5 DEVELOPING SAMPLING AND ANALYSIS REQUIREMENTS

Once a Tier 1 evaluation is completed, the following steps are followed to determine the requirements for the full characterization of project sediments:

1. determine the rank for the project
2. review recency guidelines
3. develop a conceptual dredging plan
4. determine the volume of material to be dredged
5. determine required number of dredged material management units (DMMUs) and field samples
6. determine if any non-standard COCs are required
7. develop a sampling plan which distributes the DMMUs to reflect the conceptual dredging plan, allocates the required number and depths of field samples, presents a compositing plan, and chemical and biological testing plans

These steps must be documented in the sampling and analysis plan developed for review by the agencies.

5.1 DETERMINE PROJECT RANK

A dredging area, or a specific project, is typically assigned to one of four possible ranks: *high*, *moderate*, *low-moderate*, or *low*. These ranks represent a best professional judgment of concern or potential risk *by the agencies*, typically based on a scale of potential for adverse biological effects or elevated concentrations of chemicals of concern. The lower the rank, the less the concern, and the less intense the sampling and testing requirements needed to adequately characterize the dredged material. The ranking system is based on two factors:

1. The available information on chemical and biological-response characteristics of the sediments.
2. The number, kinds, and proximity of chemical sources (existing and historical).

For those dredging projects with sufficient historical data, the assigned ranking is based on the available chemical and biological data for project sediments. For those projects lacking sufficient historical data, the number, kinds and proximity of chemical sources are the major factors driving the assigned rank. **Table 5-1** defines the ranking guidelines.

5.1.1 General Rankings

Certain geographic areas and use activities are assigned a general rank based upon the nature and extent of possible sources of chemicals of concern that could impact sediments needing to be dredged. In the absence of sediment quality data to the contrary, urban and industrialized areas as well as areas located within MTCA or CERCLA cleanup site boundaries are initially ranked ***high***. Marinas, ferry terminals, fueling and ship berthing facilities, construction facilities, and sediments located close to moderate-sized sewer outfalls are initially ranked ***moderate*** (unless located in a high-ranked urban or industrialized area). Areas that are geographically removed from potential sources of chemicals of concern are ranked ***low-moderate*** or ***low***.

Table 5-1. Dredged Material Ranking Guidelines

RANK	GUIDELINES
Low	Few or no sources of chemicals of concern. Data are available to verify low chemical concentrations (below DMMP screening levels) and no significant response in biological tests.
Low-Moderate	Available information indicates a "low" rank, but there are insufficient data to confirm the ranking.
Moderate	Sources exist in the vicinity of the project, or there are present or historical uses of the project site, with the potential for producing chemical concentrations within a range associated historically with some potential for causing adverse biological impacts.
High	Many known chemical sources, high concentrations of chemicals of concern, and/or biological testing failures in one or both of the two most recent cycles of testing. Projects located within or adjacent to a MTCA/CERCLA cleanup site may be subject to project-specific ranking guidelines with higher sampling and testing requirements.

5.1.2 Area-Specific and Project-Specific Rankings

To further facilitate the determination of sampling requirements, rankings for dredging projects in specific geographic areas or with adequate historical testing data were determined using the ranking guidelines in **Table 5-1**. Current rankings for the Puget Sound area are shown in **Table 5-2** and **Table 5-3**; for Grays Harbor and Willapa Bay in **Table 5-4** and in **Table 5-5** for the Columbia River.

5.1.3 Integration of Dioxin Data into Ranking Determinations in Puget Sound

In December 2010 the DMMP agencies implemented new interim dioxin guidelines for Puget Sound, which set a site management objective of 4 pptr TEQ for all disposal sites. In order to meet this goal, no DMMU with a TEQ of over 4 pptr can be disposed at dispersive sites. For disposal at non-dispersive sites, projects must have a volume weighted average of 4 pptr TEQ or less, with no single DMMU having a concentration greater than 10 pptr TEQ. Disposal of material with more than 10 pptr TEQ or not meeting the volume weighted average of 4 pptr TEQ is subject to DMMP Best Professional Judgment (BPJ) based on such things as the frequency of disposal site use and sequencing of dredged material disposal. The interim dioxin guidelines also include updated reason-to-believe guidance; in urban areas, there must be existing dioxin data that supports exclusion of dioxins as a chemical of concern (COC).

The DMMP uses BPJ to determine ranking relative to dioxin rather than including dioxin in the standardized ranking approach used with other COCs. Where dioxins are either known or suspected to be present, existing sediment dioxin data from the project and vicinity as well as source information will be used to design a sampling density appropriate for the project. This approach is used if elevated dioxin concentrations have limited distribution in a given area; there are demonstrated cases where the higher sampling density required for one portion of a project is not appropriate over the entire area to be characterized.

Table 5-2. Current general rankings for Puget Sound

All urban and industrialized areas except those listed individually	High
All existing fueling and ship berthing or construction facilities	Moderate
All existing marinas except those listed individually	Moderate
All ferry terminals with the exception of Keystone	Moderate
All other unidentified areas	Low-Mod

Table 5-3. Current area and project-specific rankings for Puget Sound

AREA	DETAILS	RANK
Blaine	Except marina	Low
Bellingham	Bellingham waterfront, including Inner & Outer Squalicum Boat Harbor and the head of Squalicum Waterway	High
	Squalicum Waterway (except the head)	Moderate
	Bellingham Cold Storage	Moderate
Anacortes	Cap Sante Boat Haven	High
	Former Scott Paper Mill	High
	Port of Anacortes Pier 2	High
	Cap Sante Waterway	Moderate
	Anacortes waterways, marinas and Guemes Channel	Moderate
Swinomish Channel	Federal Navigation Channel and La Conner Marina	Low
Whidbey Island	Coupeville (Keystone) Ferry Terminal	Low-Mod
	NAS Whidbey Island Fuel Pier	Moderate
Port Susan	West Port Susan, near Cavelero Beach	Moderate
Port Angeles	Inside the harbor	High
Port Townsend	South side of point and south of PT Marina	High
	Port Townsend Marina	Moderate
	Oak Bay Channel	Low
Everett/ Snohomish River	East Waterway	High
	Snohomish River: Intertidal areas upstream to the upper turning basin	High
	Subtidal areas of the Snohomish River (through the upper settling basin)	Tier1/Low/ Low-Mod
	10th Street Boat Launch & Settling Basin Realignment	Low
	Everett Marina	Low-Mod/ Moderate
Mukilteo	All projects	High
Edmonds	Edmonds Marina	Moderate
	All other projects	High
Ship Canal/ Lake Washington	Salmon Bay	High
	Lake Washington Ship Canal	High
	Lake Union	High

AREA	DETAILS	RANK
	Kenmore (north end of Lake Washington)	High
	Lake Washington (except for Kenmore)	Moderate
Elliott Bay	Seattle Waterfront, West Waterway, East Waterway	High
Duwamish River	Navigation Channel, downstream of station 254+00	High
	Navigation Channel, upstream of station 254+00	Low-Mod
	Delta Marine	Low-Mod
	All other projects downstream of the settling basin	High
Bainbridge Island	Port Madison	Moderate
	Immediately adjacent to Wyckoff	High
	Inner Eagle Harbor (west of Wyckoff west beach)	Low-Mod
Bremerton	Sinclair Inlet	High
	Dyes Inlet	Moderate
Port Orchard	All projects	Low-Mod
Vashon Island	Upper portion Quartermaster Harbor	Moderate
	Outer Quartermaster Harbor	Low-Mod
Gig Harbor	All projects	Moderate
Tacoma	Commencement Bay, except as specifically mentioned	High
	Blair Waterway (Commencement Bay) – federal navigation channel only	Low
	Blair Waterway, except for federal navigation channel	Project-specific
	Sitcum Waterway (Commencement Bay)	Low
Shelton	All projects	High
Olympia	Olympia Harbor (except parts of the federal navigation channel)	High
	Lower Budd Inlet, including East Bay and West Bay	High

Table 5-4. Current rankings for Grays Harbor and Willapa Bay

RANK	GRAYS HARBOR	WILLAPA BAY
High	Urban and Industrialized Areas	Urban and Industrialized Areas
Moderate	Marinas Fueling and Berthing Facilities Construction Facilities Located near moderate-sized sewer outfalls Westhaven Cove entrance channels (federal maintenance dredging)	Other Marinas Fueling and Berthing Facilities Construction Facilities Located near moderate-sized sewer outfalls Nahcotta Boat Basin
Low-Moderate	Rayonier Dock Citifor Dock Weyerhaeuser Bay City Dock	Tokeland Marina

RANK	GRAYS HARBOR	WILLAPA BAY
Low	Port of Grays Harbor Terminals 1, 2, 3, 4 Crossover Reach North Reach Hoquiam Reach Cow Point Reach Aberdeen Reach South Aberdeen Reach	Bay Center Inner Channel (both segments of the dog leg) and mooring area Tokeland Entrance Channel
Tier 1 Exclusionary	Bar Reach Entrance Reach South Reach	Willapa Bar Bay Center Outer Channel

Table 5-5. Current rankings for projects on the Columbia River and other waterbodies

RANK	COLUMBIA RIVER	OTHER WATERBODIES
High	Typical locations include large urban areas and shoreline areas with major industrial development.	
Moderate	Typical locations include urban marinas, fueling, and ship berthing facilities; areas downstream of major sewer or stormwater outfalls; and medium-sized urban areas with limited shoreline industrial development. • Millennium Bulk Terminals – Longview • Georgia-Pacific Camas Slough	
Low-Moderate	Level 1 available data indicate a "low" rank may be warranted, but data are not sufficient to validate the low ranking. • Weyerhaeuser - Longview	• Port of Clarkston • Port of Lewiston
Low	Typical locations include areas adjacent to entrance channels, rural marinas, navigable side sloughs, and small community berthing facilities.	• Snake/Clearwater federal navigation channel • Quillayute federal boat basin & marina
Very Low (incl. in SEF)	Typical locations include gravel bars, mainstem channels such as the lower Columbia River or coastal inlets.	

Notes: SEF- Sediment Evaluation Framework

5.1.4 Re-Ranking of Areas/Projects/Project Reaches

Modifications of the initial rankings can occur as the result of additional testing. A project area can be ranked higher (e.g., from low-moderate to moderate) based on the results of a single testing period. However, consistent results from two testing periods are required before a ranking can be

lowered (e.g., from high to moderate). Projects may be ranked lower for a one-time dredging event based on the results of a partial characterization (see Section 5.8). However, two testing cycles will be required to lower the rank on a longer-term basis.

5.2 RECENCY GUIDELINES

Recency guidelines indicate how often a project needs to conduct sediment characterization. Recency guidelines apply to both projects that have been tested but not yet dredged, and to projects that have been maintained with repeated dredging since previous testing. A key consideration in determining whether available data are still representative is the recency of the information. "Recency" guidelines for existing information refer to the duration of time for which chemical and biological characterization of project-specific sediment remains adequate and valid for decision making without further testing. These guidelines are based on the number and operating status of chemical sources near the area to be dredged, on whether the sediment is close to the sediment-water interface or could be disturbed, and on how well previous samples describe the current conditions at the project site. With older data there is increased potential for a "changed condition" that could alter its validity. Data must be sufficiently recent to be considered representative of the material to be dredged.

The ranking system for dredging projects takes into consideration both the sources of contamination and historical chemical and biological testing data (which are considered an integrated reflection of the effects of sources on the project area). Therefore, the recency guidelines are based on the project rank. For high-ranked projects, the recency guidelines allow characterization data to be valid for a period of 3 years (DMMP, 2014). The recency guideline for moderate, low-moderate and low-ranked projects is a period of 5, 6 and 7 years, respectively (**Table 5-6**).

Table 5-6. Recency Guidelines for DMMP Projects

RANK	RECENCY PERIOD (years)
High	3
Moderate	5
Low-moderate	6
Low	7

When other permitting requirements prevent a project from being dredged during the recency period, extension of the recency period will be considered on a case-by-case basis. When considering whether existing data continue to adequately characterize sediment from a specific project, the agencies will review previous characterization data, any new data from the dredge site or vicinity, and site use and character. Based on this review, the agencies may extend the recency determination, typically for one year. This extension may be allowed with no additional testing, or may require some level of additional testing, from confirmatory to full characterization.

The recency guidelines never apply when a known "changed" condition (e.g., accidental spills or new discharges) has occurred since the most recent samples were obtained. For subsurface sediments, the potential for contamination from groundwater sources must be considered.

Project proponents must request a recency extension from the DMMO if recency guidelines are likely to be exceeded at their project site prior to dredging. The recency extension request should thoroughly evaluate the above variables and suggest a course of action. The DMMP will respond in writing to the request, and provide a recency determination after the request has been evaluated.

For projects with upland disposal, DMMP will use BPJ regarding recency.

For further clarification on recency extensions and guidelines, see the DMMP program-level updates entitled, *Recency Guidelines: Program Considerations* (2002b) and *Recency Guideline Exceedances: Guidelines for Retesting in High Ranked Areas* (2003b) and *Recency Guideline Modifications* (2014b).

Recency guidelines apply to, and supersede, the concept previously known as "frequency," which referred to the extent of time a given dredging project could be maintained with repeated dredging without further testing.

Two cycles of sampling and testing for a project are required before the project can be dredged multiple times under a single characterization within the recency guidelines. A biological testing failure--or opting out of biological testing during any testing cycle--will negate the applicability of the recency guidelines and automatically result in a need to conduct testing every dredging cycle.

5.3 DEVELOPING A CONCEPTUAL DREDGING PLAN

Prior to determining a sampling plan, a project-specific conceptual dredging plan needs to be prepared. This plan takes into consideration the depth and physical characteristics of the sediment, side slopes, practicable dredge cut widths and depths, dredging along pier faces, other physical and logistical constraints, available dredging methods and equipment, and conventional construction practices at similar dredging projects.

While construction-level detail is not required at this point in the process, a realistic conceptual dredging plan will aid in the delineation of DMMUs and avoid the situation in which a suitability determination could negatively impact the ability to dredge the project and properly dispose of the material.

If surface sediment is to be characterized separately from subsurface material, the conceptual dredging plan must indicate how surface and subsurface material will be dredged separately in the event that one or the other is found unsuitable for open-water disposal. A one-foot vertical buffer is typically required when dredging an unsuitable DMMU. This buffer must be considered when developing the conceptual dredging plan. If the resulting layer of suitable dredged material is too thin or patchy to feasibly dredge separately, or consists of a narrow wedge of material at the toe of a slope, then all material should be considered surface material.

5.4 DETERMINING VOLUME OF MATERIAL TO BE DREDGED

Where possible, the physical geometry and volume of sediments proposed for dredging should be determined from a pre-sampling bathymetric survey. The dredging volume calculation should include side slopes, overdepth and sediments anticipated to slough from under piers and wharves. For dredging projects with cuts deeper than 4 ft and that occur infrequently, the dredging prism can be divided between a "surface" layer (generally four feet in depth) and a "subsurface" layer consisting of everything below the surface layer. The volumes comprising each of these layers should be calculated.

Dredging contracts routinely include "overdepth" material that is often one to two feet below the required dredging depth (except for very small projects where it may be decided to minimize overdepth volume for cost control). Overdepth volume will be included in the calculation of the requirements for sampling and analysis.

Volume estimates, including overdepth material, are incorporated into the project permit, water quality certification and site use authorization. Exceedances of permitted volumes may result in fines or work stoppages. Thus it is important to develop an accurate volume estimate of material to be dredged. To reduce the incidence of permit violations, the following guidelines should be followed:

1. Pre-sampling surveys should be taken as close in time as possible to the sampling event to get the best possible bathymetric data for volume estimates.
2. Pre-sampling volume estimates must include allowable overdepth for the entire dredging prism, including sideslopes. Technical justification for the selected angle of repose for the sideslopes must be included in the sampling and analysis plan.
3. When a box cut is proposed along a pier face, sloughing from under the pier should be anticipated in all cases. Technical justification for the selected angle of repose for sideslopes under piers must be included in the sampling and analysis plan. The dredging proponent should ensure that all necessary geotechnical or under-pier survey data be provided to the contractor estimating the dredged material volume.
4. It is highly recommended that presampling estimates of in-situ volume be increased by an uncertainty factor to account for the error inherent in the estimation process. Sampling and testing requirements will be based on this adjusted volume. The uncertainty factor must be identified in the sampling and analysis plan along with a technical justification for its selection. It should be noted that the uncertainty factor applies only to estimates of in-situ volume and is not meant to address bulking of sediments during dredging.

Some areas, particularly channels and settling basins, are characterized by rapid shoaling during winter storm events. Since sampling and testing are required prior to dredging, not all of the sediments to be dredged will have been deposited at the time of sampling. In such instances, pre-sampling bathymetric surveys, records from previous dredging events and best professional judgment will be used to estimate the volume of sediments likely to be dredged. Sampling and testing requirements will be based on this estimated volume.

5.5 DETERMINING THE NUMBER OF DMMUS AND FIELD SAMPLES

The number of field samples to be taken and the number of laboratory analyses conducted to fully characterize the sediments for any given project must be sufficient to allow for an adequate assessment. The following guidelines specify a maximum volume of dredged material that can be represented by a single field sample and by a single laboratory analysis. They are considered "minimum" requirements in that the dredger may opt for, or regulatory agencies may require, additional samples or analyses if warranted.

5.5.1 Dredged Material Management Units

A "dredged material management unit" (DMMU) is the smallest volume of dredged material that is truly dredgeable (i.e., capable of being dredged independently from adjacent sediments) and also for which a separate disposal decision can be made by the agencies. **Thus, a given volume of**

sediment can only be considered a DMMU if it is capable of being dredged, evaluated and managed separately from all other sediment in the project.

All of the field samples taken within a DMMU are composited to provide a single sediment sample for laboratory analysis that is representative of that DMMU. Therefore, the selection of sampling locations and the development of a compositing scheme must provide an accurate representation of the condition of each DMMU. In general, samples should be distributed across the dredging prism so as to target the bulk of the dredge volume. However, special circumstances, such as the presence of sources of contamination, may dictate otherwise. The location of point sources in the vicinity of the project must be taken into consideration when locating field samples, but "worst-case" sampling should *not* be the goal of full characterization (it *is* the goal of partial characterization sampling; see Section 5.8). Tier I information, including the location of point sources, should be included in the sampling and analysis plan and should support the sampling locations selected to ensure representative sampling of the proposed dredged sediments.

5.5.2 How Many DMMUs?

Sediment in any given project is considered either "heterogeneous" or "homogeneous." Heterogeneous sediment is presumed, or known, to have different contamination levels in the surface and subsurface sediments. Most projects fall into this category. Heterogeneous sediments are sampled with a core sampling device in order to sample the entire depth of the dredge prism.

To characterize heterogeneous sediments, different sampling intensities are used for the surface and subsurface portions of the dredge prism (**Table 5-7**). Heterogeneous sediment is usually divided into "surface" (0 to 4 feet of the dredging prism) and "subsurface" (greater than 4 feet below the sediment surface.) Using **Table 5-7**, in a moderate-ranked area with 32,000 cubic yards (CY) of surface material (0- 4-foot cut depth) and 24,000 CY of subsurface material (at 4-foot cut depth or deeper), a total of three DMMUs are required (two from the surface volume and one from the subsurface volume).

The DMMO can provide any assistance necessary in the development of a sampling approach.

This approach assumes that the surface material is more contaminated than the underlying material. A similar approach could be used if the converse is true, that is if subsurface material is known to be more contaminated than surface. Generally, the specific conditions for a particular dredging project will dictate the volume limits for DMMUs.

For projects which are dredged frequently due to rapid or routine shoaling, the sediments are expected to be relatively homogeneous and the distinction between surface and subsurface sediments becomes less important. In this case, DMMU volumes may be based on the average of surface and subsurface maximum allowable volumes. The proposed dredging volume may be divided by this average volume to determine the number of DMMUs. Grab samples are usually considered adequate to characterize homogeneous sediments.

The DMMO must be consulted before categorizing a project as "homogenous" as there are only a small number of cases in which this designation applies. These include--but are not limited to--the Duwamish turning basin and adjacent federal navigation project, Snohomish River federal navigation project, Swinomish Channel federal navigation project and the Grays Harbor federal navigation project.

Table 5-7. Maximum sediment volume represented by each DMMU

PROJECT RANK	HETEROGENEOUS SEDIMENT (contamination level decreases with depth*)		HOMOGENEOUS SEDIMENT (well mixed)
	SURFACE	SUBSURFACE	
Low	48,000 CY	72,000 CY	60,000 CY
Low-moderate	32,000 CY	48,000 CY	40,000 CY
Moderate	16,000 CY	24,000 CY	20,000 CY
High	4,000 CY	12,000 CY	8,000 CY

***If contamination increases with depth, project specifics will dictate the appropriate volume limits for the surface and subsurface DMMUs.**

5.5.3 Sampling Intensity

The maximum volume of sediment that may be represented by a single field sample (typically a 4-foot core section) varies with project rank and is presented in **Table 5-8**. For projects in areas ranked low or low-moderate, a single sediment sample should be taken for every 8,000 CY of material to be dredged. For projects in areas ranked high or moderate, a single sediment sample should be taken for every 4,000 CY. Unlike the maximum volume represented by each DMMU, the maximum volume represented by each field sample does not vary with sediment depth. Continuing with the example presented in the previous section, a moderate-ranked project with 32,000 CY of surface sediment and 24,000 CY of subsurface sediment would require a total of 14 field samples: eight from the surface volume and six from the subsurface volume, which would be composited respectively to generate two analyses/DMMUs for the surface material and a single analysis/DMMU for the subsurface material.

Table 5-8. Maximum sediment volume represented by a single field sample

PROJECT RANK	SURFACE	SUBSURFACE
Low	8,000	8,000
Low-moderate	8,000	8,000
Moderate	4,000	4,000
High	4,000	4,000

5.6 DETERMINING THE CHEMICALS OF CONCERN (COC) LIST

The standard list of COCs for both marine and freshwater projects can be found in **Table 8-2**. Tributyltin (TBT) is included on the standard list for freshwater projects, but is required only on a case-by-case basis for marine projects. Note that if the project proponent of a freshwater project can provide compelling evidence that butyltins are unlikely to be present (e.g. streams, inland lakes, etc.), then butyltins may be dropped as a COC. Dioxins/furans are required on a case-by-case basis for both freshwater and marine projects. Information on when and where analyses of dioxins/furans and TBT are needed can be found in sections 8.3.1 and 8.4.2, respectively. Other COCs in limited areas are discussed in section 8.4.

5.7 SPECIAL PROJECT CONSIDERATIONS

5.7.1 Reduced Sampling and Testing for Small Projects

For small projects, the cost of testing must be balanced against the environmental risks posed by disposal of a very small volume of dredged material. Small projects in low, low-moderate and moderate ranked areas represent low potential risk that unacceptable adverse effects will result at the disposal site from the discharge of project material. As a result, with the exception of high-ranked areas, a small volume of sediment to be removed at a dredging site may require no testing or reduced testing.

To clearly define what constitutes a small project, there are two key qualifiers. First, intentional partitioning of a dredging project to reduce or avoid testing requirements is not acceptable. Second, recognizing that multiple small discharges can cumulatively affect the disposal site, project volumes are defined in as large a context as possible. One example of this latter qualifier is recurring maintenance dredging of a small marina where "project volume" will be the projected dredging volume over 5 years. Another example is multiple-project dredging contracts where a single dredging contractor conducts dredging for several projects under a single contract or contract effort. Again, the "project volume" will be summed across all projects (as will any sampling and compositing efforts prior to testing).

5.7.2 "No-Test" Volumes for Small Projects

For projects in low, low-moderate, or moderate-ranked areas, volumes for which no testing need be conducted are shown in **Table 5-9**. For low-ranked areas, the "no test" volume is equal to the maximum volume represented by a single field sample (i.e., 8,000 CY). For low-moderate and moderate rankings, the "no test" volume of 1,000 CY is representative of the capacity of medium-sized barges. For high-ranked areas there is not a "no test" volume and some testing is always required.

Table 5-9. "No Test" volumes for small projects

PROJECT RANK	"NO-TEST" VOLUME
Low	Less than 8,000 CY
Low-moderate and Moderate	Less than 1,000 CY
High	Some testing is always required

Some small dredging projects consist of the removal of sediment discharged from an outfall, or located directly adjacent to an outfall, yet fall within a general geographic area ranked low, low-moderate or moderate. However, it is possible that these sediments contain chemicals at a level of concern far greater than the area in general. Therefore, such dredging projects may be given a "high" rank by the agencies regardless of the rank of the general area. This decision will be made on a case-by-case basis, with consideration given to the type and size of the outfall, the shoaling pattern relative to the outfall, and any other relevant information available to the project proponent, such as catch basin and particulate data associated with the outfall.

If the dredged material is proposed for disposal at a dispersive site, dioxin testing may be required on a project-specific basis (Section 8.3).

5.7.3 Reduced Testing for Small Projects Exceeding the "No-Test" Volume

The original PSDDA documents outlined reduced testing requirements for some small projects that exceed the no-test volume (PSDDA 1988). These guidelines have been rarely used during the life of the program. For more information please contact the DMMO office.

5.7.4 Reduced Sampling and Testing for Native Material

Projects that involve dredging of native material that has not been exposed to contaminated groundwater may require less sampling and testing than the requirements identified in **Table 5-7** and **Table 5-8**. The agencies will make this determination using best professional judgment on a case-by-case basis using site-specific information.

5.8 PARTIAL CHARACTERIZATION FOR DOWN-RANKING

A dredging proponent may choose to do a partial characterization (PC) of project sediments. A PC is most frequently done on larger projects and is based on the chemical analysis of a limited number of samples. If the PC data indicate that the project has been over-ranked, then down-ranking may be permitted for a subsequent full characterization (FC). Down-ranking may substantially reduce the overall cost of sampling and testing for a large project.

A PC is designed to be simple and economical. A PC is not a substitute for a full characterization, but is only a means for establishing a "reason to believe" that a lower ranking is appropriate. A PC must provide sufficient information to support a decision to re-rank a project. PC results are used to down-rank a project on a one-time basis only. Two cycles of testing are required for longer-term down-ranking.

5.8.1 Development of a PC Sampling and Analysis Plan

A sampling and analysis plan must be developed for a PC. The PC plan must be submitted to the DMMO, who in turn will coordinate agency review with EPA, Ecology and DNR representatives.

The following PC guidelines are appropriate for most dredging projects. However, because anomalies may exist for a given project, the agencies reserve the right to depart from these guidelines if conditions so warrant (e.g. complex chemical source environment, ambiguous and/or highly variable characterization data, etc.). As with all aspects of the dredged material evaluation process, professional judgment will be an important factor in the decision-making process. The dredger should coordinate with the DMMO in the development of an adequate PC plan.

5.8.2 Sampling Requirements for Down-Ranking

The number of samples required for down-ranking is based on a percentage of the number of samples that would be required for a full characterization. A dredger may elect to down-rank up to two levels by increasing the sampling intensity. No compositing of samples for a PC is allowed. PC sampling station delineation must be approved in advance by the agencies and should represent "worst-case" sampling relative to the location of local point sources.

For the option of lowering a rank one level, ten percent of the FC minimum surface sample requirement must be analyzed for a PC. A minimum of two samples must be analyzed for this option. For the option of lowering a ranking two levels, 20 percent of the FC minimum surface sample requirement must be analyzed for a PC. At least three samples must be analyzed for this option. A dredger has the option of performing a PC on subareas of a dredging project. Subareas must be selected with the approval of the agencies. A minimum of two samples is required for each subarea. Although a PC is most frequently done on surface sediments, a dredger may be required to

perform subsurface sampling and analysis during a PC if there is reason to believe that subsurface sediments are contaminated relative to sediments in the upper four feet of the dredging prism.

Partial characterization data for a given sampling station may also be used, in some limited cases, in partial fulfillment of FC requirements. The strategy for doing so must be clearly stated in the PC sampling and analysis plan and approved by the agencies.

5.8.3 Ranking Guidelines Based on PC Data

The down-ranking of a project (or subarea) will be based on the results of the sample having the highest level of chemicals of concern (see also Section 8.4, which discusses special COCs). Ranking guidelines based on PC data are shown in Table 5-10.

PC samples must be analyzed for the full list of chemicals of concern (see **Table 8-2**) and sediment conventionals. PC data may also be used as a "reason to believe" test to screen out some chemicals of concern. If a chemical is not found in the PC and is not available from nearby sources, it may be deleted from the full characterization.

Table 5-10. Ranking Guidelines Based On Partial Characterization Data

RANK	PC GUIDELINE
High	At least one chemical > ML
Moderate	At least one chemical > (SL +ML)/2 and < ML
Low-moderate	At least one chemical > SL and < (SL + ML)/2
Low	All chemicals < SL

Note: SL (screening level) and ML (maximum level) values can be found in Table 8-2.

Partial characterization protocols were developed through the PSDDA program for marine sediments. If partial characterization is requested for freshwater projects, the DMMP will utilize BPJ on a case-by-case basis.

5.9 POST-DREDGE SEDIMENT SURFACE (Z-SAMPLES)

Dredging alters environmental conditions in the dredging area by exposing new sediments to direct contact with biota and the water column. The sediment exposed by dredging must meet the antidegradation policy (WAC 173-204-120) under the State of Washington Sediment Management Standards (SMS). The "Z-sample" represents the sediment that will be exposed by dredging. Z-samples are collected from the **first two feet** below the dredging overdepth and must be collected during sampling for all projects requiring core sampling. Z-sample collection and analysis guidance is as follows:

- Z-samples will be collected and archived for every core sampling location for all projects, regardless of rank. Archived sediment must be maintained at -18° C.
- If TBT testing of Z-samples is required, analysis procedures should follow the guidelines found in DMMP 2015d. See Section 8.4.2 for further details.
- It is likely that the holding time for mercury will be exceeded prior to any testing of archived Z-sample sediment. If the Z-sample is eventually tested for mercury, the results should be flagged as having exceeded the holding time.
- If an immediately overlying DMMU is found to be contaminated (e.g., unsuitable for unconfined open-water disposal), the associated underlying Z-sample must be analyzed to verify the sediment quality of the Z-layer.

- If there is reason-to-believe that concentrations of chemicals of concern increase with depth, the DMMP agencies may require Z-samples to be analyzed concurrently with analysis of the DMMUs.
- Z-sample analyses will initially consist of sediment conventional and chemical analyses. If the results of these analyses indicate that the sediment to be exposed by dredging will be degraded relative to the existing sediment surface, the dredging applicant may be required to remobilize and resample locations with degraded Z-samples in order to perform required biological testing (bioassays and/or bioaccumulation testing).
- For the majority of projects, a decision about Z-sample analysis will be made after review of the chemistry/bioassay data associated with the dredged material.

For further discussion of Z-sample testing and antidegradation evaluations, see Chapter 12.