Hylebos Waterway Natural Resource Damage Settlement Proposal Report

A Habitat Restoration-Based Approach
For Resolving Natural Resource Damage Claims
Relating to the Hylebos Waterway
Of the
Commencement Bay Nearshore/Tideflats Superfund Site
Combined With a Proposal
For Allocating Liability for Settlement Purposes

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Executive Summary

Under applicable law, parties responsible for releasing hazardous substances into the environment are liable both for the costs of responding to the release (by cleaning up, containing or otherwise remediating the release) and for damages arising from injuries to publicly owned or managed natural resources resulting from the release. Federal and state agencies and Indian tribes designated as natural resource trustees are authorized to determine the damages and to present claims to responsible parties for the damages, plus the costs of assessing the damages, in a process known as natural resource damage assessment. The natural resource trustees conducting the natural resource damage assessment for the Commencement Bay environment consist of the National Oceanic and Atmospheric Administration, the U.S. Department of the Interior, the Washington Department of Ecology (as lead state trustee), the Puyallup Tribe of Indians, and the Muckleshoot Indian Tribe (the Trustees). This document contains a proposal by the Trustees for settling natural resource damage claims relating to Commencement Bay's Hylebos Waterway. This proposal has been prepared to facilitate settlement for Hylebos Waterway natural resource damages, and the approach and data used herein would not necessarily be applicable to other sites or in other contexts.

Studies both by the Trustees and by contractors for potentially responsible parties (PRPs) as part of the EPA-led remedial process have documented that large quantities of hazardous substances have contaminated extensive areas of the Hylebos Waterway. The Trustees' studies have demonstrated how the contamination has harmed not only the organisms that inhabit the marine sediments, but fish and wildlife that come into contact with the pollution or that eat contaminated prey items. While the Trustees have developed significant evidence of natural resource injuries, the natural resource damage assessment for Commencement Bay is not yet finished. However, it is becoming increasingly urgent for the Trustees to resolve damages claims promptly and to move ahead with habitat restoration. Although the damage assessment is not complete, the Trustees feel they have sufficient information and data currently available to frame a settlement proposal that would adequately compensate the public for natural resource damages associated with the Hylebos Waterway.

The Trustees are proposing that Hylebos Waterway PRPs settle natural resource damage claims by agreeing 1) to undertake (in concert with other PRPs or individually) or to fund the development of habitat restoration projects that will generate a specified amount of environmental benefits; 2) to fund the Trustees' oversight of the restoration project(s); and 3) to pay an allocated share of the Trustees' past damage assessment costs. In the traditional approach to similar natural resource damage cases, Trustees determine the cost to restore the injured or lost natural resources and/or the monetary value of lost human uses; collect monetary damages from responsible parties; and use the recovered damages to plan, design and construct restoration projects. For this case the Trustees believe they can achieve restoration quicker, and possibly more efficiently, if responsible parties are encouraged to construct restoration projects directly rather than to fund the Trustees to perform the work.

Instead of stating natural resource damage claims in dollar terms, the Trustees' settlement proposal relies upon a process called *habitat equivalency analysis* (HEA) to determine how much restoration activity PRPs need to undertake to resolve their natural resource damage liabilities. HEA equates the losses resulting from the injuries and the amount of restoration needed to compensate for the losses by using some aspect of the affected environment as a sort of yardstick. Because of the central role that waterway marine sediments and the sediment-based biological community play in the Commencement Bay environment, the Trustees have decided to quantify natural resource injuries for settlement purposes in terms of affected habitat rather than numbers of individual species impacted. To determine how much habitat restoration needs to be developed to compensate for contaminant-related injuries to marine sediments, the Trustees use the concept of *ecological services*. The Hylebos HEA calculates the amount of ecological services lost as a result of contamination, and the amount of ecological services that would be gained from example restoration projects, making past and future losses and gains comparable by applying a discounting factor. The results of the calculations are stated in terms of *discounted service acre-years (DSAYs)*.

In determining the amount of ecological services lost due to sediment contamination, the Trustees take into consideration the type of habitat affected and its importance to key species, and whether the ecological services provided by the habitat were diminished because of the effect of over-water structures, log rafting, or the accumulation of wood debris. The Trustees also adjust the level of ecological services assigned to certain areas depending upon the nature of adjacent habitats. The Trustees reviewed scientific literature, technical data, applicable regulatory standards and the results of their own studies to determine the effect that varying sediment concentration levels of different hazardous substances have on key species or species groups. This information was used to develop a series of concentration threshold levels for each hazardous substance, which are assigned a corresponding percent reduction in ecological services per acre of affected habitat. Using a geographical information system (GIS) and data developed by the Trustees and by PRPs, the Trustees calculate the acreage of areas exceeding the sediment contamination threshold criteria, taking into account whether areas were slated for remediation or natural recovery and when natural resource injuries in different areas are likely to cease. The Hylebos HEA uses these data to calculate that hazardous substance contamination in the Hylebos Waterway from all sources generated a total loss of 2,438.681 DSAYs.

To facilitate settlement discussions, the Trustees developed a proposal to allocate the DSAY losses among the facilities along the Hylebos Waterway that have been shown to be responsible for releases of hazardous substances to waterway sediments. The Trustees were aware that a number of Hylebos Waterway PRPs were developing an allocation of remedial costs. Because that allocation was not addressing natural resource damage liability and was being conducted as a part of a confidential process in which not all PRPs were participating, the Trustees determined it would more likely lead to settlement of natural resource damage claims if the Trustees prepared an independent allocation focused solely on those claims.

The Trustees' allocation assigns liability to facilities or sites, rather than parties, leaving it to multiple parties responsible for an individual site to resolve among themselves how to apportion shares of that site's liability. The allocation is based on publicly available information about site operations and hazardous substance releases, obtained from the files of EPA and the Washington Department of Ecology and in some cases from public libraries.

Under the Trustees' allocation, to trigger assignment of liability to a site there has to be evidence of a pathway or means for contaminants to travel from the site to waterway. There has to be evidence of an activity conducted at the site that is a likely source of a substance of concern or which released a chemical likely to exacerbate the impact of a substance of concern. Further there has to be evidence of actual environmental contamination by the substance of concern. For most substances of concern, the Trustees are able to allocate liability by examining mapped contaminant footprints, or patterns of contaminant distribution in the sediments. Because of the widespread distribution of certain contaminants (polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs)), a footprint-based allocation approach for these substances is unworkable. For these the Trustees use a mass-loading approach, which relies on a relative comparison of the duration and area of operations associated with releases and of the extent to which the type of activities conducted at each facility is likely to have generated significant releases. This approach also takes into account where along the waterway facilities are located and the likelihood that releases in one part of the waterway have contaminated sediments in other parts of the waterway. In some other areas where contaminants appear to exhibit a discrete pattern but cannot be allocated to one site by the footprint approach alone the Trustees use a combination of the footprint and mass-loading approaches.

The Trustees have adjusted their claim against PRPs to eliminate some DSAYs generated by low-level pentachlorophenol (PCP) concentrations, due to issues relating to the underlying data and analyses. The Trustees also eliminated DSAYs allocated to facilities for which the City of Tacoma and/or the Port of Tacoma appears to be solely responsible, as the Trustees have previously entered into a natural resource damage settlements addressing the City's and Port's liability Commencement Bay-wide. These adjustments leave a total of **2100 DSAYs** that the Trustees are seeking to recover in settlements with PRPs. Liability for certain contaminant footprints is not assigned at present where there is inadequate information to employ one of the allocation approaches. The Trustees anticipate that the public review process for this proposal may generate further information or suggest other approaches that will enable these footprints to be allocated.

The Trustees' goal through settlements is to recover the DSAYs allocated to each facility by reaching agreements under which PRPs will construct habitat restoration projects under Trustee oversight. The Trustees will use the Hylebos HEA to evaluate the ecological service gains expected from proposed restoration projects, and projects will be scaled to generate DSAY increases that are equal to allocated DSAY losses. The Trustees expect to enter into settlements under a range of scenarios involving either individual settling parties or groups of jointly acting

PRPs. The Trustees are willing to consider different mechanisms for reaching their goal of achieving compensation through restoration.

As an element of any restoration-based settlement, PRPs must also agree to conduct post-construction monitoring to confirm that the restoration project is meeting performance criteria. In addition to commitments to develop, participate in or fund restoration projects, the Trustees are also seeking from PRPs cash contributions toward Trustee costs to oversee project construction and performance. The costs of oversight will vary with individual project design and cannot be determined until Trustees and settling parties reach an agreement on the nature of a proposed project.

Since parties responsible for natural resource damages are also responsible for the costs of assessing damages, each settling PRP must also agree to reimburse a share of the Trustees' past damage assessment costs. The Trustees have developed an approach for allocating those costs among Hylebos Waterway facilities and for taking into account cost reimbursements already recovered under previous settlement agreements or through agreements with some PRPs. The assessment costs reported in this proposal reflect only those cost figures developed to date. The final assessment costs figure will reflect additional costs being incurred by the Trustees in preparing and obtaining public review of this proposal and in negotiating settlement agreements.

To encourage PRPs to enter into voluntary settlements, to ensure that all PRPs are being treated fairly and equitably, and to ensure that the proposed settlement is in the public interest, the Trustees are making this Report and the supporting information publicly available for 30 days for review and comment. The Trustees will evaluate all comments received during the comment period and will make any adjustments to the settlement proposal the Trustees judge to be warranted. To keep the public review and comment process manageable, the Trustees are encouraging reviewers to make their comments concise and specific. Parties who wish to present further factual or technical materials for the Trustees to consider must include a document describing how the specific submitted facts or information relate to specific parts of the Trustees' proposal, and describing how the reviewer believes the submitted facts or information should alter or affect the Trustees' analysis.

Once the Trustees review and evaluate comments and information received, they will make whatever changes to their proposal they determine appropriate. The Trustees will then approach individual PRPs to negotiate settlement agreements. Negotiated settlement agreements will be incorporated in one or more federal court consent decrees that will be lodged (filed) with the court and made available for public review for 30 days. The Trustees will evaluate and prepare a response to comments received at that time. If the comments do not prompt the Trustees to reconsider the proposed settlement(s), the Trustees will then ask the U.S. Department of Justice to request that the court enter (approve) the consent decree(s) and make the settlement agreements final.

Introduction

This Hylebos Waterway Natural Resource Damage Settlement Proposal Report (Report) has been prepared by the agencies and tribes who serve as the natural resource trustees (Trustees) for the Commencement Bay environment (National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior, the Washington Department of Ecology (lead state trustee), the Puyallup Tribe of Indians, and the Muckleshoot Indian Tribe). This Report describes the settlement proposal developed by the Trustees, including the information on which the proposal is based. It also details the means the Trustees have proposed for allocating natural resource damage liability for settlement purposes among individual Hylebos Waterway-related sites or facilities. The Report explains how the proposal relates to and differs from a proposal by the U.S. Environmental Protection Agency (EPA) to resolve claims for remediating contaminated sediments in the Hylebos Waterway. The Report also describes the process the Trustees will follow in seeking public comment on this proposal and in negotiating settlements with individual parties.

Readers should be advised that this proposal has been prepared to facilitate settlement for Hylebos Waterway natural resource damages, and the approach and data used herein would not necessarily be applicable to other sites or in other contexts.

The Trustees encourage reviewers to evaluate this proposal in light of benefits to potentially responsible parties (PRPs), the public and the environment that voluntary restoration-based natural resource damage settlements can produce. Settlements avoid the costly expenditures of time and money required in litigation, produce certainty for PRPs and the Trustees, and bring the benefits of restoration to the public and the environment more promptly.

Natural Resource Damage Assessment

Under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601 *et seq.* (CERCLA), parties responsible for releasing hazardous substances into the environment are liable both for the costs of responding to the release (by cleaning up, containing or otherwise remediating the release) and for damages arising from injuries to publicly owned or managed natural resources resulting from the release. Natural resource damage assessment (NRDA) is the process of assessing the nature and extent of the resulting injury, destruction or loss of natural resources and the services they provide. NRDA also includes the process of determining the compensation required to make the public whole for such injuries, destruction or loss. CERCLA authorizes certain federal and state agencies and Indian tribes to be designated as trustees for affected natural resources. Under CERCLA these agencies and tribes are authorized to assess natural resource damages and to seek compensation from responsible parties, including the costs of performing the damage assessment. The Trustees are required to use recovered damages only to restore, replace or acquire the equivalent of the injured or lost resources.

Commencement Bay Natural Resource Damage Assessment and Restoration Planning

In October 1991 the Trustees initiated the Commencement Bay Natural Resource Damage Assessment and Restoration Planning by issuing a Preassessment Screen, Determination to Perform Assessment, and Notice of Intent to Perform Assessment. The first phase of the damage assessment was completed in May 1995 with the issuance of the Phase I report. The Phase I report consisted of a compilation of existing information and plans for further studies. During Phase II, the Trustees have been studying the extent and effect of hazardous substance contamination in the Commencement Bay marine environment, focusing primarily upon the Hylebos Waterway. At the same time that the Trustees have been investigating and documenting contaminant-related natural resource injuries, they have also been designing, planning and building restoration projects intended to benefit the injured resources, thus restoring or replacing the services those resources provide.

While the damage assessment and restoration planning have been proceeding, the Trustees have taken advantage of opportunities to settle natural resource damage claims with willing parties. Those settlements have taken the form of consent decrees that have been entered into in federal district court. In one case, the Trustees have also entered into an administrative settlement agreement with the prospective purchaser of a facility on the Hylebos Waterway.

Copies of the Preassessment Screen, the Phase I report, several Phase II injury study reports, the Trustees' Commencement Bay Programmatic Environmental Impact Statement and Restoration Plan, and existing settlement agreements are available for review or download on the internet at http://www.darcnw.noaa.gov/cb.htm. The internet site also includes information on the restoration projects planned and built by the Trustees and settling parties.

Studies both by the Trustees and by contractors for PRPs as part of the remedial process have documented that large quantities of hazardous substances have contaminated extensive areas of the Hylebos Waterway. The Trustees' studies have demonstrated how the contamination has harmed not only the organisms that inhabit the marine sediments, but fish and wildlife that come into contact with the pollution or that eat contaminated prey items. Juvenile chinook salmon – recently designated as a threatened species under the Endangered Species Act – have been hard hit. Ocean-type juveniles are absolutely dependent upon a period of residence in the nearshore and intertidal waters of Commencement Bay as they grow and put on weight needed to make a successful transition to ocean life. Unfortunately, hazardous substances have polluted large portions of what little Commencement Bay salmon habitat is left. The effects of the pollution, documented in studies in Commencement Bay and elsewhere, hit the juveniles at a particularly vulnerable time, and in particularly harmful ways. Exposure to the types of contaminants found in the Hylebos Waterway has been shown to result in reduced growth and in impaired immune system function in juvenile chinook salmon. Smaller fish have a harder time acquiring prey, and are more subject to being preyed upon themselves. Fish with weakened immune systems are more likely to develop diseases and infections; when they develop diseases and infections they are less likely to survive.

English sole, which spend much of their lives in contact with polluted sediments, suffer a broader range of injuries. Exposure to the contaminants has been documented to result in cancerous or pre-cancerous liver lesions. In addition, studies show that contaminant exposure has disrupted English sole reproductive cycles. The effects on sole reproduction have been particularly insidious, with females reaching sexual maturation early, experiencing impaired gonadal development, reduced fecundity and failure to spawn and producing abnormal larvae.

While the Trustees have developed significant evidence of natural resource injuries, the natural resource damage assessment for Commencement Bay is not yet finished. The Trustees have begun designing a third round of Phase II studies to further document and quantify natural resource injuries. In Phase III, the Trustees will develop evidence of the extent of the biological and economic losses that have resulted from the injuries and calculate the damages claim they will present to responsible parties.

Completing all the remaining steps of the assessment process will require the Trustees to spend additional time and effort. However, it is becoming increasingly urgent for the Trustees to resolve damages claims promptly and to move ahead with habitat restoration. The inclusion of injured species such as chinook salmon on the list of threatened and endangered species has underscored the need for prompt action to restore habitat. Development pressures in the nearshore and tideflats areas are making potential restoration project sites closest to the area where the resource injuries occurred increasingly scarce and expensive. The Trustees want to act quickly to settle natural resource damage claims and develop restoration projects before the opportunities to do the greatest good at a reasonable cost are lost. Therefore, even though the assessment process is not complete, the Trustees are making the current settlement offer to capitalize on the restoration opportunities that remain.

While the damage assessment is not complete, the Trustees feel they have sufficient information and data available to frame a settlement proposal that would adequately compensate the public for natural resource damages associated with the Hylebos Waterway. The Trustees have agreed to suspend further injury studies and associated natural resource damage assessment activity while PRPs are reviewing and responding to this settlement proposal. Doing so will avoid incurring unnecessary damage assessment costs, and permit Trustee staff to devote the time and attention needed to negotiate settlements. If all natural resource damage claims associated with the Hylebos Waterway can be resolved in connection with the current proposal, the Trustees will end the damage assessment process as it relates to the Hylebos and will concentrate on other unresolved Commencement Bay problem areas. If Hylebos Waterway natural resource damage claims remain outstanding, the Trustees will re-focus any remaining Hylebos-related injury studies and damage assessment activities to address the liability of non-settling parties.

Relation to EPA Remedial Settlement Discussions

In December 2000, EPA sent a Special Notice Letter to Hylebos Waterway PRPs initiating a process for negotiating settlement of claims by EPA for the costs of responding to and remediating sediment contamination in the waterway. Natural resource damage claims are a wholly separate class of claims by the Trustees against PRPs. Liability for natural resource damages is a distinct obligation from liability for cleanup. Settlement of response cost claims with EPA does not relieve settling parties of their liability to the Trustees for natural resource damages. Likewise, settlement of natural resource damage claims with the Trustees does not relieve settling parties of their liability to EPA for response costs.

Components of Proposed Natural Resource Damages Settlement

The Trustees are proposing that Hylebos Waterway PRPs settle natural resource damage claims by agreeing 1) to undertake (in concert with other PRPs or individually) or to fund the development of habitat restoration projects that will generate a specified amount of environmental benefits; 2) to fund the Trustees' oversight of the restoration project(s); and 3) to pay an allocated share of the Trustees' past damage assessment costs.

CERCLA requires that Trustees use recovered natural resource damages only to restore, replace or acquire the equivalent of the injured or lost natural resources. In the traditional approach to CERCLA NRDA cases, Trustees determine the cost to restore the injured or lost natural resources and/or the monetary value of lost human uses; collect monetary damages from responsible parties; and use the recovered damages to plan, design and construct restoration projects. The Trustees have determined not to follow this approach in framing the current settlement proposal. Instead, the Trustees believe in this case they can achieve restoration quicker, and possibly more efficiently, if responsible parties are encouraged to construct restoration projects directly rather than to fund the Trustees to perform the work.

For purposes of this proposal, the Trustees have chosen to use *habitat equivalency analysis (HEA)* to determine the amount of natural resource habitat restoration needed to compensate for injuries resulting from hazardous substance contamination in the Hylebos Waterway. No separate human use losses, either past or future, are included for purposes of this proposal. HEA is an economic model used as a tool to estimate the amount of habitat restoration that is needed to produce environmental gains sufficient to compensate for losses resulting from natural resource injuries. HEA has been used successfully in a number of natural resource damage cases around the country for settlements as well as for litigated claims.[1] HEA equates the losses

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[1]*United States v. Great Lakes Dredge and Dock Co.*, No. 97-10075, 1999 U.S. Dist. Lexis 17612 (S.D. Fla. Sept. 27, 1999), *aff'd in part, vacated in part and remanded on other grounds*, No. 00-12002 (11th Cir. 2001); *United States v. Fisher*, 977 F.Supp. 1193 (S.D. Fla. 1997); *State of Idaho, et al. v. The M.A. Hanna Company, et al.*, No. 83-4179, Consent Decree

resulting from the injuries and the amount of restoration needed to compensate for the losses by using some aspect of the affected environment as a sort of yardstick. **Appendix A** contains a technical report giving an overview of the HEA process.

In its simplest form, HEA considers how much of a particular environmental component was lost (*e.g.*, number of acres destroyed, numbers of fish lost, etc.), to calculate how much restoration would be required to generate a net gain of an equivalent amount of the lost component. Because environmental losses and gains are not experienced at a single point in time, the calculation also takes into account the number of years of losses that were experienced and the rate at which losses and gains decrease or increase to determine the amount of gains the restoration must produce over what period of time (*e.g.*, fish-years, acre-years, etc.).

HEA requires the Trustees to take into account not just the number of years of losses and gain but the timing of the injuries, remediation and restoration. Environmental losses and gains that occur at different points in time need to be equated in resolving natural resource damage claims. The Trustees are using HEA in essence to quantify natural resource damages in terms of environmental values rather than dollar values. However, in stating their claim in non-monetary terms, the Trustees must ensure that any resulting settlement still adequately compensates the public for natural resource injuries. One important aspect of a monetary claim is the effect of the time-value of money. Payments made at different points in time have different values in the present. In order to compare payments made at different times, economists routinely apply a discount rate, compounding past gains and losses and discounting future gains and losses. If a discount rate were not applied to natural resource damage claims, the public would not be fully compensated, and responsible parties would have every incentive to put off settlement (and thus postpone restoration) as long as possible. To avoid this outcome, the Trustees have in this proposal applied a 3% discount rate to compound past environmental losses and discount future environmental gains and losses to a present value.[2]

To apply HEA to develop this settlement proposal, the Trustees perform the following steps: 1) identify the environmental components to measure losses from natural resource injuries and gains from restoration actions; 2) identify and quantify the losses that occurred; 3) identify the time period over which the losses occurred, and the rate at which any changes in the losses occurred; 4) calculate the total losses over time and apply the discount rate to the losses to determine the present value of the total losses; and 5) determine what restoration actions need to be undertaken to generate ecological service gains with a present value equal to the total losses.

(D. Idaho Sept. 1, 1995), *at* http://www.darcnw.noaa.gov/Bbird.htm.

[2]The reasoning behind the determination and application of the discount rate are described in more detail in the paper "Discounting and the Treatment of Uncertainty in Natural Resource Damage Assessment," Technical Paper 99-1 (NOAA Damage Assessment Center February 19, 1999) at **Appendix B**.

Each of those steps will be summarized below, and described in greater detail in the attached appendices.

1. *Identify the environmental components to measure losses from natural resource injuries and gains from restoration actions*

In this case, hazardous substances released to the environment have tended to accumulate in the sediments on the bottom of Commencement Bay's waterways. The organisms that live in and on the sediments, and that are exposed to sediment contamination, form the base of the food web on which most of the fish, birds and other wildlife that use the Commencement Bay environment depend. As illustrated by Figure 1, below, contamination of the sediments consequently affects nearly all aspects of the Commencement Bay ecosystem. As mentioned above, Trustee studies completed during Phase II of the damage assessment document contaminant-related impacts to salmon and flatfish as well as benthic invertebrates. The studies also show that several species of birds are being exposed to hazardous substances at potentially harmful levels.

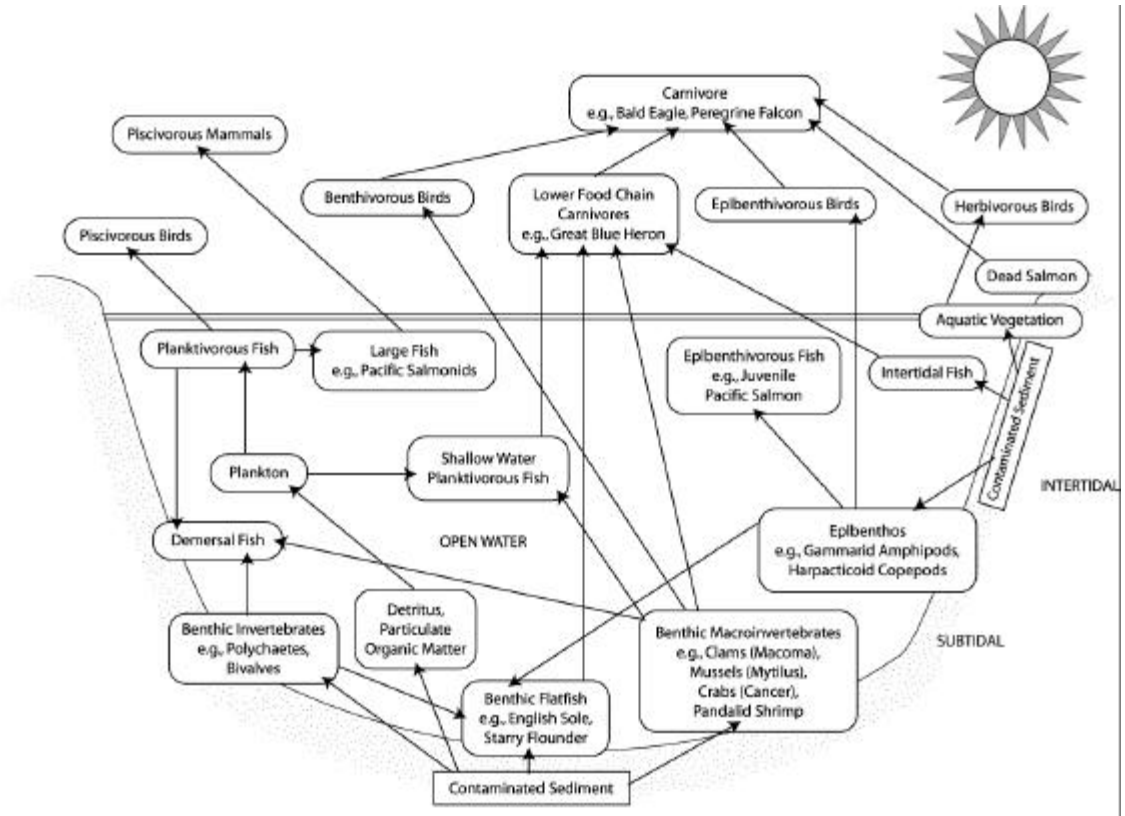

Figure 1 Conceptual Food Web for Commencement Bay
Modified from "Commencement Bay Phase I Damage Assessment"

Because of the central role that the sediments and the sediment-based biological community play in the Commencement Bay environment, the Trustees have decided to quantify natural resource injuries for settlement purposes in terms of affected habitat rather than numbers of individual species impacted. To use affected habitat as an input to the HEA model, the Trustees measured the acreage of Hylebos Waterway sediments that are contaminated by hazardous substances at injurious levels. However, "acres of contaminated sediments" is not useful as a yardstick for calculating the amount of compensatory restoration required. Much of the area of the Hylebos Waterway contaminated by hazardous substances consists of deeper subtidal areas with fine-grained sediments. Asking PRPs to compensate for natural resource injuries by constructing a given number of acres of deep-water, fine-grained habitat – in essence, to create new waterways – is unrealistic. Further, emphasizing creation of deep-water habitat does not take into consideration the ecological limitations of the Commencement Bay environment.

Currently, the Commencement Bay environment is dominated by deep channels, uplands, and steep hard-surfaced (*e.g.* riprapped) banks. The habitats that are in short supply are vegetated shallows, intertidal mudflats and marshes. These latter types of habitats are ecologically important as food sources, rearing and refuge areas, and spawning and nursery habitat for a variety of Commencement Bay species. Because of their scarcity, these habitats serve as a limiting factor on the overall health of the Commencement Bay environment. The Trustees' Commencement Bay-wide Restoration Plan addresses this imbalance in part by including as a restoration goal the development of a diversity of habitat types, with particular emphasis on habitats in short supply that are necessary to critical life stages of key injured species.

In order to maximize the benefits of restoration actions to be developed under this proposal, the Trustees evaluated a range of habitat types in terms of their relative importance to impacted species. To keep the process manageable, the Trustees conducted the evaluation using chinook salmon and English sole as representative fish species to assess the value of habitats to all fish. The Trustees used assemblages of bird species rather than individual species to assess habitat value to birds. The report at **Appendix C**, "Determining Habitat Value and Time to Sustained Function," describes in detail the habitat needs of the selected species and assemblages. As a result of this analysis, the Trustees have prioritized the creation of intertidal habitat – in particular estuarine emergent marsh habitat – as the goal of compensatory restoration projects to be built through natural resource damage settlements.

Allowing for the creation of one habitat type to compensate for losses suffered in other habitat types requires the development of some means to equate different habitats. From a biological perspective, it is overly simplistic and unsupportable to calculate the amount of marsh habitat that needs to be created to compensate for contamination of waterway bottom sediments on a straight one-to-one, acre-for-acre basis. As the analysis in Appendix C points out, marsh habitat is much more important to the affected life stages of most of the key injured species than subtidal fine-grained habitat. Estuarine marsh habitat is also more valuable because of its scarcity in the Commencement Bay environment. An acre-for-acre replacement approach does not take into account how the different habitats function or the ecological services that the different habitats

provide. Ecological services – providing food, cover, spawning, nursery or rearing habitat, refuge from predators, etc. – determine the value that different habitats have from a restoration perspective. As a result, the Trustees have decided to use the *ecological services* provided by the various habitats as the environmental component for measuring losses from natural resource injuries and gains from restoration actions. In essence, ecological services function as the currency for equating losses and gains for different habitat types.

2. Identify and quantify the losses that occurred

In order to use the ecological services currency to identify and quantify losses from natural resource injuries, the Trustees assigned an ecological services value to each of the injured habitats and the habitats potentially to be created through restoration actions. To compare different habitat types, the Trustees first identified a benchmark, or "gold standard," against which all habitat types would be measured. Since this settlement prioritizes estuarine marsh habitats, the ecological services provided by a given area of fully functioning estuarine marsh were chosen as that standard and assigned a baseline value of 1.0. The Trustees reviewed scientific literature and consulted with experts to determine the benefits provided to key species by each of the other existing and potential Commencement Bay habitat types. Because of the Endangered Species Act listing of chinook salmon and the significance of salmon to Indian tribe trustees and all regional populations, the Trustees weight habitats in terms of their importance to chinook salmon at twice the value assigned due to their importance to flatfish or birds. Based on this analysis, the Trustees have created a matrix of assigned ecological service baseline values for the different habitat types that either exist now in the Hylebos Waterway or that may be the subject of restoration actions in the Hylebos or elsewhere. The assigned baseline values range from 1.0 for fully functioning estuarine marsh, down to 0.1 for degraded habitat or areas of rip-rap. The following table shows the values assigned.

Table 1. Existing and Potential Hylebos Waterway Habitat Values

Habitat	Fully Functioning	Baseline Adjusted	Degraded
Estuarine Marsh	1.0	0.85	NA
Intertidal	0.9	0.75	0.1
Shallow Subtidal	0.7	0.55	0.1
Deep Subtidal	0.3	0.3	0.1
Rip-rap	NA	NA	0.1
Vegetated Buffer	0.4	NA	NA
Upland Greenbelt	0.15	NA	NA

The table introduces two additional habitat valuation concepts: *baseline adjusted*, and *degraded*. The Trustees adjust the baseline values of specific habitat areas to reflect the fact that habitats function in connection with each other. For certain habitat types to be fully functional, they must exist in conjunction with and interact with an adjacent habitat, often of a particular type, forming habitat complexes that enhance overall production. Habitats considered *baseline adjusted* do not have these adjacent habitats to enhance their function and are therefore assigned a lower value. For example, intertidal habitats not associated with an adjacent vegetated buffer or an adjacent fully functioning marsh are designated baseline adjusted and given a value of 0.75. Based on a review of the physical characteristics present in the Hylebos Waterway, the Trustees have designated all existing intertidal and shallow subtidal habitats in the waterway as baseline adjusted.

The Trustees assign a designation of *degraded* to specific habitat areas to reflect the fact that hazardous substance contamination has not been the only source of harm to the Commencement Bay environment. Commencement Bay habitats have been degraded by development, physical modification, and non-hazardous pollution, among other things for which CERCLA does not authorize Trustees to recover natural resource damages. The Trustees identify two primary circumstances warranting assignment of degraded values for the Hylebos HEA: shading cast by over-water structures and habitat impairment caused by log rafting and harmful levels of wood debris accumulation. Over-water structures such as piers, aprons, buildings, etc., inhibit the production of benthic species that serve as food sources for fish. They also interfere with salmon migratory movements and feeding and render shaded areas less valuable for juvenile salmon. Log rafting (the in-water floating storage of logs or log bundles) can harm habitat by creating shading and by grounding out at low tide. Log rafting and log handling also result in areas of the bottom being contaminated with high levels of wood debris, which can produce toxic leachates and anoxic bottom conditions.

To reflect the effects of these conditions, the Trustees assign a degraded value of 0.1 to intertidal and shallow subtidal habitats under over-water structures and to intertidal, shallow subtidal and deep subtidal habitats affected by log rafting or wood debris accumulation. The degraded classification is applied narrowly, only to situations causing severe physical impacts. Rip-rap is a special category of degraded habitat, reflecting its limited value to fish or birds. A more detailed explanation of the assignment of ecological service values and the underlying information and literature on which it is based can be found in Appendix C.

To quantify the impact of hazardous substances, the Trustees begin with the assumption that habitats contaminated to the point that they cause harm to species that use them provide less in the way of ecological services than do uncontaminated habitats. The Trustees reviewed scientific literature, technical data, applicable regulatory standards and the results of their own studies to determine the effect that varying sediment concentration levels of the different hazardous substances have on key species or species groups. The Trustees judge contamination to be injurious when the concentration of the contaminants in the sediments is sufficient to result in an adverse effect to identified species. The adverse effects considered range from subcellular

alterations up to mortality. The evaluated information shows that as hazardous substance sediment concentrations increase, the number of species adversely affected increases, and the effects themselves increase in severity. From this information, the Trustees have developed a series of concentration threshold levels for each hazardous substance, and have assigned to each threshold an increasing *percent reduction in ecological services* per unit of habitat. The threshold concentrations and percent service reductions are shown in Table 2.

(Text continues on page 12)

Table 2 - Hylebos Waterway HEA Contaminant Threshold Concentrations and Percent Service Reduction Assignments Based on Fish and Invertebrate Injuries (from Table 9, Appendix D)

Substance of Concern	symbol	units	Ecological Service Reductions							
			5%	10%	15%	20%	30%	40%	60%	80%
Total Polycyclic Aromatic Hydrocarbons	PAH	ppm dw				1		8	17	70
Total Polychlorinated Biphenyls	PCB	ppm dw	0.13			0.173		1.5	4	15.2
Metals										
Antimony	Sb	ppm dw	5.9	21	150	200				
Arsenic	As	ppm dw	57	130	450	700				
Cadmium	Cd	ppm dw	2.7	5.1	9.6	14				
Chromium	Cr	ppm dw	63.5	94		260				
Copper	Cu	ppm dw	270	390	530	1300				
Lead	Pb	ppm dw	360	450	530	1200				
Mercury	Hg	ppm dw	0.41	1.3	1.4	2.3				
Nickel	Ni	ppm dw	110			150				
Silver	Ag	ppm dw	3	3.3	6.1	8.4				
Zinc	Zn	ppm dw	410	530	1600	3800				
Tributyltin	Tbt	ppm dw	0.138			1				
Chlorobenzenes										
1,2-dichlorobenzene	oDCB	ppb dw	35			50				
1,3-dichlorobenzene	mDCB	ppb dw	21							
1,4-dichlorobenzene	pDCB	ppb dw		110		120				
1,2,4-trichlorobenzene	TCB	ppb dw	31	51		62				
Hexachlorobenzene	HCB	ppb dw	22	70	130	230				
Phthalates										
bis (2-Ethylhexyl) phthalate	bEPH	ppb dw	1300	1900		2000				
Butylbenzyl phthalate	BBPH	ppb dw	63	200	900	970				
Di-n-butyl phthalate	DnBPH	ppb dw				1400				
Di-n-octyl phthalate	DOPH	ppb dw	61			6200				
diethylphthalate	DEPH	ppb dw	6			200				
dimethylphthalate	DMPH	ppb dw	71	85		160				
Phenols										
2-methyl phenol	MP2	ppb dw	53	63	72	77				
4-methyl phenol	MP4	ppb dw	110	670	1800	3600				
2,4-dimethyl phenol	DMP	ppb dw	29	55	77	210				
Pentachlorophenol	PCP	ppb dw	12	400		690				
Phenol	Phenol	ppb dw	180	420		1200				
Hexachlorobutadiene	HCBD	ppb dw	11	120	180	270				
DDTs										
Dichloro-diphenyl-dichloroethane	DDD	ppb dw		16		70	1500	3600		
Dichloro-diphenyl-dichloroethylene	DDE	ppb dw		9		65	7000	21500		
Dichloro-diphenyl-trichloroethane	DDT	ppb dw		12		45	456	2100		

ppm = parts per million; ppb = parts per billion; oc = organic carbon; dw = dry weight

The threshold concentrations listed in Table 2 represent the floor of a range of contamination associated with a percent reduction in ecological services. For example, in the case of zinc, the Trustees assign percent service reductions to four concentration thresholds. The multiple thresholds are applied as follows:

Zinc Concentration (dw)	Percent service reduction
Up to 410 ppm	0%
From 410 ppm up to 530 ppm	5%
From 530 ppm up to 1600 ppm	10%
From 1600 ppm up to 3800 ppm	15%
3800 ppm and above	20%

Appendix D details the analysis conducted by the Trustees in developing the service reduction figures and the information upon which they are based. Also included in Appendix D is a memorandum describing how the Trustees evaluate the service losses from multiple contaminants at the same location.

3. Identify the time period over which the losses occurred, and the rate at which any changes in the losses occurred

Once hazardous substances come to rest in marine sediments, many remain biologically available and can contribute to natural resource injuries over an extended period of time. The contaminants can cause ecological service reductions over a series of years, beginning when the concentrations reach injurious levels and continuing until the sediments are remediated or naturally recover. There are at present in the Hylebos some prominent areas of sediments contaminated by DDT, for example, years after its production and use in the United States were banned. Releases of contaminants to the Hylebos Waterway, and resulting natural resource injuries, have occurred over many years. Significant efforts by industry and regulatory agencies to control many releases did not begin in earnest at some waterway facilities until well into the 1980s or later. Much of this effort has only begun to have an impact on sediment contamination. Trustee fish injury studies, for example, found hazardous substance-related injuries to flatfish in the Hylebos Waterway occurring in 1997 at a prevalence that had not appreciably changed since the late 1970s and 1980s.

Despite the fact that natural resource injuries have apparently been occurring for decades, CERCLA precludes recovering natural resource damages where the damages and the releases from which the damages resulted occurred wholly before December 11, 1980. CERCLA's stipulation that both the releases and damages must have occurred prior to that date to be exempt from the statute means that the Trustees can legally seek compensation for natural resource damages that occurred after that date even if the release that resulted in the damages occurred before it. The Trustees ultimately must exercise their discretion and authority in determining, within the limits of CERCLA, what compensation they will consider appropriate from the PRPs for natural resource injuries. For purposes of this settlement proposal and seeking public input, the Trustees are considering and have focused on restoration that would be scaled based on ecological service losses post-CERCLA through the completion of natural recovery following remediation.

The Trustees assume that service losses from contamination have occurred and will continue to occur at a constant rate until completion of remediation. Once the remediation is completed, the Trustees assume that ecological services provided by the affected area will increase at a constant rate until the area produces the services it would otherwise produce but for the contamination. The Trustees assume that sediment remediation in the Hylebos Waterway will be completed in 2003. For purposes of this settlement proposal, the Trustees assume that areas subject to active remediation will recover to full service levels 10 years after remediation, and that areas subject to natural recovery will take 25 years to recover[3].

4. Calculate the total losses over time and apply the discount rate to the losses to determine the present value of the total losses

To pull together the assignments of habitat ecological services, designation of degraded areas, and service reductions from contamination, and to show the effect of remedial plans, the Trustees have compiled a database of relevant information and used that database to develop a series of maps using a geographical information system (GIS). The Trustees developed GIS map layers showing habitat types (in terms of water depth and type of substrate, reflecting judgments about degraded conditions), baseline adjustments, areas exceeding hazardous substance threshold concentrations, and areas for which active remediation is planned.[4] When the map layers are overlaid, the result is a combined map showing a series of patches or polygons, each with a unique combination of ecological characteristics. Figure 2 consists of a portion of the GIS map for the Hylebos Waterway showing the polygons generated by the combined map layers. The process of

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[3]Presumably, areas actively dredged as part of the remedial process will have injurious concentrations of contaminants immediately removed. However, it will take time for benthic organisms to recolonize these areas to the point that they are generating the levels of ecological services they would be expected to produce. In addition, for some time after remediation there will remain areas in the waterway with contaminant concentrations below levels triggering active cleanup but still high enough to produce natural resource injuries. Due to the constant resuspension and stirring of sediments that occurs in this active waterway, the Trustees assume that organisms in dredged areas will continue to be exposed to contaminants for some time after remediation is complete.

[4]The boundaries on the Trustees' maps of the areas exceeding the injury threshold levels do not necessarily coincide with the areas identified in the EPA-led remedial design process as needing cleanup. This is because the Trustees take into consideration a different set of criteria in defining natural resource injuries than EPA uses in making decisions on what areas should be remediated. For example, EPA has determined that some contaminated areas should be allowed to naturally recover over time rather than be actively remediated. However, where such areas contain contaminant concentrations above Trustee injury thresholds, they have been included in the Trustees' injury calculations. The remedial process also must concentrate on contamination below the surface layers of sediments that might be exposed by future development or through other means; the Trustees' analysis for this settlement proposal focuses only on the upper sediment layers currently biologically available.

compiling the database and maps is described in detail in **Appendix E**. That appendix also includes the maps used to perform the ecological service value calculations.

(Text continues on page 16)

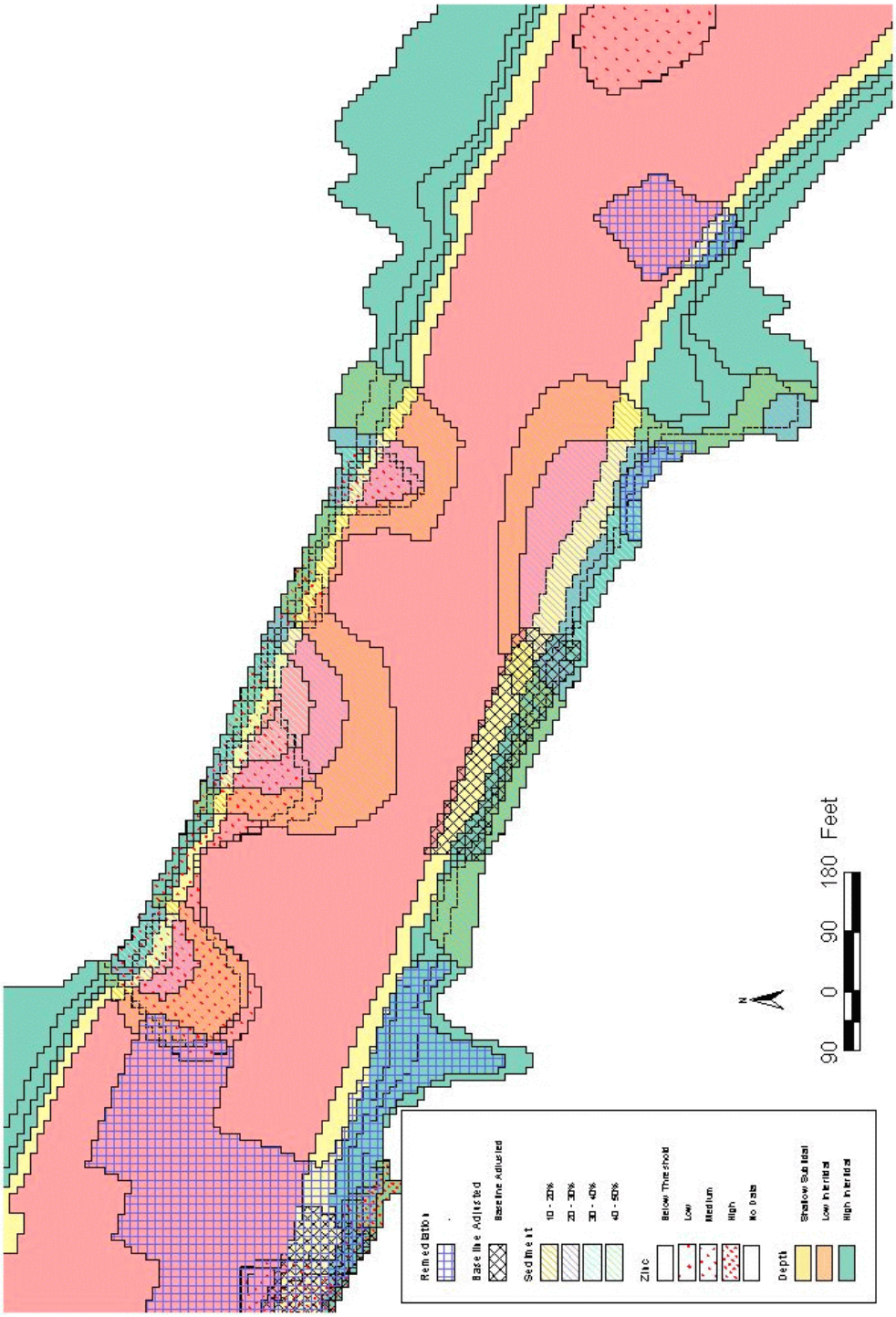

Figure 2 - GIS Map Polygons Formed by Overlaid Data Layers (per Appendix E)

The particular combination of characteristics and habitat types that define a polygon generates a specific ecological services value loss figure for that polygon. Taking into account the size of the polygon, and applying assumptions about the timing of remedial action and rates of recovery for remediated and unremediated areas, generates a service acre-years[5] loss figure for the polygon. Adding those figures for all polygons produces a total service acre-years loss for the waterway as a whole. Applying the 3% discount rate to past and future losses to determine their present value results in a calculation of a total *discounted service acre-years (DSAYs)* loss. All hazardous substance contaminants analyzed in the Hylebos Waterway have resulted in a total loss of 2,438.68 DSAYs (rounded to two decimal places). **Appendix F** describes in greater detail the steps involved in performing the calculations that make up the HEA model developed for this settlement proposal.

While all contaminants together have generated a loss of 2,438.68 DSAYs, the Trustees are seeking to recover a somewhat smaller claim. Of the total injury figure, 207.56 DSAYs are the result of data showing pentachlorophenol (PCP) in excess of the lowest contaminant threshold concentration. As more fully discussed in Appendix E, the characteristics of the PCP data combined with the very low level of the lowest threshold concentration have led the Trustees to disregard those DSAYs generated solely by exceedances of the lowest PCP threshold. Also, since the Trustees have already entered into a settlement covering the City of Tacoma's and the Port of Tacoma's Bay-wide natural resource damage liability, the Trustees are not seeking to recover some 131.16 DSAYs allocated to facilities for which the City of Tacoma and/or the Port of Tacoma appears to be the only party or parties responsible. Consequently, the Trustees' natural resource damage claim for purposes of this proposal will at a maximum amount to **2099.96 DSAYs**. This figure, representing all natural resource damages for all hazardous substances for the Hylebos Waterway, is the total claim that the Trustees are seeking to recover from all PRPs via this settlement proposal.[6]

5. Determine what restoration actions need to be undertaken to generate ecological service gains with a present value equal to the total losses

Calculating the amount of restoration needed to compensate for the natural resource injuries follows a similar analysis, using the same assumptions. As the goal of natural resource damage assessment is to compensate the public for natural resource losses, the objective of a restoration-based settlement must be to produce ecological service gains that would not otherwise occur that are equivalent to the calculated service losses. The Trustees' goal in this settlement is to enter into settlement agreements that will result in the development of a series of restoration projects that will together produce a total gain of 2099.96 DSAYs.

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[5] In the Hylebos HEA, one service acre-year is equivalet to the amount of ecological services that would be provided by one acre of fully functioning estuarine marsh habitat in a year.

[6]The Trustees' total claim figure may be further reduced if the Trustees cannot identify sites liable for 350.92 DSAYs they are unable to allocate based on available information.

To judge the gains expected to be generated from an individual proposed restoration project, the Trustees would begin by calculating the present value of the ecological services the project site would generate without the restoration project. The Trustees would analyze the current condition of the project site to determine the type of habitat present and the level at which it is functioning, and make informed judgments about any potential change in the service levels the site would provide without the project in the future. This information is used to calculate the present value of the total service acre-years the site would provide if the project were not built. A proposed project design must then be developed and reviewed to determine the types of habitat and levels of services the project will provide once constructed. The services to be provided each year of the project are summed and the present value of the total service acre-years calculated. Subtracting the DSAYs produced by the site without the project from the DSAYs to be produced by the site assuming the project is constructed generates the total DSAY gain from the project.

Since proposed projects have obviously not yet been constructed, the Trustees must predict the likelihood of project success and the rate at which project elements may change over time (*e.g.*, growth rate for vegetation) based on their own experience and the experience of others. Appendix C details the information and analysis Trustees have used in developing projections for the time different habitats will require to reach full function. **Appendix G** describes example restoration projects of types the Trustees expect to be developed and illustrates how the Trustees will evaluate the DSAY credit to be granted to proposed projects.

Allocation of Liability

Releases of hazardous substances into the Hylebos Waterway have become commingled to the extent that the Trustees cannot reasonably distinguish the impacts of one party's releases from another. Under these circumstances, the law holds any party contributing to the contamination to be jointly and severally liable for the whole injury. The Trustees recognize, however, that settling parties likely would be reluctant to contribute voluntarily more than what they feel would be a fair share of the total compensation required for the Hylebos Waterway injuries. Consequently, in order to encourage settlement, the Trustees have attempted to apportion settlement shares among responsible parties. The Trustees are aware that some Hylebos Waterway PRPs have been developing a scheme for allocating response cost liability among all PRPs. Because not all PRPs were directly involved in the remedial allocation process, and because the terms of that allocation have until recently been subject to a confidentiality agreement, the Trustees judged that it would more likely lead to a prompt settlement of Hylebos Waterway natural resource damage claims if the Trustees developed and publicly presented an independent natural resource damage settlement allocation proposal.

Appendix H to this Report describes in detail the information used by the Trustees in developing their allocation, and the analytical methodology employed to allocate the proposed settlement. Unlike the process used in the PRPs' remedial allocation, the Trustees have allocated the proposed settlement among Hylebos Waterway facilities or sites, and have not attempted to apportion liability among multiple parties responsible for individual sites or facilities. The Trustees expect that in cases where different parties bear some responsibility for releases at the

same facility, the parties will already have discussed among themselves how to apportion that responsibility, or will do so in the course of settlement discussions with the Trustees.

Another way in which the Trustees' allocation and the remedial allocation processes differ is in the information the two processes consider. The remedial allocation reportedly involves significant efforts to develop and present evidence of facility operations and hazardous substance releases that had not previously been made public. Because of the confidentiality agreement among the participants in the remedial allocation process, the Trustees have not previously had access to that information. Instead, the Trustees have relied upon publicly available data and information, obtained mainly from the files of EPA and the Washington Department of Ecology, along with information obtained from public libraries.

The Trustees' allocation analysis is designed to be fair and equitable to PRPs while ensuring that the interests of the public are adequately served. To trigger allocation of liability to a site there has to be evidence of a pathway for water or sediment to travel from the site to the Hylebos Waterway. There also has to be evidence of an activity conducted at the site that is a likely source of a substance of concern or which released a chemical likely to exacerbate the impact of a substance of concern. In addition, there has to be evidence of actual environmental contamination by the hazardous substance due to a water pollution control permit violation; the presence of contamination in surface water, groundwater, soil or sediment; or the presence of a sediment contamination footprint in very close proximity to the site.

The contaminants released to the Hylebos Waterway have become mixed and transported to different parts of the waterway by currents, by the effects of prop wash and ship scour, and by movement of sediments associated with dredging operations. As a result, a given area of the waterway may be contaminated with multiple hazardous substances from several apparent sources. Rather than assigning each facility associated with a particular contaminant a fixed percentage of liability, for settlement purposes the Trustees first apply a contaminant footprint approach to the extent possible. By examining concentration gradients of contaminants in surface sediments, and reviewing available information on hazardous substance releases, the Trustees have assigned liability for areas of sediment contamination to one or more facilities for most contaminants.

Areas contaminated with polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) are not readily susceptible to allocation by footprint because of the widespread distribution of those substances. For these substances, the Trustees use a mass-loading approach, which relies on a relative comparison of the duration and area of operations associated with releases and of the extent to which the type of activities conducted at each facility is likely to have generated significant releases. The Trustees also consider where along the waterway the facilities are located and the likelihood that releases in one part of the waterway have contaminated sediments in other parts of the waterway. There are also a handful of areas contaminated with other substances that appear to exhibit a discrete pattern, but cannot be allocated to one facility by the footprint approach alone. For these, the Trustees employ a combination of the footprint and mass-loading approaches.

Using each of the above approaches still leaves some areas of waterway contamination unallocated based upon information currently available. Where there is no apparent connection to any facility, the Trustees designate the footprint involved as Type I Non-Allocated. Where there is an apparent physical connection between a footprint and a facility but no information indicating activity that may have resulted in the release, the Trustee designate the footprint as Type II Non-Allocated. For convenient reference Type II Non-Allocated footprints are labeled with the name of an adjacent site. Following the public review process for this proposal, the Trustees will evaluate new information received to determine whether it allows these unresolved areas to be allocated to individual facilities.

The Trustees use each of the above approaches to allocate liability for DSAY reductions generated by the contaminants in all the mapped polygons described earlier. The combined results of the allocation approaches are summarized in **Attachment 1.** As mentioned previously, the Trustees allocate liability to facilities rather than to parties and are expecting multiple parties associated with a given facility to resolve among themselves how to sub-allocate that facility's share of liability. **Attachment 2** identifies the parties the Trustees are currently aware of who may share responsibility for hazardous substance releases at each site.

It is important to underscore that the Trustees have developed this allocation solely for settlement purposes. By performing this allocation, the Trustees are not suggesting or conceding that the effects of Hylebos Waterway contamination are readily divisible among contaminants, natural resource injuries, facilities or parties. Further, the allocation approach of assigning liability based upon an apparent sediment contamination footprint is employed solely for convenience and does not address the potential that many of the contaminants may have been transported some distance from the point of initial release. In the event that not all Hylebos Waterway natural resource damage claims can be resolved through settlement, the Trustees reserve the right to pursue all possible claims against non-settling parties on a joint and several liability basis.

Restoration Project Proposals

The Trustees' allocation assigns to each facility a DSAY settlement figure. The Trustees are proposing to settle NRDA claims by reaching an agreement under which the party or parties responsible for each facility develop a restoration project or projects that would generate the facility's DSAY assignment. Because the availability of suitable project sites is limited, and because several facilities have a fairly small DSAY liability assignment, in a number of cases it may be preferable for multiple parties to develop jointly a single restoration project of a size and configuration sufficient to satisfy the total liability of the jointly acting parties. To facilitate such multi-party projects, the Trustees are willing to consider different options for resolving the multiple party liability with joint projects. For example, one PRP has proposed to develop a large restoration project that would generate DSAY credits in excess of its liability and to sell the excess credits to other PRPs. Under this proposal, the Trustees would enter into a settlement with each participating PRP based upon evidence of each party's participation in the joint project at a level sufficient to satisfy the party's liability, combined with payments of any amounts required to cover restoration oversight and project monitoring and to reimburse past damage assessment costs.

Restoration Oversight Costs and Project Monitoring

In order to ensure that proposed restoration projects generate the anticipated DSAY credit and thereby compensate the public for natural resource injuries, each project will include performance criteria and monitoring to verify that the criteria are being met. The details of the performance criteria and monitoring requirements for each project will depend upon the nature, size and parameters of the project and consequently will need to be developed as part of the project design process. Examples of the types of performance criteria and monitoring that the Trustees will be considering are detailed in the Trustees' Commencement Bay Monitoring Program document, a copy of which is included as **Appendix I**.

The Trustees will exercise oversight of settling parties' development of restoration projects to ensure that project design specifications are met and the projects are developed in accordance with agreed project plans. The Trustees' costs in performing the oversight constitute a portion of the Trustees' claim and will be included in any settlement. The costs of overseeing project development will necessarily vary with the project size and configuration, and are not necessarily proportional to the project size. A minimum level of oversight effort is required for any project. However, a large, simple project may require only marginally more than the minimum oversight effort, while a smaller, highly complex project may require substantially more. Since the level of oversight cannot be determined until Trustees and settling parties reach an agreement on the nature of a proposed project, it is not possible at this juncture to identify the amount of oversight costs that will be required. Instead, that figure will be developed in conjunction with individual settlement discussions.

Recovery of Past Damage Assessment Costs

CERCLA provides that parties responsible for natural resource damages also are responsible for the costs incurred by the Trustees in assessing the damages. The Trustees have incurred significant personnel and contract costs in evaluating information developed by PRPs and others and in planning, undertaking and overseeing the Trustees' independent investigations and analyses. At different times during the damage assessment process, individual PRPs have entered into agreements with the Trustees under which the PRPs were permitted to directly participate in portions of the damage assessment in return for reimbursing a portion of the Trustees' damage assessment costs. Also, in connection with settlements already reached with some PRPs, the Trustees have recovered a portion of their past costs. However, the bulk of the Trustees' assessment costs to date remain unreimbursed and subject to recovery from parties who have not yet settled their natural resource damage liability. In addition, the Trustees will incur further costs in developing this proposal and making it available for public review, in addressing comments received on this proposal and in negotiating settlements.

The Trustees also developed an allocation to individual facilities of unreimbursed costs to date. The Trustees initially allocated to the Hylebos Waterway a portion of the total unreimbursed damage assessment costs incurred in connection with the Commencement Bay site as a whole. The combined Hylebos Waterway-specific costs plus the Hylebos Waterway share of the Commencement Bay-wide costs are then allocated among waterway facilities by assigning each

facility a portion of those costs equal to the facility's allocated share of the total DSAY losses calculated for the waterway. Where assessment costs are incurred and tracked specific to a facility, those costs are added to the facility's allocated share. Prior reimbursements by a party are deducted from the costs assigned to the facility with which the party is associated to generate a net assessment costs figure for the facility. Details on the allocated costs and the cost allocation analysis are included in **Appendix J**.

Readers should note that the past costs information in this proposal is incomplete and reflects only those cost data compiled as of the date of this report. The final damage assessment costs attributable to the Hylebos Waterway will increase as the Trustees report more current data and expend additional efforts in obtaining public review of this proposal, negotiating settlements and obtaining review and approval of settlements. Final damage assessment costs will therefore not be determinable until later in the settlement process.

Public Review

To encourage PRPs to enter into voluntary settlements, to ensure that all PRPs are being treated fairly and equitably, and to ensure that the proposed settlement is in the public interest, the Trustees are making this Report and the supporting information publicly available for review and comment. The Trustees will evaluate all comments received during the comment period and will make any adjustments to the settlement proposal the Trustees judge to be warranted.

The process of making an NRDA settlement proposal in this type of case available for public and PRP review is not typical. The Trustees are taking this step because they believe it will significantly increase the odds of being able to settle NRDA claims with the multiple parties involved in the Hylebos Waterway efficiently in a way that maximizes public and judicial acceptance of the settlements and results in prompt and productive habitat restoration actions. To keep the settlement process moving forward and to manage the workload involved, the Trustees are required to place reasonable limits on the length of the review period and mechanics of the comment process. The Trustees will make this proposal available for review for 30 days. The Trustees encourage reviewers to be concise and specific in comments and, where applicable, to cite specific sections of this Report or its appendices. Some reviewers may have factual or technical information not included or cited in this Report or the supporting documents that they wish the Trustees to consider as part of the settlement proposal. The Trustees can accept and consider additional factual or technical information only if it is accompanied by a document describing how the specific submitted facts or information relate to specific parts of the Trustees' proposal, and describing how the reviewer believes the submitted facts or information should alter or affect the Trustees' analysis. In short, the Trustees must reject and not consider information presented in the form of a "document dump" or "data flood." The Trustees also reserve the right to reject and not consider comments or submissions of facts or information they deem to be intended primarily for the purpose of harassment, obstruction or delay.

The purpose of the review and comment process the Trustees are undertaking is to provide all PRPs and the public an opportunity for reasonable input to the settlement process, and to verify that the overall proposal is in the public interest. The Trustees do not intend to make a final

administrative decision regarding the settlement proposal, and consequently have no plans to issue a formal decision document at the conclusion of the review process. Rather, following the close of the review and comment period, the Trustees will evaluate the comments and revise their proposal as they determine to be appropriate. Thus, no legal rights or obligations will be established either by the proposal in its current form or by the proposal as amended following the public comment period. Once any necessary revisions have been made, the Trustees will approach PRPs responsible for each facility with an offer to settle NRDA claims based on the proposal. Final decisions by the Trustees regarding the overall scale of Hylebos Waterway NRDA liability, the allocation of that liability among the waterway facilities, and the appropriate terms on which to settle NRDA claims with individual PRPs will be reflected in consent decrees negotiated by the Trustees and the U.S. Department of Justice with individual PRPs or PRP groups. Those consent decrees will be lodged with the federal district court and undergo a public review process before the settlements become final.

Settlement Negotiations

The process of negotiating settlements with multiple parties simultaneously will demand a large commitment and expenditure of time and resources by the Trustees. In order to effectively manage the process of negotiating and processing settlements, the Trustees will set a reasonable deadline for receiving good faith proposals. The Trustees will encourage PRPs to present joint proposals from multiple parties to reduce transaction costs and speed the process of concluding negotiations. As described above, some PRPs may find it in their interests to propose to develop a restoration project that generates DSAYs in excess of their liability and to solicit participation in the project by other PRPs, on terms they would separately negotiate. The Trustees have been discussing one such arrangement with one PRP. The Trustees encourage such collaboration, and will take steps to facilitate it upon request.

Once a settlement agreement is reached with one or more PRPs, it will be incorporated into one or more federal court consent decrees. To expedite negotiations, the Trustees will develop a template consent decree that will be presented to PRPs as part of the process of negotiating individual settlements. To satisfy federal and state requirements for such agreements, proposed consent decrees will be lodged (filed) with the court and made available for public review for 30 days. The Trustees will evaluate and prepare a response to comments regarding the settlement(s) received at that time. If the comments do not prompt the Trustees to reconsider the proposed settlement(s), the Trustees will then ask the U.S. Department of Justice to request that the court enter (approve) the consent decree(s).

Facilitating Restoration of Injured Resources

The combined settlement proposal and liability allocation approach contained in this Report has not been attempted in any other natural resource damage assessment case. The Trustees have undertaken this exercise – and incurred the considerable expenditure of time and funds involved – because they believe that the openness, visibility and obvious independence of this approach give it the greatest chance of expeditiously settling most Hylebos Waterway natural resource damage claims in a way that is fair to all parties and fulfills the Trustees' obligations to

the public. This way of proceeding should lead more promptly to concluding settlements and achieving the natural resource restoration that is the ultimate goal of the natural resource damage assessment process.

LIST OF ACRONYMS AND ABBREVIATIONS

ACOE	U.S. Army Corps of Engineers
AET	Apparent Effects Threshold
Ag	silver
ASR	automobile shredder residue
As	arsenic
AST	above ground storage tank
BA	baseline adjusted
Bay	Commencement Bay
BBPH	butylbenzyl phthalate
bEPH	bis(2-ethyhexyl) phthalate
BOD	Biological Oxygen Demand
CBO	Congressional Budget Office
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
Cd	cadmium
Cr	chromium
CRIS	United States Courts' Court Registry Investment System
Cu	copper
CWA	Clean Water Act
DARRF	Damage Assessment and Restoration Revolving Fund
DDD	dichloro-diphenyl-dichloroethane
DDE	dichloro-diphenyl-dichloroethylene
DDT	dichloro-diphenyl-trichloroethane
DEPH	diethylphthalate
DMP	2,4-dimethyl phenol
DMPH	dimethylphthalate
DnBPH	di-n-buthyl phthalate
DOI	U.S. Department of the Interior
DOPH	di-n-octyl phthalate
DSAY	discounted service acre-year
dw or DW	dry weight
EAR	elevations above reference
ECI	Employment Cost Index
Ecology	Washington Department of Ecology
ESA	Endangered Species Act
EPA	U.S. Environmental Protection Agency
FF	fully functional
GAO	General Accounting Office
GIS	Geographic Information System
H_2S	hydrogen sulfide
HCBD	hexachlorobutadiene
HCB	hexachlorobenzene
HCC	Hylebos Cleanup Committee
HEA	Habitat Equivalency Analysis
Hg	mercury

HPAH	high molecular weight polycyclic aromatic hydrocarbons
HSI	Habitat Suitability Indices
HSV	Habitat Service Value
HWDMS	Hylebos Waterway Data Management System
ID	identification
LPAH	low molecular weight polycyclic aromatic hydrocarbons
mDCB	1,3-dichlorobenzene
mg/kg	milligram per kilogram = part per million
MLLW	mean lower low water, NOAA = 0 feet tidal elevation
m2	square meter
mm	millimeter
MP2	2-methyl phenol
MP4	4-methyl phenol
MSQS	Marine Sediment Quality Standards (Ecology)
NA	not application or not available
NMSA	National Marine Sanctuaries Act
ng/g	nanogram per gram = parts per billion
Ni	nickel
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPL	National Priority List (US EPA)
NRDA	Natural Resource Damage Assessment (CERCLA)
OC	organic carbon
oDCB	1,2-dichlorobenzene
OMB	Office of Management and Budget
OPA	Oil Pollution Act of 1990
PAH	polycyclic aromatic hydrocarbon
Pb	lead
ppb	part per billion
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
pDCB	1,4-dichlorobenzene
ppm	part per million
RI	Remedial Investigation - EPA Commencement Bay Nearshore/Tideflats
ROD	Record of Decision - EPA Commencement Bay Nearshore/Tideflats
PRP	potential responsible party
PSL	Percent Service Loss
RSV	Residual Service Value
SAY	service acre-year
Sb	antimony
SEC	sediment effects concentration
SI	Suitability Indices
SMS	Sediment Management Standards (Ecology)
SOC	substance of concern
SQS	Sediment Quality Standards (Ecology)
TBT	tributyl tin

TCB	1,2,4-trichlorobenzene
TOC	total organic carbon
ug/kg	microgram per kilogram = parts per billion
UK	United Kingdom
U.S.C.	United States Code
UST	underground storage tank
USEPA	U.S. Environmental Protection Agency
WADOE	Washington Department of Ecology
WRC	Water Resources Council
Zn	zinc
%	percent
< >	greater than, less than
+ -	positive, negative
e.g.	for example
i.e.	that is

Hylebos Waterway Natural Resource Damage
Settlement Proposal Report
)))))))))))))
Content of Appendices

Appendix A Habitat Equivalency Analysis: An Overview (NOAA Damage Assessment and Restoration Program, Revised October 4, 2000)

This document describes the concept and functioning of habitat equivalency analysis. It demonstrates the application of the process in the context of a hypothetical oil spill in a salt marsh. An appendix to the document contains details of the algebraic formula for a typical habitat equivalency analysis.

Appendix B Discounting and the Treatment of Uncertainty in Natural Resource Damage Assessment, Technical Paper 99-1 (NOAA Damage Assessment Center, February 19, 1999)

This document contains a discussion of the application of discounting and the determination of an appropriate discount rate in natural resource damage actions, and how to treat uncertainty in general in natural resource damage assessments.

Appendix C Determining Habitat Value and Time to Sustained Function (Nicholas E. Iadanza, September 11, 2000)

This report reviews the scientific literature and opinion regarding the importance of different habitat types to juvenile chinook salmon, English sole and an assemblage of bird species, and ranks the habitats in relative terms in regard to each habitat's potential to provide attributes that support feeding and refuge functions for these species. Based on this ranking, the report assigns numeric values to the habitats based on their importance for all considered species. The values assigned through this ranking process, stated as ecological service values, are used as inputs in the habitat equivalency analysis. The report describes the Trustees' analysis of the impact of adjacent habitats and specific limiting factors in modifying the ecological services that habitats provide. The report also includes a section that reviews the scientific literature and opinion regarding the time required for habitat restoration projects to mature to the point of reaching a sustained function state.

Appendix D Defining Injuries to Natural Resources in Hylebos Waterway (Robert J. Wolotira, February 27, 2002); Supplement 1 - Calculating and Separating the Effects of Multiple Contaminants (Robert J. Wolotira, December 17, 2001); Supplement 2- Associating Ecosystem Service Loss with Indicators of Toxicity in Habitat Equivalency Analysis (David Cacela, Joshua Lipton, Douglas Beltman and James Hansen, April 18, 2001); Addendum - Sediment Chemistry Data Preparation (Angela Stringer and Robert Wolotira, ND).

This report reviews study results, scientific literature and opinion and regulatory standards to assign correlations between sediment concentrations of identified substances of concern and percent ecological service losses for affected habitats. The percent service losses, assigned to increasing stepwise threshold concentrations of the substances of concern, are applied in the Trustees' habitat equivalency analysis as reductions in the ecological service values assigned to affected habitats per the process described in Appendix C. The first supplemental memorandum describes how the Trustees evaluate the effects of multiple contaminants occurring in the same location. The second supplemental memorandum discusses further the concept of assigning percent service reductions to sediment contamination thresholds. An addendum describes the components and procedures used to prepare and combine the sediment chemistry data sets for spatial analysis, and contains tables of the analyzed data.

Appendix E How Habitat and Sediment Injury Information is Mapped Via a Geographic Information System: Spatial Analysis of Sediment Chemistry Data (Angela B. Stringer, Robert J. Wolotira and Richard A. Morse, February 28, 2002)

This document is a detailed technical explanation of how the Trustees map data on sediment concentrations of substances of concern in the Hylebos Waterway, ecological service value modifying factors, and assumptions regarding sediment remediation and natural recovery using a geographic information system (GIS). The Trustees use the mapping to calculate the number of acres that experience varying levels of ecological service losses due to sediment contamination.

Appendix F Equating Contaminant-Related Ecological Service Losses and Restoration-Generated Service Gains for the Hylebos Waterway Using Habitat Equivalency Analysis (David J. Chapman and Robert A. Taylor, March 1, 2002)

This appendix details the steps the Trustees followed in combining the habitat values, percent service loss figures, and GIS mapping data described in the previous appendices to generate inputs to the mathematical model that makes up the Hylebos Waterway habitat equivalency analysis (HEA). The appendix describes in general terms the more complex portion of the model that is used to calculate the DSAY losses due to contamination, and explains the relationship between the DSAY loss calculations and the process for allocating injury liability among Hylebos Waterway facilities. The appendix also describes how a more simplified version of the HEA is used to calculate the DSAY gains from example restoration projects.

Appendix G Determining Discounted Service Acre-Year (DSAY) Credits for Example Habitat Restoration Projects (Jennifer A. Steger and Christine O'Connor, August 22, 2001)

This report describes three example habitat restoration projects and demonstrates how the Trustees would determine the ecological service values that would be generated by each project. The examples illustrate how the Trustees would evaluate the ecological service gains that comparable projects would generate and consequently how the Trustees would value the projects in the context of the proposed settlement.

Appendix H Natural Resource Damage Allocation of Injuries to Natural Resources in the Hylebos Waterway (EcoChem Inc. and GeoSphere, February 28, 2002)

This report details the approaches used by the Trustees in allocating for settlement purposes the DSAY losses calculated for the Hylebos Waterway. The allocation follows a step-by-step process using three different approaches in allocating liability: use of unique sediment contamination footprints; and use of a mass loading-based determination for contaminants not subject to footprint analysis; use of a hybrid approach for contaminants demonstrating a footprint with multiple known sources. The report includes maps of contaminant footprints and tables describing known information on activities and contamination associated with waterway facilities.

Appendix I Commencement Bay Natural Resource Damage Assessment Restoration Monitoring Program (Commencement Bay Natural Resource Trustees, March 2001)

This document contains the Trustees' program for monitoring the performance of Commencement Bay natural resource habitat restoration projects. The document describes performance criteria and monitoring methodologies and frequencies for different types of projects the Trustees have developed or are considering developing. The Trustees will follow the monitoring program in evaluating projects developed in conjunction with the current settlement proposal.

Appendix J Allocation of Interim Natural Resource Damage Assessment Costs Incurred in Connection with the Hylebos Waterway (Robert A. Taylor, December 3, 2001)

This memorandum identifies the natural resource damage assessment costs compiled by the Trustees to date and explains the approach the Trustees are following in allocating a share of Commencement Bay-wide costs to the Hylebos Waterway and allocating Hylebos Waterway costs among waterway facilities. The memorandum also explains how the Trustees will ensure that PRPs who have made prior reimbursements of Trustee assessment costs are fully credited with those payments.

Attachment 1

Discounted Service Acre Years by Substance of Concern and Site for Hylebos Waterway

Site	Ag	As	BBPH	BEPH	Cd	Cr	Cu	DDD	DDE	DDT	DEPH	DMP	DMPH	DOPH	HCB	HCBD	Hg	MDCB	Ni	PAHs	Pb	PCBs	PCP	PDCB	Sb	TBT	TCB	Zn	TOTAL
1670 MARINE VIEW DR (TYPE II)*	--	--	--	--	--	--	--	--	--	--	--	--	11.684	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.684
3138 MARINE VIEW DR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.420	--	--	2.360	--	--	--	--	--	--	--	--	8.780
3138 MARINE VIEW DR (TYPE II)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.396	--	1.396
AIRO SERVICES	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.272	--	5.849	--	--	--	--	--	--	23.121
AK-WA SHIPBUILDING	--	2.790	--	--	--	2.680	15.991	--	--	--	--	--	--	--	--	--	--	--	--	379.988	--	20.997	--	--	3.452	8.408	--	7.368	441.675
AK-WA SHIPBUILDING (TYPE II)	--	--	1.684	1.642	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.326
AOL EXPRESS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.442	--	--	--	--	--	--	--	--	3.442
B&L WOODWASTE LANDFILL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.623	--	--	--	--	--	--	--	--	4.623
BONNEVILLE POWER	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.623	--	2.236	--	--	--	--	--	--	6.859
BUFFELEN	--	--	--	--	--	--	2.858	--	--	--	--	--	--	--	--	--	--	--	--	12.724	--	2.881	--	--	--	--	--	--	18.463
CASCADE TIMBER (YARD #1)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.863	--	--	--	1.863
CENEX AG	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.895	--	--	--	--	--	--	--	--	6.895
CITY OF TACOMA #1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.442	--	--	--	--	--	--	--	--	3.442
CITY OF TACOMA (STEAM PLANT)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	69.175	--	58.546	--	--	--	--	--	--	127.721
CITY OF TACOMA (STEAM PLANT) (II)		--	1.042	--	--	--	--	0.846	--	0.169	--	--	0.211	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.268
DON OLINE AUTOFLUFF SITE	--	--	10.881	1.076	0.720	--	0.934	--	--	--	--	--	1.217	0.282	--	--	0.238	--	0.638	--	0.681	7.192	--	--	--	--	--	1.057	24.915
DON OLINE AUTOFLUFF SITE (TYPE II)		--	--	--	--	0.346	--	--	--	--	--	0.291	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.637
DUNLAP TOWING	--	1.116	--	--	--	--	--	--	--	--	--	0.076	--	--	--	--	--	--	--	4.340	--	--	--	--	2.043	--	--	--	7.575
DUNLAP TOWING (TYPE II)	--	--	--	0.017	--	--	--	--	--	--	--	--	0.135	0.361	--	0.912	--	0.678	--	--	--	--	--	--	--	--	--	--	2.103
ELF ATOCHEM	--	5.097	--	--	--	0.065	--	3.321	3.313	9.400	--	--	--	--	1.414	13.511	6.894	--	--	21.668	--	17.851	--	--	2.889	--	--	0.039	85.461
ELF ATOCHEM (TYPE II)	--	--	--	--	--	--	--	--	--	--	--	0.062	4.856	--	--	--	--	4.635	--	--	--	--	--	--	--	1.800	--	--	11.353
GENERAL METALS OF TACOMA	--	1.050	10.803	5.194	0.257	0.275	--	--	--	--	--	--	--	1.167	--	0.711	2.098	2.089	--	54.174	--	59.506	--	--	2.043	--	--	2.113	141.479
GENERAL METALS OF TACOMA (II)	--	--	--	--	--	--	--	--	--	0.247	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.247
HYLEBOS MARINA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.396	--	--	--	--	--	--	--	0.164	0.730	--	--	2.290
HYLEBOS MARINA (TYPE II)	--	--	--	--	--	--	--	--	--	--	--	--	0.144	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.144
JONES & GOODELL BOATBUILDING	--	--	--	--	--	--	1.485	--	--	--	--	--	--	--	--	--	0.573	--	--	4.623	--	--	--	--	0.594	2.120	--	0.241	9.636
JONES & GOODELL BOATBUILDING (II)		--	5.100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.100
JONES CHEMICAL	--	--	0.272	2.491	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.763
JOSEPH SIMON & SONS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.895	--	5.849	--	--	1.863	--	--	--	14.607
JOSEPH SIMON & SONS (TYPE II)	--	--	--	5.693	--	--	--	--	--	--	--	--	--	2.458	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.151
KAISER ALUMINUM & CHEMICAL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	112.005	--	23.071	--	--	--	--	--	--	135.076
LEVY, ROBERT E. (TYPE II)	--	--	--	--	--	--	--	--	--	--	--	--	0.639	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.639
LONE STAR NORTHWEST	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.623	--	--	--	--	--	--	--	--	4.623
LOUISIANA PACIFIC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.623	--	--	--	--	--	--	--	--	4.623
LOUISIANA PACIFIC (TYPE II)	--	--	1.463	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.463
MANKE LUMBER	--	1.817	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.623	--	--	--	--	2.803	0.533	--	--	9.776
MANKE LUMBER (TYPE II)	--	--	--	0.095	--	--	--	--	--	--	--	--	0.132	--	--	1.967	--	0.793	--	--	--	--	--	--	--	--	--	--	2.987

*--TYPE II refers to an Unresolved Type II Footprint. Site names accompanying the Type II designation are for geographic reference, not injury allocation to the site. For other information, see Appendix H.

Attachment 1

Discounted Service Acre Years by Substance of Concern and Site for Hylebos Waterway

Site	Ag	As	BBPH	BEPH	Cd	Cr	Cu	DDD	DDE	DDT	DEPH	DMP	DMPH	DOPH	HCB	HCBD	Hg	MDCB	Ni	PAHs	Pb	PCBs	PCP	PDCB	Sb	TBT	TCB	Zn	TOTAL
MODUTECH MARINE	--	--	10.881	0.902	--	--	0.934	--	--	--	--	--	1.217	--	--	--	--	--	--	5.095	--	7.192	--	--	0.691	--	--	--	26.913
MODUTECH MARINE (TYPE II)	--	--	--	--	--	--	--	--	--	0.230	--	--	--	--	--	--	--	1.583	--	--	--	--	--	--	--	--	--	--	1.813
MURRAY PACIFIC	--	0.675	--	--	--	--	0.111	--	--	--	--	--	--	--	--	--	--	--	--	5.095	--	--	--	--	1.269	--	--	0.122	7.272
MURRAY PACIFIC (TYPE II)	--	--	0.163	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.163
NO ALLOCATION	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	207.562	--	--	--	--	--	207.562
NORDLUND PROPERTIES	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.623	--	--	--	--	--	--	--	--	4.623
OCCIDENTAL	--	0.023	--	--	--	0.195	0.188	--	--	--	--	--	--	--	37.154	99.397	1.617	1.343	0.337	71.243	3.597	125.963	0.093	0.280	3.846	--	10.144	0.219	355.640
OCCIDENTAL (TYPE II)	--	--	--	0.131	--	--	--	3.002	3.308	4.412	--	--	0.078	--	--	--	--	--	--	--	--	--	--	--	--	3.077	--	--	14.008
OLE & CHARLIE'S MARINA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.360	--	--	--	--	--	0.443	--	--	2.803
PETROLEUM RECLAIMING SERVICES		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32.506	--	5.954	--	--	--	--	--	--	38.460
PORT OF TACOMA (3002 TAYLOR WAY)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22.389	--	--	--	--	--	--	--	--	22.389
PORT OF TAC.(9533 E 11TH ST) (II)	1.515	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.591	--	--	--	2.089	--	--	--	8.195
SOUND REFINING	1.052	5.568	--	--	0.294	--	4.495	--	--	--	--	--	--	--	--	--	--	--	--	69.175	0.727	--	--	--	--	--	--	1.981	83.292
SOUND REFINING (TYPE II)	--	--	20.072	--	--	--	--	--	--	--	--	--	--	0.097	--	12.469	--	--	--	--	--	--	--	--	5.248	18.051	--	--	55.937
SPECIALITY MARINE SHOP	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.360	--	--	--	--	--	--	--	--	2.360
STONE INVESTMENTS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.286	--	--	--	--	--	--	--	--	1.286
STONE INVESTMENTS (TYPE II)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.483	--	--	--	--	--	--	--	--	--	--	1.483
STREICH BROTHERS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.623	--	--	--	--	--	--	--	--	4.623
TACOMA BOATBUILDING	--	3.503	--	--	--	0.389	5.140	--	--	--	--	--	--	--	--	--	--	--	--	11.566	0.912	--	--	--	13.279	10.126	--	3.861	48.776
TAYLOR WAY PROPERTIES	--	0.562	--	--	--	1.328	0.415	--	--	--	--	--	--	--	--	--	--	--	--	34.553	0.230	58.546	--	--	5.589	--	--	0.427	101.649
TAYLOR WAY PROPERTIES (TYPE II)		--	--	--	--	--	--	--	--	0.052	--	--	--	--	--	0.043	--	--	--	--	--	--	--	--	--	--	--	--	0.095
TOPE TRACTOR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.721	--	--	--	--	--	--	--	--	1.721
UNRESOLVED TYPE I	--	0.187	3.091	0.187	--	--	--	0.310	1.077	--	180.118	0.348	0.430	0.516	1.081	7.225	7.079	1.087	--	--	--	--	0.453	--	0.331	1.861	1.020	0.284	206.684
US GYPSUM	--	2.026	--	--	--	0.196	1.534	--	--	--	--	--	--	--	--	--	--	--	--	10.823	1.184	--	--	--	6.345	--	--	1.651	23.760
US GYPSUM (TYPE II)	0.434	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.434
US NAVAL RESERVE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	47.482	--	--	--	--	--	--	--	--	47.482
US NAVAL RESERVE (TYPE II)	--	--	--	--	--	5.502	--	--	--	--	--	--	--	--	--	--	--	0.971	--	--	--	--	--	--	--	--	--	--	6.473
WASSER WINTERS	--	0.117	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.623	--	--	--	--	1.133	--	--	--	5.873
WASSER WINTERS (TYPE II)	--	--	0.045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.969	--	--	--	--	--	--	--	--	--	--	1.014
WEYERHAEUSER	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.566	--	--	--	--	--	--	--	--	11.566
WEYERHAEUSER (TYPE II)	--	--	--	--	--	0.125	--	--	--	--	--	--	--	--	--	--	--	2.997	--	--	--	--	--	--	--	--	--	--	3.122
Totals by SOC	3.001	24.531	65.496	17.429	1.271	11.101	34.085	7.478	7.698	14.510	180.118	0.777	20.743	4.881	39.649	136.235	26.314	18.628	0.975	1065.212	11.922	401.634	208.108	0.280	57.534	47.149	12.560	19.363	2438.681

Total Allocated DSAYs	1880.200
Total Type I Non-allocated DSAYs	206.684
Total Type II Non-allocated DSAYs	144.235
Total Unallocated DSAYs	207.562

*--TYPE II refers to an Unresolved Type II Footprint. Site names accompanying the Type II designation are for geographic reference, not injury allocation to the site. For other information, see Appendix H.

Attachment 2
Allocation Sites and Associated Parties

Site	Map Seg	Site No.
3138 MARINE VIEW DRIVE	5	51
Cascade Timber		
Manke Lumber		
Port of Tacoma		
Weyerhaeuser Co.		
AIRO SERVICES	4	42
Airo Services		
Bay Chemical		
Don & Ronald Oline		
AK-WA SHIPBUILDING	5	56
AK-WA Shipbuilding		
Port of Tacoma		
Tacoma Boatbuilding Co.		
Todd Shipyard		
U.S. Navy		
Zidell Dismantling		
AOL EXPRESS	4	79
AOL Express		
B&L WOODWASTE LANDFILL	1	8
B&L Trucking and Construction Co.,		
Camille Fjetland		
Executive Bark, Inc.		
BONNEVILLE POWER	1	15
ASARCO, Inc.		
B & L Trucking		
Bonneville Power Administration		
Occidental Chemical Corp.		

Site	Map Seg	Site No.
BUFFELEN	3	28
Buffelen Woodworking Co.		
CASCADE TIMBER (YARD #1)	3	27
Cascade Timber Co.		
CENEX AG	4	50
Cenex Agriculture, Inc.		
Ryder Truck Rental		
CITY OF TACOMA (#1)	4	95
City of Tacoma - Public Utilities		
Port of Tacoma		
CITY OF TACOMA(STEAM PLANT)	4	44
City of Tacoma - Public Utilities		
DON ONLINE AUTOFLUFF SITE	3	23
Don and Alba Oline		
General Metals		
Hylebos Marina		
Judy Johnson		
Ronald Oline		
DUNLAP TOWING	2	20
ASARCO, Inc.		
Cascade Timber Co.		
Dunlap Towing		
Echo Lumber		
Elf Atochem		
Johnson-Byers		
Portac		

ELF ATOCHEM	2	19
Elf Atochem		
GENERAL METALS OF TACOMA	2	16
ASARCO, Inc.		
Schnitzer Steel Industries, Inc.		
SRS Properties		
U.S. Navy		
HYLEBOS MARINA	3	22
Hylebos Marina		
JONES & GOODELL BOATBUILDING	1	5
J & G Investments		
Jones & Goodell Ship Building Corp.		
Port of Tacoma		
JONES CHEMICAL	2	101
Jones Chemicals, Inc.		
JOSEPH SIMON & SONS	4	48
Cascade Timber		
Joseph Simon & Sons		
Rail and Locomotive Equipmt. Co.		
KAISER ALUMINUM & CHEMICAL	1	14
Kaiser Aluminum & Chemical Corp.		
Oline Corporation		
U.S. Dept. of Defense		
LONE STAR NORTHWEST	1	11
Lone Star Industries Northwest		
LOUISIANA PACIFIC	1	12
ASARCO, Inc.		
Louisiana Pacific		
Port of Tacoma		

MANKE LUMBER	1	6
ASARCO, Inc.		
Manke Lumber		
Nordlund Boat Co.		
Port of Tacoma		
MODUTECH MARINE	3	22
Babet Fund III		
Carl and Elaine Swindahl		
Don and Alba Oline		
Modutech Marine		
Schnitzer Steel Industries, Inc.		
MURRAY PACIFIC	3	29
ASARCO, Inc.		
Boardman W. Brown		
Buffelen Woodworking Co.		
Mary Jane Anderson		
Murray Pacific Corp.		
Pan Pacific Trading		
Seaport Bark		
NORDLUND PROPERTIES	1	2
Nordlund Boat Co.		
Nordlund Properties		
Pederson Oil		
Port of Tacoma		

OCCIDENTAL	5	57
Fletcher Oil		
FOF Inc.		
Hooker-Detrex		
Occidental Chemical Corp.		
PRI Northwest, Inc.		
Todd Shipyard		
U.S. Dept. of Defense		
U.S. Navy		
OLE & CHARLIE'S MARINA	5	55
Don Olson		
Ole & Charlie's Marina		
Port of Tacoma		
Schnitzer Steel Industries, Inc.		
PETROLEUM RECLAIMING SERVICES	2	21
City of Tacoma - Public Utilities		
Ohio Ferro-Alloys		
Petroleum Reclaiming Services		
PRSI (Annon May; Wendell Smith)		

PORT OF TACOMA(3002 TAYLOR WY)	1	13
ASARCO, Inc.		
Buffelen Woodworking Co.		
Cascade Timber		
City of Tacoma - Public Utilities		
Don Oline		
Milgard Manufacturing		
Murray Pacific Corp.		
Occidental Chemical Corp.		
Ohio Ferro-Alloys		
Port of Tacoma		
Portac		
Sol-Pro		
U.S. Navy		
SOUND REFINING	4	41
ASARCO, Inc.		
Kalama Chemical, Inc.		
Kewanee Chemical		
Sound Refining, Inc.		
Wright Marine Towing, Inc.		
SPECIALTY MACHINE SHOP	5	52
Speciality Machine Shop		
STONE INVESTMENTS	3	25
Stone Investments		
STREICH BROTHERS	1	3
Streich Brothers		
TACOMA BOATBUILDING	1	7
Tacoma Boatbuilding Co.		

TAYLOR WAY PROPERTIES	4	47
Brazier Forest Industries		
Hylebos Properties		
ITT Rayonier		
John and Dorothy Brazier		
Sierra Sandblasting and Paint		
Tacoma Powdered Metals		
Taylor Way Properties		
U.S. Navy		
Zidell Dismantling		
TOPE TRACTOR	4	38
Norberg Auto Body		
U.S. GYPSUM	2	18
USG Interiors, Inc.		
U.S. NAVAL RESERVE	5	59
FOF Inc.		
Linden Trucking		
Port of Tacoma		
PRI Northwest, Inc.		
Reichhold Chemicals, Inc.		
Sol-Pro		
Tacoma Boatbuilding Co.		
U.S. Airforce		
U.S. Navy		

WASSER WINTERS	1	1
Louisiana Pacific		
Nordlund Boat Co.		
Nordlund Properties		
Pederson Oil		
Port of Tacoma		
Wasser & Winters Co., Inc.		
ASARCO, Inc.		
WEYERHAEUSER	1	10
Kaiser Aluminum & Chemical Corp.		
Weyerhaeuser Co.		