Background Information on the DMMP and Dioxins

The following information is intended to provide a basic understanding of the issue at hand.

What is the Dredged Material Management Program?

The Dredged Material Management Program (DMMP) consists of four agencies that work collaboratively to manage and regulate the disposal of dredged material from dredging projects in Washington State. These agencies include the U.S. Army Corps of Engineers, Seattle District (USACE); the U.S. Environmental Protection Agency, Region 10 (USEPA); the Washington Department of Ecology (Ecology); and the Washington State Department of Natural Resources (DNR). The DMMP website is at:
http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=dmmo&pagename=home

The DMMP manages material dredged to maintain navigational waterways and berth depths when those areas are filled in by natural sediment deposition. The DMMP agencies determine what material can be disposed of at open-water disposal sites. The state-owned sites are managed by DNR. The DMMP does not manage contaminated sediment cleanups--those are managed by cleanup programs within Ecology and the USEPA.

How Much Maintenance Dredging is Done and Why is it Important?

Dredging affects the lives of nearly every Washington State citizen and visitor. Maintenance and navigation dredging is done frequently in harbor areas, ports and marinas. These areas naturally silt in. Dredging is performed to maintain the depths needed for boats to operate, and to develop new areas or achieve increased depths for boat access. A significant component of Washington's economy depends on navigation and commerce, which in turn depends on dredging the state's waterways. Between 2000 and 2006, approximately 20 million cubic yards of dredged material were dredged and disposed of at the open-water disposal sites.

Where is Dredged Material Disposed?

The DMMP agencies went through an extensive public process to define open-water sites for dredged material disposal, and to define the guidelines for dredged material that can be disposed at these sites. There are two types of sites, dispersive and nondispersive. Dispersive sites are located in areas with strong tidal currents. Dredged material placed at these sites disperses quickly.

Dredged material placed at nondispersive sites remains on-site and is the subject of long-term monitoring. Nondispersive sites are managed such that minor adverse effects are allowed, such as sub-lethal effects to some species after long-term exposure. Adverse effects are not allowed at dispersive sites, so dredged material must meet more stringent evaluation guidelines to be eligible for disposal at these sites.

There are eight dredged material disposal sites around Puget Sound (three dispersive and five nondispersive) and two dispersive estuarine sites each in Grays Harbor and Willapa Bay. Additionally, Grays Harbor has one 3.9-mile Ocean disposal site. The DMMP agencies collectively evaluate the suitability of dredged material for disposal at these sites. As owner of the state's aquatic lands, DNR manages the disposal sites and is responsible for environmental monitoring of all nondispersive disposal sites.

What are Dioxins, What are their Sources, and Why are they Important?

Polychlorinated dibenzo-dioxins (PCDDs) and polychlorinated dibenzo-furans (PCDFs) are commonly referred to together as "dioxins." Dioxins are a group of chlorinated organic compounds with similar chemical structures, called congeners. The most studied and most toxic dioxin congener is 2,3,7,8- tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD). 2,3,7,8-TCDD has been identified as a "known human carcinogen" (IARC 1997) and a probable human carcinogen by USEPA (Group B2 carcinogen). Other dioxins may cause cancer, disrupt the endocrine system, and cause reproduction and developmental effects (USEPA 2003; http://www.epa.gov/ncea/pdfs/dioxin/nas-review/). Dioxins are toxic to humans and other mammals at very low concentrations.

Dioxins are unintentionally produced by natural and industrial activities. Natural activities include forest fires or volcanic activity. Industrial processes include incomplete combustion of materials in the presence of chloride, such as burning of fuels, municipal and domestic waste incineration, as well as chlorine bleaching of pulp and paper, and chlorinated pesticide manufacturing.

Although dioxins are produced at very low levels (e.g., parts per trillion or parts per quadrillion), the compounds exist throughout the environment. Due to their chemical and physical properties, they persist and have the potential to bioaccumulate in the tissue of humans and wildlife.

How Does the DMMP Currently Address Dredged Material Containing Dioxins?

The existing DMMP framework for evaluating dredged materials suitability for disposal at open-water sites includes sediment testing for dioxins when there is a "reason to believe" that dioxins may be of concern based on site history or proximity to possible sources. In the past, the DMMP agencies have applied best professional judgment on a case-by-case basis in determining the suitability of dioxin-containing dredged material for open-water disposal.

This case-by-case evaluation has relied in part on a risk assessment done in Grays Harbor in 1991. A risk assessment uses local conditions, contaminant sources, fish consumption rates, and other factors to approximate the risk to humans of eating seafood caught in the area. But as we come to understand more about dioxin in the environment, about the amount of seafood consumed by subsistence (tribal) fishers, and about how to evaluate risk, it is clear that the approach derived from Grays Harbor should not be applied to DMMP projects in Puget Sound.

In 2006, the detection of elevated levels of dioxins in sediment proposed for dredging from Olympia Harbor triggered a site-specific determination related to the conditions at the Anderson/Ketron open-water disposal site. A risk-based approach was attempted for the Anderson/Ketron open-water disposal site, but ultimately a background-based interim framework was adopted. The Supplemental Suitability Determination Memorandum (SDM) for the Port of Olympia project includes a technical appendix detailing the basis for this site-specific interim dioxin approach. It is available at:
http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/060912_FINAL_AK_Dioxin_Evaluation.pdf .

What is being Considered as an Updated Approach?

The DMMP agencies are in the process of developing an updated framework for evaluating the suitability of dredged material containing dioxins for disposal at the existing DMMP open-water disposal sites. The DMMP agencies are doing this in coordination with the Puget Sound Initiative, which is evaluating the quality of Puget Sound as a whole. The goals of the Puget Sound Initiative include cleaning up polluted sites in and near Puget Sound; preventing oil spills and toxic contamination; and restoring nearshore, estuarine, and salmon habitats.

Because dioxins are ubiquitous in Puget Sound and have natural and industrial sources, the DMMP agencies are considering a variety of options for the updated dioxin evaluation framework. A ***DMM***P Dioxin Analysis of Stakeholder Input report was prepared that presents a summary of the stakeholder comments and input received from the dioxin public meetings and technical workshops held from September to November. Potential options for a revised framework that have been suggested by the Public are presented in the document and summarized below.

Potential options for a revised framework include, but are not limited to the following:

- Base the framework on Non-urban background concentrations;
- Base the framework on existing conditions in Puget Sound with some urban influence;
- Determine suitability based on incremental risk, as opposed to absolute risk;
- Utilize comparative risk evaluations to consider total project effects;
- Set multiple suitability thresholds by depth at the disposal site, and require sequencing of material placement;
- Evaluate existing disposal sites to determine acceptability of past disposal practices;
- Consider establishment of multi-user confined aquatic disposal sites; and
- Broaden the framework to address PCBs, which have similar concerns regarding bioaccumulative risk.

The document, including an Executive Summary and Appendices, can be viewed **here**.

What is the Process?

Stakeholder input was received this past summer and fall 2007 through a questionnaire, public meetings and technical workshops. The input received for the DMMP agencies consideration for the development of revised interpretive guidelines for dioxins was summarized in the ***DMMP Dioxin Analysis of Stakeholder Input*** report as described above. The DMMP agencies have deliberated on the input received, as well as each DMMP agency's legal and regulatory context. Due to the technical, legal, and policy level complexity of dioxins and challenges associated with balancing various objectives a proposal for a revised framework is still under development.

A number of alternatives are under consideration to determine the suitability of dredged material containing dioxin (and dioxin-like compounds such as PCBs) for unconfined, open-water disposal. However, there are few dioxin/furan or PCB congener data for Puget Sound outside of certain Superfund and MTCA cleanup sites. Therefore, it is currently difficult to evaluate the practical, economic, environmental, and regulatory consequences of these alternatives.

As a result, the agencies have determined that additional sampling is needed to provide data on concentrations of dioxins/furans and PCB congeners in Puget Sound which would be a useful set of information for inclusion in the DMMP program deliberations. In addition, data collected will have utility for other programs such as cleanup programs (CERCLA/MTCA) and the Puget Sound Partnership. To assure timely progress towards realization of the procedures, the DMMP intends to complete this sampling by September 2008, and have results available to the agencies mid-winter. The DMMP Agencies are committed to having a proposal for interpretive guidelines that is as clear as possible, and includes public input, by the 2009-2010 dredge season.

Dredging suitability determinations regarding dioxins will be made in the interim on a case-by-case basis, using a disposal-site-specific, background-based evaluation method, similar to that used in 2006 at the Anderson/Ketron disposal site. More information on the interim

approach can be found **here**.

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