

DMMP/SMS CLARIFICATION PAPER EVALUATION OF SEDIMENT QUALITY FOR NAVIGATIONAL DREDGING, CONTAMINATED SEDIMENT CLEANUP OR BOTH

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Background/Introduction

The early PSDDA program, perhaps prior to 1994, usually involved evaluation of maintenance dredging projects located in uncontaminated areas. Sediment quality of the dredged material was generally characterized as suitable for unconfined, open-water disposal (1). During the same period, relatively few contaminated sediment cleanup sites were being actively investigated under the new Sediment Management Standards rule (2), while a few large EPA Superfund sites were well characterized (3,4).

During the last half of the 1990's, there was a gradual increase in the number of navigation dredging projects located either in more contaminated areas or associated in some manner with cleanup sites. As a consequence, more material was found unsuitable for open-water disposal (5). Simultaneously, there was much more activity investigating areas of sediment known or suspected to be more highly contaminated, in part because Ecology published a list of 49 contaminated (marine) sediment sites (6) and cleanup programs had matured.

Evaluations of sediment quality for both navigation and cleanup projects, in many respects, have become routine over the years. Evaluation procedures such as sampling methods, analytical protocols and toxicity test result interpretations have all become more familiar. In other respects, such evaluations have become considerably more complex. Some of the reasons for this complexity include a) locations being studied having greater environmental heterogeneity, b) increased concern about common but less "familiar" sediment contaminants, c) rapidly evolving analytical methods, and d) need to assess risk not only to benthic communities but also to wildlife, endangered species and humans. It was apparent by the year 2000 it was becoming increasingly clear that risk to wildlife and humans could be just as important as risk to benthic communities in determining sediment cleanup levels. Examples of these complexities are cited below.

- Regulators found a heterogeneous distribution of suitable and unsuitable material in the area of the Puget Sound Naval Shipyard located in Bremerton, Washington, that was proposed for new construction and maintenance dredging (7)
- Unexplained toxicity at some sites led to the realization that tributyltin (TBT) was fairly ubiquitous in the sediments of more urban areas of Puget Sound. Whole sediments with high concentrations of Total TBT sometimes showed no toxicity or accumulation, so how to best evaluate risk from TBT became (and remains) an issue (8)
- Where concentrations of sediment PCBs are of concern, there have been lengthy discussions about how to measure PCBs, in part because of a national trend toward

analyzing and assessing sediment risk based on concentrations of only a limited set of PCB congeners (9).

- For the recently listed Lower Duwamish Waterway Superfund site, the risk to human health is being evaluated using standard equations, but with significant debate over many of the assumptions and parameters, including fish/shellfish consumption rates, how and where to measure fish/shellfish tissue contaminants, etc. (10)

Other factors complicating sediment evaluations include: lack of clarity on the purpose(s) of the project, uncertainty about the regulatory authority or authorities under which it should be evaluated, legitimate receptors of concern, important exposure pathways, appropriate approaches to sampling and testing sediment quality, etc. These have played a role in numerous recent projects. The reality is that DMMP and cleanup staff has found it increasingly difficult to distinguish whether a project is being conducted for the purpose of navigation, cleanup or both. This is exemplified by the following projects:

- East Waterway (Seattle - Harbor Island). The “Stage II” area, first evaluated under the DMMP, recently became part of the Harbor Island Superfund site and is being remediated under authority of the CERCLA program.
- Harris Avenue Shipyard (Bellingham Bay). This is a MTCA cleanup site that also requires dredging for navigational purposes and is therefore being evaluated by both the DMMP and Ecology’s MTCA/SMS program.
- Glacier Northwest and South Park Marina (Seattle - Lower Duwamish). These are two sites that need to be dredged for maintaining navigation depth but located within the Lower Duwamish CERCLA sediment cleanup site. Exposing a contaminated surface was an issue at the former site, so the DMMP and cleanup programs coordinated on a plan to overdredge, place and monitor an interim sand cap. The latter site overlaps with a sub-area in the Duwamish designated as a CERCLA non-time-critical removal. Sediment evaluation at the latter site required substantial interagency coordination to finalize a complex analysis plan (SAP) that met the needs of both navigation and cleanup programs.
- Manke Lumber (Tacoma - Commencement Bay). This is a MTCA wood waste cleanup site with maintenance dredging needs. Areas of sediment/wood debris were characterized by both programs.
- Fisherman’s Terminal (Seattle - Ship Canal). This project is located in an area of known and suspected contamination, and is on Ecology’s sediment cleanup list as part of the greater Lake Union sediment cleanup site. But it has recently been characterized solely as a navigation project because there is no existing plan to conduct a cleanup investigation in this specific area.
- Dakota Creek Industries (Anacortes). This project was evaluated as a navigation project and received a suitability determination in 2004?. DMMP staff subsequently learned that there was an active MTCA cleanup investigation on adjacent uplands and that a potential source of dioxins had not been disclosed. The SD was rescinded and further investigations are ongoing.
- U.S. Navy - Puget Sound Naval Shipyard (Sinclair Inlet). This project was a maintenance/construction dredging project evaluated and conducted under the DMMP that was coordinated with a CERCLA remediation effort.

- Pope and Talbot (Port Gamble) and Port Townsend Paper (Port Townsend). Both of these projects claimed a need for maintenance dredging but also contained significant wood waste areas of interest to Ecology's Toxics Cleanup Program (MTCA/SMS). The first project was characterized under both programs and the second project was characterized only under the DMMP.

Problem Statement

It is not always easy to determine the appropriate authority under which to develop a SAP and evaluate the results of various sediment quality analyses. This is exemplified by the numerous projects described above. Therefore, the agencies believe there is need to provide general and/or specific guidance on how to determine whether or not an evaluation of sediment quality should be conducted a) under the DMMP using its guidelines, b) under a cleanup authority, e.g., CERCLA or MTCA/SMS, using different requirements and guidance, or c) under both types of sediment management programs using a combination of guidelines and requirements. This paper draws from many of the above project experiences to provide such clarifying guidance.

Proposed Clarifications

A. Recommended Regulatory Processes

DMMP Process

1. The need for navigation-related dredging usually results in a) submittal of a JARPA to various entities, b) a Corps pre-application meeting, and/or c) the Corps permit application itself. One of these should mark the start of a navigation dredging project.
2. DMMP staff works with permit applicants to develop and approve a SAP that will result in sediment quality adequate to determine suitability for open-water disposal.
3. Development of the SAP should always include communication with both Ecology and staff from appropriate EPA cleanup programs to determine whether or not a) the project is located in or near one or more listed or suspected cleanup sites, b) there is known or suspected contaminated sediment in or near the site, and c) there are known or suspected sources of contaminants that could be expected to influence the site.
 - If the site is being actively investigated under a cleanup authority, e.g., a preliminary site assessment is underway, then DMMP staff should communicate and coordinate with cleanup project managers to develop one or more SAPs that are mutually satisfactory. For clarity and transparency, the agencies recommend a single, joint program SAP.
 - If the site is not being actively investigated but there is known or suspected sediment contamination or issues related to source control and investigations are being planned under a cleanup authority, then DMMP staff should communicate with cleanup site managers to determine the timeline for investigations. If planned investigations are imminent or to be initiated in the near-term, e.g., <1-2 years, then DMMP staff should negotiate an agreed strategy for developing the SAP with both the applicant and other regulators.

- If the site is on a cleanup list but ranked as a low priority, or is located in an area of concern but there is no plan to investigate it in the near future, then DMMP staff should proceed to develop a SAP that meets DMMP guidelines.

Cleanup Process

1. Existing environmental data, knowledge of historic or ongoing sources of contamination incidents such as a spills, and/or public complaints can lead to a requirement to investigate a cleanup site. The site may be located in an area that also needs navigation dredging.
2. If the site is or will soon be actively investigated, the cleanup project manager should determine through communication with appropriate parties, e.g., land owners, ports, and DMMP staff, whether or not it is located in an area that also needs navigation dredging in the near future, e.g., <1-2 years.
 - If navigation dredging may be needed at the site in the near future, then the cleanup site manager should contact DMMP staff and work with them to develop a SAP that meets the general needs and specific guidelines of both programs.
 - If the site has no need for navigation dredging in the near future, then a SAP should be developed according to cleanup program guidance.

B. Required SAPs - A Summary

DMMP SAPs are required ...

- Whenever dredging is proposed to meet navigation needs in a specific location a) not listed as a cleanup site, b) with no known or suspected sediment contamination, and c) with no known or suspected sources of sediment contamination in the vicinity.
- Whenever dredging is proposed to meet navigation needs within a cleanup area but cleanup investigations are planned only in the distant future (e.g., > 1-2 years) or not at all.

Cleanup Program SAPs are required ...

- Whenever there is need to characterize the *in situ* risk associated with exposure to surface and subsurface sediments in a sediment cleanup area, with no near-term need for navigation dredging.

“Hybrid” SAPs are required ...

- Whenever dredging is proposed to meet navigation needs within or near a cleanup area and planned cleanup investigations are either ongoing or planned for the near future (e.g., <1-2 years).
- Whenever there is need to characterize the *in situ* risk from exposure to surface and subsurface sediments in a sediment cleanup area and there is an immediate or near-future need for navigation dredging (e.g., <1-2 years).

C. Purposes and Approaches to Sampling

- Characterizing sediment quality using samples composited to resemble the dredged material that will potentially be placed at open-water disposal sites is *not* equivalent to characterizing *in situ* sediment quality to assess risk from exposure to contaminants in surface sediment (or sediment at a proposed new surface).

- DMMP sampling and testing guidelines are designed to characterize the “average” sediment quality within the area and depth of a proposed dredge prism. The guidelines are not intended to represent the *in situ* surface sediment quality.
- Cleanup sampling and testing requirements and guidance are intended to result in data representative of *in situ* sediment quality. This is because the major pathways of *in situ* exposure, hence dose and risk, begin in the surface sediment. Cleanup programs often characterize subsurface sediment quality at a site, but usually to a much lesser extent and for different reasons. Subsurface sediment quality data helps determine a) the spatial extent/volume of material needing remediation, and b) the feasibility and cost of alternative remedial actions.

D. A Final Link Between Programs

It may be appropriate for contaminated sediment cleanup projects that have already carefully characterized risk associated with exposures to surface sediment contaminants, and where it has already been determined the preferred management alternatives include removing contaminated sediment from at least some portion of the site, to then sample and test the material according to DMMP guidelines to also determine if any of it is suitable for open-water disposal.

References (STILL DRAFT)

- (1) PSDDA, 1992. Minutes from Annual Review Meeting.
- (2) Chapter 173-204 WAC.
- (3) EPA, 1989. Record of Decision for the Commencement Bay Nearshore Tidelands Superfund Site.
- (4) EPA, 198x. Record of Decision for the Eagle Harbor Superfund Site.
- (5) Corps, 2005. Personal communication with Dr. David Kendall.
- (6) Ecology, 1996. Contaminated Sediment Site List.
- (7) U.S. Navy, 1995 and 1998. Sediment quality evaluations for Puget Sound Naval Shipyard - Bremerton.
- (8) EPA, 199x. Sediment quality site evaluations for Harbor Island, Sediment Operable Unit.
- (9) DMMP, 199x. Minutes to 199x SMARM.
- (10) Lower Duwamish Work Group, 2003. Phase I Remedial Investigation Report, Appendix B, Human Health Risk Assessment.