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# **Elliott Bay and Central Puget Sound Crab Data Report: 2014 Sampling**

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December 2016



**King County**

Department of Natural Resources and Parks  
Water and Land Resources Division

**Science and Technical Support Section**

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# **Elliott Bay and Central Puget Sound Crab Data Report: 2014 Sampling**

## **Submitted by:**

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**King County**

Department of  
Natural Resources and Parks

**Water and Land Resources Division**



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## Acronyms

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µg	microgram
µg/L	micrograms per liter
EPA	U.S. Environmental Protection Agency
FOD	frequency of detection
GC/MS-SIM	gas chromatograph/mass spectroscopy—selective ion monitoring
GPC	Gel Permeation Chromatography
ID	identification
KCEL	King County Environmental Lab
kg	kilogram
m	meter
mg	milligram
mm	millimeter
MDL	method detection limit
NOAA	National Oceanic and Atmospheric Administration
PCBs	polychlorinated biphenyls
QA/QC	quality assurance/quality control
RDL	reporting detection limit
RPD	relative percent difference
SAP	sampling and analysis plan
SOP	standard operating procedure
SRM	standard reference material
WDFW	Washington Department of Fish and Wildlife
WDOH	Washington State Department of Health
ww	wet weight

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## EXECUTIVE SUMMARY

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This report presents the tissue chemistry results for Dungeness crab (*Metacarcinus magister*) and Red rock crab (*Cancer productus*) collected near public fishing piers in Elliott Bay and locations in the Central Basin of Puget Sound within King County. This effort is a component of the County's Tissue Monitoring Program. Results provide updated information on contaminant concentrations in crab tissue that support a variety of objectives for King County and state agencies (e.g., seafood consumption advisories). Crab tissue (muscle and hepatopancreas) was analyzed for metals, mercury, polychlorinated biphenyls (PCBs) using both Aroclor and homolog analysis methods, and lipids.

The crab tissue data collected for this study advances three of the tissue monitoring program goals: (1) understand the type and concentration of chemicals in shellfish that could be consumed by local fishers; (2) understand the impact of chemical exposures on the health of marine invertebrates in local King County waters; and (3) develop a long-term program to evaluate changes in chemical body burdens in shellfish over time as the quality of stormwater discharges are improved, reductions in uncontrolled combined sewer overflow discharges to surface waters are made, and contaminated sediments are remediated.

The results were evaluated in the following ways:

- Compared concentrations of metals, mercury, PCBs, and lipids between crab species and crab tissue types
- Compared contaminant concentrations between sampling locations or geographic areas
- Compared total PCB concentrations between two analytical methods: Aroclors and homologs
- Compared contaminant results for Dungeness crab tissue collected by this study to those recently measured by Washington Department of Fish and Wildlife (WDFW)

Concentrations of mercury and zinc were higher in muscle tissue (legs, body) relative to levels in the hepatopancreas (crab butter). However, concentrations of cadmium, copper, lead, selenium, and silver were higher in the hepatopancreas. Total PCB concentrations were much higher in both Dungeness and Red rock hepatopancreas compared to their respective muscle tissues. The hepatopancreas is often consumed by some cultures, including members of some environmental justice communities. In general, metal, mercury, and total PCBs concentrations in crab tissues from the same locations were lower in Red rock than in Dungeness crab.

Concentrations of metals and mercury did not differ greatly between sampling locations. Overall, total PCB concentrations were higher in crab from Elliott Bay, relative to other sampling locations in Central Puget Sound within King County.

Total PCB concentrations measured using the homolog analytical method were comparable to levels measured using the Aroclor method. However, use of the homolog method resulted in

lower analytical detection limits. Some samples analyzed with the homolog method resulted in PCB detections when analysis with the less sensitive Aroclor method did not. The homolog composition was similar between Dungeness and Red rock muscle and hepatopancreas tissue and both tissue types were dominated by penta- and hexachlorobiphenyls.

All PCB concentrations in Dungeness crab muscle and hepatopancreas composite samples exceeded fish tissue-equivalent concentrations of human health-based water quality criteria applicable to Washington State. Additional information is needed on the form of arsenic and mercury in crab tissue to confirm if similar exceedances of fish-tissue equivalent concentrations are occurring for these contaminants.

The results of this study had similar findings to the WDFW study.

This report presents the first results for King County's long-term contaminant monitoring in crab tissue. It is anticipated that crab will be sampled again in 2018. As more data are collected by the Monitoring Program, King County will begin to evaluate spatial and temporal trends in tissue contaminant levels in crab tissue.

## 1.0 INTRODUCTION

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This report presents the chemistry results for Dungeness crab (*Metacarcinus magister*<sup>1</sup>) and Red rock crab (*Cancer productus*) tissue collected in 2014 from Elliott Bay and locations in the Central Basin of Puget Sound within King County. The overall objective of this sampling effort is to advance the goals outlined in King County's Tissue Monitoring Program Work Plan (King County 2016) (Work Plan). The Tissue Monitoring Program includes annual collection and analysis of marine species from Elliott Bay and the Central Basin of Puget Sound within King County waters. Monitoring of crab tissue for contaminants is expected to occur approximately every four years. This report presents results of the first effort by King County to monitor contaminants in crab tissue. The next sampling effort is expected to occur in 2018.

The crab tissue data reported here contribute to advancing three of the tissue monitoring program goals: (1) understand the type and concentration of chemicals in shellfish that could be consumed by local fishers; (2) understand the impact of chemical exposures on the health of marine invertebrates in local King County waters; and (3) develop a long-term program to evaluate changes in chemical body burdens in shellfish over time as the quality of stormwater discharges are improved, reductions in uncontrolled combined sewer overflow discharges to surface waters are made, and contaminated sediments are remediated. As more data are collected by the Monitoring Program, King County will evaluate spatial and temporal trends in contaminant levels in crab tissue.

In addition to serving King County, data produced under the tissue monitoring program also serve the needs of a number of other state and regional organizations, such as the Washington State Department of Health (WDOH), Washington Department of Fish and Wildlife (WDFW) and the Puget Sound Partnership. For example, both crab species are consumed by people, and thus, these data can be used by public health agencies to update consumption advisories, as necessary. These data can also provide a general comparison of contaminants in crab previously collected from the Lower Duwamish Waterway and East Waterway Superfund sites.

Finally, contaminants in Dungeness and Red rock crab are of particular interest in Puget Sound because of the high importance of these species in commercial, tribal, and recreational fisheries. In 2009, the recreational fishery alone landed almost 1.5 million pounds of Dungeness crab, while the commercial fleet collected just over 3 million pounds throughout Puget Sound (WDFW 2011; Kraig 2013).

Dungeness crab range from the Pribilof Islands, Alaska, to Santa Barbara, California, and inhabit sandy bottoms and eelgrass beds at depths ranging from the intertidal zone to about 230 m (Jensen 1995). Dungeness crab can reach ten inches across the back, though six to seven inches are more common (WDFW 2016). They are opportunistic carnivores,

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<sup>1</sup> Formerly known as *Cancer magister*, therefore this name may be used for the same species in older literature

eating a wide variety of benthic organisms such as bivalves, fish and small crustaceans, and are preyed upon by a variety of animals, including their own species, large fish, and octopi (Stevens et al. 1982; Jensen 1995). The homing range of Dungeness crab in Puget Sound is not well understood. Most movement is restricted to less than 10 miles, although individual males had been found to travel up to 100 miles (Leet et al. 2001).

Red rock crab range from Kodiak Island, Alaska, down to central Baja California, Mexico, and prefer inhabiting rocky or reef-type substrate from the intertidal zone down to over 100 m (Leet et al. 2001). This species usually measures less than six inches across the back and is characterized by large claws (WDFW 2016). Red rock crab is both a predator and scavenger, feeding on a variety of other invertebrates such as snails, clams, abalone, barnacles, and oysters (Leet et al. 2001). Red rock crab does not appear to migrate or undertake large-scale movements (Leet et al. 2001); therefore their tissue concentrations are expected to be representative of local conditions.

This monitoring event included collection of crabs near public fishing piers at six sites: three sampling locations in Elliott Bay, two sampling locations at Shilshole Bay Marina, and one sampling location at Redondo Pier. A *Seattle Times* article written after the samples were collected indicates that many of the targeted locations are popular public crabbing locations (Yuasa 2016). Crab muscle and hepatopancreas tissue samples were analyzed for metals, mercury, polychlorinated biphenyls (PCBs) using both homolog and Aroclor methods, as well as lipids and total solids.

Analysis of both muscle and hepatopancreas tissue was conducted to identify differences in contaminant accumulation between the two tissue types. Some metals are known to preferentially accumulate in either the muscle or hepatopancreas. The hepatopancreas (known by various common names such as the “butter,” “mustard,” or “tomalley”) is a detoxification organ that serves as a combination liver and pancreas for the crab. Lipid content is higher in the hepatopancreas than in muscle; therefore, concentrations of lipophilic contaminants, such as PCBs may be higher in the hepatopancreas. Muscle is more commonly consumed by the general population, while the hepatopancreas is commonly eaten by some cultures, including members of some environmental justice communities.

This report presents a summary of the field sampling methods, sample processing, and analytical procedures (Section 2). Subsequent sections present results, including a comparison to data from a previous WDFW study (Section 3) as well as conclusions (Section 4).

## 2.0 SAMPLING AND ANALYSIS METHODS

This section presents information on sampling locations, field sampling methods, sample processing, and the laboratory methods used to analyze the samples. More detailed information on the sampling and analytical methods can be found in the project Sampling and Analysis Plan (SAP) (King County 2014). Sample chain of custody forms are presented in Appendix A.

### 2.1 Field Sampling Methods

#### 2.1.1 Sample Locations

Crabs were collected from six sampling locations in King County (Figure 1). Two sites were located along the western shoreline of the Ballard neighborhood at Shilshole Bay Marina: Shilshole Bay Marina North and South. Three sites were located in Elliott Bay at Seacrest Park and Duwamish Head fishing piers in West Seattle and the fishing pier at Terminal 86 in Magnolia. An additional site was located in south King County at Redondo Pier. Des Moines Marina Pier was originally identified in the SAP as a south King County sampling location. However, due to insufficient catch at that location, the sampling location was moved to Redondo Pier.

General sampling location coordinates, as well as locator identification names (ID) associated with each site are presented below in Table 1. Appendix B lists the specific coordinates where each individual crab pot was deployed.

**Table 1. Locator ID and general coordinates for each sampling location.**

Sampling Location	Locator ID	General Location Coordinates <sup>a</sup>	
		X	Y
Shilshole North	CB-SHMarina-N	1253476	254630
Shilshole South	CB-SHMarina-S	1251797	250856
Terminal 86 Pier	EB-T86Pier	1260471	232101
Duwamish Head	EB-DuwHead	1256857	221836
Seacrest Park Pier	EB-SCPPier	1258804	218982
Redondo Pier	CB-Redondo	1270333	130936

<sup>a</sup> Coordinates represent approximate sampling locations. See Appendix B for specific pot deployment coordinates. Coordinates are in State Plane North NAD83 US Survey Feet.

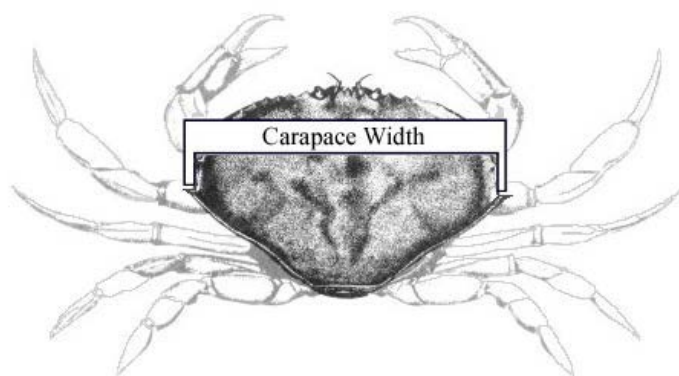


Figure 1. Crab Sampling Locations



### 2.1.2 Sampling Collection

Samples were collected over a three-day period (October 1, 2, and 9, 2014). King County Environmental Lab (KCEL) Field Sciences Unit staff targeted male Dungeness crab, and both male and female Red rock crab. The target size was within a quarter inch of legal size, which was defined as having a carapace size of at least 6.25" for Dungeness and 5" for Red rock (Figure 2). Crab carapace width measurements were made in the field using a crab gauge to ensure the appropriate size was being retained.



**Figure 2. Location of crab carapace width measurements (WDFW 2012)**

Crabs were collected using standard recreational crab pots deployed from a boat within approximately 200 yards of public access fishing piers. After initial deployments, pots at the Terminal 86 Pier sampling location were moved further offshore from the pier in order to get sufficient catch. Crab pots were baited with frozen herring. Two crab pots were deployed at each location for approximately 12-24 hours (overnight) and then retrieved. With the exception of the Duwamish Head and Redondo Pier sites, crab pots were deployed twice at each site to obtain sufficient catch numbers. Only one deployment was necessary to obtain sufficient catch at the Duwamish Head and Redondo Pier sites. Crab pots were deployed twice at the Des Moines Marina site; however, due to poor catch numbers, efforts were shifted to Redondo Pier. A total of 44 Dungeness and 20 Red rock crabs were collected and retained for analysis (Table 2). The total number of crab collected, including those not retained but reported to WDFW, are summarized in Appendix B.

**Table 2. Number of each crab species collected and retained from each sampling location.**

Sampling Location	Number of Crab Collected from Pots	
	Dungeness	Red Rock
Shilshole North	10	2
Shilshole South	10	3
Terminal 86 Pier	15	0
Duwamish Head	9	2
Seacrest Park Pier	0	3
Des Moines Marina <sup>a</sup>	0	1

Sampling Location	Number of Crab Collected from Pots	
	Dungeness	Red Rock
Redondo Pier	0	9
<b>Total</b>	<b>44</b>	<b>20</b>

<sup>a</sup> Per the SAP, crab collection was attempted at Des Moines Marina; however, due to insufficient catch, no crab were included in a composite sample.

Following pot retrieval, crabs retained for analysis were rinsed with site water and placed in sealed plastic bags. To optimize the natural shell and membrane protection, crabs with damaged shells were not retained as samples. Detailed size and weight measurements of retained crabs were conducted at KCEL, and are included in Appendix B. All bagged crabs were placed on ice in coolers for no more than 12 hours after collection. They were then stored frozen at  $-18^{\circ}\text{C} \pm 2$  at KCEL until processing and homogenization.

## 2.2 Sample Processing and Homogenization

Not all retained crabs were used to form composite samples for analysis. However, tissue was archived from crabs that were retained but not analyzed. Of the 44 Dungeness crabs collected, 42 were composited into 14 muscle and 9 hepatopancreas samples (Table 3). Of the 20 Red rock crabs collected, 17 were composited into 6 muscle and 4 hepatopancreas samples (Table 3). Only crabs from the same location and species were combined into a composite sample. The average size (length and weight) of crabs collected are shown in Table 4.

**Table 3. Composite sample scheme for muscle and hepatopancreas tissue.**

Sampling Location	Species			
	Dungeness		Red Rock	
	Crabs/ composite	No. of samples	Crabs/ composite	No. of samples
<b>Muscle</b>				
Shilshole North	3	3	2	1
Shilshole South	3	3	3	1
Terminal 86 Pier	3	5	0	0
Duwamish Head	3	3	0	0
Seacrest Park Pier	0	0	3	1
Redondo Pier	0	0	3	3
<b>Total</b>		<b>14</b>		<b>6</b>
<b>Hepatopancreas</b>				
Shilshole North	4	2	0	0
Shilshole South	4	2	3	1
Terminal 86 Pier	4	2	0	0
Duwamish Head	4	2	0	0
Seacrest Park Pier	0	0	3	1
Redondo Pier	0	0	4	2
<b>Total</b>		<b>8</b>		<b>4</b>

**Table 4. Average size of Dungeness & Red rock crab included in composite samples.**

Species	Dungeness		Red Rock	
Sampling Location	Mean Width (mm)	Mean Mass (g)	Mean Width (mm)	Mean Mass (g)
Shilshole North	158.8	641.6	125.2	307.0
Shilshole South	167.0	725.5	159.2	570.6
Terminal 86 Pier	163.0	671.2	n/a	n/a
Duwamish Head	167.1	739.5	146.0	444.0
Seacrest Park Pier	n/a	n/a	148.4	512.3
Redondo Pier	n/a	n/a	153.1	542.4
<b>Mean</b>	<b>164.0</b>	<b>694.4</b>	<b>146.4</b>	<b>475.3</b>

n/a = Not applicable

Not all sites had both Dungeness and Red rock composite samples. Some sites did not have sufficient number of crabs for one or both species. For example, no Dungeness crabs were collected from Redondo Pier or Seacrest Park Pier. No Red rock crabs were collected from Terminal 86 Pier and insufficient numbers of Red rock crab were collected at Duwamish Head. Sufficient muscle tissue was collected from Shilshole North to form a composite, but there was insufficient tissue to form a hepatopancreas composite.

Whole frozen crabs were sorted into groups—by site and species—and staggered into defrost cycles to standardize the total time out of frozen storage. Samples were held in plastic storage bags at room temperature until hard frozen internal tissues began to soften sufficiently for processing. When necessary, samples were placed in refrigerated storage ( $4^{\circ}\text{C} \pm 2$ ) to slow defrost rates.

Once defrosted, each individual crab was dissected on a decontaminated high density polyethylene cutting board covered in clean aluminum foil. Hepatopancreas tissue was placed directly into previously tared pre-cleaned glass jars with a Teflon® septum.

Following collection of hepatopancreas tissue, muscle tissue for the composite was taken from the body, legs, and the claws. The proximal terminus of the cheliped and legs (where muscle and hepatopancreas tissues are in contact) was rinsed with laboratory reverse osmosis water prior to collection of muscle tissues. This rinse reduced the presence of possible trace quantities of hepatopancreas tissue from being included with muscle samples. Muscle tissue was not collected from walking and swimming leg segments more distal than the merus.

Crab joints and segments were broken using stainless scissors or a glass hammer. Tissue was collected with pre-cleaned stainless tweezers and a spatula, and placed directly into pre-cleaned glass jars with Teflon® septum. All muscle and hepatopancreas tissues were weighed to the nearest hundredth gram and placed into freezer storage ( $-18^{\circ}\text{C} \pm 2$ ) for later homogenization.

### 2.2.1 Homogenization and Compositing of Crab Hepatopancreas and Muscle Tissue

All tissue samples were homogenized inside the glass sample jar utilized for individual tissue sample storage. Due to small sample sizes and delicate tissue structure, hepatopancreas samples were homogenized by hand utilizing chemically clean high density polyethylene spatulas. Muscle tissue samples were homogenized utilizing a 30 × 150 mm slotted 316 stainless steel tissue cutter mounted to a PRO250 homogenizing motor (PRO Scientific Inc.). Muscle tissue samples were homogenized until a smooth even texture was achieved (approximately one minute). After each use, spatulas and tissue cutters were decontaminated.

Immediately following homogenization of individual samples, an aliquot of tissue was weighed out (nearest 0.1 gram) and placed into the composite sample jar. This process was repeated for all individual tissue samples that comprised each composite sample. Homogenization equipment was decontaminated between samples to prevent cross contamination of individual samples. After homogenization and combining individual tissue aliquots into the composite, the whole composite sample was then homogenized and returned to frozen storage until analysis. Any remaining tissue (>1 gram) was archived for potential later use. All processes utilized chemically clean laboratory equipment and standard operating procedures sufficient to ensure that individual and composite tissue samples were not cross contaminated.

To the extent possible, equal amounts of muscle or hepatopancreas tissue were removed from each individual crab homogenate to form the composite samples. This was done to ensure that an individual crab did not bias the results of the composite sample. For each Dungeness crab, 75 grams of muscle tissue was used. In some cases, Red rock crabs were not equally represented within composite muscle samples; however, in general 75 grams of muscle tissue per individual crab was targeted. Due to high variability and lower average tissue mass collected, equal representation by individual crab within the composite hepatopancreas samples was infrequently achieved. Hepatopancreas tissue from Dungeness and Red rock crab averaged 21.9 and 14.1 grams per crab, respectively.

Table 5 lists the composite sample ID and matches it with the sampling location, species, and tissue type/ organ. More detailed information on crab muscle and hepatopancreas composites can be found in Appendix B.

**Table 5. Sample composite IDs by station, species, and tissue type.**

Sampling Location	Composite ID	Species		Tissue Type	
		Dun-geness	Red Rock	Muscle	Hepato-pancreas
Shilshole North	L61592-1	X		X	
	L61592-2	X		X	
	L61592-3	X		X	
	L61592-17		X	X	
	L61593-4	X			X
	L61593-5	X			X
Shilshole South	L61592-4	X		X	
	L61592-5	X		X	
	L61592-6	X		X	
	L61592-7		X	X	
	L61593-6	X			X
	L61593-7	X			X
	L61593-8		X		X
Terminal 86 Pier	L61592-11	X		X	
	L61592-12	X		X	
	L61592-13	X		X	
	L61592-14	X		X	
	L61592-15	X		X	
	L61593-1	X			X
	L61593-2	X			X
Duwamish Head	L61592-8	X		X	
	L61592-9	X		X	
	L61592-10	X		X	
	L61593-11	X			X
	L61593-12	X			X
Seacrest Park Pier	L61592-16		X	X	
	L61593-3		X		X
Redondo Pier	L61592-18		X	X	
	L61592-19		X	X	
	L61592-20		X	X	
	L61593-9		X		X
	L61593-10		X		X

## 2.3 Laboratory Methods

Laboratory analyses on all crab samples included conventional parameters (lipids and total solids), as well as metals (arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc), mercury, PCB homologs, and PCB Aroclors. All analyses were conducted by KCEL. The following section summarizes the laboratory methods; more detail is presented in the SAP (King County 2014).

### 2.3.1 Conventional Parameters

Total solids were analyzed according to Standard Method 2540-G and followed KCEL Standard Operating Procedure (SOP) # 307v3. Lipid analysis was conducted following KCEL draft SOP # 740v1. Samples for lipid analysis were extracted by the same method as was used for PCBs.

### 2.3.2 Metals and Mercury

Metals were analyzed by inductively coupled plasma mass spectrometer according to KCEL SOP # 624. This method generally follows PSEP (1997) and U.S. Environmental Protection Agency (EPA) 6020A protocols. Tissue samples required acid digestion before analysis.

Total mercury was analyzed according to KCEL SOP # 604 using cold vapor atomic absorption spectrometry. The analysis is reported under PSEP (1997), which retains method elements of EPA 245.1 revision 3, SW-846 7470, and 7471B. Tissue samples require acid digestion before analysis.

### 2.3.3 PCBs

Total PCBs were analyzed by two methods: Aroclors and a low resolution homolog method. PCB Aroclor analysis followed KCEL SOP #757, which is a modification of EPA Method SW846-8082A. Sample preparation is described in SOP# 705. The preparation method used is a modified Soxhlet extraction and 100% methylene chloride as the solvent following EPA Method SW846-3540C.

The PCB homolog method was still under development during preparation of the SAP. Therefore, a summary of the method and the detection limit goals are presented here. The analysis followed KCEL SOP #782. The PCB homolog extraction method was based on EPA Method 1668C using a Soxhlet extraction and 100% methylene chloride as the solvent (KCEL SOP # 705). Two cleanups were also performed: Gel Permeation Chromatography (GPC) (KCEL SOP # 718) followed by an Anthropogenic Isolation Column cleanup (which is also from method EPA 1668C) (KCEL SOP # 783).

The PCB homolog analysis uses EPA method 680 and 1668C as guidelines. PCB homologs are analyzed by a low-resolution method gas chromatograph/mass spectroscopy—selective ion monitoring (GC/MS-SIM) that generates PCB concentrations based upon each of the 9 homolog groups—mono- through nona-chlorobiphenyls (KCEL SOP #782). Qualitative identification of the homolog isomers in the extract is performed using their corresponding retention time windows and the relative abundance of two or more characteristic masses. Quantitative analysis was performed by summing the congeners within each homolog group and comparing their responses to a single isomer of its characteristic mass. The quantitation uses an internal standard method with five or more points for each homolog calibration curve. The method detection limits (MDLs) and reporting detection limits (RDLs) for both muscle and hepatopancreas tissue are shown in Tables 6 and 7 below.

**Table 6. Laboratory detection limit goals for muscle tissue.**

Crab Muscle	MDL µg/Kg	RDL µg/Kg
Monochlorobiphenyls	0.069	0.133
Dichlorobiphenyls	0.069	0.133
Trichlorobiphenyls	0.069	0.133
Tetrachlorobiphenyls	0.069	0.267
Pentachlorobiphenyls	0.12	0.267
Hexachlorobiphenyls	0.15	0.267
Heptachlorobiphenyls	0.13	0.4
Octachlorobiphenyls	0.18	0.4
Nonachlorobiphenyls	0.18	0.4

Note: These values were calculated on a wet weight basis using 15g of sample to 0.5mL final volume with a 5/8 GPC split.

**Table 7. Laboratory detection limit goals for hepatopancreas tissue.**

Crab Hepatopancreas	MDL µg/Kg	RDL µg/Kg
Monochlorobiphenyls	0.21	0.4
Dichlorobiphenyls	0.21	0.4
Trichlorobiphenyls	0.21	0.4
Tetrachlorobiphenyls	0.21	0.8
Pentachlorobiphenyls	0.37	0.8
Hexachlorobiphenyls	0.45	0.8
Heptachlorobiphenyls	0.38	1.2
Octachlorobiphenyls	0.54	1.2
Nonachlorobiphenyls	0.54	1.2

Note: These values were calculated on a wet weight basis using 5 g of sample to 0.5 mL final volume with a 5/8 GPC split.

## 2.4 Deviations from SAP

As previously indicated, an insufficient number of crabs were collected at the Des Moines Marina. As a result the sampling station was moved to the Redondo Pier. The Duwamish Head sampling location was not included in the original SAP, but was added due to insufficient catch at Seacrest Park; both Dungeness and Red rock crab were collected from the Duwamish Head location. These deviations are not expected to alter the outcome of the results or the objectives of the study.

## 3.0 RESULTS AND DISCUSSION

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Dungeness and Red rock crab muscle and hepatopancreas results are presented by species and tissue type. All tissue results are presented as wet weight (ww) concentrations. Sample-specific results and the full data set including lab qualifiers and laboratory quality assurance/quality control (QA/QC) reports are presented in Appendix C and D, respectively.

Chemistry results were compared across species, tissue types, and locations to visually identify any possible trends. Any differences that can be attributed to these characteristics are presented in this section.

Comparison of contaminant concentrations across species was difficult due to several factors. Both species and tissue types were infrequently available for all locations. There were a limited number of Red rock samples, with some locations only having one composite. The Red rock sample size (n=6) was much lower than that for Dungeness crab (n=14). Five of the 14 Dungeness composite muscle samples were collected from Terminal 86 Pier, an urbanized waterfront location, while half of the Red rock crab samples were collected from Redondo Pier, which has fewer anthropogenic upland contaminant sources. However, both species were collected at Shilshole North and South, but at Shilshole North there was an insufficient mass for a Red rock hepatopancreas sample.

Additional detail is provided for arsenic, mercury, and PCB results due to human health concerns associated with accumulation of these contaminants in seafood. However, it is important to note that only concentrations of total metals were analyzed for this study. Levels of inorganic arsenic and methylmercury are of greatest concern for human health.

A comparison of results from this study to data recently collected by WDFW is also presented below in Section 3.4. Arsenic, mercury, and PCB tissue concentrations in Dungeness crab from both studies were compared to fish tissue-equivalent concentrations of human health-based water quality criteria applicable to Washington State to serve as a comparison value. Red rock crab results were not compared due to the small sample size and this species was not included in the WDFW study.

### 3.1 Conventional Parameters

The analytical results for total solids and lipids met all acceptable lab QA/QC limits, including method blank detection and relative percent difference (RPD).

Mean percent total solids in all species and tissue types ranged from 16.4 to 17.1% (Table 8). There was little variation between species or tissue type.



**Table 8. Percent total solids by species and tissue type.**

Species	Tissue Type	Minimum (%)	Maximum (%)	n	Mean (%)
Dungeness	Muscle	14.9	19.7	14	17.1
	Hepatopancreas	13.6	20.9	8	16.4
Red Rock	Muscle	15.1	23.1	6	17.8
	Hepatopancreas	12.9	21.0	4	17.0

Lipid content was much lower in muscle than in the hepatopancreas tissue. Mean percent lipid content in muscle tissue was 0.233% in Red rock crab and 0.461% in Dungeness crab, while lipid content in the hepatopancreas tissue was 6.99% in Red rock crab and 7.76% in Dungeness crab. Lipid content in muscle and hepatopancreas tissue was similar across species (Table 9). These results suggest that lipid content is not likely to significantly influence observed differences in chemical concentrations between species.

**Table 9. Percent lipids by species and tissue type.**

Species	Tissue Type	Minimum (%)	Maximum (%)	n	Mean (%)
Dungeness	Muscle	0.277	0.694	14	0.461
	Hepatopancreas	5.67	11.2	8	7.76
Red Rock	Muscle	0.08	0.605	6	0.233
	Hepatopancreas	2.36	14.1	4	6.99

## 3.2 Metals and Mercury

Analyses for metals and mercury met the data QA/QC objectives with the following exceptions. Percent recoveries for chromium in the standard reference material (SRM) and SRM duplicate were below QC lab limits, indicating a potential low bias to sample results. Based on this, chromium for all samples should be considered an estimated value. Percent recoveries for lead in the SRM duplicate were below QC lab limits, indicating a potential low bias to sample results. Based on these data, lead concentrations for all hepatopancreas samples should be considered an estimated value. Mercury analyses exceeded the 28-day holding time limit; however, because samples were held frozen, this is not expected to result in bias to the results.

Concentrations of arsenic, mercury, and zinc were higher in Dungeness muscle tissue relative to levels in hepatopancreas tissue. The reverse pattern was observed for cadmium, copper, lead, nickel, selenium, and silver where concentrations were higher in Dungeness hepatopancreas tissue than in muscle tissue (Tables 10 and 12). Chromium concentrations were similar in both Dungeness crab tissue types.

Similar to the results observed for Dungeness crab, concentrations of mercury and zinc were higher in Red rock muscle than in hepatopancreas tissue. Concentrations of cadmium, copper, selenium, and silver were also higher in Red rock hepatopancreas tissue than in muscle tissue. Concentrations of arsenic and lead in both Red rock tissue types were similar, while nickel was not frequently detected in Red rock muscle (Tables 11 and 13).

Beryllium and thallium were analyzed but not detected in any tissues above the MDL. Cadmium concentrations were an order of magnitude higher in both Dungeness and Red rock hepatopancreas tissue compared to their respective concentrations in muscle.

All chromium concentrations in Dungeness and Red rock muscle tissue were detected between the MDL and the RDL. Chromium concentrations were similar across sites. All lead concentrations in Dungeness crab were detected between the MDL and the RDL, except for samples from Terminal 86 Pier. Some nickel and selenium results were also detected between the MDL and RDL.

In general, metal concentrations in composite muscle samples from the same locations were lower in Red rock than in Dungeness crab. Further data collection would be necessary to better understand differences between the two species.

**Table 10. Summary statistics for metals and mercury concentrations (mg/kg ww) in Dungeness crab muscle.**

Metal	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Arsenic	Shilshole N	3/3	3.24	5.45	4.18
	Shilshole S	3/3	4.73	6.16	5.54
	Terminal 86 Pier	5/5	4.17	13.4	8.25
	Duwamish Head	3/3	4.07	6.76	5.32
	All Sites	14/14	3.24	13.4	6.17
Cadmium	Shilshole N	3/3	0.0408	0.0574	0.0518
	Shilshole S	3/3	0.0154	0.0414	0.0266
	Terminal 86 Pier	5/5	0.0169	0.0825	0.0447
	Duwamish Head	3/3	0.0385	0.0684	0.0507
	All Sites	14/14	0.0154	0.0825	0.0436
Chromium <sup>b</sup>	Shilshole N	3/3	0.010	0.012	0.011
	Shilshole S	3/3	0.012	0.015	0.014
	Terminal 86 Pier	5/5	0.013	0.016	0.014
	Duwamish Head	3/3	0.014	0.015	0.015
	All Sites	14/14	0.010	0.016	0.014
Copper	Shilshole N	3/3	7.35	8.15	7.77
	Shilshole S	3/3	7.37	9.40	8.72
	Terminal 86 Pier	5/5	7.18	10.0	8.87
	Duwamish Head	3/3	6.11	7.15	6.80
	All Sites	14/14	6.11	10.0	8.16

Metal	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Lead <sup>c</sup>	Shilshole N	3/3	0.0100	0.0140	0.0117
	Shilshole S	3/3	0.0073	0.0150	0.0114
	Terminal 86 Pier	5/5	0.010	0.0373	0.0204
	Duwamish Head	3/3	0.0071	0.0079	0.0074
	All Sites	14/14	0.0071	0.0373	0.0138
Mercury	Shilshole N	3/3	0.0395	0.0569	0.0470
	Shilshole S	3/3	0.0541	0.0961	0.0697
	Terminal 86 Pier	5/5	0.0302	0.127	0.0607
	Duwamish Head	3/3	0.0318	0.0425	0.0365
	All Sites	14/14	0.0302	0.127	0.0545
Nickel <sup>d</sup>	Shilshole N	3/3	0.024	0.053	0.040
	Shilshole S	2/3	<MDL (0.021)	0.023	0.021
	Terminal 86 Pier	4/5	<MDL (0.020)	0.166	0.062
	Duwamish Head	2/3	<MDL (0.021)	0.045	0.032
	All Sites	11/14	<MDL (0.020)	0.166	0.042
Selenium <sup>d</sup>	Shilshole N	3/3	0.33	0.43	0.37
	Shilshole S	3/3	0.35	0.41	0.38
	Terminal 86 Pier	5/5	0.37	0.552	0.440
	Duwamish Head	3/3	0.29	0.39	0.35
	All Sites	14/14	0.29	0.552	0.394
Silver	Shilshole N	3/3	0.0892	0.176	0.127
	Shilshole S	3/3	0.136	0.194	0.174
	Terminal 86 Pier	5/5	0.116	0.371	0.215
	Duwamish Head	3/3	0.140	0.187	0.160
	All Sites	14/14	0.0892	0.371	0.175
Zinc	Shilshole N	3/3	32.1	37.9	34.3
	Shilshole S	3/3	37.6	43.8	40.2
	Terminal 86 Pier	5/5	35.4	39.8	37.2
	Duwamish Head	3/3	34.9	43.6	38.4
	All Sites	14/14	32.1	43.8	37.5

<MDL = Not detected at MDL (MDL in parentheses)

<sup>a</sup> = Mean concentrations calculated with detected concentrations and MDL for non-detect results.

<sup>b</sup> = All reported concentrations were between the MDL and RDL are estimated due to QA/QC issues.

<sup>c</sup> = All reported concentrations, except two samples from Terminal 86 Pier, were between the MDL and RDL.

<sup>d</sup> = All detected concentrations, except one sample from Terminal 86 Pier, were between the MDL and RDL.

FOD = frequency of detection

**Table 11. Summary statistics for metals and mercury concentrations (mg/kg ww) in Red rock crab muscle.**

<b>Metal</b>	<b>Sampling Location</b>	<b>FOD</b>	<b>Min</b>	<b>Max</b>	<b>Mean<sup>a</sup></b>
Arsenic	Shilshole N	1/1	n/a	2.22	n/a
	Shilshole S	1/1	n/a	3.88	n/a
	Seacrest Park Pier	1/1	n/a	2.59	n/a
	Redondo Pier	3/3	2.41	3.20	2.71
	All Sites	6/6	2.22	3.88	2.80
Cadmium	Shilshole N	1/1	n/a	0.108	n/a
	Shilshole S	1/1	n/a	0.267	n/a
	Seacrest Park Pier	1/1	n/a	0.271	n/a
	Redondo Pier	3/3	0.425	0.593	0.508
	All Sites	6/6	0.108	0.593	0.362
Chromium	Shilshole N	1/1	n/a	0.022	n/a
	Shilshole S	1/1	n/a	0.018	n/a
	Seacrest Park Pier	1/1	n/a	0.011	n/a
	Redondo Pier	3/3	0.012	0.020	0.015
	All Sites	6/6	0.011	0.022	0.016
Copper	Shilshole N	1/1	n/a	12.4	n/a
	Shilshole S	1/1	n/a	7.73	n/a
	Seacrest Park Pier	1/1	n/a	5.76	n/a
	Redondo Pier	3/3	4.42	7.81	6.18
	All Sites	6/6	4.42	12.4	7.40
Lead	Shilshole N	1/1	n/a	0.0130	n/a
	Shilshole S	1/1	n/a	0.0303	n/a
	Seacrest Park Pier	1/1	n/a	0.0217	n/a
	Redondo Pier	3/3	0.0068	0.0160	0.0104
	All Sites	6/6	0.0068	0.0303	0.0161
Mercury	Shilshole N	1/1	n/a	0.0337	n/a
	Shilshole S	1/1	n/a	0.0321	n/a
	Seacrest Park Pier	1/1	n/a	0.0179	n/a
	Redondo Pier	3/3	0.0160	0.0251	0.0216
	All Sites	6/6	0.0160	0.0337	0.0248

Metal	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Nickel	Shilshole N	1/1	n/a	0.030	n/a
	Shilshole S	0/1	<MDL (0.021)	n/a	n/a
	Seacrest Park Pier	0/1	<MDL (0.020)	n/a	n/a
	Redondo Pier	0/3	<MDL (0.020)	n/a	n/a
	All Sites	1/6	<MDL (0.020)	0.030	n/a
Selenium <sup>b</sup>	Shilshole N	1/1	n/a	0.51	n/a
	Shilshole S	1/1	n/a	0.531	n/a
	Seacrest Park Pier	1/1	n/a	0.42	n/a
	Redondo Pier	3/3	0.39	0.40	0.40
	All Sites	6/6	0.39	0.531	0.44
Silver	Shilshole N	1/1	n/a	0.103	n/a
	Shilshole S	1/1	n/a	0.0533	n/a
	Seacrest Park Pier	1/1	n/a	0.0646	n/a
	Redondo Pier	3/3	0.0750	0.0864	0.0796
	All Sites	6/6	0.0533	0.103	0.0766
Zinc	Shilshole N	1/1	n/a	76.5	n/a
	Shilshole S	1/1	n/a	48.8	n/a
	Seacrest Park Pier	1/1	n/a	38.0	n/a
	Redondo Pier	3/3	57.8	68.4	62.3
	All Sites	6/6	38.0	76.5	58.4

<MDL = Not detected at MDL (MDL in parentheses)

<sup>a</sup> = Mean concentrations calculated with detected concentrations and MDL for non-detect results.

<sup>b</sup> = All concentrations were between the MDL and RDL, except one sample from Shilshole South.

n/a = Not applicable, usually due to insufficient sample size for calculations

FOD = frequency of detection

**Table 12. Summary statistics for metals and mercury concentrations (mg/kg ww) in Dungeness crab hepatopancreas.**

Metal	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Arsenic	Shilshole N	2/2	3.32	3.92	3.62
	Shilshole S	2/2	4.24	4.49	4.37
	Terminal 86 Pier	2/2	3.45	4.16	3.81
	Duwamish Head	2/2	2.86	4.38	3.62
	All Sites	8/8	2.86	4.49	3.85

<b>Metal</b>	<b>Sampling Location</b>	<b>FOD</b>	<b>Min</b>	<b>Max</b>	<b>Mean<sup>a</sup></b>
Cadmium	Shilshole N	2/2	1.07	1.24	1.16
	Shilshole S	2/2	0.520	0.689	0.605
	Terminal 86 Pier	2/2	1.37	1.80	1.59
	Duwamish Head	2/2	0.959	1.87	1.42
	All Sites	8/8	0.520	1.87	1.19
Chromium <sup>b</sup>	Shilshole N	2/2	0.035	0.051	0.043
	Shilshole S	2/2	0.025	0.032	0.029
	Terminal 86 Pier	2/2	0.040	0.050	0.045
	Duwamish Head	2/2	0.027	0.032	0.030
	All Sites	8/8	0.025	0.051	0.037
Copper	Shilshole N	2/2	15.2	43.1	29.2
	Shilshole S	2/2	29.8	31.1	30.5
	Terminal 86 Pier	2/2	19.8	21.2	20.5
	Duwamish Head	2/2	4.41	5.62	5.02
	All Sites	8/8	4.41	43.1	21.3
Lead	Shilshole N	2/2	0.0682	0.0986	0.0834
	Shilshole S	2/2	0.0748	0.0869	0.0809
	Terminal 86 Pier	2/2	0.0716	0.126	0.0988
	Duwamish Head	2/2	0.0712	0.0998	0.0855
	All Sites	8/8	0.0682	0.126	0.0871
Mercury	Shilshole N	2/2	0.0280	0.0394	0.0337
	Shilshole S	2/2	0.0326	0.0476	0.0401
	Terminal 86 Pier	2/2	0.0352	0.0478	0.0415
	Duwamish Head	2/2	0.0182	0.0275	0.0229
	All Sites	8/8	0.0182	0.0478	0.0345
Nickel	Shilshole N	2/2	0.244	0.288	0.266
	Shilshole S	2/2	0.109	0.151	0.130
	Terminal 86 Pier	2/2	0.684	1.05	0.867
	Duwamish Head	2/2	0.205	0.279	0.242
	All Sites	8/8	0.109	1.05	0.376

Metal	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Selenium	Shilshole N	2/2	1.02	1.07	1.05
	Shilshole S	2/2	0.817	1.04	0.929
	Terminal 86 Pier	2/2	0.931	1.15	1.04
	Duwamish Head	2/2	0.789	0.925	0.857
	All Sites	8/8	0.789	1.150	0.968
Silver	Shilshole N	2/2	0.238	0.789	0.514
	Shilshole S	2/2	0.569	0.892	0.731
	Terminal 86 Pier	2/2	0.726	1.00	0.863
	Duwamish Head	2/2	0.211	0.284	0.248
	All Sites	8/8	0.211	1.00	0.589
Zinc	Shilshole N	2/2	17.8	22.2	20.0
	Shilshole S	2/2	12.6	16.6	14.6
	Terminal 86 Pier	2/2	16.9	22.8	19.9
	Duwamish Head	2/2	12.8	16.5	14.7
	All Sites	8/8	12.6	22.8	17.3

<sup>a</sup> = Mean concentrations calculated with detected concentrations and MDL for non-detect results.

<sup>b</sup> = All reported concentrations were between the MDL and RDL. All are estimated due to QA/QC.

n/a = Not applicable, usually due to insufficient sample size for calculations

FOD = frequency of detection

**Table 13. Summary statistics for metals and mercury concentrations (mg/kg ww) in Red rock crab hepatopancreas.**

Metal	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Arsenic	Shilshole S	1/1	n/a	3.47	n/a
	Seacrest Park Pier	1/1	n/a	3.66	n/a
	Redondo Pier	2/2	2.54	2.69	2.62
	All Sites	4/4	2.54	3.66	3.09
Cadmium	Shilshole S	1/1	n/a	10.7	n/a
	Seacrest Park Pier	1/1	n/a	4.41	n/a
	Redondo Pier	2/2	7.36	7.40	7.38
	All Sites	4/4	4.41	10.7	7.47
Chromium <sup>b</sup>	Shilshole S	1/1	n/a	0.035	n/a
	Seacrest Park Pier	1/1	n/a	0.024	n/a
	Redondo Pier	0/2	<MDL (0.020)	n/a	n/a
	All Sites	2/4	<MDL (0.020)	0.035	0.025

<b>Metal</b>	<b>Sampling Location</b>	<b>FOD</b>	<b>Min</b>	<b>Max</b>	<b>Mean<sup>a</sup></b>
Copper	Shilshole S	1/1	n/a	41.3	n/a
	Seacrest Park Pier	1/1	n/a	8.10	n/a
	Redondo Pier	2/2	6.98	7.12	7.05
	All Sites	4/4	6.98	41.3	15.9
Lead	Shilshole S	1/1	n/a	0.050	n/a
	Seacrest Park Pier	1/1	n/a	0.124	n/a
	Redondo Pier	2/2	0.013	0.016	0.015
	All Sites	4/4	0.013	0.124	0.051
Mercury <sup>c</sup>	Shilshole S	1/1	n/a	0.0308	n/a
	Seacrest Park Pier	1/1	n/a	0.012	n/a
	Redondo Pier	2/2	0.010	0.012	0.011
	All Sites	4/4	0.010	0.0308	0.0162
Nickel	Shilshole S	1/1	n/a	0.105	n/a
	Seacrest Park Pier	1/1	n/a	0.110	n/a
	Redondo Pier	2/2	0.0599	0.0632	0.0616
	All Sites	4/4	0.0599	0.110	0.0845
Selenium	Shilshole S	1/1	n/a	1.09	n/a
	Seacrest Park Pier	1/1	n/a	0.953	n/a
	Redondo Pier	2/2	0.831	0.905	0.868
	All Sites	4/4	0.831	1.09	0.945
Silver	Shilshole S	1/1	n/a	0.564	n/a
	Seacrest Park Pier	1/1	n/a	0.0995	n/a
	Redondo Pier	2/2	0.171	0.186	0.179
	All Sites	4/4	0.0995	0.564	0.255
Zinc	Shilshole S	1/1	n/a	29.2	n/a
	Seacrest Park Pier	1/1	n/a	30.2	n/a
	Redondo Pier	2/2	22.1	22.4	22.3
	All Sites	4/4	22.1	30.2	26.0

<MDL = Not detected at MDL (MDL in parentheses)

<sup>a</sup> = Mean concentrations calculated with detected concentrations and MDL for non-detect results.

<sup>b</sup> = All reported concentrations were between the MDL and RDL. All are estimated due to QA/QC issues.

<sup>c</sup> = Concentrations in one Seacrest Park Pier sample and both Redondo Pier samples were detected between the MDL and RDL.

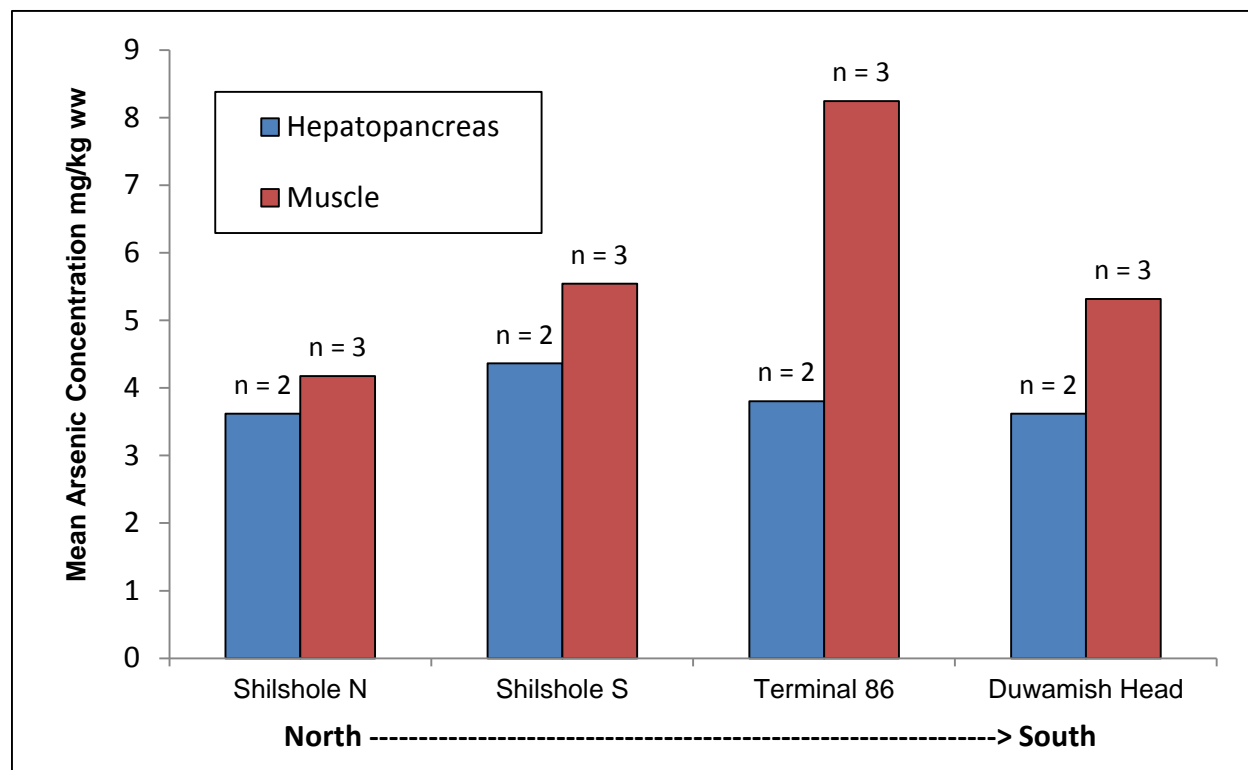
n/a = Not applicable, usually due to insufficient sample size for calculations.

FOD = frequency of detection



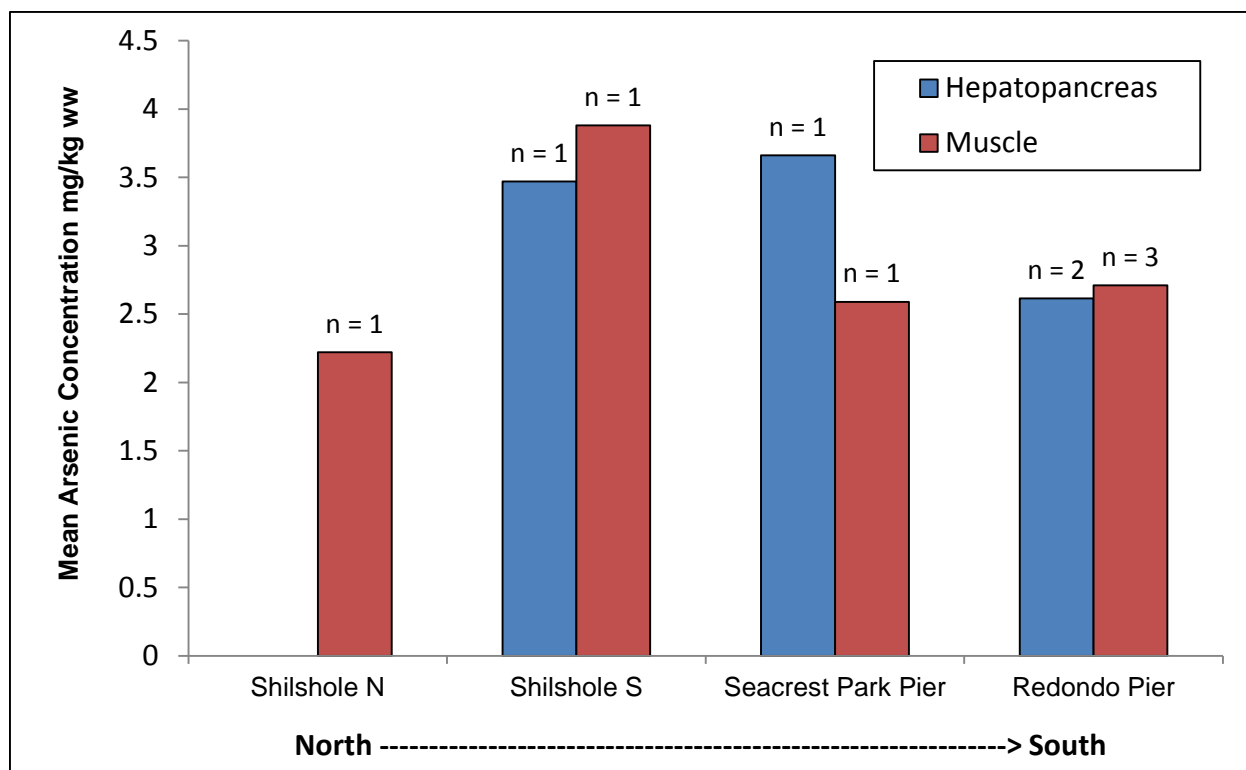
### 3.2.1 Arsenic

The highest mean arsenic concentration (8.25 mg/kg ww) was detected in Dungeness muscle collected from Terminal 86 Pier; mean concentrations were similar at the remaining sites (Figure 3). Arsenic concentrations in Dungeness crab hepatopancreas were similar across sampling locations. Muscle tissue concentrations were consistently higher than those in hepatopancreas tissue.



**Figure 3. Mean Total Arsenic Concentrations in Dungeness Crab Tissue**

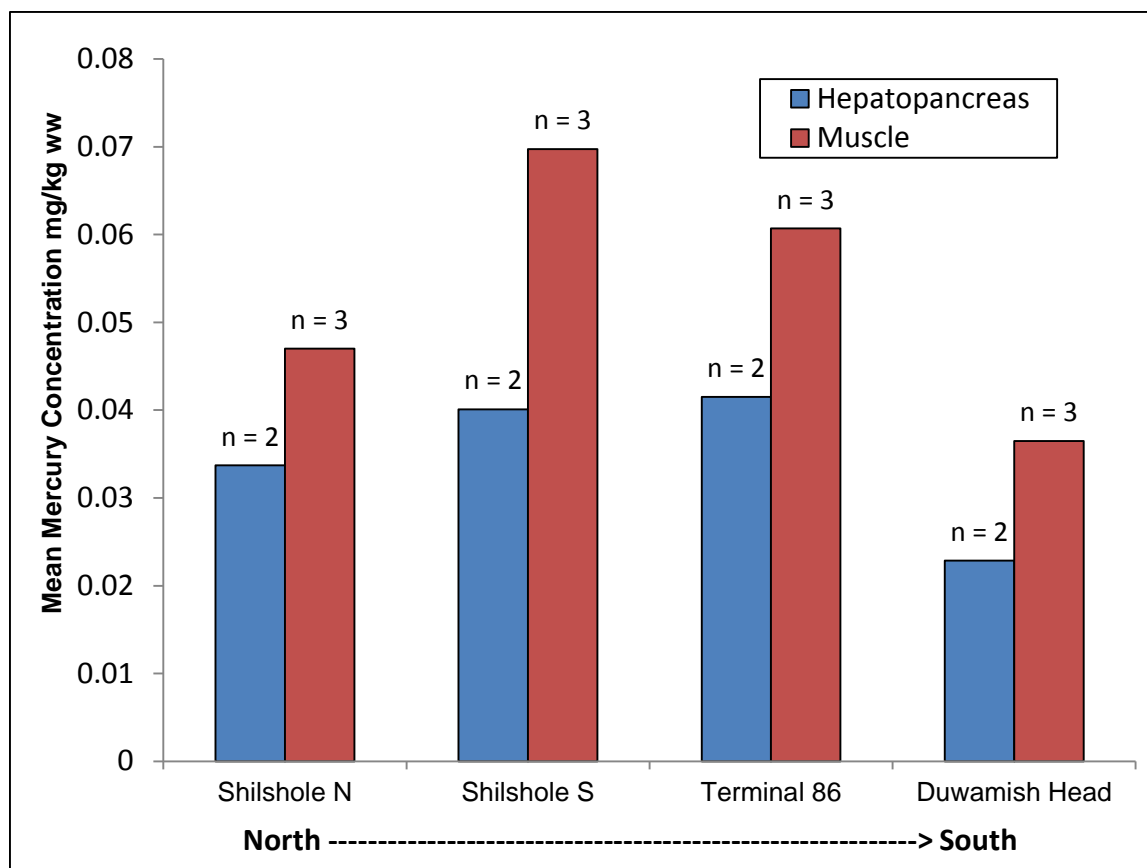
Unlike results for Dungeness crab, mean arsenic concentrations in both Red rock muscle and hepatopancreas tissues were similar across all sampling locations (Figure 4). However, these observations are based on a very small sample size of Red rock crab from each station.



**Figure 4. Mean Total Arsenic Concentrations in Red Rock Crab Tissue**

### 3.2.2 Mercury

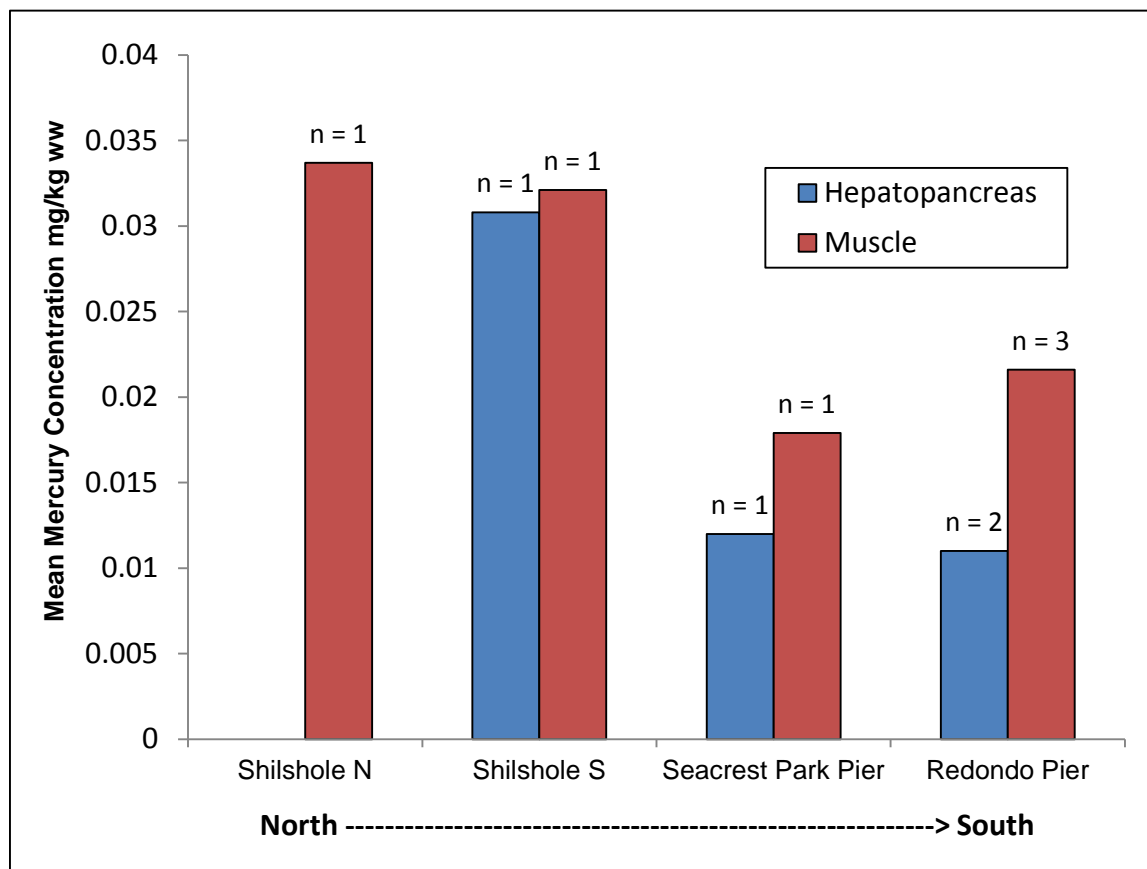
Although mean mercury concentrations in Dungeness muscle tissue were highest in the Shilshole South samples, levels were generally similar across sites (Figure 5). Mean mercury concentrations in Dungeness hepatopancreas tissue were also similar across sites. Mean mercury concentrations were higher in Dungeness crab muscle than in hepatopancreas tissue.



**Figure 5. Mean Total Mercury Concentrations in Dungeness Crab Tissue**

The highest mean mercury concentrations in Red rock crab muscle tissue samples were detected in samples from the Shilshole North and South sites (Figure 6). The highest mean mercury concentration in Red rock hepatopancreas tissue was also detected in samples from Shilshole South.<sup>2</sup> As was observed for Dungeness crab, mercury concentrations were higher in muscle tissue than in the hepatopancreas.

<sup>2</sup> Due to insufficient hepatopancreas tissue mass, mercury was not measured in samples from Shilshole North.



**Figure 6. Mean Total Mercury Concentrations in Red Rock Crab Tissue**

### 3.3 PCBs

Both PCB Aroclors and homologs were frequently detected in all tissue types except Red rock crab muscle. In most cases where Aroclors were not detected, homologs were detected due to the difference in method detection sensitivities. Total PCB concentrations for each sample were calculated for both methods independently; totals are based on the sum of detected Aroclors or homologs.

PCB analyses met all data QA/QC objectives, except lab duplicates for two homolog groups. Results for the octochlorobiphenyl homolog lab duplicate exceeded the laboratory RPD limit of 35%, indicating an unknown bias for all hepatopancreas samples. The nonachlorobiphenyl homolog lab duplicate exceeded the laboratory RPD limit of 35%, indicating an unknown bias for all muscle and hepatopancreas concentrations. Based on these data, octochlorobiphenyls and nonachlorobiphenyls concentrations in these samples should be considered estimated values.

PCB Aroclors were detected in 12 of 14 Dungeness crab muscle samples, while PCB homologs were detected in all Dungeness muscle samples (Table 14). Total PCB concentrations (based on homologs) ranged from 2.86 to 64.5  $\mu\text{g/kg ww}$  in Dungeness crab

muscle, with the highest concentration detected at Terminal 86 Pier. In contrast, PCB Aroclors were not detected in Red rock muscle samples, while homologs were detected in four of six samples. Total PCB concentrations (based on homologs) in Red rock crab ranged from less than MDL (0.18 µg/kg ww) to 3.70 µg/kg ww (Table 15).

PCBs (both Aroclors and homologs) were detected in all Dungeness crab hepatopancreas samples (Table 16). Total PCBs (based on homologs) ranged from 141 to 1308 µg/kg ww, with the highest levels detected at Terminal 86 Pier. Duwamish Head had the lowest total PCB concentrations (both Aroclors and homologs).

PCB Aroclors and homologs were detected in all Red rock crab hepatopancreas samples (Table 17). Total PCBs (based on homologs) ranged from 26.6 to 394 µg/kg ww, with the highest levels detected at the Seacrest Park Pier.

Total PCB concentrations in hepatopancreas tissue for both species were higher than levels detected in muscle tissue. This is likely influenced by the higher lipid content in the hepatopancreas (Table 9), and the lipophilicity of PCBs. Also, the hepatopancreas serves as a detoxification organ for these crab species.

Based on limited data, PCB concentrations in Red rock muscle and hepatopancreas tissue were lower than levels detected in Dungeness muscle and hepatopancreas tissue from the same location. Across all sites, mean total PCB concentrations in Red rock crab muscle tissue were lower than those in Dungeness crab. Total PCBs (based on homologs) in Red rock muscle averaged 1.34 µg/kg ww compared to 17.7 µg/kg ww in Dungeness crab muscle (Tables 14 and 15). A similar pattern was observed in hepatopancreas tissue. Total PCBs (based on homologs) in Red rock hepatopancreas averaged 145 µg/kg ww compared to 504 µg/kg ww in Dungeness hepatopancreas.

PCB concentrations were lipid-normalized to determine if lipid content had an influence on data interpretation. Results were lipid-normalized by dividing wet weight concentration by percent lipid content (µg/kg-lipid). However, lipid-normalized results are not presented because with the exception of one location, these results had minimal impact on interpreting differences between sites. Lipid-normalized Red rock muscle and hepatopancreas PCB results had the highest concentrations in Shilshole South rather than Seacrest Park Pier.

The concentration differences between species may have been influenced by location. In general, Red rock crabs were collected from locations further removed from known PCB sources, such as inner Elliott Bay and the Duwamish Waterway.

**Table 14. Summary statistics for Total PCB concentrations ( $\mu\text{g/kg ww}$ ) in Dungeness crab muscle.**

Total PCBs	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Aroclors	Shilshole N	2/3	<MDL (12.0)	13.5	12.3
	Shilshole S	3/3	9.8	16.9	13.6
	Terminal 86 Pier	5/5	13.2	62.1	31.6
	Duwamish Head	2/3	<MDL (12.0)	5.3	7.2 <sup>b</sup>
	All Sites	12/14	<MDL (12.0)	62.1	18.4 <sup>b</sup>
Homologs	Shilshole N	3/3	3.34	14.4	8.58
	Shilshole S	3/3	7.68	17.8	13.2
	Terminal 86 Pier	5/5	11.7	64.5	32.9
	Duwamish Head	3/3	2.86	7.83	5.85
	All Sites	14/14	2.86	64.5	17.7

<sup>a</sup> = Mean concentrations calculated with detected concentrations and MDL for non-detect results.

<sup>b</sup> = One sample with an Aroclor detection limit of 12.0  $\mu\text{g/kg}$  is biasing the mean for Duwamish Head sampling location. The mean for Duwamish Head of just the two detected values would be 4.80  $\mu\text{g/kg ww}$ .

FOD = frequency of detection

**Table 15. Summary statistics for Total PCB concentrations ( $\mu\text{g/kg ww}$ ) in Red rock crab muscle.**

Total PCBs	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Aroclors	Shilshole N	0/1	<MDL (12.0)	n/a	n/a
	Shilshole S	0/1	<MDL (12.0)	n/a	n/a
	Seacrest Park Pier	0/1	<MDL (12.0)	n/a	n/a
	Redondo Pier	0/3	<MDL (12.0)	n/a	n/a
	All Sites	0/6	<MDL (12.0)	n/a	n/a
Homologs	Shilshole N	1/1	n/a	0.741	n/a
	Shilshole S	1/1	n/a	3.12	n/a
	Seacrest Park Pier	1/1	n/a	3.70	n/a
	Redondo Pier	1/3	<MDL (0.18)	0.15	n/a
	All Sites	4/6	<MDL (0.18)	3.70	1.34

<sup>a</sup> = Mean concentrations calculated with detected concentrations and MDL for non-detect results.

FOD = frequency of detection

**Table 16. Summary statistics for Total PCB concentrations ( $\mu\text{g/kg ww}$ ) in Dungeness crab hepatopancreas.**

Total PCBs	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Aroclors	Shilshole N	2/2	275	426	351
	Shilshole S	2/2	400	595	498
	Terminal 86 Pier	2/2	600	1291	946
	Duwamish Head	2/2	144	193	169
	All Sites	8/8	144	1291	491
Homologs	Shilshole N	2/2	325	418	371
	Shilshole S	2/2	384	688	536
	Terminal 86 Pier	2/2	578	1308	943
	Duwamish Head	2/2	141	191	166
	All Sites	8/8	141	1308	504

<sup>a</sup> = Mean concentrations calculated with detected concentrations and MDL for non-detect results.  
FOD = frequency of detection

**Table 17. Summary statistics for Total PCB concentrations ( $\mu\text{g/kg ww}$ ) in Red rock crab hepatopancreas.**

Total PCBs	Sampling Location	FOD	Min	Max	Mean <sup>a</sup>
Aroclors	Shilshole S	1/1	n/a	99.1	n/a
	Seacrest Park Pier	1/1	n/a	409	n/a
	Redondo Pier	2/2	26.6	57.1	41.9
	All Sites	4/4	26.6	409	148
Homologs	Shilshole S	1/1	n/a	106	n/a
	Seacrest Park Pier	1/1	n/a	394	n/a
	Redondo Pier	2/2	26.6	54.3	40.5
	All Sites	4/4	26.6	394	145

<sup>a</sup> = Mean concentrations calculated with detected concentrations and MDL for non-detect results.  
FOD = frequency of detection

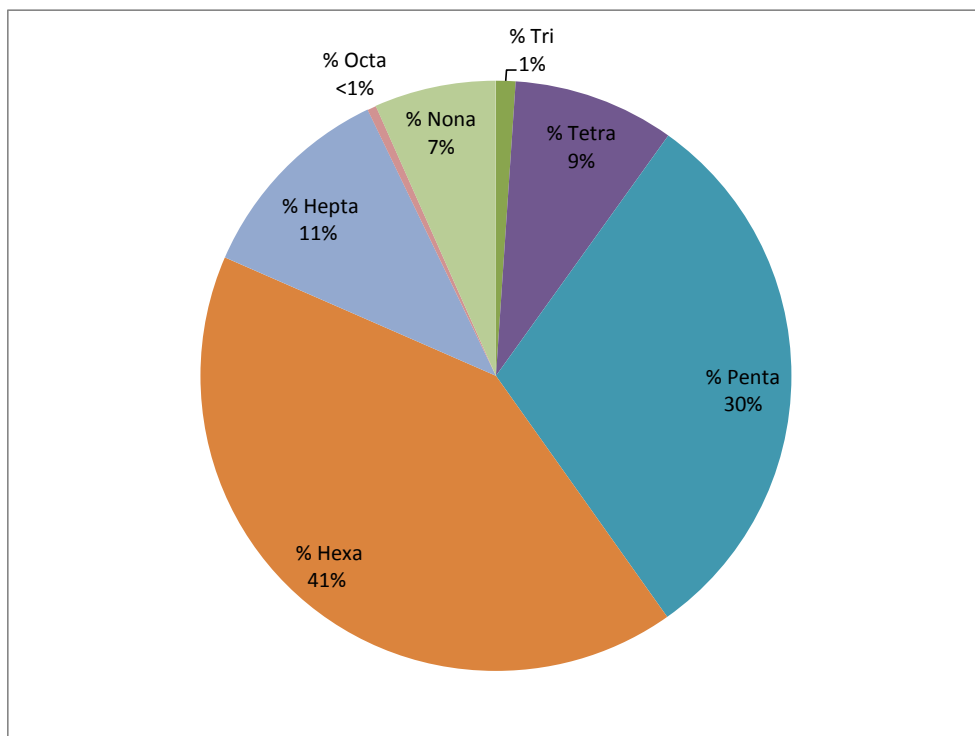
### 3.3.1 Homolog Patterns

The composition of PCB homologs was similar between Dungeness and Red rock muscle and hepatopancreas tissue. Concentrations in both tissue types were dominated by penta- and hexachlorobiphenyls. Dungeness crab muscle tissues, on average, were composed of 41% hexachlorobiphenyls, 30% pentachlorobiphenyls, and the remaining 29% were largely hepta-, tetra- and nonachlorobiphenyls (Figure 7). Neither mono- nor dichlorobiphenyl homologs were detected in Dungeness muscle tissue.

Red rock crab muscle tissue exhibited a slightly different homolog pattern. On average, concentrations were dominated by hexachlorobiphenyls at 58%, pentachlorobiphenyls at 21%, and the remaining 21% comprised of tetra-, hepta- and trichlorobiphenyls (Figure 8). One Red rock muscle sample was excluded from this analysis because the homolog pattern was remarkably different from the other samples analyzed. This one sample had non-detects for all homologs (MDLs ranging from 0.069 to 0.18 µg/kg ww) except for nonachlorobiphenyls. Nonachlorobiphenyls in this sample were detected just above the MDL and considered an estimated value. As noted earlier, the laboratory duplicate associated with this sample exceeded the RPD QA/QC limit for nonachlorobiphenyls. Inclusion of this sample in the homolog pattern analysis would have resulted in a 25% contribution by nonachlorobiphenyls.

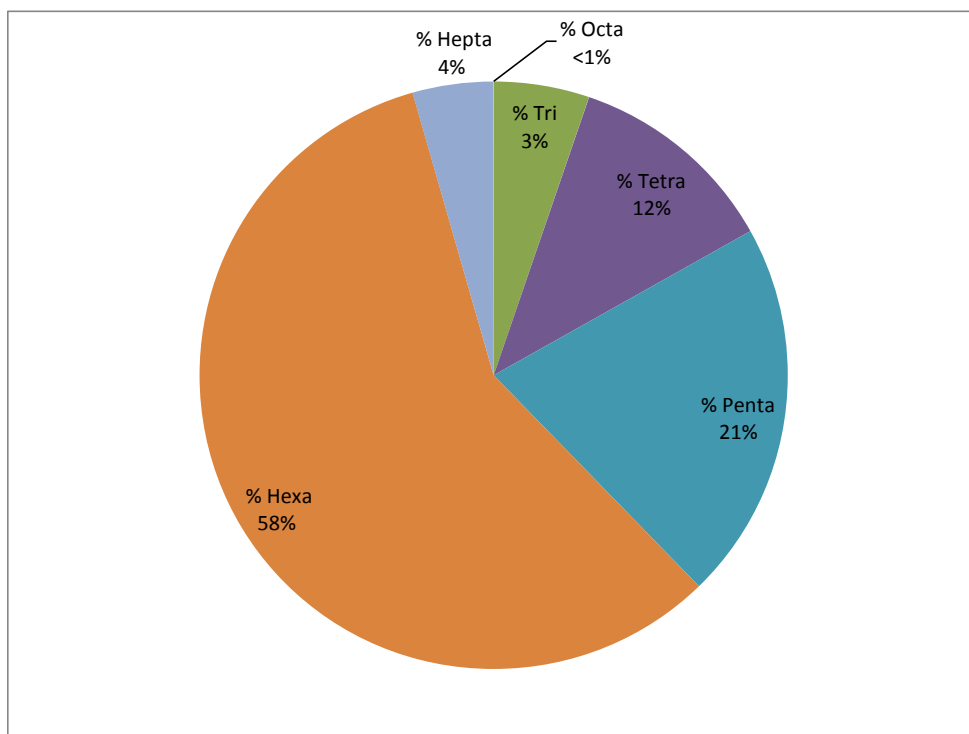
Relative to Dungeness muscle samples, homolog patterns for individual Red rock muscle samples were more variable. The greater variability is likely caused by low sample number and more non-detects relative to the Dungeness muscle samples. Additional samples would allow a more thorough comparison of PCB homolog composition between the two species.

The PCB homolog pattern in both Dungeness and Red rock crab hepatopancreas tissue was similar across all sampling locations and species. When all hepatopancreas data are combined, the homolog pattern was dominated by hexachlorobiphenyls (41%), followed by pentachlorobiphenyls (31%) and heptachlorobiphenyls (14%) (Figure 9). Mono- and dichlorobiphenyls were not detected in hepatopancreas tissue. This pattern was also similar to that observed for Dungeness crab muscle tissue.



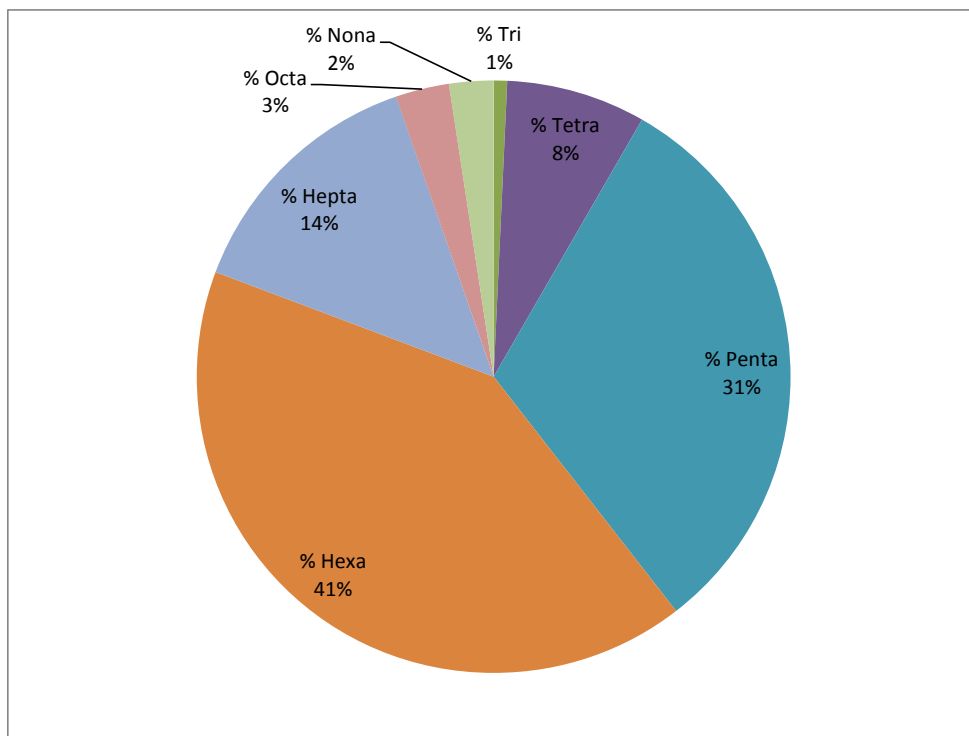
**Figure 7. PCB Homolog Composition in Dungeness Crab Muscle Tissue, based on mean of detected concentrations (N=14)**





\* = One sample excluded due to inconsistent homolog pattern (see Section 3.3.1 for details)

**Figure 8. PCB Homolog Composition in Red Rock Crab Muscle Tissue, based on mean of detected concentrations (N=5\*)**



**Figure 9. PCB Homolog Composition in Dungeness and Red Rock Hepatopancreas, based on mean of detected concentrations (N=12)**

### 3.3.2 Comparison of Total PCBs by Aroclor and Homolog Methods

In general, total PCBs concentrations based on both Aroclor and homolog analytical methods were similar when compared on an individual sample basis (Figures 10, 11, and 12)<sup>3</sup>. The homolog analysis consistently detected PCBs at lower concentrations than provided by the Aroclor analysis. RPDs were calculated for each sample to compare total PCBs by the two methods. The RPDs in muscle were higher on average than those found in hepatopancreas tissues (Table 18). RPDs for all but three samples (all species and tissue types<sup>4</sup>) were below the acceptable QA/QC precision limit for lab duplicates (RPD < 35%). This suggests the two analytical methods performed similarly for quantifying total PCBs in these tissues.

**Table 18. RPDs between Aroclor and homolog total PCB concentrations.**

Sampling Location	Species & Tissue Type	n	Composite ID	Total PCBs (µg/kg ww)		Absolute RPD
				Homologs	Aroclors	
Shilshole N	Dungeness Muscle	2	L61592-1 L61592-2 L61592-3	8.00	11.5	35.9
				14.4	13.5	6.4
				3.34	<MDL (12.0)	n/c <sup>1</sup>
	Red Rock Muscle	0	L61592-17	0.741	<MDL (12.0)	n/c <sup>1</sup>
	Dungeness Hepatopancreas	2	L61593-4 L61593-5	418	426	2.1
				325	275	16.8
Shilshole S	Dungeness Muscle	3	L61592-4 L61592-5 L61592-6	14.0	14.2	1.3
				17.8	16.9	5.1
				7.68	9.80	24.2
	Red Rock Muscle	0	L61592-7	3.12	<MDL (12.0)	n/c <sup>1</sup>
	Dungeness Hepatopancreas	2	L61593-6 L61593-7	688	595	14.6
				384	400	4.2
Terminal 86 Pier	Dungeness Muscle	5	L61592-11 L61592-12 L61592-13 L61592-14 L61592-15	17.7	17.6	0.6
				22.1	24.0	8.1
				64.5	62.1	3.7
				11.7	13.2	11.8
				48.6	40.9	17.2
	Dungeness Hepatopancreas	2	L61593-1 L61593-2	578	600	3.7
				1308	1291	1.3

<sup>3</sup> A figure was not included for Red rock muscle results because no Aroclors were detected in these samples.

<sup>4</sup> RPDs not calculated when total PCBs were < MDL by either method.

Sampling Location	Species & Tissue Type	n	Composite ID	Total PCBs (µg/kg ww)		Absolute RPD
				Homologs	Aroclors	
Duwamish Head	Dungeness Muscle	2	L61592-8	7.83	5.30	38.4
			L61592-9	2.86	<MDL (12.0)	n/c <sup>1</sup>
			L61592-10	6.87	4.30	45.9
	Dungeness Hepatopancreas	2	L61593-11	141	144	2.2
			L61593-12	191	193	1.0
Seacrest Park Pier	Red Rock Muscle	0	L61592-16	3.70	<MDL (12.0)	n/c <sup>1</sup>
	Red Rock Hepatopancreas	1	L61593-3	394	409	3.7
Redondo Pier	Red Rock Muscle	0	L61592-18 L61592-19 L61592-20	0.15	<MDL (12.0)	n/c <sup>1</sup>
				<MDL (0.18)		n/c <sup>1</sup>
				<MDL (0.18)		n/c <sup>1</sup>
	Red Rock Hepatopancreas	2	L61593-9 L61593-10	26.6	26.6	0.0
				54.3	57.1	5.0
All Sites	Dungeness Muscle	12	Average <sup>2</sup>	17.7	18.3	16.6 ± 15.8
All Sites	Red Rock Muscle	0	Average <sup>3</sup>	1.34	<MDL (12.0)	n/c <sup>3</sup>
All Sites	Dungeness Hepatopancreas	8	Average <sup>2</sup>	504	491	5.7 ± 6.3
All Sites	Red Rock Hepatopancreas	4	Average <sup>2</sup>	145	148	3.9 ± 2.9

n = sample count; RPD = relative percent difference; n/c = not calculated

<sup>1</sup> RPD values would be skewed if calculated by comparing the Aroclor MDL to a lower detected homolog concentration.

<sup>2</sup> Average RPD excluded samples with Aroclor non-detects to avoid a biased value.

<sup>3</sup> No average RPD calculated because all Aroclors were below the MDL.

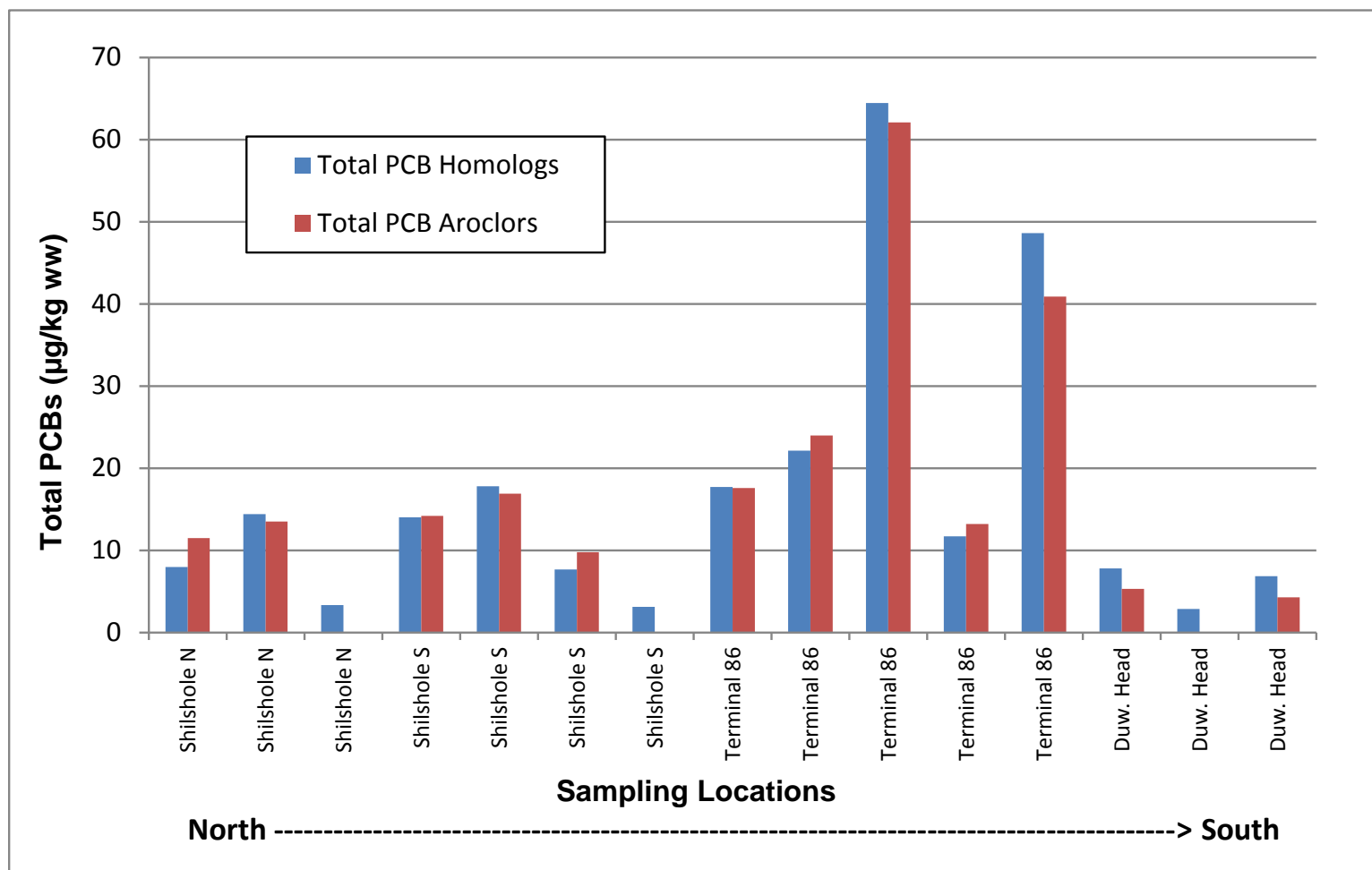


Figure 10. Comparison of Total PCB concentrations by Homolog and Aroclor Methods in Dungeness Crab Muscle Samples

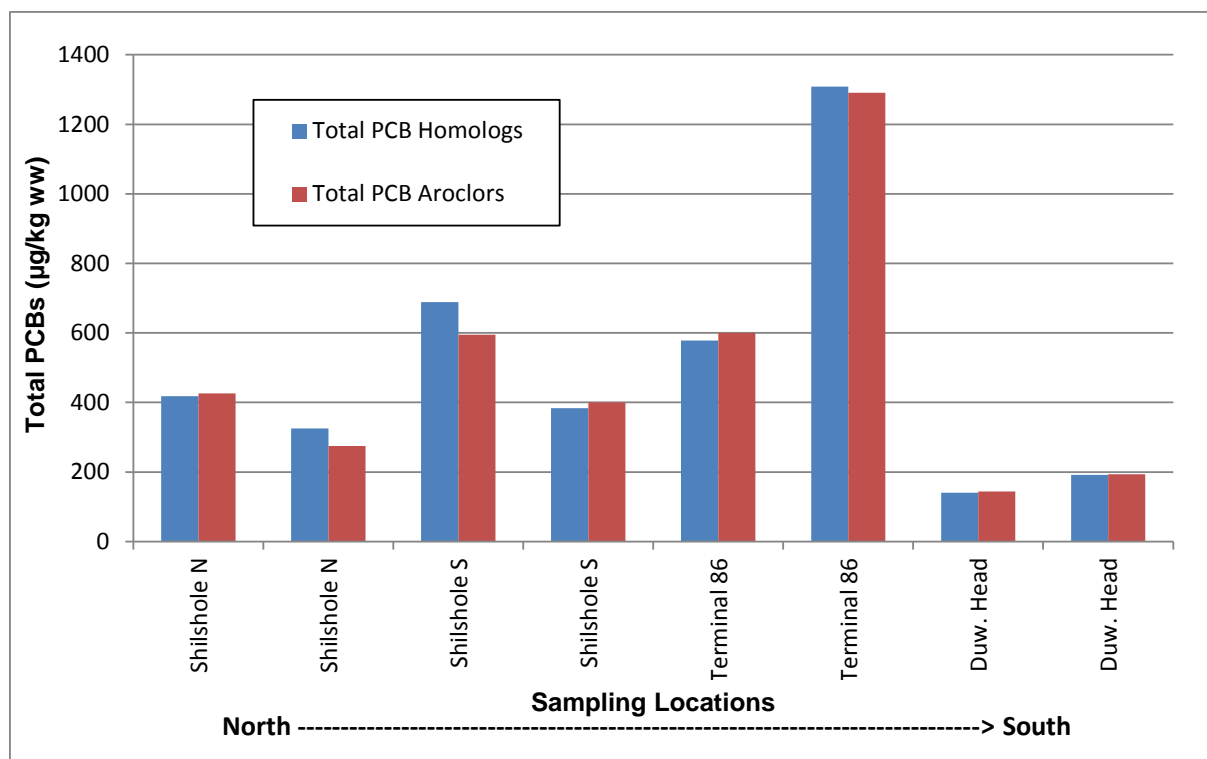


Figure 11. Comparison of Total PCB Concentrations by Homolog and Aroclor Methods in Dungeness Crab Hepatopancreas Samples

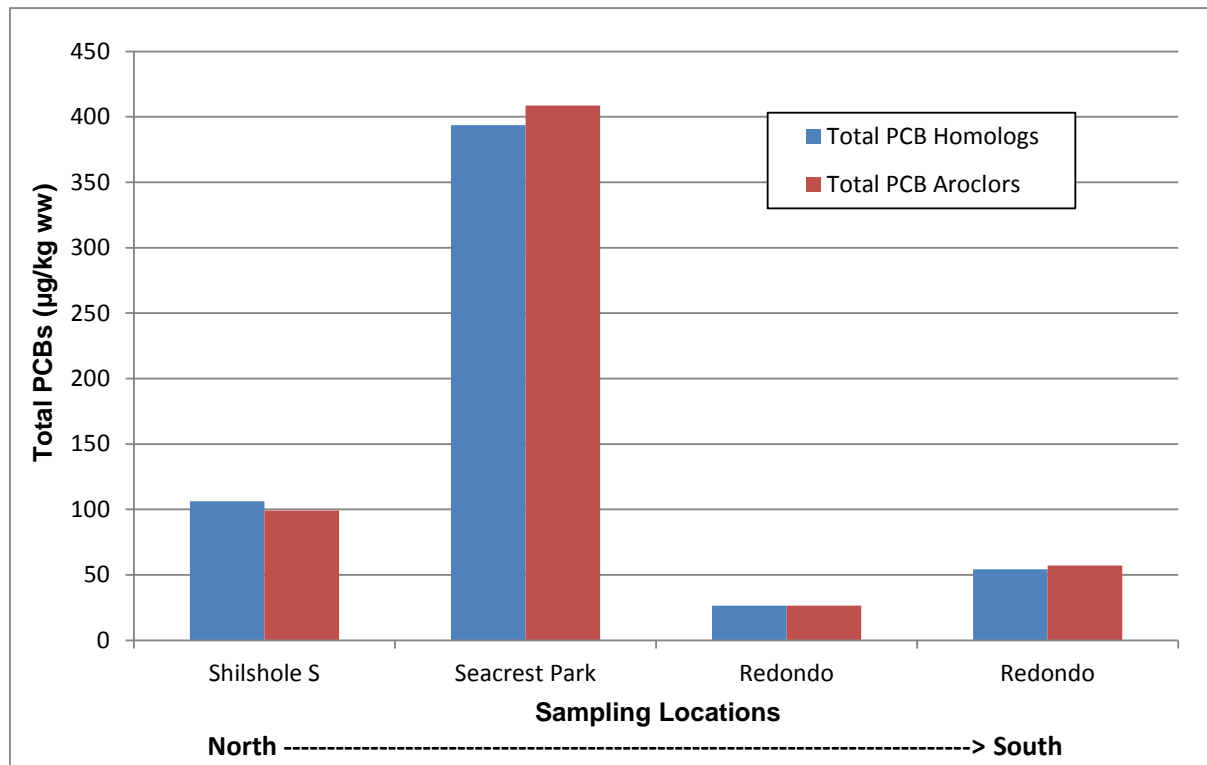


Figure 12. Comparison of Total PCB Concentrations by Homolog and Aroclor Methods in Red Rock Crab Hepatopancreas Sample

### 3.4 Comparison to WDFW Study

WDFW collected Dungeness crab and spot prawn (*Pandalus platyceros*) throughout Puget Sound in 2011 and 2012 to evaluate regional contaminant trends (Carey et al. 2014). Samples were analyzed for a number of metals and organic contaminants, including those analyzed by this King County study. WDFW's sampling sites included eight locations in the same region as those used for this King County study: inner Elliott Bay [5], outer Elliott Bay [1], southern King County [1], and just outside of King County near Edmonds [1] (Figure 13).

Sample collection and processing protocols between the two studies were slightly different. WDFW collected samples over two periods: April through May 2011 and March through August 2012. If there are seasonal and/or annual differences in contaminant levels, this timing could have affected data comparability. WDFW analyzed claw tissue and the largest sections of the legs, but did not include the muscle tissue from the crab body like King County did. Both studies included analysis of the hepatopancreas tissue.

Metals and mercury analyses in both studies were performed by KCEL using the same methods, extractions, and SOPs. Similar MDLs and RDLs for metals and mercury were achieved for both studies.

PCB analytical methods differed between the two studies. WDFW samples were analyzed at National Oceanic and Atmospheric Administration's Northwest Fisheries Science Center using accelerated solvent extraction and GC/MS according to Sloan et al. 2004. In brief, this method comprises three steps: (1) accelerated solvent extraction of tissue using methylene chloride; (2) cleanup of the extract by silica/aluminum columns; and (3) size-exclusion high-performance liquid chromatography (Carey et al. 2014). WDFW estimates total PCBs by summing detected concentrations of 18 commonly detected congeners, and then multiplying the results by two (Lauenstein and Cantillo 1993). Non-detects were treated as zeros (West Pers. Comm. 2016). King County samples were analyzed by Aroclor and homolog methods (Section 2.3.3).

The two studies followed similar sample composite methods. WDFW included 3 to 5 crabs per muscle tissue composite for each sampling location, while King County included 3 crabs per muscle tissue composite. Both studies included a greater number of individual crabs in the hepatopancreas composites to compensate for the smaller tissue mass. WDFW included 4 to 5, while King County included 4 crabs per hepatopancreas composite. WDFW collected tissue for only one composite sample per location, whereas King County collected multiple composite samples per location. As a result of the greater number of samples per location, the King County data may provide more information on intra-site variability.

Where relevant, WDFW's Dungeness crab data are compared to the data presented in this report. While sample collection, location, and processing were slightly different between the two studies, comparison of the datasets provides more detailed context on regional contaminant levels in Dungeness crab.



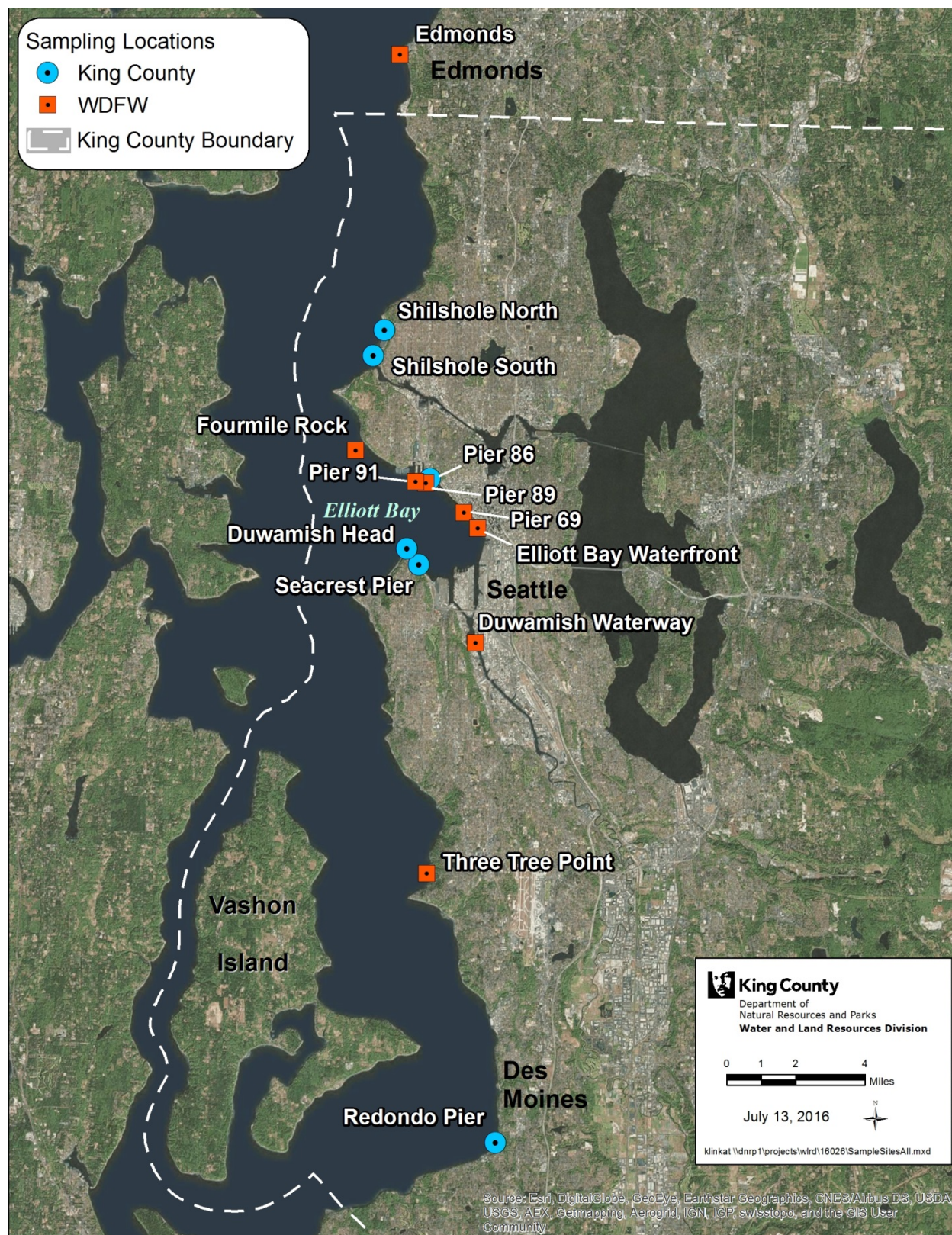


Figure 13. WDFW vs. KC Crab Sampling Locations

To facilitate site comparisons, King County's sampling location results were aligned with the three sampling regions defined by WDFW: Marine Area 10, Elliott Bay, and Marine Area 11.<sup>5</sup> Marine Area 10 extends roughly from the northern boundary of King County to the northern tip of Vashon Island, thereby covering northern King County locations. Marine Area 11 extends from the northern tip of Vashon Island to the Tacoma Narrows Bridge, thereby covering southern King County locations. Elliott Bay was examined as a separate region due to its high degree of urbanization even though WDFW includes it as part of Marine Area 10.

The size of Dungeness crab collected by King County fell in the lower range of those collected by WDFW. Carapace width of crab collected by WDFW ranged from 150 to 239 mm (Carey et al. 2014) compared to 150 to 180 mm for the King County study.

Lipid content in Dungeness crab muscle was similar between the King County (0.277% to 0.694% ww) and WDFW (0.21% to 0.35% ww) studies. Lipid content in hepatopancreas tissue tended to be lower in WDFW study (2.26% to 6.15%) relative to the King County results (5.67% to 11.2%). The different extraction methods used for lipid analysis could affect differences in lipid measurements. WDFW used accelerated solvent extraction of tissue with methylene chloride, with silica/aluminum column cleanup (Carey et al. 2014). King County also used methylene chloride as an extract, but used a Soxhlet cleanup. Crabs were also collected in different seasons, which may have influenced differences in lipid content.

Similar to the King County study, WDFW detected higher concentrations of cadmium, copper, lead, and total PCBs in the hepatopancreas tissue relative to levels in muscle tissue. Concentrations of mercury, arsenic, and zinc were higher in muscle tissue relative to levels in hepatopancreas tissue (Carey et al. 2014). A more detailed discussion of arsenic, mercury, and total PCBs is presented below.

### 3.4.1 Arsenic

In general, the range of arsenic concentrations in Dungeness muscle tissue collected from WDFW's Elliott Bay and Marine Areas 10 and 11 locations were similar to King County's (Figure 14). Arsenic concentrations in hepatopancreas composite samples were slightly higher in most WDFW samples compared to the King County results (Figure 15).

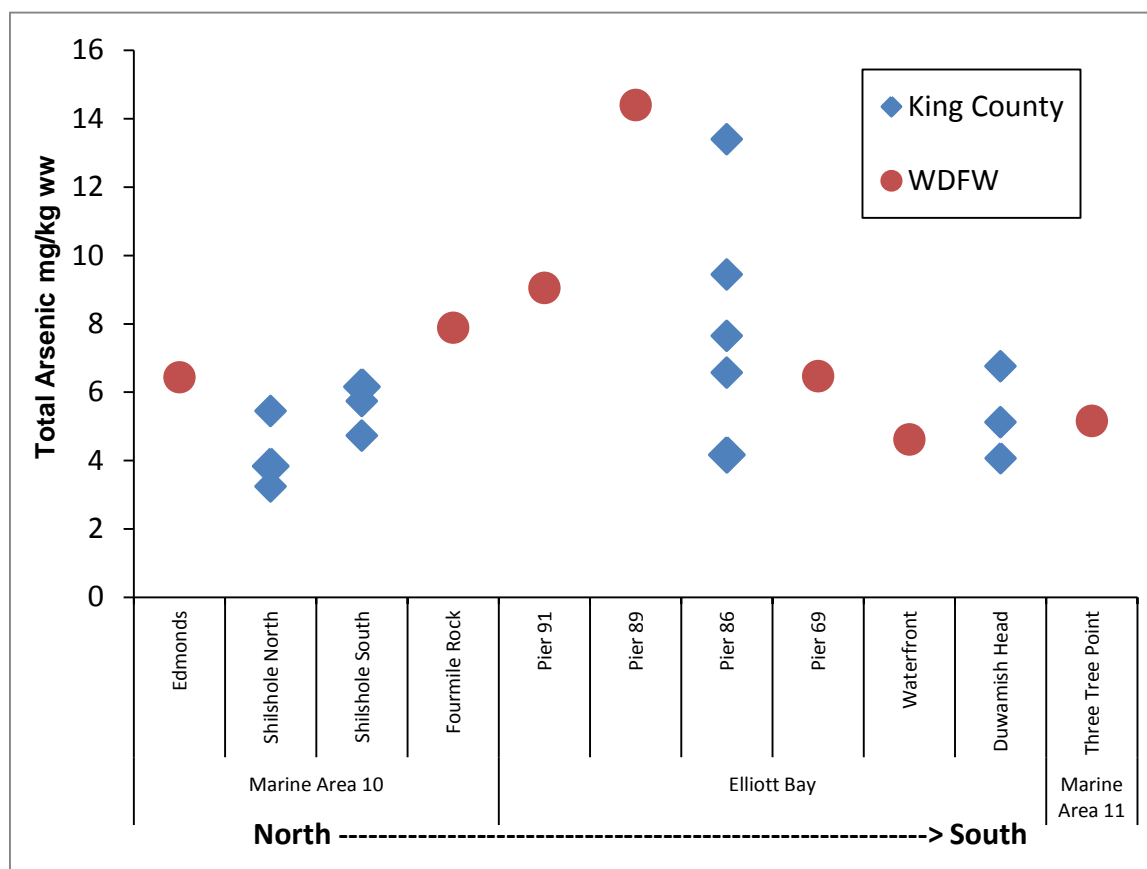
To provide additional context, arsenic tissue concentrations were compared to a fish tissue equivalent concentration from the EPA-promulgated human health-based water quality criteria applicable to Washington (81 FR 85417-85436). The fish tissue equivalent criterion for arsenic is 0.00616 mg/kg ww inorganic arsenic. This value was calculated by multiplying the bioconcentration factor for arsenic (44 L/kg tissue) by the respective water quality criterion for inorganic arsenic (0.14 µg/L). The water quality criterion is based on 6.5 grams per day fish tissue consumption and a lifetime cancer risk of one-in-a-

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<sup>5</sup> Marine Areas 10 and 11 are based on WDFW fishing jurisdictional regions.

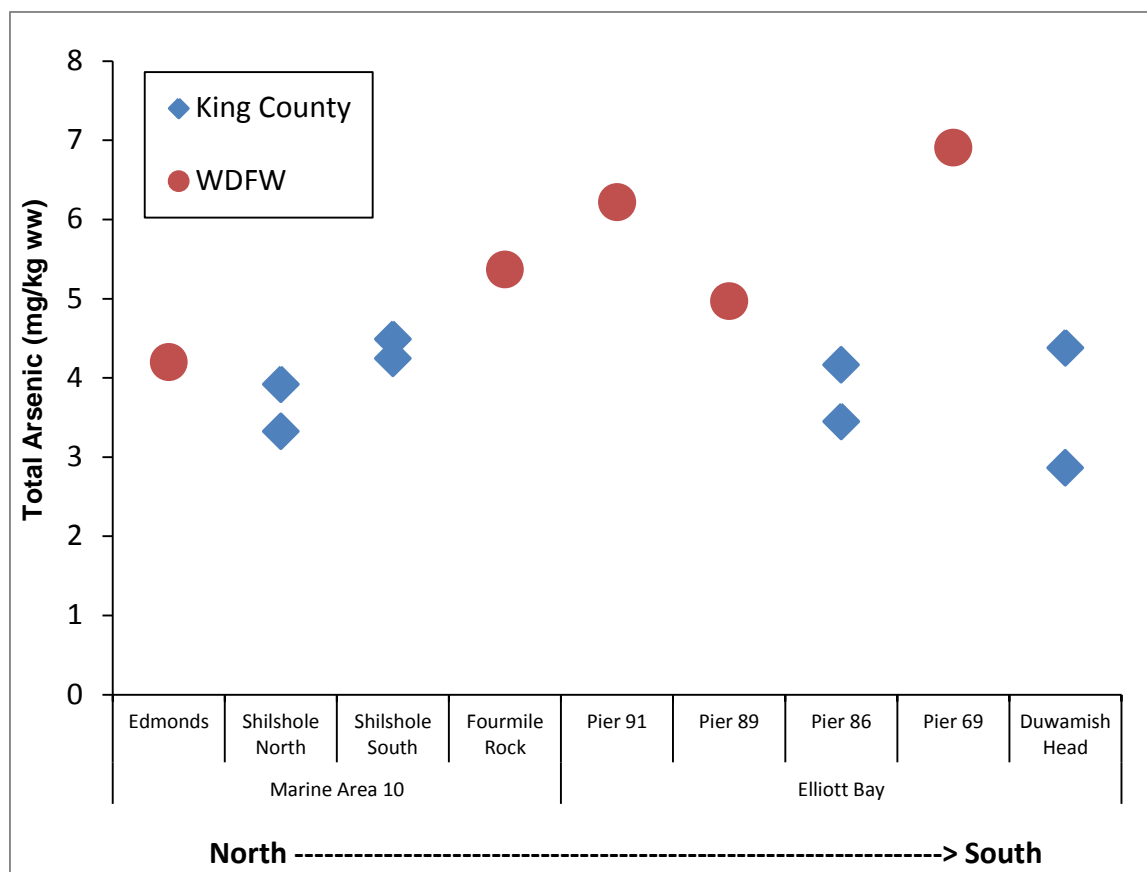


million.<sup>6</sup> Since only total arsenic was measured in both studies; the fraction of inorganic arsenic is unknown. However, as a conservative estimate, WDOH assumes that inorganic arsenic represents approximately 1% of the total arsenic is present in Puget Sound shellfish (ATSDR 2015). A speciation study conducted by the Washington Department of Ecology indicated that inorganic arsenic represented less than one percent of the total arsenic analyzed in all crabs (Ecology 2002). Assuming that inorganic arsenic comprises one percent of the total arsenic in crab, all samples collected by both King County and WDFW would exceed the tissue equivalent criterion for inorganic arsenic.



**Figure 14. Arsenic Concentrations in Dungeness Crab Muscle Composite Samples: King County vs. WDFW**

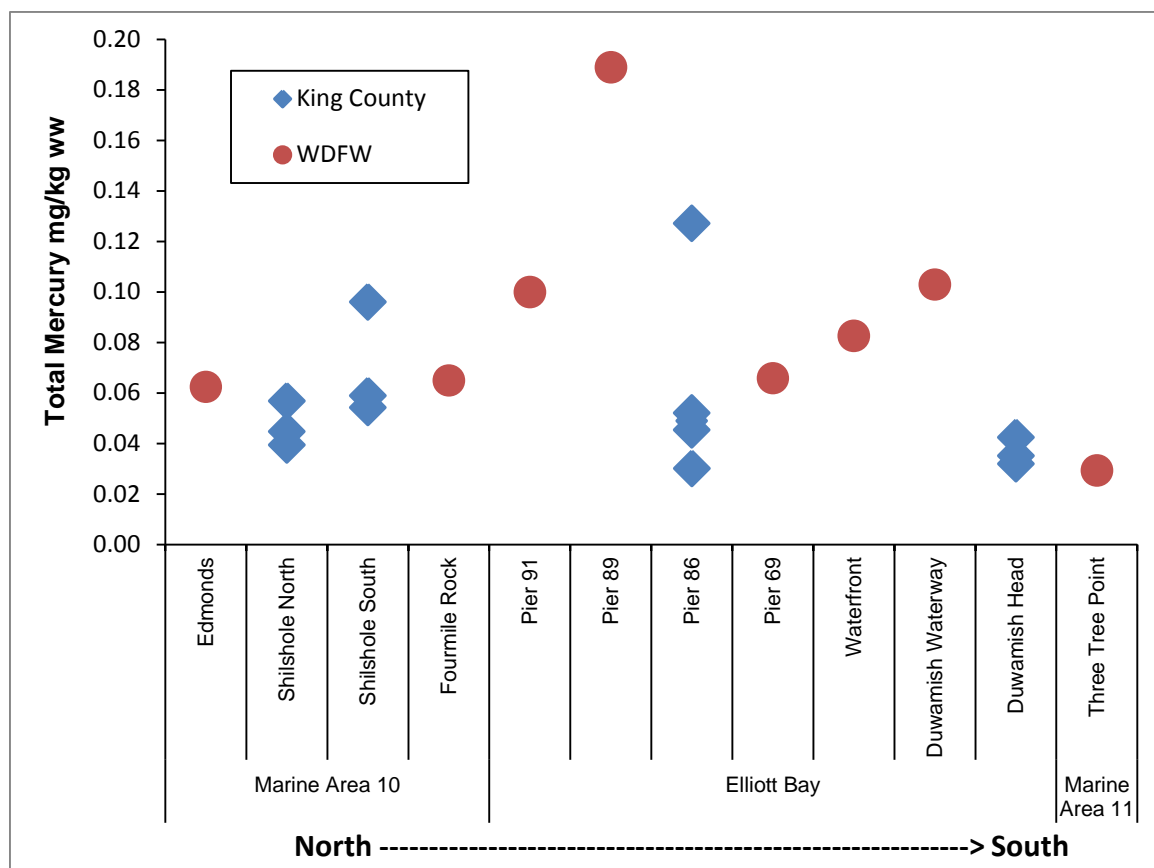
<sup>6</sup> Given the uncertainty regarding aspects of the science upon which the proposed human health criterion for arsenic was based, EPA withdrew its proposal of revised criteria for arsenic, leaving the existing criteria from the National Toxics Rule (6.5 grams/ day) in effect. EPA plans to reevaluate the existing federal arsenic human health criteria for Washington by 2018 (81 FR 85421).



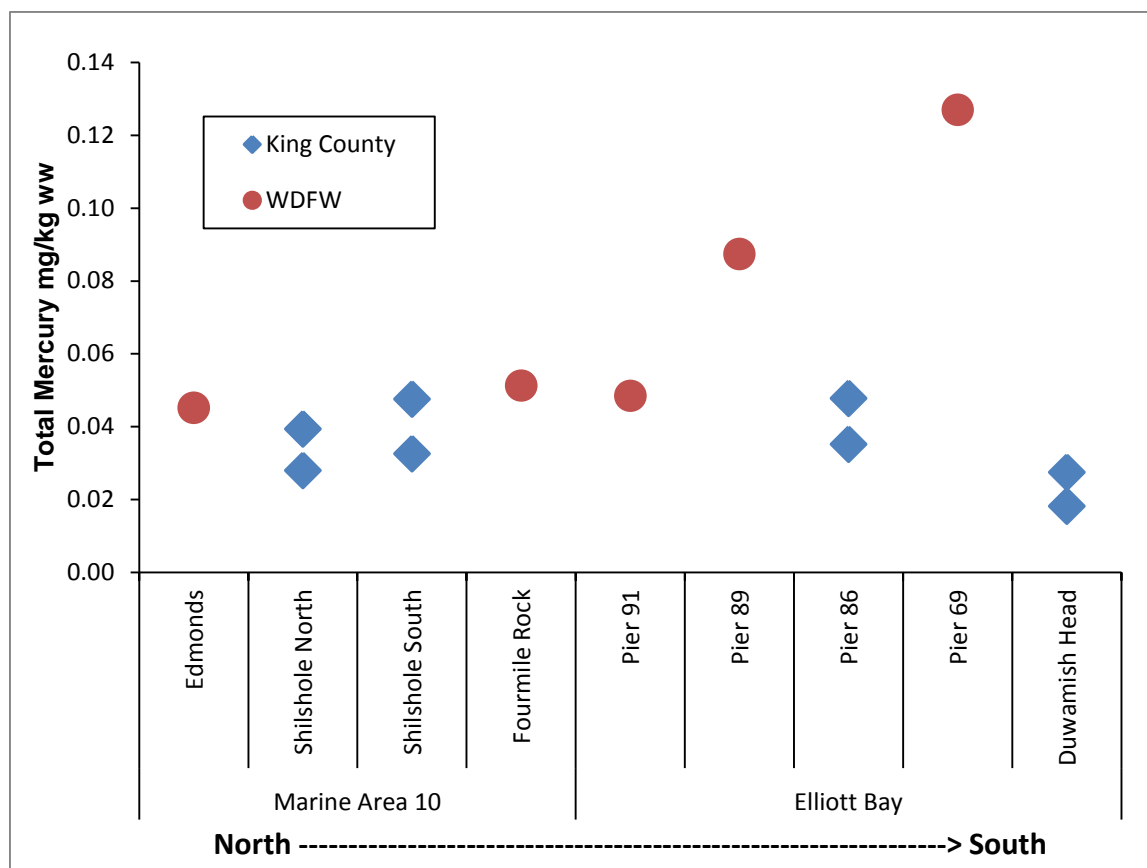
**Figure 15. Arsenic Concentrations in Dungeness Crab Hepatopancreas Composite Samples: King County vs. WDFW**

### 3.4.2 Mercury

In general, the range of mercury concentrations in Dungeness muscle tissue collected from Elliott Bay was similar between the two studies (Figure 16). Mercury concentrations in hepatopancreas tissue between the two studies were similar in Marine Area 10, but two of three composite samples in Elliott Bay were higher in WDFW study compared to the King County study. As described above for arsenic, the fish tissue equivalent of the EPA-promulgated human health-based water quality criteria applicable to Washington (81 FR 85417-85436) was used to provide a context for comparison to these data. The mercury criterion is based on methylmercury in fish tissue from a fish consumption rate of 175 grams per day (0.03 mg/kg). Because the criterion is based on methylmercury, and only total mercury was analyzed, it is difficult to ascertain how many samples fell below this criterion. Some hepatopancreas samples fell below this criterion because their total mercury concentrations were less than 0.03 mg/kg (Figure 17).



**Figure 16. Mercury Concentrations in Dungeness Muscle Composite Samples: King County vs. WDFW**



**Figure 17. Mercury Concentrations in Dungeness Hepatopancreas Composite Samples: King County vs. WDFW**

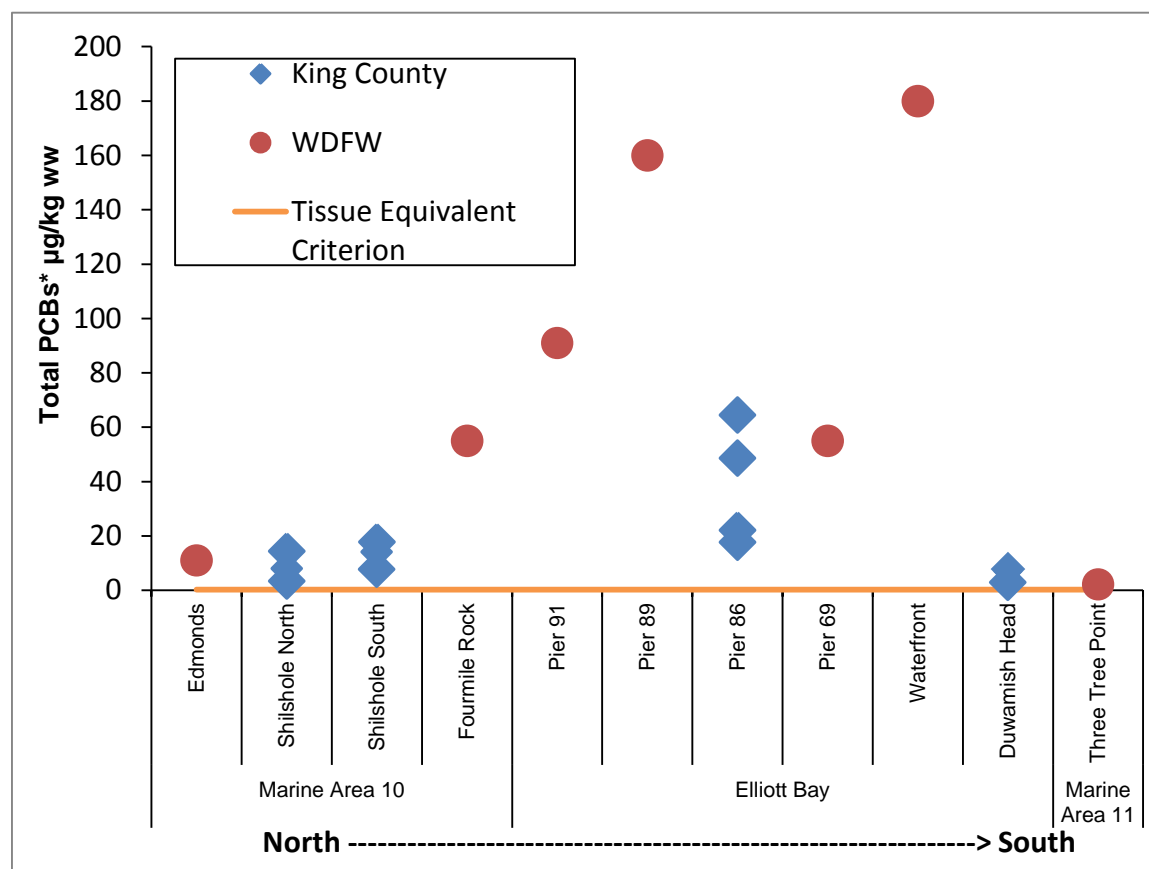
### 3.4.3 PCBs

Of the 40 congeners analyzed by WDFW, the penta- and hexachlorobiphenyl homolog groups were the most frequently detected in Dungeness crab muscle and hepatopancreas (Carey et al. 2014). This is similar to the pattern observed in the King County study. Results of both studies indicate that the highest PCB concentrations were detected in crabs from inner Elliott Bay, while levels at locations outside of this area were lower in both tissue types.

Total PCB concentrations detected in Elliott Bay Dungeness crab muscle and hepatopancreas tissue in the WDFW study tended to be higher than levels found in the King County study (Figures 18 and 19). The average total PCB concentration in Dungeness muscle tissue from WDFW's inner Elliott Bay sampling locations was 122  $\mu\text{g/kg ww}$  compared to average concentrations (32.9  $\mu\text{g/kg ww}$  [homologs]; 31.6  $\mu\text{g/kg ww}$  [Aroclors]) from King County's Terminal 86 sampling site. The average total PCB concentrations in Dungeness hepatopancreas tissue from WDFW's inner Elliott Bay sampling locations was higher than the average levels detected in crabs from King County's Terminal 86 station (1733  $\mu\text{g/kg ww}$  vs. 943  $\mu\text{g/kg ww}$  [homologs]; 946  $\mu\text{g/kg ww}$  [Aroclors]). Concentrations in muscle and hepatopancreas samples from Marine Area 10

were similar between the two studies, except in crabs from the Fourmile Rock sampling station, which were higher (Figures 18 and 19). Some of the concentration differences observed between the two studies may be attributed to the different analytical and summation methods.

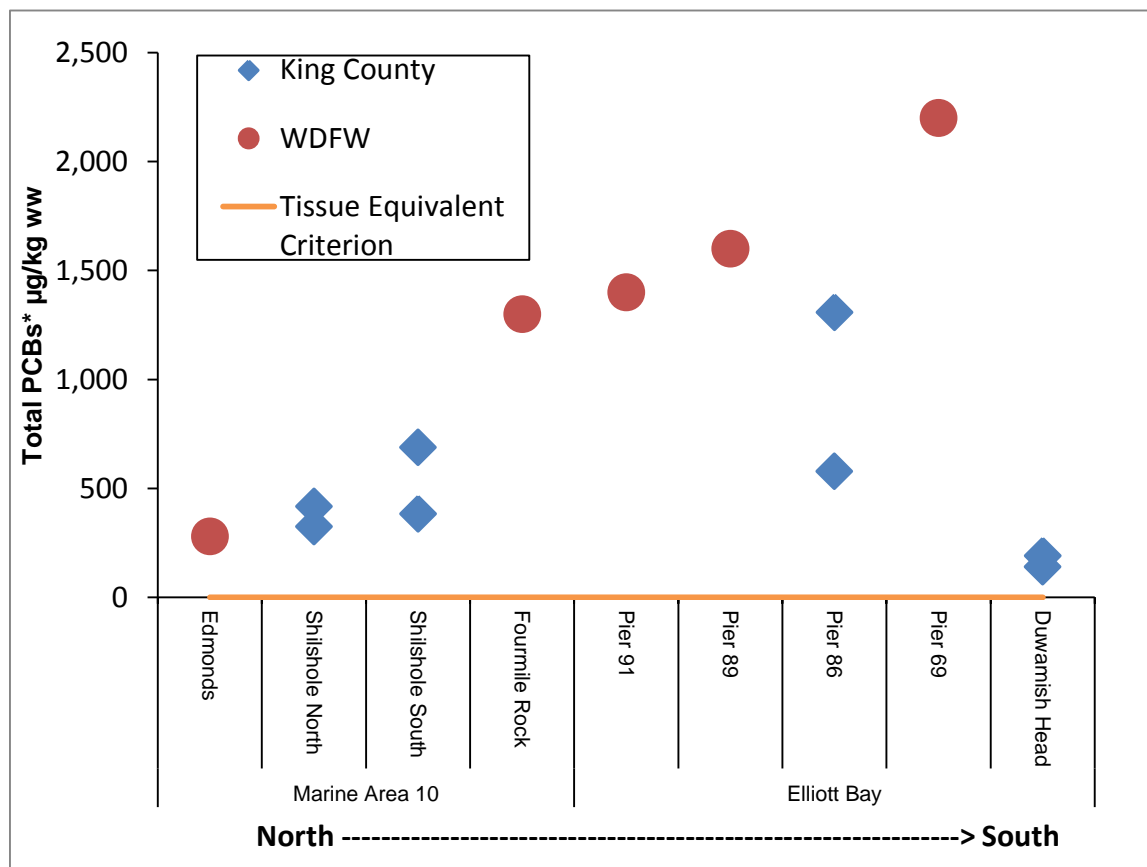
As previously described for arsenic and mercury, the PCB data were compared to the fish tissue equivalent of the EPA-promulgated human health-based water quality criteria applicable to Washington (81 FR 85417-85436). This value was calculated by multiplying the bioconcentration factor for PCBs (31,200 L/kg tissue) by the respective water quality criterion (0.000007 µg/L) to result in a 0.2184 µg/kg tissue equivalent criterion. The water quality criterion is based on consumption of 175 grams per day of fish tissue and a lifetime cancer risk of one-in-a-million. All Dungeness muscle and hepatopancreas samples collected by both King County and WDFW exceeded this tissue equivalent criterion (Figures 18 and 19).



\*WDFW PCB concentrations estimated based on sum of 18 commonly detected congeners multiplied by 2; King County PCB data based on the sum of homologs.

Fish Tissue Equivalent Criterion = 0.2184 µg/kg ww Total PCBs

**Figure 18. Total PCB Homologs vs. Estimated Total PCBs in Dungeness Muscle Composite Samples: King County vs. WDFW**



\*WDFW PCB concentrations estimated based on sum of 18 commonly detected congeners multiplied by 2; King County PCB data based on the sum of homologs.  
 Fish Tissue Equivalent Criterion = 0.2184 µg/kg ww Total PCBs

**Figure 19. Total PCB Homologs vs. Estimated Total PCBs in Dungeness Hepatopancreas Composite Samples: King County vs. WDFW**

## 4.0 CONCLUSIONS

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Dungeness and Red rock crabs were collected from several different locations in King County marine waters to monitor contaminant concentrations. Locations with public access fishing piers were targeted to sample areas with maximum potential public use. Crab muscle and hepatopancreas tissue were analyzed for metals, mercury, and PCBs (both as homologs and Aroclors), as well as conventional parameters.

This study found that some metals were preferentially accumulated in each of the tissue types. Arsenic, mercury, and zinc concentrations were higher in Dungeness muscle tissue compared to hepatopancreas tissue. The reverse was observed for cadmium, copper, lead, nickel, selenium, and silver, where concentrations were higher in Dungeness hepatopancreas tissue than in muscle tissue. A similar pattern was observed for most metals in Red rock muscle and hepatopancreas tissues.

Total PCB concentrations, as measured by both homologs and Aroclors, were higher in hepatopancreas tissues compared to their respective muscle tissues for both species. This was not surprising, because the hepatopancreas is the detoxification organ in crab and also has higher lipid content than the muscle. Total PCB concentrations tended to be higher in crab from in and around inner Elliott Bay, while crab from other King County sampling locations tended to have much lower concentrations.

There was a predominance of penta- and hexachlorobiphenyl homologs in Dungeness and Red rock crab muscle and hepatopancreas. Total PCB concentrations measured using the homolog method were very comparable to those measured using the Aroclor method. In some samples, using the homolog method resulted in detections when the less sensitive Aroclor method did not. Therefore, use of the PCB homolog method may be a more effective measure of PCBs for future monitoring at sites where PCBs measured as Aroclors are too low to be detected.

Some results of this study were similar to those of the WDFW study. WDFW found that concentrations of cadmium, copper, and lead were higher in Dungeness hepatopancreas relative to muscle. Concentrations of mercury, arsenic, and zinc were higher in muscle tissue compared to the hepatopancreas.

PCB concentrations in Dungeness hepatopancreas tissue from both studies were frequently detected at over an order of magnitude higher than levels detected in corresponding muscle tissues. Both studies also found a predominance of penta- and hexachlorobiphenyl homologs in Dungeness crab muscle and hepatopancreas. Finally, both studies found that PCB concentrations were elevated in both Dungeness crab muscle and hepatopancreas at inner Elliott Bay locations relative to those in Central Puget Sound.

All PCB concentrations in most Dungeness crab muscle and hepatopancreas samples collected by King County and WDFW exceeded fish tissue-equivalent concentrations of human health-based water quality criteria applicable to Washington State. Additional information is needed

on the form of arsenic and mercury in crab tissue to confirm if similar exceedances of fish-tissue equivalent concentrations are occurring for these contaminants.

Data presented here represent the first year of results for King County's long-term contaminant monitoring in crab tissue. It is anticipated that crab will be sampled again in 2018. As more data are collected by the Monitoring Program, King County will begin to evaluate spatial and temporal trends in tissue contaminant levels in crab.



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## Appendix A: Chain of Custody Forms



# Field Record for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 9/30/14 → 10/1/14  
 Approximate Time: 1115 → 1105  
 Location: Des Moines Pier  
 Equipment: CI  
 Pot Number: CI  
 Pot Coordinates: 150474 N  
1268686 E

12 meter depth

10/1/14 1530  
 10114 1530

Species <sup>1</sup>	# Taken	Returned		Observations <sup>2</sup>
		Number	Approximate size ranges	
Keel Rock	1			

<sup>1</sup> To lowest taxonomic level possible.

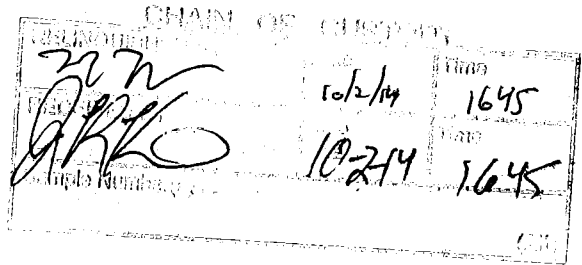
<sup>2</sup> Includes general disposition of species

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel: GM. Joo

# Field Record for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/1/14 10/2/14  
 Approximate Time: 1020 1130  
 Location: Seacrest E  
 Equipment: E2  
 Pot Number: E2  
 Pot Coordinates: 219137 N  
1258822 E



Species <sup>1</sup>	# Taken	Returned		Observations <sup>2</sup>
		Number	Approximate size ranges	
Red Rock	3			
Dungeness F		1	6.4	

<sup>1</sup> To lowest taxonomic level possible.

<sup>2</sup> Includes general disposition of species

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel: BH. JON



# Field Record for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/1/14 10/2/14  
 Approximate Time: 0945 1059  
 Location: T86E  
 Equipment: H2  
 Pot Number: H2  
 Pot Coordinates: 231762N  
1260943E

*Handwritten notes:*  
 212  
 24 m Depth  
 10/2/14 1645  
 10-2-14 1645

Species <sup>1</sup>	# Taken	Returned		Observations <sup>2</sup>
		Number	Approximate size ranges	
Dungeness F	5	5	6.3, 6.4, 6.3, 6.2, 6.4	
Dungeness M	9			

<sup>1</sup> To lowest taxonomic level possible.

<sup>2</sup> Includes general disposition of species

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel: Bk. JDD

# Field Record for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/1/14 10/2/14  
 Approximate Time: 0850 1052  
 Location: T86 W  
 Equipment: G2  
 Pot Number: G2  
 Pot Coordinates: 231959 N  
1260291 E

M2  
24m Depth ARK 10/2/14 1645  
10-214 1645

Species <sup>1</sup>	# Taken	Returned		Observations <sup>2</sup>
		Number	Approximate size ranges	
Dungeness F	<del>124</del>	7	6.1, 6.0, 6.4	5.9, 6.3, 6.5, 6.1
Dungeness M	6			

<sup>1</sup> To lowest taxonomic level possible.

<sup>2</sup> Includes general disposition of species

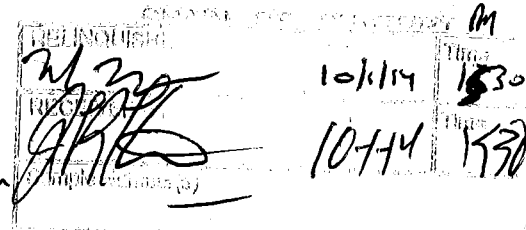
Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel: AK, JOD

# Field Record for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 9/30 → 10/1  
 Approximate Time: 0930 → ~~825~~ 825  
 Location: Shilohole South  
 Equipment: \_\_\_\_\_  
 Pot Number: B-4  
 Pot Coordinates: 50850N  
1251797E

Depth 8 m



Species <sup>1</sup>	# Taken	Returned		Observations <sup>2</sup>
		Number	Approximate size ranges	
Dungeness	6			
Red Rock	2			
Dungeness	no	3	Male 5.4", 5.7" Female 6.1"	

<sup>1</sup> To lowest taxonomic level possible.

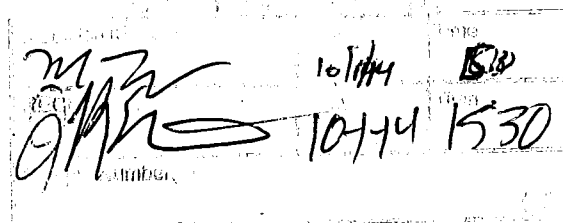
<sup>2</sup> Includes general disposition of species

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel: BK, JDD

# Field Record for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 9/30 → 10/1  
 Approximate Time: 0920 → 0835  
 Location: Shilshole N  
 Equipment: A1  
 Pot Number: A1  
 Pot Coordinates: 254742 N  
1253495 E



Species <sup>1</sup>	# Taken	Returned		Observations <sup>2</sup>
		Number	Approximate size ranges	
Dungeness	2			one is missing claw
Dungeness		4	5.4" 6.1" female 5.2" 5.6" male	

<sup>1</sup> To lowest taxonomic level possible.

<sup>2</sup> Includes general disposition of species

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel: GA JOD

# Field Record for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/1/14 → 10/2/14

Approximate Time: 0850 1400

Location: Shilshole South ~~San~~

Equipment: \_\_\_\_\_

Pot Number: B2

Pot Coordinates: 250856 N  
1251797 E

*M 72* 10/2/14 1645  
Depth 8 *JP* 10-2-14 1645

Species <sup>1</sup>	# Taken	Returned		Observations <sup>2</sup>
		Number	Approximate size ranges	
Red Rock	1			
Dungeness m	4	12	6-6.5	
Dungeness F		4	5.7, 6.1, 6.2	5.4
		2		

<sup>1</sup> To lowest taxonomic level possible.

<sup>2</sup> Includes general disposition of species

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Field Personnel: Re. Jan

# Field Record for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/1/14 - 10/2/14

Approximate Time: 0905

Location: Shitshale N

Equipment: A2

Pot Number: A2

Pot Coordinates: 254742N

1253495E

*MZ*  
*GR*

10/2/14 1645

10-2-14 1645

Species <sup>1</sup>	# Taken	Returned		Observations <sup>2</sup>
		Number	Approximate size ranges	
<u>Rock Rock</u>	<u>2</u>		<del>4-5.5</del>	
<u>Dungeness F</u>		<u>13</u>	<u>5.5-5.9</u>	
<u>Dungeness M</u>	<u>8</u>			
<u>Dungeness m</u>		<u>7</u>	<u>6-6.5</u>	

<sup>1</sup> To lowest taxonomic level possible.

<sup>2</sup> Includes general disposition of species

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Field Personnel: Be. Joo

# Sample Processing for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/9/14  
 Locator: Redondo  
 Species: Red Rock  
 Pot Number: A3

*MSZ*  
*YK*  
 10/9/14 1115  
 10-9-14 1115

Individual # (sequential)	Total Carapace Length (mm)	Sex	Whole Body Mass (g)
1	148.2	M	536.12
2	152.11	M	572.57
3	162.75	M	634.76
4	143.9	M	469.73
5	145.75	M	484.50
6	160.12	M	467.97
7			
8			
9			
10			
11			
12			
	--	--	

Missing 3 legs

missing 2 legs

missing 1 leg

missing 3 legs + 1 claw

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Lab Personnel: Rh. H. Joo

# Sample Processing for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/9/14  
 Locator: Redondo  
 Species: Red Rock  
 Pot Number: 83

*Handwritten notes:*  
 10/9/14 1115  
 10-9-14 1115

Individual # (sequential)	Total Carapace Length (mm)	Sex	Whole Body Mass (g)
1	158.99	M	597.86
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
	--	--	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Lab Personnel: Dr. SH, Joo



# Sample Processing for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/9/14  
 Locator: Redondo  
 Species: Red Rock  
 Pot Number: C3

RECEIVED BY <i>[Signature]</i>	Date 10/9/14	Time 1115
<i>[Signature]</i>	10/9/14	1115

Individual # (sequential)	Total Carapace Length (mm)	Sex	Whole Body Mass (g)
1	<del>517.23</del> 517.61	M	629.63
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
	--	--	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Lab Personnel: Mr. SH. JOO

# Sample Processing for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/9/14  
 Locator: Redondo  
 Species: Red Rock  
 Pot Number: 03

*MZ*  
*JH*

10/9/14 1115  
 10-9-14 1115

Individual # (sequential)	Total Carapace Length (mm)	Sex	Whole Body Mass (g)
1	149.27	M	488.42
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
	--	--	

Missing 2 legs

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Lab Personnel: Ch. H. Joo

# Sample Processing for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/9/14  
 Locator: Duw Head  
 Species: Red Rock  
 Pot Number: G3

*M 3* 10/9/14 1105  
*JBH* 10-9-14 1115

Individual # (sequential)	Total Carapace Length (mm)	Sex	Whole Body Mass (g)
1	154.02	M	526.16
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
	--	--	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Lab Personnel: BH, SH, JOD

# Sample Processing for 2014 Elliott Bay/Puget Sound Crab Tissue Monitoring Event

Date of Collection: 10/9/14  
 Locator: Duw Head  
 Species: Dungeness  
 Pot Number: H3

7422  
 10/9/14 1115  
 10-9-14 1115

Individual # (sequential)	Total Carapace Length (mm)	Sex	Whole Body Mass (g)
1	167.57	M	755.67
2	170.92	M	824.69
3	169.34	M	797.66
4	177.12	M	838.23
5	163.27	M	678.81
6	168.39	M	779.41
7	169.65	M	798.32
8	170.54	M	826.22
9	167.64	M	757.21
10			
11			
12			
	--	--	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Lab Personnel: M. H. JMD

## Appendix B: Crab Collection and Compositing Data



**Table B-1. Summary of Elliott Bay and Central Puget Sound Crab Collection Effort.**

Species	Waterbody/County	Location	Collection Date	Pot #	Northing	Easting	# of Individuals	Retained/Returned Status	Sex
Dungeness Crab	Central Basin/King County	Des Moines Marina	10/2/2014	D2	150438	1268963	1	Returned to Water	Female
Kelp Crab	Central Basin/King County	Des Moines Marina	10/2/2014	D2	150438	1268963	1	Returned to Water	Not recorded
Red Rock Crab	Central Basin/King County	Des Moines Marina	10/1/2014	C1	150474	1268686	1	Retained for Analysis	Male
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	E3	222212	1256740	3	Returned to Water	Male
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	E3	222212	1256740	3	Returned to Water	Female
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	F3	222000	1256780	4	Returned to Water	Female
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	F3	222000	1256780	1	Returned to Water	Male
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	H3	221592	1256892	2	Returned to Water	Female
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	H3	221592	1256892	1	Returned to Water	Male
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	G3	221836	1256857	8	Returned to Water	Male
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	G3	221836	1256857	8	Returned to Water	Female
Dungeness Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	H3	221592	1256892	9	Retained for Analysis	Male
Red Rock Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	G3	221836	1256857	1	Retained for Analysis	Male
Red Rock Crab	Elliott Bay/King County	Duwamish Head	10/9/2014	H3	221592	1256892	1	Retained for Analysis	Female
Dungeness Crab	Elliott Bay/King County	Terminal 86 Pier	10/2/2014	H2	231762	1260543	5	Returned to Water	Female
Dungeness Crab	Elliott Bay/King County	Terminal 86 Pier	10/2/2014	G2	231959	1260291	7	Returned to Water	Female
Dungeness Crab	Elliott Bay/King County	Terminal 86 Pier	10/2/2014	G2	231959	1260291	6	Retained for Analysis	Male
Dungeness Crab	Elliott Bay/King County	Terminal 86 Pier	10/2/2014	H2	231762	1260543	9	Retained for Analysis	Male
Dungeness Crab	Central Basin/King County	Redondo Beach	10/9/2014	B3	130880	1270417	1	Returned to Water	Female
Dungeness Crab	Central Basin/King County	Redondo Beach	10/9/2014	C3	130869	1270254	2	Returned to Water	Female
Dungeness Crab	Central Basin/King County	Redondo Beach	10/9/2014	D3	130936	1270333	1	Returned to Water	Female
Red Rock Crab	Central Basin/King County	Redondo Beach	10/9/2014	A3	130781	1270380	6	Retained for Analysis	Male
Red Rock Crab	Central Basin/King County	Redondo Beach	10/9/2014	B3	130880	1270417	1	Retained for Analysis	Male
Red Rock Crab	Central Basin/King County	Redondo Beach	10/9/2014	C3	130869	1270254	1	Retained for Analysis	Male
Red Rock Crab	Central Basin/King County	Redondo Beach	10/9/2014	D3	130936	1270333	1	Retained for Analysis	Male
Dungeness Crab	Central Basin/King County	SeaCrest Park Pier	10/1/2014	E1	219017	1258852	1	Returned to Water	Female
Dungeness Crab	Central Basin/King County	SeaCrest Park Pier	10/1/2014	F1	219025	1258733	2	Returned to Water	Female
Dungeness Crab	Central Basin/King County	SeaCrest Park Pier	10/1/2014	E2	219137	1258822	1	Returned to Water	Female
Dungeness Crab	Central Basin/King County	SeaCrest Park Pier	10/2/2014	F2	219025	1258733	1	Returned to Water	Female
Red Rock Crab	Central Basin/King County	SeaCrest Park Pier	10/2/2014	E2	219137	1258822	3	Retained for Analysis	Male
Dungeness Crab	Central Basin/King County	Shilshole Marina North	10/1/2014	A1	254742	1253495	3	Returned to Water	Female
Dungeness Crab	Central Basin/King County	Shilshole Marina North	10/1/2014	A1	254742	1253495	1	Returned to Water	Male
Dungeness Crab	Central Basin/King County	Shilshole Marina North	10/1/2014	A1	254742	1253495	2	Retained for Analysis	Male
Dungeness Crab	Central Basin/King County	Shilshole Marina North	10/2/2014	A2	254742	1253495	13	Returned to Water	Female

Table B-1. Summary of Elliott Bay and Central Puget Sound Crab Collection Effort.

Species	Waterbody/County	Location	Collection Date	Pot #	Northing	Easting	# of Individuals	Retained/Returned Status	Sex
Dungeness Crab	Central Basin/King County	Shilshole Marina North	10/2/2014	A2	254742	1253495	7	Returned to Water	Male
Dungeness Crab	Central Basin/King County	Shilshole Marina North	10/2/2014	A2	254742	1253495	8	Retained for Analysis	Male
Red Rock Crab	Central Basin/King County	Shilshole Marina North	10/2/2014	A2	254742	1253495	2	Retained for Analysis	Female
Dungeness Crab	Central Basin/King County	Shilshole Marina South	10/1/2014	B1	250856	1251797	1	Returned to Water	Female
Dungeness Crab	Central Basin/King County	Shilshole Marina South	10/1/2014	B1	250856	1251797	2	Returned to Water	Male
Dungeness Crab	Central Basin/King County	Shilshole Marina South	10/1/2014	B1	250856	1251797	6	Retained for Analysis	Male
Dungeness Crab	Central Basin/King County	Shilshole Marina South	10/2/2014	B2	250856	1251797	4	Returned to Water	Female
Dungeness Crab	Central Basin/King County	Shilshole Marina South	10/2/2014	B2	250856	1251797	12	Returned to Water	Male
Dungeness Crab	Central Basin/King County	Shilshole Marina South	10/2/2014	B2	250856	1251797	4	Retained for Analysis	Male
Red Rock Crab	Central Basin/King County	Shilshole Marina South	10/1/2014	B1	250856	1251797	2	Retained for Analysis	Male
Red Rock Crab	Central Basin/King County	Shilshole Marina South	10/2/2014	B2	250856	1251797	1	Retained for Analysis	Male

Totals

Dungeness Crab retained: 44

Dungeness Crab returned: 95

Red Rock Crab retained: 20

Red Rock Crab returned: 0

Kelp Crab returned: 1

Notes:

There were no unusual disposition of specimens noted

Coordinates are in State Plane North NAD83



**Table B-2. Dungeness Crab Compositing Scheme.**

Location	Collect Date	Crab Pot	Individual	Length (mm)	Mass (g)	Composite	
						Muscle	Hepatopancreas
Terminal 86 Pier	10/2/2014	H2	2	149.85	551.5	A	X
Terminal 86 Pier	10/2/2014	H2	3	180.33	850.42	A	X
Terminal 86 Pier	10/2/2014	H2	4	163.07	646.25	A	X
Terminal 86 Pier	10/2/2014	G2	1	149.63	534.6	B	no
Terminal 86 Pier	10/2/2014	H2	5	162.69	674.92	B	X
Terminal 86 Pier	10/2/2014	H2	7	180.46	951.24	B	no
Terminal 86 Pier	10/2/2014	G2	2	150.78	493.2	C	Y
Terminal 86 Pier	10/2/2014	G2	5	178.25	916.4	C	Y
Terminal 86 Pier	10/2/2014	H2	8	165.55	665.4	C	Y
Terminal 86 Pier	10/2/2014	G2	3	158.97	592.26	D	no
Terminal 86 Pier	10/2/2014	H2	1	171.48	732.49	D	no
Terminal 86 Pier	10/2/2014	H2	6	148.66	481.22	D	no
Terminal 86 Pier	10/2/2014	G2	4	164.52	682.57	E	Y
Terminal 86 Pier	10/2/2014	G2	6	155.51	588.48	E	no
Terminal 86 Pier	10/2/2014	H2	9	165.82	706.69	E	no
Shilshole South	10/1/2014	B1	1	162.44	612.38	no	no
Shilshole South	10/1/2014	B1	3	157.44	643.69	A	X
Shilshole South	10/1/2014	B1	6	165.6	676.17	A	X
Shilshole South	10/2/2014	B2	1	183.79	1010.01	A	X
Shilshole South	10/1/2014	B1	4	161.49	596.9	B	Y
Shilshole South	10/2/2014	B2	2	163.92	720.28	B	Y
Shilshole South	10/2/2014	B2	3	174.64	823.91	B	Y
Shilshole South	10/1/2014	B1	2	170.5	789.95	C	Y
Shilshole South	10/1/2014	B1	5	159.41	640.96	C	no
Shilshole South	10/2/2014	B2	4	166.28	740.93	C	X
Shilshole North	10/2/2014	A2	1	175.66	867.8	no	no
Shilshole North	10/2/2014	A2	3	159.99	588.05	A	X
Shilshole North	10/2/2014	A2	4	148.99	535.7	A	X
Shilshole North	10/2/2014	A2	6	163.14	645.3	A	X
Shilshole North	10/2/2014	A2	2	163.29	706.75	B	Y
Shilshole North	10/2/2014	A2	5	152.66	605.5	B	Y
Shilshole North	10/1/2014	A1	1	158.36	535.35	B	Y
Shilshole North	10/2/2014	A2	7	163.42	636.62	C	X
Shilshole North	10/2/2014	A2	8	156.18	580.44	C	Y
Shilshole North	10/1/2014	A1	2	156.27	714.31	C	no
Duwamish Head	10/9/2014	H3	1	167.57	755.67	A	X
Duwamish Head	10/9/2014	H3	2	170.92	824.69	A	X
Duwamish Head	10/9/2014	H3	3	169.34	797.66	A	X
Duwamish Head	10/9/2014	H3	4	177.12	838.23	B	X
Duwamish Head	10/9/2014	H3	5	163.27	678.81	B	no
Duwamish Head	10/9/2014	H3	6	168.39	779.41	B	Y
Duwamish Head	10/9/2014	H3	7	169.65	798.32	C	Y
Duwamish Head	10/9/2014	H3	8	170.54	826.22	C	Y
Duwamish Head	10/9/2014	H3	9	167.64	757.21	C	Y

**Notes:**

Those with shared letter at a location were composited

A 'no' under composite indicates crab tissue not included

**Table B-3. Red Rock Crab Compositing Scheme.**

Location	Collect Date	Crab Pot	Individual	Length (mm)	Mass (g)	Sex	Composite	
							Muscle	Hepatopancreas
Des Moines	10/1/2014	C1	1	129.19	284.22	M	no	no
Seacrest Park Pier	10/2/2014	E2	1	142.95	452.52	M	A	X
Seacrest Park Pier	10/2/2014	E2	2	158.74	637.14	M	A	X
Seacrest Park Pier	10/2/2014	E2	3	143.48	447.23	M	A	X
Shilshole South	10/1/2014	B1	1	152.12	464.07	M	A	X
Shilshole South	10/1/2014	B1	2	163.9	645.13	M	A	X
Shilshole South	10/2/2014	B2	1	161.45	602.71	M	A	X
Shilshole North	10/2/2014	A2	1	121.59	260.15	F	A	no
Shilshole North	10/2/2014	A2	2	128.89	353.86	F	A	no
Redondo Beach	10/9/2014	A3	1	148.2	536.12	M	A	X
Redondo Beach	10/9/2014	A3	3	162.35	634.76	M	A	X
Redondo Beach	10/9/2014	A3	4	143.9	469.73	M	A	X
Redondo Beach	10/9/2014	A3	2	152.11	572.57	M	B	Y
Redondo Beach	10/9/2014	A3	5	145.75	484.5	M	B	Y
Redondo Beach	10/9/2014	B3	1	158.99	597.86	M	B	Y
Redondo Beach	10/9/2014	A3	6	160.12	467.97	M	C	no
Redondo Beach	10/9/2014	C3	1	157.23	629.63	M	C	Y
Redondo Beach	10/9/2014	D3	1	149.23	488.42	M	C	X
Duwamish Head	10/9/2014	G3	1	154.02	526.16	M	no	no
Duwamish Head	10/9/2014	H3	1	138.01	361.76	F	no	no

Notes:

Those with shared letter at a location were composited

## Appendix C: Analytical Data Results



**Table C-1. Dungeness and Red Rock Crab Muscle Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: CB-SHMARINA-N Descrip: SHILSHOLE MARINA, Sample: L61592-1 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 17 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-SHMARINA-N Descrip: SHILSHOLE MARINA, Sample: L61592-2 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 15.5 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-SHMARINA-N Descrip: SHILSHOLE MARINA, Sample: L61592-3 Matrix: TD SHELLFISH ColDate: 10/1/14 9:00 TimeSpan: TotalSolid: 16.6 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units		
CV SM2540-G																	
Total Solids	17		0.005	0.01	%	15.5		0.005	0.01	%	16.6		0.005	0.01	%		
ES NONE																	
Sample Information	Dungeness Muscle, A2-2,4,6				none	Dungeness Muscle, A2, 3,5,7				none	Dungeness Muscle, A1-1,2, A2-8				none		
MT PSEP 1997																	
Mercury, Total, CVAA	0.0395	H	0.004	0.0161	mg/Kg	0.0569	H	0.0039	0.0157	mg/Kg	0.0446	H	0.0041	0.0163	mg/Kg		
MT PSEP1997*SW846 6020A																	
Arsenic, Total, ICP-MS	3.24		0.021	0.103	mg/Kg	3.84		0.02	0.102	mg/Kg	5.45		0.02	0.102	mg/Kg		
Beryllium, Total, ICP-MS	<MDL		0.004	0.0199	mg/Kg	<MDL		0.0042	0.0208	mg/Kg	<MDL		0.0039	0.0197	mg/Kg		
Cadmium, Total, ICP-MS	0.0408		0.0021	0.0103	mg/Kg	0.0574		0.002	0.0102	mg/Kg	0.0571		0.002	0.0102	mg/Kg		
Chromium, Total, ICP-MS	0.012	<RDL	0.0082	0.0411	mg/Kg	0.01	<RDL	0.0081	0.0406	mg/Kg	0.012	<RDL	0.0082	0.0408	mg/Kg		
Copper, Total, ICP-MS	7.35		0.016	0.0822	mg/Kg	8.15		0.016	0.0812	mg/Kg	7.81		0.016	0.0816	mg/Kg		
Lead, Total, ICP-MS	0.014	<RDL	0.0041	0.0206	mg/Kg	0.011	<RDL	0.0041	0.0203	mg/Kg	0.01	<RDL	0.0041	0.0204	mg/Kg		
Nickel, Total, ICP-MS	0.024	<RDL	0.02	0.0994	mg/Kg	0.053	<RDL	0.021	0.104	mg/Kg	0.042	<RDL	0.02	0.0984	mg/Kg		
Selenium, Total, ICP-MS	0.33	<RDL	0.1	0.514	mg/Kg	0.36	<RDL	0.1	0.508	mg/Kg	0.43	<RDL	0.1	0.51	mg/Kg		
Silver, Total, ICP-MS	0.0892		0.0016	0.00822	mg/Kg	0.117		0.0016	0.00812	mg/Kg	0.176		0.0016	0.00816	mg/Kg		
Thallium, Total, ICP-MS	<MDL		0.0016	0.00822	mg/Kg	<MDL		0.0016	0.00812	mg/Kg	<MDL		0.0016	0.00816	mg/Kg		
Zinc, Total, ICP-MS	32.8		0.1	0.514	mg/Kg	32.1		0.1	0.508	mg/Kg	37.9		0.1	0.51	mg/Kg		
OR GRAVIMETRIC SOP 740v2																	
Percent Lipids	0.547		0.05	0.1	%	0.565		0.05	0.1	%	0.427		0.05	0.1	%		
OR SW846 3540C*EPA 680 SIM																	
Dichlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Heptachlorobiphenyls	0.774		0.13	0.4	ug/Kg	1.67		0.13	0.4	ug/Kg	0.18	<RDL	0.13	0.4	ug/Kg		
Hexachlorobiphenyls	3.31		0.15	0.267	ug/Kg	6.24		0.15	0.267	ug/Kg	1.34		0.15	0.267	ug/Kg		
Monochlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Nonachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	0.764		0.18	0.4	ug/Kg	0.778		0.18	0.4	ug/Kg		
Octachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	0.21	<RDL	0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg		
Pentachlorobiphenyls	3.05		0.12	0.267	ug/Kg	4.58		0.12	0.267	ug/Kg	0.879		0.12	0.267	ug/Kg		
Tetrachlorobiphenyls	0.751		0.069	0.267	ug/Kg	0.857		0.069	0.267	ug/Kg	0.16	<RDL	0.069	0.267	ug/Kg		
Total PCB Homologs	7.995		0.069	0.133	ug/Kg	14.398		0.069	0.133	ug/Kg	3.337		0.069	0.133	ug/Kg		
Trichlorobiphenyls	0.11	<RDL	0.069	0.133	ug/Kg	0.077	<RDL	0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
OR SW846 3540C*SW846 8082A																	
Aroclor 1016	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1221	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1232	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1242	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1248	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1254	5.9	<RDL	4	16	ug/Kg	6.3	<RDL,J	4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1260	5.6	<RDL	4	16	ug/Kg	7.2	<RDL	4	16	ug/Kg	<MDL		4	16	ug/Kg		
Total Aroclors	11.5	<RDL	4	16	ug/Kg	13.5	<RDL	4	16	ug/Kg	<MDL		12	16	ug/Kg		

**Table C-1. Dungeness and Red Rock Crab Muscle Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: CB-SHMARINA-S Descrip: SHILSHOLE MARINA, Sample: L61592-4 Matrix: TD SHELLFISH ColDate: 10/1/14 9:00 TimeSpan: TotalSolid: 17 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-SHMARINA-S Descrip: SHILSHOLE MARINA, Sample: L61592-5 Matrix: TD SHELLFISH ColDate: 10/1/14 9:00 TimeSpan: TotalSolid: 18.6 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-SHMARINA-S Descrip: SHILSHOLE MARINA, Sample: L61592-6 Matrix: TD SHELLFISH ColDate: 10/1/14 9:00 TimeSpan: TotalSolid: 18.9 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units		
CV SM2540-G																	
Total Solids	17		0.005	0.01	%	18.6		0.005	0.01	%	18.9		0.005	0.01	%		
ES NONE																	
Sample Information	Dungeness Muscle, B1-3,6, B2-1				none	Dungeness Muscle, B1-4, B2-2,3				none	Dungeness Muscle, B1-2,5, B2-4				none		
MT PSEP 1997																	
Mercury, Total, CVAA	0.059	H	0.004	0.0159	mg/Kg	0.0961	H	0.004	0.0161	mg/Kg	0.0541	H	0.0039	0.0157	mg/Kg		
MT PSEP1997*SW846 6020A																	
Arsenic, Total, ICP-MS	5.74		0.02	0.1	mg/Kg	6.16		0.02	0.0979	mg/Kg	4.73		0.02	0.0996	mg/Kg		
Beryllium, Total, ICP-MS	<MDL		0.0041	0.0203	mg/Kg	<MDL		0.004	0.02	mg/Kg	<MDL		0.0039	0.0196	mg/Kg		
Cadmium, Total, ICP-MS	0.0154		0.002	0.01	mg/Kg	0.0231		0.002	0.00979	mg/Kg	0.0414		0.002	0.00996	mg/Kg		
Chromium, Total, ICP-MS	0.015	<RDL	0.008	0.0401	mg/Kg	0.012	<RDL	0.0078	0.0392	mg/Kg	0.015	<RDL	0.008	0.0398	mg/Kg		
Copper, Total, ICP-MS	9.38		0.016	0.0802	mg/Kg	9.4		0.016	0.0783	mg/Kg	7.37		0.016	0.0797	mg/Kg		
Lead, Total, ICP-MS	0.015	<RDL	0.004	0.02	mg/Kg	0.0073	<RDL	0.0039	0.0196	mg/Kg	0.012	<RDL	0.004	0.0199	mg/Kg		
Nickel, Total, ICP-MS	0.023	<RDL	0.02	0.102	mg/Kg	<MDL		0.02	0.0998	mg/Kg	0.02	<RDL	0.02	0.098	mg/Kg		
Selenium, Total, ICP-MS	0.35	<RDL	0.1	0.501	mg/Kg	0.41	<RDL	0.098	0.489	mg/Kg	0.37	<RDL	0.1	0.498	mg/Kg		
Silver, Total, ICP-MS	0.194		0.0016	0.00802	mg/Kg	0.191		0.0016	0.00783	mg/Kg	0.136		0.0016	0.00797	mg/Kg		
Thallium, Total, ICP-MS	<MDL		0.0016	0.00802	mg/Kg	<MDL		0.0016	0.00783	mg/Kg	<MDL		0.0016	0.00797	mg/Kg		
Zinc, Total, ICP-MS	37.6		0.1	0.501	mg/Kg	39.3		0.098	0.489	mg/Kg	43.8		0.1	0.498	mg/Kg		
OR GRAVIMETRIC SOP 740v2																	
Percent Lipids	0.407		0.05	0.1	%	0.694		0.05	0.1	%	0.591		0.05	0.1	%		
OR SW846 3540C*EPA 680 SIM																	
Dichlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Heptachlorobiphenyls	0.929		0.13	0.4	ug/Kg	2.6		0.13	0.4	ug/Kg	0.736		0.13	0.4	ug/Kg		
Hexachlorobiphenyls	5.21		0.15	0.267	ug/Kg	7.77		0.15	0.267	ug/Kg	3.51		0.15	0.267	ug/Kg		
Monochlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Nonachlorobiphenyls	0.29	<RDL	0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg	<MDL,J		0.18	0.4	ug/Kg		
Octachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg		
Pentachlorobiphenyls	5.45		0.12	0.267	ug/Kg	5.87		0.12	0.267	ug/Kg	2.65		0.12	0.267	ug/Kg		
Tetrachlorobiphenyls	1.92		0.069	0.267	ug/Kg	1.39		0.069	0.267	ug/Kg	0.695		0.069	0.267	ug/Kg		
Total PCB Homologs	14.019		0.069	0.133	ug/Kg	17.793		0.069	0.133	ug/Kg	7.683		0.069	0.133	ug/Kg		
Trichlorobiphenyls	0.22		0.069	0.133	ug/Kg	0.163		0.069	0.133	ug/Kg	0.092	<RDL	0.069	0.133	ug/Kg		
OR SW846 3540C*SW846 8082A																	
Aroclor 1016	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1221	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1232	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1242	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1248	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1254	8.9	<RDL	4	16	ug/Kg	7.9	<RDL	4	16	ug/Kg	5.3	<RDL	4	16	ug/Kg		
Aroclor 1260	5.3	<RDL	4	16	ug/Kg	9	<RDL	4	16	ug/Kg	4.5	<RDL,J	4	16	ug/Kg		
Total Aroclors	14.2	<RDL	4	16	ug/Kg	16.9		4	16	ug/Kg	9.8	<RDL	4	16	ug/Kg		

**Table C-1. Dungeness and Red Rock Crab Muscle Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: CB-SHMARINA-S Descrip: SHILSHOLE MARINA, Sample: L61592-7 Matrix: TD SHELLFISH ColDate: 10/1/14 9:00 TimeSpan: TotalSolid: 15.4 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: EB-DUWHEAD Descrip: DUWAMISH HEAD FISH Sample: L61592-8 Matrix: TD SHELLFISH ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 16.4 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: EB-DUWHEAD Descrip: DUWAMISH HEAD FISH Sample: L61592-9 Matrix: TD SHELLFISH ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 19.7 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units		
CV SM2540-G																	
Total Solids	15.4		0.005	0.01	%	16.4		0.005	0.01	%	19.7		0.005	0.01	%		
ES NONE																	
Sample Information	Red Rock Muscle, B1-1,2, B2-1				none	Dungeness Muscle, H3-2,6,7				none	Dungeness Muscle, H3-1,8,9				none		
MT PSEP 1997																	
Mercury, Total, CVAA	0.0321	H	0.004	0.016	mg/Kg	0.0352	H	0.0039	0.0157	mg/Kg	0.0318	H	0.0039	0.0158	mg/Kg		
MT PSEP1997*SW846 6020A																	
Arsenic, Total, ICP-MS	3.88		0.02	0.099	mg/Kg	4.07		0.02	0.101	mg/Kg	5.12		0.02	0.0988	mg/Kg		
Beryllium, Total, ICP-MS	<MDL		0.0041	0.0207	mg/Kg	<MDL		0.0039	0.0195	mg/Kg	<MDL		0.0041	0.0207	mg/Kg		
Cadmium, Total, ICP-MS	0.267		0.002	0.0099	mg/Kg	0.0451		0.002	0.0101	mg/Kg	0.0684		0.002	0.00988	mg/Kg		
Chromium, Total, ICP-MS	0.018	<RDL	0.0079	0.0396	mg/Kg	0.014	<RDL	0.008	0.0402	mg/Kg	0.015	<RDL	0.0079	0.0395	mg/Kg		
Copper, Total, ICP-MS	7.73		0.016	0.0792	mg/Kg	6.11		0.016	0.0805	mg/Kg	7.15		0.016	0.0791	mg/Kg		
Lead, Total, ICP-MS	0.0303		0.004	0.0198	mg/Kg	0.0071	<RDL	0.004	0.0201	mg/Kg	0.0072	<RDL	0.004	0.0198	mg/Kg		
Nickel, Total, ICP-MS	<MDL		0.021	0.103	mg/Kg	0.029	<RDL	0.02	0.0977	mg/Kg	<MDL		0.021	0.103	mg/Kg		
Selenium, Total, ICP-MS	0.531		0.099	0.495	mg/Kg	0.29	<RDL	0.1	0.503	mg/Kg	0.38	<RDL	0.099	0.494	mg/Kg		
Silver, Total, ICP-MS	0.0533		0.0016	0.00792	mg/Kg	0.14		0.0016	0.00805	mg/Kg	0.187		0.0016	0.00791	mg/Kg		
Thallium, Total, ICP-MS	<MDL		0.0016	0.00792	mg/Kg	<MDL		0.0016	0.00805	mg/Kg	<MDL		0.0016	0.00791	mg/Kg		
Zinc, Total, ICP-MS	48.8		0.099	0.495	mg/Kg	34.9		0.1	0.503	mg/Kg	43.6		0.099	0.494	mg/Kg		
OR GRAVIMETRIC SOP 740v2																	
Percent Lipids	0.141		0.05	0.1	%	0.449		0.05	0.1	%	0.541		0.05	0.1	%		
OR SW846 3540C*EPA 680 SIM																	
Dichlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Heptachlorobiphenyls	0.29	<RDL	0.13	0.4	ug/Kg	1		0.13	0.4	ug/Kg	0.14	<RDL	0.13	0.4	ug/Kg		
Hexachlorobiphenyls	1.27		0.15	0.267	ug/Kg	3.06		0.15	0.267	ug/Kg	1.08		0.15	0.267	ug/Kg		
Monochlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Nonachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	1.1		0.18	0.4	ug/Kg	0.888		0.18	0.4	ug/Kg		
Octachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg		
Pentachlorobiphenyls	1.18		0.12	0.267	ug/Kg	2.05		0.12	0.267	ug/Kg	0.501		0.12	0.267	ug/Kg		
Tetrachlorobiphenyls	0.291		0.069	0.267	ug/Kg	0.543		0.069	0.267	ug/Kg	0.25	<RDL	0.069	0.267	ug/Kg		
Total PCB Homologs	3.118		0.069	0.133	ug/Kg	7.826		0.069	0.133	ug/Kg	2.859		0.069	0.133	ug/Kg		
Trichlorobiphenyls	0.087	<RDL	0.069	0.133	ug/Kg	0.073	<RDL	0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
OR SW846 3540C*SW846 8082A																	
Aroclor 1016	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1221	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1232	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1242	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1248	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1254	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1260	<MDL		4	16	ug/Kg	5.3	<RDL	4	16	ug/Kg	<MDL		4	16	ug/Kg		
Total Aroclors	<MDL		12	16	ug/Kg	5.3	<RDL	4	16	ug/Kg	<MDL		12	16	ug/Kg		

**Table C-1. Dungeness and Red Rock Crab Muscle Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: EB-DUWHEAD Descrip: DUWAMISH HEAD FISH Sample: L61592-10 Matrix: TD SHELLFISH ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 15.4 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: EB-T86PIER Descrip: TERMINAL 86 PIER Sample: L61592-11 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 14.9 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: EB-T86PIER Descrip: TERMINAL 86 PIER Sample: L61592-12 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 15.5 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units		
CV SM2540-G																	
Total Solids	15.4		0.005	0.01	%	14.9		0.005	0.01	%	15.5		0.005	0.01	%		
ES NONE																	
Sample Information	Dungeness Muscle, H3-3,4,5				none	Dungeness Muscle, H2-2,3,4				none	Dungeness Muscle, G2-1, H2-5,7				none		
MT PSEP 1997																	
Mercury, Total, CVAA	0.0425	H	0.004	0.0158	mg/Kg	0.049	H	0.004	0.0159	mg/Kg	0.0302	H	0.004	0.0159	mg/Kg		
MT PSEP1997*SW846 6020A																	
Arsenic, Total, ICP-MS	6.76		0.02	0.101	mg/Kg	9.44		0.02	0.101	mg/Kg	4.17		0.02	0.0976	mg/Kg		
Beryllium, Total, ICP-MS	<MDL		0.0039	0.0194	mg/Kg	<MDL		0.0041	0.0206	mg/Kg	<MDL		0.0039	0.0195	mg/Kg		
Cadmium, Total, ICP-MS	0.0385		0.002	0.0101	mg/Kg	0.0825		0.002	0.0101	mg/Kg	0.079		0.002	0.00976	mg/Kg		
Chromium, Total, ICP-MS	0.015	<RDL	0.0081	0.0403	mg/Kg	0.014	<RDL	0.0081	0.0405	mg/Kg	0.015	<RDL	0.0078	0.039	mg/Kg		
Copper, Total, ICP-MS	7.13		0.016	0.0806	mg/Kg	10		0.016	0.0809	mg/Kg	9.25		0.016	0.0781	mg/Kg		
Lead, Total, ICP-MS	0.0079	<RDL	0.004	0.0202	mg/Kg	0.014	<RDL	0.004	0.0202	mg/Kg	0.0373		0.0039	0.0195	mg/Kg		
Nickel, Total, ICP-MS	0.045	<RDL	0.019	0.0969	mg/Kg	0.166		0.021	0.103	mg/Kg	0.079	<RDL	0.019	0.0974	mg/Kg		
Selenium, Total, ICP-MS	0.39	<RDL	0.1	0.504	mg/Kg	0.45	<RDL	0.1	0.506	mg/Kg	0.37	<RDL	0.098	0.488	mg/Kg		
Silver, Total, ICP-MS	0.153		0.0016	0.00806	mg/Kg	0.213		0.0016	0.00809	mg/Kg	0.371		0.0016	0.00781	mg/Kg		
Thallium, Total, ICP-MS	<MDL		0.0016	0.00806	mg/Kg	<MDL		0.0016	0.00809	mg/Kg	<MDL		0.0016	0.00781	mg/Kg		
Zinc, Total, ICP-MS	36.8		0.1	0.504	mg/Kg	36.1		0.1	0.506	mg/Kg	37		0.098	0.488	mg/Kg		
OR GRAVIMETRIC SOP 740v2																	
Percent Lipids	0.389		0.05	0.1	%	0.277		0.05	0.1	%	0.284		0.05	0.1	%		
OR SW846 3540C*EPA 680 SIM																	
Dichlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Heptachlorobiphenyls	0.948		0.13	0.4	ug/Kg	2.32		0.13	0.4	ug/Kg	2.75		0.13	0.4	ug/Kg		
Hexachlorobiphenyls	2.83		0.15	0.267	ug/Kg	7.93		0.15	0.267	ug/Kg	8.54		0.15	0.267	ug/Kg		
Monochlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Nonachlorobiphenyls	0.481		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg	0.3	<RDL	0.18	0.4	ug/Kg		
Octachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	0.21	<RDL	0.18	0.4	ug/Kg	0.24	<RDL	0.18	0.4	ug/Kg		
Pentachlorobiphenyls	2		0.12	0.267	ug/Kg	5.63		0.12	0.267	ug/Kg	7.08		0.12	0.267	ug/Kg		
Tetrachlorobiphenyls	0.535		0.069	0.267	ug/Kg	1.46		0.069	0.267	ug/Kg	2.75		0.069	0.267	ug/Kg		
Total PCB Homologs	6.868		0.069	0.133	ug/Kg	17.711		0.069	0.133	ug/Kg	22.122		0.069	0.133	ug/Kg		
Trichlorobiphenyls	0.074	<RDL	0.069	0.133	ug/Kg	0.161		0.069	0.133	ug/Kg	0.462		0.069	0.133	ug/Kg		
OR SW846 3540C*SW846 8082A																	
Aroclor 1016	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1221	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1232	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1242	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1248	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1254	<MDL		4	16	ug/Kg	8.2	<RDL	4	16	ug/Kg	12	<RDL	4	16	ug/Kg		
Aroclor 1260	4.3	<RDL	4	16	ug/Kg	9.4	<RDL	4	16	ug/Kg	12	<RDL	4	16	ug/Kg		
Total Aroclors	4.3	<RDL	4	16	ug/Kg	17.6		4	16	ug/Kg	24		4	16	ug/Kg		



**Table C-1. Dungeness and Red Rock Crab Muscle Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: EB-T86PIER Descrip: TERMINAL 86 PIER Sample: L61592-13 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 15 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: EB-T86PIER Descrip: TERMINAL 86 PIER Sample: L61592-14 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 17.9 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: EB-T86PIER Descrip: TERMINAL 86 PIER Sample: L61592-15 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 18.5 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units		
CV SM2540-G																	
Total Solids	15		0.005	0.01	%	17.9		0.005	0.01	%	18.5		0.005	0.01	%		
ES NONE																	
Sample Information	Dungeness Muscle, G2-2,5, H2-8				none	Dungeness Muscle, G2-3, H2-1,6				none	Dungeness Muscle, G2-4,6, H2-9				none		
MT PSEP 1997																	
Mercury, Total, CVAA	0.127	H	0.0039	0.0155	mg/Kg	0.0453	H	0.0039	0.0158	mg/Kg	0.052	H	0.0039	0.0155	mg/Kg		
MT PSEP1997*SW846 6020A																	
Arsenic, Total, ICP-MS	13.4		0.02	0.0996	mg/Kg	7.65		0.02	0.1	mg/Kg	6.57		0.02	0.102	mg/Kg		
Beryllium, Total, ICP-MS	<MDL		0.0041	0.0203	mg/Kg	<MDL		0.004	0.0202	mg/Kg	<MDL		0.0041	0.0205	mg/Kg		
Cadmium, Total, ICP-MS	0.0181		0.002	0.00996	mg/Kg	0.0272		0.002	0.01	mg/Kg	0.0169		0.002	0.0102	mg/Kg		
Chromium, Total, ICP-MS	0.016	<RDL	0.008	0.0398	mg/Kg	0.013	<RDL	0.008	0.04	mg/Kg	0.013	<RDL	0.0082	0.0408	mg/Kg		
Copper, Total, ICP-MS	10		0.016	0.0797	mg/Kg	7.18		0.016	0.08	mg/Kg	7.93		0.016	0.0816	mg/Kg		
Lead, Total, ICP-MS	0.0257		0.004	0.0199	mg/Kg	0.01	<RDL	0.004	0.02	mg/Kg	0.015	<RDL	0.0041	0.0204	mg/Kg		
Nickel, Total, ICP-MS	0.022	<RDL	0.02	0.102	mg/Kg	0.021	<RDL	0.02	0.101	mg/Kg	<MDL		0.02	0.102	mg/Kg		
Selenium, Total, ICP-MS	0.43	<RDL	0.1	0.498	mg/Kg	0.552		0.1	0.5	mg/Kg	0.4	<RDL	0.1	0.51	mg/Kg		
Silver, Total, ICP-MS	0.223		0.0016	0.00797	mg/Kg	0.116		0.0016	0.008	mg/Kg	0.15		0.0016	0.00816	mg/Kg		
Thallium, Total, ICP-MS	<MDL		0.0016	0.00797	mg/Kg	<MDL		0.0016	0.008	mg/Kg	<MDL		0.0016	0.00816	mg/Kg		
Zinc, Total, ICP-MS	35.4		0.1	0.498	mg/Kg	37.5		0.1	0.5	mg/Kg	39.8		0.1	0.51	mg/Kg		
OR GRAVIMETRIC SOP 740v2																	
Percent Lipids	0.332		0.05	0.1	%	0.457		0.05	0.1	%	0.499		0.05	0.1	%		
OR SW846 3540C*EPA 680 SIM																	
Dichlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Heptachlorobiphenyls	11.1		0.13	0.4	ug/Kg	1.56		0.13	0.4	ug/Kg	6.34		0.13	0.4	ug/Kg		
Hexachlorobiphenyls	30.2		0.15	0.267	ug/Kg	4.59		0.15	0.267	ug/Kg	19.7		0.15	0.267	ug/Kg		
Monochlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Nonachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	1.06		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg		
Octachlorobiphenyls	1.28		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg	0.559		0.18	0.4	ug/Kg		
Pentachlorobiphenyls	17.4		0.12	0.267	ug/Kg	3.38		0.12	0.267	ug/Kg	14		0.12	0.267	ug/Kg		
Tetrachlorobiphenyls	4.06		0.069	0.267	ug/Kg	0.983		0.069	0.267	ug/Kg	6.88		0.069	0.267	ug/Kg		
Total PCB Homologs	64.469		0.069	0.133	ug/Kg	11.727		0.069	0.133	ug/Kg	48.609		0.069	0.133	ug/Kg		
Trichlorobiphenyls	0.429		0.069	0.133	ug/Kg	0.154		0.069	0.133	ug/Kg	1.13		0.069	0.133	ug/Kg		
OR SW846 3540C*SW846 8082A																	
Aroclor 1016	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1221	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1232	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1242	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1248	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1254	24.5		4	16	ug/Kg	6.5	<RDL	4	16	ug/Kg	21.6		4	16	ug/Kg		
Aroclor 1260	37.6		4	16	ug/Kg	6.7	<RDL	4	16	ug/Kg	19.3		4	16	ug/Kg		
Total Aroclors	62.1		4	16	ug/Kg	13.2	<RDL	4	16	ug/Kg	40.9		4	16	ug/Kg		

**Table C-1. Dungeness and Red Rock Crab Muscle Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: EB-SCPPIER Descrip: SEACREST PARK PIER Sample: L61592-16 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 15.1 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-SHMARINA-N Descrip: SHILSHOLE MARINA, Sample: L61592-17 Matrix: TD SHELLFISH ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 23.1 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-REDONDO Descrip: REDONDO LAUNCH PIE Sample: L61592-18 Matrix: TD SHELLFISH ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 16.6 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units		
CV SM2540-G																	
Total Solids	15.1		0.005	0.01	%	23.1		0.005	0.01	%	16.6		0.005	0.01	%		
ES NONE																	
Sample Information	Red Rock Muscle, E2-1,2,3				none	Red Rock Muscle, A2-1,2				none	Red Rock Muscle, A3-4, B3-1, C3-1				none		
MT PSEP 1997																	
Mercury, Total, CVAA	0.0179	H	0.0039	0.0157	mg/Kg	0.0337	H	0.0039	0.0156	mg/Kg	0.0237	H	0.0039	0.0156	mg/Kg		
MT PSEP1997*SW846 6020A																	
Arsenic, Total, ICP-MS	2.59		0.02	0.101	mg/Kg	2.22		0.021	0.103	mg/Kg	2.41		0.02	0.0983	mg/Kg		
Beryllium, Total, ICP-MS	<MDL		0.004	0.02	mg/Kg	<MDL		0.0041	0.0203	mg/Kg	<MDL		0.004	0.02	mg/Kg		
Cadmium, Total, ICP-MS	0.271		0.002	0.0101	mg/Kg	0.108		0.0021	0.0103	mg/Kg	0.593		0.002	0.00983	mg/Kg		
Chromium, Total, ICP-MS	0.011	<RDL	0.0081	0.0405	mg/Kg	0.022	<RDL	0.0082	0.0411	mg/Kg	0.012	<RDL	0.0079	0.0393	mg/Kg		
Copper, Total, ICP-MS	5.76		0.016	0.081	mg/Kg	12.4		0.016	0.0822	mg/Kg	4.42		0.016	0.0786	mg/Kg		
Lead, Total, ICP-MS	0.0217		0.0041	0.0203	mg/Kg	0.013	<RDL	0.0041	0.0206	mg/Kg	0.0085	<RDL	0.0039	0.0197	mg/Kg		
Nickel, Total, ICP-MS	<MDL		0.02	0.0998	mg/Kg	0.03	<RDL	0.02	0.102	mg/Kg	<MDL		0.02	0.1	mg/Kg		
Selenium, Total, ICP-MS	0.42	<RDL	0.1	0.506	mg/Kg	0.51	<RDL	0.1	0.514	mg/Kg	0.39	<RDL	0.098	0.491	mg/Kg		
Silver, Total, ICP-MS	0.0646		0.0016	0.0081	mg/Kg	0.103		0.0016	0.00822	mg/Kg	0.075		0.0016	0.00786	mg/Kg		
Thallium, Total, ICP-MS	<MDL		0.0016	0.0081	mg/Kg	<MDL		0.0016	0.00822	mg/Kg	<MDL		0.0016	0.00786	mg/Kg		
Zinc, Total, ICP-MS	38		0.1	0.506	mg/Kg	76.5		0.1	0.514	mg/Kg	57.8		0.098	0.491	mg/Kg		
OR GRAVIMETRIC SOP 740v2																	
Percent Lipids	0.277		0.05	0.1	%	0.605		0.05	0.1	%	0.08	<RDL	0.05	0.1	%		
OR SW846 3540C*EPA 680 SIM																	
Dichlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Heptachlorobiphenyls	0.15	<RDL	0.13	0.4	ug/Kg	<MDL		0.13	0.4	ug/Kg	<MDL		0.13	0.4	ug/Kg		
Hexachlorobiphenyls	1.21		0.15	0.267	ug/Kg	<MDL		0.15	0.267	ug/Kg	0.15	<RDL	0.15	0.267	ug/Kg		
Monochlorobiphenyls	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
Nonachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	0.741		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg		
Octachlorobiphenyls	<MDL		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg	<MDL		0.18	0.4	ug/Kg		
Pentachlorobiphenyls	0.916		0.12	0.267	ug/Kg	<MDL		0.12	0.267	ug/Kg	<MDL		0.12	0.267	ug/Kg		
Tetrachlorobiphenyls	0.942		0.069	0.267	ug/Kg	<MDL		0.069	0.267	ug/Kg	<MDL		0.069	0.267	ug/Kg		
Total PCB Homologs	3.698		0.069	0.133	ug/Kg	0.741		0.069	0.133	ug/Kg	0.15		0.069	0.133	ug/Kg		
Trichlorobiphenyls	0.48		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg	<MDL		0.069	0.133	ug/Kg		
OR SW846 3540C*SW846 8082A																	
Aroclor 1016	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1221	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1232	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		
Aroclor 1242	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1248	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1254	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Aroclor 1260	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg	<MDL		4	16	ug/Kg		
Total Aroclors	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg	<MDL		12	16	ug/Kg		

**Table C-1. Dungeness and Red Rock Crab Muscle Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: CB-REDONDO Descrip: REDONDO LAUNCH PIE Sample: L61592-19 Matrix: TD SHELLFISH ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 16.8 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-REDONDO Descrip: REDONDO LAUNCH PIE Sample: L61592-20 Matrix: TD SHELLFISH ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 19.7 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	
CV SM2540-G											
Total Solids	16.8		0.005	0.01	%	19.7		0.005	0.01	%	
ES NONE											
Sample Information	Red Rock Muscle, A3-2,5,6				none	Red Rock Muscle, A3-1,3, D3-1				none	
MT PSEP 1997											
Mercury, Total, CVAA	0.016	<RDL,H	0.0039	0.0157	mg/Kg	0.0251	H	0.0039	0.0157	mg/Kg	
MT PSEP1997*SW846 6020A											
Arsenic, Total, ICP-MS	2.52		0.02	0.0998	mg/Kg	3.2		0.02	0.1	mg/Kg	
Beryllium, Total, ICP-MS		<MDL	0.0039	0.0197	mg/Kg		<MDL	0.004	0.0198	mg/Kg	
Cadmium, Total, ICP-MS	0.505		0.002	0.00998	mg/Kg	0.425		0.002	0.01	mg/Kg	
Chromium, Total, ICP-MS	0.013	<RDL	0.008	0.0399	mg/Kg	0.02	<RDL	0.008	0.0401	mg/Kg	
Copper, Total, ICP-MS	7.81		0.016	0.0798	mg/Kg	6.3		0.016	0.0801	mg/Kg	
Lead, Total, ICP-MS	0.016	<RDL	0.004	0.02	mg/Kg	0.0068	<RDL	0.004	0.02	mg/Kg	
Nickel, Total, ICP-MS		<MDL	0.02	0.0985	mg/Kg		<MDL	0.02	0.099	mg/Kg	
Selenium, Total, ICP-MS	0.4	<RDL	0.1	0.499	mg/Kg	0.4	<RDL	0.1	0.501	mg/Kg	
Silver, Total, ICP-MS	0.0864		0.0016	0.00798	mg/Kg	0.0773		0.0016	0.00801	mg/Kg	
Thallium, Total, ICP-MS		<MDL	0.0016	0.00798	mg/Kg		<MDL	0.0016	0.00801	mg/Kg	
Zinc, Total, ICP-MS	60.7		0.1	0.499	mg/Kg	68.4		0.1	0.501	mg/Kg	
OR GRAVIMETRIC SOP 740v2											
Percent Lipids	0.143		0.05	0.1	%	0.154		0.05	0.1	%	
OR SW846 3540C*EPA 680 SIM											
Dichlorobiphenyls		<MDL	0.069	0.133	ug/Kg		<MDL	0.069	0.133	ug/Kg	
Heptachlorobiphenyls		<MDL	0.13	0.4	ug/Kg		<MDL	0.13	0.4	ug/Kg	
Hexachlorobiphenyls		<MDL	0.15	0.267	ug/Kg		<MDL	0.15	0.267	ug/Kg	
Monochlorobiphenyls		<MDL	0.069	0.133	ug/Kg		<MDL	0.069	0.133	ug/Kg	
Nonachlorobiphenyls		<MDL	0.18	0.4	ug/Kg		<MDL	0.18	0.4	ug/Kg	
Octachlorobiphenyls		<MDL	0.18	0.4	ug/Kg		<MDL	0.18	0.4	ug/Kg	
Pentachlorobiphenyls		<MDL	0.12	0.267	ug/Kg		<MDL	0.12	0.267	ug/Kg	
Tetrachlorobiphenyls		<MDL	0.069	0.267	ug/Kg		<MDL	0.069	0.267	ug/Kg	
Total PCB Homologs		<MDL	0.18	0.4	ug/Kg		<MDL	0.18	0.4	ug/Kg	
Trichlorobiphenyls		<MDL	0.069	0.133	ug/Kg		<MDL	0.069	0.133	ug/Kg	
OR SW846 3540C*SW846 8082A											
Aroclor 1016		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg	
Aroclor 1221		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg	
Aroclor 1232		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg	
Aroclor 1242		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg	
Aroclor 1248		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg	
Aroclor 1254		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg	
Aroclor 1260		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg	
Total Aroclors		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg	

**Table C-2. Dungeness and Red Rock Crab Hepatopancreas Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800  
 Locator: EB-T86PIER  
 Descrp: TERMINAL 86 PIER  
 Sample: L61593-1  
 Matrix: TH ORGANS  
 ColDate: 10/2/14 9:00  
 TimeSpan:  
 TotalSolid: 13.6  
 ClientLoc:  
 SampDepth:  
**WET Weight Basis**

Project: 421250-800  
 Locator: EB-T86PIER  
 Descrp: TERMINAL 86 PIER  
 Sample: L61593-2  
 Matrix: TH ORGANS  
 ColDate: 10/2/14 9:00  
 TimeSpan:  
 TotalSolid: 15.8  
 ClientLoc:  
 SampDepth:  
**WET Weight Basis**

Project: 421250-800  
 Locator: EB-SCPPIER  
 Descrp: SEACREST PARK PIER  
 Sample: L61593-3  
 Matrix: TH ORGANS  
 ColDate: 10/2/14 9:00  
 TimeSpan:  
 TotalSolid: 21  
 ClientLoc:  
 SampDepth:  
**WET Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
Total Solids	13.6		0.005	0.01	%	15.8		0.005	0.01	%	21		0.005	0.01	%
ES NONE															
Sample Information	Dungeness Hepa, H2-1, 2, 3, 4				none	Dungeness Hepa, G2-1, 4, H2-5, 7				none	Red Rock Hepa, E2-1, 2, 3				none
MT PSEP 1997															
Mercury, Total, CVAA	0.0352	H	0.0039	0.0154	mg/Kg	0.0478	H	0.0039	0.0155	mg/Kg	0.012	<RDL,H	0.0039	0.0157	mg/Kg
MT PSEP1997*SW846 6020A															
Arsenic, Total, ICP-MS	4.16		0.01	0.0499	mg/Kg	3.45		0.0098	0.0489	mg/Kg	3.66		0.01	0.0506	mg/Kg
Beryllium, Total, ICP-MS		<MDL	0.01	0.0499	mg/Kg		<MDL	0.0098	0.0489	mg/Kg		<MDL	0.01	0.0506	mg/Kg
Cadmium, Total, ICP-MS	1.37		0.005	0.025	mg/Kg	1.8		0.0049	0.0244	mg/Kg	4.41		0.0051	0.0253	mg/Kg
Chromium, Total, ICP-MS	0.04	<RDL	0.02	0.0998	mg/Kg	0.05	<RDL	0.02	0.0978	mg/Kg	0.035	<RDL	0.02	0.101	mg/Kg
Copper, Total, ICP-MS	21.2		0.04	0.2	mg/Kg	19.8		0.039	0.196	mg/Kg	8.1		0.04	0.202	mg/Kg
Lead, Total, ICP-MS	0.0716		0.01	0.0499	mg/Kg	0.126		0.0098	0.0489	mg/Kg	0.124		0.01	0.0506	mg/Kg
Nickel, Total, ICP-MS	1.05		0.01	0.0499	mg/Kg	0.684		0.0098	0.0489	mg/Kg	0.11		0.01	0.0506	mg/Kg
Selenium, Total, ICP-MS	0.931		0.05	0.25	mg/Kg	1.15		0.049	0.244	mg/Kg	0.953		0.051	0.253	mg/Kg
Silver, Total, ICP-MS	1		0.004	0.02	mg/Kg	0.726		0.0039	0.0196	mg/Kg	0.0995		0.004	0.0202	mg/Kg
Thallium, Total, ICP-MS		<MDL	0.004	0.02	mg/Kg		<MDL	0.0039	0.0196	mg/Kg		<MDL	0.004	0.0202	mg/Kg
Zinc, Total, ICP-MS	16.9		0.05	0.25	mg/Kg	22.8		0.049	0.244	mg/Kg	30.2		0.051	0.253	mg/Kg
OR GRAVIMETRIC SOP 740v2															
Percent Lipids	6.31		0.05	0.1	%	7.19		0.05	0.1	%	14.1		0.05	0.1	%
OR SW846 3540C*EPA 680 SIM															
Dichlorobiphenyls		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg
Heptachlorobiphenyls	90.3		0.38	1.2	ug/Kg	197		0.38	1.2	ug/Kg	55.7		0.38	1.2	ug/Kg
Hexachlorobiphenyls	241		0.45	0.8	ug/Kg	540		0.45	0.8	ug/Kg	151		0.45	0.8	ug/Kg
Monochlorobiphenyls		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg
Nonachlorobiphenyls	7.24		0.54	1.2	ug/Kg	1.68		0.54	1.2	ug/Kg	2.27		0.54	1.2	ug/Kg
Octachlorobiphenyls	21.4		0.54	1.2	ug/Kg	42.3		0.54	1.2	ug/Kg	11.2		0.54	1.2	ug/Kg
Pentachlorobiphenyls	176		0.37	0.8	ug/Kg	404		0.37	0.8	ug/Kg	118		0.37	0.8	ug/Kg
Tetrachlorobiphenyls	37.8		0.21	0.8	ug/Kg	113		0.21	0.8	ug/Kg	48.8		0.21	0.8	ug/Kg
Total PCB Homologs	578.29		0.21	0.4	ug/Kg	1308.18		0.21	0.4	ug/Kg	393.65		0.21	0.4	ug/Kg
Trichlorobiphenyls	4.55		0.21	0.4	ug/Kg	10.2		0.21	0.4	ug/Kg	6.68		0.21	0.4	ug/Kg
OR SW846 3540C*SW846 8082A															
Aroclor 1016		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg
Aroclor 1221		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg
Aroclor 1232		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg
Aroclor 1242	14	<RDL,J	4	16	ug/Kg	31.1	J	4	16	ug/Kg	21.6	J	4	16	ug/Kg
Aroclor 1248		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg
Aroclor 1254	253		4	16	ug/Kg	549		4	16	ug/Kg	186		4	16	ug/Kg
Aroclor 1260	333		4	16	ug/Kg	711		4	16	ug/Kg	201		4	16	ug/Kg
Total Aroclors	600		4	16	ug/Kg	1291.1		4	16	ug/Kg	408.6		4	16	ug/Kg

**Table C-2. Dungeness and Red Rock Crab Hepatopancreas Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: CB-SHMARINA-N Descrip: SHILSHOLE MARINA, Sample: L61593-4 Matrix: TH ORGANS ColDate: 10/1/14 9:00 TimeSpan: TotalSolid: 18.4 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-SHMARINA-N Descrip: SHILSHOLE MARINA, Sample: L61593-5 Matrix: TH ORGANS ColDate: 10/2/14 9:00 TimeSpan: TotalSolid: 20.9 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: CB-SHMARINA-S Descrip: SHILSHOLE MARINA, Sample: L61593-6 Matrix: TH ORGANS ColDate: 10/1/14 9:00 TimeSpan: TotalSolid: 18 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units		
Total Solids	18.4		0.005	0.01	%	20.9		0.005	0.01	%	18		0.005	0.01	%		
ES NONE																	
Sample Information	Dungeness Hepa, A1-1, 2, H2-5, 8				none	Dungeness Hepa, A2-2, 3, 4, 6				none	Dungeness Hepa, B1-4, 5, B2-2, 3				none		
MT PSEP 1997																	
Mercury, Total, CVAA	0.0394	H	0.0039	0.0154	mg/Kg	0.028	H	0.0039	0.0155	mg/Kg	0.0476	H	0.0039	0.0155	mg/Kg		
MT PSEP1997*SW846 6020A																	
Arsenic, Total, ICP-MS	3.32		0.0099	0.0495	mg/Kg	3.92		0.0099	0.0495	mg/Kg	4.24		0.01	0.0511	mg/Kg		
Beryllium, Total, ICP-MS		<MDL	0.0099	0.0495	mg/Kg		<MDL	0.0099	0.0495	mg/Kg		<MDL	0.01	0.0511	mg/Kg		
Cadmium, Total, ICP-MS	1.24		0.005	0.0248	mg/Kg	1.07		0.005	0.0248	mg/Kg	0.689		0.0051	0.0256	mg/Kg		
Chromium, Total, ICP-MS	0.051	<RDL	0.02	0.099	mg/Kg	0.035	<RDL	0.02	0.0991	mg/Kg	0.025	<RDL	0.02	0.102	mg/Kg		
Copper, Total, ICP-MS	43.1		0.04	0.198	mg/Kg	15.2		0.04	0.198	mg/Kg	31.1		0.041	0.204	mg/Kg		
Lead, Total, ICP-MS	0.0986		0.0099	0.0495	mg/Kg	0.0682		0.0099	0.0495	mg/Kg	0.0748		0.01	0.0511	mg/Kg		
Nickel, Total, ICP-MS	0.288		0.0099	0.0495	mg/Kg	0.244		0.0099	0.0495	mg/Kg	0.109		0.01	0.0511	mg/Kg		
Selenium, Total, ICP-MS	1.07		0.05	0.248	mg/Kg	1.02		0.05	0.248	mg/Kg	0.817		0.051	0.256	mg/Kg		
Silver, Total, ICP-MS	0.789		0.004	0.0198	mg/Kg	0.238		0.004	0.0198	mg/Kg	0.892		0.0041	0.0204	mg/Kg		
Thallium, Total, ICP-MS		<MDL	0.004	0.0198	mg/Kg		<MDL	0.004	0.0198	mg/Kg		<MDL	0.0041	0.0204	mg/Kg		
Zinc, Total, ICP-MS	22.2		0.05	0.248	mg/Kg	17.8		0.05	0.248	mg/Kg	12.6		0.051	0.256	mg/Kg		
OR GRAVIMETRIC SOP 740v2																	
Percent Lipids	8.91		0.05	0.1	%	11.2		0.05	0.1	%	9.09		0.05	0.1	%		
OR SW846 3540C*EPA 680 SIM																	
Dichlorobiphenyls		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		
Heptachlorobiphenyls	84.7		0.38	1.2	ug/Kg	34		0.38	1.2	ug/Kg	92.9		0.38	1.2	ug/Kg		
Hexachlorobiphenyls	202		0.45	0.8	ug/Kg	128		0.45	0.8	ug/Kg	287		0.45	0.8	ug/Kg		
Monochlorobiphenyls		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		
Nonachlorobiphenyls	6.4		0.54	1.2	ug/Kg	2.43		0.54	1.2	ug/Kg	4.03		0.54	1.2	ug/Kg		
Octachlorobiphenyls	20.1		0.54	1.2	ug/Kg	6.78		0.54	1.2	ug/Kg	22.4		0.54	1.2	ug/Kg		
Pentachlorobiphenyls	86.8		0.37	0.8	ug/Kg	124		0.37	0.8	ug/Kg	230		0.37	0.8	ug/Kg		
Tetrachlorobiphenyls	16.4		0.21	0.8	ug/Kg	28.3		0.21	0.8	ug/Kg	49		0.21	0.8	ug/Kg		
Total PCB Homologs	417.57		0.21	0.4	ug/Kg	325.26		0.21	0.4	ug/Kg	688.48		0.21	0.4	ug/Kg		
Trichlorobiphenyls	1.17		0.21	0.4	ug/Kg	1.75		0.21	0.4	ug/Kg	3.15		0.21	0.4	ug/Kg		
OR SW846 3540C*SW846 8082A																	
Aroclor 1016		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		
Aroclor 1221		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		
Aroclor 1232		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		
Aroclor 1242		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg	12	<RDL,J	4	16	ug/Kg		
Aroclor 1248		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		
Aroclor 1254	75.3	J	4	16	ug/Kg	182		4	16	ug/Kg	246		4	16	ug/Kg		
Aroclor 1260	351		4	16	ug/Kg	92.8		4	16	ug/Kg	337		4	16	ug/Kg		
Total Aroclors	426.3		4	16	ug/Kg	274.8		4	16	ug/Kg	595		4	16	ug/Kg		

# Table C-2. Dungeness and Red Rock Crab Hepatopancreas Tissue Laboratory Results.

## King County Environmental Lab Analytical Report

Project: 421250-800  
Locator: CB-SHMARINA-S  
Descrip: SHILSHOLE MARINA,  
Sample: L61593-7  
Matrix: TH ORGANS  
ColDate: 10/1/14 9:00  
TimeSpan:  
TotalSolid: 16.3  
ClientLoc:  
SampDepth:  
**WET Weight Basis**

Project: 421250-800  
Locator: CB-SHMARINA-S  
Descrip: SHILSHOLE MARINA,  
Sample: L61593-8  
Matrix: TH ORGANS  
ColDate: 10/1/14 9:00  
TimeSpan:  
TotalSolid: 12.9  
ClientLoc:  
SampDepth:  
**WET Weight Basis**

Project: 421250-800  
Locator: CB-REDONDO  
Descrip: REDONDO LAUNCH PIE  
Sample: L61593-9  
Matrix: TH ORGANS  
ColDate: 10/9/14 9:00  
TimeSpan:  
TotalSolid: 17  
ClientLoc:  
SampDepth:  
**WET Weight Basis**

Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units
Total Solids	16.3		0.005	0.01	%	12.9		0.005	0.01	%	17		0.005	0.01	%
ES NONE															
Sample Information	Dungeness Hepa, B1-3, 6, B2-1, 4				none	Red Rock Hepa, B1-1, 2, B2-1				none	Red Rock Hepa, A3-1, 4, B3-1, C3-1				none
MT PSEP 1997															
Mercury, Total, CVAA	0.0326	H	0.0039	0.0155	mg/Kg	0.0308	H	0.0039	0.0155	mg/Kg	0.012	<RDL,H	0.0039	0.0157	mg/Kg
MT PSEP1997*SW846 6020A															
Arsenic, Total, ICP-MS	4.49		0.01	0.0508	mg/Kg	3.47		0.0098	0.0492	mg/Kg	2.54		0.01	0.0498	mg/Kg
Beryllium, Total, ICP-MS		<MDL	0.01	0.0508	mg/Kg		<MDL	0.0098	0.0492	mg/Kg		<MDL	0.01	0.0498	mg/Kg
Cadmium, Total, ICP-MS	0.52		0.0051	0.0254	mg/Kg	10.7		0.0049	0.0246	mg/Kg	7.4		0.005	0.0249	mg/Kg
Chromium, Total, ICP-MS	0.032	<RDL	0.02	0.102	mg/Kg	0.024	<RDL	0.02	0.0984	mg/Kg		<MDL	0.02	0.0995	mg/Kg
Copper, Total, ICP-MS	29.8		0.041	0.203	mg/Kg	41.3		0.039	0.197	mg/Kg	6.98		0.04	0.199	mg/Kg
Lead, Total, ICP-MS	0.0869		0.01	0.0508	mg/Kg	0.0499		0.0098	0.0492	mg/Kg	0.013	<RDL	0.01	0.0498	mg/Kg
Nickel, Total, ICP-MS	0.151		0.01	0.0508	mg/Kg	0.105		0.0098	0.0492	mg/Kg	0.0599		0.01	0.0498	mg/Kg
Selenium, Total, ICP-MS	1.04		0.051	0.254	mg/Kg	1.09		0.049	0.246	mg/Kg	0.831		0.05	0.249	mg/Kg
Silver, Total, ICP-MS	0.569		0.0041	0.0203	mg/Kg	0.564		0.0039	0.0197	mg/Kg	0.186		0.004	0.0199	mg/Kg
Thallium, Total, ICP-MS		<MDL	0.0041	0.0203	mg/Kg		<MDL	0.0039	0.0197	mg/Kg		<MDL	0.004	0.0199	mg/Kg
Zinc, Total, ICP-MS	16.6		0.051	0.254	mg/Kg	29.2		0.049	0.246	mg/Kg	22.1		0.05	0.249	mg/Kg
OR GRAVIMETRIC SOP 740v2															
Percent Lipids	7		0.05	0.1	%	2.36		0.05	0.1	%	4.88		0.05	0.1	%
OR SW846 3540C*EPA 680 SIM															
Dichlorobiphenyls		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg
Heptachlorobiphenyls	43.4		0.38	1.2	ug/Kg	13.2		0.38	1.2	ug/Kg	2.45		0.38	1.2	ug/Kg
Hexachlorobiphenyls	149		0.45	0.8	ug/Kg	42.4		0.45	0.8	ug/Kg	10.5		0.45	0.8	ug/Kg
Monochlorobiphenyls		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg
Nonachlorobiphenyls	4.71		0.54	1.2	ug/Kg	4.18		0.54	1.2	ug/Kg	1.8		0.54	1.2	ug/Kg
Octachlorobiphenyls	6.7		0.54	1.2	ug/Kg	4		0.54	1.2	ug/Kg		<MDL	0.54	1.2	ug/Kg
Pentachlorobiphenyls	143		0.37	0.8	ug/Kg	34.7		0.37	0.8	ug/Kg	9.24		0.37	0.8	ug/Kg
Tetrachlorobiphenyls	34.4		0.21	0.8	ug/Kg	7.11		0.21	0.8	ug/Kg	2.25		0.21	0.8	ug/Kg
Total PCB Homologs	383.7		0.21	0.4	ug/Kg	106.249		0.21	0.4	ug/Kg	26.59		0.21	0.4	ug/Kg
Trichlorobiphenyls	2.49		0.21	0.4	ug/Kg	0.659		0.21	0.4	ug/Kg	0.35	<RDL	0.21	0.4	ug/Kg
OR SW846 3540C*SW846 8082A															
Aroclor 1016		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg
Aroclor 1221		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg
Aroclor 1232		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg
Aroclor 1242	9.3	<RDL,J	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg
Aroclor 1248		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg
Aroclor 1254	232		4	16	ug/Kg	56		4	16	ug/Kg	16.6		4	16	ug/Kg
Aroclor 1260	159		4	16	ug/Kg	43.1		4	16	ug/Kg	10	<RDL	4	16	ug/Kg
Total Aroclors	400.3		4	16	ug/Kg	99.1		4	16	ug/Kg	26.6		4	16	ug/Kg

**Table C-2. Dungeness and Red Rock Crab Hepatopancreas Tissue Laboratory Results.**  
**King County Environmental Lab Analytical Report**

Project: 421250-800 Locator: CB-REDONDO Descrip: REDONDO LAUNCH PIE Sample: L61593-10 Matrix: TH ORGANS ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 16.9 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: EB-DUWHEAD Descrip: DUWAMISH HEAD FISH Sample: L61593-11 Matrix: TH ORGANS ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 14.1 ClientLoc: SampDepth: WET Weight Basis						Project: 421250-800 Locator: EB-DUWHEAD Descrip: DUWAMISH HEAD FISH Sample: L61593-12 Matrix: TH ORGANS ColDate: 10/9/14 9:00 TimeSpan: TotalSolid: 13.9 ClientLoc: SampDepth: WET Weight Basis					
Parameters	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units	Value	Qual	MDL	RDL	Units		
Total Solids	16.9		0.005	0.01	%	14.1		0.005	0.01	%	13.9		0.005	0.01	%		
ES NONE																	
Sample Information	Red Rock Hepa, A3-2, 3, 5, 6				none	Dungeness Hepa, H3-2, 6, 7, 8				none	Dungeness Hepa, H3-1, 3, 4, 5				none		
MT PSEP 1997																	
Mercury, Total, CVAA	0.01	<RDL,H	0.0039	0.0157	mg/Kg	0.0182	H	0.0039	0.0156	mg/Kg	0.0275	H	0.0039	0.0157	mg/Kg		
MT PSEP1997*SW846 6020A																	
Arsenic, Total, ICP-MS	2.69		0.01	0.0501	mg/Kg	2.86		0.0099	0.0495	mg/Kg	4.38		0.01	0.0512	mg/Kg		
Beryllium, Total, ICP-MS		<MDL	0.01	0.0501	mg/Kg		<MDL	0.0099	0.0495	mg/Kg		<MDL	0.01	0.0512	mg/Kg		
Cadmium, Total, ICP-MS	7.36		0.005	0.0251	mg/Kg	0.959		0.005	0.0248	mg/Kg	1.87		0.0051	0.0256	mg/Kg		
Chromium, Total, ICP-MS		<MDL	0.02	0.1	mg/Kg	0.027	<RDL	0.02	0.099	mg/Kg	0.032	<RDL	0.02	0.102	mg/Kg		
Copper, Total, ICP-MS	7.12		0.04	0.2	mg/Kg	4.41		0.04	0.198	mg/Kg	5.62		0.041	0.205	mg/Kg		
Lead, Total, ICP-MS	0.016	<RDL	0.01	0.0501	mg/Kg	0.0712		0.0099	0.0495	mg/Kg	0.0998		0.01	0.0512	mg/Kg		
Nickel, Total, ICP-MS	0.0632		0.01	0.0501	mg/Kg	0.205		0.0099	0.0495	mg/Kg	0.279		0.01	0.0512	mg/Kg		
Selenium, Total, ICP-MS	0.905		0.05	0.251	mg/Kg	0.789		0.05	0.248	mg/Kg	0.925		0.051	0.256	mg/Kg		
Silver, Total, ICP-MS	0.171		0.004	0.02	mg/Kg	0.211		0.004	0.0198	mg/Kg	0.284		0.0041	0.0205	mg/Kg		
Thallium, Total, ICP-MS		<MDL	0.004	0.02	mg/Kg		<MDL	0.004	0.0198	mg/Kg		<MDL	0.0041	0.0205	mg/Kg		
Zinc, Total, ICP-MS	22.4		0.05	0.251	mg/Kg	16.5		0.05	0.248	mg/Kg	12.8		0.051	0.256	mg/Kg		
OR GRAVIMETRIC SOP 740v2																	
Percent Lipids	6.62		0.05	0.1	%	5.67		0.05	0.1	%	6.73		0.05	0.1	%		
OR SW846 3540C*EPA 680 SIM																	
Dichlorobiphenyls		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		
Heptachlorobiphenyls	7.04		0.38	1.2	ug/Kg	22.1		0.38	1.2	ug/Kg	31.5		0.38	1.2	ug/Kg		
Hexachlorobiphenyls	20.5		0.45	0.8	ug/Kg	61		0.45	0.8	ug/Kg	85.8		0.45	0.8	ug/Kg		
Monochlorobiphenyls		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		<MDL	0.21	0.4	ug/Kg		
Nonachlorobiphenyls	4.77		0.54	1.2	ug/Kg	1.53		0.54	1.2	ug/Kg	4.52		0.54	1.2	ug/Kg		
Octachlorobiphenyls	1.54		0.54	1.2	ug/Kg	4.24		0.54	1.2	ug/Kg	7.01		0.54	1.2	ug/Kg		
Pentachlorobiphenyls	16.1		0.37	0.8	ug/Kg	41.6		0.37	0.8	ug/Kg	51		0.37	0.8	ug/Kg		
Tetrachlorobiphenyls	3.96		0.21	0.8	ug/Kg	9.45		0.21	0.8	ug/Kg	10.7		0.21	0.8	ug/Kg		
Total PCB Homologs	54.331		0.21	0.4	ug/Kg	140.608		0.21	0.4	ug/Kg	191.208		0.21	0.4	ug/Kg		
Trichlorobiphenyls	0.421		0.21	0.4	ug/Kg	0.688		0.21	0.4	ug/Kg	0.678		0.21	0.4	ug/Kg		
OR SW846 3540C*SW846 8082A																	
Aroclor 1016		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		
Aroclor 1221		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		
Aroclor 1232		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		<MDL	12	16	ug/Kg		
Aroclor 1242		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		
Aroclor 1248		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		<MDL	4	16	ug/Kg		
Aroclor 1254	25.5		4	16	ug/Kg	58.5		4	16	ug/Kg	70.2		4	16	ug/Kg		
Aroclor 1260	31.6		4	16	ug/Kg	85.2		4	16	ug/Kg	123		4	16	ug/Kg		
Total Aroclors	57.1		4	16	ug/Kg	143.7		4	16	ug/Kg	193.2		4	16	ug/Kg		





## Appendix D: QA/QC Data



# King County Environmental Laboratory Batch Report

WG136995 Total Solids

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61592-1	421250-800	Marine Fish Tissue Tox	CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:20	WG136995-1,-2	
L61592-2	421250-800		CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:21		
L61592-3	421250-800		CVTOTS	SHELLFISH	10/1/2014 9:00	1/12/2015 14:10	1/13/2015 7:22		
L61592-4	421250-800		CVTOTS	SHELLFISH	10/1/2014 9:00	1/12/2015 14:10	1/13/2015 7:22		
L61592-5	421250-800		CVTOTS	SHELLFISH	10/1/2014 9:00	1/12/2015 14:10	1/13/2015 7:22		
L61592-6	421250-800		CVTOTS	SHELLFISH	10/1/2014 9:00	1/12/2015 14:10	1/13/2015 7:23		
L61592-7	421250-800		CVTOTS	SHELLFISH	10/1/2014 9:00	1/12/2015 14:10	1/13/2015 7:23		
L61592-8	421250-800		CVTOTS	SHELLFISH	10/9/2014 9:00	1/12/2015 14:10	1/13/2015 7:23		
L61592-9	421250-800		CVTOTS	SHELLFISH	10/9/2014 9:00	1/12/2015 14:10	1/13/2015 7:24		
L61592-10	421250-800		CVTOTS	SHELLFISH	10/9/2014 9:00	1/12/2015 14:10	1/13/2015 7:25		
L61592-11	421250-800		CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:25		
L61592-12	421250-800		CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:26		
L61592-13	421250-800		CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:27		
L61592-14	421250-800		CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:27		
L61592-15	421250-800		CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:28		
L61592-16	421250-800		CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:28		
L61592-17	421250-800		CVTOTS	SHELLFISH	10/2/2014 9:00	1/12/2015 14:10	1/13/2015 7:28		
L61592-18	421250-800		CVTOTS	SHELLFISH	10/9/2014 9:00	1/12/2015 14:10	1/13/2015 7:29		
L61592-19	421250-800		CVTOTS	SHELLFISH	10/9/2014 9:00	1/12/2015 14:10	1/13/2015 7:29		
L61592-20	421250-800		CVTOTS	SHELLFISH	10/9/2014 9:00	1/12/2015 14:10	1/13/2015 7:29		
WG136995-1	MB		CVTOTS	OTHR TISS		1/12/2015 14:10	1/13/2015 7:20		MB2 1/12/15
WG136995-2	LD		CVTOTS	SHELLFISH		1/12/2015 14:10	1/13/2015 7:21		L61592-1

# King County Environmental Laboratory Batch Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

WG136179 Total Mercury - Water

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61422-6	421422-VAGW	SWD-VAGW Vashon Groundwater Quarterly	MTHG-MID	GRND WTR	11/14/2014 9:55	11/18/2014 12:00	11/19/2014 12:11	WG136179-1,-2,-3,-4	
L61422-6	421422-VAGW		MTHG-MID-DISS	GRND WTR	11/14/2014 9:55	11/18/2014 12:00	11/19/2014 12:10	WG136179-1	
L61502-1	421422-VAGW		MTHG-MID	GRND WTR	11/14/2014 9:15	11/18/2014 12:00	11/19/2014 12:19	WG136179-1,-2,-3,-4	
L61502-1	421422-VAGW		MTHG-MID-DISS	GRND WTR	11/14/2014 9:15	11/18/2014 12:00	11/19/2014 12:17	WG136179-1	
L61502-2	421422-VAGW		MTHG-MID	GRND WTR	11/14/2014 10:10	11/18/2014 12:00	11/19/2014 12:22	WG136179-1,-2,-3,-4	
L61502-2	421422-VAGW		MTHG-MID-DISS	GRND WTR	11/14/2014 10:10	11/18/2014 12:00	11/19/2014 12:21	WG136179-1	
L61502-12	421422-VAGW		MTHG-MID	GRND WTR	11/13/2014 11:15	11/18/2014 12:00	11/19/2014 12:30	WG136179-1,-2,-3,-4	
L61502-12	421422-VAGW		MTHG-MID-DISS	GRND WTR	11/13/2014 11:15	11/18/2014 12:00	11/19/2014 12:28	WG136179-1	
L61502-15	421422-VAGW		MTHG-MID	GRND WTR	11/13/2014 9:58	11/18/2014 12:00	11/19/2014 12:33	WG136179-1,-2,-3,-4	
L61502-15	421422-VAGW		MTHG-MID-DISS	GRND WTR	11/13/2014 9:58	11/18/2014 12:00	11/19/2014 12:31	WG136179-1	
L61502-17	421422-VAGW		MTHG-MID	GRND WTR	11/14/2014 8:45	11/18/2014 12:00	11/19/2014 12:37	WG136179-1,-2,-3,-4	
L61502-17	421422-VAGW		MTHG-MID-DISS	GRND WTR	11/14/2014 8:45	11/18/2014 12:00	11/19/2014 12:35	WG136179-1	
L61502-20	421422-VAGW		MTHG-MID	GRND WTR	11/10/2014 10:35	11/18/2014 12:00	11/19/2014 12:40	WG136179-1,-2,-3,-4	
L61502-20	421422-VAGW		MTHG-MID-DISS	GRND WTR	11/10/2014 10:35	11/18/2014 12:00	11/19/2014 12:38	WG136179-1	
L61592-21	421250-800	Marine Fish Tissue Tox	MTHG-MID	BLANK WTR	10/30/2014 9:00	11/18/2014 12:00	11/19/2014 12:42	WG136179-1,-2,-3,-4	
L61592-22	421250-800		MTHG-MID	BLANK WTR	10/30/2014 9:00	11/18/2014 12:00	11/19/2014 12:44		
L61592-23	421250-800		MTHG-MID	BLANK WTR	11/3/2014 9:00	11/18/2014 12:00	11/19/2014 12:49		
L61592-24	421250-800		MTHG-MID	BLANK WTR	11/3/2014 9:00	11/18/2014 12:00	11/19/2014 12:51		
L61592-25	421250-800		MTHG-MID	BLANK WTR	11/4/2014 9:00	11/18/2014 12:00	11/19/2014 12:53		
L61592-26	421250-800		MTHG-MID	BLANK WTR	11/4/2014 9:00	11/18/2014 12:00	11/19/2014 12:55		
WG136179-1	MB		MTHG-MID	BLANK WTR		11/18/2014 12:00	11/19/2014 12:06		MB
WG136179-1	MB		MTHG-MID-DISS	BLANK WTR		11/18/2014 12:00	11/19/2014 12:06	WG136179-1	MB
WG136179-2	SB		MTHG-MID	BLANK WTR		11/18/2014 12:00	11/19/2014 12:08	WG136179-1,-2,-3,-4	WG136179-1 HG-LMID
WG136179-3	MS		MTHG-MID	GRND WTR		11/18/2014 12:00	11/19/2014 12:13		L61422-6 HG-LMID
WG136179-4	MSD		MTHG-MID	GRND WTR		11/18/2014 12:00	11/19/2014 12:15		WG136179-3 L61422-6 HG-LMID-MSD

# King County Environmental Laboratory Batch Report

WG136696 Total Mercury - Tissue

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61592-1	421250-800	Marine Fish Tissue Tox	MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 10:36	WG136696-1,-2,-3,-4,-5,-6	
L61592-2	421250-800		MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 10:41		
L61592-3	421250-800		MTHG-TISS	SHELLFISH	10/1/2014 9:00	12/17/2014 10:30	12/30/2014 10:43		
L61592-4	421250-800		MTHG-TISS	SHELLFISH	10/1/2014 9:00	12/17/2014 10:30	12/30/2014 11:33		
L61592-5	421250-800		MTHG-TISS	SHELLFISH	10/1/2014 9:00	12/17/2014 10:30	12/30/2014 10:59		
L61592-6	421250-800		MTHG-TISS	SHELLFISH	10/1/2014 9:00	12/17/2014 10:30	12/30/2014 11:01		
L61592-7	421250-800		MTHG-TISS	SHELLFISH	10/1/2014 9:00	12/17/2014 10:30	12/30/2014 11:03		
L61592-8	421250-800		MTHG-TISS	SHELLFISH	10/9/2014 9:00	12/17/2014 10:30	12/30/2014 11:05		
L61592-9	421250-800		MTHG-TISS	SHELLFISH	10/9/2014 9:00	12/17/2014 10:30	12/30/2014 11:07		
L61592-10	421250-800		MTHG-TISS	SHELLFISH	10/9/2014 9:00	12/17/2014 10:30	12/30/2014 11:08		
L61592-11	421250-800		MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 11:10		
L61592-12	421250-800		MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 11:12		
L61592-13	421250-800		MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 11:14		
L61592-14	421250-800		MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 11:16		
L61592-15	421250-800		MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 11:22		
L61592-16	421250-800		MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 11:24		
L61592-17	421250-800		MTHG-TISS	SHELLFISH	10/2/2014 9:00	12/17/2014 10:30	12/30/2014 11:26		
L61592-18	421250-800		MTHG-TISS	SHELLFISH	10/9/2014 9:00	12/17/2014 10:30	12/30/2014 11:28		
L61592-19	421250-800		MTHG-TISS	SHELLFISH	10/9/2014 9:00	12/17/2014 10:30	12/30/2014 11:29		
L61592-20	421250-800		MTHG-TISS	SHELLFISH	10/9/2014 9:00	12/17/2014 10:30	12/30/2014 11:31		
WG136696-1	MB		MTHG-TISS	TISS BLANK		12/17/2014 10:30	12/30/2014 10:29		MB
WG136696-2	SB		MTHG-TISS	TISS BLANK		12/17/2014 10:30	12/30/2014 10:31		WG136696-1 HG-TISS
WG136696-3	MS		MTHG-TISS	SHELLFISH		12/17/2014 10:30	12/30/2014 10:32		L61592-1 HG-TISS
WG136696-4	LD		MTHG-TISS	SHELLFISH		12/17/2014 10:30	12/30/2014 10:34		L61592-1 RPD-TISS
WG136696-5	LCS		MTHG-TISS	SHELLFISH		12/17/2014 10:30	12/30/2014 10:38		MUSSEL
WG136696-6	LCSD		MTHG-TISS	SHELLFISH		12/17/2014 10:30	12/30/2014 10:40		WG136696-5 MUSSEL

# King County Environmental Laboratory Batch Report

WG136628 Total Metals - Water

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61592-21	421250-800	Marine Fish Tissue Tox	MTICPMS	BLANK WTR	10/30/2014 9:00	12/15/2014 14:00	12/22/2014 9:23	WG136628-1,-2,-3,-4	
L61592-22	421250-800		MTICPMS	BLANK WTR	10/30/2014 9:00	12/15/2014 14:00	12/22/2014 9:40		
L61592-23	421250-800		MTICPMS	BLANK WTR	11/3/2014 9:00	12/15/2014 14:00	12/22/2014 9:46		
L61592-24	421250-800		MTICPMS	BLANK WTR	11/3/2014 9:00	12/15/2014 14:00	12/22/2014 10:09		
L61592-25	421250-800		MTICPMS	BLANK WTR	11/4/2014 9:00	12/15/2014 14:00	12/22/2014 10:15		
L61592-26	421250-800		MTICPMS	BLANK WTR	11/4/2014 9:00	12/15/2014 14:00	12/22/2014 10:21		
WG136628-1	MB		MTICPMS	BLANK WTR		12/15/2014 14:00	12/22/2014 9:12		METHOD BLANK
WG136628-2	SB		MTICPMS	BLANK WTR		12/15/2014 14:00	12/22/2014 9:17		WG136628-1 MS-20
WG136628-3	LD		MTICPMS	BLANK WTR		12/15/2014 14:00	12/22/2014 9:29		L61592-21 RPD-LIQ
WG136628-4	MS		MTICPMS	BLANK WTR		12/15/2014 14:00	12/22/2014 9:35		L61592-21 MS-20

# King County Environmental Laboratory Batch Report

WG136415 Total Metals - Tissue

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61592-1	421250-800	Marine Fish Tissue Tox	MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 15:38	WG136415-1,-2,-3,-4,-5,-6	
L61592-2	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 15:43		
L61592-3	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/3/2014 13:00	12/11/2014 15:49		
L61592-4	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/3/2014 13:00	12/11/2014 15:54		
L61592-5	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/3/2014 13:00	12/11/2014 16:22		
L61592-6	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/3/2014 13:00	12/11/2014 16:28		
L61592-7	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/3/2014 13:00	12/11/2014 16:33		
L61592-8	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/3/2014 13:00	12/11/2014 16:39		
L61592-9	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/3/2014 13:00	12/11/2014 16:45		
L61592-10	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/3/2014 13:00	12/11/2014 16:50		
L61592-11	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 16:56		
L61592-12	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 17:01		
L61592-13	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 17:07		
L61592-14	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 17:13		
L61592-15	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 17:29		
L61592-16	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 17:35		
L61592-17	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/3/2014 13:00	12/11/2014 17:41		
L61592-18	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/3/2014 13:00	12/11/2014 17:46		
L61592-19	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/3/2014 13:00	12/11/2014 17:52		
L61592-20	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/3/2014 13:00	12/11/2014 17:57		
WG136415-1	MB		MTICPMS-TISS	TISS BLANK		12/3/2014 13:00	12/11/2014 15:15		METHOD BLANK
WG136415-2	SB		MTICPMS-TISS	TISS BLANK		12/3/2014 13:00	12/11/2014 15:20		WG136415-1 MS-100
WG136415-3	SRM		MTICPMS-TISS	ORGANS		12/3/2014 13:00	12/11/2014 15:26		TORT2
WG136415-4	SRMD		MTICPMS-TISS	ORGANS		12/3/2014 13:00	12/11/2014 15:32		WG136415-3 TORT2 RPD-TISS
WG136415-5	LD		MTICPMS-TISS	SHELLFISH		12/3/2014 13:00	12/11/2014 16:00		L61592-4 RPD-TISS
WG136415-6	MS		MTICPMS-TISS	SHELLFISH		12/3/2014 13:00	12/11/2014 16:05		L61592-4 MS-100

# King County Environmental Laboratory Batch Report

WG136656 Total Metals, Nickel Only - Tissue

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61592-1	421250-800	Marine Fish Tissue Tox	MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 11:35	WG136656-1,-2,-3,-4,-5,-6	
L61592-2	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 11:40		
L61592-3	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/16/2014 14:00	12/18/2014 11:44		
L61592-4	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/16/2014 14:00	12/18/2014 11:48		
L61592-5	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/16/2014 14:00	12/18/2014 12:09		
L61592-6	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/16/2014 14:00	12/18/2014 12:14		
L61592-7	421250-800		MTICPMS-TISS	SHELLFISH	10/1/2014 9:00	12/16/2014 14:00	12/18/2014 12:18		
L61592-8	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/16/2014 14:00	12/18/2014 12:22		
L61592-9	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/16/2014 14:00	12/18/2014 12:26		
L61592-10	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/16/2014 14:00	12/18/2014 12:31		
L61592-11	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 12:35		
L61592-12	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 12:39		
L61592-13	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 12:43		
L61592-14	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 12:48		
L61592-15	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 13:01		
L61592-16	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 13:05		
L61592-17	421250-800		MTICPMS-TISS	SHELLFISH	10/2/2014 9:00	12/16/2014 14:00	12/18/2014 13:09		
L61592-18	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/16/2014 14:00	12/18/2014 13:13		
L61592-19	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/16/2014 14:00	12/18/2014 13:18		
L61592-20	421250-800		MTICPMS-TISS	SHELLFISH	10/9/2014 9:00	12/16/2014 14:00	12/18/2014 13:22		
WG136656-1	MB		MTICPMS-TISS	TISS BLANK		12/16/2014 14:00	12/18/2014 11:18		METHOD BLANK
WG136656-2	SB		MTICPMS-TISS	TISS BLANK		12/16/2014 14:00	12/18/2014 11:22		WG136656-1 MS-100
WG136656-3	SRM		MTICPMS-TISS	FISH		12/16/2014 14:00	12/18/2014 11:27		TORT2
WG136656-4	SRMD		MTICPMS-TISS	FISH		12/16/2014 14:00	12/18/2014 11:31		WG136656-3 TORT2 RPD-TISS
WG136656-5	LD		MTICPMS-TISS	FISH		12/16/2014 14:00	12/18/2014 11:52		L61592-4 RPD-TISS
WG136656-6	MS		MTICPMS-TISS	FISH		12/16/2014 14:00	12/18/2014 11:57		L61592-4 MS-100



# King County Environmental Laboratory Batch Report

WG137160 Lipids

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61592-1	421250-800	Marine Fish Tissue Tox	ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39	WG137160-1,-2,-3	
L61592-2	421250-800		ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-3	421250-800		ORLIPIDS	SHELLFISH	10/1/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-4	421250-800		ORLIPIDS	SHELLFISH	10/1/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-5	421250-800		ORLIPIDS	SHELLFISH	10/1/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-6	421250-800		ORLIPIDS	SHELLFISH	10/1/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-7	421250-800		ORLIPIDS	SHELLFISH	10/1/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-8	421250-800		ORLIPIDS	SHELLFISH	10/9/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-9	421250-800		ORLIPIDS	SHELLFISH	10/9/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-10	421250-800		ORLIPIDS	SHELLFISH	10/9/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-11	421250-800		ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-12	421250-800		ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-13	421250-800		ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-14	421250-800		ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-15	421250-800		ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-16	421250-800		ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-17	421250-800		ORLIPIDS	SHELLFISH	10/2/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-18	421250-800		ORLIPIDS	SHELLFISH	10/9/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-19	421250-800		ORLIPIDS	SHELLFISH	10/9/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
L61592-20	421250-800		ORLIPIDS	SHELLFISH	10/9/2014 9:00	1/21/2015 17:00	1/22/2015 14:39		
WG137160-1	MB		ORLIPIDS	OTHR TISS		1/21/2015 17:00	1/22/2015 14:39		MB150121
WG137160-2	LD		ORLIPIDS	SHELLFISH		1/21/2015 17:00	1/22/2015 14:39		L61592-2
WG137160-3	LD		ORLIPIDS	SHELLFISH		1/21/2015 17:00	1/22/2015 14:39		L61592-4

# King County Environmental Laboratory Batch Report

WG137277 PCB

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61592-1	421250-800	Marine Fish Tissue Tox	ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 11:20	WG137277-1,-2,-3,-4,-5	
L61592-2	421250-800		ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 11:36		
L61592-3	421250-800		ORPCB	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 11:51		
L61592-4	421250-800		ORPCB	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 12:06		
L61592-5	421250-800		ORPCB	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 10:34		
L61592-6	421250-800		ORPCB	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 11:05		
L61592-7	421250-800		ORPCB	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 12:22		
L61592-8	421250-800		ORPCB	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 12:37		
L61592-9	421250-800		ORPCB	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 12:53		
L61592-10	421250-800		ORPCB	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 13:08		
L61592-11	421250-800		ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 13:54		
L61592-12	421250-800		ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 14:10		
L61592-13	421250-800		ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 14:25		
L61592-14	421250-800		ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 14:41		
L61592-15	421250-800		ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 14:56		
L61592-16	421250-800		ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 15:11		
L61592-17	421250-800		ORPCB	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 15:27		
L61592-18	421250-800		ORPCB	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 15:42		
L61592-19	421250-800		ORPCB	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 15:58		
L61592-20	421250-800		ORPCB	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 16:13		
WG137277-1	MB		ORPCB	OTHR TISS		1/27/2015 17:00	2/5/2015 9:32		MB150127
WG137277-2	SB		ORPCB	OTHR TISS		1/27/2015 17:00	2/5/2015 9:48		WG137277-1
WG137277-3	MS		ORPCB	SHELLFISH		1/27/2015 17:00	2/5/2015 10:03		L61592-5
WG137277-4	MSD		ORPCB	SHELLFISH		1/27/2015 17:00	2/5/2015 10:18		WG137277-3 L61592-5
WG137277-5	LD		ORPCB	SHELLFISH		1/27/2015 17:00	2/5/2015 10:49		L61592-6

# King County Environmental Laboratory Batch Report

WG137276 PCB Homolog

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61592-1	421250-800	Marine Fish Tissue Tox	ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/4/2015 21:53	WG137276-1,-2,-3,-4,-5,-6	
L61592-2	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/4/2015 22:49		
L61592-3	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/4/2015 23:45		
L61592-4	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 0:41		
L61592-5	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 8:46		
L61592-6	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 9:42		
L61592-7	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/1/2014 9:00	1/27/2015 17:00	2/5/2015 10:38		
L61592-8	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 11:34		
L61592-9	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 12:30		
L61592-10	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/5/2015 13:27		
L61592-11	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 14:23		
L61592-12	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 15:19		
L61592-13	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 16:15		
L61592-14	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/5/2015 17:11		
L61592-15	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/6/2015 8:26		
L61592-16	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/6/2015 9:22		
L61592-17	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/2/2014 9:00	1/27/2015 17:00	2/6/2015 10:18		
L61592-18	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/6/2015 11:14		
L61592-19	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/6/2015 12:10		
L61592-20	421250-800		ORPCB-HOMOLOG	SHELLFISH	10/9/2014 9:00	1/27/2015 17:00	2/6/2015 13:06		
WG137276-1	MB		ORPCB-HOMOLOG	OTHR TISS		1/27/2015 17:00	2/4/2015 16:16		MB150127
WG137276-2	SB		ORPCB-HOMOLOG	OTHR TISS		1/27/2015 17:00	2/4/2015 17:13		WG137276-1
WG137276-3	MS		ORPCB-HOMOLOG	SHELLFISH		1/27/2015 17:00	2/4/2015 18:09		L61592-3
WG137276-4	MSD		ORPCB-HOMOLOG	SHELLFISH		1/27/2015 17:00	2/4/2015 19:05		WG137276-3 L61592-3
WG137276-5	LD		ORPCB-HOMOLOG	SHELLFISH		1/27/2015 17:00	2/4/2015 20:01		L61592-6
WG137276-6	SRM		ORPCB-HOMOLOG	FISH		1/27/2015 17:00	2/4/2015 20:57		

King County Environmental Laboratory Analytical QC Report

Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG136995 Total Solids

MB:WG136995-1 Matrix: OTHR TISS Listtype:CVTOTS Method:SM2540-G Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Solids	0.005	0.01	%	<MDL	

LD:WG136995-2 L61592-1 Matrix: SHELLFISH Listtype:CVTOTS Method:SM2540-G Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP	LD Value	RPD	Qual	Lab Limit
				Value				
Total Solids	0.005	0.01	%	17	17.1	1		0--20

King County Environmental Laboratory Analytical QC Report

Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG136179 Total Mercury - Water

MB:WG136179-1 Matrix: BLANK WTR Listtype:MTHG-MID Method:EPA 245.1\*SW846 7470A Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Mercury, Total, CVAA	0.05	0.1	ug/L	<MDL	

MB:WG136179-1 Matrix: BLANK WTR Listtype:MTHG-MID-DISS Method:EPA 245.1\*SW846 7470A Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Mercury, Dissolved, CVAA	0.05	0.1	ug/L	<MDL	

SB:WG136179-2 MB:WG136179-1 Matrix: BLANK WTR Listtype:MTHG-MID Method:EPA 245.1\*SW846 7470A Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.05	0.1	ug/L	<MDL	1	0.992	99		85--115

MSD:WG136179-4 MS:WG136179-3 L61422-6 Matrix: GRND WTR Listtype:MTHG-MID Method:EPA 245.1\*SW846 7470A Project:421422-VAGW Pkey:STD  
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Mercury, Total, CVAA	0.05	0.1	ug/L	<MDL	1	0.935	94		75--125	1	0.97	97		4		0--20

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG136696 Total Mercury - Tissue

MB:WG136696-1 Matrix: TISS BLANK Listtype:MTHG-TISS Method:PSEP 1997 Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Mercury, Total, CVAA	0.0038	0.0154	mg/Kg	<MDL	

SB:WG136696-2 MB:WG136696-1 Matrix: TISS BLANK Listtype:MTHG-TISS Method:PSEP 1997 Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.0038	0.0154	mg/Kg	<MDL	0.192	0.183	95		85--115

MS:WG136696-3 L61592-1 Matrix: SHELLFISH Listtype:MTHG-TISS Method:PSEP 1997 Project:421250-800 Pkey:STD  
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.004	0.0161	mg/Kg	0.0395	0.196	0.235	100		75--125

LD:WG136696-4 L61592-1 Matrix: SHELLFISH Listtype:MTHG-TISS Method:PSEP 1997 Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual	Lab Limit
Mercury, Total, CVAA	0.004	0.0161	mg/Kg	0.0395	0.0371	6		0--20

LCSD:WG136696-6 LCS:WG136696-5 Matrix: SHELLFISH Listtype:MTHG-TISS Method:PSEP 1997 Project: Pkey:STD  
(Lab Control Sample Duplicate, Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit	True Value	LCSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Mercury, Total, CVAA	0.0099	0.0398	mg/Kg	0.101	0.0899	89		74--104	0.101	0.0905	90		1		0--20

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG136628 Total Metals - Water

MB:WG136628-1 Matrix: BLANK WTR Listtype:MTICPMS Method:EPA 200.8\*SW846 6020A Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Beryllium, Total, ICP-MS	0.1	0.5	ug/L	<MDL	
Chromium, Total, ICP-MS	0.2	1	ug/L	<MDL	
Nickel, Total, ICP-MS	0.1	0.5	ug/L	<MDL	
Copper, Total, ICP-MS	0.4	2	ug/L	<MDL	
Zinc, Total, ICP-MS	0.5	2.5	ug/L	<MDL	
Arsenic, Total, ICP-MS	0.1	0.5	ug/L	<MDL	
Selenium, Total, ICP-MS	0.5	1	ug/L	<MDL	
Silver, Total, ICP-MS	0.04	0.2	ug/L	<MDL	
Cadmium, Total, ICP-MS	0.05	0.25	ug/L	<MDL	
Thallium, Total, ICP-MS	0.04	0.2	ug/L	<MDL	
Lead, Total, ICP-MS	0.1	0.5	ug/L	<MDL	

SB:WG136628-2 MB:WG136628-1 Matrix: BLANK WTR Listtype:MTICPMS Method:EPA 200.8\*SW846 6020A Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Beryllium, Total, ICP-MS	0.1	0.5	ug/L	<MDL	20	20.3	101		85--115
Chromium, Total, ICP-MS	0.2	1	ug/L	<MDL	20	20	100		85--115
Nickel, Total, ICP-MS	0.1	0.5	ug/L	<MDL	20	20.4	102		85--115
Copper, Total, ICP-MS	0.4	2	ug/L	<MDL	20	20.1	101		85--115
Zinc, Total, ICP-MS	0.5	2.5	ug/L	<MDL	20	19.8	99		85--115
Arsenic, Total, ICP-MS	0.1	0.5	ug/L	<MDL	20	20.2	101		85--115
Selenium, Total, ICP-MS	0.5	1	ug/L	<MDL	20	20.5	103		85--115
Silver, Total, ICP-MS	0.04	0.2	ug/L	<MDL	20	20.3	102		85--115
Cadmium, Total, ICP-MS	0.05	0.25	ug/L	<MDL	20	20.3	101		85--115
Thallium, Total, ICP-MS	0.04	0.2	ug/L	<MDL	20	19.5	98		85--115
Lead, Total, ICP-MS	0.1	0.5	ug/L	<MDL	20	19.4	97		85--115

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

LD:WG136628-3 L61592-21 Matrix: BLANK WTR Listtype:MTICPMS Method:EPA 200.8\*SW846 6020A Project:421250-800 Pkey:STD

(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP	LD Value	RPD	Qual	Lab Limit
				Value				
Beryllium, Total, ICP-MS	0.1	0.5	ug/L	<MDL	<MDL			0--20
Chromium, Total, ICP-MS	0.2	1	ug/L	0.5	0.41			0--20
Nickel, Total, ICP-MS	0.1	0.5	ug/L	1.91	1.73	10		0--20
Copper, Total, ICP-MS	0.4	2	ug/L	0.45	0.55			0--20
Zinc, Total, ICP-MS	0.5	2.5	ug/L	3.69	3.7	0		0--20
Arsenic, Total, ICP-MS	0.1	0.5	ug/L	<MDL	<MDL			0--20
Selenium, Total, ICP-MS	0.5	1	ug/L	<MDL	<MDL			0--20
Silver, Total, ICP-MS	0.04	0.2	ug/L	<MDL	<MDL			0--20
Cadmium, Total, ICP-MS	0.05	0.25	ug/L	<MDL	<MDL			0--20
Thallium, Total, ICP-MS	0.04	0.2	ug/L	<MDL	<MDL			0--20
Lead, Total, ICP-MS	0.1	0.5	ug/L	<MDL	<MDL			0--20

MS:WG136628-4 L61592-21 Matrix: BLANK WTR Listtype:MTICPMS Method:EPA 200.8\*SW846 6020A Project:421250-800 Pkey:STD

(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP	True	MS Value	% Rec.	Qual	Lab Limit
				Value	Value				
Beryllium, Total, ICP-MS	0.1	0.5	ug/L	<MDL	20	19.8	99		75--125
Chromium, Total, ICP-MS	0.2	1	ug/L	0.5	20	19.6	95		75--125
Nickel, Total, ICP-MS	0.1	0.5	ug/L	1.91	20	21.5	98		75--125
Copper, Total, ICP-MS	0.4	2	ug/L	0.45	20	19.9	97		75--125
Zinc, Total, ICP-MS	0.5	2.5	ug/L	3.69	20	23.2	97		75--125
Arsenic, Total, ICP-MS	0.1	0.5	ug/L	<MDL	20	19.2	96		75--125
Selenium, Total, ICP-MS	0.5	1	ug/L	<MDL	20	19	95		75--125
Silver, Total, ICP-MS	0.04	0.2	ug/L	<MDL	20	19.7	99		75--125
Cadmium, Total, ICP-MS	0.05	0.25	ug/L	<MDL	20	19.4	97		75--125
Thallium, Total, ICP-MS	0.04	0.2	ug/L	<MDL	20	19	95		75--125
Lead, Total, ICP-MS	0.1	0.5	ug/L	<MDL	20	19	95		75--125



# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG136415 Total Metals - Tissue

MB:WG136415-1 Matrix: TISS BLANK Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Chromium, Total, ICP-MS	0.0077	0.0385	mg/Kg	<MDL	
Copper, Total, ICP-MS	0.015	0.0769	mg/Kg	<MDL	
Zinc, Total, ICP-MS	0.096	0.481	mg/Kg	<MDL	
Arsenic, Total, ICP-MS	0.019	0.0962	mg/Kg	<MDL	
Selenium, Total, ICP-MS	0.096	0.481	mg/Kg	<MDL	
Silver, Total, ICP-MS	0.0015	0.00769	mg/Kg	<MDL	
Cadmium, Total, ICP-MS	0.0019	0.00962	mg/Kg	<MDL	
Thallium, Total, ICP-MS	0.0015	0.00769	mg/Kg	<MDL	
Lead, Total, ICP-MS	0.0038	0.0192	mg/Kg	<MDL	

SB:WG136415-2 MB:WG136415-1 Matrix: TISS BLANK Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Chromium, Total, ICP-MS	0.0077	0.0385	mg/Kg	<MDL	0.769	0.761	99		85--115
Copper, Total, ICP-MS	0.015	0.0769	mg/Kg	<MDL	0.769	0.756	98		85--115
Zinc, Total, ICP-MS	0.096	0.481	mg/Kg	<MDL	0.769	0.708	92		85--115
Arsenic, Total, ICP-MS	0.019	0.0962	mg/Kg	<MDL	0.769	0.708	92		85--115
Selenium, Total, ICP-MS	0.096	0.481	mg/Kg	<MDL	0.769	0.724	94		85--115
Silver, Total, ICP-MS	0.0015	0.00769	mg/Kg	<MDL	0.769	0.762	99		85--115
Cadmium, Total, ICP-MS	0.0019	0.00962	mg/Kg	<MDL	0.769	0.706	92		85--115
Thallium, Total, ICP-MS	0.0015	0.00769	mg/Kg	<MDL	0.769	0.782	102		85--115
Lead, Total, ICP-MS	0.0038	0.0192	mg/Kg	<MDL	0.769	0.762	99		85--115

SRMD:WG136415-4 SRM:WG136415-3 Matrix: ORGANS Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD  
(Std Reference Material Duplicate, Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit	True Value	SRMD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Chromium, Total, ICP-MS	0.041	0.206	mg/Kg	0.77	0.332	43	*	80--120	0.77	0.326	42	*	2		0--20
Copper, Total, ICP-MS	0.082	0.412	mg/Kg	106	95.6	90		80--120	106	93.8	88		2		0--20
Zinc, Total, ICP-MS	0.51	2.57	mg/Kg	180	168	93		80--120	180	173	96		3		0--20
Arsenic, Total, ICP-MS	0.1	0.514	mg/Kg	21.6	20	93		80--120	21.6	19.3	89		3		0--20
Selenium, Total, ICP-MS	0.51	2.57	mg/Kg	5.63	5.57	99		80--120	5.63	5.34	95		4		0--20
Cadmium, Total, ICP-MS	0.01	0.0514	mg/Kg	26.7	24.7	93		80--120	26.7	24	90		3		0--20
Lead, Total, ICP-MS	0.021	0.103	mg/Kg	0.35	0.344	98		80--120	0.35	0.326	93		5		0--20

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

LD:WG136415-5 L61592-4 Matrix: SHELLFISH Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP		RPD	Qual	Lab Limit
				Value	LD Value			
Chromium, Total, ICP-MS	0.008	0.0401	mg/Kg	0.015	0.015			0--20
Copper, Total, ICP-MS	0.016	0.0802	mg/Kg	9.38	9.53	2		0--20
Zinc, Total, ICP-MS	0.1	0.501	mg/Kg	37.6	39.4	5		0--20
Arsenic, Total, ICP-MS	0.02	0.1	mg/Kg	5.74	5.64	2		0--20
Selenium, Total, ICP-MS	0.1	0.501	mg/Kg	0.35	0.35			0--20
Silver, Total, ICP-MS	0.0016	0.00802	mg/Kg	0.194	0.195	0		0--20
Cadmium, Total, ICP-MS	0.002	0.01	mg/Kg	0.0154	0.0154	0		0--20
Thallium, Total, ICP-MS	0.0016	0.00802	mg/Kg	<MDL	<MDL			0--20
Lead, Total, ICP-MS	0.004	0.02	mg/Kg	0.015	0.015			0--20

MS:WG136415-6 L61592-4 Matrix: SHELLFISH Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project:421250-800 Pkey:STD  
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP		MS Value	% Rec.	Qual	Lab Limit
				Value	True Value				
Chromium, Total, ICP-MS	0.008	0.0401	mg/Kg	0.015	0.803	0.785	96		75--125
Copper, Total, ICP-MS	0.016	0.0802	mg/Kg	9.38	0.803	10.5		4xRule	75--125
Zinc, Total, ICP-MS	0.1	0.501	mg/Kg	37.6	0.803	41.4		4xRule	75--125
Arsenic, Total, ICP-MS	0.02	0.1	mg/Kg	5.74	0.803	6.74		4xRule	75--125
Selenium, Total, ICP-MS	0.1	0.501	mg/Kg	0.35	0.803	1.19	104		75--125
Silver, Total, ICP-MS	0.0016	0.00802	mg/Kg	0.194	0.803	1.02	103		75--125
Cadmium, Total, ICP-MS	0.002	0.01	mg/Kg	0.0154	0.803	0.745	91		75--125
Thallium, Total, ICP-MS	0.0016	0.00802	mg/Kg	<MDL	0.803	0.769	96		75--125
Lead, Total, ICP-MS	0.004	0.02	mg/Kg	0.015	0.803	0.755	92		75--125

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG136656 Total Metals, Nickel Only - Tissue

MB:WG136656-1 Matrix: TISS BLANK Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Beryllium, Total, ICP-MS	0.0038	0.0192	mg/Kg	<MDL	
Nickel, Total, ICP-MS	0.019	0.0962	mg/Kg	<MDL	

SB:WG136656-2 MB:WG136656-1 Matrix: TISS BLANK Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Beryllium, Total, ICP-MS	0.0038	0.0192	mg/Kg	<MDL	0.769	0.708	92		85--115
Nickel, Total, ICP-MS	0.019	0.0962	mg/Kg	<MDL	0.769	0.775	101		85--115

SRMD:WG136656-4 SRM:WG136656-3 Matrix: FISH Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD  
(Std Reference Material Duplicate, Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit	True Value	SRMD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Nickel, Total, ICP-MS	0.11	0.553	mg/Kg	2.5	2.1	84		80--120	2.5	2.14	86		2		0--20

LD:WG136656-5 L61592-4 Matrix: FISH Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual	Lab Limit
Beryllium, Total, ICP-MS	0.0041	0.0203	mg/Kg	<MDL	<MDL			0--20
Nickel, Total, ICP-MS	0.02	0.102	mg/Kg	0.023	0.023			0--20

MS:WG136656-6 L61592-4 Matrix: FISH Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project:421250-800 Pkey:STD  
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Beryllium, Total, ICP-MS	0.0041	0.0203	mg/Kg	<MDL	0.822	0.678	82		75--125
Nickel, Total, ICP-MS	0.02	0.102	mg/Kg	0.023	0.822	0.838	99		75--125

King County Environmental Laboratory Analytical QC Report

Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG137160 Lipids

MB:WG137160-1 Matrix: OTHR TISS Listtype:ORLIPIDS Method:GRAVIMETRIC SOP 740v2 Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Percent Lipids	0.05	0.1	%	<MDL	

LD:WG137160-2 L61592-2 Matrix: SHELLFISH Listtype:ORLIPIDS Method:GRAVIMETRIC SOP 740v2 Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP		RPD	Qual	Lab Limit
				Value	LD Value			
Percent Lipids	0.05	0.1	%	0.565	0.495	13		0--20

LD:WG137160-3 L61592-4 Matrix: SHELLFISH Listtype:ORLIPIDS Method:GRAVIMETRIC SOP 740v2 Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP		RPD	Qual	Lab Limit
				Value	LD Value			
Percent Lipids	0.05	0.1	%	0.407	0.419	3		0--20

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG137277 PCB

MB:WG137277-1 Matrix: OTHR TISS Listtype:ORPCB Method:SW846 3540C\*SW846 8082A Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Aroclor 1016	4	16	ug/Kg	<MDL	
Aroclor 1221	12	16	ug/Kg	<MDL	
Aroclor 1232	12	16	ug/Kg	<MDL	
Aroclor 1242	4	16	ug/Kg	<MDL	
Aroclor 1248	4	16	ug/Kg	<MDL	
Aroclor 1254	4	16	ug/Kg	<MDL	
Aroclor 1260	4	16	ug/Kg	<MDL	
Total Aroclors	12	16	ug/Kg	<MDL	

SB:WG137277-2 MB:WG137277-1 Matrix: OTHR TISS Listtype:ORPCB Method:SW846 3540C\*SW846 8082A Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Aroclor 1242	4	16	ug/Kg	<MDL	320	271	85		50--150
Aroclor 1260	4	16	ug/Kg	<MDL	320	340	106		50--150

MSD:WG137277-4 MS:WG137277-3 L61592-5 Matrix: SHELLFISH Listtype:ORPCB Method:SW846 3540C\*SW846 8082A Project:421250-800 Pkey:STD  
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Aroclor 1242	4	16	ug/Kg	<MDL	320	282	88		50--150	320	280	87		1		0--35
Aroclor 1260	4	16	ug/Kg	9	320	338	103		50--150	320	337	103		0		0--35

LD:WG137277-5 L61592-6 Matrix: SHELLFISH Listtype:ORPCB Method:SW846 3540C\*SW846 8082A Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual	Lab Limit
Aroclor 1016	4	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1221	12	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1232	12	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1242	4	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1248	4	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1254	4	16	ug/Kg	5.3	5.6			0--35
Aroclor 1260	4	16	ug/Kg	4.5	5.1			0--35
Total Aroclors	4	16	ug/Kg	9.8	10.7			0--35

## King County Environmental Laboratory Analytical QC Report

## Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Surrogate: (Lab Limits)	2,4,5,6- Tetra chloro m- xylene 30--120	Deca chloro biphenyl 50--150
L61592-1	99	121
L61592-2	95	110
L61592-3	91	110
L61592-4	92	115
L61592-5	90	112
L61592-6	92	116
L61592-7	96	114
L61592-8	88	115
L61592-9	97	113
L61592-10	95	119
L61592-11	99	110
L61592-12	97	114
L61592-13	92	115
L61592-14	101	118
L61592-15	98	107
L61592-16	96	111
L61592-17	96	123
L61592-18	95	113
L61592-19	100	119
L61592-20	93	118
WG137277-1	82	107
WG137277-2	87	111
WG137277-3	83	116
WG137277-4	92	116
WG137277-5	86	112

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

Workgroup: WG137276 PCB Homolog

MB:WG137276-1 Matrix: OTHR TISS Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Monochlorobiphenyls	0.069	0.133	ug/Kg	<MDL	
Dichlorobiphenyls	0.069	0.133	ug/Kg	<MDL	
Trichlorobiphenyls	0.069	0.133	ug/Kg	<MDL	
Tetrachlorobiphenyls	0.069	0.267	ug/Kg	<MDL	
Pentachlorobiphenyls	0.12	0.267	ug/Kg	<MDL	
Hexachlorobiphenyls	0.15	0.267	ug/Kg	<MDL	
Heptachlorobiphenyls	0.13	0.4	ug/Kg	<MDL	
Octachlorobiphenyls	0.18	0.4	ug/Kg	<MDL	
Nonachlorobiphenyls	0.18	0.4	ug/Kg	<MDL	
Total PCB Homologs	0.18	0.4	ug/Kg	<MDL	

SB:WG137276-2 MB:WG137276-1 Matrix: OTHR TISS Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Monochlorobiphenyls	0.069	0.133	ug/Kg	<MDL	53.3	43.2	81		30--150
Dichlorobiphenyls	0.069	0.133	ug/Kg	<MDL	53.3	46.2	87		30--150
Trichlorobiphenyls	0.069	0.133	ug/Kg	<MDL	53.3	47.5	89		30--150
Tetrachlorobiphenyls	0.069	0.267	ug/Kg	<MDL	107	96.6	91		30--150
Pentachlorobiphenyls	0.12	0.267	ug/Kg	<MDL	107	100	94		30--150
Hexachlorobiphenyls	0.15	0.267	ug/Kg	<MDL	107	109	102		30--150
Heptachlorobiphenyls	0.13	0.4	ug/Kg	<MDL	160	167	104		30--150
Octachlorobiphenyls	0.18	0.4	ug/Kg	<MDL	160	169	106		30--150

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Muscle, L61592

MSD:WG137276-4 MS:WG137276-3 L61592-3 Matrix: SHELLFISH Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project:421250-800 Pkey:STD  
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Monochlorobiphenyls	0.069	0.133	ug/Kg	<MDL	53.3	45.8	86		30--150	53.3	42	79		9		0--35
Dichlorobiphenyls	0.069	0.133	ug/Kg	<MDL	53.3	48.4	91		30--150	53.3	49.2	92		2		0--35
Trichlorobiphenyls	0.069	0.133	ug/Kg	<MDL	53.3	50.4	94		30--150	53.3	52.5	98		4		0--35
Tetrachlorobiphenyls	0.069	0.267	ug/Kg	0.16	107	103	96		30--150	107	107	100		4		0--35
Pentachlorobiphenyls	0.12	0.267	ug/Kg	0.879	107	104	97		30--150	107	110	102		5		0--35
Hexachlorobiphenyls	0.15	0.267	ug/Kg	1.34	107	112	103		30--150	107	119	110		6		0--35
Heptachlorobiphenyls	0.13	0.4	ug/Kg	0.18	160	170	106		30--150	160	180	112		6		0--35
Octachlorobiphenyls	0.18	0.4	ug/Kg	<MDL	160	167	105		30--150	160	179	112		7		0--35

LD:WG137276-5 L61592-6 Matrix: SHELLFISH Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual	Lab Limit
Monochlorobiphenyls	0.069	0.133	ug/Kg	<MDL	<MDL			0--35
Dichlorobiphenyls	0.069	0.133	ug/Kg	<MDL	<MDL			0--35
Trichlorobiphenyls	0.069	0.133	ug/Kg	0.092	0.098			0--35
Tetrachlorobiphenyls	0.069	0.267	ug/Kg	0.695	0.74	6		0--35
Pentachlorobiphenyls	0.12	0.267	ug/Kg	2.65	3.04	14		0--35
Hexachlorobiphenyls	0.15	0.267	ug/Kg	3.51	3.94	12		0--35
Heptachlorobiphenyls	0.13	0.4	ug/Kg	0.736	0.883	18		0--35
Octachlorobiphenyls	0.18	0.4	ug/Kg	<MDL	<MDL			0--35
Nonachlorobiphenyls	0.18	0.4	ug/Kg	<MDL	0.919	200	*	0--35
Total PCB Homologs	0.069	0.133	ug/Kg	7.683	9.62	22		0--35

SRM:WG137276-6 Matrix: FISH Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project: Pkey:STD  
(Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit
Total PCB Homologs	0.52	1	ug/Kg	1680	2057.8	122		30--150



Surrogate: (Lab Limits)	2,4,5,6- Tetra chloro m- xylene 30--150	Deca chloro biphenyl 30--150
L61592-1	85	110
L61592-2	87	110
L61592-3	88	108
L61592-4	87	111
L61592-5	93	114
L61592-6	83	114
L61592-7	88	114
L61592-8	82	111
L61592-9	84	109
L61592-10	87	114
L61592-11	87	112
L61592-12	88	115
L61592-13	83	115
L61592-14	89	112
L61592-15	91	115
L61592-16	90	118
L61592-17	90	120
L61592-18	88	120
L61592-19	90	120
L61592-20	84	114
WG137276-1	82	110
WG137276-2	83	109
WG137276-3	89	110
WG137276-4	85	114
WG137276-5	83	110
WG137276-6	81	104

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4xRule indicates no MS/MSD recovery was calculated due to the 4x rule.

King County Environmental Laboratory Analytical QC Report

Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Workgroup: WG137279 Total Solids

MB:WG137279-1 Matrix: OTHR TISS Listtype:CVTOTS Method:SM2540-G Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Solids	0.005	0.01	%	<MDL	

LD:WG137279-2 L61593-7 Matrix: ORGANS Listtype:CVTOTS Method:SM2540-G Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual Lab Limit
Total Solids	0.005	0.01	%	16.3	16.2	1	0--20

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Workgroup: WG136556 Total Mercury

MB:WG136556-1 Matrix: TISS BLANK Listtype:MTHG-TISS Method:PSEP 1997 Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Mercury, Total, CVAA	0.0038	0.0154	mg/Kg	<MDL	

SB:WG136556-2 MB:WG136556-1 Matrix: TISS BLANK Listtype:MTHG-TISS Method:PSEP 1997 Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.0038	0.0154	mg/Kg	<MDL	0.192	0.188	98		85--115

MS:WG136556-3 L61593-6 Matrix: ORGANS Listtype:MTHG-TISS Method:PSEP 1997 Project:421250-800 Pkey:STD  
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Mercury, Total, CVAA	0.0039	0.0155	mg/Kg	0.0476	0.194	0.214	86		75--125

LD:WG136556-4 L61593-6 Matrix: ORGANS Listtype:MTHG-TISS Method:PSEP 1997 Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual	Lab Limit
Mercury, Total, CVAA	0.0039	0.0155	mg/Kg	0.0476	0.046	3		0--20

SRMD:WG136556-6 SRM:WG136556-5 Matrix: ORGANS Listtype:MTHG-TISS Method:PSEP 1997 Project: Pkey:STD  
(Std Reference Material Duplicate, Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit	True Value	SRMD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Mercury, Total, CVAA	0.01	0.0399	mg/Kg	0.27	0.258	96		69--121	0.27	0.258	96		0		0--20

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Workgroup: WG136717 Total Metals

MB:WG136717-1 Matrix: TISS BLANK Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Beryllium, Total, ICP-MS	0.0096	0.0481	mg/Kg	<MDL	
Chromium, Total, ICP-MS	0.019	0.0962	mg/Kg	<MDL	
Nickel, Total, ICP-MS	0.0096	0.0481	mg/Kg	<MDL	
Copper, Total, ICP-MS	0.038	0.192	mg/Kg	<MDL	
Zinc, Total, ICP-MS	0.048	0.24	mg/Kg	<MDL	
Arsenic, Total, ICP-MS	0.0096	0.0481	mg/Kg	<MDL	
Selenium, Total, ICP-MS	0.048	0.24	mg/Kg	<MDL	
Silver, Total, ICP-MS	0.0038	0.0192	mg/Kg	<MDL	
Cadmium, Total, ICP-MS	0.0048	0.024	mg/Kg	<MDL	
Thallium, Total, ICP-MS	0.0038	0.0192	mg/Kg	<MDL	
Lead, Total, ICP-MS	0.0096	0.0481	mg/Kg	<MDL	

SB:WG136717-2 MB:WG136717-1 Matrix: TISS BLANK Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Beryllium, Total, ICP-MS	0.0096	0.0481	mg/Kg	<MDL	0.385	0.382	99		85--115
Chromium, Total, ICP-MS	0.019	0.0962	mg/Kg	<MDL	0.385	0.373	97		85--115
Nickel, Total, ICP-MS	0.0096	0.0481	mg/Kg	<MDL	0.385	0.417	109		85--115
Copper, Total, ICP-MS	0.038	0.192	mg/Kg	<MDL	0.385	0.38	99		85--115
Zinc, Total, ICP-MS	0.048	0.24	mg/Kg	<MDL	0.385	0.383	100		85--115
Arsenic, Total, ICP-MS	0.0096	0.0481	mg/Kg	<MDL	0.385	0.38	99		85--115
Selenium, Total, ICP-MS	0.048	0.24	mg/Kg	<MDL	0.385	0.371	97		85--115
Silver, Total, ICP-MS	0.0038	0.0192	mg/Kg	<MDL	0.385	0.426	111		85--115
Cadmium, Total, ICP-MS	0.0048	0.024	mg/Kg	<MDL	0.385	0.411	107		85--115
Thallium, Total, ICP-MS	0.0038	0.0192	mg/Kg	<MDL	0.385	0.419	109		85--115
Lead, Total, ICP-MS	0.0096	0.0481	mg/Kg	<MDL	0.385	0.405	105		85--115

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

SRMD:WG136717-4 SRM:WG136717-3 Matrix: SHELLFISH Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project: Pkey:STD

(Std Reference Material Duplicate, Std Reference Material)

Parameter	MDL	RDL	Units	True Value	SRM Value	% Rec.	Qual	Lab Limit	True Value	SRMD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Chromium, Total, ICP-MS	0.21	1.05	mg/Kg	0.77	0.41	53	*	80--120	0.77	0.4	53	*	1		0--20
Nickel, Total, ICP-MS	0.11	0.527	mg/Kg	2.5	2.2	88		80--120	2.5	2.22	89		1		0--20
Copper, Total, ICP-MS	0.42	2.11	mg/Kg	106	107	101		80--120	106	106	100		1		0--20
Zinc, Total, ICP-MS	0.53	2.64	mg/Kg	180	182	101		80--120	180	179	99		2		0--20
Arsenic, Total, ICP-MS	0.11	0.527	mg/Kg	21.6	21.9	102		80--120	21.6	21.9	101		0		0--20
Selenium, Total, ICP-MS	0.53	2.64	mg/Kg	5.63	6.02	107		80--120	5.63	6.04	107		0		0--20
Cadmium, Total, ICP-MS	0.053	0.264	mg/Kg	26.7	28.6	107		80--120	26.7	28.3	106		1		0--20
Lead, Total, ICP-MS	0.11	0.527	mg/Kg	0.35	0.41	116		80--120	0.35	0.44	125		* 8		0--20

LD:WG136717-5 L61593-7 Matrix: SHELLFISH Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project:421250-800 Pkey:STD

(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual	Lab Limit
Beryllium, Total, ICP-MS	0.01	0.0508	mg/Kg	<MDL	<MDL			0--20
Chromium, Total, ICP-MS	0.02	0.102	mg/Kg	0.032	0.031			0--20
Nickel, Total, ICP-MS	0.01	0.0508	mg/Kg	0.151	0.149	1		0--20
Copper, Total, ICP-MS	0.041	0.203	mg/Kg	29.8	27.1	9		0--20
Zinc, Total, ICP-MS	0.051	0.254	mg/Kg	16.6	15.8	5		0--20
Arsenic, Total, ICP-MS	0.01	0.0508	mg/Kg	4.49	4.32	4		0--20
Selenium, Total, ICP-MS	0.051	0.254	mg/Kg	1.04	0.988	5		0--20
Silver, Total, ICP-MS	0.0041	0.0203	mg/Kg	0.569	0.595	5		0--20
Cadmium, Total, ICP-MS	0.0051	0.0254	mg/Kg	0.52	0.515	1		0--20
Thallium, Total, ICP-MS	0.0041	0.0203	mg/Kg	<MDL	<MDL			0--20
Lead, Total, ICP-MS	0.01	0.0508	mg/Kg	0.0869	0.0805	8		0--20

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

MS:WG136717-6 L61593-7 Matrix: SHELLFISH Listtype:MTICPMS-TISS Method:PSEP1997\*SW846 6020A Project:421250-800 Pkey:STD  
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec. Qual	Lab Limit
Beryllium, Total, ICP-MS	0.01	0.0508	mg/Kg	<MDL	0.4	0.413	103	75--125
Chromium, Total, ICP-MS	0.02	0.102	mg/Kg	0.032	0.4	0.44	102	75--125
Nickel, Total, ICP-MS	0.01	0.0508	mg/Kg	0.151	0.4	0.574	106	75--125
Copper, Total, ICP-MS	0.041	0.203	mg/Kg	29.8	0.4	31.6	4xRule	75--125
Zinc, Total, ICP-MS	0.051	0.254	mg/Kg	16.6	0.4	17.7	4xRule	75--125
Arsenic, Total, ICP-MS	0.01	0.0508	mg/Kg	4.49	0.4	4.99	4xRule	75--125
Selenium, Total, ICP-MS	0.051	0.254	mg/Kg	1.04	0.4	1.5	114	75--125
Silver, Total, ICP-MS	0.0041	0.0203	mg/Kg	0.569	0.4	1	109	75--125
Cadmium, Total, ICP-MS	0.0051	0.0254	mg/Kg	0.52	0.4	0.95	107	75--125
Thallium, Total, ICP-MS	0.0041	0.0203	mg/Kg	<MDL	0.4	0.436	109	75--125
Lead, Total, ICP-MS	0.01	0.0508	mg/Kg	0.0869	0.4	0.505	105	75--125

King County Environmental Laboratory Analytical QC Report

Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Workgroup: WG137892 Lipids

MB:WG137892-1 Matrix: OTHR TISS Listtype:ORLIPIDS Method:GRAVIMETRIC SOP 740v2 Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Percent Lipids	0.05	0.1	%	<MDL	

LD:WG137892-2 L61593-10 Matrix: ORGANS Listtype:ORLIPIDS Method:GRAVIMETRIC SOP 740v2 Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP		RPD	Qual	Lab Limit
				Value	LD Value			
Percent Lipids	0.05	0.1	%	6.62	6.53	1		0--20

LD:WG137892-3 L61593-11 Matrix: ORGANS Listtype:ORLIPIDS Method:GRAVIMETRIC SOP 740v2 Project:421250-800 Pkey:STD  
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP		RPD	Qual	Lab Limit
				Value	LD Value			
Percent Lipids	0.05	0.1	%	5.67	6	6		0--20

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Workgroup: WG137891 PCB

MB:WG137891-1 Matrix: OTHR TISS Listtype:ORPCB Method:SW846 3540C\*SW846 8082A Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Aroclor 1016	4	16	ug/Kg	<MDL	
Aroclor 1221	12	16	ug/Kg	<MDL	
Aroclor 1232	12	16	ug/Kg	<MDL	
Aroclor 1242	4	16	ug/Kg	<MDL	
Aroclor 1248	4	16	ug/Kg	<MDL	
Aroclor 1254	4	16	ug/Kg	<MDL	
Aroclor 1260	4	16	ug/Kg	<MDL	
Total Aroclors	12	16	ug/Kg	<MDL	

SB:WG137891-2 MB:WG137891-1 Matrix: OTHR TISS Listtype:ORPCB Method:SW846 3540C\*SW846 8082A Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Aroclor 1242	4	16	ug/Kg	<MDL	317	253	80		50--150
Aroclor 1260	4	16	ug/Kg	<MDL	317	303	96		50--150

MSD:WG137891-4 MS:WG137891-3 L61593-12 Matrix: ORGANS Listtype:ORPCB Method:SW846 3540C\*SW846 8082A Project:421250-800 Pkey:STD  
(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Aroclor 1242	4	16	ug/Kg	<MDL	317	299	94		50--150	317	302	95		1		0--35
Aroclor 1260	4	16	ug/Kg	123	317	433	98		50--150	317	439	100		1		0--35



# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

LD:WG137891-5 L61593-10 Matrix: ORGANS Listtype:ORPCB Method:SW846 3540C\*SW846 8082A Project:421250-800 Pkey:STD

(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP		RPD	Qual	Lab Limit
				Value	LD Value			
Aroclor 1016	4	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1221	12	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1232	12	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1242	4	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1248	4	16	ug/Kg	<MDL	<MDL			0--35
Aroclor 1254	4	16	ug/Kg	25.5	25.7	1		0--35
Aroclor 1260	4	16	ug/Kg	31.6	32.3	2		0--35
Total Aroclors	4	16	ug/Kg	57.1	58	2		0--35

Surrogate: (Lab Limits)	2,4,5,6- Tetra chloro m- xylene 30--120	Deca chloro biphenyl 50--150
L61593-1	96	103
L61593-2	101	111
L61593-3	85	94
L61593-4	98	108
L61593-5	94	102
L61593-6	85	100
L61593-7	92	96
L61593-8	89	103
L61593-9	93	99
L61593-10	89	100
L61593-11	88	98
L61593-12	88	94
WG137891-1	83	94
WG137891-2	77	92
WG137891-3	94	104
WG137891-4	97	104
WG137891-5	96	103

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Workgroup: WG137890 PCB Homolog

MB:WG137890-1 Matrix: OTHR TISS Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project: Pkey:STD  
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Monochlorobiphenyls	0.21	0.4	ug/Kg	<MDL	
Dichlorobiphenyls	0.21	0.4	ug/Kg	<MDL	
Trichlorobiphenyls	0.21	0.4	ug/Kg	<MDL	
Tetrachlorobiphenyls	0.21	0.8	ug/Kg	<MDL	
Pentachlorobiphenyls	0.37	0.8	ug/Kg	<MDL	
Hexachlorobiphenyls	0.45	0.8	ug/Kg	<MDL	
Heptachlorobiphenyls	0.38	1.2	ug/Kg	<MDL	
Octachlorobiphenyls	0.54	1.2	ug/Kg	<MDL	
Nonachlorobiphenyls	0.54	1.2	ug/Kg	<MDL	
Total PCB Homologs	0.54	1.2	ug/Kg	<MDL	

SB:WG137890-2 MB:WG137890-1 Matrix: OTHR TISS Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project: Pkey:STD  
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Monochlorobiphenyls	0.21	0.4	ug/Kg	<MDL	160	127	79		30--150
Dichlorobiphenyls	0.21	0.4	ug/Kg	<MDL	160	137	86		30--150
Trichlorobiphenyls	0.21	0.4	ug/Kg	<MDL	160	143	89		30--150
Tetrachlorobiphenyls	0.21	0.8	ug/Kg	<MDL	320	272	85		30--150
Pentachlorobiphenyls	0.37	0.8	ug/Kg	<MDL	320	307	96		30--150
Hexachlorobiphenyls	0.45	0.8	ug/Kg	<MDL	320	315	98		30--150
Heptachlorobiphenyls	0.38	1.2	ug/Kg	<MDL	480	483	101		30--150
Octachlorobiphenyls	0.54	1.2	ug/Kg	<MDL	480	528	110		30--150

# King County Environmental Laboratory Analytical QC Report

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

MSD:WG137890-4 MS:WG137890-3 L61593-11 Matrix: ORGANS Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project:421250-800 Pkey:STD

(Matrix Spike Duplicate, Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit	True Value	MSD Value	% Rec.	Qual	RPD	Qual	Lab Limit
Monochlorobiphenyls	0.21	0.4	ug/Kg	<MDL	160	131	82		30--150	160	132	82		1		0--35
Dichlorobiphenyls	0.21	0.4	ug/Kg	<MDL	160	145	91		30--150	160	147	92		2		0--35
Trichlorobiphenyls	0.21	0.4	ug/Kg	0.688	160	154	96		30--150	160	157	98		2		0--35
Tetrachlorobiphenyls	0.21	0.8	ug/Kg	9.45	320	301	91		30--150	320	305	92		1		0--35
Pentachlorobiphenyls	0.37	0.8	ug/Kg	41.6	320	344	95		30--150	320	349	96		1		0--35
Hexachlorobiphenyls	0.45	0.8	ug/Kg	61	320	383	101		30--150	320	391	103		2		0--35
Heptachlorobiphenyls	0.38	1.2	ug/Kg	22.1	480	500	100		30--150	480	510	102		2		0--35
Octachlorobiphenyls	0.54	1.2	ug/Kg	4.24	480	516	107		30--150	480	520	108		1		0--35

LD:WG137890-5 L61593-10 Matrix: ORGANS Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project:421250-800 Pkey:STD

(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual	Lab Limit
Monochlorobiphenyls	0.21	0.4	ug/Kg	<MDL	<MDL			0--35
Dichlorobiphenyls	0.21	0.4	ug/Kg	<MDL	<MDL			0--35
Trichlorobiphenyls	0.21	0.4	ug/Kg	0.421	0.49	15		0--35
Tetrachlorobiphenyls	0.21	0.8	ug/Kg	3.96	4.05	2		0--35
Pentachlorobiphenyls	0.37	0.8	ug/Kg	16.1	16.9	5		0--35
Hexachlorobiphenyls	0.45	0.8	ug/Kg	20.5	20.6	1		0--35
Heptachlorobiphenyls	0.38	1.2	ug/Kg	7.04	7.18	2		0--35
Octachlorobiphenyls	0.54	1.2	ug/Kg	1.54	0.72	73	*	0--35
Nonachlorobiphenyls	0.54	1.2	ug/Kg	4.77	<MDL	200	*	0--35
Total PCB Homologs	0.21	0.4	ug/Kg	54.331	49.94	8		0--35

LCS:WG137890-6 Matrix: FISH Listtype:ORPCB-HOMOLOG Method:SW846 3540C\*EPA 680 SIM Project: Pkey:STD

(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Total PCB Homologs	0.52	1	ug/Kg	1680	1627.4	97		30--150

Surrogate: (Lab Limits)	2,4,5,6- Tetra chloro m- xylene 30--150	Deca chloro biphenyl 30--150
L61593-1	76	95
L61593-2	76	99
L61593-3	68	88
L61593-4	72	93
L61593-5	76	96
L61593-6	69	95
L61593-7	72	92
L61593-8	71	100
L61593-9	74	94
L61593-10	73	100
L61593-11	71	92
L61593-12	71	89
WG137890-1	71	96
WG137890-2	77	110
WG137890-3	81	103
WG137890-4	82	105
WG137890-5	78	101
WG137890-6	64	86

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4xRule indicates no MS/MSD recovery was calculated due to the 4x rule.

# King County Environmental Laboratory Batch Report

WG137279 Total Solids

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61593-1	421250-800	Marine Fish Tissue Tox	CVTOTS	ORGANS	10/2/2014 9:00	1/27/2015 14:35	1/28/2015 10:39	WG137279-1,-2	
L61593-2	421250-800		CVTOTS	ORGANS	10/2/2014 9:00	1/27/2015 14:35	1/28/2015 10:39		
L61593-3	421250-800		CVTOTS	ORGANS	10/2/2014 9:00	1/27/2015 14:35	1/28/2015 10:40		
L61593-4	421250-800		CVTOTS	ORGANS	10/1/2014 9:00	1/27/2015 14:35	1/28/2015 10:41		
L61593-5	421250-800		CVTOTS	ORGANS	10/2/2014 9:00	1/27/2015 14:35	1/28/2015 10:41		
L61593-6	421250-800		CVTOTS	ORGANS	10/1/2014 9:00	1/27/2015 14:35	1/28/2015 10:41		
L61593-7	421250-800		CVTOTS	ORGANS	10/1/2014 9:00	1/27/2015 14:35	1/28/2015 10:42		
L61593-8	421250-800		CVTOTS	ORGANS	10/1/2014 9:00	1/27/2015 14:35	1/28/2015 10:43		
L61593-9	421250-800		CVTOTS	ORGANS	10/9/2014 9:00	1/27/2015 14:35	1/28/2015 10:43		
L61593-10	421250-800		CVTOTS	ORGANS	10/9/2014 9:00	1/27/2015 14:35	1/28/2015 10:43		
L61593-11	421250-800		CVTOTS	ORGANS	10/9/2014 9:00	1/27/2015 14:35	1/28/2015 10:44		
L61593-12	421250-800		CVTOTS	ORGANS	10/9/2014 9:00	1/27/2015 14:35	1/28/2015 10:45		
WG137279-1	MB		CVTOTS	OTHR TISS		1/27/2015 14:35	1/28/2015 10:39		MB1 1/27/15
WG137279-2	LD		CVTOTS	ORGANS		1/27/2015 14:35	1/28/2015 10:42		L61593-7

# King County Environmental Laboratory Batch Report

WG136556 Total Mercury

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61593-1	421250-800	Marine Fish Tissue Tox	MTHG-TISS	ORGANS	10/2/2014 9:00	12/11/2014 11:00	12/29/2014 12:09	WG136556-1,-2,-3,-4,-5,-6	
L61593-2	421250-800		MTHG-TISS	ORGANS	10/2/2014 9:00	12/11/2014 11:00	12/29/2014 12:10		
L61593-3	421250-800		MTHG-TISS	ORGANS	10/2/2014 9:00	12/11/2014 11:00	12/29/2014 12:12		
L61593-4	421250-800		MTHG-TISS	ORGANS	10/1/2014 9:00	12/11/2014 11:00	12/29/2014 12:14		
L61593-5	421250-800		MTHG-TISS	ORGANS	10/2/2014 9:00	12/11/2014 11:00	12/29/2014 12:16		
L61593-6	421250-800		MTHG-TISS	ORGANS	10/1/2014 9:00	12/11/2014 11:00	12/29/2014 12:22		
L61593-7	421250-800		MTHG-TISS	ORGANS	10/1/2014 9:00	12/11/2014 11:00	12/29/2014 12:28		
L61593-8	421250-800		MTHG-TISS	ORGANS	10/1/2014 9:00	12/11/2014 11:00	12/29/2014 12:30		
L61593-9	421250-800		MTHG-TISS	ORGANS	10/9/2014 9:00	12/11/2014 11:00	12/29/2014 12:31		
L61593-10	421250-800		MTHG-TISS	ORGANS	10/9/2014 9:00	12/11/2014 11:00	12/29/2014 12:33		
L61593-11	421250-800		MTHG-TISS	ORGANS	10/9/2014 9:00	12/11/2014 11:00	12/29/2014 12:35		
L61593-12	421250-800		MTHG-TISS	ORGANS	10/9/2014 9:00	12/11/2014 11:00	12/29/2014 12:37		
WG136556-1	MB		MTHG-TISS	TISS BLANK		12/11/2014 11:00	12/29/2014 12:01		MB
WG136556-2	SB		MTHG-TISS	TISS BLANK		12/11/2014 11:00	12/29/2014 12:03		WG136556-1 HG-TISS
WG136556-3	MS		MTHG-TISS	ORGANS		12/11/2014 11:00	12/29/2014 12:26		L61593-6 HG-TISS
WG136556-4	LD		MTHG-TISS	ORGANS		12/11/2014 11:00	12/29/2014 12:24		L61593-6 RPD-TISS
WG136556-5	SRM		MTHG-TISS	ORGANS		12/11/2014 11:00	12/29/2014 12:05		TORT2
WG136556-6	SRMD		MTHG-TISS	ORGANS		12/11/2014 11:00	12/29/2014 12:07		WG136556-5 TORT2

# King County Environmental Laboratory Batch Report

WG136717 Total Metals

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61593-1	421250-800	Marine Fish Tissue Tox	MTICPMS-TISS	ORGANS	10/2/2014 9:00	12/16/2014 14:00	12/19/2014 11:56	WG136717-1,-2,-3,-4,-5,-6	
L61593-2	421250-800		MTICPMS-TISS	ORGANS	10/2/2014 9:00	12/16/2014 14:00	12/19/2014 12:01		
L61593-3	421250-800		MTICPMS-TISS	ORGANS	10/2/2014 9:00	12/16/2014 14:00	12/19/2014 12:07		
L61593-4	421250-800		MTICPMS-TISS	ORGANS	10/1/2014 9:00	12/16/2014 14:00	12/19/2014 12:12		
L61593-5	421250-800		MTICPMS-TISS	ORGANS	10/2/2014 9:00	12/16/2014 14:00	12/19/2014 12:18		
L61593-6	421250-800		MTICPMS-TISS	ORGANS	10/1/2014 9:00	12/16/2014 14:00	12/19/2014 12:24		
L61593-7	421250-800		MTICPMS-TISS	ORGANS	10/1/2014 9:00	12/16/2014 14:00	12/19/2014 12:41		
L61593-8	421250-800		MTICPMS-TISS	ORGANS	10/1/2014 9:00	12/16/2014 14:00	12/19/2014 12:57		
L61593-9	421250-800		MTICPMS-TISS	ORGANS	10/9/2014 9:00	12/16/2014 14:00	12/19/2014 13:03		
L61593-10	421250-800		MTICPMS-TISS	ORGANS	10/9/2014 9:00	12/16/2014 14:00	12/19/2014 13:09		
L61593-11	421250-800		MTICPMS-TISS	ORGANS	10/9/2014 9:00	12/16/2014 14:00	12/19/2014 13:14		
L61593-12	421250-800		MTICPMS-TISS	ORGANS	10/9/2014 9:00	12/16/2014 14:00	12/19/2014 13:20		
WG136717-1	MB		MTICPMS-TISS	TISS BLANK		12/16/2014 14:00	12/19/2014 11:33		METHOD BLANK
WG136717-2	SB		MTICPMS-TISS	TISS BLANK		12/16/2014 14:00	12/19/2014 11:39		WG136717-1 MS-100
WG136717-3	SRM		MTICPMS-TISS	SHELLFISH		12/16/2014 14:00	12/19/2014 11:44		TORT2
WG136717-4	SRMD		MTICPMS-TISS	SHELLFISH		12/16/2014 14:00	12/19/2014 11:50		WG136717-3 TORT2 RPD-TISS
WG136717-5	LD		MTICPMS-TISS	SHELLFISH		12/16/2014 14:00	12/19/2014 12:46		L61593-7 RPD-TISS
WG136717-6	MS		MTICPMS-TISS	SHELLFISH		12/16/2014 14:00	12/19/2014 12:52		L61593-7 MS-100

# King County Environmental Laboratory Batch Report

WG137892 Lipids

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61593-1	421250-800	Marine Fish Tissue Tox	ORLIPIDS	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/5/2015 15:30	WG137892-1,-2,-3	
L61593-2	421250-800		ORLIPIDS	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-3	421250-800		ORLIPIDS	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-4	421250-800		ORLIPIDS	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-5	421250-800		ORLIPIDS	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-6	421250-800		ORLIPIDS	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-7	421250-800		ORLIPIDS	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-8	421250-800		ORLIPIDS	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-9	421250-800		ORLIPIDS	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-10	421250-800		ORLIPIDS	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-11	421250-800		ORLIPIDS	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
L61593-12	421250-800		ORLIPIDS	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/5/2015 15:30		
WG137892-1	MB		ORLIPIDS	OTHR TISS		3/4/2015 17:00	3/5/2015 15:30		MB150304
WG137892-2	LD		ORLIPIDS	ORGANS		3/4/2015 17:00	3/5/2015 15:30		L61593-10
WG137892-3	LD		ORLIPIDS	ORGANS		3/4/2015 17:00	3/5/2015 15:30		L61593-11



# King County Environmental Laboratory Batch Report

WG137891 PCB

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61593-1	421250-800	Marine Fish Tissue Tox	ORPCB	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/11/2015 11:06	WG137891-1,-2,-3,-4,-5	
L61593-2	421250-800		ORPCB	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/11/2015 11:21		
L61593-3	421250-800		ORPCB	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/11/2015 11:36		
L61593-4	421250-800		ORPCB	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/11/2015 11:52		
L61593-5	421250-800		ORPCB	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/11/2015 12:07		
L61593-6	421250-800		ORPCB	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/11/2015 12:23		
L61593-7	421250-800		ORPCB	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/11/2015 12:38		
L61593-8	421250-800		ORPCB	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/11/2015 13:09		
L61593-9	421250-800		ORPCB	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/11/2015 13:24		
L61593-10	421250-800		ORPCB	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/11/2015 10:50		
L61593-11	421250-800		ORPCB	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/11/2015 13:40		
L61593-12	421250-800		ORPCB	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/11/2015 10:20		
WG137891-1	MB		ORPCB	OTHR TISS		3/4/2015 17:00	3/11/2015 9:18		MB150304
WG137891-2	SB		ORPCB	OTHR TISS		3/4/2015 17:00	3/11/2015 9:33		WG137891-1
WG137891-3	MS		ORPCB	ORGANS		3/4/2015 17:00	3/11/2015 9:49		L61593-12
WG137891-4	MSD		ORPCB	ORGANS		3/4/2015 17:00	3/11/2015 10:04		WG137891-3 L61593-12
WG137891-5	LD		ORPCB	ORGANS		3/4/2015 17:00	3/11/2015 10:35		L61593-10

# King County Environmental Laboratory Batch Report

WG137890 PCB Homolog

# Emerging Toxics, Marine Tissue, Crab Hepatopancreas, L61593

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L61593-1	421250-800	Marine Fish Tissue Tox	ORPCB-HOMOLOG	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/18/2015 14:07	WG137890-1,-2,-3,-4,-5,-6	
L61593-2	421250-800		ORPCB-HOMOLOG	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/18/2015 15:03		
L61593-3	421250-800		ORPCB-HOMOLOG	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/18/2015 15:59		
L61593-4	421250-800		ORPCB-HOMOLOG	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/18/2015 16:55		
L61593-5	421250-800		ORPCB-HOMOLOG	ORGANS	10/2/2014 9:00	3/4/2015 17:00	3/19/2015 8:35		
L61593-6	421250-800		ORPCB-HOMOLOG	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/19/2015 9:31		
L61593-7	421250-800		ORPCB-HOMOLOG	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/19/2015 10:27		
L61593-8	421250-800		ORPCB-HOMOLOG	ORGANS	10/1/2014 9:00	3/4/2015 17:00	3/19/2015 11:23		
L61593-9	421250-800		ORPCB-HOMOLOG	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/19/2015 12:19		
L61593-10	421250-800		ORPCB-HOMOLOG	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/19/2015 13:16		
L61593-11	421250-800		ORPCB-HOMOLOG	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/19/2015 14:12		
L61593-12	421250-800		ORPCB-HOMOLOG	ORGANS	10/9/2014 9:00	3/4/2015 17:00	3/19/2015 15:08		
WG137890-1	MB		ORPCB-HOMOLOG	OTHR TISS		3/4/2015 17:00	3/18/2015 8:30		MB150304
WG137890-2	SB		ORPCB-HOMOLOG	OTHR TISS		3/4/2015 17:00	3/18/2015 9:26		WG137890-1
WG137890-3	MS		ORPCB-HOMOLOG	ORGANS		3/4/2015 17:00	3/18/2015 10:22		L61593-11
WG137890-4	MSD		ORPCB-HOMOLOG	ORGANS		3/4/2015 17:00	3/18/2015 11:18		WG137890-3 L61593-11
WG137890-5	LD		ORPCB-HOMOLOG	ORGANS		3/4/2015 17:00	3/18/2015 12:14		L61593-10
WG137890-6	LCS		ORPCB-HOMOLOG	FISH		3/4/2015 17:00	3/18/2015 13:11		