10	230	--	7.9	840	15,000	590
Total Pentachlorodibenzofuran (PeCDF)	--	--	76	3.3	--	2.3	72	--	0.55 U	510	67	100
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	16	1.3	--	0.81	17	--	0.41 U	42	1,500	160
Total Tetrachlorodibenzofuran (TCDF)	--	--	12	2.3	--	2.3	15	--	0.65	39	9.7	46
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	10	0.95	--	0.23 U	5.6	--	0.19 U	5.4	110	53

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-11 LRIS-LR-11-SS 4/20/2010 0-10 cm	LRIS-LR-12 LRIS-LR-12-SS 4/20/2010 0-10 cm	LRIS-LR-13 LRIS-LR-13-SS 4/20/2010 0-10 cm	LRIS-LR-14 LRIS-LR-14-SS 4/20/2010 0-10 cm	LRIS-LR-15 LRIS-LR-15-SS 4/20/2010 0-10 cm	LRIS-LR-15 LRIS-LR-65-SS 4/20/2010 0-10 cm	LRIS-LR-16 LRIS-LR-16-SS 4/20/2010 0-10 cm	LRIS-LR-17 LRIS-LR-17-SS 4/20/2010 0-10 cm	LRIS-LR-18 LRIS-LR-18-SS 4/20/2010 0-10 cm	LRIS-LR-19 LRIS-LR-19-SS 4/21/2010 0-10 cm
Conventional Parameters												
Total organic carbon (pct)	--	--	**1.4**	**0.36**	**1.2**	**1.1**	**1.1**	**1.3**	**3.2**	**0.77**	**1.2**	**2.1 J**
Total solids (pct)	--	--	**51**	**70**	**53**	**56**	**54**	**55**	**37**	**64**	**58**	**57**
Total volatile solids (pct)	--	--	**3.8 J**	**1.2 J**	**3.8 J**	**2.8 J**	**3.4 J**	**3.4 J**	**7.4 J**	**2.2 J**	**2.9 J**	**3.7**
Ammonia (mg/kg)	--	--	**-- R**	22 UJ	**33 J**	28 UJ	**39 J**	**45 J**	54 UJ	30 UJ	**40 J**	**39 J**
Sulfide (mg/kg)	--	--	9.7 UJ	**21 J**	**15 J**	**4.3 J**	**7.4 J**	**13 J**	13 UJ	**10 J**	**9.6 J**	**13 J**
Grain Size (pct)												
Clay	--	--	**8.9**	**1.6**	**7.4**	**5.7**	**9**	**9.6**	**14**	**6.7**	**11**	**6.4**
Gravel	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.9**	**0**
Sand, Coarse	--	--	**0**	**0.7**	**0**	**0**	**0**	**0**	**0**	**0**	**3.3**	**0**
Sand, Fine	--	--	**38**	**84**	**42**	**58**	**49**	**46**	**43**	**70**	**44**	**47**
Sand, Medium	--	--	**0.6**	**9.4**	**0.8**	**1.7**	**0.6**	**0.8**	**2.7**	**0.8**	**5.1**	**1.5**
Sand, Very Fine	--	--	**12**	**2.1**	**12**	**5.7**	**13**	**12**	**6.5**	**7.9**	**5.7**	**7.4**
Silt	--	--	**41**	**2.7**	**38**	**29**	**28**	**31**	**34**	**15**	**30**	**38**
Total Clay	--	--	**8.9**	**1.6**	**7.4**	**5.7**	**9**	**9.6**	**14**	**6.7**	**11**	**6.4**
Total Fines (silt + clay)	--	--	**49.9**	**4.3**	**45.4**	**34.7**	**37**	**40.6**	**48**	**21.7**	**41**	**44.4**
Total Gravel	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.9**	**0**
Total Sand	--	--	**50.6**	**96.2**	**54.8**	**65.4**	**62.6**	**58.8**	**52.2**	**78.7**	**58.1**	**55.9**
Total Silt	--	--	**41**	**2.7**	**38**	**29**	**28**	**31**	**34**	**15**	**30**	**38**
Total Grain Size	--	--	**100.5**	**100.5**	**100.2**	**100.1**	**99.6**	**99.4**	**100.2**	**100.4**	**100**	**100.3**
Phenols (µg/kg)												
Phenol	120	1	**2.8 J**	**11**	**11**	**5.1 J**	**6.3 J**	9 U	**11 J**	**10**	**3.2 J**	**7.7 J**
2-Methylphenol (o-Cresol)	63	3	9.6 U	**0.63 J**	9.4 U	8.8 U	9.2 U	9 U	**4.5 J**	7.8 U	8.5 U	8.8 U
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	**3.5 J**	**49**	**28**	**2.3 J**	**34**	**13 J**	**220**	**16**	**7.1 J**	**12 J**
2,4-Dimethylphenol	29	3	9.6 U	7.1 U	9.4 U	8.8 U	9.2 U	9 U	13 U	7.8 U	8.5 U	8.8 U
Pentachlorophenol	1,200	1	9.6 U	**44**	**16**	**24**	9.2 U	9 U	**76**	**8.7**	**7.9 J**	**380**
Metals (mg/kg)												
Arsenic	14	1	**5.1**	**6**	**5.6**	**3.7**	**4.6**	**4.3**	**6.5**	**5.6**	**4.8**	**7.3**
Cadmium	2.1	1	**0.21 J**	**0.071 J**	**0.26 J**	**0.22 J**	**0.29 J**	**0.053 J**	**0.31 J**	**0.061 J**	**0.56**	**0.14 J**
Chromium	72	1	**18**	**21**	**20**	**15**	**19**	**16**	**20**	**13**	**20**	**25**
Copper	400	1	**19**	**13**	**20**	**17**	**21**	**16**	**30**	**11**	**24**	**27**
Lead	360	1	**10**	**5.7**	**9.9**	**8.8**	**11**	**9.7**	**14**	**6.4**	**14**	**14**
Mercury	0.66	1	**0.053**	**0.029**	**0.045**	**0.035**	**0.046**	**0.079**	**0.081**	**0.024 J**	**0.083**	**0.038 J**
Nickel	26	1	**15**	**10**	**15**	**13**	**16**	**14**	**17**	**12**	**17**	**15**
Silver	0.58	1	**0.12 J**	**0.078 J**	**0.13 J**	**0.1 J**	**0.13 J**	**0.11 J**	**0.14 J**	**0.083 J**	**0.13 J**	**0.12 J**
Zinc	3,200	1	**77**	**100**	**85**	**74**	**91**	**64**	**99**	**56**	**92**	**75**
Polycyclic Aromatic Hydrocarbons (PAH) (µg/kg)												
Total PAH (U = 1/2)	17,000	1	**63.4**	**492**	**139**	**373**	**93.1**	**132**	**2,127**	**130**	**297**	**2,863**
Total PAH (U = 0)	--	--	**58.6**	**492**	**139**	**373**	**91.3**	**129**	**2,127**	**127**	**297**	**2,863**
Total LPAH (U = 1/2)	--	--	**9.1**	**89.6**	**19.8**	**42.0**	**15.3**	**18.5**	**310**	**15.7**	**41.7**	**225**
Total LPAH (U = 0)	6,590	2	**6.3**	**89.6**	**19.8**	**42.0**	**15.3**	**16.7**	**310**	**14.1**	**41.7**	**225**
Naphthalene	529	2	**0.46 J**	**4.5**	**4.7**	**3**	**1.3 J**	**1.5 J**	**13**	1.6 U	**4**	**9.4**

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-11 LRIS-LR-11-SS 4/20/2010 0-10 cm	LRIS-LR-12 LRIS-LR-12-SS 4/20/2010 0-10 cm	LRIS-LR-13 LRIS-LR-13-SS 4/20/2010 0-10 cm	LRIS-LR-14 LRIS-LR-14-SS 4/20/2010 0-10 cm	LRIS-LR-15 LRIS-LR-15-SS 4/20/2010 0-10 cm	LRIS-LR-15 LRIS-LR-65-SS 4/20/2010 0-10 cm	LRIS-LR-16 LRIS-LR-16-SS 4/20/2010 0-10 cm	LRIS-LR-17 LRIS-LR-17-SS 4/20/2010 0-10 cm	LRIS-LR-18 LRIS-LR-18-SS 4/20/2010 0-10 cm	LRIS-LR-19 LRIS-LR-19-SS 4/21/2010 0-10 cm
Acenaphthylene	470	2	1.9 U	**1.6**	**0.85 J**	**1.7 J**	**0.78 J**	**0.98 J**	**5.9**	**1.3 J**	**2.5**	**35**
Acenaphthene	1,060	2	1.9 U	**28**	**1.2 J**	**2.6**	**0.66 J**	1.8 U	**25**	**0.78 J**	**3**	**4.1**
Fluorene	1,070	2	**0.64 J**	**15**	**1.3 J**	**3.4**	**1.3 J**	**2.3**	**29**	**2.2**	**3.6**	**7.1**
Phenanthrene	6,100	2	**4.4**	**27**	**8**	**25**	**7.8**	**9.2**	**190**	**6.4**	**21**	**81**
Anthracene	1,230	2	**0.77 J**	**11**	**2.4**	**5.2**	**2.6**	**2.7**	**37**	**3.4**	**5.2**	**84**
2-Methylnaphthalene	469	2	1.9 U	**2.5**	**1.3 J**	**1.1 J**	**0.83 J**	1.8 U	**10**	1.6 U	**2.4**	**4.6**
Total HPAH (U = 1/2)	--	--	**54.3**	**403**	**119**	**331**	**77.9**	**114**	**1,817**	**115**	**255**	**2,638**
Total HPAH (U = 0)	31,640	2	**52.3**	**403**	**119**	**331**	**76.0**	**112**	**1,817**	**113**	**255**	**2,638**
Fluoranthene	11,100	2	**14**	**140**	**30**	**90**	**16**	**32**	**600**	**31**	**51**	**380**
Pyrene	8,790	2	**11**	**110**	**25**	**78**	**13**	**25**	**440**	**28**	**52**	**350**
Benzo(a)anthracene	4,260	2	**3.7**	**29**	**7.1**	**22**	**6.7**	**6.9**	**130**	**7.8**	**17**	**110**
Chrysene	5,940	2	**8.3**	**38**	**14**	**48**	**8.1**	**12**	**220**	**12**	**27**	**570**
Benzofluoranthene, Total	11,000	2	**9.4**	**43**	**19**	**46**	**13**	**20**	**260**	**20**	**44**	**750**
Benzo(a)pyrene	3,300	2	**2.8 J**	**18**	**7.2**	**16**	**7**	**6.8**	**87**	**7**	**24**	**160**
Indeno(1,2,3-c,d)pyrene	4,120	2	**2 J**	**10**	**6.6**	**11**	**6.3**	**4.3**	**35**	**3.2**	**15**	**150**
Dibenzo(a,h)anthracene	800	2	3.9 U	**4.6**	**3.3 J**	**4.5**	3.7 U	3.6 U	**9.8**	3.1 U	**4.3**	**38**
Benzo(g,h,i)perylene	4,020	2	**1.1 J**	**10**	**7**	**15**	**5.9**	**5.1**	**35**	**4.1**	**21**	**130**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)												
Total SMS LPAH (U = 0)	370	3	**0.45**	**24.2**	**1.5**	**3.7**	**1.3**	**1.3**	**9.4**	**1.8**	**3.3**	**10.5**
Naphthalene	99	3	**0.03 J**	**1.3**	**0.39**	**0.27**	**0.12 J**	**0.12 J**	**0.41**	0.21 U	**0.33**	**0.45**
Acenaphthylene	66	3	0.14 U	**0.44**	**0.07 J**	**0.15 J**	**0.07 J**	**0.08 J**	**0.18**	**0.17 J**	**0.21**	**1.7**
Acenaphthene	16	3	0.14 U	**7.8**	**0.10 J**	**0.24**	**0.06 J**	0.14 U	**0.78**	**0.10 J**	**0.25**	**0.20**
Fluorene	23	3	**0.05 J**	**4.2**	**0.11 J**	**0.31**	**0.12 J**	**0.18**	**0.91**	**0.29**	**0.30**	**0.34**
Phenanthrene	100	3	**0.31**	**7.5**	**0.67**	**2.3**	**0.71**	**0.71**	**5.9**	**0.83**	**1.8**	**3.9**
Anthracene	220	3	**0.06 J**	**3.1**	**0.20**	**0.47**	**0.24**	**0.21**	**1.2**	**0.44**	**0.43**	**4.0**
2-Methylnaphthalene	38	3	0.14 U	**0.69**	**0.11 J**	**0.10 J**	**0.08 J**	0.14 U	**0.31**	0.21 U	**0.20**	**0.22**
Total SMS HPAH (U = 0)	960	3	**3.7**	**112**	**9.9**	**30.0**	**6.9**	**8.6**	**56.8**	**14.7**	**21.3**	**126**
Fluoranthene	160	3	**1.0**	**38.9**	**2.5**	**8.2**	**1.5**	**2.5**	**18.8**	**4.0**	**4.3**	**18.1**
Pyrene	1,000	3	**0.79**	**30.6**	**2.1**	**7.1**	**1.2**	**1.9**	**13.8**	**3.6**	**4.3**	**16.7**
Benzo(a)anthracene	110	3	**0.26**	**8.1**	**0.59**	**2.0**	**0.61**	**0.53**	**4.1**	**1.0**	**1.4**	**5.2**
Chrysene	110	3	**0.59**	**10.6**	**1.2**	**4.4**	**0.74**	**0.92**	**6.9**	**1.6**	**2.3**	**27.1**
Benzofluoranthene (unspecified)	230	3	**0.67**	**11.9**	**1.6**	**4.2**	**1.2**	**1.5**	**8.1**	**2.6**	**3.7**	**35.7**
Benzo(a)pyrene	99	3	**0.20 J**	**5.0**	**0.60**	**1.5**	**0.64**	**0.52**	**2.7**	**0.91**	**2.0**	**7.6**
Indeno(1,2,3-c,d)pyrene	34	3	**0.14 J**	**2.8**	**0.55**	**1.0**	**0.57**	**0.33**	**1.1**	**0.42**	**1.3**	**7.1**
Dibenzo(a,h)anthracene	12	3	0.28 U	**1.3**	**0.28 J**	**0.41**	0.34 U	0.28 U	**0.31**	0.40 U	**0.36**	**1.8**
Benzo(g,h,i)perylene	31	3	**0.08 J**	**2.8**	**0.58**	**1.4**	**0.54**	**0.39**	**1.1**	**0.53**	**1.8**	**6.2**
Chlorinated Hydrocarbons (µg/kg)												
1,4-Dichlorobenzene	110	4	4.8 U	3.6 U	4.7 U	4.4 U	4.6 U	4.5 U	6.7 U	3.9 U	4.3 U	4.4 U
1,2-Dichlorobenzene	35	4	4.8 U	3.6 U	4.7 U	4.4 U	4.6 U	4.5 U	6.7 U	3.9 U	4.3 U	4.4 U
1,2,4-Trichlorobenzene	31	4	4.8 U	3.6 U	4.7 U	4.4 U	4.6 U	4.5 U	6.7 U	3.9 U	4.3 U	4.4 U
Hexachlorobenzene	22	4	4.8 U	3.6 U	4.7 U	4.4 U	4.6 U	4.5 U	6.7 U	3.9 U	4.3 U	4.4 U
Chlorindated Hydrocarbons (mg/kg-OC)												

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-11 LRIS-LR-11-SS 4/20/2010 0-10 cm	LRIS-LR-12 LRIS-LR-12-SS 4/20/2010 0-10 cm	LRIS-LR-13 LRIS-LR-13-SS 4/20/2010 0-10 cm	LRIS-LR-14 LRIS-LR-14-SS 4/20/2010 0-10 cm	LRIS-LR-15 LRIS-LR-15-SS 4/20/2010 0-10 cm	LRIS-LR-15 LRIS-LR-65-SS 4/20/2010 0-10 cm	LRIS-LR-16 LRIS-LR-16-SS 4/20/2010 0-10 cm	LRIS-LR-17 LRIS-LR-17-SS 4/20/2010 0-10 cm	LRIS-LR-18 LRIS-LR-18-SS 4/20/2010 0-10 cm	LRIS-LR-19 LRIS-LR-19-SS 4/21/2010 0-10 cm
1,4-Dichlorobenzene	3.1	3	0.34 U	1.0 U	0.39 U	0.40 U	0.42 U	0.35 U	0.21 U	0.51 U	0.36 U	0.21 U
1,2-Dichlorobenzene	2.3	3	0.34 U	1.0 U	0.39 U	0.40 U	0.42 U	0.35 U	0.21 U	0.51 U	0.36 U	0.21 U
1,2,4-Trichlorobenzene	0.81	3	0.34 U	1.0 U	0.39 U	0.40 U	0.42 U	0.35 U	0.21 U	0.51 U	0.36 U	0.21 U
Hexachlorobenzene	0.38	3	0.34 U	1.0 U	0.39 U	0.40 U	0.42 U	0.35 U	0.21 U	0.51 U	0.36 U	0.21 U
Phthalates (µg/kg)												
Dimethyl phthalate	311	2	9.6 U	7.1 U	**0.52 J**	**0.48 J**	9.2 U	9 U	**2.2 J**	7.8 U	**2.2 J**	8.8 U
Diethyl phthalate	200	4	9.6 U	7.1 U	9.4 U	8.8 U	9.2 U	9 U	13 U	7.8 U	8.5 U	8.8 U
Di-n-butyl phthalate	380	1	**20**	**1.9 J**	**4 J**	**20**	**23**	**16 J**	**20 J**	**3 J**	**5.5 J**	**19**
Butylbenzyl phthalate	260	2	**35**	7.1 U	**4.6 J**	**49**	**62**	**43**	**9.6 J**	**6.3 J**	**12**	**24**
Bis(2-ethylhexyl) phthalate	500	1	**19 J**	**13 J**	**48 J**	**36 J**	**31 J**	**27 J**	**75 J**	**16 J**	**22 J**	**21 J**
Di-n-octyl phthalate	39	1	19 U	14 U	19 U	18 U	18 U	18 U	27 U	16 U	17 U	18 U
Phthalates (mg/kg-OC)												
Dimethyl phthalate	53	3	0.69 U	2.0 U	**0.04 J**	**0.04 J**	0.84 U	0.69 U	**0.07 J**	1.0 U	**0.18 J**	0.42 U
Diethyl phthalate	61	3	0.69 U	2.0 U	0.78 U	0.80 U	0.84 U	0.69 U	0.40 U	1.0 U	0.71 U	0.42 U
Di-n-butyl phthalate	220	3	**1.4**	**0.53 J**	**0.33 J**	**1.8**	**2.1**	**1.2 J**	**0.63 J**	**0.39 J**	**0.46 J**	**0.90**
Butylbenzyl phthalate	4.9	3	**2.5**	2.0 U	**0.38 J**	**4.5**	**5.6**	**3.3**	**0.30 J**	**0.82 J**	**1.0**	**1.1**
Bis(2-ethylhexyl) phthalate	47	3	**1.4 J**	**3.6 J**	**4.0 J**	**3.3 J**	**2.8 J**	**2.1 J**	**2.3 J**	**2.1 J**	**1.8 J**	**1.0 J**
Di-n-octyl phthalate	58	3	1.4 U	3.9 U	1.6 U	1.6 U	1.6 U	1.4 U	0.84 U	2.1 U	1.4 U	0.86 U
Miscellaneous Extractables (µg/kg)												
Benzyl alcohol	57	3	9.6 U	**1.8 J**	9.4 U	8.8 U	9.2 U	**5.3 J**	13 U	7.8 U	**3.2 J**	**2.2 J**
Benzoic acid	2,900	1	**71 J**	**53 J**	**78 J**	**73 J**	**85 J**	**72 J**	**170 J**	**72 J**	**69 J**	**77 J**
Dibenzofuran	200	1	9.6 U	**2.8 J**	**0.97 J**	**2.1 J**	9.2 U	**0.69 J**	**16**	**0.94 J**	**2.5 J**	**4.4 J**
Hexachlorobutadiene	29	4	4.8 U	3.6 U	4.7 U	4.4 U	4.6 U	4.5 U	6.7 U	3.9 U	4.3 U	4.4 U
N-Nitrosodiphenylamine	28	4	4.8 U	3.6 U	4.7 U	4.4 U	4.6 U	4.5 U	6.7 U	3.9 U	4.3 U	4.4 U
Miscellaneous Extractables (mg/kg-OC)												
Dibenzofuran	15	3	0.69 U	**0.78 J**	**0.08 J**	**0.19 J**	0.84 U	**0.05 J**	**0.50**	**0.12 J**	**0.21 J**	**0.21 J**
Hexachlorobutadiene	3.9	3	0.34 U	1.0 U	0.39 U	0.40 U	0.42 U	0.35 U	0.21 U	0.51 U	0.36 U	0.21 U
N-Nitrosodiphenylamine	11	3	0.34 U	1.0 U	0.39 U	0.40 U	0.42 U	0.35 U	0.21 U	0.51 U	0.36 U	0.21 U
Total Petroleum Hydrocarbons (mg/kg)												
Diesel #2 Range	340	1	--	31 U	--	--	--	--	59 U	--	--	40 U
Motor Oil Range	3,600	1	--	63 U	--	--	--	--	**76 J**	--	--	81 U
Polychlorinated Biphenyl (PCB) Aroclors (µg/kg)												
Total PCB Aroclors (U = 0)	110	1	--	14 U	--	17 U	--	--	25 U	--	--	--
PCB Aroclors (mg/kg-OC)												
Total PCB Aroclors (U = 0)	12	3	--	3.9 U	--	1.5 U	--	--	0.78 U	--	--	--
PCB Aroclors (µg/kg)												
Aroclor 1016	--	--	--	14 U	--	17 U	--	--	25 U	--	--	--
Aroclor 1221	--	--	--	14 U	--	17 U	--	--	25 U	--	--	--
Aroclor 1232	--	--	--	14 U	--	17 U	--	--	25 U	--	--	--
Aroclor 1242	--	--	--	14 U	--	17 U	--	--	25 U	--	--	--
Aroclor 1248	--	--	--	14 U	--	17 U	--	--	25 U	--	--	--
Aroclor 1254	--	--	--	14 U	--	17 U	--	--	25 U	--	--	--

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-11 LRIS-LR-11-SS 4/20/2010 0-10 cm	LRIS-LR-12 LRIS-LR-12-SS 4/20/2010 0-10 cm	LRIS-LR-13 LRIS-LR-13-SS 4/20/2010 0-10 cm	LRIS-LR-14 LRIS-LR-14-SS 4/20/2010 0-10 cm	LRIS-LR-15 LRIS-LR-15-SS 4/20/2010 0-10 cm	LRIS-LR-15 LRIS-LR-65-SS 4/20/2010 0-10 cm	LRIS-LR-16 LRIS-LR-16-SS 4/20/2010 0-10 cm	LRIS-LR-17 LRIS-LR-17-SS 4/20/2010 0-10 cm	LRIS-LR-18 LRIS-LR-18-SS 4/20/2010 0-10 cm	LRIS-LR-19 LRIS-LR-19-SS 4/21/2010 0-10 cm
Aroclor 1260	--	--	--	14 U	--	17 U	--	--	25 U	--	--	--
Dioxin Furans (ng/kg)												
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	2.4	61.3	16.6	13.1	1.1	--	14.2	4.3	0.85	107
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	2.8	61.3	16.6	13.2	1.5	--	14.3	4.6	1.7	108
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	26	180 J	210	92 J	19	--	170 J	55	14 J	3,500 J
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	900	18,000 J	7,900 J	4,600 J	370	--	5,500 J	1,100	270 J	40,000 J
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	12	160 J	56	71 J	7 J	--	60 J	32	4.8 J	780 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	89	2,000 J	540	510 J	44	--	600 J	190	30 J	4,800 J
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	0.67 J	9.5	3.3 J	4.5	0.28 U	--	3.7 J	2.1 J	0.49 J	54 J
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	2.1 J	25	6.6	8.2	0.51 U	--	4.4	2.6 J	0.37 UJ	49 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	1.1 J	20	3.5 J	3.1 J	0.42 U	--	2.8 J	0.47 J	0.66 UJ	17 J
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	0.79 J	9.9	2.8 J	3.7	0.49 J	--	2.4 J	1.1 J	0.36 UJ	20 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	3.8	80	28	17	2.1 J	--	22	9.4	2 J	180
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	0.24 U	1.4 J	0.27 J	0.75 J	0.27 U	--	0.59 J	0.2 U	0.28 UJ	2.4 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	1.9 J	41 J	8.1	4.1 J	1 J	--	5 J	1.8 J	1.2 J	27 J
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	0.4 U	4.6	1.4 J	1.9 J	0.38 U	--	1.5 J	0.32 U	0.83 U	6.1 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	0.37 U	13 J	1.9 J	1.1 J	0.36 U	--	1.3 J	0.32 U	0.75 UJ	3.5 J
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	0.59 J	5.7	1.6 J	2.7 J	0.31 J	--	1.9 J	0.98 J	0.29 UJ	17 J
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	0.46 U	5.8 J	1.9 J	2 J	0.45 U	--	1.6 J	0.39 U	0.96 U	9.3 J
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	0.57 J	1.2	0.97 J	0.84	0.58 J	--	1.2	0.41 J	0.87	3.5 J
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	0.24 U	0.83	0.45 J	0.22 U	0.2 U	--	0.3 U	0.14 U	0.54 U	1.2 U
Total Heptachlorodibenzofuran (HpCDF)	--	--	38	510	220	260	21	--	230	120	18	4,100
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	200	3,700 J	1,100	1,200 J	87	--	1,200 J	300	67	9,200 J
Total Hexachlorodibenzofuran (HxCDF)	--	--	19	370	100	140	7.6	--	100	45	5.9	1,200
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	20	660	150	80	10	--	94	24	11	690
Total Pentachlorodibenzofuran (PeCDF)	--	--	1.2	78	13	28	0.71	--	15	2.5	0.96 U	130
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	0.37 U	200	15	6.3	0.36 U	--	7.3	0.32 U	0.75 U	17
Total Tetrachlorodibenzofuran (TCDF)	--	--	0.57	11	3.6	4.5	0.58	--	7	0.68	1.4	6.7
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	0.24 U	20	8.1	1.7	0.2 U	--	3	0.14 U	0.54 U	21

Table 6
Lake River Surface Sediment Testing Results

Location ID	Preliminary Sediment Screening Criteria		LRIS-LR-20	LRIS-LR-21	LRIS-LR-22	LRIS-LR-23	LRIS-LR-23	LRIS-LR-24	LRIS-LR-25	LRIS-LR-26	LRIS-LR-27	LRIS-LR-28
Sample ID			LRIS-LR-20-SS	LRIS-LR-21-SS	LRIS-LR-22-SS	LRIS-LR-23-SS	LRIS-LR-73-SS	LRIS-LR-24-SS	LRIS-LR-25-SS	LRIS-LR-26-SS	LRIS-LR-27-SS	LRIS-LR-28-SS
Sample Date			4/21/2010	4/21/2010	4/21/2010	4/21/2010	4/21/2010	4/21/2010	4/21/2010	4/21/2010	4/21/2010	4/21/2010
Sample Depth			0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
Conventional Parameters												
Total organic carbon (pct)	--	--	2.4 J	0.63 J	1.6 J	0.49 J	0.57	1.9	1.3	0.97	0.99	0.34
Total solids (pct)	--	--	49	64	62	65	64	55	54	67	60	71
Total volatile solids (pct)	--	--	5	1.4	2.5	1.3	1.1	3.4	5.4	1.6	1.9	0.87
Ammonia (mg/kg)	--	--	25 J	-- R	35 J	27 J	21 J	37 J	26 J	-- R	20 J	-- R
Sulfide (mg/kg)	--	--	6.6 J	13 J	12 J	11 J	6.3 J	26 J	9.3 UJ	11 J	13 J	7.9 J
Grain Size (pct)												
Clay	--	--	7.8	4.6	3.2	5.2	4.2	4.3	1.2	1.7	5.4	3.1
Gravel	--	--	0	0	0	0	0	0	0	0	0	0
Sand, Coarse	--	--	0	0	0	0	0	0	0	0	0	0
Sand, Fine	--	--	37	67	70	66	67	43	61	75	42	86
Sand, Medium	--	--	2	0.2	2.3	0.3	0.3	1.5	7.2	1.7	0.3	0.9
Sand, Very Fine	--	--	7.5	7.5	3.8	8.7	8.7	10	3.8	4.9	12	2.7
Silt	--	--	46	21	20	20	20	41	27	17	40	6.8
Total Clay	--	--	7.8	4.6	3.2	5.2	4.2	4.3	1.2	1.7	5.4	3.1
Total Fines (silt + clay)	--	--	53.8	25.6	23.2	25.2	24.2	45.3	28.2	18.7	45.4	9.9
Total Gravel	--	--	0	0	0	0	0	0	0	0	0	0
Total Sand	--	--	46.5	74.7	76.1	75	76	54.5	72	81.6	54.3	89.6
Total Silt	--	--	46	21	20	20	20	41	27	17	40	6.8
Total Grain Size	--	--	100.3	100.3	99.3	100.2	100.2	99.8	100.2	100.3	99.7	99.5
Phenols (µg/kg)												
Phenol	120	1	9.6 J	11	24	12	10	19 J	23 J	36	15	13
2-Methylphenol (o-Cresol)	63	3	10 U	7.8 U	8 U	7.6 U	7.8 U	16 J	8.3 J	7.5 U	8.4 U	7 U
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	8.8 J	23	51	63	130	4.5 J	52 J	190	26	23
2,4-Dimethylphenol	29	3	10 U	7.8 U	8 U	7.6 U	7.8 U	9 U	19 U	7.5 U	8.4 U	7 U
Pentachlorophenol	1,200	1	490	7.8 U	310	7.6 U	7.8 U	510 J	740 J	45	4.9 J	2.8 J
Metals (mg/kg)												
Arsenic	14	1	9.2	4.6	5.5	3.2	3.2	6	12	8.1	4.6	5.7
Cadmium	2.1	1	0.27 J	0.02 J	0.17 J	0.25 U	0.25 U	0.16 J	0.22 J	0.16 J	0.073 J	0.23 U
Chromium	72	1	23	14	14	15	16	19	24	21	18	13
Copper	400	1	30	13	15	13	14	22	23	16	19	8.5
Lead	360	1	32	6.9	8.3	5.2	5.7	10	9.8	6.7	8.3	5.4
Mercury	0.66	1	0.096 J	0.018 J	0.02 J	0.014 J	0.017 J	0.044 J	0.051 J	0.017 J	0.03 J	0.021 UJ
Nickel	26	1	17	14	11	14	15	15	14	13	16	12
Silver	0.58	1	0.13 J	0.083 J	0.084 J	0.094 J	0.1 J	0.12 J	0.12 J	0.081 J	0.13 J	0.073 J
Zinc	3,200	1	100	49	69	46	53	93	120	78	66	57
Polycyclic Aromatic Hydrocarbons (PAH) (µg/kg)												
Total PAH (U = 1/2)	17,000	1	2,237	61.7	817	50.2	58.7	975	4,160	506	116	55.0
Total PAH (U = 0)	--	--	2,237	60.2	816	46.5	55.6	975	4,160	506	116	53.6
Total LPAH (U = 1/2)	--	--	195	9.9	94.1	6.7	11.3	144	1,149	99.2	17.0	12.9
Total LPAH (U = 0)	6,590	2	195	9.9	93.3	4.5	9.7	144	1,149	99.2	17.0	11.5
Naphthalene	529	2	7	0.96 J	2.7	0.63 J	0.95 J	8.6	260	17	1.8	2.4

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-20 LRIS-LR-20-SS 4/21/2010 0-10 cm	LRIS-LR-21 LRIS-LR-21-SS 4/21/2010 0-10 cm	LRIS-LR-22 LRIS-LR-22-SS 4/21/2010 0-10 cm	LRIS-LR-23 LRIS-LR-23-SS 4/21/2010 0-10 cm	LRIS-LR-23 LRIS-LR-73-SS 4/21/2010 0-10 cm	LRIS-LR-24 LRIS-LR-24-SS 4/21/2010 0-10 cm	LRIS-LR-25 LRIS-LR-25-SS 4/21/2010 0-10 cm	LRIS-LR-26 LRIS-LR-26-SS 4/21/2010 0-10 cm	LRIS-LR-27 LRIS-LR-27-SS 4/21/2010 0-10 cm	LRIS-LR-28 LRIS-LR-28-SS 4/21/2010 0-10 cm
Acenaphthylene	470	2	**20**	**0.47 J**	**4.9**	1.5 U	1.6 U	**10**	**31**	**4.7**	**0.55 J**	**0.38 J**
Acenaphthene	1,060	2	**5.3**	**0.37 J**	**7.7**	1.5 U	1.6 U	**6.5**	**92**	**15**	**1 J**	1.4 U
Fluorene	1,070	2	**12**	**1.4 J**	**13**	**0.3 J**	**1.2 J**	**20**	**110**	**8.7**	**2.1**	**1.6**
Phenanthrene	6,100	2	**100**	**4.8**	**47**	**2.6**	**5.1**	**59**	**410**	**35**	**7.8**	**5.4**
Anthracene	1,230	2	**46**	**1.1 J**	**18**	**0.94 J**	**1.5 J**	**35**	**160**	**13**	**2.3**	**1.7**
2-Methylnaphthalene	469	2	**5**	**0.78 J**	1.6 U	1.5 U	**0.91 J**	**4.5**	**86**	**5.8**	**1.4 J**	1.4 U
Total HPAH (U = 1/2)	--	--	**2,042**	**51.9**	**723**	**43.5**	**47.5**	**831**	**3,011**	**406**	**99.1**	**42.1**
Total HPAH (U = 0)	31,640	2	**2,042**	**50.3**	**723**	**42.0**	**45.9**	**831**	**3,011**	**406**	**99.1**	**42.1**
Fluoranthene	11,100	2	**420**	**11**	**170**	**7.1**	**13**	**150**	**850**	**110**	**26**	**10**
Pyrene	8,790	2	**390**	**9.4**	**140**	**5.5**	**11**	**130**	**690**	**91**	**22**	**9**
Benzo(a)anthracene	4,260	2	**140**	**4.6**	**54**	**3.9**	**2.7**	**58**	**210**	**24**	**7.2**	**2.8**
Chrysene	5,940	2	**320**	**5.6**	**95**	**6.3**	**4.4**	**100**	**400**	**55**	**13**	**4.2**
Benzofluoranthene, Total	11,000	2	**470**	**8.1**	**150**	**9.9**	**5.7**	**180**	**480**	**66**	**12**	**5.4**
Benzo(a)pyrene	3,300	2	**120**	**3.3**	**49**	**3.8**	**2.4**	**76**	**170**	**22**	**5.6**	**2.5**
Indeno(1,2,3-c,d)pyrene	4,120	2	**80**	**4.2**	**26**	**3**	**3.7**	**59**	**89**	**16**	**5.1**	**3.5**
Dibenzo(a,h)anthracene	800	2	**26**	3.1 U	**10**	3 U	3.1 U	**15**	**35**	**6.4**	**3.1 J**	**1.8 J**
Benzo(g,h,i)perylene	4,020	2	**76**	**4.1**	**29**	**2.5**	**3**	**63**	**87**	**16**	**5.1**	**2.9**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)												
Total SMS LPAH (U = 0)	370	3	**7.9**	**1.4**	**5.8**	**0.91**	**1.5**	**7.3**	**81.8**	**9.6**	**1.6**	**3.4**
Naphthalene	99	3	**0.29**	**0.15 J**	**0.17**	**0.13 J**	**0.17 J**	**0.45**	**20.0**	**1.8**	**0.18**	**0.71**
Acenaphthylene	66	3	**0.83**	**0.07 J**	**0.31**	0.31 U	0.28 U	**0.53**	**2.4**	**0.48**	**0.056 J**	**0.11 J**
Acenaphthene	16	3	**0.22**	**0.06 J**	**0.48**	0.31 U	0.28 U	**0.34**	**7.1**	**1.5**	**0.10 J**	0.41 U
Fluorene	23	3	**0.50**	**0.22 J**	**0.81**	**0.06 J**	**0.21 J**	**1.1**	**8.5**	**0.90**	**0.21**	**0.47**
Phenanthrene	100	3	**4.2**	**0.76**	**2.9**	**0.53**	**0.89**	**3.1**	**31.5**	**3.6**	**0.79**	**1.6**
Anthracene	220	3	**1.9**	**0.17 J**	**1.1**	**0.19 J**	**0.26 J**	**1.8**	**12.3**	**1.3**	**0.23**	**0.50**
2-Methylnaphthalene	38	3	**0.21**	**0.12 J**	0.10 U	0.31 U	**0.16 J**	**0.24**	**6.6**	**0.60**	**0.14 J**	0.41 U
Total SMS HPAH (U = 0)	960	3	**85.1**	**8.0**	**45.2**	**8.6**	**8.1**	**43.7**	**232**	**41.9**	**10.0**	**12.4**
Fluoranthene	160	3	**17.5**	**1.7**	**10.6**	**1.4**	**2.3**	**7.9**	**65.4**	**11.3**	**2.6**	**2.9**
Pyrene	1,000	3	**16.3**	**1.5**	**8.8**	**1.1**	**1.9**	**6.8**	**53.1**	**9.4**	**2.2**	**2.6**
Benzo(a)anthracene	110	3	**5.8**	**0.73**	**3.4**	**0.80**	**0.47**	**3.1**	**16.2**	**2.5**	**0.73**	**0.82**
Chrysene	110	3	**13.3**	**0.89**	**5.9**	**1.3**	**0.77**	**5.3**	**30.8**	**5.7**	**1.3**	**1.2**
Benzofluoranthene (unspecified)	230	3	**19.6**	**1.3**	**9.4**	**2.0**	**1.0**	**9.5**	**36.9**	**6.8**	**1.2**	**1.6**
Benzo(a)pyrene	99	3	**5.0**	**0.52**	**3.1**	**0.78**	**0.42**	**4.0**	**13.1**	**2.3**	**0.57**	**0.74**
Indeno(1,2,3-c,d)pyrene	34	3	**3.3**	**0.67**	**1.6**	**0.61**	**0.65**	**3.1**	**6.8**	**1.6**	**0.52**	**1.0**
Dibenzo(a,h)anthracene	12	3	**1.1**	0.49 U	**0.63**	0.61 U	0.54 U	**0.79**	**2.7**	**0.66**	**0.31 J**	**0.53 J**
Benzo(g,h,i)perylene	31	3	**3.2**	**0.65**	**1.8**	**0.51**	**0.53**	**3.3**	**6.7**	**1.6**	**0.52**	**0.85**
Chlorinated Hydrocarbons (µg/kg)												
1,4-Dichlorobenzene	110	4	5.1 U	3.9 U	4 U	3.8 U	3.9 U	4.5 U	9.3 U	3.7 U	4.2 U	3.5 U
1,2-Dichlorobenzene	35	4	5.1 U	3.9 U	4 U	3.8 U	3.9 U	4.5 U	9.3 U	3.7 U	4.2 U	3.5 U
1,2,4-Trichlorobenzene	31	4	5.1 U	3.9 U	4 U	3.8 U	3.9 U	4.5 U	9.3 U	3.7 U	4.2 U	3.5 U
Hexachlorobenzene	22	4	5.1 U	3.9 U	4 U	3.8 U	3.9 U	4.5 U	9.3 U	3.7 U	4.2 U	3.5 U
Chlorindated Hydrocarbons (mg/kg-OC)												

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-20 LRIS-LR-20-SS 4/21/2010 0-10 cm	LRIS-LR-21 LRIS-LR-21-SS 4/21/2010 0-10 cm	LRIS-LR-22 LRIS-LR-22-SS 4/21/2010 0-10 cm	LRIS-LR-23 LRIS-LR-23-SS 4/21/2010 0-10 cm	LRIS-LR-23 LRIS-LR-73-SS 4/21/2010 0-10 cm	LRIS-LR-24 LRIS-LR-24-SS 4/21/2010 0-10 cm	LRIS-LR-25 LRIS-LR-25-SS 4/21/2010 0-10 cm	LRIS-LR-26 LRIS-LR-26-SS 4/21/2010 0-10 cm	LRIS-LR-27 LRIS-LR-27-SS 4/21/2010 0-10 cm	LRIS-LR-28 LRIS-LR-28-SS 4/21/2010 0-10 cm
1,4-Dichlorobenzene	3.1	3	0.21 U	0.62 U	0.25 U	0.78 U	0.68 U	0.24 U	0.72 U	0.38 U	0.42 U	1.0 U
1,2-Dichlorobenzene	2.3	3	0.21 U	0.62 U	0.25 U	0.78 U	0.68 U	0.24 U	0.72 U	0.38 U	0.42 U	1.0 U
1,2,4-Trichlorobenzene	0.81	3	0.21 U	0.62 U	0.25 U	0.78 U	0.68 U	0.24 U	0.72 U	0.38 U	0.42 U	1.0 U
Hexachlorobenzene	0.38	3	0.21 U	0.62 U	0.25 U	0.78 U	0.68 U	0.24 U	0.72 U	0.38 U	0.42 U	1.0 U
Phthalates (µg/kg)												
Dimethyl phthalate	311	2	10 U	**2.7 J**	**15**	7.6 U	7.8 U	9 U	19 U	7.5 U	8.4 U	7 U
Diethyl phthalate	200	4	10 U	7.8 U	8 U	7.6 U	7.8 U	9 U	19 U	7.5 U	8.4 U	7 U
Di-n-butyl phthalate	380	1	**23**	25 U	28 U	**21**	16 U	**41**	27 UJ	**13 J**	17 U	**4 J**
Butylbenzyl phthalate	260	2	**43**	**40**	**51**	**25**	11 U	**40**	**90**	**21**	8.4 U	8.8 U
Bis(2-ethylhexyl) phthalate	500	1	**43 J**	120 U	**40 J**	**19 J**	120 U	**47 J**	**82 J**	**36 J**	130 U	110 U
Di-n-octyl phthalate	39	1	20 U	16 U	16 U	15 U	16 U	18 U	37 U	15 U	17 U	14 U
Phthalates (mg/kg-OC)												
Dimethyl phthalate	53	3	0.42 U	**0.43 J**	**0.94**	1.6 U	1.4 U	0.47 U	1.5 U	0.77 U	0.85 U	2.1 U
Diethyl phthalate	61	3	0.42 U	1.2 U	0.50 U	1.6 U	1.4 U	0.47 U	1.5 U	0.77 U	0.85 U	2.1 U
Di-n-butyl phthalate	220	3	**0.96**	4.0 U	1.8 U	**4.3**	2.8 U	**2.2**	2.1 UJ	**1.3 J**	1.7 U	**1.2 J**
Butylbenzyl phthalate	4.9	3	**1.8**	**6.3**	**3.2**	**5.1**	1.9 U	**2.1**	**6.9**	**2.2**	0.85 U	2.6 U
Bis(2-ethylhexyl) phthalate	47	3	**1.8 J**	19.0 U	**2.5 J**	**3.9 J**	21.1 U	**2.5 J**	**6.3 J**	**3.7 J**	13.1 U	32.4 U
Di-n-octyl phthalate	58	3	0.83 U	2.5 U	1.0 U	3.1 U	2.8 U	0.95 U	2.8 U	1.5 U	1.7 U	4.1U
Miscellaneous Extractables (µg/kg)												
Benzyl alcohol	57	3	**10**	7.8 U	**29**	7.6 U	7.8 U	**29**	**28**	7.5 U	**6.2 J**	**9.2**
Benzoic acid	2,900	1	**140 J**	**91 J**	**210**	190 U	**68 J**	**240**	**220 J**	190 U	**77 J**	**64 J**
Dibenzofuran	200	1	**8.2 J**	**0.38 J**	**5.2 J**	7.6 U	**0.66 J**	**9.5**	**83**	**6.3 J**	**0.82 J**	**1.3 J**
Hexachlorobutadiene	29	4	5.1 U	3.9 U	4 U	3.8 U	3.9 U	4.5 U	9.3 U	3.7 U	4.2 U	3.5 U
N-Nitrosodiphenylamine	28	4	5.1 U	3.9 U	4 U	3.8 U	3.9 U	4.5 U	9.3 U	3.7 U	4.2 U	3.5 U
Miscellaneous Extractables (mg/kg-OC)												
Dibenzofuran	15	3	**0.34 J**	**0.06 J**	**0.33 J**	1.6 U	**0.12 J**	**0.50**	**6.4**	**0.65 J**	**0.08 J**	**0.38 J**
Hexachlorobutadiene	3.9	3	0.21 U	0.62 U	0.25 U	0.78 U	0.68 U	0.24 U	0.72 U	0.38 U	0.42 U	1.0 U
N-Nitrosodiphenylamine	11	3	0.21 U	0.62 U	0.25 U	0.78 U	0.68 U	0.24 U	0.72 U	0.38 U	0.42 U	1.0 U
Total Petroleum Hydrocarbons (mg/kg)												
Diesel #2 Range	340	1	45 U	--	**8.3 J**	--	--	--	39 U	--	--	--
Motor Oil Range	3,600	1	89 U	--	**25 J**	--	--	--	**35 J**	--	--	--
Polychlorinated Biphenyl (PCB) Aroclors (µg/kg)												
Total PCB Aroclors (U = 0)	110	1	--	--	--	--	--	--	--	--	--	--
PCB Aroclors (mg/kg-OC)												
Total PCB Aroclors (U = 0)	12	3	--	--	--	--	--	--	--	--	--	--
PCB Aroclors (µg/kg)												
Aroclor 1016	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	--	--	--	--	--	--	--	--	--	--	--	--

Table 6
Lake River Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-20 LRIS-LR-20-SS 4/21/2010 0-10 cm	LRIS-LR-21 LRIS-LR-21-SS 4/21/2010 0-10 cm	LRIS-LR-22 LRIS-LR-22-SS 4/21/2010 0-10 cm	LRIS-LR-23 LRIS-LR-23-SS 4/21/2010 0-10 cm	LRIS-LR-23 LRIS-LR-73-SS 4/21/2010 0-10 cm	LRIS-LR-24 LRIS-LR-24-SS 4/21/2010 0-10 cm	LRIS-LR-25 LRIS-LR-25-SS 4/21/2010 0-10 cm	LRIS-LR-26 LRIS-LR-26-SS 4/21/2010 0-10 cm	LRIS-LR-27 LRIS-LR-27-SS 4/21/2010 0-10 cm	LRIS-LR-28 LRIS-LR-28-SS 4/21/2010 0-10 cm
Aroclor 1260	--	--	--	--	--	--	--	--	--	--	--	--
Dioxin Furans (ng/kg)												
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**259**	**0.28**	--	**0.43**	--	**173**	**256**	--	**0.86**	**0.70**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**259**	**0.53**	--	**0.61**	--	**173**	**256**	--	**1.1**	**0.87**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**2,600 J**	**3.9 J**	--	**5.6 J**	--	**570 J**	**980 J**	--	**14 J**	**3.9 J**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**92,000 J**	**96 J**	--	**120 J**	--	**70,000 J**	**68,000 J**	--	**170 J**	**260 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**1,000 J**	**1.7 J**	--	**2.5 J**	--	**700 J**	**680 J**	--	**4.2 J**	**3.3 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**11,000 J**	**13 J**	--	**14 J**	--	**5,600 J**	**7,800 J**	--	**23 J**	**30 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**61**	0.21 U	--	0.17 U	--	**44**	**43**	--	0.52 U	0.19 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**99**	**0.23 J**	--	**0.34 J**	--	**210**	**100**	--	**0.51 J**	**0.23 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**36**	0.15 U	--	0.17 U	--	**26**	**53**	--	**0.26 J**	**0.22 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**40**	0.089 U	--	**0.62 J**	--	**55**	**38**	--	**0.46 J**	**0.3 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**520**	**0.62 J**	--	**0.58 J**	--	**220**	**320**	--	**0.98 J**	**1.3 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**3.9 J**	0.094 U	--	0.26 U	--	**4.8 J**	**3.7 J**	--	0.24 U	0.22 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**81 J**	**0.23 J**	--	**0.47 J**	--	**48 J**	**120 J**	--	**0.46 J**	**0.35 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**35**	0.15 U	--	0.14 U	--	**28**	**24**	--	0.24 U	0.15 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**14 J**	0.24 UJ	--	0.15 UJ	--	**8.9 J**	**58 J**	--	0.26 UJ	0.17 UJ
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**39**	0.079 U	--	0.24 U	--	**30**	**27**	--	0.2 U	**0.22 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**36 J**	0.16 U	--	0.15 U	--	**58 J**	**31 J**	--	0.28 U	0.17 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**15**	0.15 U	--	**0.3 J**	--	**7.5**	**10**	--	**0.58 J**	**0.25 J**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**1.2 J**	0.14 U	--	0.084 U	--	**1.1 J**	**15**	--	**0.21 J**	0.085 U
Total Heptachlorodibenzofuran (HpCDF)	--	--	**3,800**	**6.1**	--	**7.2**	--	**2,100**	**2,200**	--	**13**	**8.5**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**21,000 J**	**27 J**	--	**28 J**	--	**12,000 J**	**16,000 J**	--	**47 J**	**59 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	**2,200**	**2.9**	--	**7.4**	--	**1,900**	**1,600**	--	**8.8**	**7.1**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**1,800**	**3.2**	--	**5.4**	--	**910**	**2,100**	--	**7.5**	**9.4**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**370**	**0.26**	--	**0.58**	--	**430**	**330**	--	**1.3**	**0.59**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**67**	0.24 U	--	**0.17**	--	**69**	**500**	--	**0.38**	**0.36**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**43**	0.15 U	--	**1**	--	**30**	**75**	--	**1.9**	**0.59**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**89**	0.14 U	--	**0.11**	--	**18**	**190**	--	**0.38**	0.11 U

Table 6
Lake River Surface Sediment Testing Results

Notes:

Detected concentration is greater than Ridgefield Preliminary Screening Level.
Bold = Detected result
J = Estimated value
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
R = Compound analyzed exceeding holding time, but not detected above detection limit
SMS = Sediment Management Standards
TEQ = toxicity equivalents
Non-detect ammonia results were rejected because the samples were analyzed past twice the holding time.
Total PAH includes the following PAHs: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, 2-Methylnaphthalene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Total Benzofluoranthenes, Benzo(a)pyrene,Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,)Perylene.
Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, and 2-Methylnaphthalene.
Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene.
Total SMS LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene. (2-Methylnaphthalene is not included.)
Total SMS HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene. (2-Methylnaphthalene is not included.)
mg/kg = milligram per kilogram
µg/kg = micrograms per kilogram
ng/kg = nanograms per kilogram
OC = organic carbon normalized
1. Ecology 2010 Draft Freshwater Sediment Sediment Quality Standards (SQS)/Screening Level (SL)1
2. Ecology 2003 Freshwater Lowest Apparent Effects Threshold (LAET)
3. Sediment Management Standard SQS (Marine)
4. Dredged Material Management Program SL (Marine)

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-CL-01 LRIS-CL-01-SS 4/15/2010 0-10 cm	LRIS-CL-01 LRIS-CL-01-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-02 LRIS-CL-02-SS 4/15/2010 0-10 cm	LRIS-CL-02 LRIS-CL-02-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-03 LRIS-CL-03-SS 4/15/2010 0-10 cm	LRIS-CL-03 LRIS-CL-03-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-04 LRIS-CL-04-SS 4/15/2010 0-10 cm	LRIS-CL-04 LRIS-CL-04-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-05 LRIS-CL-05-SS 4/15/2010 0-10 cm
Conventional Parameters											
Total organic carbon (%)	--	--	**4.5**	--	**5.4**	**2.8**	**3.6**	--	**4.9**	**1.4**	**1.3**
Total solids (%)	--	--	**55**	--	**39**	**57**	**50**	--	**34**	**64**	**56**
Total volatile solids (%)	--	--	**11**	--	**14**	**6.2**	**9.2**	--	**11**	**3.6**	**17**
Ammonia (mg/kg)	--	--	**29 J**	--	**-- R**	--	**25 J**	--	**-- R**	--	**-- R**
Sulfide (mg/kg)	--	--	**12**	--	13 U	--	10 U	--	15 U	--	**19**
Grain Size (%)											
Clay	--	--	**34**	--	**43**	**34**	**29**	--	**22**	**32**	**25**
Gravel	--	--	**0**	--	**0**	**0**	**0**	--	**0**	**0**	**0**
Sand, Coarse	--	--	**0**	--	**0**	**0**	**0**	--	**0**	**0**	**0**
Sand, Fine	--	--	**14**	--	**4.6**	**8 J**	**25**	--	**18**	**5.5**	**14**
Sand, Medium	--	--	**0.9**	--	**1.6**	**1.6**	**1**	--	**2**	**0.7**	**1.8**
Sand, Very Fine	--	--	**6**	--	**1.3**	**2.8 J**	**8.3**	--	**5.4**	**2.4**	**5.5**
Silt	--	--	**44**	--	**50**	**53**	**36**	--	**53**	**59**	**54**
Total Clay	--	--	**34**	--	**43**	**34**	**29**	--	**22**	**32**	**25**
Total Fines (silt + clay)	--	--	**78**	--	**93**	**87**	**65**	--	**75**	**91**	**79**
Total Gravel	--	--	**0**	--	**0**	**0**	**0**	--	**0**	**0**	**0**
Total Sand	--	--	**20.9**	--	**7.5**	**12.4**	**34.3**	--	**25.4**	**8.6**	**21.3**
Total Silt	--	--	**44**	--	**50**	**53**	**36**	--	**53**	**59**	**54**
Total Grain Size	--	--	**98.9**	--	**100.5**	**99.4**	**99.3**	--	**100.4**	**99.6**	**100.3**
Phenols (µg/kg)											
Phenol	120	1	9 U	--	**7.1 J**	43 U	**2.3 J**	--	**22**	7.8 U	8.9 U
2-Methylphenol (o-Cresol)	63	3	9 U	--	25 U	43 U	10 U	--	14 U	7.8 U	8.9 U
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	18 U	--	**6.4 J**	**7.6 J**	**3.5 J**	--	**110**	**2.1 J**	**4.7 J**
2,4-Dimethylphenol	29	3	9 U	--	25 U	43 U	10 U	--	14 U	7.8 U	8.9 U
Pentachlorophenol	1,200	1	**23**	--	**880**	**270 J**	**11**	--	**210**	**11**	**8.9**
Metals (mg/kg)											
Arsenic	14	1	**8.3**	--	**48**	**15**	**6.9**	--	**10**	**3.7**	**4.3**
Cadmium	2.1	1	**0.68 J**	--	**0.96 J**	**0.75**	**0.82 J**	--	**0.65 J**	**0.52**	**0.45 J**
Chromium	72	1	**28**	--	**86**	**34**	**27**	--	**31**	**31**	**23**
Copper	400	1	**29**	--	**75**	**32**	**28**	--	**34**	**27**	**20**
Lead	360	1	**29**	--	**42**	**18**	**24**	--	**23**	**13**	**11**
Mercury	0.66	1	**0.053**	--	**0.084**	**0.027 J**	**0.058**	--	**0.05**	**0.038 J**	**0.036**
Nickel	26	1	**17**	--	**21**	**20**	**18**	--	**18**	**20**	**17**
Silver	0.58	1	**0.12 J**	--	**0.16 J**	**0.12 J**	**0.12 J**	--	**0.098 J**	**0.11 J**	**0.074 J**
Zinc	3,200	1	**130 J**	--	**220 J**	**110**	**120 J**	--	**110 J**	**78**	**68 J**
Polycyclic Aromatic Hydrocarbons (PAH) (µg/kg)											
Total PAH (U = 1/2)	17,000	1	**62.8**	--	**840**	**342**	**62.0**	--	**226**	**20.7**	**179**
Total PAH (U = 0)	--	--	**61.9**	--	**840**	**324**	**59.0**	--	**220**	**13.6**	**177**
Total LPAH (U = 1/2)	--	--	**8.8**	--	**132**	**57.3**	**6.7**	--	**40.2**	**5.9**	**33.3**
Total LPAH (U = 0)	6,590	2	**7.9**	--	**132**	**48.6**	**5.7**	--	**37.3**	**5.1**	**33.3**
Naphthalene	529	2	**0.83 J**	--	**5.5**	**3.7 J**	**0.54 J**	--	**5.5**	**1.5 J**	**2.5**

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-CL-01 LRIS-CL-01-SS 4/15/2010 0-10 cm	LRIS-CL-01 LRIS-CL-01-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-02 LRIS-CL-02-SS 4/15/2010 0-10 cm	LRIS-CL-02 LRIS-CL-02-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-03 LRIS-CL-03-SS 4/15/2010 0-10 cm	LRIS-CL-03 LRIS-CL-03-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-04 LRIS-CL-04-SS 4/15/2010 0-10 cm	LRIS-CL-04 LRIS-CL-04-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-05 LRIS-CL-05-SS 4/15/2010 0-10 cm
Acenaphthylene	470	2	**0.8 J**	--	**16**	**4.7 J**	**0.54 J**	--	**3.3**	**0.36 J**	**0.6 J**
Acenaphthene	1,060	2	**0.49 J**	--	**2 J**	8.7 U	**0.53 J**	--	2.9 U	**0.52 J**	**1.6 J**
Fluorene	1,070	2	1.8 U	--	**3.9 J**	8.7 U	2 U	--	2.9 U	1.6 U	**3.5**
Phenanthrene	6,100	2	**3.8**	--	**23**	**14**	**2.7**	--	**12**	**1.7**	**17**
Anthracene	1,230	2	**1.6 J**	--	**80**	**25**	**0.97 J**	--	**15**	**0.6 J**	**7.5**
2-Methylnaphthalene	469	2	**0.35 J**	--	**1.7 J**	**1.2 J**	**0.44 J**	--	**1.5 J**	**0.43 J**	**0.64 J**
Total HPAH (U = 1/2)	--	--	**54.0**	--	**708**	**284**	**55.3**	--	**186**	**14.7**	**146**
Total HPAH (U = 0)	31,640	2	**54.0**	--	**708**	**276**	**53.3**	--	**183**	**8.5**	**144**
Fluoranthene	11,100	2	**7.8**	--	**58**	**27**	**7.8**	--	**28**	**3.2**	**33**
Pyrene	8,790	2	**8.6**	--	**53**	**27**	**8.6**	--	**22**	**2.3**	**28**
Benzo(a)anthracene	4,260	2	**3.8**	--	**25**	**9.8 J**	**4.4**	--	**11**	**0.69 J**	**18**
Chrysene	5,940	2	**6.8**	--	**180**	**54**	**5**	--	**30**	2.1 U	**16**
Benzofluoranthene, Total	11,000	2	**11**	--	**170**	**77**	**10**	--	**45**	**2.3 J**	**21**
Benzo(a)pyrene	3,300	2	**5.8**	--	**24**	**17**	**7**	--	**14**	2.3 U	**14**
Indeno(1,2,3-c,d)pyrene	4,120	2	**4.1**	--	**94**	**32**	**4.9**	--	**15**	3.1 U	**6.6**
Dibenzo(a,h)anthracene	800	2	**0.51 J**	--	**25**	17 U	4 U	--	5.8 U	3.1 U	3.6 U
Benzo(g,h,i)perylene	4,020	2	**5.6**	--	**79**	**32 J**	**5.6**	--	**18**	1.9 U	**7.4**
Aromatic Hydrocarbons (mg/kg-OC)											
Total SMS LPAH (U = 0)	370	3	**0.17**	--	**2.4**	**1.7**	**0.15**	--	**0.73**	**0.33**	**2.5**
Naphthalene	99	3	**0.02 J**	--	**0.10**	**0.13 J**	**0.02 J**	--	**0.11**	**0.11 J**	**0.19**
Acenaphthylene	66	3	**0.02 J**	--	**0.30**	**0.17 J**	**0.02 J**	--	**0.07**	**0.03 J**	**0.05 J**
Acenaphthene	16	3	**0.01 J**	--	**0.04 J**	0.31 U	**0.01 J**	--	0.06 U	**0.04 J**	**0.12 J**
Fluorene	23	3	0.04 U	--	**0.07 J**	0.31 U	0.06 U	--	0.06 U	0.11 U	**0.27**
Phenanthrene	100	3	**0.08**	--	**0.43**	**0.50**	**0.08**	--	**0.24**	**0.12**	**1.3**
Anthracene	220	3	**0.04 J**	--	**1.5**	**0.89**	**0.03 J**	--	**0.31**	**0.04 J**	**0.58**
2-Methylnaphthalene	38	3	**0.01 J**	--	**0.03 J**	**0.04 J**	**0.01 J**	--	**0.03 J**	**0.03 J**	**0.05 J**
Total SMS HPAH (U = 0)	960	3	**1.2**	--	**13.1**	**9.9**	**1.5**	--	**3.7**	**0.61**	**11.1**
Fluoranthene	160	3	**0.17**	--	**1.1**	**0.96**	**0.22**	--	**0.57**	**0.23**	**2.5**
Pyrene	1,000	3	**0.19**	--	**0.98**	**0.96**	**0.24**	--	**0.45**	**0.16**	**2.2**
Benzo(a)anthracene	110	3	**0.08**	--	**0.46**	**0.35 J**	**0.12**	--	**0.22**	**0.05 J**	**1.4**
Chrysene	110	3	**0.15**	--	**3.3**	**1.9**	**0.14**	--	**0.61**	0.15 U	**1.2**
Benzofluoranthene (unspecified)	230	3	**0.24**	--	**3.1**	**2.8**	**0.28**	--	**0.92**	**0.16 J**	**1.6**
Benzo(a)pyrene	99	3	**0.13**	--	**0.44**	**0.61**	**0.19**	--	**0.29**	0.16 U	**1.1**
Indeno(1,2,3-c,d)pyrene	34	3	**0.09**	--	**1.7**	**1.1**	**0.14**	--	**0.31**	0.22 U	**0.51**
Dibenzo(a,h)anthracene	12	3	**0.01 J**	--	**0.46**	0.61 U	0.11 U	--	0.12 U	0.22 U	0.28 U
Benzo(g,h,i)perylene	31	3	**0.12**	--	**1.5**	**1.1 J**	**0.16**	--	**0.37**	0.14 U	**0.57**
Chlorinated Hydrocarbons (µg/kg)											
1,4-Dichlorobenzene	110	4	4.5 U	--	13.0 U	22.0 U	5.0 U	--	7.2 U	3.9 U	4.5 U
1,2-Dichlorobenzene	35	4	4.5 U	--	13.0 U	22.0 U	5.0 U	--	7.2 U	3.9 U	4.5 U
1,2,4-Trichlorobenzene	31	4	4.5 U	--	13.0 U	22.0 U	5.0 U	--	7.2 U	3.9 U	4.5 U
Hexachlorobenzene	22	4	4.5 U	--	13.0 U	22.0 U	5.0 U	--	7.2 U	3.9 U	4.5 U

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Location ID	Preliminary Sediment Screening Criteria		LRIS-CL-01	LRIS-CL-01	LRIS-CL-02	LRIS-CL-02	LRIS-CL-03	LRIS-CL-03	LRIS-CL-04	LRIS-CL-04	LRIS-CL-05
Sample ID			LRIS-CL-01-SS	LRIS-CL-01-SB-1-2	LRIS-CL-02-SS	LRIS-CL-02-SB-1-2	LRIS-CL-03-SS	LRIS-CL-03-SB-1-2	LRIS-CL-04-SS	LRIS-CL-04-SB-1-2	LRIS-CL-05-SS
Sample Date			4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010
Sample Depth			0-10 cm	1-2 ft	0-10 cm	1-2 ft	0-10 cm	1-2 ft	0-10 cm	1-2 ft	0-10 cm
Chlorindated Hydrocarbons (mg/kg-OC)											
1,4-Dichlorobenzene	3.1	3	0.10 U	--	0.24 U	0.79 U	0.14 U	--	0.15 U	0.28 U	0.35 U
1,2-Dichlorobenzene	2.3	3	0.10 U	--	0.24 U	0.79 U	0.14 U	--	0.15 U	0.28 U	0.35 U
1,2,4-Trichlorobenzene	0.81	3	0.10 U	--	0.24 U	0.79 U	0.14 U	--	0.15 U	0.28 U	0.35 U
Hexachlorobenzene	0.38	3	0.10 U	--	0.24 U	0.79 U	0.14 U	--	0.15 U	0.28 U	0.35 U
Phthalates (µg/kg)											
Dimethyl phthalate	311	2	9 U	--	25 U	43 U	10 U	--	14 U	7.8 U	8.9 U
Diethyl phthalate	200	4	**2.8 J**	--	25 U	**8.9 J**	**1.9 J**	--	**3.7 J**	**2.7 J**	**2.4 J**
Di-n-butyl phthalate	380	1	**3.8 J**	--	51 U	87 U	**3.5 J**	--	**6.9 J**	**4.6 J**	**3.5 J**
Butylbenzyl phthalate	260	2	9 U	--	25 U	43 U	10 U	--	14 U	8.6 U	8.9 U
Bis(2-ethylhexyl) phthalate	500	1	**14 J**	--	**54 J**	**47 J**	**14 J**	--	220 U	**7.2 J**	**17 J**
Di-n-octyl phthalate	39	1	18 U	--	**31 J**	87 U	**6 J**	--	29 U	16 U	18 U
Phthalates (mg/kg-OC)											
Dimethyl phthalate	53	3	0.2 U	--	0.46 U	1.5 U	0.28 U	--	0.29 U	0.56 U	0.68 U
Diethyl phthalate	61	3	**0.06 J**	--	0.46 U	**0.32 J**	**0.05 J**	--	**0.08 J**	**0.19 J**	**0.18 J**
Di-n-butyl phthalate	220	3	**0.08 J**	--	0.94 U	3.1 U	**0.10 J**	--	**0.14 J**	**0.33 J**	**0.27 J**
Butylbenzyl phthalate	4.9	3	0.20 U	--	0.46 U	1.5 U	0.28 U	--	0.29 U	0.61 U	0.68 U
Bis(2-ethylhexyl) phthalate	47	3	**0.31 J**	--	**1.0 J**	**1.7 J**	**0.39 J**	--	4.5 U	**0.51 J**	**1.3 J**
Di-n-octyl phthalate	58	3	0.40 U	--	**0.57 J**	3.1 U	**0.17 J**	--	0.59 U	1.1 U	1.4 U
Miscellaneous Extractables (µg/kg)											
Benzyl alcohol	57	3	9 U	--	25 U	43 U	**4.9 J**	--	14 U	**1.5 J**	8.9 U
Benzoic acid	2,900	1	**62 J**	--	**220 J**	1100 U	**73 J**	--	**220 J**	190 U	**80 J**
Dibenzofuran	200	1	**0.24 J**	--	**3.8 J**	43 U	10 U	--	14 U	7.8 U	**1.7 J**
Hexachlorobutadiene	29	4	4.5 U	--	13 U	22 U	5 U	--	7.2 U	3.9 U	4.5 U
N-Nitrosodiphenylamine	28	4	4.5 U	--	**7.9 J**	22 U	5 U	--	7.2 U	3.9 U	4.5 U
Miscellaneous Extractables (mg/kg-OC)											
Dibenzofuran	15	3	**0.01 J**	--	**0.07 J**	1.5 U	0.28 U	--	0.29 U	0.56 U	**0.13 J**
Hexachlorobutadiene	3.9	3	0.1 U	--	0.24 U	0.79 U	0.14 U	--	0.15 U	0.28 U	0.35 U
N-Nitrosodiphenylamine	11	3	0.1 U	--	**0.15 J**	0.79 U	0.14 U	--	0.15 U	0.28 U	0.35 U
Total Petroleum Hydrocarbons (mg/kg)											
Diesel #2 Range	340	1	--	--	**25 J**	--	--	--	67 U	--	--
Motor Oil Range	3,600	1	--	--	**140**	--	--	--	130 U	--	--
Dioxin Furans (ng/kg)											
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**141**	**5.6**	**1,396**	**130**	**24.3**	**0.77**	**298**	**2.2**	**2.0**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**141**	**5.6**	**1,402**	**130**	**24.3**	**1.2**	**303**	**2.3**	**2.1**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**590**	**25**	**2,800 J**	**330**	**91**	**3.7 J**	**790 J**	**5.5 J**	**5.3 J**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**38,000**	**1,700**	**220,000 J**	**32,000 J**	**4,800 J**	**490**	**64,000 J**	**510**	**400**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**480**	**18**	**6,200 J**	**420**	**83**	**2.9 J**	**1,100 J**	**6.8**	**5.3**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**4,600**	**190**	**63,000 J**	**4,600 J**	**800**	**24**	**12,000 J**	**78**	**62**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**27**	1 U	**430**	**23**	**3.9 J**	0.41 U	**48 J**	0.39 U	0.46 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**91**	**2.7 J**	**1,000**	**71**	**12**	**0.57 J**	**170**	**1.4 J**	**0.81 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**41**	**1.7 J**	**450**	**40**	**8.1**	**0.61 J**	**77 J**	**0.58 J**	**0.78 J**

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Location ID	Preliminary Sediment Screening Criteria		LRIS-CL-01	LRIS-CL-01	LRIS-CL-02	LRIS-CL-02	LRIS-CL-03	LRIS-CL-03	LRIS-CL-04	LRIS-CL-04	LRIS-CL-05
Sample ID			LRIS-CL-01-SS	LRIS-CL-01-SB-1-2	LRIS-CL-02-SS	LRIS-CL-02-SB-1-2	LRIS-CL-03-SS	LRIS-CL-03-SB-1-2	LRIS-CL-04-SS	LRIS-CL-04-SB-1-2	LRIS-CL-05-SS
Sample Date			4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010
Sample Depth			0-10 cm	1-2 ft	0-10 cm	1-2 ft	0-10 cm	1-2 ft	0-10 cm	1-2 ft	0-10 cm
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	31	1.2 J	510	31	5.2	0.44 U	82 J	0.54 J	0.47 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	250	7.5	350	250	43	1.2 J	540	3.8	3.3
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	2.1 J	0.52 J	67 J	3.4 J	0.44 J	0.5 U	24 U	0.29 U	0.28 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	71	2 J	810 J	56	16	0.91 J	140 J	1.4 J	1.6 J
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	21	1.1 U	320	25	3 J	0.5 U	42 J	0.45 J	0.39 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	13	0.63 J	140 J	11	3.1 J	0.32 U	22 J	0.23 J	0.32 J
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	24	0.78 J	360	19	4.5	0.38 U	65 J	0.24 U	0.35 J
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	39	1.7 J	390 J	30	4.5	0.57 U	50 J	0.41 J	0.31 J
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	9.4	0.56 J	120	13	1.8	0.2 J	18	0.49 J	0.33 J
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	1.4	0.14 J	12 U	0.56 J	0.29 J	0.13 U	7.1 U	0.081 U	0.12 U
Total Heptachlorodibenzofuran (HpCDF)	--	--	1,400	52	21,000	1,300	230	6.7	3300	20	13
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	8,400	340	120,000 J	8,500	1,500	49	2,2000 J	150	130
Total Hexachlorodibenzofuran (HxCDF)	--	--	1,100	42	21,000	1,400	190	5.1	2,900	21	12
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	1,000	37	14,000	1,100	240	9.8	2,300	19	25
Total Pentachlorodibenzofuran (PeCDF)	--	--	300	13	5,000	310	46	1.2	760	4.9	4.4
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	69	4.7	840	58	27	0.55	180	1.5	2.8
Total Tetrachlorodibenzofuran (TCDF)	--	--	45	4.1 U	440	41	13	3.8	43	1.7	1.9
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	30	4.9	75	8.8	6.7	5.2	18	0.99	0.98

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-CL-05 LRIS-CL-05-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-06 LRIS-CL-06-SS 4/16/2010 0-10 cm	LRIS-CL-06 LRIS-CL-06-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-07 LRIS-CL-07-SS 4/16/2010 0-10 cm	LRIS-CL-07 LRIS-CL-07-SB-1-2 4/15/2010 1-2 ft
Conventional Parameters							
Total organic carbon (%)	--	--	--	**2.4**	--	**1.7**	--
Total solids (%)	--	--	--	**40**	--	**53**	--
Total volatile solids (%)	--	--	--	**6.8**	--	**4.5**	--
Ammonia (mg/kg)	--	--	--	**-- R**	--	**-- R**	--
Sulfide (mg/kg)	--	--	--	**44**	--	**14**	--
Grain Size (%)							
Clay	--	--	--	**20**	--	**23**	--
Gravel	--	--	--	**0**	--	**0**	--
Sand, Coarse	--	--	--	**0**	--	**0**	--
Sand, Fine	--	--	--	**24**	--	**36**	--
Sand, Medium	--	--	--	**1.8**	--	**1**	--
Sand, Very Fine	--	--	--	**4.8**	--	**6.2**	--
Silt	--	--	--	**50**	--	**33**	--
Total Clay	--	--	--	**20**	--	**23**	--
Total Fines (silt + clay)	--	--	--	**70**	--	**56**	--
Total Gravel	--	--	--	**0**	--	**0**	--
Total Sand	--	--	--	**30.6**	--	**43.2**	--
Total Silt	--	--	--	**50**	--	**33**	--
Total Grain Size	--	--	--	**100.6**	--	**99.2**	--
Phenols (µg/kg)							
Phenol	120	1	--	12 U	--	9.5 U	--
2-Methylphenol (o-Cresol)	63	3	--	12 U	--	9.5 U	--
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	--	**40**	--	**1.8 J**	--
2,4-Dimethylphenol	29	3	--	12 U	--	9.5 U	--
Pentachlorophenol	1,200	1	--	**15**	--	9.5 U	--
Metals (mg/kg)							
Arsenic	14	1	--	**5.5**	--	**5.2**	--
Cadmium	2.1	1	--	**0.46 J**	--	**0.33 J**	--
Chromium	72	1	--	**19**	--	**17**	--
Copper	400	1	--	**21**	--	**16**	--
Lead	360	1	--	**14**	--	**10**	--
Mercury	0.66	1	--	**0.027 J**	--	**0.028 J**	--
Nickel	26	1	--	**14**	--	**12**	--
Silver	0.58	1	--	**0.067 J**	--	**0.051 J**	--
Zinc	3,200	1	--	**66 J**	--	**56 J**	--
Polycyclic Aromatic Hydrocarbons (PAH) (µg/kg)							
Total PAH (U = 1/2)	17,000	1	--	**180**	--	**115**	--
Total PAH (U = 0)	--	--	--	**176**	--	**112**	--
Total LPAH (U = 1/2)	--	--	--	**27.2**	--	**22.8**	--
Total LPAH (U = 0)	6,590	2	--	**25.9**	--	**21.8**	--
Naphthalene	529	2	--	**2.2 J**	--	**1.1 J**	--

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-CL-05 LRIS-CL-05-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-06 LRIS-CL-06-SS 4/16/2010 0-10 cm	LRIS-CL-06 LRIS-CL-06-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-07 LRIS-CL-07-SS 4/16/2010 0-10 cm	LRIS-CL-07 LRIS-CL-07-SB-1-2 4/15/2010 1-2 ft
Acenaphthylene	470	2	--	**1.1 J**	--	**1.4 J**	--
Acenaphthene	1,060	2	--	**2.3 J**	--	**2.2**	--
Fluorene	1,070	2	--	**3.8**	--	**3.4**	--
Phenanthrene	6,100	2	--	**11**	--	**9**	--
Anthracene	1,230	2	--	**5.5**	--	**4.7**	--
2-Methylnaphthalene	469	2	--	2.5 U	--	1.9 U	--
Total HPAH (U = 1/2)	--	--	--	**153**	--	**92**	--
Total HPAH (U = 0)	31,640	2	--	**150**	--	**90**	--
Fluoranthene	11,100	2	--	**28**	--	**17**	--
Pyrene	8,790	2	--	**25**	--	**17**	--
Benzo(a)anthracene	4,260	2	--	**22**	--	**7.7**	--
Chrysene	5,940	2	--	**15**	--	**12**	--
Benzofluoranthene, Total	11,000	2	--	**29**	--	**20**	--
Benzo(a)pyrene	3,300	2	--	**13**	--	**5.2**	--
Indeno(1,2,3-c,d)pyrene	4,120	2	--	**9.5**	--	**6**	--
Dibenzo(a,h)anthracene	800	2	--	5 U	--	3.8 U	--
Benzo(g,h,i)perylene	4,020	2	--	**8.9**	--	**5.2**	--
Aromatic Hydrocarbons (mg/kg-OC)							
Total SMS LPAH (U = 0)	370	3	--	**1.1**	--	**1.3**	--
Naphthalene	99	3	--	**0.09 J**	--	**0.06 J**	--
Acenaphthylene	66	3	--	**0.05 J**	--	**0.08 J**	--
Acenaphthene	16	3	--	**0.10 J**	--	**0.13**	--
Fluorene	23	3	--	**0.16**	--	**0.20**	--
Phenanthrene	100	3	--	**0.46**	--	**0.53**	--
Anthracene	220	3	--	**0.23**	--	**0.28**	--
2-Methylnaphthalene	38	3	--	0.10 U	--	0.11 U	--
Total SMS HPAH (U = 0)	960	3	--	**6.3**	--	**5.3**	--
Fluoranthene	160	3	--	**1.2**	--	**1.0**	--
Pyrene	1,000	3	--	**1.0**	--	**1.0**	--
Benzo(a)anthracene	110	3	--	**0.92**	--	**0.45**	--
Chrysene	110	3	--	**0.63**	--	**0.71**	--
Benzofluoranthene (unspecified)	230	3	--	**1.2**	--	**1.2**	--
Benzo(a)pyrene	99	3	--	**0.54**	--	**0.31**	--
Indeno(1,2,3-c,d)pyrene	34	3	--	**0.40**	--	**0.35**	--
Dibenzo(a,h)anthracene	12	3	--	0.21 U	--	0.22 U	--
Benzo(g,h,i)perylene	31	3	--	**0.37**	--	**0.31**	--
Chlorinated Hydrocarbons (µg/kg)							
1,4-Dichlorobenzene	110	4	--	6.2 U	--	4.7 U	--
1,2-Dichlorobenzene	35	4	--	6.2 U	--	4.7 U	--
1,2,4-Trichlorobenzene	31	4	--	6.2 U	--	4.7 U	--
Hexachlorobenzene	22	4	--	6.2 U	--	4.7 U	--

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-CL-05 LRIS-CL-05-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-06 LRIS-CL-06-SS 4/16/2010 0-10 cm	LRIS-CL-06 LRIS-CL-06-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-07 LRIS-CL-07-SS 4/16/2010 0-10 cm	LRIS-CL-07 LRIS-CL-07-SB-1-2 4/15/2010 1-2 ft
Chlorindated Hydrocarbons (mg/kg-OC)							
1,4-Dichlorobenzene	3.1	3	--	0.26 U	--	0.28 U	--
1,2-Dichlorobenzene	2.3	3	--	0.26 U	--	0.28 U	--
1,2,4-Trichlorobenzene	0.81	3	--	0.26 U	--	0.28 U	--
Hexachlorobenzene	0.38	3	--	0.26 U	--	0.28 U	--
Phthalates (µg/kg)							
Dimethyl phthalate	311	2	--	12 U	--	9.5 U	--
Diethyl phthalate	200	4	--	12 U	--	**2.2 J**	--
Di-n-butyl phthalate	380	1	--	**6.7 J**	--	19 U	--
Butylbenzyl phthalate	260	2	--	12 U	--	9.5 U	--
Bis(2-ethylhexyl) phthalate	500	1	--	**20 J**	--	**24 J**	--
Di-n-octyl phthalate	39	1	--	25 U	--	**3.2 J**	--
Phthalates (mg/kg-OC)							
Dimethyl phthalate	53	3	--	0.50 U	--	0.56 U	--
Diethyl phthalate	61	3	--	0.50 U	--	**0.13 J**	--
Di-n-butyl phthalate	220	3	--	**0.28 J**	--	1.1 U	--
Butylbenzyl phthalate	4.9	3	--	0.50 U	--	0.56 U	--
Bis(2-ethylhexyl) phthalate	47	3	--	**0.83 J**	--	**1.4 J**	--
Di-n-octyl phthalate	58	3	--	1.0 U	--	**0.19 J**	--
Miscellaneous Extractables (µg/kg)							
Benzyl alcohol	57	3	--	12 U	--	9.5 U	--
Benzoic acid	2,900	1	--	**120 J**	--	**85 J**	--
Dibenzofuran	200	1	--	12 U	--	**2.3 J**	--
Hexachlorobutadiene	29	4	--	6.2 U	--	4.7 U	--
N-Nitrosodiphenylamine	28	4	--	6.2 U	--	4.7 U	--
Miscellaneous Extractables (mg/kg-OC)							
Dibenzofuran	15	3	--	0.50 U	--	**0.14 J**	--
Hexachlorobutadiene	3.9	3	--	0.26 U	--	0.28 U	--
N-Nitrosodiphenylamine	11	3	--	0.26 U	--	0.28 U	--
Total Petroleum Hydrocarbons (mg/kg)							
Diesel #2 Range	340	1	--	--	--	--	--
Motor Oil Range	3,600	1	--	--	--	--	--
Dioxin Furans (ng/kg)							
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**0.28**	**21.7**	**0.16**	**31.5**	**0.46**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**0.38**	**22.0**	**0.31**	**31.8**	**0.69**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	0.99 U	**54 J**	0.43 U	**110 J**	2 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**37**	**5,000 J**	**43**	**8,700 J**	**130**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	0.61 U	**51 J**	0.49 U	**100 J**	**1.9 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**5**	**780 J**	**6.4**	**1,300 J**	**19**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	0.19 U	4.4 U	0.11 U	**5**	0.54 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	0.24 U	**6.8**	**0.067 J**	**10**	**0.31 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.16 J**	**8.5**	**0.13 J**	**8.3**	0.22 U

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-CL-05 LRIS-CL-05-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-06 LRIS-CL-06-SS 4/16/2010 0-10 cm	LRIS-CL-06 LRIS-CL-06-SB-1-2 4/15/2010 1-2 ft	LRIS-CL-07 LRIS-CL-07-SS 4/16/2010 0-10 cm	LRIS-CL-07 LRIS-CL-07-SB-1-2 4/15/2010 1-2 ft
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	0.14 U	**5.6**	0.064 U	**7**	**0.16 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.35 J**	**34**	**0.4 J**	**55**	**1 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**0.18 J**	1.4 U	0.069 U	1.6 U	0.15 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.21 J**	**17 J**	**0.27 J**	**17 J**	**0.52 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	0.17 U	**3 J**	0.17 U	**4.1**	0.16 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	0.091 U	**3.3 J**	0.13 U	**3.1 J**	0.24 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	0.12 U	**2.9 J**	0.061 U	**5.2**	**0.16 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	0.14 U	**2.9 J**	0.19 U	**3.9 J**	0.2 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**0.47 J**	**1.4**	0.28 U	**2.1**	0.11 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.086 J**	0.38 U	0.057 U	0.27 U	0.093 U
Total Heptachlorodibenzofuran (HpCDF)	--	--	1.4 U	**130**	1 U	**300**	**5.1**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**10**	**1,700 J**	**14**	**2,500 J**	**36**
Total Hexachlorodibenzofuran (HxCDF)	--	--	1.1 U	**110**	**1.1**	**230**	**4.3**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**2.1**	**270**	**3.6**	**290**	**5.7**
Total Pentachlorodibenzofuran (PeCDF)	--	--	0.38 U	**47**	0.19 U	**65**	**0.67**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	0.091 U	**35**	0.13 U	**28**	0.24 U
Total Tetrachlorodibenzofuran (TCDF)	--	--	0.67 U	**13**	0.28 U	**11**	0.11 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.18**	**5.2**	**0.27**	**4.4**	**0.13**

Table 7
Carty Lake Surface and Subsurface Sediment Testing Results

Notes:

(yellow highlight) Detected concentration is greater than Ridgefield Preliminary Screening Level.
Bold = Detected result
J = Estimated value
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
R = Compound analyzed exceeding holding time, but not detected above detection limit
SMS = Sediment Management Standards
TEQ = toxicity equivalents
Non-detect ammonia results were rejected because the samples were analyzed past twice the holding time.
Total PAH includes the following PAHs: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, 2-Methylnaphthalene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Total Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,)Perylene.
Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, and 2-Methylnaphthalene.
Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene.
Total SMS LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene (2-Methylnaphthalene is not included).
Total SMS HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene (2-Methylnaphthalene is not included).
mg/kg = milligram per kilogram
µg/kg = micrograms per kilogram
ng/kg = nanograms per kilogram
OC = organic carbon normalized
1. Ecology 2010 Draft Freshwater Sediment Sediment Quality Standards (SQS)/Screening Level (SL)1
2. Ecology 2003 Freshwater Lowest Apparent Effects Threshold (LAET)
3. Sediment Management Standard SQS (Marine)
4. Dredged Material Management Program SL (Marine)

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-01 LRIS-LR-01-SB-1-2 4/26/2010 1-2 ft	LRIS-LR-01 LRIS-LR-01-SB-4-5 4/26/2010 4-5 ft	LRIS-LR-03 LRIS-LR-03-SB-1-2 4/27/2010 1-2 ft	LRIS-LR-03 LRIS-LR-03-SB-3-4 4/27/2010 3-4 ft	LRIS-LR-05 LRIS-LR-05-SB-1-2 4/27/2010 1-2 ft	LRIS-LR-05 LRIS-LR-05-SB-9-10.5 4/27/2010 9-10.5 ft	LRIS-LR-05 LRIS-LR-55-SB-9-10.5 4/27/2010 9-10.5 ft
Conventional Parameters									
Total organic carbon (%)	--	--	**1.4**	**0.84**	**1.4**	**1.4**	**1.3**	**0.3**	**0.13 J**
Total solids (%)	--	--	**60**	**72**	**59**	**63**	**64**	**82**	**81**
Total volatile solids (%)	--	--	**4**	**2.3**	**4.2**	**4**	**4.5**	**0.97**	**0.95**
Grain Size (%)									
Clay	--	--	**17 J**	**6.7**	**20**	**15**	**21**	**1.9**	**1.1**
Gravel	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Sand, Coarse	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Sand, Fine	--	--	**18**	**58**	**9.3**	**22**	**24**	**85**	**85**
Sand, Medium	--	--	**0.5**	**0.1**	**0.4**	**0.4**	**1.1**	**7.9**	**8.6**
Sand, Very Fine	--	--	**5.1**	**9.2**	**6.3**	**4.6**	**6.3**	**0.41**	**0.5**
Silt	--	--	**60**	**26**	**64**	**58**	**48**	**4.6**	**4.6**
Total Clay	--	--	**17 J**	**6.7**	**20**	**15**	**21**	**1.9**	**1.1**
Total Fines (silt + clay)	--	--	**77**	**32.7**	**84**	**73**	**69**	**6.5**	**5.7**
Total Gravel	--	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Sand	--	--	**23.6**	**67.3**	**16**	**27**	**31.4**	**93.31**	**94.1**
Total Silt	--	--	**60**	**26**	**64**	**58**	**48**	**4.6**	**4.6**
Total Grain Size	--	--	**100.6**	**100**	**100**	**100**	**100.4**	**99.81**	**99.8**
Phenols (µg/kg)									
Phenol	120	1	**4.5 J**	**9.8**	**6.8 J**	**7.9**	**14**	**15**	**12**
2-Methylphenol (o-Cresol)	63	3	8.4 U	6.9 U	8.5 U	7.9 U	**1.9 J**	6.1 U	6.1 U
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	**5.4 J**	14 U	17 U	**5.3 J**	**12 J**	12 U	12 U
2,4-Dimethylphenol	29	3	8.4 U	6.9 U	8.5 U	7.9 U	7.8 U	6.1 U	6.1 U
Pentachlorophenol	1,200	1	**8.7**	6.9 U	**11**	**11**	**41**	6.1 U	6.1 U
Metals (mg/kg)									
Arsenic	14	1	**5.4**	**2**	**6.2**	**6.9**	**6.6**	**0.98**	**0.88**
Cadmium	2.1	1	**0.85**	0.2 U	**0.51**	**0.71**	**0.34**	0.22 U	0.21 U
Chromium	72	1	**24**	**18**	**24**	**25**	**21**	**8.1**	**8.4**
Copper	400	1	**28**	**20**	**31**	**30**	**27**	**7**	**6.8**
Lead	360	1	**20**	**5.5**	**20**	**22**	**18**	**2.7**	**2.6**
Mercury	0.66	1	**0.089**	**0.02 J**	**0.15**	**0.092**	**0.064**	0.016 U	**0.011 J**
Nickel	26	1	**18**	**17**	**19**	**20**	**19**	**10**	**9.4**
Silver	0.58	1	**0.17 J**	**0.11 J**	**0.18 J**	**0.19 J**	**0.16 J**	**0.047 J**	**0.045 J**
Zinc	3,200	1	**120**	**45**	**120**	**140**	**110**	**22**	**21**
Polycyclic Aromatic Hydrocarbons (PAH) (µg/kg)									
Total PAH (U = 1/2)	17,000	1	**401**	**12.9**	**349 J**	**659**	**7,006**	2.4 U	**11.7**
Total PAH (U = 0)	--	--	**401**	**1.7**	**349 J**	**659**	**7,006**	2.4 U	**0.19**
Total LPAH (U = 1/2)	--	--	**69.1**	**4.4**	**48.6 J**	**153**	**3,796**	1.2 U	**3.8**
Total LPAH (U = 0)	6,590	2	**69.1**	**1.6**	**48.6 J**	**153**	**3,796**	1.2 U	**0.19**
Naphthalene	529	2	**14**	**0.52 J**	**2.8 J**	**26**	**18**	1.2 U	1.2 U
Acenaphthylene	470	2	**3.1**	1.4 U	**1.3 J**	**3**	**8.9**	1.2 U	1.2 U
Acenaphthene	1,060	2	**2.6**	1.4 U	**4.8 J**	**16**	**300**	1.2 U	1.2 U

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-01 LRIS-LR-01-SB-1-2 4/26/2010 1-2 ft	LRIS-LR-01 LRIS-LR-01-SB-4-5 4/26/2010 4-5 ft	LRIS-LR-03 LRIS-LR-03-SB-1-2 4/27/2010 1-2 ft	LRIS-LR-03 LRIS-LR-03-SB-3-4 4/27/2010 3-4 ft	LRIS-LR-05 LRIS-LR-05-SB-1-2 4/27/2010 1-2 ft	LRIS-LR-05 LRIS-LR-05-SB-9-10.5 4/27/2010 9-10.5 ft	LRIS-LR-05 LRIS-LR-55-SB-9-10.5 4/27/2010 9-10.5 ft
Fluorene	1,070	2	**4**	1.4 U	**3.3 J**	**7.9**	**290**	1.2 U	1.2 U
Phenanthrene	6,100	2	**32**	**0.7 J**	**25 J**	**79**	**3,000**	1.2 U	**0.19 J**
Anthracene	1,230	2	**9.2**	1.4 U	**9.7 J**	**16**	**170**	1.2 U	1.2 U
2-Methylnaphthalene	469	2	**4.2**	**0.34 J**	**1.7 J**	**5.2**	**9.4**	1.2 U	1.2 U
Total HPAH (U = 1/2)	--	--	**332**	**8.5**	**301 J**	**505**	**3,210**	2.4 U	2.4 U
Total HPAH (U = 0)	31,640	2	**332**	**0.14**	**301 J**	**505**	**3,210**	2.4 U	2.4 U
Fluoranthene	11,100	2	**76**	1.4 U	**83 J**	**140**	**1,400**	1.2 U	1.2 U
Pyrene	8,790	2	**76**	1.4 U	**75 J**	**130**	**1,100**	1.2 U	1.2 U
Benzo(a)anthracene	4,260	2	**27**	1.7 U	**25 J**	**46**	**170**	1.5 U	1.5 U
Chrysene	5,940	2	**40**	**0.14 J**	**39 J**	**59**	**210**	1.5 U	1.5 U
Benzofluoranthene, Total	11,000	2	**52**	2.8 U	**40 J**	**62**	**190**	2.4 U	2.4 U
Benzo(a)pyrene	3,300	2	**24**	2.1 U	**15 J**	**29**	**75**	1.8 U	1.8 U
Indeno(1,2,3-c,d)pyrene	4,120	2	**14**	2.8 U	**9.2 J**	**16**	**25**	2.4 U	2.4 U
Dibenzo(a,h)anthracene	800	2	**5**	2.8 U	**4.5 J**	**6.4**	**11**	2.4 U	2.4 U
Benzo(g,h,i)perylene	4,020	2	**18**	1.7 U	**9.9 J**	**17**	**29**	1.5 U	1.5 U
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
Total SMS LPAH (U = 0)	370	3	**4.6**	**0.15**	**3.4 J**	**10.6**	**291**	0.40 U	**0.15**
Naphthalene	99	3	**1.0**	**0.06 J**	**0.20 J**	**1.9**	**1.4**	0.40 U	0.92 U
Acenaphthylene	66	3	**0.22**	0.17 U	**0.09 J**	**0.21**	**0.68**	0.40 U	0.92 U
Acenaphthene	16	3	**0.19**	0.17 U	**0.34 J**	**1.1**	**23.1**	0.40 U	0.92 U
Fluorene	23	3	**0.29**	0.17 U	**0.24 J**	**0.56**	**22.3**	0.40 U	0.92 U
Phenanthrene	100	3	**2.3**	**0.08 J**	**1.8 J**	**5.6**	**231**	0.40 U	**0.15 J**
Anthracene	220	3	**0.66**	0.17 U	**0.69 J**	**1.1**	**13.1**	0.40 U	0.92 U
2-Methylnaphthalene	38	3	**0.30**	**0.04 J**	**0.12 J**	**0.37**	**0.72**	0.40 U	0.92 U
Total SMS HPAH (U = 0)	960	3	**23.7**	**0.02**	**21.5 J**	**36.1**	**247**	**0.80 U**	**1.8**
Fluoranthene	160	3	**5.4**	0.17 U	**5.9 J**	**10.0**	**108**	0.40 U	0.92 U
Pyrene	1,000	3	**5.4**	0.17 U	**5.4 J**	**9.3**	**84.6**	0.40 U	0.92 U
Benzo(a)anthracene	110	3	**1.9**	0.20 U	**1.8 J**	**3.3**	**13.1**	0.40 U	1.2 U
Chrysene	110	3	**2.9**	**0.02 J**	**2.8 J**	**4.2**	**16.2**	0.40 U	1.2 U
Benzofluoranthene (unspecified)	230	3	**3.7**	0.33 U	**2.9 J**	**4.4**	**14.6**	0.40 U	1.8 U
Benzo(a)pyrene	99	3	**1.7**	0.25 U	**1.1 J**	**2.1**	**5.8**	0.40 U	1.4 U
Indeno(1,2,3-c,d)pyrene	34	3	**1.0**	0.33 U	**0.66 J**	**1.1**	**1.9**	0.40 U	1.8 U
Dibenzo(a,h)anthracene	12	3	**0.36**	0.33 U	**0.32 J**	**0.46**	**0.85**	0.40 U	1.8 U
Benzo(g,h,i)perylene	31	3	**1.3**	0.20 U	**0.71 J**	**1.2**	**2.2**	0.40 U	1.2 U
Chlorinated Hydrocarbons (µg/kg)									
1,4-Dichlorobenzene	110	4	4.2 U	3.4 U	4.2 UJ	3.9 U	3.9 U	3 U	3.1 U
1,2-Dichlorobenzene	35	4	4.2 U	3.4 U	4.2 UJ	3.9 U	3.9 U	3 U	3.1 U
1,2,4-Trichlorobenzene	31	4	4.2 U	3.4 U	4.2 UJ	3.9 U	3.9 U	3 U	3.1 U
Hexachlorobenzene	22	4	4.2 U	3.4 U	4.2 UJ	3.9 U	3.9 U	3 U	3.1 U
Chlorindated Hydrocarbons (mg/kg-OC)									
1,4-Dichlorobenzene	3.1	3	0.30 U	0.40 U	0.30 UJ	0.28 U	0.30 U	1.0 U	2.4 U
1,2-Dichlorobenzene	2.3	3	0.30 U	0.40 U	0.30 UJ	0.28 U	0.30 U	1.0 U	2.4 U

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-01 LRIS-LR-01-SB-1-2 4/26/2010 1-2 ft	LRIS-LR-01 LRIS-LR-01-SB-4-5 4/26/2010 4-5 ft	LRIS-LR-03 LRIS-LR-03-SB-1-2 4/27/2010 1-2 ft	LRIS-LR-03 LRIS-LR-03-SB-3-4 4/27/2010 3-4 ft	LRIS-LR-05 LRIS-LR-05-SB-1-2 4/27/2010 1-2 ft	LRIS-LR-05 LRIS-LR-05-SB-9-10.5 4/27/2010 9-10.5 ft	LRIS-LR-05 LRIS-LR-55-SB-9-10.5 4/27/2010 9-10.5 ft
1,2,4-Trichlorobenzene	0.81	3	0.30 U	0.40 U	0.30 UJ	0.28 U	0.30 U	1.0 U	2.4 U
Hexachlorobenzene	0.38	3	0.30 U	0.40 U	0.30 UJ	0.28 U	0.30 U	1.0 U	2.4 U
Phthalates (µg/kg)									
Dimethyl phthalate	311	2	8.4 U	6.9 U	8.5 UJ	7.9 U	7.8 U	6.1 U	6.1 U
Diethyl phthalate	200	4	8.4 U	6.9 U	8.5 UJ	7.9 U	7.8 U	6.1 U	6.1 U
Di-n-butyl phthalate	380	1	17 U	14 U	17 UJ	19 U	16 U	12 U	12 U
Butylbenzyl phthalate	260	2	15 U	6.9 U	12 UJ	11 U	15 U	6.1 U	6.1 U
Bis(2-ethylhexyl) phthalate	500	1	130 U	100 U	130 UJ	120 U	120 U	91 U	92 U
Di-n-octyl phthalate	39	1	**2.4 J**	14 U	17 UJ	**1.2 J**	16 U	12 U	12 U
Phthalates (mg/kg-OC)									
Dimethyl phthalate	53	3	0.60 U	0.82 U	0.61 UJ	0.56 U	0.60 U	2.0 U	4.7 U
Diethyl phthalate	61	3	0.60 U	0.82 U	0.61 UJ	0.56 U	0.60 U	2.0 U	4.7 U
Di-n-butyl phthalate	220	3	1.2 U	1.7 U	1.2 UJ	1.4 U	1.2 U	4.0 U	9.2 U
Butylbenzyl phthalate	4.9	3	1.1 U	0.82 U	0.86 UJ	0.79 U	1.2 U	2.0 U	4.7 U
Bis(2-ethylhexyl) phthalate	47	3	9.3 U	11.9 U	9.3 UJ	8.6 U	9.2 U	30.3 U	70.8 U
Di-n-octyl phthalate	58	3	**0.17 J**	1.7 U	1.2 UJ	**0.09 J**	1.2 U	4.0 U	9.2 U
Miscellaneous Extractables (µg/kg)									
Benzyl alcohol	57	3	8.4 U	6.9 U	8.5 UJ	7.9 U	**5.2 J**	**2.6 J**	**2.4 J**
Benzoic acid	2,900	1	**97 J**	**63 J**	210 UJ	**85 J**	**110 J**	150 UJ	150 UJ
Dibenzofuran	200	1	**3.5 J**	6.9 U	**2.2 J**	**4.7 J**	**52**	6.1 U	6.1 U
Hexachlorobutadiene	29	4	4.2 U	3.4 U	4.2 UJ	3.9 U	3.9 U	3 U	3.1 U
N-Nitrosodiphenylamine	28	4	**1.9 J**	3.4 U	4.2 UJ	3.9 U	3.9 U	3 U	3.1 U
Miscellaneous Extractables (mg/kg-OC)									
Dibenzofuran	15	3	**0.25 J**	0.82 U	**0.16 J**	**0.34 J**	**4.0**	2.0 U	4.7 U
Hexachlorobutadiene	3.9	3	0.30 U	0.40 U	0.30 UJ	0.28 U	0.30 U	1.0 U	2.4 U
N-Nitrosodiphenylamine	11	3	**0.14 J**	0.40 U	0.30 UJ	0.28 U	0.30 U	1.0 U	2.4 U
Dioxin Furans (ng/kg)									
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**7.4**	--	--	--	**16.9**	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**7.4**	--	--	--	**16.9**	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**27**	--	--	--	**120**	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**2,200**	--	--	--	**8,800 J**	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**27**	--	--	--	**55**	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**210**	--	--	--	**600**	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**2.2 J**	--	--	--	**3.3**	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**4.7**	--	--	--	**6.1**	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**1.5 J**	--	--	--	**3.5**	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**2.7 J**	--	--	--	**4.5**	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**8.8**	--	--	--	**30**	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**0.2 J**	--	--	--	**0.45 J**	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**4.4**	--	--	--	**7.3 J**	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**1.5 J**	--	--	--	**2.5 J**	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**0.75 J**	--	--	--	**1 J**	--	--

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-01 LRIS-LR-01-SB-1-2 4/26/2010 1-2 ft	LRIS-LR-01 LRIS-LR-01-SB-4-5 4/26/2010 4-5 ft	LRIS-LR-03 LRIS-LR-03-SB-1-2 4/27/2010 1-2 ft	LRIS-LR-03 LRIS-LR-03-SB-3-4 4/27/2010 3-4 ft	LRIS-LR-05 LRIS-LR-05-SB-1-2 4/27/2010 1-2 ft	LRIS-LR-05 LRIS-LR-05-SB-9-10.5 4/27/2010 9-10.5 ft	LRIS-LR-05 LRIS-LR-55-SB-9-10.5 4/27/2010 9-10.5 ft
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**1.2 J**	--	--	--	**2.1 J**	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**1.6 J**	--	--	--	**2.3 J**	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**1.7**	--	--	--	**1.5**	--	--
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.54 J**	--	--	--	**0.36 J**	--	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	**88**	--	--	--	**190**	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**460**	--	--	--	**1,300**	--	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	**54**	--	--	--	**110**	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**60**	--	--	--	**160**	--	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	**14**	--	--	--	**14**	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**5.7**	--	--	--	**8.3**	--	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	**11**	--	--	--	**6.4**	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**2.4**	--	--	--	**3.4**	--	--

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-06 LRIS-LR-06-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-06 LRIS-LR-06-SB-3-4 4/28/2010 3-4 ft	LRIS-LR-08 LRIS-LR-08-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-08 LRIS-LR-08-SB-3-4 4/28/2010 3-4 ft	LRIS-LR-09 LRIS-LR-09-SB-1-2 4/29/2010 1-2 ft	LRIS-LR-09 LRIS-LR-09-SB-4-5 4/29/2010 4-5 ft	LRIS-LR-10 LRIS-LR-10-SB-1-2 4/28/2010 1-2 ft
Conventional Parameters									
Total organic carbon (%)	--	--	**0.93**	**1.5**	**1.2**	**3**	**0.87**	**1.3**	**1.2**
Total solids (%)	--	--	**64**	**62**	**77**	**60**	**66**	**61**	**61**
Total volatile solids (%)	--	--	**3**	**5.3**	**1.4**	**9.4**	**2.6**	**4.1**	**3**
Grain Size (%)									
Clay	--	--	**17**	**22**	**2.6**	**15**	**7.1 J**	**18.3**	**9.1**
Gravel	--	--	**0**	**0**	**47**	**0**	**0**	**0**	**0**
Sand, Coarse	--	--	**0**	**0**	**8.2**	**0**	**0**	**0**	**0**
Sand, Fine	--	--	**34**	**17**	**33**	**31**	**46.7**	**11.3**	**36**
Sand, Medium	--	--	**0.7**	**0.5**	**7.2**	**2.4**	**0.2**	**0.1**	**0.9**
Sand, Very Fine	--	--	**7.6**	**3.5**	**1.5**	**5.2**	**9.1**	**6.1**	**9.3**
Silt	--	--	**41**	**57**	**0.44**	**46**	**36.9**	**64.2**	**45**
Total Clay	--	--	**17**	**22**	**2.6**	**15**	**7.1 J**	**18.3**	**9.1**
Total Fines (silt + clay)	--	--	**58**	**79**	**3.04**	**61**	**44**	**82.5**	**54.1**
Total Gravel	--	--	**0**	**0**	**47**	**0**	**0**	**0**	**0**
Total Sand	--	--	**42.3**	**21**	**49.9**	**38.6**	**56**	**17.5**	**46.2**
Total Silt	--	--	**41**	**57**	**0.44**	**46**	**36.9**	**64.2**	**45**
Total Grain Size	--	--	**100.3**	**100**	**99.94**	**99.6**	**100**	**100**	**100.3**
Phenols (µg/kg)									
Phenol	120	1	**20 J**	**24**	6.4 U	**24**	**24 J**	**22 J**	**36**
2-Methylphenol (o-Cresol)	63	3	7.7 UJ	8.1 U	6.4 U	8.3 U	**-- R**	**-- R**	8.2 U
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	**2.5 J**	16 U	13 U	**31**	**360**	**280 J**	**4.9 J**
2,4-Dimethylphenol	29	3	7.7 UJ	8.1 U	6.4 U	8.3 U	**-- R**	**-- R**	8.2 U
Pentachlorophenol	1,200	1	7.7 UJ	8.1 U	**3,100**	**22**	**-- R**	**7.9 J**	**78**
Metals (mg/kg)									
Arsenic	14	1	**5.1 J**	**5.3 J**	**4 J**	**5.8 J**	--	--	**7.2 J**
Cadmium	2.1	1	0.26 UJ	0.32 UJ	**0.087 J**	**0.57 J**	--	--	**0.22 J**
Chromium	72	1	**23 J**	**23 J**	**16 J**	**23 J**	--	--	**26 J**
Copper	400	1	**29**	**30**	**29**	**33**	--	--	**29**
Lead	360	1	**10**	**8.8**	**14**	**16**	--	--	**14**
Mercury	0.66	1	**0.049**	**0.059**	**0.038**	**0.082**	--	--	**0.054**
Nickel	26	1	**20 J**	**21 J**	**13 J**	**18 J**	--	--	**17 J**
Silver	0.58	1	**0.18 J**	**0.18 J**	**0.11 J**	**0.19 J**	--	--	**0.16 J**
Zinc	3,200	1	**57**	**57**	**88**	**110**	--	--	**120**
Polycyclic Aromatic Hydrocarbons (PAH) (µg/kg)									
Total PAH (U = 1/2)	17,000	1	**27.4**	**22.3**	**38,577**	**575**	**164 J**	**116 J**	**992**
Total PAH (U = 0)	--	--	**23.6**	**11.3**	**38,577**	**573**	**164 J**	**116 J**	**992**
Total LPAH (U = 1/2)	--	--	**7.9**	**7.4**	**10,447**	**137**	**13.3 J**	**10.3 J**	**203**
Total LPAH (U = 0)	6,590	2	**7.2**	**3.4**	**10,447**	**137**	**13.3 J**	**10.3 J**	**203**
Naphthalene	529	2	**1.4 J**	1.6 U	**7.1**	**20**	**-- R**	**-- R**	**22**
Acenaphthylene	470	2	**0.7 J**	1.6 U	**16**	**5.9**	**1.1 J**	**0.6 J**	**5.2**
Acenaphthene	1,060	2	1.5 UJ	1.6 U	**920**	**8.6**	**0.64 J**	**1 J**	**12**

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-06 LRIS-LR-06-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-06 LRIS-LR-06-SB-3-4 4/28/2010 3-4 ft	LRIS-LR-08 LRIS-LR-08-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-08 LRIS-LR-08-SB-3-4 4/28/2010 3-4 ft	LRIS-LR-09 LRIS-LR-09-SB-1-2 4/29/2010 1-2 ft	LRIS-LR-09 LRIS-LR-09-SB-4-5 4/29/2010 4-5 ft	LRIS-LR-10 LRIS-LR-10-SB-1-2 4/28/2010 1-2 ft
Fluorene	1,070	2	**0.84 J**	1.6 U	**1,000**	**12**	**1.1 J**	**1.1 J**	**19**
Phenanthrene	6,100	2	**2.9 J**	**2.6**	**7,300**	**62**	**8.3 J**	**5.5 J**	**92**
Anthracene	1,230	2	**0.74 J**	1.6 U	**1,200**	**23**	**2.2 J**	**1.7 J**	**45**
2-Methylnaphthalene	469	2	**0.58 J**	**0.78 J**	**3.5**	**5.7**	**-- R**	**0.35 J**	**7.7**
Total HPAH (U = 1/2)	--	--	**19.5**	**14.9**	**28,130**	**438**	**151 J**	**106 J**	**789**
Total HPAH (U = 0)	31,640	2	**16.4**	**7.9**	**28,130**	**436**	**151 J**	**106 J**	**789**
Fluoranthene	11,100	2	**3.5 J**	3.2 U	**12,000**	**100**	**42 J**	**18 J**	**190**
Pyrene	8,790	2	**4 J**	**3.9**	**8,900**	**100**	**33 J**	**20 J**	**180**
Benzo(a)anthracene	4,260	2	**1.8 J**	2 U	**2,100**	**39**	**12 J**	**9.6 J**	**68**
Chrysene	5,940	2	**1.1 J**	**1 J**	**2,100**	**47**	**18 J**	**14 J**	**110**
Benzofluoranthene, Total	11,000	2	**3.1 J**	3.2 U	**1,700**	**61**	**22 J**	**18 J**	**140**
Benzo(a)pyrene	3,300	2	**1.4 J**	2.4 U	**760**	**39**	**9.4 J**	**10 J**	**45**
Indeno(1,2,3-c,d)pyrene	4,120	2	3.1 UJ	**2.5 J**	**230**	**22**	**5.6 J**	**5.8 J**	**23**
Dibenzo(a,h)anthracene	800	2	3.1 UJ	3.2 U	**110**	3.3 U	**2.6 J**	**3.1 J**	**8.2**
Benzo(g,h,i)perylene	4,020	2	**1.5 J**	**0.52 J**	**230**	**28**	**6.5 J**	**7.4 J**	**25**
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)									
Total SMS LPAH (U = 0)	370	3	**0.71**	**0.17**	**870**	**4.4**	**1.5 J**	**0.79 J**	**16.3**
Naphthalene	99	3	**0.15 J**	0.11 U	**0.59**	**0.67**	**-- R**	**-- R**	**1.8**
Acenaphthylene	66	3	**0.08 J**	0.11 U	**1.3**	**0.20**	**0.13 J**	**0.05 J**	**0.43**
Acenaphthene	16	3	0.16 UJ	0.11 U	**76.7**	**0.29**	**0.07 J**	**0.08 J**	**1.0**
Fluorene	23	3	**0.09 J**	0.11 U	**83.3**	**0.40**	**0.13 J**	**0.08 J**	**1.6**
Phenanthrene	100	3	**0.31 J**	**0.17**	**608**	**2.1**	**0.95 J**	**0.42 J**	**7.7**
Anthracene	220	3	**0.08 J**	0.11 U	**100**	**0.77**	**0.25 J**	**0.13 J**	**3.8**
2-Methylnaphthalene	38	3	**0.06 J**	**0.05 J**	**0.29**	**0.19**	**-- R**	**0.03 J**	**0.64**
Total SMS HPAH (U = 0)	960	3	**1.8**	**0.53**	**2,344**	**14.5**	**17.4 J**	**8.1 J**	**65.8**
Fluoranthene	160	3	**0.38 J**	0.21 U	**1,000**	**3.3**	**4.8 J**	**1.4 J**	**15.8**
Pyrene	1,000	3	**0.43 J**	**0.26**	**742**	**3.3**	**3.8 J**	**1.5 J**	**15.0**
Benzo(a)anthracene	110	3	**0.19 J**	0.13 U	**175**	**1.3**	**1.4 J**	**0.74 J**	**5.7**
Chrysene	110	3	**0.12 J**	**0.07 J**	**175**	**1.6**	**2.1 J**	**1.08 J**	**9.2**
Benzofluoranthene (unspecified)	230	3	**0.33 J**	0.21 U	**142**	**2.0**	**2.5 J**	**1.4 J**	**11.7**
Benzo(a)pyrene	99	3	**0.15 J**	0.16 U	**63.3**	**1.3**	**1.1 J**	**0.77 J**	**3.8**
Indeno(1,2,3-c,d)pyrene	34	3	0.33 UJ	**0.17 J**	**19.2**	**0.73**	**0.64 J**	**0.45 J**	**1.9**
Dibenzo(a,h)anthracene	12	3	0.33 UJ	0.21 U	**9.2**	0.11 U	**0.30 J**	**0.24 J**	**0.68**
Benzo(g,h,i)perylene	31	3	**0.16 J**	**0.03 J**	**19.2**	**0.93**	**0.75 J**	**0.57 J**	**2.1**
Chlorinated Hydrocarbons (µg/kg)									
1,4-Dichlorobenzene	110	4	3.9 UJ	4 U	3.2 U	4.2 U	**-- R**	**-- R**	4.1 U
1,2-Dichlorobenzene	35	4	3.9 UJ	4 U	3.2 U	4.2 U	**-- R**	**-- R**	4.1 U
1,2,4-Trichlorobenzene	31	4	3.9 UJ	4 U	3.2 U	4.2 U	**-- R**	**-- R**	4.1 U
Hexachlorobenzene	22	4	3.9 UJ	4 U	3.2 U	4.2 U	**-- R**	**-- R**	4.1 U
Chlorindated Hydrocarbons (mg/kg-OC)									
1,4-Dichlorobenzene	3.1	3	0.42 UJ	0.27 U	0.27 U	0.14 U	**-- R**	**-- R**	0.34 U
1,2-Dichlorobenzene	2.3	3	0.42 UJ	0.27 U	0.27 U	0.14 U	**-- R**	**-- R**	0.34 U

Table 8
Lake River Subsurface Sediment Testing Results

Location ID	Preliminary Sediment Screening Criteria		LRIS-LR-06	LRIS-LR-06	LRIS-LR-08	LRIS-LR-08	LRIS-LR-09	LRIS-LR-09	LRIS-LR-10
Sample ID			LRIS-LR-06-SB-1-2	LRIS-LR-06-SB-3-4	LRIS-LR-08-SB-1-2	LRIS-LR-08-SB-3-4	LRIS-LR-09-SB-1-2	LRIS-LR-09-SB-4-5	LRIS-LR-10-SB-1-2
Sample Date			4/28/2010	4/28/2010	4/28/2010	4/28/2010	4/29/2010	4/29/2010	4/28/2010
Sample Depth			1-2 ft	3-4 ft	1-2 ft	3-4 ft	1-2 ft	4-5 ft	1-2 ft
1,2,4-Trichlorobenzene	0.81	3	0.42 UJ	0.27 U	0.27 U	0.14 U	**-- R**	**-- R**	0.34 U
Hexachlorobenzene	0.38	3	0.42 UJ	0.27 U	0.27 U	0.14 U	**-- R**	**-- R**	0.34 U
Phthalates (µg/kg)									
Dimethyl phthalate	311	2	7.7 UJ	8.1 U	6.4 U	8.3 U	**-- R**	**-- R**	8.2 U
Diethyl phthalate	200	4	7.7 UJ	8.1 U	6.4 U	8.3 U	**-- R**	**-- R**	8.2 U
Di-n-butyl phthalate	380	1	15 UJ	16 U	13 U	17 U	**2.5 J**	**2.7 J**	16 U
Butylbenzyl phthalate	260	2	7.7 UJ	8.1 U	6.4 U	8.3 U	**4.1 J**	**3.2 J**	14 U
Bis(2-ethylhexyl) phthalate	500	1	120 UJ	120 U	97 U	130 U	**11 J**	**16 J**	120 U
Di-n-octyl phthalate	39	1	15 UJ	16 U	260 U	17 U	**-- R**	**-- R**	16 U
Phthalates (mg/kg-OC)									
Dimethyl phthalate	53	3	0.83 UJ	0.54 U	0.53 U	0.28 U	**-- R**	**-- R**	0.68 U
Diethyl phthalate	61	3	0.83 UJ	0.54 U	0.53 U	0.28 U	**-- R**	**-- R**	0.68 U
Di-n-butyl phthalate	220	3	1.6 UJ	1.1 U	1.1 U	0.57 U	**0.29 J**	**0.21 J**	1.3 U
Butylbenzyl phthalate	4.9	3	0.83 UJ	0.54 U	0.53 U	0.28 U	**0.47 J**	**0.25 J**	1.2 U
Bis(2-ethylhexyl) phthalate	47	3	12.9 UJ	8.0 U	8.1 U	4.3 U	**1.3 J**	**1.2 J**	10.0 U
Di-n-octyl phthalate	58	3	1.6 UJ	1.1 U	21.7 U	0.57 U	**-- R**	**-- R**	1.3 U
Miscellaneous Extractables (µg/kg)									
Benzyl alcohol	57	3	7.7 UJ	**4 J**	6.4 U	8.3 U	**-- R**	**1 J**	**5.3 J**
Benzoic acid	2,900	1	190 UJ	**79 J**	160 UJ	**180 J**	**55 J**	**82 J**	**120 J**
Dibenzofuran	200	1	7.7 UJ	8.1 U	**91**	**4 J**	**-- R**	**0.36 J**	**12**
Hexachlorobutadiene	29	4	3.9 UJ	4 U	3.2 U	4.2 U	**-- R**	**-- R**	4.1 U
N-Nitrosodiphenylamine	28	4	3.9 UJ	4 U	3.2 U	4.2 U	**-- R**	**-- R**	4.1 U
Miscellaneous Extractables (mg/kg-OC)									
Dibenzofuran	15	3	0.83 UJ	0.54 U	**7.6**	**0.13 J**	**-- R**	**0.02 J**	**1.0**
Hexachlorobutadiene	3.9	3	0.42 UJ	0.27 U	0.27 U	0.14 U	**-- R**	**-- R**	0.34 U
N-Nitrosodiphenylamine	11	3	0.42 UJ	0.27 U	0.27 U	0.14 U	**-- R**	**-- R**	0.34 U
Dioxin Furans (ng/kg)									
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	--	--	**909**	**6.6**	**1.3**	**2.5**	**79.6**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	--	--	**909**	**6.9**	**1.6**	**3.4**	**83.3**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	--	--	**1,400 J**	**18 J**	**20**	**19**	**290**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	--	**260,000 J**	**1,300 J**	**460**	**800**	**19,000 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**4,100 J**	**31 J**	**8.3**	**12**	**200**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**30,000 J**	**140 J**	**49**	**84**	**3,200 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**200**	**1.6 J**	**0.77 J**	**2 J**	**15**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**1,300**	**12**	**0.72 J**	**1.5 J**	**22**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**70**	**1.4 J**	**0.4 J**	**0.96 J**	**38**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**380**	**3.4 J**	**0.43 J**	**1.3 J**	**14**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**1,200**	**6.2**	**2.1 J**	**5.4**	**150**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**48 J**	0.63 U	0.16 U	0.38 U	3 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**120 J**	**1.5 J**	**0.68 J**	**2 J**	**95**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**200**	**1 J**	0.26 U	0.93 U	**7.4**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**15 J**	0.53 UJ	0.29 U	0.79 U	7.2 U

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-06 LRIS-LR-06-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-06 LRIS-LR-06-SB-3-4 4/28/2010 3-4 ft	LRIS-LR-08 LRIS-LR-08-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-08 LRIS-LR-08-SB-3-4 4/28/2010 3-4 ft	LRIS-LR-09 LRIS-LR-09-SB-1-2 4/29/2010 1-2 ft	LRIS-LR-09 LRIS-LR-09-SB-4-5 4/29/2010 4-5 ft	LRIS-LR-10 LRIS-LR-10-SB-1-2 4/28/2010 1-2 ft
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**190**	**2.2 J**	**0.25 J**	**0.65 J**	**5.7**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**410 J**	**1.8 J**	**0.34 J**	1.1 U	**8.6**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**93**	**1.6**	**0.56 J**	**0.93**	**3.7**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**3.9 J**	**1.1**	0.18 U	0.6 U	**4**
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	--	**13,000**	**83**	**28**	**34**	**680**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	--	**53,000 J**	**270 J**	**92**	**170**	**6,400**
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	--	**16,000**	**110**	**9.7**	**18**	**410**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	--	**4,500**	**51**	**13**	**33**	**1,300**
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	--	**6,300**	**43**	**1.4**	**1.5**	**69**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	--	**680**	**11**	0.29 U	0.79 U	**220**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	--	**1,300**	**42**	**1.6**	**2.6**	**24**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	--	**280**	**6.6**	0.18 U	0.6 U	**96**

Table 8
Lake River Subsurface Sediment Testing Results

Location ID / Sample ID / Sample Date / Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-10 LRIS-LR-10-SB-5-6 4/28/2010 5-6 ft	LRIS-LR-12 LRIS-LR-12-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-12 LRIS-LR-12-SB-4-5 4/28/2010 4-5 ft	LRIS-LR-14 LRIS-LR-14-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-14 LRIS-LR-14-SB-4-5 4/28/2010 4-5 ft
Conventional Parameters							
Total organic carbon (%)	--	--	**2.3**	**2.4**	**1.9**	**0.79**	**2**
Total solids (%)	--	--	**67**	**59**	**64**	**67**	**58**
Total volatile solids (%)	--	--	**6**	**5.8**	**5.1**	**2.7**	**4.6**
Grain Size (%)							
Clay	--	--	**9.5**	**2.6**	**10**	**12**	**24**
Gravel	--	--	**0**	**0**	**0**	**0**	**0**
Sand, Coarse	--	--	**0**	**0**	**0**	**0**	**0**
Sand, Fine	--	--	**37**	**60**	**39**	**53**	**20**
Sand, Medium	--	--	**5**	**5.3**	**1.8**	**1.7**	**0.6**
Sand, Very Fine	--	--	**5.8**	**6**	**8.1**	**4.7**	**4.5**
Silt	--	--	**43**	**26**	**41**	**28**	**51**
Total Clay	--	--	**9.5**	**2.6**	**10**	**12**	**24**
Total Fines (silt + clay)	--	--	**52.5**	**28.6**	**51**	**40**	**75**
Total Gravel	--	--	**0**	**0**	**0**	**0**	**0**
Total Sand	--	--	**47.8**	**71.3**	**48.9**	**59.4**	**25.1**
Total Silt	--	--	**43**	**26**	**41**	**28**	**51**
Total Grain Size	--	--	**100.3**	**99.9**	**99.9**	**99.4**	**100.1**
Phenols (µg/kg)							
Phenol	120	1	**32**	**61**	**14**	**63**	**63**
2-Methylphenol (o-Cresol)	63	3	**4 J**	8.5 U	7.7 U	7.4 U	8.6 U
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	**18**	17 U	**21**	**15**	17 U
2,4-Dimethylphenol	29	3	7.4 U	8.5 U	7.7 U	7.4 U	8.6 U
Pentachlorophenol	1,200	1	**5.9 J**	**15**	7.7 U	7.4 U	8.6 U
Metals (mg/kg)							
Arsenic	14	1	**5.3 J**	**7.7 J**	**5.9 J**	**6.1 J**	**4.8 J**
Cadmium	2.1	1	**0.54 J**	**0.018 J**	**1.1 J**	**0.078 J**	0.28 UJ
Chromium	72	1	**25 J**	**43 J**	**27 J**	**21 J**	**28 J**
Copper	400	1	**26**	**30**	**31**	**35**	**35**
Lead	360	1	**14**	**12**	**17**	**33**	**10**
Mercury	0.66	1	**0.064**	**0.047**	**0.11**	**0.046**	**0.029**
Nickel	26	1	**18 J**	**21 J**	**17 J**	**19 J**	**25 J**
Silver	0.58	1	**0.18 J**	**0.18 J**	**0.17 J**	**0.16 J**	**0.21 J**
Zinc	3,200	1	**100**	**180**	**130**	**96**	**65**
Polycyclic Aromatic Hydrocarbons (PAH) (µg/kg)							
Total PAH (U = 1/2)	17,000	1	**702**	**827**	**711**	**232**	**16.5**
Total PAH (U = 0)	--	--	**702**	**825**	**711**	**232**	**2.9**
Total LPAH (U = 1/2)	--	--	**161**	**453**	**112**	**71.4**	**5.7**
Total LPAH (U = 0)	6,590	2	**161**	**453**	**112**	**71.4**	**2.3**
Naphthalene	529	2	**27**	**110**	**23**	**16**	**0.68 J**
Acenaphthylene	470	2	**8.1**	**2.3**	**11**	**6.6**	1.7 U
Acenaphthene	1,060	2	**26**	**80**	**3.8**	**3.2**	1.7 U

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-10 LRIS-LR-10-SB-5-6 4/28/2010 5-6 ft	LRIS-LR-12 LRIS-LR-12-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-12 LRIS-LR-12-SB-4-5 4/28/2010 4-5 ft	LRIS-LR-14 LRIS-LR-14-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-14 LRIS-LR-14-SB-4-5 4/28/2010 4-5 ft
Fluorene	1,070	2	**16**	**41**	**6.9**	**4.2**	1.7 U
Phenanthrene	6,100	2	**63**	**170**	**45**	**30**	**1 J**
Anthracene	1,230	2	**12**	**30**	**17**	**7.9**	1.7 U
2-Methylnaphthalene	469	2	**8.9**	**20**	**5.7**	**3.5**	**0.63 J**
Total HPAH (U = 1/2)	--	--	**541**	**374**	**598**	**161**	**10.8**
Total HPAH (U = 0)	31,640	2	**541**	**372**	**598**	**161**	**0.59**
Fluoranthene	11,100	2	**110**	**130**	**99**	**40**	1.7 U
Pyrene	8,790	2	**120**	**110**	**120**	**38**	1.7 U
Benzo(a)anthracene	4,260	2	**39**	**24**	**46**	**11**	2.1 U
Chrysene	5,940	2	**55**	**34**	**59**	**15**	**0.59 J**
Benzofluoranthene, Total	11,000	2	**81**	**35**	**97**	**19**	3.4 U
Benzo(a)pyrene	3,300	2	**56**	**18**	**77**	**12**	2.6 U
Indeno(1,2,3-c,d)pyrene	4,120	2	**30**	**10**	**38**	**9.9**	3.4 U
Dibenzo(a,h)anthracene	800	2	**8.9**	3.4 U	**9.2**	**3.9**	3.4 U
Benzo(g,h,i)perylene	4,020	2	**41**	**11**	**53**	**12**	2.1 U
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)							
Total SMS LPAH (U = 0)	370	3	**6.6**	**18.1**	**5.6**	**8.6**	**0.08**
Naphthalene	99	3	**1.2**	**4.6**	**1.2**	**2.0**	**0.03 J**
Acenaphthylene	66	3	**0.35**	**0.10**	**0.58**	**0.84**	0.09 U
Acenaphthene	16	3	**1.1**	**3.3**	**0.20**	**0.41**	0.09 U
Fluorene	23	3	**0.70**	**1.7**	**0.36**	**0.53**	0.09 U
Phenanthrene	100	3	**2.7**	**7.1**	**2.4**	**3.8**	**0.05 J**
Anthracene	220	3	**0.52**	**1.3**	**0.89**	**1.0**	0.09 U
2-Methylnaphthalene	38	3	**0.39**	**0.83**	**0.30**	**0.44**	**0.03 J**
Total SMS HPAH (U = 0)	960	3	**23.5**	**15.5**	**31.5**	**20.4**	**0.03**
Fluoranthene	160	3	**4.8**	**5.4**	**5.2**	**5.1**	0.09 U
Pyrene	1,000	3	**5.2**	**4.6**	**6.3**	**4.8**	0.09 U
Benzo(a)anthracene	110	3	**1.7**	**1.0**	**2.4**	**1.4**	0.11 U
Chrysene	110	3	**2.4**	**1.4**	**3.1**	**1.9**	**0.03 J**
Benzofluoranthene (unspecified)	230	3	**3.5**	**1.5**	**5.1**	**2.4**	0.17 U
Benzo(a)pyrene	99	3	**2.4**	**0.75**	**4.1**	**1.5**	0.13 U
Indeno(1,2,3-c,d)pyrene	34	3	**1.3**	**0.42**	**2.0**	**1.3**	0.17 U
Dibenzo(a,h)anthracene	12	3	**0.39**	0.14 U	**0.48**	**0.49**	0.17 U
Benzo(g,h,i)perylene	31	3	**1.8**	**0.46**	**2.8**	**1.5**	0.105 U
Chlorinated Hydrocarbons (µg/kg)							
1,4-Dichlorobenzene	110	4	3.7 U	4.2 U	3.9 U	3.7 U	4.3 U
1,2-Dichlorobenzene	35	4	3.7 U	4.2 U	3.9 U	3.7 U	4.3 U
1,2,4-Trichlorobenzene	31	4	3.7 U	4.2 U	3.9 U	3.7 U	4.3 U
Hexachlorobenzene	22	4	3.7 U	4.2 U	3.9 U	3.7 U	4.3 U
Chlorindated Hydrocarbons (mg/kg-OC)							
1,4-Dichlorobenzene	3.1	3	0.16 U	0.18 U	0.21 U	0.47 U	0.22 U
1,2-Dichlorobenzene	2.3	3	0.16 U	0.18 U	0.21 U	0.47 U	0.22 U

Table 8
Lake River Subsurface Sediment Testing Results

Location ID / Sample ID / Sample Date / Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-10 / LRIS-LR-10-SB-5-6 / 4/28/2010 / 5-6 ft	LRIS-LR-12 / LRIS-LR-12-SB-1-2 / 4/28/2010 / 1-2 ft	LRIS-LR-12 / LRIS-LR-12-SB-4-5 / 4/28/2010 / 4-5 ft	LRIS-LR-14 / LRIS-LR-14-SB-1-2 / 4/28/2010 / 1-2 ft	LRIS-LR-14 / LRIS-LR-14-SB-4-5 / 4/28/2010 / 4-5 ft
1,2,4-Trichlorobenzene	0.81	3	0.16 U	0.18 U	0.21 U	0.47 U	0.22 U
Hexachlorobenzene	0.38	3	0.16 U	0.18 U	0.21 U	0.47 U	0.22 U
Phthalates (µg/kg)							
Dimethyl phthalate	311	2	7.4 U	8.5 U	7.7 U	7.4 U	8.6 U
Diethyl phthalate	200	4	7.4 U	8.5 U	7.7 U	7.4 U	8.6 U
Di-n-butyl phthalate	380	1	15 U	17 U	15 U	15 U	17 U
Butylbenzyl phthalate	260	2	7.4 U	8.5 U	7.7 U	7.4 U	8.6 U
Bis(2-ethylhexyl) phthalate	500	1	110 U	130 U	120 U	110 U	130 U
Di-n-octyl phthalate	39	1	15 U	17 U	15 U	15 U	17 U
Phthalates (mg/kg-OC)							
Dimethyl phthalate	53	3	0.32 U	0.35 U	0.41 U	0.94 U	0.43 U
Diethyl phthalate	61	3	0.32 U	0.35 U	0.41 U	0.94 U	0.43 U
Di-n-butyl phthalate	220	3	0.65 U	0.71 U	0.79 U	1.9 U	0.85 U
Butylbenzyl phthalate	4.9	3	0.32 U	0.35 U	0.41 U	0.94 U	0.43 U
Bis(2-ethylhexyl) phthalate	47	3	4.8 U	5.4 U	6.3 U	13.9 U	6.5 U
Di-n-octyl phthalate	58	3	0.65 U	0.71 U	0.79 U	1.9 U	0.85 U
Miscellaneous Extractables (µg/kg)							
Benzyl alcohol	57	3	**6.7 J**	8.5 U	7.7 U	**4.5 J**	**8.6**
Benzoic acid	2,900	1	**160 J**	210 UJ	**96 J**	190 UJ	210 UJ
Dibenzofuran	200	1	**6.6 J**	**27**	**3 J**	**2.4 J**	8.6 U
Hexachlorobutadiene	29	4	3.7 U	4.2 U	3.9 U	3.7 U	4.3 U
N-Nitrosodiphenylamine	28	4	3.7 U	4.2 U	3.9 U	3.7 U	4.3 U
Miscellaneous Extractables (mg/kg-OC)							
Dibenzofuran	15	3	**0.29 J**	**1.1**	**0.16 J**	**0.30 J**	0.43 U
Hexachlorobutadiene	3.9	3	0.16 U	0.18 U	0.21 U	0.47 U	0.22 U
N-Nitrosodiphenylamine	11	3	0.16 U	0.18 U	0.21 U	0.47 U	0.22 U
Dioxin Furans (ng/kg)							
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	--	**9.8**	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	--	**9.8**	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	--	**47**	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**3,500 J**	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**48**	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**300**	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	**3.6**	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**7.6**	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**2 J**	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**3.5**	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**13**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	**0.32 J**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**4.4**	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**1.8 J**	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**1 J**	--	--	--

Table 8
Lake River Subsurface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Preliminary Sediment Screening Criteria		LRIS-LR-10 LRIS-LR-10-SB-5-6 4/28/2010 5-6 ft	LRIS-LR-12 LRIS-LR-12-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-12 LRIS-LR-12-SB-4-5 4/28/2010 4-5 ft	LRIS-LR-14 LRIS-LR-14-SB-1-2 4/28/2010 1-2 ft	LRIS-LR-14 LRIS-LR-14-SB-4-5 4/28/2010 4-5 ft
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**1.5 J**	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**1.9 J**	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**1.1**	--	--	--
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**0.28 J**	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	**160**	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**620**	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	**120**	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**100**	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	**22**	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**13**	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	**7.6**	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**4.7**	--	--	--

Table 8
Lake River Subsurface Sediment Testing Results

Notes:

Detected concentration is greater than Ridgefield Preliminary Screening Level.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

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

R = Compound analyzed exceeding holding time, but not detected above detection limit

SMS = Sediment Management Standards

TEQ = toxicity equivalents

Non-detect ammonia results were rejected because the samples were analyzed past twice the holding time.

Total PAH includes the following PAHs: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, 2-Methylnaphthalene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Total Benzofluoranthenes, Benzo(a)pyrene,Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,)Perylene.

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, and 2-Methylnaphthalene.

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene.

Total SMS LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene. (2-Methylnaphthalene is not included.)

Total SMS HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene. (2-Methylnaphthalene is not included.)

mg/kg = milligram per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

OC = organic carbon normalized

1. Ecology 2010 Draft Freshwater Sediment Sediment Quality Standards (SQS)/Screening Level (SL)1
2. Ecology 2003 Freshwater Lowest Apparent Effects Threshold (LAET)
3. Sediment Management Standard SQS (Marine)
4. Dredged Material Management Program SL (Marine)

Table 9
Background Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Freshwater Sediment Screening Criteria		LRIS-BKG-01 LRIS-BKG-01-SS 4/20/2010 0-10 cm	LRIS-BKG-02 LRIS-BKG-02-SS 4/20/2010 0-10 cm	LRIS-BKG-03 LRIS-BKG-03-SS 4/20/2010 0-10 cm	LRIS-BKG-04 LRIS-BKG-04-SS 4/16/2010 0-10 cm
Conventional Parameters						
Total organic carbon (%)	--	--	**1.2**	**0.21**	**1.4**	**3.2**
Total solids (%)	--	--	**56**	**71**	**52**	**37**
Total volatile solids (%)	--	--	**4.5 J**	**0.98 J**	**3.8 J**	**7.5**
Ammonia (mg/kg)	--	--	**-- R**	**-- R**	**-- R**	**-- R**
Sulfide (mg/kg)	--	--	9 UJ	7 UJ	**6.2 J**	13 U
Grain Size (%)						
Clay	--	--	**3.2**	**1.3**	**6.5 J**	**20**
Gravel	--	--	**0**	**0**	**0**	**0**
Sand, Coarse	--	--	**0**	**0.2**	**0**	**0**
Sand, Fine	--	--	**74**	**74**	**36**	**23**
Sand, Medium	--	--	**1.1**	**20**	**0.6 J**	**1.2**
Sand, Very Fine	--	--	**6.9**	**2.2**	**10 J**	**7.7**
Silt	--	--	**14**	**2.6**	**47**	**48**
Total Clay	--	--	**3.2**	**1.3**	**6.5 J**	**20**
Total Fines (silt + clay)	--	--	**17.2**	**3.9**	**53.5**	**68**
Total Gravel	--	--	**0**	**0**	**0**	**0**
Total Sand	--	--	**82**	**96.4**	**46.6**	**31.9**
Total Silt	--	--	**14**	**2.6**	**47**	**48**
Total Grain Size	--	--	**99.2**	**100.3**	**100.1**	**99.9**
Phenols (µg/kg)						
Phenol	120	1	**13**	**12**	**4.5 J**	--
2-Methylphenol (o-Cresol)	63	3	8.9 U	7 U	9.6 U	--
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	260	1	**25**	**12 J**	**8.5 J**	--
2,4-Dimethylphenol	29	3	8.9 U	7 U	9.6 U	--
Pentachlorophenol	1,200	1	8.9 U	7 U	9.6 U	13 U
Polycyclic Aromatic Hydrocarbons (µg/kg)						
Total PAH (U = 1/2)	17,000	1	**149**	**15.1**	**102**	--
Total PAH (U = 0)	--	--	**146**	**4.8**	**101**	--
Total LPAH (U = 1/2)	--	--	**20.4**	**4.7**	**8.7**	--
Total LPAH (U = 0)	6,590	2	**20.4**	**0.52**	**6.8**	--
Naphthalene	529	2	**0.71 J**	1.4 U	**0.74 J**	--
Acenaphthylene	470	2	**0.72 J**	1.4 U	**0.32 J**	--
Acenaphthene	1,060	2	**0.99 J**	1.4 U	1.9 U	--
Fluorene	1,070	2	**1.5 J**	1.4 U	**0.56 J**	--
Phenanthrene	6,100	2	**14**	**0.52 J**	**3.5**	--
Anthracene	1,230	2	**1.7 J**	1.4 U	**1.7 J**	--
2-Methylnaphthalene	469	2	**0.75 J**	1.4 U	1.9 U	--
Total HPAH (U = 1/2)	--	--	**129**	**10.4**	**93.7**	--
Total HPAH (U = 0)	31,640	2	**126**	**4.3**	**93.7**	--
Fluoranthene	11,100	2	**48**	**1.2 J**	**13**	--
Pyrene	8,790	2	**38**	**1.5**	**14**	--
Benzo(a)anthracene	4,260	2	**4.3**	**0.7 J**	**8.9**	--
Chrysene	5,940	2	**11**	**0.88 J**	**16**	--
Benzofluoranthene, Total	11,000	2	**17**	2.8 U	**18**	--
Benzo(a)pyrene	3300	2	**5**	2.1 U	**11**	--
Indeno(1,2,3-c,d)pyrene	4,120	2	**2.5 J**	2.8 U	**5.9**	--
Dibenzo(a,h)anthracene	800	2	3.6 U	2.8 U	**1.3 J**	--
Benzo(g,h,i)perylene	4,020	2	2.2 U	1.7 U	**5.6**	--
Polycyclic Aromatic Hydrocarbons (mg/kg-OC)						
Total SMS LPAH (U = 0)	370	3	**1.6**	**0.25**	**0.49**	--
Naphthalene	99	3	**0.10 J**	0.67 U	**0.05 J**	--
Acenaphthylene	66	3	**0.06 J**	0.67 U	**0.02 J**	--
Acenaphthene	16	3	**0.08 J**	0.67 U	0.14 U	--
Fluorene	23	3	**0.13 J**	0.67 U	**0.04 J**	--
Phenanthrene	100	3	**1.2**	**0.25 J**	**0.25**	--
Anthracene	220	3	**0.14 J**	0.67 U	**0.12 J**	--
2-Methylnaphthalene	38	3	**0.06 J**	0.67 U	0.14 U	--
Total SMS HPAH (U = 0)	960	3	**10.5**	**2.0**	**6.7**	--
Fluoranthene	160	3	**4.0**	**0.57 J**	**0.93**	--
Pyrene	1,000	3	**3.2**	**0.71**	**1.0**	--
Benzo(a)anthracene	110	3	**0.36**	**0.33 J**	**0.64**	--
Chrysene	110	3	**0.92**	**0.42 J**	**1.1**	--
Benzofluoranthene (unspecified)	230	3	**1.4**	1.3 U	**1.3**	--
Benzo(a)pyrene	99	3	**0.42**	1.0 U	**0.79**	--
Indeno(1,2,3-c,d)pyrene	34	3	**0.21 J**	1.3 U	**0.42**	--
Dibenzo(a,h)anthracene	12	3	0.30 U	1.3 U	**0.09 J**	--
Benzo(g,h,i)perylene	31	3	0.18 U	0.81 U	**0.40**	--
Chlorinated Hydrocarbons (µg/kg)						
1,4-Dichlorobenzene	110	4	4.4 U	3.5 U	4.8 U	--
1,2-Dichlorobenzene	35	4	4.4 U	3.5 U	4.8 U	--
1,2,4-Trichlorobenzene	31	4	4.4 U	3.5 U	4.8 U	--
Hexachlorobenzene	22	4	4.4 U	3.5 U	4.8 U	--

Table 9
Background Surface Sediment Testing Results

Location ID Sample ID Sample Date Sample Depth	Freshwater Sediment Screening Criteria		LRIS-BKG-01 LRIS-BKG-01-SS 4/20/2010 0-10 cm	LRIS-BKG-02 LRIS-BKG-02-SS 4/20/2010 0-10 cm	LRIS-BKG-03 LRIS-BKG-03-SS 4/20/2010 0-10 cm	LRIS-BKG-04 LRIS-BKG-04-SS 4/16/2010 0-10 cm
Chlorindated Hydrocarbons (mg/kg-OC)						
1,4-Dichlorobenzene	3.1	3	0.37 U	1.7 U	0.34 U	--
1,2-Dichlorobenzene	2.3	3	0.37 U	1.7 U	0.34 U	--
1,2,4-Trichlorobenzene	0.81	3	0.37 U	1.7 U	0.34 U	--
Hexachlorobenzene	0.38	3	0.37 U	1.7 U	0.34 U	--
Phthalates (µg/kg)						
Dimethyl phthalate	311	2	**2.1 J**	7 U	9.6 U	--
Diethyl phthalate	200	4	8.9 U	7 U	9.6 U	--
Di-n-butyl phthalate	380	1	**23**	**8.8 J**	**25**	--
Butylbenzyl phthalate	260	2	**39**	**25**	**34**	--
Bis(2-ethylhexyl) phthalate	500	1	**29 J**	**16 J**	**21 J**	--
Di-n-octyl phthalate	39	1	18 U	14 U	19 U	--
Phthalates (mg/kg-OC)						
Dimethyl phthalate	53	3	**0.18 J**	3.3 U	0.69 U	--
Diethyl phthalate	61	3	0.74 U	3.3 U	0.69 U	--
Di-n-butyl phthalate	220	3	**1.9**	**4.2 J**	**1.8**	--
Butylbenzyl phthalate	4.9	3	**3.3**	**11.9**	**2.4**	--
Bis(2-ethylhexyl) phthalate	47	3	**2.4 J**	**7.6 J**	**1.5 J**	--
Di-n-octyl phthalate	58	3	1.5 U	6.7 U	1.4 U	--
Miscellaneous Extractables (µg/kg)						
Benzyl alcohol	57	3	8.9 U	7 U	9.6 U	--
Benzoic acid	2,900	1	220 U	170 U	**70 J**	--
Dibenzofuran	200	1	**0.72 J**	7 U	9.6 U	--
Hexachlorobutadiene	29	4	4.4 U	3.5 U	4.8 U	--
N-Nitrosodiphenylamine	28	4	4.4 U	3.5 U	4.8 U	--
Miscellaneous Extractables (mg/kg-OC)						
Dibenzofuran	15	3	**0.06 J**	3.3 U	0.69 U	--
Hexachlorobutadiene	3.9	3	0.37 U	1.7 U	0.34 U	--
N-Nitrosodiphenylamine	11	3	0.37 U	1.7 U	0.34 U	--
PCB Aroclors (µg/kg)						
Total PCB Aroclors (U = 0)	110	1	**16.9**	14 U	19 U	24 U
PCB Aroclors (mg/kg-OC)						
Total PCB Aroclors (U = 0)	12	3	**1.4**	6.7 U	1.4 U	0.75 U
PCB Aroclors (µg/kg)						
Aroclor 1016	--	--	17 U	14 U	19 U	24 U
Aroclor 1221	--	--	17 U	14 U	19 U	24 U
Aroclor 1232	--	--	17 U	14 U	19 U	24 U
Aroclor 1242	--	--	17 U	14 U	19 U	24 U
Aroclor 1248	--	--	17 U	14 U	19 U	24 U
Aroclor 1254	--	--	**8.4 J**	14 U	19 U	24 U
Aroclor 1260	--	--	**8.5 J**	14 U	19 U	24 U
Dioxin Furans (ng/kg)						
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**0.60**	**0.06**	**0.65**	**18.1**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**0.83**	**0.18**	**0.86**	**18.1**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**9.6**	1.4 U	**14**	**44**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**190**	**22**	**230**	**3,000**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**3.6**	0.68 U	**4.6**	**41**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**23**	**2.9**	**27**	**510**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	0.67 U	0.62 U	0.76 U	**2.9**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	1 U	0.58 U	0.81 U	**6.9**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	0.26 U	0.05 U	0.24 U	**7.4**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	0.3 U	0.14 U	0.31 U	**5.2**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.93 J**	0.12 U	**1.3 J**	**27**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	0.18 U	0.11 U	0.085 U	0.5 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.59 J**	0.15 U	**0.69 J**	**22**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	0.62 U	0.31 U	0.27 U	**3.4**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	0.18 U	0.038 U	0.12 U	**3.2**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	0.19 U	0.048 U	0.18 U	**2.4**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.25 J**	0.066 U	0.21 U	**3**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**0.52 J**	**0.2 J**	**0.63 J**	**1.4**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	0.054 U	0.053 U	0.065 U	**0.23**
Total Heptachlorodibenzofuran (HpCDF)	--	--	**12**	2.6 U	**16**	**99**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**74**	6.1 U	**53**	**1,100**
Total Hexachlorodibenzofuran (HxCDF)	--	--	8.1 U	2.6 U	**9.5**	**97**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**7.4**	1.4 U	**8.3**	**250**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**2.5**	**0.85**	**3.1**	**44**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**0.76**	**0.046**	**0.91**	**32**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**1.9**	**0.57**	**2.5**	**19**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.47**	**0.16**	**0.77**	**8.2**

Table 9
Background Surface Sediment Testing Results

Notes:

Detected concentration is greater than Ridgefield Preliminary Screening Level.

Bold = Detected result

J = Estimated value

U = Compound analyzed, but not detected above detection limit

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

SMS = Sediment Management Standards

TEQ = toxicity equivalents

Non-detect ammonia results were rejected because the samples were analyzed past twice the holding time.

Total PAH includes the following PAHs: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, 2-Methylnaphthalene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Total Benzofluoranthenes, Benzo(a)pyrene,Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,)Perylene

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, and 2-Methylnaphthalene

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene,

Total SMS LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene (2-Methylnaphthalene is not included)

Total SMS HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-

mg/kg = milligram per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

OC = organic carbon normalized

1. Ecology 2010 Draft Freshwater Sediment Sediment Quality Standards (SQS)/Screening Level (SL)1
2. Ecology 2003 Freshwater Lowest Apparent Effects Threshold (LAET)
3. Sediment Management Standard SQS (Marine)
4. Dredged Material Management Program SL (Marine)

FIGURES

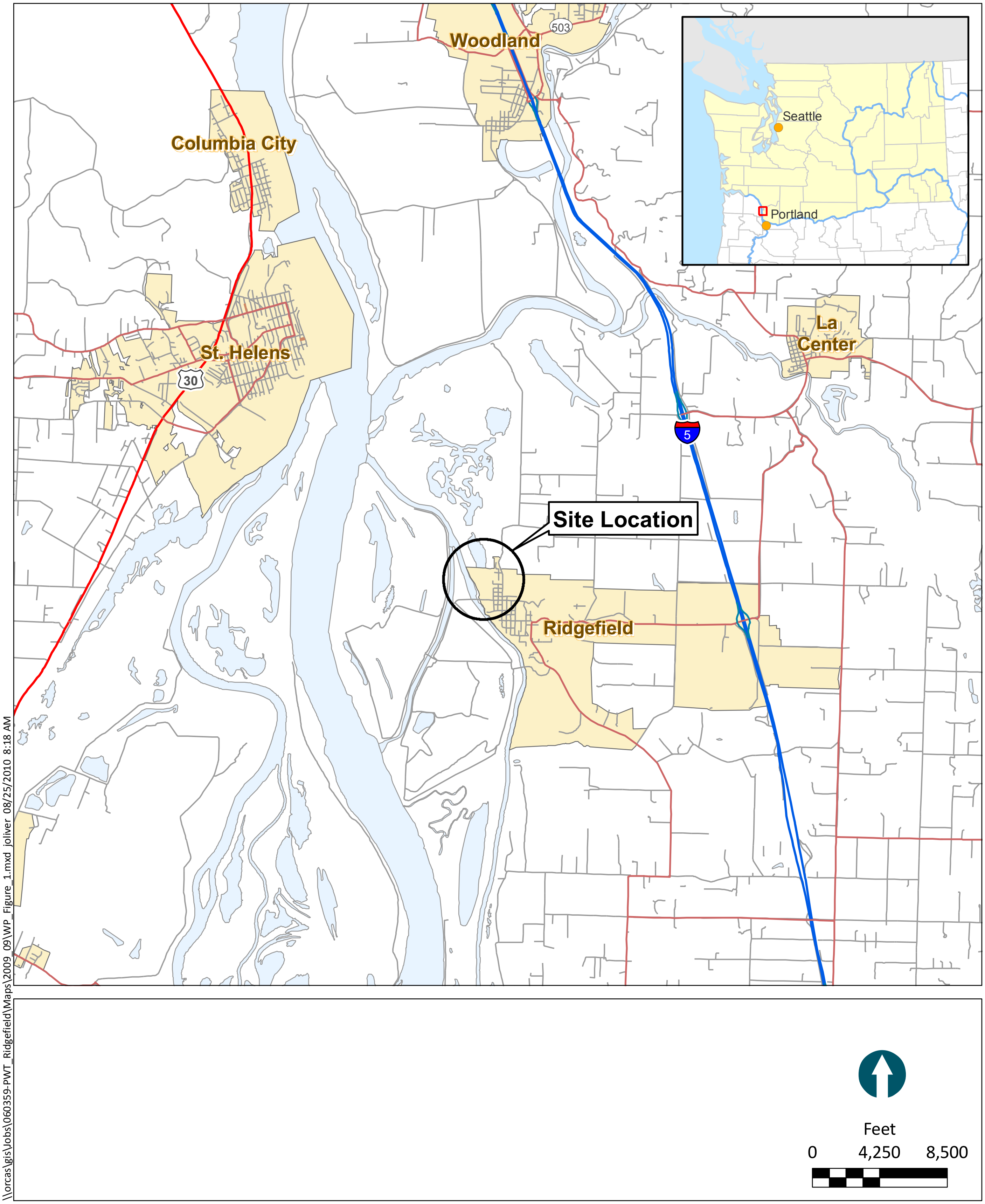

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Figure 1
Site Vicinity and Location Features
LRIS Ridgefield, WA
Draft Sediment RI Data Memorandum

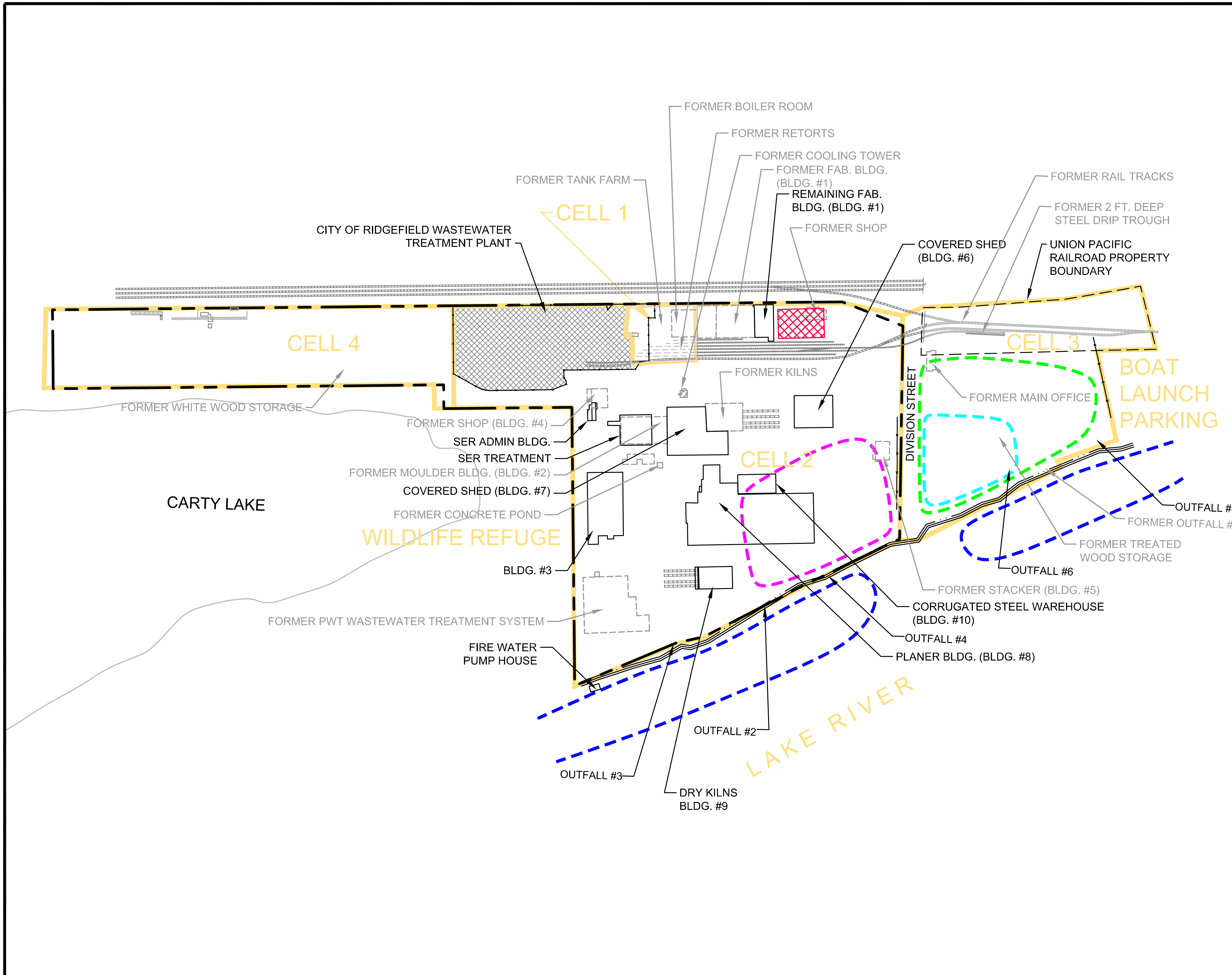


Figure 2
Current and Historical Site Features

Port of Ridgefield
Ridgefield, Washington

LEGEND:
- CITY OF RIDGEFIELD WASTEWATER TREATMENT PLANT
- PORT OF RIDGEFIELD PROPERTY BOUNDARY
- UNION PACIFIC PROPERTY BOUNDARY
- CELL BOUNDARY
- CURRENT FEATURES
- RAIL LINE
- FENCE LINE
- FORMER PWT FEATURES

HISTORICAL FEATURES*:
- INTERMITTENT LOG RAFTING AREAS
- SAWMILL OPERATIONS (APPROXIMATE 1920'S)
- SAWMILL OPERATIONS (APPROXIMATE 1940-1960)
- SAWMILL OPERATIONS (APPROXIMATE 1950-1960)
- FORMER SHELL OIL CO. BULK STORAGE

* LOCATIONS APPROXIMATED THROUGH REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS (SEE APPENDIX A)

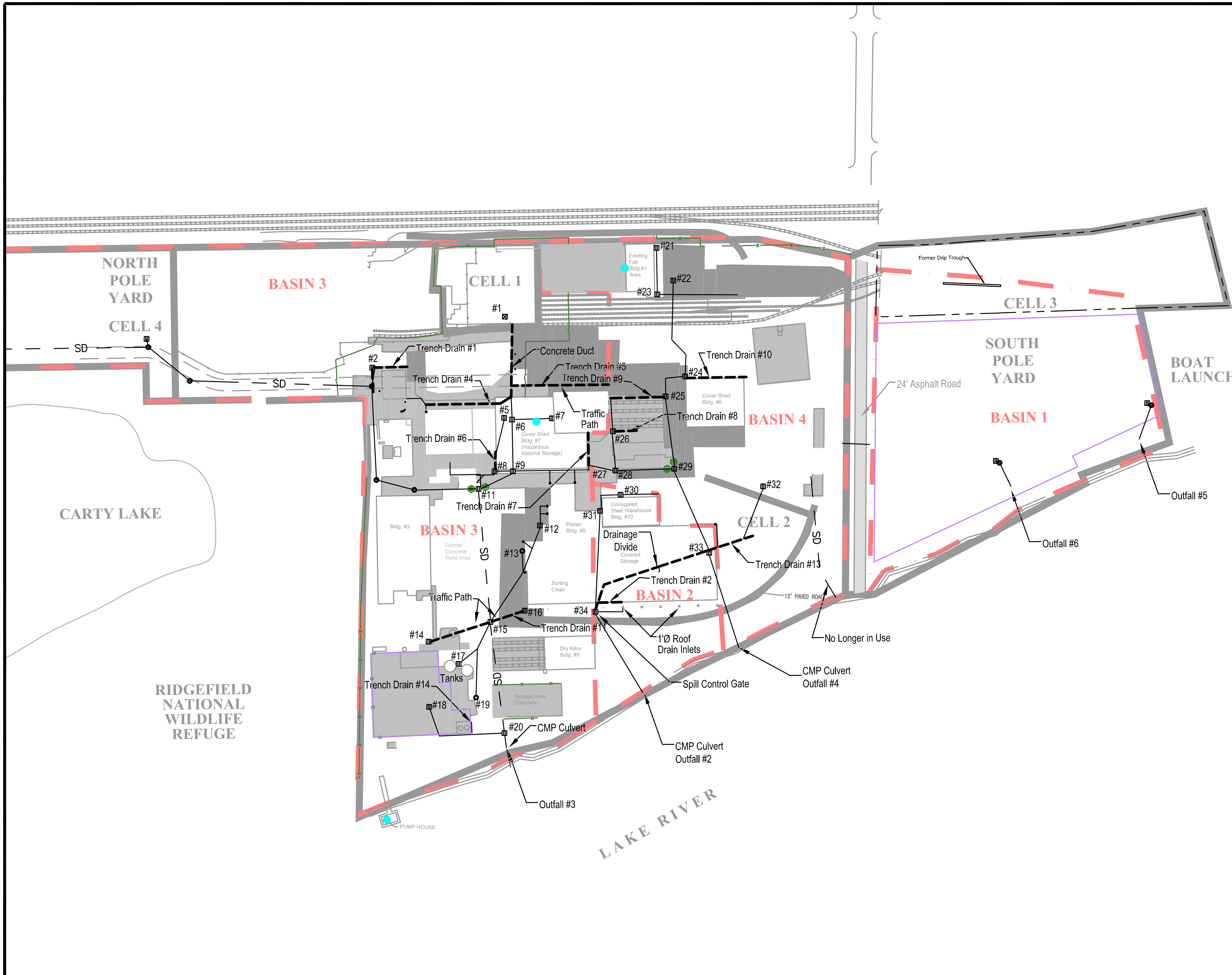
N

0 300 600
FEET

MAUL FOSTER ALONGI

Figure 3
Current Stormwater System

Port of Ridgefield
Ridgefield, Washington



Legend:

- Manhole
- Catch Basin
- Sump
- Trench Drain
- Storm Sewer
- Union Pacific Property
- Impervious Surface (Asphalt)
- Impervious Surface (Concrete)
- Berm
- Stormwater Basin
- Cell Designations
- Sluice Gate
- Spill Kit Location

N

0 300 600
FEET

MAUL FOSTER ALONGI

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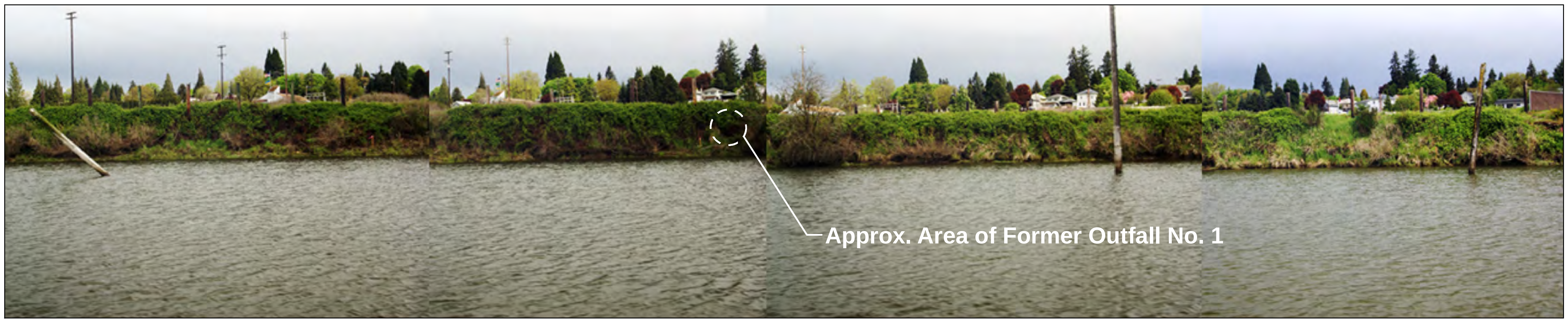
Layout: 1 Project: 9003.01.40 Drawn By: J. Fisher Approved By: A. Hughes

ANCHOR QEA

SOURCE: Photographs taken during Sediment RI activities on April 27. 2010 approximately 100 feet offshore.

Figure 4 (1 of 2)
Shoreline Photograph Compilation
LRIS Ridgefield, WA
Draft Sediment RI Data Memorandum



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ANCHOR QEA

SOURCE: Photographs taken during Sediment RI activities
on April 27. 2010 approximately 100 feet offshore.

Figure 4 (2 of 2)
Shoreline Photograph Compilation
LRIS Ridgefield, WA
Draft Sediment RI Data Memorandum

\\Orcas\GIS\Jobs\060359-PWT_Ridgefield\Maps\2010_11\Bathymetry and Site Base Map.mxd epipkin 12/21/2010 3:25 PM

2-foot Topographical Contours (MFA)

1-foot Bathymetry Contours (Barbieri & Associates, Inc, 2008)

1. Horizontal Datum: WA State Plane South HARN NAD83 (feet)
2. Vertical Datum: NGVD29 (feet)
3. Topographic contours do not reflect work conducted as part of interim action performed during summer and fall of 2010 in Cells 3 and 4.

Feet

0 175 350 525 700

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Figure 5

Bathymetry and Site Base Map

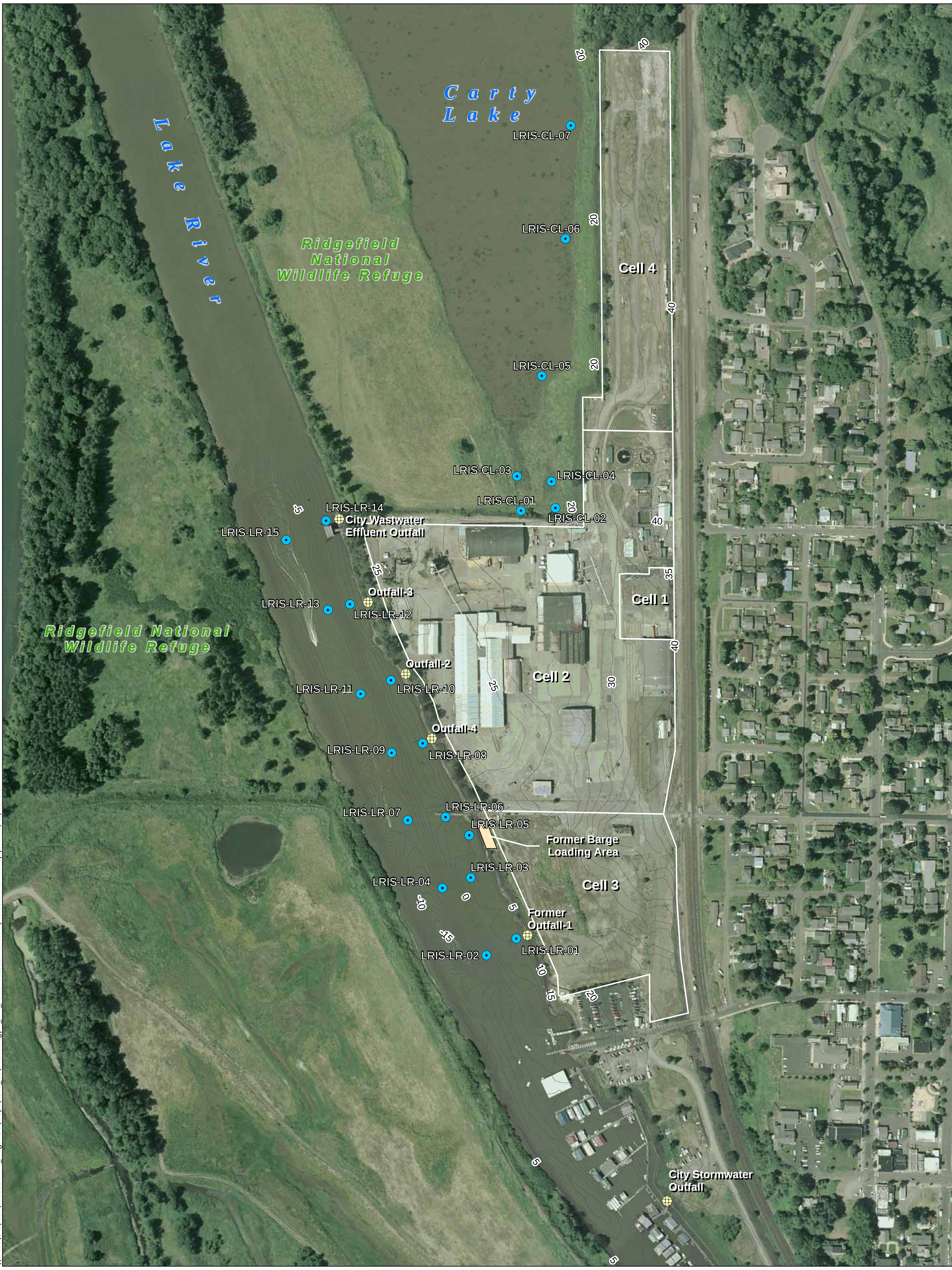
LRIS Ridgefield, WA

Draft Sediment RI Data Memorandum

1. Horizontal Datum: WA State Plane South HARN NAD83 (feet)
2. Vertical Datum: NGVD29 (feet)
3. Samples were collected 4/15/10 - 4/21/10.
4. Stations LRIS-LR-01 to 15 and LRIS-CL-01 to 07 were colocated with subsurface cores.
5. Presented locations represent accepted grabs only.
6. Topographic contours do not reflect work conducted as part of interim action performed during summer and fall of 2010 in Cells 3 and 4.

ANCHOR QEA

Figure 6
Surface Sediment Sampling Locations
LRIS Ridgefield, WA
Draft Sediment RI Data Memorandum



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- Subsurface Sediment Sampling Locations
- Approximate Outfall Location
- 1ft Bathymetric and Topographic Contours (NGVD29 Feet)

1. Horizontal Datum: WA State Plane South HARN NAD83 (feet)
2. Vertical Datum: NGVD29 (feet)
3. Samples were collected 4/15/10 - 4/29/10.
4. Stations LRIS-LR-01 to 15 and LRIS-CL-01 to 07 were colocated with surface grabs.
5. Presented locations represent accepted cores only.
6. Topographic contours do not reflect work conducted as part of interim action performed during summer and fall of 2010 in Cells 3 and 4.

Feet

0 175 350 525 700

ANCHOR QEA

Figure 7

Subsurface Sediment Sampling Locations

LRIS Ridgefield, WA

Draft Sediment RI Data Memorandum

Background Grab

Approximate Outfall Location

1. Horizontal Datum: WA State Plane South HARN NAD83 (feet)
2. Vertical Datum: NGVD29 (feet)
3. Samples were collected 4/16/10 and 4/20/10.
4. Presented locations represent accepted grabs only.

Feet

0 250 500 750 1,000

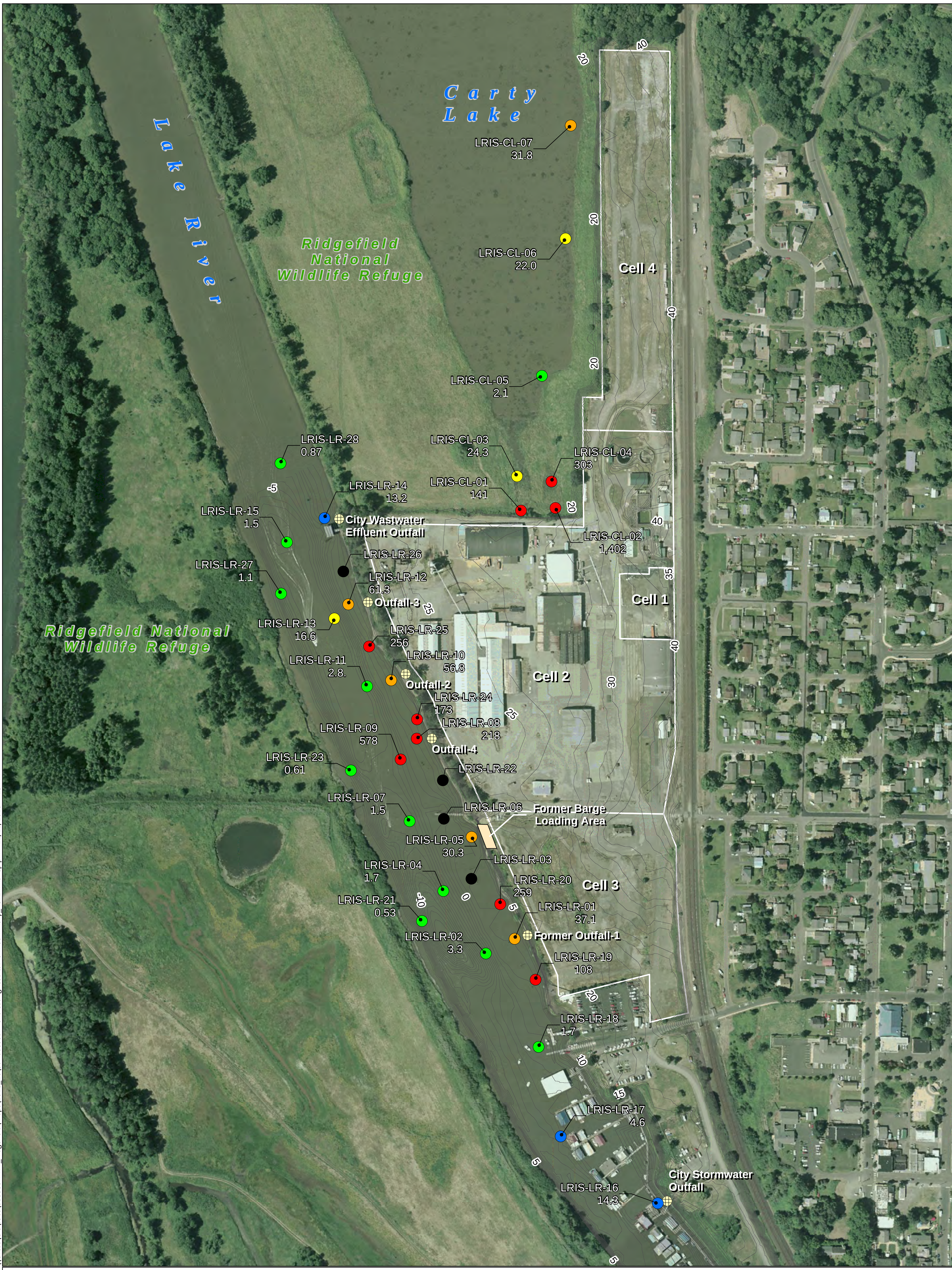
ANCHOR QEA

Figure 8

Background Surface Sediment Sampling Locations

LRIS Ridgefield, WA

Draft Sediment RI Data Memorandum



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Approximate Outfall Location

1ft Bathymetric and Topographic Contours (NGVD29 Feet)

TEQ Dioxin Concentrations (ng/kg)

- 0 - 4
- 4 - 15
- 15 - 30
- 30 - 100
- ≥100
- Sediment Samples Not Tested

1. Horizontal Datum: WA State Plane South HARN NAD83 (feet)
2. Vertical Datum: NGVD29 (feet)
3. Samples were collected 4/15/10 - 4/29/10.
4. Stations LRIS-LR-01 through 15 and LRIS-CL-01 through 07 were colocated with subsurface cores.
5. Presented locations represent accepted grabs only.
6. Dioxin values are Total Dioxin/Furan TEQ 2005 (Mammal) (U=1/2).
7. Topographic contours do not reflect work conducted as part of interim action performed during summer and fall of 2010 in Cells 3 and 4.

Feet

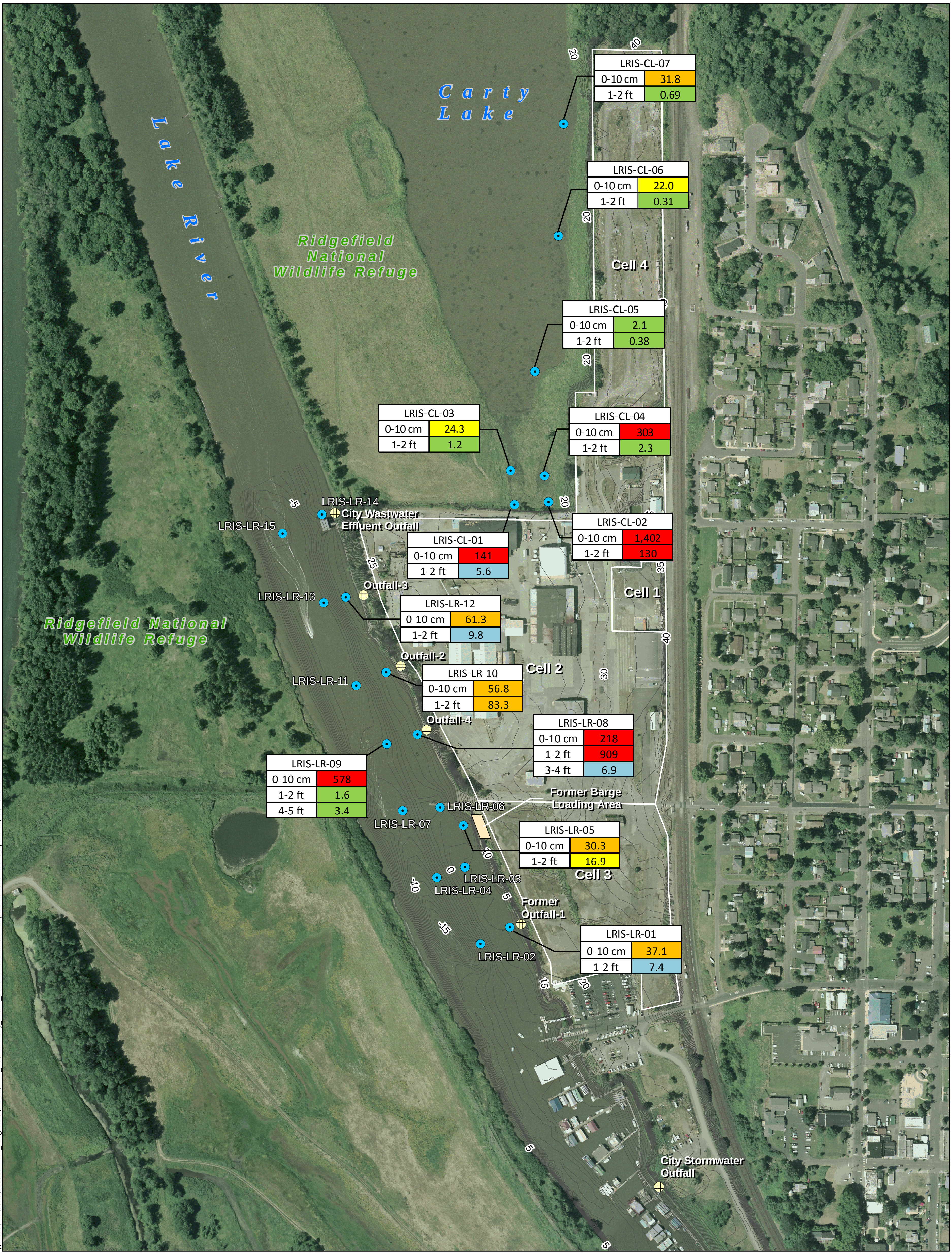
0 125 250 375 500

Figure 9

Summary of Surface Sediment Dioxins Testing Results

LRIS Ridgefield, WA

Draft Sediment RI Data Memorandum



- Subsurface Sediment Sampling Locations
- Approximate Outfall Location
- 1ft Bathymetric and Topographic Contours (NGVD29 Feet)

TEQ Dioxin Concentrations (ng/kg)

- 0 - 4
- 4 - 15
- 15 - 30
- 30 - 100
- ≥100

1. Horizontal Datum: WA State Plane South HARN NAD83 (feet)
2. Vertical Datum: NGVD29 (feet)
3. Samples were collected 4/15/10 - 4/29/10.
4. Stations LRIS-LR-01 to 15 and LRIS-CL-01 to 07 were colocated with surface grabs.
5. Presented locations represent accepted cores only.
6. Available subsurface dioxin testing results are presented. Subsurface dioxin testing was not conducted at locations where results are not reported.
7. Topographic contours do not reflect work performed as part of interim action during summer and fall of 2010 in Cells 3 and 4.

Feet
0 175 350 525 700

ANCHOR QEA

Figure 10
Summary of Subsurface Sediment Dioxins Testing Results
LRIS Ridgefield, WA
Draft Sediment RI Data Memorandum

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TEQ Dioxin Concentrations (ng/kg)

- 0 - 4
- 4 - 15
- 15 - 30
- 30 - 100
- ≥100

Approximate Outfall Location

1. Horizontal Datum: WA State Plane South HARN NAD83 (feet)
2. Vertical Datum: NGVD29 (feet)
3. Samples were collected 4/16/10 and 4/20/10.
4. Presented locations represent accepted grabs only.

Feet
0 250 500 750 1,000

Figure 11
Summary of Background Surface Sediment Dioxin Testing Results
LRIS Ridgefield, WA
Draft Sediment RI Data Memorandum

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R:\Jobs\060359-PWT_Ridgefield\Raster\RIDGEFIELD-LAKE RIVER-HISTORIC DREDGE-SECTIONS-REV1.dwg PLAN

Jan 17, 2011 1:38pm epipkin

SOURCE: Bathymetric and topographic survey data provided by Maul Foster & Alongi, Inc. Historical bathymetry provided by USACE.

NOTES:

1. This figure presents the difference in Lake River mudline elevations from 1970 and current surveys. Based on files provided by the Army Corps of Engineers, 1970 appears to be the deepest dredge in Lake River and no maintenance dredging has been performed since 1970. The 1970 survey was a post-dredge condition survey.
2. Contours shown are existing bathymetry and topography, 2-ft interval, NGVD 29.
3. Thickness surface derived from digitized point data from 1970 Post-Dredge Condition Survey provided by USACE with point elevations presented to tenth-foot precision., for Lake River Wash, Ridgefield, 20 January 1970. Due to historical figure quality and survey extent, not all areas of Lake River (e.g. banks) have data available to estimate sediment thickness.
4. Aerial image is 2009 National Agriculture Imagery Program.
5. Topographic contours do not reflect work conducted as part of interim action performed during summer and fall of 2010 in Cells 3 and 4.

Figure 12

Estimated Sediment Deposition Since 1970 and Regional Flow

LRIS Ridgefield, WA

Draft Sediment RI Data Memorandum

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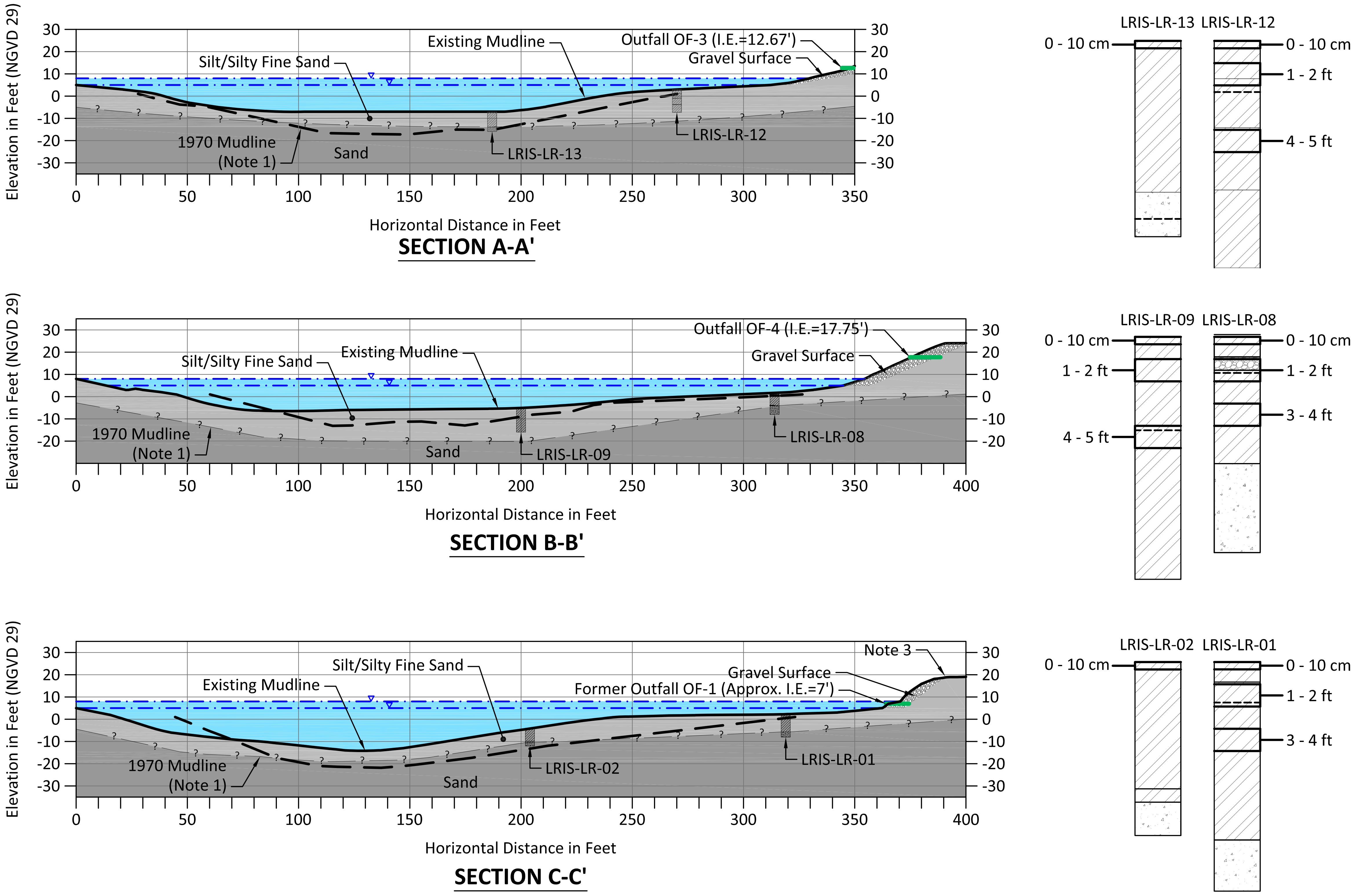


CORE LEGEND:

Silt/Silty Fine Sand

Sand

Gravel

Estimated Deepest Dredge Elevation

CORE NOTES:

1. Core intervals on cross sections presented are in-situ depths.
2. Sediment samples tested for Tier 1 and Tier 2 analyses are presented by bold brackets and depth interval.

0 50
Scale in Feet

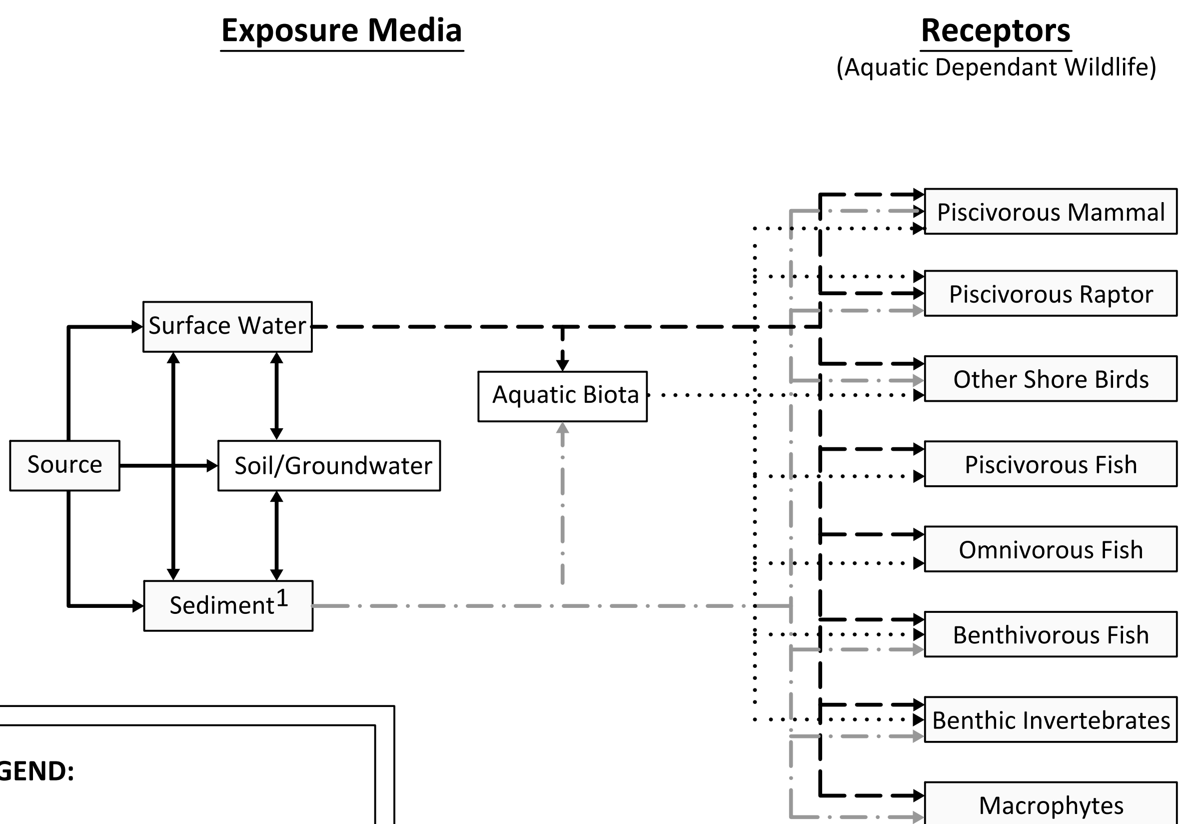
SOURCE: Drawing prepared from bathymetric survey data provided by Maul Foster & Alongi, Inc. Historical bathymetry provided by USACE.

VERTICAL DATUM: NGVD 29 (Feet).

NOTES:

1. Historical bathymetry derived from points digitized from 1970 Condition Survey provided by USACE. Lake River Wash. Ridgefield. 20 January 1970. This survey presents conditions post-dredge.
2. Surface water elevations shown are highest and lowest elevations at time of sediment RI.
3. Topographic survey in this area does not reflect interim action work performed in summer and fall of 2010.

Figure 13
Conceptual Lake River Cross Sections
LRIS Ridgefield, WA
Draft Sediment RI Data Memorandum



Exposure Pathways

Receptor	Direct Sediment Contact	Sediment Ingestion	Direct Water Contact	Water Ingestion	Benthic Ingestion	Fish Ingestion	Other Ingestion (e.g. zooplankton algae, terrestrial insects, etc.)
Piscivorous Mammal	■	■	■	■	■	■	■
Piscivorous Raptor	□	□	■	■	■	■	□
Other Shore Birds	■	■	■	■	■	■	■
Piscivorous Fish	■	■	■	■	□	■	□
Omnivorous Fish	■	■	■	■	■	■	■
Benthivorous Fish	■	■	■	■	■	■	■
Benthic Invertebrates	■	■	■	■	□	□	■
Macrophytes	■	□	■	□	□	□	□

LEGEND:

■ Preliminary Complete Pathway

□ Preliminary Incomplete Pathway

1 - Includes Porewater

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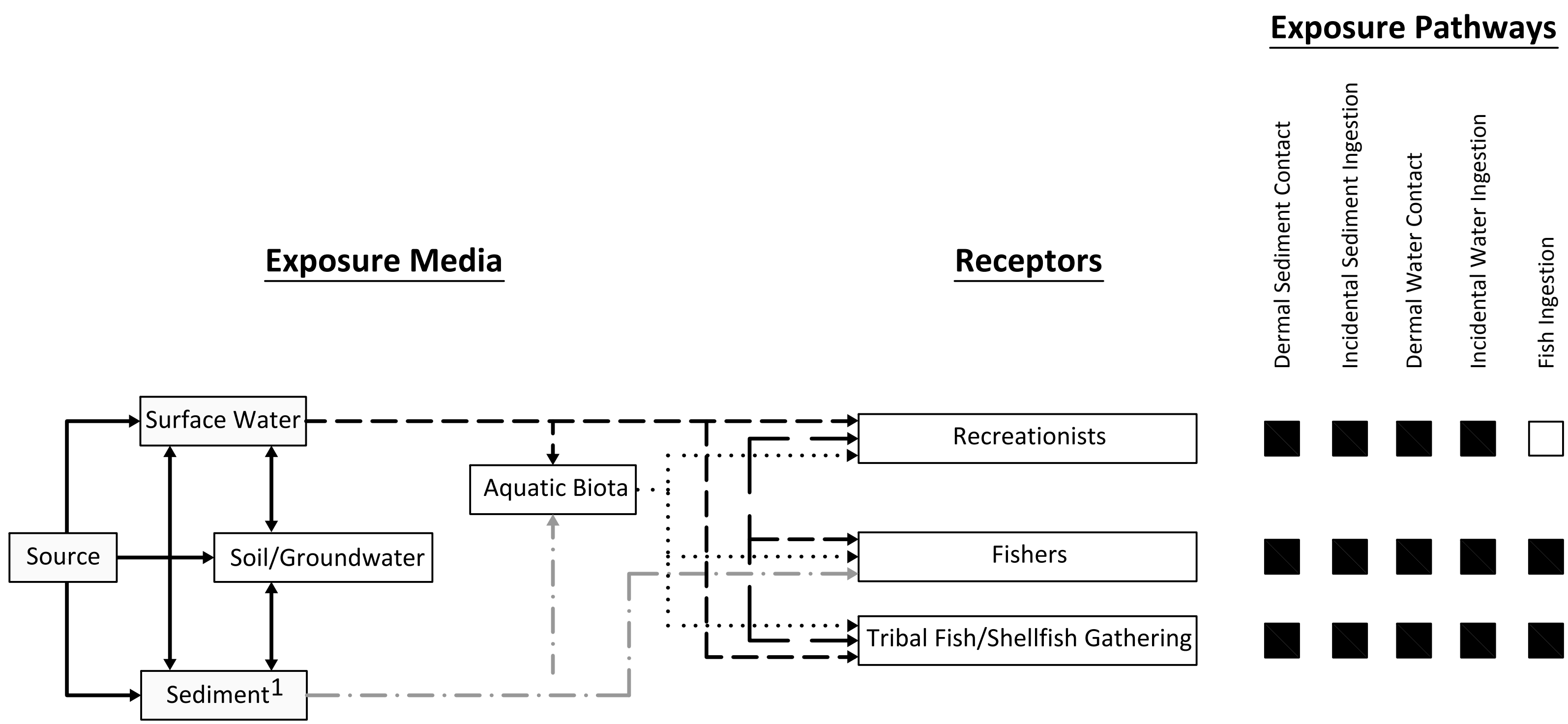
Figure 14
Aquatic Dependant Wildlife Conceptual Site Model
LRIS Ridgefield, Washington
Draft Sediment RI Data Memorandum



LEGEND:

■ Preliminary Complete Pathway

□ Preliminary Incomplete Pathway

1 - Includes Porewater

Figure 15
Human Health Conceptual Site Model
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APPENDIX A
SEDIMENT RI SURFACE OBSERVATIONS AND SUBSURFACE CORE LOGS

Table A-1
Summary of Surface Sediment Collection and Observations

Station ID	Date Collected	Sample Recovery Details: Recovery Depth (cm)	Depth of Sample (cm)	Water Depth-Leadline (ft)	Mudline Elevation (NGVD)	Field Observations of Sample: Color	Sediment Type	Biological	Odor	PID	Sheen	Comments
Carty Lake Area												
LRIS-CL-01	4/15/2010	10	0-10	0.0	NA	Dark Brown	f-sandy, very clayey, SILT	Substantial roots (grass)	Slight organic	2.9	None	Medium stiff, moist to wet
		2 ft	1-2 ft			Dark Brown to Gray	silty, CLAY, trace f-SAND	Occasional rootlets	Slight organic	3.2	None	Medium stiff, wet. Clay is of medium plasticity
LRIS-CL-02	4/15/2010	10	0-10	1.6	NA	Medium to Dark Brown	f-sandy, very clayey, SILT	Moderate roots	Slight organic	3.2	None	Soft, wet
		2 ft	1-2 ft			Medium to Dark Brown and Gray	clayey, SILT, trace f-SAND	Occasional rootlets	Slight organic	NA	None	Medium stiff, wet
LRIS-CL-03	4/15/2010	10	0-10	0.0	NA	Medium to Dark Brown	clayey, very f-sandy, SILT	Substantial roots	Slight organic	3.1	None	Soft, moist to wet
		2 ft	1-2 ft			Dark Brown	silty, CLAY, trace f-SAND	Occasional rootlets	Slight organic	4.1	None	Medium stiff, moist to wet. Clay is of medium plasticity
LRIS-CL-04	4/15/2010	10	0-10	1.3	NA	Medium to Dark Brown	clayey, f-sandy, SILT	Moderate to substantial roots	Slight organic	2.7	None	Soft, wet
		2 ft	1-2 ft			Medium to Dark Brown and Gray	silty CLAY, trace f-SAND	Occasional rootlets	Slight organic	3.4	None	Medium stiff to stiff, wet
LRIS-CL-05	4/15/2010	10	0-10	3.0	NA	Medium Brown to Gray	clayey, f-sandy, SILT	Moderate roots and vegetation	Slight organic	3.2	None	Medium stiff to stiff, wet
		2 ft	1-2 ft			Olive Gray	silty CLAY, trace f-SAND	None	None	2.8	None	Medium stiff to stiff, moist
LRIS-CL-06	4/16/2010	10	0-10	2.7	NA	Medium to Dark Brown	very f-sandy, SILT, occasional clay pockets	Occasional roots and surface vegetation	Slight organic	18.4	None	Soft, wet
		2 ft	1-2 ft			Medium to Dark Brown	clayey SILT, trace f-SAND, occasional clay pockets	None	None	24.5	None	Medium stiff, wet
LRIS-CL-07	4/16/2010	10	0-10	2.7	NA	Medium to Dark Olive Brown	clayey, very silty, f-SAND	Moderate roots and surface vegetation	Slight organic	10.1	None	Very soft, wet
		2 ft	1-2 ft			Medium to Dark Olive Brown	clayey SILT, trace f-SAND, occasional clay pockets	Trace rootlets	Slight organic	4.8	None	Soft, wet
Lake River Area												
LRIS-LR-01	4/19/2010	17	0-10	4.2	2.9	Olive Gray	slightly clayey, very f-sandy, SILT	Trace grass (3"-long)	None	14.7	None	Soft, wet
LRIS-LR-02	4/19/2010	16	0-10	11.1	-4.3	Olive Gray	slightly clayey, f-sandy, SILT	Trace vegetation	Slight organic	3.6	None	Soft, wet
LRIS-LR-03	4/19/2010	15	0-10	4.3	2.5	Olive Gray	slightly clayey, very vf-f-sandy, SILT	Trace vegetation	None	1.8	None	Soft, wet
LRIS-LR-04	4/19/2010	16	0-10	11.4	-4.9	Olive Gray	slightly clayey, very vf-f-sandy, SILT	Trace vegetation and roots	None	6.9	None	Soft, wet
LRIS-LR-05	4/19/2010	17	0-10	5.4	0.7	Olive Gray	slightly clayey, f-sandy, SILT	Moderate vegetation (leaves) on surface	None	21	None	Very soft, wet. Grades to medium stiff with depth
LRIS-LR-06	4/19/2010	14	0-10	7.5	-1.7	Olive Gray	slightly clayey, very vf-f-sandy, SILT	Trace vegetation, decomposed leaves in jaws	None	4.5	None	Soft, wet. @ 8cm: Grades to medium stiff, moist, olive gray, very, very fine to f-sandy, Silt. Roof shingles in jaws
LRIS-LR-07	4/19/2010	15	0-10	12.4	-6.7	Olive Gray	slightly clayey, silty, vf-f-SAND	Trace worms @7cm: roots	None	4.6	None	Soft, wet. @ 7cm: Grades to medium dense, moist, olive gray, silty, very f-SAND, sand is multicolored
LRIS-LR-08	4/19/2010	13	0-10	3.6	1.9	Dark Gray	slightly clayey, slightly silty, f-SAND	None	None	42	None	Medium dense, moist
LRIS-LR-09	4/19/2010	16	0-10	8.4	-3.0	Olive Gray	slightly clayey, very silty, vf-f-SAND	Trace worm tubes	None	51.9	None	Soft to medium stiff, wet to moist
LRIS-LR-10	4/19/2010	14	0-10	3.4	1.8	Olive Gray	very silty, f-SAND	Trace vegetation	None	1.6	None	Soft, wet
LRIS-LR-11	4/20/2010	17	0-10	13.2	-5.9	Olive Gray	very silty, vf-f-SAND	Trace rootlets	None	NA	None	Very soft to soft, wet
LRIS-LR-12	4/20/2010	12	0-10	4.4	2.8	Dark Gray	f-SAND, trace silt	Trace rootlets	None	2.9	None	Medium dense, wet. Sand grains are multicolored (green, beige, white, black, gray, red, micacious)

Table A-1
Summary of Surface Sediment Collection and Observations

Station ID	Date Collected	Sample Recovery Details				Field Observations of Sample						
		Recovery Depth (cm)	Depth of Sample (cm)	Water Depth-Leadline (ft)	Mudline Elevation (NGVD)	Color	Sediment Type	Biological	Odor	PID	Sheen	Comments
LRIS-LR-13	4/20/2010	13	0-10	14.1	-7.2	Olive Gray	slightly clayey, very silty, vf-f-SAND	Trace rootlets	None	2	None	Soft, wet
LRIS-LR-14	4/20/2010	12	0-10	5.2	1.7	Dark Gray	slightly clayey, silty, f-SAND	None	None	4.1	None	Medium dense, damp
LRIS-LR-15	4/20/2010	17	0-10	15.2	-8.4	Dark Gray	slightly clayey, silty, f-SAND	Occasional rootlets	None	0	None	Medium dense to soft, damp
LRIS-LR-16	4/20/2010	10	0-10	6.0	-0.6	Olive Gray	slightly clayey, very silty, f-SAND	Substantial organic fibers	None	2.7	2 mm sheen upon homogenization	Soft, wet
LRIS-LR-17	4/20/2010	13	0-10	9.1	-3.9	Dark Gray	slightly clayey, silty, f-SAND	Trace roots	Slight sulfide	2.4	None	Medium dense, damp
LRIS-LR-18	4/20/2010	13	0-10	6.6	-1.6	Olive Gray	slightly clayey, very silty, f-SAND	None	None	2.5	Slight sheen spots upon homogenization	Soft, wet
LRIS-LR-19	4/21/2010	17	0-10	4.7	2.2	Olive Gray	slightly clayey, very silty, f-SAND	Occasional rootlets	None	6.1	None	Soft, wet
LRIS-LR-20	4/21/2010	15	0-10	4.6	2.4	Olive Gray	slightly clayey, very silty, f-SAND	None	None	2.9	None	Soft, wet. Sand grains are multicolored (beige, green, gray, red, white, micacious)
LRIS-LR-21	4/21/2010	16	0-10	15.8	-8.7	Dark Gray	silty, f-SAND, trace clay	None	None	5.6	None	Loose, wet
LRIS-LR-22	4/21/2010	11	0-10	4.7	2.4	Olive Gray	silty, f-SAND, trace clay	None	None	4.2	None	Loose, wet
LRIS-LR-23	4/21/2010	13	0-10	9.8	-2.7	Dark Gray	slightly clayey, silty, f-SAND	None	None	NA	None	Loose, wet
LRIS-LR-24	4/21/2010	13	0-10	4.9	2.1	Olive Gray	very silty, vf-f-SAND, trace clay	None	None	10.2	None	Soft, wet to damp. Silt is gummy, rolls easily. Sand is multicolored
LRIS-LR-25	4/21/2010	13	0-10	6.6	0.2	Olive Gray	silty, f-SAND, trace clay	None	None	5	None	Loose, wet
LRIS-LR-26	4/21/2010	11	0-10	3.6	3.1	Dark Gray	silty, f-SAND, trace clay	Trace vegetation	None	9.9	None	Loose, wet. @ 5cm: fruit sticker
LRIS-LR-27	4/21/2010	13	0-10	13.5	-7.0	Olive Gray	slightly clayey, very silty, vf-f-SAND	None	None	4.9	None	Soft, wet to damp
LRIS-LR-28	4/21/2010	10	0-10	12.6	-6.2	Dark Gray	slightly silty, f-SAND, trace clay	None	None	13.4	None	Loose to medium dense, wet to damp
Background Areas												
LRIS-BKG-01	4/20/2010	11	0-10	17.8	-12.2	Olive Gray	slightly silty, f-SAND, trace clay	None	None	2.2	None	Soft, wet
LRIS-BKG-02	4/20/2010	12	0-10	6.2	-0.1	Dark Gray	f-SAND, trace silt, trace clay	None	None	202	None	Medium dense, damp
LRIS-BKG-03	4/20/2010	17	0-10	8.1	-2.2	Olive Gray	slightly clayey, very vf-f-sandy, SILT	Decomposed leaves on surface, moderate organic fibers	None	3	None	Soft to medium stiff, wet
LRIS-BKG-04	4/16/2010	10	0-10	3.3	NA	Medium to Dark Olive Brown	clayey, very vf-f-sandy, SILT	Substantial vegetation on surface, moderate roots	Slight organic	29.2	None	Soft, wet

Notes:
All Lake River and background samples collected using pneumatically controlled Van Veen grab sampler operated by Northwest Underwater Construction (Subsea Sampling Solutions).
Carty Lake surface grabs collected using manual methodology.

Table A-2
Surface and Subsurface Sediment Wood Debris Physical Observations

Station ID	Wood Debris (Field Observations and Descriptions)		
	Sediment Type	% by Volume of Wood Debris	Description
Surface Sediment			
Lake River Stations (LR)			
LRIS-LR-01	very fine sandy, SILT	None	--
LRIS-LR-02	very fine sandy, SILT	None	--
LRIS-LR-03	very fine sandy, SILT	None	--
LRIS-LR-04	very fine sandy, SILT	None	--
LRIS-LR-05	slightly very fine sandy, SILT	10%	Twigs up to 3"long
LRIS-LR-06	very fine sandy, SILT	None	--
LRIS-LR-07	very, very fine sandy, SILT	5%	Wood fibers 1"long
LRIS-LR-08	silty, fine SAND	5%	Black wood fragments 1"long
LRIS-LR-09	very, very fine sandy, SILT	None	--
LRIS-LR-10	very, very fine sandy, SILT	None	--
LRIS-LR-11	very fine sandy, SILT	5%	Wood fibers
LRIS-LR-12	slightly silty, fine SAND	5%	Wood fibers and wood chunks 2"x 1"
LRIS-LR-13	very fine sandy, SILT	None	--
LRIS-LR-14	silty, fine SAND	5%	Wood chunks 3"x 2"
LRIS-LR-15	silty, fine SAND	10%	Wood fibers
LRIS-LR-16	fine sandy, SILT	40%	Wood fragments
LRIS-LR-17	slightly silty, fine to very fine SAND	None	--
LRIS-LR-18	slightly very fine sandy, SILT	10%	Wood fragments
LRIS-LR-19	very fine sandy, SILT	10%	Wood fibers
LRIS-LR-20	very fine sandy, SILT	20%	Twigs up to 2" long
LRIS-LR-21	silty, fine SAND	5%	Wood fibers
LRIS-LR-22	silty, fine SAND	20%	Wood chunks and sticks
LRIS-LR-23	very silty, fine SAND	5%	Wood fragments
LRIS-LR-24	slightly very fine sandy, SILT	1%	Fresh wood chunk 7"x 3"
LRIS-LR-25	very silty, fine SAND	40%	Wood fibers and fragments up to 5" long
LRIS-LR-26	fine SAND, trace silt	None	--
LRIS-LR-27	very, very fine sandy, SILT	20%	Wood fibers
LRIS-LR-28	slightly silty, fine to medium SAND	None	--
Carty Lake Stations (CL)			
LRIS-CL-01	clayey SILT, trace fine sand	None	--
LRIS-CL-02	SILT, trace fine sand and clay	None	--
LRIS-CL-03	SILT, trace fine sand and clay	None	--
LRIS-CL-04	SILT, trace fine sand	None	--
LRIS-CL-05	silty CLAY, trace fine sand	None	--
LRIS-CL-06	SILT, trace fine sand, occasional clay	10%	Twigs, one decomposed wood chunk
LRIS-CL-07	SILT, trace fine sand, occasional clay	20%	Twigs
Background Stations (BKG)			
LRIS-BKG-01	very fine sandy, SILT	40%	Twigs, wood chunks and wood fragments up to 2"
LRIS-BKG-02	fine SAND	None	--
LRIS-BKG-03	very, very fine sandy, SILT	None	--
LRIS-BKG-04	SILT, trace very fine sand, occasional clay pockets	None	--
Subsurface Sediment			
Lake River Stations (LR)			
LRIS-LR-01			
0 - 2.3 ft	Slightly very fine sandy, SILT	10%	Wood fibers and wood fragments, yellow,
@ 2.2 ft	Slightly very fine sandy, SILT	1" layer	Decomposed wood fragments
LRIS-LR-02			
@ 5.4 ft	Slightly very fine sandy, SILT	One piece	Black, decomposed wood fragment
LRIS-LR-03			
@ 2.8 ft	SILT, interbeds of silty, fine sand	One piece	Stick 1" long
@ 8 ft	SILT, interbeds of silty, fine sand	One piece	Black wood chunk 1" long (charcoal-like)
@ 9.4 ft	SILT, interbeds of silty, fine sand	2" layer	Decomposed wood fibers
@ 9.8 ft	SILT, interbeds of silty, fine sand	One piece	Orange, fresh wood chunk, 1" long
LRIS-LR-04			
0 - 4.2 ft	Slightly very fine sandy, SILT	10%	Decomposed wood fibers, 1" long
4.2 - 9.8 ft	SILT	5%	Wood fibers
@ 6 ft	SILT	One piece	Decomposed, black, wood chunk, 1" long (charcoal-like)
LRIS-LR-05			
0 - 3.5 ft	SILT, interbeds of silty, fine to very fine	10%	Wood fragments and sticks, up to 3" long
3.5 - 7.2 ft	silty, very fine to fine SAND	10%	Decomposed wood fibers, sticks and layers
LRIS-LR-06			
0 - 0.4 ft	very fine sandy, SILT	40%	Black wood fragments, up to 4" long (charcoal)
0.4 - 4.8 ft	SILT, layers of silty fine SAND	10%	Wood fibers
4.8 - 5.6 ft	very silty, fine SAND	40%	Wood fragments, 1/4" long
LRIS-LR-07			
0 - 3.8 ft	slightly very fine sandy, SILT	10%	Decomposed, orange wood fragments and wood
3.8 - 10.9 ft	SILT	5%	Wood fibers

Table A-2
Surface and Subsurface Sediment Wood Debris Physical Observations

Station ID	Wood Debris (Field Observations and Descriptions)		
	Sediment Type	% by Volume of Wood Debris	Description
LRIS-LR-08			
0 - 0.9 ft	slightly very fine sandy, SILT	40%	Wood fragments, 3" long
1.5 - 5.7 ft	SILT, interbeds of silty, very fine to fine	10%	Wood fragments and wood fibers, 3"x 2"
LRIS-LR-09			
0 - 10.9 ft	SILT, interbeds of silty, very fine sand	5%	Wood fragments
LRIS-LR-10			
0 - 4 ft	very fine sandy, SILT	10%	Wood fibers
4 - 5.8 ft	slightly very fine sandy, SILT	40%	Wood chunks, up to 3" long
LRIS-LR-11			
0 - 10.3 ft	SILT, layers of very fine to fine sand	10%	Decomposed wood fibers and wood fragments, up
LRIS-LR-12			
0 - 1.5 ft	slightly silty, very fine to fine SAND	10%	Wood fibers
1.5 - 3.4 ft	SILT, layers of silty, fine sand	10%	Wood fragments
3.4 - 5.8 ft	very silty, very fine SAND	10%	Wood fibers
LRIS-LR-13			
0 - 6.8 ft	SILT, interbeds of very fine to fine sand	5%	Wood fibers
LRIS-LR-14			
0 - 1.3 ft	very silty, fine SAND	10%	Fresh wood fragments, up to 3" long
5.7 - 10.2 ft	very fine to fine SAND, interbeds of silt	10%	Wood fragments and wood fibers
@ 9.4 ft	very fine to fine SAND, interbeds of silt	One piece	Fresh wood chunk, 3"x 1"
LRIS-LR-15			
0 - 11 ft	SILT, layers of sand	10%	Decomposed wood fibers and wood fragments, 1"

Table A-3
Summary of Subsurface Sediment Vibracores Collection

Station ID	Nearshore/ Channel	Total Tape Measurement (water + drive)	Water Depth (feet)	Penetration (ft below mudline)	Core Tube Length	Measured Headspace (feet)	Measured Recovery (feet)	Core Recovery (%)	Recovery Compaction Factor (x)	Drive Notes	Sand Present (SP) (Y/N-Quantity)	Log-Only Cores Sand Present (Y/N)
Lake River												
LRIS-LR-01	Nearshore	16.0	2.7	13.3	14.5	3.7	10.8	81%	1.23	Easy to 13.0 Hard to 13.3	Y (2.5')	N
LRIS-LR-02	Channel	21.3	9.1	12.2	14.5	6.2	8.3	68%	1.47	Easy to 12.2	Y (2')	N
LRIS-LR-03	Nearshore	16.9	3.7	13.2	14.5	4.0	10.5	80%	1.25	Easy to 12.5 Moderate/Refusal to 13.2	N	N
LRIS-LR-04	Channel	24.3	10.6	13.7	14.5	3.1	11.4	83%	1.20	Easy to 5.9 Moderate to 13.7	N	N
LRIS-LR-05	Nearshore	18.2	4.7	13.5	14.5	3.7	10.8	80%	1.25	Easy to 5.0 Moderate to 13.5	Y (3')	N
LRIS-LR-06	Nearshore	19.1	7.4	11.7	14.5	5.4	9.1	78%	1.28	Easy to 10.7 Hard to 11.7	Y (2.5')	N
LRIS-LR-07	Channel	26.0	12.6	13.4	14.5	3.3	11.2	84%	1.19	Easy to 11.4 Hard to 13.4	N	N
LRIS-LR-08	Nearshore	17.3	4.3	13.0	14.5	4.4	10.1	78%	1.28	Easy to 13.0	Y (4')	N
LRIS-LR-09	Channel	25.5	12.0	13.5	14.5	3.5	11.0	81%	1.23	Easy to 10.0 Moderate to 13.5	N	Y (2')
LRIS-LR-10	Nearshore	16.9	4.1	12.8	14.5	4.8	9.7	76%	1.32	Easy to 9.0 Moderate to 16.5 Hard to 16.9	Y (2')	N
LRIS-LR-11	Channel	28.5	14.9	13.6	14.5	3.7	10.8	79%	1.27	Easy to 10.0 Moderate to 13.6	N	Y (1.5')
LRIS-LR-12	Nearshore	16.5	4.0	12.5	14.5	3.7	10.8	86%	1.16	Easy to 12.0 Hard/Refusal to 12.5	N	N
LRIS-LR-13	Channel	26.0	14.2	11.8	14.5	5.5	9.0	76%	1.32	Easy to 9.0 Moderate/Refusal to 11.8	Y (2')	Y (1')
LRIS-LR-14	Nearshore	19.5	6.0	13.5	14.5	4.0	10.5	78%	1.28	Easy to 12.5 Moderate to 13.5	Y (5')	N
LRIS-LR-15	Channel	29.5	16.0	13.5	14.5	3.3	11.2	83%	1.20	Easy to 13.5	N	N

Sediment Core Log

LRIS-LR-01

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **5.5**	Penetration Depth (ft): **13.3**
Client: **Port of Ridgefield**	Water Depth (ft): **2.7**	Field Recovery Length (ft): **10.8**
Collection Date: **4/23/2010**	Surveyed Mudline Elevation (ft): **2.8**	Process Date: **4/26/2010**
Contractor: **SSS**	N/LAT: **1066513.70** E/LONG: **184786.51**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0–1	LRIS-LR-01-SB-0-1		0.5	(ML) Soft, moist, olive gray, clayey, f-sandy, SILT. Occasional yellow, decomposed wood fibers and fragments, 1/2" long.	0
1–2	LRIS-LR-01-SB-1-2	SVOC, Metals, GS, TS, TVS, TOC, Dioxins	0.7		1
2–3	LRIS-LR-01-SB-2-3		0.6	@ 2.2': 1" layer of decomposed wood (ML) Medium stiff, moist, olive gray, SILT and substantial seams, layers and interbeds (up to 3" thick) of medium dense, moist, olive gray, silty, f-SAND (SM).	2
3–4	LRIS-LR-01-SB-3-4		0.7		3
4–5	LRIS-LR-01-SB-4-5	SVOC, Metals, GS, TS, TVS, TOC	0.5		4
5–6	LRIS-LR-01-SB-5-6		0.8		5
6–7	LRIS-LR-01-SB-6-7		0.8		6
7					7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.23x

Calculated Recovery
Recovery Length/Penetration Depth:
10.8/13.3 ft. = 81.2%

Sediment Core Log

LRIS-LR-01

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **5.5**	Penetration Depth (ft): **13.3**
Client: **Port of Ridgefield**	Water Depth (ft): **2.7**	Field Recovery Length (ft): **10.8**
Collection Date: **4/23/2010**	Surveyed Mudline Elevation (ft): **2.8**	Process Date: **4/26/2010**
Contractor: **SSS**	N/LAT: **1066513.70** E/LONG: **184786.51**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7–8	LRIS-LR-01-SB-7-8		0.8	(ML) Medium stiff, moist, olive gray, SILT and substantial seams, layers and interbeds (up to 3" thick) of medium dense, moist, olive gray, silty, f-SAND (SM).	
8–9	LRIS-LR-01-SB-8-9		0.7	(SW) Medium dense, damp, dark gray, f-m-SAND. Sand grains are multicolored and are black, white, beige, red, green and micaceous. @ 8.5': 1/4" seam of olive gray SILT (ML)	
9–10.3	LRIS-LR-01-SB-9-10.3		0.5		
10.3				End of core at 10.3'.	

Depth scale (ft): 7, 8, 9, 10, 11, 12, 13, 14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.23x

Calculated Recovery
Recovery Length/Penetration Depth:
10.8/13.3 ft. = 81.2%

Sediment Core Log

LRIS-LR-02

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **5.3**	Penetration Depth (ft): **12.2**
Client: **Port of Ridgefield**	Water Depth (ft): **9.1**	Field Recovery Length (ft): **8.3**
Collection Date: **4/22/2010**	Surveyed Mudline Elevation (ft): **-3.8**	Process Date: **4/27/2010**
Contractor: **SSS**	N/LAT: **1066408.33** E/LONG: **184726.95**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0	LRIS-LR-02-SB-0-1		0	(ML) Soft to medium stiff, moist, olive gray, clayey SILT and substantial seams, layers, and interbeds of medium dense, moist, dark gray, silty, f-SAND (SM).	0
1	LRIS-LR-02-SB-1-2		0.2		1
2	LRIS-LR-02-SB-2-3		0.2		2
3	LRIS-LR-02-SB-3-4		0.3		3
4	LRIS-LR-02-SB-4-5		0.3	@ 4.1': 3" black, thin, anthropogenic fragment (rubber/shingle)	4
5	LRIS-LR-02-SB-5-6		2.1	@ 5.4': 1" black, decomposed, wood fragment (SM) Dense, moist, dark gray, slightly silty, vf-f-SAND and moderate seams and layers of medium stiff, moist, olive gray SILT (ML).	5
6	LRIS-LR-02-SB-6-7		0.7	(SW) Dense, damp, gray, f-m-SAND and trace layers (1" thick) of medium stiff, moist, olive gray, SILT (ML). Sand grains are multicolored and are black, white, red, beige, green, and micaceous.	6
7					7

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Footnote(1): Attempt 2 of 2

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.47x

Calculated Recovery
Recovery Length/Penetration Depth:
8.3/12.2 ft. = 68%

Sediment Core Log

LRIS-LR-02

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **5.3**	Penetration Depth (ft): **12.2**
Client: **Port of Ridgefield**	Water Depth (ft): **9.1**	Field Recovery Length (ft): **8.3**
Collection Date: **4/22/2010**	Surveyed Mudline Elevation (ft): **-3.8**	Process Date: **4/27/2010**
Contractor: **SSS**	N/LAT: **1066408.33** E/LONG: **184726.95**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-02-SB-7-7.8		0.1	(SW) Dense, damp, gray, f-m-SAND and trace layers (1" thick) of medium stiff, moist, olive gray, SILT (ML). Sand grains are multicolored and are black, white, red, beige, green, and micaceous.	7
7.8				End of core at 7.8'.	
8					8
9					9
10					10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 2 of 2

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.47x

Calculated Recovery
Recovery Length/Penetration Depth:
8.3/12.2 ft. = 68%

Sediment Core Log

LRIS-LR-03

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.2**	Penetration Depth (ft): **13.2**
Client: **Port of Ridgefield**	Water Depth (ft): **3.7**	Field Recovery Length (ft): **10.5**
Collection Date: **4/23/2010**	Surveyed Mudline Elevation (ft): **2.5**	Process Date: **4/27/2010**
Contractor: **SSS**	N/LAT: **1066352.24** E/LONG: **185002.28**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0–1	LRIS-LR-03-SB-0-1		0	(ML) Soft, moist, olive gray, clayey, vf-sandy, SILT.	0
1–2	LRIS-LR-03-SB-1-2	SVOC, Metals, GS, TS, TVS, TOC	0.4	(ML) Soft to medium stiff, moist, olive gray, clayey, SILT and moderate seams and interbeds (up to 2" thick) of medium dense, moist, dark gray, silty, f-SAND (SM).	1
2–3	LRIS-LR-03-SB-2-3		0.1	@ 2.8': 1" wood fragment, stick	2
3–4	LRIS-LR-03-SB-3-4	SVOC, Metals, GS, TS, TVS, TOC	0.2		3
4–5	LRIS-LR-03-SB-4-5		0.2		4
5–6	LRIS-LR-03-SB-5-6		0.3		5
6–7	LRIS-LR-03-SB-6-7		0.2		6
7					7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.25x

Calculated Recovery
Recovery Length/Penetration Depth:
10.5/13.2 ft. = 79.5%

Sediment Core Log

LRIS-LR-03

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.2**	Penetration Depth (ft): **13.2**
Client: **Port of Ridgefield**	Water Depth (ft): **3.7**	Field Recovery Length (ft): **10.5**
Collection Date: **4/23/2010**	Surveyed Mudline Elevation (ft): **2.5**	Process Date: **4/27/2010**
Contractor: **SSS**	N/LAT: **1066352.24** E/LONG: **185002.28**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-03-SB-7-8		0.1	(ML) Soft to medium stiff, moist, olive gray, clayey, SILT and moderate seams and interbeds (up to 2" thick) of medium dense, moist, dark gray, silty, f-SAND (SM).	7
8	LRIS-LR-03-SB-8-9		0.1	@ 8': 1" black wood chunk @ 8.5': shell fragments	8
9	LRIS-LR-03-SB-9-10.3		0.1	@ 9.4': 2" layer of f-sandy, WOOD, decomposed fibers @ 9.8': 1" Orange wood chunk	9
10				End of core at 10.3'.	10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.25x

Calculated Recovery
Recovery Length/Penetration Depth:
10.5/13.2 ft. = 79.5%

Sediment Core Log

LRIS-LR-04

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **5.6**	Penetration Depth (ft): **13.7**
Client: **Port of Ridgefield**	Water Depth (ft): **10.6**	Field Recovery Length (ft): **11.4**
Collection Date: **4/22/2010**	Surveyed Mudline Elevation (ft): **-5.0**	Process Date: **4/26/2010**
Contractor: **SSS**	N/LAT: **1066252.04** E/LONG: **184965.46**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0	LRIS-LR-04-SB-0-1		0.7	(ML) Soft, moist, olive gray, slightly vf-sandy, clayey, SILT. Occasional decomposed wood fibers, 1" long.	0
1	LRIS-LR-04-SB-1-2		0.6	@ 1.8': 3" thick interbed of medium dense, damp, dark gray, f-SAND (SW)	1
2	LRIS-LR-04-SB-2-3		0.6		2
3	LRIS-LR-04-SB-3-4		0		3
4	LRIS-LR-04-SB-4-5		0	(ML) Medium stiff, moist, olive gray, SILT. Trace wood fibers.	4
5	LRIS-LR-04-SB-5-6		0.3		5
6	LRIS-LR-04-SB-6-7		0	@ 6': 1" chunk of black partially decomposed wood (charcoal-like)	6
7					7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.20x

Calculated Recovery
Recovery Length/Penetration Depth:
11.4/13.7 = 83.2%

Sediment Core Log

LRIS-LR-04

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **5.6**	Penetration Depth (ft): **13.7**
Client: **Port of Ridgefield**	Water Depth (ft): **10.6**	Field Recovery Length (ft): **11.4**
Collection Date: **4/22/2010**	Surveyed Mudline Elevation (ft): **-5.0**	Process Date: **4/26/2010**
Contractor: **SSS**	N/LAT: **1066252.04** E/LONG: **184965.46**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-04-SB-7-8		0	(ML) Medium stiff, moist, olive gray, SILT. Trace wood fibers. @ 7.8': 1/4" seam of medium dense, moist, dark gray, f-SAND (SW)	7
8	LRIS-LR-04-SB-8-9		0.1		8
9	LRIS-LR-04-SB-9-9.8		0.1		9
10				End of core at 9.8'.	10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.20x

Calculated Recovery
Recovery Length/Penetration Depth:
11.4/13.7 = 83.2%

Sediment Core Log

LRIS-LR-05

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.3**	Penetration Depth (ft): **13.5**
Client: **Port of Ridgefield**	Water Depth (ft): **4.7**	Field Recovery Length (ft): **10.8**
Collection Date: **4/23/2010**	Surveyed Mudline Elevation (ft): **1.6**	Process Date: **4/27/2010**
Contractor: **SSS**	N/LAT: **1066347.21** E/LONG: **185152.68**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0–1	LRIS-LR-05-SB-0-1		0.2	(ML) Soft to medium stiff, moist, olive gray, clayey, SILT and substantial seams and layers of medium dense, moist, olive gray, silty, f-SAND (SM). Occasional wood fragments and sticks, up to 3" long. Vegetation on surface.	0–1
1–2	LRIS-LR-05-SB-1-2	SVOC, Metals, GS, TS, TVS, TOC, Dioxins	0.3		1–2
2–3	LRIS-LR-05-SB-2-3		0.2		2–3
3–4	LRIS-LR-05-SB-3-4		0.3	(SM) Dense, damp, olive gray, silty, vf-f-SAND. Occasional decomposed wood fibers, sticks, and wood layers.	3–4
4–5	LRIS-LR-05-SB-4-5		0.1		4–5
5–6	LRIS-LR-05-SB-5-6		1.2		5–6
6–7	LRIS-LR-05-SB-6-7		1.1		6–7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.25x

Calculated Recovery
Recovery Length/Penetration Depth:

10.8/13.5 ft. = 80.0%

Sediment Core Log

LRIS-LR-05

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.3**	Penetration Depth (ft): **13.5**
Client: **Port of Ridgefield**	Water Depth (ft): **4.7**	Field Recovery Length (ft): **10.8**
Collection Date: **4/23/2010**	Surveyed Mudline Elevation (ft): **1.6**	Process Date: **4/27/2010**
Contractor: **SSS**	N/LAT: **1066347.21** E/LONG: **185152.68**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Sediment Description

Samples and Descriptions are in Recovered Depths
In-Situ Depths Shown on Right
Classification Scheme: USCS

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	Sediment Description	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-05-SB-7-8		1.4	(SM) Dense, damp, olive gray, silty, vf-f-SAND. Occasional decomposed wood fibers, sticks, and wood layers.	7
				(SW) Dense, damp, gray, f-m-SAND and trace layers of very f-sand. Grains are multicolored and are black, white, beige, red, green, orange, and micaceous.	
8	LRIS-LR-05-SB-8-9		0.8		8
9	LRIS-LR-05-SB-9-10.5	SVOC, Metals, GS, TS, TVS, TOC	1.1		9
10				@ 10.3': 1/2" layer of SILT (ML)	10
				End of core at 10.5'.	
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.25x

Calculated Recovery
Recovery Length/Penetration Depth:
10.8/13.5 ft. = 80.0%

Sediment Core Log

LRIS-LR-06

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.5**	Penetration Depth (ft): **11.7**
Client: **Port of Ridgefield**	Water Depth (ft): **7.4**	Field Recovery Length (ft): **9.1**
Collection Date: **4/23/2010**	Surveyed Mudline Elevation (ft): **-0.9**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1066263.58** E/LONG: **185217.32**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0–1	LRIS-LR-06-SB-0-1		0.9	(ML) Soft, wet, brown, very f-sandy, SILT. Substantial wood fragments, up to 4" long (charcoal-like). One piece of 2" clear glass shard. @ 0.3': 1" layer of f-c-GRAVEL, subrounded and angular, up to 2.5" diameter (ML) Soft, moist, olive gray, SILT and substantial seams and layers of medium dense, moist, dark gray, silty, f-SAND (SM). Occasional wood fibers.	
1–2	LRIS-LR-06-SB-1-2	SVOC, Metals, GS, TS, TVS, TOC	0.5		
2–3	LRIS-LR-06-SB-2-3		0.6		
3–4	LRIS-LR-06-SB-3-4	SVOC, Metals, GS, TS, TVS, TOC	1	@ 3': Grades to moderate seams and layers of SAND (SM)	
4–5	LRIS-LR-06-SB-4-5		1.3	(SM) Medium dense, damp, olive gray, clayey, very silty, f-SAND. Substantial wood fragments, 1/4" long.	
5–6	LRIS-LR-06-SB-5-6		1.2	(SW) Medium dense, damp, gray, f-m-SAND. Sand grains are multicolored and are black, white, red, beige, green, and micaceous.	
6–7	LRIS-LR-06-SB-6-7		1		

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.28x

Calculated Recovery
Recovery Length/Penetration Depth:
9.1/11.7 ft. = 77.8%

Sediment Core Log

LRIS-LR-06

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.5**	Penetration Depth (ft): **11.7**
Client: **Port of Ridgefield**	Water Depth (ft): **7.4**	Field Recovery Length (ft): **9.1**
Collection Date: **4/23/2010**	Surveyed Mudline Elevation (ft): **-0.9**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1066263.58** E/LONG: **185217.32**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-06-SB-7-8		0.6	(SW) Medium dense, damp, gray, f-m-SAND. Sand grains are multicolored and are black, white, red, beige, green, and micaceous.	7
8	LRIS-LR-06-SB-8-8		1.1	@ 8.1': Grades to substantial layers and interbeds (up to 2" thick) of medium stiff, damp, olive gray, SILT (ML)	8
				End of core at 8.6'.	
9					9
10					10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.28x

Calculated Recovery
Recovery Length/Penetration Depth:
9.1/11.7 ft. = 77.8%

Sediment Core Log

LRIS-LR-07

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.3**	Penetration Depth (ft): **13.4**
Client: **Port of Ridgefield**	Water Depth (ft): **12.6**	Field Recovery Length (ft): **11.2**
Collection Date: **4/22/2010**	Surveyed Mudline Elevation (ft): **-6.3**	Process Date: **4/26/2010**
Contractor: **SSS**	N/LAT: **1066129.76** E/LONG: **185205.69**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0	LRIS-LR-07-SB-0-1		0	(ML) Medium stiff, moist, olive gray, slightly vf-sandy, SILT. Occasional decomposed, orange, wood fibers and fragments, 1/2" long. Slight H2S-like odor.	0
1	LRIS-LR-07-SB-1-2		0	@1.8': 1" pocket of medium dense, moist, dark gray, vf-f-SAND (SW)	1
2	LRIS-LR-07-SB-2-3		0		2
3	LRIS-LR-07-SB-3-4		0	(ML) Medium stiff, moist, olive gray, SILT. Silt texture is gummy. Trace wood fibers. Slight H2S-like odor.	3
4	LRIS-LR-07-SB-4-5		0		4
5	LRIS-LR-07-SB-5-6		0		5
6	LRIS-LR-07-SB-6-7		0		6
7					7

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Footnote(1): Attempt 3 of 3

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.19x

Calculated Recovery
Recovery Length/Penetration Depth:
11.2/13.4 ft. = 84%

Sediment Core Log

LRIS-LR-07

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.3**	Penetration Depth (ft): **13.4**
Client: **Port of Ridgefield**	Water Depth (ft): **12.6**	Field Recovery Length (ft): **11.2**
Collection Date: **4/22/2010**	Surveyed Mudline Elevation (ft): **-6.3**	Process Date: **4/26/2010**
Contractor: **SSS**	N/LAT: **1066129.76** E/LONG: **185205.69**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-07-SB-7-8		0	(ML) Medium stiff, moist, olive gray, SILT. Silt texture is gummy. Trace wood fibers. Slight H2S-like odor.	7
				@ 7.9': 1/4" seam of dark gray, f-SAND (SW)	
8	LRIS-LR-07-SB-8-9		0		8
9	LRIS-LR-07-SB-9-10		0		9
10	LRIS-LR-07-SB-10-10.9			@ 10.2': Grades to damp, blocky texture	10
11				End of core at 10.9'.	11
12					12
13					13
14					14

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Footnote(1): Attempt 3 of 3

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.19x

Calculated Recovery
Recovery Length/Penetration Depth:
11.2/13.4 ft. = 84%

Sediment Core Log

LRIS-LR-08

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.5**	Penetration Depth (ft): **13.0**
Client: **Port of Ridgefield**	Water Depth (ft): **4.3**	Field Recovery Length (ft): **10.1**
Collection Date: **4/26/2010**	Surveyed Mudline Elevation (ft): **2.2**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1066182.48** E/LONG: **185479.09**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0–1	LRIS-LR-08-SB-0-1		0.8	(ML) Soft, wet, olive gray, slightly vf-sandy, SILT. Substantial wood fragments, up to 3" long. @ 0.2': Two agglomerates, 2" diameter	
1–2	LRIS-LR-08-SB-1-2	SVOC, Metals, GS, TS, TVS, TOC, Dioxins	1	(GW) Medium dense, moist, gray, f-c-sandy, f-c-GRAVEL. Gravel is black, yellow, 1/4" to 1.5" subrounded and subangular. (ML) Medium stiff, moist, olive gray, clayey, SILT and moderate seams, layers, and interbeds (up to 3" thick) of medium dense, moist, dark gray, silty, vf-f-SAND (SM). Occasional wood fragments and fibers (up to 3" x 2"). Slight H2S-like odor.	
2–3	LRIS-LR-08-SB-2-3		1.5		
3–4	LRIS-LR-08-SB-3-4	SVOC, Metals, GS, TS, TVS, TOC, Dioxins	1.2		
4–5	LRIS-LR-08-SB-4-5		1.2		
5–6	LRIS-LR-08-SB-5-6		1.3	(SW) Medium dense, damp, dark gray, f-m-SAND and trace seams of medium stiff, damp, olive gray SILT (ML). Sand grains are multicolored and are black, white, red, beige, green and micaceous.	
6–7	LRIS-LR-08-SB-6-7		0.6		

Depth scale (recovered and in-situ): 0, 1, 2, 3, 4, 5, 6, 7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.28x

Calculated Recovery
Recovery Length/Penetration Depth:
10.1/13.0 ft. = 77.7%

Sediment Core Log

LRIS-LR-08

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.5**	Penetration Depth (ft): **13.0**
Client: **Port of Ridgefield**	Water Depth (ft): **4.3**	Field Recovery Length (ft): **10.1**
Collection Date: **4/26/2010**	Surveyed Mudline Elevation (ft): **2.2**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1066182.48** E/LONG: **185479.09**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7–8	LRIS-LR-08-SB-7-8		0.6	(SW) Medium dense, damp, dark gray, f-m-SAND and trace seams of medium stiff, damp, olive gray SILT (ML). Sand grains are multicolored and are black, white, red, beige, green and micaceous.	7
8–9	LRIS-LR-08-SB-8-9		1.1		8
9–9.7	LRIS-LR-08-SB-9-9.7		2.1		9
9.7				End of core at 9.7'.	
10					10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.28x

Calculated Recovery
Recovery Length/Penetration Depth:
10.1/13.0 ft. = 77.7%

Sediment Core Log

LRIS-LR-09

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **7.0**	Penetration Depth (ft): **13.5**
Client: **Port of Ridgefield**	Water Depth (ft): **12.0**	Field Recovery Length (ft): **11.0**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **-5.0**	Process Date: **4/29/2010**
Contractor: **SSS**	N/LAT: **1066072.47** E/LONG: **185445.37**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0	LRIS-LR-09-SB-0-1		0.6	(ML) Soft, wet, olive gray, SILT and substantial seams, layers, and interbeds of medium dense, moist, gray, silty, vf-SAND (SM). Trace rootlets and wood fragments.	0
1	LRIS-LR-09-SB-1-2	SVOC, GS, TS, TVS, TOC, Dioxins	0.7		1
2	LRIS-LR-09-SB-2-3		6.3		2
3	LRIS-LR-09-SB-3-4		5.5	@ 3.4': Grades to moderate seams and layers of SAND (SM)	3
4	LRIS-LR-09-SB-4-5	SVOC, GS, TS, TVS, TOC, Dioxins	2.7	@ 4': Grades to occasional seams and layers of SAND (SM)	4
5	LRIS-LR-09-SB-5-6		2.5		5
6	LRIS-LR-09-SB-6-7		3	@ 6.9': Grades to blocky texture	6
7					7

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Footnote(1): Attempt 3 of 3

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.23x

Calculated Recovery
Recovery Length/Penetration Depth:
11.0/13.5 ft. = 81.5%

Sediment Core Log

LRIS-LR-09

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **7.0**	Penetration Depth (ft): **13.5**
Client: **Port of Ridgefield**	Water Depth (ft): **12.0**	Field Recovery Length (ft): **11.0**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **-5.0**	Process Date: **4/29/2010**
Contractor: **SSS**	N/LAT: **1066072.47** E/LONG: **185445.37**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-09-SB-7-8		2.6	(ML) Soft, wet, olive gray, SILT and substantial seams, layers, and interbeds of medium dense, moist, gray, silty, vf-SAND (SM). Trace rootlets and wood fragments.	7
8	LRIS-LR-09-SB-8-9		1.5		8
9	LRIS-LR-09-SB-9-10		2.2		9
10	LRIS-LR-09-SB-10-10.9		2.6		10
11				End of core at 10.9'.	11
12					12
13					13
14					14

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Footnote(1): Attempt 3 of 3

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.23x

Calculated Recovery
Recovery Length/Penetration Depth:
11.0/13.5 ft. = 81.5%

Sediment Core Log

LRIS-LR-10

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.1**	Penetration Depth (ft): **12.8**
Client: **Port of Ridgefield**	Water Depth (ft): **4.1**	Field Recovery Length (ft): **9.7**
Collection Date: **4/26/2010**	Surveyed Mudline Elevation (ft): **2.0**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1066070.06** E/LONG: **185702.50**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	Sediment Description Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0–1	LRIS-LR-10-SB-0-1		0.8	(ML) Soft, wet, olive gray, slightly clayey, very f-sandy, SILT. Occasional wood fibers.	0
1–2	LRIS-LR-10-SB-1-2	SVOC, Metals, GS, TS, TVS, TOC, Dioxins	1.4	@ 1.8': Grades to slightly f-sandy, SILT. Silt texture is gummy	1
2–3	LRIS-LR-10-SB-2-3		1		2
3–4	LRIS-LR-10-SB-3-4		1.3	@ 3.7': Several 2" pieces of green glass shards (bottle)	3
4–5	LRIS-LR-10-SB-4-5		1.8	@ 4': Grades to medium stiff and substantial wood chunks, up to 3" long	4
5–6	LRIS-LR-10-SB-5-6	SVOC, Metals, GS, TS, TVS, TOC	0.7		5
6–7	LRIS-LR-10-SB-6-7		0.7	(SM) Medium dense, damp, olive gray, very silty, f-SAND.	6–7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.32x

Calculated Recovery
Recovery Length/Penetration Depth:
9.7/12.8 ft. = 75.8%

Sediment Core Log

LRIS-LR-10

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.1**	Penetration Depth (ft): **12.8**
Client: **Port of Ridgefield**	Water Depth (ft): **4.1**	Field Recovery Length (ft): **9.7**
Collection Date: **4/26/2010**	Surveyed Mudline Elevation (ft): **2.0**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1066070.06** E/LONG: **185702.50**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-10-SB-7-8			(SM) Medium dense, damp, olive gray, very silty, f-SAND.	7
			1.4	(SW) Medium dense, damp, dark gray, f-m-SAND. Sand grains are multicolored and are black, white, beige, red, green and micaceous. @ 7.7': 2" layer of medium stiff, moist, olive gray, SILT (ML)	
8	LRIS-LR-10-SB-8-9.2		1.6		8
9				End of core at 9.2'.	9
10					10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.32x

Calculated Recovery
Recovery Length/Penetration Depth:
9.7/12.8 ft. = 75.8%

Sediment Core Log

LRIS-LR-11

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **7.2**	Penetration Depth (ft): **13.6**
Client: **Port of Ridgefield**	Water Depth (ft): **14.9**	Field Recovery Length (ft): **10.8**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **-7.7**	Process Date: **4/29/2010**
Contractor: **SSS**	N/LAT: **1065962.63** E/LONG: **185654.50**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0	LRIS-LR-11-SB-0-1		1.8	(ML) Soft, wet, olive gray, SILT and substantial seams and layers of medium dense, moist, dark gray, vf-f-SAND (SW). Occasional decomposed wood fibers and fragments, up to 1" long. Slight H2S-like odor.	0
1	LRIS-LR-11-SB-1-2		1	@ 1': Grades to moderate seams and layers of SAND (SW)	1
2	LRIS-LR-11-SB-2-3		2.2		2
3	LRIS-LR-11-SB-3-4		0.6		3
4	LRIS-LR-11-SB-4-5		0.3	@ 4': Grades to medium stiff, moist and occasional seams and layers of SAND (SW)	4
5	LRIS-LR-11-SB-5-6		0.3		5
6	LRIS-LR-11-SB-6-7		1.6		6
7					7

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Footnote(1): Attempt 4 of 4

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.27x

Calculated Recovery
Recovery Length/Penetration Depth:
10.8/13.6 ft. = 79.4%

Sediment Core Log

LRIS-LR-11

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **7.2**	Penetration Depth (ft): **13.6**
Client: **Port of Ridgefield**	Water Depth (ft): **14.9**	Field Recovery Length (ft): **10.8**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **-7.7**	Process Date: **4/29/2010**
Contractor: **SSS**	N/LAT: **1065962.63** E/LONG: **185654.50**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7–8	LRIS-LR-11-SB-7-8		1.2	(ML) Soft, wet, olive gray, SILT and substantial seams and layers of medium dense, moist, dark gray, vf-f-SAND (SW). Occasional decomposed wood fibers and fragments, up to 1" long. Slight H2S-like odor.	7
8–9	LRIS-LR-11-SB-8-9		2.1		8
9–10.3	LRIS-LR-11-SB-9-10.3		0.3		9
10					10
10.3				End of core at 10.3'.	
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 4 of 4

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.27x

Calculated Recovery
Recovery Length/Penetration Depth:
10.8/13.6 ft. = 79.4%

Sediment Core Log

LRIS-LR-12

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.8**	Penetration Depth (ft): **12.5**
Client: **Port of Ridgefield**	Water Depth (ft): **4.0**	Field Recovery Length (ft): **10.8**
Collection Date: **4/26/2010**	Surveyed Mudline Elevation (ft): **2.8**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1065925.32** E/LONG: **185972.30**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0	LRIS-LR-12-SB-0-1		20	SM: (SM) Medium dense, moist, dark gray, silty, f-SAND. Occasional wood fibers.	0
1	LRIS-LR-12-SB-1-2	SVOC, Metals, GS, TS, TVS, TOC, Dioxins	19.4	ML: (ML) Soft, moist, olive gray, SILT and moderate seams and layers of medium dense, moist, dark gray, silty, f-SAND (SM). Occasional fresh wood fragments, up to 2" L x 1" W.	1
2	LRIS-LR-12-SB-2-3		3.3		2
3	LRIS-LR-12-SB-3-4		1	SM: (SM) Medium dense, moist, olive gray, slightly clayey, very silty, f-SAND, trace layers of gravel. Occasional wood fibers.	3
4	LRIS-LR-12-SB-4-5	SVOC, Metals, GS, TS, TVS, TOC	1		4
5	LRIS-LR-12-SB-5-6		1.3	@ 5.6': 2" layer of light gray, vesicular rocks up to 2" diameter	5
6	LRIS-LR-12-SB-6-7		1	ML: (ML) Medium stiff, moist, olive gray, SILT and occasional seams and layers of medium dense, moist, dark gray, f-SAND, trace gravel. @ 6.3': 2" diameter subangular c-GRAVEL @ 6.5': 2" diameter subangular c-GRAVEL	6
7					7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.16x

Calculated Recovery
Recovery Length/Penetration Depth:
10.8/12.5 ft. = 86.4%

Sediment Core Log

LRIS-LR-12

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.8**	Penetration Depth (ft): **12.5**
Client: **Port of Ridgefield**	Water Depth (ft): **4.0**	Field Recovery Length (ft): **10.8**
Collection Date: **4/26/2010**	Surveyed Mudline Elevation (ft): **2.8**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1065925.32** E/LONG: **185972.30**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7–10.2	LRIS-LR-12-SB-7-8		1.1	(ML) Medium stiff, moist, olive gray, SILT and occasional seams and layers of medium dense, moist, dark gray, f-SAND, trace gravel. @7.1': 4" diameter subrounded, light gray, vesicular rock	7
	LRIS-LR-12-SB-8-9		0.9		8
	LRIS-LR-12-SB-9-10.2		0.7		9
10.2				End of core at 10.2'.	10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.16x

Calculated Recovery
Recovery Length/Penetration Depth:
10.8/12.5 ft. = 86.4%

Sediment Core Log

LRIS-LR-13

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.8**	Penetration Depth (ft): **11.8**
Client: **Port of Ridgefield**	Water Depth (ft): **14.2**	Field Recovery Length (ft): **9.0**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **-7.4**	Process Date: **4/29/2010**
Contractor: **SSS**	N/LAT: **1065846.92** E/LONG: **185952.23**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0	LRIS-LR-13-SB-0-1		1.9	(ML) Soft, wet, olive gray, SILT and substantial interbeds, layers, and seams of medium dense, moist, dark gray, f-SAND (SW). Trace wood fibers. Slight organic odor.	0
1	LRIS-LR-13-SB-1-2		2.9	@ 2': Grades to medium stiff, moist, and occasional seams and layers of SAND (SW)	1
2	LRIS-LR-13-SB-2-3		1.9		2
3	LRIS-LR-13-SB-3-4		1.7		3
4	LRIS-LR-13-SB-4-5		2.3		4
5	LRIS-LR-13-SB-5-6		2.3		5
6	LRIS-LR-13-SB-6-7		2.2	(SW) Dense, damp, gray, f-SAND. Sand grains are multicolored and are black, white, red, beige, green and	6
7					7

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206-287-9130

Footnote(1): Attempt 4 of 4

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.32x

Calculated Recovery
Recovery Length/Penetration Depth:
9.0/11.8 ft. = 76.3%

Sediment Core Log

LRIS-LR-13

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **6.8**	Penetration Depth (ft): **11.8**
Client: **Port of Ridgefield**	Water Depth (ft): **14.2**	Field Recovery Length (ft): **9.0**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **-7.4**	Process Date: **4/29/2010**
Contractor: **SSS**	N/LAT: **1065846.92** E/LONG: **185952.23**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-13-SB-7-8		2.1	(SW) Dense, damp, gray, f-SAND. Sand grains are multicolored and are black, white, red, beige, green and micaceous. @ 7.2': 2" interbed of olive gray SILT (ML)	7
8	LRIS-LR-13-SB-8-8.8		0.9	@ 8.3': Winnowing to the end of the core	8
9				End of the core at 8.8'.	9
10					10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 4 of 4

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.32x

Calculated Recovery
Recovery Length/Penetration Depth:
9.0/11.8 ft. = 76.3%

Sediment Core Log

LRIS-LR-14

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **7.6**	Penetration Depth (ft): **13.5**
Client: **Port of Ridgefield**	Water Depth (ft): **6.0**	Field Recovery Length (ft): **10.5**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **1.6**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1065840.20** E/LONG: **186268.91**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0–1	LRIS-LR-14-SB-0-1		0.6	(SM) Loose, moist, olive gray, very silty, f-SAND, trace gravel. Occasional fresh wood fragments, up to 3" long.	0
1–2	LRIS-LR-14-SB-1-2	SVOC, Metals, GS, TS, TVS, TOC	0.8	(ML) Soft, moist, olive gray, SILT and substantial layers and seams of medium dense, moist, gray, silty, f-SAND (SM). @ 1': 4" diameter orange and black subrounded cobble	1
2–3	LRIS-LR-14-SB-2-3		0.6		2
3–4	LRIS-LR-14-SB-3-4		0.5	@ 3.5': Grades to trace seams of SAND (SM)	3
4–5	LRIS-LR-14-SB-4-5	SVOC, Metals, GS, TS, TVS, TOC	0.4	@ 4.9': Grades to substantial seams of SAND (SM)	4
5–6	LRIS-LR-14-SB-5-6		0.5	(SW) Dense, moist, gray, f-SAND and moderate layers and seams of SILT (ML). Occasional wood fragments and fibers.	5
6–7	LRIS-LR-14-SB-6-7		0.6		6–7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.28x

Calculated Recovery
Recovery Length/Penetration Depth:
10.5/13.5 ft. = 77.8%

Sediment Core Log

LRIS-LR-14

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **7.6**	Penetration Depth (ft): **13.5**
Client: **Port of Ridgefield**	Water Depth (ft): **6.0**	Field Recovery Length (ft): **10.5**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **1.6**	Process Date: **4/28/2010**
Contractor: **SSS**	N/LAT: **1065840.20** E/LONG: **186268.91**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-14-SB-7-8		0.4	(SW) Dense, moist, gray, f-SAND and moderate layers and seams of SILT (ML). Occasional wood fragments and fibers.	7
8	LRIS-LR-14-SB-8-9		0.3	@ 7.9': Grades to trace layers of SILT (ML)	8
9	LRIS-LR-14-SB-9-10.2		0.2	@ 9.4': Wood chunk, 3" x 1"	9
10				End of core at 10.2'.	10
11					11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.28x

Calculated Recovery
Recovery Length/Penetration Depth:
10.5/13.5 ft. = 77.8%

Sediment Core Log

LRIS-LR-15

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **7.4**	Penetration Depth (ft): **13.5**
Client: **Port of Ridgefield**	Water Depth (ft): **16.0**	Field Recovery Length (ft): **11.2**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **-8.6**	Process Date: **4/29/2010**
Contractor: **SSS**	N/LAT: **1065699.35** E/LONG: **186200.61**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
0	LRIS-LR-15-SB-0-1		1.6	(ML) Soft, wet, olive gray, SILT and substantial layers and seams of medium dense, moist, dark gray, f-SAND (SW). Occasional decomposed wood fibers and fragments, up to 1" long. Slight H2S-like odor.	0
1	LRIS-LR-15-SB-1-2		1.4		1
2	LRIS-LR-15-SB-2-3		1.5	@ 2': Grades to medium stiff, moist and moderate seams and layers of SAND (SW)	2
3	LRIS-LR-15-SB-3-4		1.3		3
4	LRIS-LR-15-SB-4-5		1.9	@ 4.4': Grades to occasional seams and layers of SAND (SW)	4
5	LRIS-LR-15-SB-5-6		2.1		5
6	LRIS-LR-15-SB-6-7		1.7		6
7					7

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core. Compaction factor = 1.20x

Calculated Recovery
Recovery Length/Penetration Depth:

11.2/13.5 ft. = 83.0%

Sediment Core Log

LRIS-LR-15

Project: **LRIS Sediment Investigation**	Location: **Lake River**	Tube Length (ft): **14.5**
Project #: **080519-01.01**	Water Elevation (ft)/Tide: **7.4**	Penetration Depth (ft): **13.5**
Client: **Port of Ridgefield**	Water Depth (ft): **16.0**	Field Recovery Length (ft): **11.2**
Collection Date: **4/27/2010**	Surveyed Mudline Elevation (ft): **-8.6**	Process Date: **4/29/2010**
Contractor: **SSS**	N/LAT: **1065699.35** E/LONG: **186200.61**	Process Method: **Cut tube**
Vessel: **Vibrador**	Horiz. Datum: **NAD 83 HARN SP Wa S** Vert. Datum: **NGVD29**	Sample Quality: **Good**
Operator: **Justin Siewert**	Method/Tube ID: **Vibracore-poly liner/3.25" round**	Logged By: **JD/AO**

Recoverd Detph (ft)	Recovered Interval & Sample	Chemical Analysis	PID Measurement	**Sediment Description** Samples and Descriptions are in Recovered Depths In-Situ Depths Shown on Right Classification Scheme: USCS	*In-situ* Depth (ft) & Graphic Log
7	LRIS-LR-15-SB-7-8		2.2	(ML) Soft, wet, olive gray, SILT and substantial layers and seams of medium dense, moist, dark gray, f-SAND (SW). Occasional decomposed wood fibers and fragments, up to 1" long. Slight H2S-like odor.	7
8	LRIS-LR-15-SB-8-9		1.4		8
9	LRIS-LR-15-SB-9-10		2.3		9
10	LRIS-LR-15-SB-10-11		0.5	@ 10.2': Grades to substantial seams and layers of SAND (SW)	10
11				End of core at 11'.	11
12					12
13					13
14					14

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Footnote(1): Attempt 1 of 1

Footnote (2): In-situ depth applies compaction throughout core.
Compaction factor = 1.20x

Calculated Recovery
Recovery Length/Penetration Depth:
11.2/13.5 ft. = 83.0%

APPENDIX B
SEDIMENT RI SAMPLING PERMITS

WASHINGTON STATE DEPARTMENT OF
Natural Resources
Peter Goldmark - Commissioner of Public Lands

Caring for
your natural resources
... now and forever

March 17, 2010

MAR 19 2010

CERTIFIED MAIL

Brent Grening, Executive Director
Port of Ridgefield
PO Box 55
Ridgefield, WA 98642

SUBJECT: Aquatic Lands Environmental Right of Entry No. 23-085263

Dear Mr. Grening:

Enclosed is a final signed copy of the Aquatic Lands Environmental Right of Entry No. 23-085263 for your records. Please record this document at the Clark County Recorder's Office. Please send me the recording information, including the date of recordation and file number.

If you should have any questions, feel free to contact me at 360-902-1071.

Sincerely,

Don Olmsted, Ports Program Manager
Aquatic Resources

Enclosures

WASHINGTON STATE DEPARTMENT OF
Natural Resources
Peter Goldmark - Commissioner of Public Lands

AQUATIC LANDS ENVIRONMENTAL RIGHT OF ENTRY

Right of Entry No. 23-085263

THIS AGREEMENT is made by and between the STATE OF WASHINGTON, acting through the Department of Natural Resources ("State"), and the Port of Ridgefield, a governmental entity ("Licensee").

SECTION 1 PERMISSION, LOCATION AND ACCESS

Subject to the terms and conditions set forth below, State grants Licensee and its agents, contractors, and subcontractors a temporary revocable license to enter upon the real property described in Exhibit A (the "Property") for the limited purposes described below.

SECTION 2 CONSIDERATION

The consideration paid by Licensee to State shall be as follows: Five hundred dollars ($500.00).

SECTION 3 TERM OF LICENSE

KS

FIFTH APRIL

This license shall be effective on the ~~Fifteenth~~ day of ~~January~~, 2010, and shall terminate on the ~~Thirty-first day of May~~, 2010, unless terminated sooner under the terms of this License, or when Licensee completes the Work, whichever occurs first. State reserves the right to revoke this License at any time upon thirty (30) days notice to Licensee.

TWENTIETH DAY OF AUGUST, KS

SECTION 4 WORK

(a) Licensee wishes access to the Property for the purpose of conducting surveys of soil, intertidal or marine sediment, surface water, and/or groundwater samples.

The specific work to be performed is described in Exhibit B to this Agreement (the "Work"). No other activities or work may be conducted on the Property without the prior written permission of State.

(b) Restrictions on Use. Licensee shall not cause or permit any damage to natural resources on the Property. Licensee shall also not cause or permit any filling activity to occur on the Property. This prohibition includes any deposit of rock, earth, ballast, refuse, garbage, waste matter (including chemical, biological or toxic wastes), hydrocarbons, any other pollutants, or other matter in or on the Property, except as approved in writing by State. Licensee shall neither commit nor allow waste to be committed to or on the Property. If Licensee fails to comply with all or any of the restrictions in use set out in this Section 4, State may take any steps reasonably necessary to remedy such failure. Upon demand by State, Licensee shall pay all costs of such remedial action, including but not limited to the costs of removing and disposing of any material deposited improperly on the Property.

(c) Condition of the Property. Prior to the termination of this Agreement, or within thirty (30) days after receiving notice of an early revocation of this License, Licensee shall restore the Property to a condition as near as reasonably possible to the condition of the Property at the commencement of this Agreement except for any changed conditions caused solely by parties other than Licensee, its agents, contractors, or subcontractors.

SECTION 5 SAMPLING

State or its authorized representative shall have the right to take split samples of any sampling performed on the Property. It shall be the sole responsibility of Licensee to lawfully handle and dispose of any material Licensee has gathered or generated as part of the sampling process. State shall have the same responsibility with respect to any split samples it takes. State shall be responsible for all costs and expenses of analytical or laboratory work associated with its split samples. Licensee shall provide State with copies of all sampling and analytical results from samples taken from the Property within two (2) weeks of Licensee's receipt of same. State shall be responsible for reimbursing Licensee for the reasonable costs of copying and mailing the same.

SECTION 6 TITLE TO PROPERTY

State grants this right of access only to the extent of its interest in the Property. It does not warrant that it is the owner of the Property or that Licensee's entry and use of the Property does not violate other persons' rights to the Property. This Agreement does not grant any right to harvest, collect, or damage any natural resources, including aquatic life or living plants. Licensee agrees to obtain approvals from other persons who have a right, title, or interest in the Property. This license shall not be exclusive and State may grant similar rights to anyone else, including the Washington State Department of Ecology, the Environmental Protection Agency, natural resource trustees, and designated representatives, contractors, or subcontractors of all or any of them. State may also lease the Property or grant easements or licenses to others. These other interests in the Property shall not unreasonably interfere with this License.

SECTION 7 NOTICE OF DATE OF ENTRY

Licensee and its agents, contractors, and subcontractors shall provide State with at least two (2) weeks notice of the schedule of anticipated dates necessary for access, surveys, and sampling. Licensee shall promptly notify State of any modifications in the schedule. State shall give Licensee at least two (2) days notice of its desire to take split samples.

SECTION 8 COMPLIANCE WITH LAWS

Licensee shall, at its sole expense, conform to all applicable laws, regulations, permits, orders, or other directives of any public authority concerning Licensee's use or occupation of the Property. Licensee shall, at its sole expense, obtain all regulatory or proprietary consents or approvals required to be obtained from any public authority, State, or third party in connection with any Work on the Property or Licensee's use or occupation of the Property.

SECTION 9 INDEMNIFICATION AND LIABILITY

Licensee shall indemnify, defend, and hold harmless State, its employees, officers, and agents from any and all liability, damages (including bodily injury, personal injury and damages to land, aquatic life, and other natural resources), expenses, causes of action, suits, claims, costs, fees (including attorneys' fees), penalties, or judgments, of any nature whatsoever, arising out of the use, occupation, or control of the Property by Licensee, its Sublicensees, invitees, agents, employees, licensees, or permittees, except as may arise solely out of the willful or negligent act of State or State's elected officials, employees, or agents. To the extent that RCW 4.24.115 applies, Licensee shall not be required to indemnify, defend, and hold State harmless from State's sole or concurrent negligence.

SECTION 10 INSURANCE

At its own expense, Licensee shall procure and maintain during the Term of this license, the insurance coverages and limits described in Section 10(a) and (b) below. This insurance shall be issued by an insurance company or companies admitted and licensed by the Insurance Commissioner to do business in the State of Washington. Insurers must have a rating of B+ or better by "Best's Insurance Reports," or a comparable rating by another rating company acceptable to State. If non-admitted or non-rated carriers are used, the policies must comply with Chapter 48.15 RCW.

(a) Types of Required Insurance.

(1) Commercial General Liability Insurance. Licensee shall procure and maintain Commercial General Liability insurance covering claims for bodily injury, personal injury, or property damage arising on the Property and/or arising out of Licensee's operations. Insurance must include liability coverage with limits not less than those specified below:

Description	
Each Occurrence	$1,000,000
General Aggregate Limit	$5,000,000

(2) Worker's Compensation/Employer's Liability Insurance. As applicable, Licensee shall procure and maintain:

(i) State of Washington Worker's Compensation coverage with respect to any work by Licensee's employees on or about the Property and on any improvements;

(ii) Employers Liability or "Stop Gap" insurance coverage with limits not less than those specified below. Insurance must include bodily injury coverage with limits not less than those specified below:

By Accident	Each Employee By Disease	Policy Limit By Disease
$1,000,000	$1,000,000	«Policy_Limit_Amount»

(iii) Jones Act coverage with respect to any work by Licensee's employees on or about the Property and on any improvements.

(b) Terms of Insurance. The policies required under Section 10(a) shall name the State of Washington, Department of Natural Resources as an additional insured (except for State of Washington Worker's Compensation coverage, and Federal Jones' Act coverage). Furthermore, all policies of insurance described in Section 10(a) shall meet the following requirements:

(1) Policies shall be written as primary policies not contributing with and not in excess of coverage that State may carry;

(2) Policies shall expressly provide that such insurance may not be canceled or nonrenewed with respect to State except upon forty-five (45) days prior written notice from the insurance company to State;

(3) All liability policies must provide coverage on an occurrence basis; and

(4) Liability policies shall not include exclusions for cross liability.

(c) Proof of Insurance. Licensee shall furnish evidence of insurance in the form of a Certificate of Insurance satisfactory to the State accompanied by a check list of coverages provided by State, executed by a duly authorized representative of each insurer showing compliance with the insurance requirements described in Section 10, and, if requested, copies of policies to State. The Certificate of Insurance shall reference the State of Washington, Department of Natural Resources and the right of entry number. Receipt of such certificates or policies by State does not constitute approval by State of the terms of such policies. Licensee acknowledges that the coverage requirements set forth herein are the minimum limits of insurance the Licensee must purchase to enter into this agreement. These limits may not be sufficient to cover all liability losses and related claim settlement expenses. Purchase of these limits of coverage does not relieve the Licensee from liability for losses and settlement expenses greater than these amounts.

SECTION 11 PROHIBITION AGAINST ASSIGNMENT

Licensee shall not assign this Agreement.

SECTION 12 APPLICABLE LAW AND VENUE

This Agreement shall be interpreted and construed pursuant to the laws of the State of Washington. Venue for any action arising out of or in connection with this Agreement shall be in the Superior Court for Thurston County, Washington.

SECTION 13 MODIFICATION

Any modification of this Agreement must be in writing and signed by the parties. State shall not be bound by any oral representations or statements.

THIS AGREEMENT requires the signature of all parties and is executed as of the date of the last signature below.

PORT OF RIDGEFIELD

Dated: MARCH 3, 2010

By: Brent Grening
Title: Executive Director
Address: PO Box 55
Ridgefield, WA 98642
Phone: 360-887-3873
E-mail: bgrening@portridgefield.org

STATE OF WASHINGTON

DEPARTMENT OF NATURAL RESOURCES

Dated: March 16, 2010

By: Kristin Swenddal
Title: Division Manager
Aquatic Resources Division
Address: 1111 Washington Street SE
PO Box 47027
Olympia, WA 98504-7027
Phone: 360-902-1100
E-mail: kristin.swenddal@dnr.wa.gov

Approved as to form this
October, 2003
Mike Grossmann, Assistant Attorney General

REPRESENTATIVE ACKNOWLEDGMENT

STATE OF)
) ss
County of)

I certify that I know or have satisfactory evidence that Brent A. Grening is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the Executive Director (type of authority) of Port of Ridgefield (name of corporation) to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: March 3, 2010

(Seal or stamp)

JEANETTE LUDKA
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
JULY 7, 2013

Jeanette Ludka
(Signature)

JEANETTE LUDKA
(Print Name)

Notary Public in and for the State of Washington, residing at

Clark

My appointment expires 7-7-2013

STATE ACKNOWLEDGMENT

STATE OF WASHINGTON)
) ss
County of)

I certify that I know or have satisfactory evidence that KRISTIN SWENDDAL is the person who appeared before me, and said person acknowledged that she signed this instrument, on oath stated that she was authorized to execute the instrument and acknowledged it as the Aquatic Resources Division Manager of the Department of Natural Resources of the State of Washington to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: ______________________________

(Seal or stamp)

____
(Signature)

____
(Print Name)

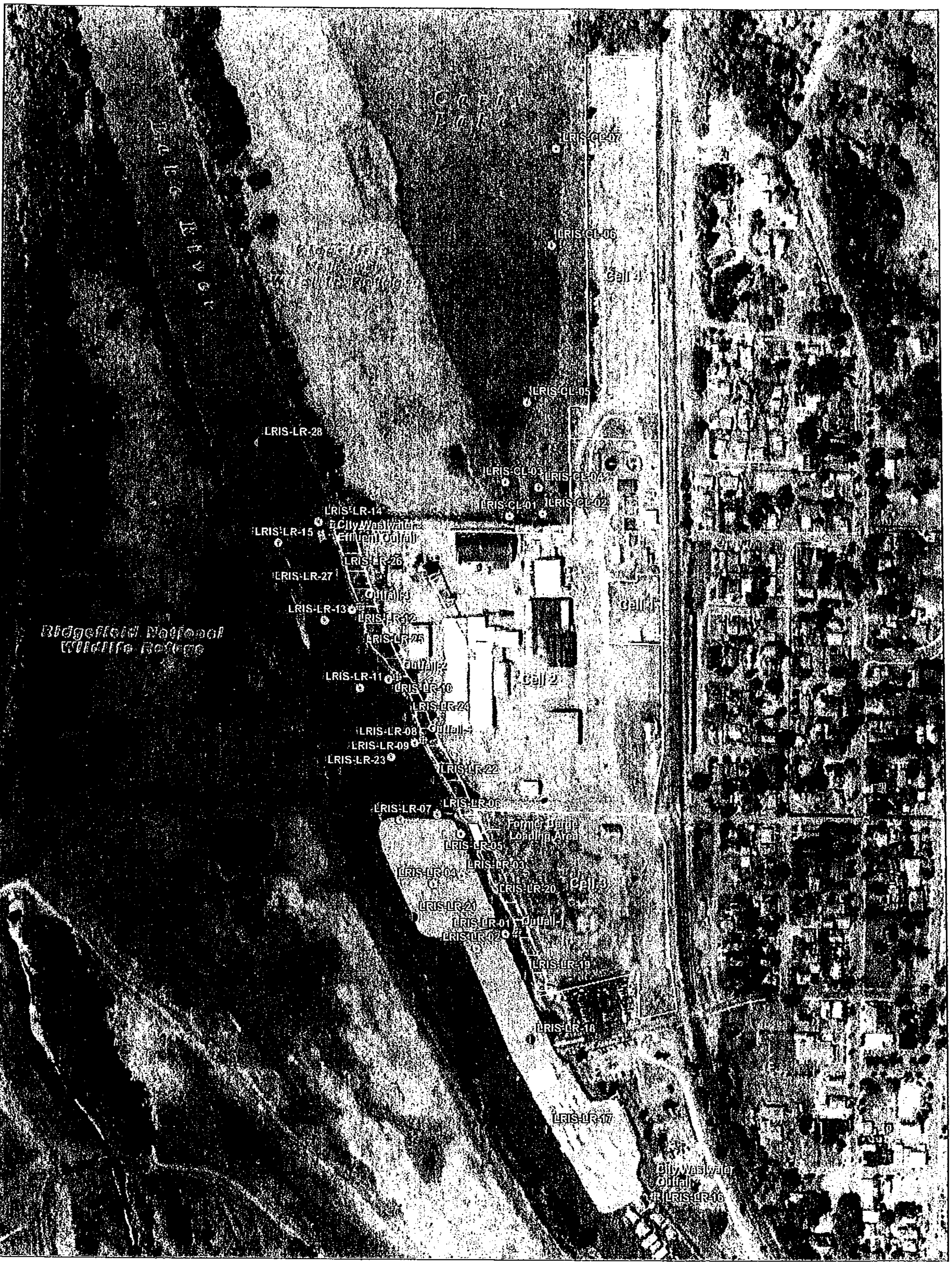
Notary Public in and for the State of Washington, residing at

____

My appointment expires ______________

EROE 23-085263

Exhibit A



Surface Grab and Co-Located Subsurface

Surface Grab

Approximate Area of Dredging for Barge Turning Basin

Approximate Area of Maintenance Dredging

Approximate Outfall Location

Shoreline Fill[1]

Notes:
1 Shoreline has been historically filled and modified. Aerial photos will be used to identify Shoreline Fill Areas of interest prior to Reconnaissance Survey and Bathymetric Survey.
2. Final sample collection method and location in Carty Lake will be determined after the reconnaissance survey and will depend on access and water level.
3. Sediment testing details at each station are presented in the SAP, Table B-1 and Table B-2.

Feet
0 175 350 525 700

Q:\Jobs\060359-PWT_Ridgefield\Maps\2009_08\LRIS_Drft_Sed_WP_Fig_10.mxd rlachie 09/22/2009 9:19 AM

ANCHOR QEA

Figure 10
Proposed Sediment Sampling Locations
Lake River Industrial Site
Ridgefield, Washington

United States Department of the Interior
U.S. Fish and Wildlife Service

Special Use Application and Permit

2. Application Date: 8 February 2010

3. Period of Use Applying for:

1. Ridgefield National Wildlife Refuge

From: ~~1 March 2010~~ 15 April 2010 To: ~~31 March 2010~~ 30 April 2010

4. Applicant Information:

Name	Laurie Olin	Phone:	360.887.3873
Organization:	Port of Ridgefield	Fax:	360.887.3403
Address:	PO Box 55	email	lolin@portridgefield.org
City/State/ZIP	Ridgefield, WA 98642		

5. Purpose of the Permit Application:

- [ ] Agriculture
- [ ] Commercial Activities
- [x] Research/Monitoring
- [ ] Commercial Visitor Services
- [ ] Commercial Filming
- [ ] Special Event
- [ ] Other (describe)

6. Describe the above activity as specifically as you can.
Include: Where the activity will take place (units, roads, trails); When (seasons, days, hours); How (methods, techniques, transportation); Frequency (one time only, daily, occassionally); Number of people/vehicles/boats; Special Needs/access
Researchers may be required to supply a research proposal.

To collect sediment samples in Carty Lake as part of the ongoing remedial investigation for the former Pacific Wood Treating site at the Lake River Industrial Site. Eight borings would be completed just north of the Lake River Industrial Site at 111 W. Division Street. The locations are identified by dots on the figure. The borings will be completed to approximately 2 feet below the mudline. A box corer or hand auger will be used to collect the sediment samples. The samplers will create a 3 to 4-inch diameter hole. Locations of the boring are displayed on the attached Cultural Clearance Memo, subject line title "Notification of Compliance with Section 106 of the National Historic Preservation Act (NHPA)". No mechanically operated boats or off trail/road vehicular travel will be allowed.

The sampling would take approximately 1 to 2 days. Only hand equipment would be used. The samples are near shore and will be collected by wading out in chest waders to the desired sampling location. Maul Foster & Alongi will oversee all work performed on the Refuge.

7. Print Form

8. Applicant Signature: Laurie Olin for Port of Ridgefield **Date:** 2/08/10

Print this form and return it to the refuge for processing. Do not fill out any information below this line.

For Official Use Only

Application approved: [ ] yes [ ] no

Special Conditions: Payment exempted. Port of Ridgefield Partnership.

Station Number: 13551

Permit Number: 10-002

Record of Payments: [x] Payment exempt [ ] Partial payment [ ] Full payment

Amount of payment: Record of partial payments:

This permit is issued by the U.S. Fish and Wildlife Service and accepted by the above signed, subject to the terms, convenants, obligations, and reservations, expressed or implied herein, and to the notice, conditions, and requirements appearing on the reverse side.

Permit Approved and Issued By: (name and title) Robert Flores, Project Leader **Date:** 8 Feb. 2010

Notice

In accordance with the Privacy Act (5 U.S. C. 552a) and the Paperwork Reduction Act (44 U.S. C. 3501), please note the following information:

1. The issuance of a permit and collection of fees on lands of the National Wildlife Refuge System is authorized by the National Wildlife Refuge System Administration Act (16 U.S. C. 668dd-ee) as amended, and the Refuge Recreation Act (16 U.S. C. 460k-460k-4).

2. The information that you provide is voluntary; however submission of requested information is required to evaluate the qualifications, determine eligibility, and document permit applicants under the above Acts. It is our policy not to use your name for ony other purpose. The information is maintained in accordance with the Privacy Act. All information you provide will be considered in reviewing this application. False, fictitious, or fraudulent statements or representations made in the application may be grounds for revocation of the Special Use Permit and may be punishable by fine or imprisonment (18 U.S.C. 1001). Failure to provide all required information is sufficient cause for the U.S. Fish and Wildlife Service to deny a permit. Response is not required unless a currently valid Office of Management and Budget (OMB) control number is displayed.

3. No members of Congress or Resident Commissioner shall participate in any part of this contract or to any benefit that may arise from it, but this provision shall not pertain to this contract if made with a corporation for its general benefit.

4. The Permittee agrees to be bound by the equal opportunity "nondiscrimination in employment" clause of Executive Order 11246.

5. Routine use disclosures may also be made: (a) to the U.S. Department of Justice when related to litigation or anticipated litigation; (b) of information indicating a violation or potential violation of a statute, rule, order, or license to appropriate Federal, State, local or foreign agencies responsible for investigating or prosecuting the violation or for enforcing or implementing the statute, rule, regulations, order, or license; (c) from the record of the individual in reponse to an inquiry from a Congressional office made at the request of the individual (42 FR 19083; April 11, 1977); and (d) to provide addresses obtained from the Internal Revenue Service to debt collection agencies for purposes of locating a debtor to collect or compromise a Federal Claim against the debtor, or to consumer reporting agencies to prepare a commercial credit report for use by the Deparment (48 FR 54716; December 6, 1983).

6. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. This information collection has been approved by OMB and assigned control number 1018-0102. The public reporting burden for this information collection varies based on the specific refuge use being requested. The relevant public reporting burden estimate for the Special Use Permit Application form is estimated to average one hour per response, including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Comments on this form should be mailed to the Information Collection Clearance Officer, Mail Stop 222, Arlington Square, U.S. Fish and Wildlife Service, Arlington, Virginia, 22203. Thank you.

General Conditions and Requirements.

1. Responsibility of Permittee: The permittee, by operating on the premises, shall be considered to have accepted these premises with all facilities, fixtures, or improvements in their existing condition as of the date of this permit. At the end of the period specified or upon earlier termination, the permittee shall give up the premises in as good order and condition as when received except for reasonable wear, tear, or damage occurring without fault or negligence. The permittee will fully repay the Service for any and all damage directly or indirectly resulting from negligence or failure on his/her part, and/or the part of anyone of his/her associates, to use reasonable care.

2. Operating Rules and Laws: The permittee shall keep the premises in a neat and orderly condition at all times, and shall comply with all municipal, county, and State laws applicable to the operations under the permit as well as all Federal laws, rules, and regulations governing national wildlife refuges and the area described in this permit. The permittee shall comply with all instructions applicable to this permit issued by the refuge official in charge. The permittee shall take all reasonable precautions to prevent the escape of fires and to suppress fires and shall render all reasonable assistance in the suppression of refuge fires.

3. Use Limitations: The permittee's use of the described premises is limited to the purposes herein specified and does not, unless provided for in this permit, allow him/her to restrict other authorized entry onto his/her area; and permits the Service to carry on whatever activities are necessary for: (1) protection and maintenance of the premises and adjacent lands administered by the Service; and (2) the management of wildlife and fish using the premises and other Service lands.

4. Transfer of Privileges: This permit is not transferable, and no privileges herein mentioned may be sublet or made available to any person or interest not mentioned in this permit. No interest hereunder may accrue through lien or be transferred to a third party without the approval of the Regional Director of the Service and the permit shall not be used for speculative purposes.

5. Compliance: The Service's failure to require strict compliance with any of this permit's terms, conditions, and requirements shall not constitute a waiver or be considered as a giving up of the Service's right to thereafter enforce any of the permit's terms or conditions.

6. Conditions of Permit not Fulfilled: If the permittee fails to fulfill any of the conditions and requirements set forth herein, all money paid under this permit shall be retained by the Goverment to be used to satisfy as much of the permittee's obligation as possible.

7. Payments: All payment shall be made on or before the due date to the local representative of the Service by a postal money order or check made payable to the U.S. Fish and Wildlife Service.

8. Termination Policy: At the termination of this permit the permittee shall immediately give up possession to the Service representative, reserving, however, the rights specified in paragraph 11. If he/she fails to do so, he/she will pay the government, as liquidated damages, an amount double the rate specified in this permit for the entire time possession is withheld. Upon yielding possession, the permittee will still be allowed to reenter as needed to remove his/her property as stated in paragraph 11. The acceptance of any fee for the liquidated damages or any other act of administration relating to the continued tenancy is not to be considered as an affirmation of the permittee's action nor shall it operate as a waiver of the Government's right to terminate or cancel the permit for the breach of any specified condition or requirement.

9. Revocation Policy: This permit may be revoked by the Regional Director of the Service without notice for noncompliance with the terms hereof or for violation of general and/or specific laws or regulations governing national wildlife refuges or for nonuse. It is at all times subject to discretionary revocation by the Director of the Service. Upon such revocation the Service, by and through any authorized representative, may take possession of the said premises for its own and sole use, and/or may enter and possess the premises as the agent of the permittee and for his/her account.

10. Damages: The United States shall not be responsible for any loss or damage to property including, but not limited to, growing crops, animals, and machinery or injury to the permittee or his/her relatives, or to the officers, agents, employees, or any other who are on the premises from instructions or by the sufferance of wildlife or employees or representatives of the Government carrying out their official responsibilities. The permittee agrees to save the United States or any of its agencies harmless from any and all claims for damages or losses that may arise to be incident to the flooding of the premises resulting from any associated Government river and harbor, flood control, reclamation, or Tennessee Valley Authority activitiy.

11. Removal of Permittee's Property: Upon the expiration or termination of this permit, if all rental charges and/or damage claims due to the Government have been paid, the permittee may, within a reasonable period as stated in the permit or as determined by the refuge official in charge, but not to exceed 60 days, remove all structures, machinery, and/or equipment, etc. from the premises for which he/she is responsible. Within this period the permittee must also remove any other of his/her property including his/her acknowledged share of products or crops grown, cut, harvested, stored, or stacked on the premises. Upon failure to remove any of the above items within the aforesaid period, they shall become the property of the United States.

12. Collected Specimens: You may use specimens collected under this permit, any components of any specimens (including natural organisms, enzymes, genetic materials or seeds), and research results derived from collected specimens for scientific or educational purposes only, and not for commerical purposes unless you have entered into a Cooperative Research and Development Agreement (CRADA) with us. We prohibit the sale of collected research specimens or other transfers to third parties. Breach of any of the terms of this permit will be grounds for revocation of this permit and denial of future permits. Furthermore, if you sell or otherwise transfer collected specimens of any components without a CRADA, you will pay us a royalty rate of 20 percent of the gross revenue from such sales. In addition to such royalty, we may seek other damages and injunctive relief against you.

Instructions for Completing Application:

You may complete the application portion electronically and submit to the refuge for review.

1. Enter the name of the refuge at which you are applying for a permit.
2. Under Application Date, fill in the date of application.
3. Under Period of Use, fill in the date(s) for which the activity is requested (inclusive)
4. Under Applicant Information, fill in your name, organization (if applicable), address, phone, fax, and email.
5. Under Purpose, check one of the following categories:
    a. Agriculture - haying, grazing, crop planting, logging, beekeeping, and other agricultural products.
    b. Commerical activities - commercial fishing, trapping, and other commercial activities.
    c. Research/Monitoring - any investigations or monitoring projects proposed for the refuge.
    d. Commercial filming - audio, video, and photographic products with a monetary value.
    e. Commerical visitor services - outfitters/guides; for hunting, fishing, canoing, kayaking; and other visitor services.
    f. Special Events - weddings, fishing tournaments, one-time events, and other special events.
    g. Other - specificy any other activity(ies) not mentioned above.
6. Under Describe the Above Activity, provide detailed information on the activity, including locations, times, methods, routes of travel, number of people, types and number of vehicles, etc. If you are proposing a research project, you may be asked to submit a research proposal. Contact the refuge for details.
7. Click on the Print button to print the application (if using the fillable version).
8. Under Applicant Signature and Date, sign and date the application, then submit to the refuge per their instructions (fax, mail, in-person)
9. The refuge official will review and, if approved, fill out the remaining information, sign, and return a copy to you.

The form is not valid as a permit unless it includes refuge approval, a station number, a refuge-assigned permit number, and is signed by a refuge official.

United States Department of the Interior

FISH AND WILDLIFE SERVICE, REGIONS 1 and 8
Cultural Resources Team
20555 SW Gerda Lane
Sherwood, OR 97140
503-625-4377 (fax) 503-625-4887

To: **Bob Flores** **11/21/2009**

FWS Program - **Refuges**
Funding - **Refuges**

From: **Virginia Parks**
R1 Cultural Resource Specialist,
on behalf of Anan Raymond, Regional Historic Preservation Officer

Subject: **Notification of Compliance with Section 106 of the National Historic Preservation Act (NHPA)**

Thank you for submitting the RCRC form for the below listed project. We have reviewed the form and applied the terms of the Fish and Wildlife Service (FWS) Programmatic Agreement (PA)*, with the state of: **Washington**

*Based on the location and nature of the activities, **"Appendix A"** applies to the following project as described:*

Carty Lake Test Wells for Contaminants Survey - Ridgefield NWR

An Appendix A determination indicates that the FWS has evaluated the potential impact of the proposed project on cultural resources at the location listed above, and we do not anticipate that the project would affect or impact cultural resources.

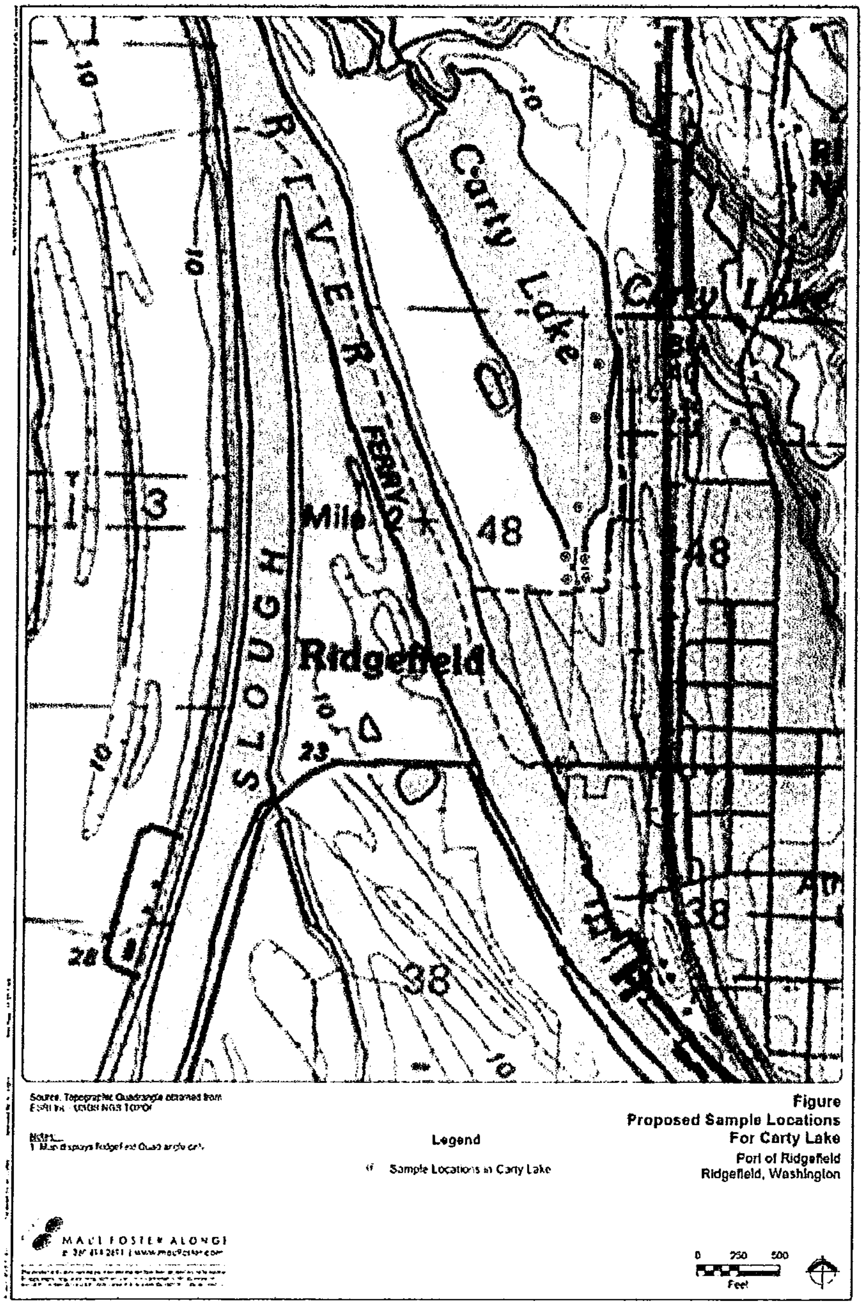
No further cultural resource identification effort is necessary for the project. However, the existence of cultural resources can never be predicted with certainty. Please be aware that cultural resources are protected by all applicable federal and state laws. In the event that cultural resources are discovered during project implementation, any ground disturbing activity should be halted and the FWS Regional Archaeologist should be notified at the above address. If the planned activities change, please let us know.

Please note that, in compliance with the terms of the PA, the project will be reported to the State Historic Preservation Office in the annual report, prepared and submitted after the end of the current fiscal year. Thank you for considering cultural resources.

**Programmatic Agreement Among the U.S. Fish and Wildlife Service Region 1, the Advisory Council on Historic Preservation, and the State Historic Preservation Officer Regarding the Administration of Routine Undertakings in the State of Washington*

Project Name: **Carty Lake, Test Wells for Contaminants Survey - Ridgefield NWR**

Location Information:		Township	Range	Section	Project Acres
County **Clark**	FWS Unit **Ridgefield NWR**	**4N**	**1W**	**13**	Total **37**
State **Washington**	USGS Topo **St. Helens OR-WA**				
Appendix Item A 9	Program Funding Refuges **Refuges** / Field Contact **Flores, B**				APE **5**



Note: Section 106 compliance assistance is being provided solely for the activities as defined in the request for cultural resource compliance submitted to the CRT for the project. Changes to the planned activities and any future projects in this area may be subject to additional Section 106 compliance efforts.

APPENDIX C
DATA QC AND VALIDATION

APPENDIX D
LABORATORY DATA REPORTS

APPENDIX E
HISTORIC DREDGE EVALUATION SUPPORTING INFORMATION