Duwamish River Cleanup Coalition

Community Coalition for Environmental Justice • Duwamish Tribe• Georgetown Community Council • Green–Duwamish Watershed Alliance • ECOSS • People for Puget Sound • Puget Soundkeeper Alliance • Washington Toxics Coalition • Waste Action Project

July 31, 2002

Ms. Allison Hiltner
U.S. Environmental Protection Agency
1200 Sixth Avenue, ECL–111
Seattle, WA 98101

**Re: Comments on LDWG's Draft Task 8 – Phase 2 Remedial Investigation Work Plan**

Dear Ms. Hiltner:

Thank you for the opportunity to review the Lower Duwamish Waterway Group's Draft Task 8: Phase 2 RI Work Plan. We represent nine environmental, tribal, community and small businesses organizations affected by the contamination and cleanup of the lower Duwamish River, and collectively serve as the Community Advisory Group to EPA on the Superfund site cleanup. Our members and technical advisors have reviewed the draft document and have the following questions and comments:

**General Comments**

- In order for the public to provide thoughtful, comprehensive comments, EPA, Ecology, LDWG and DRCC must develop a reliable mechanism for informing the community and their technical reviewers of the pending date of delivery of documents prior to their release, and ensure sufficient time for comprehensive technical review. Despite previous efforts to achieve this, the delay in release of the Draft Phase 2 Work Plan left us without the availability of our technical advisors to assist with the public review (they are not on an "on-call" retainer, but rather their services are reserved per EPA's document release schedule – they were no longer available to review the documents when they were actually delivered, and our review suffered significant delays). As a result, our technical review was restricted to less than 1 week, rather than the allotted month. We look forward to revisiting the scheduling and delivery system with you to attempt to resolve and prevent this problem in the future.

Several areas of the Work Plan in the draft document require modification, as follows:

1) The Work Plan states that residual risks remaining after early action cleanup areas are remediated will be determined. How will this be achieved prior to completion and monitoring of success of early action sites? What timeline is anticipated, given that some recontamination may take years? Please demonstrate how the sampling locations are being designed to help both demonstrate the effectiveness of Early Actions as well as the possible routes or mechanisms of recontamination. The Work Plan needs to clearly state that data from monitoring at Early Action sites will be integrated into the determination of the need for further remediation in subsequent clean up actions.

2) The Plan calls for conducting clam surveys at beaches on the lower Duwamish River in order to predict or estimate the potential for human harvest and consumption. If the clam populations are low, presumably too low for people to bother with harvesting, then the clams will be excluded from the health risk assessment. This approach is not appropriate and must not be applied as described. The eventual cleanup needs to protect future uses, including those that are not possible or permissible now because of the present contamination. It is entirely possible, or probable, that the contaminants (notably metals) are toxic to clams and prevent large or perhaps any populations from establishing and thriving in the lower Duwamish River. Some species should be absent, yet expected, because this area is in the usual habitat and distribution. We recommend measuring the beaches, collecting clams along with other species, and conducting a literature survey for the normal distribution of species in the lower Duwamish. The clam field survey can assess presence, abundance and tissue levels, but should not be the sole source of information on clam populations and whether clean up is required to protect human health for future consumption of clams. Literature searches in such volumes as Kozloff's text and Light's Manual will provide important information on the anticipated distribution of clams.

3) The seafood consumption rates in Table 3-24 show seafood consumption rates of adult 31 g/d and 4.87 g/d for adults and children. Both of these rates are low for a seacoast population and especially low for the type of communities that are present in the Lower Duwamish area. These rates must be raised and the means of deriving these data should be re-evaluated. At the very least, the HHRA must also evaluate higher rates (375 g/d) along with these to address the range of potential doses from contaminated seafood. Even considering that shellfish have to be added in, these rates are nearer to the rates for national averages than coast populations.

4) The Plan calls for measuring PCB congeners at a number of sites, compared with total PCB's. At one point, the Work Plan calls for using tPCB's, as it is more practical and economical, especially given that the PCB's occur in mixtures that may be more accurately and more cheaply assessed as tPCB's. The plan to measure congeners v. tPCB's needs further discussion. The use of tPCB measurements will be valuable for making earlier data usable in the present context, and for determining sediment and soil levels in post-cleanup sampling and assessment, and identifying distributions and levels of contamination. However, the most accurate way to assess PCB health and ecological risks for tissue, notably to certain populations and species, is using PCB congeners. PCB congener data is sorely lacking for Duwamish River fish and wildlife, and needs to be collected as part of the Phase 2 RI.

5) The Work Plan treats TBT (and related compounds) as principally, or even exclusively, a toxic chemical for ecological purposes only, and this is not correct. TBT is also a human toxicant.

6) The Work Plan omits dioxin/furan sampling with the rationale that there are no identified sources of dioxin on the river. However, the Duwamish River is on the State 303(d) list for exceedances of dioxins, and Ashgrove and LaFarge operations on the river are known

sources of dioxin to the air, which may also be an airborne source to the river. Logically, dioxins and furans must be included in the sampling plan.

7) There was no information given about the prioritization of the locations and number of sediment samples to be collected in Phase 2. The DRCC does not disagree with the criteria, but tradeoffs and prioritization procedure not clearly stated. Clearly, for example, there are many other sites that have had low historic spatial coverage and decisions were made about the number of samples to be taken. This is an exceedingly critical and difficult decision to make. Considering this, DRCC has provided comments on some specific sites and analyses selected. We would welcome the opportunity to sit down and review these decisions. Notably, there is no information about the criteria used to determine the total number of samples to be collected: i.e., why 110 and not 130 or 150? While there are obvious cost considerations, it is a more complex issue. DRCC is especially concerned about collecting adequate PCB congener data, as opposed to total PCBs. In the case of document transfer of PCBs into the upper food chain in the LDW, the relative value of lower quality data from many sites vs. higher quality data from fewer sites needs some discussion and clarification.

8) The Work Plan needs to spell out the use of Monte Carlo and other probabilistic assessment tools. These tools can be misapplied to obscure the data and hide trends. The most useful application is to show the exceedance probabilities, and to use them in conjunction with probability bounds analysis. These same analyses must also include the relation to, and show the point estimate and the maximum exposure, not simply the RME. This element of the Work Plan needs additional discussion with the public, including a stakeholder meeting or briefing on the nature and use of these analytical tools.

9) The north, east, and south sides of Kellogg Is have been neglected in sampling. Considering the proliferation of wildlife in the area (otters, osprey, spotted sandpipers, fish use, etc), ensuring that these sites are clean is imperative. Kellogg Island is being treated as a "control" site when it is most certainly not.

10) An osprey monitoring program through the BEST program at USGS has been initiated this summer along the lower Duwamish, with egg collections and monitoring of nesting outcomes. This data should be integrated into the Phase 2 Work Plan as the number of nests in the vicinity of the LDR, Elliott Bay and Lake Washington (some 15+ nests) can provide some excellent pre and post monitoring for the early actions and FS. In addition, People for Puget Sound has some bird monitoring data from several Duwamish River restoration sites that may provide good supplemental information for the bird habitat assessment.

*11)* The Work Plan needs to address the sequestration of phthalates in small amounts of plastic making them unavailable in toxicity tests, but easily extracted in analytical tests. This would elevate the toxicity value for a toxicity test. It is also unclear whether current sources of phthalates are the same compounds as historic ones. Has there been a recent GC-MS assessment of phthalate compounds or verification from EPA that no new formulations of plasticizers are being used with new compounds?

*12)* There is no indication which samples will be performed for arsenic speciation. Because arsenic is a critical component of the HHRA, it is essential to have arsenic speciation

performed in samples that are directly being used for the HHRA. Similarly, it is not indicated whether the co-planar PCBs, i.e., BZ #s 77, 81, 126, and 169 will be performed with the dioxins and furans analysis. There is good evidence from a study of herons in the Columbia River that BZ# 77, 126 and 169 occurred in heron eggs from 1994 and 1995 (Thomas and Anthony 1999, ET&C article previously referenced in comments to EPA). This study also determined that there were significant differences (100-fold) in the detection limits of laboratories in these analyses (one lab was able to detect non-ortho PCBs at 1pg/g and dioxins/furans at 0.1 pg/g).

13) Several toxicity tests have been omitted from the Work Plan without explanation: no reproduction tests are included, despite the availability of the Neanthes reproduction test; no imposex related test with gastropods or mussels is planned, despite the presence of TBT as a COC at some locations and levels that indicate possible effects.

*Specific Comments*

**Executive Summary**

Pg. ES-4; 1st paragraph: *"The work plan describes several other areas in which the Phase 2 risk assessments differ from those conducted in Phase 1, as shown in Table ES-2."*
Whatever differences or modifications are made in going from the screening risk assessment of Phase I to the Phase II assessment, the outcome has to plan for unrestricted human use of the waterway, related areas and associated resources.

Pg. ES-4; 4th paragraph: *"For example, the results of the invertebrate survey, in which sampling will be conducted within the LDW to determine where clams might exist in concentrations sufficient for sustained harvesting for human consumption, will be used to determine the need for clam tissue sampling and analysis that will be described in the tissue chemistry QAPP."*
What are the differences?

Page ES-5:

- The market basket has the advantage of including a range of species, but the analysis should not exclude the meals of single species.
- Whole body chemical analysis for PCB's, dioxins, metals, etc. is necessary; this feature is included.
- Site specific data on inorganic arsenic is a positive feature.
- Congener specific PCB data is the best way to determine health as well as ecological risks. However, tPCB's may be more cost effective for screening sediments and soils, once congener specific analysis has shown the nature of contamination.

**Introduction**

Pg. 2: 1st paragraph*: "The field studies will be conducted in a tiered fashion whereby the results of the first studies will influence the design of subsequent studies. Baseline ecological and human health risk assessments (ERA and HHRA) will be conducted in Phase 2 to include newly collected data and additional technical approaches."*

These should be tiered, but require that the parties keep the public informed as to progress and involve the public representatives and technical experts as to progress, milestones and decisions. Data must be shared and input solicited as this iterative process progresses.

**Initial Evaluation**

Pg. 6; 2nd paragraph: *"These data indicate that chlorinated solvents have been detected at low concentrations in seeps at two of these sites (i.e., Great Western and Boeing Plant 2). The significance of these seeps in the LDW is unknown. As expected due to their low affinity to sediments and high solubility and volatility, chlorinated solvents have not been detected in sediment at any of the potential discharge zones, based on the data currently available. The seep data, particularly at Boeing Plant 2, are difficult to interpret with respect to the likely chemical source because of additional influences (i.e., chemicals in seeps may be due to a mix of inputs from LDW water, groundwater, and sediment)."*
What does the RI Work Plan do to address data gaps related to these chemical 'seeps'? Little is mentioned of these, yet these are the source of serious pollutants.

Pg. 11; 2nd paragraph: Figure 2-4
No such figure could be located in the document.

**Phase 2 Remedial Investigation Tasks**

Pg. 14; 1st paragraph: *"Better site usage data are needed for some of the receptors of concern characterized in the Phase 1 risk assessments, including crabs and clams (see section 3.1.2), rockfish, sandpiper, and recreational users of the intertidal zone (e.g., beach play areas; see Section 3.3.2). These data will reduce uncertainties in the exposure assessments and provide additional information to assess links between COPC concentrations in fish and shellfish tissue and COPC concentrations in sediment, using a food web model (see Section 3.3.3)."*
While it is important to understand site-specific characteristics of current use, the RI has to predict for future use – present use is likely reduced due to fish consumption restrictions. The idea is to anticipate greater public use of the fishery and the resources once contamination is remediated. The present level of contamination has undoubtedly lessened the public's interest in recreating in polluted waters.

Pg. 14; 2nd paragraph: *"..will be completed over many months in a tiered fashion so that designs of later studies can be based directly on data collected in earlier studies. , Task 13, also defined in the SOW, is the preparation of a river-wide FS work plan."*
There must be a timeline, schedule, and advance notice of products, reports, etc. The one given at the end of the Work Plan is vague, somewhat by necessity. The need is for the EPA, Ecology. responsible parties and DRCC to inform and involve the public in a meaningful way.

P 16: Table 3-1
This table needs to be amended to include the public in the process.

Pg. 16; bottom paragraph: *"Preliminary study designs are presented in this Work Plan to provide all stakeholders with a common understanding of the general technical approach and level of effort that will apply to each of the Phase 2 data collection efforts."*
There needs to be greater reliability in scheduled delivery dates and adequate time for review.

Pg. 17; 3.1.1: *summer/fall of 2003*
Stakeholders and the public need notice and results.

Pg. 17; 3.1.1.1: *Objectives and background; analysis of bottom substrate composition*
DRCC agrees with these objectives. The analysis needs to assess the composition of the substrate at the bottom of the river.

Pg 20; 3.1.2.1 Objectives and Background, Invertebrate Abundance Survey
In viewing the sampling locations in this project in Figure 3-2, we recommend that some sites be placed closer to intertidal areas. It is not clear whether a 24 hour sampling period is more effective than a single tidal cycle, which could allow deployment of traps in intertidal areas that may be more heavily used by crabs and shrimp that migrate to deeper waters and away from traps during low tides.

Pg. 21; 1st paragraph: *"Other marine invertebrate species consumed by the Suquamish Tribe, such as oysters, geoduck, scallops, squid, sea urchins, and sea cucumbers, have not been observed in the LDW. For the purposes of the Phase 2 RI, it is assumed that these species are not present in the LDW."*
This assumption is not acceptable. The Work Plan must assess risks of future harvest of all these species. The Duwamish is within the normal range and habitat for these species, which likely were present in the past and may be in the general area, according to Kozloff, Lights manual, etc.

Pg. 21; 3rd paragraph: "*The second part of the study will provide data to estimate the potential harvest of clams in the exposed intertidal zone of the LDW by surveying potential clam beaches throughout the LDW during a low tide event. A reconnaissance survey will be completed in July 2003 to locate beaches in the study area that may support clams. These areas will then be revisited during low tide in August 2003 and sampled for clams using methods based on WDFW clam and oyster guidance (Campbell 1996). Each beach will be surveyed and a general description of the beach recorded, including percent fines and interstitial salinity. Mean number and weight of clams per species will be calculated per productive beach area. Harvestability, defined as the harvest rate that is sustainable over time without depleting the resource between years, will also be estimated. The method for estimating harvestability will be determined from consultation with WDFW. Physical measurements of beach substrate will be made because these characteristics may constrain the ability of the habitat to support clams. Observations of other intertidal invertebrates, such as oysters, mussels, and shore crabs, will also be recorded during this survey because these species may also be consumed by people. Additional observations of mussels on hard surfaces other than intertidal beaches (e.g., pilings) will be made during transit between beaches. Observations of these other species will provide qualitative data that will be used to supplement the more quantitative data derived from the crab/shrimp and clam surveys."*

This sampling is not needed for this purpose. The cleanup must plan for future unrestricted use of the resource as it is supposed to be, not as it is now in a degraded state. Examine the literature and WDFW for which species are endemic, then take tissue samples as part of the status and exposure assessment.

Pg. 22, last paragraph: *"…clams to assess the maximum potential harvest."*
The LDW is polluted and the pollution keeps the populations of animals low or eliminates them. If the survey shows there are not enough clams to support harvest due to contamination mortality and the RI/FS does not clean it up for harvest of those species that should be present but are not, then the process has failed. The assessment needs to account for the species that are supposed to be present and in historical or predictable abundance.

The field procedure needs to get the weight of each crab and total shrimp weight.

Pg. 23, Section 3.1.3 Juvenile Chinook Salmon Diets
The document does not include the data from the 1999 Coastal America study (Cordell et al. 2001. Biological Monitoring at Duwamish River Coastal America Restoration and Reference Sites: A 7 Year Perspective. SAFS-UW-0108. Fisheries Research Institute, UW). This data includes some more stomach content data from the Turning Basin, Kellogg Island and T-105 from the months of April, May and June.

Though fish have already been collected in the 2003 fish surveys, there are still questions about the data being collected. In Cordell et al (2001) the fish were weighed to the nearest 0.01 gms, not 0.1 gms (as specified on Page 27 in 3.1.3.3) and the stomach contents were separated by taxa and separately weighed to 0.1 mg, not 0.1 gm as a total stomach content. Data from FRI's analysis of the stomach taxa was recorded into NODC forms and analyzed by the US FRI GUTBUGS program. Comparisons with the 4 years of FRI's data should be presented to determine a range of values

Pg., 28, Section 3,.1.4 Surface Sediment Collection.
The maps used are old. They do not indicate current owners at several sites and do no indicate many of the restored areas.

The consideration to drop sampling at Early Action sites needs to consider the issue of recontamination. Is there adequate data quality at the Early Action sites to document whether recontamination is occurring? Since this has become an issue at the Norfolk CSO, making sure that the existing data is adequate to be able to document recontamination is critical. Some locations that might be considered include south of site 16, near the Diagonal CSO, just below the 16th St. bridge at Boeing's site with major CSL exceedances (across from Sediment Sampling Site 74).

Please explain the specific QC issues that caused the rejection of some data. Was the entire data set dropped if some data were not to Superfund standards? Could some other data in those data sets be useful in the location of sediment locations? The unavailability of this information and the lack of rationale has the appearance of dropping sites that may have contaminant concerns.

Pg. 28; 3.1.3.4 & Table 3-3: **Analytical methods**
*"Analytical methods and quality control considerations for chemical analysis will be described in detail in a complete, revised QAPP after the final list of analytes is determined, in consultation with EPA and Ecology."*
The analytical methods proposed are the ones to be used and the plan to give a more detailed explanation of these methods is only acceptable if the EPA, Ecology and LDWG provide adequate notice for technical review and public comments.

Pg. 29, Section 3.1.4.1 Sediment Chemistry Analysis
The large number of sites and short period of time to assess the locations makes a thorough assessment difficult. It would assist in the clarification of the criteria for the selection if the sites that were not selected were indicated and some emphasis within the considerations were indicated, such as one to four "x's" to indicate stronger locations.

The north, east, and south sides of Kellogg Is have been neglected in sampling. Considering the proliferation of wildlife in the area (otters, osprey, spotted sandpipers, fish use, etc..) ensuring that these sites are clean is imperative. The varied background around the island and few multiple chemical groups measured, especially metals, requires more sampling there. Site 19 should be located more directly off the historic Puget Creek outlet and should especially be evaluated for possible components of contaminated cement kiln dust.

Dioxins/Furans
While Sediment Sampling Site #13 indicates it is near potential Cement Kiln Dust (CKD) contaminated with dioxins/furans, Sediment Sampling Site #15 does not indicate such. Please explain why Site #15 will be sampled for Dioxins and Furans. Considering the large amounts of CKD placed above the historic outflow of Puget Creek into the area around Kellogg Island, Sediment Sampling Site #19 and possibly Sediment Sampling Site #22, #25, or #27 should be considered. Sediment Sampling Site #29 at the Holman (now Lafarge) cement site is being sampled, while Sediment Sampling Site #31 is not. Is there some justification for excluding #31? Are there other sites where contaminated CKD or slag could have been used?

TBT
Only two of the sites at Kellogg Island are being tested for TBT, despite the site being a major barge storage area with considerable contact between the barges and the sediment occurring on low tides. Please provide a justification for the location of the two samples.

Pg. 29; last paragraph: *"Additional surface sediment chemistry data have been collected within the last 2 years that were not included in the Phase 1 RI because they were collected after the cutoff date for incorporation into Phase 1. The data from these events will be assessed and incorporated as appropriate into the Phase 2 RI. LDWG will discuss with EPA and Ecology which of these recently collected data sets are appropriate for use in Phase 2. An updated list of sediment chemistry data sets to be used for the Phase 2 RI will be included in the sediment QAPP."*
The public needs to be included in this process.

Pg. 31; *"Six primary considerations were used to determine where to collect additional surface Sediment chemistry data for Phase II."*

These six considerations are correct for this purpose.

Pg. 33; figure 3-4: This figure needs labels.

Pg. 42; 1st paragraph: *"..regional anthropogenic arsenic sources outside the LDW., background sampling locations (e.g., grain size, organic carbon content)"*
Stakeholders and public must have input and discussion for this "background" determination. The arsenic smelter poured AS into the entire region – so 'background' will be tough to find. Literature and historic data will be needed. This issue involves many technical and policy determinations that require broad-based review and support.

Pg. 43; Table 3-6:
EPA has not provided sufficient time to review this part of the Work Plan – what measurements at which locations? To be conservative, tPCBs and TCDDs/TCDFs at should be measured at every station and at two depths.

Pg. 48; 3rd paragraph: (Analytical Methods) These methods for chemical analysis of sediment samples are correct, noting the need to involve the public in further technical review.

Pg. 49, Section 3.1.4.2: Sediment Toxicity Testing
Why was no reproductive toxicity test performed, specifically Neanthes? It is also not clear whether there were holding times on sediments being held for later toxicity testing.
Why was no imposex related test with gastropods or mussels not performed especially since TBT is considered an issue at some locations.

Pg. 55; 3.1.5: (subsurface sediment) With public review and more time for review.

Pg. 60, Section 3.1.6: Fish and Benthic Invertebrate Tissue Chemistry
It is not clear which perch species are being discussed, as there are a variety of species in the LDW. Clear identification of species should be performed. Shiner perch (Cymatogaster aggregata) may provide a large percentage of the heron diet, but do not grow large enough for osprey and otters. There may be major differences in the contaminant load in the shiner perch by season. Depending upon where the females obtain their food, collections in early summer may provide higher contaminant loading due to the high fat load due to their viviparous reproduction. Fall individuals may not be smaller and indicative of young of the year. It is not clear whether there are concentrations of shiner perch in the LDW that could be providing herons with a major portion of their diet.

Pg. 61, 5th bullet: *if current or future scenarios indicate sustainable clam populations for human consumption.*
See earlier comments. Have to assume that there should be harvestable populations of clams and act/protect accordingly.

Pg. 65; 3.1.6.2, Table 3-13, Table 3-14:
Tissue samples need to be taken for whole animals – (minus shell for clams, crabs) for 3 reasons.

1. Whole body tissue concentration is a measure of contamination, accumulations, transfer and internal dose.
2. Wildlife, fish, etc consume whole prey – osprey never skin their meals and seldom fillet
3. People do prepare fish/seafood whole and prepare edible from that, or put them into soup, stew, etc.

Once again, the survey must not base future use and use capability on past or present conditions. Present conditions may/do limit the ability of clams, other animals to live there –
TBT is toxic to humans as well.

Pg. 67; 2nd paragraph: (sampling approach). OK

Pg. 72; 2nd paragraph: *"To estimate background concentrations of arsenic in tissue, three composite samples of perch fillet and three composite samples of crab (edible meat) will be collected from a location outside of the Green/Duwamish watershed. Arsenic concentrations in English sole, another important component of the HHRA market basket."*
The public must be involved in selecting 'background'/reference location, far from other sources.

Pg. 81, 3.1.8: Seep Survey and Chemistry
It is not clear at what time of year the seep surveys will be performed. Seeps may not be present in the dry summer months when there are daytime minus tides, making a visual survey more difficult to be performed at night. Collection of information from Puget Soundkeeper, Green-Duwamish Watershed Alliance and other local sources would assist in focusing efforts on sites.

It is also not clear how seep sites will be linked to the sediment sampling and in what order. How will the sites with seep chemistry performed be subsequently related to identifying sediment contamination? Are there any planned sediment sampling sites that are already linked to possible seeps to provide an initial comparison?

Pg. 82, Section 3.1.8.2
The Study Design for the Seep Study indicates that only salinity will be measured at the seep. Many other parameters can be easily measured (and also simultaneously) along with salinity that are indicative of contaminated groundwater, including temperature, dissolved oxygen, conductivity, and ORP (Redox potential). An estimate of the extent of the seep and the flow rate per unit area, especially in storm events, may assist in ranking the seeps by quantify entering the LDW.

Pg. 85, Section 3.1.9: Sediment Transport Study
A major uncertainty in the risk models is the amount of resuspension of sediment occurring in the LDW. It appears that this issue is not being addressed in the sediment transport study. With the existing sediment data, specific locations with sediment characteristics of concern should be able to be identified and specifically noted as data quality objectives in the study. These are not presented. The goals of the study should be able to identify and compare differing sources of transport, such as propeller scour, bedload transport during rain events in high water, or extreme tides. It has not been clarified which of these types of events are driving the resuspension of materials in the LDW. This would help clarify the types of concerns that need to be addressed in

the FS and ultimately allow for the evaluation of removal, capping or dredging depths.

It is not clear whether the proposed measurements will address the likely scenario of resuspension but little net transport, which could occur during propeller scour and tidal fluxes. There was mention of data collected during the King County Water Quality Study, but not assessment of whether those locations are representative of the sediment types of concern, e.g. those with elevated COPCs. In the recent presentation of the hydrodynamic model used in the King County Water Quality Study, it appears that this model could be adapted to address some of the resuspension issues, but was not designed to address that issue. That model could also be used to estimate sediment movement, especially if trap and current information at several depths were located at critical points in the LDW, such as the location of the salt wedge. Salinometers should also be linked to flow meters to document the impact of the salt wedge as a mechanism for increasing or decreasing bioavailability of COPCs during resuspension events. This data will be extremely useful in the Residual Risk Assessments.

Pg. 90, 4th bullet: *probabilistic risk characterization and uncertainty analysis*.
This analysis must include Probability-bounds, and 2nd level Monte Carlo analysis, as well as placing the point estimates for the maximum exposure in the same figures and results.

Pg. 91, Section 3.3.1.1: ERA Problem Formulation
A discussion should occur about the use of osprey to supplement bald eagle data for analysis of the upper piscivore ROCs. The establishment of an osprey study on the LDW by USGS offers an excellent opportunity to improve the ROC data for eagles. In the past several years, the number of osprey nesting in the LDW has significantly increased and there are now at least 5 nests in the study area, and several more nests that may forage with the study area. The USGS study collected eggs this summer from several nests within and outside of the study area and is also collecting productivity and foraging information. Additional support for these studies is warranted for several reasons. Not only are these samples being analyzed without cost to EPA or the LDWG, they are linked into a large data set that improves both statistical and QA parameters over what can be accomplished with eagles.

There are several reasons why osprey will provide invaluable supplemental ROC data. First, osprey have been well studied in the region, so comparative contaminant and productivity data are available. Recent studies on the Everett, lower Columbia River, Fraser River and Willamette River are available through USGS. Second, there are a number of nests in the LDR. This will make the sample size larger to make better assessments compared to only one eagle nest site that may not be accessible or available for sampling. Third, because there may be over 15 nests in the area, there is an opportunity to establish a gradient of both nests and foraging areas from completely within the LDW to outside of it. This allows a local comparison of the contaminant results from egg sampling and productivity at that nest within one area and year. There is an extensive literature about the linkages of contaminants to productivity in osprey and with the dietary studies being initiated this year, there is an excellent opportunity to provide baseline and post Early Action assessments as well as Remediation monitoring. Fourth, specific osprey diets can be assessed, which are more difficult with species like spotted sandpiper, otter, great blue heron. Finally, the almost exclusive diet of fish by osprey make them a better predictor of food chain biomagnification than the bald eagle, which can have a varied diet, and is more

opportunistic, and thus less likely to be representative year to year, which is critical for pre and post comparisons.

There are several types of studies that could improve the uncertainties about osprey diet and foraging site fidelity, all of which could be coordinated with USGS at minimal cost. These include mounting video cameras at male feeding perches and at nests that can document fish species captured. A camera was planned to be mounted at the Lafarge Cement Plant nest on the roof of the facility, but the nest failed. There is also the possibility of performing some radio telemetry to determine the percentage of time foraging within the LDW. Osprey have been outfitted with satellite transmitters to document their wintering grounds. Tracking the survival of juveniles fledged in the LDW is also an excellent measure of success of cleanup, as juveniles in the nest can be banded easily. Juveniles can also be easily bled for contaminant loading, as well as feather pulls to compare with other sites. Access to nests in the LDW was arranged this summer with the Port of Seattle and with Seattle City Light at several sites.

It is also important to note that herons have begun to nest again in the LDW, after being absent or undocumented since 1999. Several nests were located north of the historic nesting area above Kellogg Island, the specific nesting sites have not been visited to be located, but are somewhere north of the Bald Eagle nest north of the Continental Van Lines property. If this colony succeeds, it may be possible to access these nests after the Early Actions have been performed and collect eggs again. The colony abandonment in 1998 appears to be an ongoing problem of eagle predation, but may also have been due to the construction of the Herring House restoration site that summer, disrupting the primary foraging area for the colony at Kellogg Island.

Pg. 92, Section 3.3.1.2: Wildlife
Please present the studies that have been used to demonstrate the proposed methodology to compare the "potencies" of the PCB congener mixture between sediment and biota. Please also define potency. Because a subset of samples will presumably be performed for both congeners and total PCBs, who will they be compared? Also provide some documentation to presume that the residual PBC signature in the LDW is based upon Aroclor 1254. The major spill that occurred in the LDW in 1974 was a lower percent chlorine Aroclor (1242?) and it is not clear from the past data how the Aroclor designations have been made. There may be significant concentrations of more toxic PCB congeners that have very low concentrations that would be missed in a gross Aroclor estimate. Major changes in PCBs are known to occur in sediments, depending upon their oxidative state, as well as changes through the food chain. The high levels of PCBs that were measured in herons at the West Seattle heron colony indicate that some transfer of PCBs is occurring through the food chain and it is critical to determine what percentage of those PCBs are more toxic. There are also a number of non-coplanar-PCBs that do show some dioxin like potency and often provide the majority of the AH receptor risk. This issue needs to be addressed and is best accomplished with the TEQ based approach.

Sandpiper Site Usage Assessment
Two species of sandpipers nest in the LDW, spotted sandpipers and killdeer. As the Coastal America and WashDOT restoration sites have developed additional foraging areas, these species have increased in number. Evidence of nesting at Hamm Creek and the Turning Basin, in addition to the Kellogg Island area has been documented for spotted sandpipers. The collection

of benthic invertebrates and the selection of sediment sampling sites in intertidal areas will assist in improving the risk estimates for Spotted Sandpipers, which serve as a surrogate for a wide variety of other species in the LDW.

The proposed 3 components of the sandpiper site use assessment should be clarified to provide additional weight of evidence in the exposure assessment. The past review of avian surveys (Component 1) only documents the occurrence of spotted sandpipers and does not assist in determining a site usage factor. Changes in the availability of habitat, especially the development of intertidal streams at Hamm Creek and the 1st Ave S. Bridge have likely increased the density of spotted sandpipers. Because sandpipers are likely to be just off the Duwamish water in these new waterways, a field comparison of habitat foraging areas (Component 2) should include a simultaneous boat and land survey protocol. The USFWS service is currently also performing surveys at various tidal cycles which will also dramatically impact sandpiper foraging locations. To estimate a worst case scenario, it would be assumed that a low to minus tide during the early morning would provide the best time to survey for sandpipers.

The major problem of selecting a survey time also remains. The increase in bird numbers does improve the chances in obtaining site use data, as there are problems with sample size and the lack of marked individuals. Because the number of birds is unknown in the LDW and because of the polyandry of the species, non-nesting individual and females may range widely over the river. Since the purpose of the estimate is to determine what percentage of the time spotted sandpipers are spending in foraging areas with differing risks of exposure, it is critical to determine that the birds observed are the same individual. The migration period for spotted sandpipers likely overlaps with the summer resident period of proposed surveys. Fall migration starts earlier further north than in the Puget Sound area and non-breeders may start migrating while there are still local breeders on site. While observation of non-breeders on sites provides information about site preference, which is another important factor in site use assessment, it is a different endpoint for risk than the total time spent over several months.

The power of the study increases greatly if individuals are known. Banding of individuals, and specifically color banding allows the utilization a mark-recapture approach. This can be performed with only a small increase in effort and provide a much more semi-quantitative approach. The use of survey effort while banding and subsequent ability to use a mark recapture methodology is preferable to simply making more observations. Because the proposed study without banded birds will not be able to differentiate individuals observed are on territories and not "floaters", the estimates of risk will remain large. How long migrants forage and possibly winter in the LDW is an entirely separate and more complicated question than the summer exposure. Another factor involved in the exposure assessment is the lack of a defined exposure period. It is not clear when the summer resident spotted sandpipers arrive and when they leave.

Finally, the review of substrate (Component 3) will likely be unable to assess the marine location for preference, as most studies have been performed on lakes and freshwater rivers. However, if the information about the intertidal sediments is linked to a GIS based habitat classification scheme (rip-rap, mudflat unrestored, mudflat restored, above high tide level, stream), the percent time can provide percentages of time that can be extrapolated to the summer season and risk.

Don Norman is presenting the feasibility of such a marked- recapture study to experts on spotted sandpipers, such as Lou Oring at the Univ of Nevada, John Elliott and Rob Butler at the Canadian Wildlife Service, and Tom Custer at USGS in LaCrosse, WI. Ability of obtain a color banding permit requires coordination with these and other spotted sandpiper researchers to avoid overlap of color schemes. Don Norman is permitted to capture sandpipers and band them. Capture of spotted sandpipers is not difficult and sites in the LDW have been assessed as trapping sites. Capturing birds on known nesting territories is also much simpler. There should not be any barriers to obtaining a permit for such a project.

Pg. 104; 1st and 2nd paragraph: *"The Phase 2 market basket approach for the seafood exposure scenario will incorporate knowledge that multiple species and fish/shellfish parts may be consumed within each market basket component by individuals in the target populations."*
The Market basket is but one measure of seafood consumption. The Phase II risk assessment will need to see this measurement compared with traditional methods, the values sued for Tribal rates here and elsewhere in Washington, and the higher rates from subsistence fishing. Also, the rates must include consumption of single species meals at feasts – e.g. crabs, salmon, rockfish.

Pg. 114; 1st paragraph: *"This is in part because historical sediment chemistry data were either largely or only available for Aroclors, analytical analysis is significantly less costly than congener analysis (Approximately $120 versus $950 per sample). Also, if monitoring is expected to follow remediation, it is less practical to set a remediation goal dependant on congener analysis because of the complexity of monitoring individual PCB congeners in a mixture when risks are based on the mixture. Therefore, the most practical PRG will be based on an Aroclor total, and any congener-specific PRGs modeled would need to be concerted to an Aroclor total."*
The point of 'practicality' is fair enough, so long as it does not compromise health and ecological protection. PCBs do occur as mixtures and the best way to assess the effects is via individual congeners and then reconstruct the tPCB level. But the most practical way is to assess in bulk/en masse as total PCBs in later efforts, as in monitoring to insure that all the contamination is gone, find boundaries, etc. in sediment samples.

Thank you again for the opportunity to review and provide comments on the Draft Phase 2 RI Work Plan. We look forward to discussing any questions or clarifications, as needed, and look forward to assisting EPA and Ecology in their review of future deliverables.

Sincerely,

BJ Cummings
Coordinator