

DMMP CLARIFICATION PAPER

QUALITY OF POST-DREDGE SEDIMENT SURFACES (UPDATED)

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INTRODUCTION

Dredging operations can alter the condition of the surface sediments in the dredging area by exposing new sediments to direct contact with biota and the water column. Because the newly exposed surface may have greater sediment chemical concentrations than existed before dredging, this aspect of dredging must be considered in project planning, review and decision-making.

From the inception of the Puget Sound Dredged Disposal Analysis program twenty years ago, the DMMP agencies have maintained an antidegradation policy with respect to sediment exposed by dredging (PSDDA, 1988). This policy was reinforced by the State of Washington Sediment Management Standards rule, which seeks to manage “sediment quality so as to protect existing beneficial uses and move towards attainment of designated beneficial uses” (SMS, 1995). This means that, if at all possible, post-dredge surface sediment should be closer to meeting the chemical and biological sediment quality standards than the pre-dredge surface sediment.

In 2001, the DMMP agencies took steps to clarify the means by which compliance with the antidegradation policy would be determined for dredging projects (DMMP 2001a and 2001b).

The guidance discussed in this paper is not intended to apply to projects that are part of, or in process of becoming, a cleanup project. These projects are under the regulatory authority of the Sediment Management Standards, the Model Toxics Control Act and/or CERCLA. Additionally, coordination with Ecology and EPA cleanup programs will be triggered for any project where either SMS exceedences paired with bioassay failures or CSL exceedences are observed.

PROBLEM IDENTIFICATION

Continuing experience with application of the antidegradation policy has resulted in the need to further refine the procedures used to evaluate post-dredge surface sediment quality.

PROPOSED DMMP CLARIFICATION

The DMMP agencies propose to use the following guidance regarding post-dredge sediment quality:

New Sediment Surface Exposed by Dredging.

The DMMP agencies require that the sediment to be exposed by dredging (SED) be sampled to a depth of 1 ft below overdepth for all projects, regardless of rank, and archived pending the testing results for the overlying sediment (DMMP 2001b). Chemical analysis of this archived material is required if the testing results for the overlying sediment are a) found to be unsuitable for unconfined aquatic disposal, or b) if any other project in the same waterbody has shown evidence of subsurface sediments with greater contamination than surface sediments, or c) if there is any other site-specific reason to believe that the SED may fail to meet the antidegradation policy.

In the event that testing of the archived sediment is required, there are a number of possible outcomes that need to be considered:

1. **The SED exceeds no DMMP screening levels (SL) or bioaccumulation triggers (BT) or SMS sediment quality standards (SQS).** In this case, the dredging proponent (hereafter referred to as the “dredger”) has no requirement under the Dredged Material Management Program concerning the fate of the post-dredge surface sediments.
2. **The dredging operation may result in SED that has higher chemical concentrations than those in the upper lift of dredged material (typically, but not always, 0-4 feet).** The following scenarios are possible:
 - a. **The SED exceeds one or more SLs or SQSs but is less than 1) DMMP BTs and maximum levels (ML) and 2) SMS cleanup screening levels (CSL).** In this case the DMMP agencies will determine whether bioassays¹ are required. The decision to resample and conduct bioassays will be based on factors such as the magnitude of elevation of chemical concentrations compared to the surface lift of dredged material and the results of bioassays on the overlying sediment.
 - If bioassays are conducted but the results do not exceed the biological SQS, the dredger has no requirement under the dredging program concerning the fate of the post-dredge surface sediments,
 - If bioassays are conducted and exceed the biological SQS, the dredger will be required by DMMP to overdredge and/or cap the new sediment surface.
 - b. **The SED exceeds one or more BTs (note that SLs and/or SQSs would likely also be exceeded in this scenario, in which case the provisions in scenario 2a would also apply).** Similar to the case with bioassays, the DMMP agencies will determine whether bioaccumulation testing is required.
 - If bioaccumulation testing is conducted but the bioaccumulation potential is less than that of the surface lift of dredged material and no human health guidelines are exceeded, the dredger has no requirement under the dredging program concerning the fate of the post-dredge surface sediments.

- If bioaccumulation testing results for the SED indicate higher bioaccumulation potential than the surface lift of dredged material, or exceed human health guidelines for bioaccumulation, then the dredger will be required by DMMP to overdredge and/or cap the new sediment surface.
 - c. **The SED exceeds one or more DMMP MLs or SMS CSLs.** Projects that would result in SED that exceeds MLs or CSLs are not in compliance with the DMMP and/or SMS antidegradation policy. In such cases, the DMMP will require the dredger to overdredge and/or cap the new sediment surface.
- 3. **The dredging operation may result in SED that has lower chemical concentrations than those in the surface lift of dredged material.** The following scenarios are possible:
 - a. **The SED exceeds one or more SLs, BTs or SQSs but is less than MLs and CSLs.** In this case the DMMP agencies will determine whether bioassays or bioaccumulation testing are required.
 - If, based on biological testing results or best professional judgment, the DMMP agencies determine that the SED will have lower toxicity and less bioaccumulation potential than was initially present, the dredger has no requirement under the Dredged Material Management Program concerning the fate of the exposed sediments.
 - If, based on biological testing results, the DMMP agencies determine that the SED will have higher toxicity or higher bioaccumulation potential than was initially present, the dredger will be required by DMMP to overdredge and/or cap the new sediment surface.
 - b. **The SED exceeds one or more MLs or CSLs.** As in 2c (above), any SED exceeding one or more MLs or CSLs is not in compliance with the DMMP and/or SMS antidegradation policy. In such cases, the DMMP will require the dredger to overdredge and/or cap the new sediment surface.

Best Professional Judgment

The complexity of dredging projects varies considerably. Not every scenario can be foreseen or easily captured in words. Thus, best professional judgment will be exercised by the DMMP agencies in making decisions regarding the need for additional testing and/or overdredging/capping of SED. Examples of situations where best professional judgment may be required include the following:

1. Some chemicals of concern may have higher concentrations in the SED compared to the surface lift of dredged material, while other COCs may have lower concentrations.
2. Carbon-normalized concentrations could produce comparative results different from those of dry-weight-normalized concentrations.
3. In those cases where the SED is resampled to collect sediment for biological testing, the resampled SED must undergo DMMP chemical testing to provide a synoptic dataset.

Chemical results from the resampled SED may be different from the results from the originally sampled SED.

4. Compact native material may restrict the ability to collect z-samples.
5. Some COCs, such as dioxin, currently do not have SMS standards or DMMP numerical guidelines.
6. A reason-to-believe that the SED may be degraded relative to the surface lift, based on historical data or other site-specific considerations, may dictate that additional z-samples be taken from deeper sediment. For example, z-samples from 0-1, 1-2 and 2-3 feet below the overredge depth might be required.
7. Due to time constraints or other considerations the dredging proponent may desire to forego biological testing of the z-layer and proceed directly to overdredging and/or capping the new sediment surface.
8. Projects in freshwater will need to use freshwater guidelines.

Upland Disposal

For some dredging, especially along the Columbia River, upland disposal (without return flow) may be proposed. In such cases there is no requirement under Section 404 of the Clean Water Act to test the dredged material². However, an evaluation of the SED must still be made in order to ensure compliance with the State's antidegradation policy. The DMMP agencies may require that one or more samples of the existing surface sediment (0-10 cm) be analyzed and compared to the SED to make an antidegradation determination.

REFERENCES

DMMP, 2001a. *Quality of Post-Dredge Sediment Surfaces* – A DMMP Clarification Paper. Prepared by Thomas Gries for the DMMP agencies, 2001.

DMMP, 2001b. *Clarifications to the DMMP Z-Sample Analysis Guidance and/or post dredge monitoring policy* – A DMMP Clarification Paper. Prepared by David Kendall for the DMMP agencies, 2001.

PSDDA, 1988. *Evaluation Procedures Technical Appendix – Phase I*, Prepared by the Puget Sound Dredged Disposal Analysis agencies: U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Washington State Department of Ecology, Washington State Department of Natural Resources, 1988.

SMS, 1995. *Sediment Management Standards, 173-204 Washington Administrative Code*. Washington Department of Ecology, revised 1995.

¹ A decision to conduct bioassays will likely necessitate re-sampling of the SED due to holding time restrictions.

² Note that testing may be required by local public health departments/solid waste officials to determine what beneficial use or disposal options are appropriate.