

**SEDIMENT MANAGEMENT
ANNUAL REVIEW MEETING
SUMMARY**

13 MAY 1998

**DREDGED MATERIAL
MANAGEMENT PROGRAM**

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¹ A title description listing all overheads presented at the SMARM are provided in the text, but are not included in this summary document. A copy of all overheads presented are on file at the Dredged Material Management Office.

LIST OF ACRONYMS

AET	Apparent Effects Thresholds
BCoC	Bioaccumulative Chemicals of Concern
BioStat	Bioassay Statistics Software
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSMP	Cooperative Sediment Management Program
DAIS	Dredged Analysis Information System
DDT	Dichlorodiphenyltrichloroethane
DMMP	Dredged Material Management Program
DMMU	Dredged Material Management Units
DNR	Washington State Department of Natural Resources
DRV	Default Reference sample response Values
E2D2	Environmental Effects & Dredging and Disposal Database
Ecology	Washington Department of Ecology
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERED	Environmental Residue-Effects Database
ESA	Endangered Species Act
GIS	Geographic Information System
MTCA	Model Toxics Control Act
MUDS	Multiuser Confined Disposal Site
MXR	"multixenobiotic transport" enzyme
NEPA	National Environmental Policy Act
NPDES	National Pollution Discharge Elimination System
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PSAMP	Puget Sound Ambient Monitoring Program
PSDDA	Puget Sound Dredged Disposal Analysis
PSEP	Puget Sound Estuary Program
RCRA	Resource Conservation and Recovery Act
SAPA	Sampling and Analysis Plan Appendix
SCUM1	Sediment Cleanup User's Manual Volume I
SEDQUAL	Ecology's Sediment Quality Database
SMARM	Sediment Management Annual Review Meeting
SMS	Sediment Management Standards
SQS	Sediment Quality Standard
TBT	Tributyltin
TMDL	Total Maximum Daily Loads
TOC	Total organic carbon
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish & Wildlife Service
WES	Waterways Experimental Station

SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING

The Cooperative Sediment Management Program (CSMP) held its annual review of dredging/disposal and sediment management issues on May 13, 1998. This Sediment Management Annual Review Meeting (SMARM) was hosted by the U.S. Army Corps of Engineers (USACE), Seattle District, at the North Auditorium at Federal Center South, Seattle, Washington. The SMARM encompassed both the Dredged Material Management Program (DMMP) annual review meeting and the Washington Department of Ecology's Sediment Management Standards (SMS) annual review process. The DMMP is an interagency cooperative program for dredged material management that began with the Puget Sound Dredged Disposal Analysis Program (PSDDA) and has expanded to other regions of Washington State. The meeting agenda is provided as Attachment 1, and Attachment 2 is the list of attendees.

MORNING SESSION

Introduction and Overview

1. Brian Applebury, Chief, Operations Division, USACE, Seattle District gave opening remarks and introduced Colonel James Rigsby, Commander, Seattle District Corps of Engineers.
2. Colonel Rigsby welcomed the participants. He talked about the success of the DMMP and SMS programs, and how the process for these programs is very cooperative. The state agencies, federal agencies, and many other people have worked well together to deal with tough issues. The program they have created can stand as a model for the rest of the country. Due to the success the DMMP program has had over the past 10 years, we are ready to continue and tackle even more difficult issues.
3. Mr. Applebury then introduced Lee Daneker, Manager, Aquatic Resources Division, Environmental Protection Agency, Region 10.
4. Mr. Daneker greeted the participants. He discussed the development of the PSDDA program and how it has been a cooperative program that involves active consensus based decisions by the agencies. The program has involved annual public comment, and is a far cry from what is happening in other areas of the United States (e.g., New York). The successor to the PSDDA program is the Dredged Material Management Program, which demonstrates how the program has outgrown Puget Sound and is applied to other areas within the state of Washington in addition to Puget Sound. He discussed how the PSDDA program is recognized throughout the nation. Although the meetings can get intense, the agencies have worked through issues to consensus-based decisions that are firmly grounded in science and the available information. Decisions have not been based on agency preference. One aspect that has made the PSDDA

program different and made it a success is the public's interest in the program and its input. He commended everyone for the work that has been done and that will be completed in the future. He thanked everyone for coming to the meeting.

5. Brian Applebury then introduced Doug Hotchkiss, Port of Seattle, who stood in for Eric Johnson, Washington Public Ports Association.

6. Mr. Hotchkiss pointed out that although this meeting was the tenth annual review meeting, it has not been only ten years that this whole process has been going on. There were many years spent in getting the program together. It has involved open and candid communication between everyone involved including the public and various agencies. This open communication has been what has made PSDDA really work. He suggested that there needs to be more group meetings for specific issues, such as regulatory work groups that involve the agencies and public. Regulatory workgroups have been successful at making good programmatic decisions. Rather than having "us and them" situations (e.g., regulators vs. regulated public), everyone works together, talking candidly and openly about the merits and values of given guidelines. Mr. Hotchkiss emphasized that we should continue with the same level of open, candid communication on both current and future issues.

7. Mr. Applebury then introduced the panel of agency representatives: Dr. David Kendall, USACE, Seattle District; Ted Benson, Washington Department of Natural Resources (DNR); Lee Daneker, U.S. Environmental Protection Agency (EPA), Region 10; and Dave Bradley, Washington Department of Ecology (Ecology).

8. Brian Applebury reviewed the objectives of the meeting and topics of discussion including overviews of the DMMP and SMS programs, various agency and public issue papers, and DMMP/SMS clarification topics. Some of the clarification papers and status reports would not be presented during the meeting, but there would be time set aside during the meeting for comments on these papers. He asked that anyone who had comments for discussion during the meeting or at the post-SMARM meeting to fill out a card provided in the back, and to submit it during the meeting or by June 3, 1998 to the DMMP agencies for consideration. Written comments for the SMS annual review process should be submitted for consideration by June 17, 1998. Mr. Applebury also indicated that the agencies are updating the DMMP mailing list, and that anyone who wants to be on the list must submit their name and address in the box provided at the back of the room.

- Ovrhd 1-1. 1998 Sediment Management Annual Review Meeting
- Ovrhd 1-2. SMARM Jointly Sponsored by the Dredged Material Management Program and the SMS Group
- Ovrhd 1-3. Meeting Objectives and Purpose
- Ovrhd 1-4. Dredged Material Management Program Overview
- Ovrhd 1-5. SMS Group Overview
- Ovrhd 1-6. Bioaccumulation (DMMP)
- Ovrhd 1-7. PSDDA Clarification and Status Papers (presented)
- Ovrhd 1-8. Public Issue Paper

- Ovrhd 1-9. Papers (not presented)
- Ovrhd 1-10. Summary and Closing
- Ovrhd 1-11. SMS Public Meeting (Dave Bradley, Ecology)

9. Prior to the next speaker, Brett Betts, Ecology, briefly interjected that Ecology would be demonstrating their updated SEDQUAL database and software application at the back of the room throughout the meeting. He welcomed those interested in the program to come back and view the demonstration at any time during the meeting.

DMMP Dredging/Disposal Overview

10. Stephanie Stirling, USACE, summarized the DMMP accomplishments and developments since the 1997 SMARM. Prior to the SMARM, the agencies posted on the Internet the issues they considered important for discussion at the 1998 SMARM. They received public comment on their topics and revised the agenda accordingly. She reviewed some of the highlights of the issues provided in the 1997 SMARM meeting minutes, including sediment larval comments, refinements of chronic/sublethal tests, withdrawal of the reference toxicant paper, and other SMS issues. The sediment larval workshop was held in January 1998 to discuss whether echinoderm and bivalve data should be combined and to compare several endpoints. Mr. Tom Gries, Ecology, would discuss the workshop later at this meeting. She described issues concerning chronic/sublethal bioassay tests; in particular, comparison of the Puget Sound Estuary Program (PSEP) *Neanthes* test protocol with the USACE Waterways Experimental Station (WES) protocol, and the potential use of *Leptocheirus plumulosus* for a bioassay test of effects of tributyltin (TBT).

Ms. Stirling reviewed the program accomplishments including the *Biennial Report, Beneficial Uses Report* (second draft), *Columbia River Manual*, and *DMMP User's Manual*. Comments on the *Columbia River Manual* are due June 20, 1998. The *DMMP User's Manual* expires in August 1998. She reviewed some of the on-going programs including the Bellingham pilot project, confined disposal study, and the apparent effects threshold (AET) regulatory work group. Technical accomplishments of the DMMP have included the bioaccumulation technical report, TBT protocol clarification, BioStat Software completion, and SEDQUAL database update. Ms. Stirling also indicated that the agencies have provided a list of Internet sites for information on the DMMP developments including agency homepages, documents, and databases.

- Ovrhd 2-1. DMMP Program Accomplishments
- Ovrhd 2-2. The Bureaucracy
- Ovrhd 2-3. 1997 SMARM Issues
- Ovrhd 2-4. Sediment Larval Workshop
- Ovrhd 2-5. Chronic/Sublethal Tests
- Ovrhd 2-6. Program Accomplishments
- Ovrhd 2-7. On-going Programs
- Ovrhd 2-8. Technical Accomplishments

11. David Kendall, USACE, gave an overview of DMMP projects and testing activities. He reviewed 1997 and 1998 (to date) project volumes for Puget Sound, Grays Harbor and Willapa Bay. He briefly reviewed how testing of the federal maintenance material in Grays Harbor is accomplished. Due to the amount of material within the inner harbor (approximately 1.5 million cubic yards), the characterization of the sediments is spread over a six-year period (e.g., one-third tested every two years), so that the entire project is evaluated once every six years. Dr. Kendall presented the number of dredged material management units (DMMUs) tested for each of the 1997 dredging year projects and the suitability determinations for these projects. He summarized 1996/97 dredging year testing results for which there were either screening level, bioaccumulation trigger level, or maximum level exceedances for polychlorinated biphenyls (PCBs), indeno(1,2,3-c,d)pyrene, mercury, hexachlorobutadiene, hexachlorobenzene, and total dichlorodiphenyl-trichloroethane (DDT). Most of the exceedances were for Terminal 18 sediments. The agencies found that 27 percent of the hexachlorobutadiene and hexachlorobenzene exceedances were based on detection limits being above the screening level. Obtaining detection limits below the screening levels continues to be a problem among the laboratories for some chemicals.

Dr. Kendall then reviewed the bioassay testing results. For single-hit responses, good concordance among the bioassays test results was observed. However, for two-hit responses there were some variances among the bioassay tests. For example, for hits falling under the two-hit rule, 26 percent of the DMMUs for amphipod tests failed, while only 2.8 percent of the DMMUs for the *Neanthes* tests failed (It should be noted that concordance among bioassays is not necessarily expected due to differential sensitivities of taxa/species to chemicals of concern within any given dredging prism tested).

Dr. Kendall summarized the outcome of the suitability determinations (suitable vs. unsuitable) over time. The 1997 dredging year had the highest percentage of unsuitable material (15% of the dredge volume), primarily due to the Terminal 18 project. He concluded by summarizing the amount of time it takes for the regulatory process for dredging programs to be completed, including the various stages of the process (DMMP process, permit application, public notice, public comments, applicant response to comments, 404(b)1 analysis, National Environmental Policy Act [NEPA] documentation, issuance of the permit). The complete DMMP process averaged 235 days for dredging years 1996 and 1997, including sampling and analysis plan preparation and review, field sampling, testing, and data submittal, data review, and the suitability determination. However, much of the processing time is out of the control of the DMMP agencies and in the hands of the applicant/contractor (199 days). The DMMP agencies averaged 19 days for sampling and analysis plan review and approvals, and 17 days for data review and suitability determinations during this period.

- Ovrhd 3-1. Overview of Dredged Material Management Program Project/Testing Activities
- Ovrhd 3-2. DY97 Project Volumes: Puget Sound
- Ovrhd 3-3. DY97 Project Volumes: Grays Harbor/Willapa Bay
- Ovrhd 3-4. DY98 Project Volumes (to date): Puget Sound
- Ovrhd 3-5. DY98 Project Volumes (to date): Grays Harbor/Willapa Bay
- Ovrhd 3-6. DY97 Projects

- Ovrhd 3-7. DY97 Suitability Determinations
- Ovrhd 3-8. DY96/97 Testing Summary: PCBs
- Ovrhd 3-9. DY96/97 Testing Summary: Indeno(1,2,3-c,d)pyrene
- Ovrhd 3-10. DY96/97 Testing Summary: Mercury
- Ovrhd 3-11. DY96/97 Testing Summary: Hexachlorobutadiene and Hexachlorobenzene
- Ovrhd 3-12. DY96/97 Testing Summary: Total DDT
- Ovrhd 3-13. DY96/97 Bioassay Hits
- Ovrhd 3-14. Dredging Year Testing Outcome Summaries
- Ovrhd 3-15. Regulatory Processing Time
- Ovrhd 3-16. DMMP Processing Time

12. Ted Benson, DNR, presented an overview of the DMMP disposal site use and monitoring work. He first summarized the disposal site activity and site use for dredging years 1996 and 1997 at the various DMMP disposal sites in Puget Sound and Grays Harbor. He then reviewed the disposal site monitoring framework, and the differences between full and partial monitoring at the sites. He summarized the results of the 1996 partial monitoring in Commencement Bay, and indicated that no monitoring was necessary at any of the sites in 1997. He summarized the cumulative site use and average volumes disposed per year at each of the disposal sites. Most of the sites have another 50 years of use, although Port Gardner has approximately 47 years left if disposal at the site continues at the current rate.

Because disposal site monitoring was not warranted in 1997, the funds that would have been used for disposal site monitoring will be used for development of a tributyltin protocol. This will include the *Leptocheirus plumulosus* toxicity protocol development and comparison with the standard PSDDA suite of bioassays. A contract has been arranged between DNR and Batelle to complete this study. The study objectives are to measure the chronic toxicity of TBT and TBT contaminated sediment, to develop tissue residue based dose-response curves for bioaccumulated TBT, and to compare TBT sensitivity of *Leptocheirus* with standard PSDDA test species, including *Eohaustorius*, *Neanthes*, and echinoderm larvae.

Mr. Benson concluded with announcing that the environmental site monitoring contract request for proposal will be coming out soon. It will be a multi-year contract that will include full and partial monitoring, a compilation of changes to the monitoring program instituted over the years, and will incorporate statistical time trends analysis.

- Ovrhd 4-1. Dredged Material Management Program
- Ovrhd 4-2. Disposal Activity and Site Use
- Ovrhd 4-3. Puget Sound
- Ovrhd 4-4. Grays Harbor
- Ovrhd 4-5. Elliott Bay Disposals
- Ovrhd 4-6. Commencement Bay Disposals
- Ovrhd 4-7. Port Gardner Disposals
- Ovrhd 4-8. Bellingham Bay Disposals
- Ovrhd 4-9. Rosario Straits Disposals
- Ovrhd 4-10. Port Angeles Disposals

- Ovrhd 4-11. Point Chehalis Disposals
- Ovrhd 4-12. South Jetty Disposals
- Ovrhd 4-13. Half Moon Bay Disposals
- Ovrhd 4-14. Disposal Activity and Site Use
- Ovrhd 4-15. Puget Sound
- Ovrhd 4-16. Grays Harbor
- Ovrhd 4-17. Elliott Bay Disposals
- Ovrhd 4-18. Port Gardner Disposal
- Ovrhd 4-19. Point Chehalis Disposals
- Ovrhd 4-20. South Jetty Disposal
- Ovrhd 4-21. Half Moon Bay Disposals
- Ovrhd 4-22. PSDDA Disposal Site Monitoring
- Ovrhd 4-23. Two Types of Monitorings
- Ovrhd 4-24. Commencement Bay Partial Monitoring
- Ovrhd 4-25. Cumulative Site Use Summary
- Ovrhd 4-26. Cumulative Site Use Summary (Cont)
- Ovrhd 4-27. Site Use Summary – Non-dispersive Sites
- Ovrhd 4-28. Site Use Summary – Dispersive Sites
- Ovrhd 4-29. Site Use Summary – PSDDA Sites
- Ovrhd 4-30. Planned Activities
- Ovrhd 4-31. TBT Study
- Ovrhd 4-32. Environmental Site Monitoring Contract

13. Discussion and Public Comment

An attendee asked why Bellingham dredged materials were being discharged at the Rosario Strait disposal site.

Ted Benson replied that the Rosario Strait site is a dispersive site, and the disposal standards are a little different than non-dispersive sites. In general, as site management goes, the agencies would like materials to go to a dispersive site, which may have an almost unlimited capacity. The Bellingham Bay disposal site is a non-dispersive site and has a definite capacity limitation.

David Kendall added that the agencies always intended the Bellingham Bay site to be a low use site due to crab, pandalid shrimp and demersal fish impact issues. The site is used only three and a half months out of the year.

Brian Applebury asked if there were any other questions or comments for the first group of presenters. There were none. The morning break followed this session.

SMS Overview

14. Brian Applebury introduced the next topics of discussion, the SMS group overview, including SMS activities and annual review and regional cleanup activities.

15. Rachel Friedman-Thomas, Ecology, reviewed what the SMS program had accomplished over the past year. She mentioned at the beginning that she would be referring those interested in more information about a given topic or project to the specific people in charge of the project. Ms. Friedman-Thomas outlined the schedule for SMS rule amendments. The SMS Implementation Committee would be meeting in the summer and fall, and in the winter 1998/1999, Ecology plans to formally propose the revised SMS rule for adoption. They plan to formally adopt the revised SMS rule in the summer of 1999. The SMS rule amendments include chemical and biological criteria issues, sediment cleanup issues, and clarifying data management, laboratory accreditation, and sediment impact zone requirements (refer to overheads for more specific issues).

Ms. Friedman-Thomas then discussed the results of five years of sediment source control developments. The *Sediment Source Control User's Manual Volume I (SCUM1)* was released in 1993, and since then 78 industrial and municipal discharges have been subject to some level of review. Sediment was sampled for 48 discharges, 26 of which had some level of sediment contamination. The next steps for the sediment source control program include updating guidance documents, combining the sediment source control process with the watershed process, and working with National Pollution Discharge Elimination System (NPDES) sediment and stormwater programs. The Sediment Sampling and Analysis Plan Appendix (SAPA) and SCUM1 documents can be found on the Internet at <http://www.wa.gov/ecology/cp/sediment.html>.

She also discussed other issues such as the updated contaminated sediment sites list, the development of benthic effects sediment quality standards, and the SEDQUAL sediment management information system. The target date for publication of the new contaminated site list is summer of 1998. The sediment quality standards benthic effects developments included development of reference area performance standards and identification/evaluation of additional benthic tests for sediment management standards (e.g., Swartz's dominance index, total richness, and enhanced polychaete abundance). The new SEDQUAL system includes a geographic information system (GIS) component link and will be used to perform marine and freshwater sediment quality assessments. Ecology was demonstrating what they could produce with the GIS link in the demonstration at the back of the room.

Ms. Friedman-Thomas reviewed the developments and accomplishments of the Bellingham Bay Pilot Project, which is a cooperative partnership to develop a comprehensive bay-wide approach for source control, cleanup, disposal, habitat restoration, and aquatic lands. Results of 1996 sampling at the Post Point STP indicated one mercury sediment quality standard (SQS) exceedance, suggesting there were no cleanup issues associated with this discharge. For the Georgia-Pacific Pulp and Paper Mill discharge there were 8 or 9 mercury SQS exceedances. However, through modeling, they found that Georgia-Pacific was not directly causing the levels of mercury observed in the vicinity. There appeared to be a historical exceedance, and they are looking toward natural recovery. She then reviewed some of the pilot project integrated activities (refer to overhead).

The next steps for sediment management include prioritizing the SMS criteria revisions; streamlining integration of site list into other agency lists; determining how the sediment work fits

into the watershed approach; integration into total maximum daily load (TMDL) activities; and continuing to develop a database that is current, accessible, and efficient.

- Ovrhd 5-1. Sediment Management Standards Sediment Activities
- Ovrhd 5-2. Sediment Management Standards Rule Amendments: Schedule
- Ovrhd 5-3. Sediment Management Standards Rule Amendments:
Chemical and Biological Criteria Issues.
- Ovrhd 5-4. Sediment Management Standards Rule Amendments:
Sediment Cleanup Issues
- Ovrhd 5-5. Sediment Management Standards Rule Amendments:
Miscellaneous Issues
- Ovrhd 5-6. 5 Years of Sediment Source Control
- Ovrhd 5-7. Sediment Source Control: What Next?
- Ovrhd 5-8. Contaminated Sediment Site List
- Ovrhd 5-9. Development of Benthic Effects Sediment Quality Standards
- Ovrhd 5-10. SEDQUAL Sediment Management Integrated Information System
- Ovrhd 5-11. Ownership Analysis
- Ovrhd 5-12. Mercury Surface Analysis
- Ovrhd 5-13. Bellingham Bay Demonstration Pilot Project
- Ovrhd 5-14. Bellingham Bay: Sediment Source Control
- Ovrhd 5-15. Bellingham Bay Pilot Integrated Activities
- Ovrhd 5-16. Sediment Management Next Steps

16. Russ McMillan, Ecology, discussed the regional cleanup activities. He first thanked Dr. Teresa Michelsen, a former Ecology employee, for all her contributions at Ecology and introduced Peter Adolphson as a new staff member. Mr. McMillan then discussed the cleanup priority and distribution of the workload. For highly contaminated sites, most sites fell under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), while for medium and low contaminated sites CERCLA and Model Toxics Control Act (MTCA) had similar numbers of sites. He mentioned that Gas Works Park would be investigated in the near future. Regional sediment characterization studies have included Salmon Bay, Budd Inlet, and Grays Harbor, and they will be studying the Lower Columbia River next. He also discussed voluntary cleanup programs that are initiated by a party other than Ecology. These may range from being completely independent of Ecology, being independent with some assistance from Ecology, or having full oversight of Ecology under a signed agreement. He concluded by mentioning that Ecology may also provide technical assistance on these programs for a fee. The advantage of this is that it lowers administrative overhead, allows lower priority projects to receive Ecology's attention, and provides greater assurance that projects will meet state requirements.

- Ovrhd 6-1. Regional Sediment Cleanup Activities
- Ovrhd 6-2. Cleanup Priority and Distribution of Workload
- Ovrhd 6-3. To Puget Sound and Beyond
- Ovrhd 6-4. Voluntary Cleanup Program

17. Discussion and Public Comment

Dr. Teresa Michelsen, Avocet Consulting, wanted to give one suggestion for future regional efforts. She said there really is no attention paid to Eastern Washington sites such as the agricultural areas, Columbia River, Wenatchee, and Yakima areas. She has been concerned about these areas, but there never seems to have been the resources available to address them. Given how far along the programs have come with the Puget Sound area, she wanted to encourage the agencies to begin looking at Central and Eastern Washington. She wondered how Ecology would deal with these sites.

Rachel Friedman-Thomas responded that they are hearing the same call for assistance for Eastern Washington sites within the Department of Ecology. The concerns have not just been from the cleanup program, but regarding shoreline permits and issues about filling and dredging as well. The first step will likely be to put the freshwater bioassays into the sediment management standards.

Sharon Metcalfe, City of Seattle, asked when there would be regulatory language available for review on any of the SMS issues, and whether such language is available now.

Dave Bradley responded that several steps would be taken over the summer for the rule revisions, although they are dealing with other issues as well. There will be an implementation committee meeting to clarify and reaffirm the scope of the revisions, and they expect to get the language out to the public in the summer. They plan to get the proposal for the revised SMS rule for adoption out in the winter and to adopt the revised SMS rule the following summer (1999). He mentioned that Ecology recognizes there are differences in opinion among stakeholder groups as to how quickly Ecology should move forward on various issues. However, the Department realizes they need to move forward to finish rule amendments over the next year. They hoped to clarify the scope and priorities by the June 3 date, so Ecology could go into the agency review meeting with this in mind. He explained that Ecology has not been able to get the revised rule out for public review because the agency has focused on other issues.

Doug Hotchkiss, Port of Seattle, remarked that he realized the agencies have a lot on their plate, but wanted to encourage them to get on with the rule revisions quickly. The agencies need to sort through a number of issues and determine which ones can be dealt with during the upcoming year. He said there is a "pent up dam of expectations". There are still a number of issues that need to be addressed so that the public knows what they need to do and what criteria they need to meet. He was disappointed with how the human health case study report did not go out for public review. His understanding was that a draft of the report was to be circulated for review and would go to the implementation committee before it went out. This did not happen. He is noticing that this report is being used and referenced in other reports as if it is the way things are. People seem to be taking recommendations in the report as if they are the rule or best professional judgement. He felt there really is a long way to go before everyone can start using this information in the way it is intended to be used.

Dave Bradley concurred.

Stephanie Stirling asked what process would be used to have the appropriate people review the freshwater bioassay testing protocols. She thought the implementation committee is a good group of people, but may not be comprised of the practitioners that can give the protocol the specific critique needed. There needs to be public input (i.e. laboratory input) in case there are problems with the tests.

Brett Betts responded that they would use the right process. There is an internal draft of the rule in circulation. He indicated that Ecology has been working on the freshwater criteria ever since they adopted the rule in 1991. Jim Cabbage produced a final report in July 1997 that focused on *Hyalella azteca* and Microtox (freshwater extract). The *Hyalella* protocol is an ASTM protocol and he expects that they would rely heavily on existing ASTM protocols, as opposed to developing new ones. PSEP does not include freshwater bioassays. When the PSEP protocols were revised in 1995, it was suggested that the revisions include the freshwater bioassays. However, this has yet to be done, and will be something Ecology will start to push. Mr. Betts expects that Ecology will be looking towards the regulatory workgroup as a regional body of scientists to address the bioassay issues.

Konrad Liegel, attorney at Preston, Gates & Ellis, remarked that as a member of the SMS implementation committee, he was glad to see that the rule revisions will be moving along this summer. He was impressed by the list of issues Rachel Friedman-Thomas indicated Ecology would be addressing, and can see that much internal thought has gone into consideration of these issues. He wanted to caution the agencies that having worked on this without much external review, there might be some agency rigidity that could result from this process. Once the agencies get the implementation committee process going again, he hopes that the manner in which the issues are addressed is done in an open way.

Mr. Liegel also indicated that he had not heard much about the review of the rule under Executive Order 97-02 and asked if Dave Bradley could speak to this.

Dave Bradley spoke to the rigidity concern first. He said that Ecology is constantly trying to strike a balance between (1) thinking through issues and having ideas to present to people, with (2) avoiding having those ideas become cast in concrete prior to public discussion. Ecology is trying to avoid being close-minded. It has been a challenge to come up with issues formed enough to discuss, yet continue to be open enough to consider other inputs. He understands the concern.

With respect to Executive Order 97-02, Mr. Bradley said that it was discussed at one of the implementation committee meetings last summer concerning source control and sediment cleanup. The criteria they used for these were the seven criteria in the executive order. There is a draft that had modifications based on discussions of the workgroup. Some of the scoping issues that came out of that fit within the rule process.

Doug Hotchkiss remarked that it would be beneficial to put much of the data that Rachel Friedman-Thomas presented in her slides on a web site.

Ms. Friedman-Thomas agreed to get the information onto Ecology's homepage. Copies of the slides will also be included in the SMARM minutes.

Cheryl Paston, City of Seattle, said she hasn't heard anything about the Endangered Species Act (ESA) and how that fits in with the SMS rule and other sediment issues.

Ms. Friedman-Thomas said that there were two levels to her questions: the rule amendment and the implications for the ESA. She has heard presentations from members of NMFS and she was not quite sure how it would be related. There seems to be a growing relationship between the federal Clean Water Act and the ESA. The sediment rule is considered a water quality criterion under the federal Clean Water Act, according to EPA Region 10. There is a higher rule development issue and she did not know how it would be handled.

John Malek indicated that the rule would have to undergo consultation. What that means and how that would occur, he did not know. He said Cheryl Paston's question was an excellent one.

Ms. Friedman-Thomas added that on an implementation perspective, for the Bellingham Pilot project they have been thinking about how all the short term actions and long term planning they are proposing to do, relate to the ESA. They have received some input on what they might want to do and what they would have to do. They are tackling the issue in the Bellingham Pilot project from a sediment cleanup and disposal siting perspective. She could keep Cheryl Paston apprised of developments with this project.

AFTERNOON SESSION

Presentation of DMMP Issue Paper, Clarification Paper, and Status Reports

18. John Malek, EPA, discussed the revision of DMMP guidelines for bioaccumulative chemicals of concern. There are 30 chemicals of concern identified under DMMP that pose a potential risk to human health and/or accumulation in aquatic organisms that may have an adverse effect. The framework for the bioaccumulative chemicals of concern interpretive guidelines and list were developed in 1988, and mainly had a human health focus. Due to new information concerning human health and ecological risks, these interpretive guidelines needed to be re-evaluated. As part of the re-evaluation, they potentially will take more of a risk-based approach. Ecological risk has always been an element in DMMP decisions, although the agencies use it more frequently now. The proposed actions for the revisions include recognizing the ecological risk and initiating a process for making revisions. For the revisions, the protocols and procedures will be standardized, effects-based bioaccumulation triggers will be established, and effects-based interpretive criteria will be developed. Existing pertinent information for the revisions has been incorporated into a technical support document: *Technical Support Document for Revision of Bioaccumulative Chemicals of Concern List*. The work on the revisions will be done at a national and regional level. It will be a multiyear process, and would involve both technical and regulatory people, and active participation of the stakeholders. There may need to

be trial projects on which the new ideas are imposed to see if they are really getting anything out of the revisions, and to see if they help to make decisions about the project.

- Ovrhd 7-1. Revision of Guidelines for Bioaccumulative Chemicals of Concern
- Ovrhd 7-2. Revision of Guidelines for Bioaccumulative Chemicals of Concern: General Information
- Ovrhd 7-3. Revision of Guidelines for Bioaccumulative Chemicals of Concern: Framework and Specific Re-evaluation
- Ovrhd 7-4. Revision of Guidelines for Bioaccumulative Chemicals of Concern: Proposed Actions
- Ovrhd 7-5. Revision of Guidelines for Bioaccumulative Chemicals of Concern: BCoC List Technical Support Document
- Ovrhd 7-6. Revision of Guidelines for Bioaccumulative Chemicals of Concern: Work Will Be Done

19. Erika Hoffman, EPA, presented the *Technical Support Document for Revision of Dredged Material Management Program Bioaccumulative Chemicals of Concern List*. She reviewed the existing framework for bioaccumulation testing and the proposed changes as also mentioned by John Malek: recognition of ecological risk, initiating a process for making revisions, and revising the BCoC list. The rationale for revising the list was that there is new information available concerning human health, ecological risk, and regional monitoring. She discussed how there were several chemicals on the list that are rarely observed in aquatic organisms, and that other chemicals that have the potential to be of concern are not on the list. The scope of the document includes the 30 bioaccumulative chemicals of concern and 35 additional chemicals that have been detected in Washington monitoring programs, are recommended for monitoring, or have documented use in Washington. Information summarized in the report includes pesticide use inventories, monitoring recommendations and lists, Washington tissue data, Washington sediment data, partitioning and persistence data, and information from the COE/EPA Environmental Residue Effects Database (ERED). The document recommends a list of 65 chemicals to be considered when revising the list, sources of information to be used as a starting point in the development of the final BCoC list, and draft criteria for developing a revised BCoC list. Ms. Hoffman concluded by announcing that the public comment period on the draft technical support document closes on June 30, 1998 and that questions and comments should be addressed to her. The document will be finalized for submission to the DMMP by August 1998.

- Ovrhd 8-1. Technical Support Document for Revision of Bioaccumulative Chemicals of Concern.
- Ovrhd 8-2. Existing Framework for Bioaccumulation Testing
- Ovrhd 8-3. Proposed Changes to Existing Framework
- Ovrhd 8-4. Rationale for Revising BCoC List
- Ovrhd 8-5. Scope of Document – Chemicals
- Ovrhd 8-6. Scope of Document – Information
- Ovrhd 8-7. Scope of Document – Pesticide Use Inventories
- Ovrhd 8-8. Scope of Document – Recommendations and Lists
- Ovrhd 8-9. Scope of Document – Tissue Data

- Ovrhd 8-10. Scope of Document – WA Sediments
- Ovrhd 8-11. Scope of Document – Partitioning and Persistence Data
- Ovrhd 8-12. Scope of Document – Environmental Residue Effects Database (ERED)
- Ovrhd 8-13. Scope of Document – Environmental Residue Effects Database (ERED)
(Cont)
- Ovrhd 8-14. Document Recommendations
- Ovrhd 8-15. Next Steps

20. Brian Applebury briefly explained that although Erika Hoffman works for the EPA she has been working temporarily at the USACE's Dredged Material Management Office, because David Fox is taking over leadership in the geographical information system (GIS) section.

21. David Fox, USACE, presented the bioassay statistics software, BioStat program for David Gustafson (USACE). He explained that the program is a Visual Basic program that performs statistical analysis of bioassay data. It was formulated because the statistical procedures for bioassay analysis have become more rigorous and complex, and the agencies needed a tool in which all statistics are grouped together in order to make the analyses simpler. He presented a flow chart for the BioStat program including data transformation, determinations as to whether the data are normal and whether or not the variances are equal, and the various parametric and non-parametric tests to be used depending on the normality distribution and variance tests. Other features included in the program included one-sample t-tests, power calculations for parametric tests, and the program automatically adjusts probability levels for assumption testing. Mr. Fox informed the attendees that the program was available to the public and could be downloaded from the USACE. Those interested in how to download the program could obtain a copy of the instructions from him at this meeting.

- Ovrhd 9-1. BioStat
- Ovrhd 9-2. What is BioStat?
- Ovrhd 9-3. Why BioStat?
- Ovrhd 9-4. Program Flow Chart
- Ovrhd 9-5. Assumption Testing
- Ovrhd 9-6. Other Features of BioStat

22. Tom Gries, Ecology, gave an update on the regulatory work group recommendations on AETs. He reviewed the actions taken by the DMMP in 1997 including adopting new dry weight guideline values, new statistical methods and software programs to aid in interpreting biological effects, and convening a sediment larval workshop. However, total organic carbon (TOC)-normalized guidelines were not adopted by the DMMP, 1994 amphipod mortality and echinoderm abnormality AET values were not recalculated, no new information was incorporated into the 1998 AET values (e.g. bivalve abnormality AETs), and no decisions were made regarding the use of the saline extract Microtox toxicity test or the 1986 Microtox luminosity AETs. Work in progress included comparing the reliability of TOC- and dry-weight normalized screening and maximum level guidelines. Ecology is also working on validating the *Neanthes* growth AETs, developing an inventory of larval surveys toward calculating 1998 bivalve AETs, and deciding how to use echinoderm abnormality AET values. In addition, the DMMP is developing a

standard operating procedure for calculating AETs, finalizing the 1994 re-evaluation of AETs report, and refining the 1994 AETs using new standard methodology. The DMMP will also calculate and evaluate the potential Default Reference sample response Values (DRVs).

Mr. Gries discussed preliminary results of the validation of the *Neanthes* growth AETs. The quality assurance results were generally similar to the study conducted by EVS, although a number of the surveys were lacking control data. The reference and test sample pairings were similar, although there were two surveys for which the reference pairings were different. Unfortunately, the difference in “hit/no hit” classifications between the validation results and the EVS study were caused by the difference in reference sediment selections. He said that it was too early to speculate on the implications of the *Neanthes* AETs to the dredging guidelines or SMS, although the values are in the range that can affect both programs. The reliability analysis is not complete. The overall findings of the validation were that the *Neanthes* AETs have comparable sensitivity to existing AETs, and it is possible for an independent party to develop valid, new AETs, or revise existing AETs, with additional guidance and oversight of the agencies (e.g. agree on appropriate reference sediment).

Mr. Gries then summarized the objectives and outcome of the sediment larval workshop. The objectives were to a) determine whether or not to combine results of the toxicity tests using bivalve species with echinoderm species; b) compare performance of sediment larval toxicity test endpoints; and c) recommend protocol changes to further minimize false positive toxicity test results. In the discussions concerning whether to combine the bivalve and echinoderm species, the answer is not clear yet. There is a differential toxicity between bivalves and echinoderms, and between species within a given phylum. For example, bivalves tend to be more sensitive to trace metals, while certain echinoderms have been more sensitive to polycyclic aromatic hydrocarbons (PAHs). Echinoderms that have been more sensitive to PAHs tend to lack a “multixenobiotic transporter” enzyme (MXR).

Test endpoints considered included abnormality, mortality, effective mortality, and normal survival. Some of the negative aspects ranged from difficult interpretations to false positive interpretations. Workshop discussions suggested that the agencies should also look at normal survival, which tended to have high reliability, and was unaffected by larvae not recovered. Some of the proposed protocol changes resulting from the workshop included minimizing the effects of high ammonia in samples, increasing settling time prior to test initiation, suspending larvae above sediment using a screen, and adding sample replicates to improve the initial count. There were other recommendations pending.

In order to streamline the evaluation process, Ecology can use electronic data submittals formatted for Dredged Analysis Information System (DAIS) or SEDQUAL, use the new SEDQUAL program, use programs for statistical protocols, chemical comparisons, and AET reliability calculations, and follow specific standard operating procedures. Priority goals for 1998, as Mr. Gries saw it, were to finalize *Neanthes* AETs, calculate new bivalve AETs and reliability, decide how to use 1998 bivalve AETs with 1986 oyster and 1994 echinoderm AETs, finalize the 1994 re-evaluation of AETs report, propose DRVs, and propose new screening and maximum levels.

- Ovrhd 10-1. Update on Regulatory Work Group Recommendations on AETs
- Ovrhd 10-2. AET Update: Actions Taken by DMMP
- Ovrhd 10-3. AET Update: No DMMP Actions
- Ovrhd 10-4. AET Update: DMMP Work in Progress
- Ovrhd 10-5. AET Update: DMMP Work in Progress (Cont)
- Ovrhd 10-6. AET Update: Validation of *Neanthes* Growth AETs
- Ovrhd 10-7. AET Update: Validation of *Neanthes* Growth AETs: AET Calculation Results and Reliability Calculations
- Ovrhd 10-8. AET Update: Validation of *Neanthes* Growth AETs: Conclusions
- Ovrhd 10-9. AET Update: Sediment Larval Workshop Summary: Objectives
- Ovrhd 10-10. AET Update: Sediment Larval Workshop Summary: Lump or Split?
- Ovrhd 10-11. AET Update: Larval Workshop Summary: Test Endpoints
- Ovrhd 10-12. AET Update: Sediment Larval Workshop Summary: Protocol Changes
- Ovrhd 10-13. AET Update: Streamlining Evaluation Process
- Ovrhd 10-14. AET Update: Priority Goals for 1998

23. Discussion and Public Comment

Teresa Michelsen had a few concerns for the *Neanthes* AETs calculations and protocols. She mentioned that in the most recent issue of *Environmental Toxicology and Chemistry* and another paper, the conclusion was that the *Neanthes* may appear to have low sensitivity when compared to the amphipod test. However, that may more likely be due to the high variability in the endpoint, which would reduce the statistical power of the test. She also wondered if the agencies would wait to finalize the AET calculations until there is a consistency in *Neanthes* test protocols. For example the PSEP protocols allow feeding during the test, whereas the polychaetes are not fed in the USACE's Waterways Experimental Station (WES) protocols. If AET calculations were conducted on existing data, the AETs may not be appropriate if the protocols change.

Tom Gries responded to the concern of the power of the test. He said they do a power analysis as part of the standard statistical protocol in determining adverse effects. He believes that was done when calculating the AETs. The power analysis would reveal whether there was sufficient power in the test. He doesn't recall many sample results that were considered inconclusive based on the power analysis.

Mike Johns, EVS, commented that the *Neanthes* endpoints are sensitive, and he believes that the AET work they did supported that conclusion. It would be good to look at ways to increase the power of the test. He agreed that the issue on the approach on feeding the polychaetes needs to be resolved.

Dr. Johns also had a comment on Erika Hoffman's paper. He said that it was a good first step on revising the bioaccumulative chemicals of concern. He recommended that the agencies consider adopting some of the risk paradigm when revising the BCoCs. They may find that the chemicals of concern may shift from disposal site to disposal site, particularly since there are different

resource issues at the different disposal sites. More field data should be collected to determine what chemicals of concern may be critical at each site.

John Malek agreed.

Doug Hotchkiss added a reminder that the cutting edge of technologies is a two-edged sword. One edge is what is coming up, and the other edge is keeping up with changing technology as the database is increased. The agencies should make certain that when revising the AETs they base the updates on changing and new technology.

Presentation of Issue Papers by the Public

24. Matt Kadlec, Ecology, Quality Assurance Section of the Manchester Laboratory, discussed a few bioassay laboratory quality control/quality assurance issues. One question he had was how bioassay testing laboratories should be required to demonstrate proficiency in a particular bioassay method before beginning to do tests for regulatory purposes. An example he gave was that for effluent toxicity testing under the Clean Water Act, the EPA requires five consecutive tests with a reference toxicant before initiation of tests on effluents. He was also concerned about how laboratories should demonstrate ongoing proficiency in methods they perform infrequently (and what would be a reasonable frequency). He suggested that periodic round-robin tests could be conducted, or the laboratories could perform bioassays on spiked sediment or a field collected sediment known to be contaminated. They would then send their results in for scoring. The Manchester Laboratory is currently revising their laboratory accreditation procedures and would like comments on these issues. Anyone who has questions or comments concerning these issues could contact him at the Manchester Laboratory.

Ovrhd 11-1. Bioassay Issues

Presentation of DMMP/SMS Status Reports

25. Peter Striplin, Striplin Environmental Associates, and Nancy Musgrove, R.F. Weston, Inc., presented the benthic community assessment and guideline revisions. Mr. Striplin began the presentation and talked about the development of benthic effects sediment quality standards (SQS) to add into the SMS rule revisions. He discussed the approach to the development of Puget Sound reference values. The approach included compiling data; determining chemically impacted stations and habitat categories; developing reference value ranges and testing the ranges; and prioritizing benthic indices. Grain size categories were based on percent fines: 0-20%, 20-50%, 50-80%, and 80-100% fines. Chemically impacted stations were determined by looking at both chemical and biological data in SEDQUAL and Puget Sound Ambient Monitoring Program (PSAMP) databases, which included data collected up to 1993. Stations that did not have any SQS exceedances were considered as potential reference locations. When testing reference value ranges, they ran tests for normality; determined variability within reference habitat categories; determined differences among habitat categories and between reference habitats; and compared potential reference stations to individual contaminated stations. The endpoints selected for evaluation were based on the National Benthic Experts Workshop discussions, various case

studies, and reference ranges. The indices selected for evaluation, and 1996 reference values for the less than 150 feet habitat category are listed in the overheads in Appendix C. In addition, during the development of the reference value ranges, they found that there were times when potential reference sediments would be clean chemically, but would lack particular taxa. They needed to refine the benthic database by identifying outlier data points and removing the outliers from the reference database. Outliers were identified by regression analyses against the various conventional parameters, and identification of anomalous values based on percentiles. Reference ranges were then recalculated.

- Ovrhd 12-1. Puget Sound Reference Value Project
- Ovrhd 12-2. Approach for Development of Puget Sound Reference Values
- Ovrhd 12-3. Determine Chemically Impacted Stations Using the SQS
- Ovrhd 12-4. Testing of Reference Value Ranges
- Ovrhd 12-5. Selection of Endpoints for Evaluation
- Ovrhd 12-6. 1996 Puget Sound Reference Values
- Ovrhd 12-7. Refinement of Benthic Database
- Ovrhd 12-8. Future Actions

26. Nancy Musgrove then continued the discussion of the benthic community assessment and guideline revisions. She first discussed the series of recommended benthic indices selected for evaluation: total crustacean, polychaete, and molluscan abundances and richness; total abundance; total richness; Swartz's dominance index; and the infaunal trophic index. They looked at different numeric thresholds used to make comparisons of station infaunal indices results to reference indices, including one-half the reference mean, the 95% confidence limit, and reference range (mean \pm standard deviation). They also conducted pair-wise statistical comparisons to the reference data set. During these comparisons, they found that polychaetes tended to not decline when exposed to contaminated sediment, whereas the molluscs and crustaceans died. In fact, they found that polychaete abundance tended to increase in contaminated sediment. She reviewed the initial selection criterion and criteria for impact classification used in the selection of samples for the analysis, and the impact classification (see overheads in Appendix C).

For the endpoint testing, Ms. Musgrove indicated that station and reference data were matched by habitat category. The station values were first screened against the mean reference value, and if the station and reference values were different, the station was considered impacted (Phase I). Phase II involved conducting numeric comparisons and statistical testing using the impacted stations. If the outcome of both phases agreed, then the particular endpoint was considered effective, and the endpoint was not effective if the Phase I and II results were not in agreement. They then determined the percent effective results and ranked them by chemical group and endpoint to select the most effective endpoints. They focused on endpoints that performed well in the minor to moderate impact category (see flow chart included in Appendix C).

When comparing the test methods, they found that there were fewer differences between stations and references identified when using one-half the reference mean, most differences were identified when using the 95% confidence limits, and the reference range and t-test had a similar ability to identify differences between stations and references. They determined that the most effective

endpoints were Swartz's dominance index, infaunal trophic index, total richness, molluscan abundance and richness, enhanced polychaete abundance, and crustacean abundance. She then showed a diagram summarizing some of the benthic community responses to contamination, such as decreases in crustaceans and molluscs, increases in polychaete abundance, losses of sensitive taxa or life stages, and loss of less tolerant taxa (see Appendix C).

Ms. Musgrove then discussed some of the recommendations that resulted from this study. She indicated that comparisons to reference stations should be used to evaluate benthic community structure, although there should be more strict requirements in matching station and reference sediments. Reference ranges should be used to evaluate the appropriateness of a site-specific reference area. The benthic evaluations should rely on the most effective indices described above. The t-test comparison should still be used as the method of comparison, although the agencies should consider the use of reference ranges since it appears to be similar to the t-test in the ability to identify differences between station and reference results. This comparison to reference ranges should also be used when there are no site-specific reference areas available.

- Ovrhd 13-1. Endpoints Selected for Evaluation
- Ovrhd 13-2. Comparisons to Reference
- Ovrhd 13-3. Selection of Samples
- Ovrhd 13-4. Impact Classification
- Ovrhd 13-5. Endpoint Testing
- Ovrhd 13-6. Determination of Endpoint Effectiveness
- Ovrhd 13-7. Phase I Screening and Phase II Testing
- Ovrhd 13-8. Comparison of Test Methods
- Ovrhd 13-9. Most Effective Endpoints
- Ovrhd 13-10. Benthic Community Response to Contamination
- Ovrhd 13-11. Recommendations

Striplin concluded their discussion by presenting future actions planned for the benthic analyses. One was to conduct another regional benthic expert's workshop in November 1998 and determine the endpoints and interpretive criteria for the SMS rule. In preparation for the workshop, an issue paper concerning benthic endpoints, interpretation criteria for selected endpoints, and identification of issues requiring regional expert input would be developed and presented for discussion.

27. Steve Babcock, USACE, gave an update on the Multiuser Confined Disposal Site (MUDS) study. He summarized the background for establishing a MUDS site, including a reconnaissance study and development of an Action Plan. The MUDS study goal is to assess whether the establishment of one or more MUDS sites for contaminated Puget Sound sediments is a publicly acceptable, environmentally sound, and cost-effective solution to the contaminated sediment disposal problem. Study phases for the MUDS site have included a reconnaissance phase and a feasibility phase. The reconnaissance phase is completed and a report was issued in June 1997. Conclusions of this phase were that due to the need for more suitable disposal sites, there is a strong regional commitment to create the disposal capacity, and the agencies agreed to cost share more studies.

The feasibility phase is currently underway, with the USACE and State of Washington (DNR, Ecology, Puget Sound Water Quality Action Team) sharing the costs equally. Other cooperating agencies include the Washington Public Ports Association, EPA, and U.S. Fish and Wildlife Service (USFWS). The programmatic phase of the feasibility study involves preparing a draft programmatic Environmental Impact Statement (EIS) and will screen the region to determine areas of interest where a MUDS facility may be feasible. Some of the alternatives include constructing an aquatic facility, a nearshore facility, or an upland facility; relying on existing solid waste landfills; piggybacking on projects by others; or no MUDS implementation. A de-watering facility may be necessary if they rely on existing solid waste landfills.

For the site-specific stage, they will apply a disposal siting process and siting criteria to identify and screen candidate sites. Some of the characteristics they study may include water depth, slope, seismic activity, and endangered species impacts. The next step will then be to select preferred candidate sites, perform detailed analyses and investigations of each site, and prepare site-specific EIS and feasibility reports with the findings and recommendations. The expected schedule is to complete the draft programmatic EIS by the fall 1998, and the final by late fall. The site-specific stage would begin in the late fall 1998, and the draft feasibility report and EIS would be completed by the summer 2000. The final feasibility report and EIS would be completed in the fall 2000.

He concluded by stating that there are mixed feelings about a MUDS site. Some groups of people do not want a potential MUDS site to be an upland site, others do not want it to be nearshore, while others do not want it to be an aquatic site. Therefore, there will have to be tradeoffs among opposing groups if a site is to be established.

- Ovrhd 14-1. Puget Sound Confined Disposal Site Study
- Ovrhd 14-2. Presentation Outline
- Ovrhd 14-3. Background
- Ovrhd 14-4. Background (Cont)
- Ovrhd 14-5. MUDS Study Goal
- Ovrhd 14-6. Study Phases
- Ovrhd 14-7. Reconnaissance Phase Conclusions
- Ovrhd 14-8. Feasibility Study - Cost Sharing Agreement
- Ovrhd 14-9. Feasibility Study - Programmatic Stage
- Ovrhd 14-10. Multiuser Disposal Site (MUDS) Alternatives
- Ovrhd 14-11. Feasibility Study - Site-Specific Stage
- Ovrhd 14-12. Current Schedule

28. Stephanie Stirling gave an update on the national sediment news. She discussed the documents that are now available including the *Inland Testing Manual*, *National Sediment Quality Survey*, and leachate guidance. The *Inland Testing Manual* is available on the Internet, the *National Sediment Quality Survey* is available from the EPA, and the leachate guidance may be downloaded from the Waterways Experimental Station (WES) web site (refer to overheads in Appendix C for specific titles and Internet sites). She also presented various sediment related

Internet sites that include the various agency sites, documents, and databases. The database sites include the Environmental Effects & Dredging and Disposal (E2D2) database and the Environmental Residue – Effects Database (ERED). Ms. Stirling gave examples of queries for these databases. She also talked about the National Dredging Team’s web site and EPA’s contaminated sediment strategy. The National Dredging Team is involved in developing and implementing national policy on dredging and disposal, and in developing regional teams and manuals.

- Ovrhd 15-1. National Sediment News
- Ovrhd 15-2. Documents
- Ovrhd 15-3. Internet Sites
- Ovrhd 15-4. Databases
- Ovrhd 15-5. Policy
- Ovrhd 15-6. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual
- Ovrhd 15-7. The Incidence and Severity of Sediment Characterization in Surface Waters of the United States
- Ovrhd 15-8. National Dredging Team
- Ovrhd 15-9. Leachate Testing and Evaluation for Freshwater Sediments
- Ovrhd 15-10. Memorandum Re: Leaching Test Guidance for Dredged Material Disposal Activities
- Ovrhd 15-11. Environmental Effects & Dredging and Disposal (E2-D2) Simple Query – *Neanthes*
- Ovrhd 15-12. First Page of List of Documents Matching *Neanthes* Query
- Ovrhd 15-13. E2-D2 Homepage
- Ovrhd 15-14. The Environmental Residue-Effects Database (ERED)
- Ovrhd 15-15. Internet Sites
- Ovrhd 15-16. Cartoon – Left Hand Doesn’t Know What the Right Hand is Doing

29. Discussion and Public Comment

Brett Betts asked Stephanie Stirling and John Malek if they were going to talk about the sediment characterization for the Contaminated Sediment Management Strategy. Were there any changes in the Contaminated Sediment Management Strategy document?

John Malek responded that the Contaminated Sediment Management Strategy document has basically had no change. However, the EPA prepared a 600-page comment and response section that clarifies the main document. Yet the implications in the response section are still somewhat vague.

One reason Mr. Betts was interested was that he heard there is a Resource Conservation and Recovery Act (RCRA) corrective action going on, but SMS does not work with RCRA. He said that at least the management strategy mentioned how EPA had worked with other groups on

cleanup issues. Regionally, RCRA appears to be getting involved in sediment cleanup, and Mr. Betts thought its involvement was new to this area.

Mr. Malek responded that they will finalize the wording to the toxics cleanup rule soon, and it will state that if working under a 404 permit action, the work would be covered under RCRA. If an action does not fit under the 404 permit, it would fit under a RCRA action. He said that RCRA has gotten involved in cleanup a number of times. He thought that a number of Superfund actions started as RCRA actions.

Allison Hiltner, EPA, responded that there have been a number of RCRA sites that have become Superfund sites. The Superfund and RCRA programs are separate programs, although they do work together.

John Malek added that within our region, there has been a history of different programs working together. He was not sure about the rest of the country.

Stephanie Stirling reviewed the four goals that the National Dredging Team identified for contaminated sediment. These included to prevent an increase in volume of contaminated sediment; to reduce the volume of existing contaminated sediment; to ensure that dredging and disposal occurs in an environmentally sound manner; and to develop scientifically sound sediment methods.

John Malek mentioned that if anyone has read the goals presented in the Puget Sound Plan, they would get an idea of the source of the above goals.

Allan Chartrand, ENSR, expressed that he felt Peter Striplin and Nancy Musgrove did a good job on their benthic work. He wondered if when the benthic endpoints are refined, the benthic AETs would be recalculated, and if the reference values would be incorporated into the recalculations.

Peter Striplin responded that the reference values have nothing to do with the benthic AETs at this point. There is talk of taking the reference data set and recalculating the AETs, but at this point that is not planned.

Brett Betts said that there have been discussions about incorporating the additional recommended indices when the AETs are recalculated.

Pat Romberg, King County Water and Land Resources Division, asked if the reference values could be used for station/reference comparisons, instead of having to collect a reference for each study or sampling event.

Nancy Musgrove said that this would be a subject at the next benthic workshop. The reference values could potentially be used now when a matching reference is not found. They are recommending this for consideration.

Discussion and Public Comment on Status Reports not Presented

30. Brian Applebury asked if anyone had any comments on issues submitted but not presented at the SMARM. There were no public comments on these reports.

31. Discussion and Public Comment

Stephanie Stirling indicated that she would like comments on the TBT porewater testing clarification paper.

Mike Johns stated that EVS will be conducting a significant TBT study on Harbor Island, and will be developing a large data set that may help with this issue. For the porewater extraction procedures, they will be using gas pressure instead of centrifugation, and will be conducting the extractions under nitrogen. The EPA and other agencies have accepted this procedure for this project.

Ms. Stirling added that the goal of the TBT protocol is to develop a consistent set of protocols that they can give to the applicants so that data are comparable.

Summary of DMMP and SMS Actions

32. David Kendall summarized the DMMP actions for prioritization based on discussions at the SMARM meeting. One of the actions includes taking a look at how the present AET effort and potential implementation may be affected by any protocol changes (e.g. feeding regime) should the PSEP protocols change to be consistent with WES protocols. With respect to bioaccumulation issues, the DMMP should consider adopting a risk-based paradigm and developing site-specific models for each site. Other suggested actions include conducting a technical review of the freshwater bioassay protocols and incorporating them into the PSEP protocols, and developing a workgroup process to actively resolve technical and policy issues outside of the SMARM review meetings.

Ovrhd 16-1. DMMP Actions for Prioritization

33. Dave Bradley listed the SMS public issues and concerns identified at the SMARM. Some of the concerns were that Ecology is moving too fast on some issues such as human health and the freshwater criteria, but too slow on other issues such as updating the AETs and Puget Sound Marine Criteria. The public suggested that Ecology should focus on achievable rulemaking goals, pay greater attention to Eastern Washington sediments, and work with interested parties to complete the Executive Order 97-02 review. Another issue of concern was that there appears to be a lack of constructive discussion and communication on SMS rule issues and changes. In addition, the implications and impacts of the proposed salmon listings under the Endangered Species Act also need to be determined, and recommendations on revisions to benthic assessment methods need to be made. Refer to Appendix A for public comments and issues, and agency responses to comments.

Ovrhd 17-1. SMS Public Issues and Concerns

34. Discussion and Public Comment

Teresa Michelsen asked if there was a mailing list that individuals can be on to be notified of any updates and draft papers open for review, so that they have an opportunity to provide comments. She said this is important for those who may not be part of a regulatory workgroup.

Dave Bradley responded that perhaps email could be used to notify interested individuals, or names could be added to existing distribution lists.

Brett Betts said that they could start with the SMARM mailing list. He added that Ecology also puts issues on their homepage that they want opened up for discussion

An attendee asked if there could be an e-mail mailing list to notify individuals when documents, updates, etc. are posted on the web sites.

Mr. Bradley said that they probably have an e-mail list started that they could expand.

Concerning documents, Mr. Betts indicated that one problem may be that each agency may have different word processing software, and that individuals interested in specific documents may need to be able to work with the different files. He said that most of Ecology's work is in Word or Access.

Mr. Bradley then reminded everyone to submit written comments before June 17, 1998 for SMS issues.

Closing

35. Brian Applebury stated that written comments for the SMARM are due June 3, 1998, and reiterated that SMS comments are due June 17, 1998. He then closed the meeting and thanked everyone for their participation.

**Sediment Management Annual Review Meeting (SMARM):
Dredged Material Management Program (DMMP)
and the
Department of Ecology-Sediment Management Standards (SMS) Program**

Location: Federal Center South/North Joint Use Auditorium, Seattle, WA

May 13, 1998

Final Agenda

MORNING SESSION

8:30 Coffee

9:00 Introduction and Overview

Greeting: Lee Daneker, Manager, Aquatic Resources Division, for Regional Administrator, Environmental Protection Agency

Meeting Objectives: Brian Applebury, Chief, Operations Division, Seattle District

9:30 DMMP Dredging/Disposal Overview

Summary of accomplishments since the 1997 SMARM (Stephanie Stirling, Corps)

Overview of DMMP project/testing activities (David Kendall, Corps)

Disposal site monitoring and management overview (Ted Benson, DNR)

10:15 Discussion and Public Comment on above topics

10:30 Break

10:45 SMS Overview

SMS activities and annual review (Rachel Friedman-Thomas, Ecology)

Regional cleanup activities (Russ McMillan, Ecology)

11:30 Discussion and Public Comment on above topics

11:45 Lunch

AFTERNOON SESSION

12:45 Presentation of DMMP Issue Paper (IP), Clarification Paper (CP), and Status Reports (SR)

IP: Revision of DMMP Guidelines for Bioaccumulative Chemicals (John Malek, EPA)

SR: Bioaccumulative Chemicals of Concern (Erika Hoffman, EPA)

CP: Bioassay Statistics Software (David Gustafson, Corps)

SR: AET's: Update on Regulatory Workgroup Recommendations (Tom Gries, Ecology)

1:45 Discussion and Public Comment on above topics

2:00 Break

2:15 Presentation of Issue Papers by the Public

Bioassay QA/QC Issues (Matt Kadler, Ecology/Manchester)

3:15 Discussion of Public Issue Papers

3:30 Presentation of DMMP/SMS Status Reports

SR: Benthic Community Assessment and Guideline Revisions (Pete Striplin¹ and Nancy Musgrove²)

SR: Multiuser Confined Disposal Study Update (Steve Babcock, Corps)

SR: National Sediment News Update (Stephanie Stirling, Corps)

4:15 Discussion and Public Comment on above topics and Status Reports not presented

4:30 Summary and Closing (Brian Applebury, Corps)

Public Issues Summary: The agencies will convene a post-SMARM meeting on 4 June 1998 to review and prioritize these items relative to existing DMMP and SMS action items. The meeting minutes and updated task list will be posted on the DMMO homepage at URL <http://www.nws.usace.army.mil/dmmo/homepage.htm>. Written comments may be submitted on the SMARM proceedings, but must be submitted to the DMMP agencies by June 3, 1998 for consideration.

4:45 SMS Public Meeting (David Bradley, Ecology)

SMS Issues Summary: Written comments may be submitted for SMS annual review for consideration by June 17, 1998.

5:15 Meeting Concluded

¹ Striplin and Associates Environmental, Inc.

² Roy R. Weston, Inc.

**SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING
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STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Post Office Box 488 Manchester, Washington 98353-0488 ☎ (360) 895-4649

May 6, 1998

Mr. Brian R. Applebury, P.E.
Chief, Operations Division
Seattle District, Corps of Engineers
PO Box 3755
Seattle, WA 98124-2255

Dear Mr. Applebury:

In your recent letter announcing **the Sediment Management Annual Review Meeting (SMARM)**, you asked for additional issues for consideration and discussion at the meeting. Three questions I hope will be answered at the SMARM are listed below. The SMARM should be attended by most of the parties interested in the answers to these questions:

1. How should labs be required to demonstrate proficiency in a particular bioassay method before beginning to do tests for regulatory purposes? For effluent toxicity testing under the Clean Water Act, the EPA requires five consecutive tests with a reference toxicant before initiation of tests on effluents.
2. How should labs demonstrate ongoing proficiency in methods they perform infrequently? One possible solution is periodic participation in round-robin tests and/or performance of bioassays on spiked sediment or a field collected sediment known to be contaminated with persistent toxicant(s) and diluted with clean sediment.
3. Are the Microtox methods currently included in the PSEP protocols reliable and sensitive enough to detect ecologically significant levels of sediment toxicity? If not, should these methods continue to be promulgated?

Thank you for the opportunity to submit these additional issues.

Sincerely,

Matt Kadlec, Ph.D.

Aquatic Toxicologist
Quality Assurance Section

MK:CLS:cls

cc: David Kendall

Port of Seattle

June 1, 1998

Mr. Brian R. Applebury
Chief, Operations Division
Seattle District, U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, WA 9,8124-7255

Re: Tenth Annual Sediment Management Annual Review Meeting (SMARM); Follow-Up Comments on Dredged Material Management Program (DMMP) Issues

Dear Mr. Applebury:

As in the past, we appreciate the opportunity to participate in the process surrounding the 1998 Sediment Management Annual Review Meeting (SMARM). Once again, we write on behalf of the Port of Seattle (the Port) and the Washington Public Ports Association (WPPA). Through this letter, we would like to offer our comments on certain portions of the 1998 SMARM related to the Dredged Material Management Program (DMMP).

As we work into the second decade of the DMMP process, we all should recognize the progress that we have made and the promise it holds for the future. Just last month, the Puget Sound Water Quality Action Team released its 1998 *Puget Sound Update* and *Puget Sound's Health 1998*. Although the Action Team noted continued threats to ecosystems and biological resources from the region's growing population and from unaddressed contaminated sediments, the Action Team lauded the improvements made over the past several years through decreases in certain contaminants and improvements in the health of certain -marine organism populations. To quote Duane Fagergren, deputy director of the Action Team, from the Team's press release:

The improvements we're seeing in Puget Sound's health are the result of the long-term, ongoing efforts to protect water quality and natural resources. The fact that we still see problems tells us that we need to continue to target our protection efforts on priority issues.

We take this as another indication that we are all on the right track and that we should stick to that track. Although challenges still face us, the lesson from the past decade of the DMMP process is that we should build on the programs that we have already created and follow through on the well-crafted priorities that we have already established. A crucial part of this lesson is that we need to exercise the discipline to adhere to those priorities before pressing new

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Mr. Brian R. Applebury
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initiatives.

One key to the program's success thus far has been the open communication and mutual trust between the DMMP agencies and stakeholders. We value and applaud this relationship, and trust that it will remain a cornerstone of the program's future. We offer these comments in the spirit of this open communication and mutual trust.

As you will note from this letter, we generally support what was presented and discussed at the 1998 SMARM, especially those issues that assist the DMMP agencies **and their** stakeholders to build on past progress and follow through on existing initiatives. Our primary concern is that the DMMP agencies might lose sight of their established goals and become distracted by emerging issues like bioaccumulation and human health criteria. Such distractions have been a source of our frustration with one of the DMMP agencies. We trust that the DMMP agencies as a whole, however, will continue to focus their attention on existing priorities and follow through and complete existing initiatives.

1. DMMP Priorities

In general, the Port and WPPA support the DMMP priorities discussed at the SMARM. We wholeheartedly agree that the DMMP agencies and other stakeholders will benefit from focusing attention first on matters that we all agree are important and in which significant momentum and progress have already built. Key among these priority tasks is following through on the apparent effects threshold (AET) recommendations presented by the Regulatory Work Group (RWG). The DMMP agencies should ensure that sufficient staff resources remain devoted to completing these high priority RWG tasks before the next SMARM.

2. AET Update

We are encouraged by the open process being embraced in the calculation of AETs. The Washington State Department of Ecology (Ecology) should be commended for allowing independent calculation of AETs with Ecology oversight. The process used for the *Neanthes* AET is a good example of what can be accomplished if stakeholders agree to combine resources and work together.

Even though we are pleased with the process, we would like to reserve comment on the more substantive details of the *Neanthes* AET until we have an opportunity to review the written analysis for that calculation.

3. Bioaccumulative Chemical of Concern (BCoQ)

As we mentioned before, we believe that the DMMP agencies and their stakeholders are best served by focusing efforts to follow through on existing priorities and initiatives. At the same time, we recognize the need to review and evaluate existing bioaccumulation procedures. We offer the following suggestions on how this review process may build on the existing DMMP

regulatory framework and remain tethered to solid data and analysis.

As **you know, the foundation** of the DMMP is comprised of open water disposal sites selected specifically because they were in locations that limit the risk that chemicals of concern would move or accumulate up the trophic chain. To ensure that these sites function properly, another bedrock principle of the DMMP is monitoring of the sites and evaluating that data against criteria designed to ensure that human health and the environment are not subject to unacceptable risks. The foundation is further buttressed by the DMMP evaluation procedures, which as a result of extensive discussions, employ layers of conservative assumptions designed specifically to deal with the issues of bioaccumulation in the absence of adequate scientific data. Our understanding is that the **protections built into the current DMMP are working** well. The monitoring data from the open water disposal sites, which exist for the more common BCoCs (those on the existing list), suggest that the program results in acceptable risk levels.

At the same time, we recognize that the attention paid to BCoC at the SMARM may be an appropriate starting point for a more detailed examination of the monitoring program or for an effort to look for actual signs of bioaccumulation. We support the stakeholder technical and policy review (or "workgroup") process discussed at the SMARM and commit ourselves to participating in that process.

A more detailed analysis through a public workgroup process would help ensure that the current program is functioning adequately and, only if it is not, would form a more appropriate basis from which to recommend changes. We are reviewing Erika Hoffman's paper (*Technical Support Document for DMMP Revisions to the Bioaccumulative Chemicals of Concern List*), and will offer more detailed comments in a timely manner. Yet before any party can make an informed judgment about the chemical list proposed in Ms. Hoffman's paper, additional data collection and analysis must occur, including:

Determining which of the chemicals have actually been recorded in sediment that was dredged and deposited in open water sites (i.e., determine the subset of DIAS that passed open water and was dredged and dumped on the PSDDA site);

Determining which of the chemicals were actually recorded from the sites during DMMP monitoring, and whether they were detected at levels known to generate tissue effects; and

Examining newly collected DMMP monitoring data to cross-check existing analyses and provide some information on chemicals not routinely monitored in the past.

Only then would the workgroup be in a position to recommend revisions to the BCoC list and to revise or develop bioaccumulation guidance.

In addition, the workgroup should evaluate the use of Tier IV testing. Like

Mr. Brian R. Applebury

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bioaccumulation, the agencies recognized in 1988 that the Tier IV dredger option to conduct special biological tests would **need to be revisited by the DMMP agencies** in the future as more information became available for assessing dredged material that significantly exceeded the ML triggers. Because Tier IV to date often largely involves potential bioaccumulation implications of chemicals not showing a high toxic response, only by including Tier IV testing would the workgroup be in a position to address bioaccumulation within the framework of the DMMP as a whole.

Procedurally, we recommend that the workgroup consider employing the risk assessment paradigm in its evaluation of bioaccumulation. The risk paradigm represents the scientific communities' current "best approach" to addressing the potential impacts of contaminants on biological communities. Specifically, we recommend that the workgroup begin its analysis of bioaccumulating compounds by formulating a problem statement and developing a site conceptual model. The problem formulation phase is designed as a systematic planning step that identifies the major factors to be considered in addressing the potential risks associated with bioaccumulating compounds. Topics that would be addressed include identifying the characteristics of the bioaccumulating compounds under consideration (e.g., those identified in Ms. Hoffman's paper), the aquatic community that is potentially at risk (i.e., the open water disposal sites managed by DMMP), and the ecological effects that are of concern (i.e., unacceptable adverse impacts as defined by the regulations described under PSDDA as Site Condition 11). Based on the issues identified during the problem formulation phase and applying current knowledge of the area of concern (i.e., open water disposal sites), a site conceptual model would be developed to better understand the potential risks that might be associated with the concerns identified in the problem statement. The result of the site conceptual model would be an overall understanding of potential risks associated with bioaccumulating compounds on aquatic resources that may reside in or use the open water disposal sites. Following the completion of these initial phases of the paradigm, the DMMP agencies would be in a position to determine the types of studies and data that are needed to develop a policy for assessing bioaccumulating compounds in dredged material.

4. Monitoring

We cannot stress enough the importance of monitoring as a tool to guide future DMMP priorities. The DMMP agencies have built a solid foundation of monitoring data from the disposal sites. The agencies should build on that foundation efficiently and effectively. Therefore, the bioaccumulation-related monitoring discussed above should be incorporated into the scope of the work for the upcoming disposal site monitoring.

5. Bioassay Statistic Software

We are generally impressed with the BioStat software. It will prove to be a useful tool for standardizing the interpretation of sediment quality. The Port's and WPPA's staff and consultants will continue to work with the BioStat authors on technical options that might further improve this software.

Mr. Brian R. Applebury
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6. Benthic Community Assessment

We found the presentations and papers on benthic infauna assessment endpoints and benthic effects sediment quality to be very interesting. At this point, we would like to reserve comment on the specifics of this assessment until we have had an opportunity to review documents that should be forthcoming from this ongoing study.

Conclusion

The DMMP agencies should take pride in the progress made through the first decade of the DMMP process. We believe that the challenge before the agencies is now to follow through, on existing, proven programs and initiatives. As in the past, we are pleased to be a part of this process and look forward to working with you and the other DMMP agencies in the future.

Sincerely,

Doug Hotchkiss,
Port of Seattle

Tom Newlon,
Port of Seattle

Erik Johnson,
Washington Public
Ports Association

cc: David Bradley, Washington State Department of Ecology
Ted Benson, Washington State Department of Natural Resources
David Kendall, U.S. Army Corps of Engineers
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SMARM RESPONSIVENESS SUMMARY

1. *Neanthes* bioassay: PSEP/WES protocol issue. If protocol changes (feeding regime, etc.), what does this do to present AET effort and potential implementation?

Response (Tom Gries). The DMMP agencies and the SMS program have documented all changes to toxicity test protocols used to evaluate sediment quality. For example, we have archived all editions of the PSEP Protocols and Guidelines, as well as Minutes to Sediment Management Annual Review Meetings (SMARM). The latter can be found on the Corps' web site (<http://www.nws.usace.army.mil/dmmp/homepage.htm>) and include both substantive and minor revisions to bioassay protocols.

If the agencies adopt changes to the current *Neanthes* protocol (Johns, M, T. Ginn, and D. Reish, 1990, PSEP 1995, SMARM protocol clarifications), then the changes will be recorded in SMARM minutes. The DMMP will then be able to distinguish between *Neanthes* growth Apparent Effects Thresholds or "AETs" (EVS, 1996; Exponent, 1998) established with the current protocol and comparable values established with revised protocols.

2. Agencies need to better support DMMP process to ensure continued success!

Response (Tom Gries and David Kendall). The technical staff of the DMMP agencies will be raising this concern with the agency heads/directors for response/resolution at the next Policy Review Committee Meeting. We (also) intend to pursue this matter through our respective agencies during update and revision of the CSMP interagency/-governmental agreement, as well as to avail ourselves of partnership opportunities with stakeholders (e.g., the *Neanthes* AET development effort by the Port) as they present themselves.

3. Bioaccumulation: DMMP should consider adopting a risk-based paradigm. The DMMP should also develop site-specific conceptual models for each disposal site.

Response (Erika Hoffman / John Malek). As a result of the SMARM process, the DMMP agencies have decided to proceed with a re-evaluation of the framework for assessing bioaccumulation and biomagnification of contaminants at disposal sites. In addition to human health considerations, risks to ecologically relevant communities shall be recognized as a basis for revising bioaccumulation guidance. We are currently in the process of forming a bioaccumulation work group comprised of stakeholders, regulators and the public that will be charged with making technical and policy recommendations related to revising the bioaccumulation framework. The feasibility of adopting a risk-based paradigm and using information from site-specific conceptual models in these revisions will be a primary consideration for this work group

4. Workgroup process needed to actively resolve technical and policy issues outside SMARM.

Response (Tom Gries). State and federal agencies that regulate sediment quality in Washington State have successfully used various workgroups to obtain meaningful public and stakeholder participation in resolving technical and policy issues. For example, several workgroups were used in the late 1980s to develop the original Puget Sound Dredged Disposal Analysis (PSDDA) guidelines for disposal, dredged material evaluations, monitoring and siting. The SMS program used an Implementation Committee, or “IC”, during the process of promulgating the SMS rule (173-204 WAC, 1991) and amending it (Ecology, 1995). A mostly technical Regulatory Work Group, or “RWG”, made many recommendations to the DMMP on how new biological effects information should be incorporated to revise numerical dredging guidelines.

The agencies still employ both of the latter workgroups to resolve policy and technical issues related to sediment quality evaluations and management. The “IC” will meet regularly between July 1998 and adoption of an amended SMS rule. The “RWG” will develop mostly technical recommendations on how to establish a framework for evaluating freshwater sediment toxicity and which test protocols are most appropriate to require in the amended SMS rule. In addition, the DMMP plans to establish a Bioaccumulative Chemicals of Concern workgroup to finalize a list of dredging BCoCs, among other tasks.

What is perhaps lacking is a clear and/or formalized relationship between workgroups. Such a relationship should distinguish between goals/missions of workgroups, and describe:

- ⇒ how issues are identified and discussed
- ⇒ if and how related issues are discussed simultaneously among more than one workgroup
- ⇒ how issues are referred from one workgroup to another

To minimize redundancy and maximize effectiveness, the agencies will try to better define the various workgroups and their respective goals during 1998-1999.

5. Technical review of freshwater bioassay protocols and incorporation into PSEP protocols.

Response (Tom Gries / John Malek). The Regulatory Workgroup (RWG) has agreed to submit recommendations to Ecology on 1) a preferred framework for evaluating toxicity in freshwater sediments, 2) specific toxicity test protocols to be required as part of that framework, and 3) specific interpretation guidelines for making regulatory decisions based on toxicity test results.

Recommendations will be made in late 1998, in time for incorporation into draft amendments to the SMS rule in early 1999.

The DMMP agencies will also consider how these may be incorporated into the next revisions to the PSEP protocols.

Distillation of Issues from WPPA post-SMARM letter

6. DMMP priorities. DMMP should follow through to complete priority tasks identified by agencies and stakeholders.

Response (David Kendall). The DMMP agencies are sensitive to the tasks identified by agencies and stakeholders and prioritized for agency action. All four agencies have been forced to deal with budget and resource shortfalls during the past year, which have constrained the number of tasks that could be completed. The DMMP agencies are committed to work within the existing resource allocations, to complete the highest priority tasks as soon as possible.

7. AET Update. Neanthes AET collaborative process allowing independent calculation with Ecology oversight has been a fruitful exercise.

Response (Tom Gries). The agencies agree that it was very productive for the Port of Seattle, EVS Consultants, Ecology and Exponent (formerly PTI Inc.) to collaboratively develop AETs based on growth effects in the Neanthes toxicity test. The major lessons learned from that effort were that a) biological effects relationships and potential regulatory criteria/guidelines can be developed and validated by private parties working collaboratively with regulatory agencies, and b) the main source of error in developing sediment quality values for the DMMP and SMS program is in the selection of reference samples for interpretation of adverse biological effects.

The agencies are currently building on this successful collaboration by working with the Port and its contractor to develop further sediment quality criteria/guidelines. The goals of the ongoing effort are to a) develop new AETs based on larval abnormality in bivalve species, b) revise the existing AETs that are based on mortality in the amphipod species, and c) revise draft AETs based on abnormality in echinoderm species. Work should be completed in early 1999.

8. Bioaccumulative Chemicals of Concern (BCOC). Review process should build on "existing DMMP framework and remain tethered to solid data and analysis". WPPA recommends the following analyses should be conducted prior to recommending final additions/deletions to BCOC list:

a. Determine which of the BCOC have actually been recorded in sediment dredged and disposed in open-water sites.

b. Determine which BCOC were recorded (e.g., detected) at the sites during past monitoring, and if so, whether detected levels are in excess of tissue effects levels.

c. Examine newly collected DMMP monitoring data to cross-check existing analyses and provide information on chemicals not routinely monitored in the past.

Response (Erika Hoffman / John Malek). WPPA raises a number of important considerations (a-c above) that must be addressed by the bioaccumulation work group prior to finalizing a revised BCoC list. In particular, we recognize that an evaluation of disposal site monitoring data is a critical and as yet unaddressed component of determining region-specific chemicals of concern. This list of WPPA's recommended analyses will be forwarded to the bioaccumulation work group for their consideration.

9. The RWG should evaluate the use of Tier IV testing. Procedurally, the workgroup should employ the risk assessment paradigm in its evaluation of bioaccumulation by developing a problem statement and a site conceptual model for each of the nondispersive sites as a first step.

Response. See response to 3 above.

10. Monitoring. DMMP agencies should use monitoring feedback loop as guide for setting DMMP priorities.

Response (David Kendall and Ted Benson). Monitoring has always been an important component of the DMMP feedback loop. The DMMP will continue to use site monitoring evaluations as an important guide to setting present and future DMMP priorities.

11. Bioassay Statistic Software is impressive and will be a useful tool in standardizing the interpretation of sediment quality across programs.

Response (David Kendall). We agree that this software will significantly improve the consistency of statistical interpretations across both DMMP and SMS. Anyone interested in getting a copy of this software can download BioStat from the Seattle District FTP server in any of the following ways:

a) Using your internet explorer, type in the following URL:

`ftp://ftp.nws.usace.army.mil/`

Biostat is located under `pub/psdda/biostat`

click on BIOSTAT2.EXE and select "Save to Disk option" when prompted

b) Using a DOS command window, enter the following case-sensitive commands:

```
ftp ftp.nws.usace.army.mil
User: anonymous
password: [your email address]
cd pub/psdda/biostat
type binary
get BIOSTAT2.EXE
quit
```

c) Using FTP software (such as Vista Exceed):

```
host address: ftp.nws.usace.army.mil
User: anonymous
password: [your email address]
type: binary
```

BIOSTAT2.EXE is located under pub/psdda/biostat

The file size is 4.8MB so be aware that downloading using a 33kb modem might take a little while. A draft users guide and SMARM clarification paper can also be downloaded from the same directory.

SMS ACTIONS/CONCERNS (Dave Bradley / Brett Betts)

1. Lack of constructive discussion and communication on SMS rule issues (put on internet?)

Response. Ecology began substantive discussions on revision of the Sediment Management Standards (SMS), Chapter 173-204 WAC, rule at the July 22, 1998 SMS Implementation Committee meeting. Subsequent to that meeting, Ecology has conducted routine meetings of the SMS Implementation Committee to discuss SMS rule development, primarily focused on human health sediment criteria and cleanup standards. Ecology plans continued SMS Implementation Committee meetings approximately every three weeks through formal proposal of a revised SMS rule in Winter 1998/99.

Previous to this ongoing effort, Ecology addressed many stakeholder and public comments on revision of the SMS rule, in the SMS Rule Triennial Review Responsiveness Summary, dated April 30, 1997. Copies of this document are available from Ecology, please contact Brett Betts at (360) 407-6914.

Interested persons may access handout materials and meeting minutes from the SMS Implementation Committee and other related sediment information on Ecology's webpage at: "<http://www.wa.gov/ecology/sea/smu/sediment.html>"

2. Ecology is moving too fast on some issues (e.g. freshwater) and too slow on others (AETs).

Response. Ecology understands that there may be a perception that some SMS rule related development work may be progressing faster than other work. For example, a final freshwater sediment value report was released in July 1997, while revision of Puget Sound marine AET values was still in the planning stages. Primarily, the completion of these SMS rule development activities are affected by available resources, e.g., contract monies and staff, to support the development work. The freshwater sediment value development work was supported by an EPA grant and represents the conclusion of ongoing work from previous years. Development of new and revised Puget Sound AET values was considered new work that Ecology had limited resources to support. Currently Ecology has partnered with the Port of Seattle's in efforts to revise and develop additional Puget Sound AET values to support the SMS rule revisions.

3. How will SMS rule revisions deal with ESA issues?

Response. Ecology understands that the federal Endangered Species Act (ESA) may significantly affect proposed revisions to the Sediment Management Standards rule, e.g., sediment quality chemical and biological criteria levels, to ensure protection of threatened and endangered salmonid species. Ecology is currently working to ensure coordinated compliance with the requirements of the ESA and timely federal review and approval of the revised SMS rule.

Ecology has begun coordination activities in three main areas. First, Ecology is working with the Office of the Attorney General attached to Ecology to ensure the best possible understanding of the ESA legal requirements as they might be applied to federal review and approval of the SMS rule, i.e., by the Environmental Protection Agency (EPA), Region 10. Second, Ecology is coordinating with EPA Region 10 staff to develop a Biological Assessment to support National Marine Fisheries Service (NMFS) ultimate review of the SMS rule and its potential impacts to threatened and endangered salmonids. Finally, a NMFS staff person has begun regular participation in Ecology's SMS rule stakeholder group, the SMS Implementation Committee.

4. What is Ecology doing to address Eastern Washington Sediments?

Response. As identified at previous SMS Implementation Committee meetings, Ecology has made a commitment to develop an Eastern Washington Sediments policy review group prior to proposing freshwater sediment chemical criteria. Ecology is aware of potentially significant technical and implementation issues that deserve evaluation and discussion in a focused, ad hoc review group prior to promulgation of comprehensive

freshwater sediment standards in the SMS rule. At this time, Ecology has deprioritized establishment of this group until the current SMS revision activities are completed.

However, Ecology's experience has shown that ongoing freshwater sediment cleanup and source control decisions are being made throughout Washington State using available freshwater sediment bioassay test procedures. To address compliance with the Administrative Procedure Act, Chapter 34.05 RCW, and to provide support to ongoing local, state, federal and public freshwater sediment program implementation activities, Ecology is planning to include proposed freshwater bioassays and interpretation criteria within the current SMS revision activities.

5. What are the implications of Executive Order 97-02 ?

Response. Ecology is fully aware of the Executive Order (EO) 97-02 requirements affecting rule adoption in Washington State. We have discussed these requirements frequently with members of the SMS Implementation Committee focusing on their interrelationship to similar requirements in the Administrative Procedure Act, Chapter 34.05 RCW. Prior to adoption of a revised SMS rule, Ecology plans to prepare separate EO 97-02 document identifying Ecology's analysis of the seven EO criteria in relation to the SMS rule. The seven criteria are: need, effectiveness and efficiency, clarity, intent and statutory authority, coordination, cost, and fairness. Ecology's analysis of the EO 97-02 criteria will become part of the official rule file for the revised SMS rule.

6. What are Ecology's benthic assessment recommendations?

Response. With the assistance of EPA Region 10 grants, Ecology has been working to develop reference area performance standards and revised benthic infaunal assessment procedures and interpretation criteria since 1993. Ecology currently plans to issue a final contract report with recommendations and findings from this development work in Winter 1998/99. Although Ecology is currently planning to incorporate the revised procedures and recommendations into the revised SMS rule, we are also planning for concurrent regional peer review of the report and recommendations. Providing adequate time and consideration of technical peer comments may delay ultimate adoption of revised SMS rule benthic assessment procedures. For more information on Ecology's benthic development work please contact Brett Betts at (360) 407-6914.

Sediment Source Control What Next?

- Update guidance documents - SAPA and SCUM1, www.wa.gov/ecology/cp/sediment.html
- Mesh Sediment Source Control process with Watershed Process
- Sediment TMDL development
- 2nd round of NPDES sediment requirements
- NPDES stormwater sediment requirements
- SMS: No SIZs for bioaccumulative chemical
- EPA NPDES sediment requirements?

Ovrhd 5-7. Sediment Source Control: What Next?

Contaminated Sediment Site List

- Updating 1996 list with significant changes to existing sites or site adds/deletions
- Target date for publication is summer 1998
- SMS site list is incorporated into MTCA site list and 303(d) water quality list
- Contact Michelle Wilcox at Dept. of Ecology to be added to mailing list, 360-407-7557

Ovrhd 5-8. Contaminated Sediment Site List

Development of Benthic Effects Sediment Quality Standards

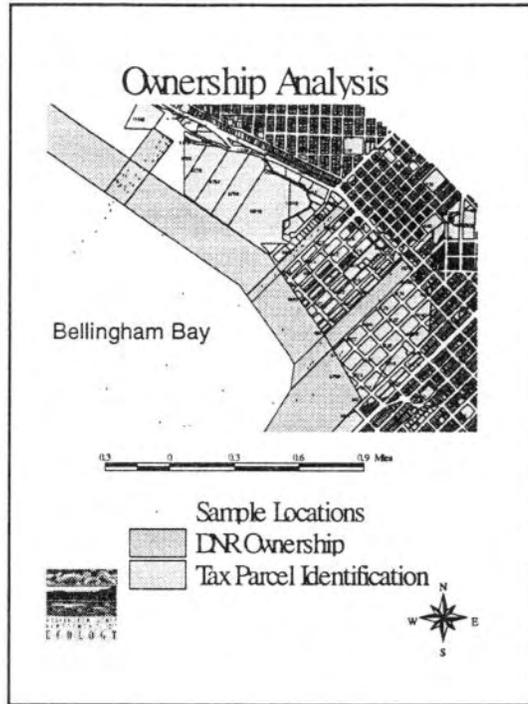
- Contract work supported by EPA Region 10
- Development of benthic reference area performance standards
- Identification/evaluation of additional benthic tests for Sediment Management Standards, e.g., Swartz Dominance Index, Total richness and enhanced polychaete abundance

Ovrhd 5-9. Development of Benthic Effects Sediment Quality Standards

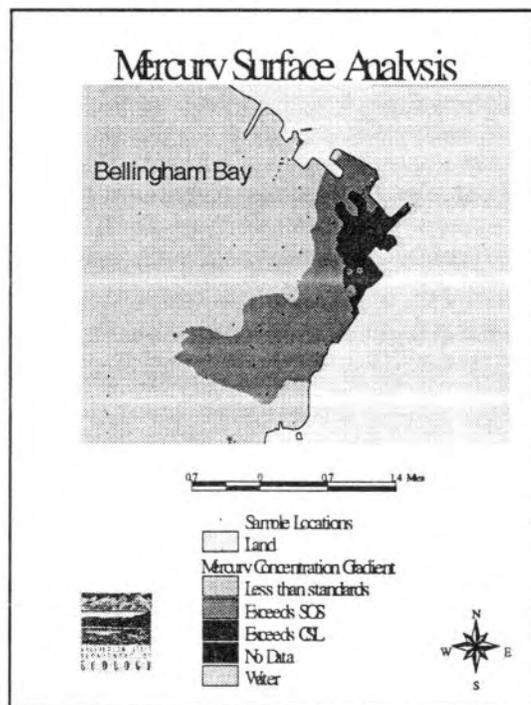
SEDQUAL Sediment Management Integrated Information System

- Database, interface and GIS components
- Contains chemical and biological sediment characterization data
- Used to perform marine and freshwater sediment quality assessment
 - Browse, query, aggregate and average, analyze, display spatial location, enter batch data
- Release Two CD ROM Available – End of May 1998

Ovrhd 5-10. SEDQUAL Sediment Management Integrated Information System



Ovrhd 5-11. Ownership Analysis



Ovrhd 5-12. Mercury Surface Analysis

Bellingham Bay Demonstration Pilot Project

- Cooperative partnership to develop a comprehensive baywide approach
 - source control, cleanup, disposal, habitat restoration, aquatic land
 - Goal to meet multiple objectives from both a long-term planning and short-term project perspective
 - Use consensus decision making to set priorities for action
-
-

Ovrhd 5-13. Bellingham Bay Demonstration Pilot Project

Bellingham Bay

Source Control and Cleanup Coordination

- **Sediment Source Control**
 - Post Point STP
 - » '96 sampling - 1 mercury SQS exceedance
 - Georgia-Pacific Pulp and Paper Mill
 - » '93 sampling - 8 of 9 mercury SQS exceedances
 - » '94 - '98 Ecology & GP modeling - mercury
 - » '96 - present Whatcom Waterway RI/FS
 - » Empirical data to confirm model results
-
-

Ovrhd 5-14. Bellingham Bay: Sediment Source Control

Bellingham Bay Pilot Integrated Activities

- 3 Priority Sediment Cleanup sites
- 8 Priority Disposal site options
- Source control priorities linked with cleanup
- 15 habitat restoration & enhancement priorities
- 7 Alternative packages for SEPA review
- Integration of dredging, capping, natural recovery, upland, inwater, nearshore disposal, no net loss, compensatory mitigation, public access, navigation

Ovrhd 5-15. Bellingham Bay Pilot Integrated Activities

Sediment Management Next Steps

- Continued need to prioritize SMS criteria revisions to manage expectations
- Streamlining integration of site list into other agency lists
- Determine how sediment work fits into the watershed approach
- Integration into TMDL activities
- Continued development of a database that is current, accessible, and efficient

Ovrhd 5-16. Sediment Management Next Steps

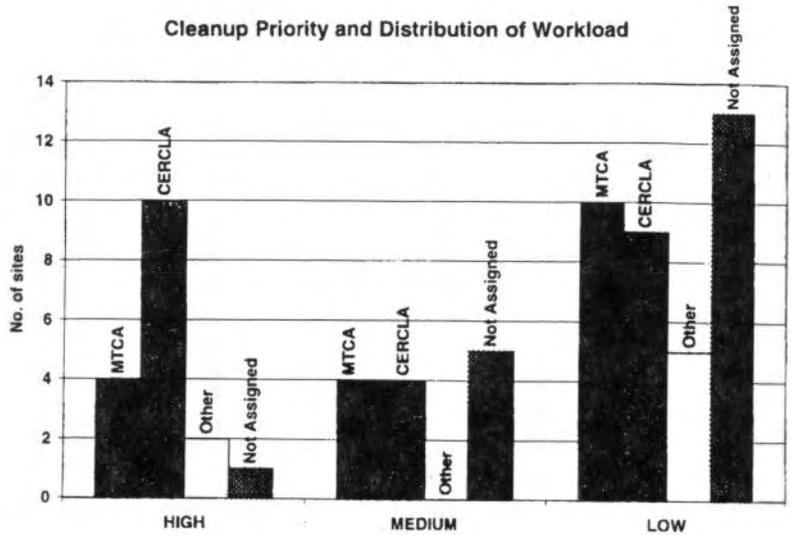
REGIONAL SEDIMENT CLEANUP ACTIVITIES

Russ McMillan
Toxics Cleanup Program
Washington Department of Ecology

- Staff Changes
- Cleanup Priorities and Site Activities

Ovrhd 6-1. Regional Sediment Cleanup Activities

Cleanup Priority and Distribution of Workload



Ovrhd 6-2. Cleanup Priority and Distribution of Workload

TO PUGET SOUND AND BEYOND

Regional Sediment Characterization Studies

- Focus on High Concern Areas
- Will Serve to Identify Sites and Priority in respective areas
- Salmon Bay (Ship Canal, Seattle)
 - Culminates Several Studies of Lake Union
- Budd Inlet (South Puget Snd, Olympia)
 - Verify "Midwest" Site and other Potential Problem Areas
- Grays Harbor
 - Marine and Industrial areas

What's Next?

- Lower Columbia River
 - Vancouver & Longview

Ovrhd 6-3. To Puget Sound and Beyond

VOLUNTARY CLEANUP PROGRAM

- Initiated by a party other than Ecology
- May be:
 - *Completely independent of Ecology
 - *Independent with some Assistance
 - *Full Ecology oversight under signed agreement
- Technical Assistance for a Fee
 - MTCA PAC Recommendation
 - Available Throughout a Voluntary Cleanup
 - Initiated through a request for assistance
 - \$500 Deposit for first ~ 8 hrs
 - Billed hourly thereafter (\$60 - \$80/hr)
 - Advantages:
 - Lower Administrative overhead
 - Allows lower priority projects to receive Ecology attention
 - Provides greater assurance projects will meet state requirements

Ovrhd 6-4. Voluntary Cleanup Program

**Revision of Guidelines for
Bioaccumulative Chemicals of Concern**

Presented by
John Malek, EPA

Ovrhd 7-1.

**Revision of Guidelines for
Bioaccumulative Chemicals of Concern**

- 30 BCoCs identified under DMMP
- DMMP defined Bioaccumulation Trigger (BT) levels for testing
- Utilizes “reason to believe” concept for potential risk to human health and/or accumulation in aquatic organisms that could pose “unacceptable adverse effect”
- Interpretive guidelines developed

Ovrhd 7-2.

**Revision of Guidelines for
Bioaccumulative Chemicals of Concern**

- Framework developed in 1988
 - “Life was simple, times were hard.”
 - Mainly Human Health focus
- Specific (comprehensive?) re-evaluation needed:
 - New information (human health & ecological risk)
 - Inland Testing Manual

Ovrhd 7-3.

**Revision of Guidelines for
Bioaccumulative Chemicals of Concern**

Proposed Actions:

- recognition of ecological risk
- initiate process for making revisions

Ovrhd 7-4.

**Revision of Guidelines for
Bioaccumulative Chemicals of Concern**

- BCoC List
 - standardized protocols and procedures
 - establish effects-based BT values
 - develop effects-based interpretive criteria
- Pull together existing pertinent information:
Technical Support Document for Revision of the Bioaccumulative Chemicals of Concern List.

Ovrhd 7-5.

**Revision of Guidelines for
Bioaccumulative Chemicals of Concern**

WORK WILL BE DONE.

- When? Multi-year effort expected.
- How?
 - Traditional Technical/Regulatory Model
 - Dedicated Bioaccumulation Workgroup
- Active participation of Stakeholders.

Ovrhd 7-6.

Technical Support Document for Revision of Bioaccumulative Chemicals of Concern List

Erika Hoffman
DMMO

5/14/98

1

Ovrhd 8-1. Technical Support Document for Revision of Bioaccumulative
Chemicals of Concern

Existing Framework for Bioaccumulation Testing

- Developed in EPTA (1988)
- Exceeding a sediment bioaccumulation trigger (BT) = “Reason to believe”
- 30 Bioaccumulative Chemicals of Concern (BCoC)
- Testing is indicator of human health effects

5/14/98

2

Ovrhd 8-2. Existing Framework for Bioaccumulation Testing

Proposed Changes to Existing Framework

- Recognition of ecological risk
- Initiate process for making revisions
- Revise BCoC list

5/14/98

3

Ovrhd 8-3. Proposed Changes to Existing Framework

Rationale for Revising BCoC List

- Doesn't reflect current knowledge
- New information available
 - Human health
 - Ecological risk
 - Regional monitoring

5/14/98

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Ovrhd 8-4. Rationale for Revising BCoC List

Scope of Document - Chemicals

- 30 existing BCoCs
- 35 additional chemicals
 - Detected in WA monitoring programs
 - Recommended for WA monitoring
 - Log Kow > 3.5
 - Documented use in WA

5/14/98

5

Ovrhd 8-5. Scope of Document – Chemicals

Scope of Document - Information

1. Pesticide use inventories
2. Monitoring recommendations & lists
3. WA tissue data
4. WA sediment data
5. Partitioning & persistence data
6. Ecological residue-effects

5/14/98

6

Ovrhd 8-6. Scope of Document – Information

Scope of Document - Information

1. Pesticide Use Inventories

- Survey urban/non-urban use in Puget Sound
- WA agricultural chemical usage

5/14/98

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Ovrhd 8-7. Scope of Document – Pesticide Use Inventories

Scope of Document - Information

2. Recommendations & lists

- WA sediment and tissue monitoring
- Other state and national programs

5/14/98

8

Ovrhd 8-8. Scope of Document – Recommendations and Lists

Scope of Document - Information

3. Tissue data (marine & fresh water)

- PSEP - special studies
- WSPMP - annual since 1992
- DOH Tier I summary
- USGS - Puget Sound & E. WA
- Published literature

5/14/98

9

Ovrhd 8-9. Scope of Document – Tissue Data

Scope of Document - Information

4. WA sediments (marine & fresh water)

- DAIS (all)
- SEDQUAL (urban bay stations)
- WSPMP - special studies
- USGS - Puget Sound & E. WA
- Published literature

5/14/98

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Ovrhd 8-10. Scope of Document – WA Sediments

Scope of Document - Information

5. Partitioning & persistence data

- Log Kow values
- Soil half-life
- BCF
- Biomagnification

5/14/98

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Ovrhd 8-11. Scope of Document – Partitioning and Persistence Data

Scope of Document - Information

6. Ecological residue-effects - ERED

- Multi-species, endpoints
- Fresh water and marine
- Cellular and subcellular endpoints not used
- Not an absolute threshold for effects

5/14/98

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Ovrhd 8-12. Scope of Document – Ecological Residue-Effects (ERED)

Scope of Document - Information

6. Ecological residue-effects - ERED (cont.)

- Data reported (in order of preference):
 1. Lowest quantified effects dose (ED50, LD100)
 2. Lowest unquantified effects dose
 3. Highest no observed effects dose

5/14/98

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Ovrhd 8-13. Scope of Document – Ecological Residue-Effects (ERED) (Cont.)

Document Recommendations

- 65 chemicals for consideration
- Sources of bioaccumulation information
- Draft decision criteria for BCoC list development

5/14/98

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Ovrhd 8-14. Document Recommendations

Next Steps

- Public comment period closes
June 30, 1998
- Questions/comments to:
 - Erika Hoffman USACE (206-764-6550)
 - erika.r.hoffman@usace.army.mil
- Revise and finalize report for submission to
DMMP (August 1998)

5/14/98

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Ovrhd 8-15. Next Steps

BioStat

David Fox
David Gustafson
Travis Shaw

1998 SMARM

Ovrhd 9-1. BioStat

What is BioStat?

- Visual Basic program
- Performs statistical analysis of bioassay data

BioStat

1998 SMARM

Ovrhd 9-2. What is BioStat?

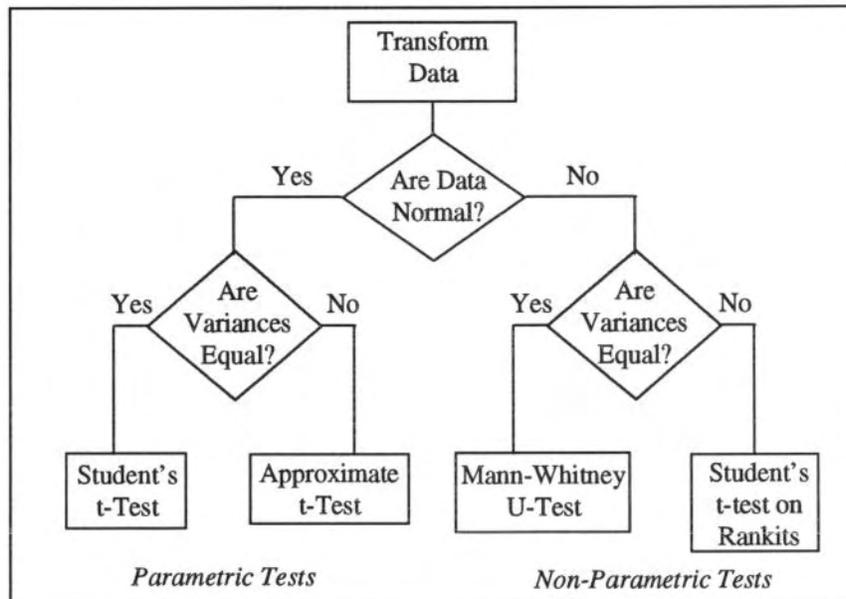
Why BioStat?

- Statistical procedures have become more rigorous but also more complex
- Agencies needed a tool which consolidates statistical guidance into one package
- Life is simpler when everyone gets the same answer!
- Because we promised!

BioStat

1998 SMARM

Ovrhd 9-3. Why BioStat?



Ovrhd 9-4. Program Flow Chart

Assumption Testing

- Test for Normality:
 - Shapiro-Wilk W-test
- Test for Equality of Variances:
 - Levene's Test

BioStat

1998 SMARM

Ovrhd 9-5. Assumption Testing

Other Features of BioStat

- One-sample t-test
- Power calculations for parametric tests
- Automatically adjusts probability levels for assumption testing

BioStat

1998 SMARM

Ovrhd 9-6. Other Features of BioStat

Update on Regulatory Work Group Recommendations on AETs

Ovrhd 10-1. Update on Regulatory Work Group Recommendations on AETs

AET Update: Actions Taken by DMMP

- Adopted new dry weight guideline values
 - raised 43 SLs, 3 BTs and 28 MLs
 - lowered 1 SL, 4 BTs and 7 MLs
- Adopted new statistical methods, developed software programs aiding interpretation of biological effects
- Convened sediment larval workshop

May 13, 1998

1998 SMARM Status Report

2

Ovrhd 10-2. AET Update: Actions Taken by DMMP

AET Update: No DMMP Actions

- TOC-normalized guidelines not adopted
- 1994 amphipod mortality and echinoderm abnormality AET values not recalculated
- New information not incorporated into 1998 AET values (e.g., bivalve abnormality AETs)
- No decisions made regarding use of the saline extract Microtox toxicity test or 1986 Microtox luminosity AETs

May 13, 1998

1998 SMARM Status Report

3

Ovrhd 10-3. AET Update: No DMMP Actions

AET Update: DMMP Work In Progress

- Comparing reliability of TOC- and dry weight-normalized SL/ML guidelines
- Validating of *Neanthes* growth AETs*
- Developing inventory of larval surveys toward calculating 1998 bivalve AETs
- Deciding how to use echinoderm abnormality AET values*

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-4. AET Update: DMMP Work in Progress

AET Update: DMMP Work In Progress

- Streamlining evaluation process*
- Developing an SOP for calculating AETs
- Finalizing 1994 Re-evaluation of AETs report
- Calculating and evaluating of potential Default Reference sample response Values (DRVs)
- Refining 1994 AETs using new standard methodology

May 13, 1998

1998 SMARM Status Report

5

Ovrhd 10-5. AET Update: DMMP Work in Progress (Cont.)

AET Update: Validation of *Neanthes* Growth AETs

- Quality assurance results generally similar, but control data often lacking
- Test/reference sample pairings similar, but different reference samples for 2/28 surveys
- “No Hit” classifications similar (8% different)
- “No Hit” outliers for four dry weight- and four TOC-normalized values

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-6. AET Update: Validation of *Neanthes* Growth AETs

AET Update: Validation of *Neanthes* Growth AETs

- AET calculation results:
 - 5 *Neanthes* AETs potentially set new SL values
 - 2 *Neanthes* AETs potentially set new ML values
- Reliability calculations:
 - Sensitivity approximately 45%
 - Efficiency approximately 65%
 - Reliability when “pooled” with other AETs not known

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-7. AET Update: Validation of *Neanthes* Growth AETs: AET Calculation Results and Reliability Calculations

AET Update: Validation of *Neanthes* Growth AETs

- ***Neanthes* AETs comparable sensitivity to existing AETs**
- **Possible for independent party to develop valid, new AETs, or revise existing AETs, with additional guidance and oversight of agencies**

May 13, 1998

1998 SMARM Status Report

8

Ovrhd 10-8. AET Update: Validation of *Neanthes* Growth AETs: Conclusions

AET Update: Sediment Larval Workshop Summary

- Objectives:
 - Determine whether or not to combine results of toxicity tests using bivalve species with echinoderm results (“lump or split”)
 - Compare performance of sediment larval toxicity test endpoints
 - Recommend protocol changes to further minimize false positive toxicity test results

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-9. AET Update: Sediment Larval Workshop Summary: Objectives

AET Update: Sediment Larval Workshop Summary

- “Lump or Split?”
 - Differential toxicity between bivalves and echinoderms, between species in given phylum
 - Bivalves more sensitive to trace metals
 - Echinoderms more sensitive to PAHs, lack “multi-xenobiotic transporter” enzyme (MXR)
 - Ecological relevance of differences?

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-10. AET Update: Sediment Larval Workshop Summary: Lump or Split?

AET Update: Larval Workshop Summary

- Test endpoints
 - Abnormality: lower variability, higher accuracy, interpretations difficult
 - Mortality: subject to errors
 - Effective mortality: accounts for abnormality and mortality, subject to false positive interpretations
 - Normal survival: high reliability, unaffected by larvae not recovered

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-11. AET Update: Larval Workshop Summary: Test Endpoints

AET Update: Sediment Larval Workshop Summary

- Protocol changes
 - Minimize effects of high ammonia in samples
 - Increase settling time prior to test initiation
 - Suspend larvae above sediment using screen
 - Add sample replicate to improve initial count
 - Other recommendations pending

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-12. AET Update: Sediment Larval Workshop Summary: Protocol Changes

AET Update: Streamlining Evaluation Process

- Electronic data submittals, formatted for DAIS/SEDQUAL
- New SEDQUAL
- Programs for statistical protocols, chemical comparisons, AET and reliability calculations
- Standard "Operating Procedures"

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-13. AET Update: Streamlining Evaluation Process

AET Update: Priority Goals for 1998

- Finalize *Neanthes* AETs
- Calculate new bivalve AETs and reliability
- Decide how to use 1998 bivalve AETs with 1986 oyster and 1994 echinoderm AETs
- Finalize 1994 Re-evaluation of AETs Report
- Propose DRVs
- Propose new SLs/MLs

May 13, 1998

1998 SMARM Status Report

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Ovrhd 10-14. AET Update: Priority Goals for 1998



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Post Office Box 488 • Manchester, Washington 98353-0488 • (360) 895-4649

May 6, 1998

Mr. Brian R. Applebury, P.E.
Chief, Operations Division
Seattle District, Corps of Engineers
PO Box 3755
Seattle, WA 98124-2255

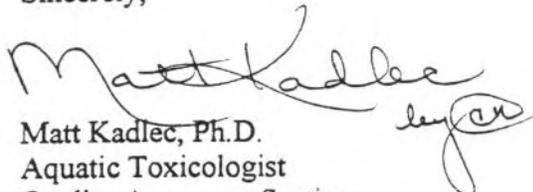
Dear Mr. Applebury:

In your recent letter announcing the Sediment Management Annual Review Meeting (SMARM), you asked for additional issues for consideration and discussion at the meeting. Three questions I hope will be answered at the SMARM are listed below. The SMARM should be attended by most of the parties interested in the answers to these questions:

1. How should labs be required to demonstrate proficiency in a particular bioassay method before beginning to do tests for regulatory purposes? For effluent toxicity testing under the Clean Water Act, the EPA requires five consecutive tests with a reference toxicant before initiation of tests on effluents.
2. How should labs demonstrate ongoing proficiency in methods they perform infrequently? One possible solution is periodic participation in round-robin tests and/or performance of bioassays on spiked sediment or a field collected sediment known to be contaminated with persistent toxicant(s) and diluted with clean sediment.
3. Are the Microtox methods currently included in the PSEP protocols reliable and sensitive enough to detect ecologically significant levels of sediment toxicity? If not, should these methods continue to be promulgated?

Thank you for the opportunity to submit these additional issues.

Sincerely,


Matt Kadlec, Ph.D.
Aquatic Toxicologist
Quality Assurance Section

MK:CLS:cls

cc: David Kendall

Ovrhd 11-1. Bioassay Issues



PUGET SOUND REFERENCE VALUE PROJECT

Task 3 Development of Benthic Effects Sediment Quality Standards

Ovrhd 12-1. Puget Sound Reference Value Project

Approach for Development of Puget Sound Reference Values

- **Data Compilation**
- **Determine Chemically Impacted Stations**
- **Determine Habitat Categories**
- **Development of Reference Value Ranges**
- **Testing of Reference Value Ranges**
- **Priortization of Benthic Indices**

Ovrhd 12-2. Approach for Development of Puget Sound Reference Values

APPENDIX C

SMARM Overheads

LIST OF OVERHEADS

Brian Applebury

- Ovrhd 1-1. 1998 Sediment Management Annual Review Meeting
- Ovrhd 1-2. SMARM Jointly Sponsored by the Dredged Material Management Program and the SMS Group
- Ovrhd 1-3. Meeting Objectives and Purpose
- Ovrhd 1-4. Dredged Material Management Program Overview
- Ovrhd 1-5. SMS Group Overview
- Ovrhd 1-6. Bioaccumulation (DMMP)
- Ovrhd 1-7. PSDDA Clarification and Status Papers (presented)
- Ovrhd 1-8. Public Issue Paper
- Ovrhd 1-9. Paper (not presented)
- Ovrhd 1-10. Summary and Closing
- Ovrhd 1-11. SMS Public Meeting (David Bradley, Ecology)

Stephanie Stirling

- Ovrhd 2-1. DMMP Program Accomplishments
- Ovrhd 2-2. The Bureaucracy
- Ovrhd 2-3. 1997 SMARM Issues
- Ovrhd 2-4. Sediment Larval Workshop
- Ovrhd 2-5. Chronic/Sublethal Tests
- Ovrhd 2-6. Program Accomplishments
- Ovrhd 2-7. On-going Programs
- Ovrhd 2-8. Technical Accomplishments

David Kendall

- Ovrhd 3-1. Overview of Dredged Material Management Program Project/Testing Activities
- Ovrhd 3-2. DY97 Project Volumes: Puget Sound
- Ovrhd 3-3. DY97 Project Volumes: Grays Harbor/Willapa Bay
- Ovrhd 3-4. DY98 Project Volumes (to date): Puget Sound
- Ovrhd 3-5. DY98 Project Volumes (to date): Grays Harbor/Willapa Bay
- Ovrhd 3-6. DY97 Projects
- Ovrhd 3-7. DY97 Suitability Determinations
- Ovrhd 3-8. DY96/97 Testing Summary: PCBs
- Ovrhd 3-9. DY96/97 Testing Summary: Indeno(1,2,3-c,d)pyrene
- Ovrhd 3-10. DY96/97 Testing Summary: Mercury
- Ovrhd 3-11. DY96/97 Testing Summary: Hexachlorobutadiene and Hexachlorobenzene
- Ovrhd 3-12. DY96/97 Testing Summary: Total DDT
- Ovrhd 3-13. DY96/97 Bioassay Hits
- Ovrhd 3-14. Dredging Year Testing Outcome Summaries
- Ovrhd 3-15. Regulatory Processing Time
- Ovrhd 3-16. DMMP Processing Time

Ted Benson

- Ovrhd 4-1. Dredged Material Management Program
- Ovrhd 4-2. Disposal Activity and Site Use
- Ovrhd 4-3. Puget Sound
- Ovrhd 4-4. Grays Harbor
- Ovrhd 4-5. Elliott Bay Disposals
- Ovrhd 4-6. Commencement Bay Disposals
- Ovrhd 4-7. Port Gardner Disposals
- Ovrhd 4-8. Bellingham Bay Disposals
- Ovrhd 4-9. Rosario Straits Disposals
- Ovrhd 4-10. Port Angeles Disposals
- Ovrhd 4-11. Point Chehalis Disposals
- Ovrhd 4-12. South Jetty Disposals
- Ovrhd 4-13. Half Moon Bay Disposals
- Ovrhd 4-14. Disposal Activity and Site Use
- Ovrhd 4-15. Puget Sound
- Ovrhd 4-16. Grays Harbor
- Ovrhd 4-17. Elliott Bay Disposals
- Ovrhd 4-18. Port Gardner Disposal
- Ovrhd 4-19. Point Chehalis Disposals
- Ovrhd 4-20. South Jetty Disposal
- Ovrhd 4-21. Half Moon Bay Disposals
- Ovrhd 4-22. PSDDA Disposal Site Monitoring
- Ovrhd 4-23. Two Types of Monitorings
- Ovrhd 4-24. Commencement Bay Partial Monitoring
- Ovrhd 4-25. Cumulative Site Use Summary
- Ovrhd 4-26. Cumulative Site Use Summary (Cont.)
- Ovrhd 4-27. Site Use Summary – Non-dispersive Sites
- Ovrhd 4-28. Site Use Summary – Dispersive Sites
- Ovrhd 4-29. Site Use Summary – PSDDA Sites
- Ovrhd 4-30. Planned Activities
- Ovrhd 4-31. TBT Study
- Ovrhd 4-32. Environmental Site Monitoring Contract

Rachel Friedman-Thomas

- Ovrhd 5-1. Sediment Management Standards Sediment Activities
- Ovrhd 5-2. Sediment Management Standards Rule Amendments: Schedule
- Ovrhd 5-3. Sediment Management Standards Rule Amendments:
Chemical and Biological Criteria Issues.
- Ovrhd 5-4. Sediment Management Standards Rule Amendments:
Sediment Cleanup Issues
- Ovrhd 5-5. Sediment Management Standards Rule Amendments:
Miscellaneous Issues
- Ovrhd 5-6. 5 Years of Sediment Source Control
- Ovrhd 5-7. Sediment Source Control: What Next?
- Ovrhd 5-8. Contaminated Sediment Site List
- Ovrhd 5-9. Development of Benthic Effects Sediment Quality Standards

Rachel Friedman-Thomas (Cont.)

- Ovrhd 5-10. SEDQUAL Sediment Management Integrated Information System
- Ovrhd 5-11. Ownership Analysis
- Ovrhd 5-12. Mercury Surface Analysis
- Ovrhd 5-13. Bellingham Bay Demonstration Pilot Project
- Ovrhd 5-14. Bellingham Bay: Sediment Source Control
- Ovrhd 5-15. Bellingham Bay Pilot Integrated Activities
- Ovrhd 5-16. Sediment Management Next Steps

Russ McMillan

- Ovrhd 6-1. Regional Sediment Cleanup Activities
- Ovrhd 6-2. Cleanup Priority and Distribution of Workload
- Ovrhd 6-3. To Puget Sound and Beyond
- Ovrhd 6-4. Voluntary Cleanup Program

John Malak

- Ovrhd 7-1. Revision of Guidelines for Bioaccumulative Chemicals of Concern
- Ovrhd 7-2. Revision of Guidelines for Bioaccumulative Chemicals of Concern:
General Information
- Ovrhd 7-3. Revision of Guidelines for Bioaccumulative Chemicals of Concern:
Framework and Specific Re-evaluation
- Ovrhd 7-4. Revision of Guidelines for Bioaccumulative Chemicals of Concern:
Proposed Actions
- Ovrhd 7-5. Revision of Guidelines for Bioaccumulative Chemicals of Concern:
BCoC List Technical Support Document
- Ovrhd 7-6. Revision of Guidelines for Bioaccumulative Chemicals of Concern:
Work Will Be Done

Erika Hoffman

- Ovrhd 8-1. Technical Support Document for Revision of Bioaccumulative Chemicals
of Concern.
- Ovrhd 8-2. Existing Framework for Bioaccumulation Testing
- Ovrhd 8-3. Proposed Changes to Existing Framework
- Ovrhd 8-4. Rationale for Revising BCoC List
- Ovrhd 8-5. Scope of Document – Chemicals
- Ovrhd 8-6. Scope of Document – Information
- Ovrhd 8-7. Scope of Document – Pesticide Use Inventories
- Ovrhd 8-8. Scope of Document – Recommendations and Lists
- Ovrhd 8-9. Scope of Document – Tissue Data
- Ovrhd 8-10. Scope of Document – WA Sediments
- Ovrhd 8-11. Scope of Document – Partitioning and Persistence Data
- Ovrhd 8-12. Scope of Document – Ecological Residue-Effects (ERED)
- Ovrhd 8-13. Scope of Document – Ecological Residue-Effects (ERED) (Cont.)
- Ovrhd 8-14. Document Recommendations
- Ovrhd 8-15. Next Steps

David Fox

- Ovrhd 9-1. BioStat
- Ovrhd 9-2. What is BioStat?
- Ovrhd 9-3. Why BioStat?
- Ovrhd 9-4. Program Flow Chart
- Ovrhd 9-5. Assumption Testing
- Ovrhd 9-6. Other Features of BioStat

Tom Gries

- Ovrhd 10-1. Update on Regulatory Work Group Recommendations on AETs
- Ovrhd 10-2. AET Update: Actions Taken by DMMP
- Ovrhd 10-3. AET Update: No DMMP Actions
- Ovrhd 10-4. AET Update: DMMP Work in Progress
- Ovrhd 10-5. AET Update: DMMP Work in Progress (Cont.)
- Ovrhd 10-6. AET Update: Validation of *Neanthes* Growth AETs
- Ovrhd 10-7. AET Update: Validation of *Neanthes* Growth AETs: AET Calculation Results and Reliability Calculations
- Ovrhd 10-8. AET Update: Validation of *Neanthes* Growth AETs: Conclusions
- Ovrhd 10-9. AET Update: Sediment Larval Workshop Summary: Objectives
- Ovrhd 10-10. AET Update: Sediment Larval Workshop Summary: Lump or Split?
- Ovrhd 10-11. AET Update: Larval Workshop Summary: Test Endpoints
- Ovrhd 10-12. AET Update: Sediment Larval Workshop Summary: Protocol Changes
- Ovrhd 10-13. AET Update: Streamlining Evaluation Process
- Ovrhd 10-14. AET Update: Priority Goals for 1998

Matt Kadlec

- Ovrhd 11-1. Bioassay Issues

Peter Striplin

- Ovrhd 12-1. Puget Sound Reference Value Project
- Ovrhd 12-2. Approach for Development of Puget Sound Reference Values
- Ovrhd 12-3. Determine Chemically Impacted Stations Using the SQS
- Ovrhd 12-4. Testing of Reference Value Ranges
- Ovrhd 12-5. Selection of Endpoints for Evaluation
- Ovrhd 12-6. 1996 Puget Sound Reference Values
- Ovrhd 12-7. Refinement of Benthic Database
- Ovrhd 12-8. Future Actions

Nancy Musgrove

- Ovrhd 13-1. Endpoints Selected for Evaluation
- Ovrhd 13-2. Comparisons to Reference
- Ovrhd 13-3. Selection of Samples
- Ovrhd 13-4. Impact Classification
- Ovrhd 13-5. Endpoint Testing
- Ovrhd 13-6. Determination of Endpoint Effectiveness
- Ovrhd 13-7. Phase I Screening and Phase II Testing
- Ovrhd 13-8. Comparison of Test Methods

Nancy Musgrove (Cont.)

- Ovrhd 13-9. Most Effective Endpoints
- Ovrhd 13-10. Benthic Community Response to Contamination
- Ovrhd 13-11. Recommendations

Steve Babcock

- Ovrhd 14-1. Puget Sound Confined Disposal Site Study
- Ovrhd 14-2. Presentation Outline
- Ovrhd 14-3. Background
- Ovrhd 14-4. Background (Cont.)
- Ovrhd 14-5. MUDES Study Goal
- Ovrhd 14-6. Study Phases
- Ovrhd 14-7. Reconnaissance Phase Conclusions
- Ovrhd 14-8. Feasibility Study Cost Sharing Agreement
- Ovrhd 14-9. Feasibility Study – Programmatic Stage
- Ovrhd 14-10. Multiuser Disposal Site (MUDES) Alternatives
- Ovrhd 14-11. Feasibility Study – Site-specific Stage
- Ovrhd 14-12. Current Schedule

Stephanie Stirling

- Ovrhd 15-1. National Sediment News
- Ovrhd 15-2. Documents
- Ovrhd 15-3. Internet Sites
- Ovrhd 15-4. Databases
- Ovrhd 15-5. Policy
- Ovrhd 15-6. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual
- Ovrhd 15-7. The Incidence and Severity of Sediment Characterization in Surface Waters of the United States
- Ovrhd 15-8. National Dredging Team
- Ovrhd 15-9. Leachate Testing and Evaluation for Freshwater Sediments
- Ovrhd 15-10. Memorandum Re: Leaching Test Guidance for Dredged Material Disposal Activities
- Ovrhd 15-11. Environmental Effects & Dredging and Disposal (E2-D2) Simple Query – *Neanthes*
- Ovrhd 15-12. First Page of List of Documents Matching *Neanthes* Query
- Ovrhd 15-13. E2-D2 Homepage
- Ovrhd 15-14. The Environmental Residue-Effects Database (ERED)
- Ovrhd 15-15. Internet Sites
- Ovrhd 15-16. Cartoon – Left Hand Doesn't Know What the Right Hand is Doing

David Kendall

- Ovrhd 16-1. DMMP Actions for Prioritization

Dave Bradley

- Ovrhd 17-1. SMS Public Issues and Concerns

**1998 SEDIMENT
MANAGEMENT
ANNUAL REVIEW
MEETING**

Ovrhd 1-1. 1998 Sediment Management Annual Review Meeting

SMARM Jointly Sponsored
by the
Dredged Material Management Program
and the SMS Group

Seattle District Joint Use North Auditorium
Seattle, WA

May 13, 1998

Hosted by Seattle District, Corps of Engineers

Ovrhd 1-2. SMARM Jointly Sponsored by the Dredged Material Management Program and the SMS Group

MEETING OBJECTIVES AND PURPOSE

- Obtain public input on proposed changes to the Dredged Material Management Program (DMMP) Management Plans per Issue Paper and Clarification Papers posted on the Corps/Dredged Material Management Office's Homepage:
(URL: www.usace.army.mil/dmmp/homepage.htm)
- Discuss disposal site management actions and changes.
- Presentation and discussion of Public Issue Papers.
- Comments and discussion on Status Reports of ongoing actions of DMMP and SMS Group.

Ovrhd 1-3. Meeting Objectives and Purpose

Dredged Material Management Program Overview

- Summary of accomplishments since the previous Annual Review Meeting
- Summary of DMMP project / testing activities
- Disposal site monitoring

Ovrhd 1-4. Dredged Material Management Program Overview

SMS Group Overview

- SMS activities and Annual Review
- Regional cleanup activities

Ovrhd 1-5. SMS Group Overview

Bioaccumulation (DMMP)

- Revisions of DMMP Guidelines for Bioaccumulation (Issue Paper)
- Bioaccumulative Chemicals of Concern (Status Report)

Ovrhd 1-6. Bioaccumulation (DMMP)

PSDDA Clarification and Status Papers (presented)

DMMP:

- Bioassay Statistics Software (Clarification)
- AET's Update on Regulatory Workgroup Recommendations (Status)

DMMP / SMS:

- Benthic Community Assessment and Guideline Revisions (Status)
- Multiuser Confined Disposal Study Update (Status)
- National Sediment News Update (Status)

Ovrhd 1-7. PSDDA Clarification and Status Papers (presented)

Public Issue Paper

- **Bioassay QA/QC (Department of Ecology/Manchester):**
 - ▶ **How do labs demonstrate proficiency in bioassay capability?**
 - ▶ **How do labs demonstrate proficiency in methods they perform infrequently?**
 - ▶ **Are the current PSEP Microtox methods reliable and sensitive enough to detect ecologically significant levels of sediment toxicity?**

Ovrhd 1-8. Public Issue Paper

Papers (not presented)

- Bellingham Pilot Study Update (Status Report)
- Beneficial Uses Manual (Status Report)
- Columbia River Dredged Material Evaluation Framework (Status Report)
- TBT Pore-Water Methods (Clarification Paper)
- SEDQUAL Database Software (Status Report)

Ovrhd 1-9. Paper (not presented)

Summary and Closing

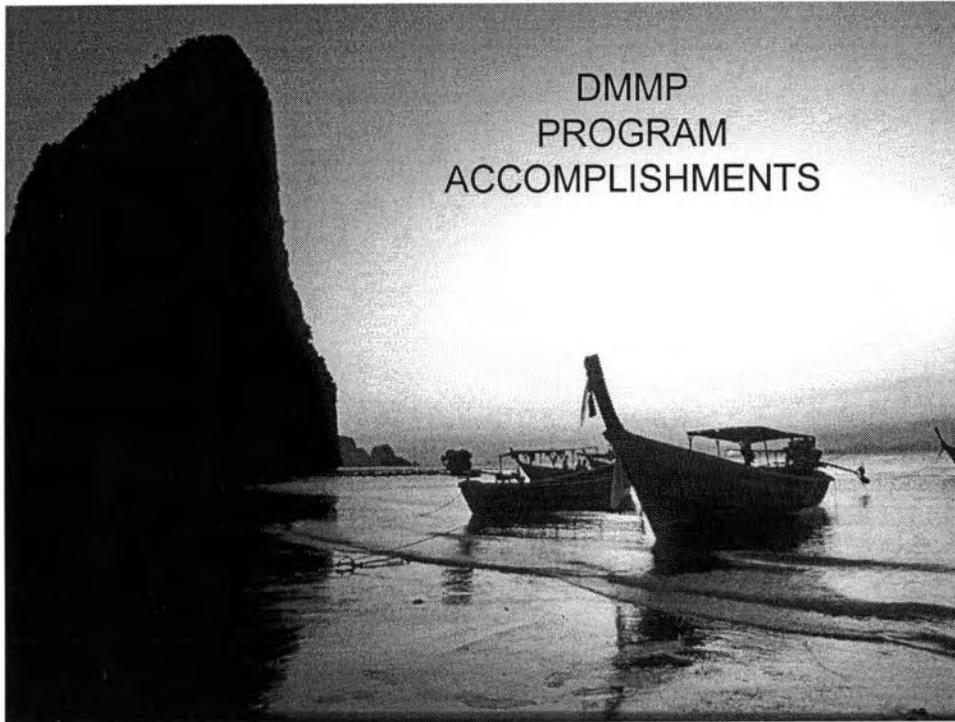
- Public Issues Summary (Agencies will convene a post-SMARM meeting on June 4, 1998 to review and prioritize public issues for DMMP action. The DMMP prioritization decision will be posted on the DMMO homepage and published in the minutes.)
- Written comments may be submitted on the SMARM proceedings, but must be submitted to the DMMP agencies by June 3, 1998 for consideration.

Ovrhd 1-10. Summary and Closing

SMS Public Meeting (David Bradley, Ecology)

- SMS Issues Summary
- Written comments may be submitted for SMS annual review for consideration by June 17, 1998.
- Public meeting concluded

Ovrhd 1-11. SMS Public Meeting (David Bradley, Ecology)

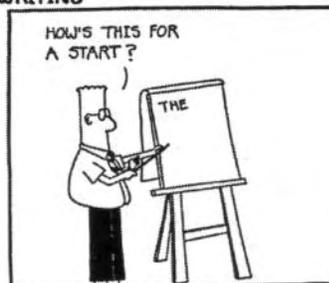


Ovrhd 2-1. DMMP Program Accomplishments

THE BUREAUCRACY

GROUP WRITING

FEW THINGS IN LIFE ARE LESS EFFICIENT THAN A GROUP OF PEOPLE TRYING TO WRITE A SENTENCE. THE ADVANTAGE OF THIS METHOD IS THAT YOU END UP WITH SOMETHING FOR WHICH YOU WILL NOT BE PERSONALLY BLAMED.



BUILD A BETTER LIFE BY STEALING OFFICE SUPPLIES, Dogbert's Big Book of Business 31

Ovrhd 2-2. The Bureaucracy

1997 SMARM Issues

- Summarized in meeting minutes
- Highlights:
 - reference toxicant paper withdrawn
 - sediment larval comments used in workshop
 - refinement of chronic/sublethal tests
 - » WES/PSEP *Neanthes* comparison
 - » *Leptocheirus*
 - SMS issues

Ovrhd 2-3. 1997 SMARM Issues

Sediment Larval Workshop

- Held in January 1998
- Regional Experts Panel
- Two Objectives
 - should enchinoderm and bivalve data be combined
 - comparison of several endpoints

Ovrhd 2-4. Sediment Larval Workshop

Chronic/Sublethal Tests

- Comparison with WES *Neanthes* protocol
 - round-robin testing under discussion
 - January 1998 meeting with WES scientists
- *Leptocheirus plumulosus*
 - national test development
 - DMMP funding of TBT test

Ovrhd 2-5. Chronic/Sublethal Tests

Program Accomplishments

- Biennial Report
- Beneficial Uses Report - 2nd Draft
- Columbia River Manual
 - public notice issued 6 May 1998
 - comments due by 20 June 1998
- DMMP User's Manual

Ovrhd 2-6. Program Accomplishments

On-going Programs

- Bellingham Pilot
- Confined Disposal Study
- Regulatory Work Group/AETs

Ovrhd 2-7. On-going Programs

Technical Accomplishments

- Bioaccumulation Technical Report completed
- TBT protocol clarification
- BIOSTAT Software completed
- SEDQUAL updated

Ovrhd 2-8. Technical Accomplishments

Overview of Dredged Material Management Program project/testing activities

David Kendall
Dredged Material Management Office

DY97 Project Volumes Puget Sound

• City of Bellevue, Meydenbauer	2,500 cy
• Curtis Wharf	32,700 cy
• Oak Harbor Marina	27,000 cy
• Port of Everett, Piers 1 &3	131,000 cy
• Port of Everett, NCD Berth	86,400 cy
• Port of Everett, Stage I, Marine Terminal Improvement	239,000 cy
• Port of Seattle, Terminal 5	36,000 cy
• Port of Seattle, Terminal 18	546,430 cy
• Port of Tacoma, Blair Turning Basin	755,000 cy
• USACE Everett (downstream settling basin)	300,437 cy
• USACE Duwamish	112,000 cy
• USACE Kenmore, Lake Washington	60,000 cy
TOTAL:	2,328,467 cy

Ovrhd 3-2. DY97 Project Volumes: Puget Sound

DY97 Project Volumes: Grays Harbor / Willapa Bay

• Department of Transportation / Willapa Bar / North Channel	5,000,000 cy
• Port of Grays Harbor, Terminal 2	15,000 cy
• Rayonier Dock	20,000 cy
• USACE Willapa Harbor (Agitation Test Dredge)	250,000 cy
TOTAL:	5,285,000 cy

Ovrhd 3-3. DY97 Project Volumes: Grays Harbor/Willapa Bay

DY98 Project volumes (to date)
Puget Sound

• U.S. Oil Company	6,000 cy
• Duwamish O&M	100,000 cy
• Swanson/Lake Washington (no test)	990 cy
• East Waterway/Elliott Bay	350,000 cy
• Blair Waterway deepening study	900,000 cy
• Murphy's Landing (no test)	450 cy
• K-Ply Port Angeles	3,000 cy
• Coal Creek Projects (Newport Shores)	34,000 cy
Totals:	1,394,440 cy

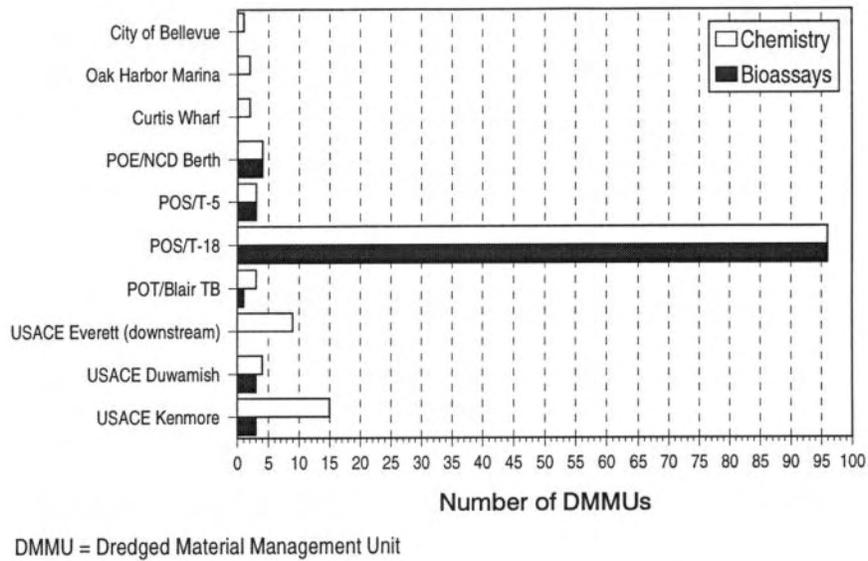
Ovrhd 3-4. DY98 Project Volumes (to date): Puget Sound

DY98 Project Volumes (to date):
Grays Harbor/Willapa Bay

• Port of Grays Harbor T-2	40,000 cy
• Rayonier Inc.	20,000 cy
• Grays Harbor O&M (tested) (2,200,000 cy total dredging)	227,700 cy
• Tokepoint Marina Moorage Basin	42,000 cy
• Tokepoint Channel Maitenance	30,200 cy
• Weyerhaeuser Bay City Dock	5,000 cy
Totals:	364,900 cy

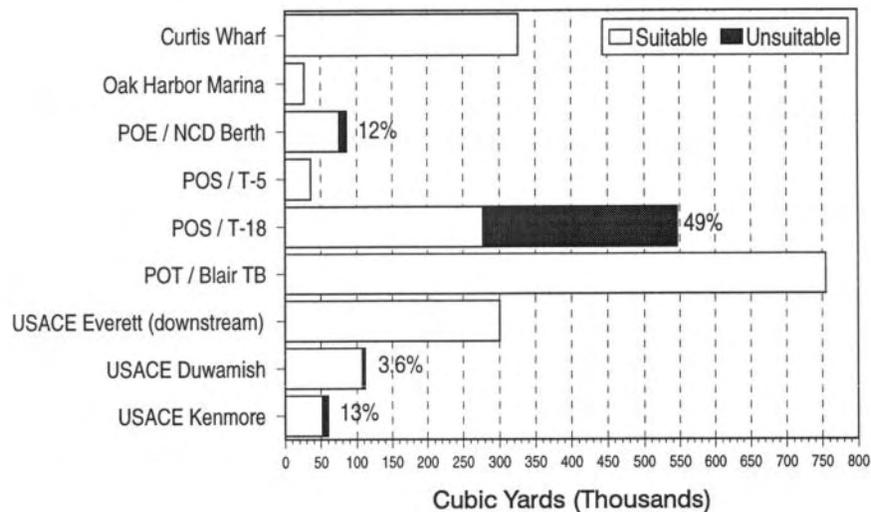
Ovrhd 3-5. DY98 Project Volumes (to date): Grays Harbor/Willapa Bay

DY97 Projects



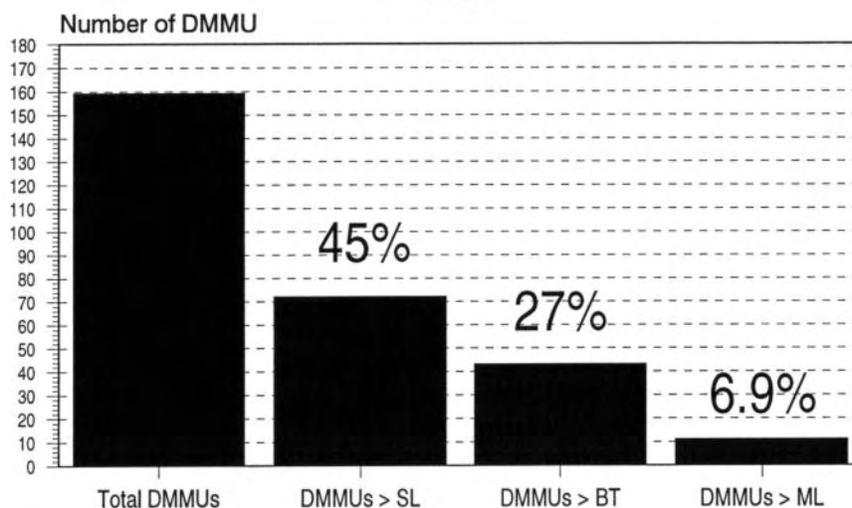
Ovrhd 3-6. DY97 Projects

DY97 Suitability Determinations



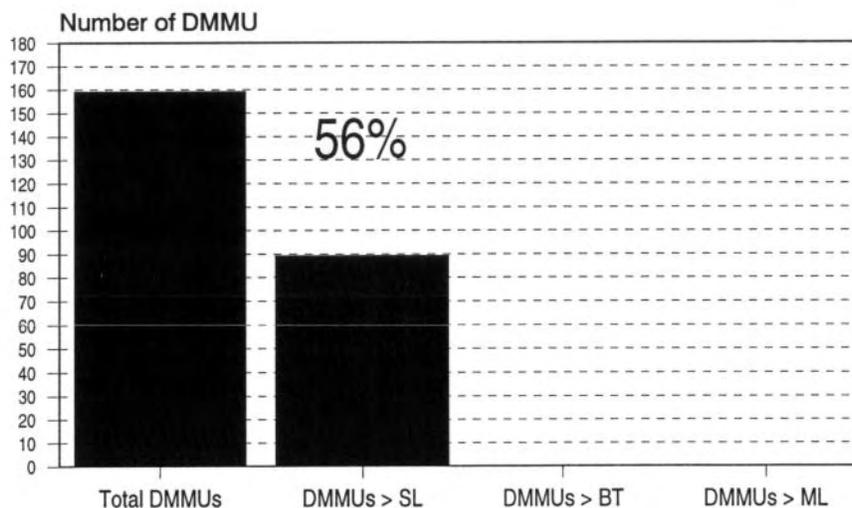
Ovrhd 3-7. DY97 Suitability Determinations

DY 96/97 Testing Summary PCBs



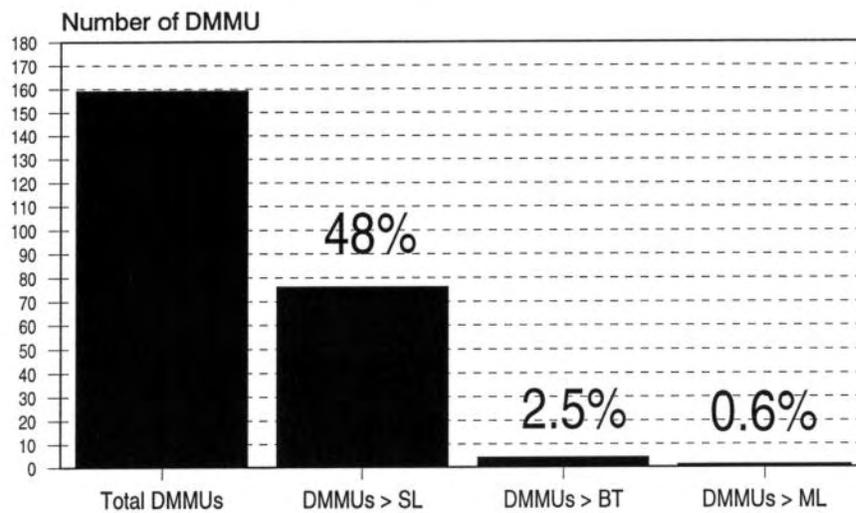
Ovrhd 3-8. DY96/97 Testing Summary: PCBs

DY 96/97 Testing Summary Indeno(1,2,3-c,d)pyrene



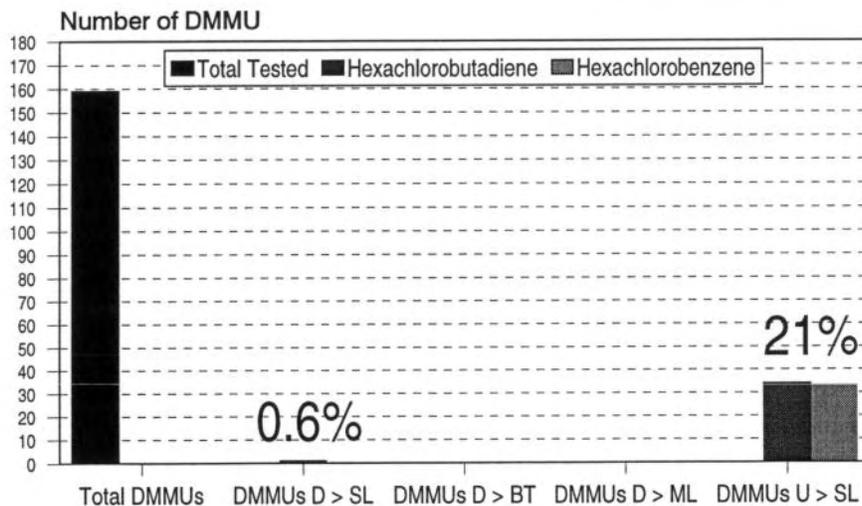
Ovrhd 3-9. DY96/97 Testing Summary: Indeno(1,2,3-c,d)pyrene

DY 96/97 Testing Summary Mercury



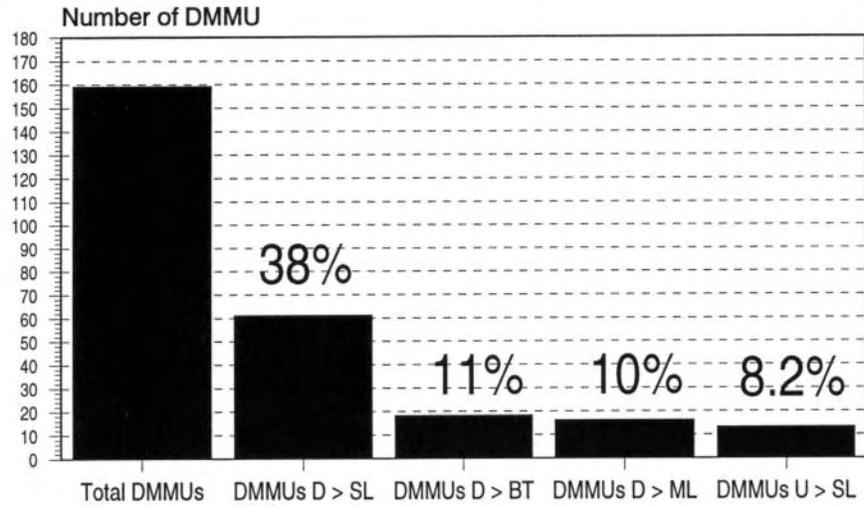
Ovrhd 3-10. DY96/97 Testing Summary: Mercury

DY 96/97 Testing Summary



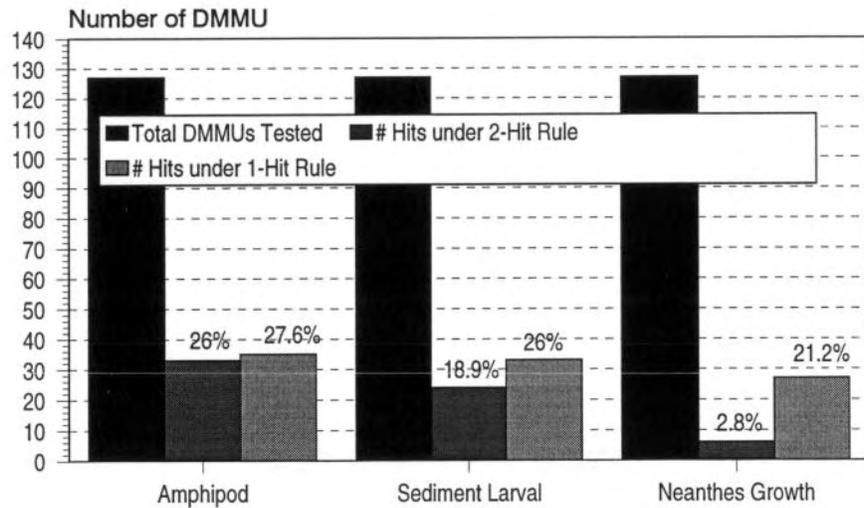
Ovrhd 3-11. DY96/97 Testing Summary: Hexachlorobutadiene and Hexachlorobenzene

DY 96/97 Testing Summary Total DDT



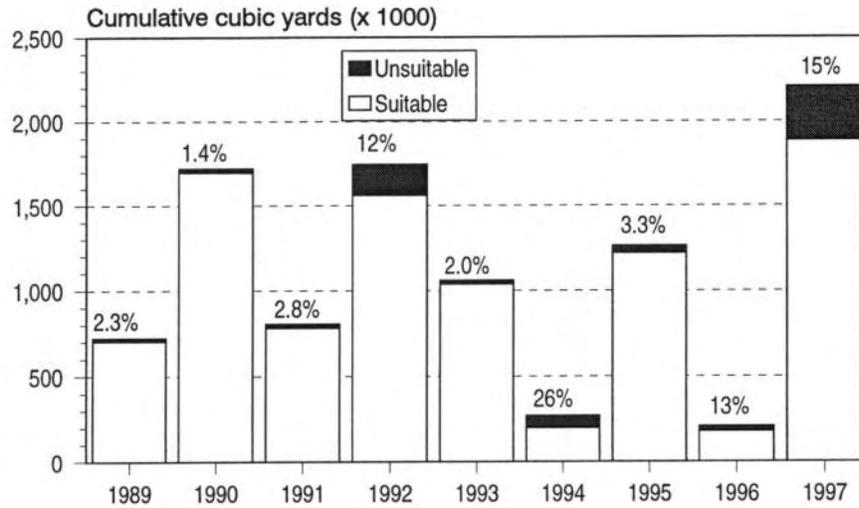
Ovrhd 3-12. DY96/97 Testing Summary: Total DDT

DY96/97 Bioassay Hits



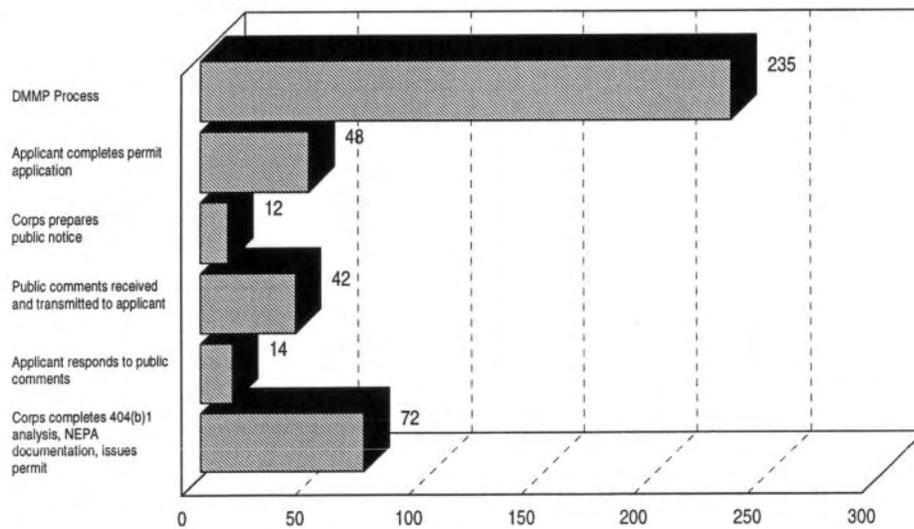
Ovrhd 3-13. DY96/97 Bioassay Hits

Dredging Year Testing Outcome Summaries



Ovrhd 3-14. Dredging Year Testing Outcome Summaries

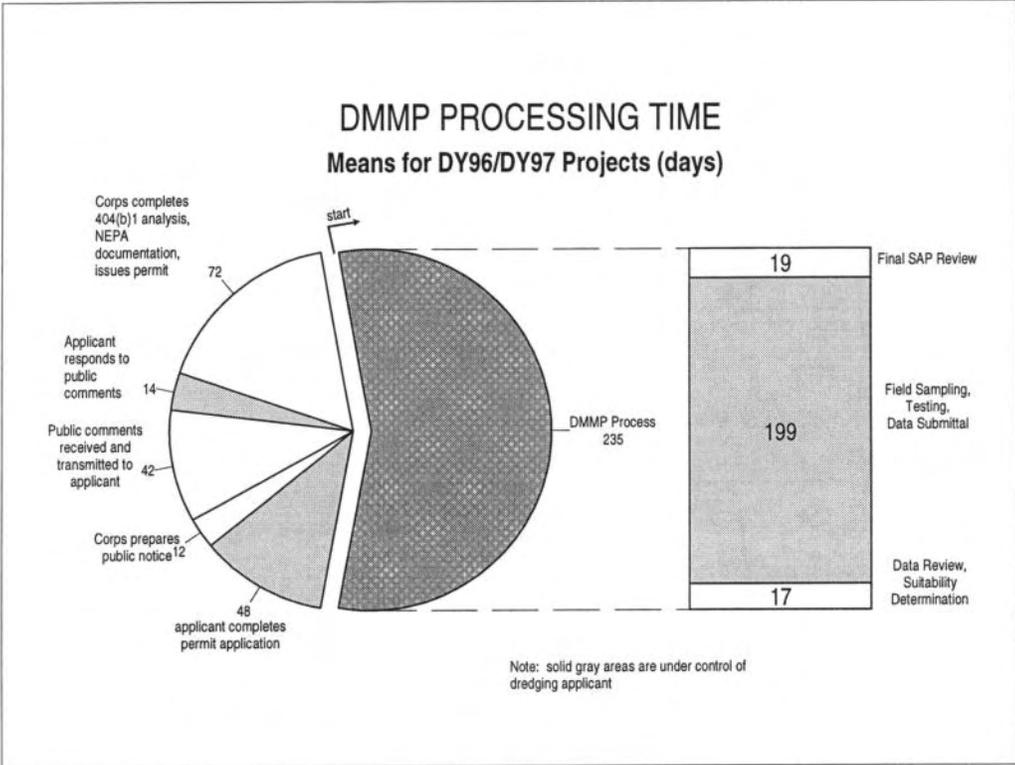
Time Elapsing for Each Regulatory Stage:



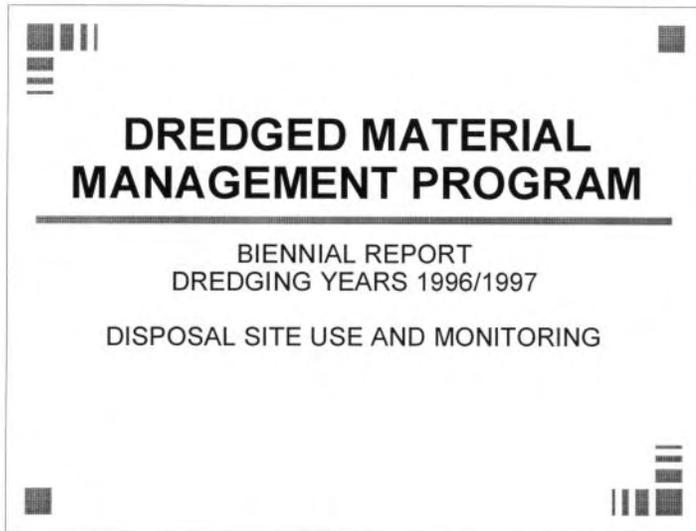
Regulatory Processing Time

Means for DY96/DY97 Projects (days)

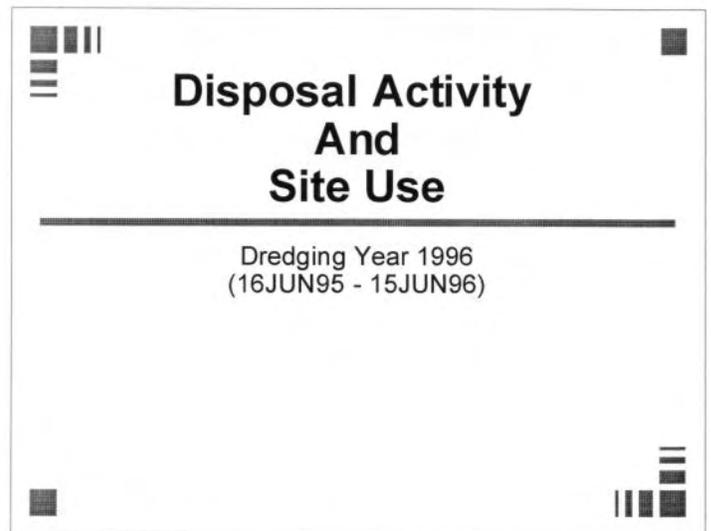
Ovrhd 3-15. Regulatory Processing Time



Ovrhd 3-16. DMMP Processing Time



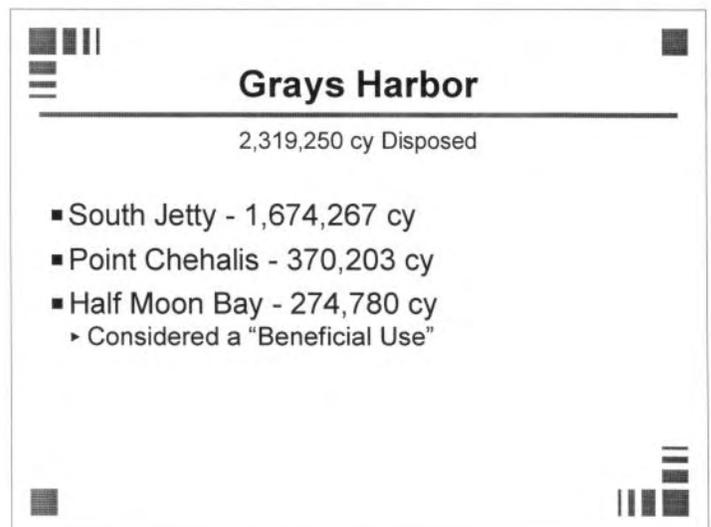
Ovrhd 4-1. Dredged Material Management Program



Ovrhd 4-2. Disposal Activity and Site Use



Ovrhd 4-3. Puget Sound



Ovrhd 4-4. Grays Harbor



Elliott Bay Disposals

DY96

- City of Bremerton (A.H. Powers)
 - ▶ 2,500 cy - 3 disposals
- Sinclair Inlet Marina (Manson Construction)
 - ▶ 2,745 cy - 6 disposals
- Duwamish O&M (J.E. McAmis)
 - ▶ 90,057 cy - 55 disposals
 - ▶ Includes 14,820 cy to SW corner of site to cap PCB contaminated material disposed in the 1970s



Ovrhd 4-5. Elliott Bay Disposals



Commencement Bay Disposals

DY96

- Port of Tacoma (Fletcher General)
 - ▶ 460,684 cy - 330 disposals



Ovrhd 4-6. Commencement Bay Disposals



Port Gardner Disposals

DY96

- Port of Everett (A.H. Powers)
 - ▶ 121,246 cy - 69 disposals



Ovrhd 4-7. Port Gardner Disposals



Bellingham Bay Disposals

DY96

- U.S.A.C.E./Port of Bellingham (J.E. McAmis)
 - ▶ 44,800 cy - 27 disposals



Ovrhd 4-8. Bellingham Bay Disposals



Rosario Straits Disposals

DY96

- Port of Bellingham/Bellingham Cold Storage (J.E. McAmis)
 - ▶ 39,000 cy - 26 disposals
- U.S.A.C.E./Port of Bellingham (J.E. McAmis)
 - ▶ 166,500 cubic yards - 111 disposals



Ovrhd 4-9. Rosario Straits Disposals



Port Angeles Disposals

DY96

- Holnam Inc. (American Construction)
 - ▶ 22,344 cy - 19 disposals



Ovrhd 4-10. Port Angeles Disposals



Point Chehalis Disposals

DY96

- Weyerhaeuser Bay City Dock (Great Lakes)
 - ▶ 6,000 cy - 2 disposals
- Rayonier Inc. (Great Lakes)
 - ▶ 19,800 cy - 6 disposals
- Port of Grays Harbor, T-2 (Great Lakes)
 - ▶ 48,684 cy - 14 disposals
- U.S.A.C.E. (Great Lakes)
 - ▶ 295,719 cy - 43 disposals



Ovrhd 4-11. Point Chehalis Disposals



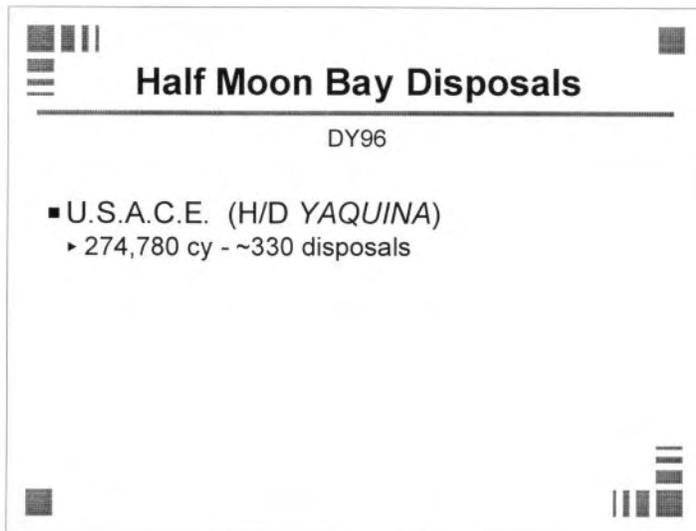
South Jetty Disposals

DY96

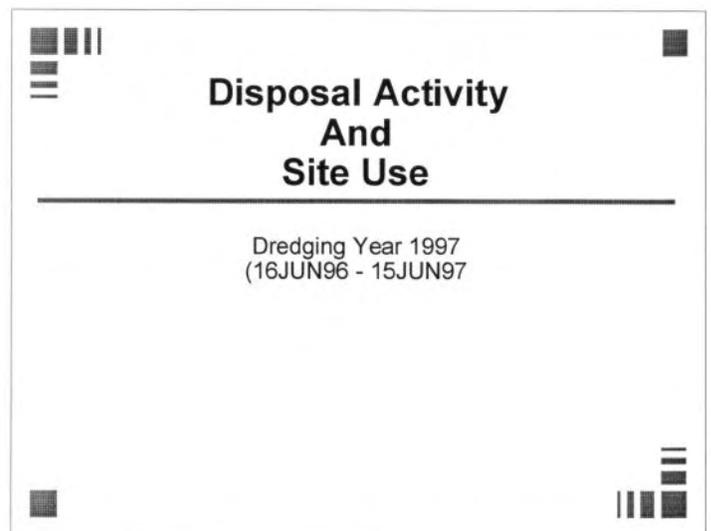
- U.S.A.C.E. (Great Lakes)
 - ▶ 1,634,517 cy - 586 disposals
- U.S.A.C.E. (H/D YAQUINA)
 - ▶ 6,375 cy - ~24 disposals
- U.S.A.C.E. (H/D YAQUINA)
 - ▶ 33,375 cy - ~40 disposals



Ovrhd 4-12. South Jetty Disposals



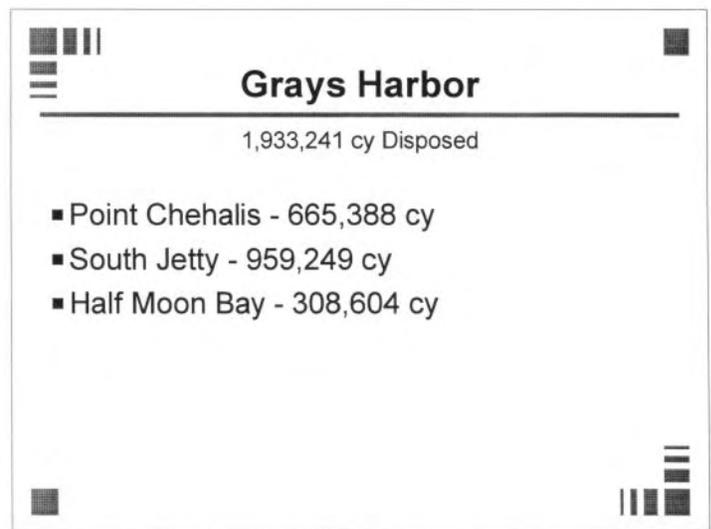
Ovrhd 4-13. Half Moon Bay Disposals



Ovrhd 4-14. Disposal Activity and Site Use



Ovrhd 4-15. Puget Sound



Ovrhd 4-16. Grays Harbor



Elliott Bay Disposals

DY97

- Lone Star NW/Kaiser Dock (A.H. Powers)
 - ▶ 12,070 cy - 7 disposals
- City of Kirkland/Marina Park (A.H. Powers)
 - ▶ 800 cy - 1 disposal
- Crowley Marine Services (American Const.)
 - ▶ 2,400 cy - 2 disposals
- Port of Seattle (A.H. Powers)
 - ▶ 3,493 cy - 4 disposals
- Sinclair Inlet Marina (Island Tug and Barge)
 - ▶ 219 cy - 1 disposal



Ovrhd 4-17. Elliott Bay Disposals



Port Gardner Disposal

DY97

- Port of Everett (A.H. Powers)
 - ▶ 102,531 cy - 92 disposals



Ovrhd 4-18. Port Gardner Disposal



Point Chehalis Disposals

DY97

- Weyerhaeuser/Bay City (Great Lakes)
 - ▶ 14,000 cy - 4 disposals
- Port of Grays Harbor/T-2 (American Const.)
 - ▶ 38,500 cy - 12 disposals
- Rayonier, Inc. (Foss Engineering)
 - ▶ 20,000 cy - 6 disposals
- Port of Grays Harbor/T-2 (Great Lakes)
 - ▶ 14,173 cy - 6 disposals
- U.S.A.C.E. (Manson Construction)
 - ▶ 14,173 cy - 6 disposals
- 218,666 cy - 215 disposals



Ovrhd 4-19. Point Chehalis Disposals



South Jetty Disposal

DY97

- U.S.A.C.E. (Manson Construction)
 - ▶ 959,249 cy - 370 disposals



Ovrhd 4-20. South Jetty Disposal



Half Moon Bay Disposals

DY97

- U.S.A.C.E. (Manson Construction)
 - ▶ 172,923 cy - 126 disposals
- U.S.A.C.E. (H/D YAQUINA)
 - ▶ 135,686 cy - ~159 disposals



Ovrhd 4-21. Half Moon Bay Disposals



PSDDA Disposal Site Monitoring

Physical and Chemical/Biological

- Designed to answer three major questions;
 - ▶ Is the dredged material deposited on site?
 - ▶ Is the deposited dredged material producing chemical and/or biological conditions on site beyond the "minor adverse effects" levels allowed by the PSDDA site management plans?
 - ▶ Is the dredged material causing any adverse impacts to biological resources beyond the disposal site boundaries?



Ovrhd 4-22. PSDDA Disposal Site Monitoring



Two Types of Monitorings

"Full" and "Partial"

- Full monitoring addresses all three questions
- Partial monitoring addresses only questions 1 and 2



Ovrhd 4-23. Two Types of Monitorings



Commencement Bay Partial Monitoring

DY96

- Followed a full monitoring the previous year.
- SVPS images and chemistry confirmed all recently disposed dredged material was within the site boundary.
- Bioassay results confirmed "minor adverse effects" limits were not exceeded.
- Time trends analysis showed the overall trend of CoCs was downward.



Ovrhd 4-24. Commencement Bay Partial Monitoring



Cumulative Site Use Summary

- Anderson/Ketron (93, 95)
- Commencement Bay (89, 91, 95, 96)
- Elliott Bay (90, 91, 92, 93, 94, 95, 96, 97)
- Port Gardner (90, 91, 93, 94, 95, 96, 97)
- Rosario Strait (91, 92, 93, 94, 95, 96)
- Bellingham Bay (93, 96)
- Port Townsend (93)
- Port Angeles (96)



Ovrhd 4-25. Cumulative Site Use Summary



Cumulative Site Use Summary

(Cont.)

- Point Chehalis (96, 97)
- South Jetty (96, 97)
- Half Moon Bay (96, 97)
- 3.9 Mile Ocean (not used)



Ovrhd 4-26. Cumulative Site Use Summary (Cont.)



Site Use Summary

Non-Dispersive Sites

- Port Gardner - 1,722,871 cy (191,430 cy/yr)
- Elliott Bay - 733,631 cy (81,515 cy/yr)
- Bellingham Bay - 77,683 cy (9,710 cy/yr)
- Commencement Bay - 769,089 cy (85,454 cy/yr)
- Anderson/Ketron - 18,874 cy (2,359 cy/yr)



Ovrhd 4-27. Site Use Summary – Non-dispersive Sites



Site Use Summary

Dispersive Sites

- Rosario Strait - 1,074,790 (134,349 cy/yr)
- Port Townsend - 22,642 cy (2,830 cy/yr)
- Port Angeles - 22,344 cy (2,793 cy/yr)



Ovrhd 4-28. Site Use Summary – Dispersive Sites



Site Use Summary

PSDDA Sites

- Total Cumulative Disposals
 - ▶ Non-dispersive sites - 3,322,148 cy
 - ▶ Dispersive sites - 1,119,776 cy
 - ▶ Total for all sites - 4,441,924
- Average Volume per Year
 - ▶ Non-dispersive sites - 370,468 cy/yr
 - ▶ Dispersive sites - 139,972 cy/yr
 - ▶ Total for all sites - 555,241 cy/yr



Ovrhd 4-29. Site Use Summary – PSDDA Sites



Planned Activities

- Tributyl-tin/*Leptocheirus plumulosus* toxicity protocol development and comparison
- New, multi-year site environmental monitoring contract



Ovrhd 4-30. Planned Activities



TBT Study

Leptocheirus plumulosus

- Contract has finished final negotiations, and is in process of being signed by Battelle and DNR.
- Study objectives are:
 - ▶ Measure the chronic toxicity of TBT and TBT contaminated sediment
 - ▶ Develop tissue-residue-based dose-response curves for bioaccumulated TBT
 - ▶ Compare TBT-sensitivity of *Leptocheirus* with PSDDA standard suite (Eohaustorius, Neanthes, Echinoderm larval)



Ovrhd 4-31. TBT Study



Environmental Site Monitoring Contract

Coming out soon!

- New multi-year contract
- Will cover full and partial monitorings
- Will require compilation of changes to monitoring program instituted over the years
- Will also incorporate statistical time trends analysis



Ovrhd 4-32. Environmental Site Monitoring Contract



Sediment Management Standards Sediment Activities

Rachel Friedman-Thomas

Sediment Management Unit, Washington
Department of Ecology



Ovrhd 5-1. Sediment Management Standards Sediment Activities



Sediment Management Standards Rule Amendments

Schedule

- Discussion with SMS Implementation Committee on issues and draft rule language (summer/fall)
 - Plan to formally propose revised SMS rule for adoption in winter 1998/1999
 - Plan to formally adopt revised SMS rule in summer 1999
- 

Ovrhd 5-2. Sediment Management Standards Rule Amendments: Schedule

***Sediment Management Standards
Rule Amendments***
Chemical and biological criteria issues

- Revised ecological criteria based on AETs
- Application to non-Puget Sound marine sediments
- Human health criteria
- Bioassays for low salinity/freshwater sediments
- Updated bioassay standards
- Clarify narrative standards

Ovrhd 5-3. Sediment Management Standards Rule Amendments: Chemical and Biological Criteria Issues

***Sediment Management Standards
Rule Amendments***
Sediment Cleanup Issues

- Cleanup site identification
- Relationship between SMS and MTCA rule
- Revisions to “types of cleanups”
- Clarify cleanup study requirements
- Role of natural recovery

Ovrhd 5-4. Sediment Management Standards Rule Amendments: Sediment Cleanup Issues

**Sediment Management Standards
Rule Amendments
Miscellaneous Issues**

- Clarify data management requirements
- Clarify laboratory accreditation requirements
- Sediment impact zone requirements

Ovrhd 5-5. Sediment Management Standards Rule Amendments:
Miscellaneous Issues

**5 Years of Sediment
Source Control**

- Sediment Source Control Standards User Manual (SCUM1) released in 1993 establishing procedures
- 78 industrial and municipal discharges subject to some level of review
 - 25 WWTP, 14 Paper, 12 Shipyard, 7 aluminum
 - 7 petroleum, 3 chem, 1 storm, 5 other industrial
- 48 discharges have sampled sediment
- 26 of 48 discharges have some level of sediment contamination

Ovrhd 5-6. 5 Years of Sediment Source Control

Determine Chemically Impacted Stations Using the SQS

- **Chemical Data** (Includes Data up to 1993)
 - **SEDQUAL & PSAMP Database**
 - 1657 Stations with data passing QA-1
 - 1241 Stations with no chemicals exceeding SQS

- **Biological Data** (Includes Data up to 1993)
 - **SEDQUAL & PSAMP Database**
 - 1525 Samples with synoptic chemistry & benthic data
 - 803 Samples with no chemicals exceeding SQS

Ovrhd 12-3. Determine Chemically Impacted Stations Using the SQS

TESTING OF REFERENCE VALUE RANGES

- **Tests For Normality**
- **Variability Within Reference Habitat Categories**
- **Differences Among Habitat Categories**
- **Differences Between Reference Habitat**
- **Comparison to Individual Contaminated Stations**

Ovrhd 12-4. Testing of Reference Value Ranges

Selection of Endpoints for Evaluation Based on the Following

- National Benthic Experts Workshop
- Case Studies
- Reference Ranges

Benthic Indices Selected for Evaluation

- | | |
|------------------------|-------------|
| ■ Total taxa richness | - Diversity |
| ■ Major taxa richness | - Evenness |
| ■ Total abundance | - Dominance |
| ■ Major taxa abundance | - ITI |

Ovrhd 12-5. Selection of Endpoints for Evaluation

1996 Puget Sound Reference Values

Benthic Endpoint	Habitat Category <150 ft.							
	N	0-20% Fines	N	20-50% Fines	N	50-80% Fines	N	80-100% Fines
Total abundance	184	295-983	69	342-647	79	156-531	97	178-436
Total Taxa	183	47-90	66	50-78	81	38-66	99	24-42
Crustacea Abundance	180	43-198	68	40-167	77	0-104	98	4-148
Crustacea Taxa	181	8-17	74	6-16	80	4-10	103	3-72
Amphipod Abundance	186	8-47	63	0-27	83	1-29	95	0-44
Amphipod Taxa	185	4-10	66	2-7	78	1-5	92	1-3
Polychete Abundance	178	72-322	67	126-322	82	78-215	97	31-145
Polychete Taxa	193	21-47	76	28-51	81	21-36	99	9-22
Mollusca Abundance	178	26-150	65	27-192	78	0-232	98	24-104
Mollusca Taxa	185	12-21	66	9-17	82	8-18	100	6-13
Shannon-Wiener Diversity (<i>H'</i>)	185	1.12-1.57	69	1.10-1.53	86	1.01-1.45	95	0.88-1.23
Pielou's Evenness Index (<i>J'</i>)	182	0.65-0.83	69	0.63-0.82	91	0.59-0.85	99	0.6-0.82
Infaunal Trophic Index (ITI)	183	67.7-81.1	65	65.9-77.3	83	63.2-77.2	101	67.3-87.1
Swartz's Dominance Index (SDI)	186	6.8-21.6	68	8.3-19.2	84	5.5-16.5	98	4.2-9.6

N = Number of samples

Ovrhd 12-6. 1996 Puget Sound Reference Values

REFINEMENT OF BENTHIC DATABASE

Identification of Outlier Data Points

- Regression analyses against conventional parameters
- Identification of anomalous values based on percentiles

Removal of Outliers from Reference Database

Recalculation of Reference Ranges

Ovrhd 12-7. Refinement of Benthic Database

FUTURE ACTIONS

Conduct Regional Benthic Experts Workshop

- To be held in November 1998
- Expected Outcome: What are Endpoints and Interpretative Criteria for Inclusion in SMS

In Preparation for Workshop Develop an Issue Paper to Include

- Benthic Endpoints for Regulatory Decision Making
- Interpretation Criteria for Selected Endpoints
- Identification of Issues Requiring Regional Expert Input

Ovrhd 12-8. Future Actions

Endpoints Selected For Evaluation

- Total crustacean abundance
- Total crustacean richness
- Total abundance
- Total richness
- Total polychaete abundance
- Total polychaete richness
- Infaunal trophic index
- Swartz's dominance index
- Total molluscan abundance
- Total molluscan richness

Comparisons to Reference

- Numeric Threshold
 - One-half reference mean
 - 95% confidence limit
 - Reference range (mean \pm standard deviation)
- Statistical test
 - Pair-wise comparison with reference data set

Selection of Samples

- Initial selection criterion:
 - Sediment chemical concentrations greater than SQS
- Criteria for impact classification:
 - CSL
 - Benthic AET (BAET)

Impact Classification

Impact Classification	SMS Chemical Groups	BAET Chemical Groups
Minor/Moderate	Less than or equal to the CSL	Less than or equal to the BAET
Moderate/Severe	Greater than the CSL	Greater than the BAET

Comparisons to be made to Puget Sound habitat-specific reference data set.

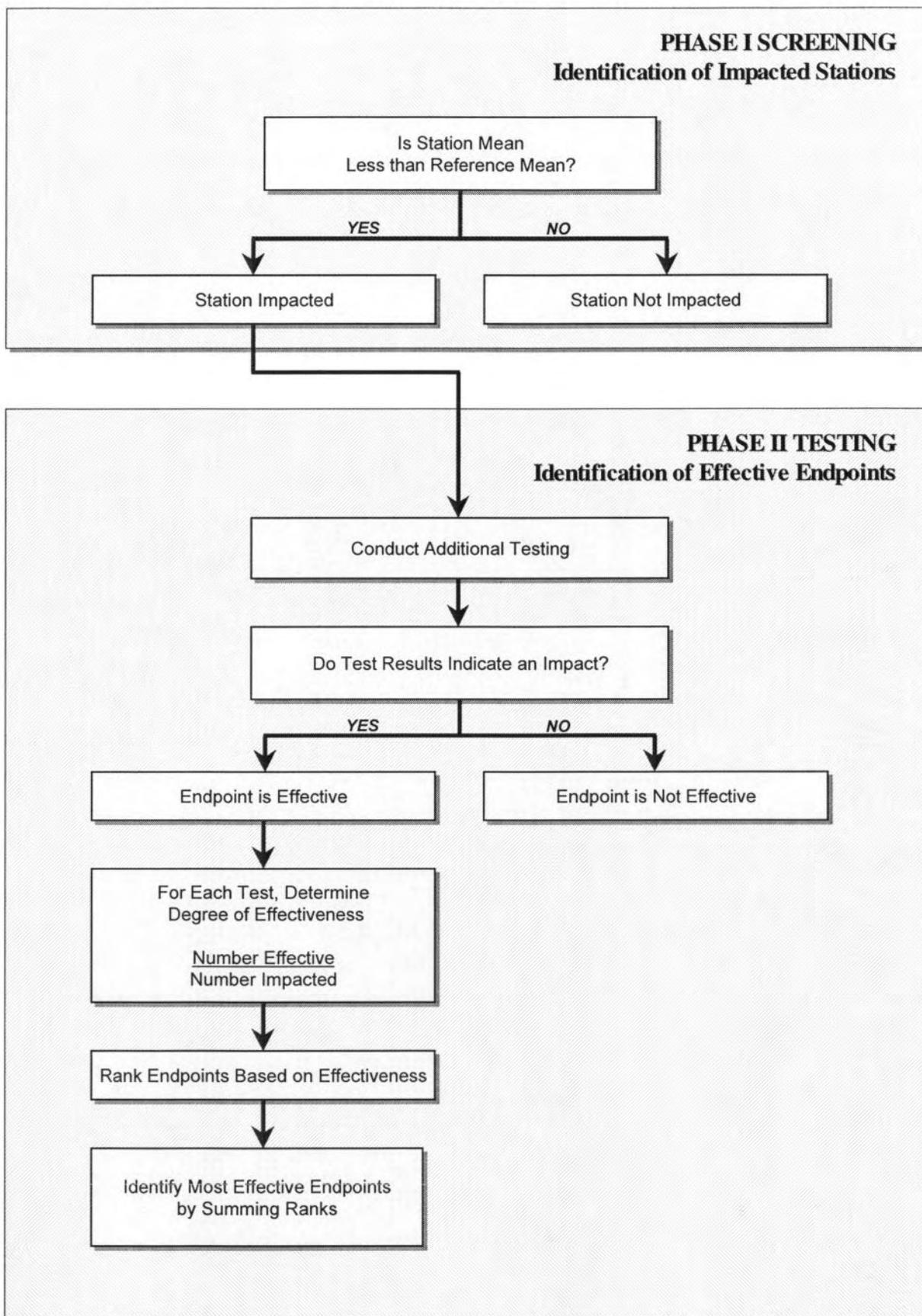
Endpoint Testing

Station and Reference Data Matched by Habitat Category

- Phase 1
 - Station value screened against mean reference value.
 - If different, declared impacted
- Phase 2
 - Conducted using impacted stations
 - Applied both numeric comparisons and statistical test

Determination of Endpoint Effectiveness

- Based on a comparison of outcome between Phase 1 and 2.
 - If agreed, considered effective
 - If disagreed, considered not effective
- Percent effective results ranked by chemical group and endpoint to select most effective endpoints
- Focused on those endpoints that performed well in the minor to moderate impact category



Comparison of Test Methods

- Fewest differences identified using one-half reference mean
 - Failed to identify differences when used with ITI
 - Worked well with abundance-based endpoints
- Most difference identified using 95% confidence limits
 - Tended to identify most stations as different from reference for many endpoints
- Reference range and t-test had similar ability to identify differences
 - t-test has high statistical power because of large size of reference data set

Most Effective Endpoints

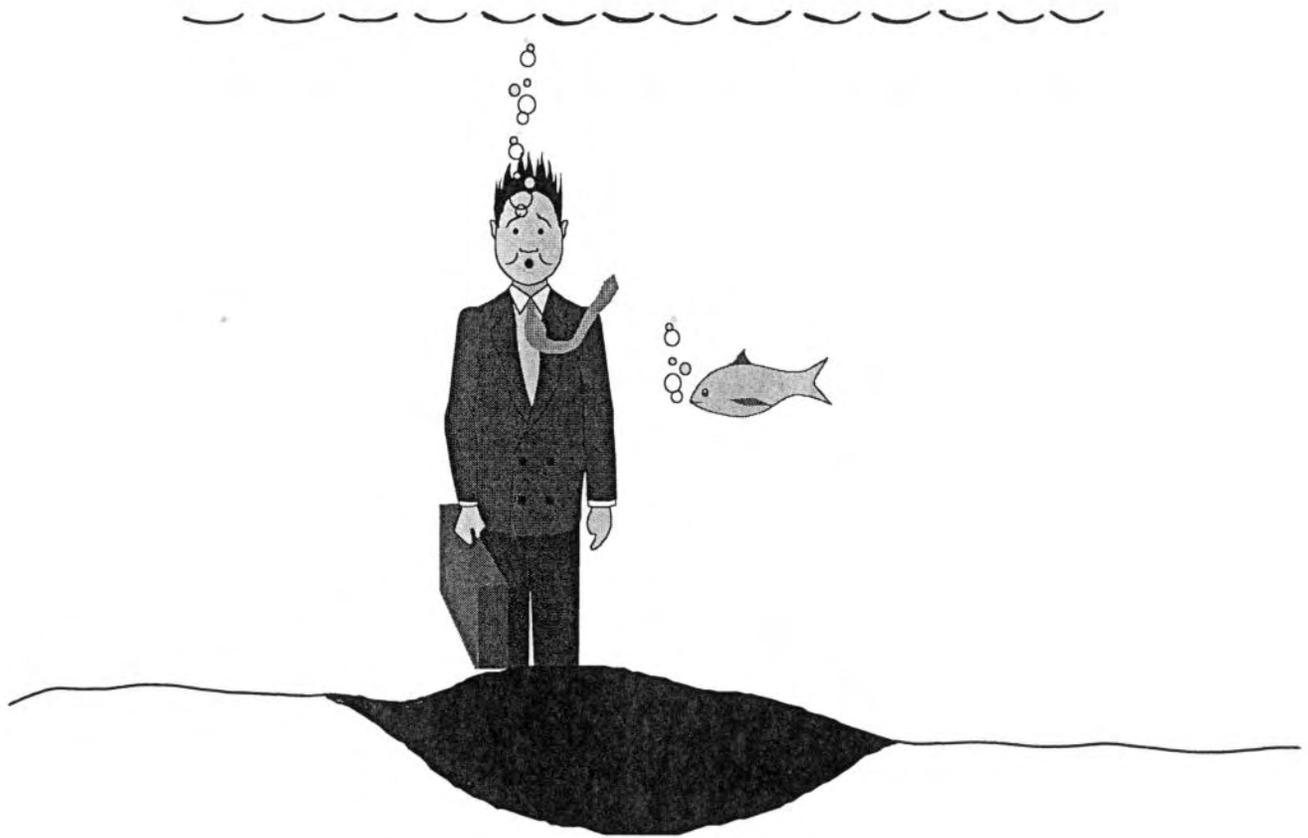
- Swartz's dominance index
- Infaunal trophic index
- Total richness
- Molluscan richness
- Enhanced polychaete abundance
- Molluscan abundance
- Crustacean abundance

Benthic Community Response to Contamination

<i>Increasing Chemical Contamination</i>	<ul style="list-style-type: none"> • Diverse community <ul style="list-style-type: none"> – Polychaetes, molluscs, crustaceans, echinoderms, and others all present • Individuals distributed relatively evenly over all taxa • No one group dominates community • Abundance, richness indices tend to be high; SDI, ITI high; dominance low 	NONE
	<ul style="list-style-type: none"> • Loss of most sensitive taxa or life stages due to mortality or lack of recruitment <ul style="list-style-type: none"> – Decreased richness in most sensitive major taxonomic group <ul style="list-style-type: none"> • Echinoderms – Total richness, total abundance may not decline due to recruitment of more tolerant taxa – May see shifts in SDI (↓) other dominance (↑) 	LOW
	<ul style="list-style-type: none"> • Continued loss of less tolerant taxa <ul style="list-style-type: none"> – Decreased total and major taxa (molluscs/crustaceans) richness – Increased abundance in polychaetes – Increased total abundance – Shifts in SDI (↓) other dominance measures (↑) and ITI (↓) 	MODERATE
	<ul style="list-style-type: none"> • Losses of tolerant taxa <ul style="list-style-type: none"> – Decreased total and all major taxa group abundances – Low richness – Low SDI; low dominance (false negative) – ITI Low 	SEVERE

Recommendations

- Comparisons to reference should be used to evaluate benthic community structure
- Stricter requirements should be made for matching physical habitat and conventional sediment chemistry between site and reference areas
 - Where possible, geographic and hydrographic similarities should be considered
- Reference ranges should be used to evaluate the appropriateness of a site-specific reference area
- Benthic community evaluations should rely on the SDI and some combination of total richness, molluscan richness, enhanced polychaete abundance, molluscan abundance, and crustacean abundance.
- Retain use of the t-test as the method of comparison; however, if endpoints are modified to include those based on diversity, the numeric criterion will need to be revised.
- Consider use of reference ranges; this approach appears to be similar to t-test in ability to identify differences from reference. Comparison to reference ranges should be used when no site-specific reference area is available.



Puget Sound Confined Disposal Site Study

Information:

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May 1998

Presentation Outline

- Background
- Study phases
- Reconnaissance phase study conclusions
- Feasibility phase study cost sharing agreement
- Feasibility programmatic stage
- Feasibility site-specific stage
- Schedule

Ovrhd 14-2. Presentation Outline

Background

- PSWQA - 1987 Puget Sound Plan - Called for establishment of multiuser disposal sites for contaminated sediments.
- PSDDA - (1989) Federal/State cooperative effort. Eight unconfined, open-water disposal sites, dredged material evaluation procedures.
- Ecology - (1991) Completed base studies and recommended interagency effort to establish multiuser disposal sites.

Ovrhd 14-3. Background

Background

- PSWQA - Adopted Ecology recommendations into 1994 Puget Sound Plan, directing development of an Action Plan.
- Reconnaissance Study - (1995-96) Developed Action Plan. Basis for agency agreement to proceed with multiuser disposal site planning.
- Cost Sharing Agreement - (1997) State and Federal funding available to conduct detailed investigations.

Ovrhd 14-4. Background (Cont.)

MUDS Study Goal

To assess whether the establishment of one or more multiuser disposal sites for contaminated sediments found in Puget Sound is a publicly-acceptable, environmentally-sound, and cost-effective solution to the regional contaminated sediment disposal problem.



Ovrhd 14-5. MUDS Study Goal

Study Phases

- **Reconnaissance Phase**
 - Congressionally authorized and 100 percent federally funded
 - Reconnaissance report (June 1997)
 - Feasibility study cost sharing agreement (July 1997)
- **Feasibility Phase**
 - Cost shared 50-50 between Corps and State of Washington
 - Sponsoring and cooperating agencies
 - Programmatic stage
 - Site-specific stage

Ovrhd 14-6. Study Phases

Reconnaissance Phase Conclusions

- Lack of suitable disposal sites impedes environmental cleanup and habitat restoration.
- Is an obstacle to improvement and maintenance of navigation.
- Strong regional commitment to create disposal capacity.

Strong sponsor and cooperating agency support to proceed.
- Agencies agree to cost share further detailed study.

Ovrhd 14-7. Reconnaissance Phase Conclusions

Feasibility Study Cost Sharing Agreement



STUDY SPONSOR:

- State of Washington
 - Department of Ecology
 - Department of Natural Resources
 - Puget Sound Water Quality Action Team

COOPERATING AGENCIES:

- Washington Public Ports Association
- U.S. Environmental Protection Agency, Region 10
- U.S. Fish and Wildlife Service

Ovrhd 14-8. Feasibility Study Cost
Sharing Agreement

Feasibility Study -- Programmatic Stage

- Assess and quantify need.
- Describe disposal alternatives.
- Programmatic review of major environmental, logistic, and economic impacts of alternatives.
- Define a facility siting process.
- Propose technical siting criteria.
- Screen region based on physical/biological/land use features to define Geographic Areas of Interest where a MUDS facility may be feasible.



Ovrhd 14-9. Feasibility Study –
Programmatic Stage

Multiuser Disposal Site (MUDS) Alternatives

- Construct aquatic facility.
- Construct nearshore facility.
- Construct upland facility.
- Rely on existing solid waste landfills.
- Piggyback on projects by others.
- Variation and/or combinations of the above.
- No action (i.e., no MUDS implementation).

Ovrhd 14-10. Multi-user Disposal Site
(MUDS) Alternatives

Feasibility Study -- Site-specific Stage

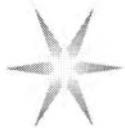
- Apply disposal siting process.
- Apply siting criteria to identify and screen candidate sites.
- Select preferred candidate site(s) and perform detailed analysis and investigations.
- Prepare site-specific EIS and feasibility report with findings and recommendation to Congress and State legislature.

Ovrhd 14-11. Feasibility Study –
Site-specific Stage

Current Schedule

- Summer 1998 Newsletter
- Fall 1998 Draft programmatic
 EIS
- Fall 1998 Public meeting
- Late fall 1998 Final PEIS
- Late fall 1998 Begin site-specific
 stage
- Summer 2000 Draft feasibility
 report and EIS
- Fall 2000 Final feasibility
 report and EIS

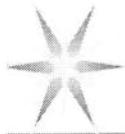
Ovrhd 14-12. Current Schedule



National Sediment News

Stephanie Stirling
USACE, Seattle District

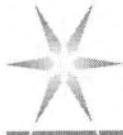
Ovrhd 15-1. National Sediment News



Documents

- Inland Testing Manual
- National Sediment Inventory
- Leachate Guidance

Ovrhd 15-2. Documents



Internet Sites

INTERNET SITES

AGENCIES

USACE, Seattle District, Dredged Material Management Office
<http://www.usace.army.mil/dmno/homepage.htm>

EPA, Region 10
<http://www.epa.gov/region10/>

Washington Department of Ecology
<http://www.wa.gov/ecology/>

Washington Department of Natural Resources
<http://www.wa.gov/dnr/>

Puget Sound Water Quality Action Team
http://www.wa.gov/puget_sound/

DOCUMENTS

Inland Testing Manual
<http://www.epa.gov/OST/pubs/ITM.html>

Ocean Testing Manual
<http://www.epa.gov/OWOW/oceans/gbook/>

Lower Columbia River Dredged Material Evaluation Framework
<http://ppwm1.usace.army.mil/DME>

DATABASES

ERED
<http://www.usace.army.mil/ered/>

Environmental Effects of Dredging and Disposal (E2D2)
<http://www.usace.army.mil/e2d2/>

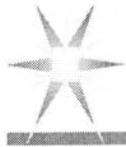
Ovrhd 15-3. Internet Sites



Databases

- E2D2
 - Environmental Effects & Dredging and Disposal
- ERED
 - Environmental Residue - Effects Database

Ovrhd 15-4. Databases



Policy

- National Dredging Team
- EPA's Contaminated Sediment Strategy

Ovrhd 15-5. Policy

United States Environmental Protection
Agency
Office of Water (4305)

Department of the Army
US Army Corps of Engineers

EPA 823-B-98-004
February 1998



US Army
Corps of Engineers

Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual

Inland Testing Manual

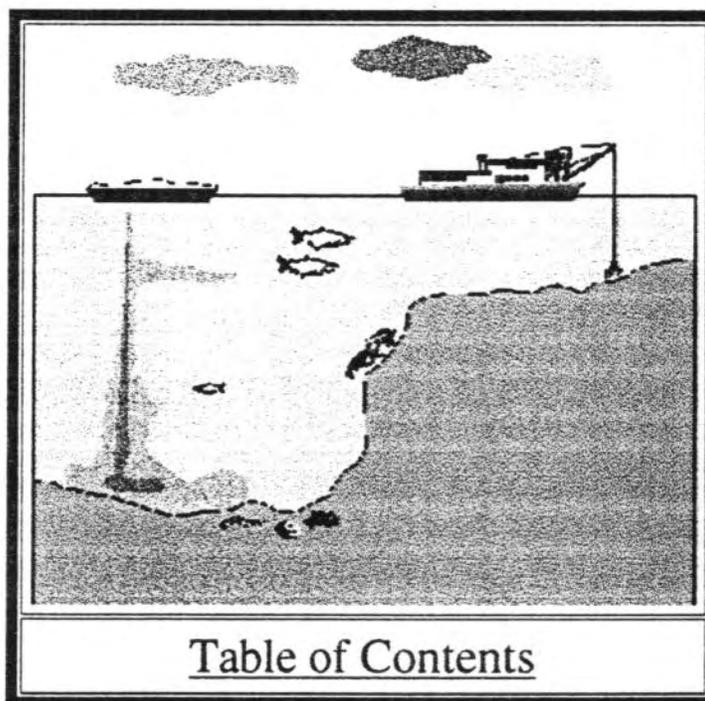


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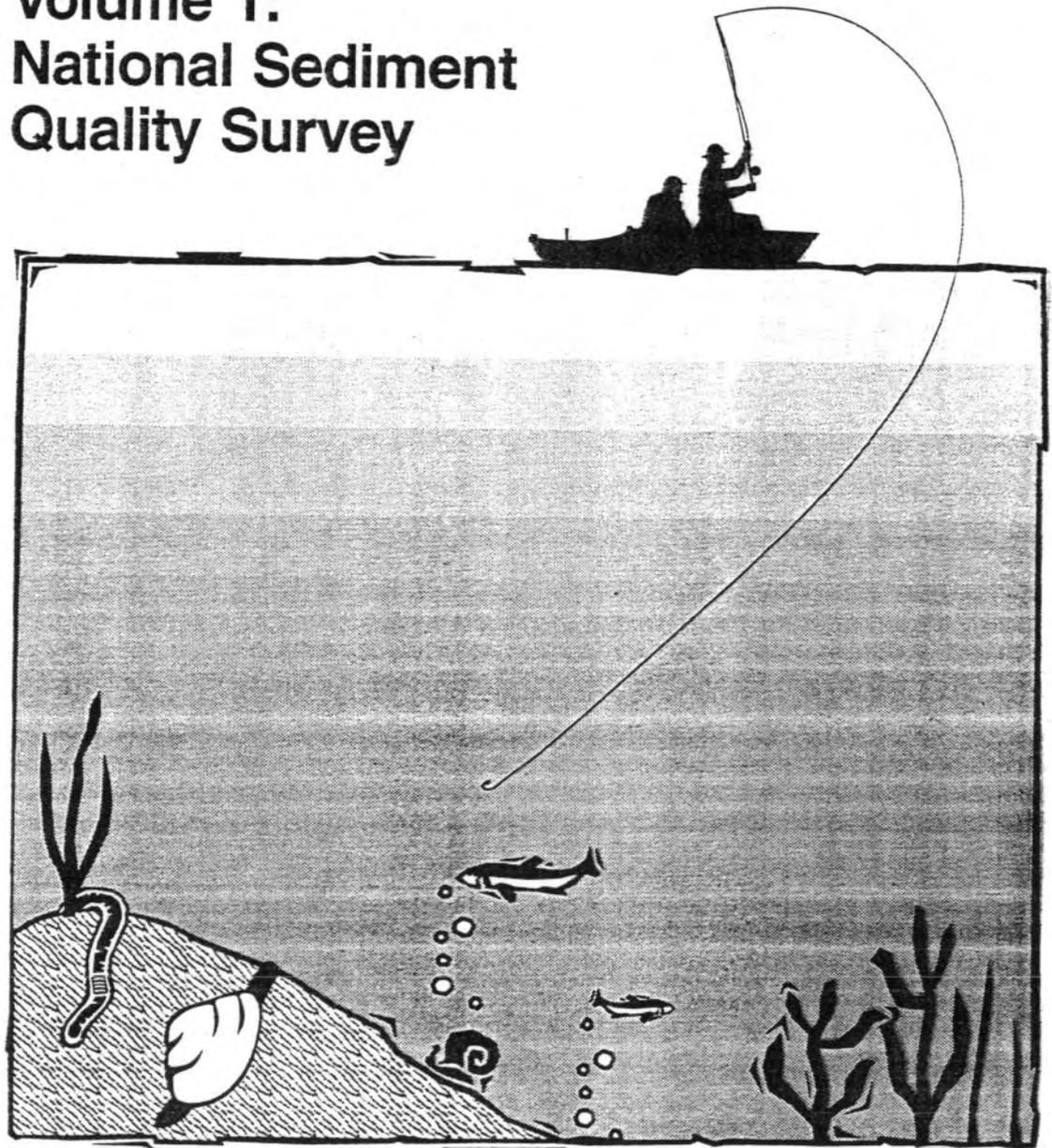
The testing protocols set out in the Inland Testing Manual are intended solely as guidance for use in conducting testing of dredged material to assess the potential for contaminant-related impacts associated with dredged material disposal into open water. The Manual does not alter the statutory and regulatory framework for permitting decisions under section 404 of the CWA. Under that framework, testing is conducted in order to assist the permitting authority in making factual determinations regarding the effect of the discharge on the aquatic ecosystem, and in determining whether the discharge will comply with the 404(b)(1) Guidelines. See 40 C.F.R. 230.10 and 230.11. The current regulations provide for testing under certain circumstances, and this Manual provides suggested protocols to follow once it has been decided that testing is appropriate. The Guidelines provide flexibility to the permitting authority to decide, based upon the facts of a particular case, whether testing is warranted.

The Manual is intended solely as guidance. The Manual is not intended, nor can it be relied upon, to create any rights or obligations enforceable by any party. The Manual provides the best available technical guidance regarding how dredged material should be tested. While it is generally anticipated that the Agencies will follow the procedures in this Manual, Agency decision-makers retain the discretion to adopt approaches on a case-by-case basis that differ from the guidance in the Manual where determined to be appropriate. The document does not, and is not intended to, impose any legally-



The Incidence And Severity Of Sediment Contamination In Surface Waters Of The United States

Volume 1: National Sediment Quality Survey





National Dredging Team



What's New

How you
Can Help

Partners

Kids' Page

POLICY: - Dredging of U.S. harbors and channels is conducted in a timely and cost effective manner while meeting environmental protection/restoration/enhancement goals.

The National Dredging Team was established in 1995 in response to the 18 recommendations in the December 1994 Interagency working Group report to the Secretary of Transportation, "The Dredging Process in the United States: An Action Plan for Improvement."

The Team is composed of two committees, the Steering Committee, composed of senior level executives, and the Operating Management Committee, composed of agency managers and decision-makers, and technical experts.

The Charter of the National Dredging Team commits participating Federal agencies to communication, coordination, and timely resolution of dredging issues and implementation of the recommendations of the report.

The National Dredging Team has also been directed by the Administration to implement the National Dredging Policy, included in the 1994 report.

The Environmental Protection Agency's (EPA's) coastal programs and the Great Lakes regional program are forming Regional Dredging Teams based on guidance by the National Team. These Teams are charged with facilitating localefforts on improving the dredging process and resolution of dredging issues at the regional and local level. These Teams are co-chaired by EPA and the U.S. Army Corps of Engineers and will include local agencies that have regulatory roles in dredged material management.

The National Dredging Team will also provide guidance on formation of Local Planning Groups and development of dredged material management plans. Local Planning Groups are to be established and chaired by the Corps of Engineers and possibly co-chaired by the local port authority, with participation by a broad range of stakeholders in dredged material management.



**US Army Corps
of Engineers**
Waterways Experiment
Station

Miscellaneous Paper D-94-1
April 1994

Long-Term Effects of Dredging Operations Program

Leachate Testing and Evaluation for Freshwater Sediments

by James M. Brannon, Tommy E. Myers, Barbara A. Tardy

Approved For Public Release; Distribution Is Unlimited



REPLY TO
ATTENTION OF:

29 DEC 1997

CECW-OD

MEMORANDUM FOR COMMANDERS, MAJOR SUBORDINATE COMMANDS

SUBJECT: Leaching Test Guidance for Dredged Material Disposal Activities

1. Reference:

a. USACE/USEPA. 1992. "Evaluating Environmental Effects of Dredged Material Management Alternatives - A Technical Framework," EPA 842-B-92-008, Washington, DC.

b. Brannon, J. M., Myers, T. E., and Tardy, B. A. 1994. "Leachate Testing and Evaluation for Freshwater Sediments," Miscellaneous Paper D-94-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

c. Myers, T. E., Brannon, J. M., Tardy, B. A., and Townsend, D. M. 1996. "Leachate Testing and Evaluation for Estuarine Sediments," Technical Report D-96-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

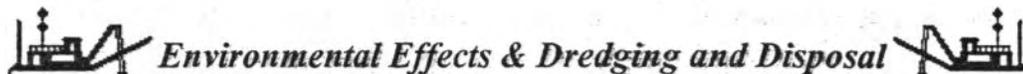
d. Toxicity Characteristic Leaching Procedure (TCLP) TECH NOTE

2. This guidance applies to leachate pathway impacts analysis for dredged material disposal activities undertaken or regulated by the U.S. Army Corps of Engineers.

3. Background.

a. Over the past 25 years, the U.S. Army Corps of Engineers has conducted research leading to the development of procedures and tests for evaluating multi-media dredged material disposal alternatives. At upland contained disposal facilities (CDF's) dredged material contaminants can move through volatilization, leaching, plant uptake, storm water run-off, and effluent through the de-watering discharge weirs. The potential for leachate containing contaminants migrating into surface or ground water and effluent discharged from the weirs are the primary contaminant pathways of concern at CDF's. When beginning the evaluation for upland dredged material discharges, there are two primary concerns: 1) Is there a reason to believe that there are contaminants of concern in the proposed dredged material; and 2) what are the likely contaminant migration pathways? The effluent discharge has long been addressed

Ovrhd 15-10. Memorandum Re: Leaching Test Guidance for Dredged Material Disposal Activities



Simple Query

Many of the Corps Districts, journals, agencies, and universities referenced in this database have internet sites. The footer on the bottom of each page catagorizes and provides links to known sites.

✱ To search on specific phrases, enclose the text in quotes. (e.g., "environmental dredging")

✱ Search is **Not** Case Sensitive.

Enter generic query: (Searches all fields for entry)

Title:

Author: (Last names only)

Publication year:

Connect all four query fields with: AND OR.

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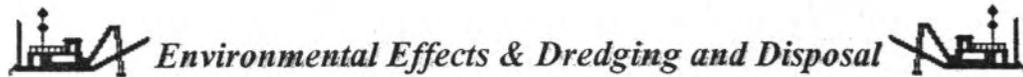
Webdate September 1997

Updated January 1998

Monday, May 11, 1998

9:39 AM

Ovrhd 15-11. Environmental Effects & Dredging and Disposal (E2-D2) Simple Query – *Neanthes*



Your query was:

neanthes au=(moore soundex moore)

The selected databases contain **28** documents matching your query:

Select some of the following documents:

fetch documents

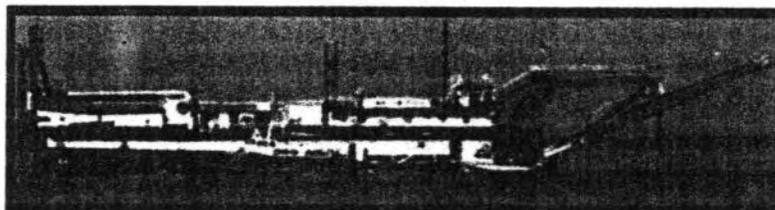
new choice

- 1: Inorganic particulate suspensions in the sea and their effects on marine animals.
- 2: Chronic Sublethal Effects of San Francisco Bay Sediments on Nereis (Neanthes)arenaceodontata; Partia
- 3: A Chronic Sublethal Sediment Bioassay with the Marine Polychaete Nereis (Neanthes) arenaceodontata.
- 4: Review of Dredged Material Disposal Techniques to Identity Wildlife Habitat Development Factors.
- 5: Preliminary Protocol for Conducting 28-Day Chronic Sublethal Sediment Bioassays Using the Estuarine
- 6: Treatability of Dredged Material. (Laboratory Study).
- 7: Chronic Sublethal Sediment Bioassays for the Regulatory Evaluation of Marine and Estuarine Dredged M
- 8: Development and Application of Design and Operation Procedures for Coagulation of Dredged Material S
- 9: Proposed New Guidance for Interpreting the Consequences of Bioaccumulation from Dredged Material.
- 10: A salty affair.
- 11: Progress in England and Wales on the development of beneficial uses of dredged material.
- 12: Monitoring Cruise at the Massachusetts Bay Disposal Site, August 1994.
- 13: Chemical Analyses of Sediment Sampling at the Massachusetts Bay Disposal Site, 5-7 June 1989.
- 14: Sediment Core Chemistry Data Summary from the MQR Mound, August and December 1991.

Monday, May 11, 1998

9:37 AM

Ovrhd 15-12. First Page of List of Documents Matching *Neanthes* Query

E2-D2**Environmental Effects & Dredging and Disposal**

Click Dredge to Enter Database

[U.S. Army Corps of Engineers](#) | [Waterways Experiment Station](#) | [Environmental Laboratory](#) |

[Warning](#)

Welcome to *E2-D2 (Environmental Effects & Dredging and Disposal)*. *E2-D2* is a literature database comprised of technical references covering a diverse range of topics related to environmental effects of dredging and dredged material disposal projects. The database focuses on broad topics such as beneficial uses of dredged material, contaminated sediments, and effects of sediment resuspension and sedimentation on aquatic organisms and their habitats. Much of the technical literature pertaining to dredging and dredged material disposal is found in the "gray" literature, i.e., non-peer-reviewed federal or state agency publications, or proceedings of symposia and specialty conferences. Many other studies of dredging operations are documented in the form of unpublished contract reports frequently held in project files rather than libraries or archives.

[\(Click here for more information\)](#)

Points of Contact



[Connect to E2-D2 Database](#)

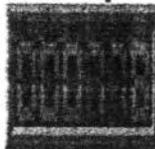


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Webdate September 1997

Updated February 18, 1998

Visitors since September 1997



The Environmental Residue-Effects Database (ERED)

U.S. Army Corps of Engineers | Waterways Experiment Station | Environmental Laboratory | Warning

The U.S. Army Corps of Engineers/U.S. Environmental Protection Agency Environmental Residue-Effects Database (ERED) is a compilation of data, taken from the literature, where biological effects (e.g., reduced survival, growth, etc.) and tissue contaminant concentrations were simultaneously measured in the same organism. Currently, the database is limited to those instances where biological effects observed in an organism are linked to a specific contaminant within its tissues.

Point of Contact: Dr. Todd Bridges E-mail

-
- ▶ Quality Assurance/Quality Control Issues
 - User Directions (Read First)
 - Data Coverage
 - Dredging Applications
 - ▶ The Nature of Toxicological Effects
 - Interpreting Bioaccumulation
 - Acknowledgments

New users download plug-in



Users with Winframe plug-in installed
Search the ERED



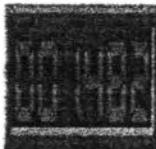
Dredging Operations Technical Support (DOTS) Program

Work for Others | Search | Technology Transfer | WES / Area Maps | What's New!

Webdate: November 4, 1997

Updated February 25, 1998

Visitors since November 4, 1997



INTERNET SITES

AGENCIES

USACE, Seattle District, Dredged Material Management Office
<http://www.nws.usace.army.mil/dmmo/homepage.htm>

EPA, Region 10
<http://www.epa.gov/region10/>

Washington Department of Ecology
<http://www.wa.gov/ecology/>

Washington Department of Natural Resources
<http://www.wa.gov/dnr/>

Puget Sound Water Quality Action Team
http://www.wa.gov/puget_sound/

DOCUMENTS

Inland Testing Manual
<http://www.epa.gov/OST/pubs/ITM.html>

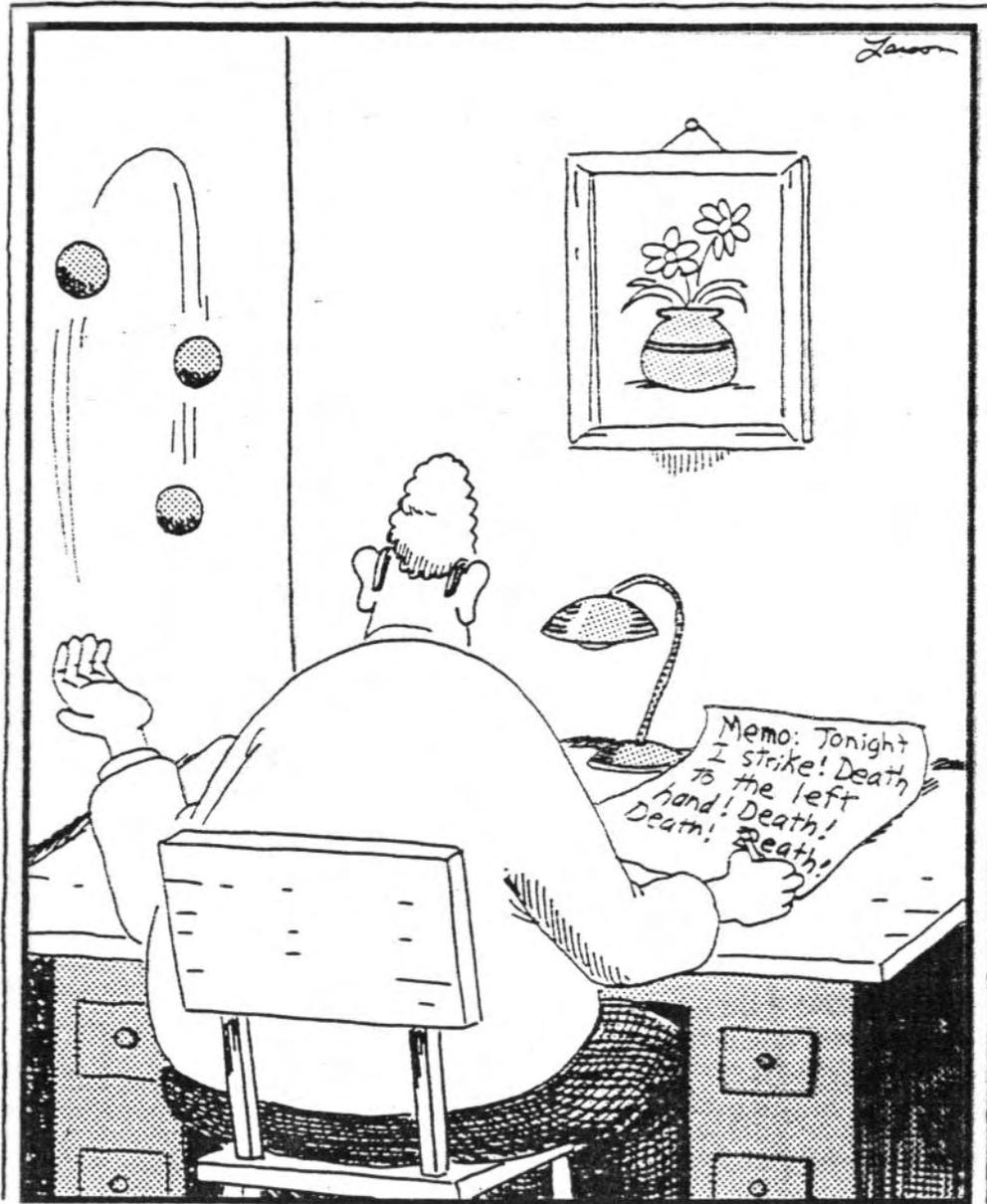
Ocean Testing Manual
<http://www.epa.gov/OWOW/oceans/gbook/>

Lower Columbia River Dredged Material Evaluation Framework
<http://nppwm1.npp.usace.army.mil/DME>

DATABASES

ERED
<http://www.wes.army.mil/el/ered/>

Environmental Effects of Dredging and Disposal (E2D2)
<http://www.wes.army.mil/el/e2d2/>



Innocent and carefree, Stuart's left hand didn't know what the right was doing.

DMMP ACTIONS FOR PRIORITIZATION

1. Neanthes bioassay: PSEP/WES protocol issue. If the protocol changes (feeding regime, etc.), what does this do to the present AET effort and potential implementation?
2. Agencies need to better support the DMMP process to ensure continued success!
3. Bioaccumulation: DMMP should consider adopting a risk-based paradigm. Site-specific conceptual models should be developed for each site.
4. Workgroup process needed to actively resolve technical and policy issues outside SMARM.
5. Technical review of freshwater bioassay protocols and incorporation into PSEP protocols.

Ovrhd 16-1. DMMP Actions for Prioritization