Green-Duwamish River Watershed

Otter Scat Analysis Data Report

Prepared for

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Limitations of Use

Leidos' project activities were restricted to facilitating laboratory analysis of otter scat samples for lipids, and polychlorinated biphenyl (PCB) congeners and Aroclors. The otter scat samples were collected by Dr. Michelle Wainstein, in collaboration with the Woodland Park Zoo's Carnivore Science and Conservation Program. Leidos has made no independent evaluations of the methods used to determine sample locations or sample collection methods. Because the project activities consisted of evaluating a limited supply of analytical data, Leidos may not have identified all potential items of concern and, therefore, Leidos warrants only that the project activities under this contract have been performed within the parameters and scope communicated by Ecology and reflected in the contract. This report is intended to be used in its entirety. Taking or using in any way excerpts from this report are not permitted and any party doing so does so at its own risk.

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Acronyms and Abbreviations

ARI	Analytical Resources, Inc.
COC	chain of custody
Ecology	Washington State Department of Ecology
EDD	electronic data deliverable
EIM	Environmental Information Management
GC	gas chromatography
HRGC	high-resolution gas chromatography
HRMS	high-resolution mass spectrometry
J	estimated concentration
km	kilometer
LCL	lower control limit
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDW	Lower Duwamish Waterway
LW	lipid weight
mg/kg	milligrams per kilogram
mL	milliliter
MS	matrix spike
MSD	matrix spike duplicate
ND	not detected
ng/kg	nanograms per kilogram
NJ	tentatively identified, approximate concentration
OPR	ongoing precision and recovery
PCB	polychlorinated biphenyl
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RM	River Mile
SAP	Sampling and Analysis Plan
U	not detected
UCL	upper control limit
ug/kg	micrograms per kilogram
USEPA	U.S. Environmental Protection Agency
Vista	Vista Analytical Laboratory
WW	wet weight

1.0 Introduction

The Green-Duwamish River watershed is located in King County, Washington. It comprises a drainage area of approximately 470 square miles of varied terrain and land use, from forested headwater areas at the crest of the Cascade Mountains to industrial and port facilities of the Duwamish estuary. The Green River flows more than 90 miles from its headwaters near Stampede Pass on the Cascade Range crest to Elliott Bay in the city of Seattle.

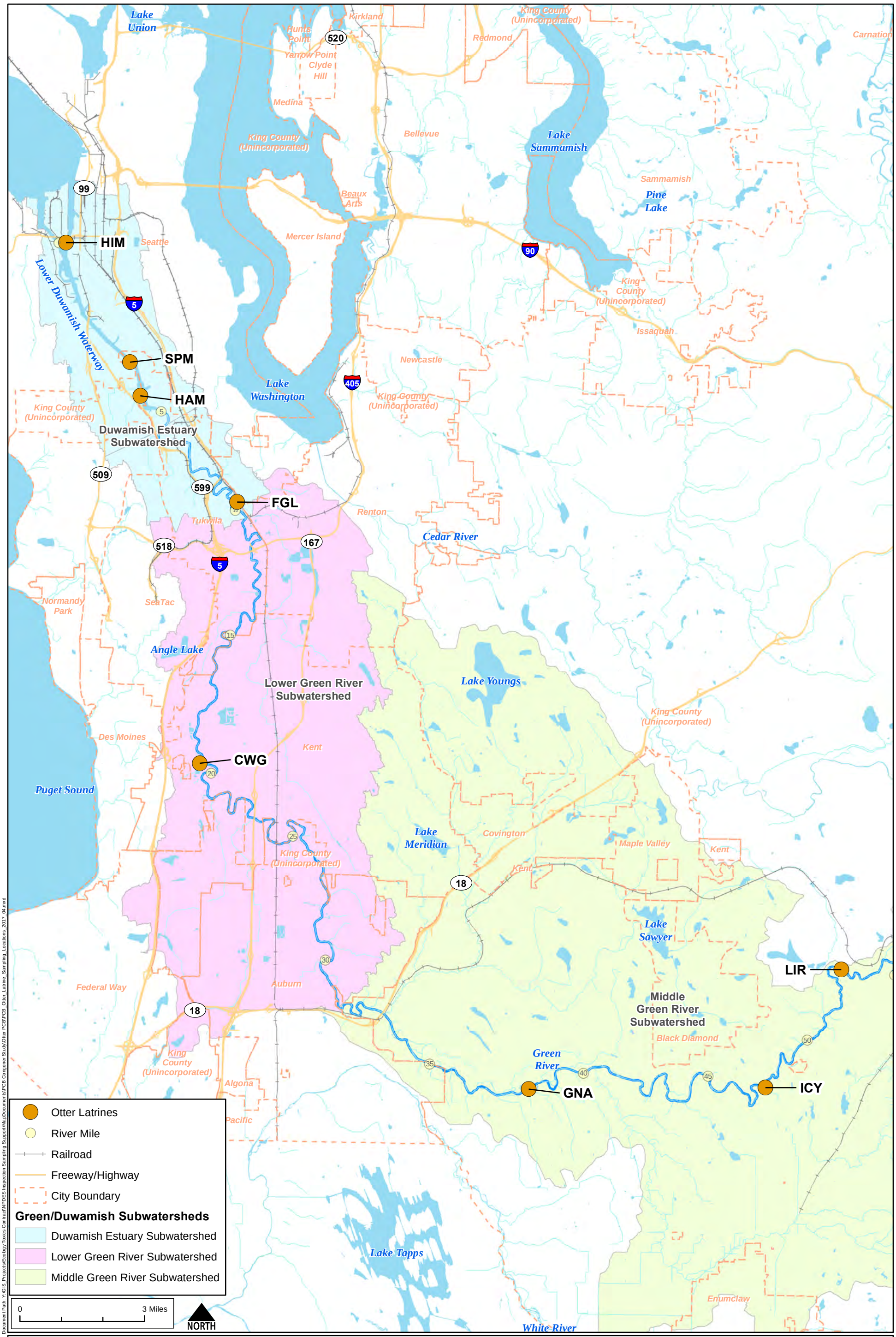
The Duwamish River begins at the confluence of the Green and Black Rivers, at approximately River Mile (RM) 11. The Lower Duwamish Waterway (LDW) Superfund Site consists of the lower 5 miles of the Duwamish River, as measured from the southern tip of Harbor Island. The Washington State Department of Ecology (Ecology) is the lead agency for identifying and controlling sources of contaminants to sediments at the LDW Superfund Site.

Since 2001, studies of the LDW have measured contaminant levels, mapped distribution of sediment contaminants, estimated risks associated with exposure to contaminated sediments, modeled movement and fate of sediments, and evaluated options for cleanup. Polychlorinated biphenyls (PCBs), in addition to other contaminants such as arsenic, dioxins/furans, and carcinogenic polycyclic aromatic hydrocarbons, have been identified as chemicals of concern for human health in LDW sediments. Wildlife species such as river otters that feed and reside in the LDW are also at risk from exposure to PCBs, and may provide useful indicators of PCB levels in the Green-Duwamish river system.

This data report describes activities conducted by Leidos to assist Ecology with the identification and quantification of PCBs in river otter feces (scat) collected at eight locations between RM 0 and RM 54 within the Green-Duwamish Watershed (Figure 1).

Otter scat samples were collected in the field by Dr. Michelle Wainstein, in collaboration with the Woodland Park Zoo's Carnivore Science and Conservation Program in Seattle, Washington, as described in Section 2.0, Field Sampling. Dr. Wainstein provided 73 scat samples to Ecology for analysis of PCBs. U.S. Environmental Protection Agency (USEPA) Method 1668 was selected for PCB analysis; this method, which analyzes for all 209 PCB congeners, was selected to provide low detection limits; a subset of samples was also analyzed for PCB Aroclors using USEPA Method 8082.

The river otter (*Lontra canadensis*) is a predator in the weasel family adapted to hunting in water, feeding on aquatic and semi-aquatic animals. River otters are widespread in waterways of Washington, where they are managed under state furbearer trapping guidelines but are not federally protected. River otters transport nutrients between aquatic and terrestrial systems, foraging in the aquatic environment (Bowyer et al. 1994; Ben-David et al. 1998) and then depositing scat and urine at latrine sites. Plants growing on latrine sites used by river otters incorporate aquatic-derived nitrogen from otter feces, urine, and anal-gland secretions (Ben-David 1998).



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DEPARTMENT OF ECOLOGY
State of Washington

Figure 1. Otter Scat Collection Locations
Green-Duwamish Watershed

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As apex predators in aquatic ecosystems, otters are vulnerable to biomagnification of persistent pollutants and may potentially transport contaminants within their home ranges. River otters have been studied as indicators of environmental health in many portions of their geographic range, including British Columbia, where contaminant loads in river otters exceeded levels suspected of having adverse effects (Elliott et al 2008). Otters with the highest toxics concentrations were those utilizing the industrial areas of Victoria and Esquimalt Harbors (Guertin et al 2010).

Fish are the main staple of otter diets, as well as crustaceans, amphibians, mollusks, small mammals, and birds (Toweill 1974; Hansen 2003). Adult otters can consume 1 to 1.5 kilograms of fish per day (Serfass et al 1993). River otters repeatedly deposit scat, urine, and anal gland secretions at habitual activity centers in riparian areas called "latrines," facilitating the collection of scat samples.

River otter home ranges tend to overlap extensively, although individuals may defend territories within home ranges that are delineated by scent marking and latrine sites (Reid et al. 1994). The basic social group is an adult female with her offspring. Home range size is usually reported in the literature as kilometer (km) or mile of waterway. Home ranges overlapped extensively and ranged in length from 8 to 78 km (5 to 48 miles) during a season in an Idaho study (Melquist and Hornocker 1983). Prey availability, habitat, weather conditions, topography, the reproductive cycle, and presence of conspecifics influence home range use and length. Travel routes follow streams. Mean daily movement distances vary, depending on age, sex, reproductive status, season, but typically are less than 5 km (3 miles) per day (Melquist and Hornocker 1983). However, maximum daily travel distances can sometimes be much greater: up to 20 km (12 miles) for individuals within their home range and 42 km (26 miles) for a dispersing yearling (Melquist and Hornocker 1983).

1.1 Project Scope and Study Objectives

The purpose of the river otter scat analysis was as follows:

- Determine the PCB congener concentrations in all samples submitted by Dr. Wainstein and determine the PCB Aroclor concentrations in 15 percent of the samples.
- Provide additional information on the role of river otters as potential sources and transport pathways for PCBs in the Green-Duwamish River watershed.

2.0 Sampling Methods

2.1 Sample Collection

Preliminary surveys were conducted by foot along accessible areas of the Green-Duwamish River to identify focal sites suitable for otter scat sampling. Focal sites are defined as conspicuous terrestrial sites (natural or man-made structures) where river otters repeatedly defecate (latrine sites) and where otters were directly sighted. Latrine site locations are shown in Figure 1.

Once latrines were identified, subsets were visited daily for 10 to 12 days to identify and collect fresh scat. Latrine sites in the Duwamish Estuary and the Lower Green subwatersheds were visited from July 25 to August 4, 2016. A subset of these sites, and the Middle Green subwatershed sites, were visited from August 8 to 18, 2016. Duwamish Estuary latrines were visited again from September 21 to 30, 2016. A subset of these sites plus the Middle Green sites were visited starting on October 3, 2016; however, this collection period was terminated because of rain, which can contaminate scat samples either directly or via runoff from surrounding substrate (P. Thomas, pers. comm.).

On the first day of a latrine visit, all existing scat was sprinkled with glitter. On each of the subsequent daily latrine visits during the sampling window, scat lacking glitter could be characterized as less than 24 hours old. Fresh scat was collected as needed; any uncollected fresh scat was also marked with glitter. Each sample was collected using a different, clean wooden spatula similar to a tongue depressor to avoid cross-contamination. Scat was collected into soda lime clear glass 60-milliliter (mL) jars, sealed, labeled and frozen until chemical analysis.

2.2 Sample Preparation

Of the 73 scat samples collected, 33 were split by Dr. Wainstein for additional analyses by the Northwest Fisheries Science Center, in Seattle, Washington. The remaining portions of the split samples were transferred into 120-mL amber glass jars, labeled, and stored with the 40 samples that were not split. Samples were stored frozen by Dr. Wainstein until sent to Vista Analytical Laboratory (Vista), El Dorado Hills, California, on January 9, 2017, in coolers on ice via overnight express mail service. Temperature blanks were included in each cooler for temperature determination of the cooler contents upon laboratory receipt. Prior to placement into the coolers, sample containers were wrapped in packing tape to ensure the labels would remain affixed to the sample containers.

Per laboratory instructions, Dr. Wainstein filled in chain-of-custody (COC) records for all samples shipped. The sample ID, date of sample collection, and time of sample collection were entered into the appropriate location on the COC. The samples were designated for the appropriate analysis, the remaining required information was entered by Dr. Wainstein, and the COC records were shipped with the samples. In addition, Dr. Wainstein emailed copies of the COC records with the tracking numbers to the laboratory and Leidos immediately after shipment so that any potential shipment problems could be tracked. All samples were received in good condition and within the method temperature requirements. The samples were received by Vista

and stored securely in accordance with Vista standard operating procedures and USEPA methodology. COC records are provided in Appendix A.

Leidos also coordinated PCB Aroclor analysis for 15 percent of the 73 otter scat samples (11 samples). Due to the limited sample mass available, the 11 samples with the largest sample mass available were selected for PCB Aroclor analysis. After Vista had completed the PCB congener analysis and determined that the data were of acceptable quality and no more sample mass would be needed for PCB congener re-analysis, the 11 samples were shipped to Analytical Resources, Inc. (ARI) for PCB Aroclor analysis. Vista's COC record provided the field sample IDs, the date and time of sample collection, the Vista laboratory sample IDs, and the weight of each sample that remained in the sample container.

The samples were shipped frozen from Vista on March 09, 2017 and were packed in ice using standard laboratory and USEPA approved procedures. The COC record and a temperature blank were shipped with the samples. The samples were received by ARI on March 10, 2017 in good condition and within the method temperature requirements. The samples were stored frozen and securely in accordance with ARI standard operating procedures and USEPA methodology. COC records are provided in Appendix A.

Vista also provided ARI with previously agreed-upon instructions. This included a request that ARI use the entire sample mass in each container for analysis in order to achieve the lowest possible detection limit. In addition, due to sample mass limitations, lipid and percent moisture analyses were not conducted by ARI. PCB Aroclor analysis was conducted using USEPA SW-846 8082A (USEPA 2007).

Table 1. Latrine Sample Locations and Number of Analyses

Site Identifier	Site Description	Sub-Watershed	River Mile	No. of Samples		
				PCB Congeners (EPA Method 1668C)	PCB Aroclors (EPA Method 8082A)	Percent Lipids
HIM	Harbor Island	Duwamish Estuary	RM 0	3	0	2
SPM	South Park Marina	Duwamish Estuary	RM 3.5	23	1	0
HAM	Hamm Creek	Duwamish Estuary	RM 4.5	2	0	0
FGL	Foster Golf Links	Duwamish Estuary	RM 10	12	3	1
CWG	Cottonwood Grove	Lower Green River	RM 20	9	2	1
GNA	Green River Natural Area	Middle Green River	RM 38	11	1	3
ICY	Icy Creek	Middle Green River	RM 48	5	2	1
LIR	Jellum Site	Middle Green River	RM 54	8	2	2
			Total No. of Samples	73	11	10

PCB = polychlorinated biphenyl; RM = river mile

3.0 Chemical Analysis

As described in Section 2, otter scat samples were submitted to Vista and ARI for the following analyses:

- Analytical Resources, Inc. (ARI): PCB Aroclors (USEPA SW-846 Method 8082A)
- Vista Analytical Laboratory (Vista): PCB congeners (USEPA Method 1668C) and lipids

3.1 Analytical Methods

All otter scat samples were analyzed by Vista for PCB congeners using an SPB-octyl gas chromatography (GC) column. A subset of 11 samples was sent to ARI for PCB Aroclor analysis. Additional details regarding analytical quality assurance/quality control (QA/QC) requirements are presented in the project Quality Assurance Project Plan (QAPP) (Leidos 2017; Appendix B). Sample analyses conformed to standard USEPA and PSEP (1997) guidance and the project QAPP. Method 1668C, Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS (USEPA 2010), quantifies the chlorinated biphenyl congeners in environmental samples by isotope dilution and internal standard high-resolution gas chromatography/high-resolution mass spectrometry (HRGC/HRMS). Prior to instrument analysis, the sample is prepared by spiking a homogenized aliquot (preferably 10 grams, but less may be used depending on the mass of sample available) with labeled compounds and mixed with anhydrous sodium sulfate and allowed to dry. This is followed by Soxhlet extraction using methylene chloride. If lipid content is required to be measured, 10 percent of the sample extract is reserved for gravimetric determination of percent lipid. The remaining extract is then cleaned-up using the appropriate procedures and concentrated to the appropriate final volume before analysis.

Method 8082A, Polychlorinated Biphenyls by Gas Chromatography (USEPA 2007), determines the concentration of PCBs as Aroclors using open-tubular capillary columns with electron capture detectors (ECD). Prior to analysis, the sample is extracted using the appropriate extraction technique. In general, surrogate standards are added to a measured weight of sample which is extracted using an organic solvent. Following appropriate cleanup methods, the extract is concentrated to a designated final effective volume.

Results are presented by Leidos using the same number of significant figures reported by the laboratory. Calculated totals were reported to two significant figures for Aroclors and three significant figures for congeners. Calculated analyte totals were calculated as described below:

- Total PCB Aroclors were calculated in accordance with the procedures described in the Washington State Sediment Management Standards using only detected values for seven Aroclor mixtures (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260). No additional Aroclors were identified in the samples. For samples in which none of the Aroclor mixtures were detected, the total PCB Aroclor results were given a value equal to the highest reporting limit of the individual Aroclor mixtures and assigned a U-qualifier.
- Total PCB congeners were calculated using only detected values for the 209 individual congener results. If an individual sample has none of the 209 PCB congeners detected, the final total PCB congener result will be given a value equal to the highest detection

limit of the individual congeners and assigned a U-qualifier. PCB congeners that did not meet minimum method requirements for qualitative determination (i.e., estimated maximum possible concentrations) were treated as non-detected values when calculating the total PCB congener sums.

Lipid determination was performed on extracts from 10 samples (Table 1) that had sufficient sample material to allow both lipid and PCB determination. No extract clean-up was performed on subsamples designated for lipid determination. The sample extract was transferred to a 250-mL mixing cylinder and the sample extract was adjusted to a known volume using a mixture of methylene chloride and hexane. The resulting sample extract was mixed well and 10 percent of the solution was transferred to an aluminum dish that had been pre-weighed on an analytical balance. The extract was allowed to air dry completely and then placed in a 50 ± 5°C oven overnight. When the aliquot was dry, the aliquot and aluminum dish were allowed to cool to room temperature, re-weighed, and the weight was recorded. Percent lipids were determined using the following equation:

% lipids = (lipid residue weight/10% of sample weight) X 100.

The remaining 90% of extract then went through the appropriate cleanup procedures prior to preparation for PCB analysis. This portion of the extract was then reduced to the required final volume and transferred to an amber crimp top auto-injector vial with an insert, and then capped and stored until the sample extract was analyzed for PCBs.

Laboratory data reports are provided as Appendix C.

3.2 Analytical Results

Section 3.2.1 summarizes analytical results for total PCB congeners; Section 3.2.2 describes homolog concentrations for all samples combined. PCB Aroclor results and lipid concentrations are discussed in Section 3.2.3 and 3.2.4, respectively.

Complete analytical results for all PCB congeners in individual samples are provided in Appendix D, Table D-1. Complete analytical results for all PCB Aroclors in individual samples are provided in Appendix D, Table D-2.

3.2.1 Total PCB Congeners

Total PCB congener concentrations for all 73 otter scat samples are listed in Table 2. Average concentrations for each latrine are summarized in Table 3, and depicted by RM location in Figure 3. PCB congener concentrations are highest in the samples collected from locations in the LDW and generally decrease in the samples collected farther upstream from latrines in the Lower Green and Middle Green River (Figure 2).

Table 2. Otter Scat Analytical Results – Total PCB Congeners

Latrine Group	Sample ID	No. of Congeners Detected	Total PCB Congeners (ug/kg WW)
HIM (RM 0)	HIM1	140	170
	HIM2	138	81.6
	HIM3	134	91.4
SPM (RM 3.5)	SPM1	119	99
	SPM2	125	80.6
	SPM3	144	318
	SPM4	139	139
	SPM5	135	84.4
	SPM6	146	121
	SPM7	132	44.3
	SPM8	134	44.3
	SPM10	135	331
	SPM11	147	255
	SPM13	133	203
	SPM14	144	382
	SPM15	132	196
	SPM16	128	191
	SPM17	143	288
	SPM18	147	121
	SPM20	131	76.4
	SPM21	120	76.6
	SPM22	148	56.2
	SPM23	143	23.2
	SPM24	143	97.8
	SPM25	138	99.0
	SPM26	126	37.5
HAM (RM 4.5)	HAM1	128	173
	HAM2	131	179
FGL (RM 10)	FGL0	130	44.4
	FGL1	105	2.25
	FGL2	103	3.78
	FGL3	103	4.64
	FGL4	122	8.95
	FGL5	147	25.7
	FGL6	106	8.93
	FGL7	98	14.9
	FGL8	90	11.7
FGL (RM 10)	FGL9	106	4.15
	FGL10	126	11.6
	FGL11	106	17.0
CWG (RM 20)	CWG1	100	5.28
	CWG2	112	5.61
	CWG3	92	3.33
	CWG4	99	3.41
	CWG5	81	2.02
	CWG6	92	12.5
	CWG7	94	3.58
	CWG8	122	11.4
	CWG9	107	5.6
GNA (RM 38)	GNA1	67	0.65
	GNA5	69	3.44
	GNA6	44	0.859
	GNA7	82	0.552
	GNA8	66	0.297
	GNA9	52	0.766
	GNA10	42	0.36
	GNA11	46	1.2
	GNA12	58	0.879
	GNA13	55	0.768
	GNA14	47	1.9
ICY (RM 48)	ICY1	69	0.795
	ICY2	49	0.219
	ICY3	63	0.315
	ICY4	85	0.572
	ICY5	96	1.01
LIR (RM 54)	LIR1	121	15.9
	LIR2	102	8.45
	LIR3	83	0.84
	LIR5	61	0.327
	LIR6	74	1.47
	LIR7	55	0.128
	LIR8	64	0.207
	LIR9	57	2.05

Note: All samples had detected concentrations of PCB congeners. Each sample had at least one J-flagged result.

J = estimated concentration; PCB = polychlorinated biphenyl; RM = river mile; ug/kg = micrograms per kilogram; WW = wet weight

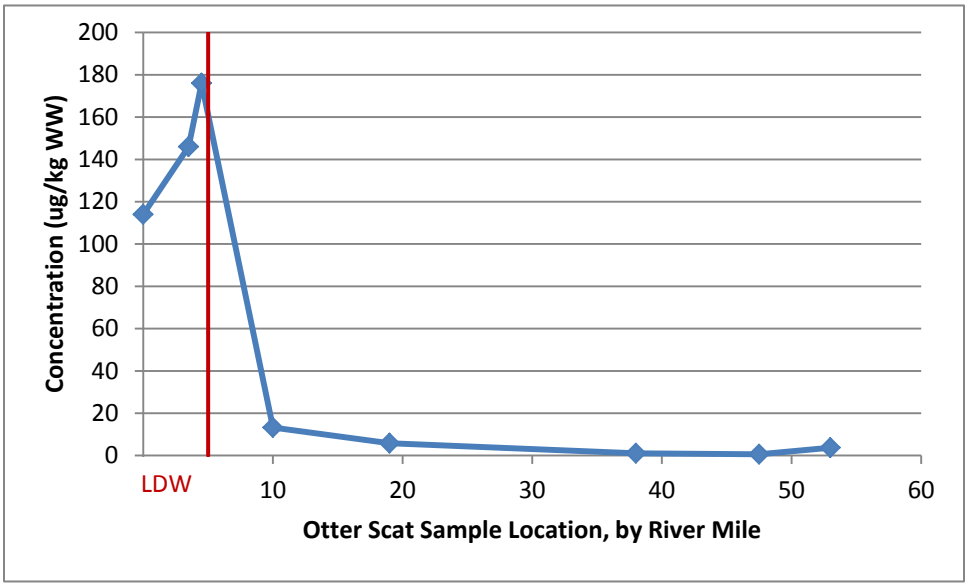
Table 3. Summary of Otter Scat Analytical Results by Latrine Group – Total PCB Congeners

Latrine Group	No. of Samples	Total PCB Congeners (ug/kg WW)		
		Minimum	Maximum	Average
HIM (RM 0)	3	81.6 J	170 J	114 J
SPM (RM 3.5)	23	23.2 J	382 J	146 J
HAM (RM 4.5)	2	173 J	179 J	176 J
FGL (RM 10)	12	2.25 J	44.4 J	13.2 J
CWG (RM 20)	9	2.02 J	12.5 J	5.85 J
GNA (RM 38)	11	0.297 J	3.44 J	1.07 J
ICY (RM 48)	5	0.219 J	1.01 J	0.582 J
LIR (RM 54)	8	0.128 J	15.9 J	3.67 J
All Samples	73	0.128 J	382 J	61.6 J

Note: All samples had detected concentrations of PCB congeners.

J = estimated concentration; PCB = polychlorinated biphenyl; RM = river mile; ug/kg = micrograms per kilogram; WW = wet weight

Figure 2. Average PCB Congener Concentrations by River Mile



Note: LDW extends from RM 0 to RM 5.

3.2.2 PCB Homolog Groups

PCBs are often grouped by the total number of chlorine atoms in the molecule; these groups are called homologs. Monochlorobiphenyl compounds have one chlorine atom; dichlorobiphenyl compounds have two chlorine atoms; trichlorobiphenyl compounds have three chlorine atoms, and so forth to decachlorobiphenyl, which has all possible open benzene ring positions occupied

by a chlorine atom. PCB congeners within the same homolog group have the same molecular weight and tend to have similar chemical properties, such as vapor pressure and water solubility.

PCB congener concentrations by homolog group for all 73 samples are summed in Table 4. As shown in Figure 3, the PCB congeners in otter scat are primarily hexachlorinated congeners, with smaller concentrations of penta- and hepta- compounds.

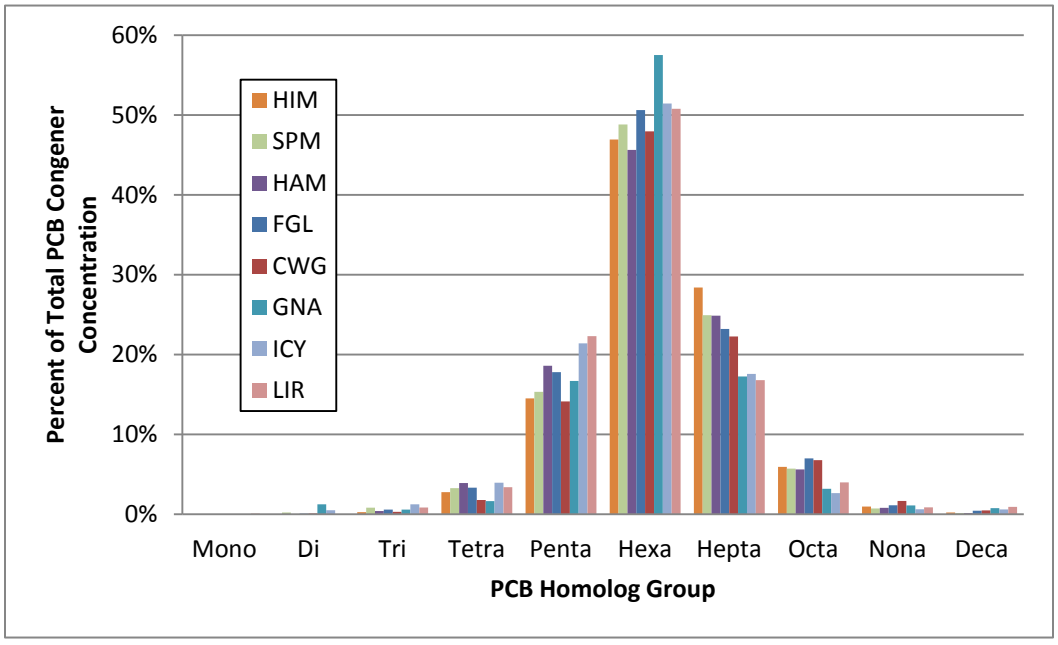
Table 4. Summary of Otter Scat Analytical Results – All Locations, by Homolog

Homolog Group	Frequency of Detection	Concentration (ug/kg WW)		
		Minimum	Maximum	Average
Total Monochlorobiphenyls	35 / 73	0.000193 J	0.0387	0.00498 J
Total Dichlorobiphenyls	62 / 73	0.000245 J	2.28 J	0.0794 J
Total Trichlorobiphenyls	72 / 73	0.000778 J	1.49 J	0.275 J
Total Tetrachlorobiphenyls	73 / 73	0.00350 J	10.2	1.67 J
Total Pentachlorobiphenyls	73 / 73	0.0376 J	46.1 J	8.77 J
Total Hexachlorobiphenyls	73 / 73	0.0594 J	160 J	28.2 J
Total Heptachlorobiphenyls	73 / 73	0.0113 J	131	15.8 J
Total Octachlorobiphenyl	73 / 73	0.00592 J	43.7	3.76 J
Total Nonachlorobiphenyl	71 / 73	0.00182	4.59	0.494 J
Total Decachlorobiphenyl	69 / 73	0.00109	0.482	0.0975
Total PCB congeners		0.128 J	382 J	61.6 J

Notes: The minimum, maximum, and average concentrations are calculated from detected results only, unless no congeners within a homolog group were detected.

ug/kg = micrograms per kilogram; WW = wet weight, J = approximate concentration

Figure 3. Percent of Total PCB Congener Concentration, by Homolog Group



3.2.3 PCB Aroclors

A total of 11 samples were analyzed for PCB Aroclors. As described above, these samples were selected based on the available sample volume. Total PCB Aroclors are summarized in Table 5 below; total PCB congener concentrations for these 11 samples are also presented for comparison. Aroclor 1260 was the only Aroclor that was detected in any of these samples.

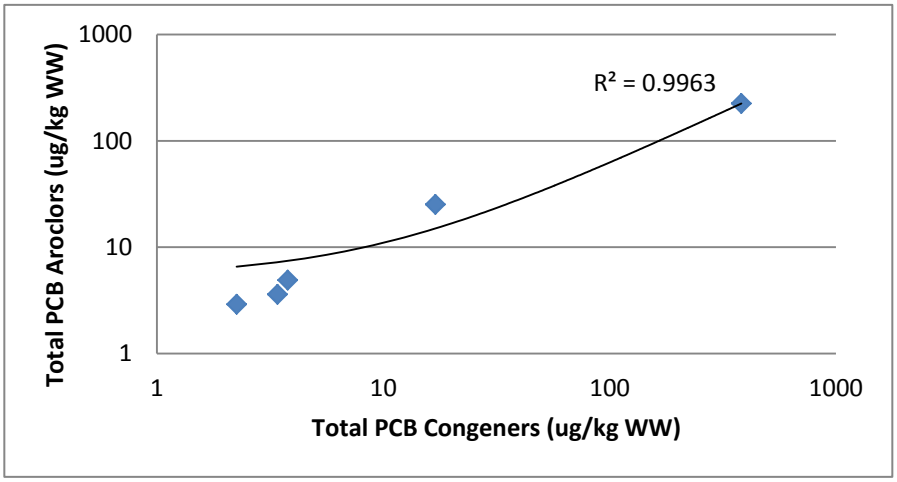
Table 5. Summary of Otter Scat Analytical Results – PCB Aroclors

Sample ID	Total PCB Aroclors (ug/kg WW)	Total PCB Congeners (ug/kg WW)	Ratio (Aroclors to Congeners)
SPM14	224	382	0.6
FGL1	2.9	2.25	1.3
FGL2	4.9	3.78	1.3
FGL11	25	17.0	1.5
CWG4	3.6	3.41	1.1
CWG5	6.8 U	2.02	NA
GNA12	4.2 U	0.879	NA
ICY2	5.3 U	0.219	NA
ICY3	5.1 U	0.315	NA
LIR7	7.8 U	0.128	NA
LIR8	6.4 U	0.207	NA

U = not detected; listed value is the highest reporting limit for individual Aroclors; ug/kg = micrograms per kilogram; WW = wet weight; PCB = polychlorinated biphenyl.

For the five samples in which Aroclors were detected, the total PCB Aroclor and total PCB congener concentrations were compared to determine whether there is a correlation between the results. A linear regression was performed to determine the strength of correlation, and an r-squared value was calculated. As shown below, the correlation is high, with an r-squared value of 0.996 (Figure 4). For samples with concentrations less than about 4 to 6 ug/kg, PCB Aroclor analysis was generally not able to detect the presence of PCBs.

Figure 4. Correlation Between PCB Aroclor and PCB Congener Results



3.2.4 Lipid Analysis

Lipid content was analyzed in 10 otter scat samples, collected at 6 of the latrine sites. Analytical results are presented and summarized in Table 6. Complete analytical results for lipid analysis in individual samples are provided in Appendix D, Table D-1.

Average lipid-normalized PCB concentrations were greatest in samples from the LDW, decreased through the sample taken at RM 48, and increased at the site farthest upstream (RM 54). Total PCB congeners, reported as lipid weight, were compared to percent lipids to determine correlation. The r-squared value, 0.0043, shows that congeners and lipids are not correlated.

Table 6. Summary of Lipid Analysis Results

Sample ID	Lipid Content	Total PCB Congeners, Lipid-Normalized (ug/kg LW)
HIM1	0.77%	22,200
HIM4	1.6%	5,710
FGL2	0.24%	1,590
CWG5	0.16%	1,230
GNA7	0.46%	121
GNA8	0.37%	80
GNA12	0.16%	540
ICY2	0.11%	209
LIR1	3.0%	529
LIR2	0.87%	969
Average	0.77%	

Note: Concentrations shown are lipid-normalized, i.e., concentrations are expressed in units of milligrams of PCB per kilogram of lipid.

LW=lipid-weight; PCB = polychlorinated biphenyl

3.3 QA/QC and Data Validation

All chemical results gathered during this investigation were independently validated by EcoChem, Inc. (EcoChem) of Seattle, Washington. A summary-level, USEPA Stage 2B data validation was performed on all PCB Aroclor results; a full-level, USEPA Stage 4 data validation was performed on all PCB congener results. The data were reviewed using guidance and quality control criteria documented in the analytical methods; in the project QAPP (Appendix B); *National Functional Guidelines for Organic Data Review* (USEPA 2008, 2014); and *National Functional Guidelines for Chlorinated Dibenzo-p-Dioxin (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review* (USEPA 2011).

The Leidos project chemist reviewed the laboratory QA/QC results for each analysis. EcoChem submitted a data validation report that summarized the results. The Leidos project chemist reviewed the data validation report against the QA/QC results submitted in the laboratories' analytical data packages, and contacted EcoChem to resolve any discrepancies. A summary of

the QA/QC review and validation results is provided below. The complete data validation report is provided in Appendix E.

Validated sample results will be submitted to Ecology's Environmental Information Management (EIM) database following completion of the final data report. Information regarding EIM can be found on Ecology's website: http://www.ecy.wa.gov/eim/.

3.3.1 PCB Congeners

No matrix spike (MS)/matrix spike duplicate (MSD) analyses were performed due to lack of available sample volume. In addition, MS/MSD analyses are not a requirement of PCB congener analysis using Method 1668C. Accuracy was assessed using labeled compound recoveries in each sample, the ongoing precision and recovery (OPR) standard prepared with each analytical batch, and standard reference materials. Field duplicates are not applicable for the collection of otter scat samples and therefore were not collected. Field blanks and equipment rinse blanks were not collected or analyzed for this project. Field QC blanks were not necessary for this project because each sample was collected using a different, clean wooden spatula, so no equipment decontamination was necessary. Precision could not be evaluated because MSD analysis and OPR duplicates are not a method requirement and were not analyzed.

The QC parameters examined during the data validation process are discussed below. The number of qualified congener results along with the data validation qualifier and the data qualifier reason code are provided for each QC parameter examined. In addition, the potential analytical bias (high or low) is provided when QC outliers provide the potential bias in the results.

To assess the impact of any blank contaminant on the reported sample results, an action level was established at five times (5x) the concentration reported in the blank. If a contaminant was reported in an associated field sample and the concentration was less than the action level, the result was qualified as not detected (U-7) at the reported concentration. Seventy-three congener results were qualified as not detected (U) due to method blank contamination.

An OPR standard is prepared with each analytical batch. The OPR is a method blank spiked with known quantities of analytes and is used to assure that the percent recovery produced by the laboratory remain within the limits specified by the method. Eleven PCB-15 results were qualified as estimated J for detected analytes and UJ for non-detected analytes due to recoveries below the lower control limit (LCL) with reason code 10L, indicating a potential low bias.

Isotopically labeled compounds are added to a homogenized aliquot of sample prior to extraction. The labeled compounds correspond to specific PCB congeners and are used in the quantitation of individual congeners and afford recovery correction for all congeners. The percent recovery for labeled compounds was within method specified control limits with the exception of those discussed below. No action was taken for cleanup standard outliers or for labeled compounds used to quantitate other labeled compounds. Three hundred and twelve individual PCB congeners quantitated using labeled compounds with recoveries above the method specified upper control limit (UCL) were qualified as estimated J with reason code 13H, indicating a potential high bias. Two PCB congeners quantitated using labeled compounds with recoveries below the method specified LCL were qualified as estimated J with reason code 13H, indicating a potential low bias.

When compound identification did not meet the ion ratio for analyte identification, the lab reported the analyte as not detected (ND) with a UEMPC qualifier. Since the compound was appropriately qualified as ND in these instances, no action was required by the data validator. When an EMPC qualifier was applied to a homolog group by the laboratory, this indicated that one or more analytes in the group did not meet identification criteria. Sixteen homolog groups were qualified as estimated J with reason code 25 during the validation process.

Several samples were re-analyzed at dilution due to results that exceeded the calibration range of the instrument in the original analyses. The lab reported the most appropriate result from each analysis for samples that required multiple dilutions. In instances where limited sample mass was available, the reporting limits were elevated. By using original and diluted runs to report sample results, the laboratory minimized the reporting of congeners above the calibration range of the instrument, however it was not practical to run enough dilutions to completely eliminate all congener results above the calibration range of the instrument. Five PCB congener results were qualified as estimated J with reason code 20 because the result was above the calibration range of the instrument.

Sample receipt, preservation and holding times were met for all samples. All initial calibrations and continuing calibration verifications met method acceptance criteria. The required target analyte list was complete. Several results were recalculated from the raw data. No transcription or calculation errors were found. The electronic data deliverable (EDD) was verified against the laboratory report for all data packages, and no errors were found. In addition, the laboratory submitted all required deliverables and followed adequate corrective action processes and all anomalies were discussed in the case narratives for each data package. All data packages were complete.

3.3.2 PCB Aroclors

No MS/ MSD analyses were performed due to lack of available sample volume. Precision and accuracy were evaluated using the laboratory control sample/laboratory control sample duplicate (LCS/LCSD) and surrogate recoveries. Field duplicates are not applicable for the collection of otter scat samples and therefore were not collected. Field blanks and equipment rinse blanks were not collected or analyzed for this project. Field QC blanks were not necessary for this project because each sample was collected using a different, clean wooden spatula similar to a lounge depressor, so no equipment decontamination was necessary. Precision could not be evaluated because MSD analysis and OPR duplicates are not a method requirement and were not analyzed.

The QC parameters examined during the data validation process are discussed below. The number of qualified congener results along with the data validation qualifier and the data qualifier reason code are provided for each QC parameter examined. In addition, the potential analytical bias (high or low) is provided when QC outliers provide the potential bias in the results.

Comparison between the results produced on the primary analytical column and the confirmation analytical column are used as a measure to assess the accuracy of compound identification. Four samples exceeded the control limit of 40%. All four samples also exceeded 60%, so the results were qualified as tentatively identified NJ with reason code 3.

For sample SPM14, the reporting limit for Aroclor 1254 was elevated due to matrix interferences.

Sample receipt, preservation, and holding times were met for all samples. All initial calibrations and continuing calibration verifications met method acceptance criteria. All laboratory method blanks were free from contamination. All surrogate and LCS/LCSD accuracy and precision met method acceptance criteria, where appropriate. The required target analyte list was complete for all samples. Several results were recalculated from the raw data. No transcription or calculation errors were found. The EDD was verified against the laboratory report for all data packages, and no errors were found. In addition, the laboratory submitted all required deliverables and followed adequate corrective action processes and all anomalies were discussed in the case narratives for each data package. All data packages were complete.

3.3.3 Overall Assessment

All analytical data, data validation qualifiers, and QC results were evaluated to determine the confidence with which the results could be used in the decision-making process. An evaluation of the data quality parameters against method and QAPP acceptance criteria as discussed in the preceding sections were used to determine the overall data usability. No sample results were rejected, indicating excellent data completeness at 100 percent complete and usable for decision-making. Results that were qualified as U, UJ, J, or NJ for various reasons encountered minor analytical problems and potential limitations are discussed in the preceding sections, but are considered fully usable for decision-making.

4.0 Conclusions

PCB congener concentrations in river otter scat samples generally were highest in the LDW (RM 0 to 5), and were significantly lower upstream of the LDW. The highest average concentration of PCBs (176 ug/kg WW) was at sample location HAM (RM 4.5), near Hamm Creek. The highest detected individual scat concentration (382 ug/kg WW) was at sample location SPM (RM 3.5), at South Park Marina and near Terminal 117. Sample locations are shown in Figure 1.

Fish and shellfish comprise the primary prey species available to otters in the Green-Duwamish River (Windward 2007). Concentrations of PCBs in fish and shellfish are elevated in the LDW (Windward 2010); no fish or shellfish tissue data were available upstream of the LDW for comparison. Data from sediment and surface water samples show higher concentrations in the LDW and lower concentrations farther upstream along the Duwamish and Green Rivers (Leidos 2017).

Contaminant concentrations in otter scat are not directly comparable to tissue concentrations of otter prey, since they are accumulated through different metabolic processes. However, the general pattern of decreasing PCB congener concentrations in surface water and sediments with distance from the LDW is comparable to the pattern of decreasing concentrations in river otter scat.

The field study design ensured that only fresh scat were collected and a study of captive river otters has shown passage rates of food through the digestive tract of 167 to188 minutes (White et al. 2007); thus, each sample likely represents food ingested over the previous 24-hour period. River otters occupy home ranges and their daily movements typically cover 5 km (3 miles) or less following watercourses, with the exception of dispersing juveniles, which cover greater distances and may move through uplands (Melquist and Hornocker 1983). Otters tend to return to the same latrine sites within their home ranges and may defend them against other otters (Reid et al. 1994). Preliminary genetic results (unpublished data, P. Thomas and M. Wainstein) revealed multiple individuals traveling between LDW sites (RM 0 to 5), while scat from location GNA (RM 38) represented unique individuals not detected lower in the river. Therefore, individual otters likely acquire most of their food within a relatively short distance of their latrine site, and are probably not bringing contaminated prey items to the Green-Duwamish system from elsewhere.

While the otters are unlikely to bring prey from distant sources into the Green-Duwamish River, they may redistribute contaminants acquired from prey within the river system. River otters are known salmon predators (e.g., Crowley et al. 2013, Scordino et al. 2016). Salmon returning to the system to spawn and die carry contaminant burdens (O'Neill et al. 2006), and otters may represent a vector for concentrating these contaminants at latrine sites. In the Green-Duwamish system, river otters may be transferring contaminants (and other nutrients, Ben-David et al. 1998) much lower in the river relative to spawning sites where decomposition and scavenging normally occur. While additional analyses from this study may reveal relationships between contaminant profiles in otter scat and prey sources (local taxa vs migrating salmon), the dynamic between otter predation, river mile of latrine site, and salmon run timing for multiple salmon species is complex. Given that "hard part" or genetic analyses of prey items in scat were not

conducted, inferences from this study would serve primarily to identify targeted questions for future research.

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Appendix A
Chain of Custody Documentation

Submit by Email* *A printed COC must accompany all samples.

Print Form

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project ID: 1700056 Temp 4.0 °C
Storage ID: WF-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
◯ 14 days ◯ 7 days Specify:

Project I.D.: NARO P.O. #: Sampler: Michelle Wainstein (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
	LEIDOS						

Relinquished by: (Printed Name and Signature) Michelle Wainstein — Date: 9 Jan 2017 — Time:
Received by: (Signature and Printed Name) Marissa Sparks — Date: 1/10/17 — Time: 1051
Relinquished by: (Printed Name and Signature) — Date: — Time:
Received by: (Signature and Printed Name) — Date: — Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

Method of Shipment: FedEx Overnight

Tracking No.: 7852 6632 2879

ATTN: Sample Receiving

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCBs	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1668 PAH	EPA1614 WHO-29	CARB429	
GNA7	11aug16	10:45	NARO	1	G	O											X				X		LIPIDS
GNA8	11aug16	10:45	NARO	1	G	O											X				X		LIPIDS
GNA9	15aug16	10:13	NARO	1	G	O											X				X		LIPIDS
GNA10	15aug16	10:13	NARO	1	G	O											X				X		LIPIDS
GNA11	15aug16	10:13	NARO	1	G	O											X				X		LIPIDS
GNA12	16aug16	10:12	NARO	1	G	O											X				X		LIPIDS
GNA13	16aug16	10:12	NARO	1	G	O											X				X		LIPIDS
GNA14	16aug16	10:12	NARO	1	G	O											X				X		LIPIDS
HAM1	30jul16	8:10	NARO	1	G	O											X				X		LIPIDS
HAM2	3aug16	11:45	NARO	1	G	O											X				X		LIPIDS

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Joe Peters
Company: LEIDOS
Address:
City: State: Zip:
Phone: 301-704-2500 Fax:
Email: petersj@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate, ☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum
O = Other river otter scat

Submit by Email* *A printed COC must accompany all samples.

Print Form

EXACT COPY OF ORIGINAL
Init BJB 1/10/17

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project ID: 1700056 Temp 4.0 °C
Storage ID: WF-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
◯ 14 days ◯ 7 days Specify:

Project I.D.: NARO P.O. #: Sampler: Michelle Wainstein (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
	LEIDOS						

Relinquished by: (Printed Name and Signature) Michelle Wainstein — Date: 9 Jan 2017 — Time: — Received by: (Signature and Printed Name) MSparks Marissa Sparks — Date: 1/10/17 — Time: 1051

Relinquished by: (Printed Name and Signature) — Date: — Time: — Received by: (Signature and Printed Name) — Date: — Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: Sample Receiving

Method of Shipment: FedEx Overnight

Tracking No.: 7852 6632 2879

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA1668 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCBs	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1668 PAH	EPA1614 WHO-29	CARB429	
HIM1	2aug16	8:40	NARO	1	G	O											X				X	LIPIDS	
HIM3	26sep16	9:50	NARO	1	G	O											X				X	LIPIDS	
HIM4	26sep16	9:50	NARO	1	G	O											X				X	LIPIDS	
ICY1	11aug16	12:00	NARO	1	G	O											X				X	LIPIDS	
ICY2	12aug16	11:20	NARO	1	G	O											X				X	LIPIDS	
ICY3	12aug16	11:20	NARO	1	G	O											X				X	LIPIDS	
ICY4	17aug16	11:23	NARO	1	G	O											X				X	LIPIDS	
ICY5	3oct16	11:05	NARO	1	G	O											X				X	LIPIDS	
LIR1	12aug16	12:30	NARO	1	G	O											X				X	LIPIDS	
LIR2	12aug16	12:30	NARO	1	G	O											X				X	LIPIDS	

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Joe Peters
Company: LEIDOS
Address:
City: State: Zip:
Phone: 301-704-2500 Fax:
Email: petersj@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate, ☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum O = Other river otter scat

Submit by Email* *A printed COC must accompany all samples.

Print Form

EXACT COPY OF ORIGINAL

Init BRB 1/10/17

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY

Laboratory Project ID: 1700057 Temp 4.3 °C

Storage ID: WF-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)

Standard ◉ 21 days

Rush (surcharge may apply)

◯ 14 days ◯ 7 days Specify:

Project I.D.: NARO P.O. #: Sampler: Michelle Wainstein (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
	LEIDOS						

Relinquished by: (Printed Name and Signature) Michelle Wainstein — Date: 9 Jan 2017 — Time: — Received by: (Signature and Printed Name) Marissa Sparks — Date: 1/10/17 — Time: 1041

Relinquished by: (Printed Name and Signature) — Date: — Time: — Received by: (Signature and Printed Name) — Date: — Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

Method of Shipment: FedEx Overnight

Tracking No.: 7852 6632 2868

ATTN: Sample Receiving

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCBs	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29	
CWG1	27jul16	11:20	NARO	1	G	O											X				X	LIPIDS
CWG2	27jul16	11:25	NARO	1	G	O											X				X	LIPIDS
CWG3	29jul16	11:15	NARO	1	G	O											X				X	LIPIDS
CWG4	29jul16	11:15	NARO	1	G	O											X				X	LIPIDS
CWG5	30jul16	10:30	NARO	1	G	O											X				X	LIPIDS
CWG6	31jul16	10:15	NARO	1	G	O											X				X	LIPIDS
CWG7	31jul16	10:15	NARO	1	G	O											X				X	LIPIDS
CWG8	3aug16	13:40	NARO	1	G	O											X				X	LIPIDS
CWG9	3aug16	13:40	NARO	1	G	O											X				X	LIPIDS
FGL0	30jul16	8:52	NARO	1	G	O											X				X	LIPIDS

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Joe Peters
Company: LEIDOS
Address:
City: State: Zip:
Phone: 301-704-2500 Fax:
Email: petersj@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate,
☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum
O = Other river otter scat

Submit by Email* *A printed COC must accompany all samples.

Print Form

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project ID: 1700057 Temp 4.3 °C
Storage ID: WF-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
◯ 14 days ◯ 7 days Specify:

Project I.D.: NARO P.O. #: Sampler: Michelle Wainstein (Name)

Invoice to: Name | Company: LEIDOS | Address | City | State | Zip | Ph# | Fax #

Relinquished by: (Printed Name and Signature) Michelle Wainstein Date: 9 Jan 2017 Time: Received by: (Signature and Printed Name) Marissa Sparks Date: 1/10/17 Time: 1047

Relinquished by: (Printed Name and Signature) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

Method of Shipment: FedEx Overnight

Tracking No.: 7852 6632 2868

ATTN: Sample Receiving

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCBs	EPA1668 209 CONGENERS	EPA1668 PBDE	FPA1614 PAH	CARB429 WHO-29	
FGL1	31jul16	8:30	NARO	1	G	O											X				X	LIPIDS
FGL2	31jul16	8:30	NARO	1	G	O											X				X	LIPIDS
FGL3	3aug16	12:30	NARO	1	G	O											X				X	LIPIDS
FGL4	3aug16	12:30	NARO	1	G	O											X				X	LIPIDS
FGL5	24sep16	13:10	NARO	1	G	O											X				X	LIPIDS
FGL6	25sep16	8:45	NARO	1	G	O											X				X	LIPIDS
FGL7	4oct16	13:30	NARO	1	G	O											X				X	LIPIDS
FGL8	4oct16	13:30	NARO	1	G	O											X				X	LIPIDS
FGL9	4oct16	13:30	NARO	1	G	O											X				X	LIPIDS
FGL10	4oct16	13:30	NARO	1	G	O											X				X	LIPIDS

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Joe Peters
Company: LEIDOS
Address:
City: State: Zip:
Phone: 301-704-2500 Fax:
Email: petersj@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate, ☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum
O = Other river otter scat

Submit by Email* *A printed COC must accompany all samples.

Print Form

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project ID: 1700058 Temp 3.7 °C
Storage ID: WF-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
◯ 14 days ◯ 7 days Specify:

Project I.D.: NARO P.O. #: Sampler: Michelle Wainstein (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
	LEIDOS						

Relinquished by: (Printed Name and Signature) Michelle Wainstein	Date: 9 Jan 2017	Time:	Received by: (Signature and Printed Name) Marissa Sparks	Date: 1/10/17	Time: 1045
Relinquished by: (Printed Name and Signature)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: Sample Receiving

Method of Shipment: FedEx Overnight

Tracking No.: 7852 6632 2880

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCBs	EPA1668 209 CONGENERS	EPA1614 PBDE	EPA1614 PAH	CARB429 WHO-29	
SPM1	30jul16	7:30	NARO	1	G	O											X				X	LIPIDS
SPM2	3aug16	11:00	NARO	1	G	O											X				X	LIPIDS
SPM3	9aug16	13:15	NARO	1	G	O											X				X	LIPIDS
SPM4	9aug16	13:15	NARO	1	G	O											X				X	LIPIDS
SPM5	9aug16	13:15	NARO	1	G	O											X				X	LIPIDS
SPM6	9aug16	13:15	NARO	1	G	O											X				X	LIPIDS
SPM7	10aug16	9:20	NARO	1	G	O											X				X	LIPIDS
SPM8	10aug16	9:20	NARO	1	G	O											X				X	LIPIDS
SPM10	13aug16	7:20	NARO	1	G	O											X				X	LIPIDS
SPM11	17aug16	9:10	NARO	1	G	O											X				X	LIPIDS

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Joe Peters
Company: LEIDOS
Address:
City: State: Zip:
Phone: 301-704-2500 Fax:
Email: petersj@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate, ☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum
O = Other river otter scat

Submit by Email* *A printed COC must accompany all samples.

Print Form

EXACT COPY OF ORIGINAL
Init BOB 01/11/17

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project ID: 1700058 Temp 3.7 °C
Storage ID: WF-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
◯ 14 days ◯ 7 days Specify:

Project I.D.: NARO P.O. #: Sampler: Michelle Wainstein (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
	LEIDOS						

Relinquished by: (Printed Name and Signature) Michelle Wainstein Date: 9 Jan 2017 Time:
Received by: (Signature and Printed Name) Marissa Sparks Date: 1/10/17 Time: 1046

Relinquished by: (Printed Name and Signature) Date: Time:
Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

Method of Shipment: FedEx Overnight

Tracking No.: 7852 6632 2880

ATTN: Sample Receiving

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCBs	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1668 PAH	EPA1614 WHO-29	CARB429	
SPM13	17aug16	9:10	NARO	1	G	O											X				X	LIPIDS	
SPM14	17aug16	9:10	NARO	1	G	O											X				X	LIPIDS	
SPM15	17aug16	9:10	NARO	1	G	O											X				X	LIPIDS	
SPM16	17aug16	9:10	NARO	1	G	O											X				X	LIPIDS	
SPM17	24sep16	12:25	NARO	1	G	O											X				X	LIPIDS	
SPM18	25sep16	8:10	NARO	1	G	O											X				X	LIPIDS	
SPM20	25sep16	9:10	NARO	1	G	O											X				X	LIPIDS	
SPM21	28sep16	9:35	NARO	1	G	O											X				X	LIPIDS	
SPM22	28sep16	9:45	NARO	1	G	O											X				X	LIPIDS	
SPM23	28sep16	9:45	NARO	1	G	O											X				X	LIPIDS	

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Joe Peters
Company: LEIDOS
Address:
City: State: Zip:
Phone: 301-704-2500 Fax:
Email: petersj@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate,
☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum
O = Other river otter scat

Submit by Email* *A printed COC must accompany all samples.

Print Form

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project ID: 1700059 Temp 4.0 °C
Storage ID: WF-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
◯ 14 days ◯ 7 days Specify:

Project I.D.: NARO P.O. #: Sampler: Michelle Wainstein (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
	LEIDOS						

Relinquished by: (Printed Name and Signature) Michelle Wainstein Date: 9 Jan 2017 Time: Received by: (Signature and Printed Name) Marissa Sparks Date: 1/10/17 Time: 1052

Relinquished by: (Printed Name and Signature) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: Sample Receiving

Method of Shipment: FedEx Overnight

Tracking No.: 7852 6632 2879

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA1668 PCDD/PCDF	FPA1614 TOTALS	CARB429 COPLANAR PCBs	209 CONGENERS	PBDE	PAH	WHO-29	
LIR3	12aug16	12:30	NARO	1	G	O											X				X	LIPIDS
LIR5	15aug16	12:50	NARO	1	G	O											X				X	LIPIDS
LIR6	18aug16	12:30	NARO	1	G	O											X				X	LIPIDS
LIR7	18aug16	12:30	NARO	1	G	O											X				X	LIPIDS
LIR8	18aug16	12:35	NARO	1	G	O											X				X	LIPID
LIR9	18aug16	12:35	NARO	1	G	O											X				X	LIPID

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Joe Peters
Company: LEIDOS
Address:
City: State: Zip:
Phone: 301-704-2500 Fax:
Email: petersj@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate, ☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum
O = Other river otter scat

Submit by Email* *A printed COC must accompany all samples.

Print Form

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY

Laboratory Project ID: 1700059 Temp 4.3 °C

Storage ID: WF 2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
◯ 14 days ◯ 7 days Specify:

Project I.D.: **NARO** P.O. #: Sampler: **Michelle Wainstein** (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
	LEIDOS						

Relinquished by: (Printed Name and Signature) **Michelle Wainstein** Date: 9 Jan 2017 Time: Received by: (Signature and Printed Name) Marissa Sparks Date: 1/10/17 Time: 1041

Relinquished by: (Printed Name and Signature) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

Method of Shipment: **FedEx Overnight**

Tracking No.: 7852 6632 2868

ATTN: **Sample Receiving**

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCBs	EPA1668 209 CONGENERS	EPA1668 PBDE	FPA1614 PAH	CARB429 WHO-29	
FGL11	6oct16	12:30	NARO	1	G	O											X				X	LIPIDS
GNA1	7aug16	11:30	NARO	1	G	O											X				X	LIPIDS
GNA5	9aug16	11:15	NARO	1	G	O											X				X	LIPIDS
GNA6	11aug16	10:45	NARO	1	G	O											X				X	LIPIDS

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: **Joe Peters**
Company: **LEIDOS**
Address:
City: State: Zip:
Phone: **301-704-2500** Fax:
Email: **petersj@leidos.com**

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate,
☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum
O = Other river otter scat

Submit by Email* *A printed COC must accompany all samples.

Print Form

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project ID: 1700059 Temp 3.7 °C
Storage ID: WF-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
◯ 14 days ◯ 7 days Specify:

Project I.D.: NARO P.O. #: Sampler: Michelle Wainstein (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
	LEIDOS						

Relinquished by: (Printed Name and Signature) Michelle Wainstein Date: 9 Jan 2017 Time: Received by: (Signature and Printed Name) Marissa Sparks Date: 1/10/17 Time: 1046

Relinquished by: (Printed Name and Signature) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

Method of Shipment: FedEx Overnight

Tracking No.: 7852 6632 2880

ATTN: Sample Receiving

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 TCDF/TCDF	EPA8290 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 TCDF/TCDF	EPA8280 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 TCDF/TCDF	EPA1668 PCDD/PCDF	EPA1668 TOTALS	EPA1614 COPLANAR PCBs	EPA1614 209 CONGENERS	EPA1614 PBDE	EPA1614 PAH	CARB429 WHO-29	
SPM24	29sep16	10:45	NARO	1	G	O											X				X	LIPIDS
SPM25	29sep16	10:50	NARO	1	G	O											X				X	LIPIDS
SPM26	30sep16	9:35	NARO	1	G	O											X				X	LIPIDS

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: Joe Peters
Company: LEIDOS
Address:
City: State: Zip:
Phone: 301-704-2500 Fax:
Email: petersj@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate, ☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum O = Other river otter scat

17C0166

Vista Analytical Laboratory

Chain-of-Custody Record

Samples from:
Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
916-673-1520

Samples sent to:
Analytical Resources, Inc.
Attn: Amanda Volgardsen
4611 S 134th Place, Suite 100
Tukwila, WA 98168

Sample Information

Lab Number	Sample Name	Sampled Date	Matrix	# of Container(s)	Amount (g)	Method
1700056-06	GNA12	8/16/16 10:12	River Otter Scat	1	14.00	PCB Aroclors Method 8082
1700056-15	ICY2	8/12/16 11:20	River Otter Scat	1	11.35	PCB Aroclors Method 8082
1700056-16	ICY3	8/12/16 11:20	River Otter Scat	1	13.30	PCB Aroclors Method 8082
1700057-04	CWG4	7/29/16 11:15	River Otter Scat	1	11.81	PCB Aroclors Method 8082
1700057-05	CWG5	7/30/16 10:30	River Otter Scat	1	8.35	PCB Aroclors Method 8082
1700057-11	FGL1	7/31/16 8:30	River Otter Scat	1	11.99	PCB Aroclors Method 8082
1700057-12	FGL2	7/31/16 8:30	River Otter Scat	1	7.05	PCB Aroclors Method 8082
1700058-12	SPM14	8/17/16 9:10	River Otter Scat	1	7.48	PCB Aroclors Method 8082
1700059-04	LIR7	8/18/16 12:30	River Otter Scat	1	6.90	PCB Aroclors Method 8082
1700059-05	LIR8	8/18/16 12:35	River Otter Scat	1	7.70	PCB Aroclors Method 8082
1700059-07	FGL11	10/6/16 12:30	River Otter Scat	1	5.80	PCB Aroclors Method 8082

Special Instructions: Please use the entire sample volume for analysis. Percent lipids and percent moisture are not required. Requested reporting limit of 4 ppb.

Required Data Deliverables: WA EIM and Level IV in PDF.

Reliquished (Printed Name/Signature/Date/Time)
Sydney Roughton 3/9/17 1507

Received (Printed Name/Signature/Date/Time)
Paul Mork Paul Mork 3/10/2017 11:15

Reliquished (Printed Name/Signature/Date/Time)

Received (Printed Name/Signature/Date/Time)

Appendix B
Quality Assurance Project Plan

Lower Duwamish Waterway
Otter Scat Analysis and Reporting

Quality Assurance Project Plan

Prepared for

Toxics Cleanup Program
Northwest Regional Office
Washington State Department of Ecology
Bellevue, Washington

Prepared by

Leidos
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

January 2017

Limitation of Use: Leidos' project activities were restricted to analysis of records made available by the Washington State Department of Ecology (Ecology) or third parties during the project. In preparing this report, Leidos has relied on verbal and written information provided by secondary sources and interviews, including information provided by the customer. Leidos has made no independent investigations concerning the accuracy or completeness of the information relied upon. Because the project activities consisted of evaluating a limited supply of information, Leidos may not have identified all potential items of concern and, therefore, Leidos warrants only that the project activities under this contract have been performed within the parameters and scope communicated by Ecology and reflected in the contract. Maps presented in this report were accurate based on the information available to Leidos.

This report is intended to be used in its entirety. Taking or using in any way excerpts from this report is not permitted, and any party doing so does so at its own risk.

Table of Contents

Appendices

Tables

Acronyms and Abbreviations

CoC	chain of custody
Ecology	Washington State Department of Ecology
EDD	electronic data deliverable
EIM	Environmental Information Management
EPA	U.S. Environmental Protection Agency
IPR	initial precision and recovery
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDW	Lower Duwamish Waterway
MS	matrix spike
MSD	matrix spike duplicate
OPR	ongoing precision and recovery
PCB	polychlorinated biphenyl
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RPD	relative percent difference
Vista	Vista Analytical Laboratories
WAC	Washington Administrative Code

1.0 Introduction

The Lower Duwamish Waterway (LDW) site is an approximately 5-mile portion of the Duwamish River, which flows into Elliott Bay. The Washington State Department of Ecology (Ecology) is the lead agency for source control on the LDW site, as defined in the U.S. Environmental Protection Agency's (EPA's) *Record of Decision, Lower Duwamish Waterway Superfund Site* (EPA 2014).

Approximately 75 samples of otter scat have been collected within the Green/Duwamish watershed by a third-party researcher. Ecology has asked Leidos to coordinate polychlorinated biphenyl (PCB) congener analysis using EPA Method 1668C (EPA 2010) for all 209 congeners for all samples and PCB Aroclor analysis using EPA SW-846 Method 8082A (EPA 2007) for 15 percent of the samples (11 samples). Leidos has prepared this Quality Assurance Project Plan (QAPP) for work performed as a subtask under Work Assignment C11139QQ.

This QAPP was prepared in accordance with the requirements outlined in Washington Administrative Code (WAC) 173-340-820. Analytical procedures are identified in the QAPP in accordance with WAC 173-340-830.

1.1 Purpose and Objectives

The primary goal of this QAPP is to define procedures that will ensure the quality and integrity of the samples, accuracy and precision of the analyses, representativeness of the results, and completeness of the information. The information gathered during this effort will provide Ecology with PCB congener and PCB Aroclor concentrations in river otter scat samples that are of sufficient quality to determine data usability and limitations, if any, that may exist for the data gathered during this effort. All data quality objectives and procedures associated with laboratory analysis, initial and continuing instrument/equipment calibration, internal quality assurance (QA) checks, performance and system audits, preventive maintenance and scheduling, data quality assessment, corrective action, and QA reports to management applicable to this project are described in this document. Sample analytical results may be used for the following purposes:

- Determine the PCB congener concentrations in all samples submitted by the third-party researcher and determine the PCB Aroclor concentrations in 15 percent of the samples submitted by the third-party researcher.
- Determine the percent lipids and percent moisture for all samples submitted by the third-party researcher.
- Provide additional information on potential sources and transport pathways for PCBs in the Green/Duwamish watershed.

Leidos and its subcontractors will implement this QAPP under the direction of Ecology. The following sections describe the key roles and responsibilities of the project team.

1.2 Project Planning and Coordination

Rick Thomas of Ecology will serve as the Government Project Manager who will conduct overall project coordination, supply government-furnished services, review reports, and coordinate with contractors. Bernice Tannenbaum of Leidos will serve as the Leidos Project Manager and will be responsible for executing this QAPP, overseeing the transfer of otter scat samples to the analytical laboratory from the third-party researcher, and reporting analytical results to Ecology.

Leidos
Bernice Tannenbaum
18912 North Creek Parkway, Suite 101
Bothell, WA 98011
Phone: (425) 482-3312
Email: Bernice.R.Tannenbaum@leidos.com

1.3 Sample Collection

The river otter scat samples were collected by a third-party researcher, and sample collection is not part of the scope for this document. Sample collection methods will be summarized in the final report submitted to Ecology.

1.4 Laboratory Coordination and Quality Assurance/Quality Control Management

Joe Peters of Leidos will serve as the laboratory coordinator responsible for subcontracting with state-certified laboratories and ensuring use of established protocols for chemical analysis and data management. He will also serve as the project chemist and project QA/quality control (QC) coordinator. Mr. Peters will provide QA oversight for the laboratory programs, including laboratory reporting and holding times, and oversight of the independent third-party data validation subcontractor to ensure that the laboratory analytical and QA/QC data are considered valid and that procedures meet the analytical requirements.

1.5 Data Manager

Megan Gay of Leidos will serve as the data manager for this project. Ms. Gay is responsible for following the data management procedures described in Appendix A, reporting data to the project team as scheduled, and submitting data to the Ecology Environmental Information Management (EIM) database.

1.6 Subcontractor Support

The Leidos project team will consist of the following subcontractors to support the data collection activities and laboratory analytical services:

- PCB Congener Analysis

  Vista Analytical Laboratories (Vista)
  Martha Maier
  1104 Windfield Way
  El Dorado Hills, CA 95762
  Phone: (916) 995-5171
  Email: mmaier@vista-analytical.com

  Vista will subcontract PCB Aroclor analysis to:

  Analytical Resources, Inc.
  4611 South 134th Place, Suite 100
  Tukwila, WA 98168
  Phone: (206) 695-6200

- Data Validation

  EcoChem, Inc.
  Christine Ransom
  1011 Western Avenue, Suite 1011
  Seattle, WA 98104
  Phone: (206)233-9332 ext. 109
  Email: cransom@ecochem.net

1.7 Project Schedule

Samples were collected and frozen by the third party and will be shipped to Vista. Samples will be analyzed and reported by Vista within 35 business days of sample receipt. All project analytical results will be independently validated within 30 calendar days as the data become available.

The draft data report (including original laboratory data sheets) will be submitted to Ecology in electronic format within 30 days after Leidos receives all validated data. Leidos will submit the final report (in both electronic and hard copy format) to Ecology within 20 days following receipt of Ecology's comments on the draft report, but no later than June 30, 2017.

The validated chemistry data will be uploaded into Ecology's EIM database following completion of the final data report, but no later than June 30, 2017. Information for entering environmental data into EIM can be found on Ecology's website: <http://www.ecy.wa.gov/eim/>.

2.0 Quality Assurance Project Plan

The purpose of the project QAPP is to provide confidence in the analytical results through a system of QA/QC performance checks with respect to laboratory analysis, data reporting, and appropriate corrective actions to achieve compliance with established performance and data quality criteria. This section presents the QA/QC protocols used to ensure that the data obtained during the investigation are legally defensible and usable for their intended purpose.

2.1 Measurements of Data Quality

The quality of the data reported by the laboratories will be evaluated for accuracy, precision, representativeness, completeness, and comparability as described below.

Accuracy is the degree to which an observed measurement agrees with an accepted reference or true value. Accuracy is a measure of the bias in the system and is expressed as the percent recoveries of spiked analytes in matrix spike/matrix spike duplicate (MS/MSD) and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) samples. Accuracy will also be evaluated through the surrogate spikes in each sample for PCB Aroclor analysis. PCB congener accuracy measurements also include initial precision and recovery (IPR) samples and ongoing precision and recovery (OPR) samples. The performance-based (or method-defined) laboratory control limits for accuracy will be used for the project.

Precision is a measure of mutual agreement among individual measurements of the same property under prescribed conditions. Precision will be assessed by the analysis of MS/MSD samples, field duplicate samples, and LCS/LCSD samples. The calculated relative percent differences (RPDs) for laboratory duplicates or MS/MSD pairs will provide information on the precision of sampling and analytical procedures, and the RPDs for LCS/LCSD pairs will provide information on precision of the analytical procedures. PCB congener precision measurements also include IPR and OPR samples The performance-based (or method-defined) laboratory control limits for precision will be used for the project.

Representativeness expresses the degree to which data accurately and precisely represent an actual condition or characteristic at a particular sampling point. Representativeness is achieved by collecting samples representative of the matrix at the time of collection. Representativeness can be evaluated using replicate samples and blanks. Representativeness is also achieved by ensuring that standard sample handling and analytical methodology are followed.

Completeness refers to the amount of acceptable data points collected relative to the amount needed to achieve the project's technical objectives. Completeness is calculated as the number of valid data points achieved divided by the total number of data points expected for all requested analyses. For this project, the overall completeness objective is 95 percent.

Comparability is based on the use of established EPA-approved methods for the analysis of the selected parameters. The quantification of the analytical parameters is based on published methods, supplemented with well-documented procedures used in the laboratory to ensure reproducibility of the data.

2.2 Quality Assurance and Quality Control

Laboratory QA/QC samples will be used to evaluate the data precision, accuracy, representativeness, and comparability of the analytical results. The laboratory QA samples are discussed below in Section 2.2.1.

2.2.1 Laboratory Quality Assurance/Quality Control Samples

Instrument calibration and laboratory QA/QC sample requirements are defined in the test methods and the laboratory's written standard operating procedures. An LCSD should be analyzed if the laboratory does not have sufficient sample volume to prepare a project-specific MS/MSD for organic test methods. The results of these samples will provide information on the accuracy and precision of the chemical analysis and will be used to qualify data, as necessary, during data validation using EPA functional guidelines modified as necessary to accommodate non-Contract Laboratory Program (i.e., EPA SW-846 methodology) (EPA 1986) analytical methods (EPA 2008, 2011).

It is anticipated that the planned analyses of MS/MSD samples may not be possible at the desired frequency due to limited sample volume collected by the third-party researcher. Leidos and Vista will communicate closely to determine how the sample volume available may impact river otter scat sample analysis and QA/QC goals for MS/MSDs. Table 1 includes the minimum and preferred sample volume for each analysis. The preferred amount represents the sample volume necessary to achieve standard reporting limits for the sample matrix. Standard laboratory reporting limits are provided in Appendix B.The minimum amount is the minimum volume the laboratory needs to perform the analysis. As the available sample volume decreases, the reporting limits increase. The amounts listed for PCB congeners include percent lipids and percent moisture. The amount listed for PCB Aroclors is for PCB Aroclors only. Additional sample volume is required for MS/MSDs.

Table 1. Analytical Methods, Sample Container, and Absolute Minimum Sample Volume Requirements

Laboratory	Analyte Group	Analytical Method	Sample Container	Minimum/Preferred Sample Volume (wet or dry weight)
Otter Scat Samples				
Vista	PCB Congeners	EPA 1668C	125-mL amber glass	5 g: 10 g preferred
ARI	PCB Aroclors	SW-846 8082A	125-mL amber glass	5 g; 20 g preferred

ARI = Analytical Resources, Inc.
EPA = U.S. Environmental Protection Agency.
g = Gram.
mL = Milliliter.
PCB = Polychlorinated biphenyl.
Vista = Vista Analytical Laboratories.

Table 2 lists the analytical methods, holding times, and preservation requirements for all targeted analyses. The frequency requirements for the analysis of laboratory QA/QC samples are summarized in Table 3. Acceptance criteria for laboratory QA/QC samples are summarized in Table 4.

Table 2. Analytical Methods, Holding Times, and Preservation Requirements

Analyte Group	Analytical Method	Holding Time	Preservation
Otter Scat Samples			
PCB Congeners	EPA 1668C	1 year	Cool (0 – 6°C) first 24 hours; frozen (-10°C) until analysis
PCB Aroclors	SW-846 8082A	14 days to extract, 40 days to analyze (1 year to extract if frozen)	Cool (0 – 6°C)

°C = Degrees Celsius.
EPA = U.S. Environmental Protection Agency.
PCB = Polychlorinated biphenyl.

Table 3. Laboratory QA/QC Sample Frequency Requirements

Analysis	Initial Calibration	CCV	LCS/OPR	Method Blank	Laboratory Duplicate	MS/MSD	Surrogates
PCB Congeners	Prior to analysis	Start of batch, every 12 hours	One per prep batch	One per prep batch	One at rate of 5 percent of samples if MS/MSD not performed	MS/MSD at rate of 5 percent of samples if available	NA
PCB Aroclors	Prior to analysis	Start of batch, every 10 field samples, and end of batch	One per prep batch	One per prep batch	NA	MS/MSD at rate of 5 percent of samples if available	Every sample

CCV = Continuing calibration verification.
LCS = Laboratory control sample; an OPR sample may be substituted for an LCS for analysis of PCB congeners.
MS = Matrix spike.
MSD = Matrix spike duplicate.
NA = Not applicable.
OPR = Ongoing precision and recovery.
PCB = Polychlorinated biphenyl.
QA = Quality assurance.
QC = Quality control.

Table 4. Laboratory QA/QC Sample Acceptance Criteria – DQOs

Analytical Group	Data Quality Indicator	Measurement Performance Criterion	QC Sample and/or Activity Used to Assess Measurement Performance
PCB Aroclors and Congeners	Completeness	≥95 percent; determined by successful collection of samples with sufficient volume and the determination of usable data (not rejected during verification/validation)	All samples collected with sufficient volume to perform the analysis
PCB Congeners	Analytical instrument accuracy	70 – 130 percent (congeners) 50 – 150 percent (internals)	CCV
PCB Congeners	Accuracy and precision	Percent RSD <25 (congeners); mean recovery 70 – 130 (congeners) See Table 6 of EPA Method 1668C for internal standard acceptance criteria	IPR; performed when commencing the method or when significant changes have been made to the method
PCB Congeners	Accuracy	60 – 135 percent (congeners) See Table 6 of EPA Method 1668C for internal standard acceptance criteria	LCS/OPR
PCB Congeners	Accuracy and precision	Recovery 60 – 135 percent RPD ≤25 percent	MS/MSD; accuracy and precision limits are advisory limits only
PCB Congeners	Accuracy/Bias contamination	≤Minimum level for each congener	Method blank
PCB Aroclors	Analytical instrument accuracy	80 – 120 percent (aroclors) 80 – 120 percent (surrogates)	CCV
PCB Aroclors	Accuracy and precision	Recovery 30 – 160 percent RPD ≤30 percent	MS/MSD LCS/LCSD
PCB Aroclors	Accuracy	Recovery 30 – 160 percent	Surrogate
PCB Aroclors	Accuracy/Bias contamination	≤½ Laboratory reporting limit	Method blank

CCV = Continuing calibration verification.
DQO = Data quality objective.
EPA = U.S. Environmental Protection Agency.
IPR = Initial precision and recovery.
LCS = Laboratory control sample.
LCSD = Laboratory control sample duplicate.
MS = Matrix spike.
MSD = Matrix spike duplicate.
OPR = Ongoing precision and recovery.
PCB = Polychlorinated biphenyl.
QA = Quality assurance.
QC = Quality control.
RPD = Relative percent difference.
RSD = Relative standard deviation.

2.2.2 Data Validation

All analytical results obtained during this investigation will undergo independent data validation by EcoChem, Inc. of Seattle, Washington. The project requires EPA Stage 2B data validation on all PCB Aroclor results and EPA Stage 4 data validation on all PCB congener results, per EPA guidance (EPA 2008, 2009, 2011). If data quality concerns are noted, the laboratory will be contacted, as necessary, and the samples will be reanalyzed, the data will be qualified, and/or the issue will be discussed in the data validation report. The results of the data validation will be summarized in a data validation report, which will be included as an appendix to the data report.

The data validation report will include a sample index; a technical report for each method that specifies the QC elements that were reviewed and any outliers/impacts to data quality or usability; criteria tables for each method that define each QC element, acceptance criteria, and qualification decisions; qualifier definitions and reason code definitions; and a table that summarizes qualified data points. In addition, 10 percent of the electronic data deliverable (EDD) data points will be verified against the laboratory data packages and will have data validation qualifiers, data validation qualifier reason codes, and final interpretive qualifiers added.

2.2.3 Analytical Laboratory Reports

Analytical laboratory reports will be accompanied by sufficient raw data and QC results to enable independent reviewers to evaluate the quality of the data and recalculate the results. The analytical laboratory deliverables will include, but are not limited to, the following:

- Method detection limits and reporting limits for each sample.
- Laboratory qualifiers reported with analyte concentrations and a summary of qualifier definitions.
- Case narrative, including any problems encountered, protocol modifications, and/or corrective actions taken.
- Sample analytical and QA/QC results with units and control limits.
- All method references used during analyses.
- Any protocol deviations from the approved QAPP.
- Surrogate recovery results and control limits.
- Internal standard recovery results and control limits.
- MS/MSD results and control limits.
- Laboratory duplicate results and control limits.
- Method blank results.
- OPR recovery results and control limits.
- LCS/LCSD results and control limits.
- Initial and continuing calibration results and control limits.
- Sample custody records (including original chain of custody [CoC] forms).
- Sample and QC results in the EDD format specified in Appendix C.

The analytical laboratories will provide electronic copies of the data packages to Leidos and EcoChem, Inc. (hardcopies are not required). The data packages will contain sufficient information to allow for the full-level data validation and review of all sample and laboratory QC sample results (i.e., calibration, method blanks, LCS/LCSD, OPR, surrogates, internals, and MS/MSD), including all raw data needed to recalculate reported results.

3.0 Data Analysis, Recordkeeping, and Reporting Requirements

3.1 Analysis of Chemistry Data

The chemical results for river otter scat samples will be processed using the data management rules presented in Appendix A. Data tables will indicate sample locations, chemical concentrations, and final data qualifiers.

3.2 Recordkeeping

At the conclusion of the study, all records, including laboratory data reports and data validation reports, will be provided to Ecology in the final report as appendices for archive.

3.3 Data Report

Leidos will prepare a data report presenting the chemical results. At a minimum, the following information will be included in the report:

- Protocols used during analysis and a summary of any deviations from the procedures described in the QAPP.
- CoC records.
- Chemistry results summarized in data tables.
- A map showing sample locations.
- A summary of the data validation.
- Copies of laboratory reports and the data validation report.

The draft data report (including original laboratory data sheets) will be submitted to Ecology in electronic format within 30 days after Leidos receives all validated data. Leidos will submit the final report (in both electronic and hard copy format) to Ecology within 20 days following receipt of Ecology's comments on the draft report, but no later than June 30, 2017.

The validated chemistry data will be uploaded into Ecology's EIM database following completion of the final data report, but no later than June 30, 2017. Information for entering environmental data into EIM can be found on Ecology's website: <http://www.ecy.wa.gov/eim/>.

4.0 References

EPA (U.S. Environmental Protection Agency). 1986 and updates. *SW-846 Manual, Test Methods for Evaluating Solid Waste, Physical/chemical Methods*. <http://www.epa.gov/epaoswer/hazwaste/test/sw846.html>.

EPA. 2007. *SW-846 Method 8082A. Polychlorinated Biphenyls by Gas Chromatography.* February.

EPA. 2008. *Contract Laboratory Program, National Functional Guidelines for Organic Data Review*. Office of Emergency and Remedial Response. EPA-540-R-08-01. June.

EPA. 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use.* Office of Emergency and Remedial Response. EPA-540-R-08-005. January.

EPA. 2010. *EPA Method 1668C. Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS*. April.

EPA. 2011. *Contract Laboratory Program, National Functional Guidelines for Chlorinated Dioxin/Furan Data Review*. Office of Emergency and Remedial Response. EPA 540-R-11-016. September.

EPA. 2014. *Record of Decision, Lower Duwamish Waterway Superfund Site*. Region 10. November.

Appendix A
Data Management Procedures

Best Result Selection

When multiple results for a single chemical are available for a sample, analyte, and fraction (i.e., total and dissolved metals), one single result must be selected for reporting purposes. Chemicals analyzed by the same analytical method will be qualified by EcoChem, Inc. However, if multiple analyses are involved, then the final result is selected by Leidos. Results not selected as the final result are qualified with a "DNR" to indicate "Do Not Report" in the project database. Results selected as the final result are reported without additional data qualification. The rationale used for best result selection is summarized below.

Detected Results

When all results are detected, the result with the highest concentration is selected as the final result. If, however, the results are from diluted and non-diluted analyses by the same analytical method, the result from the analysis with the lowest dilution factor is selected. If more than one result with the same concentration and dilution factor is available, then the result with the most certainty is selected; for example, a non-qualified result would be given preference over a result qualified as estimated (J-qualified).

Non-Detected Results

When all results are non-detected, the result with the lowest reporting limit is selected as the final result. If more than one result with the same reporting limit is available, then the result with the most certainty is selected, if known; for example, a non-qualified result (U-qualified) would be given preference over a result qualified as estimated (UJ-qualified).

Mixture of Detected and Non-Detected Results

If both detected and non-detected results are available, the detected result will be selected as the final result.

Reporting and Calculating Procedures

Significant Figures

Results will be reported by Leidos using the same number of significant figures reported by the laboratory. Calculated values, including averages and calculated totals, will be reported by Leidos to two significant figures with the exception of polychlorinated biphenyl (PCB) congener totals and toxic equivalency quotients (TEQs), which will be reported to three significant figures.

Calculated Totals

Calculated analyte totals will be calculated as described below:

- Total PCB Aroclors are calculated in accordance with the procedures described in the Washington State Sediment Management Standards (SMS) using only detected values for seven Aroclor mixtures (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260). However, if detected concentrations are found for additional Aroclors, they will also be included in the calculated total and will be noted accordingly in the technical memorandum and its data tables. For samples in which none of the Aroclor mixtures are detected, the total PCB Aroclor results will be given a value equal to the highest reporting limit of the individual Aroclor mixtures and assigned a U-qualifier.
- Total PCB congeners are calculated using only detected values for the 209 individual congener results. If an individual sample has none of the 209 PCB congeners detected, the final total PCB congener result will be given a value equal to the highest detection limit of the individual congeners and assigned a U-qualifier. PCB congeners that do not meet minimum method requirements for qualitative determination (i.e., estimated maximum possible concentrations) are treated as non-detected values when calculating the total PCB congener sums and TEQs.

Weighted Totals

Weighted calculated analyte totals will be calculated as described below:

- PCB congener TEQs are calculated using the World Health Organization consensus toxic equivalency factor (TEF) values (Van den Berg et al. 2006) for mammals, as presented in Table A-1. The TEQ is calculated as the sum of each detected congener concentration multiplied by the corresponding TEF value. When the congener concentration is reported as non-detect, then the TEF is multiplied by one-half the detection limit.

Table A-1. PCB Congener TEFs

PCB Congener IUPAC Number	TEF Value
77	0.0001
81	0.0003
105	0.00003
114	0.00003
118	0.00003
123	0.00003
126	0.1
156	0.00003
157	0.00003
167	0.00003
169	0.03
189	0.00003

IUPAC = International Union of Pure and Applied Chemistry.
PCB = Polychlorinated biphenyl.
TEF = Toxic equivalency factor.

Qualifier Mapping

Data qualifiers will be reported by the laboratories, as defined in the data packages. Additional data qualifiers may be applied during data validation using U.S. Environmental Protection Agency functional guidelines. Leidos will review the combination of both laboratory and validation qualifiers and will report final results with a single set of interpreted qualifiers, listed in Table A-2. All data qualifiers will be maintained in the project database. Results rejected for quality assurance/quality control reasons will not be reported as rejected, without quantitative values.

Table A-2. Final Data Qualifiers

Final Data Qualifier	Qualifier Definition
J	Estimated concentration
U	Non-detect at the given reporting limit
UJ	Non-detect at the given reporting limit, which is estimated
C	Result is a coelution
CJ	Result is a coelution with an estimated concentration
CU	Non-detected result is a coelution
CUJ	Non-detected result is a coelution with an estimated concentration
R	Rejected

Appendix B
Standard Laboratory Reporting Limits

PCB Congener Reporting Limits for all 209 Congeners

Congener(s)	QL/RL	Units
PCB-1	0.5	pg/g
PCB-2	0.5	pg/g
PCB-3	0.5	pg/g
PCB-4	0.5	pg/g
PCB-10	0.5	pg/g
PCB-9	0.5	pg/g
PCB-7	0.5	pg/g
PCB-6	0.5	pg/g
PCB-5	0.5	pg/g
PCB-8	0.5	pg/g
PCB-14	0.5	pg/g
PCB-11	0.5	pg/g
PCB-12/13	2.0	pg/g
PCB-15	0.5	pg/g
PCB-19	0.5	pg/g
PCB-18/30	1.0	pg/g
PCB-17	0.5	pg/g
PCB-27	0.5	pg/g
PCB-24	0.5	pg/g
PCB-16	0.5	pg/g
PCB-32	0.5	pg/g
PCB-34	0.5	pg/g
PCB-23	0.5	pg/g
PCB-26/29	0.5	pg/g
PCB-25	0.5	pg/g
PCB-31	0.5	pg/g
PCB-20/28	1.0	pg/g
PCB-21/33	1.0	pg/g
PCB-22	0.5	pg/g
PCB-36	0.5	pg/g
PCB-39	0.5	pg/g
PCB-38	0.5	pg/g
PCB-35	0.5	pg/g

PCB Congener Reporting Limits for all 209 Congeners (continued)

Congener(s)	QL/RL	Units
PCB-37	0.5	pg/g
PCB-54	0.5	pg/g
PCB-50/53	1.0	pg/g
PCB-45/51	1.0	pg/g
PCB-46	0.5	pg/g
PCB-52	0.5	pg/g
PCB-73	0.5	pg/g
PCB-43	0.5	pg/g
PCB-49/69	1.0	pg/g
PCB-48	0.5	pg/g
PCB-44/47/65	1.5	pg/g
PCB-59/62/75	1.5	pg/g
PCB-42	0.5	pg/g
PCB-40/41/71	1.5	pg/g
PCB-64	0.5	pg/g
PCB-72	0.5	pg/g
PCB-68	0.5	pg/g
PCB-57	0.5	pg/g
PCB-58	0.5	pg/g
PCB-67	0.5	pg/g
PCB-63	0.5	pg/g
PCB-61/70/74/76	2.0	pg/g
PCB-66	0.5	pg/g
PCB-55	0.5	pg/g
PCB-56	0.5	pg/g
PCB-60	0.5	pg/g
PCB-80	0.5	pg/g
PCB-79	0.5	pg/g
PCB-78	0.5	pg/g
PCB-81	0.5	pg/g
PCB-77	0.5	pg/g
PCB-104	0.5	pg/g
PCB-96	0.5	pg/g
PCB-103	0.5	pg/g

PCB Congener Reporting Limits for all 209 Congeners (continued)

Congener(s)	QL/RL	Units
PCB-94	0.5	pg/g
PCB-95	0.5	pg/g
PCB-93/98/100/102	2.0	pg/g
PCB-88/91	1.0	pg/g
PCB-84	0.5	pg/g
PCB-89	0.5	pg/g
PCB-121	0.5	pg/g
PCB-92	0.5	pg/g
PCB-90/101/113	1.5	pg/g
PCB-83/99	1.0	pg/g
PCB-112	0.5	pg/g
PCB-86/87/97/109/119/125	3.0	pg/g
PCB-85/116/117	1.5	pg/g
PCB-110/115	1.0	pg/g
PCB-82	0.5	pg/g
PCB-111	0.5	pg/g
PCB-120	0.5	pg/g
PCB-108/124	1.0	pg/g
PCB-107	0.5	pg/g
PCB-123	0.5	pg/g
PCB-106	0.5	pg/g
PCB-118	0.5	pg/g
PCB-122	0.5	pg/g
PCB-114	0.5	pg/g
PCB-105	0.5	pg/g
PCB-127	0.5	pg/g
PCB-126	0.5	pg/g
PCB-155	0.5	pg/g
PCB-152	0.5	pg/g
PCB-150	0.5	pg/g
PCB-136	0.5	pg/g
PCB-145	0.5	pg/g
PCB-148	0.5	pg/g
PCB-135/151	1.0	pg/g

PCB Congener Reporting Limits for all 209 Congeners (continued)

Congener(s)	QL/RL	Units
PCB-154	0.5	pg/g
PCB-144	0.5	pg/g
PCB-147/149	1.0	pg/g
PCB-134/143	1.0	pg/g
PCB-139/140	1.0	pg/g
PCB-131	0.5	pg/g
PCB-142	0.5	pg/g
PCB-132	0.5	pg/g
PCB-133	0.5	pg/g
PCB-165	0.5	pg/g
PCB-146	0.5	pg/g
PCB-161	0.5	pg/g
PCB-153/168	1.0	pg/g
PCB-141	0.5	pg/g
PCB-130	0.5	pg/g
PCB-137	0.5	pg/g
PCB-164	0.5	pg/g
PCB-129/138/160/163	2.0	pg/g
PCB-158	0.5	pg/g
PCB-128/166	1.0	pg/g
PCB-159	0.5	pg/g
PCB-162	0.5	pg/g
PCB-167	0.5	pg/g
PCB-156/157	1.0	pg/g
PCB-169	0.5	pg/g
PCB-188	0.5	pg/g
PCB-179	0.5	pg/g
PCB-184	0.5	pg/g
PCB-176	0.5	pg/g
PCB-186	0.5	pg/g
PCB-178	0.5	pg/g
PCB-175	0.5	pg/g
PCB-187	0.5	pg/g
PCB-182	0.5	pg/g

PCB Congener Reporting Limits for all 209 Congeners (continued)

Congener(s)	QL/RL	Units
PCB-183/185	1.0	pg/g
PCB-174	0.5	pg/g
PCB-177	0.5	pg/g
PCB-181	0.5	pg/g
PCB-171/173	1.0	pg/g
PCB-172	0.5	pg/g
PCB-192	0.5	pg/g
PCB-180/193	1.0	pg/g
PCB-191	0.5	pg/g
PCB-170	0.5	pg/g
PCB-190	0.5	pg/g
PCB-189	0.5	pg/g
PCB-202	0.5	pg/g
PCB-201	0.5	pg/g
PCB-204	0.5	pg/g
PCB-197	0.5	pg/g
PCB-200	0.5	pg/g
PCB-198/199	1.0	pg/g
PCB-196	0.5	pg/g
PCB-203	0.5	pg/g
PCB-195	0.5	pg/g
PCB-194	0.5	pg/g
PCB-205	0.5	pg/g
PCB-208	0.5	pg/g
PCB-207	0.5	pg/g
PCB-206	0.5	pg/g
PCB-209	0.5	pg/g

PCB = Polychlorinated biphenyl.
pg/g = Pictograms per gram or parts per trillion.
QL/RL = Quantitation limit/Reporting limit.
QL/RL is based on the lowest standard in the calibration curve.
QL/RL values based on a 10-gram sample; values adjusted higher if lesser volume is available.
Method detection limits are approximately one-third to one-half the QL/RL values.

PCB Aroclor Reporting Limits

Aroclor	QL/RL	Units
Aroclor-1016	4.0	µg/kg
Aroclor-1221	4.0	µg/kg
Aroclor-1232	4.0	µg/kg
Aroclor-1242	4.0	µg/kg
Aroclor-1248	4.0	µg/kg
Aroclor-1254	4.0	µg/kg
Aroclor-1260	4.0	µg/kg
Aroclor-1262	4.0	µg/kg
Aroclor-1268	4.0	µg/kg

PCB = Polychlorinated biphenyl.
µg/kg = Micrograms per kilogram or parts per billion.
QL/RL = Quantitation limit/Reporting limit.
QL/RL is based on the lowest standard in the calibration curve.
QL/RL values based on a 20-gram sample; values adjusted higher if lesser volume is available.
Method detection limits are approximately one-third to one-half the QL/RL values.

Appendix C
Electronic Data Deliverable Format

Laboratory electronic data deliverables (EDDs) will be submitted as tab-delimited text or csv files and will conform to the specifications listed below. This format provides all data required for an Environmental Information Management (EIM) submittal.

Field	Name	Type[1]	Data Required[2]
1	PROJID	T	No
2	STUDYID	T	No
3	FIELDID	T	No
4	LABID	T	Yes
5	LABBATCH	T	Yes
6	CAS NUMBER	T	Special
7	ANALYTE	T	Yes
8	VALUE	N	Yes
9	VALUESF	N	No
10	LABQUAL	T	Special
11	UNITS	T	Yes
12	MDL	N	Special
13	REPLIMIT	N	Yes
14	ANLGROUP	T	No
15	PREPMETHOD	T	No
16	ANLMETHOD	T	Yes
17	MATTYPE	T	Yes
18	BASIS	T	Yes
19	LEACHDATE	T	No
20	EXTRDATE	D	Special
21	ANLDATE	D	Yes
22	DILFACTOR	N	Yes
23	COLUMN	T	Yes
24	FRACTION	T	Yes
25	LABNAME	T	Yes
26	PARENTID	T	Special
27	SAMPLEQTY	N	No
28	QTYUNITS	T	No
29	MOISTURE	N	No
30	QCTYPE1	T	Special
31	QCTYPE2	T	Special
32	SURROGATE	N	Special
33	SPIKE	N	Special
34	RECOVERY	N	No
35	RPD	N	No
36	LOWLIMIT	N	No
37	UPPLIMIT	N	No
38	RPDLIMIT	N	No

[1] ***Type*** field refers to the following data types:

T Text, preferably left justified.

N Numeric, no decimal defined.

D Date/time, date must be eight characters long for the date with the format MM/DD/YY. Time must be six or eight characters long in the format of HH:MM (hours and minutes) or HH:MM:SS (hours, minutes, and seconds). The time must be presented in 24-hour clock (not 12-hour clock).

[2] ***Data required*** field indicates the following:

Yes The field must contain some information and a blank value is not acceptable.

No The field does not require information and, if left blank, is assumed to mean no information was supplied.

Special A special case where the field may be left blank if appropriate; however, a blank field does not represent a lack of information; rather, it indicates some meaning (i.e., a blank in LABQUAL indicates a detected result).

Field Descriptions:

1. **PROJID:** Project name, provided by the client at the beginning of the work assignment and is also listed on the chain of custody (CoC) forms, sample labels, and other project documentation.
2. **STUDYID:** Unique eight-character identifier (ID) to identify the study in the Washington Department of Ecology's EIM database.
3. **FIELDID:** The sample ID number as reported on the CoC form and on sample labels, or the laboratory quality control (QC) sample ID.

   QC samples created by the laboratory from field samples (e.g., laboratory duplicates) must contain the exact SAMPID of the field sample. Other laboratory QC samples (e.g., blanks, spikes, and duplicates) must have unique sample IDs that may be identical to the LABID below.
4. **LABID:** The laboratory internal ID number. The combination of the FIELDID and LABID fields should be sufficient to uniquely define either an environmental or QC sample but may not be sufficient to distinguish reanalyses and dilutions.
5. **LABBATCH:** The laboratory ID number used to associate laboratory generated QC samples.
6. **CAS NUMBER:** A unique identifying number assigned by the Chemical Abstracts Service (CAS) Division of the American Chemical Society to each distinct chemical substance recorded in the CAS Chemical Registry System. The CAS number is accepted nationally and internationally as an identifier for specific, definable chemical substances.
7. **ANALYTE:** Analyte or parameter reported. All compounds should be reported in upper case.
8. **VALUE:** Concentration, value, or result of the compound tested, reported to the correct number of significant figures. The reporting limit (RL) will be reported for non-detect values. Only numbers are acceptable for this field.

   In the case of spiked results, the VALUE will be the spiked sample result and will not be adjusted for the original sample results. If spiked compounds are diluted beyond detection, then the RL shall be reported in the VALUE field and a "U" added with other qualifiers in the LABQUAL field.
9. **VALUESF:** The number of significant figures that should be reported for the VALUE field.
10. **LABQUAL:** Laboratory flags or qualifiers are reported in this field.

    Qualifier codes may be used from the *Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration,* and Document OLM01.0 through revision OLM01.8 (EPA, August 1991). More than one qualifier may be used per record. If other qualifiers are used, then the laboratory must include a list of the definitions of the codes with the electronics. The list may be present as a paper copy or an electronic text file.

    All non-detected results shall be reported with a "U" qualifier. The qualification "ND" for non-detected results is unacceptable. Blank values are acceptable and implied to mean a detected result. If a range will be reported (e.g., greater than 50) the symbol ">" shall be reported in this field.

11. **UNITS:** The units of measure for each record will be reported in this field.
12. **MDL:** Used to report the method detection limit (MDL); a value determined by MDL studies performed in accordance with 40 Code of Federal Regulations or sample-specific estimated detection limits (e.g., 2.5 times signal to noise ratio) for high resolution, isotope dilution test methods. This value is corrected for dilution, percent moisture, or related factors that affect the MDL and/or RL. MDLs are required for all results, as applicable (e.g., not applicable for total solids).
13. **REPLIMIT:** Used to report the RL (presented in REPLIMIT field). Non-detect results reported in the VALUE field should contain the RL corrected for dilution, percent moisture, or related factors that affect the RL.
14. **ANLGROUP:** Field used to group results from various methods. For instance, an entry of 'METALS' may be entered to report results from methods SW-846 6010, SW-846 7041, and SW-846 7470.
15. **PREPMETHOD:** Indicate the extraction or digestion method used (e.g., SW-846 3550B).
16. **ANLMETHOD:** Indicate the analytical method used (e.g., SW-846 8270). Dissolved metals must be clearly identified versus total metals results.
17. **MATTYPE:** Indicate one of the following for the matrix analyzed: SOIL, SEDIMENT, TISSUE, and WATER. If a sample or laboratory QC material does not match one of these, indicate with a code of "X" and explain in the cover letter.
18. **BASIS:** Indicate whether results are reported on a dry weight or wet weight basis, using the terms DRY or WET. If a sample or laboratory QC material does not match one of these, indicate with a code of "X" and explain in the cover letter.
19. **LEACHDATE:** Date the sample was extracted for Toxicity Characteristic Leaching Procedure or Synthetic Precipitation Leaching Procedure test methods. If leaching extraction is not applicable, then the field must be left blank.
20. **EXTRDATE:** Date the sample was extracted or prepared. If an extraction or preparation step is not applicable, then the field may be blank.
21. **ANLDATE:** Date the sample was analyzed.
22. **DILFACTOR:** The dilution factor. This should also reflect "effective" dilutions achieved by increasing or decreasing sample or extracting solvent volumes from standard amounts. That is, pre-concentration steps will result in a dilution factor of less than 1; this is okay.
23. **COLUMN:** This field is used to identify the analytical column from which the result was reported, if applicable.

Code	Definition
1	Primary column
2	Secondary column, also known as conformational column
N	Not applicable

24. **FRACTION:** This field identifies when an aqueous sample is filtered prior to analysis to determine the "dissolved" portion of the chemical of interest. Unfiltered aqueous samples are reported as the "total" fraction. This nomenclature is typically used for metals analysis.

Code	Definition
T	Total
D	Dissolved
N	Not applicable

25. **LABNAME**: The full name (and location if appropriate) or abbreviated name (and location) of the laboratory performing the analysis.
26. **PARENTID**: For duplicate samples only (i.e., laboratory duplicate, matrix spike duplicate, or laboratory control sample duplicate). List the parent sample ID.
27. **SAMPLEQTY:** Quantity or weight of the sample aliquot used for analysis.
28. **QTYUNITS:** The units of measure for the quantity or weight of the sample used for analysis.
29. **MOISTURE:** Moisture content of solid samples, expressed as percent moisture.
30. **QCTYPE1:** This field is used to identify laboratory QC samples. A blank value is acceptable, indicating the record is not one of the sample types below. One of the following codes must be used to identify the laboratory QC sample type:

Code	Definition
RM	Reference material
MB	Method blank
LCS	Laboratory control sample (blank spike or ongoing precision and recovery check)
MS/MSD	Matrix spike/matrix spike duplicate samples
DUP	Duplicate (laboratory duplicates only; field duplicates will have a unique SAMPID)

31. **QCTYPE2:** This field is used to identify analyte types, including tentatively identified compounds (TICs), surrogate compounds, internal standards, and labeled compounds. A blank value is acceptable, indicating the record is not one of the analyte types below. One of the following codes must be used to identify the analyte type:

Code	Definition
SUR	Surrogate or labeled compound result
TIC	Tentatively identified compound
IS	Internal standard

32. **SURROGATE:** If added, this refers to the surrogate or labeled compound concentration or amount expected (e.g., 100 for 100 µg/kg). Units of measure are implied from the UNITS field.
33. **SPIKE:** If added, this refers to the spike concentration or amount expected (e.g., 100 for 100 µg/kg). Units of measure are implied from the UNITS field.
34. **RECOVERY:** Percent recovery. A blank value is acceptable, indicating a non-spiked, non-reference material result. This field should be filled in for surrogates and labeled compounds as well as spiked QC samples and reference materials.
35. **RPD:** Relative percent difference. This field should be filled in for field and laboratory duplicate, matrix spike duplicates, and laboratory control sample duplicates.
36. **LOWLIMIT:** Lower recovery control limit. This field should be filled in for surrogates, QC samples, and reference materials.
37. **UPPLIMIT:** Upper recovery control limit. This field should be filled in for surrogates, QC samples, and reference materials.
38. **RPDLIMIT:** Relative percent difference control limit. This field should be filled in for laboratory duplicates and spiked sample duplicates.

The EDD used for data validation will include all of the fields noted above with data populated by the laboratory, and the following additional fields populated by the data validator.

Field	Name	Type[1]	Data Required[2]
39	val_name	T	Yes
40	val_date	D	Yes
41	val_qual	T	Special
42	val_level	T	Yes
43	val_reason	T	Special
44	val_notes	T	No

[1] ***Type*** field refers to the following data types:

T Text, preferably left justified.

D Date/time, date must be eight characters long for the date with the format MM/DD/YY. Time must be six or eight characters long in the format of HH:MM (hours and minutes) or HH:MM:SS (hours, minutes, and seconds). The time must be presented in 24 -clock (not 12-hour clock).

[2] ***Data required*** field indicates the following:

Yes The field must contain some information and a blank value is not acceptable.

No The field does not require information and, if left blank, is assumed to mean no information was supplied.

Special A special case where the field may be left blank if appropriate; however, a blank field does not represent a lack of information; rather, it indicates some meaning (i.e., a blank in LABQUAL indicates a detected result).

39. **val_name:** The full or abbreviated name of the data validation firm.
40. **val_date:** The date on which data validation was completed.
41. **val_qual:** Any data qualifiers added during data validation.
42. **val_level:** The level of data validation (e.g., full or summary, S2AVEM).
43. **val_reason:** The reason (or reason code) for data qualification. This field is required if validation qualifiers were added.
44. **val_notes:** Any additional notes. If numeric results changed during data validation, it must be noted here.

Appendix C
Laboratory Data Reports

(Provided on CD)

Appendix D
Data Summary Tables

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	HIM (RM 0)			SPM (RM 3.5)									
		HIM1	HIM3	HIM4	SPM1	SPM2	SPM3	SPM4	SPM5	SPM6	SPM7	SPM8	SPM10	SPM11
PCB-001	ng/kg	0.521 U	0.896 U	0.625	2.71 U	1.88	0.996	1.15 U	1.09	0.737	0.621 U	0.466 U	1.34	2.82
PCB-002	ng/kg	0.209 J	0.321 U	0.269 J	0.432 U	4.32	0.383 U	0.432 J	0.320 J	0.275 J	0.0982 U	0.112 U	0.824	0.565 U
PCB-003	ng/kg	0.387 U	1.09 U	0.757	1.93	5.12	0.811 U	0.958 J	0.828	0.510 J	0.0962 U	0.381 U	1.37	1.57
Total Monochlorobiphenyls	ng/kg	0.209 J	1.09 U	1.65 J	1.93	11.3	0.996	1.39 J	2.24 J	1.52 J	0.621 U	0.466 U	3.53	4.3900
PCB-004	ng/kg	3.31	1.76	1.78	0.614 U	0.215 U	9.93	8.60	3.21	4.01	5.77	4.54	4.80	12.8
PCB-005	ng/kg	0.104 J	0.0772 U	0.0368 U	0.953 U	0.352 U	0.231 U	0.325 U	0.208 U	0.201 U	0.122 U	0.105 U	0.114 U	0.333 U
PCB-006	ng/kg	2.88	2.07	1.57	5.19 U	0.369 U	10.8	8.82	3.59	5.69	7.48	5.47	5.36	15.6
PCB-007	ng/kg	0.269 J	0.338 J	0.283 J	0.906 U	0.335 U	0.220 U	0.309 U	0.198 U	0.191 U	0.116 U	0.241 J	0.485 J	1.13
PCB-008	ng/kg	6.72	8.78	1.42	5.45 U	3.86	23.3	19.0	9.02	11.2	11.1	7.88	12.1	33.2
PCB-009	ng/kg	0.601	0.504 J	0.342 J	1.04 U	0.384 U	1.53	1.12	0.701	0.219 U	0.946	0.606	1.25	2.72
PCB-010	ng/kg	0.0320 U	0.0530 U	0.0103 U	0.389 U	0.136 U	0.0930 U	0.138 U	0.0716 U	0.0670 U	0.0563 U	0.0623 U	0.252 U	0.637
PCB-011	ng/kg	1.66 U	7.34	5.50	5.93 U	4.10	6.25	13.5	5.54	9.47	2.64	3.00	9.55	4.98
PCB-012/013	ng/kg	0.602 J	1.14	0.937 J	1.12 U	0.382 U	1.51	0.332 U	0.838 U	0.216 U	0.736 J	0.534 J	1.53	2.06
PCB-014	ng/kg	0.0308 U	0.0680 U	0.0319 U	0.938 U	0.321 U	0.202 U	0.279 U	0.181 U	0.181 U	0.100 U	0.0916 U	0.112 U	0.144 U
PCB-015	ng/kg	3.53	7.14 J	4.69	5.59 U	2.35	9.12	5.76	4.51	3.77	3.51	2.48	4.41	13.2
Total Dichlorobiphenyls	ng/kg	18.0 J	29.1 J	16.5 J	5.93 U	10.3	62.4	56.8	26.6	34.1	32.2 J	24.8 J	39.5 J	86.3
PCB-016	ng/kg	7.94	4.93	3.27	5.04	1.95	18.8	15.7	5.79	9.65	6.45	4.79	7.09	22.5
PCB-017	ng/kg	18.1	7.07	3.82	8.26	4.18	41.7	33.6	8.25	22.0	20.0	14.6	15.3	49.3
PCB-018/030	ng/kg	34.3	19.4	8.93	30.4	8.78	78.9	60.6	18.6	40.9	42.7	33.8	30.3	98.0
PCB-019	ng/kg	2.64	1.31	0.813	0.385 U	1.22	6.57	5.60	1.71 U	2.96 U	3.49	2.57	1.79	9.65
PCB-020/028	ng/kg	351	113	35.7	129	43.2	453	275	72.8	241	92.8	75.5	117	433
PCB-021/033	ng/kg	22.3	11.4	7.98	12.8	6.32	43.4	37.5	13.8	25.9	14.9	9.85	15.4	62.1
PCB-022	ng/kg	29.5	13.8	6.42	18.8	5.52	43.3	37.1	11.7	30.5	15.2	11.8	11.8	64.8
PCB-023	ng/kg	0.0316 U	0.0341 U	0.0337 U	0.273 U	0.0970 U	0.0463 U	0.139 U	0.0416 U	0.104 U	0.0459 U	0.0467 U	0.0542 U	0.257 J
PCB-024	ng/kg	0.485 J	0.236 J	0.0353 U	0.262 U	0.0985 U	0.965	0.708 J	0.211 J	0.415 J	0.328 J	0.257 J	0.219 U	1.38
PCB-025	ng/kg	8.45	4.14	1.94	13.4	3.69	14.9	21.5	5.36	16.2	11.8	8.83	5.97	42.6
PCB-026/029	ng/kg	46.2	11.9	4.48	37.2	11.0	57.5	58.0	16.0	48.9	32.8	24.5	25.7	125
PCB-027	ng/kg	8.57	1.69	0.812	5.53	3.31	11.3	8.01	2.19	5.65	5.47	4.15	3.36	15.2
PCB-031	ng/kg	75.8	42.1	19.6	84.5	18.3	89.2	111	33.3	77.9	53.5	41.9	40.2	196
PCB-032	ng/kg	16.8	4.33	2.41	9.41	3.97	48.3	27.0	7.35	17.0	13.8	9.43	10.5	42.8
PCB-034	ng/kg	0.442 J	0.237 J	0.128 J	0.840 U	0.0912 U	1.79	1.37	0.305 U	1.11	0.912	0.636	0.920	2.95
PCB-035	ng/kg	0.641	0.800	0.592	0.702 J	0.170 U	1.04	0.773 J	0.995	1.06	0.326 J	0.180 J	0.980	0.593
PCB-036	ng/kg	0.0469 U	0.0837 U	0.0437 U	0.515 U	0.156 U	0.707	0.324 J	0.0819 U	0.508 J	0.0774 U	0.0900 U	0.149 U	0.935
PCB-037	ng/kg	11.8	10.3	5.90	12.3	4.61	22.0	17.4	9.84	13.5	6.62	4.51	4.91	34.6
PCB-038	ng/kg	0.713	0.0880 U	0.0472 U	0.531 U	0.161 U	0.973	0.940 J	0.0844 U	0.730	0.0798 U	0.0740 U	0.154 U	1.72
PCB-039	ng/kg	0.807	0.411 J	0.0431 U	0.490 U	0.149 U	1.23	0.126 U	0.0779 U	1.52	0.0736 U	0.0683 U	0.142 U	0.111 U
Total Trichlorobiphenyls	ng/kg	636 J	247 J	103 J	367 J	116	936	712 J	206 J	554 J	321 J	247 J	291	1,200 J
PCB-040/041/071	ng/kg	93.9	22.8	12.0	47.5	14.0	113	108	34.7	76.6	30.4	19.0	22.6	192
PCB-042	ng/kg	67.9	27.8	7.43	39.5	8.96	65.9	86.0	21.1	80.3	16.7	13.8	11.8	150
PCB-043	ng/kg	0.111 U	3.57	0.958	7.68	1.45	15.7	10.8	2.08	8.53	4.82	3.61	2.99	18.9
PCB-044/047/065	ng/kg	860	294	183	342	182	1090	730	331	578	228	216	458	1260
PCB-045/051	ng/kg	39.7	8.23	3.81	6.40	4.45	30.2	35.7	8.65	21.9	13.8	8.62	5.57	62.7
PCB-046	ng/kg	3.51	2.19	1.06	0.952 U	0.793 J	4.64	6.27	1.66	3.84	1.51	1.23	1.11	11.0
PCB-048	ng/kg	32.7	12.1	4.05	11.6	4.57	49.7	46.1	12.2	37.7	16.3	13.0	11.0	78.9
PCB-049/069	ng/kg	1300	266	70.3	256	109	707	610	218	501	151	133	187	1150
PCB-050/053	ng/kg	53.5	13.6	4.81	11.0 U	9.06 U	22.4	37.4	8.78	23.8	16.2	11.2	3.60	80.9
PCB-052	ng/kg	2210	566	230	680	341	1460	1010	558	744	412	374	489	2340
PCB-054	ng/kg	4.52	0.431 J	0.0676 U	0.264 U	0.124 U	0.786	0.592 J	0.0681 U	0.367 J	0.276 U	0.187 U	0.174 J	0.703
PCB-055	ng/kg	2.02	1.32	0.432 J	0.504 U	0.309 U	2.03	2.47 U	0.939	2.98	0.443 U	0.537 J	0.259 U	6.28
PCB-056	ng/kg	70.9	28.8	8.79	47.6	11.5	67.0	79.1	30.6	71.7	21.8	17.7	11.3	151

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	HIM (RM 0)			SPM (RM 3.5)									
		HIM1	HIM3	HIM4	SPM1	SPM2	SPM3	SPM4	SPM5	SPM6	SPM7	SPM8	SPM10	SPM11
PCB-057	ng/kg	3.41	1.32	0.391 J	2.44	0.733 J	5.56	7.63	1.54	6.76	1.55	1.24	2.16	15.2
PCB-058	ng/kg	0.125 U	0.130 U	0.0726 U	1.24 J	0.295 J	1.86	1.84 U	0.622	2.61	0.547	0.393 J	0.796	3.55
PCB-059/062/075	ng/kg	78.3	14.5	4.97	26.8	9.69	85.1	64.3	23.9	53.1	17.9	14.7	28.0	127
PCB-060	ng/kg	241	70.7	16.5	56.5	21.1	278	131	61.9	131	36.0	42.9	91.7	219
PCB-061/070/074/076	ng/kg	1280	402	124	474	155	1380	869	360	752	223	234	493	1590
PCB-063	ng/kg	40.6	14.9	3.82	20.1	6.37	75.6	46.1	16.8	42.3	10.2	11.1	29.3	73.4
PCB-064	ng/kg	227	80.6	19.5	93.2	23.5	236	240	101	228	59.5	48.7	43.0	493
PCB-066	ng/kg	1240	366	85.9	289	107	1710	725	350	710	163	179	472	1340
PCB-067	ng/kg	15.0	4.56	1.15	7.30	2.35	12.6	17.6	4.39	16.3	3.27	2.83	4.29	31.4
PCB-068	ng/kg	9.93	2.73	1.51	6.86	2.42	6.08	12.7	3.08	10.1	2.78	2.23	4.43	22.1
PCB-072	ng/kg	36.6	6.57	2.13	13.6	5.73	24.9	26.6	7.91	22.8	6.96	6.24	15.2	56.6
PCB-073	ng/kg	0.0755 U	0.0487 U	0.0590 U	0.280 U	0.123 U	0.0653 U	0.148 U	0.0559 U	1.38	0.0610 U	0.0543 U	0.0679 U	0.0929 U
PCB-077	ng/kg	45.2	18.0	4.04	14.3	5.18	41.0	33.1	21.5	33.5	7.68	6.26	7.90	66.2
PCB-078	ng/kg	0.151 U	0.158 U	0.0911 U	0.568 U	0.348 U	0.173 U	51.4	0.167 U	2.29	0.136 U	0.149 U	0.292 U	0.366 U
PCB-079	ng/kg	13.5	4.80	2.03	8.86	2.87	11.2	19.3	5.44	19.3	2.35	3.13	2.52 U	28.0
PCB-080	ng/kg	0.125 U	0.131 U	0.0750 U	0.464 U	0.284 U	0.141 U	0.204 U	0.136 U	0.218 J	0.111 U	0.122 U	0.239 U	0.299 U
PCB-081	ng/kg	2.47	0.146 U	0.0947 U	2.52	2.10	6.83	3.99 U	1.94	3.25	1.27	1.49	4.94	5.57
Total Tetrachlorobiphenyls	ng/kg	7,970	2,230 J	793 J	2,460 J	1,020 J	7,500	5,000 J	2,190	4,190 J	1,450	1,370 J	2,400 J	9,570
PCB-082	ng/kg	69.8	40.1	12.9	40.3	11.9	40.7	86.9	24.6	73.5	5.85	7.97	4.85	142
PCB-083/099	ng/kg	7010	4370	6990	7560	6920	18100	8460	6440	6580	3200	2970	18500	14100
PCB-084	ng/kg	168	70.6	19.5	87.9	20.6	64.5	123	49.8	93.6	28.5	27.6	7.96	338
PCB-085/116/117	ng/kg	938	592	652	798	705	2560	1200	811	971	374	388	1660	1870
PCB-086/087/097/109/119/125	ng/kg	1960	577	205	567	241	1180	1490	544	1310	197	219	354	2530
PCB-088/091	ng/kg	831	168	42.5	113	34.3	118	232	79.9	192	37.7	34.0	16.9	492
PCB-089	ng/kg	2.16	0.980	0.635	1.14 U	0.533 U	3.16	4.69	1.82	3.48	0.743	0.300 U	0.436 U	9.56
PCB-090/101/113	ng/kg	5390	1960	672	1500	601	2550	3250	1250	2730	468	479	830	6130
PCB-092	ng/kg	1000	331	107	314	110	584	591	220	487	121	123	180	1370
PCB-093/098/100/102	ng/kg	385	46.1	4.03	24.8	16.8	127	132	39.8	99.5	24.9	25.0	43.7	206
PCB-094	ng/kg	1.80	1.41	0.640	0.890 U	0.432 U	1.55	2.91	0.841	1.99	1.08	0.757	0.327 U	7.89
PCB-095	ng/kg	1650	565	184	458	149	591	780	353	584	207	196	145	2170
PCB-096	ng/kg	6.33	2.25	0.671	0.867 U	0.653 J	5.68	5.18	1.85	3.91	1.93	1.53	1.42 U	14.0
PCB-103	ng/kg	431	43.6	10.3	23.3	8.28	23.4	48.6	14.3	35.8	5.00	3.47	7.68	94.0
PCB-104	ng/kg	2.40	0.224 J	0.0463 U	0.156 U	0.0476 U	0.446 J	0.679 J	0.0488 U	0.522 J	0.0542 U	0.0562 U	0.0649 U	0.927
PCB-105	ng/kg	1480	545	276	520	303	3060	1190 J	773 J	1070 J	412 J	460 J	853	2420
PCB-106	ng/kg	23.0 U	0.254 U	0.440 U	0.829 U	2.41 U	0.639 U	0.370 U	0.335 U	0.450 U	0.289 U	0.179 U	0.529 U	0.639 U
PCB-107	ng/kg	336	96.6	39.6	121	56.2	438 J	356 J	124 J	303 J	49.9 J	56.5 J	125 J	608
PCB-108/124	ng/kg	68.2	25.2	8.14	38.7	14.3	58.3 J	62.6 J	23.3 J	62.1 J	16.4 J	17.0 J	22.2 J	163
PCB-110/115	ng/kg	3900	1090	400	1140	492	2460	3010	1510	2750	466	476	566	6210
PCB-111	ng/kg	9.27	2.17	1.38	3.96	2.46	15.6	10.9	3.84	7.86	1.90	2.13	6.53	13.5
PCB-112	ng/kg	0.233 U	0.299 U	0.227 U	0.766 U	0.358 U	0.183 U	0.268 U	0.206 U	0.201 U	0.290 U	0.201 U	0.293 U	0.401 U
PCB-114	ng/kg	88.9	31.9	19.8	49.1	30.8	234 J	94.7 J	49.2 J	85.5 J	27.5 J	33.7 J	110 J	177
PCB-118	ng/kg	4200	1400	527	1440	801	7930	4000 J	1630 J	3050	818 J	1030 J	2360	6170
PCB-120	ng/kg	86.5	12.7	5.33	7.62 U	8.56	53.9	50.8	14.2	37.0	6.96	7.67	25.4	64.0
PCB-121	ng/kg	16.4	2.22	1.01	0.782 U	0.365 U	5.88	5.73	1.85	4.42	0.895 U	0.898 U	3.18	8.91
PCB-122	ng/kg	5.02	2.56	0.479 U	5.77	1.92	4.05 J	6.04 J	1.90 J	6.73 J	2.10 J	1.90 J	1.25 J	13.2
PCB-123	ng/kg	69.6	18.0	4.97	22.7	9.67	97.3 J	54.4 J	24.9 J	56.8 J	10.6 J	11.1 J	34.9 J	128
PCB-126	ng/kg	7.36	0.196 U	0.355 U	2.67	2.02 U	12.6	7.16 J	4.46 U	8.36	1.98	2.52	6.48	10.6
PCB-127	ng/kg	18.3 U	0.200 U	0.401 U	0.670 U	1.95 U	0.665 U	0.376 U	0.334 U	0.536 U	0.391 U	0.220 U	0.467 U	0.793 U

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	HIM (RM 0)			SPM (RM 3.5)									
		HIM1	HIM3	HIM4	SPM1	SPM2	SPM3	SPM4	SPM5	SPM6	SPM7	SPM8	SPM10	SPM11
Total Pentachlorobiphenyls	ng/kg	30,100	12,000 J	10,200	14,800	10,500 J	40,300 J	25,300 J	14,000 J	20,600 J	6,490 J	6,570 J	25,900 J	45,500
PCB-128/166	ng/kg	1760	1080	1430	1870	1490	3720	994 J	856	825	426	407	4170	2050
PCB-129/138/160/163	ng/kg	17600	11500	14700	17900	15500	49500	20000 J	14900	16300	7890	7550	53800	35100
PCB-130	ng/kg	593	291	223	390	271	696	652 J	300 J	557 J	103	103 J	745	1050
PCB-131	ng/kg	29.4	12.5	3.98	12.8	4.99	17.5	42.4 J	11.9	48.8	2.14	2.72	0.715 U	117
PCB-132	ng/kg	1280	495	149	234	91.7	444	665 J	266	752	91.5	91.3	40.7	1330
PCB-133	ng/kg	466	291	381	385	355	1830	609 J	438	607	229	212	1450	1360
PCB-134/143	ng/kg	172	79.8	19.4	68.3	21.0	70.7	137 J	40.7	146	20.1	22.1	16.9	495
PCB-135/151	ng/kg	2950	1140	429	736	245	914	961	367	893	200	183	380	2000
PCB-136	ng/kg	1120	268	69.9	110	39.3	132	162	70.9	131	39.9	38.8	50.3	456
PCB-137	ng/kg	513	389	434	655	591	1920 U	782 J	440 J	594 J	175	244 J	1730	1370
PCB-139/140	ng/kg	411	66.1	33.5	90.6	82.4	767	333 J	136	339	88.4	106	343	770
PCB-141	ng/kg	2170	624	242	313	162	1090	1080 J	494 J	1060 J	142	152 J	275	2290
PCB-142	ng/kg	0.423 U	0.685 U	0.337 U	0.808 U	0.373 U	1.98 U	0.538 U	0.656 U	0.812 U	0.452 U	0.588 U	0.726 U	1.66 U
PCB-144	ng/kg	561	136	46.6	89.1	40.4	106	250	88.6	219	14.0	13.6	28.6	319
PCB-145	ng/kg	0.0540 U	0.0728 U	0.0735 U	0.123 U	0.0832 U	0.438 J	0.223 U	0.130 U	0.899	0.107 U	0.112 U	0.174 U	1.60
PCB-146	ng/kg	2950	1500	1420	1610	1310	4670	2710 J	1580	1830	673	691	4250	3840
PCB-147/149	ng/kg	6350	2650	911	1070	421	1890	2740 J	1270	3100	453	356	191	4850
PCB-148	ng/kg	44.2	8.74	4.22	9.11	3.92	14.0	27.2	6.56	24.9	2.39	2.16	5.90	43.2
PCB-150	ng/kg	64.1	10.5	3.60	6.79	2.44	6.10	14.8	3.88	14.3	0.968	0.594 U	0.431 U	29.7
PCB-152	ng/kg	0.0516 U	0.708	0.0701 U	0.866 J	0.0781 U	2.58	2.61	0.763	0.132 U	0.619	0.612 U	0.817	5.70
PCB-153/168	ng/kg	31100	16300	22600	21700	20900	85800 J	26900 J	20000	23700	10600	10700	80800	48500
PCB-154	ng/kg	1480	173	74.5	149	100	492	437	140	399	60.7	64.6	213	574
PCB-155	ng/kg	9.26	1.46	1.29	1.70 J	1.74	10.3	9.13	2.33	7.80	1.52	1.87	5.63	11.1
PCB-156/157	ng/kg	1340	649	610	684	559	3840	1240	870	1050	567	540	2080	2660
PCB-158	ng/kg	1570	551	513	866	638	2750	1120 J	642	939	271	338	2280	1790
PCB-159	ng/kg	65.2	23.5	8.37	6.96	4.84	16.4	23.7 J	14.2	25.7	4.28	3.49	2.76	54.6
PCB-161	ng/kg	0.291 U	0.472 U	0.232 U	0.537 U	0.248 U	1.32 U	0.357 U	0.435 U	0.539 U	0.300 U	0.391 U	0.482 U	1.10 U
PCB-162	ng/kg	33.3	10.8	6.13	14.9	10.1	87.0	48.5	19.9	49.7	13.2	15.2	39.3	85.0
PCB-164	ng/kg	973	213	72.7	79.2	24.6	319	242 J	188 J	304 J	51.3	57.9 J	82.3	619
PCB-165	ng/kg	43.2	16.1	23.5	28.9	25.8	119	40.7 J	28.9	41.0	7.49	12.4	105	24.5
PCB-167	ng/kg	629	156	66.8	121	77.5	457	390	127	350	55.5	63.5	196	715
PCB-169	ng/kg	60.9 U	19.5	71.5 U	41.5	34.1	87.8	32.4 J	25.7	36.2	24.9	25.3	154	85.1
Total Hexachlorobiphenyls	ng/kg	76,300	38,700	44,500	49,200 J	43,000	160,000 J	62,600 J	43,300 J	54,300 J	22,200	22,000 J	153,000	113,000
PCB-170	ng/kg	6460	3950	5980	5810	4740	20500	6460	4370	5570	2490	2640	26000	11500
PCB-171/173	ng/kg	2330	589	478	553	415	2610	1020	497	1020	269	304	1730	2180
PCB-172	ng/kg	1180	413	497	372	290	1770	673	311	705	140	205	1500	1420
PCB-174	ng/kg	1680	1140	381	240	142	458	628	335	785	92.1	74.5	59.7	1970
PCB-175	ng/kg	277	49.3	26.8	33.3	17.3	44.1	41.5 J	12.6	32.1 J	3.92	3.85	19.5	78.3
PCB-176	ng/kg	323	93.0	43.1	44.2	22.0	40.3	87.3 J	29.7	71.3 J	7.48	5.68	5.39	181
PCB-177	ng/kg	1560	847	428	455	179	494	708	227	754	87.2	82.2	278	1770
PCB-178	ng/kg	1660	528	653	543	304	1070	593 J	313	396 J	134	184	1290	769
PCB-179	ng/kg	1610	468	193	210	91.0	183	310 J	117	264 J	48.8	44.9	75.0	747
PCB-180/193	ng/kg	15100	9440	14800	13800	11800	44500	16700	9660	14800	6220	6010	75700	32100
PCB-181	ng/kg	43.4	8.07	4.97	14.3	10.4	71.0	32.8 U	12.9	36.0	5.23	9.01 U	45.3	74.3
PCB-182	ng/kg	57.6	6.82	5.27	10.8	5.59	8.95	11.0 U	0.203 U	8.69 J	0.181 U	2.86	13.7	9.50
PCB-183/185	ng/kg	3860	2400	1970	1630	1360	8360	3610	1630	3450	770	839	7830	8630
PCB-184	ng/kg	6.63	1.41	1.52	1.59 J	1.53	7.77	8.16 J	2.03	5.64 J	1.52	1.90	4.96	8.27
PCB-186	ng/kg	0.0766 U	0.0792 U	0.0909 U	0.122 U	0.109 U	0.0676 U	0.289 U	0.144 U	0.142 U	0.129 U	0.148 U	0.196 U	0.248 U
PCB-187	ng/kg	5590	2070	1380	1430	474	803	641 J	308	433 J	150	137	954	1180

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	HIM (RM 0)			SPM (RM 3.5)									
		HIM1	HIM3	HIM4	SPM1	SPM2	SPM3	SPM4	SPM5	SPM6	SPM7	SPM8	SPM10	SPM11
PCB-188	ng/kg	19.0	3.03	1.95	4.01	2.27	9.71	11.9 J	3.14	10.4 J	0.811	0.754	2.55	17.5
PCB-189	ng/kg	256	169	251	205	166	756	268	159	229	83.0	93.8	1010	491
PCB-190	ng/kg	1470	898	1040	1230	1130	4230	1450	916	1230	548	637	5360	2370
PCB-191	ng/kg	309	134	204	194	153	794	222	152	202	56.3	85.4	830	469
PCB-192	ng/kg	0.426 U	0.466 U	0.490 U	0.721 U	0.421 U	1.71 U	0.969 U	0.648 U	1.34 U	0.630 U	0.376 U	1.31 U	2.05 U
Total Heptachlorobiphenyls	ng/kg	43,800	23,200	28,300	26,800 J	21,300	86,700	33,400 J	19,100	30,000 J	11,100	11,400	123,000	66,000
PCB-194	ng/kg	2860	1980	3320	2310	1820	8230	3710	1770	3780	844	909	12600	7680
PCB-195	ng/kg	1450	183	585	460	390	1900	798	430	726	223	192	2210	1550
PCB-196	ng/kg	1070	288	168	262	293	1980	1020	438	882	213	190	1150	1330
PCB-197	ng/kg	124	21.9	12.0	21.9	24.6	140	85.4	30.5	79.0	16.7	16.9	59.6	141
PCB-198/199	ng/kg	1740	984	960	657	620	3570	1730	914	1610	460	422	3410	3070
PCB-200	ng/kg	113	27.9	14.2	8.59 U	5.45 U	12.8	26.4	13.9	22.5	2.97 U	1.56	5.32	45.9
PCB-201	ng/kg	252	61.3	33.9	42.5	25.4	93.3	102	32.8	84.5	3.76 U	8.14	30.9	162
PCB-202	ng/kg	560	238	261	204	153	858	413	200	376	110	123	663	682
PCB-203	ng/kg	1740	562	428	634	704	3040	1970	857	1650	447	430	2560	2630
PCB-204	ng/kg	0.833	0.129 U	0.197 U	0.144 U	0.107 U	1.25	1.91	0.258 U	1.07	0.143 U	0.365 J	0.866	1.24 U
PCB-205	ng/kg	130	81.0	117	98.6	81.7	384	165	96.6	169	45.6	44.1	537	327
Total Octachlorobiphenyl	ng/kg	10,400	4,430	5,900	4,690	4,110	20,200	10,000	4,780	9,380	2,360	2,340 J	23,200	17,600
PCB-206	ng/kg	942	630	1210	484	383	1920	1190 J	541	1150	256	302	2670	1800
PCB-207	ng/kg	66.7	16.9	13.4	11.5	17.4	105	74.7	25.9	75.5	15.2	17.9	48.3	141
PCB-208	ng/kg	100	38.2	40.4	24.7	21.3	102	110	43.5	104	16.3	19.8	74.9	170
Total Nonachlorobiphenyl	ng/kg	1,110	685	1,260	520	422	2,130	1,370 J	610	1,330	288	340	2,790	2,110
PCB-209	ng/kg	232	170	311	68.1	69.1	365	331	195	315	82.9	102	335	452
Total Decachlorobiphenyl	ng/kg	232	170	311	68.1	69.1	365	331	195	315	82.9	102	335	452
Total PCB congeners (a)	ng/kg WW	170,000	81,600	91,400	99,000	80,600	318,000	139,000	84,400	121,000	44,300	44,300	331,000	255,000
Total PCB congeners (a)	ug/kg WW	170	81.6	91.4	99.0	80.6	318	139	84.4	121	44.3	44.3	331	255
Percent Lipids	%	0.766		1.60										
Total PCB congeners (a)	ug/kg LW	22,200		5,710										
Total PCB congeners (a)	mg/kg LW	22.2		5.71										

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	SPM (RM 3.5)												
		SPM13	SPM14	SPM15	SPM16	SPM17	SPM18	SPM20	SPM21	SPM22	SPM23	SPM24	SPM25	SPM26
PCB-001	ng/kg	1.36 U	1.76	1.34 U	1.43 U	2.17	1.95	13.7	1.76 J	5.96	6.65	4.78	5.73	0.540
PCB-002	ng/kg	1.31 U	0.188 U	1.10 U	1.23 U	1.05	35.4	5.08	1.28 J	1.40	1.31	1.69	2.24	0.0855 U
PCB-003	ng/kg	1.28 U	0.853	1.07 U	1.20 U	1.89	1.35	10.1	1.03 U	2.57	2.81	4.04	5.29	0.414 J
Total Monochlorobiphenyls	ng/kg	1.36 U	2.61	1.34 U	1.43 U	5.11	38.7	28.9	3.04 J	9.93	10.8	10.5	13.3	0.954 J
PCB-004	ng/kg	19.3 U	13.4	14.3	11.7 U	10.3	8.69	21.7	7.26	46.9	70.5	26.0	17.5	4.77 U
PCB-005	ng/kg	0.860 U	0.246 U	0.823 U	1.11 U	0.175 U	0.146 U	1.51	0.236 U	0.793 J	0.974	0.0738 U	0.729 U	0.357 U
PCB-006	ng/kg	21.8	11.7	14.6	14.5	11.7	12.8	17.8	3.91	30.5	45.5	19.5	19.1	10.5
PCB-007	ng/kg	0.818 U	1.09	0.783 U	1.06 U	1.07	0.995	2.49	0.224 U	2.76	3.66	2.39	0.693 U	0.339 U
PCB-008	ng/kg	41.5	27.4	27.9	38.5	30.4	28.6	71.0	13.8	76.9	111	63.7	76.9	9.03
PCB-009	ng/kg	0.936 U	2.05	0.896 U	2.37 U	2.38	2.27	4.96	1.54 J	5.23	6.59	4.49	4.71	0.388 U
PCB-010	ng/kg	0.566 U	0.116 U	0.467 U	0.724 U	0.134 U	0.675 J	1.05	0.165 U	2.27	3.48	0.262 U	0.475 U	0.200 U
PCB-011	ng/kg	17.5	4.21	4.84	5.83	23.6	2200	214	18.6	18.1	20.7	16.7	17.9	3.38 U
PCB-012/013	ng/kg	5.91	0.259 U	0.829 U	1.18 U	2.54	14.6	7.31	1.14 J	3.47	4.16	6.51	9.19	0.795 J
PCB-014	ng/kg	0.712 U	0.217 U	0.696 U	0.991 U	0.137 U	0.124 U	0.0911 U	0.204 U	0.132 U	0.0693 U	0.345 U	0.626 U	0.314 U
PCB-015	ng/kg	14.5	5.71	8.73	13.5	12.2	7.57	29.0	5.03	17.4	21.8	37.3	67.0	1.95
Total Dichlorobiphenyls	ng/kg	101	65.6	70.4	72.3	94.2	2,280 J	371	51.3 J	204 J	288	177	212	22.3 J
PCB-016	ng/kg	20.6	22.6	22.0	17.4	20.6	21.1	27.7	10.2	60.4	82.0	46.2	34.1	2.94
PCB-017	ng/kg	35.8	43.9	46.7	40.6	35.3	47.4	22.3	10.1	83.0	112	57.9	40.9	22.0
PCB-018/030	ng/kg	76.1	106	97.2	76.3	64.7	97.5	46.2	28.6	175	236	117	83.5	49.7
PCB-019	ng/kg	8.18	9.24	7.89	6.63	4.94	7.70	7.26	3.26	22.0 J	33.1 J	14.6	6.93 U	2.28
PCB-020/028	ng/kg	220	398	404	325	234	341	99.0	67.0	266	308	261	305	98.9
PCB-021/033	ng/kg	48.3	44.5	61.3	57.5	49.7	63.7	48.5	16.2	86.8	112	83.3	110	6.85
PCB-022	ng/kg	39.9	47.3	60.6	53.3	36.7	70.0	33.2	12.8	64.9	85.1	61.6	84.7	5.87
PCB-023	ng/kg	0.281 U	0.0702 U	0.281 U	0.387 U	0.0875 U	0.0587 U	0.0660 U	0.135 U	0.387 J	0.454 J	0.125 U	0.223 U	0.118 U
PCB-024	ng/kg	0.295 U	1.24	1.42 J	1.23 J	0.682	1.43	0.703 J	0.208 U	1.82	2.80	1.58	1.08	0.120 U
PCB-025	ng/kg	32.2	26.8	32.6	28.8	14.0	31.6	8.03	3.81	29.3	38.1	25.5	24.2	11.5
PCB-026/029	ng/kg	93.0	109	93.7	81.3	43.8	84.4	17.8	11.9	67.7	83.9	58.0	57.2	46.9
PCB-027	ng/kg	8.64	13.7	12.4	10.3	6.80	13.3	4.23	2.12	20.9	29.0	12.8	9.03	5.05
PCB-031	ng/kg	133	167	174	141	92.1	149	69.2	46.0	204	258	176	213	32.3
PCB-032	ng/kg	28.8	40.3	39.8	34.2	26.9	38.1	15.4	5.75	59.9	79.9	44.4	33.5	18.0
PCB-034	ng/kg	1.37 J	2.20	1.99 J	1.23 U	1.16	2.16	0.0620 U	0.127 U	1.72	2.47	1.23	1.02	1.25
PCB-035	ng/kg	8.19	0.663	0.625 U	0.697 U	1.86	4.88	2.48	0.665 J	1.94	1.20	2.95 J	7.66	1.09 J
PCB-036	ng/kg	2.33 J	0.203 U	0.576 U	0.642 U	0.581	90.0	5.90	0.193 U	0.203 U	0.102 U	0.285 J	0.366 U	0.135 U
PCB-037	ng/kg	24.3	15.3	24.6	25.6	20.6	25.6	22.9	6.35	23.3	26.6	45.2 J	158	2.89 J
PCB-038	ng/kg	1.41 J	1.33	1.58 J	0.662 U	0.137 U	0.720 J	0.146 U	0.199 U	0.519 J	0.105 U	0.208 U	0.378 U	0.139 U
PCB-039	ng/kg	0.641 U	0.193 U	1.37 J	1.51 J	0.545	1.69	0.134 U	0.395 J	0.653 J	1.13	0.192 U	0.349 U	0.128 U
Total Trichlorobiphenyls	ng/kg	782 J	1,050	1,080 J	901 J	655	1,090 J	431 J	225 J	1,170 J	1,490 J	1,010 J	1,160	308 J
PCB-040/041/071	ng/kg	108	136	136	113	93.4	140	36.7	29.1	133	153	124	117	23.8
PCB-042	ng/kg	61.5	102	103	88.2	57.7	121	16.8	14.3	58.3	68.4	71.4	65.8	6.69
PCB-043	ng/kg	10.9	10.3	19.5	12.4	7.56	14.9	1.96 U	1.87	9.49	12.1	9.78	7.67	1.67
PCB-044/047/065	ng/kg	717	1150	1020	888	976	776	358	304	639	435	684	612	177
PCB-045/051	ng/kg	37.4	60.4	40.5	48.3	22.6	54.2	9.70	6.85	52.6	63.8	48.2	21.5	4.62
PCB-046	ng/kg	4.45	13.3	5.31 U	8.78	4.62	9.96	3.78	1.75 U	17.4	19.3	13.1	8.36	0.474 J
PCB-048	ng/kg	46.0	58.2	64.1	53.8	42.2	78.4	12.2	8.39	51.0	61.5	51.9	42.5	5.81
PCB-049/069	ng/kg	597	1210	899	763	386	674	91.1	114	304	266	383	346	108
PCB-050/053	ng/kg	36.4	108	52.4	58.9	16.9	71.5	9.78	7.31	61.3	71.1	49.7	34.8	3.72
PCB-052	ng/kg	1450	2780	1790	1490	945	1340	270	534	819	661	810	688	235
PCB-054	ng/kg	0.381 U	1.00	1.08 J	1.08 U	0.420 U	0.614 J	0.106 U	0.246 U	1.34	1.97	1.14	0.859 J	0.116 U
PCB-055	ng/kg	1.13 U	3.52	1.05 U	1.59 U	2.45 U	4.52	0.398 U	0.297 U	2.00	2.68	3.27	4.83	0.397 J
PCB-056	ng/kg	1.17 U	81.5	1.09 U	1.65 U	67.9	121	18.9	14.9	57.3	65.2	83.3	138	7.03

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	SPM (RM 3.5)												
		SPM13	SPM14	SPM15	SPM16	SPM17	SPM18	SPM20	SPM21	SPM22	SPM23	SPM24	SPM25	SPM26
PCB-057	ng/kg	9.93	12.2	9.70	7.24	3.60	6.58	0.587 J	0.756 J	2.21	2.41	3.38	3.36	0.902
PCB-058	ng/kg	1.10 U	3.95	0.969 U	1.39 U	1.39	1.64	0.160 J	0.221 J	0.845 J	0.901	1.31	0.956 J	0.450 J
PCB-059/062/075	ng/kg	67.3	119	85.7	77.2	38.4	75.6	12.2	9.83	37.6	36.0	44.9	42.1	9.62
PCB-060	ng/kg	79.2	183	177	137	114	133	23.8	21.5	54.5	65.2	87.8	115	13.2
PCB-061/070/074/076	ng/kg	811	1450	1200	929	708	849	229	192	480	449	325 U	750	98.5
PCB-063	ng/kg	28.0	72.2	57.4	41.8	30.3	37.1	4.96	4.81	13.1	15.3	24.3	26.4	4.34
PCB-064	ng/kg	220	425	336	293	142	283	32.6	35.7	124	126	157	150	26.8
PCB-066	ng/kg	523	1010	993	781	609	677	111	90.0	228	254	434	534	79.2
PCB-067	ng/kg	24.5	26.2	17.5	16.6	9.59	20.3	2.60	1.83 J	8.02	8.71	11.8	14.1	2.17
PCB-068	ng/kg	14.3	17.2	14.6	10.3	5.95	9.09	1.35	3.05	6.29	6.98	6.45	5.88	1.60
PCB-072	ng/kg	33.5	53.8	40.7	31.9	14.1	20.1	2.16	3.15	7.47	6.61	12.2	11.4	4.37
PCB-073	ng/kg	0.478 U	0.0989 U	0.867 U	0.517 U	0.108 U	0.140 U	0.0921 U	0.150 U	0.0778 U	0.0968 U	0.117 U	0.196 U	0.0703 U
PCB-077	ng/kg	40.0	50.2	39.7	40.7	37.8	38.1	10.3	6.97	21.3	13.4	28.7	69.1	7.22
PCB-078	ng/kg	1.28 U	61.6	1.19 U	1.79 U	0.498 U	0.449 U	0.449 U	0.335 U	0.212 U	0.256 U	40.9	40.2	17.0
PCB-079	ng/kg	29.4	22.3	18.7	17.1	9.46	11.1	3.03	2.26 U	5.31	3.57	9.67	9.07	1.94
PCB-080	ng/kg	1.04 U	0.343 U	0.972 U	24.7	0.407 U	0.367 U	0.367 U	0.274 U	0.173 U	0.209 U	0.183 U	0.330 U	0.191 U
PCB-081	ng/kg	1.11 U	6.52	4.64	1.76 U	6.36	4.80	2.84	1.87	2.54	1.26	3.69	5.62	1.10
Total Tetrachlorobiphenyls	ng/kg	4,950	9,230	7,120 J	5,930	4,350	5,570 J	1,260 J	1,410 J	3,200 J	2,870	3,200	3,870 J	843 J
PCB-082	ng/kg	74.2	79.3	78.0	59.7	63.3	78.4	25.1	18.3	27.3	22.6	62.0	59.5	4.09
PCB-083/099	ng/kg	11000	12800	12500	10800	19800	9310	6870	9270	5950	2080	7880	7670	3020
PCB-084	ng/kg	193	291	147	147	61.0	178	51.0	35.8	90.6	87.0	129	103	6.73
PCB-085/116/117	ng/kg	1350	1460	1650	1370	2710	1180	748	1100	711	294	979	962	394
PCB-086/087/097/109/119/125	ng/kg	1320	2470	1630	1480	976	1080	247	217	358	240	743	730	93.4
PCB-088/091	ng/kg	299	487	251	234	110	199	30.1	35.5	68.8	60.3	141	129	9.26
PCB-089	ng/kg	4.24	5.18	4.40	3.38	3.81	4.54	2.05	1.03 U	3.85	4.14	6.15	4.11 U	0.485 U
PCB-090/101/113	ng/kg	3190	7950	3540	3400	2280	2380	391	520	748	486	1510	1500	214
PCB-092	ng/kg	717	1310	851	736	462	447	69.4	100	164	107	271	263	55.7
PCB-093/098/100/102	ng/kg	91.4	214	144	122	70.2	90.6	14.7	11.6	30.3	24.7	71.4	66.0	6.19
PCB-094	ng/kg	3.53	5.28	3.94	3.73	0.965	3.63	0.878	0.777 U	2.22	2.64	2.99	2.78	0.385 U
PCB-095	ng/kg	1360	2450	1160	1060	445	866	169	207	424	361	581	498	67.5
PCB-096	ng/kg	6.92	15.4	9.31	6.89	3.72	7.82	1.55	0.923 U	4.45	4.23	5.47	4.34	0.914
PCB-103	ng/kg	40.9	142	65.0	64.1	27.4	46.4	2.33	3.91	10.1	8.98	24.7	24.9	1.94
PCB-104	ng/kg	0.139 U	1.28	0.223 U	0.684 J	0.227 U	0.370 J	0.112 U	0.169 U	0.380 J	0.382 U	0.559 J	0.529 U	0.0460 U
PCB-105	ng/kg	1260	2260	1780	1330	1730	787 J	566	252	555	192	953 J	931 J	240 J
PCB-106	ng/kg	4.07 U	0.935 U	2.65 U	2.55 U	0.813 U	0.560 U	0.430 U	0.778 U	0.489 U	0.184 U	0.312 U	0.710 U	0.253 U
PCB-107	ng/kg	307	541 J	407	296	243	186 J	35.6	33.2	57.3	32.8	155 J	170 J	27.6 J
PCB-108/124	ng/kg	96.4	137 J	94.3	72.2	64.8	54.1 J	12.3	11.4	20.8	12.5	45.4 J	46.1 J	5.67 J
PCB-110/115	ng/kg	3700	6170	3400	3480	2150	2230	476	514	752	471	1530	1400	192
PCB-111	ng/kg	15.3	16.4	10.8	8.63	7.12	4.59	1.84	0.742 U	2.14	0.816	4.68	5.40	1.27
PCB-112	ng/kg	2.02 U	0.526 U	2.22 U	2.66 U	0.492 U	0.418 U	0.398 U	0.694 U	0.273 U	0.299 U	0.338 U	0.658 U	0.325 U
PCB-114	ng/kg	88.9	171 J	139	112	99.7	66.2 J	27.7	20.0	22.5	13.0	53.4 J	55.5 J	15.8 J
PCB-118	ng/kg	2880	6850	5140	3650	3050	2240 J	735	326	757	344	1970 J	2030 J	414 J
PCB-120	ng/kg	48.0	86.5	54.5	43.5	27.0	21.0	3.55	2.66	5.80	3.64	20.0	23.2	3.82
PCB-121	ng/kg	3.24	10.9	6.76	4.58	3.30	2.96	0.773 U	0.709 U	1.73	1.52	2.43	0.672 U	0.318 U
PCB-122	ng/kg	14.1	6.55 J	15.2	12.5	7.42	8.92 J	2.13	1.55 J	2.80	2.33	5.92 J	5.96 J	0.604 J
PCB-123	ng/kg	52.7	120 J	89.9	74.1	64.8	36.5 J	7.21	5.48	12.2	7.71	34.1 J	31.4 J	4.55 J
PCB-126	ng/kg	21.1	17.4	10.8	5.94 U	9.52	6.87	2.91	0.729 U	3.01	1.35	5.65 J	6.72 J	1.51
PCB-127	ng/kg	3.89 U	0.903 U	2.50 U	2.44 U	0.738 U	0.532 U	0.375 U	0.692 U	0.402 U	0.153 U	0.272 U	0.652 U	0.217 U

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	SPM (RM 3.5)												
		SPM13	SPM14	SPM15	SPM16	SPM17	SPM18	SPM20	SPM21	SPM22	SPM23	SPM24	SPM25	SPM26
Total Pentachlorobiphenyls	ng/kg	28,100	46,100 J	33,200	28,600 J	34,500	21,500 J	10,500	12,700 J	10,800 J	4,870	17,200 J	16,700 J	4,780 J
PCB-128/166	ng/kg	2430	2170	2360	1890	3750	1210	929	1550	760	258	972 J	970 J	555
PCB-129/138/160/163	ng/kg	32000	43400	31500	28800	53300	19100	13300	20100	9370	3200	15500 J	16100 J	7310
PCB-130	ng/kg	790	1440	704	669	877	473 J	167	321	130	57.0	318 J	334 J	98.0
PCB-131	ng/kg	25.8	124	34.4	26.3	23.0	35.4	4.82	1.37 U	4.21	2.56	13.1 J	13.4 U	0.790 U
PCB-132	ng/kg	716	1950	599	559	474	541	101	97.8	120	78.7	355 J	341 J	19.6
PCB-133	ng/kg	735	1510	703	758	1300	617	299	348	191	71.2	328 J	367 J	159
PCB-134/143	ng/kg	133	465	130	94.5	87.0	124	19.0	15.2	25.5	17.7	57.0 J	56.4 J	4.36
PCB-135/151	ng/kg	1320	3180	1390	1010	924	702	143	170	331	170	491	550	72.7
PCB-136	ng/kg	285	562	269	220	0.140 U	180	35.3	36.4	74.3	44.3	124	122	12.6
PCB-137	ng/kg	1150	1130	1000	1010	1720	714 J	411	453	302	104	472 J	507 J	238
PCB-139/140	ng/kg	247	570	329	240	285	193	52.1	49.7	39.9	14.8	118 J	126 J	32.3
PCB-141	ng/kg	1120	5010	1480	1340	846	656 J	110	94.7	153	60.1	391 J	474 J	67.9
PCB-142	ng/kg	4.55 U	1.63 U	1.71 U	3.34 U	1.42 U	0.715 U	1.26 U	1.39 U	1.14 U	0.293 U	1.19 U	0.755 U	0.324 U
PCB-144	ng/kg	201	961	302	276	153	161	16.5	15.7	31.3	17.9	93.8	112	4.70
PCB-145	ng/kg	1.18 J	0.136 U	0.559 U	0.550 U	0.386 J	0.196 U	0.293 U	0.428 U	0.173 U	0.153 U	0.0946 U	0.300 U	0.127 U
PCB-146	ng/kg	2840	4980	2790	2130	4530	2440	798	1330	612	288	1420 J	1530 J	546
PCB-147/149	ng/kg	3500	5760	2220	1970	1740	1880	278	351	459	302	1340 J	1360 J	77.1
PCB-148	ng/kg	19.7	54.0	30.6	22.1	15.7	13.8	0.985 U	2.16	3.54	2.28	10.4	11.0	0.759
PCB-150	ng/kg	11.4	36.6	15.3	13.4	6.26	9.18	0.278 U	1.08 J	1.82	1.42	7.22	7.40	0.240 J
PCB-152	ng/kg	2.27 J	4.63	4.16	2.39 J	1.71	1.81	0.275 U	0.401 U	0.807 J	0.444 J	1.44	1.47	0.119 U
PCB-153/168	ng/kg	46900 J	62500	43200 J	47600 J	73700	28000	23600	18100	12600	4360	24100 J	23700 J	9770
PCB-154	ng/kg	282	742	582	392	275	197	30.6	24.3	47.1	18.9	172	198	24.7
PCB-155	ng/kg	2.84	11.8	9.43	6.42	4.59	3.22	0.827 U	1.72 J	2.79	2.42	4.13	3.91	0.517 U
PCB-156/157	ng/kg	1840	3720	1930	1810	3510	918	863	464	572	205	1150	1190 J	520
PCB-158	ng/kg	1430	2910	1630	1240	2300	840	448	485	294	98.1	665 J	742 J	268
PCB-159	ng/kg	37.1	96.6	25.1	28.1	23.8	17.1	3.50	3.98	6.10	2.39	15.3 J	15.9	1.47
PCB-161	ng/kg	3.02 U	1.08 U	1.14 U	2.22 U	0.942 U	0.475 U	0.838 U	0.925 U	0.756 U	0.195 U	0.790 U	0.501 U	0.215 U
PCB-162	ng/kg	70.2	95.8	53.1	33.7	53.7	22.9	9.11	3.92	9.29	3.39	26.3	26.4 J	5.63
PCB-164	ng/kg	535	1310	447	476	353	151 J	32.2	34.5	46.1	22.3	163 J	148 J	31.2
PCB-165	ng/kg	59.2	30.3	58.4	62.2	84.6	43.6	22.4	23.6	16.1	5.54	28.0 J	31.2 J	9.81
PCB-167	ng/kg	415	1160	480	385	409	199	47.6	18.8	53.5	17.5	212	235 J	26.1
PCB-169	ng/kg	172	187	115	153	106	45.3	34.8	26.8	17.6	5.99	37.2 J	37.8 J	18.7
Total Hexachlorobiphenyls	ng/kg	993,000 J	146,000	94,400 J	93,200 J	151,000 J	59,500 J	41,800	44,100 J	26,300 J	9,430 J	48,600 J	49,300 J	19,900 J
PCB-170	ng/kg	12300	18600	8250	11200	14600	5100	4150	3490	2620	694	4870	4540 J	2320
PCB-171/173	ng/kg	978	7440	1450	941	1640	702	278	372	222	75.6	508	672	160
PCB-172	ng/kg	811	3600	1010	757	1300	486	203	265	158	60.6	284	440	145
PCB-174	ng/kg	1030	4120	829	755	908	437	115	126	238	76.3	419	397	30.0
PCB-175	ng/kg	45.2	246	83.3	63.2	89.2	28.2	5.14	5.96	12.3	3.31 U	32.4	33.4	2.49 U
PCB-176	ng/kg	86.7	323	103	90.8	75.7	69.6	9.92	10.2 U	18.8	6.02	57.4	59.3	2.14
PCB-177	ng/kg	760	4430	831	555	919	461	106	173	180	60.5	357	404	38.8
PCB-178	ng/kg	827	1830	930	917	1530	508	294	394	212	83.4	419	426	207
PCB-179	ng/kg	380	1170	410	407	349	257	36.7	67.2	126	35.0	169	205	17.2
PCB-180/193	ng/kg	31100	58300	22900	27100	41100	12400	10700	7290	5890	1670	10600	11100	4860
PCB-181	ng/kg	36.5	122	44.1	30.0	32.6	17.4	4.45 U	3.47 U	6.01	1.63	12.3	15.2	4.22
PCB-182	ng/kg	15.0	21.5	29.2	17.4	14.2	6.80	1.85	1.64 J	2.82	1.06	4.61	5.06	1.85
PCB-183/185	ng/kg	3580	17900	5260	3910	7810	2550	1030	1340	885	289	1890	1360	652
PCB-184	ng/kg	3.03	10.5	7.39	3.84	4.87	2.37	0.822 U	0.894 U	2.64	2.11 U	4.73 U	4.78	0.599
PCB-186	ng/kg	0.318 U	0.164 U	0.387 U	0.727 U	0.174 U	0.234 U	0.242 U	0.361 U	0.127 U	0.132 U	0.199 U	0.442 U	0.175 U
PCB-187	ng/kg	1500	5160	1300	814	1900	445	236	440	501	140	573	549	135

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	SPM (RM 3.5)												
		SPM13	SPM14	SPM15	SPM16	SPM17	SPM18	SPM20	SPM21	SPM22	SPM23	SPM24	SPM25	SPM26
PCB-188	ng/kg	7.36	25.5	11.0	8.83	9.22	4.89	0.360 U	0.742 U	1.14	0.656	6.64	7.74	0.229 U
PCB-189	ng/kg	455	993	334	397	558	212	162	113	95.9	28.1	189	199	76.8
PCB-190	ng/kg	3090	5350	1760	2150	3580	1380	970	743	666	187	1130	1030	457
PCB-191	ng/kg	270	1040	349 U	358	605	189	130	102	73.7	26.5	155	143	72.9
PCB-192	ng/kg	6.35 U	3.10 U	4.80 U	3.86 U	1.27 U	1.24 U	0.845 U	1.98 U	0.680 U	0.238 U	1.01 U	1.12 U	0.586 U
Total Heptachlorobiphenyls	ng/kg	57,300	131,000	45,500	50,500	77,000	25,300	18,400	14,900 J	11,900	3,440	21,700	21,600 J	9,180
PCB-194	ng/kg	5640	16700	4750	4660	7400	1940	1460	1030	903	314	2000	1960	948
PCB-195	ng/kg	1020	6290	1270	682	1290	495	218	220	150	54.3	402	406	167
PCB-196	ng/kg	682	5230	1230	866	1080	515	152	142	129	25.8	453	482	109
PCB-197	ng/kg	44.2	476	85.8	68.2 U	86.4	31.6	5.88 U	2.04 U	8.29	1.80	38.9	55.4	4.99
PCB-198/199	ng/kg	1500	4740	1880	1710	3820	993	666	613	472	131	1020	1000	442
PCB-200	ng/kg	22.2	66.0	34.1	26.5	34.5	20.9	5.21	10.6 U	22.6	1.73	9.87	13.5	0.705 U
PCB-201	ng/kg	83.2	454	135	112	143	48.7	6.19	10.8	25.8	3.58 U	67.3	93.3	4.64
PCB-202	ng/kg	377	1270	492	471	806	269	117	220	145	42.4	250	275	101
PCB-203	ng/kg	1510	7590	2290	1550	2010	1080	404	413	333	68.0	937	964	301
PCB-204	ng/kg	0.906 U	3.43	23.1 U	1.25 U	0.670	0.256 U	0.286 U	0.459 U	0.230 U	0.0965 U	0.309 U	0.279 U	0.234 U
PCB-205	ng/kg	257	920	210	229	361	100	69.3	46.3	42.9	14.2	80.0	88.0	45.8
Total Octachlorobiphenyl	ng/kg	11,100	43,700	12,400	10,300	17,000	5,490	3,010	2,700	2,230	653	5,260	5,340	2,120
PCB-206	ng/kg	981	3880	1290	1260	2470	508	415	367	340	118	535	587 J	290 J
PCB-207	ng/kg	59.6	419	117	61.1 U	73.0	27.3	5.52 U	5.23 U	19.4	1.23	27.3	34.1	5.47 U
PCB-208	ng/kg	69.0	279	105	81.9	130	42.1	13.7	33.0	41.8	6.01	41.0	52.6	9.06
Total Nonachlorobiphenyl	ng/kg	1,110	4,580	1,510	1,340	2,670	577	429	400	401	125	603	674 J	299 J
PCB-209	ng/kg	132	332	280	235	482	92.2	100	94.3	52.4	35.7	132	148	64.3
Total Decachlorobiphenyl	ng/kg	132	332	280	235	482	92.2	100	94.3	52.4	35.7	132	148	64.3
Total PCB congeners (a)	ng/kg WW	203,000	382,000	196,000	191,000	288,000	121,000	76,400	76,600	56,200	23,200	97,800	99,000	37,500
Total PCB congeners (a)	ug/kg WW	203	382	196	191	288	121	76.4	76.6	56.2	23.2	97.8	99.0	37.5
Percent Lipids	%													
Total PCB congeners (a)	ug/kg LW													
Total PCB congeners (a)	mg/kg LW													

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	HAM (RM 4.5)		FGL (RM 10)									
		HAM1	HAM2	FGL0	FGL1	FGL2	FGL3	FGL4	FGL5	FGL6	FGL7	FGL8	FGL9
PCB-001	ng/kg	0.965 U	0.604 U	2.97	1.70	0.836 U	0.527 U	0.815	1.55	0.247 U	0.578 U	0.526 U	0.427 U
PCB-002	ng/kg	0.282 U	0.0572 U	0.821	0.623	0.392 U	0.0955 U	0.0972 U	0.447 J	0.210 U	0.509 U	0.379 U	0.336 U
PCB-003	ng/kg	0.663 U	0.402 U	2.06	1.18	0.647	0.553 U	0.726 U	1.10	0.206 U	0.499 U	0.371 U	0.702
Total Monochlorobiphenyls	ng/kg	0.965 U	0.604 U	5.85	3.50	0.647	0.553 U	0.815	3.10 J	0.247 U	0.578 U	0.526 U	0.702
PCB-004	ng/kg	6.87	2.54	9.77	0.918 U	0.123 U	0.914 U	1.73	6.10	0.389 U	0.837 U	0.660 U	0.556 U
PCB-005	ng/kg	0.102 U	0.111 U	0.187 U	0.151 U	0.142 U	0.169 U	0.158 U	0.278 J	0.264 U	0.674 U	0.470 U	0.420 U
PCB-006	ng/kg	8.20	3.00	4.00	0.158 U	0.459 J	0.177 U	1.16	3.43	0.276 U	0.706 U	0.493 U	0.440 U
PCB-007	ng/kg	0.559 U	0.106 U	1.10	0.122 U	0.135 U	0.161 U	0.349 U	0.678	0.251 U	0.641 U	0.447 U	0.400 U
PCB-008	ng/kg	17.5	7.02	16.1	1.56	1.64 U	1.63	2.81	10.1	1.60	0.666 U	0.465 U	0.415 U
PCB-009	ng/kg	1.18	0.526 U	1.75	0.759 U	0.469 U	0.184 U	0.547	1.28	0.287 U	0.733 U	0.512 U	0.457 U
PCB-010	ng/kg	0.0699 U	0.0610 U	0.0908 U	0.0850 U	0.0776 U	0.0678 U	0.0662 U	0.315 J	0.246 U	0.530 U	0.418 U	0.352 U
PCB-011	ng/kg	4.23	2.57	12.9	3.09	3.00	1.69 U	2.03	4.16	10.1	3.31	1.88	2.47
PCB-012/013	ng/kg	2.44	0.612 U	1.94	0.0926 U	0.107 U	0.146 U	0.596 J	1.06	0.237 U	0.651 U	0.426 U	0.354 U
PCB-014	ng/kg	0.0868 U	0.0996 U	0.120 U	0.0777 U	0.0899 U	0.122 U	0.119 U	0.0754 U	0.199 U	0.546 U	0.357 U	0.297 U
PCB-015	ng/kg	5.99 J	3.30 J	4.10	0.784	0.848	1.04	1.11	2.99	1.40	0.586 U	0.384 U	0.319 U
Total Dichlorobiphenyls	ng/kg	46.4 J	18.4 J	51.7	5.43	4.31 J	2.67	9.98 J	30.4 J	13.1	3.31	1.88	2.47
PCB-016	ng/kg	9.43	4.88	6.46	0.477 J	0.651	0.715	1.37	7.54	0.840	1.19	0.590	2.08
PCB-017	ng/kg	28.8	10.7	9.63	0.589	0.699	1.29	2.82	13.0	0.862	4.00	1.28	3.06
PCB-018/030	ng/kg	81.7	24.7	11.8	0.781 J	1.06	1.75	4.46	24.1	2.07	8.39	2.63	5.74
PCB-019	ng/kg	6.30	1.49	2.17	0.0594 U	0.166 J	0.0888 U	0.377 J	3.06	0.170 U	0.394 U	0.284 U	0.622
PCB-020/028	ng/kg	415	114	14.8	3.91	4.30	5.86	17.6	68.9	9.47	28.6	9.25	16.4
PCB-021/033	ng/kg	25.9	13.0	8.82	0.760 U	1.13 U	1.85	3.05	14.6	1.42	3.65	1.65	3.83
PCB-022	ng/kg	54.6	13.6	4.77	0.471 J	0.669	1.10	2.34	9.71	1.30	2.88	1.26	3.02
PCB-023	ng/kg	0.0549 U	0.0475 U	0.0298 U	0.0214 U	0.0305 U	0.0413 U	0.0361 U	0.110 U	0.0978 U	0.224 U	0.147 U	0.104 U
PCB-024	ng/kg	0.817	0.233 U	0.312 J	0.0244 U	0.0236 J	0.0458 U	0.0968 J	0.450 J	0.101 U	0.241 U	0.167 U	0.107 U
PCB-025	ng/kg	31.7	6.99	1.30	0.153 J	0.176 J	0.298 J	0.612 U	6.44	0.449 J	1.69 U	0.651	1.53
PCB-026/029	ng/kg	124	22.4	3.36	0.442 J	0.484 J	0.917 J	2.77	15.3	1.46	6.68	1.68	3.83
PCB-027	ng/kg	14.0	2.94	0.840	0.0628 J	0.100 J	0.122 U	0.431 J	3.71	0.174 U	0.728 J	0.419 U	0.789
PCB-031	ng/kg	251	46.4	11.1	0.992	1.38	2.67	6.01	43.0	3.71	14.3	4.23	11.0
PCB-032	ng/kg	40.8	8.06	3.49	0.284 J	0.344 J	0.544	1.19	12.1	0.602	2.44	1.05	2.18
PCB-034	ng/kg	0.888	0.463 J	0.0280 U	0.0201 U	0.0287 U	0.0388 U	0.0968 J	0.439 J	0.0919 U	0.210 U	0.138 U	0.0976 U
PCB-035	ng/kg	2.92	0.210 U	1.21	0.0964 J	0.0551 U	0.161 J	0.247 J	0.481 J	0.506 J	0.221 U	0.142 U	0.122 U
PCB-036	ng/kg	32.1	0.0907 U	0.221 J	0.0727 U	0.0508 U	0.0598 U	0.0634 U	0.0423 U	0.264 J	0.203 U	0.131 U	0.113 U
PCB-037	ng/kg	16.5	7.64	3.82	0.589 U	1.18 U	1.35	1.53	5.18	1.49	1.84	0.815 U	1.68 U
PCB-038	ng/kg	1.02	0.0953 U	0.151 J	0.0749 U	0.0523 U	0.0617 U	0.0653 U	0.379 J	0.128 U	0.210 U	0.135 U	0.116 U
PCB-039	ng/kg	0.899	0.366 J	0.866	0.0691 U	0.0483 U	0.0866 U	0.273 U	1.03	0.322 U	0.193 U	0.125 U	0.107 U
Total Trichlorobiphenyls	ng/kg	1,140	278 J	85.1 J	8.26 J	10 J	19 J	44.4 J	229 J	24.4 J	74.7 J	24.3	54.1
PCB-040/041/071	ng/kg	155	38.2	14.0	0.985 J	0.515 U	2.35	4.72	57.9	2.48	5.54	4.00	7.83
PCB-042	ng/kg	54.0	29.0	4.64	0.322 J	0.281 U	0.633	1.43	29.2	0.822	2.77	1.60 U	4.30
PCB-043	ng/kg	0.277 U	2.80	1.07	0.0701 U	0.0948 U	0.173 J	0.484 J	4.03	0.184 U	0.457 U	0.197 U	0.580
PCB-044/047/065	ng/kg	1100	552	81.4	17.6	13.1	19.2	36.9	194	38.0	64.1	40.3	48.4
PCB-045/051	ng/kg	68.4	10.3	2.90	0.477 J	0.265 U	0.0899 U	0.950 J	18.4	0.183 U	2.66	1.33	3.58
PCB-046	ng/kg	4.10	1.76	0.916	0.101 J	0.108 U	0.152 U	0.0986 U	5.00	0.209 U	0.531 U	0.408 U	0.814
PCB-048	ng/kg	34.3	16.6	21.6	1.10	1.25	2.54	5.70	21.8	0.861	3.13	1.05 U	3.21
PCB-049/069	ng/kg	1420	346	27.3	4.25	3.18	7.16	18.2	152	17.6	39.6	18.7	28.9
PCB-050/053	ng/kg	62.8	12.7	2.44	0.210 U	0.0930 U	0.372 U	0.551 J	26.4	0.638 U	1.75 U	1.73 U	4.52
PCB-052	ng/kg	2670	1210	65.6	9.02	7.70	18.7	42.4	326	53.6	107	61.7	74.0
PCB-054	ng/kg	2.75	0.154 U	0.0799 U	0.0539 U	0.0736 U	0.0702 U	0.0675 U	0.492 U	0.143 U	0.363 U	0.279 U	0.146 U
PCB-055	ng/kg	0.429 U	1.31	0.541 J	0.0664 U	0.0667 U	0.0998 U	0.224 J	1.08	0.312 J	0.705 U	0.308 U	0.223 U
PCB-056	ng/kg	133	35.1	3.57	0.378 J	0.405 U	0.913	1.45	18.3	1.59	2.49	1.50	3.46

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PCB Congener	Units	HAM (RM 4.5)		FGL (RM 10)									
		HAM1	HAM2	FGL0	FGL1	FGL2	FGL3	FGL4	FGL5	FGL6	FGL7	FGL8	FGL9
PCB-057	ng/kg	6.41	3.03	0.273 J	0.0643 U	0.0275 U	0.0912 U	0.180 J	1.42	0.201 J	0.680 U	0.282 U	0.212 U
PCB-058	ng/kg	0.317 U	0.156 U	0.110 U	0.0599 U	0.0587 U	0.0850 U	0.0685 J	0.768	0.307 J	0.634 U	0.263 U	0.197 U
PCB-059/062/075	ng/kg	126	28.1	1.74 J	0.496 U	0.431 U	0.773 J	2.02	18.1	1.62	4.26	1.68 U	3.07
PCB-060	ng/kg	263	61.9	4.39	1.83	1.80	4.05	9.48	27.9	5.50	12.2	3.27	5.48
PCB-061/070/074/076	ng/kg	1980	500	51.8	18.6	18.8	26.7	58.7	263	38.4	79.0	26.5	43.7
PCB-063	ng/kg	32.1	17.6	1.33	0.354 J	0.819	1.32	3.48	10.9	1.37	2.86	0.256 U	1.24
PCB-064	ng/kg	530	108	6.52	0.792	0.753	1.69	5.70	50.3	3.79	12.5	6.28	13.7
PCB-066	ng/kg	1420	412	24.8	7.39	10.1	19.6	46.3	133	25.1	60.1	13.8	29.7
PCB-067	ng/kg	22.2	6.23	1.70	0.127 J	0.161 J	0.344 J	0.726	6.03	0.497 J	0.630 U	0.261 U	0.462 J
PCB-068	ng/kg	15.8	6.08	0.627 J	0.335 J	0.496 U	0.321 J	0.664	4.91	0.488 U	1.03	0.483 J	0.618
PCB-072	ng/kg	43.8	13.8	0.533 J	0.158 J	0.205 J	0.496 J	1.21	7.84	0.939	2.20	0.262 U	0.917
PCB-073	ng/kg	0.188 U	0.0916 U	0.0877 U	0.0465 U	0.0629 U	0.0720 U	0.0993 U	0.0326 U	0.122 U	0.303 U	0.131 U	0.241 U
PCB-077	ng/kg	59.6	16.6	6.04	0.651	1.48	1.46	2.90	11.2	2.09	3.96	1.26	2.71
PCB-078	ng/kg	0.461 U	0.191 U	0.133 U	0.0749 U	0.0753 U	0.0992 U	0.175 U	0.101 U	0.197 U	0.795 U	0.348 U	0.251 U
PCB-079	ng/kg	0.377 U	6.90	2.83	0.0587 U	0.211 U	0.322 U	0.617 U	7.99	0.154 U	0.623 U	0.273 U	0.760
PCB-080	ng/kg	0.382 U	0.158 U	0.109 U	0.0612 U	0.0615 U	0.0811 U	0.143 U	0.0822 U	0.161 U	0.649 U	0.284 U	0.205 U
PCB-081	ng/kg	13.0	0.179 U	1.85	0.151 J	0.0599 U	0.101 U	0.443 J	1.17	0.208 U	0.807 U	0.343 U	0.276 U
Total Tetrachlorobiphenyls	ng/kg	10,200	3,440	330 J	64.62 J	59.35 J	108 J	245 J	1,400	195 J	405	179 J	282 J
PCB-082	ng/kg	1.86 U	30.3	11.9	0.583	0.873	1.21	1.66	28.2	1.26	1.80 U	1.92	3.88
PCB-083/099	ng/kg	9210	13800	5300	161	118	415	623	1600	870	1420	1120	307
PCB-084	ng/kg	326	81.0	17.0	0.972	1.41	2.34	2.84	88.1	3.13	6.95	4.99	11.2
PCB-085/116/117	ng/kg	1520	1930	753	33.5	30.2	77.9	111	268	140	185	154	59.8
PCB-086/087/097/109/119/125	ng/kg	2100	865	110	9.15	10.9	21.5	37.5	349	32.0	52.0	29.3	40.5
PCB-088/091	ng/kg	938	129	8.24	0.783 J	0.989	1.60	2.94	113	4.06	7.77 U	5.25	12.0
PCB-089	ng/kg	4.73	1.90	0.590 J	0.0737 J	0.145 U	0.160 U	0.153 U	4.95	0.441 U	1.22 U	0.588 U	0.767 U
PCB-090/101/113	ng/kg	6780	2430	193	16.8	22.0	37.2	67.3	872	74.6	130	66.7	103
PCB-092	ng/kg	1340	450	21.0	3.23	4.51	9.66	20.5	168	17.6	37.2	12.4	20.4
PCB-093/098/100/102	ng/kg	291	43.5	1.75 J	0.581 J	0.674 J	1.49 J	3.64	47.5	2.62	4.66	2.08	3.67
PCB-094	ng/kg	5.96	1.39	0.204 U	0.0915 U	0.114 U	0.144 U	0.132 U	3.62	0.359 U	1.05 U	0.471 U	0.608 U
PCB-095	ng/kg	3000	680	53.1	5.04	7.14	11.8	22.4	434	23.8	62.8	27.8	59.8
PCB-096	ng/kg	12.9	2.00	0.419 J	0.0377 U	0.0333 U	0.114 J	0.252 J	3.66	0.0454 U	0.178 U	0.212 J	0.335 U
PCB-103	ng/kg	208	25.8	0.596 J	0.0775 U	0.293 J	0.122 U	0.438 J	24.7	0.764	0.857 U	0.399 U	1.79
PCB-104	ng/kg	2.71	0.139 U	0.0436 U	0.0327 U	0.0288 U	0.0384 U	0.0314 U	0.396 J	0.0393 U	0.154 U	0.105 U	0.0695 U
PCB-105	ng/kg	2330	941	186	54.0	55.1	69.0	144	256	97.4	144	83.3	79.7
PCB-106	ng/kg	0.919 U	0.641 U	0.248 U	0.0720 U	0.144 U	0.221 U	0.205 U	0.190 U	0.318 U	0.672 U	0.430 U	0.364 U
PCB-107	ng/kg	430 J	165	26.5	4.56 J	10.3	10.2	22.5 J	71.8	11.1	16.8	4.88	8.90
PCB-108/124	ng/kg	145 J	36.2	5.22	0.854 J	1.34	2.16	4.19 J	25.0	3.19 U	5.27 U	1.36 U	2.24
PCB-110/115	ng/kg	6620	1950	190	14.4	17.2	30.9	56.9	656	71.7	129	78.6	111
PCB-111	ng/kg	6.15	4.85	1.11	0.194 J	0.291 J	0.205 U	0.540 U	2.46	0.448 U	0.915 U	0.408 U	0.527 U
PCB-112	ng/kg	0.933 U	0.343 U	0.159 U	0.0711 U	0.0971 U	0.107 U	0.103 U	0.0738 U	0.296 U	0.820 U	0.394 U	0.515 U
PCB-114	ng/kg	102 J	64.1	14.6 J	2.90 J	4.35	5.08	11.8 J	18.9	6.29	8.29	3.39	0.986
PCB-118	ng/kg	3920	2190	233	86.2 J	146	171	378 J	782	197	272	82.4	110
PCB-120	ng/kg	46.9	21.5	2.08	0.218 U	1.02	0.941	2.63	11.8	1.10	1.91	0.403 U	1.02
PCB-121	ng/kg	7.34	3.40	0.337 J	0.0726 U	0.0992 U	0.109 U	0.105 U	1.60	0.123 U	0.838 U	0.403 U	0.526 U
PCB-122	ng/kg	0.957 U	2.50	1.14 J	0.117 J	0.101 U	0.0960 U	0.176 J	2.23	0.319 U	0.655 U	0.438 U	0.367 U
PCB-123	ng/kg	0.841 U	31.8	2.33	0.873 J	1.43	2.19	6.87 J	13.5	2.01	4.47	0.471 J	1.40
PCB-126	ng/kg	1.78 U	0.676 U	4.34	0.0829 U	0.430 U	0.214 U	1.10	2.75	1.52	0.811 U	0.526 U	0.615 U
PCB-127	ng/kg	0.975 U	0.532 U	0.225 U	0.0863 U	0.100 U	0.235 U	0.216 U	0.193 U	0.263 U	0.576 U	0.368 U	0.329 U

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PCB Congener	Units	HAM (RM 4.5)		FGL (RM 10)									
		HAM1	HAM2	FGL0	FGL1	FGL2	FGL3	FGL4	FGL5	FGL6	FGL7	FGL8	FGL9
Total Pentachlorobiphenyls	ng/kg	39,300 J	25,900	7,140 J	396 J	434 J	871 J	1,520 J	5,850 J	1,560	2,480	1,680 J	938
PCB-128/166	ng/kg	1630 J	3180	1300	48.4	49.7	120	149	437	213	363	287	84.1
PCB-129/138/160/163	ng/kg	21200	30000	9960	337	370	920	1510	3530	1670	2870	2390	563
PCB-130	ng/kg	623 J	901	65.2	4.79	5.22	9.96	12.7	106	14.7	21.5	16.5	13.3
PCB-131	ng/kg	0.611 U	16.4	1.58	0.156 U	0.203 U	0.226 U	0.469 J	8.27	0.462 J	0.694 U	0.817 U	0.889
PCB-132	ng/kg	1360	438	35.5	2.78	3.10	5.24	6.20	277	14.2	21.8	13.1	27.9
PCB-133	ng/kg	866 J	914	243	8.63	10.3	15.1	27.6	79.9	33.7	53.3	45.3	13.9
PCB-134/143	ng/kg	0.604 U	62.4	7.07	0.819 J	1.34	1.13 U	1.67	54.5	2.29	3.02 U	2.17	3.81
PCB-135/151	ng/kg	3420	774	32.5	8.03	25.8	19.4	36.2	503	32.7	70.2	19.7	42.0
PCB-136	ng/kg	1250	107	10.6	1.50	3.20	3.39	5.70	132	5.51	10.9	4.74	10.7
PCB-137	ng/kg	523 J	1750	549	22.8	26.4	49.3	101	141	95.7	153	130	34.2
PCB-139/140	ng/kg	480 J	201	52.4	3.65	3.92	8.62	19.1	54.4	12.7	14.7	8.26	4.55
PCB-141	ng/kg	0.424 U	694	28.5	5.77	12.8	16.5	34.9	153	23.3	46.3	12.4	20.0
PCB-142	ng/kg	0.624 U	0.837 U	0.306 U	0.0862 U	0.125 U	0.128 U	10.4 U	0.134 U	0.442 U	0.705 U	0.829 U	0.632 U
PCB-144	ng/kg	324	133	3.53	0.593	1.32	1.27	1.95	51.9	2.65	4.57	2.02	4.42
PCB-145	ng/kg	0.0716 U	0.0998 U	0.0515 U	0.0458 U	0.0480 U	0.0496 U	0.0420 U	0.568	0.0771 U	0.393 U	0.156 U	0.132 U
PCB-146	ng/kg	2800	2520	835	39.9	68.2	76.1	136	548	124	199	156	72.0
PCB-147/149	ng/kg	8640	1900	89.4	9.55	14.0	15.4	22.2	933	58.2	105	57.2	125
PCB-148	ng/kg	37.2	12.7	0.187 J	0.0611 U	0.251 J	0.221 J	0.196 U	11.6	0.103 U	0.524 U	0.208 U	0.655 U
PCB-150	ng/kg	58.0	6.20	0.144 U	0.0434 U	0.0455 U	0.0470 U	0.0398 U	8.08	0.0731 U	0.372 U	0.220 J	0.456 U
PCB-152	ng/kg	2.86	1.08	0.0990 U	0.0430 U	0.0451 U	0.0662 J	0.0394 U	1.26	0.0724 U	0.369 U	0.146 U	0.124 U
PCB-153/168	ng/kg	25600	38100	11100	429	661	1010	2040	4260	2130	3770	3150	690
PCB-154	ng/kg	651	249	8.84	1.87	4.89	6.53	12.7	85.4	7.85	13.4	4.10	6.19
PCB-155	ng/kg	4.83	4.05	0.137 U	0.0409 U	0.120 J	0.189 J	0.751	3.79	0.0689 U	0.654 J	0.139 U	0.271 U
PCB-156/157	ng/kg	2190	1390	596	45.5	55.0	75.5	142	228	148	215	200	75.6
PCB-158	ng/kg	1520 J	1580	594	27.9	32.6	56.1	7.15 U	239	95.1	129	105	34.2
PCB-159	ng/kg	92.3	14.6	0.424 U	0.312 J	0.826	0.408 J	0.599	11.0	1.10	2.19	0.737 U	1.44
PCB-161	ng/kg	0.430 U	0.577 U	0.203 U	0.0638 U	0.0830 U	0.0849 U	6.92 U	0.0891 U	0.293 U	0.468 U	0.551 U	0.420 U
PCB-162	ng/kg	77.2	24.4	7.80	1.56	2.39	2.04	4.49	10.7	3.13	3.88	1.10 U	1.99
PCB-164	ng/kg	1320 J	305	0.212 U	1.53	1.47	1.74	2.77	55.8	8.82	10.6	4.97	8.04
PCB-165	ng/kg	0.469 U	50.1	13.3	0.467 J	0.477 J	1.10	1.80 U	7.46	2.79	4.40	3.84	1.56
PCB-167	ng/kg	448	213	26.2	6.95	13.8	12.9	31.7	63.9	15.8	19.5	5.77	9.21
PCB-169	ng/kg	52.5	45.7	25.5	0.562 U	1.64	2.59	4.00	5.27	4.03 U	7.78	6.73	0.472 U
Total Hexachlorobiphenyls	ng/kg	75,200 J	85,600	25,600 J	1,010 J	1,370 J	2,430 J	4,300 J	12,000	4,720 J	8,110 J	6,630 J	1,850
PCB-170	ng/kg	5300	11200	1780	85.4	148	188	343	587	420	752	650	127
PCB-171/173	ng/kg	1380	1350	131	15.2	31.1	21.5	51.6	112	50.9	67.1	41.8	19.8
PCB-172	ng/kg	790	946	72.4	12.3	20.0	8.22 U	27.6	70.2	25.3	33.8 U	27.1	14.4
PCB-174	ng/kg	3200	899	25.5	4.92 U	11.3	4.89	6.10 U	197	14.3	40.9	20.9	39.9
PCB-175	ng/kg	38.0 J	37.0 J	1.83 U	0.399 U	2.29	0.758 U	1.17	21.0	1.79	2.85	1.04	2.04 U
PCB-176	ng/kg	307 J	64.2 J	2.14 U	0.376 J	0.885	0.627	0.648	35.6	1.96	3.81	2.01	3.66
PCB-177	ng/kg	2040	816	31.6	7.41	15.3	6.19	8.03	171	14.1	31.6	18.0	28.7
PCB-178	ng/kg	833 J	832 J	120	9.57	26.2	14.4	21.8	141	34.9	53.2	39.9	21.4
PCB-179	ng/kg	1320 J	247 J	3.27	1.03	2.45	2.13	2.84	125	9.73	16.7	5.97	11.3
PCB-180/193	ng/kg	11200	24800	5090	232	615	477	1050	1790	971	1590	1450	321
PCB-181	ng/kg	23.0	24.2	3.04 U	0.592	1.10	0.971	2.75 U	4.15	1.48 U	2.11	0.611 U	0.779
PCB-182	ng/kg	0.205 U	9.48 J	0.103 U	0.0800 U	0.103 U	0.0935 U	0.172 U	0.154 U	0.786 U	1.82	0.295 J	0.508 U
PCB-183/185	ng/kg	4540	6380	374	40.8	97.0	49.8	139	335	132	227	173	69.3
PCB-184	ng/kg	3.23 J	3.85 J	0.0793 U	0.110 U	0.147 U	0.229 U	0.707 U	4.40	0.673	0.830	0.176 U	0.389 U
PCB-186	ng/kg	0.153 U	0.103 U	0.0731 U	0.0569 U	0.0732 U	0.0665 U	0.122 U	0.110 U	0.0891 U	0.258 U	0.125 U	0.135 U
PCB-187	ng/kg	2280 J	1110 J	214	35.3	133	43.4	75.1	767	77.8	144	70.3	83.5

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	HAM (RM 4.5)		FGL (RM 10)									
		HAM1	HAM2	FGL0	FGL1	FGL2	FGL3	FGL4	FGL5	FGL6	FGL7	FGL8	FGL9
PCB-188	ng/kg	12.0 J	4.95 J	0.345 U	0.0571 U	0.232 U	0.114 U	0.351 J	4.69	0.0893 U	0.370 U	0.204 J	0.289 U
PCB-189	ng/kg	212	458	73.2	3.63	6.32 U	6.54	17.5	26.5	15.0	25.6	20.7	4.76
PCB-190	ng/kg	1660	2990	540	27.7	53.6	59.5	97.7	167	98.8	158	143	29.7
PCB-191	ng/kg	184	361	54.3	5.48	10.2	6.43	17.0	25.8	15.6	23.6	21.2	5.63
PCB-192	ng/kg	1.83 U	0.768 U	0.349 U	0.155 U	0.243 U	0.443 U	0.262 U	0.231 U	0.325 U	0.932 U	0.763 U	0.463 U
Total Heptachlorobiphenyls	ng/kg	35,300 J	52,500 J	8,510	477 J	1,170	881	1,850 J	4,580	1,880	3,140	2,690 J	781
PCB-194	ng/kg	2290	4930	663	51.6	142	69.2	176	281	158	211	214	54.8
PCB-195	ng/kg	836	825	222	20.8	54.7	24.7	56.3	90.8	33.7	74.5	66.9	21.2
PCB-196	ng/kg	991	511	192	28.0	107	33.4	122	189	42.2	35.9	19.2 U	16.3
PCB-197	ng/kg	206	31.8	5.43	1.87	7.77	2.58 U	8.28	15.1	3.84	4.37	1.04	1.38 U
PCB-198/199	ng/kg	2650	1340	567	57.6	133	54.8	126	322	53.0	78.3	60.6	38.4
PCB-200	ng/kg	0.374 U	15.6	4.93	0.282 U	1.04	0.722	0.145 U	13.5	0.587 U	1.27 U	1.15 U	2.31
PCB-201	ng/kg	157	57.4	10.3	1.93	6.37	2.45	3.86	28.1	2.46 U	6.47	2.63	3.71
PCB-202	ng/kg	576	430	66.2	9.92	22.7	11.9	32.9	77.2	23.0	32.3	19.0	13.0 U
PCB-203	ng/kg	2320	1200	536	58.0	161	74.1	244	317	110	109	59.2	35.4
PCB-204	ng/kg	0.376 U	0.359 U	0.195 U	0.0544 U	0.0816 U	0.113 U	0.397 J	0.512	0.0745 U	0.219 U	0.252 U	0.150 U
PCB-205	ng/kg	130	271	37.7	2.63	8.54	4.50	9.24	16.0	8.23	10.1	8.34	2.70
Total Octachlorobiphenyl	ng/kg	10,200	9,610	2,300	232	644	276	779 J	1,350	432	562	432	175
PCB-206	ng/kg	885	1610	244	33.2	52.7	32.5	110	132	67.3	103	78.6	42.4
PCB-207	ng/kg	71.7	46.5	5.93	1.64 U	7.25	3.52	15.7	12.5	4.65	6.75	1.05 U	3.71
PCB-208	ng/kg	124	69.2	17.2	3.94	6.45	3.92 U	11.9	22.0	5.10	12.8	3.45 U	5.25
Total Nonachlorobiphenyl	ng/kg	1,080	1,730	267	37.14	66.4	36.02	138	167	77.1	123	78.60	51.36
PCB-209	ng/kg	236	237	89.2	19.9	24.0	15.5	59.3	48.0	28.4	34.8	27.2	21.7
Total Decachlorobiphenyl	ng/kg	236	237	89.2	19.9	24.0	15.5	59.3	48.0	28.4	34.8	27.2	21.7
Total PCB congeners (a)	ng/kg WW	173,000	179,000	44,400	2,250	3,780	4,640	8,950	25,700	8,930	14,900	11,700	4,150
Total PCB congeners (a)	ug/kg WW	173	179	44.4	2.25	3.78	4.64	8.95	25.7	8.93	14.9	11.7	4.15
Percent Lipids	%					0.237							
Total PCB congeners (a)	ug/kg LW					1,590							
Total PCB congeners (a)	mg/kg LW					1.59							

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

		FGL (RM 10)		CWG (RM 20)									GNA (RM 38)	
PCB Congener	Units	FGL10	FGL11	CWG1	CWG2	CWG3	CWG4	CWG5	CWG6	CWG7	CWG8	CWG9	GNA1	GNA5
PCB-001	ng/kg	0.339 U	0.373 U	0.245 U	0.396 J	0.139 U	1.11	0.135 U	0.338 U	0.113 U	0.529	1.00	0.263 U	0.0820 U
PCB-002	ng/kg	0.289 U	0.113 U	0.221 U	0.0677 U	0.123 U	0.191 U	0.115 U	0.0985 U	0.0966 U	0.366 U	0.435 J	0.0524 U	0.0885 U
PCB-003	ng/kg	0.675 U	0.547 U	0.999 U	0.492 J	0.121 U	0.499 U	0.112 U	0.0965 U	0.0946 U	0.710	0.762	0.275 U	0.364 U
Total Monochlorobiphenyls	ng/kg	0.675 U	0.547 U	0.999 U	0.888 J	0.139 U	1.11	0.135 U	0.338 U	0.113 U	1.24	2.20 J	0.275 U	0.364 U
PCB-004	ng/kg	0.449 U	0.284 U	0.186 U	0.0723 U	0.141 U	0.225 U	0.175 U	0.121 U	0.0931 U	0.928 U	1.09	0.0355 U	0.308 U
PCB-005	ng/kg	0.370 U	0.257 U	0.174 U	0.0694 U	0.147 U	0.223 U	0.172 U	0.134 U	0.0944 U	0.162 J	0.116 U	0.172 U	0.262 U
PCB-006	ng/kg	1.48	0.269 U	0.182 U	0.0727 U	0.154 U	0.233 U	0.181 U	0.280 U	0.0989 U	0.651	0.608	0.180 U	0.275 U
PCB-007	ng/kg	0.352 U	0.244 U	0.165 U	0.0660 U	0.140 U	0.212 U	0.164 U	0.127 U	0.0898 U	0.180 U	0.201 J	0.163 U	0.250 U
PCB-008	ng/kg	3.96	1.42	0.172 U	0.476 J	0.694	0.220 U	0.937	1.28	0.776	2.34	2.48	0.741 U	0.259 U
PCB-009	ng/kg	0.403 U	0.280 U	0.189 U	0.0755 U	0.160 U	0.242 U	0.279 U	0.440 J	0.419 U	0.274 U	0.358 U	0.187 U	0.286 U
PCB-010	ng/kg	0.285 U	0.180 U	0.118 U	0.0458 U	0.0893 U	0.143 U	0.111 U	0.0764 U	0.0590 U	0.0460 U	0.0585 U	0.132 U	0.195 U
PCB-011	ng/kg	3.40	2.52 U	3.71	3.25	2.43	2.94	2.15	3.45	2.14	2.02	2.16	1.39 U	1.99 U
PCB-012/013	ng/kg	0.318 U	0.279 U	0.168 U	0.0641 U	0.135 U	0.167 U	0.150 U	0.112 U	0.0757 U	0.510 J	0.414 J	0.182 U	0.276 U
PCB-014	ng/kg	0.267 U	0.234 U	0.141 U	0.0538 U	0.113 U	0.140 U	0.126 U	0.0940 U	0.0635 U	0.0531 U	0.0798 U	0.153 U	0.231 U
PCB-015	ng/kg	1.31	1.55 U	0.907	0.608	0.714	0.942	0.771	0.597	0.706 U	1.18	1.16	0.164 U	0.249 U
Total Dichlorobiphenyls	ng/kg	10.2	1.42	4.62	4.33 J	3.84	3.88	3.86	5.77 J	2.92	6.86 J	8.11 J	1.39 U	1.99 U
PCB-016	ng/kg	5.27	0.770	0.514 J	0.353 J	0.643	0.438 J	0.393 J	0.494 J	0.340 J	1.04	0.932	0.164 U	0.192 U
PCB-017	ng/kg	9.97	0.949	0.607 U	0.542	0.820	0.750	0.396 J	0.528	0.562	2.04	1.16	0.372 J	0.268 J
PCB-018/030	ng/kg	20.0	2.28	1.36 J	1.06	1.76	1.61	0.679 J	0.734 J	0.606 J	3.41	1.61	0.834 J	0.645 J
PCB-019	ng/kg	3.10	0.219 U	0.133 U	0.148 J	0.0954 U	0.331 J	0.0902 U	0.107 U	0.0513 U	0.176 J	0.0739 U	0.140 U	0.177 U
PCB-020/028	ng/kg	50.4	9.45	8.23	5.38	10.5	7.83	1.80	3.62	1.51 U	22.8	4.55	2.11	1.62
PCB-021/033	ng/kg	11.7	2.09	0.792 U	0.622 U	0.861 U	0.764 U	0.530 U	0.908 U	0.598 U	2.58	1.55	0.687 J	0.387 U
PCB-022	ng/kg	9.21	1.65	1.59	0.822	1.16	1.33	0.478 J	0.584	0.346 J	2.35	1.23	0.520	0.394 U
PCB-023	ng/kg	0.136 U	0.154 U	0.0750 U	0.0213 U	0.0512 U	0.0581 U	0.0480 U	0.0525 U	0.0222 U	0.0190 U	0.0318 U	0.0906 U	0.107 U
PCB-024	ng/kg	0.367 J	0.145 U	0.0806 U	0.0244 U	0.0567 U	0.0647 U	0.0513 U	0.0569 U	0.0263 U	0.0809 J	0.0513 J	0.0907 U	0.106 U
PCB-025	ng/kg	4.88	0.146 U	1.37	0.342 J	0.256 J	0.179 U	0.118 J	0.110 U	0.143 J	0.738	0.237 J	0.0862 U	0.102 U
PCB-026/029	ng/kg	11.1	1.42	2.14	0.655 J	1.02	0.779 J	0.200 U	0.360 J	0.343 J	3.40	0.618 J	0.336 U	0.102 U
PCB-027	ng/kg	2.26	0.138 U	0.0764 U	0.0941 J	0.132 J	0.0613 U	0.0487 U	0.0540 U	0.0656 J	0.232 J	0.148 J	0.0861 U	0.100 U
PCB-031	ng/kg	34.2	4.25	3.67	1.90	3.16	3.36	0.894 U	1.15	0.576 U	10.8	2.35	1.06	0.877
PCB-032	ng/kg	7.65	0.644 U	0.384 J	0.363 J	0.414 J	0.432 J	0.213 U	0.337 J	0.193 U	0.932	0.541	0.0836 U	0.0977 U
PCB-034	ng/kg	0.261 J	0.144 U	0.0704 U	0.0200 U	0.0481 U	0.0545 U	0.0451 U	0.0493 U	0.0345 J	0.0870 U	0.0299 U	0.0851 U	0.100 U
PCB-035	ng/kg	0.190 U	0.689 J	0.173 U	0.0443 U	0.0804 U	0.108 U	0.0585 U	0.108 U	0.173 J	0.205 J	0.140 J	0.164 J	0.129 U
PCB-036	ng/kg	0.175 U	0.168 U	0.160 U	0.0408 U	0.0741 U	0.0992 U	0.0539 U	0.0995 U	0.0366 U	0.0461 U	0.0674 U	0.101 U	0.118 U
PCB-037	ng/kg	4.75	2.06 J	1.38	0.633 U	0.803 U	0.814 U	1.41	0.775 U	0.768 U	1.29 U	0.989 U	0.461 U	0.121 U
PCB-038	ng/kg	0.252 J	0.173 U	0.165 U	0.0420 U	0.0764 U	0.102 U	0.0555 U	0.103 U	0.0953 J	0.0476 U	0.0981 J	0.105 U	0.122 U
PCB-039	ng/kg	0.453 U	0.159 U	0.152 U	0.0388 U	0.0705 U	0.0943 U	0.0512 U	0.0946 U	0.0716 U	0.149 U	0.0641 U	0.0965 U	0.113 U
Total Trichlorobiphenyls	ng/kg	175 J	25.6 J	20.6 J	11.7 J	19.9 J	16.9 J	5.27 J	7.81 J	2.71 J	50.8 J	15.2 J	5.75 J	3.41 J
PCB-040/041/071	ng/kg	28.4	2.25	0.227 U	1.19 J	0.952 J	1.25 J	0.470 J	0.797 J	0.917 J	3.50	1.84	0.425 U	0.371 J
PCB-042	ng/kg	15.5	1.30	2.03	0.820	0.474 J	0.759	0.123 U	0.227 U	0.248 J	2.43	0.638	0.228 U	0.209 J
PCB-043	ng/kg	2.11	0.222 U	0.281 U	0.0944 U	0.277 U	0.305 U	0.144 U	0.139 U	0.0854 U	0.977	0.225 J	0.140 U	0.151 U
PCB-044/047/065	ng/kg	127	36.1	20.1	13.2	12.0	13.4	5.42	17.3	8.82	47.2	9.40	2.67	4.46
PCB-045/051	ng/kg	10.7	0.579 U	0.923 J	0.551 J	0.139 U	0.132 U	0.105 U	0.0857 U	0.0800 U	0.655 J	0.481 J	0.106 U	0.106 U
PCB-046	ng/kg	2.17	0.235 U	0.237 U	0.0624 U	0.159 U	0.150 U	0.119 U	0.0977 U	0.0913 U	0.144 J	0.0838 U	0.121 U	0.121 U
PCB-048	ng/kg	12.4	0.348 U	0.691 J	0.840	0.647	0.570 U	0.450 J	0.865	1.59	3.89	2.31	0.133 U	0.125 U
PCB-049/069	ng/kg	89.8	12.8	14.1	6.34	6.87	8.21	1.66	4.44	2.23	37.0	3.84	1.66	1.92
PCB-050/053	ng/kg	15.7	0.497 J	0.345 J	0.367 J	0.137 U	0.130 U	0.103 U	0.0845 U	0.0789 U	0.236 U	0.242 J	0.105 U	0.105 U
PCB-052	ng/kg	211	42.9	27.9	15.5	14.6	17.8	5.32	20.4	7.65	50.0	10.5	3.47	4.66
PCB-054	ng/kg	0.217 U	0.161 U	0.162 U	0.0427 U	0.109 U	0.103 U	0.0816 U	0.0669 U	0.0625 U	0.0545 U	0.0573 U	0.0829 U	0.0828 U
PCB-055	ng/kg	0.505 U	0.200 U	0.256 U	0.0571 U	0.104 U	0.105 U	0.109 U	0.106 U	0.106 U	0.222 J	0.0541 U	0.244 U	0.274 J
PCB-056	ng/kg	11.5	1.97	2.21	0.788	0.549	1.17	0.444 J	0.693	0.375 J	1.42	0.787	0.625	0.724 J

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

		FGL (RM 10)		CWG (RM 20)									GNA (RM 38)	
PCB Congener	Units	FGL10	FGL11	CWG1	CWG2	CWG3	CWG4	CWG5	CWG6	CWG7	CWG8	CWG9	GNA1	GNA5
PCB-057	ng/kg	0.845	0.185 U	0.250 U	0.0684 J	0.118 U	0.107 U	0.109 U	0.107 U	0.0439 U	0.343 J	0.0502 U	0.0536 U	0.101 U
PCB-058	ng/kg	0.198 U	0.173 U	0.233 U	0.0541 U	0.110 U	0.0998 U	0.101 U	0.100 U	0.0409 U	0.0821 J	0.0468 U	0.0500 U	0.0944 U
PCB-059/062/075	ng/kg	10.1	1.56	1.12 J	0.521 U	0.618 J	0.767 J	0.0895 U	0.381 U	0.254 U	3.51	0.401 U	0.290 J	0.0972 U
PCB-060	ng/kg	16.4	4.67	2.57	2.23	3.61	3.83	0.636	5.56	0.739	18.6	1.22	0.0551 U	0.102 U
PCB-061/070/074/076	ng/kg	119	35.2	27.8	16.7	28.8	26.3	6.69	43.5	6.67	103	11.0	4.45	6.05
PCB-063	ng/kg	3.52	1.51	0.926	0.530	1.29	0.980	0.399 J	0.0975 U	0.275 J	5.51	0.343 J	0.155 J	0.208 J
PCB-064	ng/kg	40.6	3.74	4.50	1.99	1.61 U	2.26	0.496 J	0.779	0.542	8.63	1.35	0.648	0.609 J
PCB-066	ng/kg	87.5	19.9	12.9	8.94	20.6	17.1	4.39	22.4	3.51	63.8	5.04	1.91	2.35
PCB-067	ng/kg	1.84	0.377 J	0.232 U	0.131 J	0.109 U	0.341 J	0.101 U	0.0996 U	0.0407 U	1.12	0.189 J	0.0920 U	0.0938 U
PCB-068	ng/kg	1.61	0.615	0.701 J	0.183 J	0.402 J	0.207 J	0.125 J	0.268 U	0.242 J	1.36	0.0965 J	0.0487 U	0.0920 U
PCB-072	ng/kg	2.68	0.801	0.534 J	0.243 J	0.495 J	0.377 J	0.101 U	0.0997 U	0.0407 U	2.89	0.104 U	0.0868 J	0.0939 U
PCB-073	ng/kg	0.114 U	0.0673 U	0.186 U	0.0626 U	0.184 U	0.202 U	0.0953 U	0.0921 U	0.0566 U	0.0269 U	0.0532 U	0.0927 U	0.100 U
PCB-077	ng/kg	6.33	2.99	2.25	0.840	0.939 J	1.16	0.713	4.48 J	0.721	2.36	0.629	0.328 J	0.363 J
PCB-078	ng/kg	0.248 U	0.369 J	0.289 U	0.0644 U	0.118 U	0.118 U	0.123 U	0.119 U	0.0485 U	0.0846 U	0.0610 U	0.235 J	1.22
PCB-079	ng/kg	2.11	0.177 U	0.227 U	0.0505 U	0.0924 U	0.0928 U	0.0962 U	0.471 U	0.202 U	0.511 U	0.128 U	0.0494 U	0.0915 U
PCB-080	ng/kg	0.202 U	0.185 U	0.236 U	0.0526 U	0.0963 U	0.0967 U	0.100 U	0.0976 U	0.0396 U	0.0692 U	0.0498 U	0.0515 U	0.0953 U
PCB-081	ng/kg	0.278 U	0.174 U	0.260 U	0.0647 U	0.102 U	0.114 U	0.122 U	1.27 J	0.229 J	0.360 J	0.0462 U	0.0475 U	0.106 U
Total Tetrachlorobiphenyls	ng/kg	819	170 J	122 J	71.5 J	92.8 J	95.9 J	27.2 J	122 J	34.8 J	359 J	50.1 J	16.5 J	23.4 J
PCB-082	ng/kg	14.4	2.78	2.60	1.15	0.254 U	0.670	0.364 J	0.983	0.493 J	2.07	0.796	0.132 U	0.629 U
PCB-083/099	ng/kg	827	1070	444	577	217	216	251	807	281	897	370	73.1	373
PCB-084	ng/kg	38.0	5.68	4.59	2.34	0.695	2.29	0.498	0.953	0.503	4.43	1.12	0.593	0.475 U
PCB-085/116/117	ng/kg	143	151	71.5	92.0	49.7	43.5	38.2	97.7	42.2	158	69.7	8.87	34.0
PCB-086/087/097/109/119/125	ng/kg	137	34.6	25.5	15.2	11.0	16.0	4.32	11.9	5.82	59.9	9.05	2.87 U	5.17
PCB-088/091	ng/kg	39.2	4.58	5.18	2.17	0.627 J	3.61	0.396 J	0.623 U	0.353 U	8.44	0.873 J	0.357 U	0.412 U
PCB-089	ng/kg	0.984 U	0.293 U	0.223 U	0.0971 U	0.218 U	0.201 U	0.280 U	0.203 U	0.0754 U	0.105 U	0.145 U	0.136 U	0.529 U
PCB-090/101/113	ng/kg	313	73.7	56.1	30.7	22.2	36.3	11.0	33.4	12.7	112	18.6	8.70	12.2
PCB-092	ng/kg	69.4	15.0	10.2	6.22	5.30	7.81	1.71	3.89	1.56	33.8	2.65	1.53	1.79
PCB-093/098/100/102	ng/kg	13.2	1.70 J	0.187 U	0.881 J	0.728 J	1.09 U	0.224 U	0.266 U	0.184 U	11.4	0.266 J	0.0947 U	0.414 U
PCB-094	ng/kg	1.24	0.224 U	0.199 U	0.0844 U	0.191 U	0.186 U	0.239 U	0.178 U	0.0667 U	0.0809 U	0.123 U	0.101 U	0.441 U
PCB-095	ng/kg	176	25.5	19.9	11.4	6.42	12.8	2.38	6.07	2.29	40.7	4.17	2.21	2.50
PCB-096	ng/kg	1.59	0.0729 U	0.0686 U	0.0807 J	0.0446 U	0.0684 U	0.0520 U	0.0377 U	0.0232 U	0.321 J	0.0230 U	0.0471 U	0.0483 U
PCB-103	ng/kg	5.76	0.339 J	0.517 J	0.217 U	0.150 U	0.492 U	0.203 U	0.151 U	0.0565 U	2.31	0.0871 J	0.0488 U	0.374 U
PCB-104	ng/kg	0.171 J	0.0631 U	0.0594 U	0.0252 U	0.0386 U	0.0400 U	0.0450 U	0.0326 U	0.0201 U	0.0204 U	0.0200 U	0.0408 U	0.0418 U
PCB-105	ng/kg	143	91.8 J	37.2	32.8	41.7	43.0	12.5	175	31.4	125	39.8	5.57 U	28.3
PCB-106	ng/kg	0.290 U	0.192 U	0.288 U	0.108 U	0.116 U	0.277 U	0.125 U	0.217 U	0.0712 U	0.138 U	0.134 U	0.0474 U	0.103 U
PCB-107	ng/kg	27.3	10.4 J	5.02	3.11 J	5.13	5.80	1.90	8.76	2.17	21.6	2.46	0.991 J	2.14 J
PCB-108/124	ng/kg	5.30	3.66 J	2.96	1.37 J	1.59	2.09	0.607 J	5.04	0.663 J	5.67	0.895 J	0.442 J	0.443 U
PCB-110/115	ng/kg	305	82.2	60.3	38.9	21.0	26.9	10.8	38.1	13.6	102	23.6	0.0960 U	13.6
PCB-111	ng/kg	0.576 U	0.573	0.164 U	0.205 J	0.155 U	0.141 U	0.202 U	0.265 J	0.112 U	1.18	0.131 J	0.0800 U	0.383 U
PCB-112	ng/kg	0.534 U	0.196 U	0.150 U	0.0651 U	0.146 U	0.135 U	0.188 U	0.136 U	0.0506 U	0.0706 U	0.0974 U	0.0912 U	0.355 U
PCB-114	ng/kg	4.85	6.65 J	2.89	2.29 J	2.89	3.16	0.956	15.3	1.90	13.5	1.46	0.477 J	1.30 J
PCB-118	ng/kg	260	191 J	127	63.7 J	98.9	108	27.3	379	45.3	475	34.2	14.3 J	29.6 J
PCB-120	ng/kg	2.85	1.59	0.828	0.574	0.739	0.693	0.196 J	1.09	0.238 J	5.01	0.130 J	0.0791 U	0.378 U
PCB-121	ng/kg	0.546 U	0.201 U	0.153 U	0.0630 U	0.149 U	0.138 U	0.192 U	0.139 U	0.0517 U	0.370 U	0.0994 U	0.0932 U	0.363 U
PCB-122	ng/kg	0.293 U	0.687 J	0.284 U	0.235 J	0.145 U	0.261 U	0.109 U	0.251 U	0.0707 U	0.124 U	0.0847 U	0.0452 U	0.105 U
PCB-123	ng/kg	3.09	3.05 J	2.96	1.12 J	1.46	1.40	0.439 J	11.7	0.980	4.93 U	0.327 U	0.240 J	0.364 J
PCB-126	ng/kg	1.08	1.29	1.46	0.616 U	0.365 U	0.252 U	0.0960 U	5.66	0.0638 U	0.155 U	0.0849 U	0.115 U	0.144 U
PCB-127	ng/kg	0.261 U	0.161 U	0.254 U	0.110 U	0.0898 U	0.203 U	0.0970 U	0.190 U	0.0628 U	0.158 U	0.0883 U	0.0585 U	0.103 U

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	FGL (RM 10)		CWG (RM 20)									GNA (RM 38)	
		FGL10	FGL11	CWG1	CWG2	CWG3	CWG4	CWG5	CWG6	CWG7	CWG8	CWG9	GNA1	GNA5
Total Pentachlorobiphenyls	ng/kg	2,530 J	1,780 J	881 J	883 J	487 J	530	365 J	1,600 J	443 J	2,080 J	580 J	111 J	504 J
PCB-128/166	ng/kg	218	253	104	121	72.3	68.9	47.2	219	77.7	260	168	7.41 J	33.7 J
PCB-129/138/160/163	ng/kg	1590	3140	807	1130	648	608	430	2180	674	1770	1290	133 J	687 J
PCB-130	ng/kg	37.0	26.8	9.99	8.73	7.25	9.00	3.21	16.9	5.24	12.0	10.2	1.33 J	3.91 J
PCB-131	ng/kg	2.75	0.555 U	0.621 J	0.142 U	0.244 U	0.258 J	0.179 U	0.228 U	0.0883 U	0.689 U	0.126 U	0.109 U	0.213 U
PCB-132	ng/kg	85.3	16.1	15.0	6.58	2.81	6.66	0.948 U	1.97	0.943	21.4	2.16	0.800 J	0.859 U
PCB-133	ng/kg	37.8	49.5	9.88	14.5	6.64	7.34	5.01	22.7	9.80	32.9	14.7	2.85 J	14.8 J
PCB-134/143	ng/kg	16.9	2.99	2.42	4.62	0.748 J	1.08	0.250 U	0.394 J	0.0862 U	4.02	0.320 J	0.152 U	0.327 J
PCB-135/151	ng/kg	140	27.3	23.6	13.7	12.5	19.1	3.10	4.51	2.03	72.7	4.03	2.40	2.88
PCB-136	ng/kg	35.5	5.04	3.22	2.65	1.74	3.72	0.415 J	0.641	0.361 J	14.2	0.839	0.349 J	0.0668 U
PCB-137	ng/kg	81.6	154	39.7	35.0	31.8	32.3	17.1	93.7	33.1	89.8	55.7	2.28 J	18.4 J
PCB-139/140	ng/kg	14.0	12.8	2.79	0.284 J	4.80	4.88	0.911 U	4.58	1.78	37.6	2.53	0.407 U	1.10 U
PCB-141	ng/kg	55.5	20.7	15.4	10.5	9.67	12.9	2.53	8.45	2.14	50.8	3.23	0.131 U	3.43 J
PCB-142	ng/kg	0.503 U	0.219 U	0.261 U	0.144 U	0.247 U	0.131 U	0.182 U	0.231 U	0.0897 U	0.202 U	0.128 U	0.157 U	0.216 U
PCB-144	ng/kg	14.7	1.89	2.30	1.25	0.693 U	1.96	0.242 J	0.546	0.244 J	4.94	0.379 J	0.304 J	0.381 J
PCB-145	ng/kg	0.0962 U	0.0918 U	0.0691 U	0.0194 U	0.0654 U	0.0498 U	0.0517 U	0.0408 U	0.0239 U	0.0328 U	0.0404 U	0.0519 U	0.0701 U
PCB-146	ng/kg	191	217	69.2	84.9	45.6	54.7	32.6	144	43.3	42.7	78.2	0.675 J	26.4 J
PCB-147/149	ng/kg	376	51.2	45.6	27.2	15.6	36.3	5.00	15.6	4.74	57.7	4.95	4.13 J	5.73 J
PCB-148	ng/kg	2.74 U	0.122 U	0.226 J	0.110 J	0.0872 U	0.330 J	0.0689 U	0.0544 U	0.0318 U	0.901	0.0539 U	0.0692 U	0.0934 U
PCB-150	ng/kg	2.00	0.0870 U	0.0655 U	0.0507 J	0.0619 U	0.0472 U	0.0490 U	0.0386 U	0.0226 U	0.407 J	0.0383 U	0.0492 U	0.0664 U
PCB-152	ng/kg	0.225 J	0.0862 U	0.0649 U	0.0182 U	0.0614 U	0.0467 U	0.0485 U	0.0383 U	0.0224 U	0.190 U	0.0379 U	0.0487 U	0.0658 U
PCB-153/168	ng/kg	1970	4430	1040	1400	704	709	521	2880	880	2580	1320	202 J	1260 J
PCB-154	ng/kg	22.2	6.42	1.90	2.56	3.33	4.88	0.660	2.41	0.630	28.7	1.18	0.317 U	0.681 J
PCB-155	ng/kg	1.19	0.294 J	0.0618 U	0.0690 U	0.117 U	0.0445 U	0.0461 U	0.0364 U	0.0732 J	1.59	0.0361 U	0.0463 U	0.133 J
PCB-156/157	ng/kg	151	218	64.5	71.2	54.9	61.7	27.1	202	47.0	161	91.3	11.7 J	58.4 J
PCB-158	ng/kg	86.7	110	32.8	36.0	37.3	34.5	12.6	79.4	26.8	172	49.7	2.37 J	8.60 J
PCB-159	ng/kg	3.87	1.14	0.914	0.579	0.208 U	0.497	0.0701 U	0.140 U	0.182 J	1.26	0.129 U	0.141 J	0.167 U
PCB-161	ng/kg	0.334 U	0.145 U	0.173 U	0.0954 U	0.164 U	0.0871 U	0.121 U	0.153 U	0.0595 U	0.134 U	0.0848 U	0.104 U	0.144 U
PCB-162	ng/kg	4.00	3.59	1.25	1.32	1.37	0.380 U	0.632	3.35	0.823	7.09	0.654 U	0.616	1.07 U
PCB-164	ng/kg	22.7	0.143 U	6.55	2.85	1.76	2.82	0.754	2.85	0.0654 U	3.80	0.0959 U	1.30 U	0.141 U
PCB-165	ng/kg	3.86	5.74	1.04	0.620	0.348 U	0.249 J	0.224 J	1.31 U	0.940	2.51	1.09	0.237 J	1.55 J
PCB-167	ng/kg	18.5	17.8	14.7	7.94	6.93	8.60	2.70	34.3	4.65	24.3	3.12	0.919	2.28
PCB-169	ng/kg	3.33	13.1	2.46	4.38	2.76	1.83	1.36 U	8.83	3.24	5.75	3.83	0.284 J	1.84 J
Total Hexachlorobiphenyls	ng/kg	5,190 J	8,780 J	2,320 J	2,990 J	1,670 J	1,690 J	1,110 J	5,930 J	1,820 J	5,460 J	3,110 J	374 J	2,130 J
PCB-170	ng/kg	387	1190	172	245	143	141	81.1	898	217	418	301	26.4	160
PCB-171/173	ng/kg	56.4	58.2	18.4	20.3	19.1	22.5	6.33	43.3	10.2	113	19.3	0.117 U	0.356 U
PCB-172	ng/kg	34.8	33.9	10.7	11.0	9.20	10.6	3.64	30.7	6.86	31.5	8.44	1.38	5.64
PCB-174	ng/kg	95.4	18.0	25.0	11.7	4.54	12.8	2.04	5.62	1.57	24.0	1.89	1.07	1.48 U
PCB-175	ng/kg	5.68	1.27	1.23	0.854	1.04	1.41	0.169 U	2.27	0.262 U	2.24	0.238 J	0.120 U	0.227 J
PCB-176	ng/kg	12.2	1.85	1.19	0.887	0.526 U	1.93	0.130 U	0.351 J	0.135 U	2.51	0.137 U	0.0850 U	0.0787 U
PCB-177	ng/kg	91.4	19.7	15.4	8.99	5.66	14.2	3.68	13.4	4.18	29.5	6.23	1.14	2.40
PCB-178	ng/kg	57.1	42.8	12.1	10.3	18.5	15.2	4.23	36.7	8.75	28.9	11.0	1.52	5.95
PCB-179	ng/kg	39.7	7.70	7.37	4.73	2.72	4.98	0.752	1.05	0.345 J	8.95	0.926	0.533	0.603 U
PCB-180/193	ng/kg	880	2910	516	605	369	394	200	2050	582	1260	797	60.4	372
PCB-181	ng/kg	1.90	1.80	0.788 U	0.475 U	0.521 U	0.776	0.306 J	1.14	0.175 U	2.59 U	0.168 U	1.41 U	5.32
PCB-182	ng/kg	1.80	0.568	0.453 J	0.313 U	0.608 U	0.528 U	0.0956 U	0.121 U	0.0949 J	0.0672 U	0.0816 U	0.0546 U	0.113 U
PCB-183/185	ng/kg	162	205	81.1	61.8	46.4	55.3	24.5	170	38.9	284	60.1	6.11	27.2
PCB-184	ng/kg	1.40	0.528	0.164 U	0.131 U	0.122 U	0.308 U	0.0738 U	0.0936 U	0.0637 J	1.35 U	0.0630 U	0.0422 U	0.0875 U
PCB-186	ng/kg	0.0608 U	0.0622 U	0.130 U	0.0224 U	0.112 U	0.148 U	0.0680 U	0.0862 U	0.0190 U	0.0478 U	0.0580 U	0.0389 U	0.0806 U
PCB-187	ng/kg	252	103	103	71.4	62.4	57.6	27.4	403	43.0	81.9	37.2	5.73	13.2

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

		FGL (RM 10)		CWG (RM 20)									GNA (RM 38)	
PCB Congener	**Units**	**FGL10**	**FGL11**	**CWG1**	**CWG2**	**CWG3**	**CWG4**	**CWG5**	**CWG6**	**CWG7**	**CWG8**	**CWG9**	**GNA1**	**GNA5**
PCB-188	ng/kg	1.32	0.224 J	0.131 U	0.151 J	0.113 U	0.148 U	0.0790 U	0.0864 U	0.0495 J	0.436 J	0.0290 U	0.0390 U	0.0808 U
PCB-189	ng/kg	15.0	52.7	7.58 U	12.5	5.97	6.48	4.29	44.3	9.30	18.2	14.7	1.21	7.00
PCB-190	ng/kg	87.4	289	44.8	61.9	37.6	37.9	16.9	178	70.6	102	96.7	6.32	35.5
PCB-191	ng/kg	12.6	33.0	4.17	5.70	4.77	5.16	2.16	24.4	7.54	23.5	12.4	0.548 U	4.34
PCB-192	ng/kg	0.562 U	0.370 U	0.274 U	0.128 U	0.234 U	12.3 U	0.273 U	0.316 U	0.100 U	0.220 U	0.202 U	0.123 U	0.373 U
Total Heptachlorobiphenyls	ng/kg	2,200	4,970 J	1,010 J	1,130 J	730	782	377 J	3,900 J	1,000 J	2,430 J	1,370 J	112	639 J
PCB-194	ng/kg	165	412	246	120	66.7	73.2	40.0	362	88.1	216	128	8.14	56.0
PCB-195	ng/kg	49.1	112	27.8	29.1	17.7	15.9	6.67	57.3	22.9	71.2	38.0	1.76	7.10 U
PCB-196	ng/kg	38.4	63.9	37.1	30.8	26.9	18.1	5.71	43.0	12.9	97.7	27.2	1.62 U	5.78
PCB-197	ng/kg	3.95 U	3.17	1.47 U	1.55	2.28	1.34	0.0755 U	1.24	0.171 U	13.0	0.420 U	0.100 U	0.116 U
PCB-198/199	ng/kg	108	167	61.2	88.4	39.6	37.6	14.8	120	47.1	96.6	93.1	8.99	23.3 U
PCB-200	ng/kg	6.89	1.48 U	1.15	1.39	0.262 U	0.349 J	0.0895 U	0.272 U	0.0516 U	0.0486 U	0.302 U	0.119 U	0.137 U
PCB-201	ng/kg	12.7	3.02 U	1.28 U	2.25	0.696 U	1.25 U	0.545 U	0.943	0.522	3.87	0.558	0.0917 U	0.343 U
PCB-202	ng/kg	37.1	31.8	8.63	14.8	10.5	9.32	2.22 U	14.2	4.83	29.4	8.77	1.62	4.98
PCB-203	ng/kg	85.6	197	218	90.7	86.6	51.6	18.1	122	42.2	259	95.0	5.50 U	18.1
PCB-204	ng/kg	0.170 U	0.0471 U	0.0715 U	0.0368 U	0.143 U	0.0868 U	0.0859 U	0.0526 U	0.0494 U	0.306 U	0.168 U	0.114 U	0.132 U
PCB-205	ng/kg	7.75	25.3	8.43	7.72	2.81	3.55	1.31 U	14.5	5.02	11.1	8.44	0.552 U	2.88
Total Octachlorobiphenyl	ng/kg	511	1,010	608	387	253	211 J	85.3	735	224	798	399	20.5	87.7
PCB-206	ng/kg	88.3	148	248	84.8	48.6	47.4	28.2	122	34.1	120	52.3	4.95 J	29.1
PCB-207	ng/kg	8.29	4.67	4.70	3.26	5.56	2.84	0.503 U	1.29	0.633	11.0	1.24 U	0.0509 U	0.576 J
PCB-208	ng/kg	17.7	8.29	7.83	8.93	2.83	3.10	2.06	3.27 U	2.19	7.36	3.03	0.962	1.32
Total Nonachlorobiphenyl	ng/kg	114	161	261	97.0	57.0	53.3	30.3	123	36.9	138	55.3	5.91 J	31.0 J
PCB-209	ng/kg	47.9	52.5	49.8	31.9	11.4	21.4	16.7	37.0	13.6	44.5	20.1	4.23	17.9
Total Decachlorobiphenyl	ng/kg	47.9	52.5	49.8	31.9	11.4	21.4	16.7	37.0	13.6	44.5	20.1	4.23	17.9
Total PCB congeners (a)	ng/kg WW	11,600	17,000	5,276	5,608	3,327	3,407	2,020	12,500	3,580	11,400	5,600	650	3,440
Total PCB congeners (a)	ug/kg WW	11.6	17.0	5.28	5.61	3.33	3.41	2.02	12.5	3.58	11.4	5.60	0.65	3.44
Percent Lipids	%							0.164						
Total PCB congeners (a)	ug/kg LW							1230						
Total PCB congeners (a)	mg/kg LW							1.23						

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	GNA (RM 38)									ICY (RM 48)		
		GNA6	GNA7	GNA8	GNA9	GNA10	GNA11	GNA12	GNA13	GNA14	ICY1	ICY2	ICY3
PCB-001	ng/kg	0.0854 U	0.314 U	0.0465 U	0.837 U	0.851 U	0.398 U	0.240 U	0.0758 U	0.0499 U	0.0902 U	0.0560 U	0.243 U
PCB-002	ng/kg	0.101 U	0.165 U	0.0498 U	0.157 U	0.122 U	0.439 U	0.0493 U	0.0534 U	0.0551 U	0.100 U	0.0523 U	0.0983 U
PCB-003	ng/kg	0.0992 U	0.253 U	0.0488 U	0.904 U	1.02 U	0.544 U	0.0499 U	0.0535 U	0.0551 U	0.0983 U	0.0513 U	0.0993 U
Total Monochlorobiphenyls	ng/kg	0.101 U	0.314 U	0.0498 U	0.904 U	1.02 U	0.544 U	0.240 U	0.0758 U	0.0551 U	0.100 U	0.056 U	0.243 U
PCB-004	ng/kg	0.349 U	0.0598 U	0.0507 U	0.292 U	0.135 U	0.123 U	0.111 U	0.0831 U	0.0984 U	0.106 U	0.0611 U	0.193 U
PCB-005	ng/kg	0.373 U	0.0406 U	0.0402 U	0.248 U	0.138 U	0.124 U	0.0831 U	0.0748 U	0.0983 U	0.0876 U	0.0381 U	0.182 U
PCB-006	ng/kg	0.390 U	0.258 J	0.120 U	0.259 U	0.144 U	0.130 U	0.0882 U	0.0781 U	0.103 U	0.0918 U	0.0397 U	0.193 U
PCB-007	ng/kg	0.354 U	0.0384 U	0.0380 U	0.236 U	0.131 U	0.118 U	0.0787 U	0.0712 U	0.0937 U	0.0833 U	0.0361 U	0.172 U
PCB-008	ng/kg	0.368 U	0.839	0.510 U	0.250 U	0.139 U	1.52	0.769 J	0.318 U	0.340 U	0.263 U	0.564	1.04 J
PCB-009	ng/kg	0.406 U	0.0445 U	0.0440 U	0.270 U	0.150 U	0.135 U	0.0911 U	0.0815 U	0.107 U	0.0954 U	0.0418 U	0.199 U
PCB-010	ng/kg	0.221 U	0.0371 U	0.0314 U	0.183 U	0.0843 U	0.0770 U	0.0699 U	0.0520 U	0.0615 U	0.0671 U	0.0379 U	0.122 U
PCB-011	ng/kg	0.407 U	0.931 U	0.918 U	2.76	1.48	140	1.81	1.86	1.24 U	1.57	0.521 U	3.22
PCB-012/013	ng/kg	0.409 U	0.297 U	0.253 J	0.250 U	0.142 U	0.128 U	0.0886 U	0.0684 U	0.101 U	0.105 U	0.0368 U	0.200 U
PCB-014	ng/kg	0.343 U	0.0372 U	0.0357 U	0.209 U	0.118 U	0.107 U	0.0772 U	0.0571 U	0.0847 U	0.0878 U	0.0319 U	0.175 U
PCB-015	ng/kg	0.368 U	0.565	0.302 J	0.226 UJ	0.128 UJ	0.664 J	0.483 U	0.295 J	0.0916 UJ	0.0943 UJ	0.274 J	0.176 U
Total Dichlorobiphenyls	ng/kg	0.409 U	1.66 J	0.555 J	2.76	1.48	142 J	2.58 J	2.16 J	1.24	1.57	0.838 J	4.26 J
PCB-016	ng/kg	0.245 U	0.432 U	0.293 J	0.252 U	0.162 U	0.797	0.458 J	0.0877 U	0.0944 U	0.175 J	0.289 J	0.594 J
PCB-017	ng/kg	0.176 U	0.436 J	0.228 J	0.185 U	0.119 U	0.782	0.365 J	0.176 J	0.0695 U	0.244 J	0.269 J	0.688 J
PCB-018/030	ng/kg	0.340 J	0.879 J	0.592 J	0.652 J	0.103 U	1.50	0.700 U	0.328 J	0.314 J	0.558 J	0.397 J	1.19 U
PCB-019	ng/kg	0.217 U	0.0531 U	0.0718 U	0.229 U	0.148 U	0.0978 U	0.0678 U	0.0869 U	0.0853 U	0.0963 U	0.0422 U	0.153 U
PCB-020/028	ng/kg	0.859 U	2.02	1.65	1.67	0.450 U	2.68	1.18 U	0.680 U	0.582 U	2.03	0.851 J	2.41 J
PCB-021/033	ng/kg	0.315 U	0.907 J	0.546 J	0.533 J	0.0841 U	1.18	0.687 J	0.214 J	0.184 U	0.310 J	0.500 J	0.860 J
PCB-022	ng/kg	0.144 U	0.657	0.431 J	0.461 J	0.0912 U	0.747	0.480 J	0.0502 U	0.0553 U	0.295 J	0.335 J	0.559 J
PCB-023	ng/kg	0.137 U	0.0316 U	0.0429 U	0.135 U	0.0864 U	0.0663 U	0.0511 U	0.0476 U	0.0524 U	0.0665 U	0.0253 U	0.109 U
PCB-024	ng/kg	0.135 U	0.0339 U	0.0447 U	0.143 U	0.0918 U	0.0635 U	0.0496 U	0.0497 U	0.0535 U	0.0660 U	0.0265 U	0.107 U
PCB-025	ng/kg	0.131 U	0.212 J	0.0435 U	0.125 U	0.0802 U	0.0616 U	0.148 U	0.0442 U	0.0487 U	0.0633 U	0.0907 J	0.100 U
PCB-026/029	ng/kg	0.131 U	0.346 J	0.215 J	0.294 J	0.0800 U	0.375 J	0.239 U	0.0440 U	0.0485 U	0.312 J	0.0230 U	0.396 J
PCB-027	ng/kg	0.128 U	0.0317 U	0.0417 U	0.133 U	0.0858 U	0.0593 U	0.0457 U	0.0464 U	0.0500 U	0.0626 U	0.0247 U	0.0987 U
PCB-031	ng/kg	0.438 J	1.33	0.866	0.939	0.217 U	1.91	0.814 J	0.492 J	0.346 J	1.26	0.598	1.58 J
PCB-032	ng/kg	0.125 U	0.305 J	0.229 J	0.380 J	0.0829 U	0.483	0.261 U	0.190 J	0.161 J	0.209 J	0.192 J	0.463 J
PCB-034	ng/kg	0.129 U	0.0299 U	0.0405 U	0.128 U	0.0821 U	0.0630 U	0.0487 U	0.0452 U	0.0498 U	0.0625 U	0.0239 U	0.104 U
PCB-035	ng/kg	0.157 U	0.158 J	0.0729 U	0.241 U	0.142 U	0.158 U	0.295 J	0.0624 U	0.0670 U	0.0900 U	0.0384 U	0.169 U
PCB-036	ng/kg	0.144 U	0.0424 U	0.0679 U	0.218 U	0.129 U	0.143 U	0.0873 U	0.0565 U	0.0608 U	0.0828 U	0.0358 U	0.155 U
PCB-037	ng/kg	0.147 U	0.634	0.434 J	0.221 U	0.130 U	0.468 J	0.427 U	0.0571 U	0.0614 U	0.175 U	0.308 J	0.519 J
PCB-038	ng/kg	0.149 U	0.0459 U	0.0734 U	0.229 U	0.135 U	0.150 U	0.0932 U	0.0594 U	0.0639 U	0.0854 U	0.0387 U	0.166 U
PCB-039	ng/kg	0.137 U	0.0418 U	0.0670 U	0.209 U	0.123 U	0.137 U	0.0849 U	0.0541 U	0.0581 U	0.0788 U	0.0353 U	0.151 U
Total Trichlorobiphenyls	ng/kg	0.778 J	7.88 J	5.48 J	4.93 J	0.45 U	11 J	3.10 J	1.40 J	0.82 J	5.39 J	3.83 J	8.07 J
PCB-040/041/071	ng/kg	0.292 U	0.580 J	0.0883 U	0.215 U	0.113 U	0.273 U	0.295 J	0.0787 U	0.0567 U	0.525 J	0.0812 U	0.540 J
PCB-042	ng/kg	0.114 U	0.341 J	0.193 J	0.220 U	0.115 U	0.278 U	0.168 J	0.0803 U	0.0579 U	0.278 J	0.0819 U	0.305 U
PCB-043	ng/kg	0.131 U	0.199 U	0.0991 U	0.257 U	0.135 U	0.293 U	0.112 U	0.0913 U	0.0640 U	0.144 U	0.0959 U	0.161 U
PCB-044/047/065	ng/kg	2.21 U	2.54	2.36	2.07 J	1.47 J	5.54	1.58 J	0.962 J	1.67 J	4.85	0.918 J	3.90 J
PCB-045/051	ng/kg	0.109 U	0.0931 U	0.0991 U	0.200 U	0.0882 U	0.748 J	0.112 U	0.0629 U	0.0579 U	0.105 U	0.0877 U	0.210 U
PCB-046	ng/kg	0.125 U	0.106 U	0.113 U	0.230 U	0.101 U	0.109 U	0.130 U	0.0722 U	0.0665 U	0.119 U	0.0999 U	0.242 U
PCB-048	ng/kg	0.109 U	0.310 J	0.0841 U	0.216 U	0.114 U	0.383 J	0.219 U	0.0768 U	0.0538 U	0.389 J	0.0814 U	0.133 U
PCB-049/069	ng/kg	0.663 J	1.45	1.18	0.722 J	0.323 J	1.08	0.402 J	0.282 J	0.316 J	2.56	0.325 J	2.11 J
PCB-050/053	ng/kg	0.108 U	0.0909 U	0.0968 U	0.187 U	0.0822 U	0.0886 U	0.107 U	0.0586 U	0.0539 U	0.103 U	0.0857 U	0.199 U
PCB-052	ng/kg	1.83	3.75	3.16	2.25	0.994	2.78	1.21 U	0.709	0.972	8.64	0.874	7.33
PCB-054	ng/kg	0.0854 U	0.0733 U	0.0781 U	0.155 U	0.0680 U	0.0734 U	0.0928 U	0.0485 U	0.0446 U	0.0816 U	0.0691 U	0.173 U
PCB-055	ng/kg	0.116 U	0.0783 U	0.0794 U	0.220 U	0.104 U	0.326 U	0.104 U	0.0580 U	0.0707 U	0.139 U	0.0634 U	0.188 U
PCB-056	ng/kg	0.198 U	0.513	0.355 J	0.227 U	0.108 U	0.336 U	0.112 U	0.0598 U	0.0730 U	0.144 U	0.186 J	0.202 U

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	GNA (RM 38)									ICY (RM 48)		
		GNA6	GNA7	GNA8	GNA9	GNA10	GNA11	GNA12	GNA13	GNA14	ICY1	ICY2	ICY3
PCB-057	ng/kg	0.110 U	0.0807 U	0.0840 U	0.195 U	0.0938 U	0.270 U	0.0971 U	0.0534 U	0.0651 U	0.133 U	0.0614 U	0.171 U
PCB-058	ng/kg	0.103 U	0.0739 U	0.0770 U	0.184 U	0.0884 U	0.255 U	0.0890 U	0.0504 U	0.0614 U	0.124 U	0.0562 U	0.157 U
PCB-059/062/075	ng/kg	0.0832 U	0.122 U	0.0643 U	0.155 U	0.0812 U	0.197 U	0.160 J	0.0568 U	0.0409 U	0.0994 U	0.0591 U	0.392 J
PCB-060	ng/kg	0.359 J	0.643	0.616	0.214 U	0.199 J	0.316 U	0.296 J	0.0563 U	0.229 J	1.00	0.160 J	0.706 U
PCB-061/070/074/076	ng/kg	2.35	5.12	4.57	2.79 J	2.20 J	6.15	2.05 U	0.981 J	2.25 J	8.17	1.17 J	6.84 J
PCB-063	ng/kg	0.100 U	0.0715 U	0.0744 U	0.176 U	0.0849 U	0.245 U	0.0869 U	0.0484 U	0.0589 U	0.293 J	0.0544 U	0.153 U
PCB-064	ng/kg	0.302 J	0.736	0.552	0.397 J	0.0779 U	0.644	0.243 J	0.165 J	0.0392 U	1.18	0.169 J	1.13 J
PCB-066	ng/kg	0.864 U	2.45	1.89	1.55	0.545 J	0.325 U	0.793 J	0.397 J	0.695 J	3.65	0.531	3.13
PCB-067	ng/kg	0.102 U	0.0778 U	0.0810 U	0.185 U	0.0889 U	0.256 U	0.0912 U	0.0507 U	0.0617 U	0.123 U	0.0592 U	0.161 U
PCB-068	ng/kg	0.100 U	0.0727 U	0.0756 U	0.177 U	0.0851 U	0.245 U	0.0862 U	0.0485 U	0.0591 U	0.217 J	0.0553 U	0.152 U
PCB-072	ng/kg	0.102 U	0.0769 U	0.0801 U	0.192 U	0.0923 U	0.266 U	0.0937 U	0.0526 U	0.0640 U	0.123 U	0.0585 U	0.165 U
PCB-073	ng/kg	0.0872 U	0.135 U	0.0672 U	0.174 U	0.0918 U	0.199 U	0.0777 U	0.0620 U	0.0435 U	0.0956 U	0.0650 U	0.112 U
PCB-077	ng/kg	0.292 J	0.411 J	0.374 J	0.201 U	0.0918 U	0.312 U	0.0930 U	0.0495 U	0.0657 U	0.200 U	0.0669 U	0.588 J
PCB-078	ng/kg	0.653	0.0842 U	0.0853 U	0.237 U	0.112 U	0.350 U	0.104 U	0.0623 U	0.0760 U	0.157 U	0.0681 U	0.188 U
PCB-079	ng/kg	0.103 U	0.0708 U	0.0717 U	0.193 U	0.0917 U	0.286 U	0.0891 U	0.0510 U	0.0622 U	0.123 U	0.0572 U	0.161 U
PCB-080	ng/kg	0.107 U	0.0694 U	0.0703 U	0.196 U	0.0930 U	0.290 U	0.0924 U	0.0517 U	0.0630 U	0.128 U	0.0561 U	0.167 U
PCB-081	ng/kg	0.0969 U	0.0930 U	0.0911 U	0.221 U	0.102 U	0.343 U	0.110 U	0.0522 U	0.0715 U	0.151 U	0.0714 U	0.188 U
Total Tetrachlorobiphenyls	ng/kg	6.45 J	18.8 J	15.3 J	9.78 J	5.73 J	17 J	3.94 J	3.50 J	6.13 J	31.8 J	4.33 J	26.0 J
PCB-082	ng/kg	0.202 U	0.248 U	0.288 U	0.625 U	0.258 U	0.797 U	0.302 U	0.139 U	0.201 U	0.304 U	0.231 U	0.408 U
PCB-083/099	ng/kg	149	60.4	19.7	103	28.0	152	93.5	71.3	172	101	28.6	16.6
PCB-084	ng/kg	0.241 J	0.805	0.632	0.421 U	0.192 U	0.448 U	0.197 U	0.110 U	0.146 U	0.565 U	0.150 U	0.680 U
PCB-085/116/117	ng/kg	21.5	6.76	4.83	13.2	5.52	10.4 U	5.10	4.85	11.6	13.0	2.91	4.37 J
PCB-086/087/097/109/119/125	ng/kg	0.812 U	3.95	3.35	1.72 U	0.178 U	0.549 U	0.213 U	0.673 U	0.800 J	7.84	0.149 U	5.07 U
PCB-088/091	ng/kg	0.153 U	0.483 J	0.388 J	0.363 U	0.166 U	0.387 U	0.171 U	0.0949 U	0.126 U	0.811 J	0.134 U	0.920 J
PCB-089	ng/kg	0.175 U	0.184 U	0.209 U	0.482 U	0.230 U	0.530 U	0.234 U	0.123 U	0.167 U	0.247 U	0.174 U	0.346 U
PCB-090/101/113	ng/kg	4.13	8.16	6.78	4.24	2.35 J	4.60 U	1.90 J	1.73	1.91 J	18.3	1.30 J	15.0
PCB-092	ng/kg	0.160 U	1.33 U	1.27	0.604 U	0.201 U	0.175 U	0.207 U	0.260 J	0.169 U	2.86	0.155 U	2.95
PCB-093/098/100/102	ng/kg	0.154 U	0.150 U	0.183 U	0.355 U	0.162 U	0.378 U	0.167 U	0.0928 U	0.123 U	0.189 U	0.132 U	0.245 U
PCB-094	ng/kg	0.164 U	0.163 U	0.200 U	0.397 U	0.182 U	0.423 U	0.185 U	0.104 U	0.138 U	0.201 U	0.143 U	0.272 U
PCB-095	ng/kg	0.913	2.98	2.32	0.954	0.596 J	1.20 U	0.911 J	0.469 J	0.434 J	4.37	0.920	5.50
PCB-096	ng/kg	0.0544 U	0.0563 U	0.0552 U	0.0782 U	0.0457 U	0.0513 U	0.0657 U	0.0211 U	0.0257 U	0.0605 U	0.0420 U	0.0985 U
PCB-103	ng/kg	0.139 U	0.136 U	0.166 U	0.329 U	0.150 U	0.351 U	0.155 U	0.0860 U	0.114 U	0.170 U	0.120 U	0.228 U
PCB-104	ng/kg	0.0471 U	0.0483 U	0.0474 U	0.0678 U	0.0396 U	0.0445 U	0.0577 U	0.0183 U	0.0223 U	0.0524 U	0.0360 U	0.0865 U
PCB-105	ng/kg	8.46	5.93	7.91	7.21	10.8	10.4	5.25	3.56	8.23 U	12.7	1.78	7.76
PCB-106	ng/kg	0.112 U	0.121 U	0.409 U	0.250 U	0.0885 U	0.611 U	0.127 U	0.0680 U	0.0657 U	0.215 U	0.112 U	0.220 U
PCB-107	ng/kg	0.525 U	1.26	0.961	0.451 U	0.424 J	0.531 U	0.379 J	0.199 J	0.403 J	1.56 U	0.103 U	1.45 J
PCB-108/124	ng/kg	0.210 U	0.509 J	0.355 J	0.247 U	0.0853 U	0.589 U	0.122 U	0.0655 U	0.0632 U	0.495 U	0.107 U	0.463 J
PCB-110/115	ng/kg	6.22	7.05	5.93	3.40 U	2.04	0.378 U	2.26	2.05	3.14	13.7	1.48 U	10.8
PCB-111	ng/kg	0.123 U	0.137 U	0.159 U	0.366 U	0.151 U	0.467 U	0.184 U	0.0813 U	0.118 U	0.185 U	0.127 U	0.248 U
PCB-112	ng/kg	0.117 U	0.121 U	0.137 U	0.325 U	0.155 U	0.358 U	0.158 U	0.0828 U	0.113 U	0.165 U	0.114 U	0.233 U
PCB-114	ng/kg	0.401 J	0.448 J	0.498 U	0.478 J	0.311 J	0.568 U	0.260 U	0.191 U	0.433 U	0.710 J	0.0956 U	0.667 J
PCB-118	ng/kg	8.70 J	12.5	14.5	9.22	11.2	13.2	7.16	4.95	12.4	25.6	2.65	18.5
PCB-120	ng/kg	0.121 U	0.124 U	0.144 U	0.361 U	0.149 U	0.460 U	0.172 U	0.0801 U	0.116 U	0.183 U	0.116 U	0.233 U
PCB-121	ng/kg	0.120 U	0.123 U	0.140 U	0.318 U	0.151 U	0.350 U	0.156 U	0.0808 U	0.110 U	0.169 U	0.116 U	0.230 U
PCB-122	ng/kg	0.113 U	0.121 U	0.175 U	0.236 U	0.0877 U	0.665 U	0.124 U	0.0661 U	0.0655 U	0.197 U	0.108 U	0.214 U
PCB-123	ng/kg	0.166 J	0.112 U	0.380 U	0.229 U	0.0810 U	0.560 U	0.116 U	0.0623 U	0.228 U	0.382 U	0.104 U	0.201 U
PCB-126	ng/kg	0.206 J	0.0881 U	0.322 U	0.178 U	0.0667 U	0.775 U	0.136 U	0.0770 U	0.0538 U	0.147 U	0.0765 U	0.154 U
PCB-127	ng/kg	0.119 U	0.0864 U	0.321 U	0.185 U	0.0689 U	0.810 U	0.0943 U	0.0753 U	0.0564 U	0.153 U	0.0785 U	0.175 U

Table D-1
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PCB Congener	Units	GNA (RM 38)									ICY (RM 48)		
		GNA6	GNA7	GNA8	GNA9	GNA10	GNA11	GNA12	GNA13	GNA14	ICY1	ICY2	ICY3
Total Pentachlorobiphenyls	ng/kg	200 J	111 J	68.9 J	138 J	61.2 J	176	116 J	89.4 J	203 J	201 J	38.2 J	85.0 J
PCB-128/166	ng/kg	13.3 J	9.53	7.15	14.9	7.55	12.5	12.7	7.59	21.7	15.3	3.54	5.52
PCB-129/138/160/163	ng/kg	223 J	91.4	44.1	175	67.1	241	172	142	357	129	40.5	37.7
PCB-130	ng/kg	1.74 U	0.904	1.33	1.14 U	1.17 U	1.18 U	0.759 J	0.645	1.69	1.54 U	0.236 U	1.57 J
PCB-131	ng/kg	0.220 U	0.0898 U	0.217 J	0.230 U	0.0935 U	0.670 U	0.158 U	0.136 U	0.139 U	0.204 U	0.184 U	0.256 U
PCB-132	ng/kg	0.394 J	1.29	0.658 U	0.222 U	0.0902 U	0.646 U	0.238 J	0.296 J	0.134 U	1.24	0.176 U	1.45 J
PCB-133	ng/kg	4.56 U	1.54	0.980 U	2.61	1.22 U	4.84	2.87	2.36	5.95	2.38	0.427 J	1.12 J
PCB-134/143	ng/kg	0.215 U	0.597 J	0.398 U	0.228 U	0.0925 U	0.663 U	0.153 U	0.135 U	0.137 U	0.212 J	0.180 U	0.247 U
PCB-135/151	ng/kg	1.02	2.70	0.0747 U	1.08 U	0.337 U	0.933 U	0.261 U	0.607 J	0.292 U	4.73	0.105 U	4.06 J
PCB-136	ng/kg	0.0602 U	0.573	0.295 J	0.0873 U	0.0615 U	0.104 U	0.0701 U	0.0373 U	0.0353 U	0.501 U	0.0748 U	0.126 U
PCB-137	ng/kg	4.89 J	3.44	2.30	6.75	3.41	5.64	5.27	3.81	11.7	7.24	1.50	1.65 J
PCB-139/140	ng/kg	0.435 J	0.0786 U	0.113 U	0.354 J	0.0827 U	0.593 U	0.260 U	0.120 U	0.123 U	0.507 U	0.162 U	0.223 U
PCB-141	ng/kg	0.572 J	2.07	1.67 U	1.02	0.490 J	0.534 U	0.128 U	0.124 U	0.125 U	3.94	0.194 U	2.66
PCB-142	ng/kg	0.224 U	0.0916 U	0.132 U	0.235 U	0.0956 U	0.685 U	0.156 U	0.139 U	0.142 U	0.207 U	0.188 U	0.253 U
PCB-144	ng/kg	0.204 J	0.311 U	0.0696 U	0.111 U	0.0782 U	0.132 U	0.0855 U	0.0474 U	0.0449 U	0.514 J	0.0977 U	0.480 J
PCB-145	ng/kg	0.0631 U	0.0606 U	0.304 J	0.0926 U	0.0653 U	0.110 U	0.0752 U	0.0396 U	0.0375 U	0.0702 U	0.0796 U	0.135 U
PCB-146	ng/kg	3.32 J	7.16	6.47	13.8	6.48	23.2	8.91	6.86	20.8	13.2	1.83 U	6.93
PCB-147/149	ng/kg	2.07 U	4.04	2.95	2.98	0.563 U	3.99 U	0.581 U	1.46	0.863 J	4.26	0.588 J	8.82
PCB-148	ng/kg	0.0842 U	0.0805 U	0.0754 U	0.122 U	0.0858 U	0.145 U	0.0942 U	0.0521 U	0.0492 U	0.0937 U	0.106 U	0.169 U
PCB-150	ng/kg	0.0598 U	0.0551 U	1.45	0.0858 U	0.0605 U	0.102 U	0.0702 U	0.0367 U	0.0347 U	0.0666 U	0.0724 U	0.126 U
PCB-152	ng/kg	0.0593 U	0.0578 U	0.460 J	0.0854 U	0.0602 U	0.102 U	0.0692 U	0.0365 U	0.0346 U	0.0659 U	0.0760 U	0.124 U
PCB-153/168	ng/kg	260 J	151	57.6	237	90.3	376	326	286	713	204	73.6	50.4
PCB-154	ng/kg	0.123 U	0.447 U	0.0663 U	0.106 U	0.0748 U	0.166 U	0.0831 U	0.0454 U	0.0430 U	0.691 J	0.0931 U	0.587 J
PCB-155	ng/kg	0.0564 U	0.0526 U	0.0492 U	0.0815 U	0.0575 U	0.0900 U	0.0658 U	0.0349 U	0.0330 U	0.0627 U	0.0691 U	0.118 U
PCB-156/157	ng/kg	14.8 J	7.10	4.57	11.0	7.90	15.7	11.6	11.9	26.5	12.7	3.43	3.72 U
PCB-158	ng/kg	3.84 J	3.64	2.46	4.19	2.67	5.88	2.46	1.79	4.71	4.51	0.810	2.48
PCB-159	ng/kg	0.103 U	0.158 J	0.0869 U	0.101 U	0.0579 U	0.537 U	0.0737 U	0.0543 U	0.0770 U	0.0650 U	0.0601 U	0.0926 U
PCB-161	ng/kg	0.149 U	0.0630 U	0.0905 U	0.162 U	0.0659 U	0.472 U	0.111 U	0.0958 U	0.0977 U	0.137 U	0.129 U	0.180 U
PCB-162	ng/kg	0.120 U	0.561	0.315 J	0.0994 U	0.252 J	0.683 U	0.264 J	0.0804 U	0.390 J	0.353 J	0.0657 U	0.299 U
PCB-164	ng/kg	0.153 U	0.684	0.578	0.209 J	0.169 U	0.798	0.0987 U	0.277 J	0.0963 U	0.904	0.148 U	1.14 J
PCB-165	ng/kg	0.427 U	0.0656 U	0.0943 U	0.448 J	0.0719 U	0.515 U	0.118 U	0.258 J	0.612 U	0.480 U	0.196 U	0.192 U
PCB-167	ng/kg	0.773	1.27	1.04	0.528 U	0.859 U	1.43	0.802 J	0.585 U	1.50	1.61	0.288 J	1.12 J
PCB-169	ng/kg	0.427 U	0.361 U	0.486 J	0.182 U	0.114 U	0.687 U	0.450 J	0.103 U	0.829	0.138 U	0.0941 U	0.127 U
Total Hexachlorobiphenyls	ng/kg	527 J	290 J	134 J	470 J	186 J	687	544 J	466 J	1,170 J	407 J	125 J	128 J
PCB-170	ng/kg	27.9	18.5	7.97 U	22.1	14.1	33.9	38.5	38.9	96.1	23.3	9.46	6.58
PCB-171/173	ng/kg	0.281 U	1.91	1.44 U	1.68 U	1.17 J	2.14	1.42 J	1.07	2.91	2.50	0.142 U	1.41 J
PCB-172	ng/kg	1.59 U	1.48	1.67	1.19 U	1.63	2.03	1.77	1.19 U	3.25 U	1.88	0.144 U	1.49 J
PCB-174	ng/kg	0.244 U	1.23	1.22 U	1.08	0.263 U	0.609 U	0.187 U	0.503 J	0.353 U	1.83	0.139 U	1.50 J
PCB-175	ng/kg	4.16 J	0.150 U	0.223 U	13.0	0.0778 U	0.239 U	0.106 U	0.0599 U	0.0516 U	0.414 J	0.154 U	0.281 J
PCB-176	ng/kg	0.0992 U	0.175 J	0.158 U	0.0832 U	0.0579 U	0.178 U	0.0726 U	0.0446 U	0.0384 U	0.0565 U	0.109 U	0.145 U
PCB-177	ng/kg	0.982	1.05	1.01 U	0.624 J	0.566 J	0.633 U	0.558 J	0.622	1.34	2.86	0.142 U	2.46
PCB-178	ng/kg	1.97 U	2.17	2.16 U	2.40	1.74	2.39	1.81	1.01	3.27	3.37 U	0.149 U	1.88 U
PCB-179	ng/kg	0.277 J	0.113 U	0.168 U	0.250 U	0.110 U	0.240 U	0.0758 U	0.174 U	0.0404 U	0.556 U	0.116 U	0.134 U
PCB-180/193	ng/kg	64.0	47.7	25.6	60.5	39.2	85.5	106	104	272	60.1	23.0	19.9
PCB-181	ng/kg	1.71	0.228 J	0.201 U	0.187 U	0.0979 U	0.601 U	0.111 J	0.0944 U	0.131 U	0.106 U	0.130 U	0.269 U
PCB-182	ng/kg	0.143 U	0.144 U	0.214 U	0.107 U	0.0743 U	0.229 U	0.111 U	0.0572 U	0.0493 U	0.0813 U	0.148 U	0.223 U
PCB-183/185	ng/kg	5.79	5.17	4.16	6.40	4.20	7.21 U	6.86	6.58	19.3	9.86	1.66	4.91
PCB-184	ng/kg	0.110 U	0.119 U	0.176 U	0.0890 U	0.0620 U	0.475 U	0.0811 U	0.0477 U	0.0411 U	0.220 J	0.122 U	0.162 U
PCB-186	ng/kg	0.102 U	0.109 U	0.161 U	0.0796 U	0.0554 U	0.170 U	0.0732 U	0.0426 U	0.0368 U	0.0578 U	0.112 U	0.147 U
PCB-187	ng/kg	0.140 U	8.68	11.2	0.105 U	3.35	7.70	5.03	3.41	8.51	11.6	1.66	10.5

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	GNA (RM 38)									ICY (RM 48)		
		GNA6	GNA7	GNA8	GNA9	GNA10	GNA11	GNA12	GNA13	GNA14	ICY1	ICY2	ICY3
PCB-188	ng/kg	0.102 U	0.106 U	0.157 U	0.0808 U	0.0563 U	0.173 U	0.0726 U	0.0433 U	0.0374 U	0.0580 U	0.109 U	0.145 U
PCB-189	ng/kg	0.876 U	0.901	0.235 U	0.863	0.752 J	1.15 U	1.38 U	1.70	2.86 U	0.886	0.831	0.533 U
PCB-190	ng/kg	5.28	4.26	2.37	4.54	2.76	6.87	7.70	8.62	18.9	6.48	1.55	1.88 J
PCB-191	ng/kg	0.300 U	0.230 U	0.168 U	0.645 J	0.370 U	0.918	0.823 J	0.807	2.05 U	0.446 U	0.297 J	0.234 U
PCB-192	ng/kg	0.295 U	0.104 U	0.186 U	0.190 U	0.0995 U	0.610 U	0.0764 U	0.0960 U	0.133 U	0.127 U	0.120 U	0.253 U
Total Heptachlorobiphenyls	ng/kg	110 J	93.5 J	45.0	112 J	69.5 J	141	171 J	167 J	422	122 J	38.5 J	50.9 J
PCB-194	ng/kg	8.51	7.30	5.83	7.72	9.86	11.6	13.7	15.3	39.8	8.06	3.85	6.05
PCB-195	ng/kg	2.54	1.45	2.05	0.857 U	1.18	2.03	2.73	1.22	4.59	1.22 U	0.413 U	0.412 U
PCB-196	ng/kg	0.743 U	1.45	1.44	0.470 U	0.406 U	1.99	1.54	1.01	2.36	1.36 U	0.270 J	0.797 J
PCB-197	ng/kg	0.0769 U	0.165 U	0.325 U	0.117 U	0.0520 U	0.480 U	0.0472 U	0.121 U	0.0879 U	0.172 U	0.0913 U	0.178 U
PCB-198/199	ng/kg	6.93 U	4.28	4.81	5.39	3.86 U	10.0 U	5.92	4.67	9.89	6.95	0.882 J	2.84 U
PCB-200	ng/kg	0.0912 U	0.0573 U	0.365 U	0.128 U	0.0568 U	0.524 U	0.135 J	0.132 U	0.0960 U	0.0880 U	0.103 U	0.209 U
PCB-201	ng/kg	0.0704 U	0.131 J	0.325 U	0.115 U	0.0508 U	0.468 U	0.0851 U	0.118 U	0.0858 U	0.0679 U	0.0913 U	0.176 U
PCB-202	ng/kg	1.14 U	1.09	1.30 U	1.65	1.41	1.93 U	0.717 J	0.963 U	1.58	1.61 U	0.0972 U	1.11 J
PCB-203	ng/kg	3.87 U	3.49	2.56	3.83	2.39	5.65	4.50	3.13	7.00	4.00 U	0.692	2.48
PCB-204	ng/kg	0.0875 U	0.0554 U	0.353 U	0.129 U	0.0572 U	0.527 U	0.0507 U	0.133 U	0.0966 U	0.0844 U	0.0991 U	0.191 U
PCB-205	ng/kg	0.108 U	0.459 J	0.618	0.412 J	0.409 U	0.688 U	0.719 U	1.02	2.04	0.405 U	0.228 J	0.487 U
Total Octachlorobiphenyl	ng/kg	11.1	19.7 J	17.3	19.0 J	14.8	21	29.2 J	26.4	67.3	15.0	5.92 J	10.4 J
PCB-206	ng/kg	4.49 J	4.51	5.61	4.88	9.93	8.18	5.86	7.04	17.4	4.97	1.82	3.29 U
PCB-207	ng/kg	0.342 U	0.323 U	0.229 U	0.296 U	0.214 U	0.558 U	0.199 J	0.148 U	0.575 U	0.537 J	0.170 U	0.608 U
PCB-208	ng/kg	0.361 U	0.825	0.875 U	0.852	0.575 J	0.537 U	0.348 U	0.142 U	0.716 U	1.18	0.171 U	0.634 U
Total Nonachlorobiphenyl	ng/kg	4.49 J	5.34	5.61	5.73	10.5 J	8	6.06 J	7.04	17.4	6.69 J	1.82	3.29 U
PCB-209	ng/kg	2.04 U	3.96	4.59	2.89	10.5	3.15 U	3.19	5.14	11.8	5.22	1.09	2.84
Total Decachlorobiphenyl	ng/kg	2.04 U	3.96	4.59	2.89	10.5	3.15 U	3.19	5.14	11.8	5.22	1.09	2.84
Total PCB congeners (a)	ng/kg WW	859	552	297	766	360	1,200	879	768	1,900	795	219	315
Total PCB congeners (a)	ug/kg WW	0.859	0.552	0.297	0.766	0.360	1.20	0.879	0.768	1.90	0.795	0.219	0.315
Percent Lipids	%		0.457	0.371				0.163				0.105	
Total PCB congeners (a)	ug/kg LW		121	80.0				540				209	
Total PCB congeners (a)	mg/kg LW		0.121	0.080				0.540				0.209	

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	ICY (RM 48)		LIR (RM 54)							
		ICY4	ICY5	LIR1	LIR2	LIR3	LIR5	LIR6	LIR7	LIR8	LIR9
PCB-001	ng/kg	0.0352 U	0.165 U	0.0390 U	0.0388 U	0.329 U	0.413 U	0.294 J	0.372 J	0.426 J	0.0814 U
PCB-002	ng/kg	0.193 J	0.0353 U	0.0960 U	0.0403 U	0.0936 U	0.0551 U	0.0646 U	0.0631 U	0.0745 U	0.0852 U
PCB-003	ng/kg	0.212 U	0.225 U	0.0391 U	0.305 U	0.309 U	0.327 J	0.0633 U	0.0618 U	0.0730 U	0.0835 U
Total Monochlorobiphenyls	ng/kg	0.193 J	0.225 U	0.096 U	0.305 U	0.329 U	0.327 J	0.294 J	0.372 J	0.426 J	0.0852 U
PCB-004	ng/kg	0.0392 U	0.306 U	0.0426 U	0.226 J	0.369 U	0.214 U	0.217 U	0.247 U	0.208 U	0.279 U
PCB-005	ng/kg	0.0281 U	0.0352 U	0.0388 U	0.0412 U	0.280 U	0.247 U	0.251 U	0.277 U	0.288 U	0.352 U
PCB-006	ng/kg	0.0293 U	0.0367 U	0.0942 J	0.131 J	0.293 U	0.259 U	0.263 U	0.290 U	0.301 U	0.369 U
PCB-007	ng/kg	0.0266 U	0.0333 U	0.0367 U	0.0390 U	0.266 U	0.235 U	0.239 U	0.264 U	0.273 U	0.335 U
PCB-008	ng/kg	0.194 J	0.568	0.0383 U	0.556	0.276 U	0.244 U	0.248 U	0.274 U	0.284 U	0.348 U
PCB-009	ng/kg	0.0308 U	0.0386 U	0.0424 U	0.0451 U	0.304 U	0.269 U	0.274 U	0.302 U	0.0344 U	0.383 U
PCB-010	ng/kg	0.0243 U	0.0279 U	0.0264 U	0.0275 U	0.234 U	0.136 U	0.137 U	0.156 U	0.132 U	0.177 U
PCB-011	ng/kg	0.915	1.12	0.825 U	0.644 U	1.08 U	1.47 U	1.08 U	1.08 U	1.37 U	0.354 U
PCB-012/013	ng/kg	0.481 J	0.336 J	0.0388 U	0.0408 U	0.308 U	0.266 U	0.277 U	0.308 U	0.309 U	0.356 U
PCB-014	ng/kg	0.0251 U	0.0314 U	0.0337 U	0.0354 U	0.259 U	0.223 U	0.232 U	0.258 U	0.259 U	0.299 U
PCB-015	ng/kg	0.413 J	0.356 J	0.151 J	0.233 U	0.278 U	0.239 U	0.249 U	0.278 U	0.278 U	0.321 U
Total Dichlorobiphenyls	ng/kg	2.00 J	2.38 J	0.245 J	0.913 J	1.08 U	1.47 U	1.08 U	1.08 U	1.37 U	0.383 U
PCB-016	ng/kg	0.0475 U	0.497 J	0.263 J	0.297 J	0.451 J	0.353 J	0.114 U	0.106 U	0.461 J	0.120 U
PCB-017	ng/kg	0.109 J	0.431 J	0.999	0.288 J	0.546	0.302 J	0.0815 U	0.248 U	0.430 J	0.156 J
PCB-018/030	ng/kg	0.192 J	0.867 J	1.44	0.557 J	1.14	0.524 U	0.271 J	0.471 J	0.799 J	0.109 U
PCB-019	ng/kg	0.0457 U	0.0460 U	0.136 J	0.0445 U	0.134 U	0.0964 U	0.0927 U	0.0865 U	0.0862 U	0.103 U
PCB-020/028	ng/kg	0.648 U	2.02	13.3	3.10	2.59	1.09	0.719 J	0.943 J	1.46	0.413 J
PCB-021/033	ng/kg	0.291 J	0.646 J	0.910 J	0.554 J	1.00	0.491 J	0.177 J	0.354 U	0.582 U	0.213 J
PCB-022	ng/kg	0.211 J	0.497 J	0.785	0.412 J	0.672	0.452 J	0.0698 U	0.259 U	0.489 J	0.0711 U
PCB-023	ng/kg	0.0270 U	0.0296 U	0.0255 U	0.0282 U	0.0820 U	0.0567 U	0.0665 U	0.0581 U	0.0572 U	0.0677 U
PCB-024	ng/kg	0.0275 U	0.0297 U	0.0282 U	0.0286 U	0.0856 U	0.0618 U	0.0627 U	0.0583 U	0.0568 U	0.0664 U
PCB-025	ng/kg	0.109 J	0.195 J	0.610	0.111 J	0.0781 U	0.0540 U	0.0633 U	0.0553 U	0.0544 U	0.0644 U
PCB-026/029	ng/kg	0.206 J	0.417 J	1.57	0.323 J	0.498 J	0.158 J	0.0633 U	0.172 U	0.258 J	0.0644 U
PCB-027	ng/kg	0.0257 U	0.0891 J	0.0263 U	0.0267 U	0.0812 U	0.0586 U	0.0595 U	0.0553 U	0.0539 U	0.0630 U
PCB-031	ng/kg	0.332 J	1.22	7.47	1.44	1.74	0.719	0.397 J	0.517 U	1.03	0.289 J
PCB-032	ng/kg	0.115 J	0.338 J	0.709	0.228 J	0.348 J	0.263 J	0.114 J	0.0538 U	0.269 J	0.148 U
PCB-034	ng/kg	0.0255 U	0.0280 U	0.0241 U	0.0266 U	0.0770 U	0.0533 U	0.0624 U	0.0546 U	0.0537 U	0.0636 U
PCB-035	ng/kg	0.318 J	0.196 J	0.0620 U	0.0475 U	0.0875 U	0.0787 U	0.120 U	0.0833 U	0.0817 U	0.110 U
PCB-036	ng/kg	0.164 J	0.0521 U	0.0578 U	0.0443 U	0.0806 U	0.0725 U	0.111 U	0.0767 U	0.0753 U	0.101 U
PCB-037	ng/kg	0.431 J	0.450 J	0.417 J	0.357 J	0.534 J	0.271 J	0.113 U	0.231 J	0.346 J	0.104 U
PCB-038	ng/kg	0.177 J	0.0563 U	0.0625 U	0.0479 U	0.0831 U	0.0748 U	0.114 U	0.0791 U	0.0776 U	0.105 U
PCB-039	ng/kg	0.173 J	0.0514 U	0.0570 U	0.0437 U	0.0766 U	0.0690 U	0.105 U	0.0730 U	0.0716 U	0.0964 U
Total Trichlorobiphenyls	ng/kg	2.83 J	7.86 J	28.6 J	7.67 J	9.52 J	4.10 J	1.68 J	1.65 J	5.54 J	1.07 J
PCB-040/041/071	ng/kg	0.0793 U	0.751 J	9.48	1.05 J	0.550 J	0.208 J	0.0568 U	0.190 J	0.475 J	0.0989 U
PCB-042	ng/kg	0.0801 U	0.390 J	2.83	0.410 J	0.419 J	0.208 J	0.135 J	0.0745 U	0.215 U	0.100 U
PCB-043	ng/kg	0.0890 U	0.0701 U	0.0888 U	0.0570 U	0.111 U	0.0558 U	0.0639 U	0.0862 U	0.0870 U	0.119 U
PCB-044/047/065	ng/kg	1.62	6.29	67.4	22.6	4.81	1.92	4.56	1.36 J	2.01	4.87
PCB-045/051	ng/kg	0.0880 U	0.284 U	2.90	0.429 J	0.121 U	0.0936 U	0.102 U	0.110 U	0.125 U	0.170 U
PCB-046	ng/kg	0.100 U	0.110 U	0.152 J	0.0682 U	0.138 U	0.107 U	0.117 U	0.125 U	0.143 U	0.194 U
PCB-048	ng/kg	0.0755 U	0.225 J	3.94	0.339 J	0.126 J	0.192 J	0.0530 U	0.118 J	0.0722 U	0.0987 U
PCB-049/069	ng/kg	0.714 J	3.07	55.7	8.44	3.46	0.804 J	1.46	0.529 J	0.964 J	0.836 J
PCB-050/053	ng/kg	0.0860 U	0.131 U	3.03	0.309 J	0.119 U	0.0923 U	0.101 U	0.108 U	0.123 U	0.168 U
PCB-052	ng/kg	2.68	10.4	148	25.6	10.4	2.50	3.95	1.95	3.25	3.25
PCB-054	ng/kg	0.0693 U	0.0763 U	0.0556 U	0.0472 U	0.0943 U	0.0731 U	0.0799 U	0.0856 U	0.0976 U	0.133 U
PCB-055	ng/kg	0.159 J	0.130 J	0.118 U	0.0452 U	0.0745 U	0.0511 U	0.0731 U	0.0693 U	0.0633 U	0.0749 U
PCB-056	ng/kg	0.281 J	0.496 J	1.08	0.355 J	0.421 J	0.259 J	0.0757 U	0.112 J	0.283 U	0.0776 U

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	ICY (RM 48)		LIR (RM 54)							
		ICY4	ICY5	LIR1	LIR2	LIR3	LIR5	LIR6	LIR7	LIR8	LIR9
PCB-057	ng/kg	0.0580 U	0.0589 U	0.571	0.0445 U	0.0722 U	0.0521 U	0.0708 U	0.0705 U	0.0638 U	0.0760 U
PCB-058	ng/kg	0.0531 U	0.191 U	0.117 U	0.0408 U	0.0673 U	0.0485 U	0.0660 U	0.0657 U	0.0595 U	0.0709 U
PCB-059/062/075	ng/kg	0.0578 U	0.0443 U	4.67	0.784 J	0.262 U	0.0945 J	0.175 U	0.0542 U	0.0576 U	0.0729 U
PCB-060	ng/kg	0.476 J	0.813	16.7	2.55	1.24	0.298 J	0.474 J	0.214 J	0.390 J	0.222 J
PCB-061/070/074/076	ng/kg	3.25	7.01	180	28.3	3.58 U	2.81	4.20	2.60	4.30	3.27
PCB-063	ng/kg	0.177 J	0.238 J	4.76	0.543	0.376 J	0.0472 U	0.0642 U	0.0640 U	0.169 J	0.0690 U
PCB-064	ng/kg	0.333 J	1.07	25.9	3.08	1.65	0.308 U	0.557	0.320 J	0.465 U	0.223 U
PCB-066	ng/kg	1.18	3.00	99.1	12.3	4.63	1.08	1.97	1.15	2.02	0.792
PCB-067	ng/kg	0.0559 U	0.0568 U	1.21	0.133 J	0.0669 U	0.0482 U	0.0656 U	0.0654 U	0.0591 U	0.0705 U
PCB-068	ng/kg	0.134 J	0.263 J	3.92	0.504	0.0656 U	0.0473 U	0.0643 U	0.0641 U	0.0580 U	0.0691 U
PCB-072	ng/kg	0.0552 U	0.178 J	3.48	0.374 U	0.0669 U	0.0483 U	0.0771 J	0.0654 U	0.0592 U	0.0705 U
PCB-073	ng/kg	0.0604 U	0.0476 U	0.0603 U	0.0387 U	0.0734 U	0.0370 U	0.0424 U	0.0572 U	0.0577 U	0.0788 U
PCB-077	ng/kg	0.441 J	0.457 J	4.00	0.597	0.202 J	0.0522 U	0.0766 U	0.0714 U	0.274 J	0.0722 U
PCB-078	ng/kg	0.287 J	0.0660 U	0.127 U	0.0486 U	0.0840 U	0.0576 U	0.0824 U	0.0781 U	0.0714 U	0.0844 U
PCB-079	ng/kg	0.191 U	0.0555 U	1.64	0.198 J	0.0937 J	0.0452 U	0.0646 U	0.0613 U	0.0560 U	0.0662 U
PCB-080	ng/kg	0.0520 U	0.0544 U	0.105 U	0.0400 U	0.0687 U	0.0471 U	0.0674 U	0.0639 U	0.0583 U	0.0690 U
PCB-081	ng/kg	0.276 J	0.0677 U	0.141 U	0.0511 U	0.0850 U	0.0588 U	0.0823 U	0.0783 U	0.0723 U	0.0821 U
Total Tetrachlorobiphenyls	ng/kg	12.0 J	34.8 J	640 J	109 J	28.4 J	10.4 J	17.4 J	8.54 J	13.9 J	13.2 J
PCB-082	ng/kg	0.251 U	0.218 U	4.35	0.504	0.734	0.113 U	0.433 U	0.208 U	0.148 U	0.207 U
PCB-083/099	ng/kg	57.2	102	634	886	68.5	35.0	174	8.95	11.4	254
PCB-084	ng/kg	0.168 U	0.859	12.1	1.44	1.51	0.360 U	0.316 J	0.336 J	0.642 U	0.167 U
PCB-085/116/117	ng/kg	5.95	14.0	116	113	11.0	4.30	26.0	2.14	3.14	37.3
PCB-086/087/097/109/119/125	ng/kg	2.61 J	6.50	163	18.1	10.1	2.55 J	4.48	1.93 J	3.45	2.80 J
PCB-088/091	ng/kg	0.396 J	0.931 J	41.0	2.79	1.59	0.284 U	0.398 J	0.210 J	0.349 U	0.145 U
PCB-089	ng/kg	0.194 U	0.166 U	0.917	0.156 U	0.170 U	0.0955 U	0.368 U	0.177 U	0.127 U	0.175 U
PCB-090/101/113	ng/kg	6.08	17.6	689	70.3	25.6	5.27	10.4	3.93	7.36	6.36
PCB-092	ng/kg	0.910	3.20	122	9.34	5.04	0.913	1.67	0.663 U	1.30	0.573 U
PCB-093/098/100/102	ng/kg	0.147 U	0.122 U	7.06	0.926 U	0.458 U	0.0791 U	0.0920 U	0.143 U	0.0687 U	0.146 U
PCB-094	ng/kg	0.160 U	0.133 U	0.595	0.125 U	0.154 U	0.0844 U	0.315 U	0.152 U	0.108 U	0.155 U
PCB-095	ng/kg	1.65	5.61	223	16.1	9.78	1.79 U	2.72	1.34	2.76	0.974 U
PCB-096	ng/kg	0.0481 U	0.0395 U	0.312 U	0.0280 U	0.0415 U	0.0326 U	0.0411 U	0.0285 U	0.0248 U	0.0257 U
PCB-103	ng/kg	0.134 U	0.111 U	6.59	0.514	0.131 U	0.0715 U	0.267 U	0.129 U	0.0917 U	0.132 U
PCB-104	ng/kg	0.0413 U	0.0339 U	0.115 J	0.0240 U	0.0359 U	0.0283 U	0.0356 U	0.0246 U	0.0215 U	0.0223 U
PCB-105	ng/kg	7.78	13.8	211	122	17.2	5.54	22.2	4.42	5.92	32.4 J
PCB-106	ng/kg	0.0629 U	0.139 U	0.212 U	0.123 U	0.0816 U	0.0643 U	0.101 U	0.0491 U	0.0551 U	0.0919 U
PCB-107	ng/kg	0.805	1.68	75.4	6.94	2.79	0.615	1.29	0.735	0.992 U	0.677 J
PCB-108/124	ng/kg	0.402 J	0.453 J	16.0	1.45	0.694 J	0.205 J	0.195 J	0.180 J	0.291 J	0.165 J
PCB-110/115	ng/kg	5.10	12.5	491	54.3	23.0	4.80	10.5	3.12	6.46	9.61
PCB-111	ng/kg	0.139 U	0.120 U	2.82	0.541 U	0.127 U	0.0685 U	0.117 U	0.127 U	0.0904 U	0.126 U
PCB-112	ng/kg	0.127 U	0.109 U	0.123 U	0.102 U	0.114 U	0.0641 U	0.247 U	0.119 U	0.0849 U	0.118 U
PCB-114	ng/kg	0.437 J	0.733	12.4	3.48	0.920 J	0.263 J	0.726 U	0.344 J	0.400 U	0.918 U
PCB-118	ng/kg	9.96	20.8	654	132	32.6	9.07	20.6	9.94	14.8	19.9 J
PCB-120	ng/kg	0.126 U	0.109 U	9.24	0.570 U	0.242 U	0.0677 U	0.123 J	0.125 U	0.0894 U	0.0480 U
PCB-121	ng/kg	0.130 U	0.111 U	0.125 U	0.104 U	0.116 U	0.0655 U	0.252 U	0.121 U	0.0867 U	0.120 U
PCB-122	ng/kg	0.0694 U	0.131 U	0.201 U	0.138 U	0.0801 U	0.0609 U	0.0887 U	0.0468 U	0.0502 U	0.0843 U
PCB-123	ng/kg	0.210 J	0.207 J	7.58	0.668	0.318 J	0.0968 J	0.0951 U	0.143 U	0.250 J	0.0862 U
PCB-126	ng/kg	0.371 J	0.299 J	4.04	0.539	0.115 U	0.0576 U	0.0828 J	0.0433 U	0.0280 U	0.150 U
PCB-127	ng/kg	0.0486 U	0.105 U	0.188 U	0.0952 U	0.0765 U	0.0644 U	0.0695 U	0.0410 U	0.0472 U	0.0716 U

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	ICY (RM 48)		LIR (RM 54)							
		ICY4	ICY5	LIR1	LIR2	LIR3	LIR5	LIR6	LIR7	LIR8	LIR9
Total Pentachlorobiphenyls	ng/kg	99.9 J	201 J	3,500 J	1,440	211 J	68.6 J	275 J	37.6 J	57.1 J	363 J
PCB-128/166	ng/kg	7.74	17.1	259	164	12.8	4.52	26.1	2.13	3.06	27.9 J
PCB-129/138/160/163	ng/kg	88.3	177	1640	1510	121	52.1	281	19.0	26.3	434 J
PCB-130	ng/kg	0.961	3.25	68.1	16.1	2.17	0.605	3.05	0.425 J	0.614 U	3.17 J
PCB-131	ng/kg	0.104 U	0.145 U	1.29	0.138 U	0.127 U	0.129 U	0.131 U	0.0656 U	0.267 U	0.0833 U
PCB-132	ng/kg	0.634 U	2.41	109	4.28	3.75	0.570	0.766	0.237 U	0.847	0.102 J
PCB-133	ng/kg	1.60	3.66	52.2	30.4	3.32	0.983 U	6.52	0.378 U	0.587	10.5 J
PCB-134/143	ng/kg	0.442 J	0.401 U	14.9	0.580 U	0.719 J	0.140 U	0.216 J	0.0640 U	0.182 J	0.0814 U
PCB-135/151	ng/kg	1.56	4.84	337	15.2	10.3	1.55 U	3.45	1.46	3.07	1.12 J
PCB-136	ng/kg	0.280 J	0.763	22.6	1.35	1.40 U	0.266 U	0.240 U	0.260 J	0.559	0.0370 U
PCB-137	ng/kg	3.44	6.00	51.2	49.8	4.62	1.97	10.5	1.22	1.27	15.5 J
PCB-139/140	ng/kg	0.0913 U	0.997 J	30.8	3.30	1.15	0.192 J	0.787 J	0.214 J	0.264 J	0.587 J
PCB-141	ng/kg	1.18	1.97 U	162	9.69	6.47	0.915 U	2.61	0.760 U	1.94	1.27 J
PCB-142	ng/kg	0.106 U	0.148 U	0.283 U	0.140 U	0.129 U	0.131 U	0.133 U	0.0666 U	0.271 U	0.0846 U
PCB-144	ng/kg	0.255 J	0.434 J	23.7	1.38	1.04	0.158 U	0.269 J	0.239 J	0.326 J	0.0479 U
PCB-145	ng/kg	0.0580 U	0.0573 U	0.0610 U	0.0443 U	0.0421 U	0.0270 U	0.0363 U	0.0514 U	0.0364 U	0.0388 U
PCB-146	ng/kg	5.10	19.5	609	145	14.0	3.59	28.2	2.75	4.30	38.4 J
PCB-147/149	ng/kg	2.50	11.5	834	30.6	16.4	2.55	3.73	1.09 U	3.23	1.06 J
PCB-148	ng/kg	0.0771 U	0.0762 U	6.78	0.418 J	0.0561 U	0.0360 U	0.0485 U	0.0685 U	0.0485 U	0.0518 U
PCB-150	ng/kg	0.0527 U	0.0521 U	0.0554 U	0.0402 U	0.0399 U	0.0256 U	0.0344 U	0.0487 U	0.0345 U	0.0368 U
PCB-152	ng/kg	0.0553 U	0.0547 U	2.31	0.0422 U	0.0395 U	0.0253 U	0.0341 U	0.0482 U	0.0342 U	0.0365 U
PCB-153/168	ng/kg	184	271	2340	2480	193	92.3	438	27.1	34.7	671 J
PCB-154	ng/kg	0.278 J	0.970	40.7	2.89	1.82	0.225 U	0.768	0.246 J	0.414 U	0.425 J
PCB-155	ng/kg	0.0503 U	0.0497 U	9.80	0.508	0.217 J	0.140 J	0.0325 U	0.0459 U	0.0325 U	0.0347 U
PCB-156/157	ng/kg	11.8	13.2	128	144	16.0	7.05	29.7	2.86	3.27	43.8 J
PCB-158	ng/kg	1.91	5.73	118	46.4	2.48	1.45	6.60	0.890	0.938	6.95 J
PCB-159	ng/kg	0.183 J	0.0703 U	5.06	0.256 J	0.170 J	0.0420 U	0.0408 U	0.0213 U	0.0272 U	0.0812 U
PCB-161	ng/kg	0.0731 U	0.102 U	0.194 U	0.0965 U	0.0855 U	0.0867 U	0.0881 U	0.0442 U	0.180 U	0.0562 U
PCB-162	ng/kg	0.400 J	0.444 J	8.77	2.56	0.561 U	0.215 U	0.772	0.192 J	0.307 J	1.11
PCB-164	ng/kg	0.563	1.14	64.2	3.89	1.58	0.324 U	1.26	0.162 U	0.401 U	0.175 J
PCB-165	ng/kg	0.0761 U	0.618	3.69	3.70	0.253 J	0.0700 U	0.605	0.0488 U	0.199 U	0.700 J
PCB-167	ng/kg	0.912	1.23	56.5	6.48	1.63	0.323 U	1.18	0.413 J	0.614 U	1.12
PCB-169	ng/kg	0.555	0.671	5.89 U	2.52 U	0.317 J	0.253 J	0.600 U	0.0429 U	0.0593 U	1.15 J
Total Hexachlorobiphenyls	ng/kg	314 J	542 J	7,000	4,670 J	415 J	167 J	846 J	59.4 J	85.2 J	1,260 J
PCB-170	ng/kg	29.9	33.1	332	479	24.9	14.1	60.4	3.35	4.17	81.6 J
PCB-171/173	ng/kg	1.34	4.06	104	20.6	3.86	0.663 J	3.81	0.676 J	0.787 U	3.98
PCB-172	ng/kg	1.04	2.33	70.6	21.1	1.49 U	0.844	3.98	0.701	0.627 U	3.11
PCB-174	ng/kg	1.10 U	3.05	173	10.2	5.05	0.607 U	1.06	0.0825 U	0.856 U	0.124 U
PCB-175	ng/kg	0.101 U	0.206 U	14.2	0.842	0.369 J	0.0431 U	0.220 J	0.0726 U	0.0675 U	0.0855 U
PCB-176	ng/kg	0.0719 U	0.312 J	6.28	0.468 J	0.205 J	0.0289 U	0.0653 U	0.0487 U	0.0452 U	0.0573 U
PCB-177	ng/kg	1.08	4.94	235	15.1	3.35	0.544 U	1.43	0.495 J	0.870	0.893
PCB-178	ng/kg	1.65	5.12	147	37.7	2.12	0.832	6.40	0.768	0.653	5.15
PCB-179	ng/kg	0.0762 U	1.05	11.7	1.49 U	1.44	0.193 U	0.459 J	0.172 U	0.371 J	0.0631 U
PCB-180/193	ng/kg	68.5	85.9	1010	946	62.0	35.4	141	10.2 U	14.2	185
PCB-181	ng/kg	0.0921 U	0.136 U	3.25	0.215 U	0.104 U	0.0839 U	0.159 U	0.0830 U	0.115 U	0.125 U
PCB-182	ng/kg	0.0971 U	0.125 U	4.01	0.143 U	0.0970 U	0.0417 U	0.0940 U	0.0701 U	0.0652 U	0.0825 U
PCB-183/185	ng/kg	3.67	12.8	310	98.0	11.9	2.55	13.8	2.15	3.52	15.1
PCB-184	ng/kg	0.0801 U	0.215 J	11.6	0.669	0.156 U	0.160 U	0.0726 U	0.0541 U	0.0503 U	0.0637 U
PCB-186	ng/kg	0.0732 U	0.0930 U	0.0999 U	0.0714 U	0.0284 U	0.0296 U	0.0669 U	0.0498 U	0.0463 U	0.0587 U
PCB-187	ng/kg	5.10	19.0	967	57.4	15.5	2.98 U	11.3	3.19	5.33	5.35

Table D-1
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Congeners and Lipids

PCB Congener	Units	ICY (RM 48)		LIR (RM 54)							
		ICY4	ICY5	LIR1	LIR2	LIR3	LIR5	LIR6	LIR7	LIR8	LIR9
PCB-188	ng/kg	0.0713 U	0.0905 U	3.44	0.124 U	0.0284 U	0.0297 U	0.0671 U	0.0500 U	0.0465 U	0.0588 U
PCB-189	ng/kg	1.34	1.33 U	13.7	17.1	1.43	0.757	3.35 J	0.168 U	0.143 U	4.62
PCB-190	ng/kg	6.21	8.68	64.2	94.8	6.40	3.11	13.7	0.612 U	1.23 U	21.1 J
PCB-191	ng/kg	0.301 U	0.502 J	10.6	4.41	0.667 U	0.420 J	1.84 U	0.101 U	0.190 U	2.01
PCB-192	ng/kg	0.0850 U	0.126 U	0.101 U	0.199 U	0.125 U	0.101 U	0.191 U	0.0998 U	0.138 U	0.150 U
Total Heptachlorobiphenyls	ng/kg	120	181 J	3,490	1,800 J	139 J	58.7 J	261 J	11.3 J	29.1 J	328 J
PCB-194	ng/kg	9.53	12.3	225	183	11.3	6.45	28.1	2.98	4.00	36.3
PCB-195	ng/kg	0.887	1.98	62.8	32.5	1.73	0.646	3.16	0.423 J	0.644	4.31
PCB-196	ng/kg	0.361 U	1.95	73.0	6.69	2.08	0.603	1.93	0.638	0.917	1.52 U
PCB-197	ng/kg	0.0311 U	0.234 J	9.65	0.258 J	0.213 U	0.0265 U	0.0331 U	0.0219 U	0.0930 U	0.0126 U
PCB-198/199	ng/kg	2.51	6.86	206	35.8	7.99	3.01	12.0	2.01	3.09	14.8
PCB-200	ng/kg	0.0349 U	0.0561 U	2.29	0.138 U	0.0312 U	0.0314 U	0.0393 U	0.0259 U	0.0266 U	0.0149 U
PCB-201	ng/kg	0.0313 U	0.202 J	20.2	0.0494 U	0.0980 U	0.0242 U	0.111 J	0.0510 U	0.150 J	0.0115 U
PCB-202	ng/kg	0.655	2.29	70.0	12.1	2.07	0.475 U	2.54	0.481 U	0.714	2.72
PCB-203	ng/kg	0.629 U	3.67	115	11.4	4.98	1.08 U	6.46	1.14 U	1.49 U	5.85
PCB-204	ng/kg	0.0337 U	0.0562 U	0.754	0.0536 U	0.0299 U	0.0301 U	0.0377 U	0.0249 U	0.0255 U	0.0143 U
PCB-205	ng/kg	0.489 U	0.687 U	7.94	12.2	0.600 U	0.387 U	1.37	0.295 J	0.180 J	2.60
Total Octachlorobiphenyl	ng/kg	13.6	29.5 J	793	294 J	30.2	10.7	55.7 J	6.35 J	9.70 J	66.6
PCB-206	ng/kg	3.75	5.87	123	78.0	5.71	3.27	11.7	1.97 U	2.89	13.3
PCB-207	ng/kg	0.141 U	0.413 J	18.6	1.19	0.284 U	0.0886 U	0.101 U	0.159 U	0.113 U	0.148 U
PCB-208	ng/kg	0.391 J	1.05	41.6	1.77	0.796	0.310 U	0.440 U	0.168 U	0.502	0.298 U
Total Nonachlorobiphenyl	ng/kg	4.14 J	7.33 J	183	81.0	6.51	3.27	11.7	1.97 U	3.39	13.3
PCB-209	ng/kg	3.65	3.05	291	41.3	4.26 U	3.57	5.94	2.81	2.94	6.21 U
Total Decachlorobiphenyl	ng/kg	3.65	3.05	291	41.3	4.26 U	3.57	5.94	2.81	2.94	6.21 U
Total PCB congeners (a)	ng/kg WW	572	1,010	15,900	8,450	840	327	1,470	128	207	2,050
Total PCB congeners (a)	ug/kg WW	0.572	1.01	15.9	8.45	0.840	0.327	1.47	0.128	0.207	2.05
Percent Lipids	%			3.01	0.872						
Total PCB congeners (a)	ug/kg LW			529	969						
Total PCB congeners (a)	mg/kg LW			0.529	0.969						

(a) Detected congeners only
ng/kg - nanograms per kilogram
ug/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
LW - lipid weight
WW - wet weight
RM - river mile
PCB - polychlorinated biphenyl
J - estimated concentration
U - not detected
UJ - not detected, estimated quantitation limit

Table D-2.
Green/Duwamish River Watershed - Otter Scat Analysis
Analytical Results for PCB Aroclors

PCB Aroclor (ug/kg WW)	SPM (RM 3.5)	FGL (RM 10)			CWG (RM 19)		GNA (RM 38)	ICY (RM 47.5)		LIR (RM 53)	
	SPM14	FGL1	FGL2	FGL11	CWG4	CWG5	GNA12	ICY2	ICY3	LIR7	LIR8
Aroclor 1016	8.8 U	4.1 U	8.3 U	8.4 U	4.6 U	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Aroclor 1221	8.8 U	4.1 U	8.3 U	8.4 U	4.6 U	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Aroclor 1232	8.8 U	4.1 U	8.3 U	8.4 U	4.6 U	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Aroclor 1242	8.8 U	4.1 U	8.3 U	8.4 U	4.6 U	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Aroclor 1248	8.8 U	4.1 U	8.3 U	8.4 U	4.6 U	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Aroclor 1254	26.3 U	4.1 U	8.3 U	8.4 U	4.6 U	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Aroclor 1260	224 NJ	2.9 NJ	4.9 NJ	25.2	3.6 NJ	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Aroclor 1262	8.8 U	4.1 U	8.3 U	8.4 U	4.6 U	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Aroclor 1268	8.8 U	4.1 U	8.3 U	8.4 U	4.6 U	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U
Total PCB Aroclors	224 NJ	2.9 NJ	4.9 NJ	25.2	3.6 NJ	6.8 U	4.2 U	5.3 U	5.1 U	7.8 U	6.4 U

ug/kg - micrograms per kilogram
WW - wet weight
NJ - tentatively identified, approximate concentration
U - not detected

Appendix E
Data Validation Report

DATA VALIDATION REPORT

LOWER DUWAMISH WATERWAY - OTTER SCAT ANALYSIS

Prepared for:

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Prepared by:

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EcoChem Project: C45156-1

Revised May 3, 2017

Approved for Release:

Christine Ransom
Senior Project Chemist
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PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of full validation (EPA Stage 4) performed on PCB Congener data and summary validation (EPA Stage 2B) performed on PCB Aroclor data for the Lower Duwamish Waterway Otter Scat Analysis Project. A complete list of samples is provided in the Sample Index.

PCB Congener analyses were performed by Vista, El Dorado Hills, CA and the PCB Aroclor analyses were performed by Analytical Resources, Inc., Tukwila, WA. The analytical methods and EcoChem project chemists are listed in the following table:

ANALYSIS	METHOD	PRIMARY REVIEW	SECONDARY REVIEW
PCB Congeners	EPA 1668C	E. Clayton	C. Ransom
PCB Aroclors	SW8082A		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; *Lower Duwamish Waterway Otter Scat Analysis and Reporting* (Leidos, Jan 2017); National *Functional Guidelines for Organic Data Review* (USEPA 2008, 2014); and *National Functional Guidelines for Chlorinated Dibenzo-p-Dioxin (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (*USEPA, 2014*)*.

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

Validation criteria are included as Appendix A. The qualified data summary table (QDST) is included as Appendix B. Data Validation Worksheets and project associated communications will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) is also submitted.

Sample Index
Lower Duwamish Waterway - Otter Scat Analysis

Sample ID	Vista SDG	Visat Lab ID	PCB Congeners	ARI SDG	ARI Lab ID	PCB Aroclors
CWG1	1700057	1700057-01	✓			
CWG2	1700057	1700057-02	✓			
CWG3	1700057	1700057-03	✓			
CWG4	1700057	1700057-04	✓	17C0166	17C0166-04	✓
CWG5	1700057	1700057-05	✓	17C0166	17C0166-05	✓
CWG6	1700057	1700057-06	✓			
CWG7	1700057	1700057-07	✓			
CWG8	1700057	1700057-08	✓			
CWG9	1700057	1700057-09	✓			
FGL0	1700057	1700057-10	✓			
FGL1	1700057	1700057-11	✓	17C0166	17C0166-06	✓
FGL2	1700057	1700057-12	✓	17C0166	17C0166-07	✓
FGL3	1700057	1700057-13	✓			
FGL4	1700057	1700057-14	✓			
FGL5	1700057	1700057-15	✓			
FGL6	1700057	1700057-16	✓			
FGL7	1700057	1700057-17	✓			
FGL8	1700057	1700057-18	✓			
FGL9	1700057	1700057-19	✓			
FGL10	1700057	1700057-20	✓			
SPM1	1700058	1700058-1	✓			
SPM11	1700058	1700058-10	✓			
SPM13	1700058	1700058-11	✓			
SPM14	1700058	1700058-12	✓	17C0166	17C0166-08	✓
SPM15	1700058	1700058-13	✓			
SPM16	1700058	1700058-14	✓			
SPM17	1700058	1700058-15	✓			
SPM18	1700058	1700058-16	✓			
SPM20	1700058	1700058-17	✓			
SPM21	1700058	1700058-18	✓			
SPM22	1700058	1700058-19	✓			
SPM2	1700058	1700058-2	✓			
SPM23	1700058	1700058-20	✓			
SPM3	1700058	1700058-3	✓			
SPM4	1700058	1700058-4	✓			
SPM5	1700058	1700058-5	✓			
SPM6	1700058	1700058-6	✓			
SPM7	1700058	1700058-7	✓			
SPM8	1700058	1700058-8	✓			
SPM10	1700058	1700058-9	✓			

Sample Index
Lower Duwamish Waterway - Otter Scat Analysis

Sample ID	Vista SDG	Visat Lab ID	PCB Congeners	ARI SDG	ARI Lab ID	PCB Aroclors
LIR3	1700059	1700059-01	✓			
LIR5	1700059	1700059-02	✓			
LIR6	1700059	1700059-03	✓			
LIR7	1700059	1700059-04	✓	17C0166	17C0166-09	✓
LIR8	1700059	1700059-05	✓	17C0166	17C0166-10	✓
LIR9	1700059	1700059-06	✓			
FGL11	1700059	1700059-07	✓	17C0166	17C0166-11	✓
GNA1	1700059	1700059-08	✓			
GNA5	1700059	1700059-09	✓			
GNA6	1700059	1700059-10	✓			
SPM24	1700059	1700059-11	✓			
SPM25	1700059	1700059-12	✓			
SPM26	1700059	1700059-13	✓			
GNA7	1700056	1700056-01	✓			
GNA8	1700056	1700056-02	✓			
GNA9	1700056	1700056-03	✓			
GNA10	1700056	1700056-04	✓			
GNA11	1700056	1700056-05	✓			
GNA12	1700056	1700056-06	✓	17C0166	17C0166-01	✓
GNA13	1700056	1700056-07	✓			
GNA14	1700056	1700056-08	✓			
HAM1	1700056	1700056-09	✓			
HAM2	1700056	1700056-10	✓			
HIM1	1700056	1700056-11	✓			
HIM3	1700056	1700056-12	✓			
HIM4	1700056	1700056-13	✓			
ICY1	1700056	1700056-14	✓			
ICY2	1700056	1700056-15	✓	17C0166	17C0166-02	✓
ICY3	1700056	1700056-16	✓	17C0166	17C0166-03	✓
ICY4	1700056	1700056-17	✓			
ICY5	1700056	1700056-18	✓			
LIR1	1700056	1700056-19	✓			
LIR2	1700056	1700056-20	✓			

DATA VALIDATION REPORT
Lower Duwamish Waterway – Otter Scat Analysis
PCB Congeners by EPA 1668C

This report documents the review of analytical data from the analysis of otter scat samples and the associated laboratory quality control (QC) samples. Vista Analytical Laboratory, El Dorado Hills, California, analyzed the samples. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples	Validation Level
1700056	20 Otter Scat	EPA Stage 4
1700057	20 Otter Scat	EPA Stage 4
1700058	20 Otter Scat	EPA Stage 4
1700059	13 Otter Scat	EPA Stage 4

DATA PACKAGE COMPLETENESS

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

VERIFICATION OF EDD TO LABORATORY REPORT

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

TECHNICAL DATA VALIDATION

This report documents the review of analytical QC requirements as listed in the following table.

✓	Sample Receipt, Preservation, and Holding Times	1	Matrix Spike/Matrix Spike Duplicates (MS/MSD)
✓	Initial Calibration (ICAL)	1	Field Replicates
✓	Continuing Calibration Verification	✓	Target Analyte List
2	Laboratory Blanks	1	Reporting Limits
1	Field Blanks	2	Compound Identification
2	Ongoing Precision and Recovery (OPR)	2	Compound Quantitation
2	Labeled Compound Recovery	1	Calculation Verification

1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted.
Data qualifiers were issued as discussed below.

Laboratory Blanks

To assess the impact of any blank contaminant on the reported sample results, an action level was established at five times (5x) the concentration reported in the blank. If a contaminant was reported in an associated field sample and the concentration was less than the action level, the result was qualified as not detected (U-7) at the reported concentration.

Several congeners were detected in each method blank. The results for the following congeners were qualified as not detected (U-7) in one or more field samples:

SDG	Detected Congener	Qualifier
1700056	PCB-001	U-7
	PCB-003	U-7
	PCB-011	U-7
	PCB-018/030	U-7
1700056	PCB-020/028	U-7
	PCB-052	U-7
	PCB-061/070/074/076	U-7
	PCB-205	U-7
1700057	PCB-20/28	U-7
	PCB-21/33	U-7
	PCB-31	U-7
	PCB-37	U-7
	PCB-39	U-7
	PCB-59/62/75	U-7
	PCB-79	U-7
	PCB-126	U-7
1700059	PCB-11	U-7

Field Blanks

No field blanks were submitted.

Ongoing Precision and Accuracy Standard

SDG 1700056: For Batch B7B0036, the ongoing precision and recovery (OPR) standard recovery for PCB-15 was less than the lower control limit of 60%. The results for this compound in the associated samples were estimated (J/UJ-10L) to indicate a potential low bias.

Labeled Compound Recovery

The percent recovery (%R) values for labeled compounds were within the method specified control limits with the exceptions noted below. For labeled compound recoveries greater than the upper control limit, results for the congeners quantitated using that labeled compound were estimated (J-13H). For recoveries less than the lower control limit, results for congeners quantitated using that labeled compound were estimated (J/UJ-13L). No action was taken for cleanup standard outliers or for labeled compounds used to quantitate other labeled compounds. The following outliers were noted:

SDG	Sample ID	Labeled Compound Outliers	Bias	Qualifiers
1700056	HAM1	13C-PCB-123, 13C-PCB-114, 13C-PCB-127, 13C-PCB-153, 13C-PCB-141, 13C-PCB-138, 13C-PCB-188	High	J-13H
	HAM2	13C-PCB-188	High	J-13H

SDG	Sample ID	Labeled Compound Outliers	Bias	Qualifiers
1700057	CWG2	13C-PCB-123, 13C-PCB-118, 13C-PCB-114	High	J-13H
	CWG3	13C-PCB-77, 13C-PCB-81	High	J-13H
	CWG6	13C-PCB-77, 13C-PCB-81	High	J-13H
	FGL0	13C-PCB-114	High	J-13H
	FGL1	13C-PCB-123, 13C-PCB-118, 13C-PCB-114	High	J-13H
	FGL4	13C-PCB-123, 13C-PCB-118, 13C-PCB-114	High	J-13H
1700058	SPM3	13C-PCB-123, 13C-PCB-114, 13C-PCB-127	High	J-13H
	SPM4	13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-105 13C-PCB-127, 13C-PCB-126, 13C-PCB-153, 13C-PCB-141 13C-PCB-138, 13C-PCB-159, 13C-PCB-169, 13C-PCB-188 13C-PCB-206	High	J-13H
	SPM5	13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-105 13C-PCB-127, 13C-PCB-141	High	J-13H
	SPM6	13C-PCB-123, 13C-PCB-114, 13C-PCB-105, 13C-PCB-127 13C-PCB-141, 13C-PCB-188	High	J-13H
	SPM7	13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-105 13C-PCB-127	High	J-13H
	SPM8	13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-105 13C-PCB-127, 13C-PCB-141	High	J-13H
	SPM11	13C-PCB-123, 13C-PCB-114	High	J-13H
	SPM14	13C-PCB-123, 13C-PCB-114, 13C-PCB-127	High	J-13H
	SPM18	13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-105 13C-PCB-127, 13C-PCB-141	High	J-13H
	SPM22	13C-PCB-19	Low	J-13H
	SPM23	13C-PCB-19	Low	J-13H
1700059	LIR3	13C-PCB-37, 13C-PCB-114	High	J-13H
	LIR5	13C-PCB-37	High	J-13H
	LIR6	13C-PCB-189	High	J-13H
	LIR9	13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-105, 13C-PCB-127, 13C-PCB-153, 13C-PCB-141, 13C-PCB-138, 13C-PCB-156/157, 13C-PCB-169, 13C-PCB-170	High	J-13H
	FGL11	13C-PCB-37, 13C-PCB-123, 13C-PCB-118, 13C-PCB-114 13C-PCB-105, 13C-PCB-127	High	J-13H
	GNA1	13C-PCB-37, 13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-127, 13C-PCB-126, 13C-PCB-153, 13C-PCB-138 13C-PCB-156/157, 13C-PCB-169, 13C-PCB-206	High	J-13H
	GNA5	13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-127 13C-PCB-153, 13C-PCB-141, 13C-PCB-138, 13C-PCB-159 13C-PCB-156/157, 13C-PCB-169	High	J-13H
	GNA6	13C-PCB-37, 13C-PCB-123, 13C-PCB-118, 13C-PCB-114 13C-PCB-127, 13C-PCB-126, 13C-PCB-153, 13C-PCB-141 13C-PCB-138, 13C-PCB-156/157, 13C-PCB-169, 13C-PCB-188 13C-PCB-206	High	J-13H
	SPM24	13C-PCB-37, 13C-PCB-123, 13C-PCB-118, 13C-PCB-114 13C-PCB-105, 13C-PCB-127, 13C-PCB-126, 13C-PCB-153 13C-PCB-141, 13C-PCB-138, 13C-PCB-159, 13C-PCB-169	High	J-13H

SDG	Sample ID	Labeled Compound Outliers	Bias	Qualifiers
1700059	SPM-25	13C-PCB-123, 13C-PCB-118, 13C-PCB-114, 13C-PCB-105 13C-PCB-127, 13C-PCB-126, 13C-PCB-153, 13C-PCB-141 13C-PCB-138, 13C-PCB-167, 13C-PCB-156/157, 13C-PCB-169 13C-PCB-206	High	J-13H
	SPM-26	13C-PCB-37, 13C-PCB-123, 13C-PCB-118, 13C-PCB-114 13C-PCB-105, 13C-PCB-127, 13C-PCB-206	High	J-13H

Matrix Spikes/Matrix Spike Duplicates

Matrix spike/matrix spike duplicates (MS/MSD) were not analyzed. Accuracy was assessed using labeled compound, OPR sample, and reference material recoveries. Precision could not be evaluated.

Field Replicates

No field duplicate samples were submitted.

Reporting Limits

Several samples were re-analyzed at dilution due to results that exceeded the calibration range of the instrument in the original analyses. The lab reported only the most appropriate result from each analysis.

The reporting limits for some samples were elevated due to limited sample mass available for extractions..

SDG	Sample
1700056	GNA9, GNA10, GNA14, HAM1, HAM2, ICY1, GNA12, and ICY3
1700057	CWG1, FGL0, and FGL7
1700058	SPM1, SPM2, and SPM4
1700059	GNA5, SPM24, and SPM25

Compound Identification

When the ion ratio for analyte identification was not met, the lab reported the analyte as not-detected (ND) with a UEMPC flag. No further action was taken. When an EMPC flag was assigned to a homologue group indicating one or more analytes in the group did not meet the identification criteria, the result was estimated (J-25) at the reported value.

Compound Quantitation

SDG 1700058: For Samples SPM3, SPM13, SPM15, and SPM16, the PCB-153/168 results exceeded the calibration range. The associated PCB-153/168 results were estimated (J-20).

SDG 1700059: For Sample SPM25, the PCB-170 result exceeded the calibration range. The associated PCB-170 result was estimated (J-20).

Calculation Verification

Several results were verified be recalculation form the raw data. No transcription or calculation errors were found.

OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory performed an acceptable modification of the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the labeled compound and OPR recoveries. Precision could not be evaluated.

Detection limits were elevated due to method blank contamination. Data were estimated based on labeled compound recovery outliers, OPR recovery outliers, and for exceeding the calibration range of the instrument.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lower Duwamish Waterway – Otter Scat Analysis
PCB Aroclors by SW846 Method 8082

This report documents the review of analytical data from the analysis of otter scat samples and the associated laboratory quality control (QC) samples. Analytical Resources, Inc, Tukwila, Washington, analyzed the samples. Refer to the **Sample Index** for a list of the individual samples.

SDG	Number of Samples	Validation Level
17C0166	11 Otter Scat	EPA Stage 2B

DATA PACKAGE COMPLETENESS

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

VERIFICATION OF EDD TO LABORATORY REPORT

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

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

✓	Sample Receipt, Preservation, and Holding Times	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
✓	Initial Calibration (ICAL)	1	Field Duplicates
✓	Calibration Verification	✓	Target Analyte List
✓	Laboratory Blanks	✓	Reporting Limits
1	Field Blanks	2	Compound Identification
✓	Surrogate Compounds	1	Reported Results
✓	Laboratory Control Samples (LCS/LCSD)		

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

Field Blanks

No field blanks were submitted.

Matrix Spike/Matrix Spike Duplicates

No matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed. Precision and accuracy were evaluated using the laboratory control sample/laboratory control sample duplicate (LCS/LCSD) and surrogate recoveries.

Field Duplicates

No field duplicates were submitted.

Compound Identification

The second column confirmation percent difference (%D) values for Aroclor 1260 were greater than 60% for the samples noted below. The results were qualified as estimated and tentatively identified (NJ-3).

Sample ID	Analyte	Result (ug/kg)	Qualifier
CWG4	Aroclor 1260	3.6	NJ-3
FGL1	Aroclor 1260	2.9	NJ-3
FGL2	Aroclor 1260	4.9	NJ-3
SPM14	Aroclor 1260	224	NJ-3

Reported Results

For Sample SPM14, the reporting limit for Aroclor 1254 was elevated due to matrix interferences.

OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory performed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate and LCS/LCSD recoveries and precision was acceptable as demonstrated by the LCS/LCSD RPD values.

Data were estimated based on confirmation column %D outliers.

All data, as qualified, are acceptable for use.

ECOCHEM
Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

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

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

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

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

DATA QUALIFIER REASON CODES

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

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

PCB Congener Analysis by HRMS
(Based on EPA DV Guidance[1] and Method EPA 1668C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler/Storage Temperature Preservation	Waters/Solids ≤ 6°C & in the dark Tissues <-10°C & in the dark **Preservation Aqueous:** If Cl_2 is present Thiosulfate must be added and if needed adjust pH to 2 - 3 (drinking water requirement)	EPA (1) Method (2)	J(pos)/R(ND) if thiosulfate not added if Cl_2 present and J(pos)/UJ(ND) if pH not adjusted; J(pos)/UJ(ND) if temp > 20°C	1	Note: EPA DV guidance documents use < 4°C, method uses ≤ 6°C. Info in EcoChem TM-05 also generally applies.
Holding Time	If properly stored, 1 year prior to extraction. If extracts properly stored (< -10°C & in dark), 1 year from extraction to analysis.	EPA (1) Method (2)	If not properly stored or HT exceeded: J(pos)/UJ(ND)	1	May **be dictated by QAPP** Info in EcoChem TM-05 also generally applies
Instrument Performance					
Mass Resolution (Tuning)	≥10,000 resolving power at m/z 330.9792 <5 ppm deviation from each m/z listed in **Table 7** of method. Analyzed prior to ICAL and at the beginning and end of each 12 hr. shift	EPA (1) Method (2)	R all analytes in all samples associated with a failed tune	24	PFK (Perfluorokerosene) tuning compound
Column Resolution	Mix of all 209 PCBs run prior to each ICAL/12 hours RT of PCB209 must be > 55 min PCB156 & 157 must coelute w/in 2 sec PCB34 & 23 and PCB187 & 182 must be resolved where ((x/y)*100%) < 40% x = ht of valley and y = ht of shortest peak RRT of all congeners must fall within the range in **Table 2** of the method	EPA (1) Method (2)	If criteria are not met, review sample chromatograms to determine if sample results are negatively impacted. If so, discuss with client for possible reanalyses, or J(pos) all data.	24	Criteria are for SPB-octyl column. If different column used, see Section 6.9.1.2 of method. Appendix A provides info for DB-1 column
Initial Calibration **Sensitivity**	S/N ratio > 10 for all native and labeled congeners in CS1 std.	EPA (1) Method (2)	If <10, elevate Det. Limit or R(ND)	5A	
Initial Calibration **Selectivity**	Ion Abundance ratios within QC limits (**Table 8** of Method 1668C)	EPA (1) Method (2)	If ion ratios are out for a given congener in 2 or more standards in ICAL, J(pos) results for that congener in all samples	5A	Professional judgement. The info in EcoChem TM-05 also generally applies
Initial Calibration (Minimum 5 stds.) **Stability**	%RSD < 20% for congeners listed in **Table 3** of method RRT of all congeners must meet **Table 2** of method	EPA (1) Method (2)	J(pos) natives if %RSD > 20% RRT outliers: narrate, no action	5A	RRT outliers: professional judgement. The info in EcoChem TM-05 also generally applies
Continuing Calibration (Prior to each 12 hr. shift) **Sensitivity**	S/N ratio for CS3 standard > 10	EPA (1) Method (2)	If <10, elevate Det. Limit to lowest calibration or R(ND)	5B	
Continuing Calibration (Prior to each 12 hr. shift) **Selectivity**	Ion Abundance ratios within QC limits (**Table 8** of Method 1668C)	EPA (1) Method (2)	No action if %D acceptable, review sample ion ratios, U(pos) if ion ratio outside limits	5B	Professional judgement. The info in EcoChem TM-05 also generally applies.

PCB Congener Analysis by HRMS
(Based on EPA DV Guidance[1] and Method EPA 1668C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Continuing Calibration (Prior to each 12 hr. shift) **Stability**	Recoveries must meet VER% limits in **Table 6,** Method 1668C	EPA [(1)] Method [(2)]	**Labeled congeners:** Narrate, no action. **Native congeners:** J(pos)/UJ(ND) for low bias J(pos) for high bias	5B (H,L)[3]	
	Absolute RT of all Labeled congeners and Window Defining Congeners must be +/- 15 sec of RT in ICAL RRT of all congeners must be within range in **Table 2** of method	EPA [(1)] Method [(2)]	Narrate, no action	5B	Professional judgement. The info in EcoChem TM-05 also generally applies
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected congeners	EPA [(1)] Method [(2)]	U(pos) if sample result is < 5X blank concentration	7	**Heirarchy of blank review:** **#1 - Review MB, quaify as needed** **#2 - Review FB , qualify as needed** EMPC values in blanks as considered to be non-detects
Field Blank (FB)	FB: frequency as per QAPP No detected congeners		U(pos) if sample result is < 5X blank concentration	6	
Precision and Accuracy					
MS/MSD (recovery)	**MS/MSD not typically required for HRMS analyses.** If lab analyzes MS/MSD then one set per matrix per batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos) if both %R > UCL - high bias J(pos)/UJ(ND) if both %R < LCL - low bias J(pos)/R(ND) if both %R < 10% - very low bias J(pos)/UJ(ND) if one > UCL & one < LCL, with no bias **PJ if only one %R outlier**	8 (H,L)[3]	No action if only one spike %R is outside criteria. No action if parent concentration is >4x the amount spiked. Qualify parent sample only unless other QC indicates systematic problems.
MS/MSD (RPD)	**MS/MSD not typically required for HRMS analyses.** If lab analyzes MS/MSD then one set per matrix per batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos) in parent sample if RPD > CL	9	Qualify parent sample only.
LCS (or OPR)	One per lab batch (of ≤ 20 samples) %R must meet limits in **Table 6** Method 1668C	EPA [(1)] Method [(2)]	J(pos) if %R > UCL - high bias J(pos)/UJ(ND) if %R < LCL - low bias J(pos)/R(ND) if %R < 10% - very low bias	10 (H,L)[3]	No action if only one spike %R is outside criteria, when LCSD is analyzed. Qualify all associated samples.
LCS/LCSD (RPD)	**LCS/LCSD not typically required for HRMS analyses.** If lab analyzes LCS/LCSD then one set per matrix and batch of 20 samples RPD < 35%	EcoChem standard policy	J(pos) assoc. congener in all samples if RPD > CL	9	Qualify all associated samples.
Lab Duplicate (RPD) (if required)	**Lab Dup not typically required for HRMS analyses.** One per lab batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos)/UJ(ND) if RPD > CL	9	Optional element. Qualify parent sample only.

PCB Congener Analysis by HRMS
(Based on EPA DV Guidance[1] and Method EPA 1668C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Labeled congeners (Internal Standards)	Added to all samples %R must meet limits in **Table 6** Method 1668C	EPA [(1)] Method [(2)]	J(pos) if %R > UCL - high bias J(pos)/UJ(ND) if %R < LCL - low bias J(pos)/R(ND) if %R <5% - very low bias J(pos)/UJ(ND) if %R between 5-10% for two or more labeled compounds in a substitution group (ie, mono, -di-, trichlorinated)- very low bias	13 (H,L)[3]	See next tab for labled congener associations as per **Table 2** Method 1668
Field Duplicates	Solids: RPD <50% OR difference < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	Narrate and qualify if required by project **(EcoChem PJ)**	9	**RPD values may be dictated by QAPP** 35% and 50% are EcoChem defaults
Compound ID and Calculation					
Quantitation/ Identification	All ions for each isomer must maximize within +/- 2 seconds. S/N ratio >2.5 Ion ratios must meet criteria listed in **Table 8** of 1668C; RRTs w/in limits in **Table 2** of 1668C	EPA [(1)] Method [(2)]	Narrate in report; qualify if necessary NJ(pos) for retention time outliers. U(pos) for ion ratio outliers.	25	The info in EcoChem TM-05 also generally applies
EMPC (estimated maximum possible concentration)	If quantitation identification criteria are not met, laboratory should report an EMPC value.	EPA [(1)] Method [(2)]	If laboratory correctly reported an EMPC value, qualify the native congener U to indicate that the value is an elevated detection limit and qualify total homolog groups J(+)	25	**Use professional judgment.** **See TM-18**
Interferences	Lock masses must not deviate +/- 20% from values in **Table 7** of 1668C	Method [(2)]	J(pos)/UJ(ND) if present	24	**Use professional judgment.** **See TM-17**
Calibration Range	Results greater than highest calibration standard	EcoChem standard policy	Qualify J (pos)	20	If result from dilution analysis is not reported.
Calculation Check	Check 10% of field & QC sample results	EcoChem standard policy	Contact laboratory for resolution and/or corrective action	na	Full data validation only.
Electronic Data Deliverable (EDD)					
Verification of EDD to hardcopy data	EcoChem verify @ 10% unless problems noted; then increase level up to 100% for next several packages.		Depending on scope of problem, correct at EcoChem (minor issues) to resubmittal by laboratory (major issues).	na	EcoChem Project Manager and/or Database Administrator will work with lab to provide long-term corrective action.
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	Standard reporting policy	Use "DNR" to flag results that will not be reported.	11	

[1] USEPA Region 2 Data Validation, Standard Operating Procedure for EPA Method 1668A, Revision 1, September 2008
USEPA Region 3 Interim Guidelines for the Validation of Data Generated Using Method 1668 PCB Congener Data, Revision 0, April 2004
USEPA Region 10 SOP For the Validation of Method 1668 Toxic, Dioxin-like, PCB Data, Revision 1, December 1995
[2] EPA Method 1668, Rev.C, Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS, April 2010
[3] "H" = high bias indicated; "L" = low bias indicated

(pos): Positive Result(s)
(ND): Non-detects

PCB Aroclors by GC
(Based on Organic NFG 2008 and SW-846 Method 8082A)

QC Element	Acceptance Criteria (NFG)	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample					
Cooler/Storage Temperature Preservation	4°C ± 2°C Tissue/sediments (may be frozen -20°C)	NFG [1] Method [2]	**If required by project:** J (pos)/UJ (ND) if greater than 6° C	1	Use Professional Judgment (PJ) to qualify for temperature outlier. Current SW846 criterion is ≤ 6° C [3]
Holding Time	**Extraction Aqueous:** 7 days from collection **Extraction Solid:** 14 days from collection **Exraction Tissue/Sediment (frozen):** 1 year **Analysis (all matrices)**: 40 days from extraction	NFG [1] Method [2]	**If required by project:** J (pos)/UJ (ND) if ext/analyzed > HT J (pos)/R (ND) if gross exceedance (> 2x HT)	1	Use PJ to qualify for holding time outlier. ***Current SW846 does not have an extraction holding time limit.*** [3] Gross exceedance > 2x HT, as per NFG 1999
Instrument Performance					
Retention Times	Surrogates: TCMX (± 0.05); DCB (± 0.10) Aroclors (± 0.07)	NFG [1]	NJ (pos)/R (ND) results for analytes with RT shifts	24	
Initial Calibration	Minimum 5 point with RSD ≤ 20% OR correlation coefficient (r-value) ≥ 0.995 OR Minimum 6-point with co-efficient of determination (r2-value) ≥ 0.99	NFG [1] Method [4]	J (pos) if %RSD greater than 20% OR r-value < 0.995 OR r^2-value < 0.99	5A	Refer to TM-01 for additional information. Use bias flags (H,L)[5] where appropriate
Initial Calibration Verification (ICV)	No NFG criteria. Project specific.	Project	J (pos) if > UCL J (pos)/UJ (ND) if < LCL	5B	Use bias flags (H,L) where appropriate
Continuing Calibration (Prior to each 12 hr. shift)	%D ± 20%	Method [2]	If > 20% (high bias): J (pos) If <20% (low bias: J (pos)/UJ (ND)	5B	Refer to TM-01 for additional information. Use bias flags (H,L) where appropriate
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected compounds > RL	NFG [1] Method [2]	U (pos) if result is less than appropriate 5X action level.	7	**Hierarchy of blank review:** **#1 - Review MB and IB, qualify as needed** **#2 - Review FB , qualify as needed** Note: Actions as per NFG 1999 Note: IB not required by method
Field Blank (FB)	FB: frequency as per QAPP No detected compounds > RL	NFG [1] Method [2]	U (pos) if result is less than appropriate 5X action level.	6	
Instrument Blanks (IB)	Analyzed at the beginning and end of every 12 hour sequence No analyte > CRQL	NFG [1]	U (pos) if result is less than appropriate 5X action level.	7	

PCB Aroclors by GC
(Based on Organic NFG 2008 and SW-846 Method 8082A)

QC Element	Acceptance Criteria (NFG)	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy					
MS/MSD (recovery)	One set per matrix per batch (of ≤ 20 samples) AR1016 and AR1260: %R = 29% - 135%, or project limits	NFG (1) Method (2)	Qualify parent only unless other QC indicates systematic problems. J (pos) if both %R > upper control limit (UCL) J (pos)/UJ (ND) if both %R < lower control limit (LCL) J (pos)/R (ND) if both %R < 10%	8	No action if only one spike %R is outside criteria. No action if native analyte conc. > 5x the amount spiked. Use bias flags (H,L) where appropriate. Actions apply to all Aroclors in parent sample.
MS/MSD (RPD)	One set per matrix per batch (of ≤ 20 samples) AR1016: RPD < 15%, AR1260: RPD < 20% or project limits	NFG (1) Method (2)	Qualify parent only unless other QC indicates systematic problems. J (pos) if RPD > control limit	9	No action if parent is ND.
LCS	One per lab batch (of ≤ 20 samples) AR1016 and AR1260: %R = 50% - 150%, or project limits	NFG (1)	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND) if %R < 10%	10	Use bias flags (H,L) where appropriate. Actions apply to all Aroclors in associated samples.
LCS/LCSD (RPD)	if analyzed use MS/MSD RPD criteria	NFG (1)	J (pos) assoc. compound in all samples	9	LCSD not required by method or NFG
Precision and Accuracy					
Surrogates	TCMX and DCBP added to every sample %R = 30% - 150% or project limits	NFG (1) Method (2)	J (pos) if either %R > UCL J (pos)/UJ (ND) if either %R < LCL J (pos)/R (ND) if either %R < 10%	13	If %R < 10% (sample dilution is a factor), use PJ Use bias flags (H,L) where appropriate
Internal Standards (if used)	Acceptable Range: IS area = 50% to 200% of CCAL area RT within 30 seconds of CC RT	Method (2)	J (pos) if area > 200% J (pos)/UJ (ND) if area < 50% J (pos)/R (ND) if area < 25% RT > 30 seconds, narrate	19	
Field Duplicates	**Solids:** RPD < 50% OR difference < 2X RL (for results < 5X RL) **Aqueous:** RPD < 35% OR difference < 1X RL (for results < 5X RL)	EcoChem	J (pos)/UJ (ND) Qualify only parent and field duplicate samples	9	use project limits if specified

PCB Aroclors by GC
(Based on Organic NFG 2008 and SW-846 Method 8082A)

QC Element	Acceptance Criteria (NFG)	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Compound Identification/Quantification					
Quantitation/ Identification	Between two columns: RPD < 40% or %D < 25% Within Retention Time Windows on both columns.	NFG [1] Method [2]	J (pos) if RPD = 40% - 60% (25% - 60% for %D) NJ (pos) if > 60% R (pos) if RTW criterion not met	3	See TM-08 for additional info.
Calibration Range	on column concentration < high calibration standard	NFG [1] Method [2]	J (pos) if conc > high standard and sample was not diluted	20	
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	Standard reporting policy	Use "DNR" to flag results that will not be reported.	11	TM-04 Rev. 1 for additional info.
Sample Clean-up					
GPC/Sulfur/ Florisil/Acid	No criteria - cleanups are optional	NFG [1] Method [2]	Use Professional Judgment	14	special cleanups may be required for project cleanup standards may be associated with GPC/florisil cleanups

[1] National Functional Guidelines for Organic Data Review, June, 2008
[2] Polychlorinated Biphenyls (PCBs) by Gas Chromatography USEPA Method SW846 8082A, Feb 2007, Rev. 1
[3] SW846, Chapter 4, Organic Analytes
[4] Determinative Chromatographic Separations , Method 8000C , March 2003, Rev.3
[5] "H" = high bias indicated; "L" = low bias indicated

ECOCHEM
Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700056	GNA10	EPA1668C	PCB-001	0.851	pg/g	JB	U	7
1700056	GNA10	EPA1668C	PCB-003	1.02	pg/g	B	U	7
1700056	GNA10	EPA1668C	PCB-015	0.128	pg/g	U	UJ	10L
1700056	GNA11	EPA1668C	PCB-003	0.544	pg/g	B	U	7
1700056	GNA11	EPA1668C	PCB-015	0.664	pg/g		J	10L
1700056	GNA12	EPA1668C	PCB, Dichlorobiphenyls	2.57	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB, Heptachlorobiphenyls	171	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB, Hexachlorobiphenyls	544	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB, Monochlorobiphenyls	0.240	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB, Nonachlorobiphenyls	6.06	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB, Octachlorobiphenyls	29.9	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB, Pentachlorobiphenyls	116	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB, Tetrachlorobiphenyls	7.19	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB, Trichlorobiphenyls	4.98	pg/g	EMPC	J	25
1700056	GNA12	EPA1668C	PCB-018/030	0.700	pg/g	JB	U	7
1700056	GNA12	EPA1668C	PCB-020/028	1.18	pg/g	JB	U	7
1700056	GNA12	EPA1668C	PCB-052	1.21	pg/g	B	U	7
1700056	GNA12	EPA1668C	PCB-061/070/074/076	2.05	pg/g	JB	U	7
1700056	GNA12	EPA1668C	PCB-205	0.719	pg/g	JB	U	7
1700056	GNA13	EPA1668C	PCB-015	0.295	pg/g	J	J	10L
1700056	GNA13	EPA1668C	PCB-020/028	0.680	pg/g	JB	U	7
1700056	GNA14	EPA1668C	PCB-015	0.0916	pg/g	U	UJ	10L
1700056	GNA7	EPA1668C	PCB-011	0.931	pg/g	B	U	7
1700056	GNA8	EPA1668C	PCB-011	0.918	pg/g	B	U	7
1700056	GNA9	EPA1668C	PCB-001	0.837	pg/g	B	U	7
1700056	GNA9	EPA1668C	PCB-015	0.226	pg/g	U	UJ	10L
1700056	HAM1	EPA1668C	PCB-001	0.965	pg/g	B	U	7
1700056	HAM1	EPA1668C	PCB-015	5.99	pg/g		J	10L
1700056	HAM1	EPA1668C	PCB-107	430	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-108/124	145	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-114	102	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-128/166	1630	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-130	623	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-133	866	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-137	523	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-139/140	480	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-158	1520	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-164	1320	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-175	38.0	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-176	307	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-178	833	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-179	1320	pg/g		J	13H

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700056	HAM1	EPA1668C	PCB-184	3.23	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-187	2280	pg/g		J	13H
1700056	HAM1	EPA1668C	PCB-188	12.0	pg/g		J	13H
1700056	HAM2	EPA1668C	PCB-001	0.604	pg/g	JB	U	7
1700056	HAM2	EPA1668C	PCB-003	0.402	pg/g	JB	U	7
1700056	HAM2	EPA1668C	PCB-015	3.30	pg/g		J	10L
1700056	HAM2	EPA1668C	PCB-175	37.0	pg/g		J	13H
1700056	HAM2	EPA1668C	PCB-176	64.2	pg/g		J	13H
1700056	HAM2	EPA1668C	PCB-178	832	pg/g		J	13H
1700056	HAM2	EPA1668C	PCB-179	247	pg/g		J	13H
1700056	HAM2	EPA1668C	PCB-182	9.48	pg/g		J	13H
1700056	HAM2	EPA1668C	PCB-184	3.85	pg/g		J	13H
1700056	HAM2	EPA1668C	PCB-187	1110	pg/g		J	13H
1700056	HAM2	EPA1668C	PCB-188	4.95	pg/g		J	13H
1700056	HIM1	EPA1668C	PCB-011	1.66	pg/g	B	U	7
1700056	HIM3	EPA1668C	PCB-001	0.896	pg/g	B	U	7
1700056	HIM3	EPA1668C	PCB-003	1.09	pg/g	B	U	7
1700056	HIM3	EPA1668C	PCB-015	7.14	pg/g		J	10L
1700056	ICY1	EPA1668C	PCB-015	0.0943	pg/g	U	UJ	10L
1700056	ICY2	EPA1668C	PCB-011	0.521	pg/g	B	U	7
1700056	ICY3	EPA1668C	PCB, Heptachlorobiphenyls	51.0	pg/g	EMPC	J	25
1700056	ICY3	EPA1668C	PCB, Hexachlorobiphenyls	128	pg/g	EMPC	J	25
1700056	ICY3	EPA1668C	PCB, Monochlorobiphenyls	0.243	pg/g	EMPC	J	25
1700056	ICY3	EPA1668C	PCB, Nonachlorobiphenyls	3.29	pg/g	EMPC	J	25
1700056	ICY3	EPA1668C	PCB, Octachlorobiphenyls	10.4	pg/g	EMPC	J	25
1700056	ICY3	EPA1668C	PCB, Pentachlorobiphenyls	83.1	pg/g	EMPC	J	25
1700056	ICY3	EPA1668C	PCB, Tetrachlorobiphenyls	26.0	pg/g	EMPC	J	25
1700056	ICY3	EPA1668C	PCB-018/030	1.19	pg/g	JB	U	7
1700056	ICY4	EPA1668C	PCB-003	0.212	pg/g	JB	U	7
1700056	ICY4	EPA1668C	PCB-015	0.413	pg/g	J	J	10L
1700056	ICY4	EPA1668C	PCB-020/028	0.648	pg/g	JB	U	7
1700056	ICY5	EPA1668C	PCB-003	0.225	pg/g	JB	U	7
1700056	ICY5	EPA1668C	PCB-015	0.356	pg/g	J	J	10L
1700056	LIR1	EPA1668C	PCB-011	0.825	pg/g	B	U	7
1700056	LIR2	EPA1668C	PCB-011	0.644	pg/g	B	U	7
1700057	CWG1	EPA1668C	PCB-021/033	0.792	pg/g	JB	U	7
1700057	CWG2	EPA1668C	PCB-021/033	0.622	pg/g	JB	U	7
1700057	CWG2	EPA1668C	PCB-037	0.633	pg/g	B	U	7
1700057	CWG2	EPA1668C	PCB-059/062/075	0.521	pg/g	JB	U	7
1700057	CWG2	EPA1668C	PCB-107	3.11	pg/g		J	13H
1700057	CWG2	EPA1668C	PCB-108/124	1.37	pg/g		J	13H
1700057	CWG2	EPA1668C	PCB-114	2.29	pg/g		J	13H

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700057	CWG2	EPA1668C	PCB-118	63.7	pg/g		J	13H
1700057	CWG2	EPA1668C	PCB-122	0.235	pg/g	J	J	13H
1700057	CWG2	EPA1668C	PCB-123	1.12	pg/g		J	13H
1700057	CWG2	EPA1668C	PCB-126	0.616	pg/g	B	U	7
1700057	CWG3	EPA1668C	PCB-021/033	0.861	pg/g	JB	U	7
1700057	CWG3	EPA1668C	PCB-037	0.803	pg/g	B	U	7
1700057	CWG3	EPA1668C	PCB-077	0.939	pg/g		J	13H
1700057	CWG3	EPA1668C	PCB-126	0.365	pg/g	JB	U	7
1700057	CWG4	EPA1668C	PCB-021/033	0.764	pg/g	JB	U	7
1700057	CWG4	EPA1668C	PCB-037	0.814	pg/g	B	U	7
1700057	CWG4	EPA1668C	PCB-126	0.252	pg/g	JB	U	7
1700057	CWG5	EPA1668C	PCB-021/033	0.530	pg/g	JB	U	7
1700057	CWG5	EPA1668C	PCB-031	0.894	pg/g	B	U	7
1700057	CWG6	EPA1668C	PCB-021/033	0.908	pg/g	JB	U	7
1700057	CWG6	EPA1668C	PCB-037	0.775	pg/g	B	U	7
1700057	CWG6	EPA1668C	PCB-059/062/075	0.381	pg/g	JB	U	7
1700057	CWG6	EPA1668C	PCB-077	4.48	pg/g		J	13H
1700057	CWG6	EPA1668C	PCB-079	0.471	pg/g	JB	U	7
1700057	CWG6	EPA1668C	PCB-081	1.27	pg/g		J	13H
1700057	CWG7	EPA1668C	PCB-020/028	1.51	pg/g	B	U	7
1700057	CWG7	EPA1668C	PCB-021/033	0.598	pg/g	JB	U	7
1700057	CWG7	EPA1668C	PCB-031	0.576	pg/g	B	U	7
1700057	CWG7	EPA1668C	PCB-037	0.768	pg/g	B	U	7
1700057	CWG7	EPA1668C	PCB-039	0.0716	pg/g	JB	U	7
1700057	CWG7	EPA1668C	PCB-079	0.202	pg/g	JB	U	7
1700057	CWG8	EPA1668C	PCB-037	1.29	pg/g	B	U	7
1700057	CWG8	EPA1668C	PCB-039	0.149	pg/g	JB	U	7
1700057	CWG8	EPA1668C	PCB-079	0.511	pg/g	B	U	7
1700057	CWG9	EPA1668C	PCB-037	0.989	pg/g	B	U	7
1700057	CWG9	EPA1668C	PCB-059/062/075	0.401	pg/g	JB	U	7
1700057	CWG9	EPA1668C	PCB-079	0.128	pg/g	JB	U	7
1700057	FGL0	EPA1668C	PCB-114	14.6	pg/g		J	13H
1700057	FGL0	EPA1668C	PCB-122	1.14	pg/g		J	13H
1700057	FGL1	EPA1668C	PCB-021/033	0.760	pg/g	JB	U	7
1700057	FGL1	EPA1668C	PCB-037	0.589	pg/g	B	U	7
1700057	FGL1	EPA1668C	PCB-107	4.56	pg/g		J	13H
1700057	FGL1	EPA1668C	PCB-108/124	0.854	pg/g	J	J	13H
1700057	FGL1	EPA1668C	PCB-114	2.90	pg/g		J	13H
1700057	FGL1	EPA1668C	PCB-118	86.2	pg/g		J	13H
1700057	FGL1	EPA1668C	PCB-122	0.117	pg/g	J	J	13H
1700057	FGL1	EPA1668C	PCB-123	0.873	pg/g		J	13H
1700057	FGL10	EPA1668C	PCB-039	0.453	pg/g	JB	U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700057	FGL2	EPA1668C	PCB-021/033	1.13	pg/g	B	U	7
1700057	FGL2	EPA1668C	PCB-037	1.18	pg/g	B	U	7
1700057	FGL2	EPA1668C	PCB-059/062/075	0.431	pg/g	JB	U	7
1700057	FGL2	EPA1668C	PCB-079	0.211	pg/g	JB	U	7
1700057	FGL2	EPA1668C	PCB-126	0.430	pg/g	JB	U	7
1700057	FGL3	EPA1668C	PCB-039	0.0866	pg/g	JB	U	7
1700057	FGL3	EPA1668C	PCB-079	0.322	pg/g	JB	U	7
1700057	FGL4	EPA1668C	PCB-039	0.273	pg/g	JB	U	7
1700057	FGL4	EPA1668C	PCB-079	0.617	pg/g	B	U	7
1700057	FGL4	EPA1668C	PCB-107	22.5	pg/g		J	13H
1700057	FGL4	EPA1668C	PCB-108/124	4.19	pg/g		J	13H
1700057	FGL4	EPA1668C	PCB-114	11.8	pg/g		J	13H
1700057	FGL4	EPA1668C	PCB-118	378	pg/g		J	13H
1700057	FGL4	EPA1668C	PCB-122	0.176	pg/g	J	J	13H
1700057	FGL4	EPA1668C	PCB-123	6.87	pg/g		J	13H
1700057	FGL6	EPA1668C	PCB-039	0.322	pg/g	JB	U	7
1700057	FGL8	EPA1668C	PCB-037	0.815	pg/g	B	U	7
1700057	FGL8	EPA1668C	PCB-126	0.526	pg/g	B	U	7
1700058	SPM10	EPA1668C	PCB-107	125	pg/g		J	13H
1700058	SPM10	EPA1668C	PCB-108/124	22.2	pg/g		J	13H
1700058	SPM10	EPA1668C	PCB-114	110	pg/g		J	13H
1700058	SPM10	EPA1668C	PCB-122	1.25	pg/g		J	13H
1700058	SPM10	EPA1668C	PCB-123	34.9	pg/g		J	13H
1700058	SPM13	EPA1668C	PCB-153/168	46900	pg/g	E	J	20
1700058	SPM14	EPA1668C	PCB-107	541	pg/g		J	13H
1700058	SPM14	EPA1668C	PCB-108/124	137	pg/g		J	13H
1700058	SPM14	EPA1668C	PCB-114	171	pg/g		J	13H
1700058	SPM14	EPA1668C	PCB-122	6.55	pg/g		J	13H
1700058	SPM14	EPA1668C	PCB-123	120	pg/g		J	13H
1700058	SPM15	EPA1668C	PCB-153/168	43200	pg/g	E	J	20
1700058	SPM16	EPA1668C	PCB-153/168	47600	pg/g	E	J	20
1700058	SPM18	EPA1668C	PCB-105	787	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-107	186	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-108/124	54.1	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-114	66.2	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-118	2240	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-122	8.92	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-123	36.5	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-130	473	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-137	714	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-141	656	pg/g		J	13H
1700058	SPM18	EPA1668C	PCB-164	151	pg/g		J	13H

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700058	SPM22	EPA1668C	PCB-019	22.0	pg/g		J	13L
1700058	SPM23	EPA1668C	PCB-019	33.1	pg/g		J	13L
1700058	SPM3	EPA1668C	PCB-107	438	pg/g		J	13H
1700058	SPM3	EPA1668C	PCB-108/124	58.3	pg/g		J	13H
1700058	SPM3	EPA1668C	PCB-114	234	pg/g		J	13H
1700058	SPM3	EPA1668C	PCB-122	4.05	pg/g		J	13H
1700058	SPM3	EPA1668C	PCB-123	97.3	pg/g		J	13H
1700058	SPM3	EPA1668C	PCB-153/168	85800	pg/g	E	J	20
1700058	SPM4	EPA1668C	PCB-105	1190	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-107	356	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-108/124	62.6	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-114	94.7	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-118	4000	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-122	6.04	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-123	54.4	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-126	7.16	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-128/166	994	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-129/138/160/163	20000	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-130	652	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-131	42.4	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-132	665	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-133	609	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-134/143	137	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-137	782	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-139/140	333	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-141	1080	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-146	2710	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-147/149	2740	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-153/168	26900	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-158	1120	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-159	23.7	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-164	242	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-165	40.7	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-169	32.4	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-175	41.5	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-176	87.3	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-178	593	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-179	310	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-184	8.16	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-187	641	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-188	11.9	pg/g		J	13H
1700058	SPM4	EPA1668C	PCB-206	1190	pg/g		J	13H

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700058	SPM5	EPA1668C	PCB-105	773	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-107	124	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-108/124	23.3	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-114	49.2	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-118	1630	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-122	1.90	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-123	24.9	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-130	300	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-137	440	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-141	494	pg/g		J	13H
1700058	SPM5	EPA1668C	PCB-164	188	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-105	1070	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-107	303	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-108/124	62.1	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-114	85.5	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-122	6.73	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-123	56.8	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-130	557	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-137	594	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-141	1060	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-164	304	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-175	32.1	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-176	71.3	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-178	396	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-179	264	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-182	8.69	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-184	5.64	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-187	433	pg/g		J	13H
1700058	SPM6	EPA1668C	PCB-188	10.4	pg/g		J	13H
1700058	SPM7	EPA1668C	PCB-105	412	pg/g		J	13H
1700058	SPM7	EPA1668C	PCB-107	49.9	pg/g		J	13H
1700058	SPM7	EPA1668C	PCB-108/124	16.4	pg/g		J	13H
1700058	SPM7	EPA1668C	PCB-114	27.5	pg/g		J	13H
1700058	SPM7	EPA1668C	PCB-118	818	pg/g		J	13H
1700058	SPM7	EPA1668C	PCB-122	2.10	pg/g		J	13H
1700058	SPM7	EPA1668C	PCB-123	10.6	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-105	460	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-107	56.5	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-108/124	17.0	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-114	33.7	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-118	1030	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-122	1.90	pg/g		J	13H

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700058	SPM8	EPA1668C	PCB-123	11.1	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-130	103	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-137	244	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-141	152	pg/g		J	13H
1700058	SPM8	EPA1668C	PCB-164	57.9	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-035	0.689	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-037	2.06	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-105	91.8	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-107	10.4	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-108/124	3.66	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-114	6.65	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-118	191	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-122	0.687	pg/g		J	13H
1700059	FGL11	EPA1668C	PCB-123	3.05	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-011	1.39	pg/g	B	U	7
1700059	GNA1	EPA1668C	PCB-035	0.164	pg/g	J	J	13H
1700059	GNA1	EPA1668C	PCB-107	0.991	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-108/124	0.442	pg/g	J	J	13H
1700059	GNA1	EPA1668C	PCB-114	0.477	pg/g	J	J	13H
1700059	GNA1	EPA1668C	PCB-118	14.3	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-123	0.240	pg/g	J	J	13H
1700059	GNA1	EPA1668C	PCB-128/166	7.41	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-129/138/160/163	133	pg/g	B	J	13H
1700059	GNA1	EPA1668C	PCB-130	1.33	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-132	0.800	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-133	2.85	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-137	2.28	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-146	0.675	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-147/149	4.13	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-153/168	202	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-156/157	11.7	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-158	2.37	pg/g		J	13H
1700059	GNA1	EPA1668C	PCB-165	0.237	pg/g	J	J	13H
1700059	GNA1	EPA1668C	PCB-169	0.284	pg/g	J	J	13H
1700059	GNA1	EPA1668C	PCB-206	4.95	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-011	1.99	pg/g	B	U	7
1700059	GNA5	EPA1668C	PCB-107	2.14	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-114	1.30	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-118	29.6	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-123	0.364	pg/g	J	J	13H
1700059	GNA5	EPA1668C	PCB-128/166	33.7	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-129/138/160/163	687	pg/g	B	J	13H

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700059	GNA5	EPA1668C	PCB-130	3.91	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-133	14.8	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-134/143	0.327	pg/g	J	J	13H
1700059	GNA5	EPA1668C	PCB-137	18.4	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-141	3.43	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-146	26.4	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-147/149	5.73	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-153/168	1260	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-156/157	58.4	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-158	8.60	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-165	1.55	pg/g		J	13H
1700059	GNA5	EPA1668C	PCB-169	1.84	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-114	0.401	pg/g	J	J	13H
1700059	GNA6	EPA1668C	PCB-118	8.70	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-123	0.166	pg/g	J	J	13H
1700059	GNA6	EPA1668C	PCB-126	0.206	pg/g	J	J	13H
1700059	GNA6	EPA1668C	PCB-128/166	13.3	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-129/138/160/163	223	pg/g	B	J	13H
1700059	GNA6	EPA1668C	PCB-132	0.394	pg/g	J	J	13H
1700059	GNA6	EPA1668C	PCB-137	4.89	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-139/140	0.435	pg/g	J	J	13H
1700059	GNA6	EPA1668C	PCB-141	0.572	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-146	3.32	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-153/168	260	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-156/157	14.8	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-158	3.84	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-175	4.16	pg/g		J	13H
1700059	GNA6	EPA1668C	PCB-179	0.277	pg/g	J	J	13H
1700059	GNA6	EPA1668C	PCB-206	4.49	pg/g		J	13H
1700059	LIR3	EPA1668C	PCB-011	1.08	pg/g	B	U	7
1700059	LIR3	EPA1668C	PCB-037	0.534	pg/g		J	13H
1700059	LIR3	EPA1668C	PCB-114	0.920	pg/g		J	13H
1700059	LIR5	EPA1668C	PCB-037	0.271	pg/g	J	J	13H
1700059	LIR6	EPA1668C	PCB-189	3.35	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-105	32.4	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-107	0.677	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-108/124	0.165	pg/g	J	J	13H
1700059	LIR9	EPA1668C	PCB-118	19.9	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-128/166	27.9	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-129/138/160/163	434	pg/g	B	J	13H
1700059	LIR9	EPA1668C	PCB-130	3.17	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-132	0.102	pg/g	J	J	13H

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700059	LIR9	EPA1668C	PCB-133	10.5	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-137	15.5	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-139/140	0.587	pg/g	J	J	13H
1700059	LIR9	EPA1668C	PCB-141	1.27	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-146	38.4	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-147/149	1.06	pg/g	J	J	13H
1700059	LIR9	EPA1668C	PCB-153/168	671	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-156/157	43.8	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-158	6.95	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-164	0.175	pg/g	J	J	13H
1700059	LIR9	EPA1668C	PCB-165	0.700	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-169	1.15	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-170	81.6	pg/g		J	13H
1700059	LIR9	EPA1668C	PCB-190	21.1	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-035	2.95	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-036	0.285	pg/g	J	J	13H
1700059	SPM24	EPA1668C	PCB-037	45.2	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-105	953	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-107	155	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-108/124	45.4	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-114	53.4	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-118	1970	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-122	5.92	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-123	34.1	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-126	5.65	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-128/166	972	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-129/138/160/163	15500	pg/g	B	J	13H
1700059	SPM24	EPA1668C	PCB-130	318	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-131	13.1	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-132	355	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-133	328	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-134/143	57.0	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-137	472	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-139/140	118	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-141	391	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-146	1420	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-147/149	1340	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-153/168	24100	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-158	665	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-159	15.3	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-164	163	pg/g		J	13H
1700059	SPM24	EPA1668C	PCB-165	28.0	pg/g		J	13H

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
1700059	SPM24	EPA1668C	PCB-169	37.2	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-105	931	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-107	170	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-108/124	46.1	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-114	55.5	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-118	2030	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-122	5.96	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-123	31.4	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-126	6.72	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-128/166	970	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-129/138/160/163	16100	pg/g	B	J	13H
1700059	SPM25	EPA1668C	PCB-130	334	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-132	341	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-133	367	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-134/143	56.4	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-137	507	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-139/140	126	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-141	474	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-146	1530	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-147/149	1360	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-153/168	23700	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-156/157	1190	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-158	742	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-162	26.4	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-164	148	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-165	31.2	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-167	235	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-169	37.8	pg/g		J	13H
1700059	SPM25	EPA1668C	PCB-170	4540	pg/g	E	J	20
1700059	SPM25	EPA1668C	PCB-206	587	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-011	3.38	pg/g	B	U	7
1700059	SPM26	EPA1668C	PCB-035	1.09	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-037	2.89	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-105	240	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-107	27.6	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-108/124	5.67	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-114	15.8	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-118	414	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-122	0.604	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-123	4.55	pg/g		J	13H
1700059	SPM26	EPA1668C	PCB-206	290	pg/g		J	13H
17C0166	SPM14	SW8082A	PCB-aroclor 1260	224	ug/Kg	J	NJ	3

Qualified Data Summary Table
Lower Duwamish Waterway - Otter Scat Analysis

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUAL	DV REASON
17C0166	CWG4	SW8082A	PCB-aroclor 1260	3.6	ug/Kg	J	NJ	3
17C0166	FGL1	SW8082A	PCB-aroclor 1260	2.9	ug/Kg	J	NJ	3
17C0166	FGL2	SW8082A	PCB-aroclor 1260	4.9	ug/Kg	J	NJ	3