SEDIMENT MANANGEMENT ANNUAL REVIEW MEETING
MAY 1, 2002

MINUTES

July 5, 2002

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SMARM MINUTES

Attachment 1: Agenda

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LIST OF ACRONYMS

BCOC	Bioaccumulative Chemicals of Concern
BT	Bioaccumulation Trigger
BWG	Bioaccumulation Work Group
CAD	Confined Aquatic Disposal
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Chemicals of Concern
CSMP	Cooperative Sediment Management Program
CWA	Clean Water Act
DGPS	Differential Global Positioning System
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Program
DNA	Deoxyribonucleic acid
DNR	Washington Department of Natural Resources
DOT	U.S. Department of Transportation
Ecology	Washington Department of Ecology
EHOU	East Harbor Operable Unit
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
GIS	Geographic Information System
GPS	Global Positioning System
Hg	Mercury
ML	Maximum Level
MARAD	U.S. Maritime Administration
MLLW	Mean Lower Low Water
MUDS	Multi-User Disposal Site
NAPL	Non-aqueous phase liquid
NDT	National Dredging Team
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRC	National Research Council
OMMP	Operations, Maintenance, and Monitoring Plan
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PP	Powerpoint presentation
PSDDA	Puget Sound Dredged Disposal Analysis
PSEP	Puget Sound Estuary Program
PSNS	Puget Sound Naval Shipyard
PSWQAT	Puget Sound Water Quality Action Team

RDT	Regional Dredging Team
RI	Remedial Investigation
RTK	Real-time Kinematic
SAPA	Sampling and Analysis Plan Appendix
SEDQUAL	Sediment Quality Information System (Ecology)
SL	Screening Level
SMARM	Sediment Management Annual Review Meeting
SMS	Sediment Management Standards (Washington)
SQS	Sediment Quality Standard
SVPS	Sediment Vertical Profile System
TBT	Tributyltin
TEQ	Toxic Equivalent Quantity
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
USFW	U.S. Fish and Wildlife Service

SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING MINUTES

The Cooperative Sediment Management Program (CSMP) held its annual review of dredging/disposal and sediment management issues on May 1, 2002. This Sediment Management Annual Review Meeting (SMARM) was hosted by the U.S. Environmental Protection Agency (EPA) Region 10 and held in the Galaxy Conference Room of the U. S. Army Corps of Engineers' Federal Center South in Seattle, Washington. The SMARM encompassed both the Dredged Material Management Program (DMMP) annual review meeting and the Washington State Department of Ecology's (Ecology) 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 DMMP agencies include the U.S. Army Corps of Engineers (USACE), Seattle District; EPA, Region 10; the Washington Department of Natural Resources (DNR); and Ecology. The meeting agenda is provided as Attachment 1, and Attachment 2 is the list of attendees.

MORNING SESSION

WELCOME AND OPENING REMARKS

1. Brian Applebury, Chief, Operations Division, USACE, Seattle District, welcomed all to the 14th annual review meeting, and introduced Gary Voerman, Chief of the Aquatic Resource Unit, EPA Region 10, who gave the opening remarks. Mr.Voerman described early Commencement Bay projects and the ever-mounting sediment issues. Mr. Voerman also noted the history and positive cooperation and interagency growth of PSDDA that helped form the DMMP and CSMP. He spoke of future challenges and growth potential in linking up programs, which not only deal with cleanup but with prevention. EPA priorities include salmon recovery and cross-program integration at a watershed level.

KEYNOTE SPEAKER

2. Keynote speaker Kathy Fletcher, People for Puget Sound, gave her perspective on where we are in our efforts to protect and restore Puget Sound, and on sediment management from a historical perspective.

She cited an editorial in the Seattle Post Intelligencer from over fifty years ago on the concerns and need for attention to depleted salmon runs. Ironically, this editorial is still current. Ms. Fletcher's goal and challenge for this group is to not have this editorial be relevant ten years from now.

Ms. Fletcher recalled that ten years ago, on the 20th anniversary of the passage of the Clean Water Act (CWA), there was discussion of the difficulties of reaching the goals set out in the act. There was inadequate enforcement and failure to continually reduce the discharge of pollutants into the environment to achieve the CWA goal of a zero discharge policy for pollutants. Today, at the 30th anniversary, the same issues are still present.

In 1987 the Puget Sound Management Plan, adopted by the Puget Sound Water Quality Authority, set down initial goals for dealing with sediments as they relate to the cleanup and restoration of Puget Sound. They recognized that understanding the issues surrounding sediment was crucial for moving forward. It was in the early 1980's that correlations where discovered between contaminated sediment and diseased fish.

Ms. Fletcher stated that the original thinking about discharge contaminants and pollutants in the water column was as antiquated as "the solution to pollution is dilution: that if things where put into the environment in "small" or "trace" amounts they were no longer an issue. Once we started to pay attention to where those trace amounts were ending up, which is in the sediments, we started to understand that some of these compounds do not break down and they remain in the sediment. Recognizing this, they understood that the whole concept of how we regulate pollution needed to be changed, and it was quite possible that the CWA was either on its way out or need major reform to address these new findings. This led to the Puget Sound Management Plan, which lays out the process that develops standards, inventories sites, sets priorities, and feeds back information on discharge sites to assure we are not contaminating these sites. What they had in mind was a systematic approach where in a few years they would have the groundwork necessary to go about cleaning up all the contaminated sites and go about assuring that they were not being re-contaminated.

She expressed that the SMARM meeting is a "bitter-sweet" situation for her. The fact that monthly meetings and the annual meeting have been going on for 14 years demonstrates our dedication to the problem. However, there is still the problem. Ms. Fletcher believes that it is time to revisit the initial concept/question this group strives to answer and to measure the length to which we have had success in answering the question/solving the issue. She believes that unfortunately we are not as far as we might believe we are. If the initial question/goal was to restore salmon runs and cleanup/restore Puget Sound, how close are we to that initial goal? She is conscious of the political and monetary issues that one must wade through to even have the smallest amount of impact. She challenges us to make sure that we are not just engaged in processes but that we are looking at achieving goals and moving forward.

She asked the question, “Where are we with Puget Sound”? The 2002 state of the Puget Sound ecosystem, based on the Puget Sound Action Team reports, is a mixed bag of good news and bad news, There are some truly disturbing issues. The decline in the Orca population is noteworthy. Due to the decline in food supplies (salmon) and the co-occurring contamination that collects in the blubber of the whale, the whales are unable

to thrive in the Puget Sound environment. We need to focus on the whole Puget Sound ecosystem, to set aside the politics and the monetary issues that in her perception are clouding the issues and running the process in circles. There is a need for a renewed sense of urgency and energy to address cleanup of Puget Sound. She believe that the public needs to be involved and to have an explanation of the issues involved in Puget Sound and how sediment is related to the Orcas, salmon runs and sea bird populations. She referred to a new publication put out by People for Puget Sound entitled, "Toxics in the Puget Sound Food Web". She notes that there are twin challenges on the road to success. These are: getting the job done, and engaging the public in these issues. Ms. Fletcher extends this gauntlet to all at the meeting to getting the Puget Sound problems solved.

Comment: Jim Thompson (general public) sent out a challenge to all in the room to join in and participate with Kathy Fletcher's existing programs for cleaning up the global environment.

Question: Erika Hoffman, EPA, asked if Ms. Fletcher would be able to stay and hear about the things being done and the works in progress in this area.

Response: Ms. Fletcher responded that she would not be staying but would collect all written materials. Ms. Fletcher reiterated that she is aware of all of the work being done. However, we need to measure the work being done against the original goals and time frame set out. She said, "Measure all of that forward progress relative to where we are trying to get. I think there is a huge distance to go there and I am not at all convinced that what is in motion now is going to get us there in time."

Mr. Applebury recapped Ms. Fletcher's comments. He then introduced the panel of agency representatives: Tom Gries, Washington Department of Ecology (Ecology); Leigh Espy, DNR; Gary Voerman, Chief of the Aquatic Resource Unit, EPA Region 10; David Kendall, USACE. Mr. Applebury presented the meeting agenda and gave a history and purpose of SMARM, including an overview of the objectives of DMMP and the SMS.

PP 1.1	Sediment Management Annual Review Meeting
PP 1.2	2002 SMARM
PP 1.3-1.4	Meeting Objectives And Purpose
PP 1.5-1.6	Agency Summary Reports
PP 1.7	DMMP/SMS Presentations
PP 1.8	Agency and Public Issue Papers / Discussion
PP 1.9	Topical Presentations / Lessons Learned
PP 1-10	Regional Updates
PP 1.11	Summary and Closing

AGENCY SUMMARY REPORTS

3. DMMP Program Actions And Accomplishments (David Kendall, USACE-DMMO) Dr. Kendall summarized the past year's activities and accomplishments of the DMMP. He highlighted the website at: http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=dmmo&pagename=home, and encouraged all to visit the website and view the information available. USACE has just posted the biennial report for dredging years 2000-2001. During the 2001 dredging year (June 16, 2000 to June 15, 2001), there were 15 suitability determinations of which 9 projects passed all material. Dr. Kendall noted that the failed material was primarily from projects in Hylebos Waterway: 1) Mouth of the Hylebos and Murray Pacific, and 2) Wood Debris Group, Manke Lumber / Weyerhaeuser. Two projects conducted bioaccumulation testing for TBT (Port of Anacortes / Cape Sante Marina; and Weyerhaeuser Company / Hylebos Waterway). The two largest projects were from the Hylebos Waterway (649,700 cy cumulative total volume spread over six different project areas) and Grays Harbor operations and maintenance dredging (1.86 million cy dredged annually).

To date in 2002 dredging year (June 16, 2001 to June 15, 2002) , there have been ten suitability determinations completed, and one project (Pierce County Terminal) slated for bioaccumulation testing for PCBs and DDT[1]. One additional project may undergo bioaccumulation testing for TBT. He noted that to-date only one project had failed material (U.S. Coast Guard – Pier 36).

Dr. Kendall described action issues for the DMMP, including ammonia sensitivity and purging for amphipod toxicity testing and the upcoming site monitoring for Elliott Bay beginning in June 2002. He discussed the Bioaccumulation Work Group and the bioaccumulation chemicals of concern list that is being proposed (and that Erika Hoffman would speak on later). Dr. Kendall noted that the DMMP continues to update and augment its tools for evaluating dredged material, and address other environmental issues. The DMMP is currently evaluating the potential use of the *Leptocheirus plumulosus* 28-day chronic test, as an alternative test in the DMMP. The DMMP agencies are currently evaluating a draft programmatic assessment of "Essential Fish Habitat" in Puget Sound relative to the PSDDA disposal sites

PP 2.1	Sediment Management Annual Review Meeting
PP 2.2	Overview of DMMP/SMS Program Activities
PP 2.3	Post 2001 SMARM Changes Implemented in DMMP
PP 2.4-2.6	Dredging Year 2001
PP 2.7	Dredging Year 2002

[1] Subsequent to the SMARM the Port of Tacoma elected not to conduct the bioaccumulation testing, but to accept the initial SDM that concluded that all DMMUs with boaccumulation trigger exceedances are unsuitable for unconfined-open-water disposal without further testing.

PP 2.8 Ongoing Projects
PP 2.9 DMMP Ongoing Action Issues
PP 2.10 For more DMMP information (web address)

4. DMMP Disposal and Monitoring Activities Summary (Robert Brenner, DNR)
Mr. Brenner noted at the beginning of his presentation that the time would not allow him to present all the data and so he would be presenting the highlights. Mr. Brenner gave an overview (from a historic to present perspective) of the disposal site at Commencement Bay. He discussed the monitoring tools, which consist of: sediment and tissue chemistry, sediment vertical profile system (SVPS), bioassay, and benthic infaunal community structure analyses, and how they fit in with the monitoring framework. There were some modifications to the traditional monitoring done this year to better assess the site.

The 1988 baseline analysis found contaminated dredged material from a dumpsite was present at the Commencement Bay site. In 1995, a full monitoring event was conducted. They found that all of the dredged material was still on-site and that the chemical contaminants where still present. A SVPS survey in 1998 found a thin band of fine sands and sandy silts present beyond the site boundary to the northwest. A SVPS survey in 2001 showed large excursions (areal, not volumetric) to the north-northwest and southwest, which implied that Hypothesis 1- dredge material remained on-site - can be rejected. Benchmark analyses were performed to help decipher if what is occurring is a bay wide or a site-specific dredged material issue. They found a preponderance of evidence indicating that bay-wide changes have occurred.

Based on monitoring results, Mr. Brenner discussed the following three questions:

Question 1: Does dredged material remain on-site?
- Hypothesis 1: Dredged material remains within the site boundary
  - Rejected, based on SVPS survey
- Hypothesis 2: Chemical concentrations off-site do not increase due to disposal
  - Not Rejected, chemical concentrations did not measurably increase over time due to disposal

Question 2: Has dredged material disposal caused biological effects conditions to be exceeded?
- Hypothesis 3: On-site chemical concentrations don't exceed Site Condition II guidelines
  - Not Rejected, no ML exceedances
- Hypothesis 4: Sediment toxicity doesn't exceed Site Condition II guidelines
  - Not Rejected, all three on-site stations passed bioassay interpretive guidelines

Question 3: Are unacceptable adverse effects occurring off-site due to disposal?

Hypothesis 5: No significant increase in chemical body burden of benthic infaunal taxa

Not Rejected, benchmark analysis indicates bay-wide change

Hypothesis 6: No significant decrease in abundance of dominant benthic infauna taxa.

Not Rejected, benchmark analysis indicates bay- wide decrease in benthic infaunal abundance

Due to presence of off-site materials, the Commencement Bay disposal site will be monitored annually through the life of the Pierce County Terminal project.

There were no questions.

PP 3.1	2001 Full Monitoring at the Commencement Bay Disposal Site
PP 3.2	Monitoring Framework
PP 3.3	Agenda
PP 3.4	Commencement Bay Disposal Sites - Historic
PP 3.5	Monitoring Tools
PP 3.6	2001 Modifications
PP 3.7	Summary of Baseline Conditions
PP 3.8	Summary of 1995
PP 3.9	Summary of 1996 "Partial"
PP 3.10	Summary of 1998 SVPS
PP 3.11	Commencement Bay Disposal Site
PP 3.12	2001 Results
PP 3.13	Commencement Bay Disposal sites - overlay of 1988, 1998, and present footprints of the disposal Site
PP 3.14	Sediment Vertical Profile System (SVPS)
PP 3.15	Commencement Bay Disposal Sites
PP 3.16	Sediment Chemistry
PP 3.17	Tissue Chemistry
PP 3.18	Bioassays
PP 3.19	Benthic Community Analyses
PP 3.20	Benchmark Station Analyses
PP 3.21	Special Studies
PP 3.22	Evaluation of 2001 Data
PP 3.23	Hypothesis
PP 3.24	Hypothesis
PP 3.25	Future Monitoring
PP 3.26	Special Studies

5. Summary of SMS Cleanup Activities (Tom Gries, Ecology)

Mr. Gries introduced the new Unit Supervisor for the sediment management unit at Ecology, Kathryn Carlin and new toxicologist Fu-Shin Lee (human health risk

assessment). He stated that the objective of SMS activities is to clean up and control sources of contaminants in sediment. Ecology has identified over 100 marine and 24 freshwater sediment sites. He noted that 10 years ago there were no freshwater sites. Mr. Gries described progress in marine sediment site cleanup and noted significant dredging and sediment management efforts are ongoing. There has been significant progress on the Cascade Pole, Commencement Bay, Kah Tai Lagoon and Puget Sound Naval Shipyard cleanups. The lower Duwamish Waterway Phase I evaluations have begun, with Ecology and EPA involved with cleanup and source control. The Phase I studies will look at existing data and the potential areas of concerns for the benthic community and will include ecological and human health risk assessments using existing data to identify hot spot areas. The Bellingham Bay Pilot Project includes several active cleanup sites and a summary report will be posted on Ecology's website at: http://www.ecy.wa.gov/programs/tcp/smu/sediment.html

Mr. Gries also discussed the freshwater sites that Ecology is working on and the issues involved with each of these. Sediment cleanup status reports and updates are also available on the website.

Ecology is looking at establishing freshwater sediment guidelines, particularly in response to Colville Tribe and EPA concerns. However, there are currently no plans to update the SMS. Other guidelines Ecology is looking at include evaluation procedures for wood debris sites. These sites are difficult and need special chemistry and toxicology guidelines. There are also concerns with phototoxicity and developing bioassay protocol modifications for PAH contaminated sediment sites that might be affected by phototoxicity (e.g., intertidal mud flats).

Mr. Gries also reported on Ecology's source control work. The 2002 303(d) Sediment Policy report is available at www.ecy.wa.gov/programs/wq/303d/index.html and will be available for public comment. They are waiting for approval from EPA for sediment TMDLs for Bellingham Bay and Lower Duwamish Waterway. The Lower Duwamish Waterway Workgroup has put together a strategy for source control. The Sediment Management Unit is also providing support to NPDES field permit writers and Ecology field offices for sediment impact zone analysis, and the sediment sampling and analysis plan appendix (SAPA) to the SMS is being revised to be more consistent with DMMP programs (http://www.ecy.wa.gov/programs/tcp/smu/sapa/sapa.htm).

He also provided directions for accessing other guidance documents: http://www.wa.gov/puget_sound/Publications/protocols/protocol.html http://www.nws.usace.army.mil/index.cfm. He reported that Version 4.2 of Sediment Quality Information System (SEDQUAL) was released April 2002 and includes chemical and bioassay hit identification features, automated geographic information system (GIS) mapping capabilities and freshwater data sets. It can be found at www.ecy.wa.gov/programs/tcp/smu/sedqualfirst.htm.

There were no questions.

PP 4.1	Sediment Management Standards Programs
PP 4.2	Sediment Cleanup Activities - Progress on sediment cleanups
PP 4.3	Sediment Cleanup Activities - Freshwater sediment cleanup sites
PP 4.4	Bellingham Bay Pilot Project
PP 4.5	Freshwater Sediment Guidelines
PP 4.6	Additional Guidelines
PP 4.7	2002 Sediment Cleanup Status Report
PP 4.8	Sediment Source Control
PP 4.9	Sediment Sampling and Analysis Plan Appendix (SAPA)
PP 4.10	Public Access to Guidance - SAPA/PSEP Protocols and SMARM Clarification & Issue Papers
PP 4.11	Sediment Quality Information System (SEDQUAL) Release 4.2 April 2002

6. Summary of National/Regional Activities (John Malek, EPA)
Mr. Malek presented a summary of national and regional EPA sediment activities. On March 26, 2001, the National Academy of Science's National Research Council (NRC) published a report entitled *A Risk Management Strategy for PCB-Contaminated Sediments.* Although the NRC report focused primarily on assessment and remediation of PCB-contaminated sediments, much of the information in that report is applicable to other contaminants. The NRC report may be found at http://www.nap.edu/books/0309073219/html. Since that time EPA, collectively, has been trying to respond to the report. He listed some of the issues EPA is looking into (see PP 5.5). From these discussions EPA has developed a ten-step guidance plan for handling contaminated sediments (PP 5.6-5.14). This plan is a work in progress and will be in final form soon. EPA also stands behind guidance they have been using in the past (PP 5.16-5.26). Mr. Malek finished this topic with the following Take-home Messages:

- Many contaminated sediment sites
- Cleanup at large sites can be very costly/controversial
- Still a lot of uncertainty: models, remedy effectiveness, sediment stability
- Federal agencies must coordinate and collaborate on research and tech transfer/training for site managers

New this year is the formation of a Regional Dredging Team. They will formally be called the Northwest Regional Dredging Team. They will address issues such as:

- ESA Consultations
- CWA *vs* ESA Evaluations
- CWA *vs* Superfund Designations
- New Work Disposal Site Designations
- Confined Disposal Facility Sitings
- DMMPs

- Sec 102/103 Ocean Disposal Site Designations
- Regional Sediment Management
- Environmental Windows
- Review of Regional Testing Frameworks

Mr. Malek reported that in 1998 the original Dredging Team formalized the dredged material evaluation framework (focusing on Lower Willamette River and Lower Columbia River). They took all the available data, PSDDA documents, Grays Harbor documents, and national documentation and combined them to make a usable manual for producing an agency approvable SAP. This in theory worked fine, however functionally did not measure up to the expectations of the Team. Also accomplished this year was the letter of agreement signed in March 2002 by EPA Region 10, Oregon Department of Environmental Quality, and USACE Portland District for coordination at the Portland Harbor Superfund Site in the lower Willamette River. In addition, a reference sediment area identification study for the lower Willamette River was completed and this report is available from Tim Sherman, Portland District.

There were no questions.

PP 5.1	2002 Sediment Management Annual Review Meeting
PP 5.2	EPA'S Plan for Addressing Contaminated Sediment
PP 5.3	Why do we Need a Plan?
PP 5.4	Take-home Messages from the NRC Report
PP 5.5	Ten Elements of EPA's Contaminated Sediments Action Plan 1. Continue Obtaining Stakeholder Input
PP 5.6	2. Improve Community Involvement
PP 5.7	3. Implement Risk Management Principles
PP 5.8	4. Develop Contaminated Sediment Remediation Guidance
PP 5.9	5. Implement New Consultation Procedures
PP 5.10	6. Complete National Sediment Quality Survey
PP 5.11	7. Develop Additional Monitoring Guidance
PP 5.12	8. Contaminated Sediment Assessment Pilot
PP 5.13	9. Contaminated Sediments Management Committee
PP 5.14	10. Contaminated Sediments Science Plan
PP 5.15	Principles for Managing Contaminated Sediment Risks
PP 5.16	1 - Control Sources Early
PP 5.17	2 – Involve the Community Early and Often
PP 5.18	3 – Coordinate with States, Tribes, and Natural Resource Trustees
PP 5.19	4 - Develop and Refine a Conceptual Site Model that Considers Sediment Stability
PP 5.20	5 – Use an Iterative Approach in a Risk-Based Framework
PP 5.21	6 – Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models
PP 5.22	7 – Select Site-specific, Project-specific, and Sediment-specific

	Risk Management Approaches that will Achieve Risk-based Goals
PP 5.23	8 – Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals
PP 5.24	9 – Maximize the Effectiveness of Institutional Controls and Recognize their Limitations
PP 5.25	10 – Design Remedies to Minimize Short-term Risks while Achieving Long-term Protection
PP 5.26	11 – Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness
PP 5.27	Take-home Messages
PP 5.28	National Dredging Guidance
PP 5.29	National Dredging Team, Development Of A Regional Dredging Team Who, What, Why, And How
PP 5.30	Charter Northwest Regional Dredging Team
PP 5.31	Regional Dredging Issues
PP 5.32	Dredged Material Evaluation Framework www.nwp.usace.army.mil/ec/h/hr
PP 5.33	Tiered Regional Dredging Team
PP 5.34	Letter of Agreement Between EPA, Region 10, the Oregon Department of Environmental Quality and the USACE, Portland District Concerning the Lower Willamette River
PP 5.35	Lower Willamette River Reference Sediment Area Identification Study

DMMP/SMS PRESENTATIONS

7. Commencement Bay Off-site Materials (Robert Brenner, DNR)
Mr. Brenner began by providing background on the dredged material disposal sites. Prior to 1970 there where no established dredged material disposal sites. The dredgers could choose their own sites and as Mr. Brenner noted "this was not a desirable situation." From 1970-1984 DNR chaired an interagency committee for dredged disposal management. This committee evaluated standards and determined disposal on a project-by-project basis. EPA and Ecology established Puget Sound Interim Criteria in 1984 to provide uniform standards for dredged disposal. In 1985 the Management Plans Work Group led directly into PSDDA, eight disposal sites were established in the Pacific Northwest, and in 1995 the DMMP was created. The DMMP established site criteria (PP 6.5-6.6). Mr. Brenner explained that this background is important to understanding the current issues at the Commencement Bay disposal site.

Initially the Commencement Bay disposal site had a target zone and dredged material was not suspected of being outside the permitted zone. Since 1989 the site has received 3 million cy of material, and during routine physical monitoring in 1998 DNR observed that a small lobe was forming north of the site. This off-site material was over the 3 cm

trigger. This result led to a full monitoring effort in 2001. The 2001 monitoring documented a large lobe to the north-northwest and a smaller lobe to southwest (see PP 6.9). This result triggered a response from the governing authorities and the site was closed to dredged material disposal from August 2001 through February 2002. This allowed enough time to receive monitoring results from the labs, investigate the causes, and approach the permitting authority with findings. Initially there were many theories as to why the material had moved off-site, but modeling confirmed that the dredged material had moved off-site due to the depth of the site (540-560 ft), current flow, and/or the disposal of finer material then originally modeled. There were no significant negative environmental impacts (this was verified by benchmark station analysis). In the future DNR will be placing material from the Pierce County Terminal project at the Commencement Bay site and raising the mound to 85 ft. The site has been authorized for use by Pierce County Planning and Land Services as of March 4, 2002. The current permit expires in September 2003, so DNR is preparing for the extension and renewal, albeit that there will be close scrutiny under which these plans will be carried out. In the future the site will keep the structure that it has now (with the irregular footprint) and there will be annual monitoring, depending on the amount of material disposed.

Question: John Dohrmann, Puget Sound Action Team, asked if the USACE used the model to identify certain upper limits of the currents for which material would stay on the site, and if so what percent of the time will that threshold be exceeded? He also asked if there were certain times or days when it would be better not to place material at the site.

Response: Dr. Kendall responded that they ran the model at various tidal current velocities, including no current at all. He reported that the currents seen out there are pretty low and there will be dispersal outside the site no matter what is done, even if disposal is during dead slack tide.

Additional Response: Tom Gries, Ecology, added that modeling was done to address the question of whether or not the conditions during disposal could address the footprint we saw or not. They show it could. It did not address the management decision of when you should dump such that you wouldn't exceed the original footprint of the site.

Additional Response: Robert Brenner, DNR, reported that they did address that to a certain degree, looking at 40% peak ebb, 40% flood, and 20% slack. They asked the question if limiting the times would solve the issue and the answer was "no". The fine materials are the main issue, silts and clays do not settle out fast. This is what can be carried off-site. Since there have been no environmental problems, including no benthic problems, consideration of disposal at certain times was dropped.

PP 6.1	Commencement Bay Off-site Materials
PP 6.2-6.3	History of Dredging Disposals
PP 6.4	Figure: PSDDA Locations in Puget Sound
PP 6.5	Siting Criteria/Predictions

PP 6.6	Commencement Bay Present
PP 6.7	Commencement Bay Historic Map
PP 6.8	Commencement Bay History
PP 6.9	Figure: Commencement Bay Disposal site with off-site footprint
PP 6.10	Response - Site Closure
PP 6.11	Potential Causes
PP 6.12	Commencement Bay Disposal site: Observed versus Predicted
PP 6.13	Current Knowledge
PP 6.14	Commencement Bay Disposal site with off-site footprint and Mercury (Hg) data points.
PP 6.15	Conclusions
PP 6.16	Future
PP 6.17	Site Status Report
PP 6.18	Situation Report

8. Results of interspecies comparison toxicity testing (Nancy Kohn, Battelle)
Ms. Kohn reported that the DMMP has sponsored research at Battelle to search for a more sensitive endpoint in the biological toxicity testing. Testing was done using *Leptocheirus plumulosus* (28 day test). These test results and the results of the 20-day polychaete and 10-day amphipod test were used for interspecies comparisons of toxicity sensitivity.

Ms. Kohn described the findings for the Duwamish East Waterway testing performed at five comparison stations. Battelle did statistical analysis on the toxicity and chemistry data to compare treatments significantly different from the control for the three species. They then ranked test performance and looked for gradients in each test and response endpoint, and how that would relate from one endpoint to another. The summary of toxicity comparison is as follows:

- *Eohaustorius. estuarius* survival and *Neanthes arenaceodentata* growth endpoints identified all 5 samples as significantly different from control
- *L. plumulosus* reproductive endpoint identified three samples significantly different from control
- Greatest magnitude of difference from control was observed with *L. plumulosus* reproduction endpoint (but high variability limits sensitivity)

Conclusions (See PP 7.11-7.16 for tabulated conclusions):

- *L. plumulosus* test was not more sensitive than amphipod acute test despite additional sublethal endpoints
- *L. plumulosus* test has variability issues: counting offspring, measuring growth rates
- *L. plumulosus* test still has potential for bioaccumulative endpoints and population level effects
- DMMP intends further comparative testing with *L. plumulosus*

Question: An unidentified attendee asked if there was any sexing of organisms at the end of the test.

Response: Ms. Kohn responded that this was not part of the study. Sexing is a very time consuming, labor-intensive process, but it is something you would have to do to look at populations and the reproductive endpoint.

Question: Taku Fuji, Hart Crowser, asked that since *L. plumulosus* was a non-native East Coast species, what steps does Battelle take to insure that *L. plumulosus* are not introduced into the Pacific Northwest ecosystem?

Response: Ms. Kohn responded that discharge water is monitored and they try to prevent species from getting out side their system. They monitor processes to assure species are not introduced into the discharge system.

Additional Response: Brett Betts, Ecology, commented that DMMP has also addressed this issue of the introduction of exotic species because the Washington Department of Fish and Wildlife limits laboratory introduction of exotic species. This program has addressed them.

Additional Response: Ms. Kohn added that all labs report the species they are using to state agencies.

Question: Jim Reese, USACE, asked if the sediment screening process was necessary or for this comparison only.

Response: Ms. Kohn said that they are talking about sieving the material through finer sieves prior to testing. She said Meg Pinza at Battelle would be able to provide the requested information. They have looked at size and screening tests.

Question: Mike Johns, Windward, asked what Battelle thinks is the cause of the variability of the sensitivity and endpoints? Was it lab induced or inherent in the inability to capture neonates at the end of the test?

Response: Ms. Kohn responded that she didn't know and acknowledged that it is difficult to capture the organisms at the end of the test.

Question: Teresa Michelsen, Avocet Consulting, added that this is not the first study to come up with these conclusions. The greatest variability is in the chronic tests. She said that we need to look at these issues and be realistic. Is it worth it to do long term chronic tests and reduce variability to a level that they will be more sensitive? If variability is inherent to the test and there will always be variability, would we still come up with the same results even if we spend time doing laboratory analysis? Or with five to ten years

of laboratory study would we start finding less variability in testing? As a group, we need to look at this.

Response: Erika Hoffman, EPA, added that speaking for Meg, she didn't think laboratory experience has a bearing on the results. Many labs (Battelle included) have been producing similar results.

Question: Dr. Michelsen added that maybe we should focus on looking for a more sensitive acute test species, rather than focusing on c long term chronic tests. She commented that presently long term chronic tests are not getting us better sensitivity just costing a lot of money.

Question: Joe Germano, Germano and Associates, commented that he didn't understand the high variability/low sensitivity (albeit organisms are hard to work with), so why keep spending the money, why beat your head against a wall?

Response: Ms. Kohn responded "We don't know enough yet."

PP 7.1	Interspecies Toxicity Comparison Testing
PP 7.2	Objectives
PP 7.3	Why *Leptocheirus plumulosus*?
PP 7.4	28-d Test with *L. plumulosus*
PP 7.5	Initiating and Running the 28-d Test
PP 7.6	28-d Test with *L. plumulosus*
PP 7.7	Terminating the 28-d Test
PP 7.8	Field Sediment Exposures
PP 7.9	Sediment Sampling Stations
PP 7.10	Sediment Collection
PP 7.11	5 Stations Selected for Toxicity Comparison
PP 7.12	Toxicity Test Conditions
PP 7.13	Toxicity of Field-Collected Sediment
PP 7.14	Response as a Percentage of Control
PP 7.15	Ranked Results
PP 7.16	Endpoint Sensitivity, 5 Field Sediments
PP 7.17	Summary of Toxicity Comparison
PP 7.18	Conclusions

9. Summary overview of DMMP status/clarification papers (Lauran Cole Warner, Corps)
Ms. Warner provided an overview of DMMP status and clarification papers and encouraged everyone to read the papers (including those not presented at the SMARM) on the website: http://www.nws.usace.army.mil (click on: Dredge Material Management).

Ms. Warner summarized two clarification papers. First, she discussed ammonia and amphipod toxicity testing, as two dredging proponents have proposed purging during these tests. Ms. Warner discussed the issues surrounding the lack of data available to the DMMP on this subject. Presently the DMMP allows ammonia purging, but reluctantly. They are looking into the ammonia concentrations for LC_{50} testing and sample purging to determine if and when purging is necessary. There is also the issue of method and batching for the process. However, she said the DMMP recognizes that purging is an issue to be revisited and possibly to be implemented.

Ms. Warner also presented findings (PP 8.7-8.9) on the LC_{50} testing that is being discussed as proposed thresholds. She emphasized that these are guidelines. The USACE would like to minimize purging. They would like to preserve contaminants in their natural and original form. The goal is to find a place where you can have regulatory compliance and still be sensitive to the project requirements.

Ms. Warner summarized a second clarification paper concerning the issue of recency in sediment sampling and testing. The DMMP objective is to have testing results that represent conditions in the material that is actually dredged and for which sediment characterization is valid, without further consideration. The DMMP wants to clarify the recency guideline, as the time between testing and actual dredging has increased due to ESA concerns and the time required to obtain permits.

DMMP has a stepwise approach to determine if sampling was done in a timely enough manner. They will review previous data, new data from the site, and site use and character. If the site has changed since the initial sampling, there will be no extension of recency guidelines. If there are no new data, collection of some additional data may be required. If new data show conditions are improving, recency time may be doubled. If new data show conditions may be worse, additional testing or characterization may be required. They are evaluating variables presented and suggesting a course of action.

Comment: Tom Gries, Ecology, commented that the threshold for ammonia purging is the level at which the DMMP will consider purging in amphipod toxicity testing. Ecology has a paper available (provided in the back of the room) that discusses the toxicity of naturally occurring chemicals like ammonia.

Comment: Doug Hotchkiss, Port of Seattle, expressed several comments about the recency determination. He was interested in discussing how the timeframes are decided. The permitting process is long and increased time is needed for all projects. Why stop at just two times the recency guideline? What about lifts below 4 ft; clarify if it's just surface. Consider how much of the sediment column might have changed. Finally, clarify that it is extraordinary activities that necessitate additional evaluation, not routine activities like shipping.

Additional Comments: Justine Barton, EPA, asked Mr. Hotchkiss if he had been unhappy with the recency decisions on the East Waterway project. Ms. Warner clarified that she did not intend to blame ESA for the recency problem. Mr. Hotchkiss said that the Port, USACE, and services are working to reduce permitting times.

PP 8.1	Summary Overview of DMMP Status and Clarification Papers
PP 8.2	SMARM Papers
PP 8.3	Clarifications
PP 8.4	Ammonia And Amphipod Toxicity Testing: Problem
PP 8.5	Ammonia And Amphipod Toxicity Testing: Areas for Clarification
PP 8.6	Ammonia And Amphipod Toxicity Testing: Reporting Guidelines
PP 8.7	Ammonia And Amphipod Toxicity Testing: Threshold ammonia concentrations for conducting LC_{50} test
PP 8.8	Ammonia And Amphipod Toxicity Testing: Threshold ammonia concentrations for purging
PP 8.9	Ammonia And Amphipod Toxicity Testing: Purging Methods and Batching
PP 8.10	Cartoon
PP 8.11	Recency Guidelines: Big Questions
PP 8.12	Recency Guidelines: Problem
PP 8.13	Recency Guidelines: Approach
PP 8.14	Recency Guidelines: DMMP will review
PP 8.15	Recency Guidelines: Guidelines for extension
PP 8.16	Recency Guidelines: What to do
PP 8.16	To read the papers…

AFTERNOON SESSION

AGENCY AND PUBLIC ISSUE PAPERS

10. Subsurface bioassay issues (Mike Johns, Windward Environmental)
Dr. Johns discussed how to predict what a new sediment surface will be like during biological testing. No studies have been done on this topic. The problem is they have found sediments that are toxic when the chemistry shows no sign of contaminants of concern (COCs). Sediments have been found to be toxic even though they have been buried at sediment depths that were deposited in aquatic systems for 10,000 years and where there is no industry associated with the sediment. This implies you might have toxic sediment where you do not necessarily have COC.

"New" sediment is different from those sediments that are considered "seasoned." The biota that normally thrives in seasoned sediment is not capable of sustaining in new sediment. Dr. Johns gave East Waterway as one example. There has been lots of sampling done in this area and there is lots of data available. It is useful though not conclusive about this issue. It is useful when pairing bioassay and chemistry data to note that the bioassay results do not follow the chemistry exclusively, and this raises the issue of the effect of sediment depth. You might be failing a test based not on chemistry but the depth at which you are sampling, due to the seasoning issue for the biota and benthic community. There is still not a definitive correlation between chemistry and bioassay results.

The underlying issue is of seasoning sediment and that the present protocols for evaluation are not robust enough to address these concerns. Dr. Johns stated a need to recognize that we don't have rules or regulations for new sediments.

PP 9.1	Toxicity in New Sediment
PP 9.2	Definitions
PP 9.3	Examples of New Sediment
PP 9.4	Problem
PP 9.5	Are Unknown COCs or Other Factors the Cause of Observed Toxicity?
PP 9.6	What Observations are Available?
PP 9.7	Richmond Harbor Older Bay Mud
PP 9.8	Oakland Harbor Merritt Sand Formations
PP 9.9	Bahia Upland Soil Placed Under Water (off Petaluma River, SF Bay)
PP 9.10-9.11	East Waterway
PP 9.12	East Waterway: Summary of Total Bioassay/Chemistry Data
PP 9.13	East Waterway Bioassay Failure Rate with Passing Chemistry
PP 9.14	Other Observations
PP 9.15.9.16	Unknown Factors of Toxicity?
PP 9.17	How do we address these concerns?

11. Subsurface bioassay issues (David Kendall, USACE)
Dr. Kendall discussed the ability to distinguish the differences between surface and subsurface sediment bioassay response. He acknowledged that the compositing of sediment can confound some bioassay testing results, but the incidence of confounding results is low. Recently, a subset of select[2] surface and subsurface sediments with bioassay results were compared to evaluate how toxicity was being expressed in sediments with no apparent COC contamination.

[2] The subset of data analyzed was restricted to samples (DMMUs) with no COC SL exceedances and concurrent bioassay responses.

There is a correlation (based on Mike Johns' presentation) that newly exposed sediment surfaces following dredging appear to have higher toxicity then weathered sediments. They also found significantly lower COCs in the weathered sediment as compared to the newly exposed surface. However, post-dredging analysis of these selected areas in the East Waterway also showed variability in the chemistry observed, which makes it difficult to draw any solid conclusions about the toxicity data. Dr. Kendall concluded that other East Waterway/Sinclair Inlet data analyzed seem to demonstrate that there is little apparent difference between surface and subsurface toxicity and that sampling and compositing methods probably reduce the difference between surface and subsurface sediment samples analyzed for dredging projects. Dr. Kendall also concluded that with regard to the East Waterway project, there are significant differences in the contaminant concentrations in surface and subsurface sediments, and that the different toxicity results cannot be directly compared due to the differences in chemical concentrations expressed in the two sampling intervals.

PP 10.1	DMMP Surface / Subsurface Bioassay Response Comparisons
PP 10.2	DMMP Sampling and Testing Approach
PP 10.3	Acknowledged Effects of Sediment Compositing
PP 10.4	Subset of recent DMMP projects comparing surface/subsurface toxicity data
PP 10.5	Table: Comparative Apparent Toxicity Response Evaluation for DMMUs < 1998 Screening Levels (SLs)
PP 10.6	Table: Comparative Apparent Toxicity Response Evaluation for DMMUs < 1998 Screening Levels (SLs)
PP 10.7	Comparison/Contrast of Toxicological findings at two East Waterway Post dredge Stations
PP 10.8	Table: East Waterway Post Dredge Surface Comparisons
PP 10.9	Table: East Waterway Post Dredge Surface Comparisons
PP 10.10	Conclusions: (Surface/Subsurface Toxicity)
PP 10.11	Conclusions: (East Waterway Post dredge Comparisons)

12. Proposed revisions to bioaccumulative chemicals of concern (BCOC) list (Erika Hoffman, EPA)

Ms. Hoffman described how the current BCOC list was developed in 1988 and that it is a subset of the PSDDA chemical list. The bioaccumulation triggers (BTs) in the 1988 list are mostly human health triggers. This original list is being revisited due to what some are finding to be missing BCOC and concerns about the list's deficiencies. Ms. Hoffman described the revision process. This included formation of a Bioaccumulation Work Group (BWG) that helped develop a list of characteristics to be used and selected a list of 136 BCOC for consideration. They divided this list into Primary BCOC (List 1), Candidate BCOC (List 2), Potentially Bioaccumulative (List 3), and Not Considered Bioaccumulative (List 4) (see PP 11.10 through 11.14). The result is 14 new List 1 chemicals (5 of which are not on the DMMP COC list), 20 new List 2 chemicals, and 59 new List 3 chemicals.

The new BCOC list is up for public comment on the DMMO website, and will be revisited in fall 2002. The BWG is still looking into list development issues and how BCOC make the list. Outstanding issues include:

- Evaluating Log K_{ow} thresholds
- How much data is enough?
- Providing more guidance on analytical methods
- What does List 4 mean?
- Providing more details on distributions of contaminants in tissues.

There are also implementation issues, such as SL/ML development for the five new List 1 chemicals that are not currently on the DMMP COC list, and BT development for all List 1 chemicals. They hope to have the list completed and available for comment according to the schedule below:

- Complete supporting document (Summer 2002)
- Post on DMMO Web Site at: *www.nws.usace.army.mil*
- 30-day Public Comment Period
- Revise and finalize lists by Fall 2002.

There were no questions.

PP 11.1	Proposed Revisions to the DMMP's Bioaccumulative Contaminant of Concern List
PP 11.2	What's a BCOC?
PP 11.3	What is the Current BCOC List?
PP 11.4	Why Revise the BCOC List?
PP 11.5	The Revision Process
PP 11.6	What is the BWG?
PP 11.7	Earlier BWG Recommendations
PP 11.8	Key Information Collected - 2001/2
PP 11.9	Proposed Lists
PP 11.10	List 4: No Further Consideration
PP 11.11	List 1: Primary BCOCs
PP 11.12-11.13	List 2: Candidate BCOCs
PP 11.14	List 3: Potentially Bioaccumulative
PP 11.15	Changes to BCOC List
PP 11.16	BWG's Issues re. List Development
PP 11.17	Implementation Issues
PP 11.18	Next Steps

13. Increasing the volume trigger for environmental monitoring of non-dispersive open water disposal sites (Robert Brenner, DNR).

Mr. Brenner presented an issue paper proposing that the volume trigger for environmental monitoring of non-dispersive open water disposal sites be increased. He explained that the need for disposal site monitoring to verify PSDDA predictions of site conditions following disposal, and to ensure compliance with Section 404b permit

requirements, was recognized in the early stages of implementation. However, it was expected that as evidence of successful management increased, the frequency of monitoring would be reduced. Following continuing evidence of proven success, the volume trigger has increased from the conservative initial trigger of 45,000 cy (disposed material) to the current trigger of 300,000 cy. The volume trigger is "soft" and may be adjusted depending on priorities (e.g., another monitoring event already scheduled, disposed material from areas of little contamination, sites with previous deviations from management predictions are prioritized).

The DMMP agencies are proposing that disposal site monitoring frequency requirements be changed as follows. First, to increase the volume trigger to 500,000 cy for central Puget Sound non-dispersive sites (there would be no effect on the little-used Anderson-Ketron or Bellingham Bay sites, and a delayed effect on Commencement Bay). Second, to add a temporal trigger of 15 years from the baseline or previous monitoring to account for changes in environmental conditions.

Mr. Brenner concluded by stating that details of the proposal are available in the issue paper and requested comments.

There were no questions.

PP 12.1. Increasing the Volume Trigger for Environmental Monitoring of Non.Dispersive Open Water Disposal Sites
PP 12.2. Background
PP 12.3. Background (continued)
PP 12.4. Trigger is "soft" and may be adjusted
PP 12.5. Proposed modification
PP 12.6. Comments requested.

TOPICAL PRESENATIONS/LESSONS LEARNED

14. PSNS CAD Pit – The Agony and the Ecstasy (Kathryn Carlin, Ecology).
Ms. Carlin reported on the construction of the confined aquatic disposal (CAD) pit at the Puget Sound Navel Shipyard (PSNS) National Priorities List (NPL) site. The site is located in Bremerton on the Kitsap Peninsula and includes 11,000 ft of shoreline along Sinclair Inlet. The site has been owned and operated by the Navy since 1981 and used for a variety of activities related to ship construction, repair and overhaul. In 1994 the site was placed on the NPL. Sediment contaminants include semivolatile organics, pesticides, PCBs, and metals, including mercury. In 2000, the record of decision for the sediment operable unit described the selected remedy as dredging with disposal in a CAD pit to be excavated on Navy property and established remedial action objectives and cleanup levels.

Ms. Carlin summarized data collected at the site prior to remediation, including baseline data in the CAD pit area. In the pit area, all organics (including PCBs) in ten surface sediment (0 – 10 cm depth) samples were below SQS; mercury concentrations were generally below SQS although there were some exceedances.

Construction activities began in May 2000 and continued to March 2001. Material from the CAD pit excavation was stockpiled on Navy property. Contaminated sediments were dredged with an environmental bucket to limit particulate suspension; where possible a conventional bucket was used. Contaminated sediment was placed in the CAD pit using a split hull bottom-dump barge . An interim 1-foot sand cap was placed over the contaminated material in the pit using a barge crane suspended from a barge. The remainder of the cap was comprised of clean sediment, dredged from the turning basin. This sediment was placed using a pocket scow barge. Extensive water column monitoring showed minimal short-term impacts. Sediment monitoring however, showed elevated chemical concentrations outside the pit perimeter so the area for final capping was increased, and clean turning basin sediment and stockpiled sediment was placed out to 100 feet from the pit-CAD on Navy property. Final capping was completed in August 2001.

Ms. Carlin presented the results of surface sediment monitoring after construction was completed. Elevated concentrations of mercury and PCBs were found in surface sediments up to 300 feet from the CAD pit. In sediment samples from 0-10 cm depth, mercury concentrations 20 ft from the pit perimeter were 2-3 times higher than baseline; concentrations peaked approximately 125 ft from the perimeter. In sediments from 0-2 cm depth, mercury concentrations were 1/2 to 1/3 that in the 0-10 cm samples, and no peak at 125 ft was observed. PCBs around the pit perimeter also showed elevated concentrations and similar distribution patterns.

Ms. Carlin presented three alternatives that were proposed to account for the elevated concentrations and stratification, but clarified that none could be substantiated without additional data. First, the contamination observed existed prior to the CAD construction/filling. This would imply that the limited pre-CAD baseline data (which showed low concentrations of contaminants) may not represent actual conditions. Second, the contaminated sediment may have been dispersed beyond the CAD pit perimeter during filling. Finally, the concentration peak at 125 ft may have resulted from a "mushroom" effect during filling that deposited more material in a ring at this distance, and the cleaner surface layer was an artifact of the placement of clean cap material. The observed results could also be due to a combination of these three factors, or other factors unknown at this time.

Ms. Carlin reported that the observed contamination was immediately addressed by placing capping material past the CAD pit perimeter. However, they did not have enough material to cover all affected areas, and have not covered the portion on state-owned (DNR) land. Discussions with the Navy and DNR concerning cap completion are

ongoing. Ms. Carlin also reported that cap placement was verified using a sub-bottom profiling towfish which showed that the cap was placed as planned.

Ms. Carlin identified two items that in retrospect could have been done differently: a more thorough initial site characterization and inclusion of contingency plans in the sampling and analysis plan that would address results of pre- and post-construction monitoring. She also identified project successes, highlighting the cooperation between the Navy, EPA, Ecology and DNR; the value of having surplus native material available to immediately address the perimeter chemistry conditions; that allowing the sand cap to consolidate resulted in no displacement of contaminated material during placement of the native material cap, and that bottom-dumping is feasible. Remaining work includes completing contaminant dilution work in the CAD pit area (including on DNR managed land) once material becomes available and filling data gaps through long term monitoring.

Question: Justine Barton, EPA, asked if use of SVPS was considered for identifying the margins of dredged and cap material placement.

Response: Erika Hoffman, EPA, responded that they should have, but at the time they were not certain if they would be able to distinguish two layers with similar grain size. They now know this is incorrect and SVPS is being considered for use in the long-term monitoring.

Comment: Joe Germano, Germano and Associates, reported that at an Los Angeles site, contaminated material did come out of the pit and was deposited as much as ½ to ¾ km from the pit. This would explain elevated chemistry levels. Monitoring after dumping but before capping so you know where to cap or cover is a good idea. Ms. Carlin acknowledged that the "mushroom" idea was probably closest to reality.

Comment: Pat Romberg, King County, commented that during capping at the Denny Way site a fair amount of native material used for capping spread off-site.

Question: Teresa Michelsen, Avocet Consulting, inquired if bottom-dumping was really a success when material didn't go where you wanted it to, and if previously clean areas were now contaminated, and even if capped would require future monitoring. She commented that a consistent theme in presentations today seemed to be that material dumped through water does not necessarily go where you want it to go or where you think it will go.

Response: Erika Hoffman, EPA, responded that there was extensive water column monitoring during the PSNS dredging and disposal activities and they rarely saw any elevation in either total suspended solids (TSS) or turbidity at 150 ft, let alone 300 ft. Even calculating sediment concentrations based on maximum TSS still didn't explain the deposition they observed. In response to a question, she added that their water column

monitoring included samples within 1 ft of the bottom. She thinks there may have been some flushing out of the pit, but doesn't think this is the primary factor and that the observed chemical levels may have been preexisting, but there is no data to support this.

Question: Brett Betts, Ecology, asked if any modeling had been done prior to disposal.

Response: Erika Hoffman, EPA, responded that the modeling that was done but it did not address CAD filing; for this they relied on the water quality monitoring. In response to a question, Ms. Hoffman reported that the site was relatively shallow, 40 ft depth.

Comment: Mr. Betts stated that a disposal site should not be sited in your neighbor's yard. Erika responded that it's not reasonable to place a site where you don't know what the surrounding area looks like. Ms. Carlin reported that the Navy made the site available and this allowed the project to happen.

Question: Jeff Stern, King County, asked if further studies were planned.

Response: Ms. Carlin responded that the long-term monitoring planning would address some of the outstanding questions.

Question: Peter Striplin, CEA, asked if they had looked at Ecology's ambient monitoring program station in Sinclair Inlet, since elevated mercury concentrations were reported there.

Response: Ms. Hoffman responded that they had looked at this data and the mercury levels at the Ecology station were not at the levels they saw around the CAD pit.

Comment: John Dohrmann, PSWQAT, suggested they interview Don Weitkamp, Parametrix. At a Port of Seattle fill project in the late 1970's, divers on the bottom observed a sediment plume moving toward them, up berm, and then sloshing back (did not cross berm).

PP 13.1. Puget Sound Naval Shipyard, Confined Aquatic Disposal (CAD) Pit – "The Agony and the Ecstasy".
PP 13.2. Operable Unit B
PP 13.3. PSNS CAD Pit Location
PP 13.4. Photograph – Aerial
PP 13.5. Photograph – Preparation for Dredging
PP 13.6. Photograph – Dredging with Environmental Bucket
PP 13.7. Photograph – Dredging with Conventional Bucket
PP 13.8. Photograph – Inside Split-hull Bottom-dump Barge During Disposal of Contaminated Sediment to CAD Pit
PP 13.9. Photograph – Imported Sand on Flat-deck Barge for Initial Capping of CAD Pit

PP 13.10. Photograph – Filling Pocket Scow with Suitable Sediment for Final Cap
PP 13.11. Photograph – Tugboat Positioning Pocket Scow over CAD Pit for Placement of 'Final' Cap
PP 13.12. Photograph – Sediment Grab Samples Using a Petite Ponar
PP 13.13. Post Cap Hg (ppm, 0-10 cm)
PP 13.14. Post Cap Hg (ppm, 0-2 cm)
PP 13.15. Post Cap PCBs (ppm, 0-10 cm)
PP 13.16. Post Cap PCBs (ppm, 0-2 cm)
PP 13.17. Dispersion of contaminated sediment beyond the CAD pit perimeter by filling?
PP 13.18. Baseline data not representative of true condition?
PP 13.19. Concentration peak at 125' result of CAD pit filling?
PP 13.20. Final Cap and Cover Placement 9/01 – 10/01
PP 13.21. Photograph – Sub-bottom Profiling Towfish Used to Analyze CAD Pit Cap
PP 13.22. Screen Shot of Sub-bottom Profile Sediment Cap Overlaying Sand Cap
PP 13.23. What Might Be Done Differently?
PP 13.24. Successes.
PP 13.25. What's Next?

15. Eagle Harbor Superfund Project (Brenda Bachman, USACE)
Ms. Bachman presented recent information on activities at the Wyckoff/Eagle Harbor Superfund Site, Bainbridge Island, WA, with emphasis on the East Harbor operable units (EHOU) and the soil and groundwater operable units. She summarized the site background at the former wood treatment facility that operated from 1903 to 1988. The site was placed on the NPL in 1987, and groundwater pumping and treatment began in 1990. Primary contaminants of concern are creosote (PAHs) and pentachlorophenol (PCP). Design and construction activities to date have required coordination of both harbor and upland activities, as well as coordination between the USACE and EPA. There have been three phases of capping at the EHOU. With the selection of thermal treatment as the upland remedy, sources are controlled and final sediment capping could proceed.

Ms. Bachman then described the many recent construction and remediation activities at the site. Ms. Bachman noted that having the design team also provide construction oversight during the many recent activities was key to getting the job done on time and assuring coordination of the many contractors and activities. The Phase 1 cap was placed in 1994-1995 and while not intended to be final, acted to reduce risk. This was one of the first beneficial uses of dredged material. Long term monitoring (3 events over 7 years) demonstrated that the north portion of the cap was performing as expected, although three locations near an active seep in the south portion were degrading. The Phase II cap (110,000 cy) was placed over the southern area in 2000 – 2001 using barge wash-off methods. This cap was designed and engineered. The final Phase III cap (50,000 cy) was placed in 2001-2002 by conveyor to create intertidal habitation from shallow subtidal

habitat, provide continuous intertidal habitat around the site, and return the shoreline to conditions prior to human influence.

The Phase II cap included a habitat mitigation beach for habitat lost during installation of a sheet pile wall and removal of a creosote-treated wooden bulkhead. Clean soil that was removed was used to backfill behind the sheet pile wall, and contaminated soil was placed in the upland process area for thermal treatment. This was one of the areas where coordination between the harbor and upland activities and contractors was key.

Ms. Bachman reported on future activities. These include a long-term monitoring plan and updating of the Operations, Maintenance and Monitoring Plan (OMMP) to address the new construction actions (including the new capping, intertidal areas, and southern portion of the cap). The northern portion of the site is meeting objectives and will not be monitored as frequently as in the past. The new OMMP will be for the 10 years following source control. In 2002, a thermal remediation pilot study will be conducted on the upland portion of the site. This does not include the intertidal, but if the decision is to go full-scale, there will be intertidal monitoring for thermal impacts.

Comment: Pat Romberg, King County, commented that while the Eagle Harbor Phase 1 cap was the largest beneficial use of dredged material, it was not the first. In 1992, a capping project on the Seattle waterfront used dredged material.

Question: Brett Betts, Ecology, inquired if ferry scouring was still a concern.

Response: Ms. Bachman responded that this concern had been raised but that while the movement of materials and erosion was what you'd normally expect, there had been no movement of contaminants.

PP 14.1. Wyckoff/Eagle Harbor Superfund Site, Bainbridge Island, WA.
PP 14.2. Site Map.
PP 14.3. Site Background
PP 14.4. COCs
PP 14.5. Design and Construction
PP 14.6. Photograph
PP 14.7. Photograph
PP 14.8. Photograph
PP 14.9. Phase I Sediment Cap
PP 14.10. EHOU Monitoring Zone Map
PP 14.11. Photograph
PP 14.12. Long-term Monitoring.
PP 14.13. Phase II Sediment Cap
PP 14.14. Phase II Cap Design Plan and Section
PP 14.15. Phase III Sediment Cap
PP 14.16. Photograph

PP 14.17. Phase III Cap Plan and Section
PP 14.18. Design drawing – entire cap
PP 14.19. Mitigation beach
PP 14.20. Photograph
PP 14.21. Photograph
PP 14.22. Photograph
PP 14.23. Photograph
PP 14.24. What's Left
PP 14.25. Wyckoff/Eagle Harbor Superfund Site: 1984, 1996, 2000.

16. Cascade Pole Cleanup (Peter Rude and Reid Carscadden, Landau Associates)
Dr. Rude presented a brief background on the Port of Olympia Cascade Pole Site Sediment Remedial Action Project. Dr. Rude acknowledged Russ McMillan as the key Ecology representative for the project. The site, located on Budd Inlet in South Puget Sound, was a wood treating facility from 1939 to 1986. Chemicals of concern are creosote (PAH), PCBs (dioxin), and non-aqueous phase liquid (NAPL). In 1990, a consent decree with the Port, Cascade Pole Company, and state directed an RI/FS and risk assessment. A pilot dredging project was conducted in 1998. Upland remedial actions included construction of a slurry wall, extraction wells with a pump and treatment system, NAPL interceptor trench, and a sheet pile wall to contain upland contamination and limit release to the sediments. Sediment cleanup levels were established at SMS minimum cleanup levels for PAHs; 80 ppt TEQ dioxin; 4,300 ppb carcinogenic PAHs; and any visible NAPL was removed. The sediment cleanup action plan included dredging of contaminated intertidal and subtidal sediments with backfilling to original grade, placement of contaminated sediment in an on-site upland containment area, construction of an additional sheet pile wall, and habitat improvement. There was no capping.

Reid Carscadden, Landau Associates, then described the remedial construction activities that began in the summer 2001 and are now nearly complete. The remedial area is 7.3 acres ranging from +15 ft MLLW to –11 ft MLLW. The tidal fluctuation is 0 to 14 ft leaving some areas exposed for extended periods. NAPL was present in a portion of the sediments. Sediment removal included both land based excavation and marine dredging of subtidal areas. A containment cell was constructed on the upland site to contain the contaminated sediment. It included infiltration trenches and drain pipes to control surface water, and a geotextile cover to prevent surface water infiltration. Habitat improvements included intertidal areas and riparian and salt marsh plantings.

Mr. Carscadden then provided further description and details of the construction activities. The land-based excavation, taking advantage of sediment exposed during low tides, required careful sequencing so that dredging and backfilling of an area could be completed during a tidal cycle. The contractor also successfully developed haul roads using steel plates placed directly on the sediment initially, and then on backfill areas as softer sediment was encountered. Two excavators were used concurrently. A real-time

kinematic (RTK) differential global positioning system (DGPS) using sensors on the bucket and boom and a computer screen installed in the excavator cab allowed the operator to monitor the location and cut depth in real time, check plan and target depths, and record the positions for each location. NAPL was recovered by absorbent pads and booms; large accumulations were removed by excavation and placement in the upland containment cell.

The marine dredging was accomplished using a barge mounted derrick dredge equipped with an environmental clamshell bucket. Material was placed on a scow and then off-loaded to the upland containment cell. Excavated areas were backfilled to original grade. Grade control was again achieved using RTK – DGPS but was problematic and the contractor relied on depth markings on the dredge cable and tide levels for vertical control. Vertical control was critical throughout the project as the limited capacity of the containment cell allowed little tolerance for overdredging. NAPL was also monitored during marine dredging and dredging continued until the sediment and surrounding water came up clean. Mr. Carscadden also noted that during material placement in the containment cell, the contractor could initially ramp into directly into the cell, but later began constructing roads using a variety of methods.

Conclusions presented by Mr. Carscadden included a recommendation that land-based excavation methods be considered in areas where tidal conditions permit and access is possible. This method has the advantage of visual verification and is less costly than marine dredging. He also reported that RTK-DGPS may be worth the initial investment, but cautioned that this is costly and requires installation, training and debugging prior to use. Finally, he noted that on-site disposal should be considered where off-site disposal or treatment is not a viable option. The treatment and collection of drainage and runoff from the contaminated sediments is an important consideration and at this site they were able to take advantage of the existing groundwater extraction and treatment system and slurry wall.

There were no questions.

PP 15.1. Cascade Pole Site, Port of Olympia.
PP 15.2. Outline.
PP 15.3. Wood-Treating Activities
PP 15.4. Regulatory Process
PP 15.5. Upland Interim Action Elements
PP 15.6. Cleanup Levels
PP 15.7. Cleanup Action Plan
PP 15.8. Remedial Design and Construction
PP 15.9. Site Characteristics
PP 15.10. Remedial Design Elements
PP 15.11. Upland Containment Cell Design
PP 15.12. Construction Highlights

PP 15.13. Cascade Pole Land-based Excavation Sequencing Schematic
PP 15.14. Sediment Haul Road Construction and Performance
PP 15.15. Intertidal Haul Road Construction
PP 15.16. Photograph
PP 15.17. Excavation and Backfill Methods
PP 15.18. Photograph
PP 15.19. Photograph
PP 15.20. Real Time Kinematic Differential Global Positioning System
PP 15.21. Photograph
PP 15.22. NAPL Presence and Management
PP 15.23. Photograph
PP 15.24. Marine Dredging Operations
PP 15.25. Photograph
PP 15.26. Backfill Placement
PP 15.27. Grade Control
PP 15.28. NAPL Presence and Management
PP 15.29. Sediment Disposal
PP 15.30. Photograph
PP 15.31. Photograph
PP 15.32. Sediments Restored at Cascade Pole Site.
PP 15.33. Conclusions.

REGIONAL UPDATES

17. Regional Dredging Team (Jim Reese, USACE).
Mr. Reese presented the development of a regional dredging team. He began by describing the chronology of the National Dredging Team (NDT). In 1984, concerns in Congress and DOT about port competitiveness due to the time required for deepening projects resulted in testimony and a report to congress. One recommendation in this report was the development of a National Dredging Team and in 1995 a charter was signed by six federal agencies (USACE, EPA, NMFS, USFW, DOT and NOAA/NOS). In 1997 a report on how to develop regional and local dredging teams was issued, and in 1999 a report on how to elevate issues was prepared. The goal of the NDT was to facilitate communication, coordination, and resolution of dredging issues among participating federal agencies. Participation in the NDT does not supercede or affect the authority of the participating agencies. The NDT organization has two tiers: the National Steering Committee for issue resolution, and the National Operating Team consisting of senior staff and agency managers. Issues are not resolved until all stakeholders have a chance to speak.

Mr. Reese described the Regional Dredging Team (RDT) organization. The teams have a three tier structure: an executive steering committee, a regional management team, and local planning group(s). The executive steering committee is co-chaired by EPA and

USACE and includes representatives from EPA Region 10, USACE, NMFS, NOAA (NOS), USFW, DOT (MARAD) and state and tribes, as needed. The regional management team includes the operations and management committee made up of technical experts and managers from federal, state, tribes and other invited experts that support local efforts (e.g., development of a regional sediment evaluation manual). Finally, the local management groups conduct day-to-day activities, resolve issues or decide when to elevate them, and develop and implement dredged material evaluation frameworks. It includes USACE district, state and federal agencies, ports, non-governmental organizations, and tribes. In the northwest, the local management groups include the Seattle, Oregon, and Walla Walla groups. Mr. Reese reported that the Walla Walla group is working fairly well; the Oregon group is least active due to lack of funding. He gave the Great Lakes as an example of a successful RDT and recommended their website: www.glc.org/projects/dredging.

Mr. Reese concluded by presenting a list of regional dredging issues, including Endangered Species Act issues, new disposal site designations, confined disposal facility siting, DMMPs, Section 102/103 ocean disposal site designations, regional sediment management, environmental windows and review of regional testing frameworks.

There were no questions.

PP 16.1. Development of a Regional Dredging Team: Who, What, Why, and How.
PP 16.2. Chronology of National Dredging Team
PP 16.3. National Dredging Team: Vision
PP 16.4. National Dredging Team: Goals
PP 16.5. National Dredging Team: Legislative Authorities
PP 16.6. National Dredging Team: Memebership
PP 16.7. National Dredging Team: Operating Principles
PP 16.8. Participation on the NDT will not supersede or otherwise affect any authority of the participating agneices
PP 16.9. National Dredging Team Organization
PP 16.10. NDT Steering Committee
PP 16.11. NDT Operating Management Committee
PP 16.12. NDT Issue Resolution
PP 16.13. Information will be sought from all stakeholders to help clarify specific issues as well as provide factual data on the issues
PP 16.14. NDT Agreement
PP 16.15. Tiered Regional Dredging Team
PP 16.16. Tiered Regional Dredging Team
PP 16.17. Tiered Regional Dredging Team
PP 16.18. Executive Steering Committee Tier 3
PP 16.19. Regional Dredging Team Tier 2
PP 16.20. Local Management Groups Tier 1
PP 16.21. EPA/Corps Co-Chairs

PP 16.22. Local Sediment Evaluation Team
PP 16.23. Example of a Successful RDT
PP 16.24. Regional Dredging Issues

18. MUDS, the Final Chapter (John Dohrmann, Puget Sound Water Quality Action Team). Mr. Dohrmann described the development and current status of multi-user disposal site (MUDS) efforts. He reported that the MUDS idea developed in the late 1980s and was identified in the first Puget Sound Management Plan. Ecology conducted the initial feasibility study and concluded that the MUDS idea had value. There have been more recent, exhaustive analyses and studies, including an environmental impact statement by a partnership of the USACE, state and federal agencies, and port associations, which looked at different MUDS scenarios. These scenarios included treatment and regional solid waste landfill capacity. The conclusion is a recommendation from the study team and executive committee to essentially stop pursuing siting and construction of a MUDS, with regional solid waste landfills as the confined disposal option for projects without their own site. They have provided a number of recommendations to try to standardize and streamline landfill use, with the idea that perhaps a state agency could enter into long-term agreement to establish parameters and tipping fees, but no one has stepped forward to do this. Treatment, while tempting, could not be justified in pursuing at this time. Mr. Dohrmann noted a final interesting aspect: while the estimated volume of sediment requiring disposal looks like there is significant demand, they never get dredgers or contractors saying they have material to go to a facility, so he is not sure demand is really there.

There were no questions.

19. Other issues and questions
Mr. Applebury announced that John Malek's update on the Columbia River was cancelled and called for other issues to be considered.

Comment: Peter Stoltz, PI Engineering, asked that more information on selection of reference sites be provided by the USACE/DMMP. Many projects must contact the USACE prior to selecting reference sites, and it would be helpful if more information on location, grain size, past bioassay performance, and other issues related to the site could be provided. He also noted that everyone needs to accurately report wet sieve results and sample locations so that there is a good set of data representing a variety of reference material types.

Response: Dr. Kendall, "comment noted". Lauran Cole Warner, USACE, said that perhaps this is something they can consider adding to the web site.

Question. Jeff Stern, King County, noted a couple of troubling issues raised by the Commencement Bay disposal site monitoring. First, finding contaminants at the site suggests that sampling material before disposal is not catching the problem before it shows up at the site. Second, sediment found off-site at Commencement Bay suggests

the site is failing a number of management criteria. He inquired as to what the next step will be for the management program.

Response: Mr. Malek responded that they would be looking at the monitoring information. They did look at the actual site criteria and the initial modeling used to size the site and concluded that there was no violation of criteria. What they found was that the more compacted new material placed at the site did not perform the same as the maintenance dredged material that was used in the original model. This was a reoccurrence of a problem that had been previously observed at the Port Gardner site.

Dr. Kendall clarified that there were no screening level COC exceedances on-site, or in the offsite material. There were guideline exceedances for a few chemicals (i.e., concentrations 3 to 5 times baseline), but the measured concentrations were well below screening level guidelines and SQS criteria.

Question: Brett Betts, Ecology, inquired if they were in violation of the shoreline permit if disposal was outside the set boundary? And how does a shoreline permit address the issue of outside of boundary issues like this?

Response: Robert Brenner, DNR, responded that during the first shoreline permit application all PSDDA documentation and data were submitted as exhibits. Because the original documentation said that a small amount of material (<10%) was predicted to go off-site, the fact that a small amount of material did go off-site did not violate the permit. They were already notified that this would in all likelihood occur, and when it did, it verified the original predictions.

Mr. Brenner added that the fact off-site material hadn't been observed earlier is just the luck of the draw. Because the material was in smaller volume each year and navigational maintenance dredging in its nature, rather then capital dredging (which has those less consolidated materials), it's lucky nothing happened in earlier days. So it really was simply a blip. In terms of approach, when you look at the figure, and the footprint looks like it's a really big deal, it seems we have a lot of material off-site. But it is superficial coverage and when you look at the thickness of material and look at the 3+ million cy that have gone out there you're talking about less then 2-3% that is really off-site."

Question: Mr. Betts asked how the shoreline permit people reacted to the material being off-site.

Response: Mr. Brenner reported that they met with the director and planning staff and their opinion was that it doesn't appear to be a problem and initial feeling was to go forward with this permit. If the data are good and benchmarking good this permit stands.

Question: Tim Sherman, USACE NW Division Portland District, noted that the original permit is for a mound, but the national trend is to use spreading technique to make it

lower and thinner. He asked if DNR had given any thought to making the site bigger and keeping the mound lower.

Response: Mr. Brenner responded that this was being discussed and it is something to keep discussing. DNR recognizes this has some benefits. If the national trend stays this way then DNR will most likely consider this.

Doug Hotchkiss, Port of Seattle, commented that initially there was a big push for accountability and we have been attempting to keep the target small to show accountability. We have show we're accountable and can track dredge material. Now it's time to look into things and play around with these other ideas. Commencement Bay is deep and there are not the navigational problems like in other areas.

Question: Pat Romberg, King County asked if the next set of material added to the mound (predicted to be 85 ft) will get off-site?

Response: Mr. Brenner responded that running the model for all the data, if the target zone is moved in order to keep the mound height down there will be more material moving off-site than if the mound is at 85 ft. Commencement Bay is deep enough that 85' is not an issue for navigation. In DNR's opinion, it is better to keep the mound high and than to deal with material going off-site.

Question: Jeff Stern, King County, inquired that if there is trouble with the some grain size sediments staying within the site boundaries, has there been a study to look at whether the DMMP should require fine material to be sent to a dispersive site?

Response: Dr. Kendall responded that this action would be cost prohibitive. USACE would also need a compelling reason, like showing that there has been environmental injury at the site and surrounding areas, and that it is the fault of the fine grained sediments. In fact, there have been no effects that can be quantified outside the site boundary.

Additional Response: Mr. Malek responded that there has been positive change/impact. EPA's perspective is that the material is clean and what is the problem with clean material going places? They've done some demonstrations where they've shown that procedures work as far as showing material is clean and suitable; it can be used to improve some of the situations that are out there. They predicted 7% of the material would leave the site, they've only had approximately 2% leave.

Question: Mr. Hotchkiss asked if that by looking at the repopulation each year you would be able to know as you are dumping if it would be beneficial to spread it out. Could that help the area?

Response: Mr. Brenner responded that from monitoring results (with exception of the area adjacent to where the initial excursion was noted), all of the materials outside the footprint have Stage 3 biota. In order to repopulate an area like that you must be less then 30-50 cm or you will smother them.

Additional Response: Dr. Kendall stated that it is a robust benthic community, a healthy area with no evidence of environmental impact. The benthic community structure appears to be a combination of Stage 2 and 3 communities.

CLOSING

There were no substantive issues during the meeting that require DMMP agency deliberation or action. Therefore, Mr. Applebury closed the meeting and invited everyone to the social hour at the Pyramid Alehouse.

Attachment 1: Agenda

SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING
May 1, 2002
Federal Center South, Seattle
Hosted by EPA Region 10

Registration & Coffee ..... 8:30 - 9:00
Welcoming to SMARM 2002 (Brian Applebury, Corps – Master of Ceremonies) 9:00 - 9:05
Opening Remarks (Gary Voerman, EPA - Host) ..... 9:05 - 9:15
Keynote Speaker – Kathy Fletcher, People for Puget Sound ..... 9:15 - 9:45
Agency Summary Reports ..... 9:45 - 10:45

- Corps (Summary of DMMP Testing Activities, Dave Kendall, Corps)
- DNR (Summary of DMMP Disposal and Monitoring Activities, Robert Brenner, DNR)
- Ecology (Summary of SMS Cleanup Activities, Tom Gries, Ecology)
- EPA (Summary of National/Regional Activities, John Malek, EPA)
- Questions and Answers (on any of the above presentations)

Break .....10:45 – 11:00
DMMP/SMS Presentations .....11:00 – 11:45

- Commencement Bay disposal site adaptive management (Robert Brenner, DNR)
- Results of interspecies comparison toxicity testing (Nancy Kohn, Battelle)
- Summary overview of DMMP status/clarification papers (Lauran Cole Warner, Corps)
- Questions and Answers (on any of the above presentations)

Lunch (on your own).....11:45 – 12:45
Agency and Public Issue Papers .....12:45 – 2:15

- Proposed revisions to bioaccumulative chemicals of concern (BCOC) list (Erika Hoffman, EPA)
- Increasing the volume trigger for environmental monitoring of non-dispersive open water disposal sites (Robert Brenner, DNR)
- Subsurface bioassay issues
  - Mike Johns, Windward Environmental – Public
  - David Kendall, Corps - Agencies
- "Open Mike" for issues and questions

Topical Presentations/Lessons Learned.....2:15 – 3:30

- PSNS CAD Pit - The Agony and The Ecstasy (Kathryn Carlin, Ecology)
- Eagle Harbor Superfund Project (Brenda Bachman, Corps)
- Cascade Pole cleanup (Reid Carscadden, Landau Associates)

Break .....3:30 – 3:45
Regional Updates .....3:45 – 4:30

- Regional Dredging Teams – Update (Jim Reese, Corps, NW Division & John Malek, EPA)

- MUDS, the final chapter (John Dohrmann, PSWQAT)

Summary and Closing of SMARM 2002 (Brian Applebury, Corps) .....4:30 – 4:45
Adjourn 4:45
Post-SMARM Social Hour (Pyramid Ale House) .....5:00 – 7:00

Attachment 2: List of Attendees

SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING
MAY 1, 2002
LIST OF ATTENDEES

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SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING
MAY 1, 2002
LIST OF ATTENDEES

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Attachment 3: Powerpoint Slides for each SMARM Speaker

SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING

May 1, 2002

PP 1.1. SMARM Introduction

2002 SMARM

- Jointly Sponsored by the Dredged Material Management Program (DMMP) and the SMS Program
- Moderated by the Corps of Engineers (Lead DMMP agency)
- Hosted by U.S. Environmental Protection Agency, Region 10

PP 1.2. 2002 SMARM

MEETING OBJECTIVES AND PURPOSE

- Obtain public input on proposed changes to the DMMP Management Plans through Issue Papers and Clarification Papers posted on the Corps Dredged Material Management Office's Homepage: http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=dmmo&pagename=home
- Discuss disposal site management actions and changes.

PP1.3. Meeting Objectives and Purpose

MEETING OBJECTIVES AND PURPOSE (continued)

- Obtain public input on proposed changes to the DMMP.
- Presentation and discussion of Public Issue Papers.
- Comments and discussion on Status Reports of ongoing actions of DMMP and SMS Program.

PP 1.4. Meeting Objectives and Purpose (continued)

Agency Summary Reports:

- DMMP Program Testing Activities Summary (David Kendall, Corps)
- DMMP Disposal and Monitoring Activities Summary (Robert Brenner, DNR)

PP 1.5. Agency Summary Reports

Agency Summary Reports: (continued)

- Summary of SMS Cleanup Activities (Tom Gries, Ecology)
- Summary of National/Regional Activites (John Malek, EPA)
- QUESTIONS AND ANSWERS (on above topics)

PP 1.6. Agency Summary Reports (continued)

DMMP/SMS Presentations

- Commencement Bay disposal site adaptive management (Robert Brenner, DNR)
- Results of Interspecies comparison toxicity testing (Nancy Kohn, Battelle N.W.)
- Summary Overview of DMMP Status/Clarification Papers (Lauran Cole-Warner, Corps)
- QUESTIONS AND ANSWERS (on above topics)

PP 1.7. DMMP/SMS Presentations

Agency and Public Issue Papers / Discussion:

- Proposed revisions to bioaccumulative chemicals of concern (BCOC) list (Erika Hoffman, EPA)
- Increasing the volume trigger for environmental monitoring of non-dispersive open-water disposal sites (Robert Brenner, DNR)
- Subsurface bioassay issues:
  - Mike Johns, Windward Environmental – Public Issue
  - David Kendall and Erika Hoffman – DMMP Agencies
- "Open Mike" for issues and questions

PP 1.8. Agency and Public Issue Papers

Topical Presentations / Lessons Learned

- PSNS CAD Pit – The Agony and the Ecstasy (Kathryn Carlin, Ecology)
- Eagle Harbor Superfund Project (Brenda Bachman, Corps)
- Cascade Pole cleanup (Reid Carscadden, Landau Assoc.)

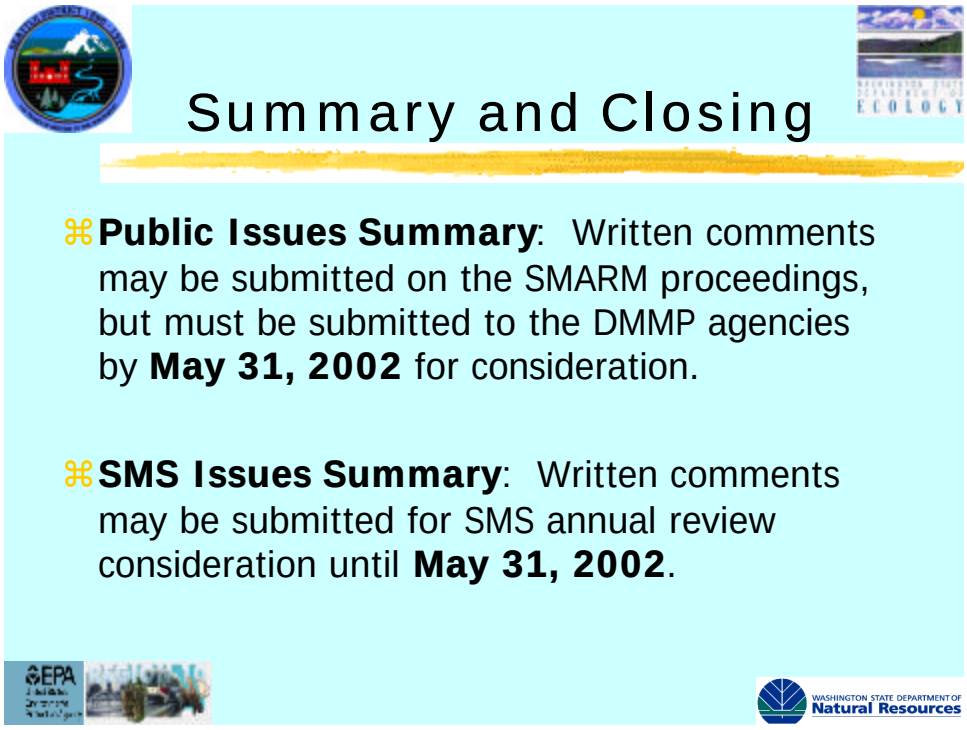
PP 1.9. Topical Presentations / Lessons Learned

Regional Updates

- Regional Dredging Teams – Updates (Jim Reese, Corps, Northwest Division)
- MUDS, the final chapter (John Dohrman, PSWQAT*)
- Columbia River (John Malek, EPA)

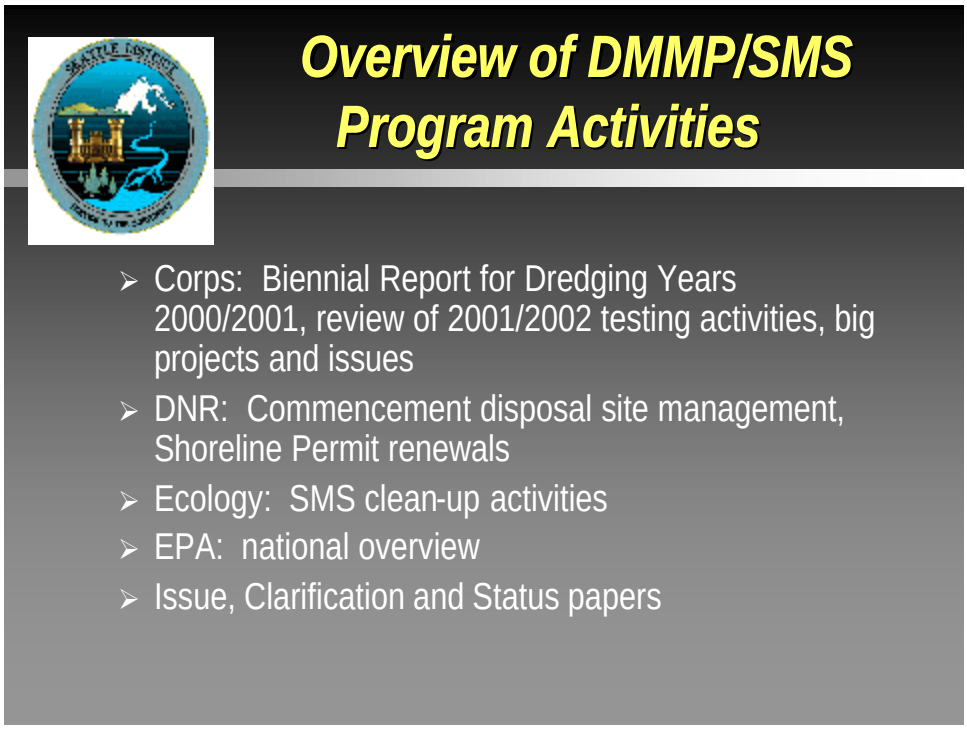
•Puget Sound Water Quality Action Team

PP 1.10. Regional Updates

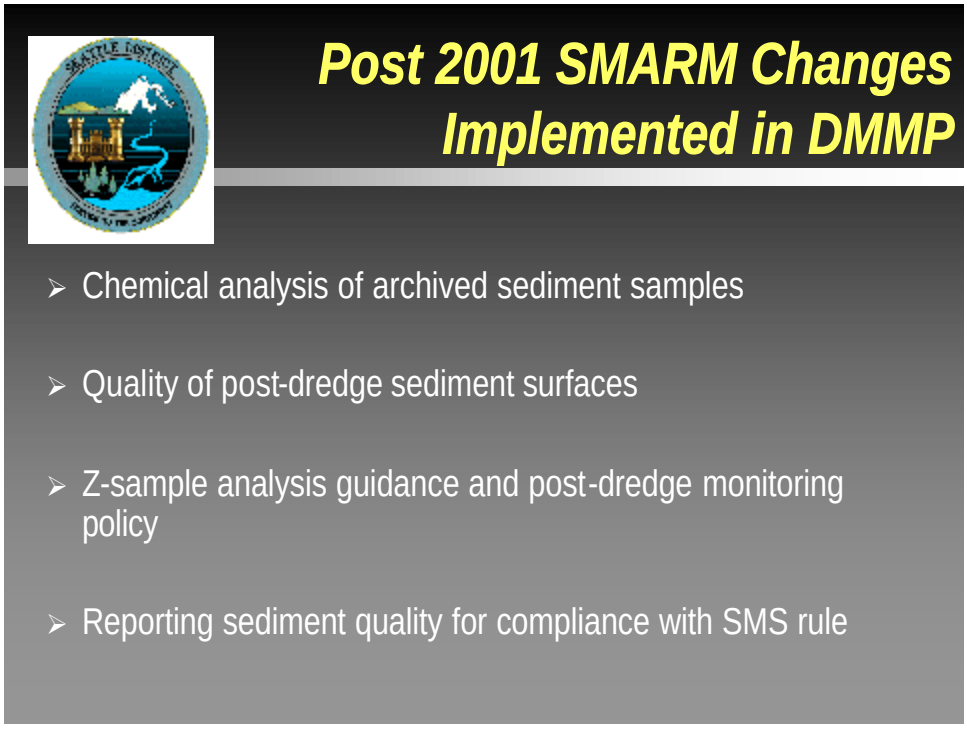


PP 1.11. Summary and Closing.

PP 2.1 SMARM Introduction DMMP Actions and Accomplishments



PP 2.2. Overview of DMMP/SMS Activities

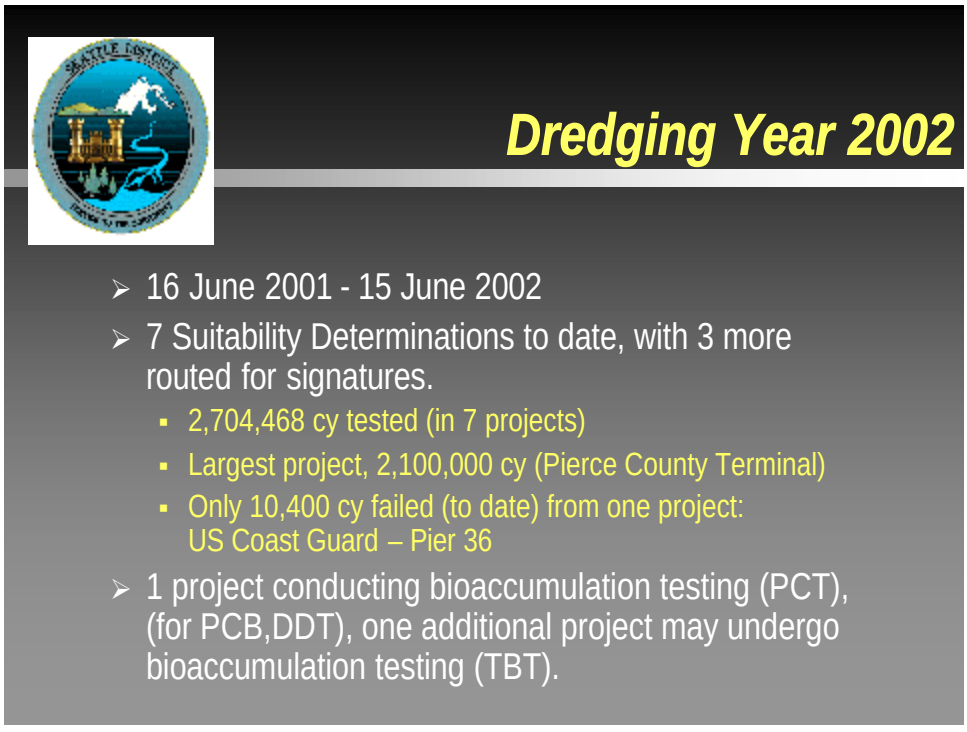


PP 2.3. Post 2001 SMARM changes implemented in DMMP

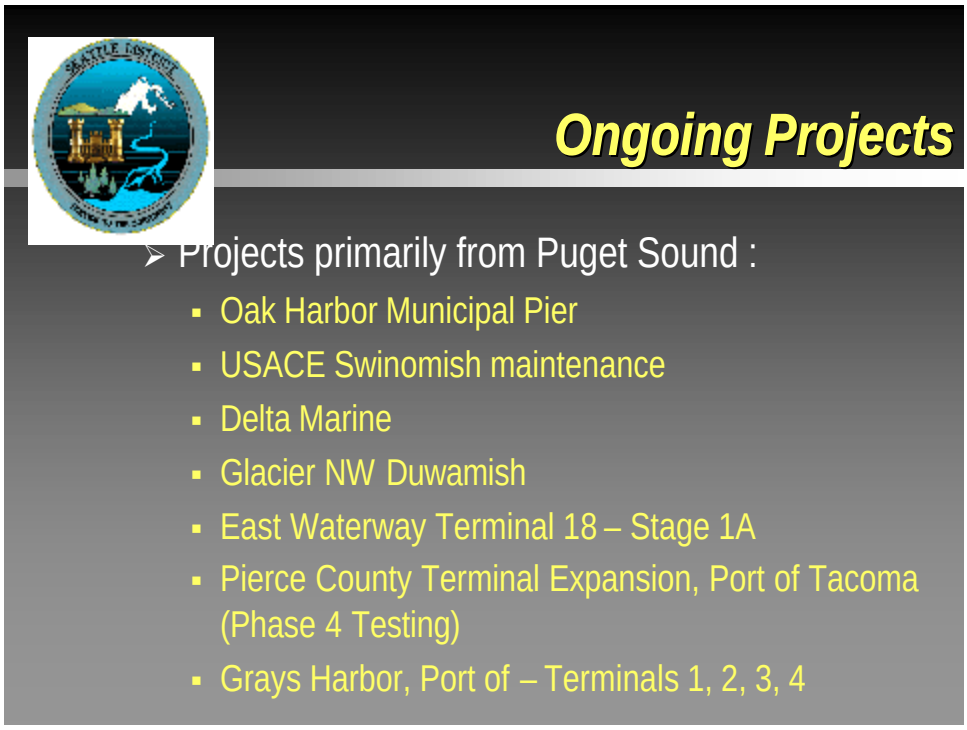
PP 2.4. Dredging Year 2001 Activities

PP 2.5. Dredging Year 2001 Activities (continued)

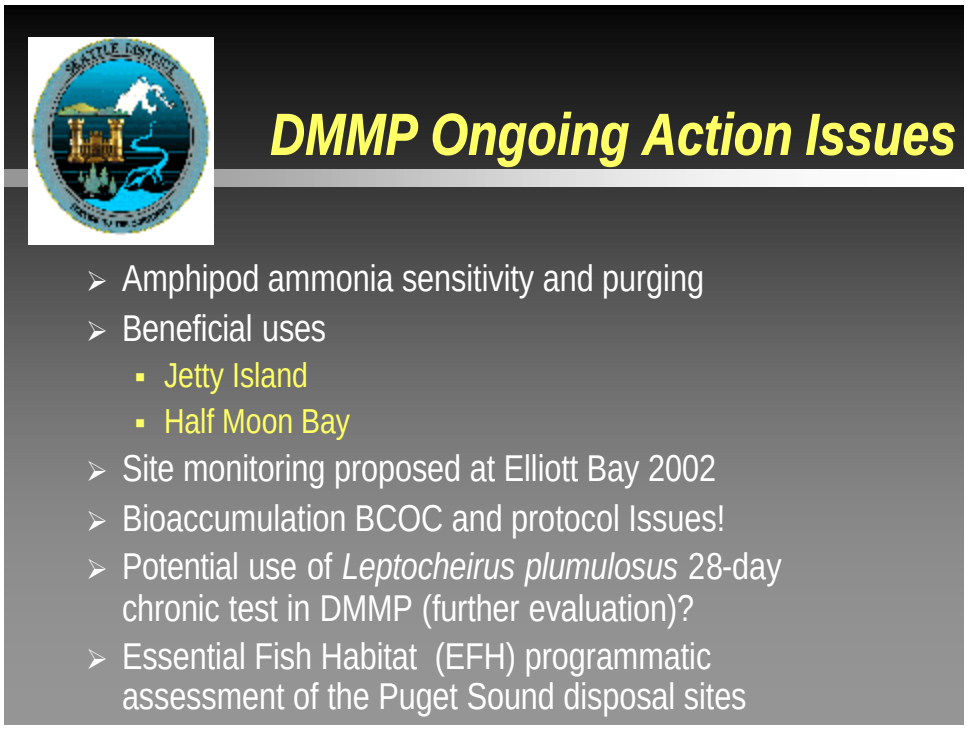
PP 2.6. Dredging Year 2001 Activities (continued)



PP 2.7. Dredging Year 2002 Activities



PP 2.8. Ongoing Projects



PP 2.9. DMMP Ongoing Action Issues

PP 2.10. For More Information.

PP 3.1. 2001 Full Monitoring at the Commencement Bay Disposal Site.

Monitoring Framework

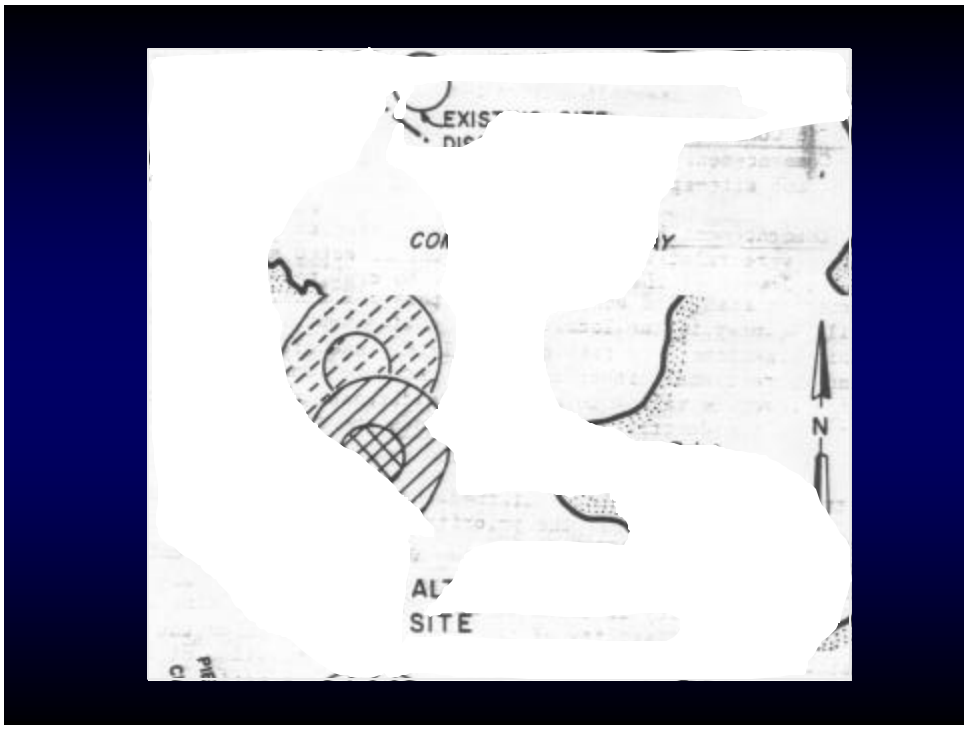
1. Does dredged material remain on site?
   - Sediment Vertical Profile System (SVPS)
   - Sediment Chemistry
2. Were biological effects conditions exceeded?
   - Sediment Chemistry
   - Sediment Bioassays
3. Were adverse effects to off-site biological resources observed?
   - Tissue Chemistry
   - Infaunal Community Structure

PP 3.2. Monitoring Framework

Agenda

- Monitoring Tools
- Modifications
- Summary of Baseline Conditions
- 2001 Findings
- 2001 Evaluations
- Future Monitoring

PP 3.3. Agenda



PP 3.4. Commencement Bay Disposal Sites – Historic

Monitoring Tools

	SVPS	Sed. Chem.	Benthic Infauna	Bioassays	Tissue Chem.
Zone Station (Z)	✓	✓		✓	
Site Station (S)	✓	✓		✓	
Perimeter Station (P)	✓	✓		✓	
Transect Station (T)	✓		✓		✓
Benchmark Station (B)	✓	✓	✓	✓	✓
Cross Station (C)	✓				
Reference Station (R)				✓	
Floating Station (F)	✓	✓	✓	✓	✓

PP 3.5. Monitoring Tools

2001 Modifications

- Porewater TBT analysis @ 2 F stations
- All but 4 T stations removed from analysis
- 51 F stations added
- Seahurst baseline DP01 resampled to be compared to historical (1983)
- Benthic infauna collected from T13-16, instead of 1, 3, & 5 as well as F03, F13, F16, Benchmarks, and Seahurst

PP 3.6. 2001 Modifications

Summary of Baseline Conditions

- Historic DM present in Southeast
- Several cmpds/metals exceeded SLs:
  HPAH, LPAH, phenol, 4-methylphenol, dibenzofuran, hexachlorobutadiene, Sb, & Hg
- 1 on-site & 1 benchmark failed bioassay
- Benthic infauna were abundant

PP 3.7. Summary of Baseline Conditions

Summary of 1995 “Full”

- SVPS – All material remained on site
- On-site stations passed chem. & bioassay
- High PAHs and Metals
- Increase in percent fines at southern end
- Molluscan taxa showed a significant decrease at the farthest transect station, unrelated to DM

PP 3.8. Summary of 1995

Summary of 1996 “Partial”

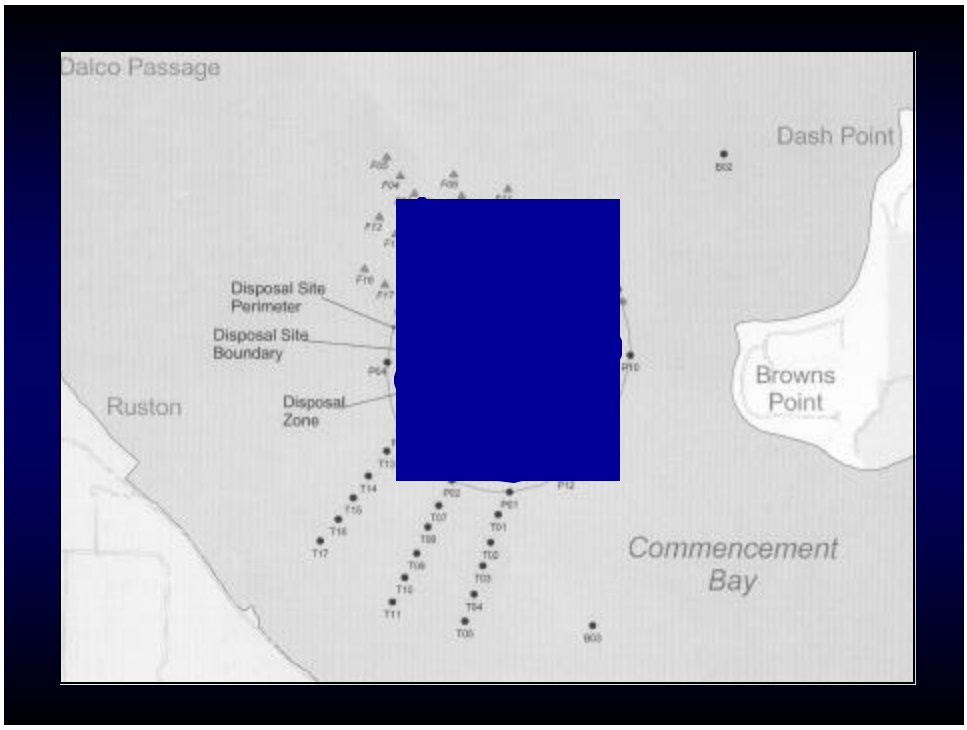
- Dredged material remained on site
- No effects beyond minor adverse biological effects
- On-site chemistry and bioassays passed
- Benchmark results used to represent baseline: All metals and several PAHs detected; Pb >SLs in all reps; indeno(1,2,3-c,d)pyrene, 4,methylphenol, benzyl alcohol, and benzoic acid > SL @ CBB02

PP 3.9. Summary of 1996 “Partial”

Summary of 1998 SVPS

- Thin band of fine sands and sandy silts were present beyond the site boundary to the NW

PP 3.10. Summary of 1998 SVPS

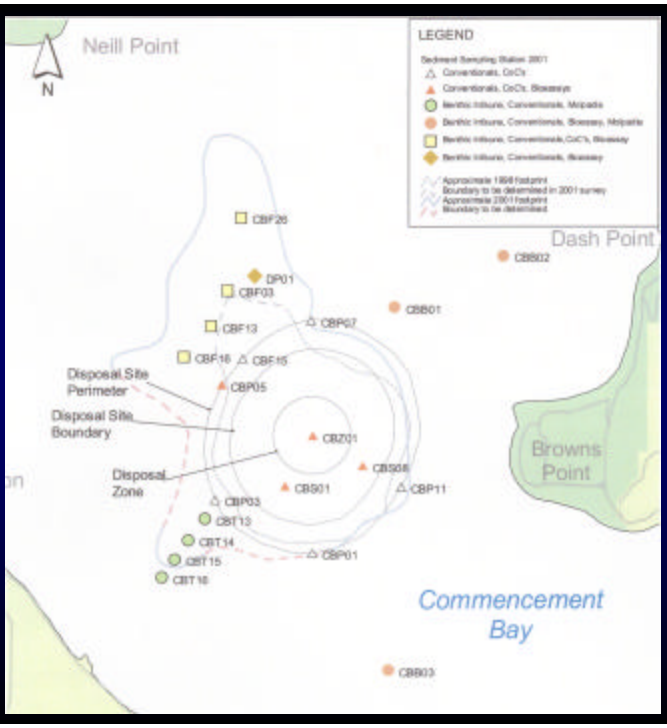


PP 3.11. Commencement Bay Disposal Site

2001 Results

- SVPS
- Site Chemistry
- Site Bioassays
- Benthic Infauna
- Tissue Analyses
- Benchmark Stations

PP 3.12. 2001 Results

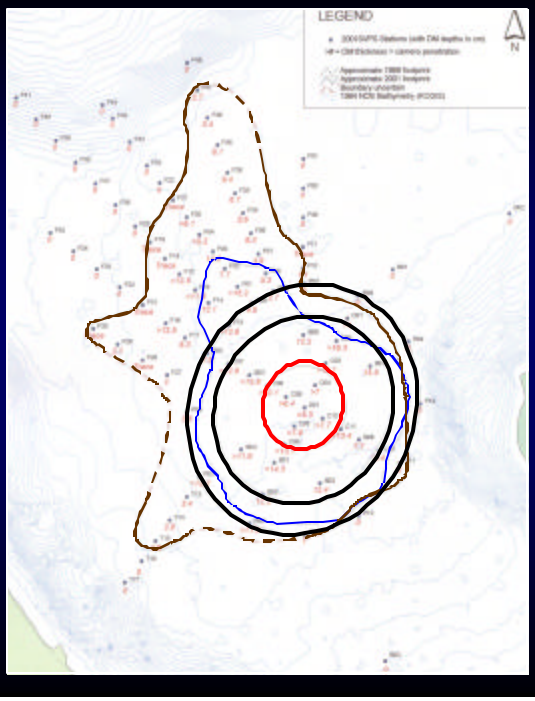


PP 3.13. Commencement Bay Disposal Sites – Overlay of 1988, 1998, and 2001 footprint

Sediment Vertical Profile System (SVPS)

- Images obtained at 92 stations
- Large excursions (areal, not volumetric) to the NNW and SW
- Off-site materials mostly fine or very-fine sands, frequently overlying silts
- Obviously, Hypothesis 1 is rejected

PP 3.14. Sediment Vertical Profile System (SVPS)



PP 3.15. Commencement Bay Disposal Site dredged material footprint map

Sediment Chemistry

- Conventionals similar to 1995 data, sediments slightly coarser on site, finer @ perimeter
- All metals except Antimony and Silver detected, no SL or SQS levels exceeded
- No PAH exceedences of SL or SQS, some organics exceeded SQS @ detection limits
- Field variability was acceptable (RSD < 50%), except for TOC & ammonia (P03), % clay (T14), Cadmium (P01 & 11) & <1% gravel (P01, T13, T14, T16).

PP 3.16. Sediment Chemistry

Tissue Chemistry

Triplicate *Molpadia* samples from T stations

- All metals detected, some >3x baseline
- Several HPAHs detected @ low concentrations
- Phenol detected in all reps @ rel. high conc.
- Other organics detected in 1 or 2 reps @ low concentrations

Prompted Benchmark Analyses

PP 3.17. Tissue Chemistry

Bioassays

- Amphipod Mortality
  - No test sediments had mortality >20% over absolute mean negative control or 30% over absolute mean reference sediment response.
- Larval Mortality/Abnormality
  - No hits in any test sediments
- Juvenile *Neanthes* Growth
  - All test samples passed. Only 3 stations differed statistically from reference

PP 3.18. Bioassays

Benthic Community Analysis

- Total abundance of all taxa increased with distance from disposal site
- Predominant trend was a reduction in abundance of infaunal organisms
  - Mollusca decreased by >50%, except T16 (41%)
  - Decreases in abundances of other taxa <50%

Prompted analysis of Benchmark Stations

PP 3.19. Benthic Community Anaysis

Benchmark Station Analyses

- Significant decreases in infaunal abundances
- Sediment chemistry is similar to baseline
- Grain-size has shifted toward coarser sediments
- Most tissue chemistry has decreased

Preponderance of evidence supports belief that bay-wide changes have occurred

PP 3.20. Benchmark Station Analyses

Special Studies

- Butyltin
  - Bulk and Porewater TBT not detected at surface of off-site materials
  - Bulk TBT not detected in ambient sediments, Porewater TBT detected @ 0.038 g L^{-1} (est.)
- Seahurst CBDP1 Station Analysis
  - Increasing polychaetes and molluscs, decreasing crustacean richness & abundance indicate that a shift may be occurring due to increase in TOC or % fines content

PP 3.21. Special Studies

Evaluation of 2001 Data

- Question 1: Does dredged material remain on-site?
  - Hypothesis 1: Dredged material remains within the site boundary
    - Rejected, based on SVPS Survey
  - Hypothesis 2: Chemical concentrations offsite do not increase due to disposal
    - Not Rejected, chemical concentrations did not measurably increase over time due to disposal

PP 3.22. Evaluation of 2001 Data – Hypothesis – Question 1

- Question 2: Has DM disposal caused bio. effects conditions to be exceeded?
  - Hypothesis 3: On-site chem. conc. don't exceed Site Cond. II guidelines
    - Not Rejected, no ML exceedances
  - Hypothesis 4: Sed. Toxicity doesn't exceed Site Condition II guidelines
    - Not Rejected, all 3 onsite stations passed bioassay interpretive guidelines

PP 3.23. Hypothesis – Question 2

- Question 3: Are unacceptable adverse effects occurring off-site due to disposal?
  - Hypothesis 5: No sig. increase in chemical body burden of benthic infaunal taxa
    - Not Rejected, benchmark analysis indicates bay-wide change
  - Hypothesis 6: No sig. decrease in abundance of dominant benthic infaunal taxa
    - Not Rejected, benchmark analysis indicates bay-wide decrease in infauna

PP 3.24. Hypotheis – Question 3.

Future Monitoring

Due to presence of off-site materials, the Commencement Bay disposal site will be monitored annually through the life of the Pierce County Terminal project (~2Mcy)

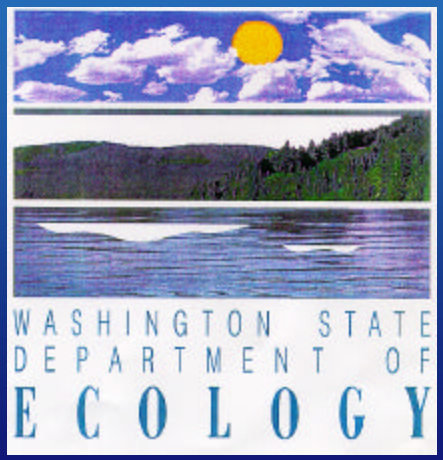
PP 3.25. Future Monitoring

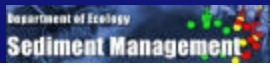
Special Studies

- Hi-Resolution PCB Analysis
  - Low concentration of dioxin-like congeners
  - No definitive conclusions can be reached
  - Provides some baseline data
- Phase II DNR Field Program
  - To be presented in Agency and Public Issue Papers section between 12:45 and 2:15

PP 3.26. Special Studies

Sediment Management Standards Programs



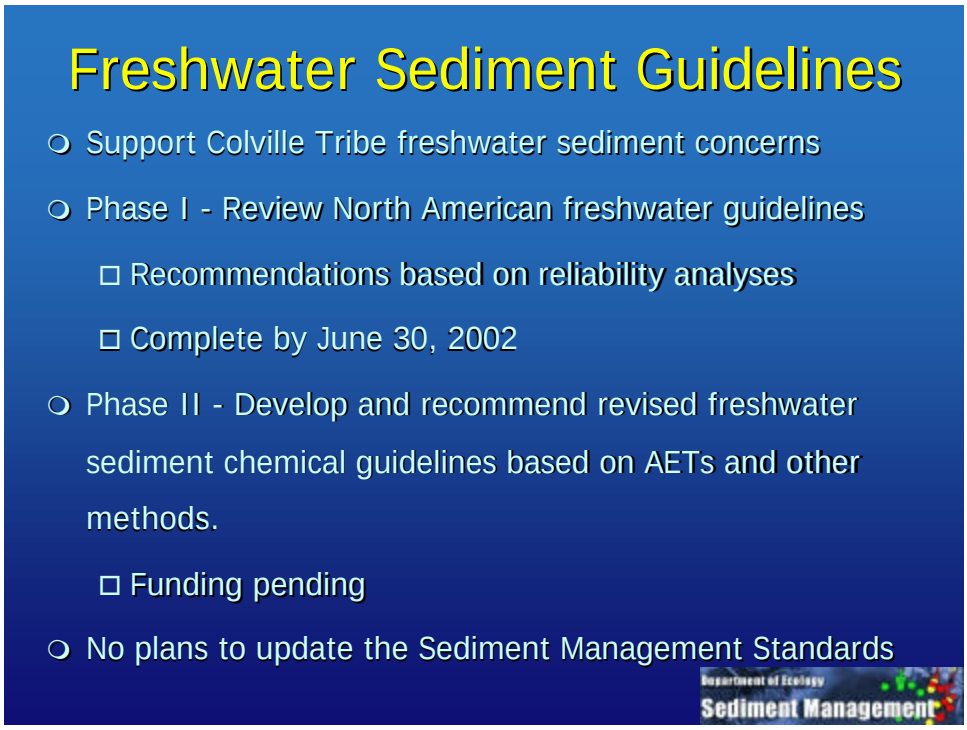


PP 4.1. Sediment Management Standards Programs

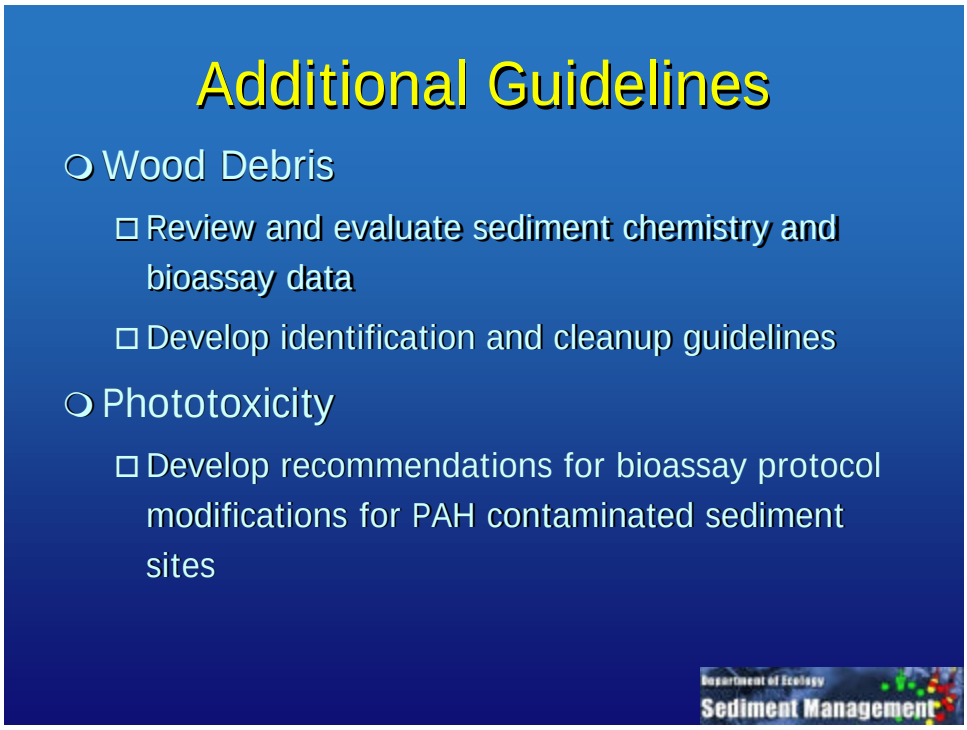
PP 4.2. Sediment Cleanup Activities

PP 4.3. Sediment Cleanup Activities (continued)

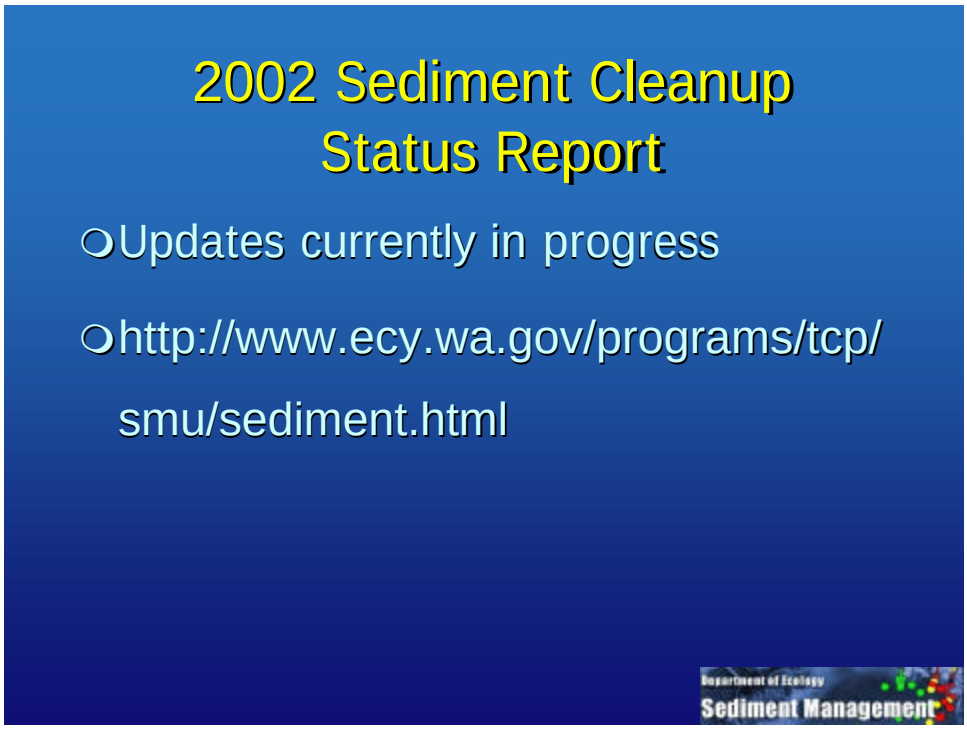
PP 4.4. Bellingham Bay Pilot Project



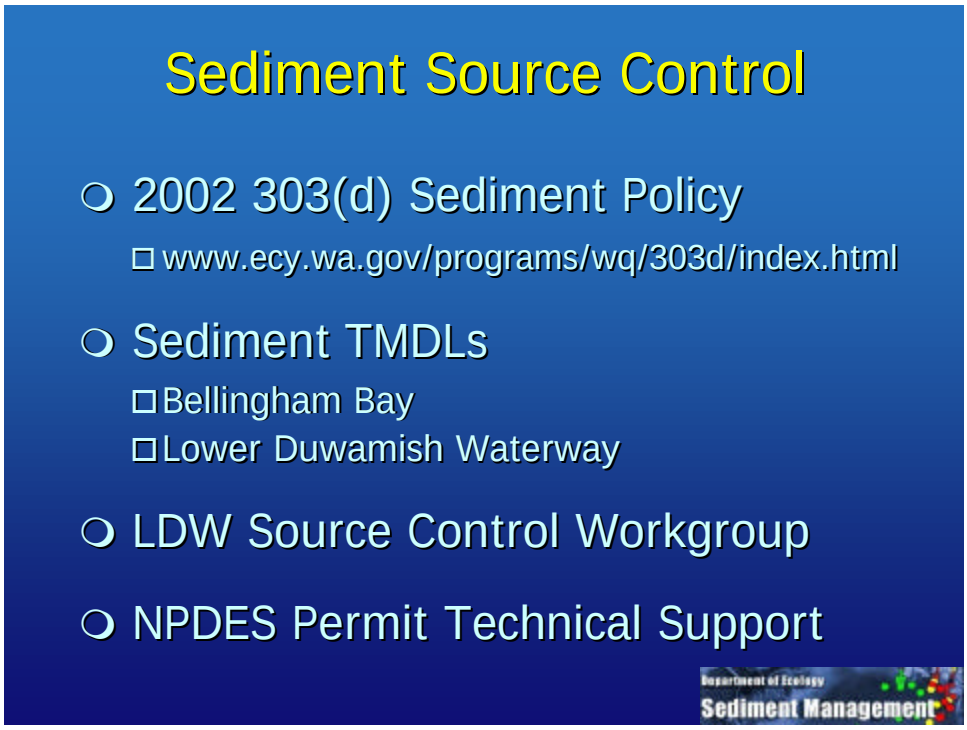
PP 4.5. Freshwater Sediment Guidelines



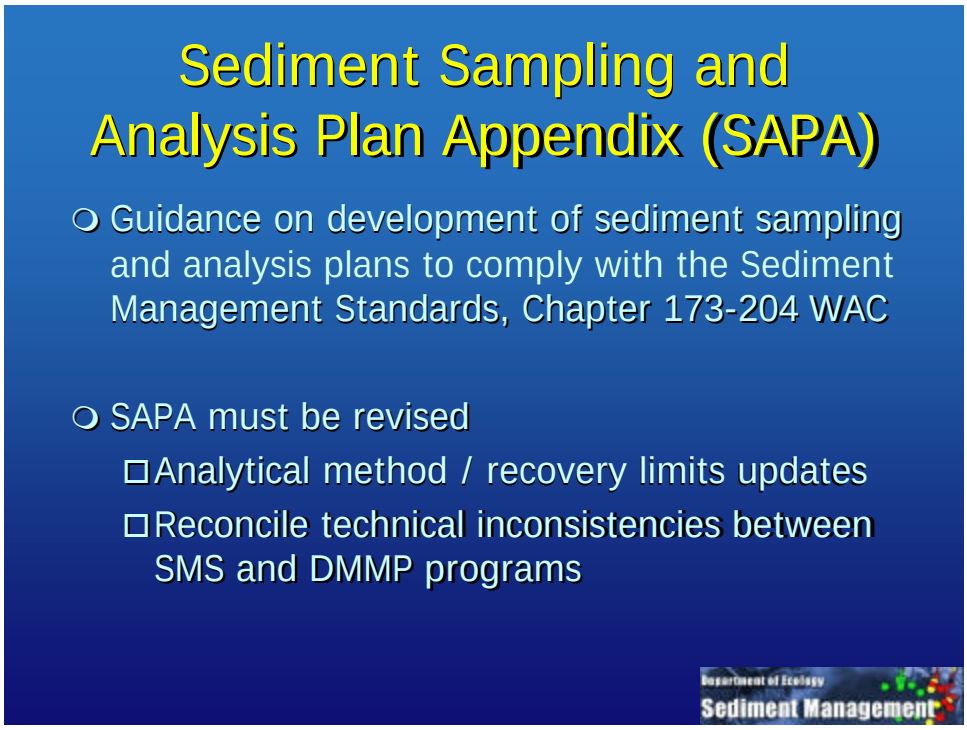
PP 4.6. Additional Guidelines



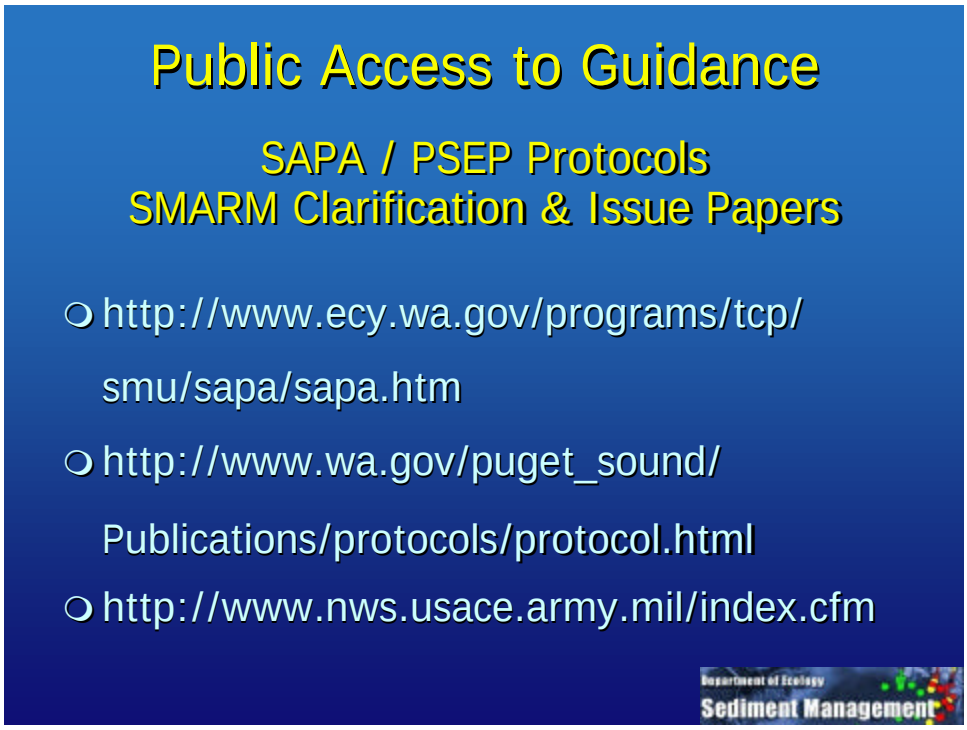
PP 4.7. 2002 Sediment Cleanup Status Report



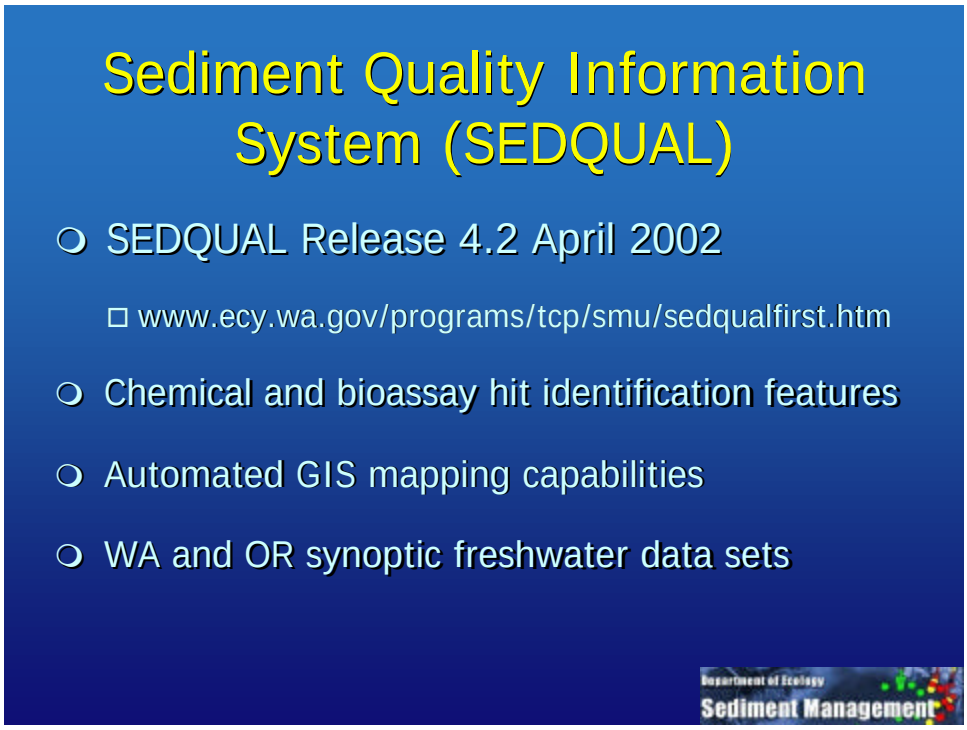
PP 4.8. Sediment Source Control



PP 4.9. Sediment Sampling and Analysis Plan Appendix (SAPA)



PP 4.10. Public Access to Guidance



PP 4.11. Sediment Quality Information System (SEDQUAL)

2002
Sediment Management
Annual Review Meeting

National/Regional Activities

John Malek, Region 10 EPA

PP 5.1. Sediment Management Annual Review Meeting

NATIONAL RESEARCH COUNCIL

On March 26, 2001, the NRC published a report entitled *A Risk Management Strategy for PCB-Contaminated Sediments*. Although the NRC report focuses primarily on assessment and remediation of PCB-contaminated sediments, much of the information in that report is applicable to other contaminants. The NRC report may be found at http://www.nap.edu/books/0309073219/html/.

PP 5.2. National Research Council

EPA'S Plan for Addressing Contaminated Sediment

Steve Ells
Office of Emergency and Remedial Response
U.S. EPA

PP 5.3. EPA's Plan for Addressing Contaminated Sediment

Why do we Need a Plan?

- Improve intra and inter-agency coordination
- Improve national consistency in approach to risk-based decisions at Superfund sites
  - 11 risk management principles
  - National remediation guidance
- Be responsive to the NRC's report

PP 5.4. Why do we need a plan?

Take-home Messages from the NRC Report

- Need more partnering with communities at controversial sites
- Need better consideration of cultural and societal impacts from current risks and risks from alternatives
- Is no default, need better comparative risk analysis of short and long-term impacts of all alternatives
- Need to do more monitoring in order to evaluate success

PP 5.5. Take-home message from the NRC report

Ten Elements of EPA's Contaminated Sediments Action Plan

#1 Continue Obtaining Stakeholder Input

- Workshop on sediment stability
- Meeting on characterizing and managing ecological risks at contaminated sediment sites
- Public meetings on remediation guidance
- NACEPT subcommittee on mega sites

PP 5.6. Ten elements of EPA's Contaminated Sediments Action Plan

2. Improve Community Involvement

- Hold EPA workshop to identify improved methods for evaluating and using societal and cultural information in decision-making
- Ensure continued technical assistance through TAG and Technical Outreach Services for Communities programs.
- New Directive: Early and Meaningful Community Involvement (Oct. 12, 2001)

PP 5.7. Improve Community Involvement

3. Implement Risk Management Principles

- 11 Principles issued on Feb. 12, 2002
- Help site managers “make scientifically sound and nationally consistent risk management decisions”
- Responds in part to NRC recommendations
- Applies to RCRA and Superfund sites

PP 5.8. Implement Risk Management Principles

4. Develop Contaminated Sediment Remediation Guidance

- Provides technical and policy guidance on remedy selection
- Additional technical guidance on sediment characterization, risk, monitoring, etc. will be in subsequent Fact Sheets
- Comments from Feds due end of March
- Further revisions needed; public review late 2002

PP 5.9. Develop Contaminated Sediment Remediation Guidance

5. Implement New Consultation Procedures

- Tier 1 sites > 10,000 yd3 or 5 acres
  - HQ review of proposed plan
  - Consultation memo describing how 11 principles considered
  - Tracking remedy effectiveness
- Tier 2 sites – very large, controversial or complex
  - Early involvement by Contaminated Sediment Technical Advisory Group (CSTAG)
  - Review continues until remedial objectives met

PP 5.10. Implement New Consultation Procedures

6. Complete National Sediment Quality Survey

- Required update of 1997 report
- Used new methodology and data from 19,470 stations
- 88 areas of probable concern
- Public comment closed March 8, 2002; responses to comments in preparation

PP 5.11. Complete National Sediment Quality Survey

7. Develop Additional Monitoring Guidance

- Superfund/ORD workshop February 2002
- Fact Sheets on physical, chemical, biological monitoring methods
- Superfund collecting site data to evaluate remedy effectiveness
- OW manual on sediment sampling methods (www.epa.gov/watersciences/cs)

PP 5.12. Develop Additional Monitoring Guidance

8. Contaminated Sediment Assessment Pilot

- Cross-Agency coordination of TMDLs and site RI/FSs
- Consider other approaches – Urban River Initiative
- Consider Brownfields and re-development initiatives

PP 5.13. Contaminated Sediment Assessment Pilot

9. Contaminated Sediments Management Committee

- Managers from OERR, OW, ORD and Regions
- Identify and resolve cross-program policy and technical issues
- Coordinate on-going projects and research

PP 5.14. Contaminated Sediments Management Committee

10. Contaminated Sediments Science Plan

- Agency wide plan, lead by OSWER
- Coordinated with ORD's multi-year plan
- Lists about 30 recommendations
- Will undergo peer review and public review in summer of 2002

PP 5.15. Contaminated Sediments Science Plan

Principles for Managing Contaminated Sediment Risks

- Help make scientifically sound and nationally consistent decisions
- Issued Feb. 12, 2002 (OSWER Directive 9285.6-08)
- Establishes new HQ consultation process

PP 5.16. Principles for managing contaminated sediment risks

#1 - Control Sources Early

- Identify continuing, significant releases
- Evaluate potential for recontamination
- May need a phased approach

PP 5.17. Control Sources Early

#2 – Involve the Community Early and Often

- Provide needed technical info and assistance in interpreting data
- Will facilitate acceptance of remedy

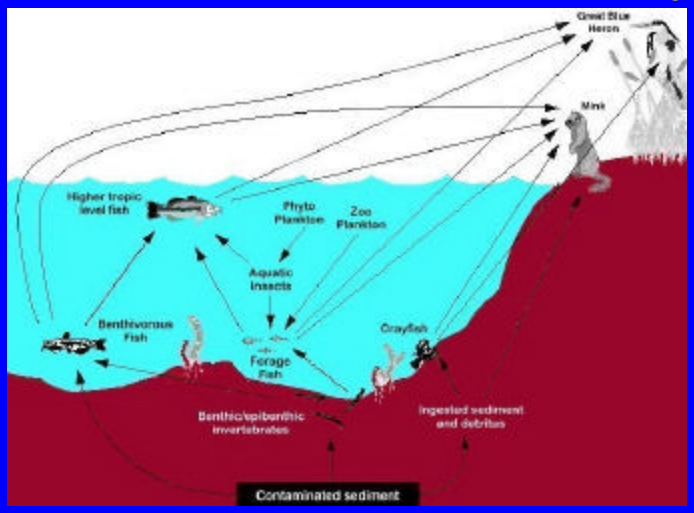
PP 5.18. Involve the community early and often

#3 – Coordinate with States, Tribes, and Natural Resource Trustees

- Coordinate RI/FS with:
  - OW's TMDL
  - Trustee's damage assessment
- States and Tribes may have useful site data

PP 5.19. Coordinate with States, Tribes, and Natural Resource Trustees

#4 - Develop and Refine a Conceptual Site Model that Considers Sediment Stability



PP 5.20. Develop and refine a conceptual site model that considers sediment stability

#5 – Use an Iterative Approach in a Risk-Based Framework

- Test hypotheses and re-evaluate assumptions
- Consider phased remediation

NRC's Risk Management Framework

PP 5.21. Use an iterative approach in a risk-based framework

#6 – Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models

- Complexity of model related to complexity of site
- Be transparent
- Peer review new models and calibration of site models

PP 5.22. Carefully evaluate the assumptions and uncertainties

#7 – Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals

- Is no default or presumptive remedy
- Combination is often best; e.g. dredge hot spots, rely on MNR in depositional areas.

PP 5.23. Select site specific project specifics, and sediment specific risk

#8 – Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals

PP 5.24. Ensure that sediment cleanup levels are clearly tied to risk management goals

#9 – Maximize the Effectiveness of Institutional Controls and Recognize their Limitations

- Don't work well for wildlife
- Follow-up actions may be needed

PP 5.25. Maximize the effectiveness of institutional controls and recognize their limitations.

#10 – Design Remedies to Minimize Short-term Risks while Achieving Long-term Protection

- Short-term impacts may be acceptable
- Comparative analysis of advantages and disadvantages may be useful

PP 5.26. Design remedies to minimize short-term risks

#11 – Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness

- Iterative process, may need to redesign cap, modify or change dredging equipment
- Is MNR really working?
- Information is needed for 5-year review

PP 5.27. Monitor during and after sediment remediation to assess and document remedy effectiveness

Take-home Messages

- Many contaminated sediment sites
- Cleanup at large sites can be very costly/controversial
- Still a lot of uncertainty: models, remedy effectiveness, sediment stability
- Federal agencies must coordinate and collaborate on research and tech transfer/training for site managers

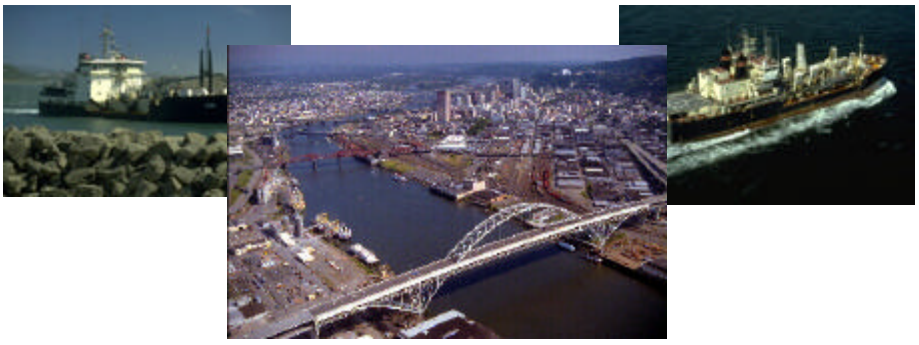
PP 5.28. Take-home message

National Dredging Guidance

- EPA/Corps Technical Framework for DM
- EPA/Corps Testing and Evaluation Manuals for Ocean (103) and Inland (404) Waters - National and Regional Manuals
- Ocean Site Designation Manual
- Dredged Material Capping Guidance Manual
- Upland Testing Manual (draft)

PP 5.29. National dredging guidance

National Dredging Team



DEVELOPMENT OF A REGIONAL DREDGING TEAM
WHO, WHAT, WHY, AND HOW

PP 5.30. National Dredging Team

CHARTER
NORTHWEST REGIONAL DREDGING TEAM

VISION

Dredging and disposal of Northwest harbors and channels is conducted in a timely and cost effective manner while meeting environmental protection/restoration/enhancement goals. (Northwest for purposes of this charter is defined as inclusive of the states of Washington, Oregon, and Idaho).

GOALS

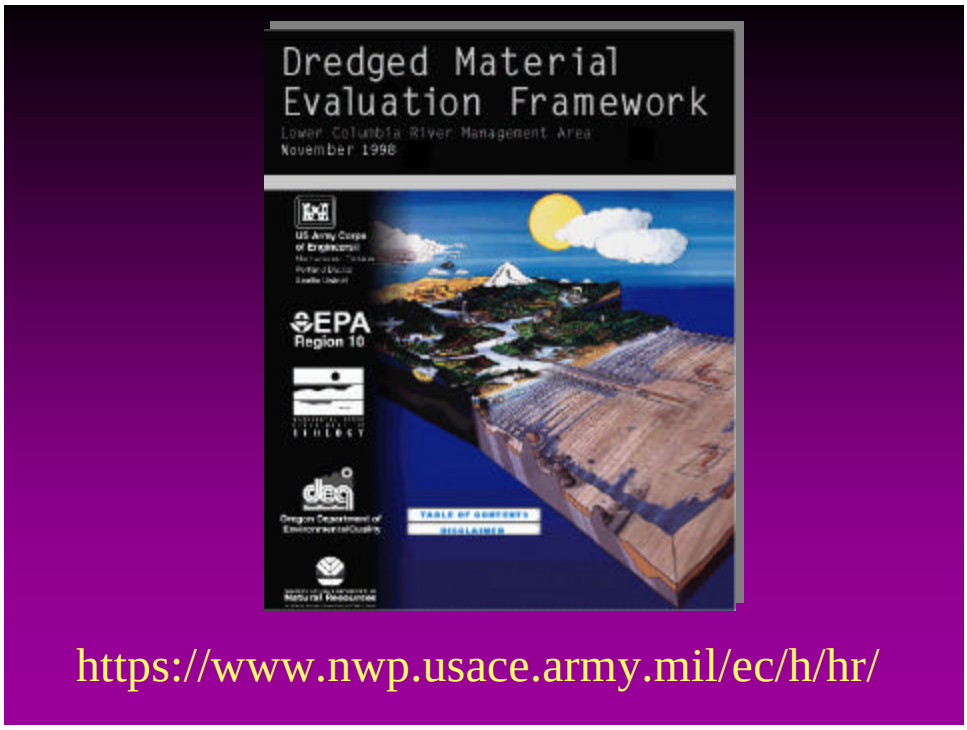
The Regional Dredging Team will facilitate communication, coordination, and resolution of dredging issues among the participating Federal agencies, and will serve as a forum for promoting the implementation of the recommendations in the Report to the Secretary of Transportation, *The Dredging Process in the United States: An Action Plan for Improvement (December 1994)* (the Report) and subsequent recommendations of the National Dredging Team already functioning as recommended in the plan.

PP 5.31. Charter Northwest Regional Dredging Team

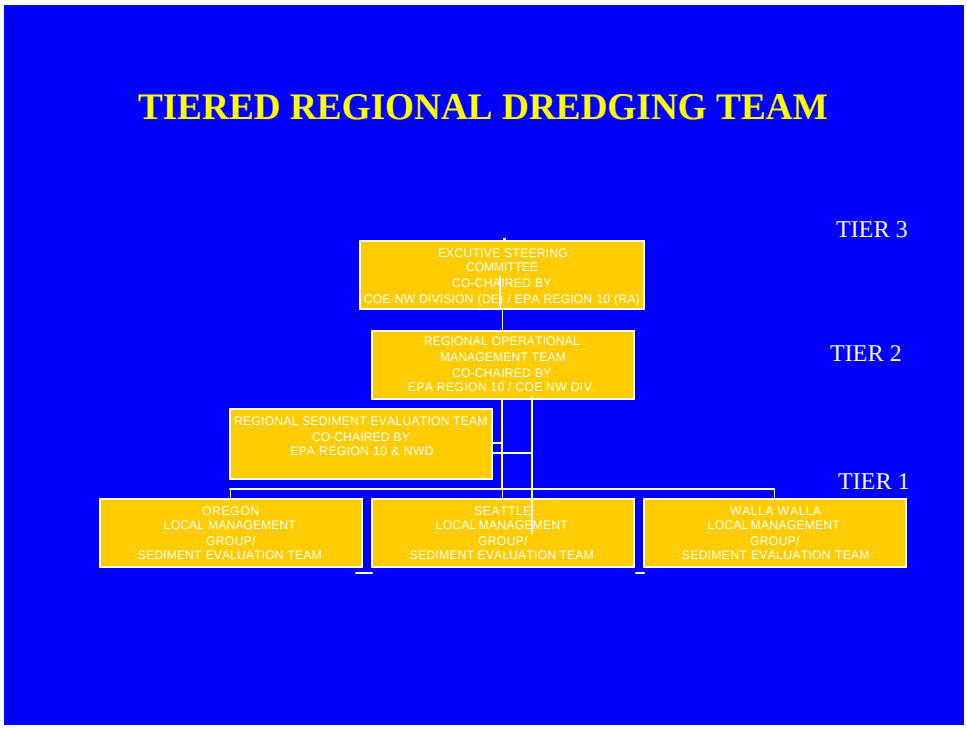
Regional Dredging Issues

- **ESA CONSULTATIONS**
- **CWA *VS* ESA EVALUATIONS**
- **CWA *VS* SUPERFUND DESIGNATIONS**
- **NEW WORK DISPOSAL SITE DESIGNATIONS**
- **CONFINED DISPOSAL FACILITY SITINGS**
- **DMMPs**
- **SEC 102/103 OCEAN DISPOSAL SITE DESIGNATIONS**
- **REGIONAL SEDIMENT MANAGEMENT**
- **ENVIRONMENTAL WINDOWS**
- **REVIEW OF REGIONAL TESTING FRAMEWORKS**

PP 5.32. Regional Dredging Issues



PP 5.33. Dredged Material Evaluation Framework



PP 5.34. Tiered Regional Dredging Team

Letter of Agreement
Between the
U.S. Environmental Protection Agency, Region 10, the
Oregon Department of Environmental Quality and
the U. S. Army Corps of Engineers, Portland District
Concerning the
Lower Willamette River

This agreement is made between and among the United States Army Corps of Engineers (USACE), Portland District, the United States Environmental Protection Agency (EPA), and the Oregon Department of Environmental Quality (ODEQ) (the Parties).

EPA, USACE, and ODEQ share complementary responsibilities within the Portland Harbor Superfund Site (Site). The purpose of this agreement is to foster and promote more effective communication and to establish a long-term coordination strategy between USACE, EPA, and ODEQ.

SIGNED BY ALL THREE PARTIES: MARCH 2002

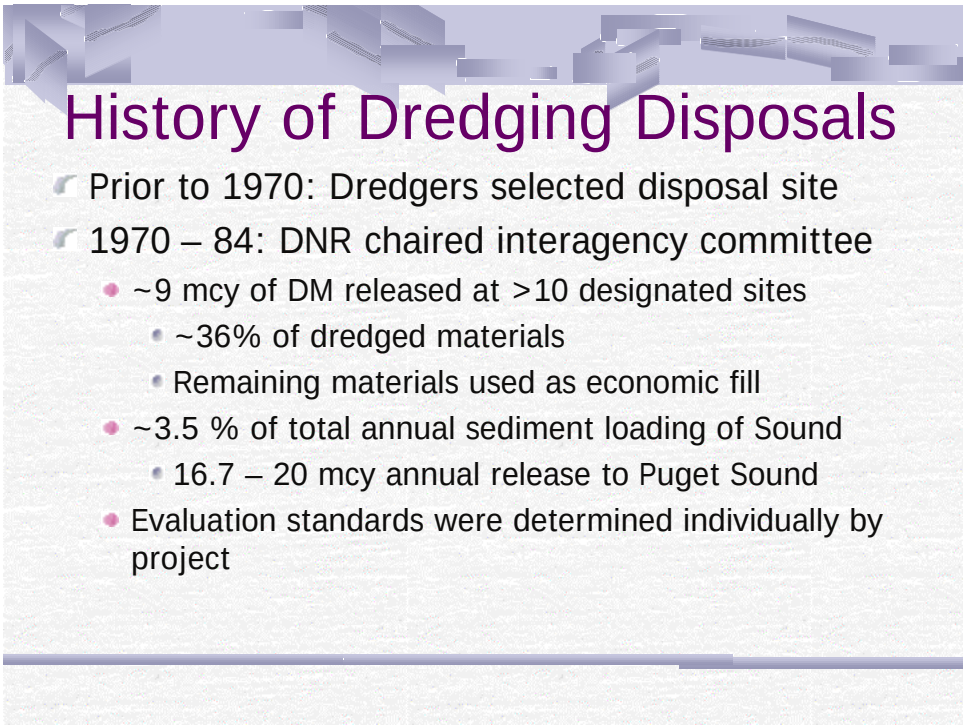
PP 5.35. Letter of Agreement

LOWER WILLAMETTE RIVER REFERENCE SEDIMENT AREA IDENTIFICATION STUDY

- Hart-Crowser for Portland District, Willamette River Dredged Material Management Plan
- Objective: Identify 3 reference areas with varying grain sizes classes
  - 70 - 80 percent fines (fine)
  - 50-60 percent fines (medium)
  - 2-10 percent fines (coarse)
- Two phases
- Report available: Tim Sherman, Portland District

PP 5.36. Lower Willamette River Reference Area Sediment Identification Study

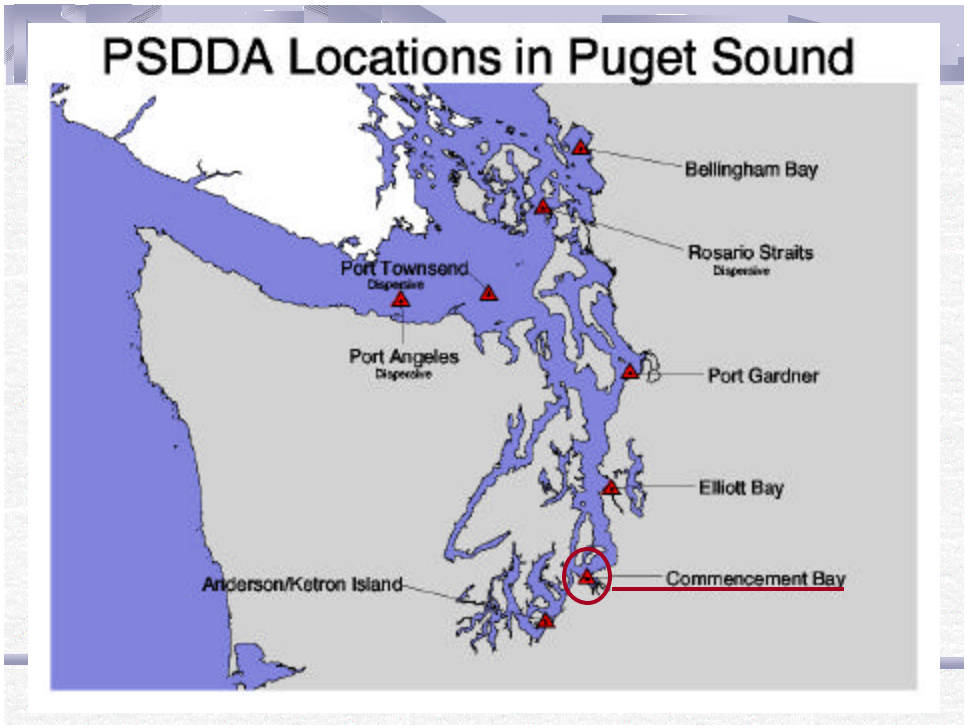
PP 6.1 Commencement Bay Off-site Materials



PP 6.2. History of dredging disposals

- 1984 – Puget Sound Interim Criteria
  - Established by USEPA and WDOE
  - Provided uniform standards
- 1985 – Mgmt Plans Work Group
  → led directly into PSDDA
  - 1989 – 2001 ~8.6 mcy released at 8 sites
  - ~3.5% of total annual sed. loading of Sound
- 1995 – GH/WBDDA incorporated → DMMP

PP 6.3. History of dredging disposals (continued)



PP 6.4. PSDDA disposal site locations

Siting Criteria/Predictions

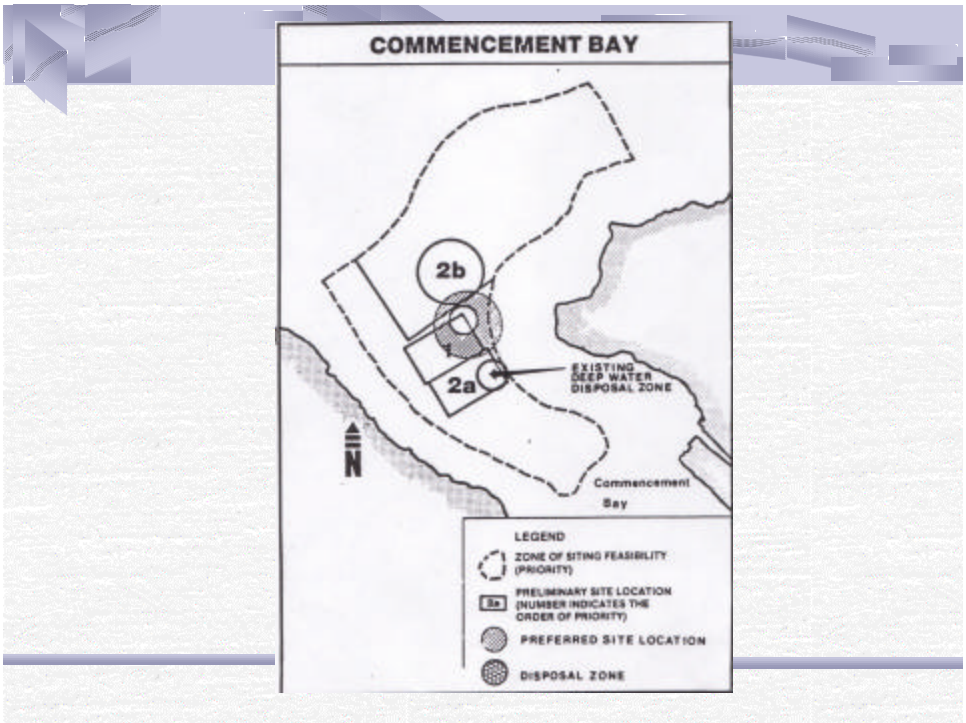
- Site should be in 120-600 ft depth
  - Avoids more biologically productive depths
    - Commercially important fish and shellfish
  - Reduces dispersion during disposal
- "...undoubtedly a small fraction of the disposal material will be transported beyond the disposal site boundaries."
- Since the DM is defined to be clean, no detectable impacts to benthic biota are expected.

PP 6.5. Siting criteria/predictions

Commencement Bay

- Located in the most energetic area of the non-dispersive disposal sites
- Deepest of the disposal sites (540-560')
- "...no crab were found within the disposal site, and shrimp were in low abundance." – paucity of biological resources

PP 6.6. Commencement Bay – Present

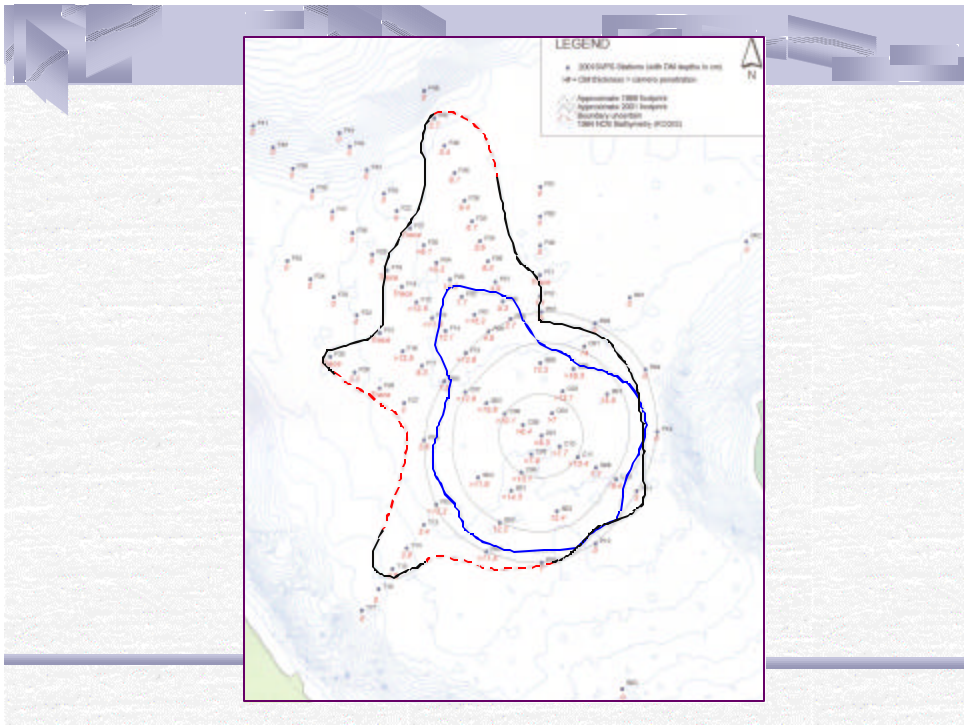


PP 6.7. Commencement bay historic map

Commencement Bay

- Site established in 1988
- Shoreline permits – 1988, 1993, 1999
- Site has received ~3 mcy since 1989
- Discovery of Off-site materials
  - 1998 Physical monitoring
    - Small lobe to North >3 cm trigger
  - 2001 Full monitoring
    - Large lobe to NNW
    - Smaller lobe to SW

PP 6.8. Commencement bay history



PP 6.9. Commencement bay offsite footprint

Response—Site Closure

- 90-day moratorium in August 2001
  - Interested parties notified
- Extended through January 15, 2002
- Extended through February 15, 2002

Allowed time for:

1. Receipt of monitoring results
2. Investigate causes
3. Approach permitting authority

January 22, 2002

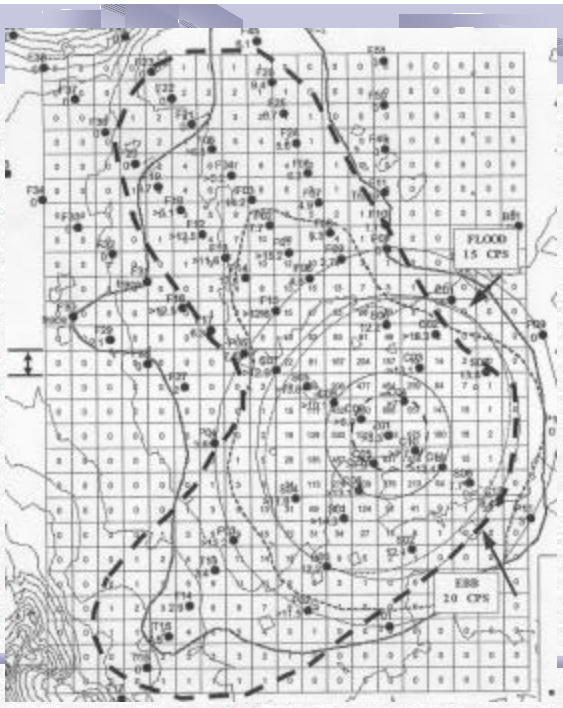
PP 6.10. Response – Site closure

Potential Causes

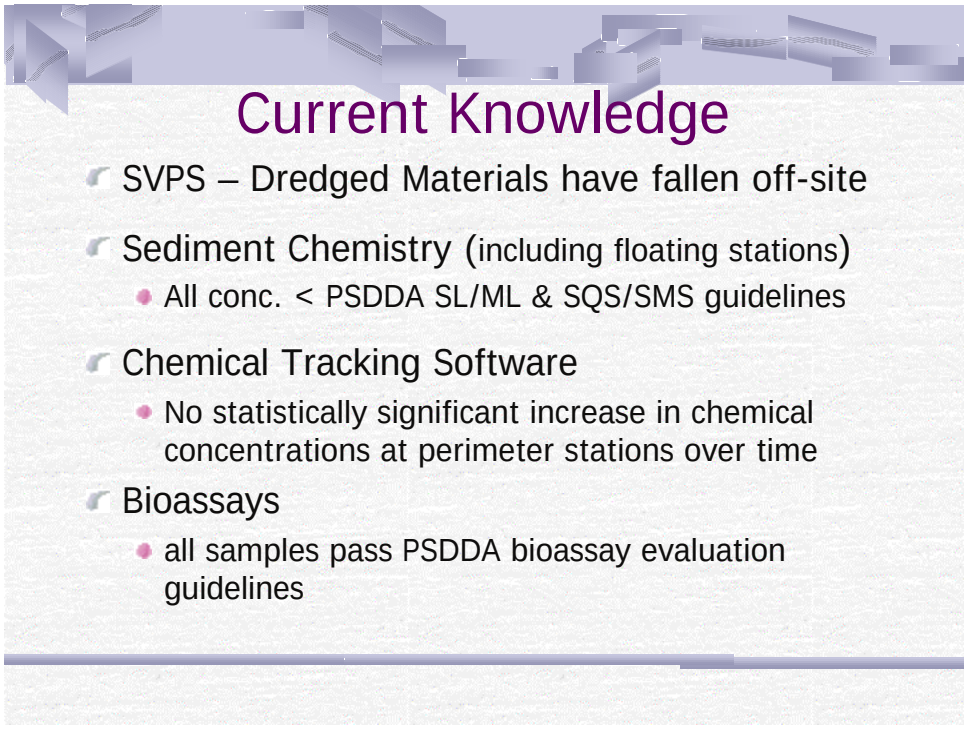
- Disposal outside site boundaries
  - GIS plotting of each disposal for 7 years
- "Midnight Dumping"
  - Chemical analyses
  - TBT analyses
- Dispersal during disposal
- Dispersal while on-site

Corps Modeling

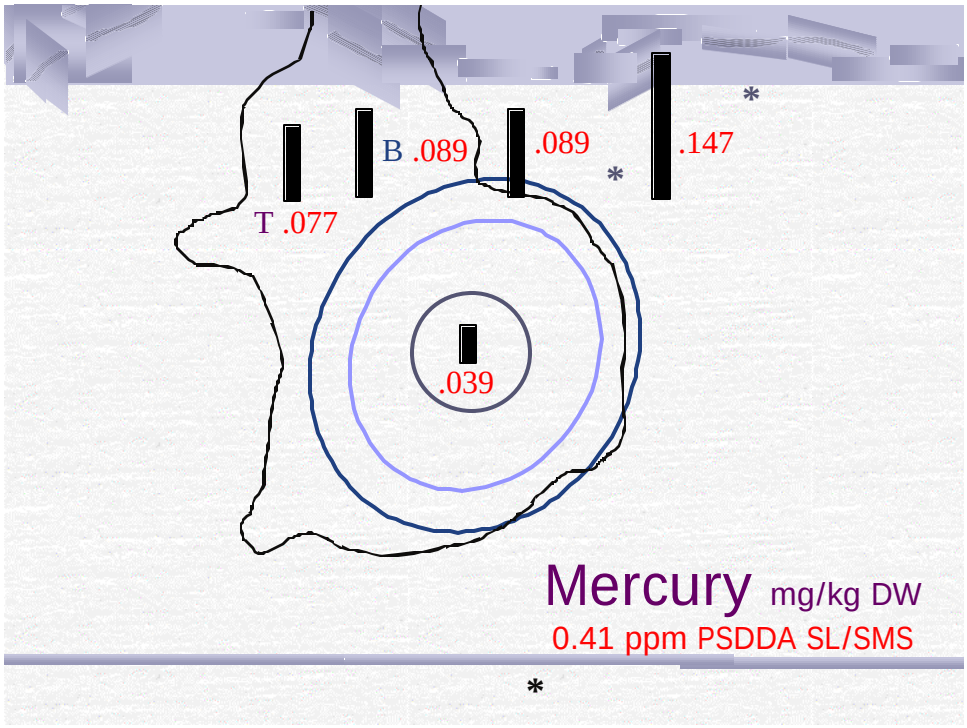
PP 6.11. Potential causes



PP 6.12. Offsite footprint – observed versus predicted



PP 6.13. Current Knowledge



PP 6.14. Mercury distribution

Conclusions

1. **No Significant Negative Env. Impacts**
   - verified by results of Benchmark Station analyses
2. **Management Predictions were exceeded**
   - Depth and current flow
   - Finer materials than originally modeled

PP 6.15. Conclusions

Future

- Pierce Co. Terminal Project
  - ~2 mcy materials slated for Comm. Bay
- Overall
  - Mound height will increase to ~85 ft
  - High fines will behave as model indicates
- Annual monitoring
  - Utilize 2001 monitoring strategy
  - No volume trigger during PCT Project

PP 6.16. Future

Site Status Report

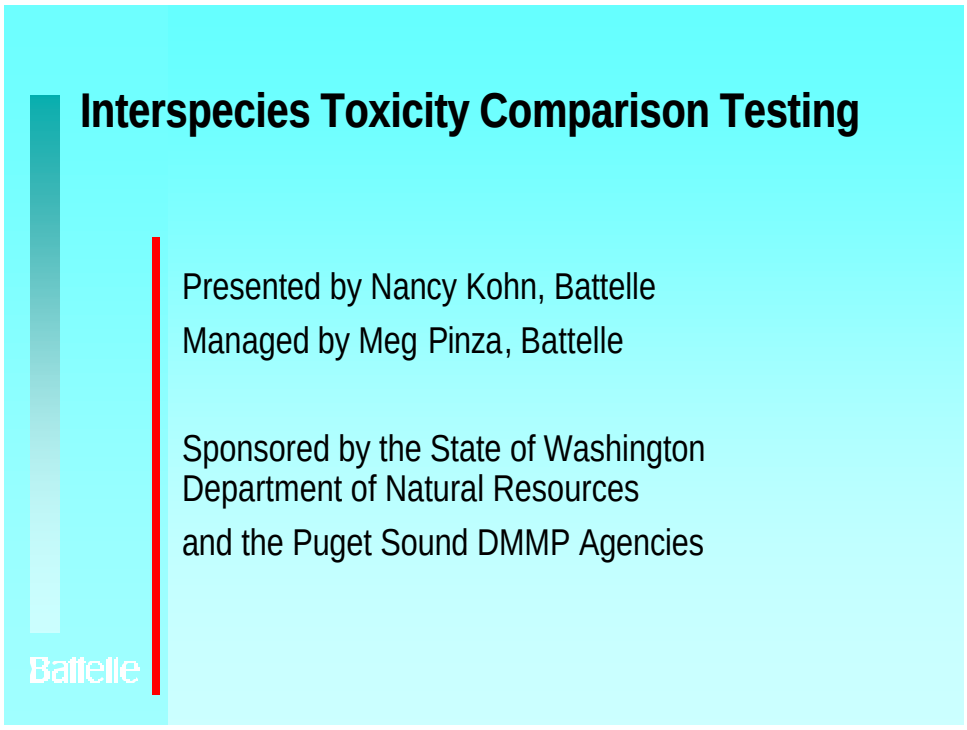
- Site has been *authorized for use* by Pierce Co. Planning and Land Services, as of March 4, 2002
- Current permit expires in September 2003, so we are preparing now for the extension and renewal
- Maintain close eye on status through annual monitoring

PP 6.17. Site Status Report

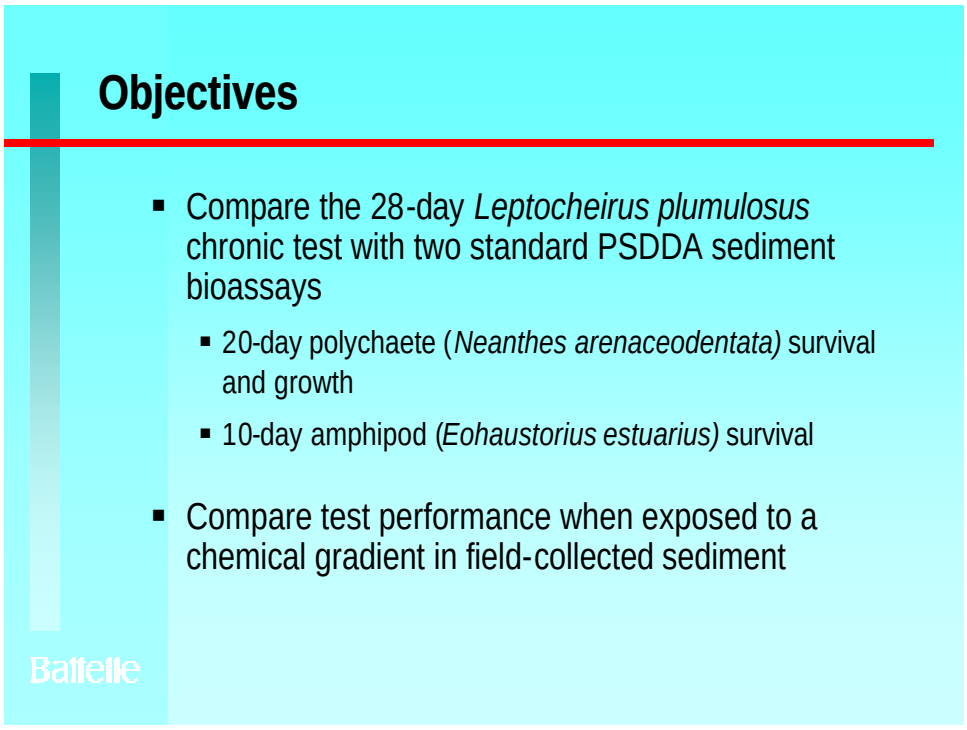
Situation Report

- Before September 2003
  - Produce a full report on the situation
  - Request an extension
  - Conduct monitoring
  - Re-evaluate situation
- Report will be on Corps website

PP 6.18. Situation Report



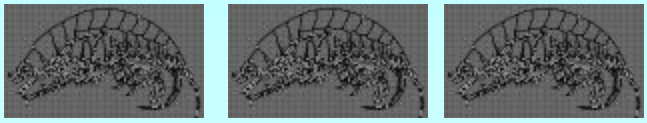
PP 7.1. Interspecies Toxicity Comparison Testing



PP 7.2. Objectives

Why *Leptocheirus plumulosus*?

- True estuarine species, tolerant of wide salinity range
- Comparable to other amphipod species in acute tests
- Short reproductive cycle, amenable to laboratory culture
- Method developed for sublethal and reproductive endpoints



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PP 7.3. Why Leptocheirus plumulosus?

28-d Test with *L. plumulosus*

- Initiate with neonates >0.25 but <0.6 mm size (approximately 24 h old)
- Daily observations
- Static Renewal, 33% renewal 3x/week
  - Measure water quality prior to renewal
  - 1/3 of overlying water removed, replaced
  - Salinity maintained at 20‰, temperature 25ºC, aerated
  - Tubing must be screened to prevent loss of organisms
- Feed 3x/week
  - Feed after water renewal
  - Feeding rate doubles halfway through test

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PP 7.4. 28-day Test with L. plumulosus

Initiating and Running the 28-d Test

Neonates are carefully selected and added randomly to treatments

Overlying water is renewed three times per week

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PP 7.5. Initiating and running the 28-day test

28-d Test with *L. plumulosus*

- Termination: rinse through two stacked sieves
  - 0.5-mm screen retains adults, check carefully
  - 0.25-mm screen retains neonates
  - Neonates stained and preserved
- Growth Endpoint
  - Rinse surviving adults in DI water
  - Dry to constant weight
- Reproductive Endpoint
- *Potential for tissue residue (bioaccumulation) endpoint*

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PP 7.6. 28-day Test with L. plumulosus (endpoints)

Terminating the 28-d Test

At 28-d, surviving adults and neonates are sieved from sediment

Survivors are enumerated, offsprint are stained and preserved

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PP 7.7. Terminating the 28-day test

Field Sediment Exposures

- Collect sediment from 8 sites in the Duwamish East waterway
- Conduct chemical analysis and choose a subset for toxicological analysis
- Conduct toxicity tests with *L. plumulosus*, *E. estuarius, and N. arenaceodentata*
- Statistically compare treatments to control
- Rank test performance

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PP 7.8. Field sediment exposures

Sediment Sampling Stations

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PP 7.9. Sediment Sampling Stations

Sediment Collection

- Surface 10-cm sediment collected using a van Veen grab deployed from R/V *Strait Science*
- Laboratory sample processing:
  - Press-sieve through 0.25-mm mesh
  - Homogenize bulk sediment
  - Split aliquots for bioassays, chemistry

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PP 7.10. Sediment Collection

5 Stations Selected for Toxicity Comparison

	S-37	S-48	2C-14[a]	2C-16/17	PDM-15
TOC (%)	2.29	2.17	1.85	2.61	1.73
Fines (%)	68	54	76	65	39
å PAH (ppm)	11.0	15.5	6.7	7.8	42.0
PCBs[b] (ppm)	2.8	3.0	1.2	2.3	2.1
å DDx (ppb)	100	34.2	37.0	217	6.5
TBT (ppm)	NM[c]	1.24 B[d]	NM	NM	4.34 B

a) Mean of analytical replicates
b) Detected Aroclors 1254+1260
c) NM Not measured
d) B analyte detected in blank; sample concentration is <5X the amount in blank.

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PP 7.11. Stations selected for toxicity comparison

Toxicity Test Conditions

Parameter	*Eohaustorius estuarius*	*Neanthes arenaceodentata*	*Leptocheirus plumulosus*
Duration	10 d	20 d	28 d
Endpoint(s)	survival	survival, growth	survival, growth, reproduction
Temperature	15ºC ± 2ºC	20ºC ± 2ºC	20ºC ± 2ºC
Salinity	28‰ ± 1‰	28‰ ± 2‰	20‰ ± 3‰
Control Performance	≥90%	≥90%, ≥ 0.38 mg/individual/day	≥80%, measurable growth, reproduction in all control reps
Reference Toxicant	Cadmium	Cadmium	Cadmium

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PP 7.12. Toxicity test conditions

Toxicity of Field-Collected Sediment

Station	*Eohaustorius* Survival (%)	*Neanthes* Survival (%)	*Neanthes* Growth (mg/d)	*Leptocheirus* Survival (%)	*Leptocheirus* Growth (mg/d)	*Leptocheirus* Reproduction (offspring per survivor)
Control	100	100	0.870	87	0.063	6.6
S-48	76	80	0.157	80	0.061	3.3
2C-14	74	100	0.478	88	0.063	2.3
S-37	68	100	0.460	74	0.047	1.2
PDM-15	58	100	0.335	60	0.038	0.5
2C-16/17	51	100	0.517	41	0.029	0.5

White highlight indicates significant difference from control

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PP 7.13. Toxicity of field-collected sediments

Response as a Percentage of Control

Station	*Eohaustorius* Survival	*Neanthes* Survival	*Neanthes* Growth	*Leptocheirus* Survival	*Leptocheirus* Growth	*Leptocheirus* Reproduction
Control	100	100	100	100	100	100
S-48	76	80	18	92	97	50
2C-14	74	100	55	101	100	35
S-37	68	100	53	85	75	18
PDM-15	58	100	39	69	60	8
2C-16/17	51	100	59	47	46	8

White highlight indicates significant difference from control

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PP 7.14. Response as a percentage of control

Ranked Results

Station	*Neanthes* Survival (%)	*Neanthes* Growth (mg/d)	*Eohaustorius* Survival (%)	*Leptocheirus* Survival (%)	*Leptocheirus* Growth (mg/d)	*Leptocheirus* Reproduction (offspring per survivor)
S-48	5	5	1	2	2	1
2C-14	2.5	2	2	1	1	2
S-37	2.5	3	3	3	3	3
PDM-15	2.5	4	4	4	4	4.5
2C-16/17	2.5	1	5	5	5	4.5

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1 highest - 5 lowest survival, growth or reproduction

PP 7.15. Ranked Results

Endpoint Sensitivity, 5 Field Sediments

- Based on ability to identify treatments significantly different from control, and
- Magnitude of difference from control

Most Sensitive

Least Sensitive

E. estuarius survival

N. arenaceodentata growth

L. plumulosus reproduction

L. plumulosus growth

L. plumulosus survival

N. arenaceodentata survival

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PP 7.16. Endpoint sensitivity, 5 field sediments

Summary of Toxicity Comparison

- *E. estuarius* survival and *N. arenaceodentata* growth endpoints identified all 5 samples as significantly different from control
- *L. plumulosus* reproductive endpoint identified 3 samples significantly different from control
- Greatest magnitude of difference from control observed with *L. plumulosus* reproduction endpoint (but high variability limits sensitivity)

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PP 7.17. Summary of Toxicity Comparisions

Conclusions

- *L. plumulosus* test not more sensitive than amphipod acute test despite additional sublethal endpoints
- *L. plumulosus* test has variability issues: counting offspring, measuring growth rates
- *L. plumulosus* test still has potential for bioaccumulative endpoints and population level effects
- DMMP intends further comparative testing with *L. plumulosus*

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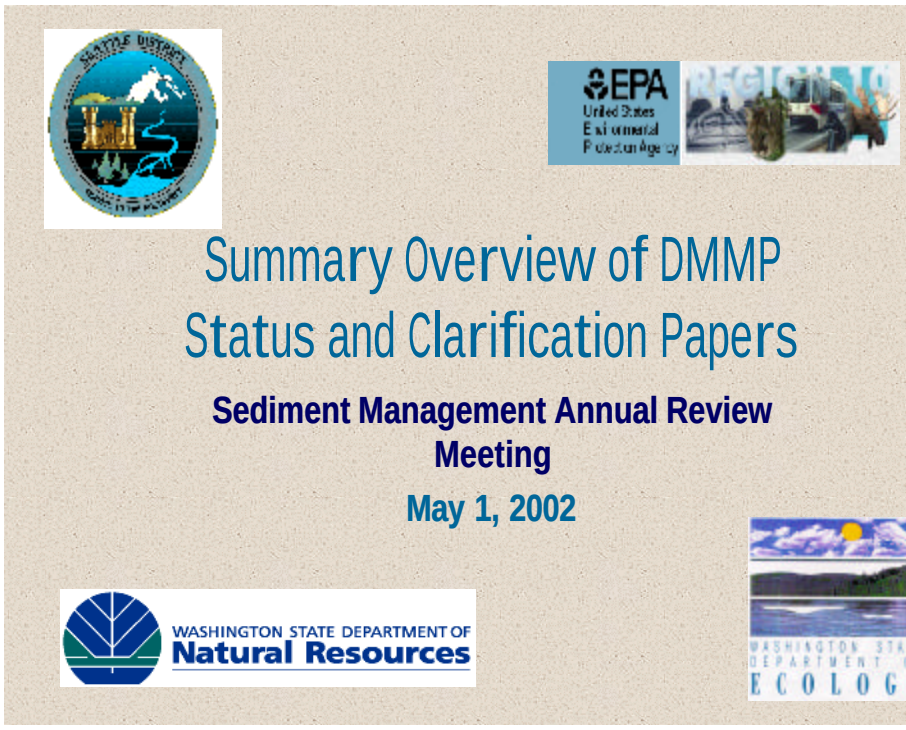
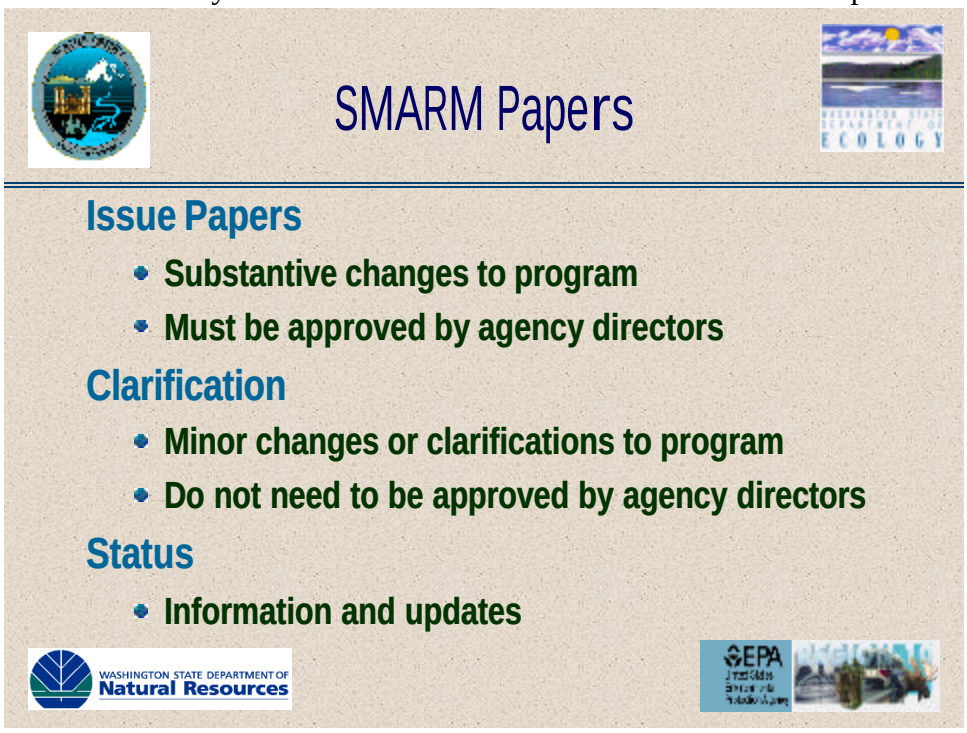
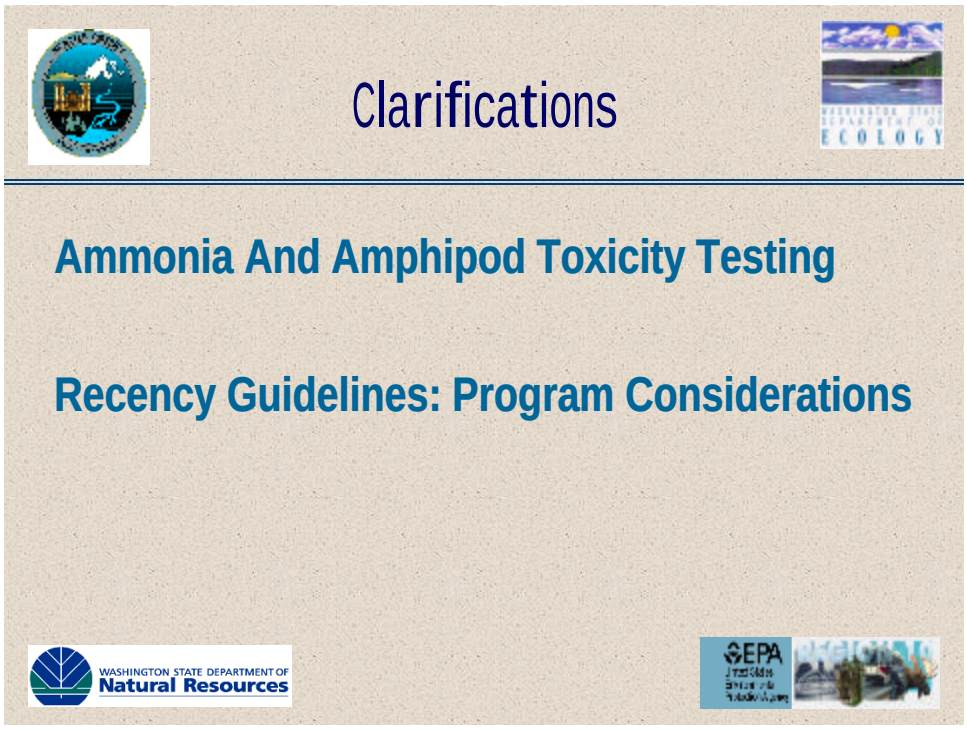
PP 7.18. Conclusions



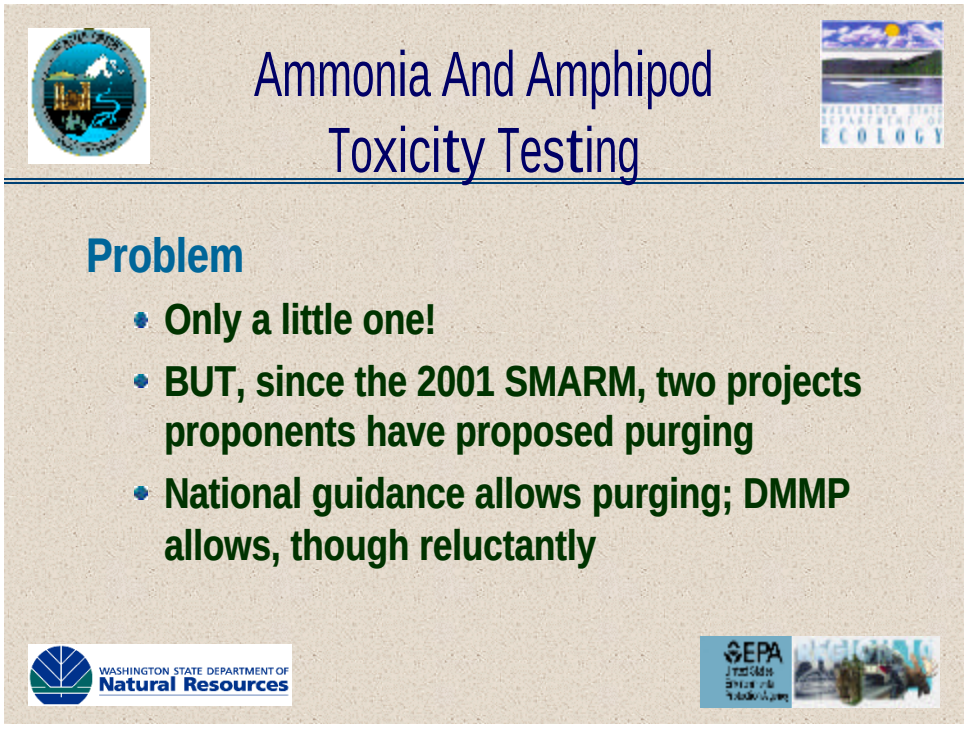
PP 8.1. Summary Overview of DMMP Status and Clarification Papers



PP 8.2. SMARM Papers

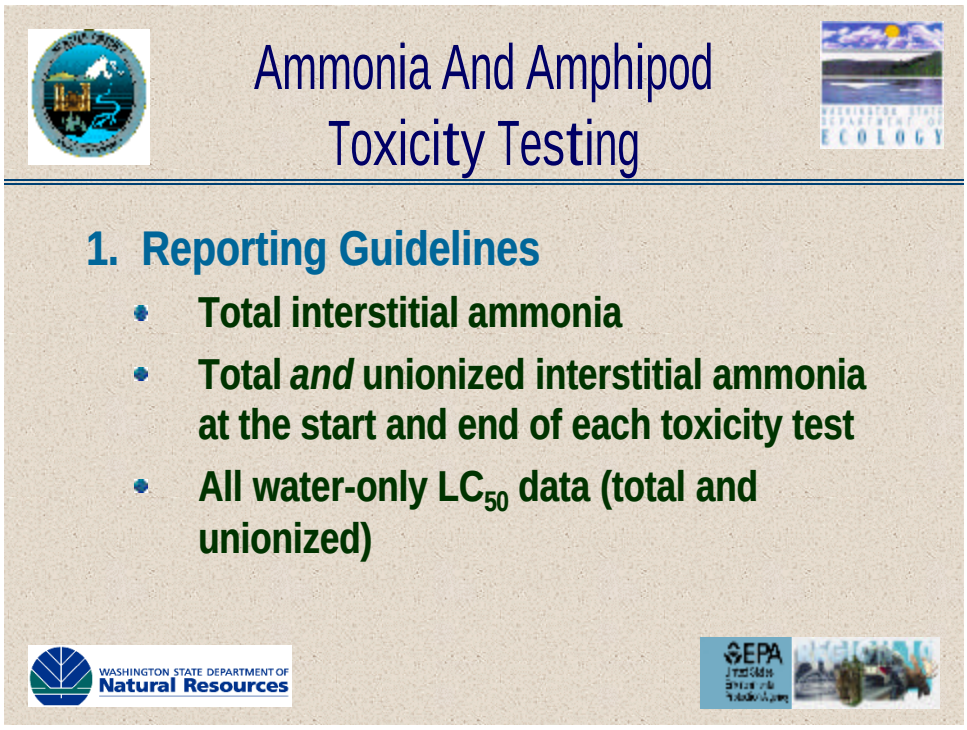


PP 8.3. Clarifications

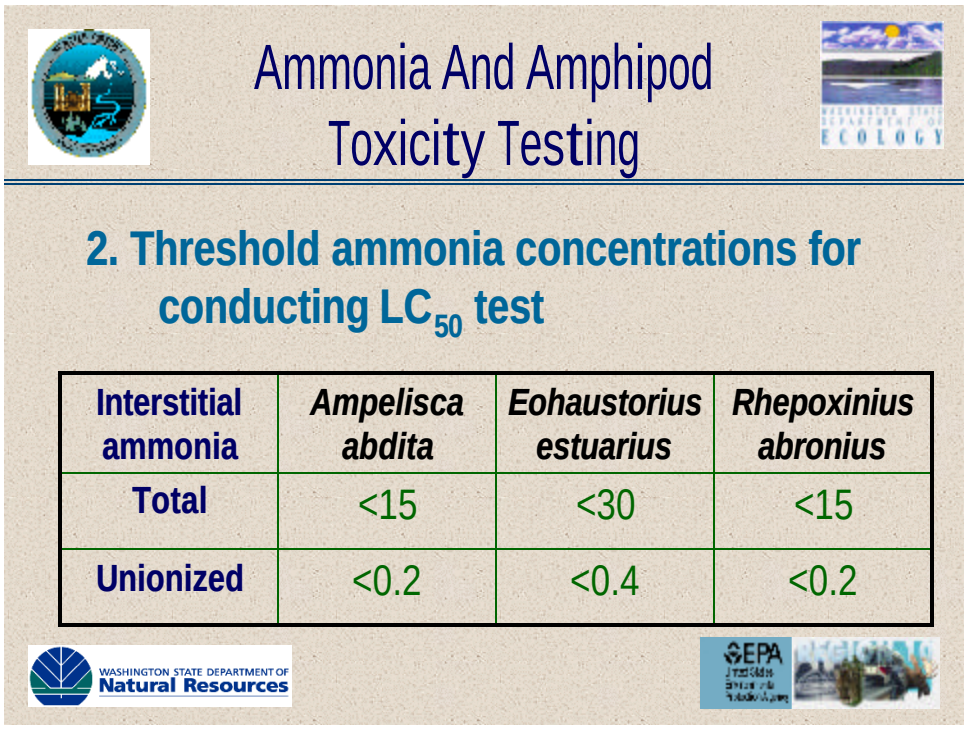


PP 8.4. Ammonia and amphipod toxicity testing

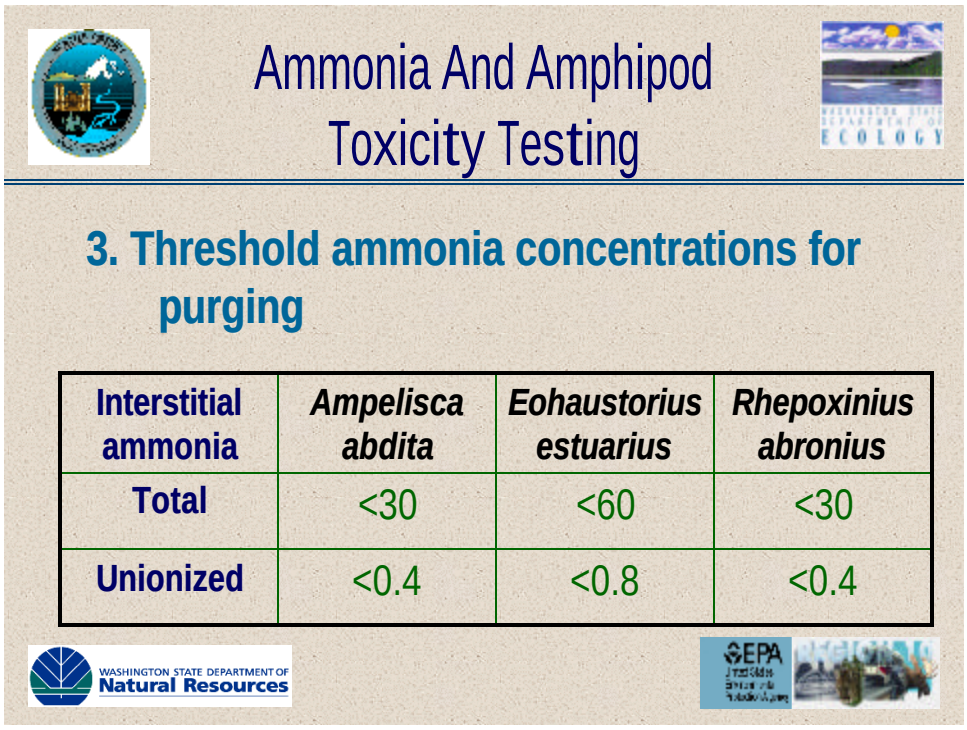
PP 8.5. Ammonia and amphipod toxicity testing (continued)



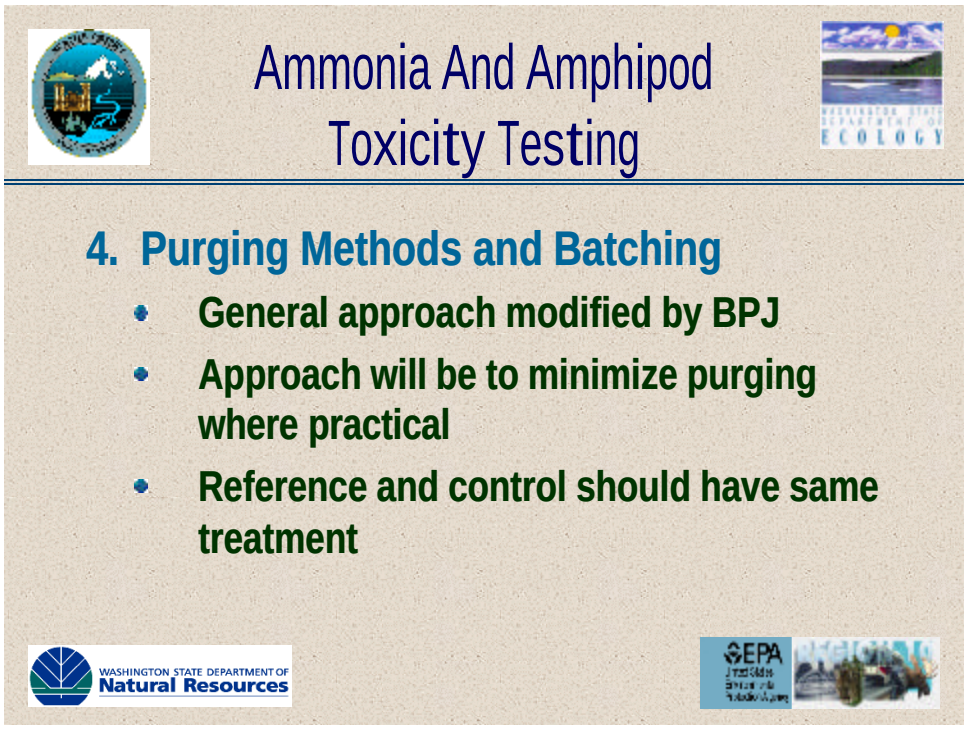
PP 8.6. Ammonia and Amphipod Toxicity Testing (continued)



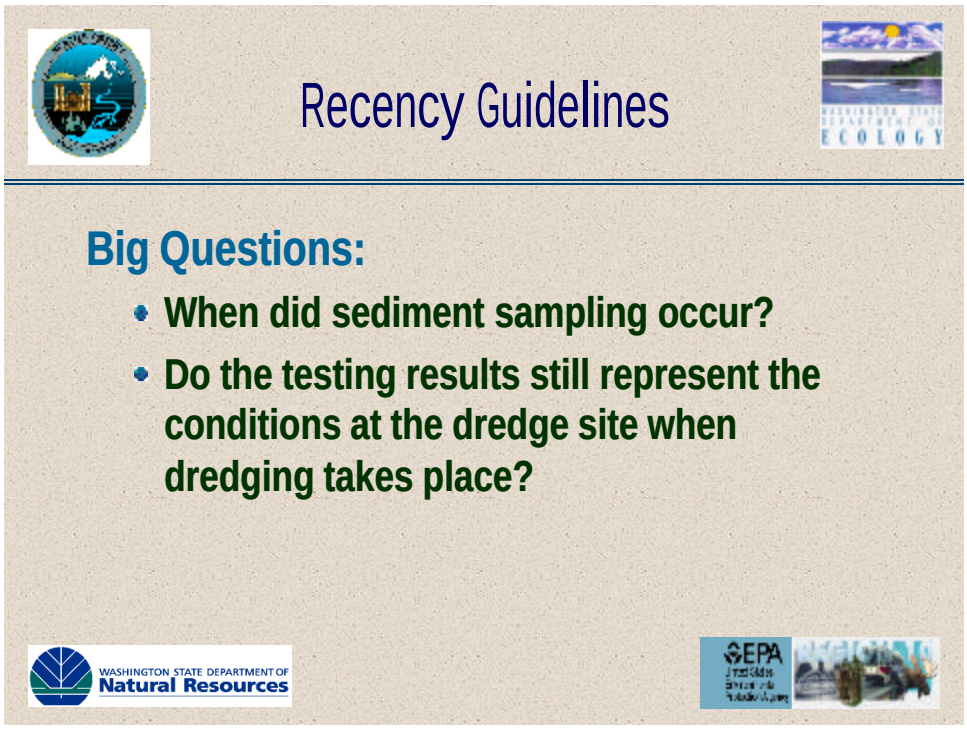
PP 8.7. Ammonia and amphipod toxicity testing (continued)



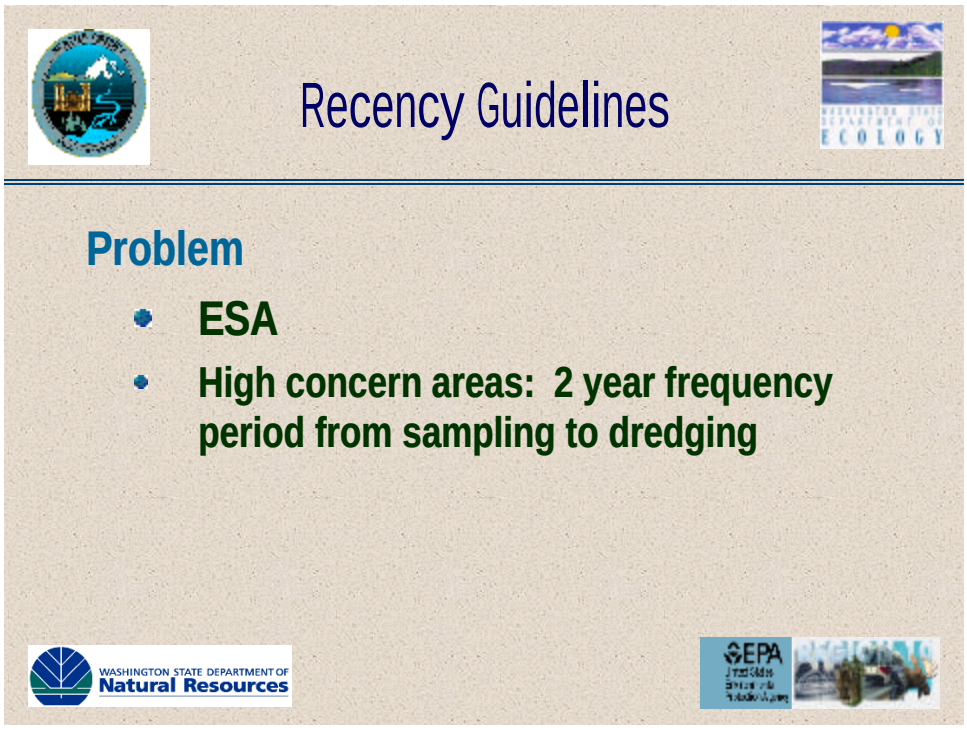
PP 8.8. Ammonia and amphipod toxicity testing (continued)



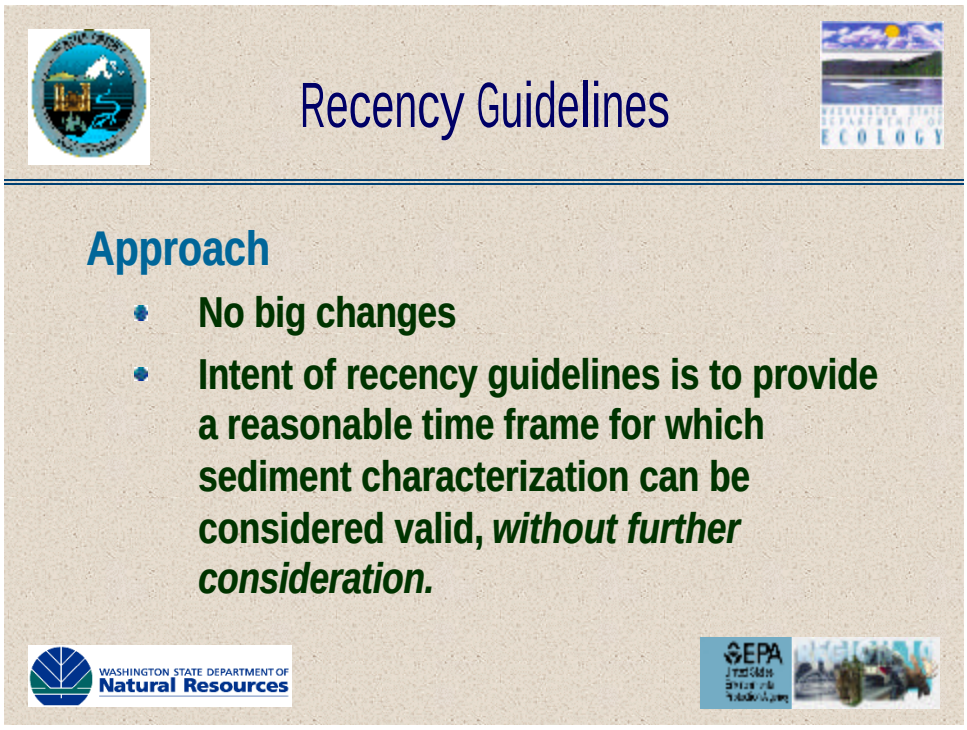
PP 8.9. Ammonia and toxicity testing (continued)



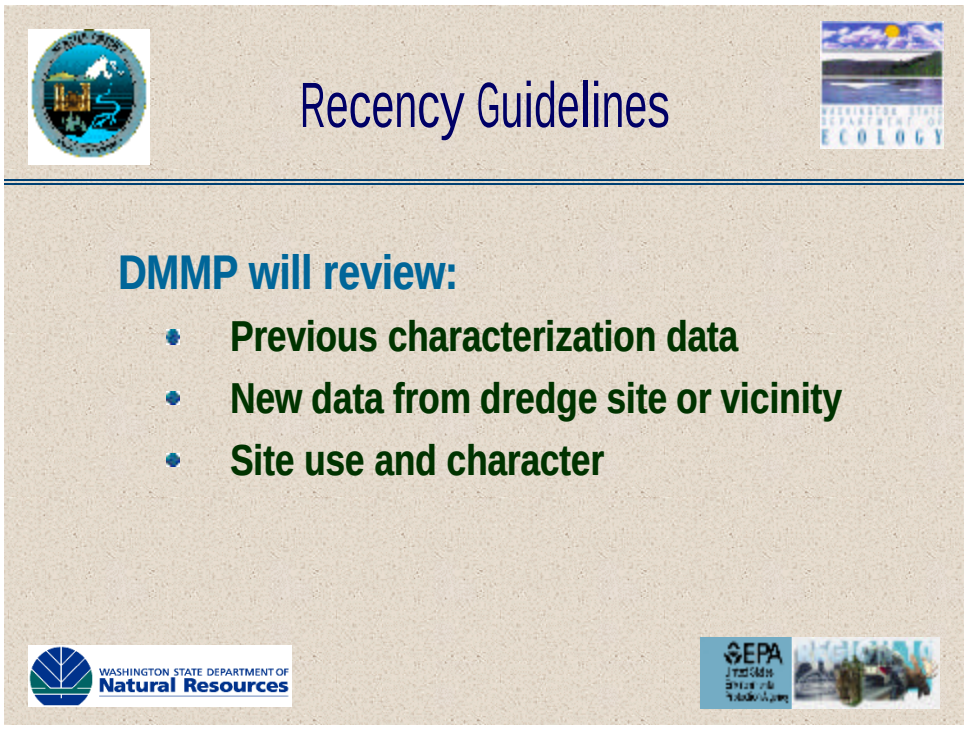
PP 8.10. Recency Guidelines



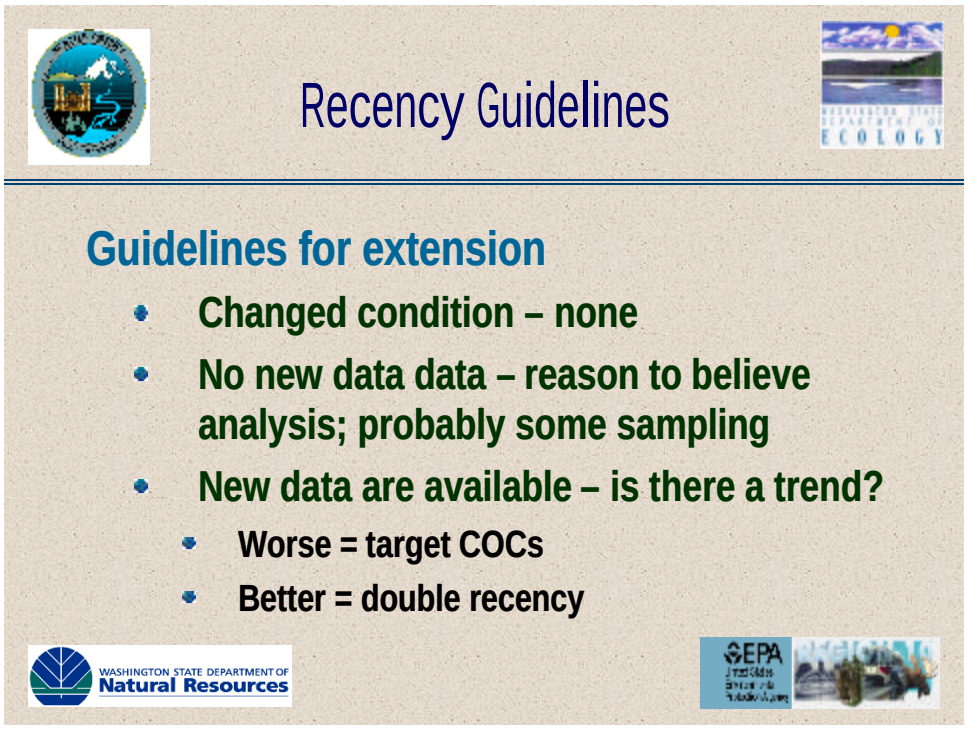
PP 8.11. Recency Guidelines (continued)



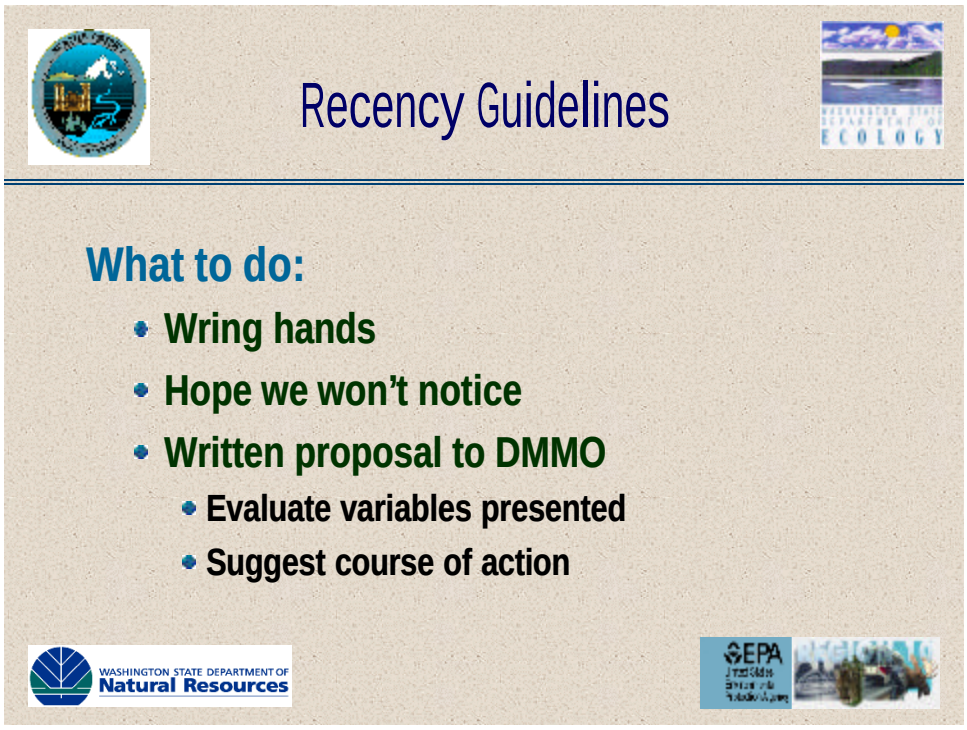
PP 8.12. Recency Guidelines (continued)



PP 8.13. Recency Guidelines (continued)



PP 8.14. Recency Guidelines (continued)



PP 8.15. Recency Guidelines (Continued)

Toxicity in New Sediment

Jack Q Word (MEC Analytical Systems, Inc)
Michael Johns (Windward Environmental)
Douglas Hotchkiss (Port of Seattle)

PP 9.1. Toxicity of new sediment

Definitions

- **New sediment = any sediment surface that is exposed to a new environment.**
- **Toxicity = any negative response in a toxicity test whether it is associated with chemical contaminants of concern, lack of food, lack of acclimation to new conditions, etc.**

PP 9.2. Definitions

Examples of New Sediment

- **Fresh water sediment placed in marine waters (or the opposite)**
- **Sediment turned over in place revealing subsurface sediment**
- **New work dredging revealing sediment that has not been undergoing biological transformation by surface dwelling organisms in the recent past**
- **Landslides falling into aquatic systems**
- **Soils or sands or gravels placed under water**
- **Remediated sediment**

PP 9.3. Examples of new sediment

Problem

- **Sediment has been found to be toxic when it apparently shows no sign of chemical contamination**

- **Sediment has been found to be toxic even though it has been buried at sediment depths that were deposited in aquatic systems for thousands of years**

PP 9.4. Problems

Are Unknown COCs or Other Factors the Cause of Observed Toxicity?

PP 9.5. Are unknown COCs or other factors the cause of observed toxicity?

What Observations are Available?

- **Richmond Harbor Older Bay Mud**
- **Oakland Harbor Merritt Sand Formations**
- **Bahia upland sediment placed under water**
- **East Waterway**

PP 9.6. What observations are available?

Richmond Harbor Older Bay Mud

- **Sediment isolated by 10-30 feet of overburden**
- **No apparent sediment contamination**
- **Low amount of sediment water content**
- **Low TOC content**
- **Fine grained sediment**
- **Sediment is toxic to *Nephtys caecoides***
- **Sediment toxicity removed by adding small amounts of higher quality TOC (*Enteromorpha*) and adding liquid to hard packed sediment (Pinza et al. 1996).**

PP 9.7. Richmond Harbor Older Bay Mud

Oakland Harbor Merritt Sand Formations

- **Sediment buried by 10-30 feet of overburden**
- **Sediment without elevated chemical contamination, except for Cr and Ni**
- **Sediment hard packed and without water content in excess of 2%.**
- **TOC content extremely low**
- **Survival of initial test organisms low (*Rhepoxynius abronius* and *Nephtys caecoides*)**
- **Sharp sediment grains cut polychaetes (Word et al. 1992)**
- **Switch to organism that uses overlying water (*Ampelisca abdita*) resulted in acceptable survival**

PP 9.8. Oakland Harbor

Bahia Upland Soil Placed Under Water (off Petaluma River, SF Bay)

- **Soils at the surface of the upland disposal site**
- **Similar chemistry with Bahia Lagoon sediment except less nitrogen**
- **Soil dry**
- **Complete mortality of *Neanthes arenaceodentata* and high mortality with *Eohaustorius estuarius***
- **Allowed sediment to acclimate under static conditions for 6 weeks; no mortality associated with acclimated sediment (Word et al., 2001).**

PP 9.9. Bahia Upland Soil

East Waterway

- **Significant number of paired sediment chemistry and toxicity tests from surface (0-15 cm) and subsurface (0-4 and > 4 ft)**
- **Some sections have been dredged and post-dredge monitoring conducted on the new sediment surface**

PP 9.10. East Waterway

East Waterway

- **Sediment at surface of new dredge cut exhibited lower concentrations of target contaminants**
- **New sediment surface was hard packed**
- **Some toxicity evident in new sediment**
- **Less toxicity in retest 1 ½ years later**

PP 9.11. East Waterway (continued)

East Waterway: Summary of Total Bioassay/Chemistry Data

Sediment Depth Interval	% of samples with chemistry failure	% Amphipod failure	% *Neanthes* failure	% Larval failure
0-15 cm	64	4	2	25
0 – 4 ft	51	9	7	11
> 4 ft	13	6	20	15

PP 9.12. East Waterway: Summary of Total Bioassay/Chemistry Data

East Waterway Bioassay Failure Rate with Passing Chemistry

Bioassay Test Organism

Sediment Depth Interval	Amphipod	*Neanthes*	Larval
0 – 15 cm	0%	0%	25%
0 – 4 ft	6%	0%	11%
> 4 ft	7%	17%	9%

PP 9.13. East Waterway Bioassay Failure Rate with Passing Chemistry

Other Observations

- **It is well recognized in the aquaculture fields that "seasoning of sediment, soils, rocks, wood, dried corals, PVC piping systems, etc. is required before introducing organisms**
- **Body of work by Don Rhoads and colleagues on newly exposed surfaces**

PP 9.14. Other observations

Unknown Factors of Toxicity?

- **They are usually present in testing**
- **The factors can be related to unknown and unmeasured contaminants but**
- **Many of the studies indicate they are issues associated with conditioning, acclimating or seasoning the sediment**

PP 9.15. Unknown Factors of Toxicity?

Unknown Factors of Toxicity?

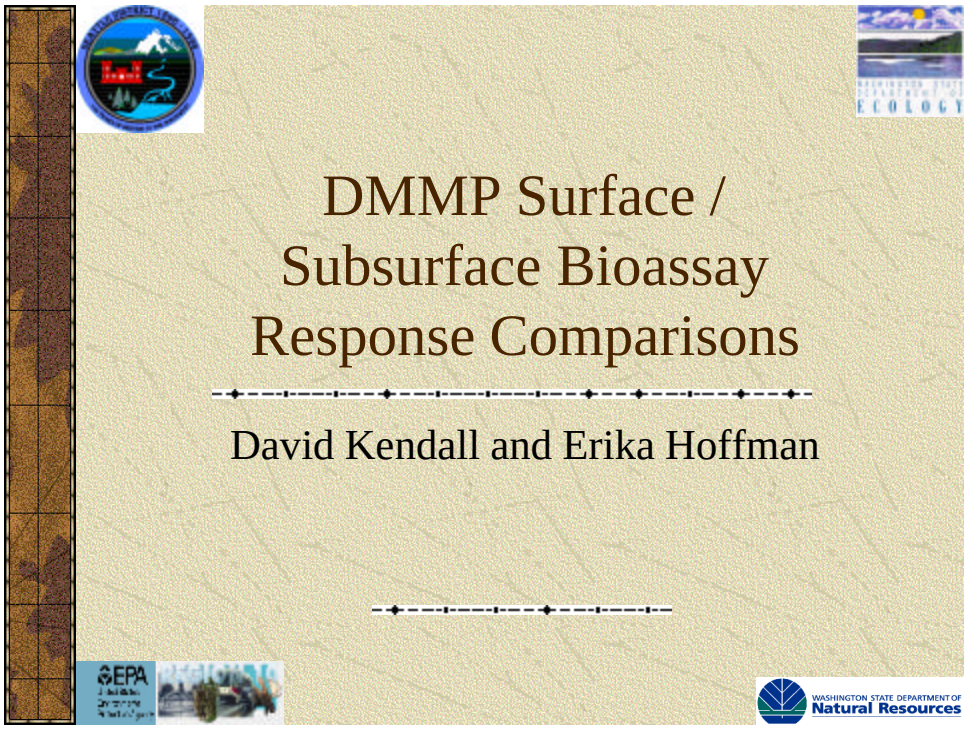
- **Concerns are highest with sediment that passes chemical screening guidelines but fail bioassay tests**
- **Concerns are high over the use of standard protocols with current toxicity tests to pre-define sediment acceptability in z-samples**
- **Concerns are also high as we begin to evaluate the effectiveness (biological as well as chemical) of cleanup and restoration activities**

PP 9.16. Unknown Factors of Toxicity?

How do we address these concerns?

- **Learn from aquaculture practices and animal husbandry techniques by employing seasoning of sediments where there is a concern that toxicity may be related to factors other than COCs**
- **Apply these methods to evaluating new surfaces of dredged material, evaluating the biological effectiveness of remediation techniques, criteria for site cleanup and evaluation of soils or sediment buried beneath the biologically active zone.**

PP 9.17. How do we address these concerns?



PP 10.1. DMMP Surface/Subsurface Bioassay Response Comparisons

DMMP Sampling and Testing Approach

- Surface samples represent a composite of the top 4 feet of sediment, as contrasted with SMS (0-10 cm).
- Subsurface samples represent a composite of the material below the 4 foot depth horizon relative to the mudline extending to the vertical limits of the dredging prism.

PP 10.2. DMMP sampling and testing approach

Acknowledged Effects of Sediment Compositing

- Destroys/Disrupts Sediment Characteristics commonly associated with surface sediments* (e.g, 0-10 cm layer):
  - Deeper redox boundary
  - Vertical partical mixing
  - High porewater exchange
  - Homogeneous sedimentary fabric (e.g., fecal pellets)

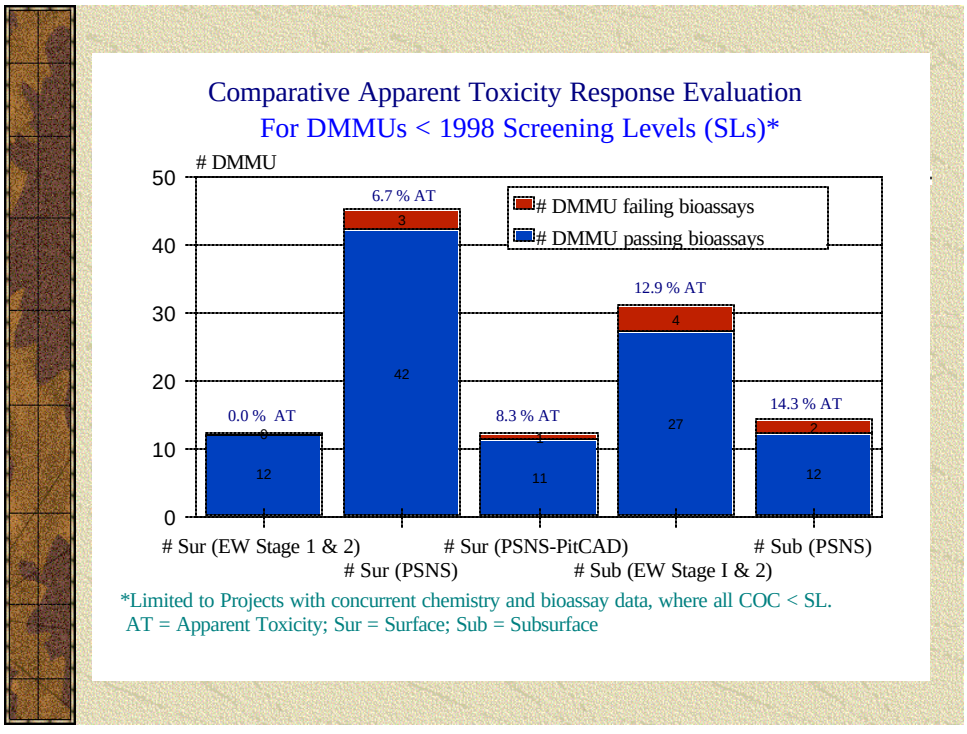
*Germano, J. 1983.

PP 10.3. Acknowledged effects of sediment compositing

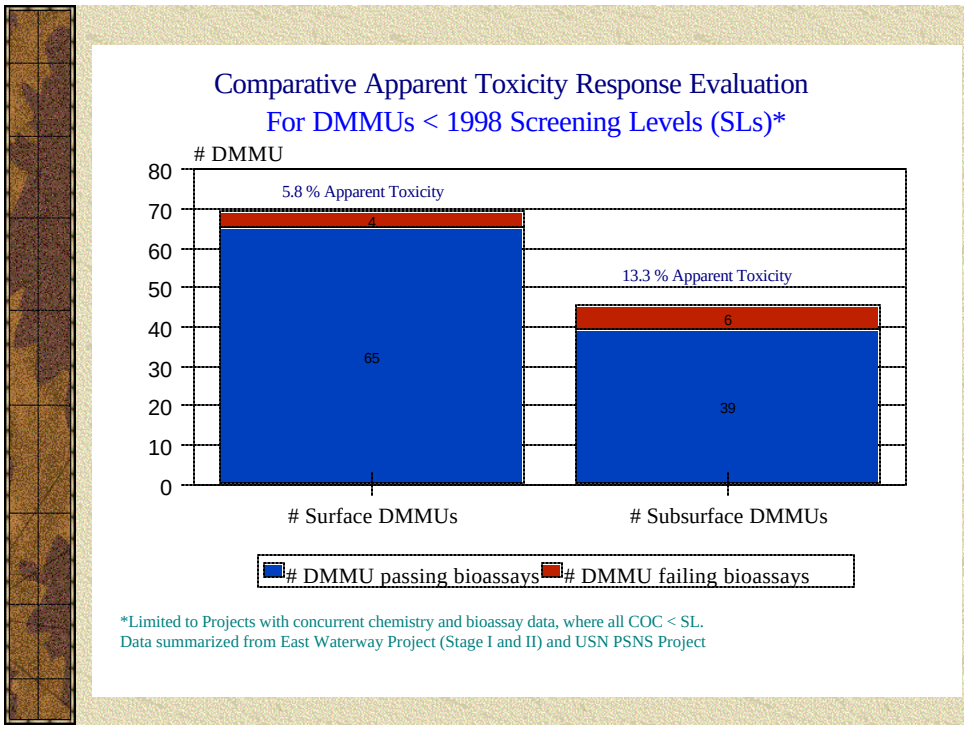
Subset of recent DMMP projects comparing surface/subsurface toxicity data

- East Waterway Stage I (T-18)(DY97, 96 DMMUs)
- East Waterway Stage II (DY00, 99 DMMUs)
- U.S. Navy Puget Sound Naval Shipyard Dredging Project (DY00, 91 DMMUs)
- U.S. Navy Puget Sound Naval Shipyard CERCLA Pit-CAD characterization (DY00, 34 DMMUs)

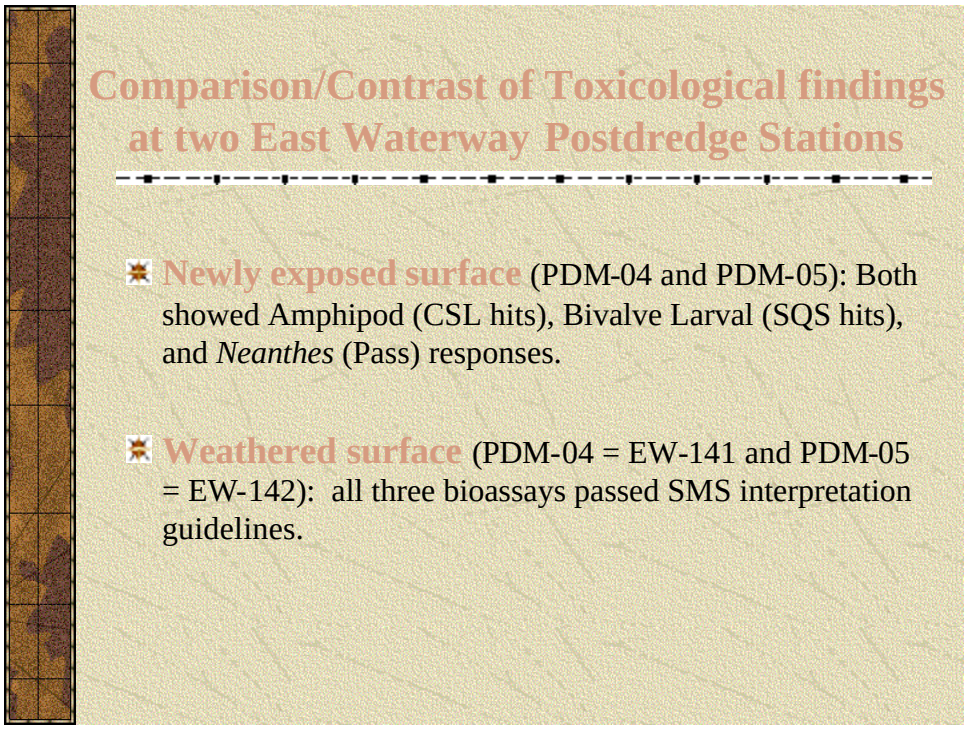
PP 10.4. Subset of recent DMMP projects



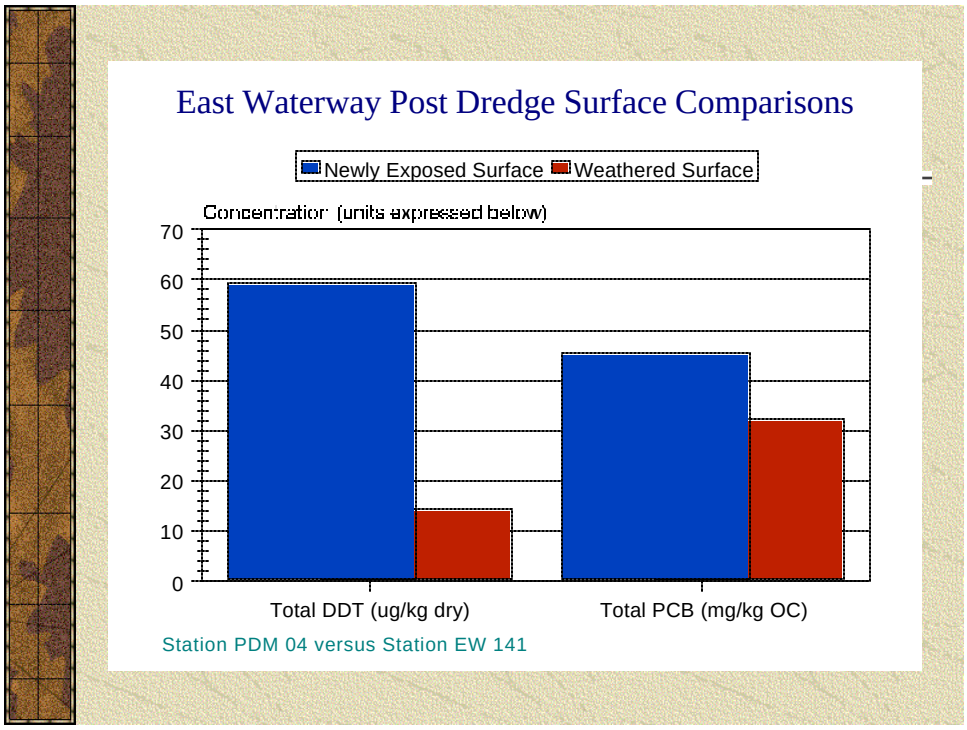
PP 10.5. Comparative Apparent Toxicity Response for Surface/Subsurface



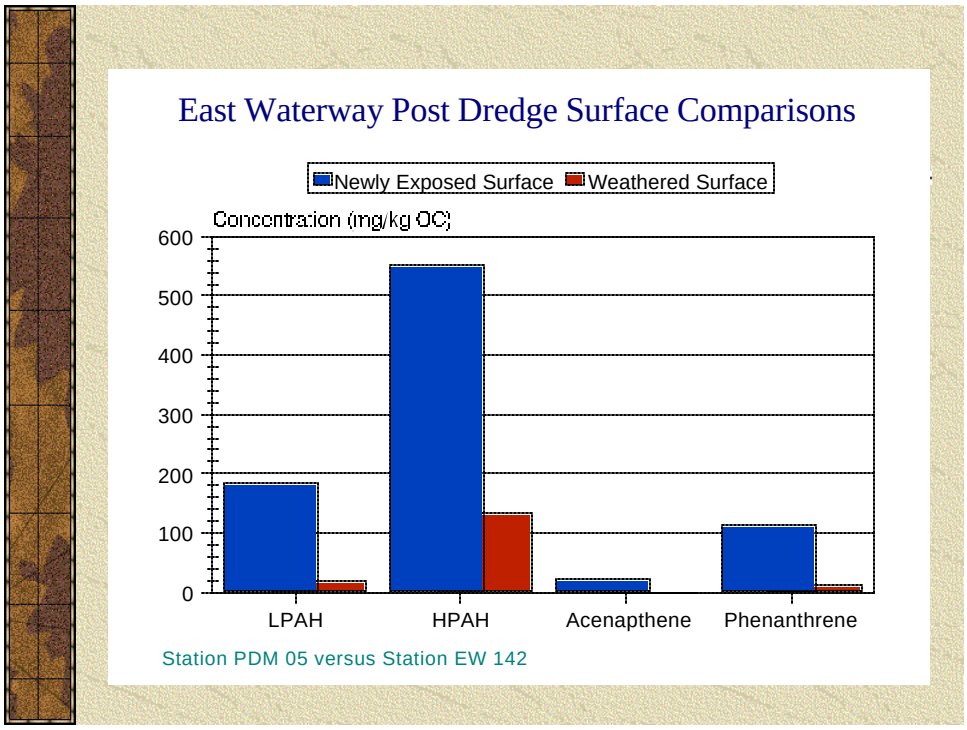
PP 10.6. Comparative Apparent Toxicity Evaluation for Surface/Subsurface



PP 10.7. Comparison/Contrast of Toxicological Findings



PP 10.8. Post Dredge Surface Comparisons



PP 10.9. Post dredge surface comparisons

Conclusions: (Surface/Subsurface Toxicity)

- There is little difference in unexplained surface and subsurface toxicity in DMMP samples examined from two large projects.
- The method of sampling and compositing within the DMMP Program reduces the difference between surface and subsurface sediment.

PP 10.10. Conclusions

Conclusions: (Eastwaterway Postdredge Comparisons):

- Chemical comparisons suggest that there are significant differences in the contaminant concentrations between the two testing intervals.
- Therefore, the differential toxicity expressed in the sediment at the two locations depicted following dredging cannot be directly compared due to the lack of consistency in chemical concentrations measured between the two sampling intervals.

PP 10.11. Conclusions (continued)

Proposed Revisions to the DMMP's Bioaccumulative Contaminant of Concern List

Erika Hoffman
EPA

PP 11.1. Proposed Revisions to the DMMP BCOC List

What's a BCOC?

BCOC = Bioaccumulative Contaminant of Concern

- accumulate in tissue
- cause adverse effects *as a result of accumulation*
- tendency to biomagnify in higher trophic levels

PP 11.2. What is a BCOC?

What is the Current BCOC List?

- Developed in EPTA (1988)
- 30 BCOCs - subset of the PSDDA COC list
- All have bioaccumulation Triggers (BT)
- Most BTs based on human health risk

PP 11.3. What is the Current BCOC List?

Why Revise the BCOC List?

- Ecological risk
- Transparency
- Consistency
- Allow future revisions
- Regional monitoring data
- Updated toxicological information
- Consider additional chemicals

PP 11.4. Why Revise the BCOC List?

The Revision Process

- Sept. 1998 Technical Support Document
- 1998 Issue Paper - Revision of Guidelines for BCOCs
- 1999 Bioaccumulation Work Group (BWG) Meetings
- 2001/2 Data compilation by DMMP/Contractor
- 2002 BWG Meeting

PP 11.5. The Revision Process

What is the BWG?

- Technical advisory group to DMMP on topics associated with bioaccumulation
- Regulatory agencies (DNR, COE, Ecology, EPA, FWS, WDFW)
- Environmental organizations and tribes
- Consultants/Researchers
- Industry and Ports

PP 11.6. What is the BWG?

Earlier BWG Recommendations

- Use Weight of Evidence rather than scoring
- 5 Categories of information
- 136 Chemicals to be considered
- Acknowledge difference between negative information and the absence of information

PP 11.7. Earlier BWG Recommendations

Key Information Collected - 2001/2

- Sediment Data
- Tissue Data
- Residue-Effects LOEDs
- Standard Methods and MDLs

PP 11.8. Key Information Collected – 2001/2

Proposed Lists

List 1: Primary BCOCs

List 2: Candidate BCOCs

List 3: Potentially Bioaccumulative

List 4: No Considered Bioaccumulative

PP 11.9. Proposed Lists

List 4: No Further Consideration

1st Definition:

- Doesn’t significantly partition into organic fraction

2nd Definition:

- Regional sediment and tissue data indicate it is rarely detected
- Detected sediment and tissue concentrations are lower than threshold residue-effect levels

PP 11.10. List 4: No Further Consideration

List 1: Primary BCOCs

1st Definition

- Partitions into the organic fraction
- Detected in monitoring at levels exceeding residue-effect thresholds

2nd Definition

- Regularly detected in monitoring
- Residue-effects data available
- known toxic to humans and/or aquatic organisms

PP 11.11. List 1: Primary BCOCs

List 2: Candidate BCOCs

1st Definition

- Partitions into organic fraction
- no tissue monitoring data
- frequently detected in sediments at levels greater than DL or
- occasionally detected in sediments at levels many times greater than DL
- known toxic to humans and/or aquatic organisms

PP 11.12. List 2: Candidate BCOCs

List 2: Candidate BCOCs

2nd Definition

- Partitions into organic fraction
- No sediment or tissue monitoring data
- known toxic to humans and/or aquatic organisms or
- high use in WA State

PP 11.13. List 2: Candidate BCOCs

List 3: Potentially Bioaccumulative

Partitions into organic fraction and:

- no sediment or tissue data available
- no information on human- and/or ecotoxicity
- no information on use in WA

PP 11.14. List 3: Potentially Bioaccumulative

Changes to BCOC List

- Original BCOC list = 31 chemicals
- List 1 = 30 chemicals
  - 14 new chemicals
  - 5 not on DMMP COC list
- List 2 = 20 chemicals - all new
- List 3 = 66 chemicals
  - 59 new
  - 7 from original list
- List 4 = 20 chemicals
  - 11 new
  - 9 from original list

PP 11.15. Changes to BCOC List

BWG's Issues re. List Development

- Evaluate Log Kow thresholds
- How much data is enough?
- Provide more guidance on analytical methods
- What does List 4 mean?
- Provide more details on distributions of contaminants in tissues

PP 11.16. BWG's Issues re. List Development

Implementation Issues

- SL/ML development for 5 new chemicals?
- BT development/revision for all List 1 chemicals?
- Which List 1 chemicals analyzed only when reason to believe?

PP 11.17. Implementation Issues

Next Steps

- Complete supporting document (Summer 2002)
- Post on DMMO Web Site at: *www.nws.usace.army.mil*
- 30-day Public Comment Period
- Revise and finalize lists by Fall 2002

PP 11.18. Next Steps

Increasing the Volume Trigger for Environmental Monitoring of Non-Dispersive Open Water Disposal Sites

Robert J. Brenner
For the DMMP Agencies

EPA REGION 10

U.S. Army Corps of Engineers Seattle District

WASHINGTON STATE DEPARTMENT OF Natural Resources

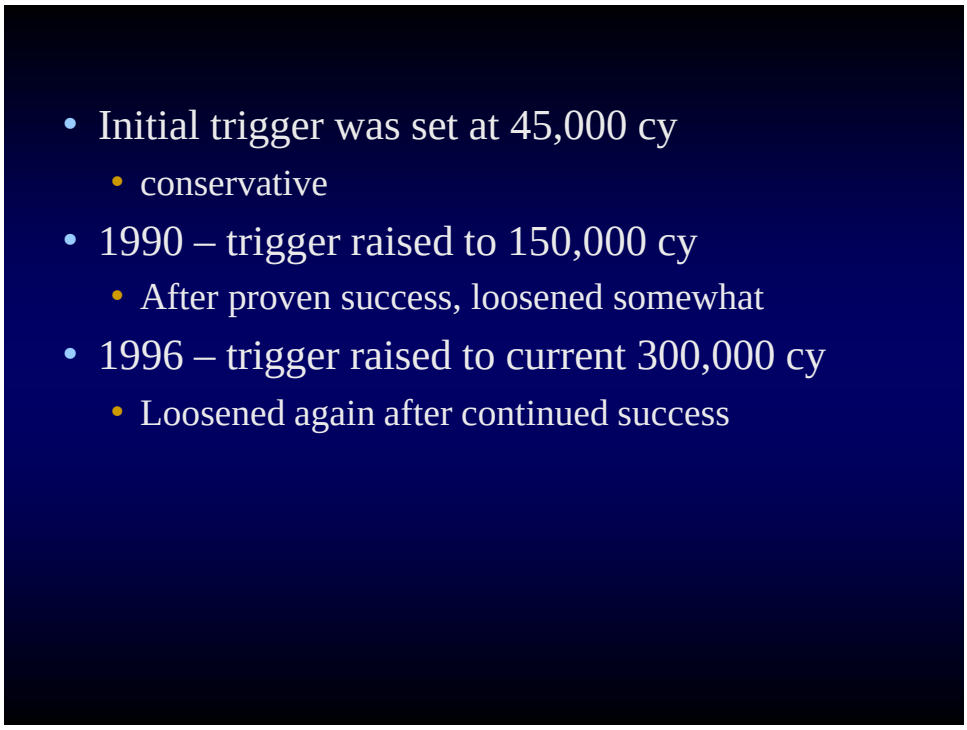
Department of Ecology

PP 12.1. Increasing the Volume Trigger for Environmental Monitoring

Background

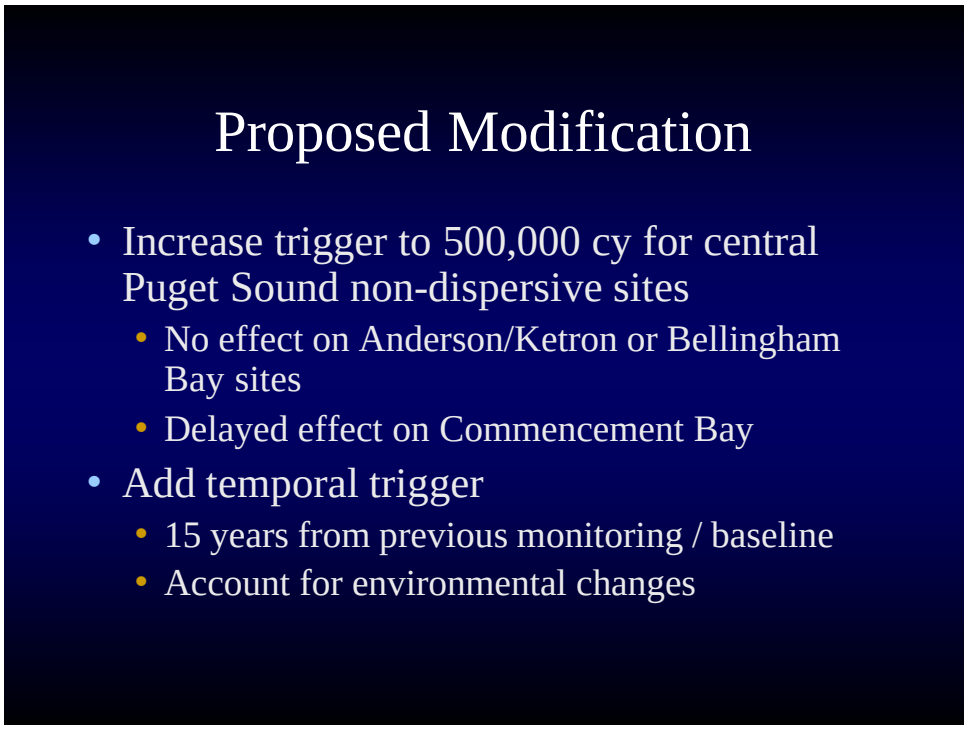
- PSDDA –
  - Recognized need for close scrutiny in early stages of implementation
  - Environmental monitoring conducted to ensure compliance with Section 404(b)(1) and verify PSDDA predictions of site conditions following disposal
  - As evidence of successful mgmt mounted, frequency of monitoring would be reduced

PP 12.2. Background

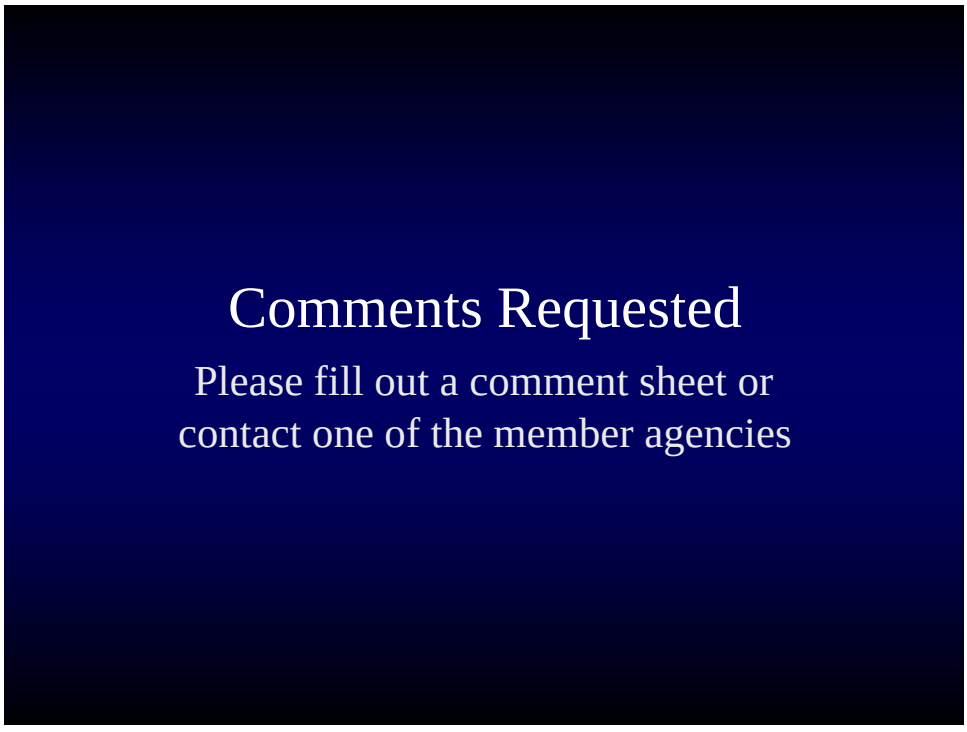


PP 12.3. Background (continued)

PP 12.4. Triggers “ Soft and may be adjusted



PP 12.5. Proposed Modification

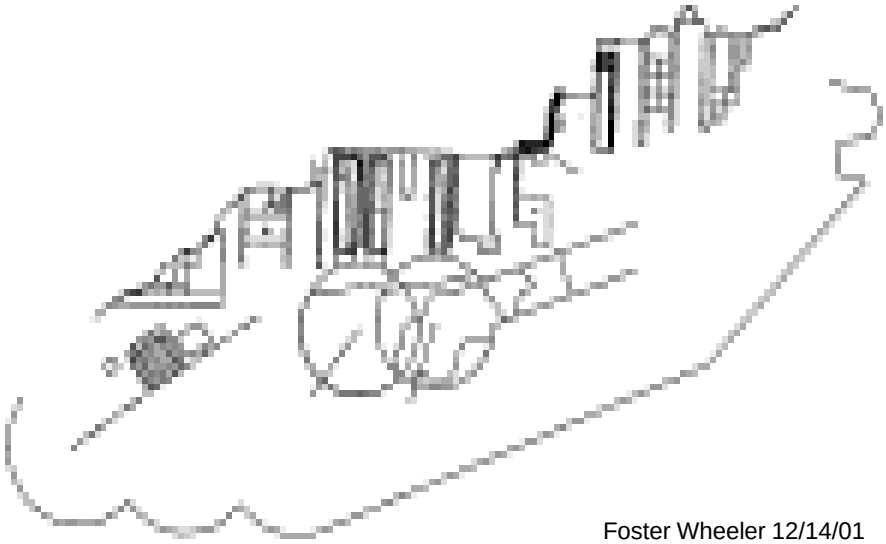


PP 12.6. Comments Requested

PP 13.1 Confined Aquatic Disposal (CAD) Pit

PP 13.2. Operable Unit B

PSNS CAD Pit Location



PP 13.3. PSNS CAD Pit Location

PP 13.4. Photograph – Aerial of Site

Preparation for Dredging

PP 13.5. Preparation for Dredging

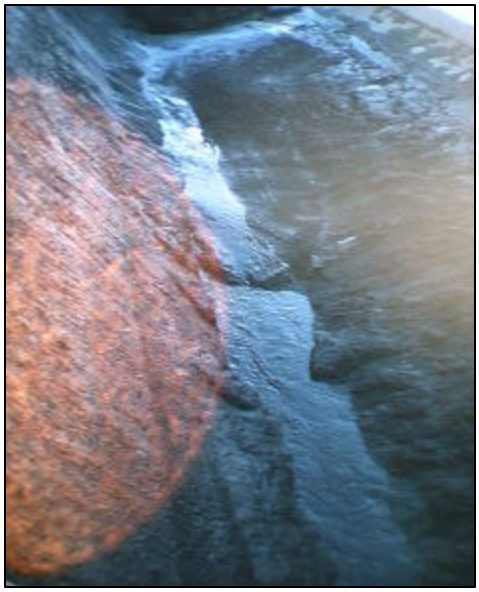
Dredging with Environmental Bucket

PP 13.6. Dredging with Environmental Bucket

Dredging with Conventional Bucket

PP 13.7. Dredging with Conventional Bucket

Inside Split-hull Bottom-dump Barge During Disposal of Contaminated Sediment to CAD Pit



PP 13.8. Inside split-hull bottom dump barge during disposal of contaminated sediments

Imported Sand on Flat-deck Barge for Initial Capping of CAD Pit

PP 13.9. Imported sand on Flat-deck Barge for Initial Capping of CAD-Pit

Filling Pocket Scow with Suitable Sediment for Final Cap

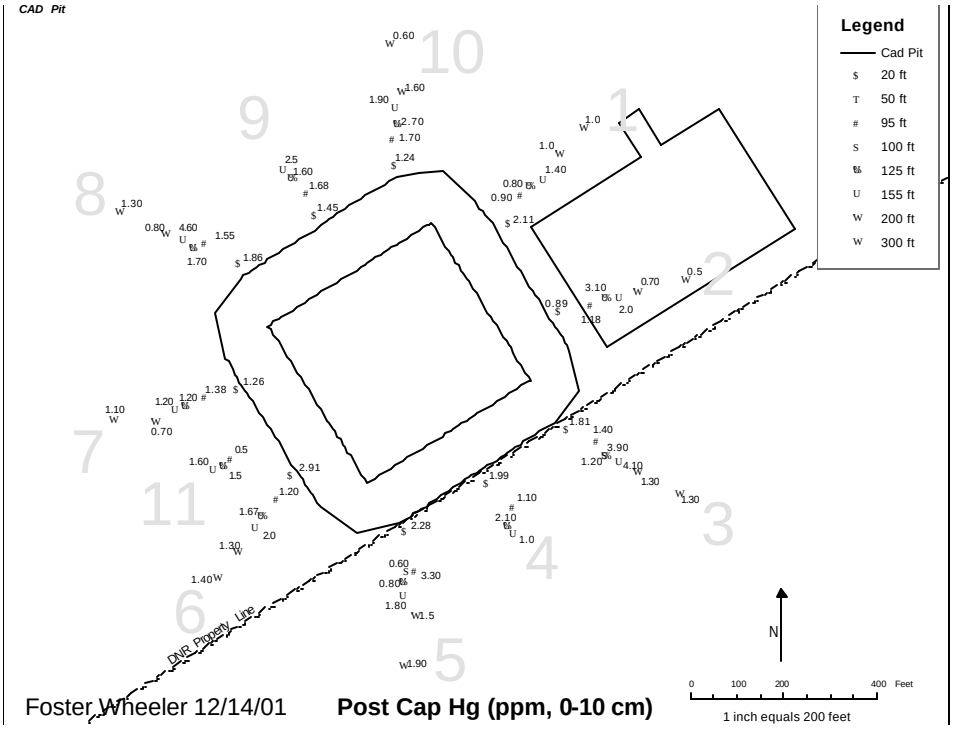
PP 13.10. Filling Pocket Scow with Suitable Sediment for Final Cap

Tugboat Positioning Pocket Scow over CAD Pit for Placement of ‘Final’ Cap

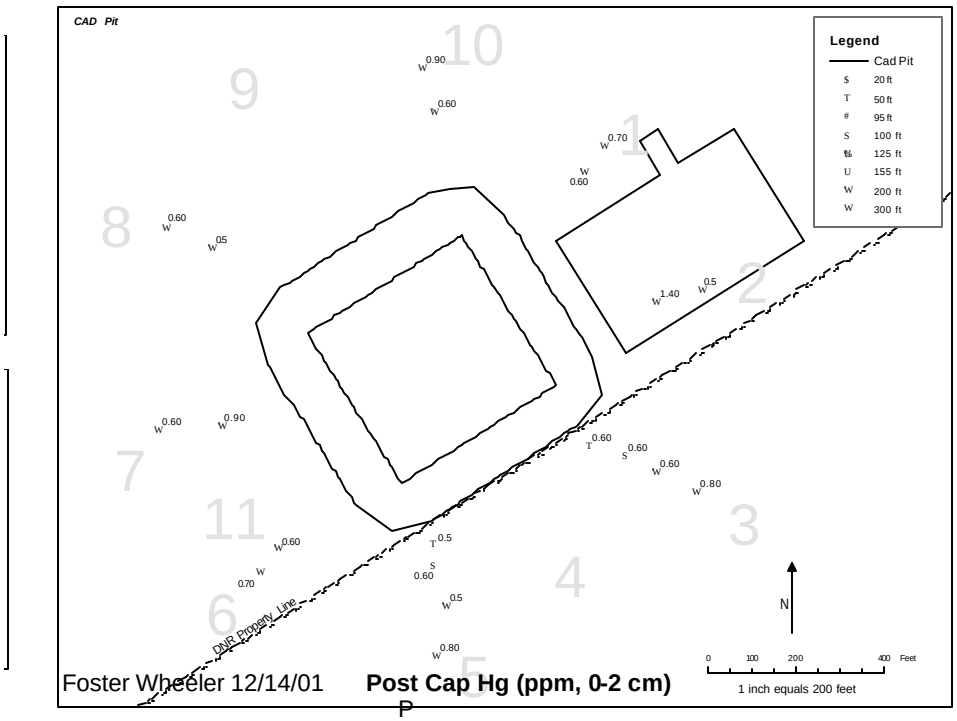
PP 13.11. Tugboat positioning Pocket-Scow over CAD-Pit

Sediment Grab Samples Using Petite Ponar

PP 13.12. Sediment Grab samples



PP 13.13. Post CAP Hg concentrations (0-10 cm)



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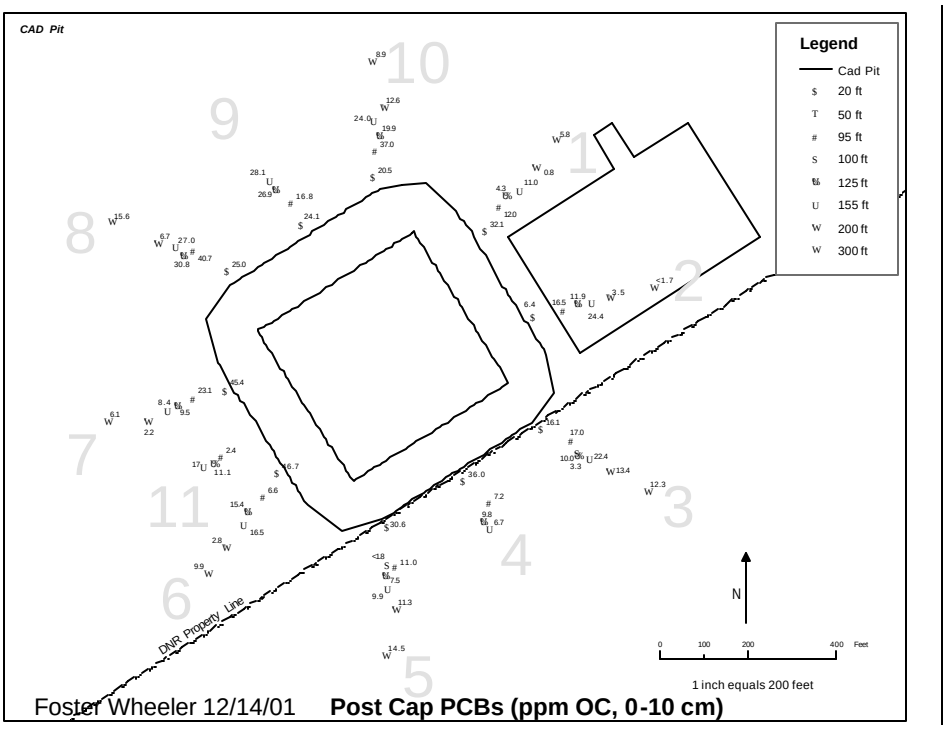
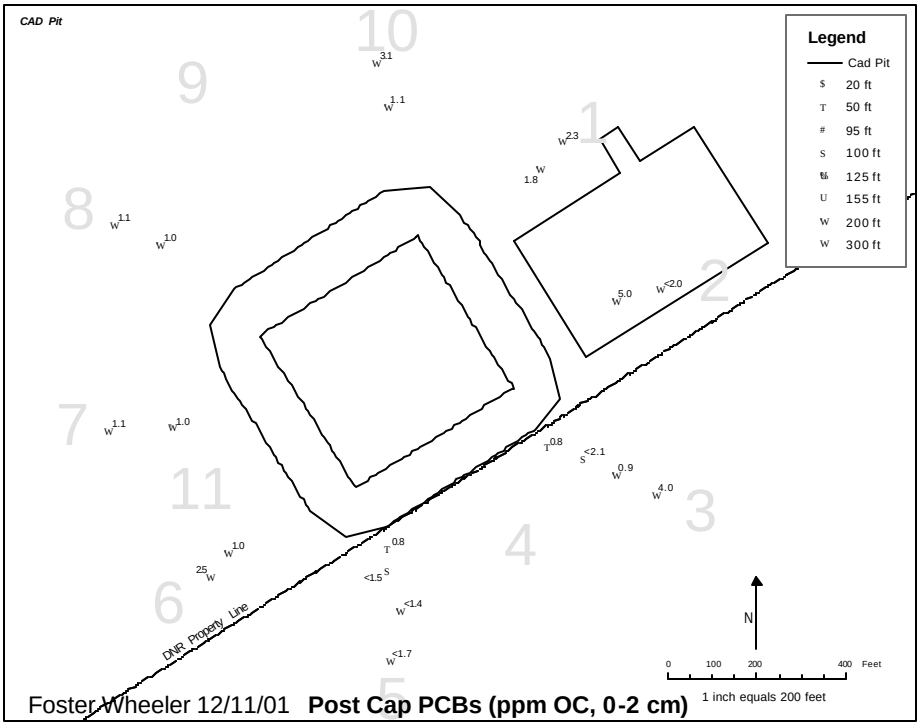
PP 13.14. Post Cap Hg (0-2 cm)



PP 13.15. Post Cap PCB Concentrations (0-10 cm)



PP 13.16. Post Cap PCB concentrations (0-2 cm)

Dispersion of contaminated sediment beyond the CAD pit perimeter by upon filling?

- CONCENTRATION STRATIFICATION
  - Worst not deposited first
  - Sediment deposition rate in question
- NO IMPACT

PP 13.17. Dispersion of contaminated sediment beyond the CAD pit

Baseline data not representative of true condition?

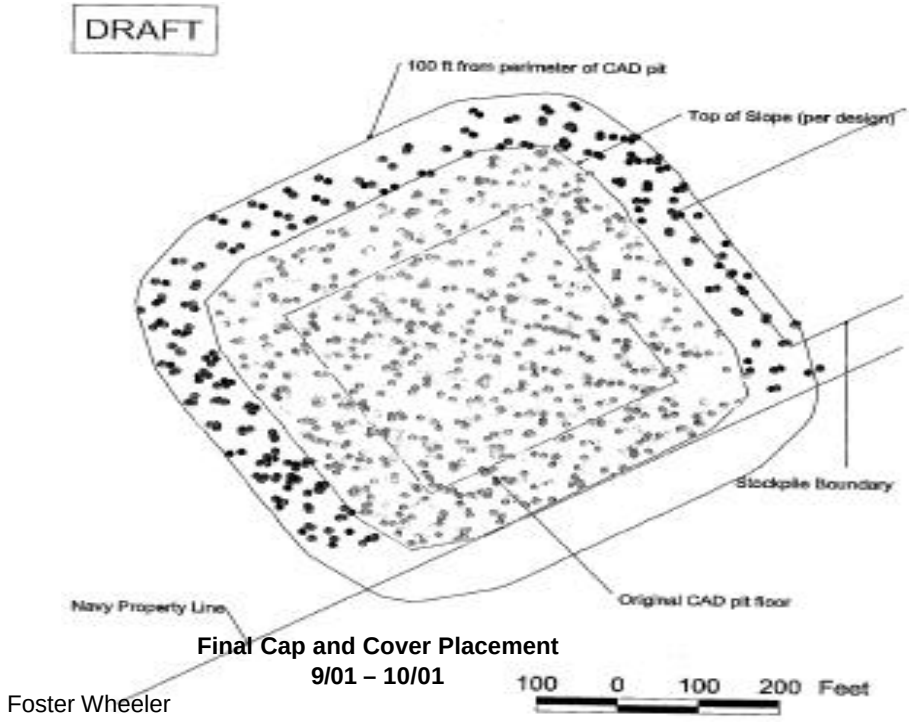
- PRE-EXISTING SITE CONDITION
  - Too few samples
  - Limited location interval
- IMPACT UNCLEAR

PP 13.18. Baseline data not representative of true condition?

Concentration peak at 125 ‘ result of CAD pit filling?

- CONCENTRATION PEAK AT 125 ‘ WITH OVERLYING CLEANER SEDIMENT LAYER
  - Impact ‘mushroom’ deposited more material in concentric ring at this distance
  - Cleaner surficial layer artifact of native cap dispersion
- LIMITED IMPACT

PP 13.19. Concentration peak at 125’ result of CAD pit filling?

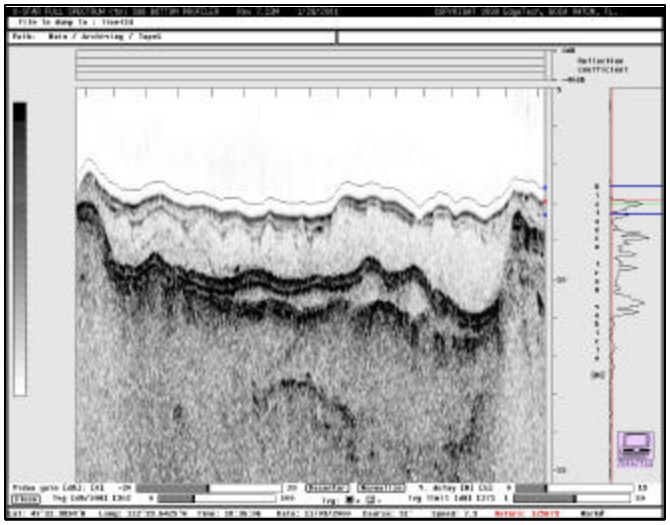


PP 13.20. Final CAP and Cover Placement (9/01-10/01)

Sub-bottom Profiling Towfish Used to Analyze CAD Pit Cap

PP 13.21. Sub-bottom Profiling Towfish

Screen Shot of Sub-bottom Profile Sediment Cap Overlaying Sand Cap



PP 13.22. Screen shot of sub-bottom profile of Sediment Cap overlaying Sand Cap

WHAT MIGHT BE DONE DIFFERENTLY?

- More thorough initial site characterization
- Address in the SAP, contingency plans to address findings upon pre- and post-construction monitoring

PP 13.23. What might be done differently?

SUCCESSES

- Cooperation between Navy, EPA, Ecology, DNR facilitated process
- Readily available resource to address perimeter chemistry in surplus native material
- No displacement of sand cap by native material
- Learned bottom dumping feasible

PP 13.24. Successes

WHAT'S NEXT?

- Complete contaminant dilution work in CAD pit area, including state managed land
- Fill data gaps through long term monitoring

PP 13.25. What's Next?

Wyckoff/Eagle Harbor Superfund Site

Bainbridge Island, WA

U.S. Environmental Protection Agency

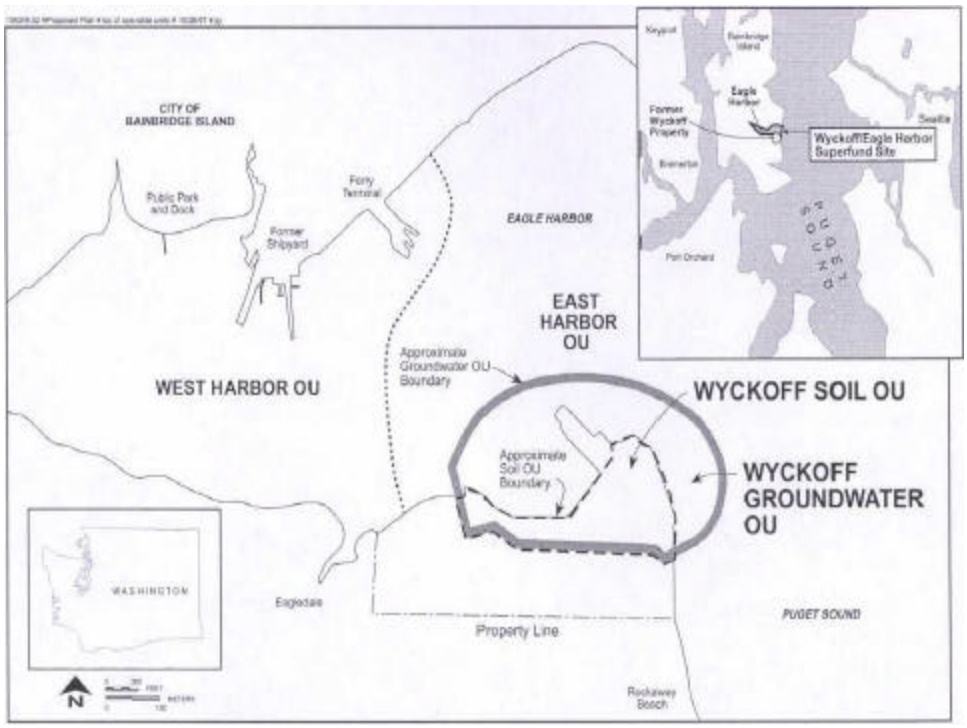
Ken Marcy, East Harbor OU RPM

Hanh Gold, Soils and Groundwater OU, RPM

U.S. Army Corps of Engineers

M. Kathy LeProwse, PM

PP 14.1. Wyckoff/Eagle Harbor Superfund Site, Bainbridge Island, WA.



PP 14.2. Site Map

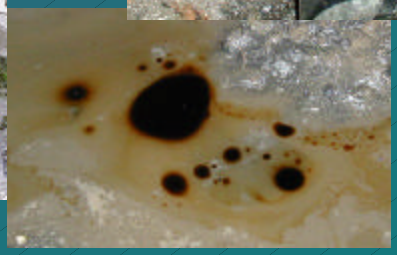
Site Background

- Former wood treatment facility in operation from 1903 until 1988 (Wyckoff, PSR and others)
- March 1984, NOAA notified EPA of tumors and lesions on fish in Eagle Harbor
- 1985, Public Health Advisory issued for shellfish and fish consumption in harbor
- July 1987, NPL
- Groundwater pump and treat system since 1990

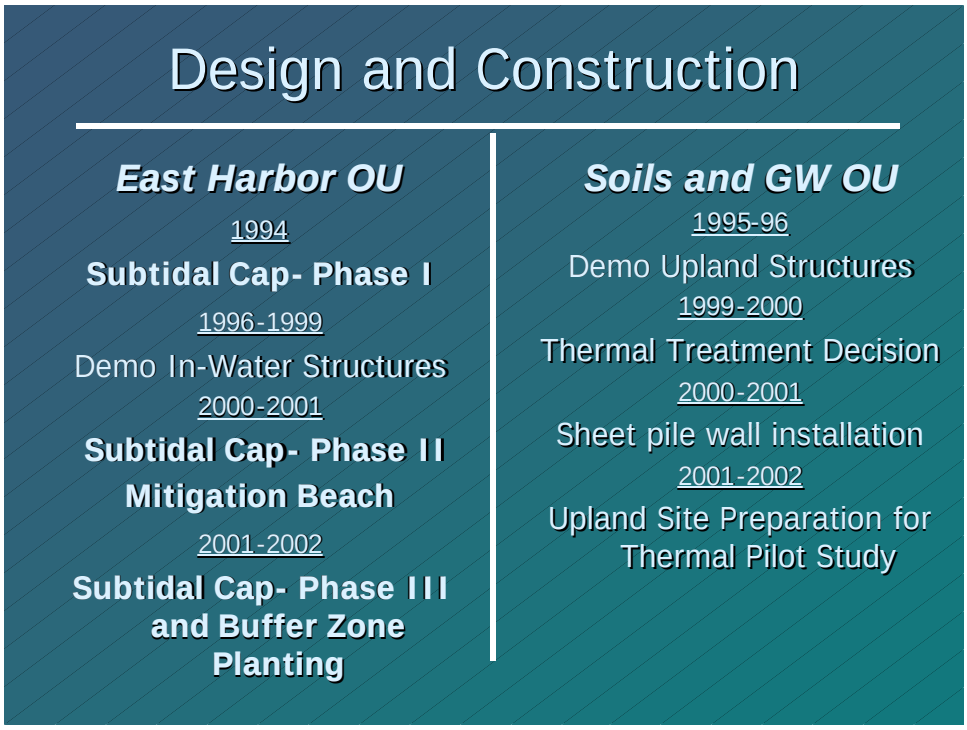
PP 14.3. Site Background

COC’s

- Creosote (PAH)
- Pentachlorophenol (PCP)



PP 14.4. COC’s



PP 14.5. Design and Construction

PP 14.6. Photograph depicting site

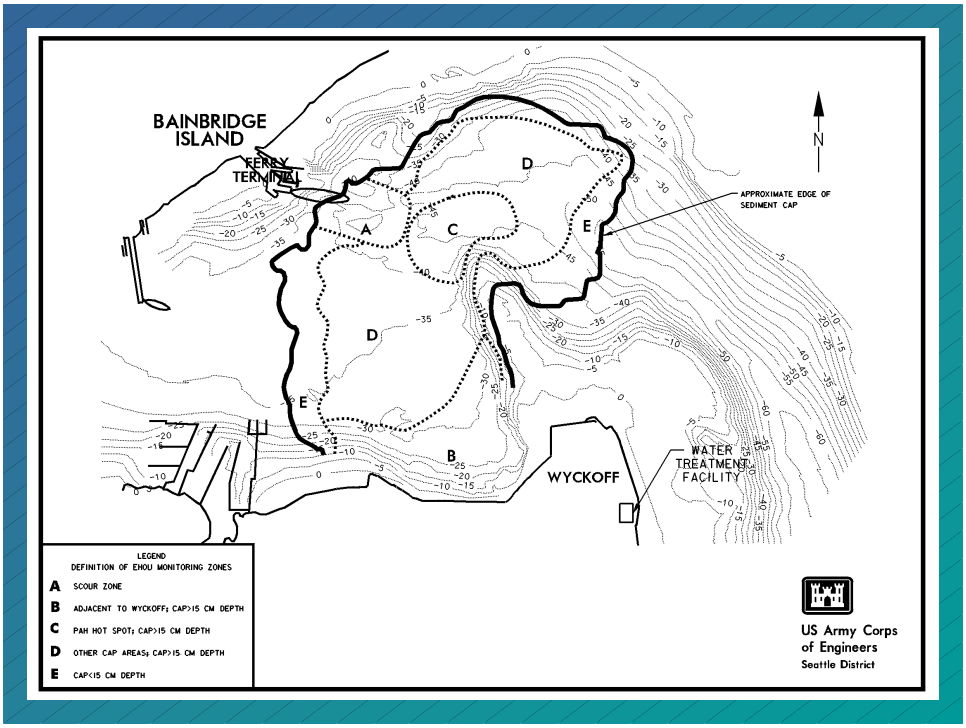
PP 14.7. Photograph

PP 14.8. Site Construction activities

Phase I Sediment Cap

- 1994-95 Removal Action
  - 54 Acre cap
  - First Beneficial Use of Dredged Material in EPA Region 10
  - Barge wash-off and bottom dump of 200,000 cy in Eagle Harbor rather than PSDDA site.
  - Not a final remedial action but first step in a series of actions to clean up the entire site (Ten year OMMP)

PP 14.9. Phase I Sediment Cap



PP 14.10. EHOU Monitoring Zone Map

PP 14.11. Photograph

Long-term Monitoring

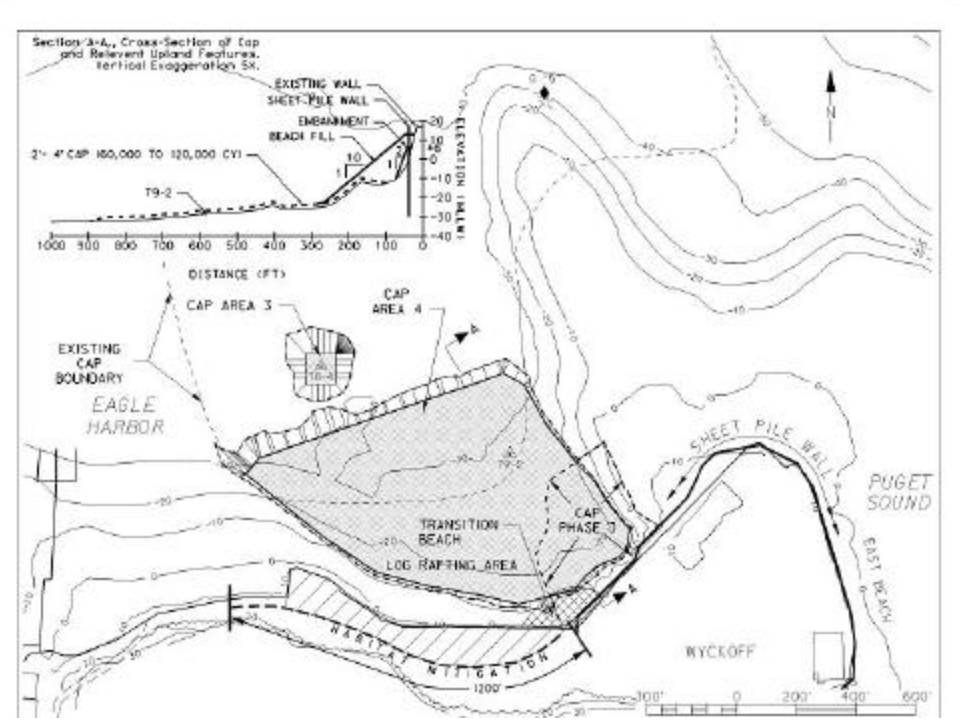
- 3 events over 7 years indicate the northern portion of the cap is meeting environmental objectives set forth in ROD
  - no sediment criteria exceedances
  - clean benthic habitat provided
- Three locations in southern portion of cap indicate degrading conditions.

PP 14.12. Long-term Monitoring

Phase II Sediment Cap

- 2000-2001 during placement of sheet pile wall and other upland activities.
- Placement of 15 acre cap in 2 Stages to cover all contaminated sediments in log-raft area.
- DESIGNED
- Barge wash-off to minimize re-suspension of bottom sediments.
- Monitoring for Water Quality Criteria by USACE and Battelle

PP 14.13. Phase II Sediment Cap



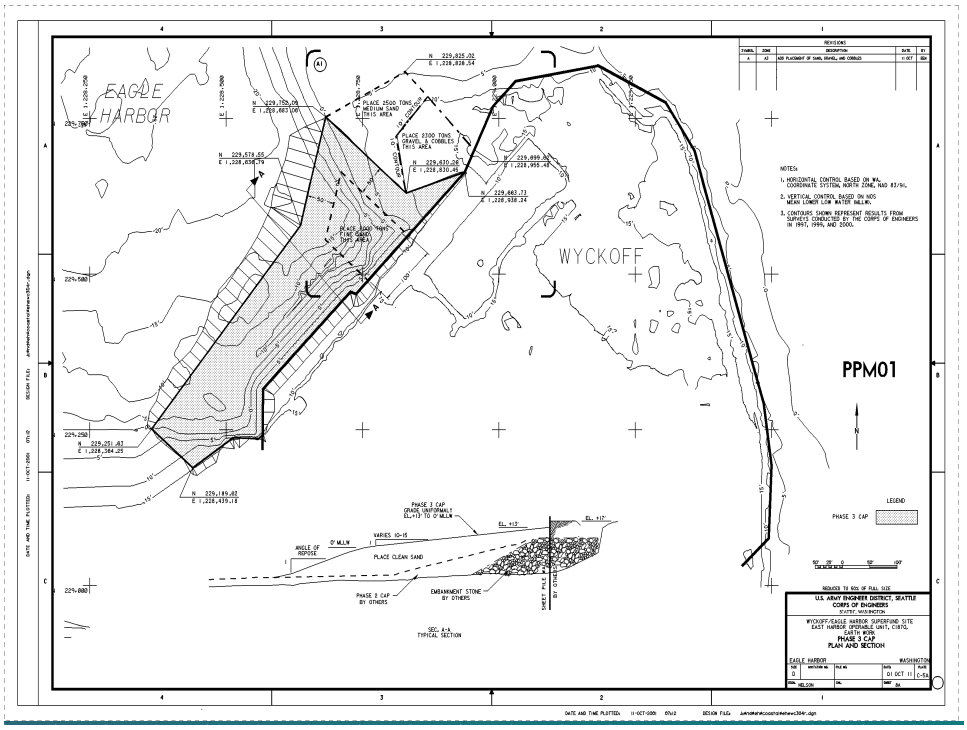
PP 14.14. Phase II Cap Design Plan and Section

Phase III Sediment Cap

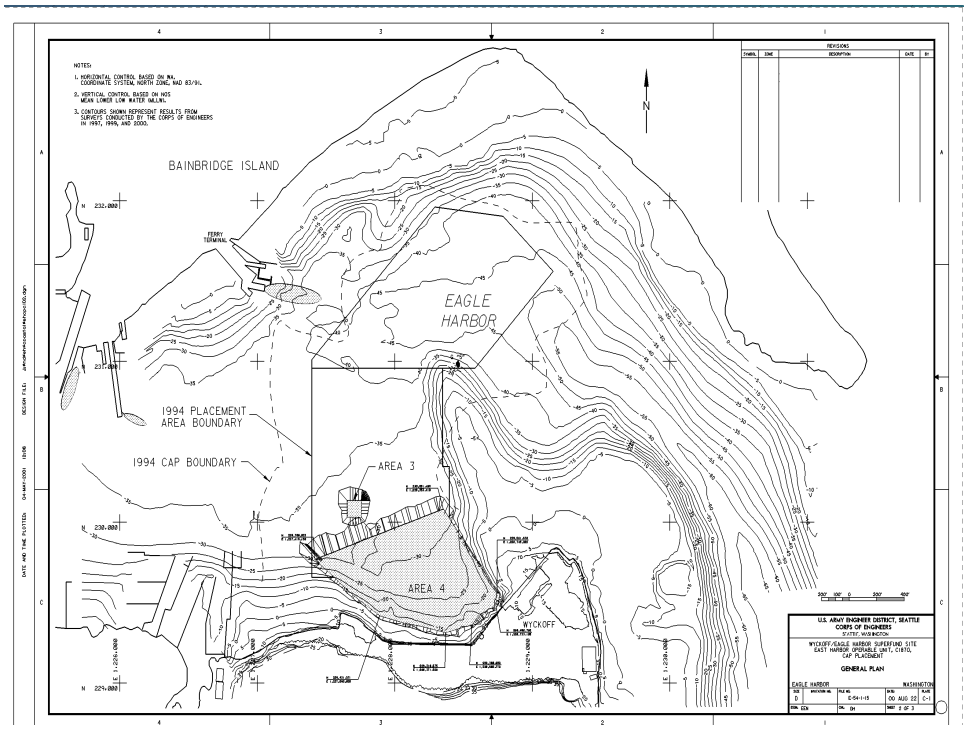
- 2001-2002
- Placement of 50,000 cy material to create intertidal from shallow subtidal and provide continuous intertidal habitat around the site
- Most closely resembled area prior to human influence
- Placed by conveyor- faster rate than wash-off and able to achieve design elevations
- Unable to use dredged material due to water content

PP 14.15. Phase III Sediment Cap

PP 14.16. Photograph



PP 14.17. Phase III Cap Plan and Section



PP 14.18. Design drawing –entire cap

Mitigation Beach

- 2000-2001 during Phase II capping
- 2 acre intertidal beach for 0.4 acres habitat taken during installation of sheet pile wall
- Removal of failing creosote-treated wooden bulkhead
- Removal of 40,000 cy soil (10,000 cy contaminated)
  - Clean soil used as backfill for sheet pile wall
  - Contaminated soil placed in process area for thermal treatment
- 50 ft Buffer Zone planted in 2001-2002

PP 14.19. Mitigation Beach

PP 14.20. Photograph

PP 14.21. Photograph

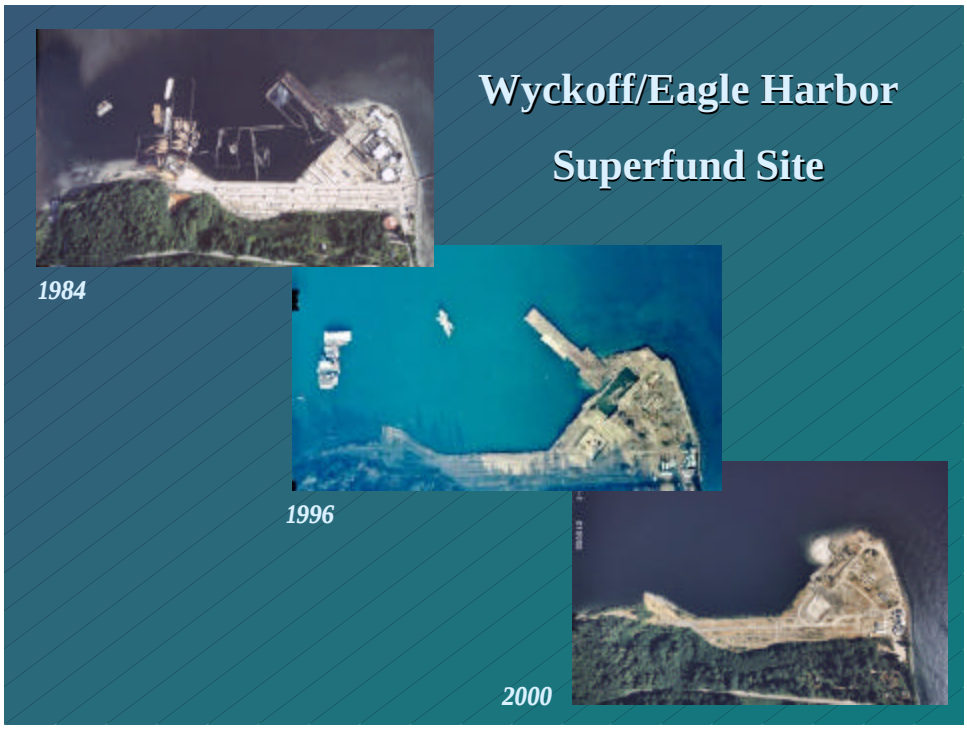
PP 14.22. Photograph

PP 14.23. Photograph

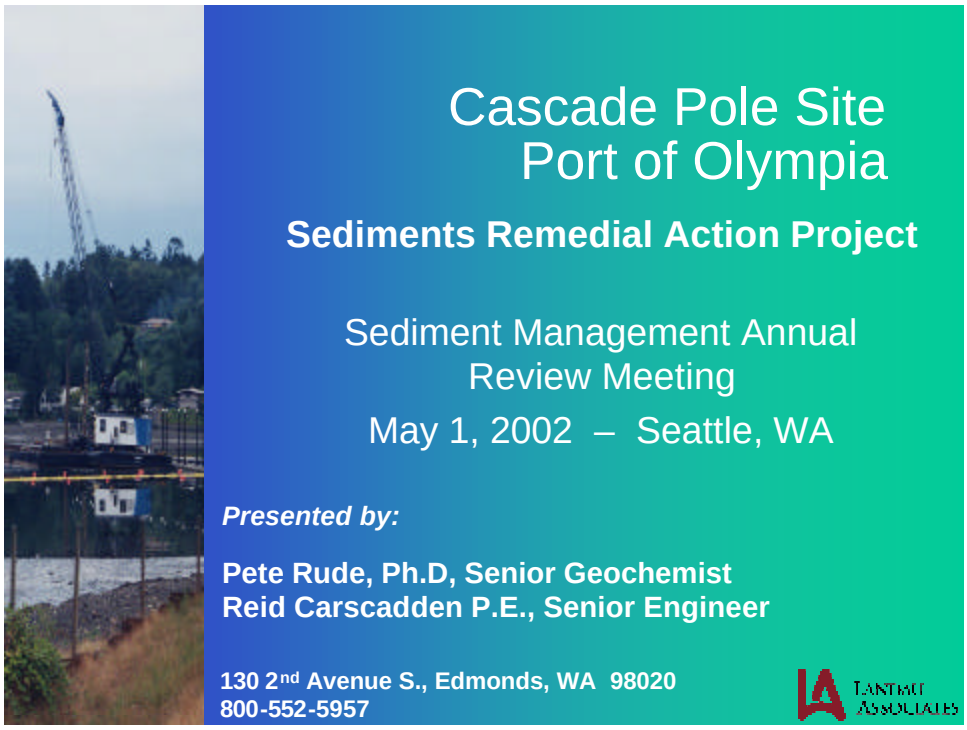
What's Left?

- Long-term Monitoring
  - Update OMMP to include newly capped subtidal areas, entire intertidal area, and southern portion of cap.
  - Ten year plan from date of source control (2001)
- Thermal Remediation Pilot Study to begin Sept. 2002
- Full-Scale Remediation?

PP 14.24. What's Left?



PP 14.25. Wyckoff/Eagle Harbor Superfund Site: 1984, 1996, 2000



PP 15.1. Cascade Pole Site, Port of Olympia

PP 15.2. Outline

Wood-Treating Activities

- 1939 – 1986
- Cascade Pole Company
- Creosote (PAH), PCP (Dioxin), and NAPL

LA LANDAU ASSOCIATES

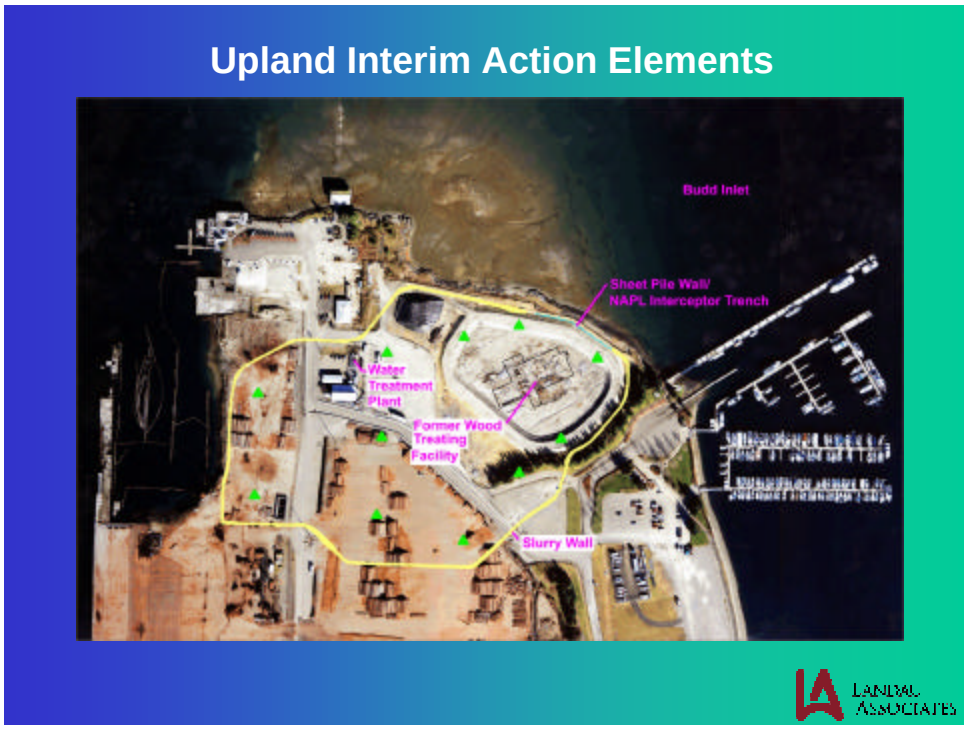
PP 15.3. Wood Treating Activities

Regulatory Process

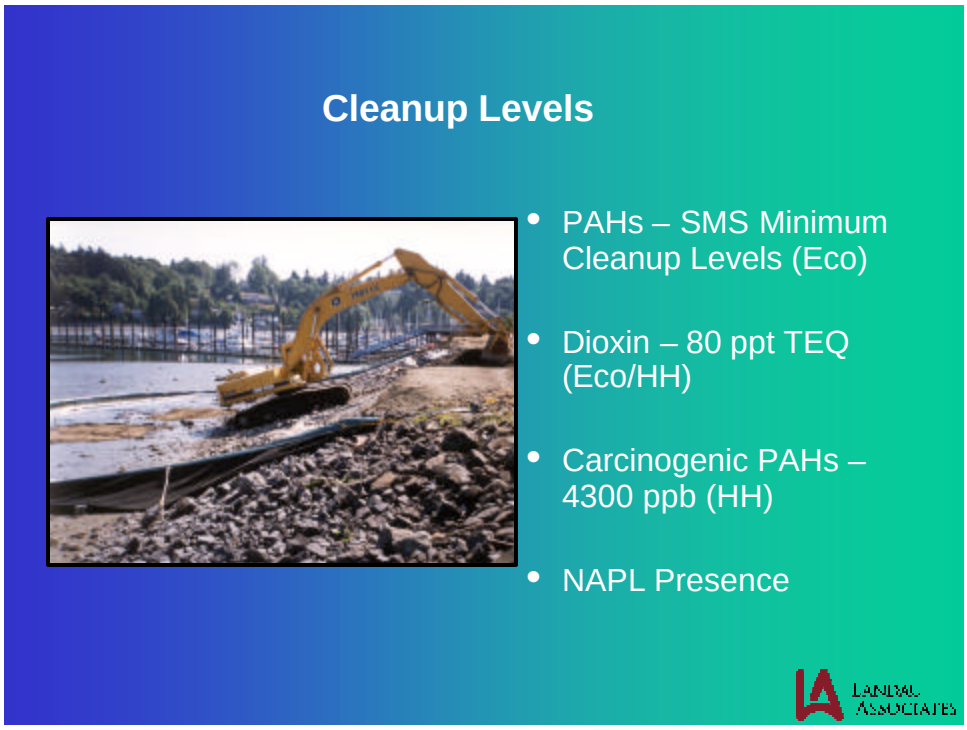
- 1990 Consent Decree (Port / CPC / State)
- Mid 1990's RI/FS and RA
- Washington State Sediment Standards (SMS)
- 1998 Pilot Dredging Project

LA LANDAU ASSOCIATES

PP 15.4. Regulatory Process



PP 15.5. Upland Interim Action Elements



PP 15.6. Cleanup levels

Cleanup Action Plan

- Dredging and Backfilling
- No Capping
- Onsite Disposal in Containment
- Nearshore Containment
- 60,000 Cubic Yards
- Habitat Improvements

LANDAU ASSOCIATES

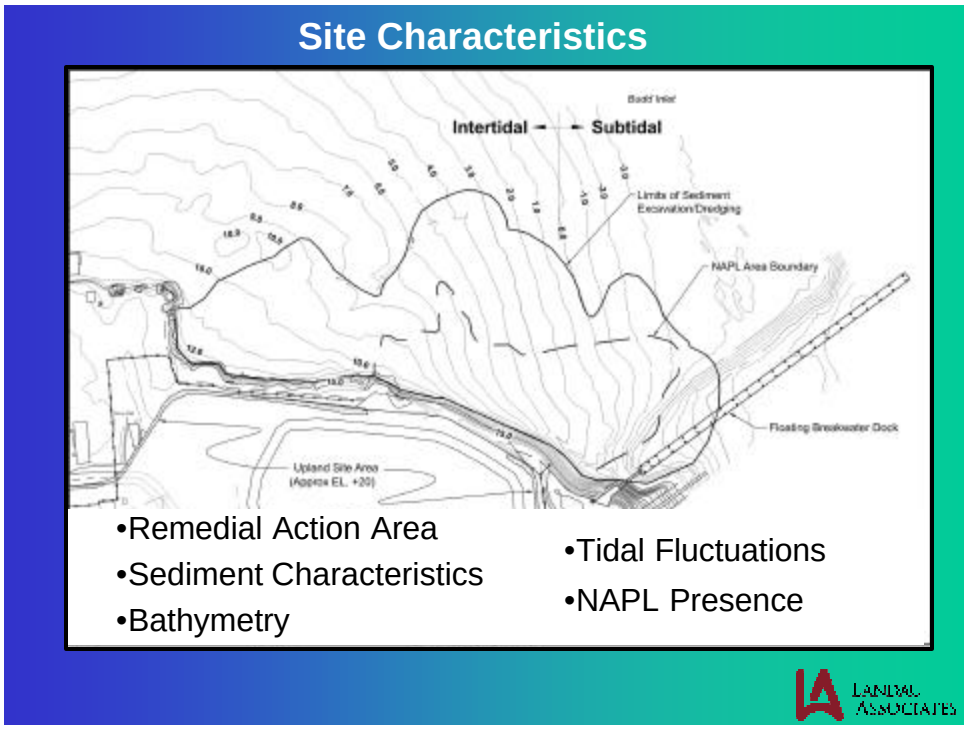
PP 15.7. Cleanup Action Plan

Remedial Design and Construction

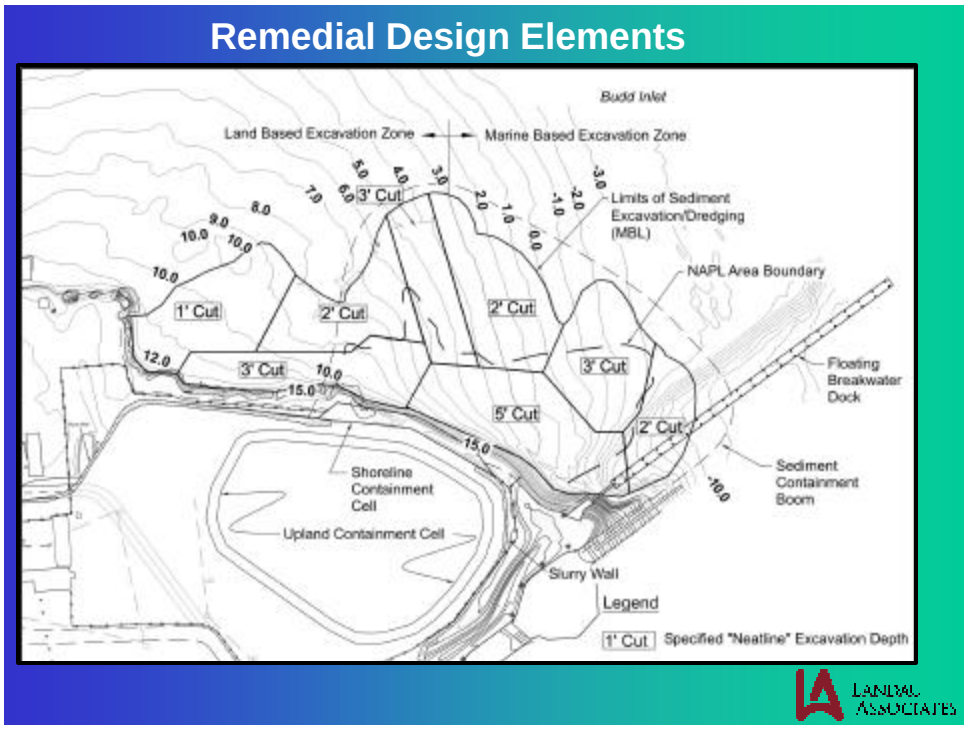
- Site Characteristics
- Design Overview
- Construction Highlights

LANDAU ASSOCIATES

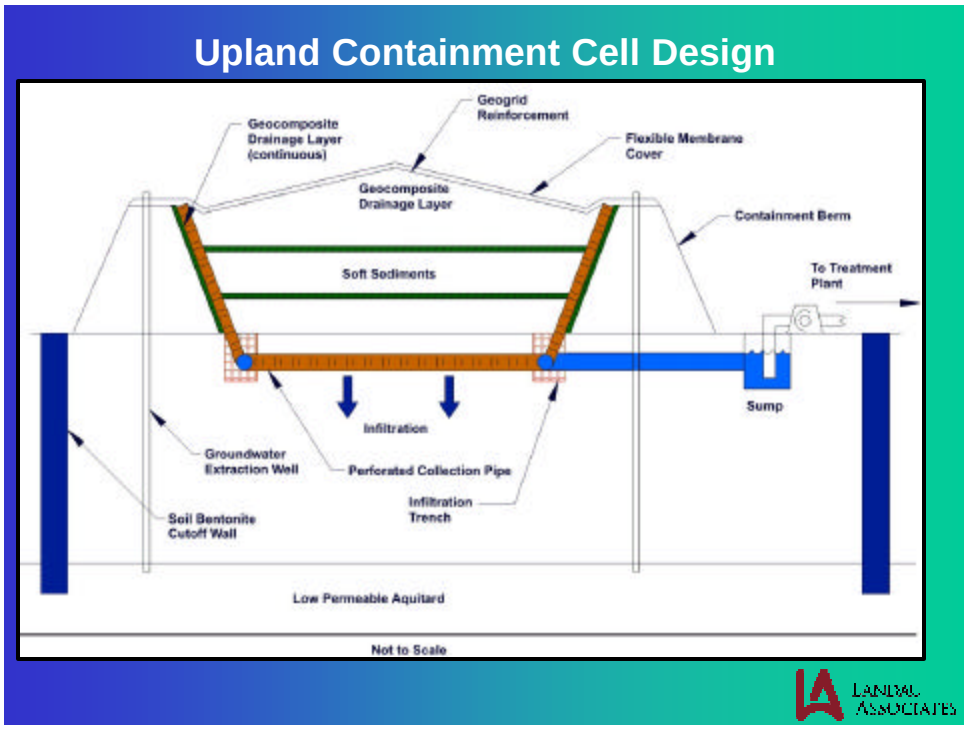
PP 15.8. Remedial Design and Construction



PP 15.9. Site Characteristics

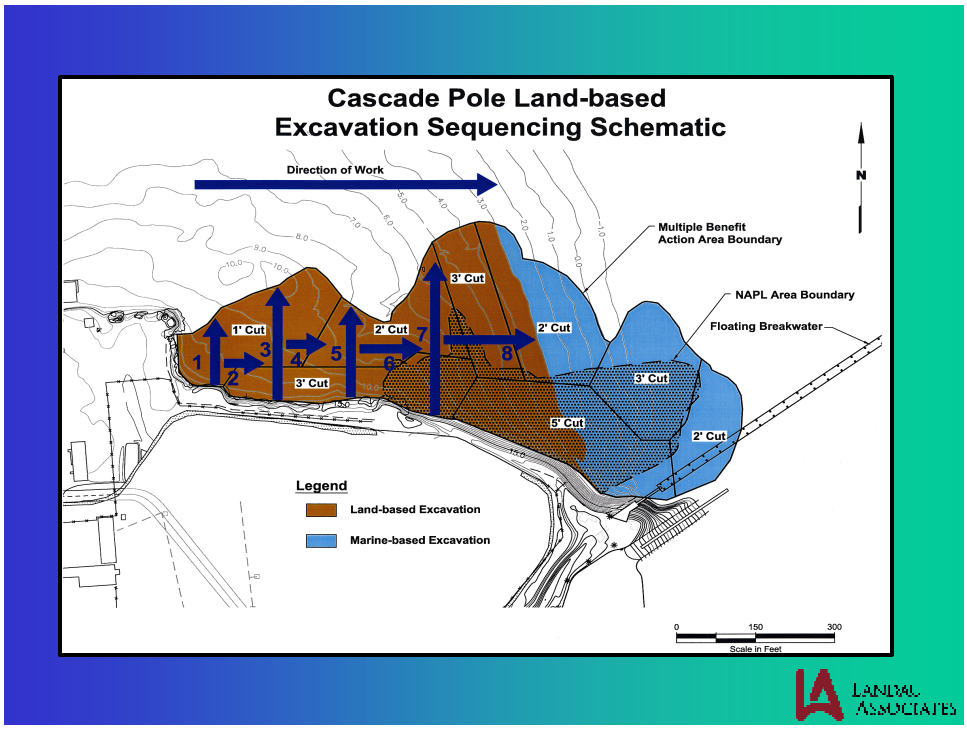


PP 15.10. Remedial Design Elements



PP 15.11. Upland Containment Cell Design

PP 15.12. Construction Highlights



PP 15.13. Cascade Pole Land-based Excavation Sequencing Schematic

PP 15.14. Sediment Haul Road Construction and Performance

PP 15.15. Intertidal Haul Road Construction

PP 15.16. Photograph

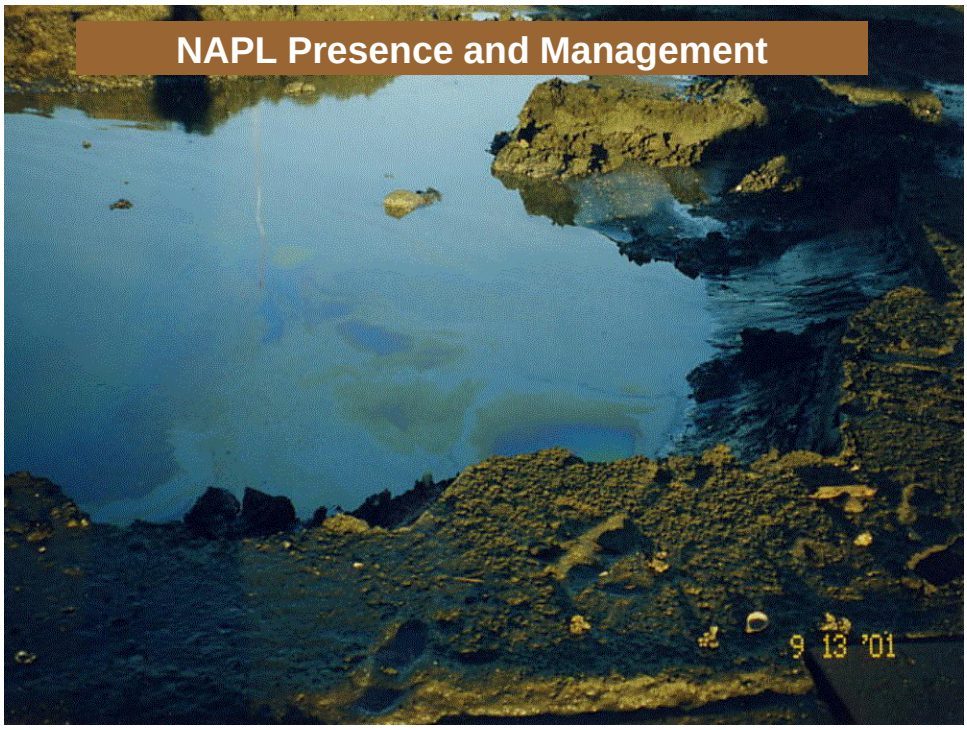
PP 15.17. Excavation and Backfill Methods

PP 15.18. Photograph

PP 15.19. Photograph

PP 15.20. Photograph

PP 15.21. Real Time Kinematic Differential Global Positioning System



PP 15.22. NAPL Presence and Management

PP 15.23. Photograph

PP 15.24. Marine Dredging Operations

PP 15.25. Photograph

PP 15.26. Backfill Placement

PP 15.27. Grade Control

PP 15.28. NAPL Presence and Management

PP 15.29. Sediment Disposal

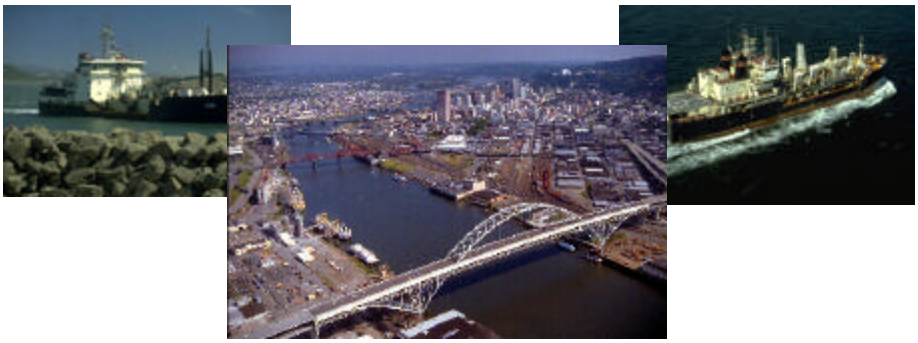
PP 15.30. Photograph

PP 15.31. Photograph

PP 15.32. Sediments Restored at Cascade Pole Site

PP 15.33. Conclusions

National Dredging Team



DEVELOPMENT OF A REGIONAL DREDGING TEAM
WHO, WHAT, WHY, AND HOW

PP 16.1. Development of Regional Dredging Team, Who, What, Why, and How

Chronology Of National Dredging Team

- 1993: nationwide public meetings DOT
- 1994: report to congress: The dredging process in the united states: An action plan for improvement
- 1995: national charter signed by 6 agencies: USACE, US EPA, NMFS, USFWS, US DOT (MARAD), NOS
- 1995: individual agency regulations, USACE 16 aug. 1995, US EPA 27 Sept. 1995.
- 1997: local planning groups & development of dredged material management plans DMMP
- 1999: procedures to elevate issues from regional dredging teams & local planning groups to the national dredging team

PP 16.2. Chronology of National Dredging Team

NATIONAL DREDGING TEAM

VISION

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

PP 16.3. National Dredging Team – Vision

National Dredging Team

GOALS

The National Dredging Team will facilitate communication, coordination, and resolution of dredging issues among the participating Federal agencies, and will serve as a forum for promoting the implementation of the recommendations in the Report to the Secretary of Transportation, *The Dredging Process in the United States: An Action Plan for Improvement (December 1994)* (the Report).

PP 16.4. National Dredging Team – Goals

NATIONAL DREDGING TEAM

LEGISLATIVE AUTHORITIES

- Federal Water Pollution Control (Clean Water) Act
- Rivers and Harbors Act of 1899
- Fish and Wildlife Coordination Act
- Endangered Species Act
- Coastal Zone Management Act
- Marine Protection, Research and Sanctuaries Act
- Merchant Marine Act
- National Environmental Policy Act
- Water Resources Development Acts

PP 16.5. NDT – Legislative Authorities

National Dredging Team

MEMBERSHIP

The National Dredging Team consist of:

Department of Defense/ U.S. Army Corps of Engineers (USACE),

U.S. Environmental Protection Agency (EPA),

Department of Interior/the U.S. Fish and Wildlife Service

Department of Commerce/National Oceanic and Atmospheric Administration/Office of Ocean and Coastal Resource Management

National Marine Fisheries Service

Department of Transportation/U.S. Maritime Administration.

(Co-chaired by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency.)

PP 16.6. NDT – Membership

National Dredging Team

OPERATING PRINCIPLES

The National Dredging Team embraces and will operate under the National Dredging Policy as outlined in the Report

Fundamental to this Policy is the recognition that a network of ports and harbors is essential to the U.S. economy and national security, and that the nation's coastal, ocean, and freshwater resources are critical assets which must be protected, conserved, and restored.

The National Team will function as a forum for information exchange, issue identification, and timely resolution of issues affecting dredging programs.

PP 16.7. NDT – Operating Principles

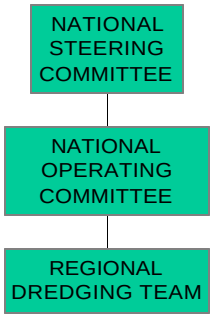
National Dredging Team

Participation on the National Dredging Team will not supersede or otherwise affect any authority of the participating agencies.

PP 16.8. NDT

National Dredging Team

NATIONAL DREDGING TEAM ORGANIZATION



PP 16.9. NDT – Organization

National Dredging Team

The Steering Committee

Composed of senior level executives appointed by the department/agency head; steering committee members should have the authority to make binding policy decisions and commitments for their respective agencies. Each department/agency head shall designate in writing the names of one member and one alternate as members of the steering committee.

PP 16.10. NDT – The Steering Committee

National Dredging Team

The Operating Management Committee

Composed of agency managers and decision-makers, and technical experts. Each agency shall designate in writing the names of a member and an alternate to represent their agency on the Operating Management Committee. The Corps of Engineers and EPA are Co-Chairs, these two agencies may have two members and one alternate each on this committee.

PP 16.11. NDT – The Operating Management Committee

National Dredging Team

ISSUE RESOLUTION

The National Team is committed to resolution of issues at the lowest authorized management level and Regional Teams are expected to utilize all available means to resolve issues prior to submitting a request to the National Team for elevation

PP 16.12. NDT – Issue Resolution

National Dredging Team

Information will be sought from all stakeholders to help clarify specific issues as well as provide factual data on the issues

PP 16.13. NDT

National Dredging Team

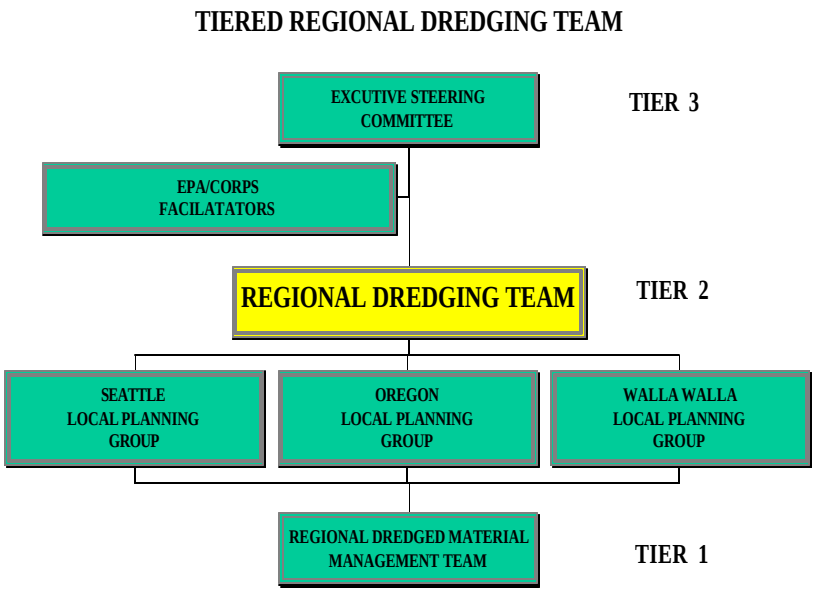
AGREEMENT

Members of the National Dredging Team agree to fully participate in the Team activities and will operate under this Charter. Participation is subject to agency budget constraints. This charter is not intended to commit members to specific funding levels.

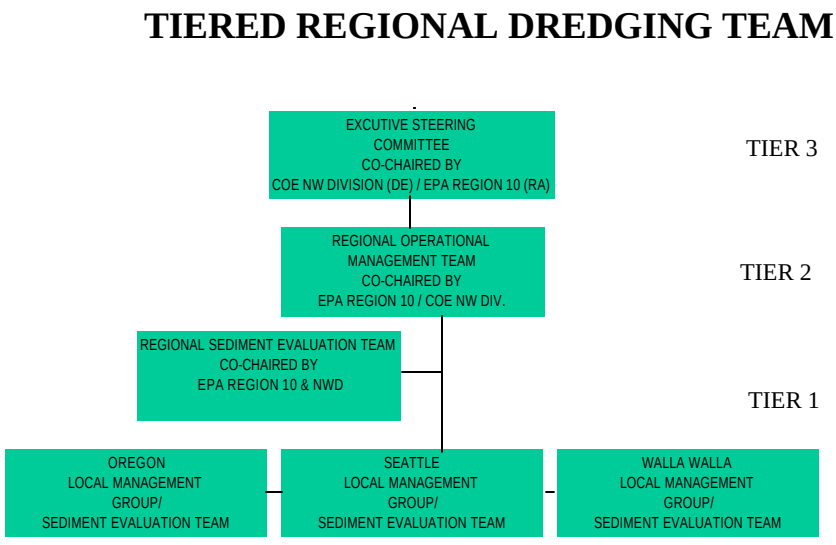
This charter shall be effective for five years from the date of signature. Agencies can terminate their participation at any time by notifying the other parties 60 days in advance of the termination.

Signed July 20, 1995, by all six participating agencies

PP 16.14. NDT – Agreement

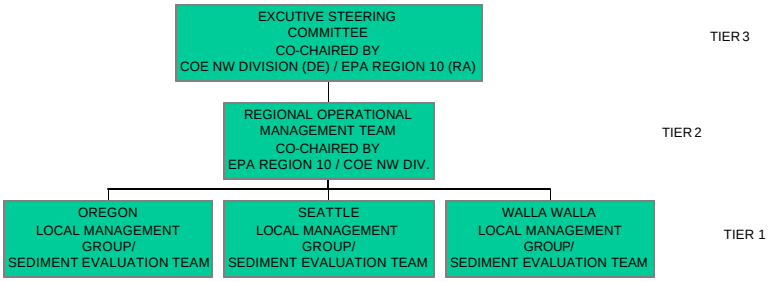


PP 16.15. Tiered Regional Dredging Team



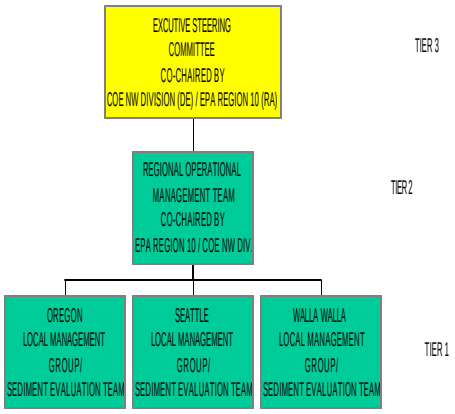
PP 16.16. Tiered Regional Dredging Team

TIERED REGIONAL DREDGING TEAM



PP 16.17. Tiered Regional Dredging Team

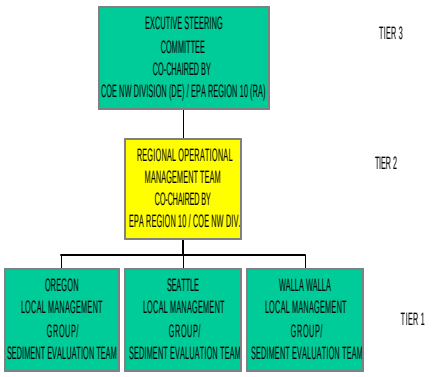
Executive Steering Committee
Tier 3



- US EPA Region 10
- USACE NWD
- NMFS
- NOAA (NOS)
- USFWS
- MARAD (DOT)
- As needed State
- & Tribal reps

PP 16.18. Executive Steering Committee Tier 3

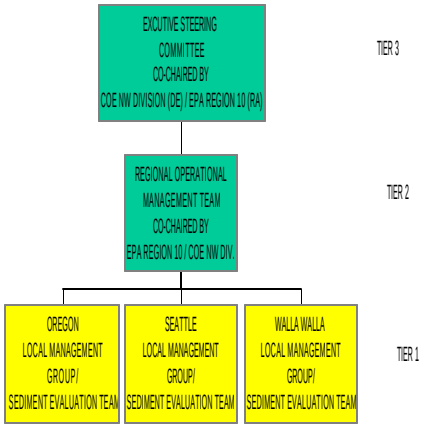
Regional Dredging Team
Tier 2



- **This is the operations and management committee made up of:**
- **Technical experts/operations managers from:**
- **Federal**
- **States**
- **Tribes**
- **Invited experts**

PP 16.19. Regional Dredging Team Tier 2

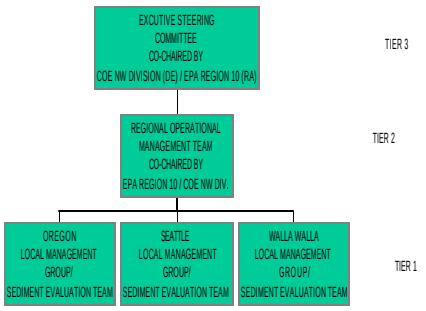
Local Management Groups
Tier 1



- **Conducts day to day**
- **Resolves all issues possible decides when to elevate**
- **Develops dredged material evaluation frameworks.**
- **Made up of:**
- **Corps district**
- **Federal agencies**
- **State agencies**
- **Ports**
- **Ngos**
- **Tribes**

PP 16.20. Local Management Groups Tier I

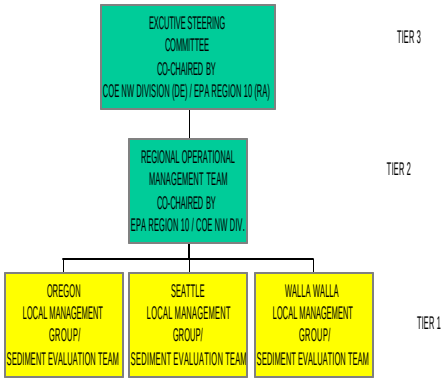
EPA/CORPS CO-CHAIRS



- **Participate with all tiers**
- **Facilitate between tiers and elevate as needed**
- **Chairs RDT and executive steering committee**
- **Attends all national level functions**
- **Presents cases to national team**

PP 16.21. EPA/Corps Co-Chairs

LOCAL SEDIMENT EVALUATION TEAM



- **Assist all local teams in preparation of dmef, & revisions**
- **Reviews sampling and analysis plans**
- **Reviews & approves results of analysis**
- **Recommends new tests**
- **Made up of:**
- **Federal & state sediment quality/regulatory experts**

PP 16.22. Local Sediment Evaluation Team

EXAMPLE OF A SUCCESSFUL RDT

http://www.glc.org/projects/dredging/

PP 16.23. Example of a Successful RDT

Regional Dredging Issues

- **ESA CONSULTATIONS**
- **CWA *VS* ESA EVALUATIONS**
- **CWA *VS* SUPERFUND DESIGNATIONS**
- **NEW WORK DISPOSAL SITE DESIGNATIONS**
- **CONFINED DISPOSAL FACILITY SITINGS**
- **DMMPs**
- **SEC 102/103 OCEAN DISPOSAL SITE DESIGNATIONS**
- **REGIONAL SEDIMENT MANAGEMENT**
- **ENVIRONMENTAL WINDOWS**
- **REVIEW OF REGIONAL TESTING FRAMEWORKS**

PP 16.24. Regional Dredging Issues