Dredged Material Management Program
Dioxin Project

Analysis of Stakeholder Input

Appendix G
Written Comments Received by E-mail

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November 30, 2007

Dredged Material Management Program
Dioxin Project
c/o Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101

Re: *DMMP Approach to Dioxin Issues*

Dear DMMP Dioxin Project:

I am writing on behalf of the Port of Anacortes, and in my capacity as Chair of the Washington Public Ports Association's Environmental Technical Committee, to comment on the Dredge Material Management Program's approach to dioxin issues. Specifically, the Port is commenting as part of the DMMP dioxin Work Group process. The Port of Anacortes is extremely concerned with the direction the agency members of the Dioxin Work Group appear to be taking to establish criteria for evaluation of dioxin in dredged material. We believe that if this approach for dioxin is continued, and is then applied to contaminants beyond dioxin (such as PCBs), open water disposal of essentially all material dredged from developed areas will cease. This result would have extremely negative consequences for both the environment and the economic viability of ports and other maritime commerce in the Puget Sound region.

The Work Group's efforts have already had a significant chilling effect on potential Port District projects in the Puget Sound region, including a major cleanup and redevelopment project that was being considered by the Port of Anacortes and three projects being evaluated by the Port of Bellingham. It is time for the DMMP agencies to step back and consider the policy and technical issues involved at a management level, rather than continuing to assess technical evaluations of an unacceptably narrow band of suggested alternatives. The approach currently being used is simply not viable for the Port of Anacortes and other entities involved with shoreline cleanup, redevelopment, and maintenance projects. Losing out on those projects will slow the recovery of Puget Sound dramatically.

The Port of Anacortes' major concerns are itemized below.

1. <u>Cleanup decisions and dredge material management decisions are not the same thing.</u>

The process adopted by the Work Group to review dioxin decisions treats dredging and disposal sites as if they were cleanup sites - they are not the same thing. Cleanup decisions are made based on applicable standards and an evaluation of risk, as applied to a site targeted for remediation as a result of scientific investigation. Dredged material management decisions deal with the disposition of materials slated to be dredged from aquatic environments that are not necessarily related to environmental cleanup sites. Repeated placement of material from dredging projects does not

trigger the same concerns, in the same way, as MTCA and CERCLA decisions related to a designated cleanup site. For dredged material disposal, a more nuanced approach is needed that takes into account risk management practices and the overall environmental consequences of what are in reality agency policy decisions. Otherwise, significant environmental and habitat benefits will be lost in the areas where dredging would have otherwise occurred, with little or no corresponding gain at the disposal site locations.

The Work Group's use of an "absolute" risk assessment approach for the evaluation of disposal suitability is an example of the inappropriate use of a remediation program tool. When applied to dioxin and a significant number of other chemicals, this risk assessment approach shows "unacceptable" risk at levels that are sometimes an order of magnitude or more lower than ambient levels across Puget Sound ("natural background" in MTCA terminology). The same approach, using the consumption assumptions currently favored by some of the agencies, would also find unacceptable risk levels from the consumption of many common food items, such as barbeque and butter. If this same approach were used for identifying cleanup sites, essentially all of Puget Sound would be deemed unacceptably contaminated.

Applying absolute risk assessments as a tool in cleanup site evaluations (i.e., sites that are already found to be sufficiently contaminated to require remediation) may be useful. However, using this same tool to change policy related to the dredging of all sediments is not appropriate. In essence, the agencies would be trying to clean up Puget Sound on a haphazard, piecemeal basis, one dredging project at a time. The problem is that upland disposal will not result in a significantly cleaner disposal sites or Puget Sound in general (given that disposal sites currently appear to be right around background levels for contaminants). Also, the foregone projects will result in higher chemical concentration sediments being left in biologically active areas and fewer habitat improvements where a majority of dredging projects occur.

2. Increased costs mean less dredging and fewer projects.

Navigation dredging projects provide substantial environmental benefits by removing higher concentration sediments and exposing native materials. Navigation dredging always leads to a cleaner environment and better habitat, in addition to providing for a vibrant working waterfront. Permit requirements, including habitat mitigation and environmental non-degradation requirements related to the sediment surface left following dredging, ensure that navigation dredging results in an improved aquatic environment. This is particularly true in urban and industrial areas where higher chemical concentration sediments are typically located.

Navigation dredging projects are price sensitive and the cost increases on the order of 100 times for upland versus in-water disposal; increasing the cost of dredging will result in less dredging. Ports and others will be able to carry out fewer projects to the extent those projects cost more. Upland disposal dramatically increases costs, and uncertainty around dredged materials disposition issues increases the risks of going forward with projects. Additionally, adverse effects on landfill capacity, public safety, traffic, and the overall carbon footprint are likely to be significant. Examples of foregone or indefinitely delayed projects are already cropping up at Puget Sound ports, including the Port of Anacortes and the Port of Bellingham.

Since the inception of the PSDDA program, more than 35 million cubic yards of dredged material has been disposed of at open water sites. The projects that occurred in conjunction with that huge volume of material have provided very significant environmental and economic benefits. The

incremental cost of disposing of that volume of material at an upland landfill, in current dollars and based on the experience of multiple ports, can reasonably be estimated to be in the range of two to three *billion* dollars. It is obvious to anyone involved with dredging that a great many of the projects that have occurred under the PSDDA/DMMP process would not have occurred if a much greater percentage of project material had been deemed unsuitable. This loss to the environment would not come with a corresponding significant environmental gain, as the open water disposal sites appear to be within the range of background concentrations, despite the program's former approach of rarely finding "reason to believe" with respect to dioxin.

3. Regulatory tools for a quantitative, "absolute risk" approach to dioxin and other contaminants are not well developed.

Risk evaluation and management policies lag behind our laboratory analytical abilities. Dioxin can be detected at low parts-per-trillion levels, but both the science of assessing risks at those low levels, and policy development for the management of whatever risks are present in the context of dredged material management decisions, lag far behind our laboratory acumen. Further, the issues associated with extremely low levels of dioxin are so fraught with uncertainty that Ecology has not promulgated a cleanup standard under MTCA or the Sediment Management Standards. The DMMP agencies are prematurely venturing into an arena that has insufficient scientific basis, policy, and regulatory development for standard-setting. This was made clear in the NAS report on dioxin risks. DMMP decisions should follow decisions made by the agencies in their cleanup programs, not lead them.

4. The interim policy should be adapted to more closely reflect prior practices.

In the past, the DMMP required dioxin sampling in very limited circumstances. As a result, given that background levels are the current interim standard in most instances, material that meets or exceeds the current interim standard no doubt was disposed of at the open water disposal sites. Despite this likelihood, the disposal sites do not appear to be "dioxin hotspots" and do not appear to be causing any significant incremental risks when compared to other sediments in the vicinity of the disposal sites and throughout greater Puget Sound.

Under the current interim policy, dioxin sampling is being required on a much more routine basis, and a background-based approach is being used. This approach should be altered to allow for a greater degree of open water disposal. Technical tools are available that would enable the DMMP agencies to justify a significantly higher dioxin level than is reflected in the interim policy approach. While DMMP agencies evaluate the policy issues surrounding dioxin, and while solutions are being formulated in applicable cleanup programs, the DMMP's approach should allow for essentially the same degree of open water disposal as has occurred in the past. The DMMP was not broken and it did not need to be fixed. Rather than losing much of the benefit of the program due to a flawed interim policy, the agencies should raise the interim policy standard such that it screens out only those sediments that are truly "outliers" (e.g., near confirmed point sources) in terms of dioxin concentration.

5. Continue the DMMP's use of adaptive management and risk management tools.

Currently, the DMMP agencies are attempting to come up with significant changes to a regulatory regime that has worked well in the past, without the data necessary to underpin such an effort. If, at a policy level, the agencies opt to continue a push towards DMMP changes related to dioxin, it

should be done using an adaptive management approach. Additional data-gathering for the disposal sites, including the dispersive sites, is needed to detect trends over time and to discern whether past practices have been creating a problem of some kind. Steady improvements over time, or indistinguishable concentrations relative to surrounding areas would be a good indication that the agencies should not be meddling with something that has worked. In the absence of the necessary information, a dramatic change is not warranted. The Work Group's stated goal of going to the 2008 SMARM with a proposed new framework seems extremely premature, given the need for additional data collection in order to make informed decisions and the huge "opportunity cost" of applying unnecessarily stringent standards in this context.

The Port of Anacortes supports the DMMP as a program that has, in the past, operated effectively to both allow for ongoing open water disposal and protect the environment. In fact, the DMMP's success has been a hidden linchpin in Washington's economy and a critical component of the environmental and habitat improvements that have come along with in-water projects. We are profoundly concerned that the approach taken by the Work Group will ultimately change the program in ways that make it far less useful and effective. We strongly encourage the agencies to take a big step back from this approach due to the concerns outlined above.

Thank you for the opportunity to comment on this project. Please call me at 360.299.1822 if you have any questions.

Sincerely,

PORT OF ANACORTES

Bob Elsner, Director of Planning, Projects, and Environmental Affairs
Port of Anacortes

Cc: Robert W. Hyde, Executive Director, Port of Anacortes
DMMP Agency Directors
WPPA Environmental Policy Committee
WPPA Environmental Technical Committee

PORT OF BELLINGHAM
Washington State

November 30, 2007

Dredge Material Management Program
c/o Floyd Snider
601 Union Street, 600
Seattle, WA 98101

Re: Dioxin Project

Dear DMMP Agencies:

This letter is in response to your request for comment on the DMMP policy update for dioxin in dredge material. As you know, the Port of Bellingham has a number of different very important projects in progress that are designed to revitalize our waterfront, cleanup historic contamination problems, and restore degraded shoreline habitat. These projects are possible only because of the predictable agency processes for evaluating marine sediments and selecting feasible solutions to achieve project objectives. That framework of regulatory process is currently destabilized by the uncertainty surrounding the DMMP dioxin policy update. As such, many of these important projects are on hold. This uncertainty needs to be resolved quickly and responsibly, if we are to achieve local community and state objectives for restoring the environmental and economic health of our Puget Sound shorelines.

Historically, the Puget Sound ports have been strong supporters of the DMMP approach to managing dredge material and the state's approach for managing contamination problems under MTCA and the SMS. The result has been a 20 year history of dramatic improvement in water quality and sediment quality in our urban embayments.

The control of stormwater as a potential source of contamination to Puget Sound has been identified as a major challenge to the health of Puget Sound for many years. This issue has recently been re-confirmed under the Puget Sound Initative. This is not news to the ports. Virtually every project that the ports undertake on our waterfronts results in improvements to stormwater management to ensure consistency with NPDES requirements. The value of focusing on stormwater as part of the Puget Sound Initiative is obvious. We want to avoid any further degradation, and we want to avoid recontaminating any areas where we have spent millions of public dollars on navigation dredging, sediment remediation and habitat restoration.

Similarly, the ports have been instrumental in cleaning up millions of cubic yards of marine sediments that have been impacted by industrial practices during WWII and prior to the rigorous framework of environmental regulations that we have today. The ports strive to protect our shorelines, because of a shared commitment to the current principles of environmental stewardship, and because we want to avoid the expense of cleaning up an area twice. The

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challenge of managing, permitting and funding these projects is profoundly complex. But the result, under the past 20 years of DMMP policy and procedures has been extraordinarly successful both from an economic perspective and from an environmental perspective.

However, the DMMP approach to the dioxin issue has caused an alarming pause in the progress of many good projects and the development of many good ideas throughout Puget Sound. The timing is most unfortunate. Just as the Governor has made an important commitment to restore Puget Sound by 2020, one of the most important tools in that effort is being taken away. And just as the Department of Ecology is making great strides in moving a number of sediment cleanup sites through their process, the dramatic change in the dioxin policy has put a halt to a number of those projects. This uncertainty in the coordinated agency process for managing dredge material needs to be addressed quickly and effectively if we are to re-engage the ports as a key partner in the restoration of Puget Sound.

The Port of Bellingham's concerns are outline below:

1. Risk management under MTCA/SMS does not apply to the DMMP.

Ecology's process for evaluating sites for possible action under MTCA is based on an entirely different risk management objective than the DMMP approach for navigation dredging.

The original process for siting DMMP disposal sites assumed a long-term deposition of dredge material in selected locations. The current and ongoing monitoring of those sites demonstrates that the protocols have been remarkably effective. They not only remove low level contamination problems from our sensitive nearshore environments, but the do so in way that does not adversely effect the disposals sites. The risk management process works.

Ecology's process for evaluating and cleaning up state-listed sediment sites is also effective, but it is based on a different risk management approach. Under the MTCA approach, potential sites are identified according to regulatory standards that apply on a site-specific assessment process. The DMMP disposal site protocols can be significantly different from the MTCA/SMS protocols, because the disposal sites are located in environments with very different conditions, and because they are loaded with a wide variety of very clean and marginally impacted sediemts.

However, the application of MTCA/SMS risk assessment methodologies to DMMP protocols is not appropriate. Such an application when applied to dioxin would result in DMMP criteria that could be orders of magnitude below ambient levels for Puget Sound. This kind of policy decision would stop the DMMP program in its tracks with unacceptable economic and environmental consequences.

2. Cost/Benefit is a critical consideration.

The DMMP policies and procedures are based on a very sophisticated coordination and integration of federal and state regulations. "In the beginning" the Corp, EPA, DNR and Ecology recognized the importance of developing a workable set of procedures for managing

dredge material in Puget Sound. The leadership of these agencies at the staff level and up through executive management in the 1980s has been recognized nationally as a remarkable accomplishment. The "regulatory beauty" that was achieved under the original DMMP program needs to be maintained an updated in order to maintain the effectiveness of this program.

A key factor in the success of the original program was the recognition that each of the applicable state and federal regulations had a cost/benefit consideration that had to be legitimately addressed within any viable framework for managing navigation dredging projects. Cost matters. In the current effort to revitalize our local waterfront economies and to restore the health of Puget Sound, the agencies must demonstrate a strategic recognition of the financial challenges ahead of us. We cannot fall into the trap of demanding perfection, if the only option to that is failure. These are complicated issues that demand a wide range of possible solutions. It is not realistic to think that we can spend $100/cy to dispose of any and all dredge material. We need that option for highly contaminated sediments. But we need a low cost option for low levels of contamination. We need a full compendium of options to address a wide range of circumstances. Without that range of options, there will be too many decisions to do nothing. We will lose the momentum we have now to continue the track record of good projects in Puget Sound.

Navigation dredging projects in particular are very closely evaluated from a cost perspective. Over the last 20 years there have been well over 30 million cubic yards of navigation dredge material managed under the DMMP without any measurable impact to the disposal sites. These projects also provide important environmental benefit to the nearshore environment. However, if the price tag lurches to an unaffordable level, these types of projects would be largely unfunded.

3. Lack of scientific support.

The strength of the "Apparent Effects Threshold" approach to characterizing marine sediments was developed by the agencies with a recognition for the importance of good science. The approach was tested through a very rigorous process, including local and national review by organizations, including agencies, private parties and scientists. The approach was presented to and supported by the National Academy of Sciences. In contrast, the current process for developing a new dioxin policy seems almost casual by comparison. Further, the NAS report on dioxin risks raises significant questions about the assumptions that are being proposed for the new sediment criteria. A change in the DMMP protocols that has the potential to fundamentally stop so many dredging projects, site cleanup actions and habitat restoration needs to be based on the best science and the most thoughtful cost/benefit analysis.

4. Types of effected projects.

The current proposed adjustment to the DMMP protocols has caused the Port of Bellingham to reconsider a number of important projects, potentially putting them on hold, pending a final agency decision. These include:

- RI/FS for the I&J Waterway site – This project includes a federal channel, US Coast Guard station, and local water-dependent commerce. The project was interrupted, following the direction of the Ecology site manager.
- Remedial Design for the Whatcom Waterway site – This project is being performed under a state Consent Decree and will result in the restoration of over **2 miles** of nearshore habitat and the creation of over 28 acres of aquatic land. However, it includes navigation dredging in a federal channel that is dependent on a financially viable option for management of sediments under the DMMP.
- Squalicum Marina maintenance dredging – The original dredging for the Port's Squalicum Harbor marina was performed in the 1950s. Maintenance dredging is necessary for the future viability of the 1,600 boat marina. These sediments have previously been determined to meet both SMS and DMMP criteria, however that would be in question with the current proposed dioxin policy. The maintenance program is on hold.
- Harris Avenue Shipyard – The Port has recently been honored as an "Innovation Zone" for marine trades because of the resurgence of boat-building and ship repair operations in Bellingham. The Harris Avenue Shipyard is both a MTCA/SMS site and the proposed location for significant improvements to marine infrastructure to support marine trades. These projects are in a holding pattern, pending the resolution of the DMMP dioxin policy.
- Squalicum Creek Restoration – Under the multi-agency Bellingham Bay Demonstration Pilot, the restoration of estuarine functions and fish passages in support of ESA objectives for threatened species is potentially affected by the DMMP policy, because the current project design anticipates the beneficial use of navigation dredge material. The reuse of this kind of material at this project and many others would likely be discontinued under the proposed dioxin policy.

These types of projects, including navigation dredging, site remediation, and beneficial reuse of dredge material for habitat restoration are all threatened by the current policy. Furthermore, and importantly, the creative discussions to identify and plan for similar projects have been effectively terminated by the current unpredictable framework. Many projects in conceptual design and discussion are simply being shelved as a potential waste of time. Without the structure to move projects forward toward a relatively certain and feasible conclusion, there is no incentive to meet the Governor's call for restoring Puget Sound by 2020.

5. Enable the use of careful adjustments to the DMMP procedures.

Throughout the 20-year history of the DMMP, the agencies have been encouraged to find feasible and effective adjustments to the dredge material program. These changes have included the promulgation of MTCA and the SMS, listing of different marine species under ESA, new NPDES requirements, litigation, changing economies, new science on the nearshore environment and lessons-learned on hundreds of projects. Through all of this history, the program has maintained it's fundamental effectiveness and predictability.

In contrast, the DMMP agencies are currently proposing profoundly unworkable changes to the program and going through a process of policy evaluation that seems upside down. Rather than top down direction from the agencies to their experienced senior management, the DMMP has put this complicated issue out for public comment without a strong agency recommendation. It

is the agencies and the parties that have worked under their direction for the past 20 years that have the experience and professional expertise to address this issue. The public deserves the best effort from the agencies, before being asked for comment on an undefined issue.

The Port of Bellingham strongly recommends that the DMMP agencies reconvene at the policy level and make a commitment to develop a clear and deliberative approach for adapting the management objectives and procedures for the DMMP, based on good science, realistic cost/benefit analysis, and a commitment to ensure the uninterrupted continuation of the program.

The DMMP's predictable program and success over the past 20 years is much appreciated by the Port of Bellingham. It has been instrumental in the dramatic improvements to Puget Sound from both an environmental perspective and as a critical component to our local waterfront economies. We look forward to working with you through this policy development process.

Sincerely,

Michael G. Stoner
Environmental Director

Port of Seattle

November 30, 2007

Dredged Material Management Program Dioxin Project
c/o Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101

Dear DMMP Dioxin Project,

The Port supports the concerns expressed by WPPA and the other Puget Sound Ports regarding the proposed approaches to addressing the ubiquitous dioxin issue.

Attached is a memorandum developed for the Port on a potential relative risk approach that might be used to generate a more reasonable interim guideline, while the issue is being reviewed in a broader context and more of the uncertainties are addressed.

Thank you very much for this opportunity to comment on this issue.

Sincerely,

Stephanie Jones
Sr. Environmental Manager

MEMORANDUM

To:	Doug Hotchkiss (Port of Seattle)
From:	Tad Deshler and Emily Duffield
Subject:	Draft proposal for DMMP dioxin evaluation framework
Date:	November 27, 2007
cc:	Tom Newlon (Stoel Rives) and Eric Johnson (Washington Public Ports Association)

The Dredged Material Management Program (DMMP) for Washington State is requesting stakeholder input on a framework for evaluating dioxins in dredged material proposed for open-water disposal. Public workshops were held on October 30 and November 6, 2007 at which various technical options were debated. A November 30 deadline for additional public comments was established at those workshops. A draft of a proposed evaluation framework is described below for your consideration.

The framework is described in a flowchart format in Figure 1. Following Figure 1, a discussion is presented for each element in the flowchart. The discussion includes the technical background associated with each step in the proposed framework.

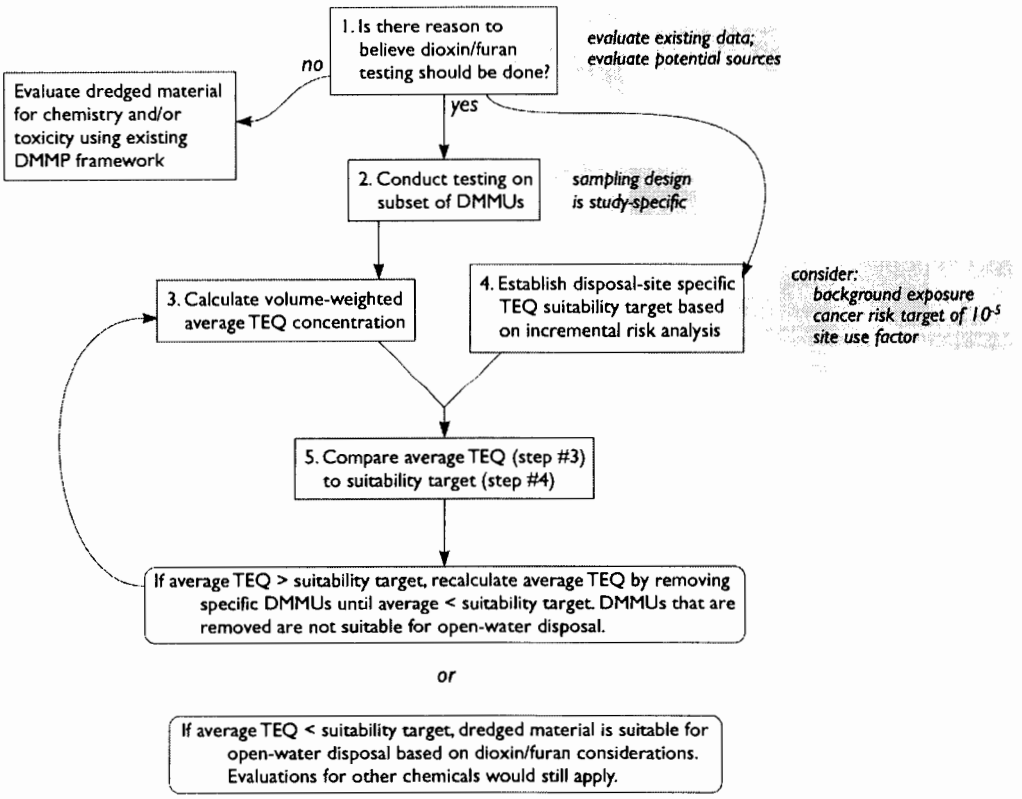

Figure 1. Framework flowchart

Step 1 – Establish reason to believe that dredged material should be tested for dioxin/furans

As discussed in the technical workshops, very few dredging projects have required dioxin/furan testing. In spite of the increased scrutiny that dioxin/furans are receiving in both regulatory and public forums, such testing should only be required when there is a reason to believe the concentrations in dredged material may pose an unacceptable environmental or human health risk. The reason to believe should be based on two factors: 1) existing dioxin/furan data from, or very near, the area to be dredged and 2) existence of a documented local source of dioxins/furans. This step of the evaluation framework should be data-driven in that testing should be required only when data indicate the potential for a problem. In other words, there should not be a presumption that a problem exists and data are used only to refute that presumption. In the absence of suitable data, a data gap exists but such a data gap should not in and of itself trigger the collection of additional dioxin/furan data by the project proponent. Data gaps do exist, but the responsibility for filling these gaps should be spread very widely among DMMP agencies and dredging proponents.

Step 2 – Test DMMUs for dioxin/furans (if needed)

As discussed during the technical workshops, the DMMP agencies recognize that the evaluation of dioxins/furans does not need to occur on the DMMU basis. Instead, a volume-weighted average dioxin TEQ concentration of dredged material is the more appropriate calculation for the assessment of seafood consumption risk, which is the driving risk pathway for this framework. Accordingly, the sampling design for dioxin/furans need not be the same as the design for other chemicals. Specifically, not every DMMU necessarily needs testing for dioxins/furans. Each sampling design should be study-specific and should be based on a combination of factors, including the expected magnitude and variability of dioxin/furan concentrations and the volume of material to be characterized. In the event that an iterative approach noted below Step 5 in Figure 1 is necessary, it may be desirable to have more data rather than less data so that individual DMMUs can be excluded, as needed. Accordingly, a phased approach may be warranted, whereby only some of the samples collected for dioxin/furans are analyzed, pending results of the original analyses.

Step 3 – Calculate volume-weighted dioxin/furan TEQ

The calculation of a volume-weighted TEQ is relatively straightforward, assuming it is made clear in the sampling and analysis plan what volume of dredged material is represented by each sample. In the current DMMP framework, each sample represents the volume of a DMMU. However, as noted in the discussion of Step 2 above, compositing across multiple DMMUs may be warranted, in which case the volume represented by the composite sample would equal the sum of the volumes of each DMMU.

Step 4 – Establish target for dioxin/furan suitability in dredged material

As previously established during the technical workshops and public meetings, suitability targets can be based on either risk estimates or background concentrations. The key element of the risk-based approach is the use of the site use factor, as explained in more detail below. Another important component is the concept of relative risk, whereby the risk from dredged material disposal is compared to risks from other exposure pathways by which people may be exposed to dioxin/furans. The key element of the relative risk approach, as explained in more detail below, is the establishment of a target risk level, which should acknowledge the background risk from other exposure pathways.

Equations 1 through 4 describe a method for calculating a risk-based dioxin/furan TEQ concentration in sediment.

The approach and rationale for each key variable is described below.

$$RBC_{sed} = \frac{RBC_{seafood}}{\left(\frac{CR_{fish}}{CR_{total}}\right) \times BSAF_{fish} + \left(\frac{CR_{crab}}{CR_{total}}\right) \times BSAF_{crab}}$$

Equation 1

Where:

ABBREVIATION	PARAMETER	UNITS
RBC_{sed}	Target risk-based dioxin/furan TEQ concentration in sediment	ng/kg dry wt
$RBC_{seafood}$	Target risk-based dioxin/furan TEQ concentration from consumption of seafood **(see Equation 2)**	ng/kg wet wt
CR_{fish}	Bottom fish consumption rate (tribe-specific)	g/day
CR_{crab}	Shellfish consumption rate (tribe-specific)	g/day
CR_{total}	Total consumption rate	g/day
$BSAF_{fish}$	Biota-sediment accumulation factor (English sole fillet)	wet/dry (fillet)
$BSAF_{crab}$	Biota-sediment accumulation factor (Dungeness crab muscle)	wet/dry (excluding hepatopancreas)

$$RBC_{seafood} = \frac{TR \times BW \times AT \times CF}{ED \times SF \times \left[\left(CR_{fish} \times SUF_{fish}\right) + \left(CR_{crab} \times SUF_{crab}\right)\right]}$$

Equation 2

Where:

ABBREVIATION	PARAMETER	UNITS
TR	Target incremental cancer risk (1×10^{-5})	unitless
BW	Body weight (tribe-specific)	kg
AT	Averaging time	yrs
CF	Conversion factor (1×10^{9})	mg/g to ng/kg
ED	Exposure duration	yrs
SF	2,3,7,8-TCDD cancer slope factor	$(mg/kg\text{-}day)^{-1}$
SUF_{fish}	Site-use factor for English sole **(see Equation 3)**	unitless
SUF_{crab}	Site-use factor for Dungeness crab **(see Equation 4)**	unitless

$$SUF_{fish} = \frac{DisposalArea}{FR_{fish}}$$

Equation 3

$$SUF_{crab} = \frac{DisposalArea}{FR_{crab}}$$

Equation 4

Where:

ABBREVIATION	PARAMETER	UNITS
DisposalArea	Size of target area where disposal will occur	km^2
FR_{fish}	English sole foraging range	km^2
FR_{crab}	Dungeness crab foraging range	km^2

TR – target risk

Target excess cancer risks typically range from 10^{-6} to 10^{-4} in various regulatory programs. The low end of that range is theoretically most health protective, but this target is not achievable for dioxins/furans, given the other sources of these chemicals in the environment. Many countries, including the US (through ATSDR), have developed values for tolerable daily intakes (TDIs) for dioxins/furans ranging from 1-4 pg/kg bw per day. Although EPA has not officially proposed a TDI, the international consensus TDI range can be evaluated in the context of EPA's cancer slope factor (150,000 per mg/kg-day) to yield an "acceptable" cancer risk estimate of 1.5×10^{-4} to 6.0×10^{-4}. This relative risk calculation indicates that a 10^{-6} target cancer risk is unreasonably low. A target cancer risk level of $\mathbf{10^{-5}}$ would be consistent with current DMMP policy and would acknowledge the goal of reducing the TDI in the future to below 1 pg/kg bw per day.

BW – body weight

Although a 70 kg adult body weight has been used for many years, a value of **81.8 kg** is more appropriate for use with the seafood consumption rates based on the Tulalip Tribes seafood consumption study (1996).

Seafood consumption rates

EPA (2007) has recently published guidelines for conducting seafood consumption risk assessments in Puget Sound. Although these guidelines were intended for use at CERCLA and RCRA cleanup sites, the approach may be useful in the DMMP program as well, when used appropriately with the site use factor variable described below. The EPA approach provides consumption rates for various seafood groups, including salmon, pelagic fish, bottom fish, and shellfish. For the dioxin/furan framework, only rates for bottom fish and shellfish are relevant, as discussed in the suitability determination for the Anderson-Ketron disposal site (Wakeman and Hoffman 2006). The rates for these groups are **9.5 g/day for bottom fish** and **82.3 g/day for shellfish**. For the purposes of the proposed framework, it was assumed that the shellfish rate can be applied to crabs.

ED – exposure duration

Although EPA's guidance for conducting seafood consumption risk assessments using tribal consumption data suggests that an exposure duration of 70 years is appropriate, this is not a reasonable value for a chemical group whose environmental concentrations have been declining rapidly in recent years (Institute of Medicine 2003; EPA 2000). An **exposure duration of 30 years** would provide adequate protectiveness and would be reflective of disposal site conditions which are certain to change (hopefully for the better, as source control efforts continue) as additional dredged material is added.

Site use factor

A key component of the incremental risk approach is the use of a site use factor to account for behavior of both the people consuming seafood and the seafood organisms themselves. In the incremental risk approach, only exposure (and ultimately risk) that is directly related to the addition of dredged material at the disposal site should be considered.

Individual seafood organisms, specifically English sole and Dungeness crab, will forage more widely than the disposal site boundaries. Only that portion of their foraging range that is within the disposal site boundaries should be considered in the incremental risk approach. Foraging area estimates are difficult to make, but several attempts have been made. For English sole, foraging areas for resident English sole in Puget Sound waters have been estimated as 1-100 km^2 (Day 1976; PSDDA 1988; Stern et al. 2003). For the purposes of this framework, an **English sole foraging range of 9 km^2**, which was previously used in the PSDDA (1988) program, can be assumed.

Less information on Dungeness crab foraging range is available, but some reports suggest this species has relatively low site fidelity, relative to English sole. Gotshall (1978) reported that interannual variation in the predominant direction of movement is considerable. Stone and O'Clair (2001) studied a population of Dungeness crabs in Southeastern Alaska and noted intrannual movements in shallow water on the order of several kilometers. No definitive estimates of foraging range in Puget Sound have been found, but for the purposes of this framework a **Dungeness crab foraging range of 10 km^2** was assumed, reflecting the lower site fidelity compared to English sole.

The final component of the site use factor calculation (Equations 3 and 4) is the size of the disposal area. The target area specified in the DMMP user's manual is a circle with 1200 ft diameter (USACE et al. 2000). Ongoing monitoring data suggests that dredged material generally stays within this target area at non-dispersive disposal sites, so this value will be used in this proposed framework. This diameter corresponds to a **DisposalArea of 0.11 km^2**.

Using the values for foraging range (FR), diet fraction (F_{diet}), and DisposalArea described above, the **site use factors are 0.0117 for English sole** (FR_{fish}) and **0.0105 for Dungeness crab** (FR_{crab}).

BSAF

The BSAF is used to convert between sediment and tissue concentrations. For dioxins/furans, it is most appropriate to derive and apply BSAFs for each of the 17 dioxin/furan congeners from which TEQs are calculated because each congener has specific bioaccumulative properties that differ from each other. The EPA has recently completed a BSAF database that summarizes BSAFs from many different sources. For

fish, average dioxin/furan BSAFs by congener range from 0.0097 (1,2,3,4,7,8,9-HpCDF, n = 15) to 1.14 (1,2,3,7,8-PeCDF, n = 63), with a median value of 0.04. For invertebrates, the range is similar with a median BSAF of 0.126. For the purposes of this proposed framework, a **BSAF of 0.1** is used for example, but the dioxin/furan data for tissue and sediment from the disposal sites should be evaluated when they are available to determine if more appropriate site-specific BSAFs can be derived.

Example calculation

Using the values shown in bold in the sections above, a target risk-based TEQ concentration in sediment would be 130 ng/kg dw. This target concentration is generally much higher than the background concentrations seen in the disposal areas, so this target would be preferred over the background approaches discussed in the workshops.

Step 5 – Compare volume-weighted TEQ (Step 3) to suitability target (Step 4)

The final step in the evaluation framework would be to compare the volume-weighted TEQ from the dredged material to the suitability target in sediment. If the volume-weighted TEQ was lower than the suitability target, then the dredged material would be suitable for open-water disposal based on the evaluation of dioxin/furans. A suitability determination based on other chemical and toxicity parameters would still apply. If the volume-weighted TEQ was higher than the suitability target, individual DMMUs could be removed from the calculation until such time as the volume-weighted TEQ was lower than the suitability target.

References

Day DE. 1976. Homing behavior and population stratification in central Puget Sound English sole (*Parophrys vetulus*). J Fish Res Board Can 33:287-282.

EPA. 2000. Exposure and human health reassessment of 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD) and related compounds. Part 1: estimating exposure to dioxin-like compounds. Vol 2: Sources of dioxin-like compounds in the United States. EPA/600/P-00/001Bb. Draft final report. National Center for Environmental Assessment, US Environmental Protection Agency, Washington, DC.

EPA. 2007. Framework for selecting and using tribal fish and shellfish consumption rates for risk-based decision making at CERCLA and RCRA cleanup sites in Puget Sound and the Strait of Georgia. U.S. Environmental Protection Agency, Region 10, Seattle, WA.

Gotshall DW. 1978. Catch-per-unit-of-effort studies of northern California Dungeness crabs, *Cancer magister*. Cal Fish Game 64(3):189-199.

Institute of Medicine. 2003. Dioxins and dioxin-like compounds in the food supply: strategies to decrease exposure. Institute of Medicine of the National Academies, The National Academies Press, Washington, DC.

PSDDA. 1988. PSDDA Reports - Management plan report: Unconfined open-water disposal of dredged material, phase I (Central Puget Sound). Prepared for Puget Sound Dredged Disposal Authority. US Army Corps of Engineers, Seattle District; US Environmental Protection Agency, Region 10, Seattle, WA; Washington Department of Ecology; and Washington Department of Natural Resources.

Stern JH, Hennessy DP, Patmont CR. 2003. Improving estimates of contaminant exposure for mobile organisms: an assessment of area-weighted home range exposure estimates applied to the relationship between sediment chemistry and liver lesions in English sole. Puget Sound Research Conference 2003, Vancouver, BC.

Stone RP, O'Clair CE. 2001. Seasonal movements and distribution of Dungeness crabs, *Cancer magister*, in a glacial southeastern Alaska estuary. Mar Ecol Prog Ser 214:167-176.

Toy KA, Polissar NL, Liao S, Mittelstaedt GD. 1996. A fish consumption survey of the Tulalip and Squaxin Island tribes of Puget Sound region. Department of Environment, Tulalip Tribes, Marysville, WA.

USACE, EPA, WDNR, Ecology. 2000. Dredged material evaluation and disposal procedures. A user's manual for the Puget Sound Dredged Disposal Analysis (PSDDA) Program. US Army Corps of Engineers, Seattle District, Seattle, WA; US Environmental Protection Agency, Region 10, Seattle, WA; Washington Department of Natural Resources; and Washington Department of Ecology.

Wakeman J, Hoffman E. 2006. Analysis to support suitability determination of dredged material with polychlorinated dibenzo-p-dioxins and furans for disposal at the Anderson/Ketron dredged material disposal site. Attachment 2 in: Supplemental determination on the suitability of dredged material tested for dioxin/furans within the Olympia Harbor federal/port navigation project evaluated under Section 404 of the Clean Water Act for open-water disposal at the Anderson/Ketron Island non-dispersive disposal site, and for beneficial use. Prepared for Puget Sound Dredged Material Management Program. US Army Corps of Engineers, Washington State Department of Ecology, Washington State Department of Natural Resources, and US Environmental Protection Agency, Olympia, WA.

November 30, 2007

Dredged Material Management Program Dioxin Project
c/o Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101

Dear DMMP Dioxin Project,

This is a comment letter on the revised DMMP framework for dioxins in dredged material that has been presented at a series of public and technical workshops during September and October of 2007. Our Association participated in several of these meetings, and we offer the following comments on the issue. While the effort has been framed as a technical discussion, we have also offered some initial policy comments at the beginning that we believe need to be considered in order to put our technical comments into appropriate context.

Overarching policy comments:

It is clear from the technical workshops that the DMMP agencies are considering the issue of dioxin in the context of dredging, but that the issue being raised is actually broader. That issue is *how to manage area-wide concentrations of dioxins (and probably PCBs) at low concentrations when there is a lot of scientific uncertainty surrounding the issue*. The Cooperative Sediment Management Program (CSMP) is no longer functioning as a vibrant policy discussion process, and the DMMP is the only forum that currently exists to discuss this issue. As a result, the DMMP is being asked to take on more than it should.

This effort has muddled the critical distinction between navigation dredging and sediment cleanups conducted under state or federal remediation statutes. This distinction has been clear for nearly twenty years: navigation dredging is an-going activity that when properly managed leaves the environment cleaner,

particularly in urban areas. The DMMP agencies worked hard to ensure that the three distinct programs governing dredging, cleanups and source control were at best synchronized and at a minimum were not in outright conflict. In this effort they were mostly successful --until now.

The combination of uncertainty and dramatically increased disposal costs for dredged material comes at an environmental cost.

- A number of environmentally beneficial waterfront redevelopment projects around Puget Sound are being delayed or even completely reconsidered in light of this issue.
- Dollars spent on unnecessary upland disposal are not available for other critical cleanup projects.

These are unfortunate policy outcomes because waterfront projects usually remove or isolate contamination, and also improve nearshore aquatic habitat.

We believe the next step in this process should be a decision by the four CSMP agencies about whether they intend low levels of area-wide sediment contamination to become a high regional priority. If the answer is yes, then the agencies should devise a regional strategy rather than allowing the case-by-case unraveling of past policy.

In the meantime, the Dredged Material Management Program should remind its policy-level agency staff that dredged material has been getting progressively cleaner over time, that the existing disposal sites are thoroughly monitored, and that there is no compelling policy need to effectively end what has been until now a very successful federal/state management process.

Technical comments:

Dioxin at parts-per-trillion levels is found throughout Washington State, in both upland and in marine and freshwater environments. Using a strict numeric risk assessment as a tool to make regulatory decisions is unwise and unjustified, because they do not consider many of the risk management factors that have already been built into this program, such as disposal site selections, in-water work windows, chemical bioavailability, and many others. The numeric risk assessments that have been used thus far are being done in a vacuum: they are not being compared to the risks of alternative courses of action, including the risks associated with delaying dredging projects. The risk assessments are based exclusively on one type of subsistence tribal exposure scenario, and they should be broadened.

Using a management framework that amounts to "anti-degradation" of the existing disposal sites is also inconsistent with years of dredging and dredged-

material management practices. There is no legal standard in place for dioxins under with the dredging program, the cleanup program or the source control program. Furthermore, the state of scientific uncertainty is still very profound, as was established by the National Academy of Science's 2006 report to the EPA on this very issue.

Simply put, there is no technical or policy justification for using an area-wide background concentration standard for dioxins – regardless of how you define "area" or "background" – in the management of dredged material. Such an approach has the practical effect of closing the three dispersive sites, backing into a cleanup standard for dioxins in sediments that we cannot justify legally or scientifically -- and which we certainly cannot afford as a region to implement practically.

Before proceeding farther, we need a much better technical understanding of the nature of the risks that appear to be driving this discussion. We do not appear to have good comprehensive information about:

- The target risk that is being selected as a management goal – keeping in mind that pure risk assessment is different from risk management,
- The site use factors for crab and sole,
- The relevant biota/sediment accumulation factors,
- The exposure durations, cooking and ingestion practices, and a host of other technical issues that are necessary in order to properly manage this issue.

For each of the issues outlined above there is a range of defensible assumptions and factors that can be selected as being appropriate or representative. These choices will have a significant influence on the allowable levels of dioxins, furans and probably other chemicals that are considered to be suitable for open-water disposal at one of the approved DMMP sites.

We reiterate the statement that we made during the initial "questionnaire" process that began this effort that a work group of qualified individuals that reflect the range of perspectives on this issue should identify and fully discuss these technical issues over a period of weeks or even months, and should frame the choices appropriately for policy-makers to subsequently understand and discuss.

This technical process would be a very useful and necessary forum for informing the policy discussion that is about to unfold. In order to accomplish this, the technical forum should not aim for a final policy recommendation at the 2008 SMARM, unless policy decisions can be made by the four DMMP agency directors within a two or three-month time period.

Thank you very much for this opportunity to comment on this issue.

Sincerely,

Eric D. Johnson, Deputy Director
Washington Public Ports Association

c: DMMP Agency Directors
WPPA Environmental Policy Committee
WPPA Environmental Technical Committee

ANCHOR ENVIRONMENTAL, L.L.C.

Technical Memorandum

To: Dredged Material Management Program (DMMP) Dioxin Project c/o Floyd Snider

From: Clay Patmont (Anchor)

Date: December 2, 2007

Re: DMMP Dioxin Evaluation Framework

The Dredged Material Management Program (DMMP) has requested stakeholder input on a proposed framework for evaluating the suitability for Puget Sound open-water disposal of dredged material containing low levels of polychlorinated dibenzo-*p*-dioxins and furans (dioxins). On behalf of a number of public agencies and private industries who rely on the DMMP to provide necessary direction on a range of important navigation dredging, site remediation, and beneficial reuse projects, Anchor Environmental LLC offers these comments in an effort to help maintain a program that to date has been a critical component of successful environmental and habitat improvements in Puget Sound.

We are profoundly concerned that the DMMP's interim and proposed future policy of determining dioxin suitability based on background conditions, while likely based on good intentions, will have an unintended disastrous effect on the ability of implementing parties to perform important environmental and habitat improvement projects in the region. We strongly encourage the DMMP agencies to rethink their current interim approach and to reexamine the effect of their policies on the larger landscape of environmental improvement projects. We also offer for your consideration an alternative procedure that attempts to provide a better risk management balance, while maintaining consistency with the existing science.

First, we ask DMMP to rethink why there is a need to change a very effective existing process for determining dioxin suitability based on a rational project-specific "reason to believe" determination and the well established risk framework that was previously being used. For dredged material disposal, an approach is needed that takes into account overall risk management and the net environmental consequences of DMMP policy decisions. This outcome was until recently regularly achieved, facilitating a number of integrated navigation

dredging, site remediation, and beneficial reuse projects. Recent monitoring data has confirmed that the DMMP disposal sites have been effectively managed to achieve regional background chemical levels for a wide variety of contaminants, including dioxins. As other stakeholders have pointed out to the DMMP, proposed changes to suitability criteria for dioxins and other bioaccumulative chemicals such as PCBs and PAHs will significantly hamper planned integrated economic development and environmental improvement projects. This will lead to foregone projects and higher chemical concentration sediments being left in biologically active areas, along with fewer habitat improvement projects.

Second, regulatory tools for a quantitative, "absolute risk" approach to dioxin and other contaminants are currently very poorly developed, and this is not the right time to be proposing changes in suitability criteria. For example, the current 156,000 $(mg/kg\text{-}day)^{-1}$ cancer potency factor for dioxins that is currently being advocated by DMMP staff is highly debated and unresolved within both the scientific and regulatory communities. EPA's proposed modifications to the dioxin potency were recently rejected by the National Academy of Sciences (NAS). In the meantime, while there is currently no "approved" dioxin cancer potency factor, California EPA derived a potency factor of 25,000 $(mg/kg\text{-}day)^{-1}$ using procedures consistent with the NAS recommendations. Similarly, the State of Michigan currently uses a potency factor of 75,000$(mg/kg\text{-}day)^{-1}$ based on similar re-evaluations of the available scientific data. The NAS, California, Michigan, and other similar scientific re-evaluations suggest the likelihood that scientifically- and risk-based cleanup levels for dioxin will increase at least 2- to 4-fold in the near future, relative to the current values being advocated by DMMP staff. Given this uncertainty, the DMMP should follow forthcoming decisions to be made by EPA and Ecology in their various regulatory programs, not lead them.

Third, suitability targets for dioxin should be based on sound science and incremental risk estimates associated with the use of the DMMP disposal site. The key element of the incremental risk approach for bioaccumulative chemicals, which formed the basis for development of existing DMMP bioaccumulation triggers (BTs) that to date have resulted in effective risk management at the DMMP sites, is the establishment of a target risk level that acknowledges background risk from other exposure pathways.

EPA recently published guidelines for conducting seafood consumption risk assessments in Puget Sound. Although these guidelines were intended for use at Superfund and related cleanup programs, DMMP staff have stated their opinion that the approach may also be applicable to developing open-water disposal suitability criteria. The EPA approach provides consumption rates for various seafood groups, including salmon, pelagic fish, bottom fish, and shellfish. For the dioxin framework, only rates for bottom fish and shellfish are relevant, as discussed in the DMMP's interim suitability determination for the Anderson-Ketron disposal site. The rates for these groups are 9.5 g/day for bottom fish and 82.3 g/day for shellfish (91.8 g/day combined).

Although EPA's guidance for conducting seafood consumption risk assessments using tribal consumption data suggests that an exposure duration of 70 years is appropriate, this is not a reasonable value for chemical concentrations such as dioxins which are declining rapidly. Consistent with the MTCA regulations, an exposure duration of 30 years would provide adequate protectiveness and would be reflective and protective of disposal site conditions.

A key component of the incremental risk approach is the use of a site use factor to account for behavior of both the people consuming seafood and the seafood organisms themselves. In the incremental risk approach, only exposure (and ultimately risk) that is directly related to the addition of dredged material at the disposal site should be considered, consistent with the approach the DMMP used to develop existing BTs for chemicals such as mercury and PCBs. Individual seafood organisms, specifically English sole and Dungeness crab, will forage more widely than the disposal site boundaries. Thus, only that portion of their foraging range that is within the disposal site boundaries should be considered in the incremental risk approach. For English sole and Dungeness crab, foraging areas in Puget Sound and the Georgia Basin waters have been reported to range from 9 to 100 km^2. For the purposes of this framework, a foraging range of 9 km^2, which was previously used in the PSDDA (1988) program to develop BTs for other chemicals such as mercury and PCBs, provides a reasonably conservative estimate.

The final component of the site use factor calculation is the size of the DMMP disposal area. The target area specified in the DMMP user's manual is a circle with 1,200 ft diameter. Ongoing monitoring data suggests that dredged material disposal has been effectively managed to stay within this target area at non-dispersive disposal sites, so this value has been assumed in this

proposed framework. This diameter corresponds to a disposal site exposure area of 0.11 km^2, and is likely also applicable to non-dispersive disposal sites.

The biota-sediment accumulation factor (BSAF) is used to convert between sediment and tissue concentrations. Empirical data are available for DMMP sites such as the Anderson-Ketron disposal site (BSAF = 0.13) that are similar to literature reports. Thus, the empirical values can be used to develop appropriate disposal site suitability criteria.

Using the values shown in the table below for the Anderson-Ketron disposal site, a risk-based BT dioxin toxicity equivalent concentration (TEC) in sediment would be 21 ng/kg dw. This BT concentration is very similar to the recent DMMP guideline of 15 ng/kg dw, and provides additional support for suitability criteria in this range. As noted above, anticipated changes in the cancer potency factor for dioxin will increase this risk-based level at least 2- to 4-fold in the near future, providing an additional level of conservatism.

Anderson-Ketron Disposal Site Dioxin TEC Suitability Criteria Calculation		
Target incremental cancer risk	1.E-06	
Body weight (tribe-specific)	81.8	kg
Averaging time (tribe-specific)	70	yrs
Bottom fish and shellfish consumption rate (tribe-specific)	91.8	gms/day
Exposure duration (MTCA & RSET)	30	yrs
2,3,7,8-TCDD cancer slope factor	1.56E+05	$(mg/kg\text{-}day)^{-1}$
Fraction ingested from disposal site:		
Region-specific diet fraction (MTCA)	50%	
English sole home range (PSDDA 1998)	9	km^2 (Dungeness crab have a larger home range)
Non-dispersive site disposal zone (to boundary):		
Target area diameter	1,200	ft (disposal site monitoring data confirm this value)
Target area	0.11	km^2
Calculated site-specific incremental risk diet fraction	0.58%	
Target incremental dioxin TEQ concentration in seafood	2.28	ppt wet
Anderson-Ketron site "BSAF" (Dungeness muscle)	0.13	wet/dry (excluding crab hepatopancreas)
Target TEQ incremental risk sediment concentration	18	ppt dry
Anderson-Ketron site background concentration	3.6	ppt dry (average value)
Anderson-Ketron disposal site dioxin suitability criterion based on incremental human health risk evaluation	**21**	**ppt dry**

From: John Malek [John.Malek@comcast.net]
Sent: Friday, November 30, 2007 6:09 PM
To: DMMP Dioxin Project
Cc: David Kendall; lino461@ecy.wa.gov; Erika Hoffman; Courtney.Wasson@dnr.wa.gov
Subject: Comment: Dioxin

Most of my salient comments were made at the two public workshops that were held. However, to reiterate:

1. The current DMMP has the scope and authorities to deal with the issue in a rationale and technical manner. What is missing and has been for some time is resource support from all of the individual agencies of the CSMP/DMMP to effectively gather data to appropriately assess the "problem" and come to meaningful conclusions. The DMMP sites and management requirements were created knowing that disposal could (not would) create temporary (in space and time) concentrations of sediments containing concentrations of chemicals that were at some elevated risk to the environment and human health. The management decisions originally anticipated that the mixing of sediments containing slightly elevated levels of some chemical constitutients with sediments containing much lower (or virtually no) levels of the same chemicals would tend to ameliorate the risk over time as other pollution abatement programs progressed to reduce contaminant-loadings to the environment. Sediments tend to be a sink for many of these waste loadings. Positively, contaminants that become sorbed to sediment particles exhibit greatly reduced bioavailability of those contaminants than they exhibit in air- or water-borne phases. Negatively, once sediment-bound, these concentrations can build up to where they become a significant source to the environment once again. To date, for most chemical constitutients, the DMMP sites have tended to become "cleaner" than the environs surrounding them. This pattern may not be absolutely true for dioxins/furans and other PBTs, however, the limited data available do not seem to suggest that the DMMP sites themselves are becoming areas of concentrated and significantly higher risk than are the surrounding environs. More data collection is warranted, and at the most recent meeting I recommended that some coring of the existing sites to evaluate whether concentrations of dioxins have been greater in the past, and that the current disposal and management practices have worked to sequester and render harmless (absolutely or relatively) the dioxins. It is speculative, but not unlikely, that the improvements over time of other chemical concentrations at the DMMP sites may also be occurring for dioxins. As risk levels are exceeded in "background" (which also needs further data collection to better define) already, the DMMP sites at least do not appear to represent any significant increased risk to the public and environment. Continuing the current management scheme and levels for dredged material may be acceptable in that light.

2. It is likely that overall risk of dioxins in Puget Sound require attention and regulatory action from all pollution abatement programs. Loadings need to be assessed to determine whether they are reducing, but this is action needed by the other programs rather than just the dredged material management program. That was the expectation and objective of the Cooperative Sediment Management Program. Sadly, over the years since its inception, the member agencies attended to their own narrow agency perspectives on site-specific issues rather than attending to the overall priorities. With the lack of attention came increasing to nearly total lack of resource support for the larger picture. Ecology effectively withdrew from and eliminated its "Sediment Management" program responsibilities as did EPA—tending to focus solely and narrowly on cleanup rather than being watchful of the overall health of sediments, the implications of new and/or developing sediment contaminants. Re-invigorating the Cooperative nature (both communication and resource allocation) of the Sediment regulatory community across agencies and across programs is a long overdue and necessary step. However, it will not eliminate the risk, controversy, and public concerns immediately. The CSMP and its developing larger sibling, the Regional

Dredging Team, provide an appropriate platform for the several state and federal agencies to mutually set priorities for common problems and to establish rational and resources means to develop and implement solutions to those priority problems while maintaining the cultural and economic well-being of the PNW and to accomplish this in an open and publicly transparent forum.

3. Interim solutions and restrictions are necessary. The agencies need to make the matter of PBTs a priority for Puget Sound and throughout the PNW and work together (as they did once successfully via the Puget Sound Dredged Disposal Analysis effort) to seek sound scientific data upon which meaningful technical solutions can be based. Those technical solutions will require policy adjustments to implement, and active resourcing to maintain. Regional decision-makers need to follow a risk assessment/risk management paradigm to balance the various needs and document how and why a solution is selected and what its anticipated and then actual outcomes are—with adjustments as necessary. And they must accomplish these improvements with recognition that the results will not be immediate.

4. The existing DMMP approach is the only program that has demonstrated gradual improvement in sediment quality over the years—in part through its lending of expertise and solutions to other programs—particularly the Cleanup program. The lack of support throughout the late 1990's and early-2000's by agency managers has significantly reduced the level of technical expertise and effectiveness. The lesson ought to have been learned.

From: Stoltz, Pete @ HDQ [PStoltz@glaciernw.com]
Sent: Tuesday, December 04, 2007 12:30 PM
To: DMMP Dioxin Project
Subject: Comments on Dioxin Project

I hope you can still take some comments on the dioxin project.

My comments are more general in nature and include what I think is important to consider when evaluating a solution for the dioxin issue.

Dredging is essential for efficient transportation of many of the resources that we depend on for basic construction, repair and maintenance in this region. For example Glacier Northwest has established infrastructure that depends upon water transportation to supply the concrete construction materials business. We receive raw materials via barge at our concrete batch plants in Tacoma, Seattle, Everett and Kenmore, we also supply concrete aggregates to customers with water front facilities such as Stone Way and Salmon Bay Concrete in Seattle, and Concrete Technology in Tacoma, and operate an aggregate yard where material arrives by barge in the Duwamish Waterway. Glacier is also a major supplier of cement (the powder used to make concrete) to this region which depends on regular deliveries via ship to our cement terminal on the Duwamish waterway. Our competitors rely on waterborn transportation to and from their facilities as well. When waterborn transportation options are compromised or limited by shoaling for extended periods while we navigate through the complex dredged material evaluation and permitting process ecological and environmental impacts result.

As an example, one typical 6,000 ton barge delivering material from our barge loading facility at out DuPont mine delivers as much material to our Duwamish concrete batch plant as 186 dump trucks with trailers. Here is a breakdown comparing the two modes of transportation:

DuPont to Seattle

Barging: **1,140 gallons** (average round trip) for a 6,000 ton payload

0.19 gallons per ton

Trucking: 92 miles / 4.5 mpg = 20.44 gallons / 32 ton payload

0.64 gallons per ton x 6,000 tons = **3,840 gallons**

Fuel Savings by Barging = 2,700 gallons per barge load

Estimate 250 Barge Trips per Year = 675,000 gallons savings (Eliminates 46,875 truck loads per year or 93,750 truck trips)

The potential ecological and economic impact of the program on resources outside the disposal site should be evaluated when considering changes to the DMMP program, The dredge characterization

process is a time consuming and expensive step that is added to an already time consuming and expensive permitting process. It often takes more than a year to get a permit for a relatively straight forward project with uncontaminated sediment. When you consider that work can only be completed during certain times of the year, it is not uncommon to spend more than two years between the time a maintenance dredgeing need is identified and the project is completed.

Certainly, project proponents are advised to plan ahead, but in many cases, especially with maintenance dredging, the rate of shoaling is not steady and can be dependent on events that are largely unpredictable, such as a high river flow event, or change in conditions upstream of the project site. Few options are available to the project proponent to reduce the time of permitting. The time and cost of characterization is not avoided when a proponent agrees to take material to upland disposal at considerable cost, because the regulatory agencies must ensure that material exposed following dredging meets the requirements of the SMS antidegradation policy and this must often be confirmed through additional characterization.

When berthing depths are reduced due to shoaling operators must take other actions such as short loading barges or ships, moving vessels to avoid grounding and scheduling work around tides. Short loading reduces the efficiency of water-born transportation substantially, grounding of a vessel is a risk to the environment as well as the vessel, and having to move a vessel or have a ship wait for an appropriate tide can cause demurrage costs to be incurred that run in the tens of thousands of dollars per day.

Listening to the discussions in the work groups, it is apparent that there is at least some question whether dioxin concentrations encountered in the program and measured in the disposal site constitute a measurable increased environmental risk relative to all the other pathways of exposure. In contrast, changes to the dredge management program that prolong, and complicate the process will have real and measurable ecological and environmental impacts. Therefore the decision process used to determine whether changes to the program are necessary should be as careful making sure that input parameters and assumptions are not overly conservative as they are protective.

Agencies should also consider the benefit of taking material out of shallow water areas such as the Duwamish River and placing it in disposal sites. This practice essentially confines mildly contaminated material that is distributed over a wide shallow area and deposits it a single deep water location, eliminating the exposure pathway for many organisms. With ongoing source control and cleanup efforts, it is reasonable to expect that concentrations measured in dredged material will decrease over time, improving conditions at the dredge site and the disposal site over time.

Changes to the program that increase project costs may prevent or postpone potential cleanup and habitat improvements that often occur as a part of projects.

If further evaluation reveals that changes to the program are necessary, it will be important to minimize the impact these changes will have on the regulated community. The program should consider whether the project is new dredging or maintenance dredging. The program should continue to use a tiered testing approach based on a “reason to believe” based on past data and sources in the proximity.

Individual risk assessments and bioaccumulation testing are tools that only make sense for large dredging projects. For smaller projects it will be important to develop numerical criteria that can be used for efficient decision making that are protective, but not overly conservative. Smaller projects should not be forced to go to upland disposal because more expensive evaluation methods are cost prohibitive.

Thanks for considering my comments

Pete