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OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

DRAFT Guidelines for the Upland Disposal of Dredged Sediment

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This document describes the requirements of the Department of Environmental Quality (DEQ) Solid Waste, Environmental Cleanup, and Water Quality Programs for evaluating dredged sediment for disposal at an upland location. The purpose is to streamline the process by helping to coordinate the requirements of the three programs. Although they are not addressed in this document, sediment-related regulations overseen by the US Army Corps of Engineers, the Department of State Lands, and other state and federal agencies also must be considered when planning a dredging project.

This document provides information and technical assistance to the public and employees of the DEQ. DEQ guidance does not constitute rulemaking by the Environmental Quality Commission and may not be relied upon to create a right or benefit, substantive or procedural, enforceable at law on in equity, by any person. DEQ may take action at variance with this guidance.

Introduction

The purpose for evaluating sediment prior to dredging is to determine if this material can be safely placed elsewhere in the waterbody ("open-water disposal") or must be removed for upland disposal. The option to use open-water disposal is evaluated through the US Army Corps of Engineers (COE) permitting process, which requires a water quality certification (WQC) from the Department of Environmental Quality and may require input from several other state and federal agencies such as the Environmental Protection Agency (EPA), National Marine Fisheries Service (NOAA Fisheries), US Fish and Wildlife Service (USFW), Oregon Department of Fish and Wildlife (ODFW), and the Oregon Department of State Lands (DSL).

When contamination in the sediment makes open-water disposal unacceptable or when suitable open-water disposal locations are not available, upland disposal is usually considered. This document provides guidelines for evaluating upland disposal of dredged material. As used in this document, the term "upland disposal" refers to:

- Disposal in a permitted landfill; or
- Placement in other upland locations approved by the DEQ.

Approval by the DEQ is required because dredged material is considered a solid waste, though in many cases it will qualify as "clean fill" as described elsewhere in this document.

When upland disposal is identified as an option for a dredge project, the most efficient way to proceed is to assess both the DEQ and the COE requirements at the same time. Therefore, when considering upland disposal you should use this document to ensure that the data requirements for disposal are identified at the same time as the data requirements for dredging. Figure 1 illustrates the basic permitting steps in the dredge process and highlights those aspects of the process that are discussed in this document.

Sample Collection

The number of samples needed to characterize the sediment for a proposed dredging project will depend on the nature of the material (*e.g.*, particle size, total organic carbon) and the potential contaminant sources in the area from which the sediment will be dredged. You must collect enough samples to represent all of the sediment proposed for upland disposal. To ensure this, divide the sediment into "homogenous units" based on prior knowledge of activities that have occurred in the area where the material will be obtained and on the nature of that material. Collect a minimum of five samples from each homogenous unit and have them analyzed for contaminants that may be present due to current or historical on-site or upstream activities. Also test them for naturally occurring metals that may be present in the dredge area at concentrations that would be considered elevated compared to background concentrations at the proposed disposal site.[1]

Sampling should generally follow standard protocols described in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA SW-846).[2] You can collect samples from the in-place material prior to dredging or from the barge after dredging. However, the number of samples and the requirement that they be representative does not change. If you collect them after dredging, make sure that the material can be held long enough for laboratory results to be reported, and for sampling documentation and lab results to be reviewed before the sediment is placed in the proposed disposal location. It's a good idea to identify alternative disposal locations ahead of time in case the sampling results indicate that the sediment cannot be placed at the proposed location.

Sediment sampling locations must be surveyed and shown on a site map with sufficient accuracy to allow resampling in the same location if required. The DEQ prefers that you use a differential global positioning system (DGPS) for this purpose. Other methods, such as triangulation or tape measurements with compass directions, may be acceptable.

The sample collection method depends on the depth of planned dredging, heterogeneity of the in-place sediment, volume of sample needed, cost, and ease of collection. Grab samples are adequate for areas where dredging will not exceed two feet in depth or for sampling material after it has been dredged. Core samples are more appropriate where dredging will exceed two feet.

[1] For additional information, see *Notes about "background"* on the bottom of page 6.
[2] This document can be found on-line at http://www.epa.gov/epaoswer/hazwaste/test/sw846.htm.

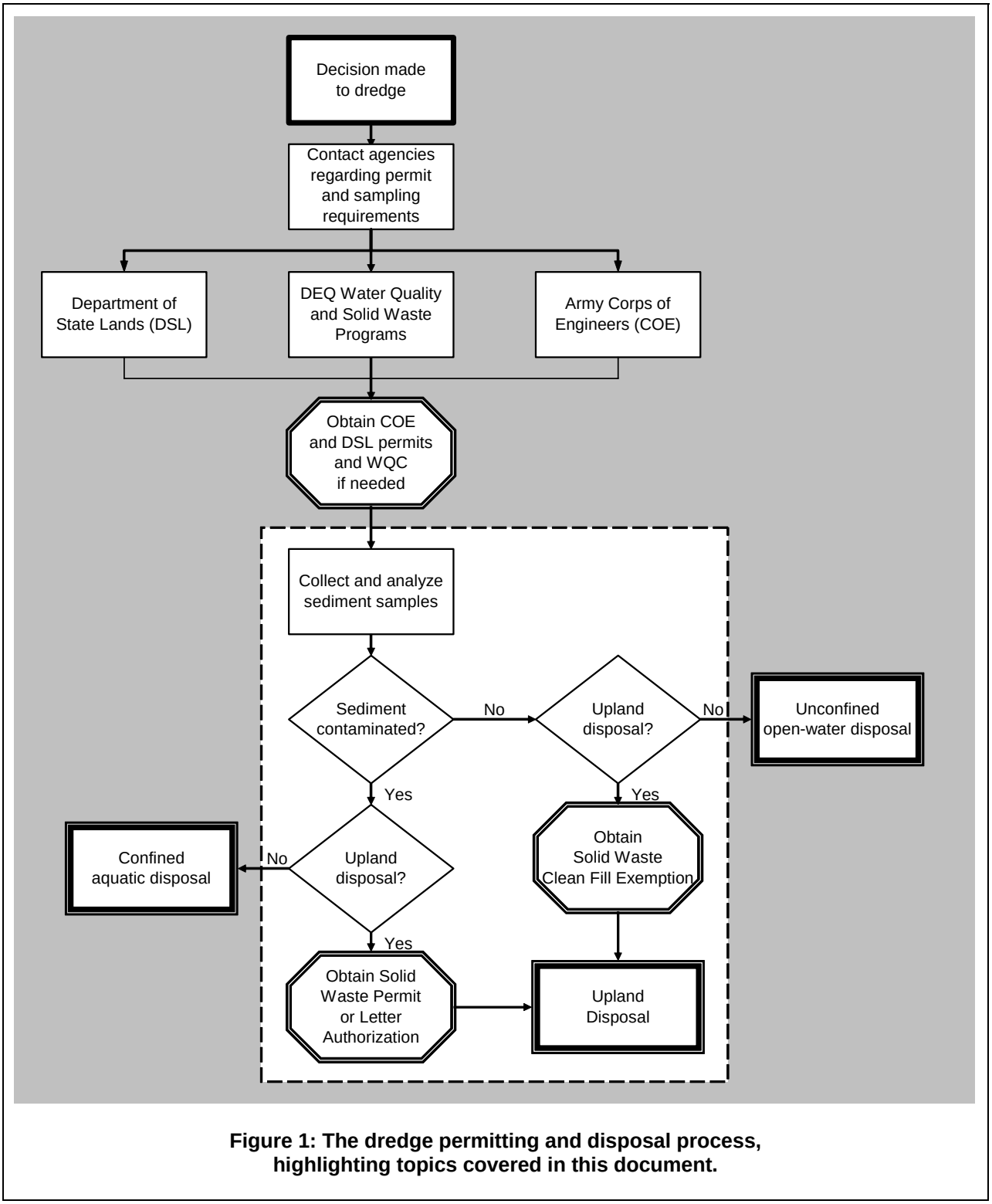

Figure 1: The dredge permitting and disposal process, highlighting topics covered in this document.

Use standard sediment sampling equipment, usually constructed of stainless steel. Sampling procedures and protocols vary depending on the methodology used. Properly decontaminate all sampling equipment before obtaining each sample, and take care to prevent incidental contact of the sample with potentially contaminated materials (including boat engine exhaust).

Store samples in pre-cleaned, tight sealing, and properly labeled sample containers. Fill out a chain-of-custody tracking form for all samples collected for analysis. Labs will often provide the necessary containers, chain-of-custody forms, and a cooler for cold transport of the samples back to the lab. Place all samples on ice as soon as collected and make sure that the ice does not melt prior to delivery to the lab. Do not use dry ice, as freezing can adversely affect sediment chemistry.

Sample Analysis

Samples should be analyzed for chemicals that are likely to be associated with past and current site activities or with upstream sediment potentially deposited in the dredge area. This will typically include metals, total petroleum hydrocarbons (TPH), semi-volatile organic carbons (SVOCs), polychlorinated biphenyls (PCBs), and pesticides. All chemical analyses should be conducted by an experienced analytical laboratory using accepted methods and recommended reporting limits. Appropriate quality assurance/quality control (QA/QC) samples should also be analyzed.

If concentrations do not exceed the screening level values provided in Table 1[3], you may be able to simplify the disposal process by obtaining a "clean fill exemption" from the Solid Waste program[4]. Contact your regional DEQ solid waste program for details on how to apply for a clean fill exemption.

If Table 1 screening levels are exceeded based on the migration-to-groundwater pathway, you may want to perform leachate tests (TCLP[5] or SPLP[6]) to evaluate this pathway more accurately. Be sure to de-water wet material prior to performing the leachate tests. Compare the test results to the Numerical Groundwater Quality Reference Levels and Guidance Levels found in OAR 340-040-0080.

If compounds are detected for which screening levels are not provided in Table 1, consult with the DEQ regarding protective levels and the need for additional testing. The DEQ plans to update this table as new information becomes available. Updates may include the addition of compounds that have been detected in fill proposals or revised screening levels based on new toxicity/bioaccumulation data. If the analyses detect more than 10 carcinogens or 2 or more non-carcinogens with the same toxicity endpoint, you may need to account for combined toxic effects.

[3] If a suspected contaminant is also a naturally occurring substance (*e.g.*, arsenic or lead), you may use a site-specific background level as the screening level instead of the risk-based level in Table 1.

[4] See OAR 340-093-0030(13).

[5] Toxicity Characteristic Leaching Procedure, EPA SW-846, Method 1311.

[6] Synthetic Precipitation Leaching Procedure, EPA SW-846, Method 1312.

A listing of laboratories accredited through the Oregon Environmental Accreditation Program for Resource Conservation and Recovery Act (RCRA) solid waste analyses can be found at http://www.deq.state.or.us/lab/orelap/orelap.htm.

Disposal Location

Oregon solid waste rules require that the location of final disposition be identified prior to upland placement of sediment, regardless of whether the material has been determined clean or not. You should start the process for determining the appropriate upland disposal location during the WQC review and evaluation process. All final WQC's for projects that propose to use an upland location for disposal of dredged material contain conditions to ensure compliance with both Oregon's water quality and solid waste rules.

If the sediment is found to meet the clean fill criteria listed in Table 1, then disposal locations are only limited to areas outside of sensitive hydrologic areas such as wetlands, floodplains, or gravel pits. If the material does not meet the clean fill criteria, it may be placed at an upland site for disposal under a solid waste disposal permit.

Solid waste disposal permit applications must include a Land Use Compatibility Statement (LUCS) from the local land use jurisdiction for the disposal site. You can download permit application and LUCS forms at http://www.deq.state.or.us/wmc/solwaste/permits/permitstsmrf.html. Solid waste disposal permits (SWDP) and one-time, short-term solid waste letter of authorization applications (SWLA) are not considered complete without a LUCS.[7]

Depending on the type and concentration of contaminants, various engineering and institutional controls will be specified in the SWDP or SWLA. These controls are determined by comparing the mobility and concentration of the contaminants to the disposal site's natural or engineered ability to contain the contaminants. Upland disposal facilities are also frequently required to construct and maintain a cap over the disposal facility following operations when mobility to groundwater and/or ecological receptors could be affected by the sediment contamination. All of these factors should be considered when searching for an upland disposal facility for sediment.

[7] A SWLA can only be issued for one-time disposal operations not taking longer than one year to complete (an initial 6-month duration with a one-time 6-month extension), while SWDP are issued for up to 10 years and are designed for continuous disposal operations.

Notes about "background:"

As used in this document, "background" refers to concentrations of naturally occurring metals in soil or sediment that have not been changed as a result of any chemical releases at or near the site. You may need to measure the background concentrations of these metals for one or both of the following reasons:

- At the dredge site, you may need to collect and analyze background samples of sediment to determine whether concentrations of naturally occurring metals in the material that you plan to dredge are background levels or are elevated as a result of contamination; or
- At the disposal site, you may need to collect and analyze background samples of soils from where you plan to dispose of the sediment in order to demonstrate that the concentrations of metals in the sediment are no higher than the concentrations at the disposal site.

Table 1: Screening Levels for Upland Disposal

Compound	Screening Level (mg/kg)	Basis	Source
Metals			
Antimony	0.3	groundwater	b
Arsenic	0.39	human (residential)	b
Barium	82	groundwater	b
Beryllium	3	groundwater	b
Cadmium	0.4	groundwater	a
Chromium	0.4	invertebrates	a
Copper	50	invertebrates	a
Iron	10	plants	a
Lead	16	birds	a
Mercury	0.1	invertebrates	a
Nickel	7	groundwater	b
Selenium	0.3	groundwater	b
Silver	2	groundwater & plants	a, b
Zinc	50	plants	a
Polychlorinated biphenyls			
Total PCBs	0.22	human (residential)	b
Pesticides			
DDD	0.01	bird	a
DDE	0.01	bird	a
DDT	0.01	bird	a
Aldrin	0.02	groundwater	b
Chlordane	0.5	groundwater	b
Dieldrin	0.0002	groundwater	b
Heptachlor	0.11	human (residential)	b
Semi-volatile Organics			
Acenaphthene	20	plants	a
Anthracene	590	groundwater	b
Benzo[a]anthracene	.08	groundwater	b
Benzo[a]pyrene	0.062	human (residential)	b
Benzo(k)fluoranthene	2	groundwater	b
Bis(2-ethylhexyl)phthalate	4.5	birds	a
Chrysene	8	groundwater	b
Dibenzo[a,h]anthracene	0.062	human (residential)	b
Dibenzofuran	0.002	mammal	b
Fluoranthene	210	groundwater	b
Fluorene	28	groundwater	b
Indeno[1,2,3-cd]pyrene	0.62	human (residential)	b
Naphthalene	4	groundwater	b
Phenol	5	groundwater	b
Pyrene	210	groundwater	b
Organotins			
Tributyltin oxide	18	human (residential)	b
Petroleum			
diesel	500 ppm	groundwater	c
gasoline	80 ppm	groundwater	c

Table 1 Notes:

a. *Guidance for Ecological Risk Assessment: Levels I, II, III, IV*, Oregon Department of Environmental Quality, 2001.

b. *Preliminary Remediation Goals*, US Environmental Protection Agency, Region 9. Values based on "groundwater" are soil screening levels with DAF=1 for the migration-to-groundwater pathway. Values based on "human (residential)" are for the residential soil direct-contact pathway. See http://www.epa.gov/Region9/waste/sfund/prg/files/02table.pdf

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