



U.S. Army Corps of Engineers  
Seattle District



WASHINGTON STATE DEPARTMENT OF  
**Natural Resources**

# SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING

MAY 14, 2008

*FINAL*

## MEETING MINUTES

*Prepared for:  
DMMP Agencies*

*Prepared by:*



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JULY 2008



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Washington Public Ports Association

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## LIST OF ACRONYMS AND ABBREVIATIONS

<b>AO</b>	Agreed Order
<b>ANOVA</b>	Analysis of Variance
<b>BCOC</b>	Bioaccumulative Chemicals of Concern
<b>CMS- M2D</b>	Coastal Modeling System: numerical computer model employing finite-volume representation of the two-dimensional (depth-integrated) continuity and momentum equations of water motion.
<b>CERCLA</b>	Comprehensive Environmental Response Compensation and Liability Act
<b>CSL</b>	Cleanup Screening Level
<b>CSMP</b>	Cooperative Sediment Management Program (Washington State)
<b>DDD</b>	Dichloro-diphenyl-dichloroethane
<b>DDE</b>	Dichloro-diphenyl-dichloroethylene
<b>DMMO</b>	Dredged Material Management Office
<b>DMMP</b>	Dredged Material Management Program
<b>DNA</b>	Deoxyribonucleic Acid
<b>DNR</b>	Washington State Department of Natural Resources
<b>DUA</b>	Decision Unit Area
<b>EA</b>	Environmental Assessment
<b>Ecology</b>	Washington State Department of Ecology
<b>EIM/myEIM</b>	Environmental Information Management System
<b>EPA</b>	U.S. Environmental Protection Agency
<b>ESA</b>	Endangered Species Act
<b>FPM</b>	Floating Percentile Method
<b>GIS</b>	Geographic Information System
<b>HPAH</b>	High Molecular Weight Polycyclic Aromatic Hydrocarbons
<b>MCY</b>	Million Cubic Yards
<b>MDFATE</b>	Multi-Disposal-Fate
<b>MTCA</b>	Model Toxics Control Act
<b>NMFS</b>	National Marine Fisheries Service
<b>NOAA</b>	National Oceanic and Atmospheric Association

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<b>PAH</b>	Polycyclic Aromatic Hydrocarbon
<b>PBDE</b>	Polybrominated Diphenyl Ether
<b>PCB</b>	Polychlorinated Biphenyl
<b>PSAMP</b>	Puget Sound Ambient Monitoring Program
<b>PSDDA</b>	Puget Sound Dredged Disposal Analysis
<b>PSI</b>	Puget Sound Initiative
<b>PSR</b>	Pacific Sound Resources
<b>PST</b>	Pacific Standard Time
<b>QA2</b>	Quality Assurance Level 2
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>RDT</b>	Regional Dredging Team
<b>RI/FS</b>	Remedial Investigation/Feasibility Study
<b>RSET</b>	Regional Sediment Evaluation Team
<b>SAIC</b>	Science Applications International Corporation
<b>SAP</b>	Sampling and Analysis Plan
<b>SAPA</b>	Sampling and Analysis Plan Appendix
<b>SEDQUAL</b>	Sediment Quality Information System
<b>SEF</b>	Sediment Evaluation Framework
<b>SED</b>	Sediment Exposed by Dredging
<b>SMARM</b>	Sediment Management Annual Review Meeting
<b>SMS</b>	Sediment Management Standards
<b>SPI</b>	Sediment Profile Imagery
<b>SQG</b>	Sediment Quality Guidelines
<b>SVPS</b>	Sediment Vertical Profile System
<b>TEQ</b>	Toxic Equivalence
<b>TOC</b>	Total Organic Carbon
<b>TPH</b>	Total Petroleum Hydrocarbon
<b>TRV</b>	Toxicity Reference Value
<b>TTL</b>	Target Tissue Level
<b>USACE</b>	United States Army Corps of Engineers
<b>USFWS</b>	United States Fish and Wildlife Service

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**WPPA**      Washington Public Ports Association  
**ZSF**        Zone of Siting Feasibility

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# **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 14, 2008. The Washington Department of Natural Resources hosted the 2008 Sediment Management Annual Review Meeting (SMARM) and the U.S. Army Corps of Engineers (USACE) facilitated. The meeting was held at the USACE Federal Center South location in Seattle, Washington. The Dredged Material Management Program (DMMP) is an interagency cooperative program that includes the USACE, Seattle District, the U.S. Environmental Protection Agency (EPA), Region 10, the Washington Department of Natural Resources (DNR), and the Washington Department of Ecology (Ecology). The public issues summary, meeting agenda, list of attendees, and the speakers' PowerPoint presentations are included as Appendices 1, 2, 3, and 4, respectively. In addition, the SMARM 2008 Follow-up Meeting Minutes for the DMMP Dioxin Project and Washington Public Ports Association Representatives (WPPA) are included as Appendix 5.

## **WELCOME AND OPENING REMARKS**

*Colonel Michael McCormick, USACE, District Engineer, Seattle District*, welcomed everyone to the 20<sup>th</sup> annual review meeting. He spoke of how the SMARM provides a forum to keep the dredged material and sediment management programs updated, using state-of-the-art science, and the latest information available. He commented that the program strives to maintain a healthy aquatic environment as well as preserve the economic vitality of Puget Sound. Dioxin and polychlorinated biphenyl (PCB) regulation have been of concern, and dioxin regulation was the focus of intense interagency reviews this year. The agencies have also concentrated on streamlining the use of dredged material for beneficial use.

While the CSMP strives to protect the environment, there are also concerns to promote and protect commerce. Colonel McCormick strongly believes that there can be a balance between economic stability and environmental protection. He commented that the success of the program requires everyone's active participation (agencies, stakeholders, and public).

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Colonel McCormick then introduced *Colonel Anthony (Tony) Wright*, who will be the incoming Seattle District Commander (USACE), after the change of command ceremony on July 24, 2008.

*Stephanie Stirling, USACE, Dredged Material Management Office (DMMO)*, served as the moderator for the annual review meeting. She indicated that the SMARM is jointly sponsored by the DMMP and the Sediment Management Standards (SMS) Program. This year the meeting was moderated by the USACE and hosted by the DNR. Ms. Stirling gave general information about the meeting, reminded everyone to sign in, and reviewed the purpose and objectives of the SMARM, which are as follows:

- Obtain public input on proposed changes to the DMMP Management Plans through Issue Papers and Clarification Papers.
- Discuss disposal site management actions and changes.
- Summarize Ecology and EPA regional cleanup activities.
- Review recent testing activities, and obtain public input on proposed changes to the DMMP.
- Present and discuss public issue papers.
- Comment on and discuss status reports of ongoing actions of DMMP and SMS programs.

Ms. Stirling stated that written comments on DMMP issues and SMS issues should be submitted for consideration by **June 14, 2008**, to the DMMP and SMS, respectively.

Ms. Stirling introduced the DMMP/SMS Agency panel:

- Wayne Wagner, USACE
- Rick Parkin, EPA
- Rich Doenges, DNR
- Chance Asher, Ecology

### **Stephanie Stirling**

PP0.1 20<sup>th</sup> Sediment Management Annual Review Meeting

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PP0.2	2008 SMARM
PP0.3	Cartoon
PP0.4	Meeting Objectives and Purpose
PP0.5	Meeting Objectives and Purpose (continued)
PP0.6	Summary and Closing

**Stephanie Stirling** continued the meeting by introducing the next speaker, Rich Doenges.

**Rich Doenges, DNR**, gave the opening remarks for the meeting. He first praised Colonel McCormick for his leadership. He indicated that, with respect to new developments, dredged material management would not be much different in 2008. The DMMP will continue to focus on removing dredged material and determining the appropriate disposal sites. There are generally conflicts regarding management of critical lands next to the shore. It is necessary to preserve some of it for navigation and commerce, while protecting it environmentally. He was impressed with the collaboration with agencies and affected parties. He noted that a specific molecule (e.g., dioxins) can have the power to create fear and loathing among the regulating and affected parties. He welcomed the Puget Sound Partnership and mentioned that everyone should coordinate efforts to work together on making progress in environmental protection while maintaining commerce. Mr. Doenges remarked that Puget Sound is not as healthy as it should be if we are to reach a goal of having a healthy sound by the year 2020. We still need to do more.

Mr. Doenges then spoke of the monitoring work that is being done in Commencement Bay, Port Gardner, and Elliott Bay and the dioxin studies in Commencement Bay. He also mentioned that the draft Commencement Bay Disposal Site Environmental Assessment was in process and that David Kendall would speak about it later at the meeting. He noted that there were a number of dioxin public workshops held. He felt that it is important to realize that no subject is too complex to explain to the public. One needs to understand the subject well enough in order to explain it to the average person, so they understand the fundamentals. This way they will appreciate what is being done and be more effective advocates of what is to be accomplished. This year, the additional surveys and sampling that will be done will give a good jump start in increasing knowledge of dioxins.

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In closing, Mr. Doenges commented that this dredge year would not look the same as last year. Mr. Doenges stated that he still sees a future for open-water disposal, but that it will not be the same as it has been in the past. Sampling and other administrative expenses will be more costly, and additional testing may be needed to answer reasonable questions posed by members of the public and the stakeholders. There may be more sediments determined to be unsuitable than in the past, and this would affect availability of disposal sites. They will need to work together as the agencies look at disposal site options that will be cost-effective, feasible, and quickly acquired. There will be some great opportunities to integrate dredge operations with habitat restoration and to incorporate beneficial reuse options within dredged material disposal planning. Fees for sediment disposal could also increase, and it may be necessary to make adjustments to fee schedules. The agencies will be watching the budget closely to see what need there is for additional testing, permit work, etc. Mr. Doenges did feel that we have a wonderful program and is still learning more about all the details that go into managing sediments.

*Stephanie Stirling* thanked Rich Doenges and introduced Cullen Stephenson of the Puget Sound Partnership. Mr. Stephenson has a degree from the University of Washington in chemical engineering. After ten years in the oil industry, he moved back to Washington and began a 20-year career at the Department of Ecology, where he directed staff working with solid waste issues, litter pickup and prevention, and grants. His responsibilities also included regulation of industrial facilities in Washington such as pulp and paper mills, aluminum smelters, and oil refineries. He recently joined the Puget Sound Partnership as Deputy Director. The Partnership is cast with protecting and restoring Puget Sound.

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## GENERAL PRESENTATIONS

### **1. Puget Sound Partnership – Cullen Stephenson, Deputy Director**

*Mr. Stephenson* gave an overview of the Puget Sound Partnership and progress that has been made. He described how the staff has grown from seven individuals approximately six months ago to a current staff of twenty-seven. Puget Sound has been divided legislatively into seven different action areas. Not everyone is in agreement as to how it has been divided. For example, there is some dispute as to whether Seattle and Tacoma should be included in the same action area, and whether Bellingham should be included with the San Juan Islands in the same action area. Some feel that their issues are different. Puget Sound is complex and one of the largest estuaries in the U.S. with 2,500 miles of shoreline and 14 major watersheds. Population growth in the area has been very high which increases the use of the Sound and in turn, impacts its health. Orcas in this area are among the most contaminated whales in the world (e.g., PCBs, polybrominated diphenyl ethers [PBDEs]), some beaches have been closed to swimming, some areas to grow oysters and clams have been shut down, and the problems are getting worse.

Mr. Stephenson discussed the goals of the Puget Sound Partnership. These included creating a unified Action Agenda to guide the protection and restoration of Puget Sound, raising public awareness regarding threats to the Sound, channeling energy and resources into necessary actions, and holding the system accountable for results. There are 75 day-long public meetings scheduled from January through October to raise public awareness and talk about the Action Agenda, and it will be a challenge to just get staff to the meetings. He commented that we need to raise public awareness that the Sound is not as clean as it might appear on the surface. For example, Hood Canal has a 6-inch layer of “slime” 10 feet down that stops oxygen transfer, yet from the ferry one only sees the surface layer, which appears to be clean.

The Action Agenda focuses on determining the current health of the Sound, what actions and policies will be necessary to restore the Sound, and what will be the first steps to accomplish the goals. The Action Agenda is due to come out first in September. Mr. Stephenson pointed out

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that this first draft will not be perfect, but it will be ambitious. He expects a series of revisions, with “plan, do, act, and check” cycles, improving each year with a continuous movement uphill.

The problems within Puget Sound have been going on for a long time, but no one has been held accountable. A baseline should be established, progress measured, and the system held accountable for results. The approach will be to coordinate resources, prioritize projects, base decisions on good science, examine costs and benefits, determine a funding mechanism, and hold ourselves and entities accountable.

Mr. Stephenson commented that point sources are not the only problem and that non-point sources, such as stormwater runoff, are problems. He displayed a photo of the Thea Foss Waterway and another showing twin outfalls at one end of the waterway. He pointed out that right above them is I-5, the Tacoma Dome, South Hill, and more development, which increases stormwater runoff. He mentioned that at the meetings held so far, the business community indicated that they do not care where they build. If it is made easier to build in the city, they will, but right now the rules of the road have forced development to sprawl. He added that increased population adds to the problems. Individual impacts may be small, but it can add up when you factor in the size of the population.

We need to protect the remaining habitat out there and adjust how we approach and regulate development. It is important to focus on why sediments are becoming contaminated and determine what should be done to prevent it. He gave an example of how successful the mercury reduction (amalgam separator) program has been since it was implemented in 2003. We should be spending as much time on working on prevention and looking at source control as we do on cleanup. It is easier to prevent contamination than to clean it up. However, the Toxics Cleanup Program has been so busy with necessary cleanup that it has had little time to focus on prevention. We, as individuals, can make an impact as well. We should think about all the garbage we produce and take the time to think about its impact on the environment. Prevention is the key to cleaning up Puget Sound. We have the opportunity to make a difference and it is now time to make a change. We have good state, governor, tribal, and monetary support. The Pacific Northwest is known to be a caring, green place. He concluded by stating that the Puget

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Sound Partnership needs our help and suggested visiting their website for more information:  
[www.psp.wa.gov](http://www.psp.wa.gov).

**Cullen Stephenson**

- PP1.1 Sediment Management Annual Review Meeting – Puget Sound Partnership
- PP1.2 Puget Sound is Complex
- PP1.3 Puget Sound is Complex (continued)
- PP1.4 Population Growth
- PP1.5 Signs of Problems
- PP1.6 Our Goal
- PP1.7 Action Agenda – 4 Questions
- PP1.8 Communications
- PP1.9 Accountability
- PP1.10 Different Approach
- PP1.11 Photo of Thea Foss Waterway
- PP1.12 Photo of Twin Drains at the End of the Thea Foss Waterway
- PP1.13 South Treatment Plant Biosolids (Seattle). Mercury Reduction Program in Effect Since 2003.
- PP1.14 We Can Do This!

**MORNING BREAK**

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## **2. MyEIM Update – Nagesha Kannadaguli, Ecology**

*Nagesha Kannadaguli* was introduced by Stephanie Stirling after the morning break. He is a team member for Ecology's new database system: myEIM (Environmental Information Management System). Mr. Kannadaguli gave an update and explanation of the system, which replaced Ecology's Sediment Quality Information System (SEDQUAL), making it available as a web application. The link to the system can be found at Ecology's website (<http://www.ecy.wa.gov>) under the Toxics Cleanup Program; a User's Manual is also available online. The myEIM system allows users to do simple or customized searches online. Mr. Kannadaguli walked through the program giving examples of how searches can be customized according to user defined criteria, how a user can conduct chemistry and bioassay queries and analyses, compare data to known standards, and utilize the site's mapping tool. Another benefit is that information or analysis results can be shared with other users.

Mr. Kannadaguli indicated that some internal training programs have already taken place and it is now a regular tool used by Ecology. They will also have training sessions available to the public. He listed the team of individuals involved in working on and building the system. Any questions regarding the program can be directed to [myeim@ecy.wa.gov](mailto:myeim@ecy.wa.gov).

### **Nagesha Kannadaguli**

- PP2.1 MyEIM Tools for Environmental Data Analysis
- PP2.2 Toxics Cleanup Home – WA Department of Ecology
- PP2.3 Flowchart
- PP2.4 MyEIM Home – Default Home Page
- PP2.5 MyEIM Portal Application – Search Definition
- PP2.6 MyEIM Portal Application – Search Definition Result
- PP2.7 EIM Query System – GIS Viewer – Sammamish Lake Stations
- PP2.8 EIM Query System – GIS Viewer – Grays Harbor
- PP2.9 MyEIM Home – Default Home Page – Share Search
- PP2.10 Chemistry Analysis
- PP2.11 MyEIM Portal Application – Search Definition
- PP2.12 MyEIM Portal Application – Search Definition Result

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- PP2.13 Cleanup Criteria, Parameters, and Derived Variables
  - PP2.14 MyEIM Analysis – Choose Comparison Criteria
  - PP2.15 MyEIM Analysis – Analysis Results
  - PP2.16 MyEIM Analysis – Choose Comparison Criteria – Soil Method A
  - PP2.17 MyEIM Analysis – Choose Comparison Criteria – Soil Method A (Cont.)
  - PP2.18 MyEIM Analysis – Analysis Results – File Download
  - PP2.19 EIM Query System – GIS Viewer
  - PP2.20 MyEIM Analysis – Analysis Results – Arsenic, Lead
  - PP2.21 MyEIM Analysis – Analysis Results – Filter Applied – Arsenic Only
  - PP2.22 EIM Query System – Geographic Information System (GIS) Viewer
  - PP2.23 Customization
  - PP2.24 MyEIM Analysis – Choose Comparison Criteria – cPAH-TEQ
  - PP2.25 MyEIM Analysis – Choose Comparison Criteria – cPAH Analysis
  - PP2.26 MyEIM Analysis – Choose Comparison Criteria – My Carcinogenic PAHs
  - PP2.27 MyEIM Analysis – Choose Comparison Criteria – Share - User Name
  - PP2.28 Processing Diagram
  - PP2.29 MyEIM Portal Application – Search Definition
  - PP2.30 MyEIM Portal Application – Search Definition Result
  - PP2.31 MyEIM Analysis – Choose Comparison Criteria – WA SMS and SQS
  - PP2.32 MyEIM Analysis – Analysis Processing
  - PP2.33 MyEIM Analysis – Analysis Results
  - PP2.34 EIM Query System – GIS Viewer – Washington, Oregon, Idaho
  - PP2.35 EIM Query System – GIS Viewer – Washington
  - PP2.36 Bioassay Analysis
  - PP2.37 MyEIM Portal Application – Search Definition – Steps 1 and 2
  - PP2.38 MyEIM Portal Application – Search Definition Result - CR-10
  - PP2.39 MyEIM Analysis – Bioassay Test Parameters
  - PP2.40 MyEIM Analysis – Bioassay Test Parameters – Draft Freshwater CSL
  - PP2.41 MyEIM Analysis – Bioassay Test Parameters – Selected Standards
  - PP2.42 MyEIM Analysis – Bioassay Match
  - PP2.43 MyEIM Analysis – Bioassay Match (Cont.)
  - PP2.44 MyEIM Analysis – Bioassay Summary

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- PP2.45 MyEIM Analysis – Bioassay Summary – *Rhepoxynius abronius*  
PP2.46 MyEIM Analysis – Bioassay Summary – PGB02C  
PP2.47 MyEIM Analysis – Bioassay Summary – Save File  
PP2.48 MyEIM Analysis – Bioassay Summary – Saved File Name  
PP2.49 EIM Query System – GIS Viewer – Amphipod Results  
PP2.50 MyEIM Analysis – Bioassay Test Parameters – Initial Transformation Formula  
PP2.51 MyEIM Analysis – Bioassay Test Parameters – Possible Math Functions  
PP2.52 Statistical Analysis Parameters  
PP2.53 Stakeholders  
PP2.54 Website: [myeim@ecy.wa.gov](mailto:myeim@ecy.wa.gov)

## Comments and Questions

*Stephanie Stirling* requested that when asking a question or making a comment that everyone should identify who they are and their affiliation to assist in keeping the minutes.

*Question:* Erika Hoffman, EPA, asked about the plans for updating the program with new data. She was aware that users will input new data into the system. Is there also any component of it that is going to be based outside Ecology in terms of updating the database?

*Response:* Mr. Kannadaguli responded that Tuan Vu is the coordinator for data uploading and he could answer the question better. He knew that they are working hard on getting the data uploaded into EIM, and it is continuously growing. There is some budget to do this and for upgrading the application. Chemistry and bioassay data are already uploaded and they are currently in the process of creating the benthic infauna database within the system.

*Question:* Donna Ebner, USACE, Portland District was part of the team that worked on this program. She asked about the training opportunities for using the system.

*Response:* Mr. Kannadaguli replied they are in the process of adding more training sessions and in a couple of months he expects one can do the training at any time. They can give 3-hour

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training sessions to help people get a jump start using the system at any time. The program is quite self sufficient and you may not need much training. He added that if anyone gets stuck using the program, they are happy to answer questions.

*Comment:* Chance Asher added that they have training sessions for both users and data input/data submittal. If anyone is interested in the sessions, the contact would be Wayne Allington. She indicated that one can find information on training and data upload links at the myEIM website and Mr. Kannadaguli added that one could also email them. Chance Asher again clarified that there are two training sessions: One for learning how to use the program and the other for learning how to submit data. They have scheduled five sessions so far and can offer more if there is enough interest.

***Stephanie Stirling*** announced that the dioxin issue was next on the agenda. She introduced Jim Pendowski who manages the Toxics Cleanup Program at Ecology.

***Jim Pendowski*** talked about how it is a daunting task for the DMMP agencies to deal with dioxins and to manage the risk of bioaccumulation. They are dealing with PCBs as well. There is a three tiered process involved in updating the dioxin and PCB interpretive guidelines which includes work by technical staff dealing with technical discussions and a basis for policy, review by mid-level managers, and review by the directors of all four DMMP agencies. It is a complicated process and they have had public input along the way. He then introduced Kate Snider who has been facilitating the process, and who would be giving the update on the guideline revisions and the direction the agencies are taking to deal with these issues. He and others involved in the program will be available to answer additional questions we might have.

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### **3. Dioxin & PCB Interpretive Guideline Revisions Update – Kate Snider, Floyd Snider**

*Kate Snider* first gave a background of the DMMP dredged material management and the disposal of dredged material, which have met DMMP guidelines, within Puget Sound open-water disposal sites. She spoke of the five non-dispersive disposal sites within the Sound. These have low current velocities, material remains onsite, and they are carefully monitored. Minor adverse effects are permitted at these sites. The dispersive sites (three within Puget Sound and additional sites in Grays Harbor and Willapa Bay) have high current velocities, material is quickly dispersed, and no adverse effects are expected. She reviewed how material for these sites is assessed using a tiered system that involves chemical testing, and selective bioassay and bioaccumulation testing. The DMMP regulations for disposal are consistent with Sediment Management Standards.

Ms. Snider then spoke of how dioxins are one of the chemicals of concern for bioaccumulation. The standards that have been used to date for regulating sediments with measurable levels of dioxins were based on human consumption of fish in Grays Harbor, but were not appropriate for application to Puget Sound. Dioxin has natural and anthropogenic sources. Dioxins are no longer entering the Sound through industrial practices, but can be introduced by other means. For example, burning things in the presence of saltwater creates dioxins. Nearly all Puget Sound sediments contain some level of dioxins. Some of the levels are very small, but theoretically could pose a risk by bioaccumulation in organisms.

Kate Snider described how the agencies were no longer using the Grays Harbor criteria for suitability determinations within Puget Sound. The interim approach used now is dependent on the proposed dredging site and planned disposal site. For disposal at non-dispersive disposal sites, the DMMP compares the dioxin levels in dredged sediments to that of the sediments surrounding the disposal site. Concentrations in the dredged material must be lower than those within the vicinity of the disposal site. If dredged material is slated to be disposed at a dispersive site, the dioxin levels in the dredged material are compared to remote reference areas such as Carr Inlet and Sequim Bay.

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Ms. Snider then discussed the purpose of the dioxin project, which was to develop a framework to manage the bioaccumulative risk of key compounds which pose an unacceptable human health risk. The initial focus has been on dioxins, although they intend to address PCBs as well. There is a strong legislative interest in managing PCBs. The intention is to manage dredged sediments in a way that is protective, such as protecting the health of Puget Sound and supporting safe consumption of seafood, while supporting a thriving regional economy.

Ms. Snider then updated everyone on the progress that has been made, which is described in a status report available on the USACE's DMMO website. The agencies received stakeholder input in the summer and fall of 2007 and have deliberated on the input received. The dioxin issue is very complex and a proposed solution is still under development. The deliberations to date have focused on Puget Sound non-dispersive sites. Grays Harbor and Willapa Bay sites will be addressed separately. She listed a number of issues and options under evaluation including the potential for setting guidelines based on existing concentrations throughout Puget Sound or existing concentrations in the vicinity of each disposal site. They are also working on defining triggers for testing. One problem they are having determining guidelines is the lack of sufficient data characterizing existing dioxin and PCB concentrations throughout the Sound. For example, there are only ten past dredging projects that have dioxin data and there are only nine data points from three remote reference areas.

Due to the lack of sufficient data, Ms. Snider indicated that the next steps include a comprehensive sampling program to be implemented by the agencies this summer throughout Puget Sound, outside of the urban bays. Data will be collected from a broader geographical area than in the past in order to help DMMP policy-makers make more informed decisions, instead of basing decisions on the handful of data that already exists. The data will be collected in the summer and will be available in the winter. The agencies have committed to a goal of having a proposal for interpretive guidelines by the 2009 to 2010 dredging season. It is an aggressive schedule, but they know that every day the guidelines are not in place and there is not a clear path forward, it impacts multiple projects and hinders everyone from being able to plan effectively. They will need input and support from multiple stakeholders to achieve an appropriate balance of environmental and maritime objectives. In the interim, site-specific

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judgments will continue to be made. Testing for dioxins will be required on a case-by-case basis, depending on if there are concerns about dioxins at the site. The “reason to believe” screen will continue to be based on proximity to historical and current point sources or if existing data points to the presence of dioxins or high PCBs in the vicinity of the site.

**Kate Snider**

- PP3.1 Dredged Material Management Program Dioxin Project
- PP3.2 Background
- PP3.3 Puget Sound Open-Water Disposal Sites
- PP3.4 Background (Cont.)
- PP3.5 Background (Cont.)
- PP3.6 Project Purpose
- PP3.7 Principles
- PP3.8 Progress
- PP3.9 Deliberations to Date
- PP3.10 A Big Problem is Lack of Data
- PP3.11 Next Steps
- PP3.12 Next Steps (Cont.)
- PP3.13 Stakeholder Involvement
- PP3.14 In the Meantime

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#### **4. Overview of the Planned Dioxin Sediment Sampling – Erika Hoffman, EPA**

*Erika Hoffman* gave an overview of the planned sediment sampling scheduled for this summer to support the dioxin interpretive guideline development. The objective is to determine representative concentrations of key bioaccumulative compounds in sediments located throughout Puget Sound, but outside of urban bays and other known point sources. The study will focus on dioxins and other bioaccumulative chemicals of concern (BCOCs), such as PCBs, and they will also do field testing of screening assays for dioxins. The data collected may be useful for other programs as well, such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Model Toxics Control Act (MTCA), and Puget Sound Ambient Monitoring Program (PSAMP) programs. It will supplement ongoing Ecology Puget Sound sediment characterizations of various urban bays.

Ms. Hoffman indicated that a detailed sampling and analysis plan has not been completed, although they plan to collect approximately 90 representative samples to support statistical analyses. Samples will cover a range of total organic carbon (TOC) levels and a variety of grain sizes. They expect to analyze approximately 50 of the samples for dioxins/furans and PCB congeners, and 30 would be used for a dioxin Toxic Equivalence (TEQ) cell-based assay. Sediments will also be archived for additional testing. The Sampling and Analysis Plan is on the fast-track and was expected to be completed in May 2008, with stakeholder input in June 2008. Information for this review will be posted on the USACE website and stakeholders will be notified directly using the SMARM and Dioxin project email list. Sampling will occur in the late summer using the EPA research vessel (R/V) OSV *Bold*. They will need to consult with statisticians on data interpretation issues. Data are expected to be available by the winter. Funding for the study will be through DNR. Contractors involved will include Floyd Snider through an Ecology contract and Science Applications International Corporation (SAIC) through the existing DNR monitoring contract.

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**Erika Hoffman**

- PP4.1 Overview of the Planned Sediment Sampling to Support Dioxin Interpretive Guideline Development
- PP4.2 Objectives
- PP4.3 Other Considerations
- PP4.4 General Scope
- PP4.5 Schedule
- PP4.6 Stakeholder Sampling and Analysis Plan (SAP) Review
- PP4.7 Resources

**Comments and Questions**

*Question:* John Herzog, GeoEngineers, commented that we have been living with the interim policy for a while. Are there any statistics regarding how many of those sediments that passed the old interim policy would have passed the most recent interim guidelines?

*Response:* Lauran Cole Warner replied that they will be showing that information in one of the later presentations at this meeting.

*Question:* Is there a paper available?

*Question:* John Herzog asked if any project that passed under the previous interim approach would pass through the current dioxin screening.

*Response:* Erika Hoffman responded that there is a list of projects that have been done previously that were compared to the interim approach. The comparison was determined on a volume basis for ten projects. Under the current interim guidelines, 71 percent of the volume proposed for dispersive sites passed.

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*Question:* John Herzog indicated that he is proponent for using the Rosario dispersive site. He asked if any sediments disposed at a dispersive site were characterized for dioxins in the last six months.

*Comment:* Courtney Wasson stated that dioxin testing at the time was low risk.

*Question:* Maura O'Brien, Ecology, asked if Ms. Hoffman could explain more about the search for dioxin-like congeners. Could she expand more on the congeners they will be considering?

*Response:* Erika Hoffman specified that the focus has primarily been on dioxins and they had not yet focused on dioxin-like PCB congeners. This summer's sampling has been expanded to include analysis for PCB congeners. With respect to PCBs, so far the focus has been on the PCB Aroclors, and these have generally been undetected. The idea is to collect and analyze for total high resolution PCB congeners. The samples collected this summer will be analyzed for the full dioxin congener range.

*Comment:* Doug Hotchkiss, Port of Seattle, commented that the sediment management program we have here is great. However, he sees it as one leg of the stool. He wondered what the impact would be if the regulatory dioxin level is "10" ppt TEQ versus "20." How will that difference translate in risk of human consumption versus its translation in cost of disposing the dredged material upland? It is another area about which we need additional knowledge to gain an understanding of all sides in order to make balanced decisions. It is important to look at the longer term picture and consider where dredged material is coming from, such as berth areas that are maintenance-dredged regularly versus dredged material from new berth areas where they may be cutting into relic sediments deposited 200 years ago. He feels the agencies and dioxin study group has made a great start, but he does not feel there is enough information yet to be ready to make a regulatory decision by next year.

*Response:* Kate Snider replied that Mr. Hotchkiss' comments were very well said and asked if anyone had anything to add to it. She added that additional input on any other data that would help them get there would be valuable.

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*Question:* Kathy Godtfredson, Winward Environmental, asked about the statistical comparisons that were done with the dredged material and reference areas. She asked about the statistical workshop concerning how to do the comparisons and what types of comparisons will be done.

*Response:* Erika Hoffman responded that one component of designing any sampling and analysis plan is looking ahead at data quality objectives and how the data will be used. Their focus right now is on the suitability determinations. They will do a statistical evaluation to determine if there is sufficient power in the sampling. She spoke of the workshop which will involve expert statisticians and discuss how to evaluate the data to determine if it meets regulations. They will also need to determine how they will deal with data that has large numbers of non-detects when making comparisons. The statistical workshop will not happen prior to sampling, but possibly may occur in the fall. They are still working on getting that together. The workshop will have applications beyond the dredging program as well.

*Comment:* Roger McGinnis, Hart Crowser, commented that the agencies should put serious thought into how they will deal with blank contamination issues (analytes in the blank are often suspected in the dioxin analysis) and how they will treat data if the analysis does not meet the laboratory ion identification criteria (K flag).

*Question:* Tom Gries, Ecology stated that he understands that due to the lack of data from clean natural reference areas, the emphasis would be to sample these sites for the dioxin study. However, from a DMMP paradigm, it seems like this would help aid in suitability determinations of dredged material that will be disposed at dispersive sites, which really is not the bulk of the material that is generally dredged.

*Response:* Kate Snider replied that the intent of the sampling this summer is to focus on areas outside of urban bays throughout Puget Sound, but not to focus just on rural reference sites for the support of dispersive sites.

*Comment:* Tom Gries stated that knowing the sites that are being discussed, most are rural reference areas with one or two exceptions. He was wondering if relying on the agencies to collect transitional urban bay or urban bay-type background areas will be adequate.

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*Response:* Erika Hoffman responded that early on in their deliberations for the sampling study, they discussed looking specifically at urban and nonurban gradients. However, they concluded this would be too expensive to do it in a way they would consider robust. It would also require resources that they do not have at this time. They also understand that some of the answers to questions that will apply to both non-dispersive and dispersive sites will be greatly enabled knowing more about areas that are away from urban development as opposed to characterizing the gradient. They are not trying to imply that what Ecology is doing under the Puget Sound Initiative will take care of everything. She is acknowledging that they are not in a position to do that kind of study and get all of the information they need.

*Question:* Tad Dashler, Winward Environmental, asked if the agencies are still looking at or considering risk-based alternatives.

*Response:* Kate Snider answered that risk-based alternatives are still on the table. Risk-based alternatives may need support by a rule change or by an additional permitting process. The DMMP agencies have not made a decision as to how to proceed yet. They have acknowledged the complexity of the issue and want to make sure the decisions they make are fully informed as to how they will impact the health of the environment, consumers, and the economy. The extra data collected this summer will help. A discussion of this is summarized in the Executive Summary of the dioxin report.

## **LUNCH**

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**(Return from Lunch)**

On behalf of the DMMP agencies, *David Kendall, USACE*, took the time to formally acknowledge Colonel McCormick for his strong support of, and many contributions to, the dredged material management program. As he handed Colonel McCormick a plaque, Dr. Kendall stated that he will not be forgotten.

*Colonel McCormick* thanked everyone and commented that it was really David Kendall and the many others involved that made the program run. He thinks it is very important and he hopes this type of program and cooperation is up and running smoothly down in New Orleans where he is headed.

*Stephanie Sirling* introduced the next topics which included agency summary and status reports.

## **AGENCY SUMMARY AND STATUS REPORTS**

### **5. Summary of Disposal Site Monitoring – Courtney Wasson, DNR**

*Courtney Wasson* discussed the results of the disposal site monitoring conducted at the Commencement Bay disposal site in 2007. She first reviewed the monitoring framework, which is designed to answer the following questions:

1. Does dredged material remain onsite?
2. Have biological effects conditions been exceeded?
3. Are there any adverse effects to offsite biological resources?

Ms. Wasson then talked about the monitoring plan modifications that were implemented in 2007. These included trawl surveys and the dioxin/furan analysis of sediments and tissues. The trawl surveys were conducted to confirm the 1986 Resource Evaluation results, which showed fish and shellfish populations to be low in the vicinity of the disposal site. The dioxin and furan analysis

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supported a three-year study to determine dioxin/furan concentrations in sediments and tissues at DMMP disposal sites.

Ms. Wasson then presented the results of the monitoring survey. The sediment vertical profile system (SVPS) surveys showed that dredged material remained onsite, with the exception of thin lobes (< 3 cm) of dredged material to the north, northwest, and west of the site. She displayed SVPS images of the coarse dredged material sediments found at the center of the site compared to the fine-grained ambient material. They determined that a layer of fine gray clay was most likely glacial runoff from the Puyallup River. Ms. Wasson briefly reviewed the idealized development of infaunal successional stages as presented in Pearson and Rosenberg, 1978. The infaunal successional stages present can be determined through the SVPS surveys. The 2007 survey showed that Stage III organisms, which are considered an equilibrium community, were present at the majority of the stations. This was an indication that the biological community at the Commencement Bay disposal site is doing well.

The results of the chemistry analyses showed that all analytes that were detected had values below the screening level. Tissue chemistry results showed that one replicate for CBT16 exceeded the background for selenium, but the result was determined to be an outlier compared to other results. Arsenic exceeded the target tissue level (TTL), but results were comparable to 1995 baseline concentrations. All bioassays passed DMMP interpretive criteria. The benthic community analysis showed significant decreases in arthropods and mollusks at all transect stations relative to baseline. However a similar decrease was observed at the benchmark stations, suggesting the decrease was not due to dredged material disposal but may have been an area-wide reduction due to regional changes in conditions.

Otter trawls were used to sample the fish and shellfish for the trawl surveys. No Dungeness crabs were encountered during the survey and densities of fish and flatfish were less than observed 1986. The site was originally picked due to low densities of fish and shellfish, and the results of the 2007 survey confirmed that the disposal site remains low in demersal invertebrate and fish resources.

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Ms. Wasson presented the conclusions of the monitoring data evaluation. The answers to the monitoring questions were that dredged material did remain onsite, biological effects conditions were not exceeded, and there were no adverse effects to offsite biological resources.

Ms. Wasson then discussed the results of the dioxin/ furan study conducted at the DMMP disposal sites. They collected samples for background concentrations at three other sites for which they did not yet have data: Port Gardner, Elliott Bay, and Bellingham Bay. Carr Inlet was used as the reference area. Sediment analysis results exhibited low TEQ concentrations in Commencement Bay, Port Gardner and Anderson/Ketron (< 4 pg/g) and higher concentrations in Elliott Bay and Bellingham Bay (8 pg/g). The lowest concentrations were observed at the Carr Inlet reference station (0.91 pg/g). Congener profile fingerprinting showed concentrations of dioxins and furans were relatively low in sediments and the profile was similar between disposal sites. Within tissues, dioxin/furan levels were low in bivalves and polychaetes. The highest concentrations were observed in Elliott Bay and the lowest concentrations in Bellingham Bay. For crab tissues, the TEQs were higher in the hepatopancreas samples than in crab meat, which may have been due to the difference in lipids in these tissues.

Ms. Wasson reported the status of the dioxin/furan report. The database was submitted by SAIC to the DMMP and the summary report of all the data compiled would be completed within approximately one month. She concluded her presentation by thanking everyone involved in these studies and the monitoring surveys.

### **Courtney Wasson**

- PP5.1 2007 Full Monitoring at the Commencement Bay DMMP Site
- PP5.2 Presentation Agenda
- PP5.3 PSDDA Monitoring Framework
- PP5.4 Monitoring Plan Modifications Implemented in 2007
- PP5.5 SVPS Survey
- PP5.6 SVPS Images – CBZ01/C and CBT13/C
- PP5.7 SVPS Images – F31/C and F45/A
- PP5.8 Idealized Development of Infaunal Successional Stages
- PP5.9 Infaunal Successional Stage

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- PP5.10 2007 Sediment and Tissue Stations
  - PP5.11 2007 Sediment Chemistry
  - PP5.12 Tissue Chemistry
  - PP5.13 Bioassays
  - PP5.14 Benthic Community Analysis
  - PP5.15 Trawl Survey
  - PP5.16 Evaluation of 2007 Monitoring Data – Question 1
  - PP5.17 Evaluation of 2007 Monitoring Data – Question 2
  - PP5.18 Evaluation of 2007 Monitoring Data – Question 3
  - PP5.19 Dioxin/Furan Study at DMMP Sites
  - PP5.20 Summary of Analyses
  - PP5.21 Dioxin/Furan in Sediments
  - PP5.22 Congener Profile – Fingerprinting
  - PP5.23 Dioxin/Furan in Tissues
  - PP5.24 Crab Tissue Samples
  - PP5.25 Port Gardner Congener Profile
  - PP5.26 Report Status
  - PP5.27 Thank you!

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## **6. Summary of DMMP Testing Activities – Lauran Cole Warner, Seattle District**

*Lauran Cole Warner, USACE*, gave an overview of the DMMP testing activities for the dredge year, which began June 16, 2007, and would end June 15, 2008. She spoke of how the DMMP has been working together for 20 years, and reviewed the role of the DMMP. Based on existing regulations and current guidelines, the DMMP evaluates potential dredged material for “suitability” for open-water disposal. It also works with recency frequency, and volume revisions, post-dredge surface evaluations, and CERCLA/MTCA coordination. Ms. Warner briefly reviewed how the DMMP characterizes sediment through a tiered evaluation that involves chemical, bioassay, and, at times, bioaccumulation testing. The suitability determination is documented in a Memorandum of Record, which summarizes the sampling and testing performed, and documents the suitability of the material for open-water disposal or for beneficial use. It must be signed by all the agencies.

Ms. Warner also talked about Recency and Exclusionary Guidelines. According to recency guidelines, the length of time for which sediment testing results will be considered representative of an area to be dredged can sometimes be extended. The extension depends on the site, its rank regarding potential contamination, and other considerations. Additional testing may be required if dredging does not occur within the permitted time frame. The decision for a recency extension is determined on a case-by-case basis. Exclusionary guidelines allow for limited testing for areas to be dredged that are sufficiently removed from potential sources of contamination.

Ms. Warner then reviewed the number of projects completed during the 2008 dredging year. Of all the projects, only a small portion of the sediments were determined to be unsuitable for open-water disposal. Some sediment from the Port of Tacoma East Blair Waterway was determined to be unsuitable due to mercury and dioxin levels. The dioxin levels observed in some of the samples were < 10 ppt, but these failed because the area around it had lower dioxin levels. Dioxin levels at the Commencement Bay disposal site were low. Cap Sante Marina also had sediments that failed due to levels of dioxin found in testing. However, for the biggest projects, most of the sediments were considered suitable. She pointed out that one trend observed in 2008

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was that there were not as many straightforward suitability determinations. Another trend was that some of the big volume projects on the Washington coast and Columbia River required minimal testing.

In conclusion, Ms. Warner listed some of the projects and work that would continue over the next dredging year. The dioxin evaluation framework would continue, more large Blair Waterway projects are planned, the Sound-wide dioxin sampling will occur this summer, and the DMMP will continue to clarify the dioxin “reason to believe” criteria. For more DMMP information, she suggested visiting the USACE website at: <http://www.nws.usace.army.mil>.

### **Lauran Cole Warner**

- PP6.1 Dredging Year 2008 DMMP Testing Activities
- PP6.2 Overview: The Year at DMMP
- PP6.3 DMMP Time
- PP6.4 What DMMP Does
- PP6.5 How DMMP Characterizes Dredged Material
- PP6.6 Suitability Determination
- PP6.7 Recency Guidelines
- PP6.8 Exclusionary Guideline
- PP6.9 DY 2008 Project Summary
- PP6.10 Volume Summary
- PP6.11 DMMP Evaluations (by volume)
- PP6.12 Suitability Determinations in DY08
- PP6.13 Unsuitable Material in DY08
- PP6.14 Biggest Projects
- PP6.15 Trends in DY 2008
- PP6.16 Coming Attractions
- PP6.17 For More DMMP Information

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## Comments and Questions

*Question:* Ted Benson, Ecology, asked if they had looked at source identification of the dioxins. For example, by looking at the congener distributions, one can determine if it may be from something like an old TP burner, a pulp mill, or other sources like that.

*Response:* Courtney Wasson replied that they had not. Lauran Warner added that a clear layer of slightly elevated dioxins in fill sediments was found in the Blair Waterway, but she did not know what the source was.

*Comment:* Courtney Wasson added that they did look at historical site uses.

*Question:* Ann Fitzpatrick, ENSR, commented that the last bullet on Lauran Warner's slide was that the agencies will continue to clarify the dioxin "reason to believe." She was wondering how they determine that and what it meant.

*Response:* Ms. Cole Warner answered that she was pointing out the issues that need to be addressed and that they are going to have to think about it more. She asked Erika Hoffman to respond to Ms. Fitzpatrick's question.

*Response:* Erika Hoffman responded that the agencies want to recognize that in making alterations to the interim or final interpretive guidelines for dioxins, that they cannot just alter that end. They must consider the end that generates the dioxin data and what their process is for making a decision as to whether they need to test for dioxins. In the past, they have made that decision by looking at historical data, sources in the area, and uses of areas near the site. The question has come up many times as to what they will do with the material if it fails. There are also monetary implications for having to do more testing, particularly if the interpretive guidelines have lower values. Ms. Warner was trying to reflect that the agencies are not only looking at refining the guidelines once they have the data, but will also be reconsidering their trigger mechanisms and whether or not they change. They will get them clarified before they ask for dioxins to be tested for a given project.

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*Question:* Heather Trim, People for Puget Sound, mentioned that she missed the morning session and was not certain if she missed a discussion on Budd Inlet, but she noted that information about Budd Inlet was not included in the Ms. Warner's update. She wondered what the status was for Budd Inlet.

*Response:* Erika Hoffman replied that it had not yet been discussed, but will be covered later in this meeting.

*Question:* Heather Trim asked in the context of the presentation they just had on DMMP testing activities, if it had it gone very far into that process.

*Response:* Ms. Hoffman replied that the navigation portion was completed to the extent that it is being dredged this dredging year (Courtney Wasson confirmed this). More about the next steps will be discussed by Chance Asher later in her update on the Toxics Cleanup Program.

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## **7. Freshwater Guideline Approach – Teresa Michelsen, Avocet Consulting**

*Dr. Teresa Michelsen* gave an update on the status of the freshwater sediment quality guideline development. Dr. Michelsen listed the workgroup members and spoke of the goals of the workgroup. The goal is to finalize the Washington State Freshwater Sediment Guidelines and promulgate them. The plan is to include them in the Regional Sediment Evaluation Team (RSET) Sediment Evaluation Framework (SEF) so they can be used in Oregon and Idaho cleanup programs. Another goal is the automation of the floating percentile method (FPM) process for calculating guidelines and development of a user-friendly module so that anyone can use it.

Dr. Michelsen mentioned that the DMMP status report on the freshwater guidelines, which she will be discussing, can be found at the USACE website. She talked about the FPM used to calculate the interim freshwater guidelines. This method is designed to minimize both false positives and false negatives simultaneously. The status of work completed includes data acquisition and compilation, bioassay and chemistry Quality Assurance Level 2 (QA2) review, workgroup agreement on methodological issues, FMP coding and testing, data screening/summing, and analysis of variance (ANOVA) testing. She then outlined the tasks ahead including workgroup reviews and approval, initial model runs, draft report, public review, and a final report expected by the fall of 2008. Peer review and publication is expected by the winter of 2008/2009, and promulgation and revision of the SEF in 2009. Adoption as an SMS rule would follow that, possibly in 2009.

When the 2003 interim guidelines were calculated, the data were predominantly from the western Washington and Portland areas. For the updated guidelines, substantial data was added from Eastern Washington, although they did not receive new data from Idaho. Dr. Michelsen said they also added new data from western Washington and Oregon. They also obtained substantial chronic data, for which there was insufficient data originally for the interim guidelines. There was a substantial amount of chronic growth data for the *Hyalella* tests, but the amount of chronic *Chironomous* test data may not be sufficient to use. They did have much

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more data for the 10-day *Chironomous* mortality and growth tests. The ANOVA tests results showed which chemicals were associated with toxicity. Some of these chemicals listed by Dr. Michelsen included PCBs, chlordanes, phenol, sulfides, dichlorodiphenyldichloroethane [DDD], and dichlorodiphenyldichloroethylene [DDE](see slides for a complete listing of chemicals being evaluated). They are still working on how to deal with petroleum hydrocarbons. Dioxins were not included on the list since the highest levels in the data set were not toxic to the organisms.

Dr. Michelsen ended her presentation by reminding everyone that the status report was available at the meeting and online, and could give further details of the method used and history. She added that if anyone had further questions they could contact her or any of the workgroup members.

**Teresa Michelsen**

- PP7.1 Freshwater Sediment Quality Guidelines (SQG) Update
- PP7.2 Goals
- PP7.3 FW SQG Workgroup
- PP7.4 Floating Percentile Method
- PP7.5 Work Completed
- PP7.6 Tasks Ahead
- PP7.7 Data Set
- PP7.8 Initial Data Set
- PP7.9 ANOVA Results
- PP7.10 Questions

**Stephanie Stirling** then introduced Lyndal Johnson of the National Marine Fisheries Service (NMFS).

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## **8. PAH Exposure Guidelines and Fish – Lyndal Johnson, NMFS**

*Lyndal Johnson* reported on the status of polycyclic aromatic hydrocarbon (PAH) exposure guidelines. She talked about how the SEF is a regulatory framework for the protection of benthic organisms, fish, wildlife, and human health. However, there are certain limitations of measures for fish. Currently, the measures are set to protect the prey base of fish, but not direct effects on fish. The Toxicity Reference Value (TRV) approach was proposed as a protection for fish from bioaccumulative compounds, but fish metabolize PAHs, so that the TRV method does not work. An exposure pathway was assessed to determine if there is a direct correlation between sediment PAH levels and biological effects, and to determine alternatives to TRVs (e.g., metabolites of PAHs in bile of fish or dietary effects thresholds).

Ms. Johnson then spoke of some of the analyses conducted. She gave an example of a hockey stick regression plot, which showed a threshold point where the baseline and effects meet. The PAH workshop determined endpoints used in threshold models, which included deoxyribonucleic acid (DNA) damage, DNA adducts in fish liver, liver tumors, liver lesions in English sole, reproductive impairment, and growth effects. Some of the thresholds they looked at were sediment PAH thresholds for DNA adducts in English sole and PAH thresholds for English sole lesions. They also looked at English sole reproductive success versus sediment PAH concentrations. One experiment included looking at growth effects on juvenile fish fed worms exposed to DNA-contaminated sediment. Ms. Johnson showed hockey stick regression plots showing the results of these analyses.

Lyndal Johnson indicated that there were some uncertainties for management application. They need to look at other tools as well. Examples included looking at the geographic extent of PAH hotspots versus biological impacts, the influence of PAH mixture composition and type on the uptake of PAHs, effects of chronic versus short-term impacts and how to incorporate this into sediment bioassays. The PAH source may affect toxicity, although they found for the Alcan Aluminum Smelter case study that the prevalence for English sole lesion were lower than expected at a site nearest the smelter. It is possible that there was reduced bioavailability due to soot-associated PAHs.

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Ms. Johnson presented hockey stick regression results for PAHs in stomach contents versus lesions and PAHs in bile versus lesions. There was a threshold value of 100 to 1,000 ppm for high molecular weight PAHs (HPAHs) in stomach contents and 65 to 100 ppm for bile metabolites measured at naphthalene wavelengths. This level is within the range commonly found in sole from urban sites. They observed that PAHs affected growth and metabolism such that physiological changes were similar to starvation effects. They also found a good correlation with dietary PAHs and bile metabolite levels. The conclusions were that hockey stick regression models with English sole suggested that liver lesions and other forms of injury are associated with threshold dietary levels in the 4 to 5  $\mu\text{g/g}$  wet weight range. Analyses of dietary PAHs versus bile metabolite levels in juvenile salmon suggested that adverse effects on growth and metabolism were associated with threshold dietary PAH concentrations in the 2.7 to 11  $\mu\text{g/g}$  wet weight range.

Ms. Johnson concluded that the next steps should involve refining threshold estimates with additional data, presenting analyses as a white paper to RSET, and figuring out how to apply findings and incorporate them into other guidelines.

### **Lyndal Johnson**

- PP8.1 PAH Exposure Guidelines and Fish
- PP8.2 SEF Regulatory Framework
- PP8.3 PAH SQGs and TRVs for Fish: Problems and Limitations
- PP8.4 Exposure Pathway/Assessment
- PP8.5 Exposure Pathway/Assessment (Cont.)
- PP8.6 Sample Hockey Stick Regression Plot
- PP8.7 Endpoints Used in Threshold Models
- PP8.8 Sediment PAH Threshold for DNA Adducts in English Sole
- PP8.9 Sediment PAH Thresholds for English Sole Lesions
- PP8.10 English Sole Reproductive Success vs. Sediment PAH Concentrations
- PP8.11 Growth of Juvenile English Sole Fed Worms from PAH-Contaminated Sediment
- PP8.12 Sediment  $\Sigma$ PAH Concentration vs. Biological Effects in English Sole
- PP8.13 Uncertainties for Management Application

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- PP8.14 PAH Source May Affect Toxicity
  - PP8.15 Exposure Pathway/Assessment
  - PP8.16 PAHs in Stomach Contents vs. Lesions
  - PP8.17 PAHs in Bile vs. Lesions
  - PP8.18 PAHs Affect Growth and Metabolism
  - PP8.19 Salmonid Bile Metabolites vs. PAHs in Diet
  - PP8.20 Salmonid Bile Metabolites vs. PAHs in Diet and Water
  - PP8.21 Conclusions
  - PP8.22 Next Steps
  - PP8.23 Sediment Quality Guidelines, Endangered Species Act, Dredged Material Management

## **Comments and Questions**

*Comment:* Teresa Michelsen added that in the RSET process, they are trying to address effects on endangered species when they develop the guidelines. When working on the freshwater guidelines, they did look to see if there were any benthic endangered species they needed to consider. They found that the only organisms of concern in the region were benthic snails and mussels found in very limited areas in Idaho. Since these organisms were not found in the area of concern for dredging or cleanup projects, they did not focus on effects on these organisms. The only issue is with PAHs with fish because of the way the PAHs are metabolized in fish. They may need to determine sediment and tissue numbers to protect fish. Most of the sediment guidelines are based on the protection of benthos.

*Comment:* Erika Hoffman thanked Lyndal Johnson for the work the PAH workgroup was doing. Prior to this, her understanding was that there was not good correlated data for PAHs and effects on fish and she was impressed to see they were delving deeper into that and considering measurement endpoints. The data may aid in the determination of either tissue or sediment based guideline numbers.

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## **9. Summary of Clarification Papers – Stephanie Stirling, USACE, Seattle District**

*Stephanie Stirling* summarized the clarification papers prepared for the SMARM, which were open for public comment until June 14, 2008. These include:

- Reference Areas for Freshwater Bioassay,
- Use of Flat-Top Barges at Dispersive Disposal Sites, and
- Quality of Post-Dredge Sediment Surfaces (Updated).

Ms. Stirling first discussed the freshwater bioassay reference area paper. The DMMP had identified a number of sites, which have been refined over the years and are suitable for collection for marine bioassays. However, suitable clean reference areas had not been identified for freshwater bioassays. Therefore, the regional sediment evaluation team's bioassay subcommittee developed and outlined a process for identifying suitable freshwater reference sites and presented it in a white paper. According to the RSET white paper, the reference sediment selection process involved two phases: Reconnaissance Phase (Phase I) and Testing Phase (Phase II). Phase I would involve identifying potential reference sediment locations away from known sources of contamination that would be available long-term, have various grain-sizes among the sites, and have acceptable TOC, ammonia, and sulfides levels. Phase II would focus on analyzing the potential reference sediment locations for a subset of chemicals of concern, choosing a site using a decision matrix within each grain-size class, and running the full suite of chemicals of concern. Bioassays and bioaccumulation testing would also be conducted. The DMMP will be recommending this approach for the identification and selection of reference sites when needed for freshwater bioassays. However, there are no current plans to complete a statewide freshwater reference area study as they have for the marine sediments due to the variability between watersheds, different sediment requirements, and the numbers of watersheds. At this time, it is not cost-effective for the DMMP to undertake this process due to the relatively few freshwater projects it reviews.

Ms. Stirling then reviewed the clarification paper on the use of flat-top barges at dispersive disposal sites, which was prepared in response to requests to use flat-top barges at DMMP sites. Currently, the Puget Sound Dredged Disposal Analysis (PSDDA) management plan specifies

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bottom dump or split hull barges for dredged material disposal in order to limit turbidity and water column mixing. At non-dispersive sites, material remains onsite and is strictly monitored. The dispersive sites are located so that material is transported away from the site. Consequently, there are more strict sediment evaluation guidelines. Turbidity is not an issue at these sites. Therefore, flat-top or deck barges will be allowed for disposal of dredged material at dispersive disposal sites, with their use limited to safety concerns (e.g., weather, currents). However, these barges can not be used at non-dispersive sites. Use at non-dispersive sites could result in unacceptable impacts to the site management goals.

Ms. Stirling last summarized the clarification update concerning the quality of post-dredged sediment surfaces. The post-dredge sediment surface is new surface sediment exposed by dredging (SED). The DMMP agencies have maintained an anti-degradation policy with respect to SED. Currently, when characterizing sediment slated to be dredged, sediment is sampled one foot beyond the dredging over-depth and archived for potential testing. Details and specifics of testing and potential results are outlined in the clarification paper located on the USACE website. Ms. Stirling briefly listed the general possible outcomes, which include: a) no problems with the newly exposed sediment (no guideline exceedances); b) these sediments could have a higher concentration than the surface lift; or c) the SEDs could exhibit exceedance but have contaminant concentrations lower than the surface sediments. If this SED layer has guideline exceedances, there may be a requirement to over-dredge or cap the newly exposed sediments. The decision to require this will likely involve best professional judgment due to the complexity of dredging projects.

### **Stephanie Stirling**

- PP9.1 Summary of Clarification Papers
- PP9.2 Three Clarification Papers
- PP9.3 Dilbert Cartoon
- PP9.4 Freshwater Reference Areas
- PP9.5 RSET White Paper
- PP9.6 Site Characteristics/Phase I
- PP9.7 Site Characteristics/Phase II
- PP9.8 Summary

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- PP9.9 Use of Flat-Top Barges at DMMP Dispersive Sites
  - PP9.10 Photo of Flat-Top Barge
  - PP9.11 Non-Dispersive and Dispersive Disposal Sites
  - PP9.12 Clarification
  - PP9.13 Cartoon – I’m Afraid You Have Humans
  - PP9.14 Quality of Post-Dredge Sediment Surface
  - PP9.15 The Guidance: New Surface Exposed by Dredging (SED)
  - PP9.16 Possible Outcomes
  - PP9.17 Actions Required
  - PP9.18 Actions Required (2)
  - PP9.19 Use of Best Professional Judgment
  - PP9.20 Emu photo

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## AFTERNOON BREAK

*Stephanie Stirling* reconvened the meeting and introduced David Kendall, USACE, Seattle District, who would be giving the next status review.

### **10. Commencement Bay Site Environmental Assessment<sup>1</sup> Status – David Kendall**

*Dr. David Kendall* reported the progress of the Environmental Assessment (EA) involving the reauthorization of the Commencement Bay dredged material disposal site. The purpose of the briefing was to inform stakeholders of the progress and to receive feedback on the proposed environmental assessment alternatives and approach. The EA includes a Technical Appendix, which is a summary of environmental data collected near or at the site; a Multi-Disposal-Fate (MDFATE) Analysis of the future disposal site capacity; an analysis of potential sediment transport near the site; an analysis of impacts of selected alternatives; and compliance with federal, state, tribal, and local environmental regulations.

Dr. Kendall discussed how it was necessary to conduct an Environmental Assessment because the Commencement Bay disposal site was approaching the previously authorized site capacity of 9 million cubic yards (mcy). However, the need for the site for the disposal of clean dredged material continues. He reviewed how the agencies decided to move the target area in 2007 to the southeast edge of the site in order to dampen the mound effect and the drift of sediments to the northwest. Site use was relatively low during the first five years after the site was designated. However, dredging increased dramatically with the cleanup of the Blair Waterway. Approximately 865,000 cubic yards per year have been disposed at the site in recent years, with most of the sediment coming from the Blair Waterway.

David Kendall reviewed the original site designation history. The non-dispersive disposal sites were established where environmental impacts would be minimized. Siting factors included avoiding areas of high energy, locating the site within water depths of 120 to 600 feet, avoiding

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<sup>1</sup> The DMMP agencies elected to change the EA to a Supplement to the 1988 Environmental Impact Statement after the SMARM.

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unacceptable impacts on biological resources, and having a 2,500 foot buffer to minimize interferences with human uses. The preferred (and current) Commencement Bay site satisfied all the zones of siting feasibility. Current velocities were low; water depths ranged from 540 to 560 feet; bottom fish, shellfish, and benthic resources were low in abundance or absent; and there was little interference with navigation or fishing. The 2007 trawl survey results confirmed that the disposal site remains low in demersal invertebrates and fish resources, and no Dungeness crabs were encountered. The survey results suggest that the site is not acting as an attraction to fish and shellfish and that conditions remain similar to those existing prior to site designation.

David Kendall pointed out that the Commencement Bay disposal site is one of the most intensively monitored disposal sites in the country, and has been monitored eight times since site designation. With few exceptions, the disposal site has performed within management criteria. The dredged material disposed at the site has remained within the site boundary with a few exceptions in recent years where a thin footprint (< 10 cm) extended beyond site boundaries. However, it remained within the site during the highest disposal year of 2007. The Sediment Vertical Profile Survey has shown thin lobes (< 3 cm) of dredged material to the north, northwest, and west of the site. The dredged material consists of coarse to medium sand with shell particles, and the penetration depth of the SVPS camera was limited. The ambient sediments were finer (e.g., olive gray, water-rich silts and clays), although medium to coarse sands are present near Dalco passage. There is also evidence of benthic activity in these sediments.

Monitoring surveys have shown no adverse impacts attributed to chemistry, toxicity, or to the benthic community. Neither were there adverse impacts documented offsite. Onsite chemistry and toxicity met DMMP guidelines, and chemistry and toxicity have actually improved since the 1988 predisposal baseline study. Sediment vertical profile imaging has shown high benthic habitat quality and high benthic infaunal successional stages. Offsite benthic community structure and tissue chemistry have always met guidelines when considering region-wide trends. Offsite chemistry has also met the guidelines with the exception of phenol and three other chemicals in 2003 (a one-time occurrence).

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David Kendall then discussed the mound height of the disposed sediments and the predicted height relative to the three alternatives considered in the Environmental Assessment. Surveys have shown the mound height to be higher and with a smaller diameter than predicted. Although the water depth is still in excess of 400 feet at the top of the mound, the hope is to dampen the effect of the height and maintain the height to less than 250 feet. This was one reason why the disposal target was shifted 565 feet to the southeast in 2007. The three selected alternatives include:

- Alternative 1: Establish a new permit volume of 23 mcy with a southwest coordinate shift at 18 mcy.
- Alternative 2 (preferred): Establish a new permit volume of 23 mcy with a site coordinate shift to the southwest at 13 mcy and northeast at 18 mcy, using adaptive management to meet site management objectives.
- Alternative 3: No Action (close the site)

Dr. Kendall then showed a graph and diagrams showing MDFATE analysis results showing the predicted mound height for the three alternatives. The predicted maximum height for an additional 15 mcy disposed at the site and incorporating the proposed target coordinate shifts (within the initial Target Zone) was the least for the preferred Alternative 2, with a predicted maximum of 155 feet. Diagrams representing the MDFATE analysis predicted mound footprint for Alternatives 1 and 2 showed similar mound areas between the two alternatives.

Dr. Kendall concluded his presentation by covering the potential for transport of disposed dredged material. Peak modeled bottom currents were at 1.1 feet per second, which were less than the critical velocity required to result in bedload transport of the deposited material. Monitoring surveys have demonstrated that the dredged material has generally remained onsite. The offsite occurrence of thin layers of dredged material to the northwest is likely due to vessel bias during disposal. Disposal records have indicated that disposal vessel headings were directed to the northwest. Moving the target in 2007 to the southeast was expected to minimize the drift offsite. CMS-M2D<sup>2</sup> modeling was conducted to simulate the current regime in the area during

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<sup>2</sup>CMS- M2D = Coastal Modeling System: numerical computer model employing finite-volume representation of the two-dimensional (depth-integrated) continuity and momentum equations of water motion. The model is used to

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flood and ebb tides. The simulations showed a gyre forming during flood tide to the southwest near the end of the flood. Current strengths were highest at the north end of the site. Simulated ebb currents were lower and generally to the northeast through the site. The highest currents were north of the site, but current strengths were not high enough to execute bedload movement. David Kendall concluded that modeling showed that the preferred alternative (Alternative 2) would have the least effect or impact on the site. Subsequent to the SMARM, the DMMP agencies elected to change the EA to a Supplemental Environmental Impact Statement (SEIS) supporting the 1988 FEIS. The draft SEIS is expected to begin Public Interest Review in November 2008.

### **David Kendall**

- PP10.1 Commencement Bay Environmental Assessment
- PP10.2 Purpose of this Briefing
- PP10.3 EA Progress Schedule
- PP10.4 Key EA Content
- PP10.5 Need
- PP10.6 2007 Disposal Site Mound
- PP10.7 1989-2003 Dredging/Disposal Forecast versus Actual Volumes
- PP10.8 Cumulative Disposal Volume
- PP10.9 Original Site Designation History (1985-1988)
- PP10.10 Original Site Designation History (1985-1988) (continued)
- PP10.11 Preferred Commencement Bay Site Satisfied all ZSF Factors
- PP10.12 2007 Trawl Survey
- PP10.13 DMMP's Management of the Site
- PP10.14 Disposal Footprint
- PP10.15 Sediment Profile Imagery (SPI) Survey
- PP10.16 SPI Images of Onsite Dredged Material and Offsite Ambient Sediments
- PP10.17 Post Disposal Environmental Monitoring Results Summary
- PP10.18 Idealized Development of Infaunal Successional Stages
- PP10.19 Mound Height

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compute tidal velocities within Puget Sound and around the Commencement Bay disposal site for present and future conditions.

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- PP10.20 Selected Alternatives
  - PP10.21 Mound Height Relative to Alternatives
  - PP10.22 MDFATE Analysis at 23 MCY with No Coordinate Shifts
  - PP10.23 Alternative 1. MDFATE Analysis at 23 mcy with One Coordinate Shift (SW) at 18 mcy.
  - PP10.24 Preferred Alternative 2 at 23 mcy with Coordinate shifts to the SW after 13 mcy and to the NE after 18 mcy.
  - PP10.25 Alternative 1. MDFATE Analysis at 23 mcy with Coordinate Shift to SW at 18 mcy. Mound Area Diagram.
  - PP10.26 Alternative 2. MDFATE Analysis for Preferred Alternative at 23 mcy with Coordinate Shifts (SW) at 13 mcy and (NE) at 18 mcy. Mound Area Diagram.
  - PP10.27 Potential for Transport of Deposited Material
  - PP10.28 MD2 Model Domain and Detail of Commencement Bay PSDDA Site
  - PP10.29 Simulated Flood Tide on 1 June 2008 1300 PST for Present Condition
  - PP10.30 Simulated Ebb Tide on 2 June 2008 0800 PST for Present Condition
  - PP10.31 Depth Averaged Current Magnitude Computed to M2D at Various Observation Cells for Present Conditions
  - PP10.32 Depth Averaged Current Magnitude Computed to M2D at Various Observation Cell “Mound C”, Center of the Commencement Bay PSDDA Site

## **Questions and Comments**

*Question:* An attendee asked about the last slides David Kendall showed of depth averaged current magnitudes computed by M2D, and wondered if it concerned bottom currents.

*Response:* David Kendall responded that we can run more models, but monitoring is showing the dredged material disposed at the site is stable and remaining onsite. David Michalsen (Corps) provided a post-SMARM response to question. Most circulation models, including M2D, are not fully three-dimensional due to the intensive computational power this would require. Instead, most models assume current velocity varies with depth following an mathematical relationship. In general, velocity is larger near the surface and becomes smaller as depth increases and reaches

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zero at the seabed. The depth averaged velocity refers to the velocity averaged over the entire water column whereas bottom current refers to a velocity at a specific depth. Bottom current is smaller in magnitude than the depth averaged current due to the friction of the seabed resisting the flow.

*Question:* James Keithly, Anchor Environmental, asked how the current speeds used in the analysis were determined.

*Response:* David Kendall replied that unfortunately he is not a current expert and David Michalsen, who did the modeling provided a post-SMARM response to question. The M2D circulation model is forced with tidal constituents reported by NOAA at the oceanward boundary near Port Angeles, WA (i.e. Strait of Juan de Fuca). These constituents are used to generate a water elevation time series (i.e. tide) in the model. At each time step, the M2D model computes water surface elevation and velocity throughout the gridded domain incorporating the effects of the bathymetry. The currents computed by M2D within Commencement Bay are used to specify the magnitude and direction of the tidal current velocity used in the MDFATE model.

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## **11. RSET Summary of Activities – Marci Cook, Portland District**

*Marci Cook* introduced herself as the project coordinator for the Regional Sediment Evaluation Team and as being relatively new to the project. She has been involved with it for about five months. She then gave an update of the RSET activities. The interim final draft of the SEF was published in 2006, and comments have been received and will be addressed in the next draft version of the SEF. Since the RSET began, a number of the original people involved in the project have retired and coordination of RSET/SEF has shifted to the Portland District Corps of Engineers. The Portland District then assigned a project coordinator to coordinate RSET/SEF activities.

The Regional Dredging Team (RDT) tasked RSET to produce the SEF. The goal is to produce a multi-agency consensus document which provides consistency to sediment testing guidelines for the region. They have resumed their monthly policy meetings, and reissued existing contracts and one new contract to help finalize the SEF.

Ms. Cook also spoke of other RSET activities. Within RSET, there are subcommittees that deal with bioaccumulation, chemical, and biological testing. The bioaccumulation subcommittee has completed the first draft of a report detailing human health bioaccumulation-based tissue levels; they have participated in the dioxin workgroup to identify a framework for working with bioaccumulation-based criteria that are below background concentrations, developed a bioaccumulative chemicals of concern list for the Portland and Walla Walla districts, tested the EIM and worked on entering bioaccumulation data, and conducted SMARM-type meetings in Idaho and Oregon. They were also involved in a PAH summit to evaluate methods for assessing PAH toxicity to fish and benthic invertebrates.

The biological testing subcommittee moved forward with various white papers on evaluating freshwater and marine biological testing interpretive criteria, reference sediment area identification, freshwater bioaccumulation test species, evaluating freshwater sediment bioassays, and biological testing for fish and Endangered Species Act (ESA) species. The chemistry subcommittee has continued to evaluate analytical methods, detection limits, quality

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control criteria, and “special analytes” (project specific) such as total petroleum hydrocarbons (TPH), organophosphorus pesticides, pyrethroids, and PBDEs; the committee also continues to provide technical support on analytical issues for sediment quality guidelines and bioaccumulation.

Ms. Cook stated that the draft final SEF is due for public release in January 2009, and that there would be three public meetings held concerning the SEF – one each in Oregon, Washington, and Idaho. The scheduled release date for the final SEF is May 29, 2009. Ms. Cook indicated that anyone interested in a copy of the final draft SEF could contact her via email at [marci.e.cook@usace.army.mil](mailto:marci.e.cook@usace.army.mil) or by phone at (503) 808-4765. Ms. Cook added that the RDT and USACE have recognized the need to update the SEF given new science and research and that the goal is to continue to have yearly public meetings and updates to the SEF.

**Marci Cook**

- PP11.1 Regional Sediment Evaluation Team and Sediment Evaluation Framework Update
- PP11.2 RSET Update – Where We’ve Been
- PP11.3 RSET Update – What’s Happening Now?
- PP11.4 RSET Update – What’s Happening Now? Bioaccumulation Update
- PP11.5 RSET Update – What’s Happening Now? Biological Testing Subcommittee
- PP11.6 RSET Update – What’s Happening Now? Chemistry Subcommittee Update
- PP11.7 RSET Update – What’s Happening Now? SEF Schedule
- PP11.8 RSET Update – What the Future Holds?

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## **12. Summary of SMS/Cleanup Activities – Chance Asher, Ecology**

*Chance Asher* summarized the Sediment Management Standards and Toxics Cleanup Program activities including the Puget Sound Initiative (PSI) sediment cleanup, bay-wide sediment characterizations conducted, and general sediment management, cleanup and SMS issues. Ms. Asher first reviewed the Puget Sound Initiative activities. Planning phases of the initiative were conducted from 2005 to 2007. In 2007, an interim action and bay-wide studies began. The focus in 2008 will be cleanup activities. The plan is to have the cleanup done by the year 2020. She then reviewed some of the PSI resources including the budget increases and a number of new staff added to complete the work. Planned bay-wide cleanup programs include Padilla Bay/Fidalgo Bay, Port Gardner/Snohomish River Estuary, Port Gamble, Lower Duwamish, Dumas Bay, Budd Inlet, Oakland Bay, and Port Angeles Harbor. They are working on streamlining the cleanup by taking a geographic approach, conducting parallel phases of cleanup, bay-wide sediment characterizations, having interagency agreement, and engaging stakeholders early. Increased funding is also important.

Ms. Asher then reviewed the progress for the Port Gamble cleanup. Port Gamble has been impacted by wood waste, which has proved to be a large problem in the area. There is both state and tribal interest in the area for shellfish (e.g., geoduck, clams, and oysters) and Port Gamble also provides habitat for herring and eelgrass. There are two sites in particular that are of concern that have wood waste issues. These include a mill site and a leased area that was used as a log storage area. The work begun for the Port Gamble cleanup includes an Interim Action completed in 2007; a Remedial Investigation and Feasibility Study (RI/FS) was started and an Agreed Order (AO) was signed in May 2008. Ms. Asher displayed a figure showing the interim action dredge area. This includes an area of approximately one acre that was dredged to native sediments. Approximately 17,000 cubic yards were dredged and stored upland for potential beneficial reuse. Ms. Asher commented that wood waste in the aquatic environment is toxic to the benthic community, but upland it is acceptable. However, there were some PAHs and a few hot spots that could not be used in this manner. There are also some issues along the shoreline that will require restoration.

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Ms. Asher then spoke of the Budd Inlet Sediment Study. She indicated that the final data report is on Ecology's website and is open for public comment until June 17, 2008. Sediments sampled included surface and subsurface sediment, and tissues collected included fish, clams, and shrimp. They found dioxins in the navigation channel and the Port's berthing area. The goal was to get a handle on the dioxin issue. Dioxins were found in surface sediment with concentrations of 2.9 to 60.3 ppt. Concentrations decreased to the north, and the highest concentrations were found under the Port's pier. The Cascade Pole site initially discharged in the area of highest concentration. Dioxins were observed in tissues in decreasing concentrations from ghost shrimp, bent-nosed clams, littleneck clams, and starry flounder. Russ McMillan, Ecology, added that concentrations ranged from 3 to 5 ppt in ghost shrimp to less than 1 ppt in starry flounder. The source of the dioxins in the tissues exhibited the profile of pentachlorophenol, which was likely from the Cascade Pole site.

Ms. Asher moved on to Fidalgo and Padilla Bays, which support important natural resources and are highly productive estuarine habitats. However, there are declining eelgrass beds in these bays. Cleanup sites include five sites within the Port of Anacortes, MJB Properties, Custom Plywood and the Whitmarsh Landfill. Fidalgo Bay was one of seven embayments included in the Puget Sound Initiative. The study focused on providing a sediment quality baseline, providing direction on cleanup priorities, and providing information to determine where else to focus cleanup. Areas of concern included a refinery area outfall and other cleanup sites along the shoreline. There were 129 sampling locations: 58 locations were sampled for SMS chemistry, dioxins/furans, and tributyltin; 25 locations were sampled for bioassays; and 79 locations were archived, some of which were slated for future chemistry analyses. Ms. Asher displayed figures of the various sediment and tissue sampling locations and decision unit areas. The southern part of the bay is exposed at low tide. They also focused on the shoreline, since that tends to be where most of the contamination is. They sampled outside of the cleanup areas because they were already being characterized by responsible parties.

Ms. Asher then described the results of the Fidalgo Bay study. She displayed SPI images of a sea pen in an unconsolidated, silty substrate, and another image showing an anoxic layer with wood waste in the silty substrate. Results showed one SQS hit for mercury and one bioassay failure in areas they expected to be contaminated. They also found one chemistry hit and three

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bioassay failures in the southern area of the bay they thought would not have problems. They suspect that stormwater outfalls may have contributed to this. Another failure was observed in an area near the marina. One thing they were trying to understand was whether there are issues outside of areas they expected to have problems. They found that there were. The Guemes channel area had PAH Cleanup Screening Level (CSL) exceedances, including one phthalate failure. There were also some dioxin detections. The areas of highest impact were along the western shore of the bay proper and in the Guemes Channel. They will be focusing the cleanup of five sites in that area. Areas showing biological toxicity are likely due to organic enrichment. Some of the next steps for the study include a further evaluation of the Guemes channel area, conducting a human health consult, continued cleanup in the northern area, and to further describe other areas.

Ms. Asher concluded her presentation with general SMS updates. She reminded everyone that the SEDQUAL database is now retired, and they are no longer accepting SEDQUAL data. However, the new Environmental Information Management System is “really cool.” New data submittal requirements will be in the sampling and analysis plan appendix (SAPA) update. Other progress for SMS have included the freshwater criteria development, SMS/MTCA harmonization, bioaccumulative chemicals of concern, and SMS criteria updates.

### **Chance Asher**

- PP12.1 Washington State Department of Ecology – Toxics Cleanup Program
- PP12.2 Take Home Messages
- PP12.3 Puget Sound Initiative
- PP12.4 Aquatic and Upland PSI Resources
- PP12.5 PSI – Bay Wide Cleanups
- PP12.6 Streamlining Cleanup
- PP12.7 Port Gamble – Impacted by Wood Waste
- PP12.8 Port Gamble – Site Overview
- PP12.9 Interim Action Dredge Area
- PP12.10 Port Gamble – Restoration
- PP12.11 Budd Inlet Sediment Study
- PP12.12 Dioxin in Surface Sediment

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- PP12.13 Dioxin in Tissue
  - PP12.14 Fidalgo and Padilla Bays
  - PP12.15 Fidalgo and Padilla Bays – Cleanup Sites
  - PP12.16 Fidalgo Bay Sediment Study – Photo of Fidalgo Bay
  - PP12.17 Fidalgo Bay Sediment Study
  - PP12.18 Fidalgo Bay – Decision Unit Areas (DUA)
  - PP12.19 Surface Chemistry/Toxicity Sampling
  - PP12.20 Figure of Sediment Sampling Locations in DUA-1
  - PP12.21 Figure of Sediment Sampling Locations in DUA-2
  - PP12.22 Figure of Sediment Sampling Locations in DUA-3
  - PP12.23 Figure of Sediment Sampling Locations in DUA-4
  - PP12.24 Figure of Tissue Locations
  - PP12.25 SPI Images
  - PP12.26 Data Results Figure for Four DUAs
  - PP12.27 Figure of Dioxin Detections
  - PP12.28 Future Analyses
  - PP12.29 Conclusions
  - PP12.30 Next Steps
  - PP12.31 Data Management
  - PP12.32 SMS Updates
  - PP12.33 Questions?

## **Comments and Questions**

*Question:* Heather Trim, People for Puget Sound, asked Chance Asher if they did or did not see contamination north near the refinery.

*Response:* Chance Asher replied that the area looked pretty good overall. They did not focus there since that is an area that responsible parties need to handle, and for which the responsible parties are responsible for sampling.

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*Question:* Erika Hoffman commented that the EIM seems to be missing a lot of important data she knows exists. She understands that new data generated will have a data submission requirement to be provided in the EIM format. She wondered if Ecology also has a plan of how to get other data into the system that is not there now because it had not been submitted previously either under SEDQUAL or EIM format.

*Response:* Chance Asher responded that right now, they do not plan on entering other data into the system unless it is submitted in their format. They require data that they need for their projects to be submitted in their format. They do not have a budget to enter other data. She would love for data in other systems to be submitted and included. They need to convince the Puget Sound Partnership and management to work on getting it into the EIM format or work on making the various systems compatible. She indicated that EPA has a lot of data in their own database system that has been submitted for EIM, and she is aware that there is a lot more data in the National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (USFWS), and EPA systems that would be great to include in EIM. Ecology is working on making the EIM system compatible for other databases, but it would also be good if it worked both ways. She also added that at the moment, they did not have more training sessions planned on how to use EIM, but do have training sessions scheduled for learning how to submit data for the system.

*Question:* Teresa Michelsen noted the wood waste in saltwater issues for Port Gamble. She wondered what they were considering on how to use sediments containing this wood waste for beneficial reuse.

*Response:* Chance Asher answered that they have required sparging to help with the salt issue. They may use the wood waste for mulch or do a wet soil amendment, and are requiring testing.

*Question:* Heather Trim asked to what extent are they coordinating the Fidalgo Bay study with other studies such as the Swinomish study.

*Response:* Chance Asher stated that they are aware of the Swinomish study and used it to decide on what analyses to do for tissues. They have been working with the tribes as well as the

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Department of Health. They are doing the best they can to have a comprehensive study that fits in with other studies. There are some controversies for some of them, in that some studies are old and the Swinomish County and State health departments do not always agree with the conclusions that have been made. They are using guidance from the Department of Health on what analyses should be done for tissues.

*Question:* Jeff Stern, King County, asked if they will include the dioxin issues in the SMS.

*Response:* Chance Asher indicated that they would not include dioxins in this first phase of SMS updates, but they do plan on addressing it.

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### **13. Summary of Regional CERCLA Activities – Sheila Eckman, EPA**

*Sheila Eckman, Associate Director, Office of Environmental Cleanup, EPA Region 10,* presented an update of the EPA Superfund or CERCLA sediment cleanup activities. She first spoke of how Puget Sound has been designated as a regional and national priority by the EPA. EPA Region 10 has developed a Puget Sound Toxics Strategy and the overall goal was to clean up an additional 200 acres between 2006 and 2011. They are currently at 123 acres. The work will be coordinated with the Puget Sound Partnership. Ms. Eckman added that one of the real problems is not just cleanup, but source control.

Ms. Eckman then reviewed the Superfund Cleanup progress in Puget Sound to date. She listed the acres that have been cleaned up, removed, capped, enhanced for natural recovery, or used for habitat mitigation, as well as tons of debris and number of pilings removed (see Power Point slide PP13.3 for more details). She briefly discussed a number of the cleanup projects in progress including Commencement Bay and the Pier 24-25 Capping Project, Harbor Island/Elliott Bay, the Lower Duwamish Waterway, and Oregon sediment projects.

For Commencement Bay, most of the cleanup has been completed with the exception of the Occidental facility site, which was highly contaminated, and the Pier 24-25 Capping Project. They hope to complete the site characterization for the Occidental facility by next year and will have a better picture of that site. The Pier 24-25 Capping Project, located in the Hylebos Waterway problem area, involved subtidal and intertidal capping under the pier in conjunction with pier repairs. It also included dredging and removal of debris and contaminated hot spots, followed by capping. The estimated life of the cap is 20 to 30 years. One concern may be dissolved arsenic breakthrough of the cap. They are also coordinating with Ecology on the upland/sediment interface. Other work within Commencement Bay included continued work on source control and continued monitoring. This included planning for bay-wide fish tissue monitoring.

Ms. Eckman indicated that for the Harbor Island/Elliott Bay sites, they are still working on source control. The focus was on the RI/FS to complete the cleanup of the East Waterway. The

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Lockheed West Seattle site was in the RI/FS phase and sediment cleanup at Todd and Lockheed shipyards and Pacific Sound Resources (PSR) were complete. Some of the work that has required both Superfund and DMMP coordination was the East Waterway T-30, Port of Seattle site, and navigational dredging project in the Superfund site area. The Superfund program also reviews the suitability determinations made for these sediments.

Ms. Eckman then gave an update on the Lower Duwamish Waterway. The draft Remedial Investigation and Human Health and Ecological Risk Assessments have been completed. The Feasibility Study is now in preparation. They are continuing to work on source control in the area. The final RI/FS is expected in 2010. The T-117 and Slip 4 Action sediment cleanups have been delayed due to source concerns and they are continuing to work on this.

Progress on sediment projects within Oregon include the Portland Harbor RI/FS and work on two early action sites is ongoing. For the McCormick & Baxter site, construction has been completed including sediment capping. It is now in the monitoring phase.

Ms. Eckman ended her update by listing the EPA contacts for the various cleanup projects, including the Oregon projects. Refer to the PowerPoint presentation slide, PP13.16, for the project, contact names, and numbers.

### **Sheila Eckman**

- PP13.1 EPA Region 10 Superfund Sediment Cleanup Update
- PP13.2 EPA Puget Sound Priority
- PP13.3 EPA Superfund Cleanup Progress in Puget Sound to Date
- PP13.4 Update on Sediment Cleanup Projects
- PP13.5 Commencement Bay Nearshore/Tideflats Superfund Sediment Construction Completion Status
- PP13.6 Commencement Bay 2008
- PP13.7 Pier 24-25 Capping Project
- PP13.8 Figure 1: Preparing to Place Sand Cap Over the Toe Berm
- PP13.9 Figure 2: Aerial View of Gravel and Cobble Substrate Placement
- PP13.10 Other Puget Sound Superfund Cleanup Sites

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- PP13.11 Harbor Island/Elliott Bay
  - PP13.12 Superfund/DMMP Coordination
  - PP13.13 Figure of Lower Duwamish Waterway
  - PP13.14 Lower Duwamish Waterway Update
  - PP13.15 Oregon Sediment Projects
  - PP13.16 EPA Contacts

### **Questions and Comments**

*Questions:* Ann Fitzpatrick, ENSR, asked Sheila Eckman about the results of monitoring projects she spoke of in her presentation.

*Response:* Sheila Eckman responded that the monitoring projects she spoke of were specific long-term monitoring for areas that have been cleaned up. The monitoring was conducted to determine if the remedy was working. There has been some recontamination of phthalates in the Thea Foss Waterway. Generally, the monitoring has shown that performance standards are being met for most of their projects so far.

*Stephanie Stirling* asked if there were any more questions concerning the presentations. She reminded everyone that if they have any comments on DMMP or SMS issues, to get them turned in by June 14, 2008. She thanked everyone for coming and participating, and thanked all those who presented and helped with the meeting.

**MEETING ADJOURNED**

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**APPENDIX 1**

**DMMP RESPONSE TO PUBLIC ISSUES**

**NO PUBLIC ISSUES WERE SUBMITTED DURING OR AFTER THE  
SMARM FOR DMMP CONSIDERATION**

**APPENDIX 2**

**MEETING AGENDA**

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# 2008 SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING AGENDA

May 14, 2008

Federal Center South, Seattle

Hosted by the Washington Department of Natural Resources

- 8:30 Registration and Coffee
- 9:00 Welcome - Colonel Michael McCormick, District Engineer, Seattle District, USACE
- 9:10 Meeting Road Map - Stephanie Stirling, Moderator
- 9:15 Opening Remarks - Rich Doenges, Department of Natural Resources
- 9:30 Puget Sound Partnership - Cullen Stephenson, Deputy Director
- 9:50 BREAK
- 10:10 myEIM Update - Nagesha Kannadaguli, Ecology
- 10:40 Update on Dioxin and PCB Interpretive Guideline Revisions - Kate Snider, Floyd Snider
- 11:40 LUNCH
- 1:00 Agency Summary Reports, Part I
- DNR, Summary of Disposal and Site Monitoring - Courtney Wasson
  - Corps, Summary of DMMP Testing Activities - Lauran Warner, Seattle District
- 1:40 Status Report
- Freshwater Guideline Approach - Teresa Michelsen, Avocet Consulting
- 2:00 Status Report
- PAH Exposure Guidelines and Fish - Lyndal Johnson, NMFS
- 2:15 Summary of Clarification Papers - Stephanie Stirling, Seattle District
- 2:30 BREAK
- 2:45 Commencement Bay Site NEPA/SEPA Review Status -David Kendall and Steve Martin, Seattle District
- 3:10 Agency Summary Reports, Part II
- RSET Summary of Activities - Marci Cook, Portland District
  - Ecology, Summary of SMS/Clean-up Activities - Chance Asher
  - EPA, Summary of Regional CERCLA Activities - Sheila Eckman
- 4:10 Summary and Closing

Title	Type of Paper	Author(s)
Use of Flat-Top Barges at DMMP Dispersive Disposal Sites	Clarification	Wasson/Stirling
Freshwater Sediment Guidelines	Status	Inouye/Michelsen
Update on Pyrethroid and PBDE Analysis	Status	RSET (Stirling)
Reference Areas for Freshwater Bioassays	Clarification	RSET (Stirling)
Quality of Post-Dredge Surfaces	Clarification	Fox/Hoffman

Papers are available at:

[http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=DMMO&pagename=SMARM\\_2008](http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=DMMO&pagename=SMARM_2008)

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**APPENDIX 3**

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**APPENDIX 4**

**POWERPOINT SLIDES FOR EACH SPEAKER**

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**APPENDIX 5**

**SMARM 2008 FOLLOW-UP MEETING MINUTES  
DMMP DIOXIN PROJECT AND  
WASHINGTON PUBLIC PORTS ASSOCIATION**

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**Meeting Summary**  
**SMARM 2008 Follow-up Meeting**  
**DMMP Dioxin Project and Washington Public Ports Association Representatives**

June 24, 2008

SMARM 2008 was unfortunately scheduled at a conflicting time to the Washington Public Ports Association (WPPA) annual meeting. This meeting, held on June 24, was scheduled to allow DMMP and WPPA representatives to review the material presented at SMARM on the dioxin framework project for the dredged material management program.

Attendees:	Bob Hyde	Port of Anacortes
	Bob Elsner	Port of Anacortes
	John Herzog	GeoEngineers
	Brian Gouran	Port of Bellingham
	Sue Mauermann	Port of Tacoma
	Eric Johnson	WPPA
	Joanne Snarski	Port of Olympia
	Doug Hotchkiss	Port of Seattle
	Dave Fox	Corps of Engineers
	Erika Hoffman	EPA
	Rick Parkin	EPA
	John Wakeman	Corps of Engineers
	Dave Bradley	Department of Ecology
	Mark Jensen	Corps of Engineers
	Rich Doenges	Washington DNR
	Kate Snider	Floyd Snider

Kate Snider and Erika Hoffman presented the same PowerPoint presentations that were given at SMARM 2008. Please reference the SMARM 2008 minutes for slides and summaries of those presentations.

Erika Hoffman additionally provided an update on the planned sampling activities:

- The Work Plan for the sampling is nearly complete
- 70 surface samples will be collected, and all 70 will be analyzed for TOC, grain size, dioxin and PCB. All 70 will additionally be analyzed with cell and DNA-based assay methods.
- The Work Plan "Study Outline" will be released in early July for a short stakeholder review.
- Sampling is planned to occur between July 31 and August 8. The EPA vessel "The Bold" will likely collect all of the samples.
- Personnel, equipment and financial resources for the sampling are provided by all DMMP agencies and the Puget Sound Partnership
- Data is expected by mid-November, and will be released following validation.

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## Questions, Comments and Responses:

- Johnson: Has permission for sampling access been secured? *Doenges: yes, all sampling is on DNR bedlands.*
- Herzog: Updated dioxin framework needs to additionally address dispersive sites
- Hotchkiss: There are many other sets of information that should feed into a policy decision on the dioxin framework, e.g., study of conditions at the existing disposal sites; information about projected dredging volumes.
- Herzog: Significant dredging is planned, especially in northern Washington. An understanding of the proposed dredging could assist to prioritize issues for resolution. Ports could provide estimates of projected volumes, preferred disposal sites and anticipated chemical concentrations, as input to the DMMP deliberations.
- Johnson: Planning horizons of 5 and 10 years could be used. WPPA could coordinate this request, and get together later with DMMP to describe.
- Johnson: Objectives or principles that support decision making need to be clarified at a greater level of detail. WPPA would like to have input to the principles. The “guiding principles” included in Kate’s presentation are extremely broad and general. DMMP should put “more meat on the bones” of the principles that are the basis for decision making, so stakeholders can understand how the project will move forward. Should have a decision making matrix that will be used over the next seven months during deliberations. *Wakeman: there are individuals skilled in multi-criterion decision making tools in which ranking and weighting are assigned to decision criteria to facilitate complex decision making and documentation – was discussed at technical meetings in fall of 2007 and could be considered.*
- Hotchkiss: Focus solely on sediment chemistry does not get to the needed information which are sediment chemistry to tissue concentration interrelationships. Tissue is the endpoint of concern – need to understand the effect of disposal on consumers. Worried that the DMMP process is being force fit into a focus on chemistry only.
- Hotchkiss: The economic impacts of dioxin framework alternatives need to be evaluated side by side the human health risk impact of alternatives.
- Hotchkiss: All participants really need to understand PCB implications of the project. Will potentially have much more significant repercussions than dioxins.
- Johnson: Reference to potential rule change – what rules are those that might need to be changed – MTCA and SMS? Is this being addressed in the scoping meetings for the MTCA rule update process? *Bradley: Yes, it is the State MTCA and SMS rules that likely could require rule change under some scenarios. The scoping meetings for MTCA updates are underway and will be coordinated with the DMMP effort. Port involvement in the MTCA Update scoping meetings would be welcomed.*
- Snarski: This project was initiated as a DMMP project regarding disposal sites, but has turned into a project that has significant influence on cleanup standards. Are the right people in the room? Need to recognize connections with the cleanup program and potential implications – significant issue.

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- Hotchkiss: Need to communicate that this project is evaluating potential risk and issues at the disposal site locations – does not necessarily translate to the nearshore environment. The primary way this should be looked at is the added risk or impact to the larger system from the small, focused disposal sites, and compared to the significant economic impact of alternatives. Input provided in the fall/winter public input process discussed this methodology.
  - Hotchkiss: How this effort relates to PCBs is a really big deal – don't rush without fully understanding the implications.
  - Mauermann: This decision making process is extremely broad and complex – what will the decision process be like? Very aggressive to make decision as quick as planned (by Spring 09). If Ecology rule amendments were required that would be a huge deal, significant process.
  - Mauermann: What uncertainty will there be if not all the DMMP agencies are aligned on a recommendation?
  - Mauermann: Ports can help the DMMP understand the economic impacts and consequences of alternatives.