20TH SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING

MAY 14, 2008

FINAL

MEETING MINUTES

SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING

MAY 14, 2008

FINAL

MEETING MINUTES

Prepared for:

Washington State Department of Natural Resources
1111 Washington Street SE
P.O. Box 47000
Olympia, WA 98504-7000

Prepared by:

Science Applications International Corporation
18912 North Creek Parkway, Suite 101
Bothell, Washington 98011

JULY 2008

TABLE OF CONTENTS

WELCOME AND OPENING REMARKS **1**

GENERAL PRESENTATIONS **5**

1. PUGET SOUND PARTNERSHIP – CULLEN STEPHENSON, DEPUTY DIRECTOR 5
2. MYEIM UPDATE – NAGESHA KANNADAGULI, ECOLOGY 8
3. DIOXIN & PCB INTERPRETIVE GUIDELINE REVISIONS UPDATE – KATE SNIDER, FLOYD SNIDER 12
4. OVERVIEW OF THE PLANNED DIOXIN SEDIMENT SAMPLING – ERIKA HOFFMAN, EPA 15

AGENCY SUMMARY AND STATUS REPORTS **20**

5. SUMMARY OF DISPOSAL SITE MONITORING – COURTNEY WASSON, DNR 20
6. SUMMARY OF DMMP TESTING ACTIVITIES – LAURAN COLE WARNER, SEATTLE DISTRICT 24
7. FRESHWATER GUIDELINE APPROACH – TERESA MICHELSEN, AVOCET CONSULTING 28
8. PAH EXPOSURE GUIDELINES AND FISH – LYNDAL JOHNSON, NMFS 30
9. SUMMARY OF CLARIFICATION PAPERS – STEPHANIE STIRLING, USACE, SEATTLE DISTRICT 33
10. COMMENCEMENT BAY SITE ENVIRONMENTAL ASSESSMENT STATUS – DAVID KENDALL 36
11. RSET SUMMARY OF ACTIVITIES – MARCI COOK, PORTLAND DISTRICT 42
12. SUMMARY OF SMS/CLEANUP ACTIVITIES – CHANCE ASHER, ECOLOGY 44
13. SUMMARY OF REGIONAL CERCLA ACTIVITIES – SHEILA ECKMAN, EPA 50

APPENDICES

Appendix 1: DMMP Response to Public Issues

Appendix 2: Meeting Agenda

Appendix 3: List of Attendees

Appendix 4: PowerPoint Slides for Each Speaker

Appendix 5: SMARM 2008 Follow-up Meeting Minutes – DMMP Dioxin Project and Washington Public Ports Association

LIST OF ACRONYMS AND ABBREVIATIONS

AO	Agreed Order
ANOVA	Analysis of Variance
BCOC	Bioaccumulative Chemicals of Concern
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.
C**ERCLA**	Comprehensive Environmental Response Compensation and Liability Act
CSL	Cleanup Screening Level
CSMP	Cooperative Sediment Management Program (Washington State)
DDD	Dichloro-diphenyl-dichloroethane
DDE	Dichloro-diphenyl-dichloroethylene
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Program
DNA	Deoxyribonucleic Acid
DNR	Washington State Department of Natural Resources
DUA	Decision Unit Area
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EIM/myEIM	Environmental Information Management System
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FPM	Floating Percentile Method
GIS	Geographic Information System
HPAH	High Molecular Weight Polycyclic Aromatic Hydrocarbons
MCY	Million Cubic Yards
MDFATE	Multi-Disposal-Fate
MTCA	Model Toxics Control Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Association

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

WPPA	Washington Public Ports Association
ZSF	Zone of Siting Feasibility

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 20th 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).

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 20th Sediment Management Annual Review Meeting

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.

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.

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

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

Sound Partnership needs our help and suggested visiting their website for more information: 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

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.

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

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

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

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

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.

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.

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 at 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

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

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.

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.

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.

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.

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

(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

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.

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

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!

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

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

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.

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.

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

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).

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.

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 µg/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 µg/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 ΣPAH Concentration vs. Biological Effects in English Sole

PP8.13 Uncertainties for Management Application

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.

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

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

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

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[1] 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

[1] The DMMP agencies elected to change the EA to a Supplement to the 1988 Environmental Impact Statement after the SMARM.

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).

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[2] modeling was conducted to simulate the current regime in the area during

[2]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

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

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

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

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.

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

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 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?

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.

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 subtrate, 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

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

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.

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

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.

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

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 Sties

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

APPENDIX 1

DMMP RESPONSE TO PUBLIC ISSUES

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

APPENDIX 2

MEETING AGENDA

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

APPENDIX 3

LIST OF ATTENDEES

Last Name	First Name	Affiliation	Email
Adolphson	Pete	Ecology	pado461@ecy.wa.gov
Asher	Chance	Ecology	cash461@ecy.wa.gov
Arden	Hiram	USACE	hiram.t.arden@usace.army.mil
Benson	Ted	Ecology	tben461@ecy.wa.gov
Berlin	Dan	Anchor Environmental	dberlin@anchorenv.com
Bradley	Dave	Ecology	dbra461@ecy.wa.gov
Breckel	Erin	Floyd/Snider	erin.breckel@floydsnider.com
Brenner	Robert	Port of Tacoma	rbrenner@portoftacoma.com
Buhbe	Nick	Nautilus	nick@nautilusenvironmental.com
Caldwell	Dick	NW Aquatic	rcaldwell@nwaquatic.com
Cammarata	Tom	Sound Environmental	tcammarata@soundenvironmental.com
Carevich	Kristie	WA AGO	kristiec@atg.wa.gov
Casteel	Gina	Ecology	gcas461@ecy.wa.gov
Catarra	Gina	Herrera	gcatarra@herrerainc.com
Chartrand	Allan	CH2M Hill	allan.chartrand@ch2m.com
Chen	Joy	CH2M Hill	joy.chen9@ch2m.com
Cook	Marci	USACE, Portland District	marci.e.cook@usace.army.mil
Datin	Margaret	Ecology	mdat461@ecy.wa.gov
DeJesus	Kathryn	Ecology	kbco461@ecy.wa.gov
Deshler	Tad	Windward Environmental	tad@windwardenv.com
Director	Rustin	USACE	rustin.a.director@usace.army.mil
Doenges	Rich	DNR	rich.doenges@dnr.wa.gov
Downie	Katie	TestAmerica Inc.	katie.downie@testamericainc.com
Dunay	Joy	Anchor Environmental	jdunay@anchorenv.com
Dunnihoo	Susan	ARI	sue@arilabs.com
Ebner	Donna	USACE, Portland District	donna.b.ebner@usace.arm.mil
Eckman	Sheila	EPA	eckman.sheila@epa.gov

Last Name	First Name	Affiliation	Email
Elliott	Colin	King County	colin.elliott@kingcounty.gov
England	Victoria	GeoEngineers	vengland@geoengineers.com
Fitzgerald	Susan	Integral Consulting	sfitzgerald@integral-corp.com
Fitzpatrick	Anne	ENSR	afitzpatrick@ensr.aecom.com
Fox	David	USACE	david.f.fox@usace.army.mil
Freedman	Jonathan	EPA	freedman.jonathan@epa.gov
Gilmour	Robert	Geomatrix	rgilmour@geomatrix.com
Godtfredsen	Kathy	Windward Environmental	kathyg@windwardenv.com
Gries	Tom	Ecology	tgri461@ecy.wa.gov
Hafferty	Andy	Ecology and Environment, Inc.	ahafferty@ene.com
Heaton	Russ	USACE, Walla Walla District	russ.d.heaton@usace.army.mil
Helland	Brad	Ecology	bhel461@ecy.wa.gov
Herzog	John	GeoEngineers	jherzog@geoengineers.com
Hoffman	Erika	EPA	hoffman.erika@epa.gov
Hollis	Michelle	Port of Portland	michelle.hollis@portofportland.com
Hotchkiss	Doug	Port of Seattle	hotchkiss.d@portseattle.org
Hiltner	Allison	EPA	hiltner.allison@epa.gov
Inouye	Laura	Ecology	lino461@ecy.wa.gov
Johnson	Lyndal	NOAA Fisheries/NMFS	lyndal.l.johnson@noaa.gov
Jordan	Jason	Port of Seattle	jordan.jason@portseattle.org
Jowise	Peter	Herrera Environmental	pjowise@herrerainc.com
Juckniess	Craig	USACE	Craig.M.Juckniess@usace.army.mil
Kannadaguli	Nagesha	Ecology	nkan461@ecy.wa.gov
Keithly	James	Anchor Environmental	jkeithly@anchorenv.com
Kendall	David	USACE	david.r.kendall@usace.army.mil
Kroeger	Keith	TetraTech	keith.kroeger@tteci.com
Kukoff	Lionel	Ecology	lku461@ecy.wa.gov

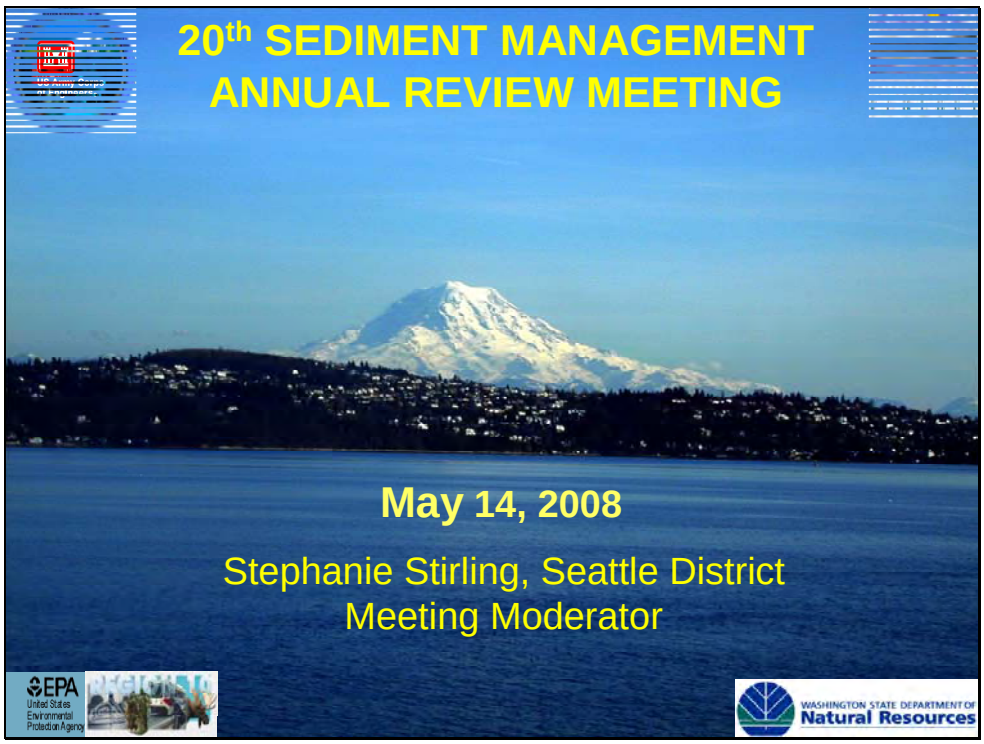
Last Name	First Name	Affiliation	Email
Kreps	Kathy	TestAmerica Inc.	kathy.kreps@testamericainc.com
Lee	Fu-Shin	Ecology	flee461@ecy.wa.gov
Leon	Peter	Parametrix	pleon@parametrix.com
Lemlich	Sandy	USACE	Sandra.k.lemlich@usace.army.mil
Lloyd	Michael	Manson Construction	mlloyd@mansonconstruction.com
Maclachlan	Kevin	Ecology	kmac461@ecy.wa.gov
Malek	John	self	John.Malek@comcast.net
Massingale	Jessi	Floyd/Snider	jessi.massingale@floydsnider.com
Mazikowski	Brian	King County	brian.mazikowski@kingcounty.gov
McCormick	Michael (Col.)	USACE	michael.mccormick.col@usace.army.mil
McGinnis	Roger	Hart Crowser	roger.mcginnis@hartcrowser.com
McGroddy	Susan	Windward Environmental	susanm@windwardenv.com
McFarland	Brenden	Ecology	bmcf461@ecy.wa.gov
McMillan	Russ	Ecology	rmcm461@ecy.wa.gov
Michelsen	Teresa	Avocet	teresa@avocetconsulting.com
Meyer	Paul	Port of Seattle	meyer.p@portseattle.org
Mortensen	Linda	Malcolm Pirnie, Inc.	lmortensen@pirnie.com
Mott	Christina	TestAmerica Inc.	christina.mott@testamericainc.com
Muller	Eric	NW Underwater Construction	emuller@nwuwconst.com
Nakayama	John	SAIC	nakayamaj@saic.com
Nelson	Siri	USACE	Siri.C.Nelson@usace.army.mil
Newbigging	Jayme	Manson Construction	jnewbigging@mansonconstruction.com
Nord	Tim	Ecology	Tnor461@ecy.wa.gov
O’Brien	Maura	Ecology	mobr461@ecy.wa.gov
O'Haleck	Shandra	NMFS	shandra.o’haleck@noaa.gov
Ott	Nicole	ENSR	nott@ensr.aecom.com
Parkin	Rick	EPA	parkin.richard@epa.gov

Last Name	First Name	Affiliation	Email
Pascoe	Gary	Pascoe Environmental	gpascoe@pascoe-env.com
Pendowski	Jim	Ecology	jpen461@ecy.wa.gov
Perleberg	Brian	NRC	bperleberg@nrcenv.net
Peterson	Delaney	Anchor Environmental	dpeterson@anchorenv.com
Pressley	Helen	Ecology	hpre461@ecy.wa.gov
Priddy	Lynda	EPA	priddy.lynda@epa.gov
Rempel-Hester	Mary Ann	Nautilus	mary.ann@nautilusenvironmental.com
Rheaume	Andy	City of Seattle	andy.rheaume@seattle.gov
Roach	Lisa	SAIC	nlroach@seanet.com
Roesler	Amber	GeoEngineers	aroesler@geoengineers.com
Rothman	Erin	SES	erinr@soundenvironmental.com
Rude	Pete	City of Seattle	pete.rude@seattle.gov
Rummel	Bruce	Hart Crowser	bruce.rummel@pentecenv.com
Singleton	Stacie	Ecology	ssin461@ecy.wa.gov
Siipola	Mark	USACE, Portland District	mark.d.siipola@usace.army.mil
Sloan	Janice	Ecology	jslo461@ecy.wa.gov
Snider	Kate	Floyd/Snider	kate.snider@floydsnider.com
Snarski	Joanne	DNR	joanne.snarski@dnr.wa.gov
St. Amant	Glen	Muckleshoot Indian Tribe	glen.stamani@muckleshoot.nsn.us
Stephenson	Cullen	Puget Sound Partnership	cullen.stephenson@psp.wa.gov
Stern	Jeff	King County	jeff.stern@kingcounty.gov
Sternberg	Dave	Ecology	dast461@ecy.wa.gov
Stirling	Stephanie	USACE	stephanie.k.stirling@usace.army.mil
Striplin	Pete	Ecology and Environment, Inc.	pstriplin@ene.com
Szelest	Tom	USACE	Thomas.J.Szelest@usace.army.mil
Takasaki	Kym	USACE	Kymberly.C.Takasaki@usace.army.mil
Thompson	Tim		

Last Name	First Name	Affiliation	Email
Trim	Heather	People for Puget Sound	htrim@pugetsound.org
Uhrich	Ann	USACE	ann.r.uhrich@usace.army.mil
Wakeman	John	USACE	john.s.wakeman@usace.army.mil
Wagner	Wayne	USACE	Wayne.E.Wagner@usace.army.mil
Warner	Lauran	USACE	lauran.c.warner@usace.army.mil
Wasson	Courtney	DNR	courtney.wasson@dnr.wa.gov
Williston	Debra	King County	debra.williston@kingcounty.gov
Williams	Les	Integral Consulting	lwilliams@integral-corp.com
Winkler	Jessie	EPA	winkler.jessica@epa.gov
Wright	Anthony (Col.)	USACE	Anthony.Wright.COL@usace.army.mil
Yang	Grant	Ecology	gyan461@ecy.wa.gov

APPENDIX 4

POWERPOINT SLIDES FOR EACH SPEAKER

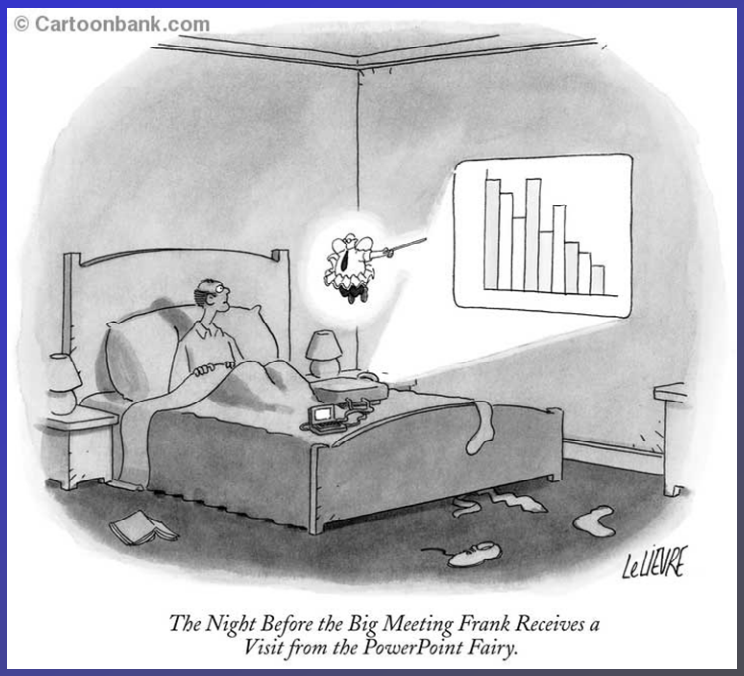

20th SEDIMENT MANAGEMENT
ANNUAL REVIEW MEETING
May 14, 2008
Stephanie Stirling, Seattle District
Meeting Moderator
EPA
United States
Environmental
Protection Agency
WASHINGTON STATE DEPARTMENT OF
Natural Resources

0.1

2008 SMARM
• Jointly Sponsored by the Dredged Material Management Program (DMMP) and the Sediment Management Standards (SMS) Program
• Moderated by the Corps of Engineers
• Hosted by Washington Department of Natural Resources
EPA
United States
Environmental
Protection Agency
WASHINGTON STATE DEPARTMENT OF
Natural Resources

0.2

US Army Corps of Engineers



The Night Before the Big Meeting Frank Receives a Visit from the PowerPoint Fairy.

0.3

US Army Corps of Engineers

MEETING OBJECTIVES AND PURPOSE

- Obtain public input on proposed changes to the DMMP Management Plans through **Issue Papers** and **Clarification Papers.**
- Discuss disposal site management actions and changes.
- Summary of Ecology Cleanup Activities
- Summary of EPA Regional Cleanup Activities

EPA United States Environmental Protection Agency

WASHINGTON STATE DEPARTMENT OF Natural Resources

0.4

MEETING OBJECTIVES AND PURPOSE
(continued)

- Review recent testing activities, and obtain public input on proposed changes to the DMMP.
- Presentation and discussion of Public Issue Papers.
- Comments and discussion on Status Reports of ongoing actions of DMMP and SMS Programs.

0.5

Summary and Closing

Public Issues Summary: Written comments to DMMP by June 14, 2008 for consideration.

SMS Issues Summary: Written comments on SMS issues submitted to SMS for consideration until June 14, 2008.

0.6

Sediment Management
Annual Review Meeting
May 14, 2008

PugetSoundPartnership
our sound, our community, our chance

1.1

Puget Sound is Complex

PugetSoundPartnership
our sound, our community, our chance

1.2

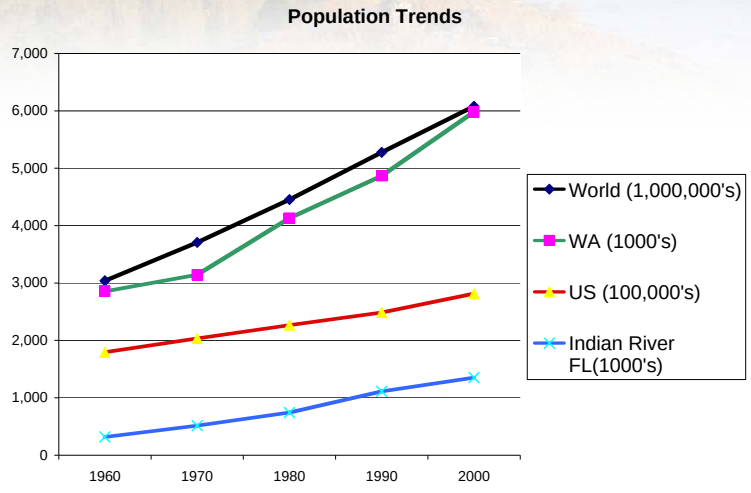
Puget Sound is Complex

- One of the largest estuaries in the U.S.
- Thousands of animals, fish, and birds
- 2,500 miles of shoreline
- 14 major rivers
- 4 million people live around the Sound
- 1.5 million more people are coming

PugetSoundPartnership
our sound, our community, our chance

1.3

Population Growth



PugetSoundPartnership
our sound, our community, our chance

1.4

Signs of Problems

- Orcas – the most contaminated whales in the world
- Areas to grow oysters and clams shut down
- Beaches closed to swimming
- Threatened and endangered species
- Sound is getting worse

PugetSoundPartnership
our sound, our community, our chance

1.5

Our Goal

- Create a single, unified Action Agenda to guide the protection and restoration of Puget Sound
- Raise public awareness regarding threats to the Sound and channel energy and resources into necessary actions.
- Hold the entire system accountable for results

PugetSoundPartnership
our sound, our community, our chance

1.6

Action Agenda - 4 Questions

- What is the current health of the Sound?
- What is a “healthy” Sound?
- What actions, activities, policies, and programs are necessary to restore the Sound?
- Where should we start?

PugetSoundPartnership
our sound, our community, our chance

1.7

Communications

- Low public awareness
- Strong public support
- Multi-year effort needed
- Sustaining momentum and resources over time for successful efforts

PugetSoundPartnership
our sound, our community, our chance

1.8

Accountability

- Establish a baseline
- Measure progress
- Hold the system accountable for results

PugetSoundPartnership
our sound, our community, our chance

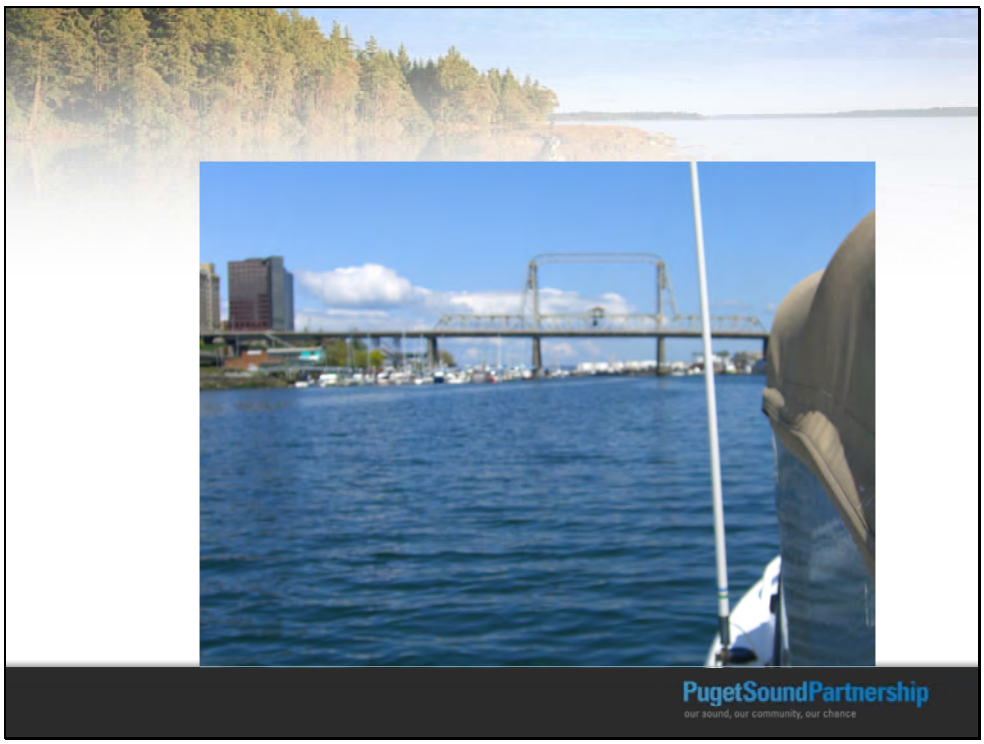
1.9

Different Approach

- Coordinate resources
- Prioritize projects
- Base decisions on science
- Examine costs and benefits
- Hold people and entities accountable

PugetSoundPartnership
our sound, our community, our chance

1.10

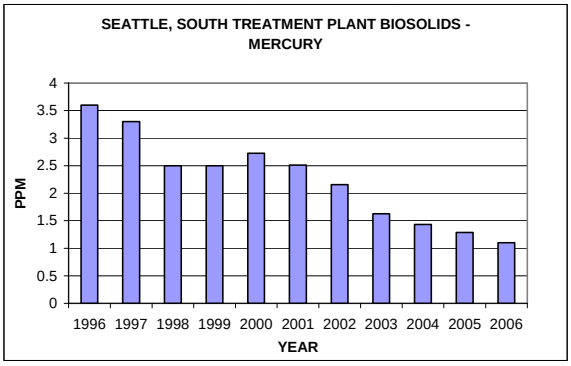

PugetSoundPartnership
our sound, our community, our chance

1.11

JUL 9 2001
PugetSoundPartnership
our sound, our community, our chance

1.12

South Treatment Plant Biosolids (Seattle). Mercury Reduction Program in Effect Since 2003.



YEAR	PPM Hg
1996	3.6
1997	3.3
1998	2.5
1999	2.5
2000	2.7
2001	2.5
2002	2.2
2003	1.6
2004	1.4
2005	1.3
2006	1.1

PugetSoundPartnership
our sound, our community, our chance

1.13

We Can Do This!

- We have an opportunity right now
- Last good chance
- We need your help - WWW.PSP.WA.GOV

PugetSoundPartnership
our sound, our community, our chance

1.14

MyEIM Tools For Environmental Data Analysis

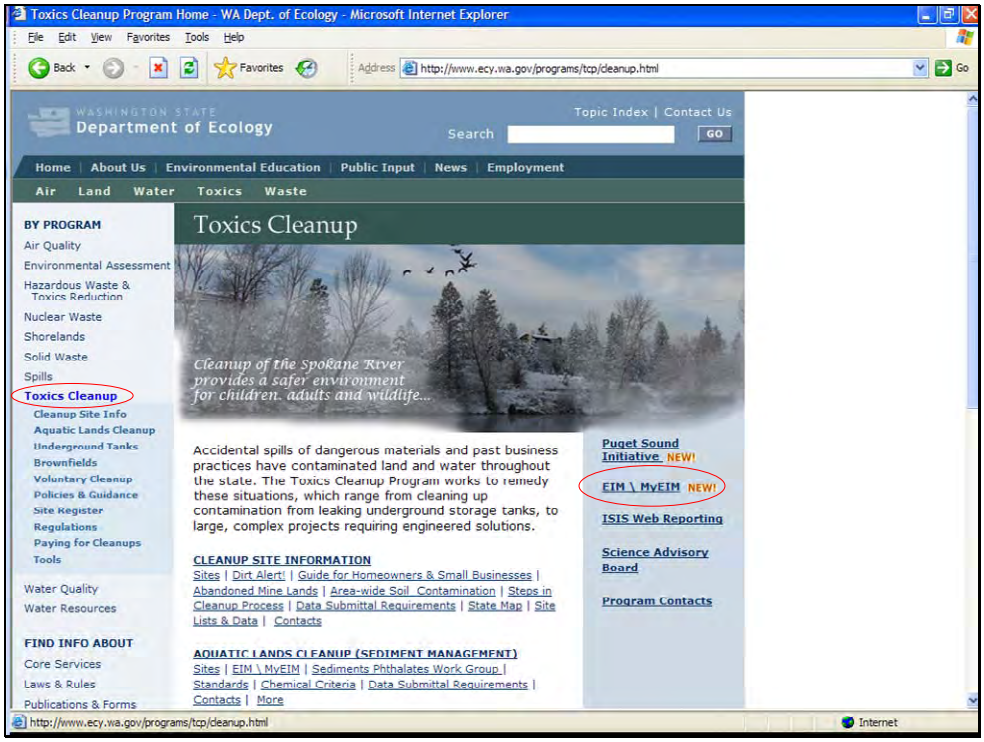
Nagesha Kannadaguli

Toxics Cleanup Program

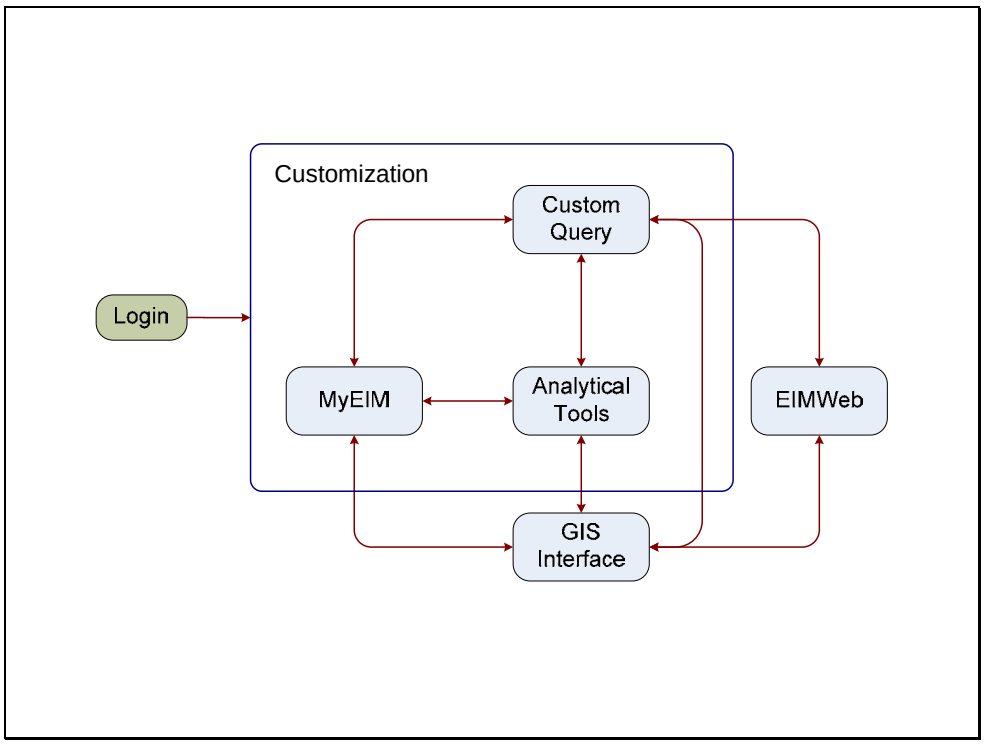
Department of Ecology

SMARM 5/14/2008

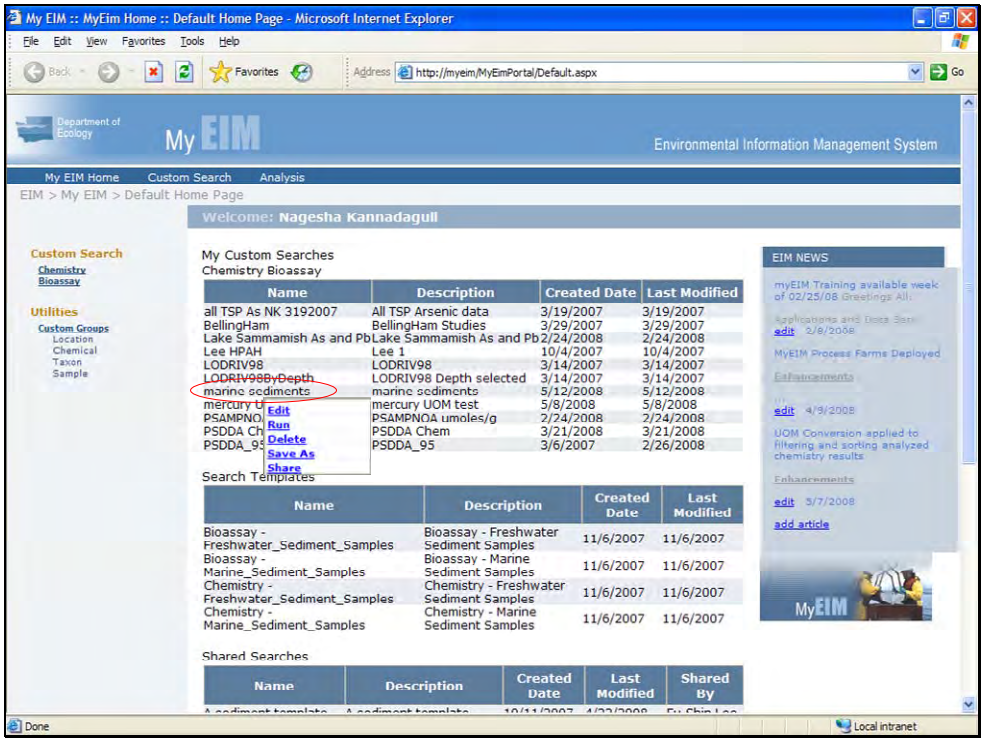
2.1



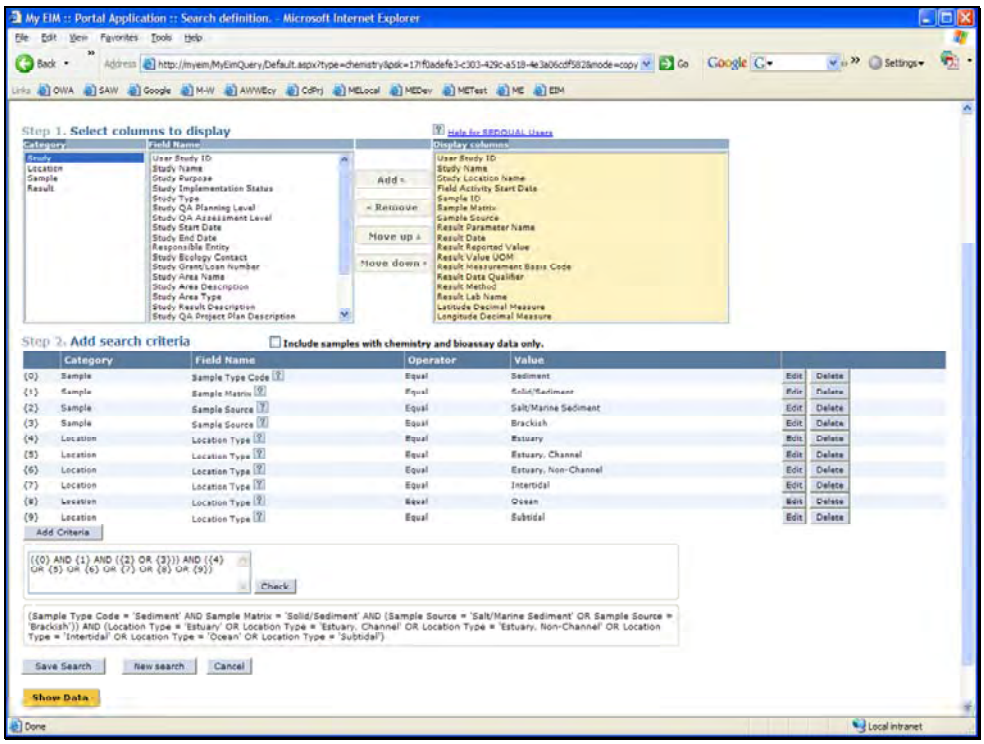
2.2


Customization
Custom Query
Login
MyEIM
Analytical Tools
EIMWeb
GIS Interface

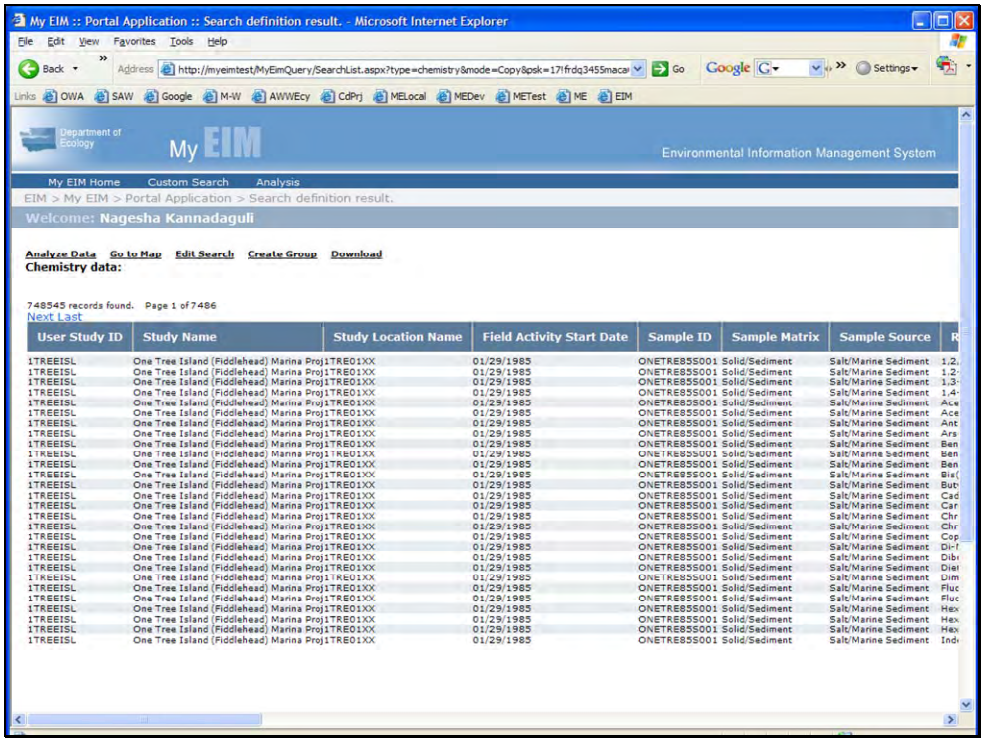
2.3


My EIM :: MyEim Home :: Default Home Page - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Favorites Address http://myeim/MyEimPortal/Default.aspx Go
Department of Ecology
My EIM
Environmental Information Management System
My EIM Home Custom Search Analysis
EIM > My EIM > Default Home Page
Welcome: Nagesha Kannadagull
Custom Search
Chemistry
Bioassay
Utilities
Custom Groups
Location
Chemical
Taxon
Sample
My Custom Searches
Chemistry Bioassay
Name Description Created Date Last Modified
all TSP As NK 3192007 All TSP Arsenic data 3/19/2007 3/19/2007
BellingHam BellingHam Studies 3/29/2007 3/29/2007
Lake Sammamish As and Pb Lake Sammamish As and Pb 2/24/2008 2/24/2008
Lee HPAH Lee 1 10/4/2007 10/4/2007
LODRIV98 LODRIV98 3/14/2007 3/14/2007
LODRIV98ByDepth LODRIV98 Depth selected 3/14/2007 3/14/2007
marine sediments marine sediments 5/12/2008 5/12/2008
mercury UOM test mercury UOM test 5/8/2008 5/8/2008
PSAMPNOA umoles/g 2/24/2008 2/24/2008
PSDDA Chem 3/21/2008 3/21/2008
PSDDA_95 3/6/2007 2/26/2008
Edit
Run
Delete
Save As
Share
Search Templates
Name Description Created Date Last Modified
Bioassay - Freshwater_Sediment_Samples Bioassay - Freshwater Sediment Samples 11/6/2007 11/6/2007
Bioassay - Marine_Sediment_Samples Bioassay - Marine Sediment Samples 11/6/2007 11/6/2007
Chemistry - Freshwater_Sediment_Samples Chemistry - Freshwater Sediment Samples 11/6/2007 11/6/2007
Chemistry - Marine_Sediment_Samples Chemistry - Marine Sediment Samples 11/6/2007 11/6/2007
Shared Searches
Name Description Created Date Last Modified Shared By
EIM NEWS
myEIM Training available week of 02/25/08 Greetings All:
edit 2/6/2008
MyEIM Process Forms Deployed
Enhancements
edit 4/9/2008
UOM Conversion applied to filtering and sorting analyzed chemistry results
Enhancements
edit 3/7/2008
add article
MyEIM
Done
Local intranet

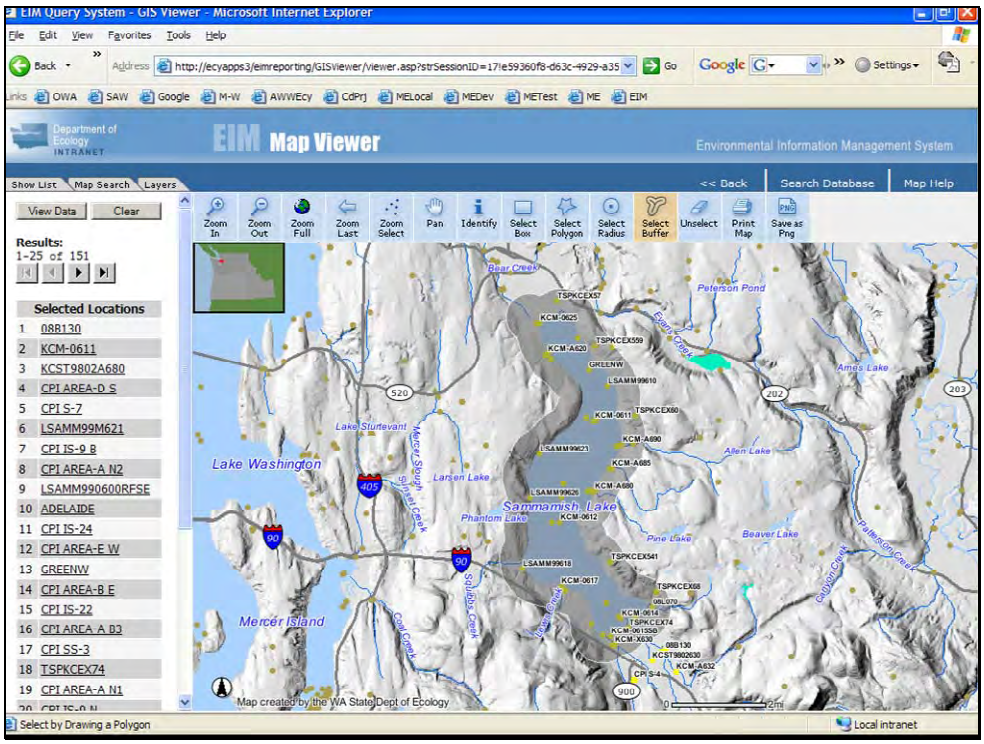
2.4


My EIM :: Portal Application :: Search definition. - Microsoft Internet Explorer
Step 1. Select columns to display
Step 2. Add search criteria
Include samples with chemistry and bioassay data only.
Add Criteria
Check
Save Search
New search
Cancel
Show Data

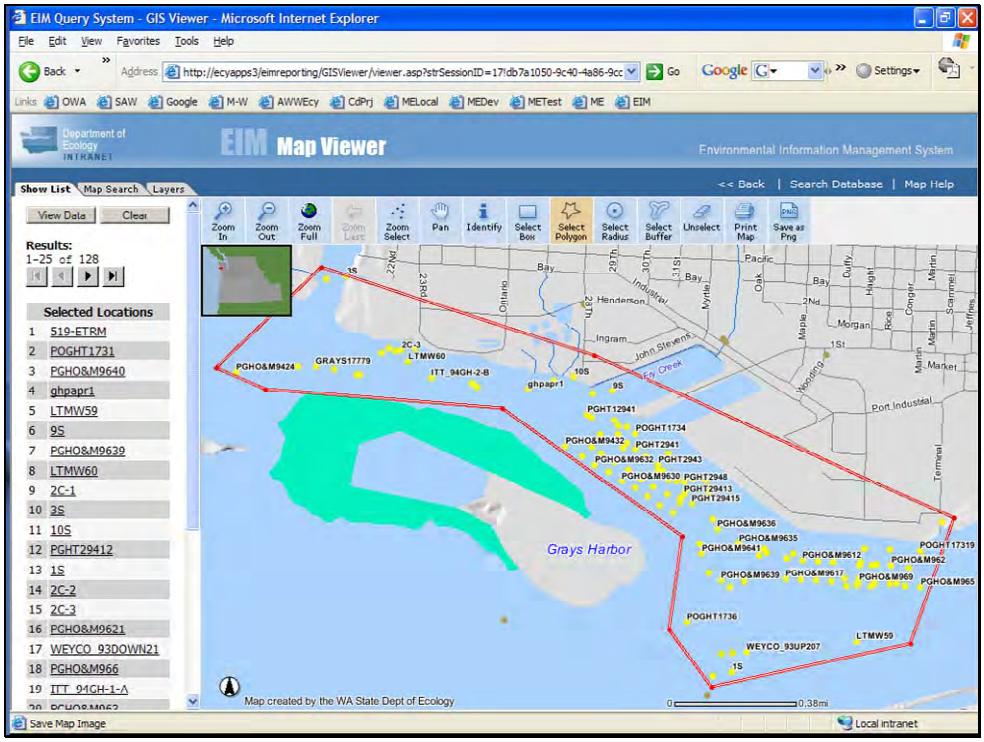
2.5


My EIM :: Portal Application :: Search definition result. - Microsoft Internet Explorer
Department of Ecology
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > Portal Application > Search definition result.
Welcome: Nagesha Kannadaguli
Analyze Data
Go to Map
Edit Search
Create Group
Download
Chemistry data:
748545 records found. Page 1 of 7486
Next Last
User Study ID
Study Name
Study Location Name
Field Activity Start Date
Sample ID
Sample Matrix
Sample Source

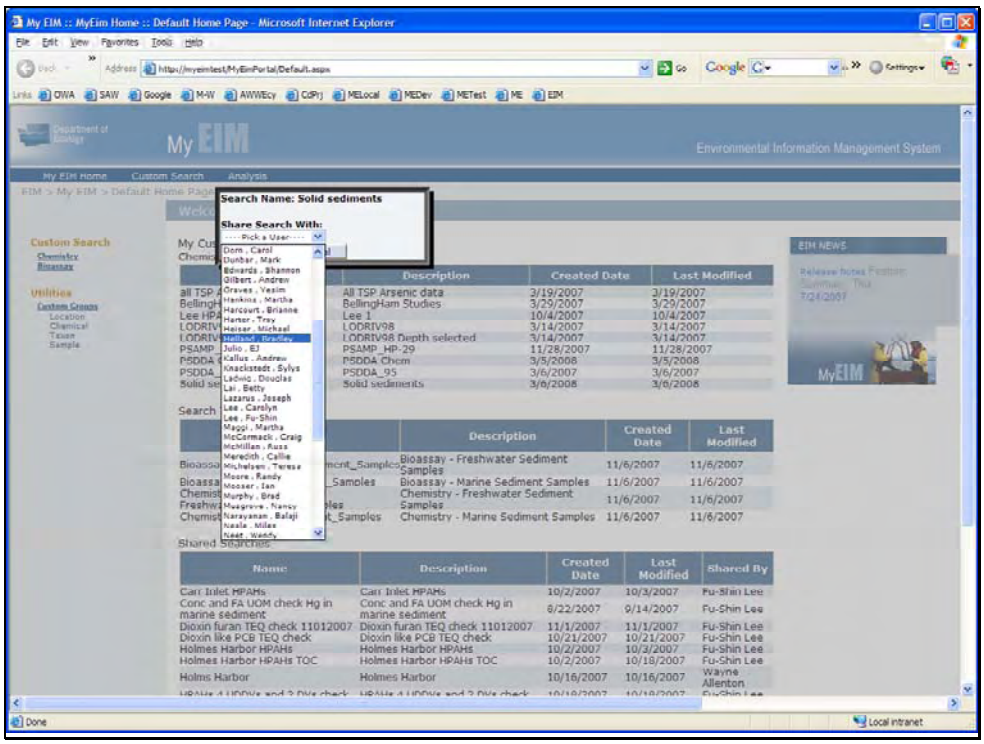
2.6


EIM Query System - GIS Viewer - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Address http://ecyapps3/eimreporting/GISViewer/viewer.asp?strSessionID=171e59360f8-d63c-4929-a35
Go
Google
Settings
Links OWA SAW Google M-W AWWEcy CdPrj MELocal MEDev METest ME EIM
Department of Ecology INTRANET
EIM Map Viewer
Environmental Information Management System
Show List Map Search Layers
<< Back Search Database Map Help
View Data Clear
Results:
1-25 of 151
Selected Locations
1 08R130
2 KCM-0611
3 KCST9802A680
4 CPI AREA-D S
5 CPI S-7
6 LSAMM99M621
7 CPI IS-9 B
8 CPI AREA-A N2
9 LSAMM990600RFSE
10 ADELAIDE
11 CPI IS-24
12 CPI AREA-E W
13 GREENW
14 CPI AREA-B E
15 CPI IS-22
16 CPI AREA A B3
17 CPI SS-3
18 TSPKCEX74
19 CPI AREA-A N1
Zoom In
Zoom Out
Zoom Full
Zoom Last
Zoom Select
Pan
Identify
Select Box
Select Polygon
Select Radius
Select Buffer
Unselect
Print Map
Save as Png
Lake Washington
Sammamish Lake
Mercer Island
Peterson Pond
Ames Lake
Allen Lake
Beaver Lake
Pine Lake
Lake Sturtevant
Larsen Lake
Phantom Lake
Map created by the WA State Dept of Ecology
Select by Drawing a Polygon
Local intranet

2.7


EIM Query System - GIS Viewer - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Address http://ecyapps3/eimreporting/GISViewer/viewer.asp?strSessionID=171db7a1050-9c40-4a86-9cc
Go
Google
Settings
Links OWA SAW Google M-W AWWEcy CdPrj MELocal MEDev METest ME EIM
Department of Ecology INTRANET
EIM Map Viewer
Environmental Information Management System
Show List Map Search Layers
<< Back | Search Database | Map Help
View Data Clear
Results:
1-25 of 128
Selected Locations
1 519-ETRM
2 POGHT1731
3 PGHO&M9640
4 ghpapr1
5 LTMW59
6 9S
7 PGHO&M9639
8 LTMW60
9 2C-1
10 3S
11 10S
12 PGHT29412
13 1S
14 2C-2
15 2C-3
16 PGHO&M9621
17 WEYCO_93DOWN21
18 PGHO&M966
19 ITT_94GH-1-A
Zoom In
Zoom Out
Zoom Full
Zoom Last
Zoom Select
Pan
Identify
Select Box
Select Polygon
Select Radius
Select Buffer
Unselect
Print Map
Save as Png
Grays Harbor
Port Industrial
Map created by the WA State Dept of Ecology
Save Map Image
Local intranet

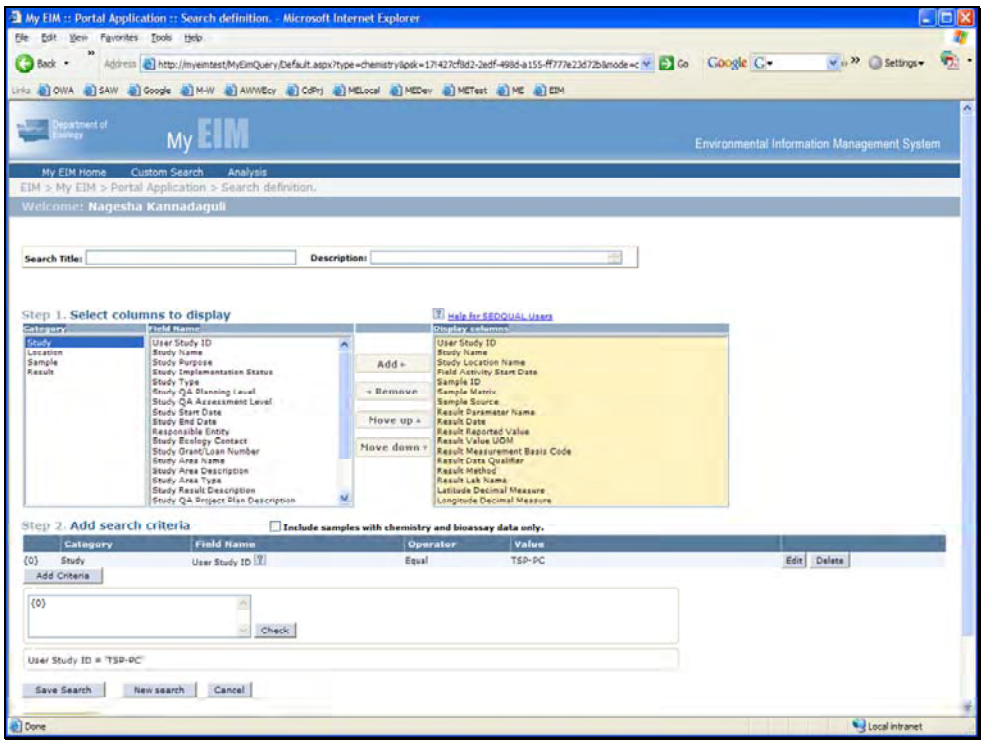
2.8



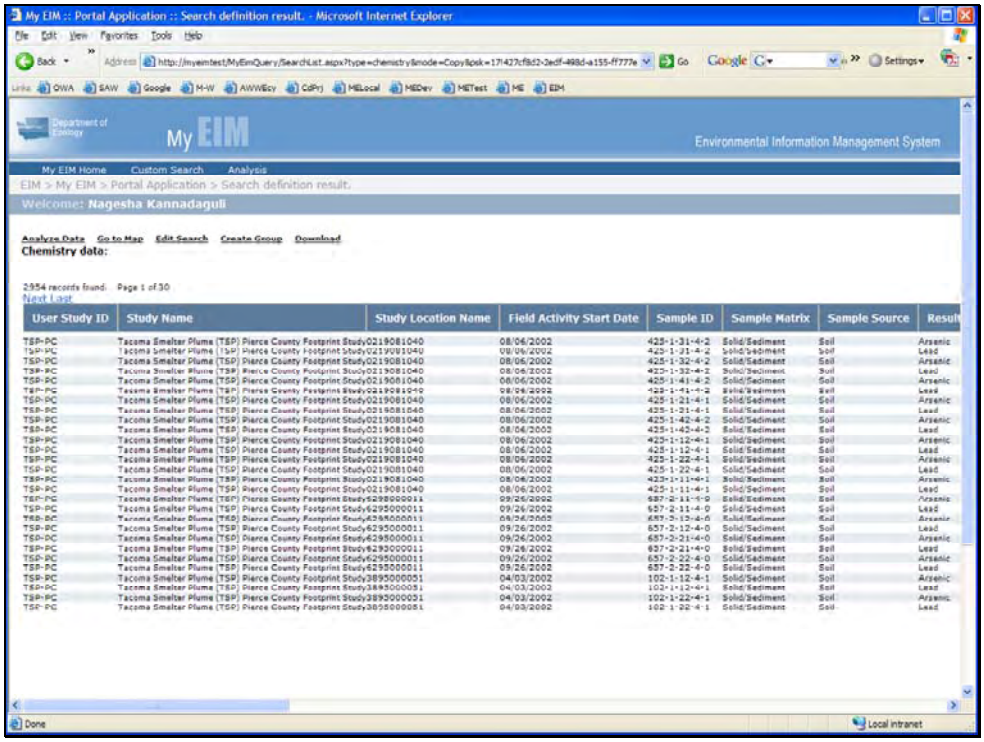
2.9

Chemistry Analysis

2.10


My EIM :: Portal Application :: Search definition. - Microsoft Internet Explorer
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > Portal Application > Search definition.
Welcome: Nagesha Kannadaguli
Search Title:
Description:
Step 1. Select columns to display
Step 2. Add search criteria
Save Search
New search
Cancel

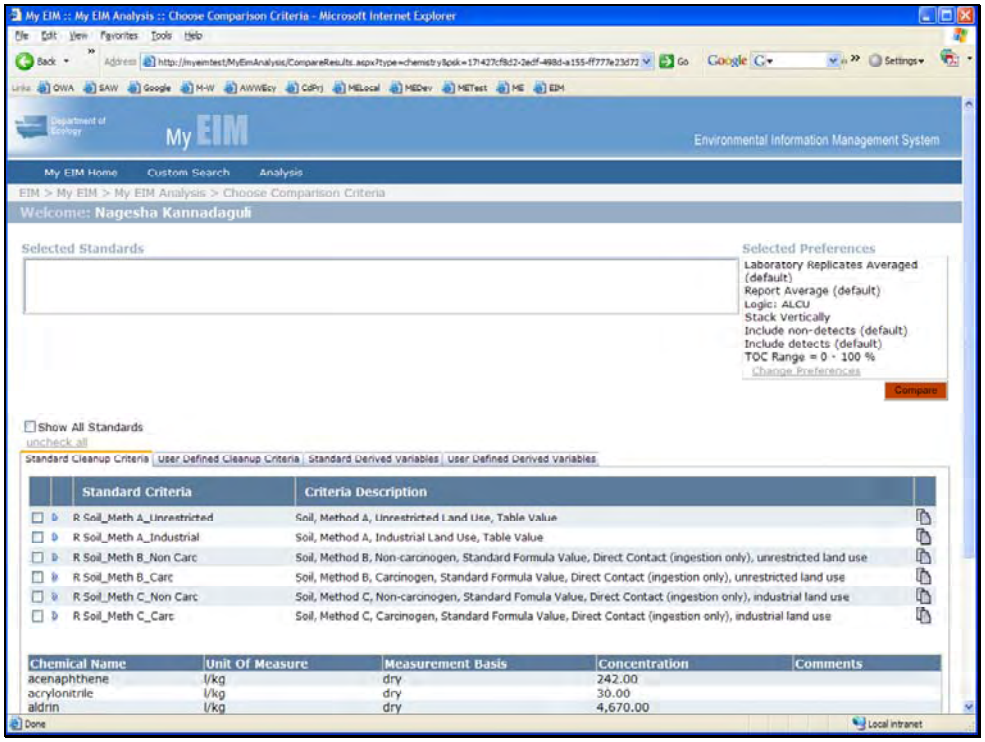
2.11


My EIM :: Portal Application :: Search definition result. - Microsoft Internet Explorer
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > Portal Application > Search definition result.
Welcome: Nagesha Kannadaguli
Chemistry data:
User Study ID
Study Name
Study Location Name
Field Activity Start Date
Sample ID
Sample Matrix
Sample Source

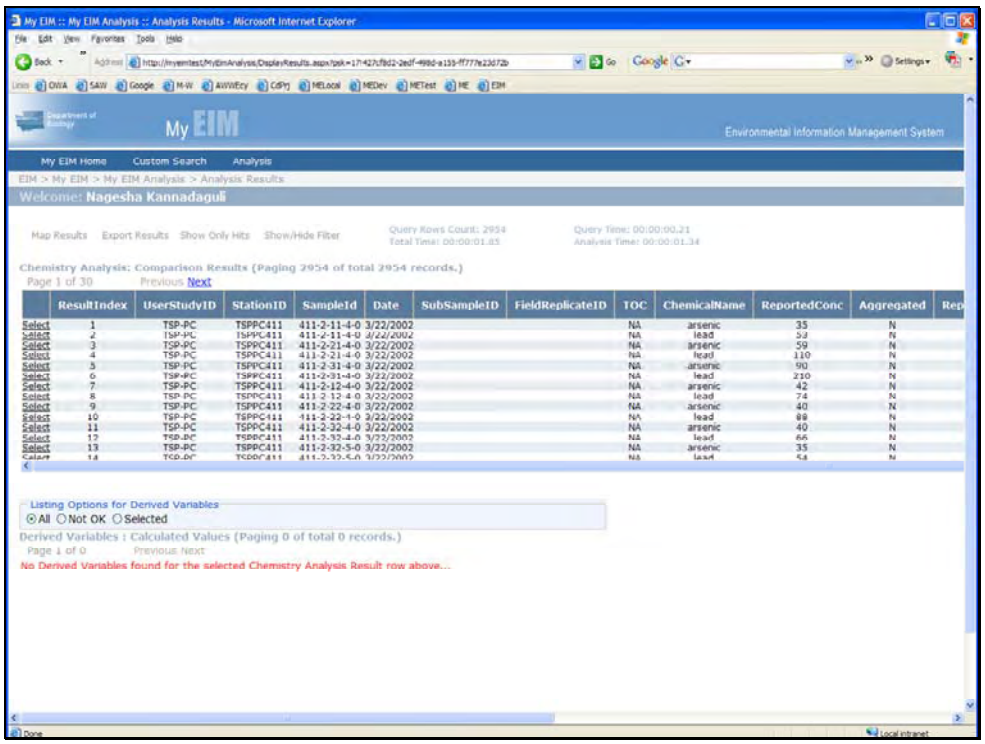
2.12

88 Cleanup Criteria	49 SEDQUAL parameters (12 Regulatory)
	39 CLARC parameters (Reg)
	User defined parameters
Derived Variables	BFA , PCB, LPAH, HPAH, cPAH
	User defined DVs
	Share your CUPs and DVs.

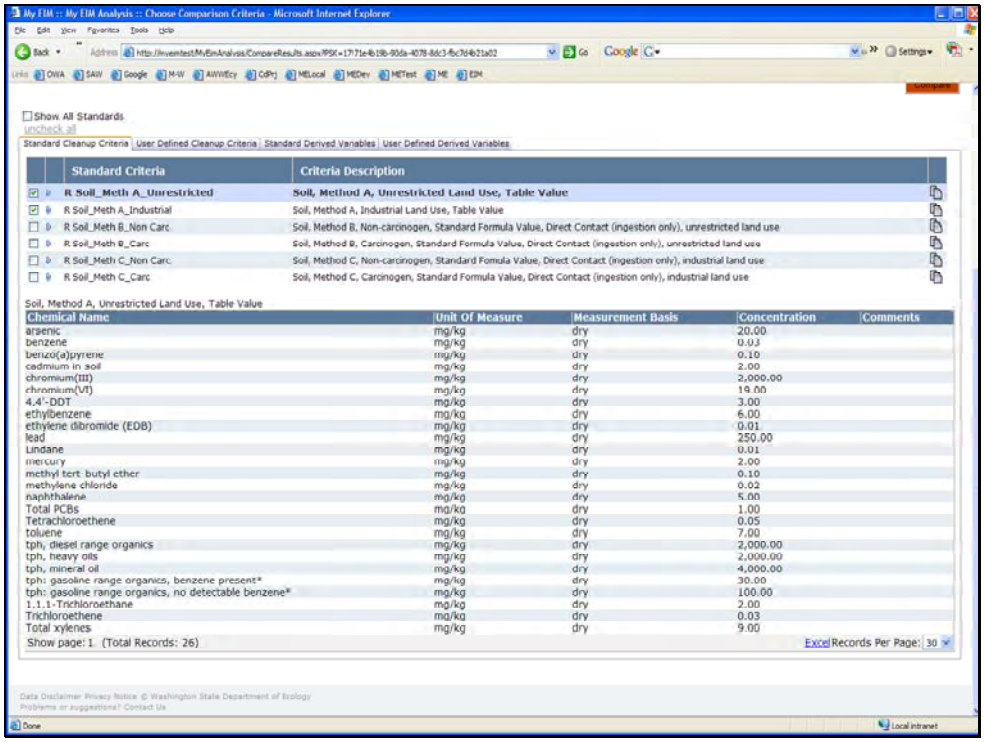
2.13



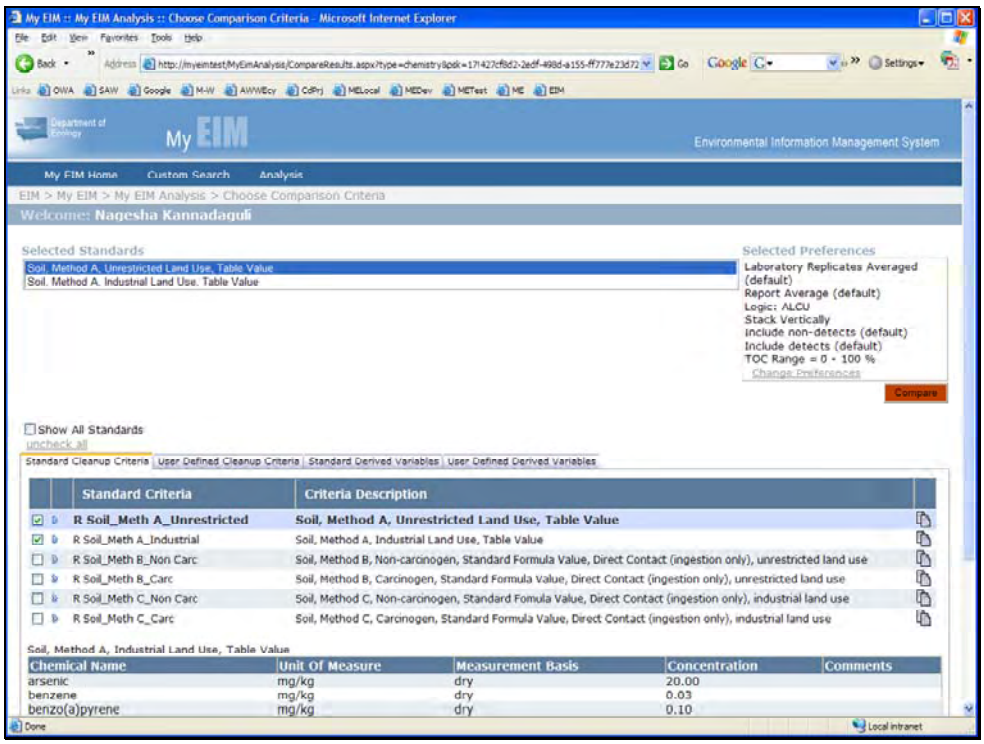
2.14


My EIM :: My EIM Analysis :: Analysis Results - Microsoft Internet Explorer
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > My EIM Analysis > Analysis Results
Welcome: Nagesha Kannadaguli
Map Results
Export Results
Show Only Hits
Show/Hide Filter
Chemistry Analysis: Comparison Results (Paging 2954 of total 2954 records.)
Page 1 of 30
Previous Next
ResultIndex
UserStudyID
StationID
SampleId
Date
SubSampleID
FieldReplicateID
TOC
ChemicalName
ReportedConc
Aggregated
Listing Options for Derived Variables
All
Not OK
Selected
Derived Variables : Calculated Values (Paging 0 of total 0 records.)
No Derived Variables found for the selected Chemistry Analysis Result row above...

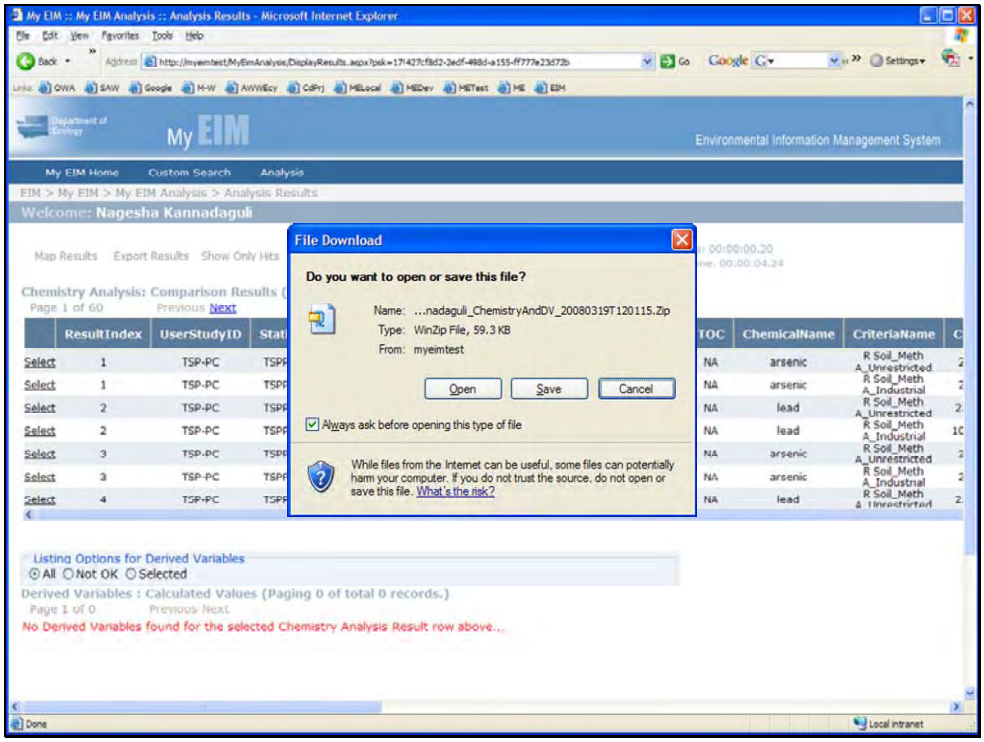
2.15


My EIM :: My EIM Analysis :: Choose Comparison Criteria - Microsoft Internet Explorer
Show All Standards
uncheck all
Standard Cleanup Criteria
User Defined Cleanup Criteria
Standard Derived Variables
User Defined Derived Variables
Standard Criteria
Criteria Description
R Soil_Meth A_Unrestricted
Soil, Method A, Unrestricted Land Use, Table Value
R Soil_Meth A_Industrial
Soil, Method A, Industrial Land Use, Table Value
R Soil_Meth B_Non Carc
Soil, Method B, Non-carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted land use
R Soil_Meth B_Carc
Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted land use
R Soil_Meth C_Non Carc
Soil, Method C, Non-carcinogen, Standard Fomula Value, Direct Contact (ingestion only), industrial land use
R Soil_Meth C_Carc
Soil, Method C, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), industrial land use
Soil, Method A, Unrestricted Land Use, Table Value
Chemical Name
Unit Of Measure
Measurement Basis
Concentration
Comments
arsenic mg/kg dry 20.00
benzene mg/kg dry 0.03
benzo(a)pyrene mg/kg dry 0.10
cadmium in soil mg/kg dry 2.00
chromium(III) mg/kg dry 2,000.00
chromium(VI) mg/kg dry 19.00
4,4'-DDT mg/kg dry 3.00
ethylbenzene mg/kg dry 6.00
ethylene dibromide (EDB) mg/kg dry 0.01
lead mg/kg dry 250.00
Lindane mg/kg dry 0.01
mercury mg/kg dry 2.00
methyl tert butyl ether mg/kg dry 0.10
methylene chloride mg/kg dry 0.02
naphthalene mg/kg dry 5.00
Total PCBs mg/kg dry 1.00
Tetrachloroethene mg/kg dry 0.05
toluene mg/kg dry 7.00
tph, diesel range organics mg/kg dry 2,000.00
tph, heavy oils mg/kg dry 2,000.00
tph, mineral oil mg/kg dry 4,000.00
tph: gasoline range organics, benzene present* mg/kg dry 30.00
tph: gasoline range organics, no detectable benzene* mg/kg dry 100.00
1,1,1-Trichloroethane mg/kg dry 2.00
Trichloroethene mg/kg dry 0.03
Total xylenes mg/kg dry 9.00
Show page: 1 (Total Records: 26)
Excel
Records Per Page: 30

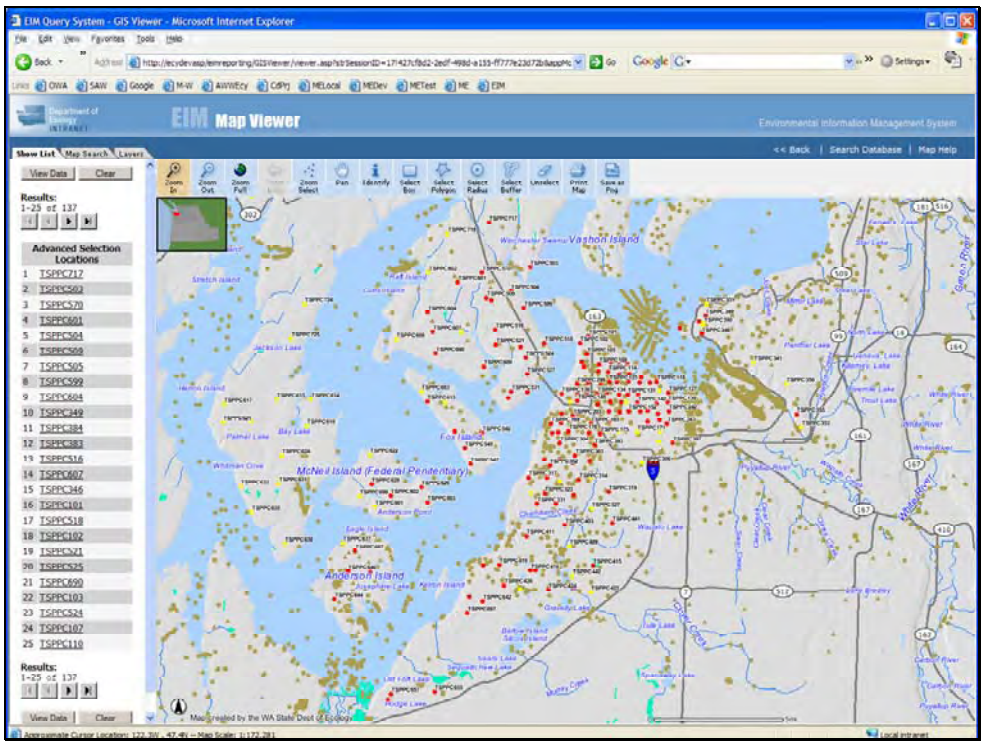
2.16


My EIM :: My EIM Analysis :: Choose Comparison Criteria - Microsoft Internet Explorer
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > My EIM Analysis > Choose Comparison Criteria
Welcome: Nagesha Kannadaguli
Selected Standards
Soil, Method A, Unrestricted Land Use, Table Value
Soil, Method A, Industrial Land Use, Table Value
Selected Preferences
Laboratory Replicates Averaged (default)
Report Average (default)
Logic: ALCU
Stack Vertically
Include non-detects (default)
Include detects (default)
TOC Range = 0 - 100 %
Change Preferences
Compare
Show All Standards
uncheck all
Standard Cleanup Criteria
User Defined Cleanup Criteria
Standard Derived Variables
User Defined Derived Variables
Standard Criteria
Criteria Description
R Soil_Meth A_Unrestricted
Soil, Method A, Unrestricted Land Use, Table Value
R Soil_Meth A_Industrial
Soil, Method A, Industrial Land Use, Table Value
R Soil_Meth B_Non Carc
Soil, Method B, Non-carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted land use
R Soil_Meth B_Carc
Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted land use
R Soil_Meth C_Non Carc
Soil, Method C, Non-carcinogen, Standard Fomula Value, Direct Contact (ingestion only), industrial land use
R Soil_Meth C_Carc
Soil, Method C, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), industrial land use
Soil, Method A, Industrial Land Use, Table Value
Chemical Name
Unit Of Measure
Measurement Basis
Concentration
Comments
arsenic
mg/kg
dry
20.00
benzene
mg/kg
dry
0.03
benzo(a)pyrene
mg/kg
dry
0.10
Done
Local intranet

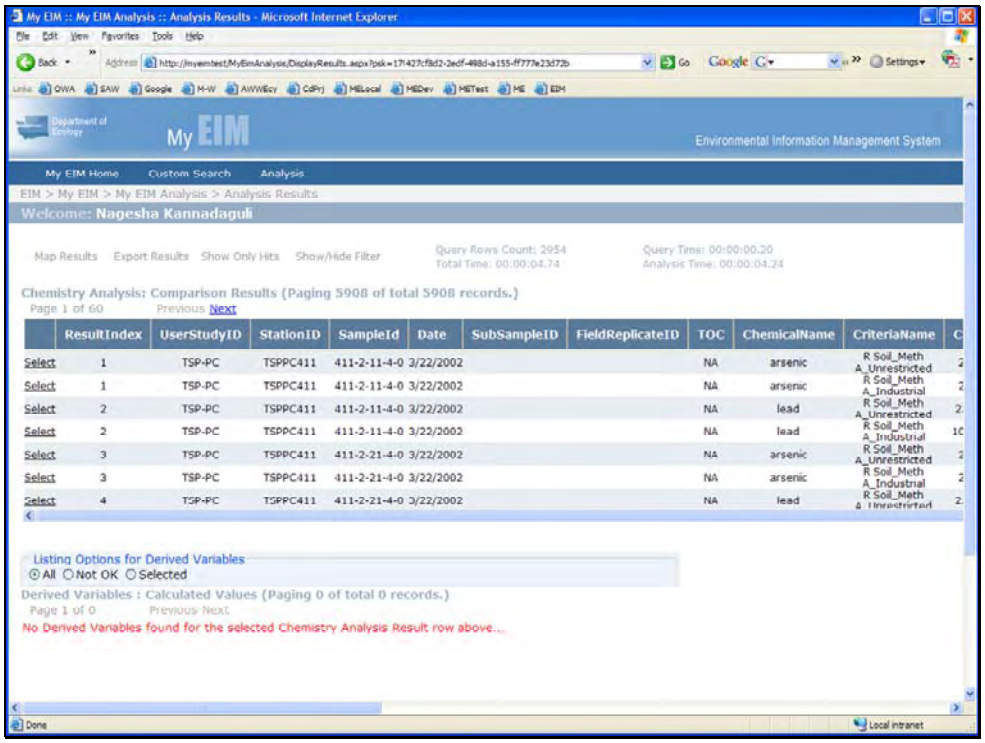
2.17


My EIM :: My EIM Analysis :: Analysis Results - Microsoft Internet Explorer
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > My EIM Analysis > Analysis Results
Welcome: Nagesha Kannadaguli
Map Results
Export Results
Show Only Hits
Chemistry Analysis: Comparison Results
Page 1 of 60
Previous Next
ResultIndex
UserStudyID
TOC
ChemicalName
CriteriaName
File Download
Do you want to open or save this file?
Name: ...nadaguli_ChemistryAndDV_20080319T120115.Zip
Type: WinZip File, 59.3 KB
From: myeimtest
Open
Save
Cancel
Always ask before opening this type of file
While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file. What's the risk?
Listing Options for Derived Variables
All
Not OK
Selected
Derived Variables : Calculated Values (Paging 0 of total 0 records.)
Page 1 of 0
Previous Next
No Derived Variables found for the selected Chemistry Analysis Result row above...
Done
Local intranet

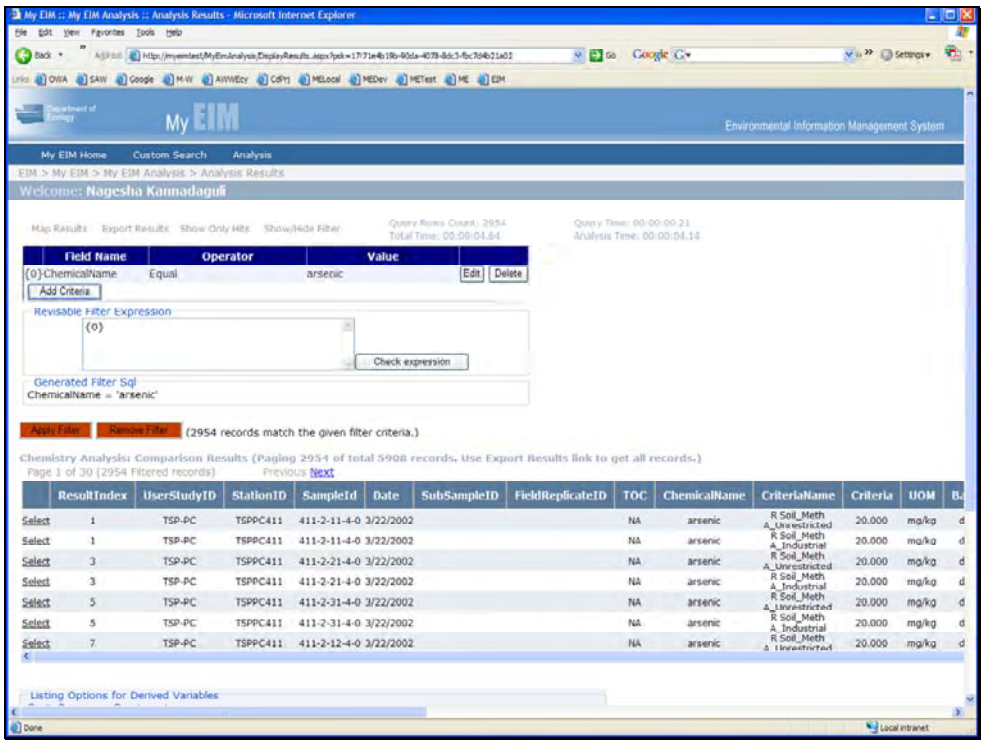
2.18


EIM Query System - GIS Viewer - Microsoft Internet Explorer
EIM Map Viewer
Environmental Information Management System
Show List
Map Search
Layers
View Data
Clear
Results:
1-25 of 137
Advanced Selection Locations
1 TSPPC712
2 TSPPC662
3 TSPPC570
4 TSPPC601
5 TSPPC504
6 TSPPC508
7 TSPPC505
8 TSPPC599
9 TSPPC604
10 TSPPC349
11 TSPPC384
12 TSPPC633
13 TSPPC616
14 TSPPC607
15 TSPPC346
16 TSPPC101
17 TSPPC518
18 TSPPC102
19 TSPPC521
20 TSPPC525
21 TSPPC699
22 TSPPC103
23 TSPPC524
24 TSPPC107
25 TSPPC110
Vashon Island
McNeil Island (Federal Penitentiary)
Anderson Island

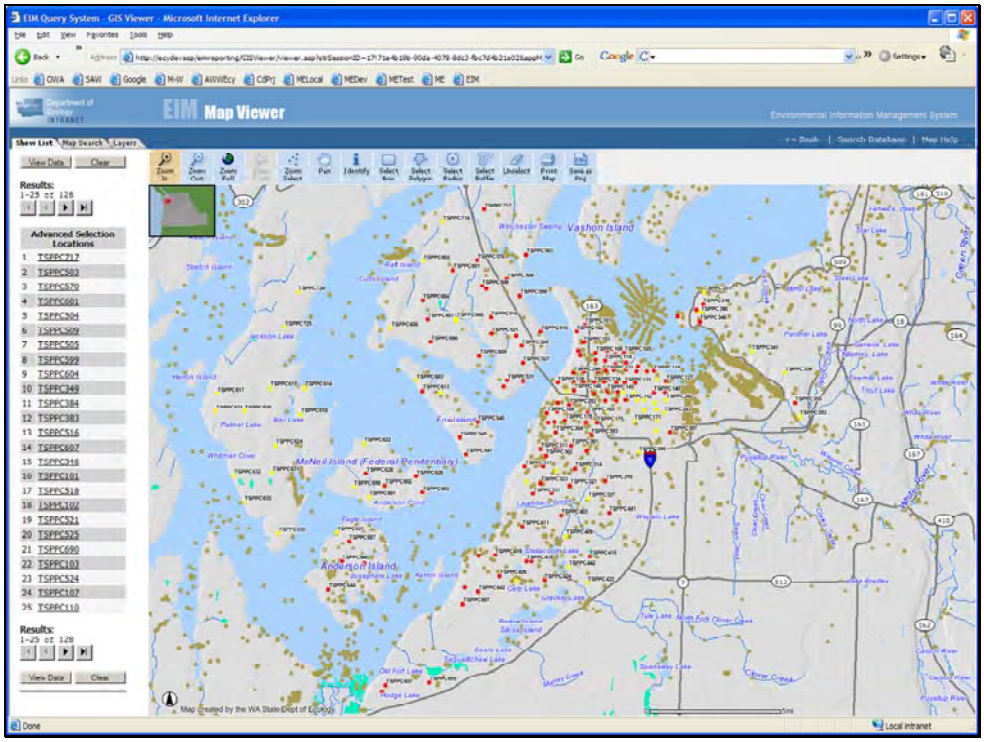
2.19


My EIM :: My EIM Analysis :: Analysis Results - Microsoft Internet Explorer
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > My EIM Analysis > Analysis Results
Welcome: Nagesha Kannadaguli
Map Results
Export Results
Show Only Hits
Show/Hide Filter
Query Rows Count: 2954
Total Time: 00:00:04.74
Query Time: 00:00:00.20
Analysis Time: 00:00:04.24
Chemistry Analysis: Comparison Results (Paging 5908 of total 5908 records.)
Page 1 of 60
Previous Next
ResultIndex
UserStudyID
StationID
SampleId
Date
SubSampleID
FieldReplicateID
TOC
ChemicalName
CriteriaName
Listing Options for Derived Variables
All
Not OK
Selected
Derived Variables : Calculated Values (Paging 0 of total 0 records.)
Page 1 of 0
Previous Next
No Derived Variables found for the selected Chemistry Analysis Result row above...

2.20


My EIM :: My EIM Analysis :: Analysis Results - Microsoft Internet Explorer
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
Welcome: Nagesha Kannadaguli
Field Name
Operator
Value
(0)ChemicalName
Equal
arsenic
Edit
Delete
Add Criteria
Revisable Filter Expression
Check expression
Generated Filter Sql
ChemicalName = 'arsenic'
Apply Filter
Remove Filter
(2954 records match the given filter criteria.)
Chemistry Analysis: Comparison Results (Paging 2954 of total 5908 records, Use Export Results link to get all records.)
Listing Options for Derived Variables

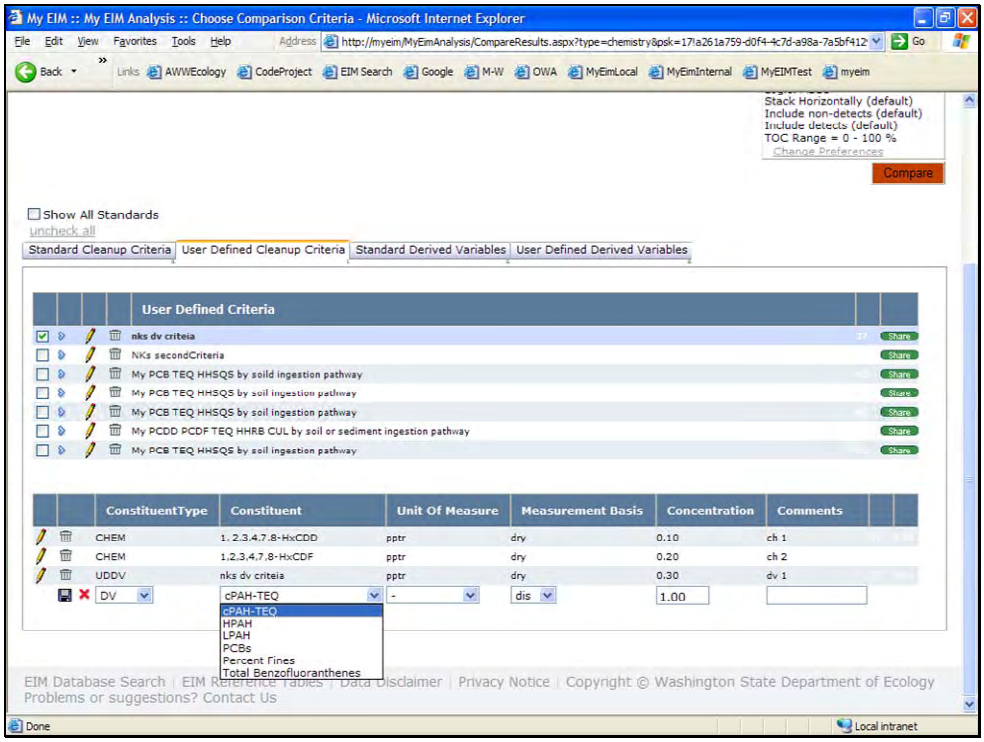
2.21


EIM Query System - GIS Viewer - Microsoft Internet Explorer
EIM Map Viewer
Environmental Information Management System
Vashon Island
McNeil Island (Federal Penitentiary)
Anderson Island

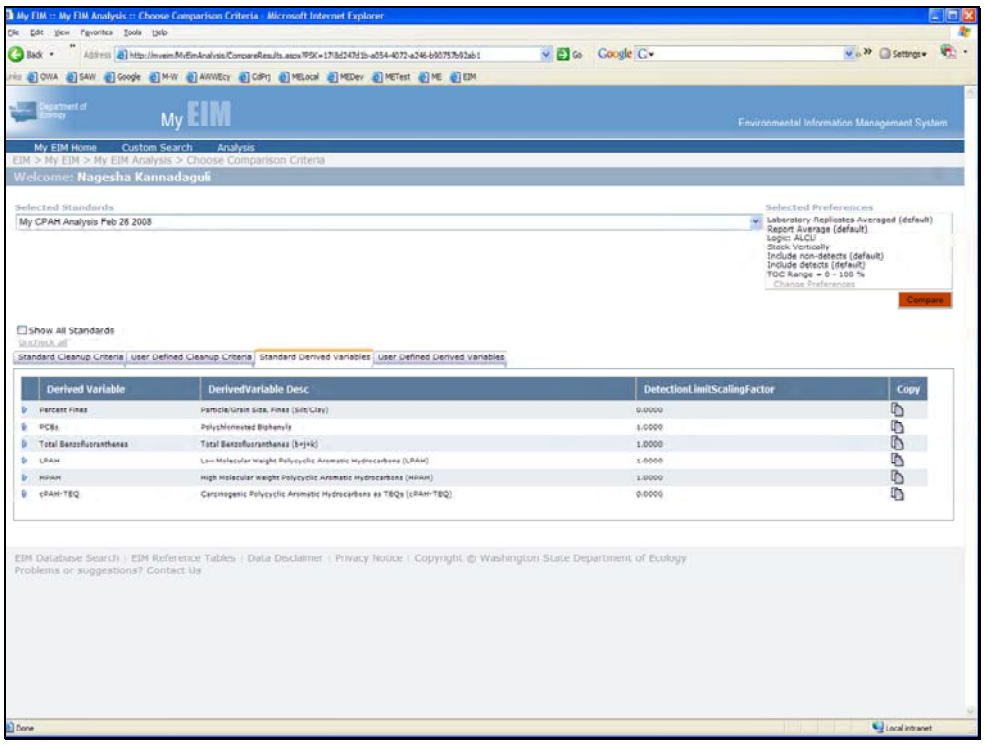
2.22

Customization

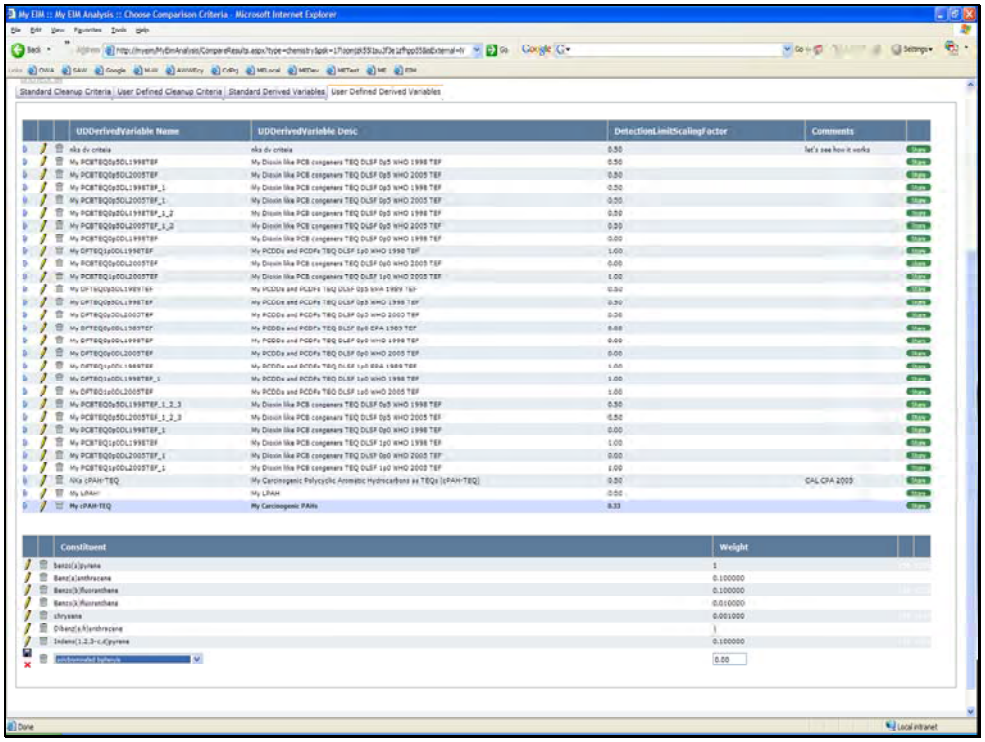
2.23



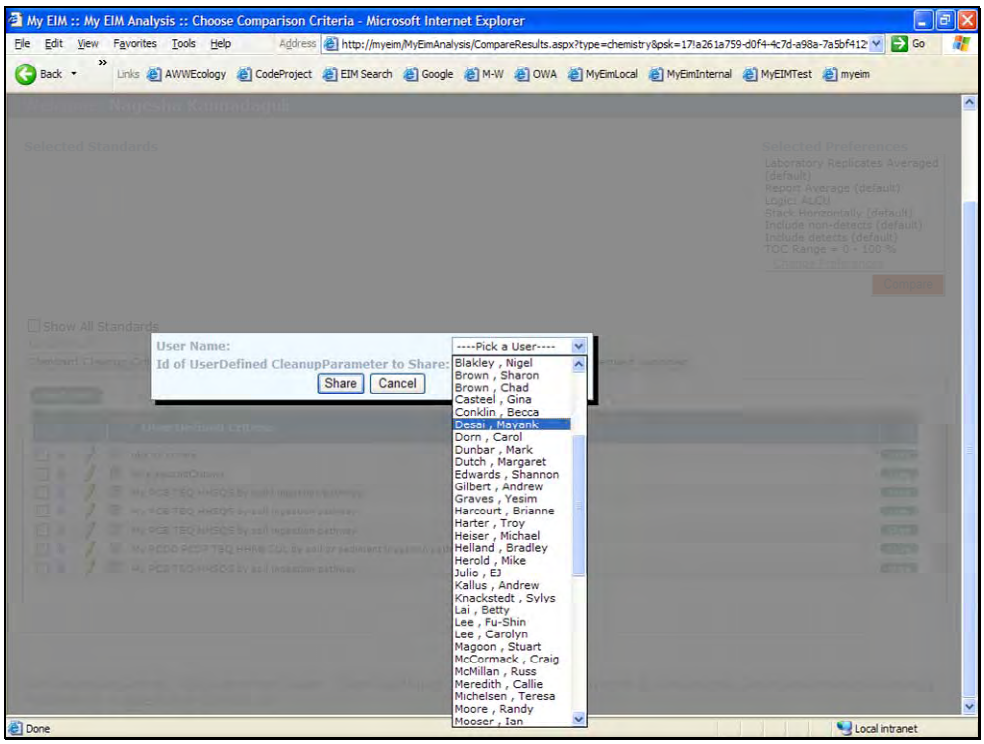
2.24


My EIM :: My EIM Analysis :: Choose Comparison Criteria - Microsoft Internet Explorer
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > My EIM Analysis > Choose Comparison Criteria
Welcome: Nagesha Kannadaguli
Selected Standards
My CPAH Analysis Feb 28 2008
Selected Preferences
Laboratory Replicates Averaged (default)
Report Average (default)
Logic: ALCU
Stack Vertically
Include non-detects (default)
Include detects (default)
TOC Range = 0 - 100 %
Change Preferences
Compare
Show All Standards
Standard Cleanup Criteria
User Defined Cleanup Criteria
Standard Derived Variables
User Defined Derived Variables
Derived Variable
DerivedVariable Desc
DetectionLimitScalingFactor
Copy
Percent Fines
Particle/Grain Size, Fines (Silt/Clay)
0.0000
PCBs
Polychlorinated Biphenyls
1.0000
Total Benzofluoranthenes
Total Benzofluoranthenes (b+j+k)
1.0000
LPAH
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAH)
1.0000
HPAH
High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAH)
1.0000
cPAH-TEQ
Carcinogenic Polycyclic Aromatic Hydrocarbons as TEQs (cPAH-TEQ)
0.0000
EIM Database Search | EIM Reference Tables | Data Disclaimer | Privacy Notice | Copyright © Washington State Department of Ecology
Problems or suggestions? Contact Us
Done
Local intranet

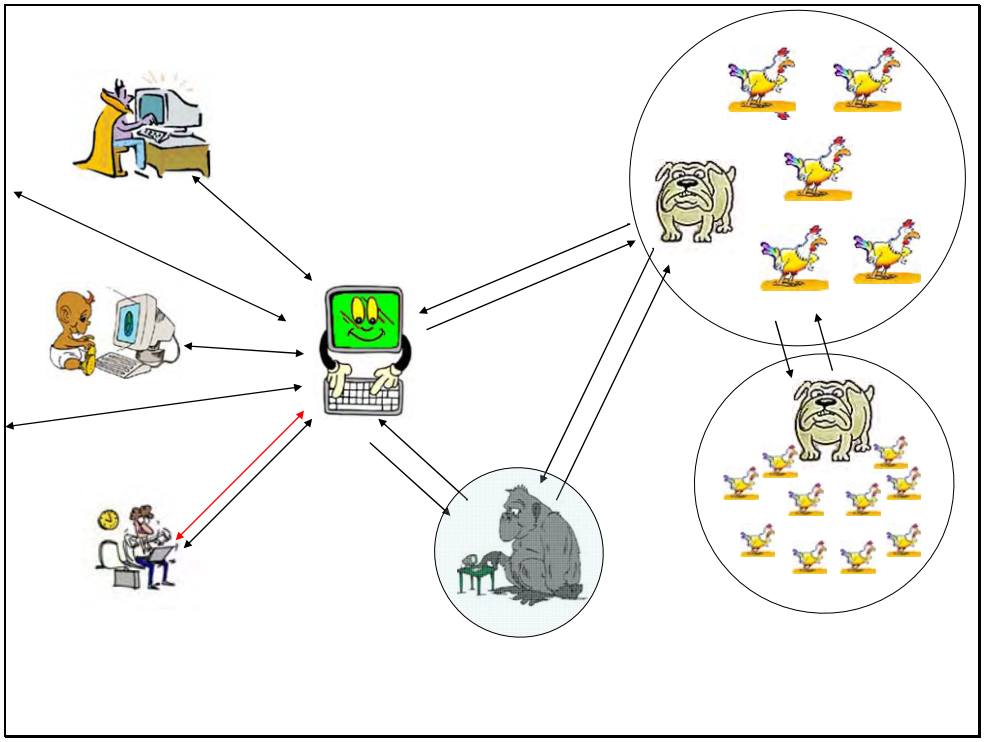
2.25


My EIM :: My EIM Analysis :: Choose Comparison Criteria - Microsoft Internet Explorer
Standard Cleanup Criteria
User Defined Cleanup Criteria
Standard Derived Variables
User Defined Derived Variables
UDDerivedVariable Name
UDDerivedVariable Desc
DetectionLimitScalingFactor
Comments
Constituent
Weight
Done
Local intranet

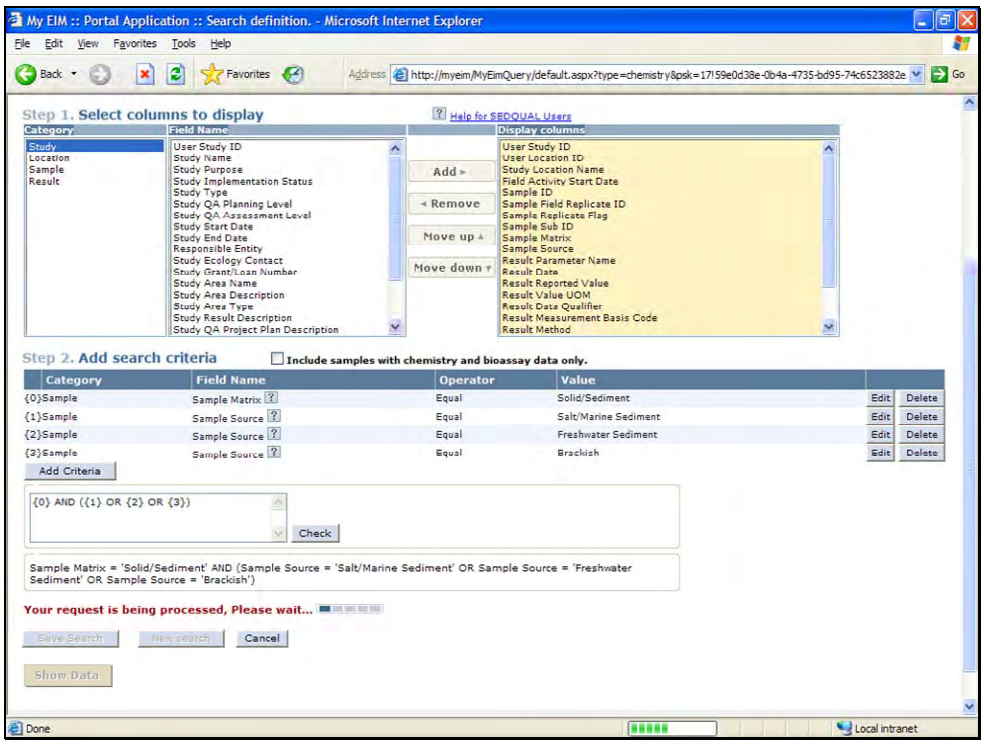
2.26


My EIM :: My EIM Analysis :: Choose Comparison Criteria - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://myeim/MyEimAnalysis/CompareResults.aspx?type=chemistry&psk=17a261a759-d0f4-4c7d-a98a-7a5bf412
Go
Back
Links AWWEcology CodeProject EIM Search Google M-W OWA MyEimLocal MyEimInternal MyEIMTest myeim
Selected Standards
Selected Preferences
Laboratory Replicates Averaged (default)
Report Average (default)
Logic: AND
Stack Horizontally (default)
Include non-detects (default)
Include detects (default)
TOC Range = 0 - 100 %
Compare
Show All Standards
User Name:
Id of UserDefined CleanupParameter to Share:
Share
Cancel
----Pick a User----
Blakley , Nigel
Brown , Sharon
Brown , Chad
Casteel , Gina
Conklin , Becca
Desai , Mayank
Dorn , Carol
Dunbar , Mark
Dutch , Margaret
Edwards , Shannon
Gilbert , Andrew
Graves , Yesim
Harcourt , Brianne
Harter , Troy
Heiser , Michael
Helland , Bradley
Herold , Mike
Julio , EJ
Kallus , Andrew
Knackstedt , Sylvs
Lai , Betty
Lee , Fu-Shin
Lee , Carolyn
Magoon , Stuart
McCormack , Craig
McMillan , Russ
Meredith , Callie
Michelsen , Teresa
Moore , Randy
Mooser , Ian
Done
Local intranet

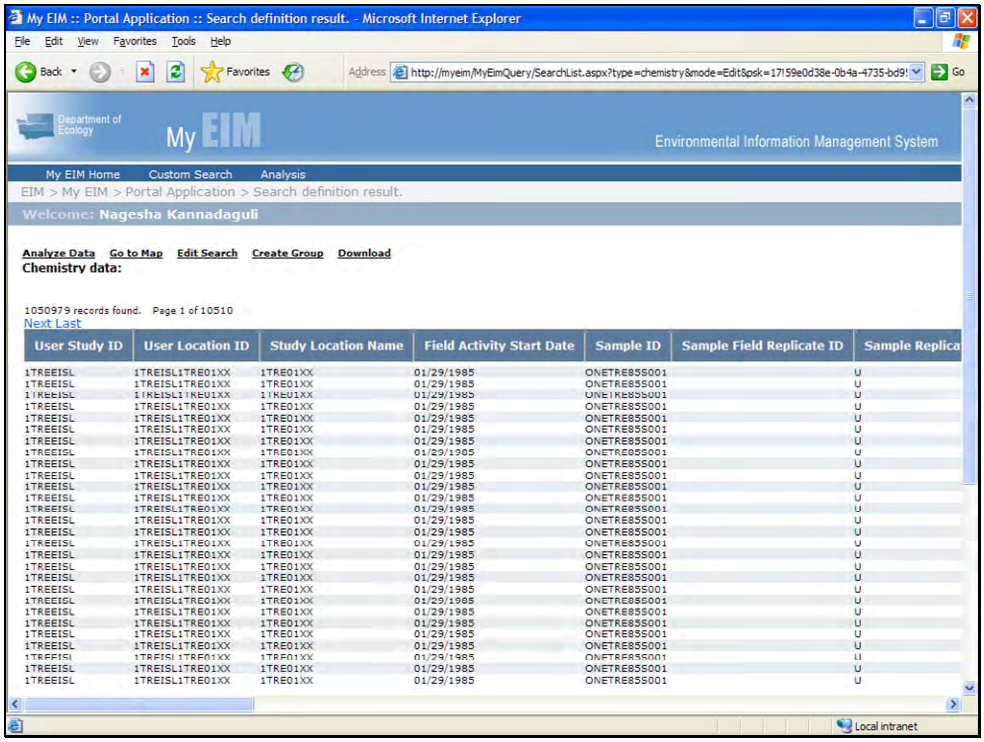
2.27



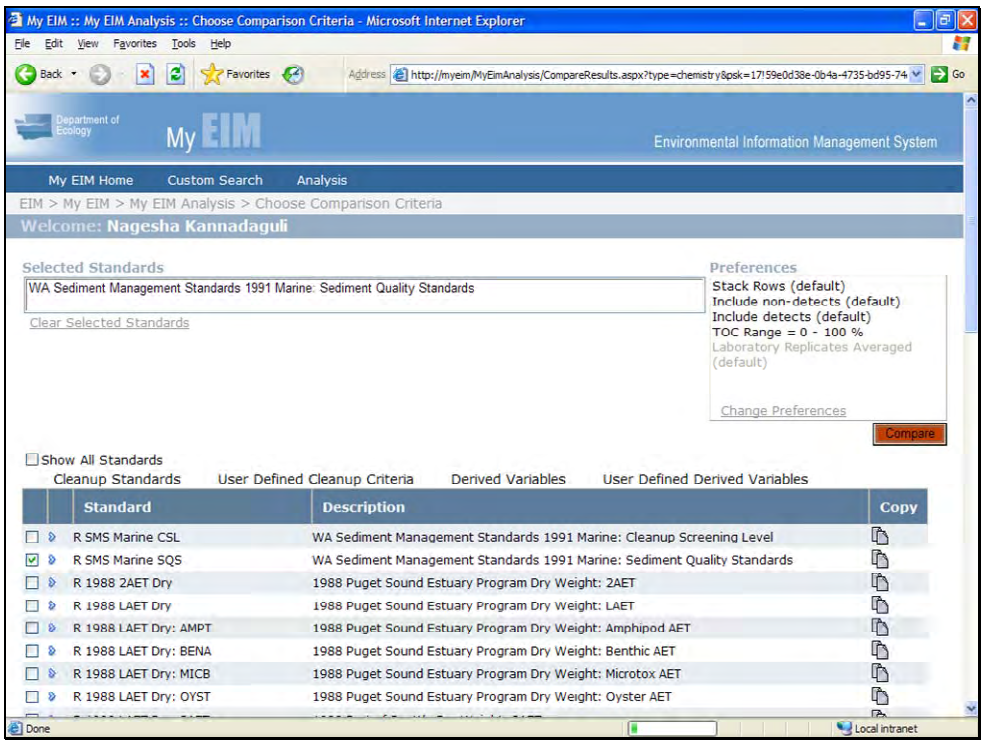
2.28


My EIM :: Portal Application :: Search definition. - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Favorites Address http://myeim/MyEimQuery/default.aspx?type=chemistry&psk=17159e0d38e-0b4a-4735-bd95-74c6523882e Go
Step 1. Select columns to display
Help for SEDQUAL Users
Category
Study
Location
Sample
Result
Field Name
User Study ID
Study Name
Study Purpose
Study Implementation Status
Study Type
Study QA Planning Level
Study QA Assessment Level
Study Start Date
Study End Date
Responsible Entity
Study Ecology Contact
Study Grant/Loan Number
Study Area Name
Study Area Description
Study Area Type
Study Result Description
Study QA Project Plan Description
Add
Remove
Move up
Move down
Display columns
User Study ID
User Location ID
Study Location Name
Field Activity Start Date
Sample ID
Sample Field Replicate ID
Sample Replicate Flag
Sample Sub ID
Sample Matrix
Sample Source
Result Parameter Name
Result Date
Result Reported Value
Result Value UOM
Result Data Qualifier
Result Measurement Basis Code
Result Method
Step 2. Add search criteria
Include samples with chemistry and bioassay data only.
Category
Field Name
Operator
Value
{0}Sample Sample Matrix Equal Solid/Sediment Edit Delete
{1}Sample Sample Source Equal Salt/Marine Sediment Edit Delete
{2}Sample Sample Source Equal Freshwater Sediment Edit Delete
{3}Sample Sample Source Equal Brackish Edit Delete
Add Criteria
{0} AND ({1} OR {2} OR {3})
Check
Sample Matrix = 'Solid/Sediment' AND (Sample Source = 'Salt/Marine Sediment' OR Sample Source = 'Freshwater Sediment' OR Sample Source = 'Brackish')
Your request is being processed, Please wait...
Save Search
New search
Cancel
Show Data
Done
Local intranet

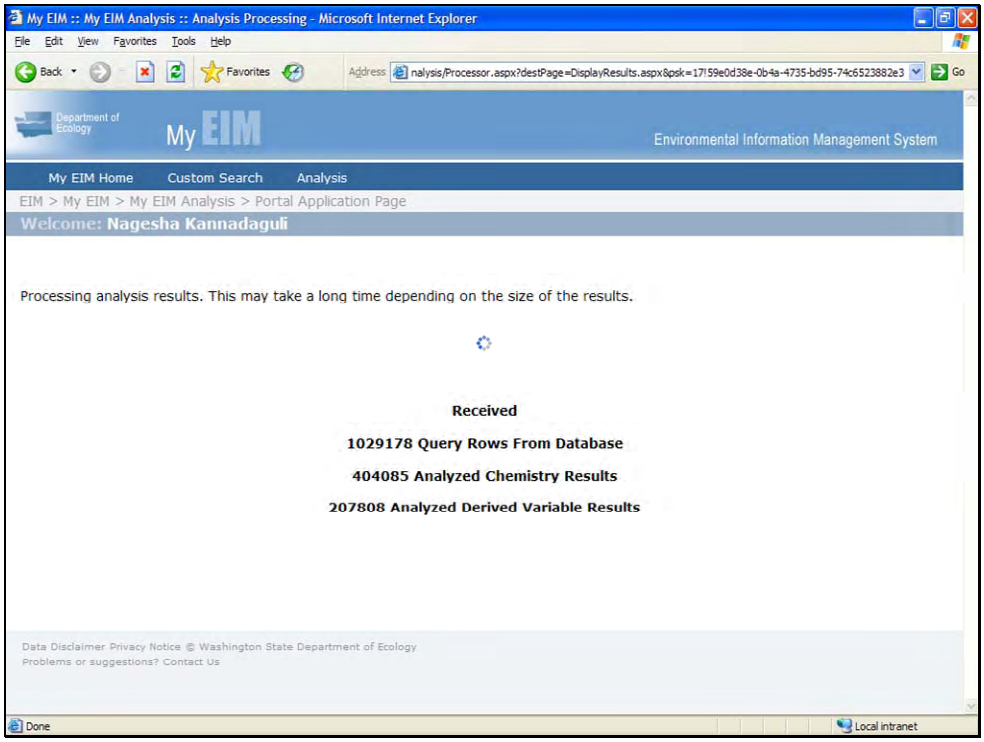
2.29


My EIM :: Portal Application :: Search definition result. - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Favorites Address http://myeim/MyEimQuery/SearchList.aspx?type=chemistry&mode=Edit&psk=17159e0d38e-0b4a-4735-bd9!
Go
Department of Ecology
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > Portal Application > Search definition result.
Welcome: Nagesha Kannadaguli
Analyze Data
Go to Map
Edit Search
Create Group
Download
Chemistry data:
1050979 records found. Page 1 of 10510
Next Last
User Study ID
User Location ID
Study Location Name
Field Activity Start Date
Sample ID
Sample Field Replicate ID
Sample Replica
1TREEISL 1TREEISL1TRE01XX 1TRE01XX 01/29/1985 ONETRE855001 U
Local intranet

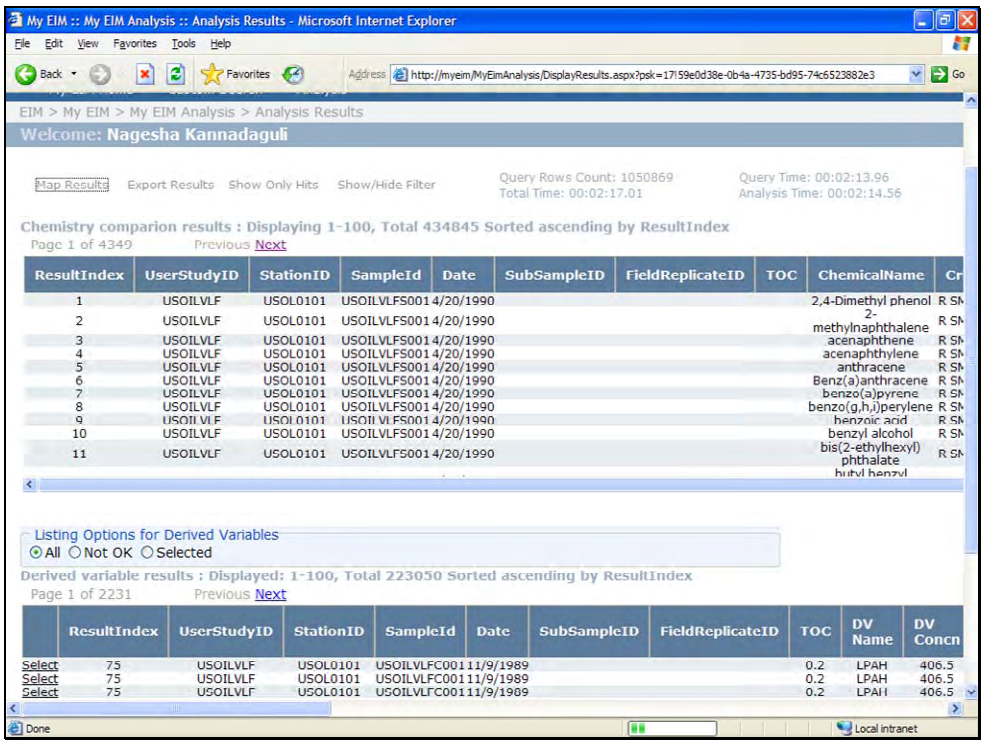
2.30


My EIM :: My EIM Analysis :: Choose Comparison Criteria - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Favorites Address http://myeim/MyEimAnalysis/CompareResults.aspx?type=chemistry&psk=17!59e0d38e-0b4a-4735-bd95-74 Go
Department of Ecology
My EIM
Environmental Information Management System
My EIM Home Custom Search Analysis
EIM > My EIM > My EIM Analysis > Choose Comparison Criteria
Welcome: Nagesha Kannadaguli
Selected Standards
WA Sediment Management Standards 1991 Marine: Sediment Quality Standards
Clear Selected Standards
Preferences
Stack Rows (default)
Include non-detects (default)
Include detects (default)
TOC Range = 0 - 100 %
Laboratory Replicates Averaged (default)
Change Preferences
Compare
Show All Standards
Cleanup Standards User Defined Cleanup Criteria Derived Variables User Defined Derived Variables
Standard Description Copy
R SMS Marine CSL WA Sediment Management Standards 1991 Marine: Cleanup Screening Level
R SMS Marine SQS WA Sediment Management Standards 1991 Marine: Sediment Quality Standards
R 1988 2AET Dry 1988 Puget Sound Estuary Program Dry Weight: 2AET
R 1988 LAET Dry 1988 Puget Sound Estuary Program Dry Weight: LAET
R 1988 LAET Dry: AMPT 1988 Puget Sound Estuary Program Dry Weight: Amphipod AET
R 1988 LAET Dry: BENA 1988 Puget Sound Estuary Program Dry Weight: Benthic AET
R 1988 LAET Dry: MICB 1988 Puget Sound Estuary Program Dry Weight: Microtox AET
R 1988 LAET Dry: OYST 1988 Puget Sound Estuary Program Dry Weight: Oyster AET
Done
Local intranet

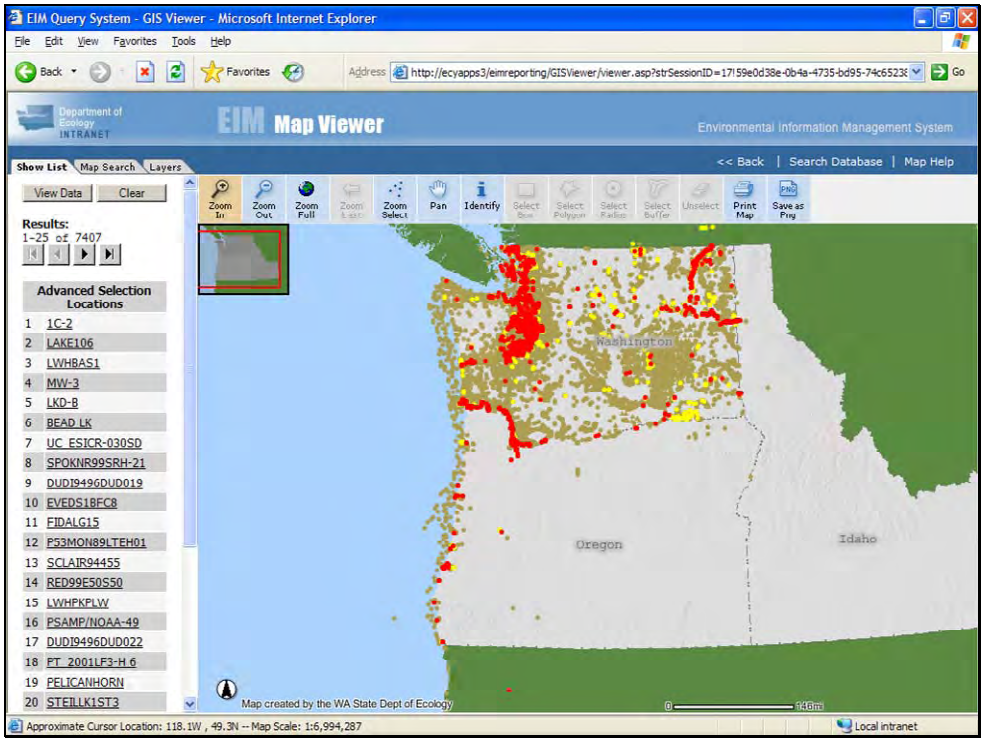
2.31


My EIM :: My EIM Analysis :: Analysis Processing - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Favorites Address nalysis/Processor.aspx?destPage=DisplayResults.aspx&psk=17!59e0d38e-0b4a-4735-bd95-74c6523882e3 Go
Department of Ecology
My EIM
Environmental Information Management System
My EIM Home Custom Search Analysis
EIM > My EIM > My EIM Analysis > Portal Application Page
Welcome: Nagesha Kannadaguli
Processing analysis results. This may take a long time depending on the size of the results.
Received
1029178 Query Rows From Database
404085 Analyzed Chemistry Results
207808 Analyzed Derived Variable Results
Data Disclaimer Privacy Notice © Washington State Department of Ecology
Problems or suggestions? Contact Us
Done
Local intranet

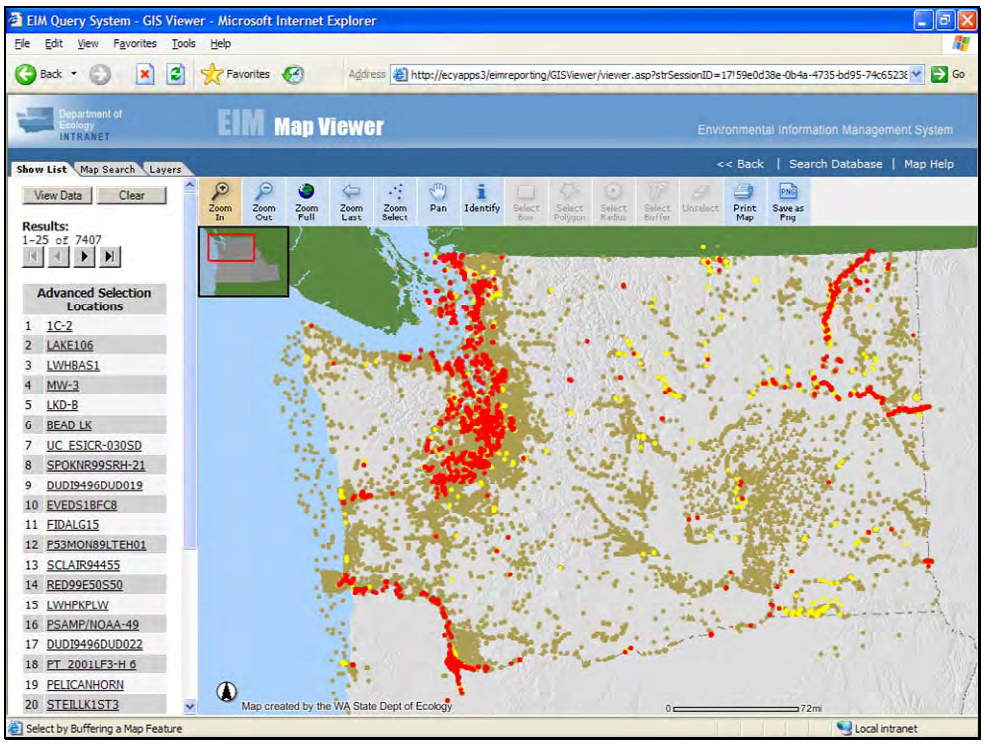
2.32


My EIM :: My EIM Analysis :: Analysis Results - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Favorites Address http://myeim/MyEimAnalysis/DisplayResults.aspx?psk=17!59e0d38e-0b4a-4735-bd95-74c6523882e3 Go
EIM > My EIM > My EIM Analysis > Analysis Results
Welcome: Nagesha Kannadaguli
Map Results Export Results Show Only Hits Show/Hide Filter
Query Rows Count: 1050869
Total Time: 00:02:17.01
Query Time: 00:02:13.96
Analysis Time: 00:02:14.56
Chemistry comparion results : Displaying 1-100, Total 434845 Sorted ascending by ResultIndex
Page 1 of 4349 Previous Next
ResultIndex UserStudyID StationID SampleId Date SubSampleID FieldReplicateID TOC ChemicalName
1 USOILVLF USOL0101 USOILVLFS001 4/20/1990 2,4-Dimethyl phenol
2 USOILVLF USOL0101 USOILVLFS001 4/20/1990 2-methylnaphthalene
3 USOILVLF USOL0101 USOILVLFS001 4/20/1990 acenaphthene
4 USOILVLF USOL0101 USOILVLFS001 4/20/1990 acenaphthylene
5 USOILVLF USOL0101 USOILVLFS001 4/20/1990 anthracene
6 USOILVLF USOL0101 USOILVLFS001 4/20/1990 Benz(a)anthracene
7 USOILVLF USOL0101 USOILVLFS001 4/20/1990 benzo(a)pyrene
8 USOILVLF USOL0101 USOILVLFS001 4/20/1990 benzo(g,h,i)perylene
9 USOILVLF USOL0101 USOILVLFS001 4/20/1990 benzoic acid
10 USOILVLF USOL0101 USOILVLFS001 4/20/1990 benzyl alcohol
11 USOILVLF USOL0101 USOILVLFS001 4/20/1990 bis(2-ethylhexyl) phthalate
Listing Options for Derived Variables
All Not OK Selected
Derived variable results : Displayed: 1-100, Total 223050 Sorted ascending by ResultIndex
Page 1 of 2231 Previous Next
ResultIndex UserStudyID StationID SampleId Date SubSampleID FieldReplicateID TOC DV Name DV Concn
Select 75 USOILVLF USOL0101 USOILVLFC001 11/9/1989 0.2 LPAH 406.5
Select 75 USOILVLF USOL0101 USOILVLFC001 11/9/1989 0.2 LPAH 406.5
Select 75 USOILVLF USOL0101 USOILVLFC001 11/9/1989 0.2 LPAH 406.5
Done
Local intranet

2.33


EIM Query System - GIS Viewer - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Favorites Address http://ecyapps3/eimreporting/GISViewer/viewer.asp?strSessionID=17!59e0d38e-0b4a-4735-bd95-74c6523 Go
Department of Ecology INTRANET
EIM Map Viewer
Environmental Information Management System
<< Back | Search Database | Map Help
Show List Map Search Layers
View Data Clear
Results:
1-25 of 7407
Advanced Selection Locations
1 1C-2
2 LAKE106
3 LWHBAS1
4 MW-3
5 LKD-B
6 BEAD LK
7 UC_ESICR-030SD
8 SPOKNR99SRH-21
9 DUDI9496DUD019
10 EVEDS1BFC8
11 FIDALG15
12 P53MON89LTEH01
13 SCLAIR94455
14 RED99E50S50
15 LWHPKPLW
16 PSAMP/NOAA-49
17 DUDI9496DUD022
18 PT_2001LF3-H 6
19 PELICANHORN
20 STEILLK1ST3
Zoom In Zoom Out Zoom Full Zoom Last Zoom Select Pan Identify Select Box Select Polygon Select Radius Select Buffer Unselect Print Map Save as Png
Washington
Oregon
Idaho
Map created by the WA State Dept of Ecology
Approximate Cursor Location: 118.1W , 49.3N -- Map Scale: 1:6,994,287
Local intranet

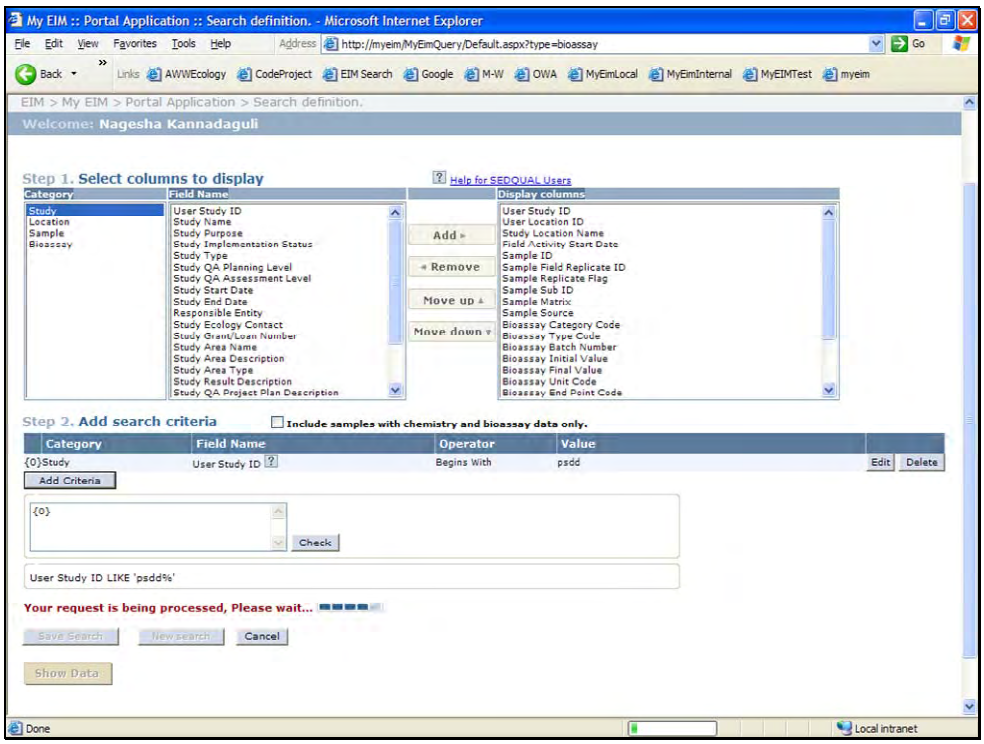
2.34



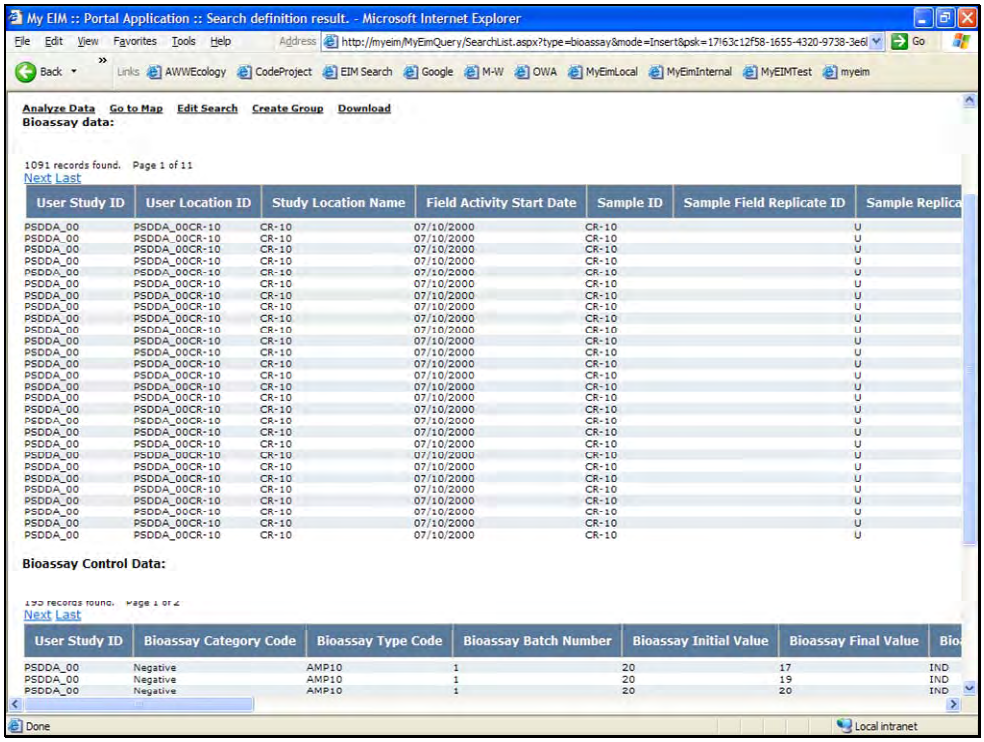
2.35

Bioassay Analysis

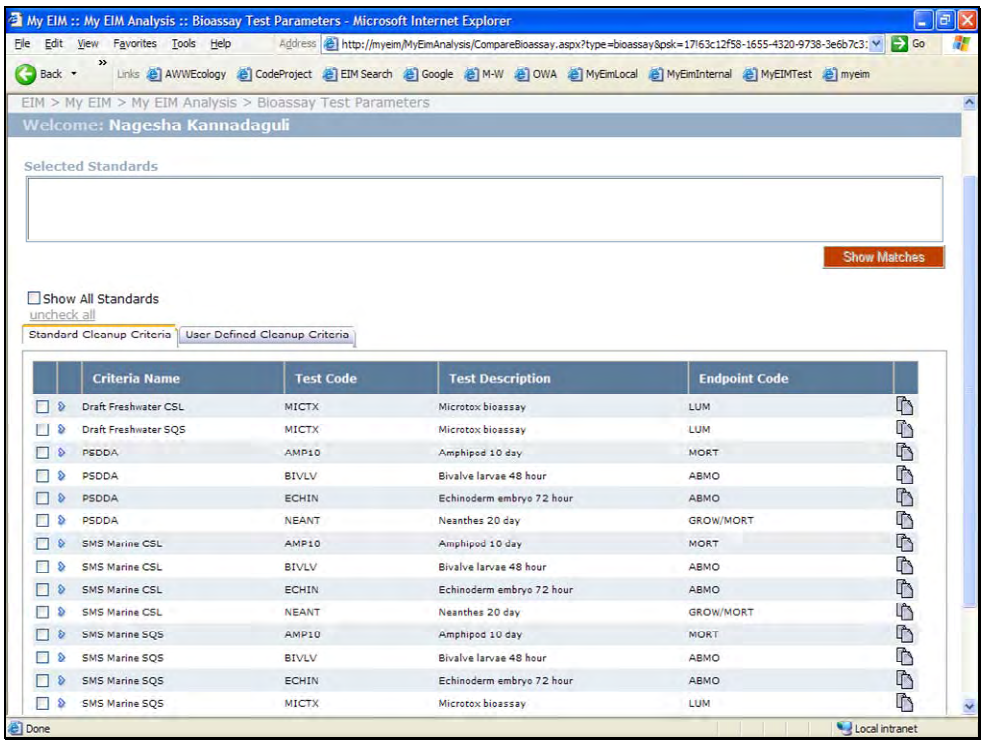
2.36


My EIM :: Portal Application :: Search definition. - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://myeim/MyEimQuery/Default.aspx?type=bioassay
Back
Links AWWEcology CodeProject EIM Search Google M-W OWA MyEimLocal MyEimInternal MyEIMTest myeim
EIM > My EIM > Portal Application > Search definition.
Welcome: Nagesha Kannadaguli
Step 1. Select columns to display
Help for SEDQUAL Users
Category
Field Name
Display columns
Study
Location
Sample
Bioassay
User Study ID
Study Name
Study Purpose
Study Implementation Status
Study Type
Study QA Planning Level
Study QA Assessment Level
Study Start Date
Study End Date
Responsible Entity
Study Ecology Contact
Study Area Name
Study Area Description
Study Area Type
Study Result Description
Study QA Project Plan Description
Add »
« Remove
Move up
Move down
User Study ID
User Location ID
Study Location Name
Field Activity Start Date
Sample ID
Sample Field Replicate ID
Sample Replicate Flag
Sample Sub ID
Sample Matrix
Sample Source
Bioassay Category Code
Bioassay Type Code
Bioassay Batch Number
Bioassay Initial Value
Bioassay Final Value
Bioassay Unit Code
Bioassay End Point Code
Step 2. Add search criteria
Include samples with chemistry and bioassay data only.
Category
Field Name
Operator
Value
{0}Study
User Study ID
Begins With
psdd
Edit
Delete
Add Criteria
{0}
Check
User Study ID LIKE 'psdd%'
Your request is being processed, Please wait...
Save Search
New search
Cancel
Show Data
Done
Local intranet

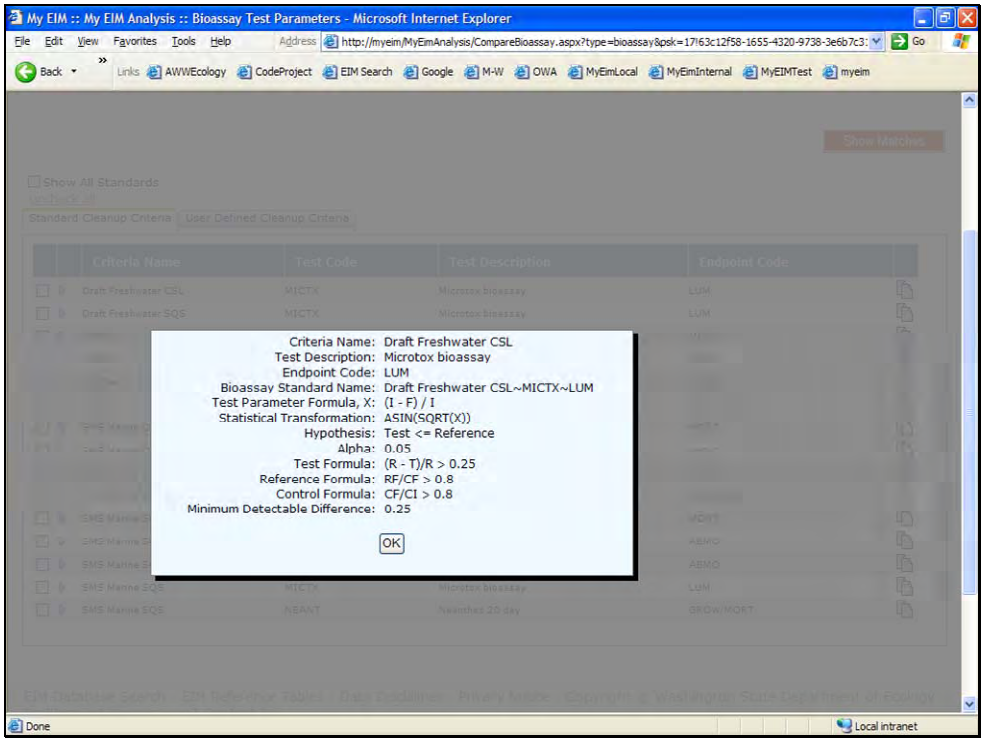
2.37


My EIM :: Portal Application :: Search definition result. - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://myeim/MyEimQuery/SearchList.aspx?type=bioassay&mode=Insert&psk=17163c12f58-1655-4320-9738-3e6
Back
Links AWWEcology CodeProject EIM Search Google M-W OWA MyEimLocal MyEimInternal MyEIMTest myeim
Analyze Data
Go to Map
Edit Search
Create Group
Download
Bioassay data:
1091 records found. Page 1 of 11
Next Last
User Study ID
User Location ID
Study Location Name
Field Activity Start Date
Sample ID
Sample Field Replicate ID
Sample Replica
PSDDA_00 PSDDA_00CR-10 CR-10 07/10/2000 CR-10 U
Bioassay Control Data:
Next Last
User Study ID
Bioassay Category Code
Bioassay Type Code
Bioassay Batch Number
Bioassay Initial Value
Bioassay Final Value
Bio
PSDDA_00 Negative AMP10 1 20 17 IND
PSDDA_00 Negative AMP10 1 20 19 IND
PSDDA_00 Negative AMP10 1 20 20 IND
Done
Local intranet

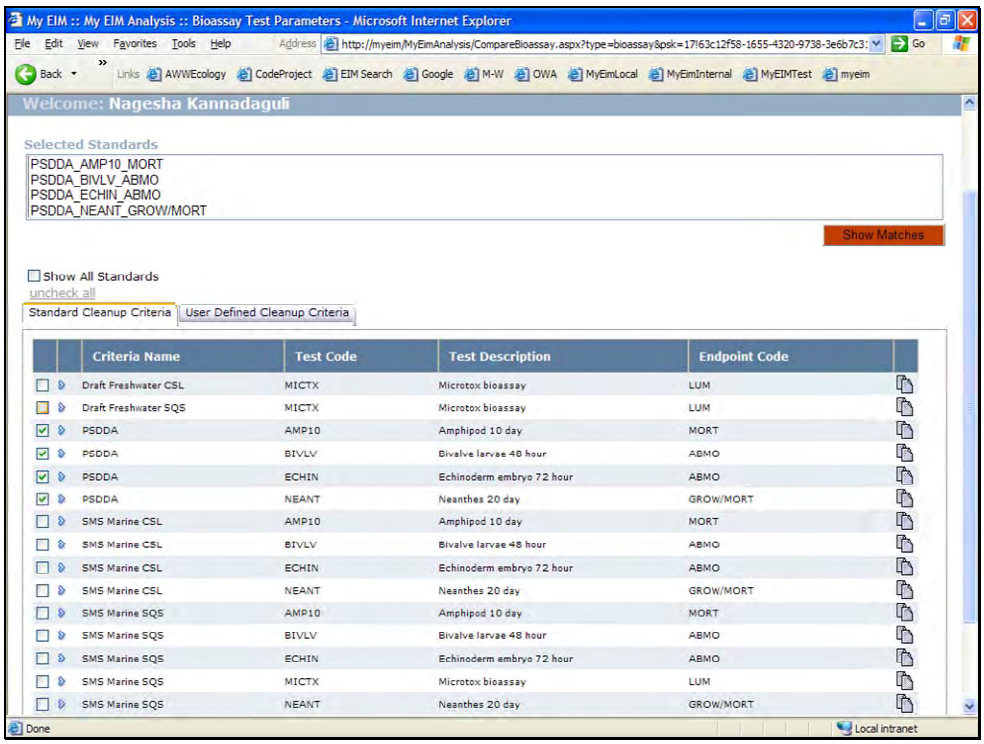
2.38


My EIM :: My EIM Analysis :: Bioassay Test Parameters - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://myeim/MyEimAnalysis/CompareBioassay.aspx?type=bioassay&psk=17f63c12f58-1655-4320-9738-3e6b7c3:
Go
Back
Links AWWEcology CodeProject EIM Search Google M-W OWA MyEimLocal MyEimInternal MyEIMTest myeim
EIM > My EIM > My EIM Analysis > Bioassay Test Parameters
Welcome: Nagesha Kannadaguli
Selected Standards
Show Matches
Show All Standards
uncheck all
Standard Cleanup Criteria
User Defined Cleanup Criteria
Criteria Name
Test Code
Test Description
Endpoint Code
Draft Freshwater CSL MICTX Microtox bioassay LUM
Draft Freshwater SQS MICTX Microtox bioassay LUM
PSDDA AMP10 Amphipod 10 day MORT
PSDDA BIVLV Bivalve larvae 48 hour ABMO
PSDDA ECHIN Echinoderm embryo 72 hour ABMO
PSDDA NEANT Neanthes 20 day GROW/MORT
SMS Marine CSL AMP10 Amphipod 10 day MORT
SMS Marine CSL BIVLV Bivalve larvae 48 hour ABMO
SMS Marine CSL ECHIN Echinoderm embryo 72 hour ABMO
SMS Marine CSL NEANT Neanthes 20 day GROW/MORT
SMS Marine SQS AMP10 Amphipod 10 day MORT
SMS Marine SQS BIVLV Bivalve larvae 48 hour ABMO
SMS Marine SQS ECHIN Echinoderm embryo 72 hour ABMO
SMS Marine SQS MICTX Microtox bioassay LUM
Done
Local intranet

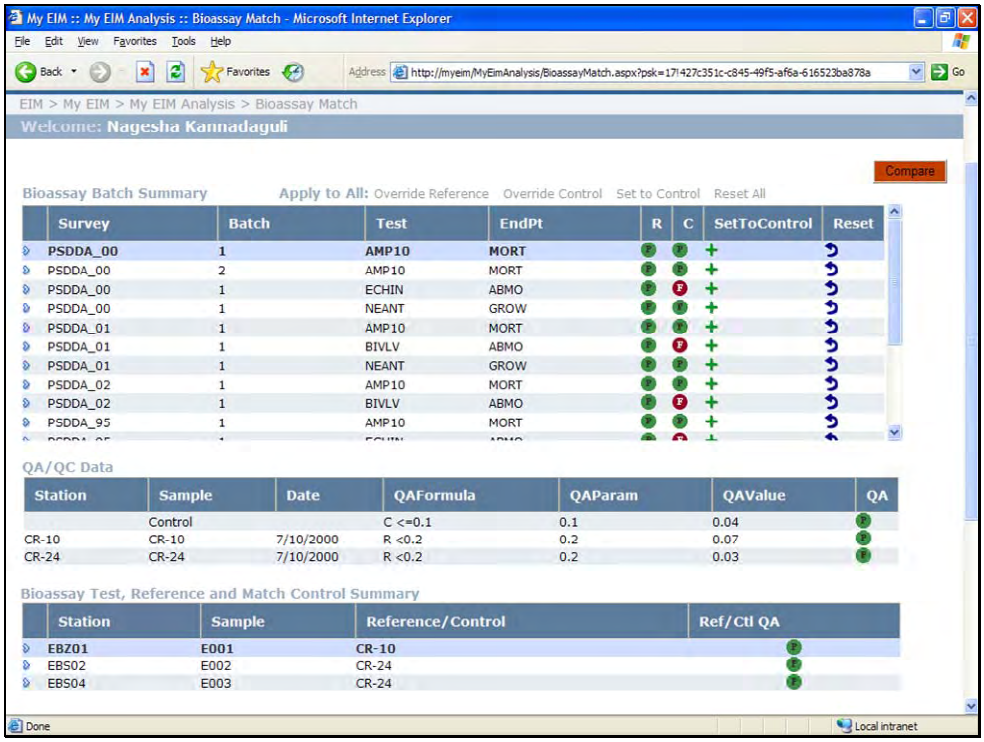
2.39


My EIM :: My EIM Analysis :: Bioassay Test Parameters - Microsoft Internet Explorer
Criteria Name: Draft Freshwater CSL
Test Description: Microtox bioassay
Endpoint Code: LUM
Bioassay Standard Name: Draft Freshwater CSL~MICTX~LUM
Test Parameter Formula, X: (I - F) / I
Statistical Transformation: ASIN(SQRT(X))
Hypothesis: Test <= Reference
Alpha: 0.05
Test Formula: (R - T)/R > 0.25
Reference Formula: RF/CF > 0.8
Control Formula: CF/CI > 0.8
Minimum Detectable Difference: 0.25
OK

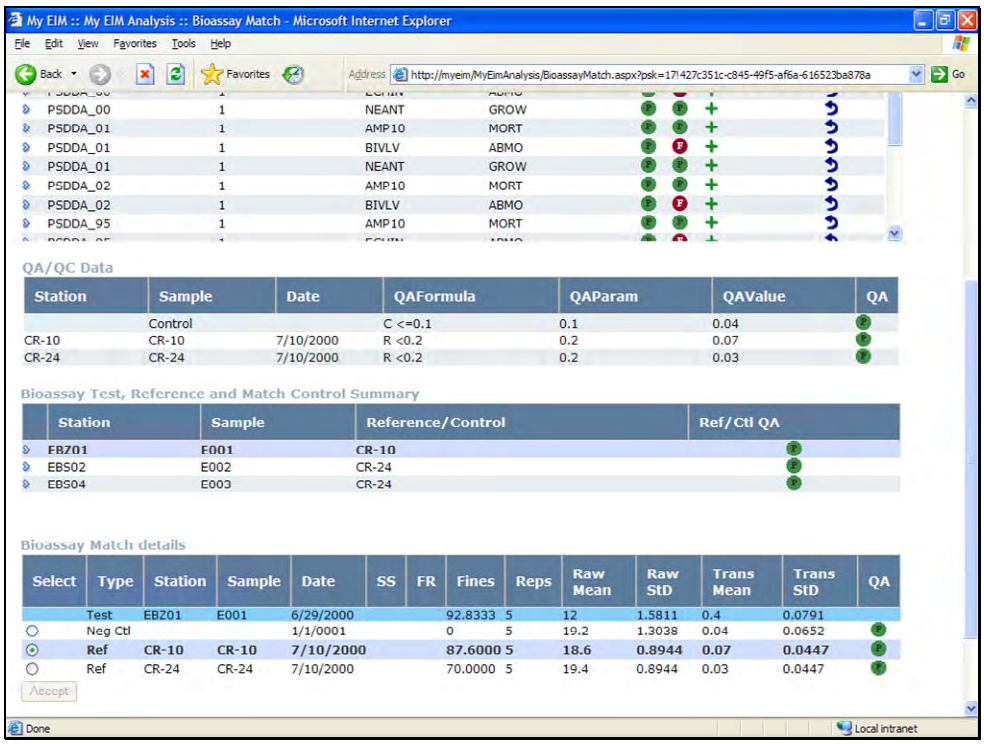
2.40


My EIM :: My EIM Analysis :: Bioassay Test Parameters - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://myeim/MyEimAnalysis/CompareBioassay.aspx?type=bioassay&psk=17f63c12f58-1655-4320-9738-3e6b7c3:
Go
Back
Links AWWEcology CodeProject EIM Search Google M-W OWA MyEimLocal MyEimInternal MyEIMTest myeim
Welcome: Nagesha Kannadaguli
Selected Standards
PSDDA_AMP10_MORT
PSDDA_BIVLV_ABMO
PSDDA_ECHIN_ABMO
PSDDA_NEANT_GROW/MORT
Show Matches
Show All Standards
uncheck all
Standard Cleanup Criteria
User Defined Cleanup Criteria
Criteria Name
Test Code
Test Description
Endpoint Code
Draft Freshwater CSL MICTX Microtox bioassay LUM
Draft Freshwater SQS MICTX Microtox bioassay LUM
PSDDA AMP10 Amphipod 10 day MORT
PSDDA BIVLV Bivalve larvae 48 hour ABMO
PSDDA ECHIN Echinoderm embryo 72 hour ABMO
PSDDA NEANT Neanthes 20 day GROW/MORT
SMS Marine CSL AMP10 Amphipod 10 day MORT
SMS Marine CSL BIVLV Bivalve larvae 48 hour ABMO
SMS Marine CSL ECHIN Echinoderm embryo 72 hour ABMO
SMS Marine CSL NEANT Neanthes 20 day GROW/MORT
SMS Marine SQS AMP10 Amphipod 10 day MORT
SMS Marine SQS BIVLV Bivalve larvae 48 hour ABMO
SMS Marine SQS ECHIN Echinoderm embryo 72 hour ABMO
SMS Marine SQS MICTX Microtox bioassay LUM
SMS Marine SQS NEANT Neanthes 20 day GROW/MORT
Done
Local intranet

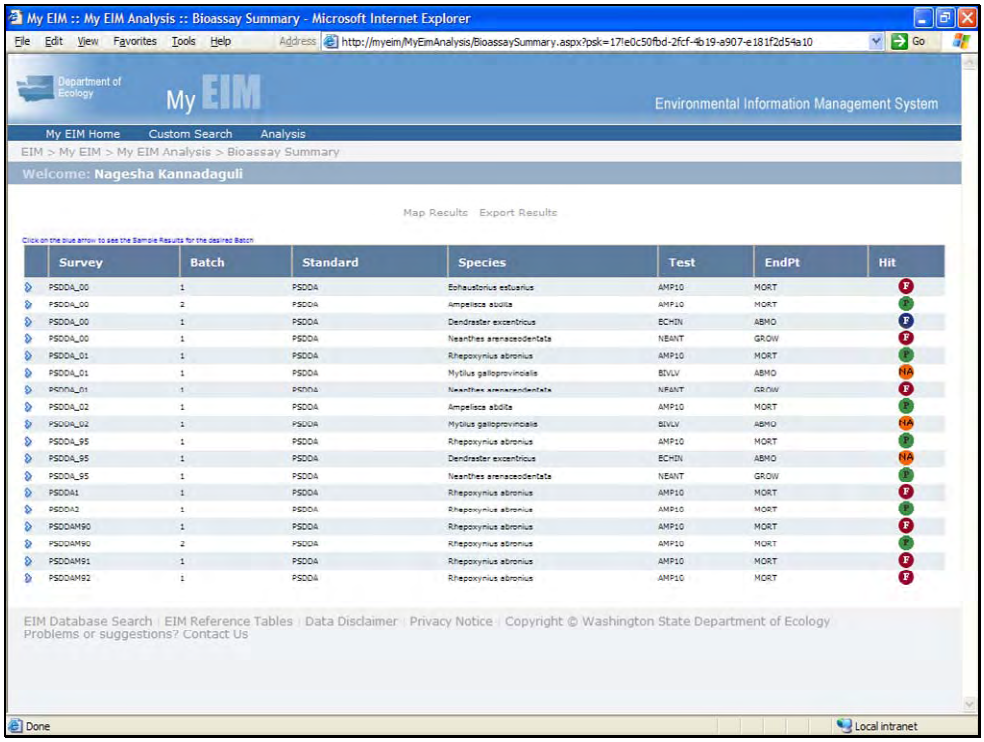
2.41


My EIM :: My EIM Analysis :: Bioassay Match - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Favorites
Address http://myeim/MyEimAnalysis/BioassayMatch.aspx?psk=17f427c351c-c845-49f5-af6a-616523ba878a
Go
EIM > My EIM > My EIM Analysis > Bioassay Match
Welcome: Nagesha Kannadaguli
Compare
Bioassay Batch Summary
Apply to All: Override Reference Override Control Set to Control Reset All
Survey
Batch
Test
EndPt
R
C
SetToControl
Reset
PSDDA_00 1 AMP10 MORT
PSDDA_00 2 AMP10 MORT
PSDDA_00 1 ECHIN ABMO
PSDDA_00 1 NEANT GROW
PSDDA_01 1 AMP10 MORT
PSDDA_01 1 BIVLV ABMO
PSDDA_01 1 NEANT GROW
PSDDA_02 1 AMP10 MORT
PSDDA_02 1 BIVLV ABMO
PSDDA_95 1 AMP10 MORT
QA/QC Data
Station
Sample
Date
QAFormula
QAParam
QAValue
QA
Control C <=0.1 0.1 0.04
CR-10 CR-10 7/10/2000 R <0.2 0.2 0.07
CR-24 CR-24 7/10/2000 R <0.2 0.2 0.03
Bioassay Test, Reference and Match Control Summary
Station
Sample
Reference/Control
Ref/Ctl QA
EBZ01 E001 CR-10
EBS02 E002 CR-24
EBS04 E003 CR-24
Done
Local intranet

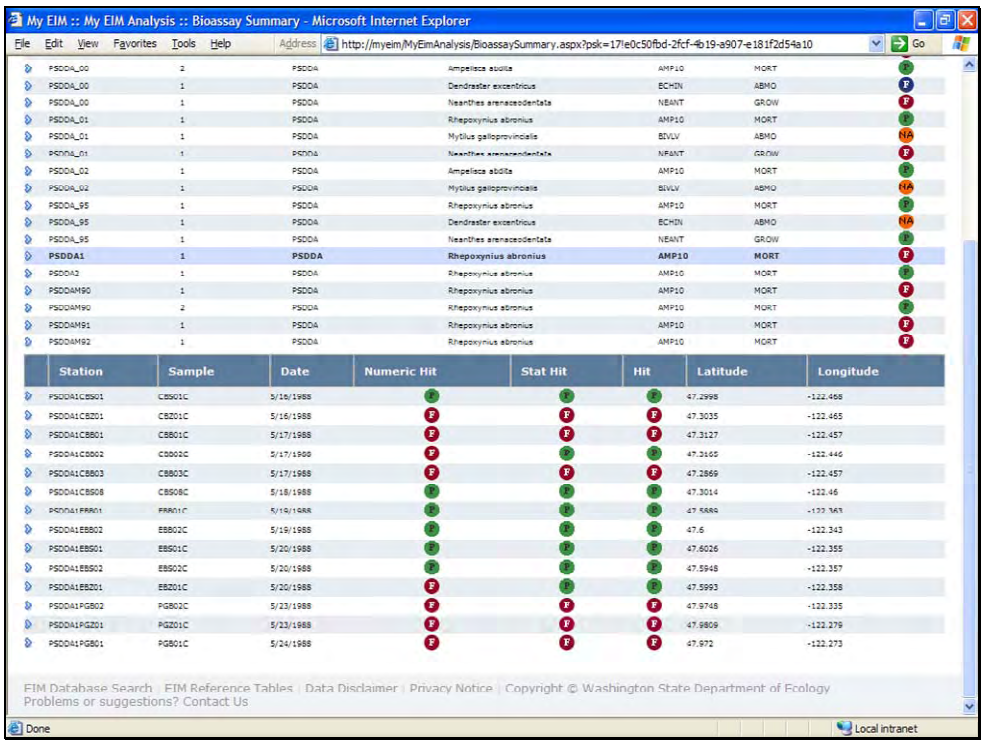
2.42


My EIM :: My EIM Analysis :: Bioassay Match - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Favorites Address http://myeim/MyEimAnalysis/BioassayMatch.aspx?psk=17!427c351c-c845-49f5-af6a-616523ba878a Go
PSDDA_00 1 NEANT GROW
PSDDA_01 1 AMP10 MORT
PSDDA_01 1 BIVLV ABMO
PSDDA_01 1 NEANT GROW
PSDDA_02 1 AMP10 MORT
PSDDA_02 1 BIVLV ABMO
PSDDA_95 1 AMP10 MORT
QA/QC Data
Station Sample Date QAFormula QAParam QAValue QA
Control C <=0.1 0.1 0.04
CR-10 CR-10 7/10/2000 R <0.2 0.2 0.07
CR-24 CR-24 7/10/2000 R <0.2 0.2 0.03
Bioassay Test, Reference and Match Control Summary
Station Sample Reference/Control Ref/Ctl QA
EBZ01 E001 CR-10
EBS02 E002 CR-24
EBS04 E003 CR-24
Bioassay Match details
Select Type Station Sample Date SS FR Fines Reps Raw Mean Raw StD Trans Mean Trans StD QA
Test EBZ01 E001 6/29/2000 92.8333 5 12 1.5811 0.4 0.0791
Neg Ctl 1/1/0001 0 5 19.2 1.3038 0.04 0.0652
Ref CR-10 CR-10 7/10/2000 87.6000 5 18.6 0.8944 0.07 0.0447
Ref CR-24 CR-24 7/10/2000 70.0000 5 19.4 0.8944 0.03 0.0447
Accept
Done
Local intranet

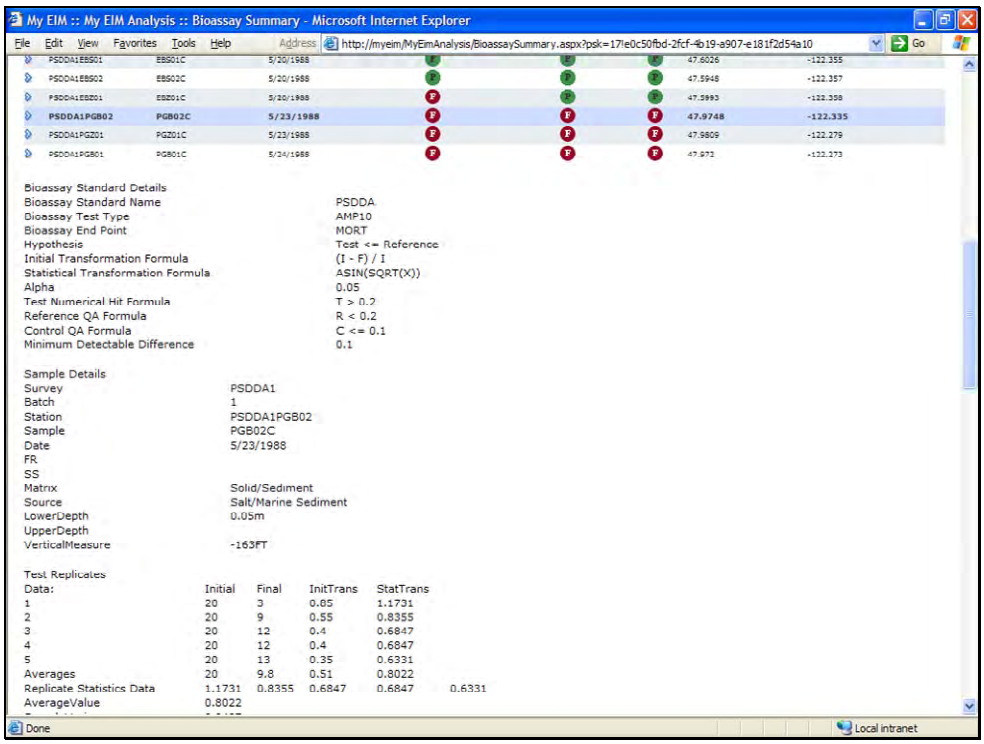
2.43


My EIM :: My EIM Analysis :: Bioassay Summary - Microsoft Internet Explorer
File Edit View Favorites Tools Help Address http://myeim/MyEimAnalysis/BioassaySummary.aspx?psk=17!e0c50fbd-2fcf-4b19-a907-e181f2d54a10 Go
Department of Ecology
My EIM
Environmental Information Management System
My EIM Home Custom Search Analysis
EIM > My EIM > My EIM Analysis > Bioassay Summary
Welcome: Nagesha Kannadaguli
Map Results Export Results
Click on the blue arrow to see the Sample Results for the desired Batch
Survey Batch Standard Species Test EndPt Hit
PSDDA_00 1 PSDDA Eohaustorius estuarius AMP10 MORT F
PSDDA_00 2 PSDDA Ampelisca abdita AMP10 MORT P
PSDDA_00 1 PSDDA Dendraster excentricus ECHIN ABMO F
PSDDA_00 1 PSDDA Neanthes arenaceodentata NEANT GROW F
PSDDA_01 1 PSDDA Rhepoxynius abronius AMP10 MORT P
PSDDA_01 1 PSDDA Mytilus galloprovincialis BIVLV ABMO NA
PSDDA_01 1 PSDDA Neanthes arenaceodentata NEANT GROW F
PSDDA_02 1 PSDDA Ampelisca abdita AMP10 MORT P
PSDDA_02 1 PSDDA Mytilus galloprovincialis BIVLV ABMO NA
PSDDA_95 1 PSDDA Rhepoxynius abronius AMP10 MORT P
PSDDA_95 1 PSDDA Dendraster excentricus ECHIN ABMO NA
PSDDA_95 1 PSDDA Neanthes arenaceodentata NEANT GROW P
PSDDA1 1 PSDDA Rhepoxynius abronius AMP10 MORT F
PSDDA2 1 PSDDA Rhepoxynius abronius AMP10 MORT P
PSDDAM90 1 PSDDA Rhepoxynius abronius AMP10 MORT F
PSDDAM90 2 PSDDA Rhepoxynius abronius AMP10 MORT P
PSDDAM91 1 PSDDA Rhepoxynius abronius AMP10 MORT F
PSDDAM92 1 PSDDA Rhepoxynius abronius AMP10 MORT F
EIM Database Search | EIM Reference Tables | Data Disclaimer | Privacy Notice | Copyright © Washington State Department of Ecology
Problems or suggestions? Contact Us
Done
Local intranet

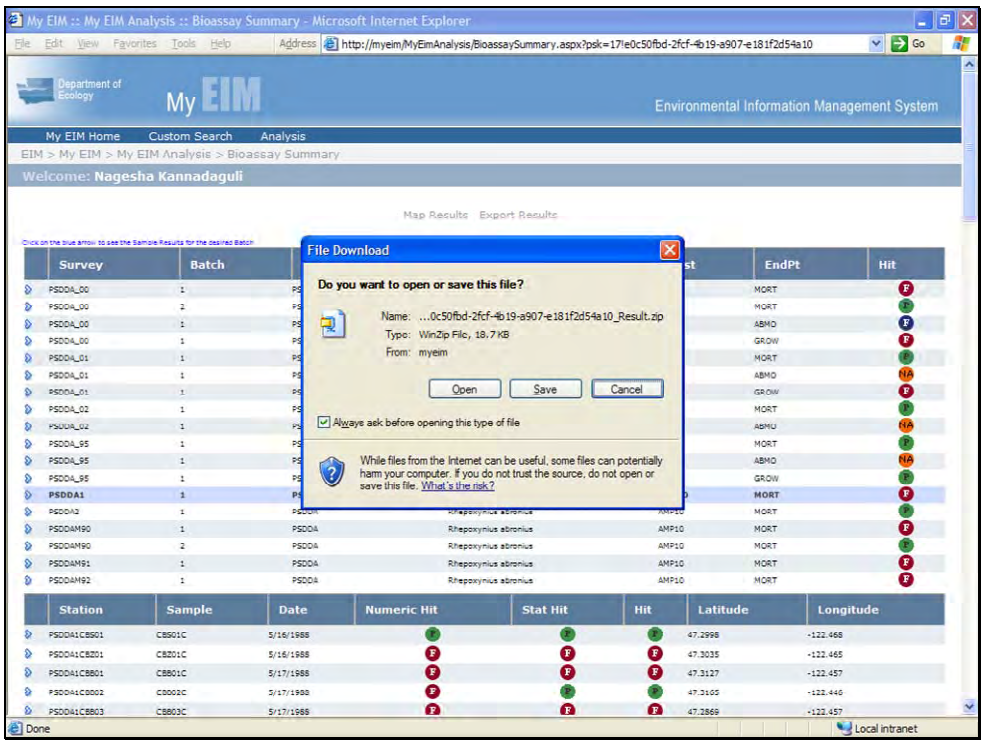
2.44


My EIM :: My EIM Analysis :: Bioassay Summary - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://myeim/MyEimAnalysis/BioassaySummary.aspx?psk=17fe0c50fbd-2fcf-4b19-a907-e181f2d54a10
Go
PSDDA_00 2 PSDDA Ampelisca abdita AMP10 MORT
PSDDA_00 1 PSDDA Dendraster excentricus ECHIN ABMO
PSDDA_00 1 PSDDA Neanthes arenaceodentata NEANT GROW
PSDDA_01 1 PSDDA Rhepoxynius abronius AMP10 MORT
PSDDA_01 1 PSDDA Mytilus galloprovincialis BIVLV ABMO
PSDDA_01 1 PSDDA Neanthes arenaceodentata NEANT GROW
PSDDA_02 1 PSDDA Ampelisca abdita AMP10 MORT
PSDDA_02 1 PSDDA Mytilus galloprovincialis BIVLV ABMO
PSDDA_95 1 PSDDA Rhepoxynius abronius AMP10 MORT
PSDDA_95 1 PSDDA Dendraster excentricus ECHIN ABMO
PSDDA_95 1 PSDDA Neanthes arenaceodentata NEANT GROW
PSDDA1 1 PSDDA Rhepoxynius abronius AMP10 MORT
PSDDA2 1 PSDDA Rhepoxynius abronius AMP10 MORT
PSDDAM90 1 PSDDA Rhepoxynius abronius AMP10 MORT
PSDDAM90 2 PSDDA Rhepoxynius abronius AMP10 MORT
PSDDAM91 1 PSDDA Rhepoxynius abronius AMP10 MORT
PSDDAM92 1 PSDDA Rhepoxynius abronius AMP10 MORT
Station Sample Date Numeric Hit Stat Hit Hit Latitude Longitude
PSDDA1CBS01 CBS01C 5/16/1988 47.2998 -122.468
PSDDA1CBZ01 CBZ01C 5/16/1988 47.3035 -122.465
PSDDA1CBB01 CBB01C 5/17/1988 47.3127 -122.457
PSDDA1CBB02 CBB02C 5/17/1988 47.3165 -122.446
PSDDA1CBB03 CBB03C 5/17/1988 47.2869 -122.457
PSDDA1CBS08 CBS08C 5/18/1988 47.3014 -122.46
PSDDA1EBB02 EBB02C 5/19/1988 47.6 -122.343
PSDDA1EBS01 EBS01C 5/20/1988 47.6026 -122.355
PSDDA1EBS02 EBS02C 5/20/1988 47.5948 -122.357
PSDDA1EBZ01 EBZ01C 5/20/1988 47.5993 -122.358
PSDDA1PGB02 PGB02C 5/23/1988 47.9748 -122.335
PSDDA1PGZ01 PGZ01C 5/23/1988 47.9809 -122.279
PSDDA1PGB01 PGB01C 5/24/1988 47.972 -122.273
EIM Database Search | EIM Reference Tables | Data Disclaimer | Privacy Notice | Copyright © Washington State Department of Ecology
Problems or suggestions? Contact Us
Done
Local intranet

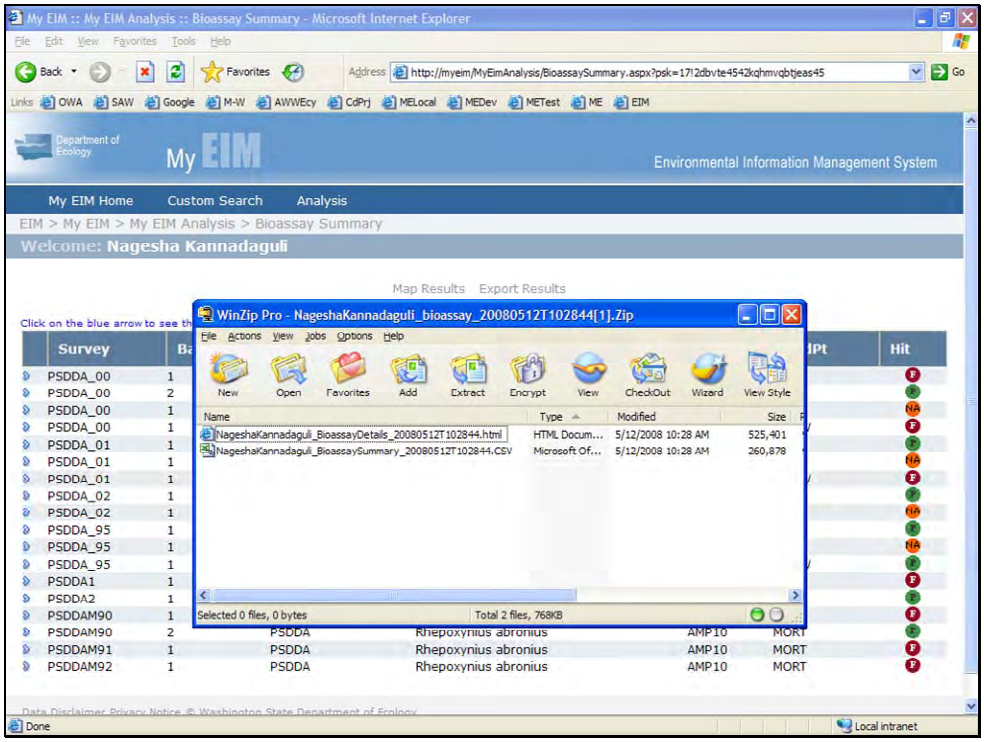
2.45


My EIM :: My EIM Analysis :: Bioassay Summary - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://myeim/MyEimAnalysis/BioassaySummary.aspx?psk=17fe0c50fbd-2fcf-4b19-a907-e181f2d54a10
Go
PSDDA1EBS01 EBS01C 5/20/1988 47.6026 -122.355
PSDDA1EBS02 EBS02C 5/20/1988 47.5948 -122.357
PSDDA1EBZ01 EBZ01C 5/20/1988 47.5993 -122.358
PSDDA1PGB02 PGB02C 5/23/1988 47.9748 -122.335
PSDDA1PGZ01 PGZ01C 5/23/1988 47.9809 -122.279
PSDDA1PGB01 PGB01C 5/24/1988 47.972 -122.273
Bioassay Standard Details
Bioassay Standard Name PSDDA
Bioassay Test Type AMP10
Bioassay End Point MORT
Hypothesis Test <= Reference
Initial Transformation Formula (I - F) / I
Statistical Transformation Formula ASIN(SQRT(X))
Alpha 0.05
Test Numerical Hit Formula T > 0.2
Reference QA Formula R < 0.2
Control QA Formula C <= 0.1
Minimum Detectable Difference 0.1
Sample Details
Survey PSDDA1
Batch 1
Station PSDDA1PGB02
Sample PGB02C
Date 5/23/1988
FR
SS
Matrix Solid/Sediment
Source Salt/Marine Sediment
LowerDepth 0.05m
UpperDepth
VerticalMeasure -163FT
Test Replicates
Data: Initial Final InitTrans StatTrans
1 20 3 0.05 1.1731
2 20 9 0.55 0.8355
3 20 12 0.4 0.6847
4 20 12 0.4 0.6847
5 20 13 0.35 0.6331
Averages 20 9.8 0.51 0.8022
Replicate Statistics Data 1.1731 0.8355 0.6847 0.6847 0.6331
AverageValue 0.8022
Done
Local intranet

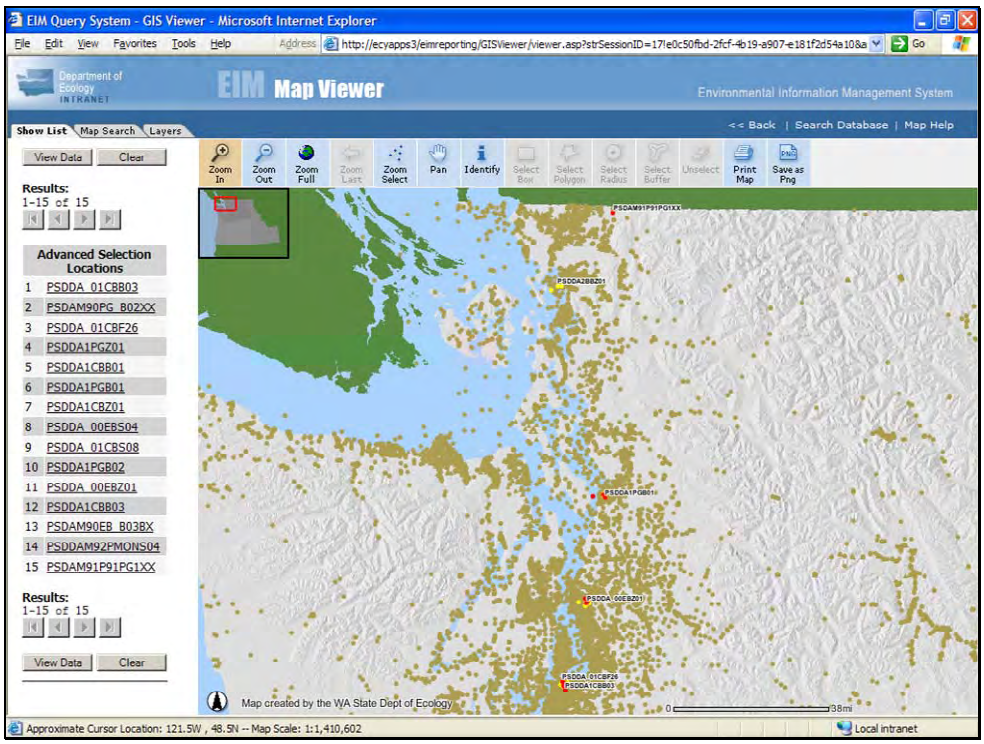
2.46


My EIM :: My EIM Analysis :: Bioassay Summary - Microsoft Internet Explorer
Department of Ecology
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > My EIM Analysis > Bioassay Summary
Welcome: Nagesha Kannadaguli
Map Results
Export Results
File Download
Do you want to open or save this file?
Name: ...0c50fbd-2fcf-4b19-a907-e181f2d54a10_Result.zip
Type: WinZip File, 18.7 KB
From: myeim
Open
Save
Cancel
Always ask before opening this type of file
While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file. What's the risk?
Survey
Batch
EndPt
Hit
Station
Sample
Date
Numeric Hit
Stat Hit
Hit
Latitude
Longitude
Done
Local intranet

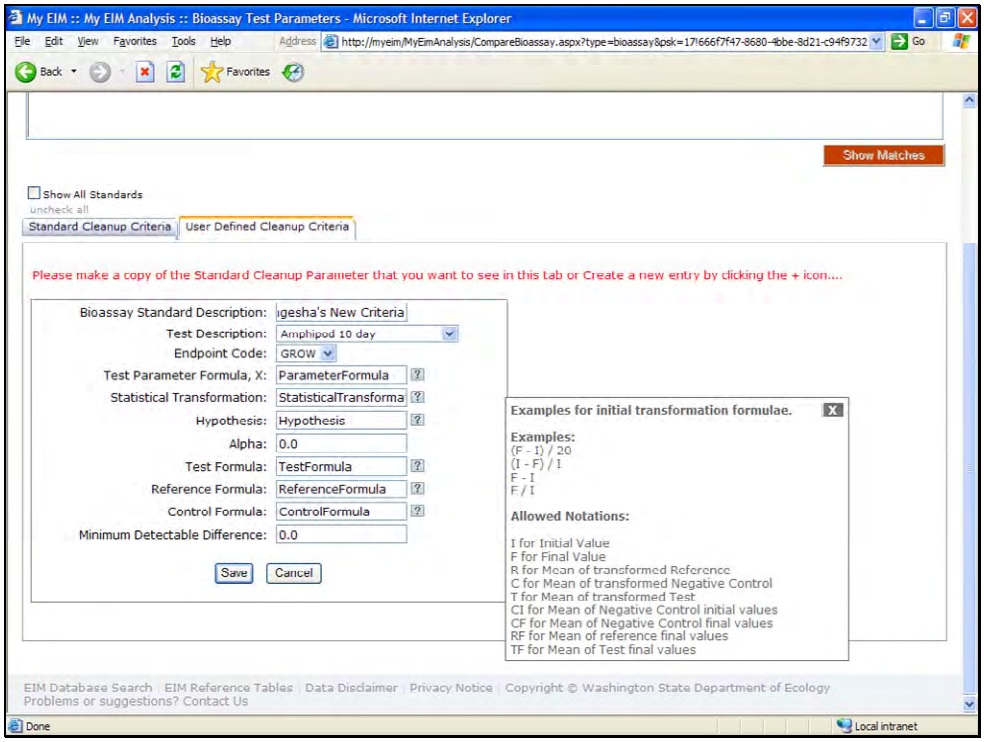
2.47


My EIM :: My EIM Analysis :: Bioassay Summary - Microsoft Internet Explorer
Department of Ecology
My EIM
Environmental Information Management System
My EIM Home
Custom Search
Analysis
EIM > My EIM > My EIM Analysis > Bioassay Summary
Welcome: Nagesha Kannadaguli
Map Results
Export Results
WinZip Pro - NageshaKannadaguli_bioassay_20080512T102844[1].Zip
New
Open
Favorites
Add
Extract
Encrypt
View
CheckOut
Wizard
View Style
NageshaKannadaguli_BioassayDetails_20080512T102844.html
NageshaKannadaguli_BioassaySummary_20080512T102844.CSV
Selected 0 files, 0 bytes
Total 2 files, 768KB
Survey
Hit
Done
Local intranet

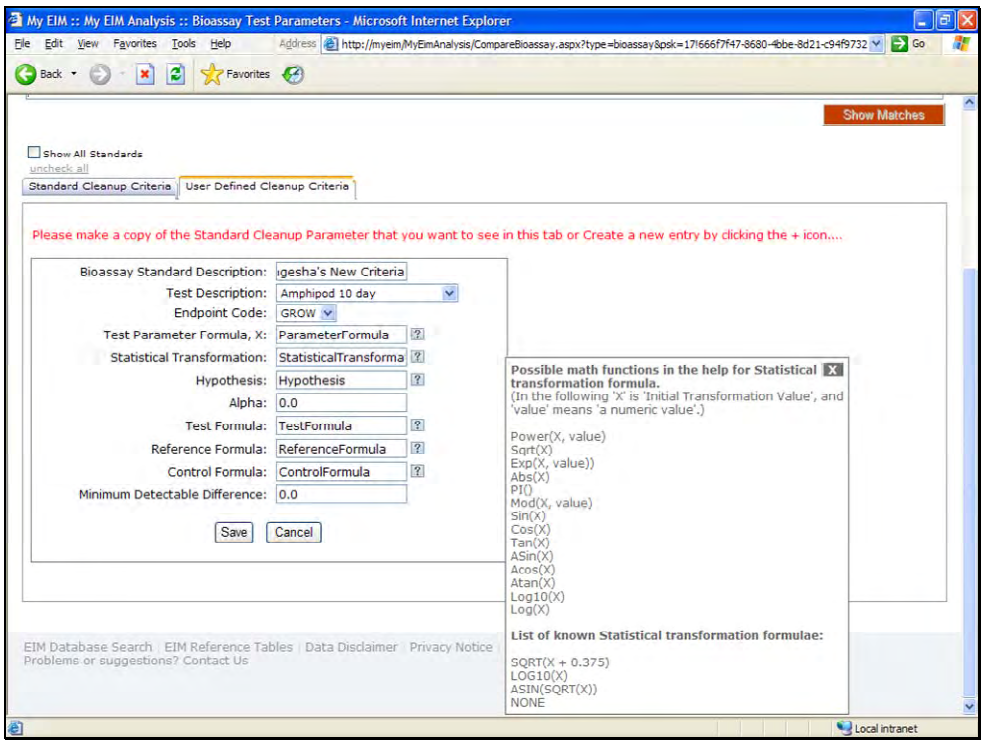
2.48


EIM Query System - GIS Viewer - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://ecyapps3/eimreporting/GISViewer/viewer.asp?strSessionID=17fe0c50fbd-2fcf-4b19-a907-e181f2d54a10&a
Go
Department of Ecology INTRANET
EIM Map Viewer
Environmental Information Management System
Show List
Map Search
Layers
<< Back | Search Database | Map Help
View Data
Clear
Zoom In
Zoom Out
Zoom Full
Zoom Last
Zoom Select
Pan
Identify
Select Box
Select Polygon
Select Radius
Select Buffer
Unselect
Print Map
Save as Png
Results:
1-15 of 15
Advanced Selection Locations
1 PSDDA_01CBB03
2 PSDAM90PG_B02XX
3 PSDDA_01CBF26
4 PSDDA1PGZ01
5 PSDDA1CBB01
6 PSDDA1PGB01
7 PSDDA1CBZ01
8 PSDDA_00EBS04
9 PSDDA_01CBS08
10 PSDDA1PGB02
11 PSDDA_00EBZ01
12 PSDDA1CBB03
13 PSDAM90EB_B03BX
14 PSDDAM92PMONS04
15 PSDAM91P91PG1XX
Results:
1-15 of 15
View Data
Clear
Map created by the WA State Dept of Ecology
0
38mi
Approximate Cursor Location: 121.5W , 48.5N -- Map Scale: 1:1,410,602
Local intranet

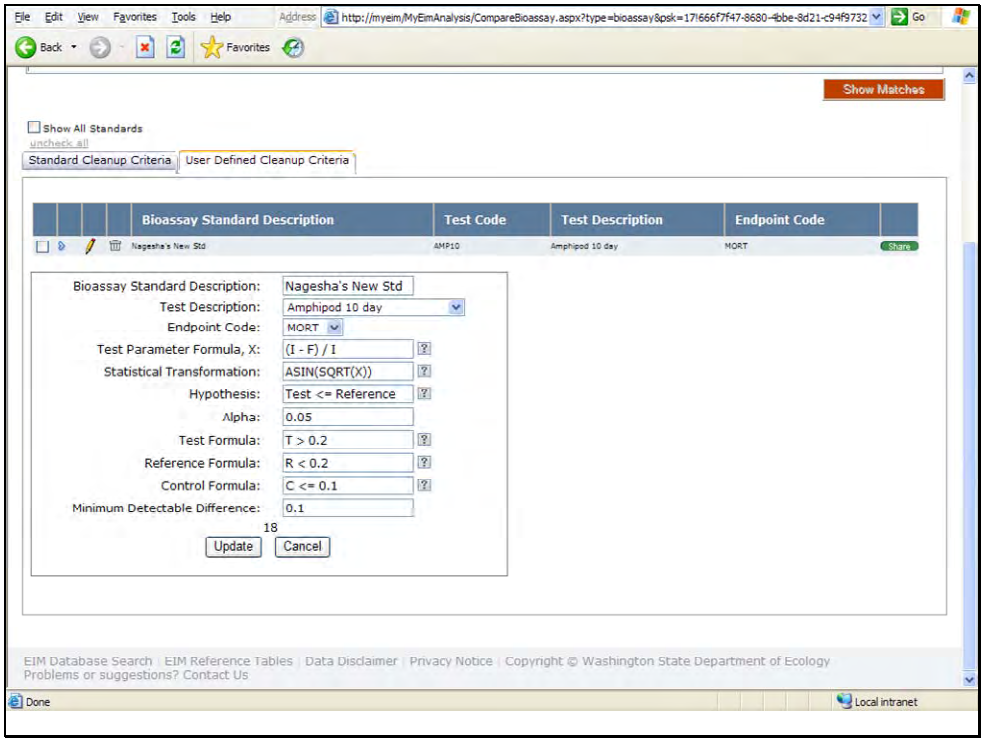
2.49


My EIM :: My EIM Analysis :: Bioassay Test Parameters - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://myeim/MyEimAnalysis/CompareBioassay.aspx?type=bioassay&psk=17f666f7f47-8680-4bbe-8d21-c94f9732
Go
Back
Favorites
Show Matches
Show All Standards
uncheck all
Standard Cleanup Criteria
User Defined Cleanup Criteria
Please make a copy of the Standard Cleanup Parameter that you want to see in this tab or Create a new entry by clicking the + icon....
Bioassay Standard Description: igesha's New Criteria
Test Description: Amphipod 10 day
Endpoint Code: GROW
Test Parameter Formula, X: ParameterFormula
Statistical Transformation: StatisticalTransforma
Hypothesis: Hypothesis
Alpha: 0.0
Test Formula: TestFormula
Reference Formula: ReferenceFormula
Control Formula: ControlFormula
Minimum Detectable Difference: 0.0
Save
Cancel
Examples for initial transformation formulae.
X
Examples:
(F - I) / 20
(I - F) / I
F - I
F / I
Allowed Notations:
I for Initial Value
F for Final Value
R for Mean of transformed Reference
C for Mean of transformed Negative Control
T for Mean of transformed Test
CI for Mean of Negative Control initial values
CF for Mean of Negative Control final values
RF for Mean of reference final values
TF for Mean of Test final values
EIM Database Search | EIM Reference Tables | Data Disclaimer | Privacy Notice | Copyright © Washington State Department of Ecology
Problems or suggestions? Contact Us
Done
Local intranet

2.50


My EIM :: My EIM Analysis :: Bioassay Test Parameters - Microsoft Internet Explorer
Show Matches
Show All Standards
uncheck all
Standard Cleanup Criteria
User Defined Cleanup Criteria
Please make a copy of the Standard Cleanup Parameter that you want to see in this tab or Create a new entry by clicking the + icon....
Bioassay Standard Description: gesha's New Criteria
Test Description: Amphipod 10 day
Endpoint Code: GROW
Test Parameter Formula, X: ParameterFormula
Statistical Transformation: StatisticalTransforma
Hypothesis: Hypothesis
Alpha: 0.0
Test Formula: TestFormula
Reference Formula: ReferenceFormula
Control Formula: ControlFormula
Minimum Detectable Difference: 0.0
Save
Cancel
Possible math functions in the help for Statistical transformation formula.
(In the following 'X' is 'Initial Transformation Value', and 'value' means 'a numeric value'.)
Power(X, value)
Sqrt(X)
Exp(X, value))
Abs(X)
PI()
Mod(X, value)
Sin(X)
Cos(X)
Tan(X)
ASin(X)
Acos(X)
Atan(X)
Log10(X)
Log(X)
List of known Statistical transformation formulae:
SQRT(X + 0.375)
LOG10(X)
ASIN(SQRT(X))
NONE
EIM Database Search | EIM Reference Tables | Data Disclaimer | Privacy Notice
Problems or suggestions? Contact Us
Local intranet

2.51


Show Matches
Show All Standards
uncheck all
Standard Cleanup Criteria
User Defined Cleanup Criteria
Bioassay Standard Description
Test Code
Test Description
Endpoint Code
Nagesha's New Std
AMP10
Amphipod 10 day
MORT
Share
Bioassay Standard Description: Nagesha's New Std
Test Description: Amphipod 10 day
Endpoint Code: MORT
Test Parameter Formula, X: (I - F) / I
Statistical Transformation: ASIN(SQRT(X))
Hypothesis: Test <= Reference
Alpha: 0.05
Test Formula: T > 0.2
Reference Formula: R < 0.2
Control Formula: C <= 0.1
Minimum Detectable Difference: 0.1
Update
Cancel
EIM Database Search | EIM Reference Tables | Data Disclaimer | Privacy Notice | Copyright © Washington State Department of Ecology
Problems or suggestions? Contact Us
Done
Local intranet

2.52

Stakeholders

- **Executive Sponsor**: Jim Pendowski, Toxics Cleanup Program Manager
- **Business Sponsors**: Dave Bradley, Tim Nord
- **Project Managers**: Wayne Allenton, Balaji Narayanan
- **Technical Lead**: Nagesha Kannadaguli
- **System Architect:** Sven Akerman – Sierra Systems
- **Technical Team**: Elkin Julio, Ewan Whitaker, Daniel Rice, Ky Vu, Miles Neale, Sy Knackstedt, Dan Saul, Tammy Pelletier, Tod Randle
- **Contractors**: Mayank Desai – Sierra Systems, Chandra Vaiyapur
- **Design Team**: Fu-Shin Lee, Nigel Blakley, Russ McMillan, Pete Adolphson, Brad Helland, Mark Dunbar, Sharon R. Brown, Yesim Graves
- **Army Corps of Engineers**: Ruth Abney, Donna Ebner
- **Scientific Consultants**: Teresa Michelsen – Avocet Consulting, Nancy A. Musgrove – MER Consulting

2.53

myeim@ecy.wa.gov

2.54

Dredged Material Management Program
Dioxin Project

SMARM 2008 Status Report

May 14, 2008

3.1

Background

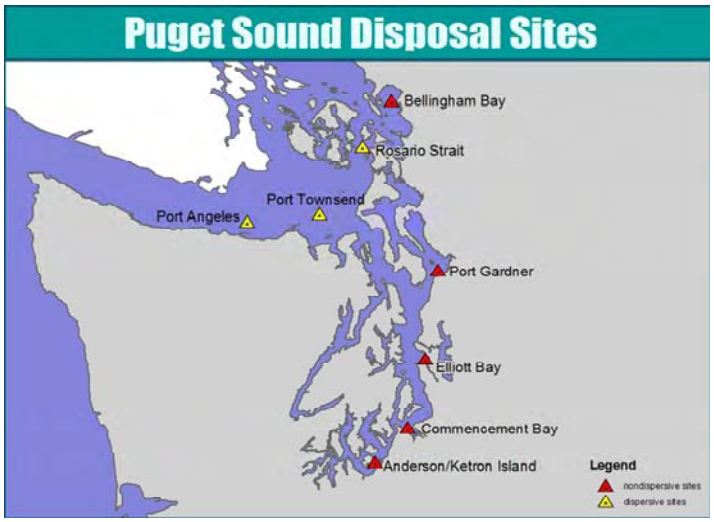
- DMMP manages material dredged from navigational waterways, harbors and bays
- Dredged materials meeting DMMP guidelines go to open water disposal sites – about 20 million cubic yards between 2000-2006
- 5 Non-dispersive disposal sites in Puget Sound
  - Low current velocities, material remains on-site, carefully monitored
  - Minor adverse affects are permitted
- 3 Dispersive sites in Puget Sound, and additional dispersive sites in Grays Harbor and Willapa Bay
  - High current velocities, material quickly dispersed
  - No adverse affects

2

3.2

Puget Sound Open-water Disposal Sites

5 Non-dispersive Sites
3 Dispersive Sites



3.3

Background

- Material for disposal at dispersive and non-dispersive sites is assessed with tiered system using chemical testing, with selective bioassay and bioaccumulation testing
- Concentrations protect benthic community from toxicity (consistent with SMS)
- Dioxin suitability in the past based on case-by-case evaluation relying in part on a 1991 risk assessment in Grays Harbor – now believed not protective of overall Puget Sound conditions and subsistence seafood consumption

4

3.4

Background

- Dioxins are ubiquitous due to both global distribution of anthropogenic sources and natural sources
- Most sediments throughout Puget Sound contain dioxin at levels that theoretically pose an unacceptable risk to subsistence seafood consumers
- The interim approach that is currently in place determines suitability for open-water disposal based on a comparison of dioxin in dredged sediments to
  - disposal-site vicinity concentrations for the non-dispersive sites
  - remote reference bay concentrations for dispersive sites

5

3.5

Project Purpose

- Development of a framework to manage bioaccumulative risk for key compounds for which unacceptable human health risk for subsistence seafood consumption exists at concentrations below Puget Sound background
  - Initially dioxin
  - Intent to broaden to address PCBs as well – strong legislative interest in management of PCBs, similar bioaccumulative concerns
- Framework to manage dredged sediments in a way that is protective given this concern

6

3.6

Principles

- Protect the health of the Puget Sound ecosystem
- Support state goals for a healthier Sound
- Support safe consumption of seafood
- Support a thriving regional economy - maintain viability of the open water disposal program for dredged material
- Make sure DMMP guidance is consistent with regulatory requirements

Progress

- Today = status report only
- Received stakeholder input in summer and fall 2007
- Input received is summarized in the January Executive Summary
  - Seattle ACOE Web Page re: Dredged Material Mgmt
- DMMP agencies have deliberated on the input received, as well as each DMMP agency's legal and regulatory context
- Very complex and difficult: technical, legal and policy – balancing of objectives
- A proposed solution is still under development

Deliberations to Date

Focus on Puget Sound sites – non-dispersive sites in particular

- Grays Harbor/Willapa Bay will need to be addressed separately

Issues and Options under Evaluation:

- Legal and regulatory context of DMMP policies and guidelines
- Potential to set suitability guidelines based on the existing concentrations throughout Puget Sound
- Potential to set suitability guidelines based on existing concentrations in the vicinity of each disposal site
- Consideration of site-specific management practices to reduce concentrations in the biologically available surface sediments
- Potential management under Sediment Impact Zone regulations
- Clear definition of testing triggers
- Other options as defined by stakeholder input

9

3.9

A Big Problem is Lack of Data

- Lack of data characterizing existing dioxin and PCB concentrations throughout Puget Sound
- Existing data only includes
  - 9 data points from 3 remote reference areas
  - Recent data in vicinity of the 5 non-dispersive disposal sites
  - Cleanup project data
  - 10 past dredging projects
  - Some Ecology urban bay characterizations
- Can talk theoretically about alternatives at this point; but need more data for reality testing

10

3.10

Next Steps

- Comprehensive sampling program to be implemented by Agencies this summer throughout Puget Sound, outside urban bays
  - To support subsequent DMMP deliberations
  - To assist other programs & Puget Sound Partnership
- Data from a broader geographical area to assist DMMP to make a better informed decision
- Ability to evaluate alternatives based on knowledge of dioxin characterization throughout the Sound
- Data will assist all of us to evaluate options and their ramifications

11

3.11

Next Steps

- More detailed discussion of proposed sampling follows my talk
  - Aggressive schedule – sampling this summer
  - So that data will be available in winter
- DMMP Agencies committed to having a proposal for interpretive guidelines on table that is as clear as possible by 2009-2010 dredge season

12

3.12

Stakeholder Involvement

- Sampling plan – brief focused opportunity for input
- Ultimate DMMP proposal will need to be thoroughly vetted
- Need support of multiple stakeholders to achieve appropriate balance of environmental, human health & maritime objectives
- Depending on selected alternative, rule change and additional permitting may, or may not, be required

In the Meantime

- Site specific judgments under the current interim framework
- ACOE Seattle District web page – "Dredged Material Management"

Current Interim Framework

- Dioxin testing required on a case-by-case basis ("reason to believe")
  - Proximity to current or historical point sources
  - Existing data from the area, areas with high PCBs
- For non-dispersive sites, suitability for open-water disposal based on a comparison of dioxin in test sediments to concentrations already in the disposal-site vicinity
- For dispersive sites, suitability based on remote reference area concentrations

Overview of the Planned Sediment Sampling to Support Dioxin Interpretive Guideline Development

DMMP Agencies

SMARM 2008

4.1

Objectives

- Determine representative concentrations of key bioaccumulative compounds in sediments located throughout Puget Sound (outside of urban bays and away from known point sources).
- Make data available by winter 2008 to support clarifications to DMMP guidelines that may be utilized in 2009-2010 dredging season.
- Pilot test screening assays for dioxin-like compounds to evaluate their potential use as cost-effective analysis alternative.

4.2

Other Considerations

- Data useful for many programs aside from DMMP (e.g., CERCLA, RCRA, MTCA, PSAMP)
- Supplements ongoing Ecology characterization of various urban bays (under Puget Sound Initiative)

General Scope

- Collect ~90 samples to be representative and support statistical analysis
- Determine representative range of TOC and grain size
- Analyze ~ 50 samples for Dioxins/Furans and PCB congeners
- Analyze ~ 30 samples using a dioxin TEQ cell based assay
- Archive sediments for additional analytes

Schedule

- Fast-track development of sampling plan (May 2008)
- Stakeholder input to SAP (June 2008)
- Sampling in late summer to include use of the EPA research vessel (OSV Bold)
- Consult with statisticians on data interpretation issues (possible experts workshop)
- Data available by Winter 2008

Stakeholder SAP review

- Agencies provide study outline as well as map of proposed locations in mid-June
- Information posted on COE web site
- Notification using SMARM and Dioxin project email list
- 2 week review period to meet fast-track timeline.

Resources

- State and Federal Agencies contributing:
  - Funding (PSP; DNR disposal site acct.)
  - Contractors (Floyd-Snider from Ecology; SAIC through existing site monitoring contract)
  - Vessels (OSV Bold)
  - Staff
- Soliciting more assistance

2007 Full Monitoring at the Commencement Bay DMMP Site

Presentation of Results
May 14, 2008

Sediment Management Annual Review Meeting

From Science to Solutions™

5.1

Presentation Agenda

- Review DMMP Monitoring Framework
- 2007 Findings
- DMMP Dioxin/Furan Study

5.2

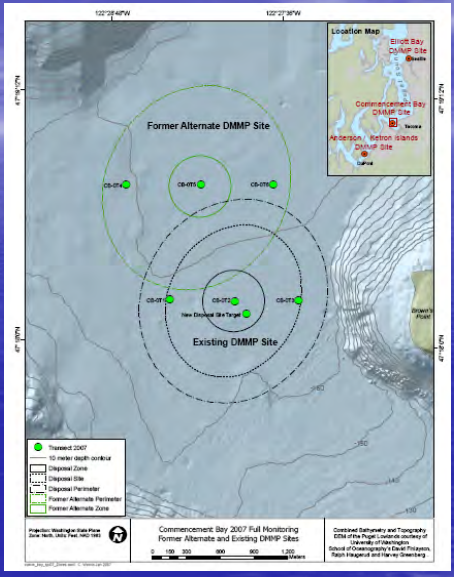
PSDDA Monitoring Framework

1. Does dredged material remain onsite?
   - Sediment Vertical Profile System (3 cm)
   - Sediment Chemistry (SQS and CTS)
2. Have biological effects conditions been exceeded?
   - Sediment Chemistry (PSDDA MLs)
   - Sediment Bioassays
3. Any adverse effects to offsite biological resources?
   - Tissue Chemistry (metals 3x baseline, organics 5x baseline)
   - Infaunal Community Structure (1/2 baseline of major taxa)

5.3

Monitoring Plan Modifications Implemented in 2007

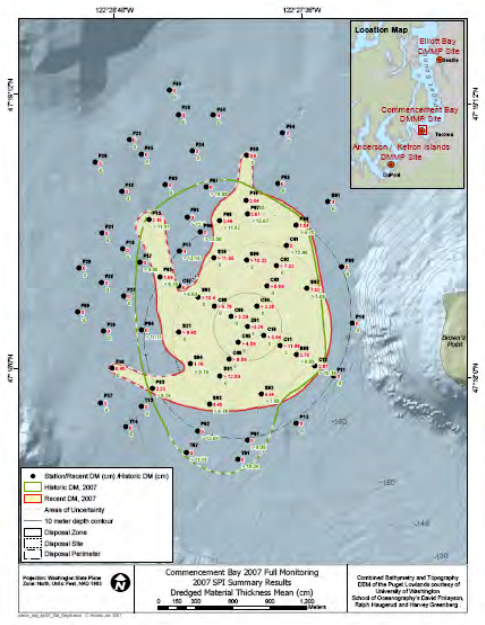
- Trawl Surveys
  - Confirmation of 1986 Resource Evaluation
- Dioxin/Furan Analysis of Sediments and Tissues



5.4

SVPS Survey

- Thin lobes (<3 cm) of dredged material to the north, NW, & west
- Dredged material
  - Coarse to medium sand with shell particles
- Surrounding sediments
  - Olive gray, water-rich silt clays
  - Medium to coarse sands near Dalco Passage
  - Homogeneous gray clay



5.5

CBZ01/B

Recent DM >P

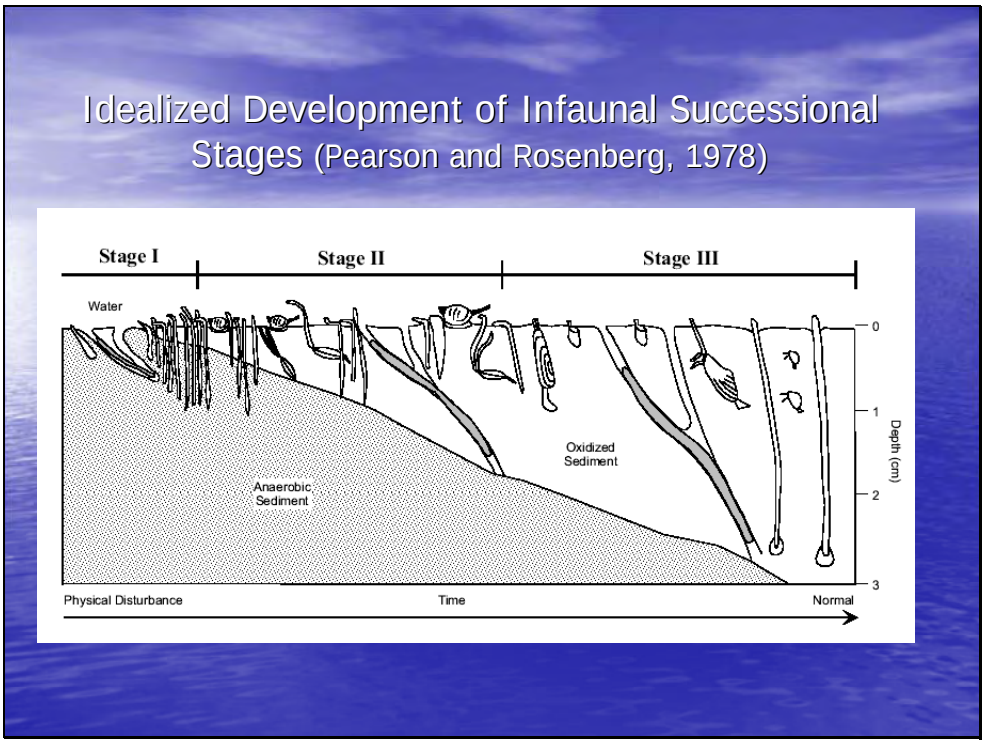
CBT13/C

Fine-Grained Ambient

5.6

CBF31/C
CBF45/A
Gray Clay Surface Layer

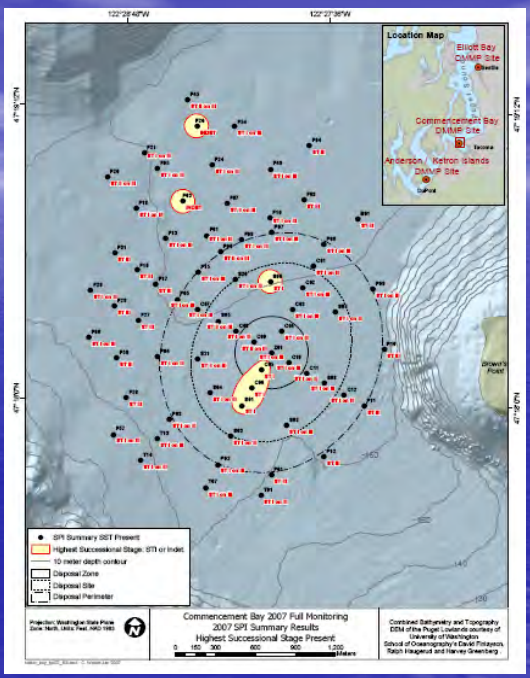
5.7


Idealized Development of Infaunal Successional Stages (Pearson and Rosenberg, 1978)
Stage I
Stage II
Stage III
Water
Oxidized Sediment
Anaerobic Sediment
0
1
2
3
Depth (cm)
Physical Disturbance
Time
Normal

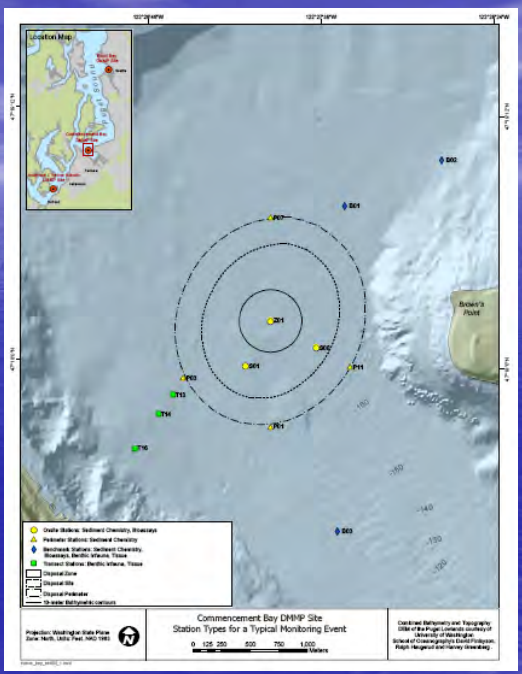
5.8

Infaunal Successional Stage

- Stage III succession considered an equilibrium community (Rhoads and Germano, 1982)
- Stage III present at a majority of stations



2007 Sediment and Tissue Stations



2007 Sediment Chemistry

- Conventional Parameters
  - Levels comparable between stations except grain size
  - High sand and low TOC at onsite stations
- Metals
  - Detected at all stations but below SLs
- Organic Compounds
  - Detected compounds found at low or trace levels, well below SLs
  - VOAs, chlorinated aromatic hydrocarbons, PCBs undetected

5.11

Tissue Chemistry

- *Molpadia* sea cucumbers analyzed for BCOCs at transect stations
- Arsenic exceeded TTLs, but comparable to 1995 baseline concentrations.
- One replicate at CBT16 exceeded background for selenium (81 mg/kg) – outlier based on consistently low concentrations (1.4 ± 0.2 mg/kg)

5.12

Bioassays

- DMMP bioassays conducted on three onsite (CBZ01, CBS01, CBS08) and two Carr Inlet reference stations (MSMP-43, CR23).
- Laboratory error – CBS08 tested after holding time.
- All bioassays passed DMMP interpretive criteria.

5.13

Benthic Community Analysis

- In 2007, significant decreases (>50%) in arthropods and molluscs at all transect stations relative to 1995 baseline
- Significant decrease in arthropods and annelids at 2007 benchmark stations relative to 1988 baseline
- Benchmark hypothesis testing – reductions reflect regional changes in conditions

5.14

Trawl Survey

- Otter trawls at six sites
- No Dungeness crabs encountered
- Densities of shrimp and flatfish were less than 1986
- Survey confirms that the disposal site remains low in demersal invertebrate and fish resources

5.15

Evaluation of 2007 Monitoring Data

- Question 1: Does dredged material remain onsite?
  - Hypothesis 1: Dredged material remains within site boundaries.
    - Hypothesis is accepted.
  - Hypothesis 2: Chemical concentrations offsite do not increase over time due to dredged material disposal.
    - SQS not exceeded for all detected chemical concentrations.
    - Hypothesis is accepted.

5.16

Evaluation of 2007 Monitoring Data

- Question 2: Are biological effects conditions exceeded?
  - Hypothesis 3: Site Condition II for sediment chemistry.
    - PSDDA MLs not exceeded.
    - Hypothesis is accepted.
  - Hypothesis 4: Site Condition II for sediment bioassays.
    - Toxicity tests passed DMMP criteria.
    - Hypothesis is accepted.

Evaluation of 2007 Monitoring Data

- Question 3: Adverse effects to offsite biological resources?
  - Hypothesis 5: No increase in tissue body burden.
    - All chemicals below 1995 guidelines with one exception.
    - Hypothesis is accepted.
  - Hypothesis 6: No decrease in infaunal major taxa abundance over time.
    - Area-wide reduction in arthropods and molluscs.
    - Hypothesis is accepted.

Dioxin/Furan Study at DMMP Sites

- Extensive 3-year study to determine dioxin/furan concentrations in sediments and tissues at DMMP sites

5.19

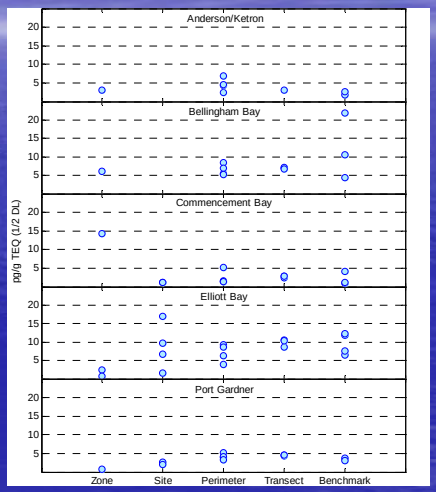
Summary of Analyses

- Total of 175 samples analyzed
  - 61 DMMP site sediments, 5 Carr Inlet reference sediments
  - 73 invertebrate tissues (bivalves, polychaetes)
  - 13 English sole and 3 starry flounder composites
  - 10 Dungeness crab meat and 10 hepatopancreas composites

5.20

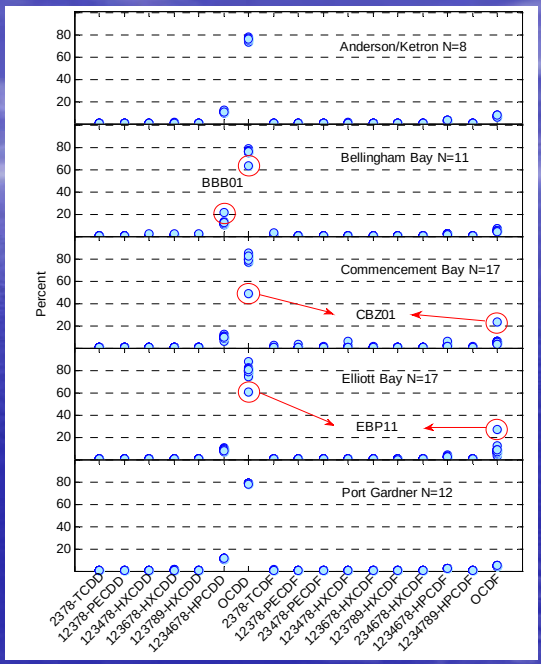
Dioxin/Furan in Sediments

- Low mean TEQ concentrations in Commencement Bay (3.12 pg/g) , Port Gardner (3.52 pg/g), Anderson/Ketron (3.57 pg/g)
- Higher concentrations in Elliott Bay (7.91 pg/g) and Bellingham Bay (8.19 pg/g)
- Lowest concentrations in Carr Inlet (0.91 pg/g)



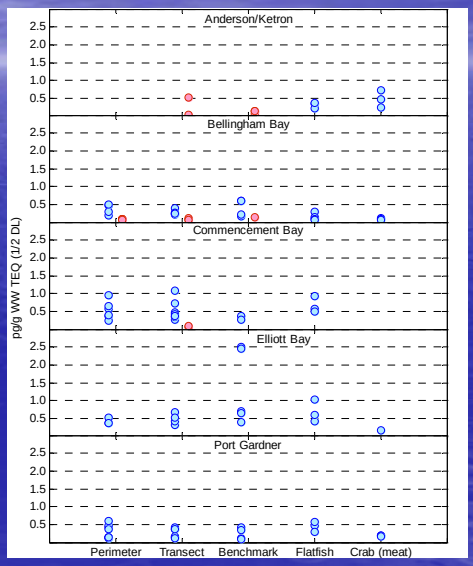
Congener Profile - Fingerprinting

- Concentrations are relatively low in sediments
- Profile similar between disposal sites



Dioxin/Furan in Tissues

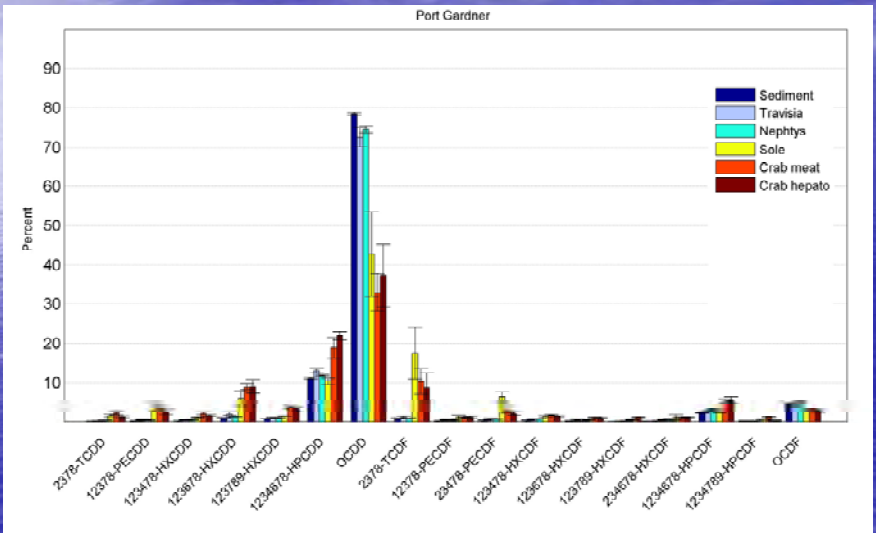
- Low bivalve and polychaete concentrations (close to DLs)
  - Highest concentrations in Elliott Bay (average of 0.76 pg/g WW TEQ)
  - Lowest concentrations in Bellingham Bay (low bivalve concentrations)



Crab Tissue Samples

- Dungeness crab meat TEQs range from 0.07 to 0.73 pg/g
- Highest TEQs in hepatopancreas (1.67 to 14.92 pg/g)
- When lipid normalized, tissue and hepato concentrations are similar

Port Gardner Congener Profile



5.25

Report Status

- Dioxin/furan database was compiled by SAIC and submitted to DMMP
- Summary report will be completed within a month.

5.26

Thank you!

- John Nakayama
- Entire DMMP staff
- Sarah Dzinbal
- Special thanks to Dr. David Kendall

SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING

May 14, 2008

Dredging Year 2008

DMMP Testing Activities

Lauran Cole Warner

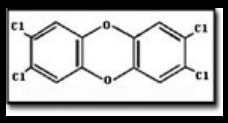
Corps - Dredged Material Management Office

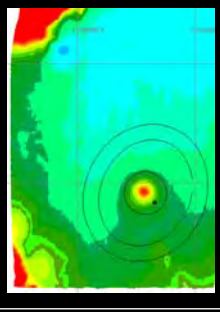
US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.1

Overview: the Year at DMMP

- Dioxin Issues and Workgroup
- Commencement Bay site high use, must evaluate for additional material
- RSET, Freshwater....





US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.2

DMMP Time

Dredging Year 2008 ⟷ **June 16, 2007 to June 15, 2008**

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.3

What DMMP Does

- Based on existing regulations and current guidelines, we evaluate potential dredged material for "suitability for open-water disposal"
  - Suitability Determination *as well as*
    - Recency, Frequency, Volume Revision
    - Post-dredge surface evaluation
    - CERCLA/MTCA Coordination

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.4

How DMMP Characterizes DM

Tiered Evaluation:

- Chemical testing
  - Standard suite of chemicals of concern
  - COCs in limited areas – e.g. dioxins and TBT
  - Screening levels and bioaccumulation triggers
- Acute and sublethal bioassays
- Bioaccumulation

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.5

Suitability Determination

- Memorandum for Record
  - Summary of sampling and testing activities
  - Documents the suitability of dredged material for open-water disposal or beneficial use
  - Signed by all DMMP agencies

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.6

Recency Guidelines

- Time – the length of time for which testing results will be considered representative of the area to be dredged
- Rank – how much do we have to worry?
- Additional Testing – may be required
- Recency Extension – typically one year; granted on a case-by-case basis

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.7

Exclusionary Guidelines

- Section 404 CWA
  - DMMP – Tier 1 Determination
  - RSET – codified in SEF
- Limited testing - Grain size/conventionals
  - Fines < 20%
  - TOC < 0.5%
  - "location sufficiently removed from potential sources of sediment contamination"

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.8

DY 2008 Project Summary

- 17 completed projects
  - 9 Suitability Determinations
  - 2 Recency Determination
  - 3 Volume Revisions
  - 3 Exclusions from testing
- 9 ongoing projects, more coming

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.9

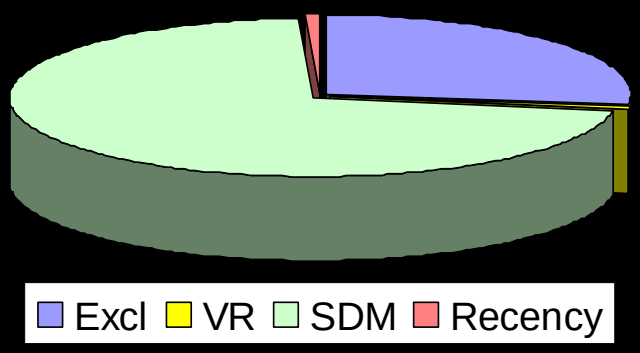
Volume Summary

Project Status	Volume (cubic yds)
SD completed	4,232,000
Recency extensions	41,600
Volume revisions	+ 29,700
On-going	2,150,700
Total	6,454,000

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.10

DMMP Evaluations (by volume)



US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.11

Suitability Determinations in DY08

- 10 projects conducted testing (9 SD, 1 Recency)
  - 5 projects included dioxin testing
  - 2 projects conducted bioassays
  - No bioaccumulation testing
  - 2 projects with unsuitable material, totaling 79, 728 cy (1.3% of tested material)

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.12

Unsuitable Material in DY08

Project	Unsuitable Volume (cy)	Reason
Port of Tacoma – East Blair	38,828	Hg, dioxin
Cap Sante Marina - recency	40,900	dioxin

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.13

Biggest Projects

- Tested:
  - Inner Grays Harbor O&M – 1,770,000 cy/yr
  - Port of Tacoma East Blair – 1,000,000 cy
- Exclusionary:
  - Outer Grays Harbor O&M – 455,000 cy/yr
  - Shoalwater Bay – 700,000 cy (BU for shoreline erosion)

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.14

Trends in DY2008

- Big volume projects on Washington coast and Columbia River – minimal testing
- Not as many straightforward SD's – we're seeing anti-degradation projects, a "draft" SD, volume revisions

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.15

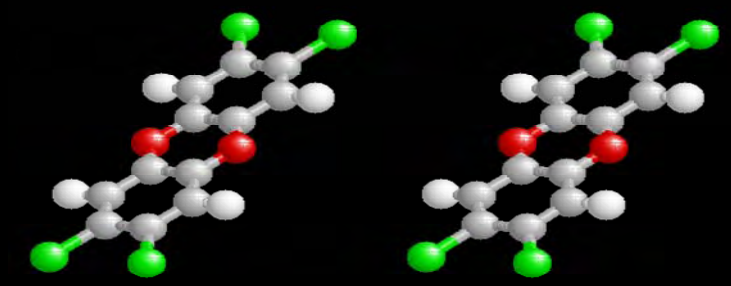
Coming Attractions

- Dioxin evaluation framework continues
- More big projects from Blair Waterway
- Sound-wide dioxin sampling
- Continue to clarify dioxin reason-to-believe

US Army Corps of Engineers · Department of Ecology · EPA United States Environmental Protection Agency · Washington State Department of Natural Resources

6.16

For more DMMP information



http://www.nws.usace.army.mil

Click on “Dredged Material Management”

Freshwater Sediment Quality Guidelines Update

Teresa Michelsen
Avocet Consulting

7.1

Goals

- Finalization/promulgation of Washington State Freshwater Sediment guidelines (update of 2003 SQGs)
- Inclusion in the RSET SEF and availability to the Oregon/Idaho cleanup programs
- Automation of the FPM process and development of a user-friendly module

7.2

FW SQG Workgroup

- Keith Johnson, DEQ, Chair
- Dave Sternberg, Ecology, Project Manager
- Laura Inouye, Ecology
- Mark Siipola, Portland District Corps
- Burt Shephard, EPA
- Robert Anderson & Lyndal Johnson, NOAA
- Jeremy Buck, US F&W
- Mike Poulsen & Paul Seidel, DEQ
- Mike Anderson, formerly DEQ
- Taku Fuji, Kennedy Jenks

7.3

Floating Percentile Method

- Goal: Minimize false negatives and false positives simultaneously
- Approach:
  - Data screening and summing
  - Initial range-finding
  - Iterative optimization routine treating each chemical or sum as an independent variable

7.4

Work Completed

- ✓ Data acquisition and compilation
- ✓ Bioassay and chemistry QA/QC (QA2)
- ✓ Agreement on methodological issues
  - ✓ Bioassays – Tests/endpoints/hit-no-hit guidelines
  - ✓ Chemistry – Summation/non-detects/qualifiers
  - ✓ Process – Code/method changes
  - ✓ Evaluation – Reliability measures
- ✓ FPM coding and testing
- ✓ Data screening/summing and ANOVA testing

7.5

Tasks Ahead

- Workgroup review/approval (May 27)
- Initial runs (early June)
- Workgroup review/approval (late June)
- Draft report (late July)
- Public review (August/Sept)
- Final runs/final report (fall 2008)
- Peer review/publication (winter 2008/9)
- Promulgation/revision of SEF (2009)
- SMS rule revisions (???)

7.6

Data Set

- Did add substantial data from Eastern WA
- Did not get any new data from Idaho
- Added some new data from western WA/OR, including Portland Harbor
- Obtained substantial chronic data, especially for *Hyalella*
- Chronic *Chironomus* data may not be sufficient to use (30-40 stations)

7.7

Initial Data Set

- Hyalella 10-day mortality – 366
- Chironomus 10-day mortality – 550
- Chironomus 10-day growth – 504
- Microtox – 103
- Hyalella 28-day mortality – 319
- Hyalella 28-day growth – 85
- Chironomus 20-day mortality – 36
- Chironomus 20-day growth – 34

7.8

ANOVA Results

Chemicals associated with toxicity:

- Tier 1: TPHs, PCBs, DDD/DDE, HCCHs, Chlordanes, Dieldrin, Endrin ketone, di-n-butyl phthalate, phenol, 4-methylphenol, benzoic acid, sulfide
- Tier 2: Ammonia, TOC, As, Cd, Cr, Cu, Pb, Hg, Ni, Ag, butyltins, DDT, PAHs
- Tier 3: Fines, Be, V, Zn, penta, Endrin, various phthalates

Questions?

- Please see me or contact any of the workgroup members
- A status report is available here today and online giving further details of the method and history

PAH Exposure Guidelines and Fish

Lyndal Johnson
NOAA Fisheries

8.1

SEF Regulatory Framework

Protection of:

- Benthic organisms (SQGs)
- Fish (TRVs/SQGs)
- Wildlife (TTLs/BTs)
- Human Health (TTLs/BTs)

8.2

PAH SQGs & TRVs for fish: Problems and limitations

- Current SQGs are based on synoptic field data combining chemistry with invertebrate bioassay and/or benthic data
- May be protective of fish prey base, but not direct effects on fish
- TRV approach proposed as alternative for protection of fish for bioaccumulative compounds
- Fish metabolize PAHs, so TRV won't work; something different needed

8.3

Exposure Pathway/Assessment

- Direct correlation of sediment PAH levels with biological effects
- Alternatives to TRVs
  - Metabolites of PAHs in bile of fish
  - Dietary effects thresholds

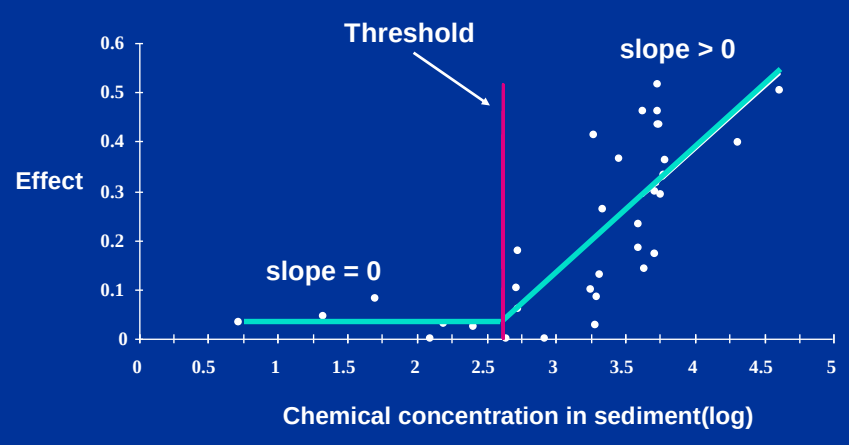
8.4

Exposure Pathway/Assessment

- Direct correlation of sediment PAH levels with biological effects
- Alternatives to TRVs
  - Metabolites of PAHs in bile of fish
  - Dietary effects thresholds

8.5

Sample Hockey Stick Regression Plot



8.6

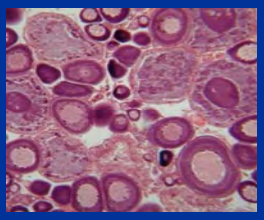
Endpoints Used in Threshold Models

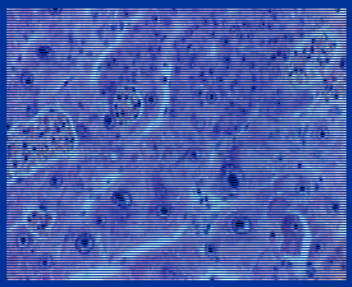
-DNA Damage

-Liver tumors and precancerous lesions

-Reproductive impairment

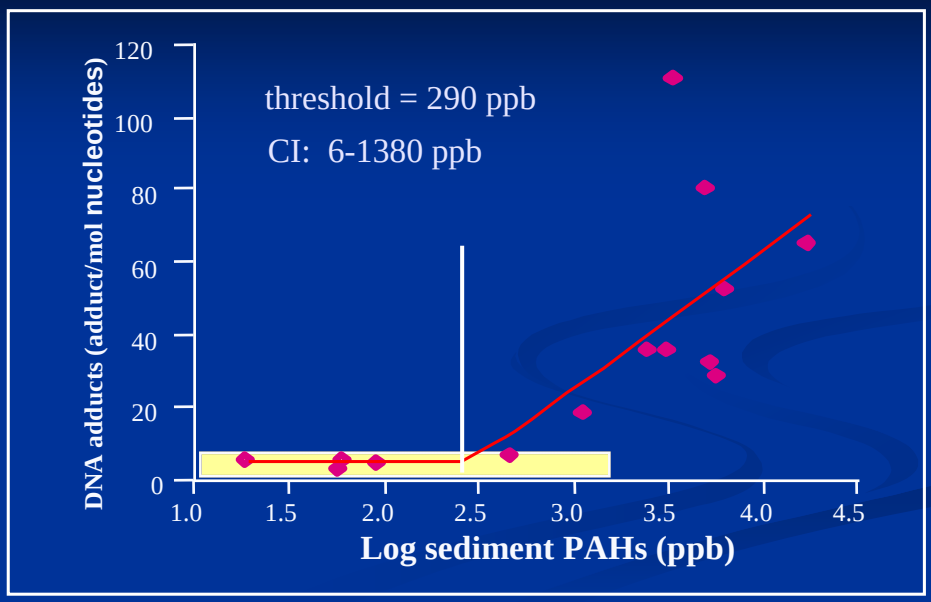
-Growth





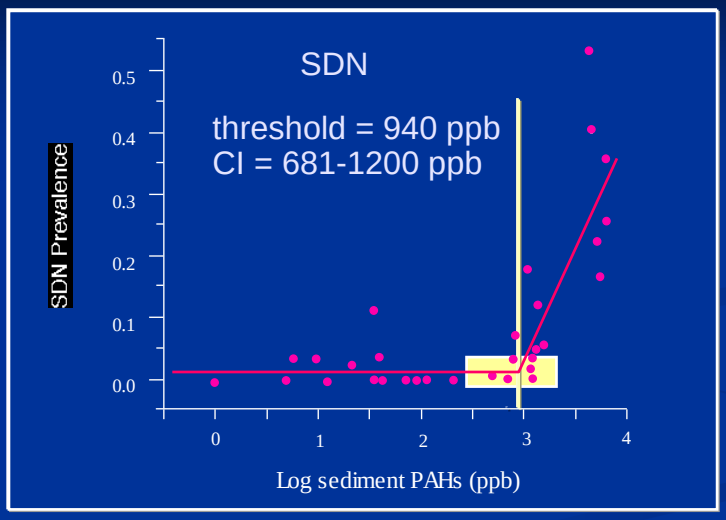
8.7

Sediment PAH threshold for DNA adducts in English sole



8.8

Sediment PAH thresholds for English sole lesions



Neoplasms
2800 ppb
(11-5500)

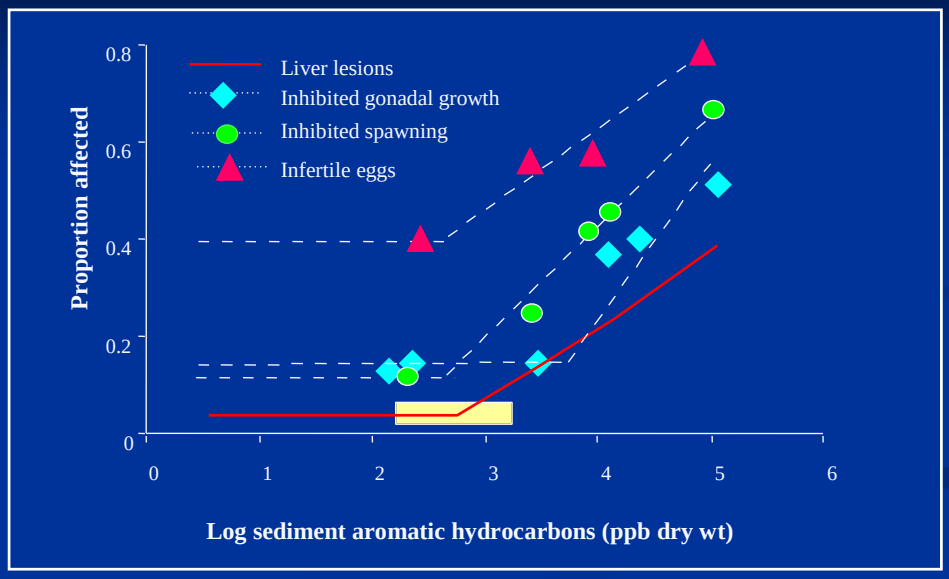
FCA
54 ppb
(na-780)

Proliferative Lesions
230 ppb
(1.4-830)

Any Lesions
620 ppb
(300-1000)

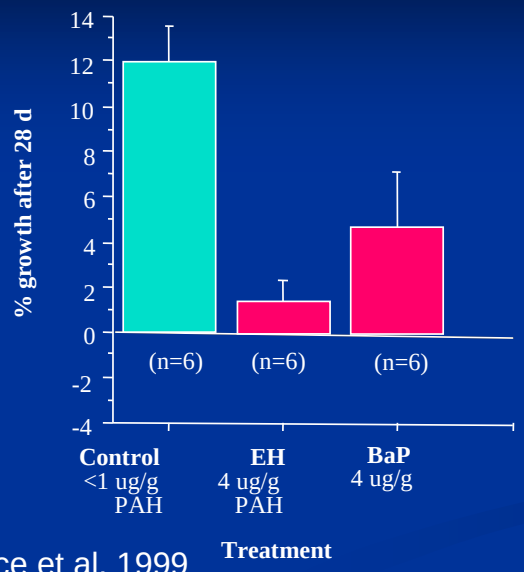
8.9

English sole reproductive success vs. sediment PAH concentrations



8.10

Growth of juvenile English sole fed worms from PAH-contaminated sediment



Rice et al. 1999

8.11

Sediment PAH concentration vs.biological effects in English sole

Biological Effect

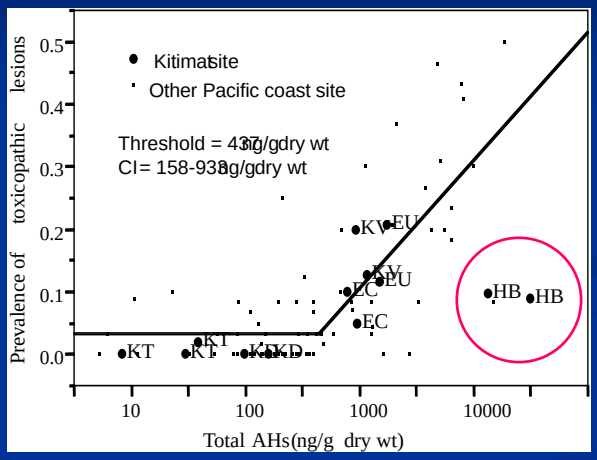
PAH (ppb dry wt)	Liver Lesions (%)	Gonad Dev (%)	Inhib. spawn (%)	Infertile eggs (% eggs)	DNA damage (nmol adducts per mol bases)	Reduced Growth (%change in wt per day)
50	0	15	12	38	5	1.1-1.2
100	0	15	12	38	5	--
1000	9	15	17	42	25	--
2000	18	15	25	48	36	--
3000	24	15	30	51	43	--
5000	31	18	35	55	51	0.05-0.10
10000	40	27	43	61	63	--
100000	71	58	69	80	100	--

8.12

Uncertainties for Management Application

- Geographic extent of PAH hotspot vs. biological impact
- Influence of PAH mixture composition and type on uptake
- Effects of chronic vs. short-term impact
- How to incorporate into sediment bioassays?

PAH Source may affect toxicity: Alcan Aluminum Smelter Case Study, Kitimat, BC



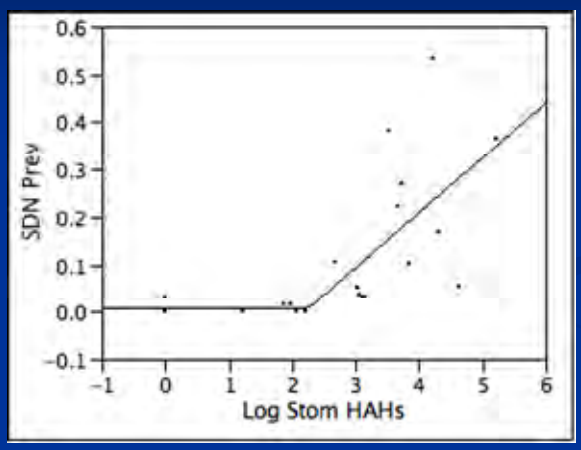
English sole lesion prevalences lower than expected at site nearest aluminum smelter

May be due to reduced bioavailability of soot-associated PAHs

Exposure Pathway/Assessment

- Direct correlation of sediment PAH levels with biological effects
- Alternatives to TRVs
  - Metabolites of PAHs in bile if fish
  - Dietary effects thresholds

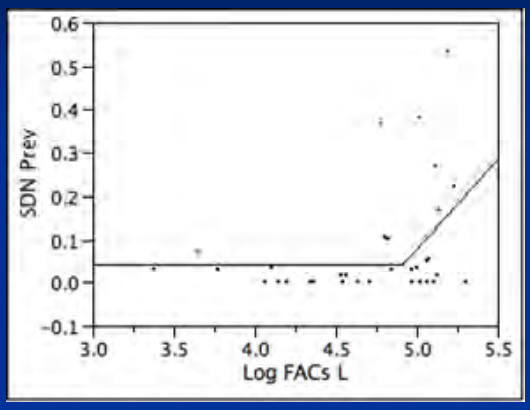
PAHs in stomach contents vs. lesions



Threshold value of 100-1000 ppm for high molecular weight PAHs

Similar values for Low molecular weight PAHs

PAHs in bile vs. lesions



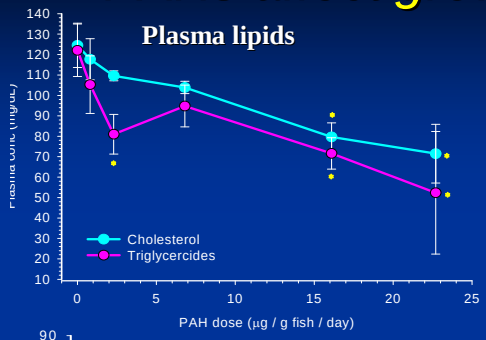
Log FACs-NPH (ng/g bile)

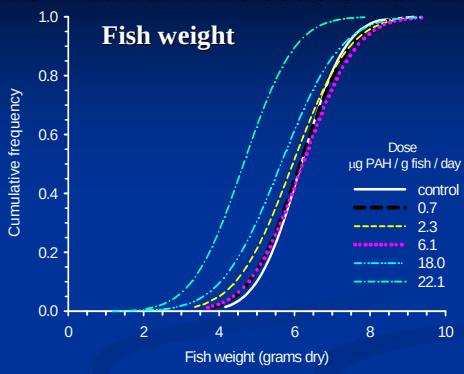
Threshold value of around 65-100 ug/g bile for metabolites measured at naphthalene wavelengths

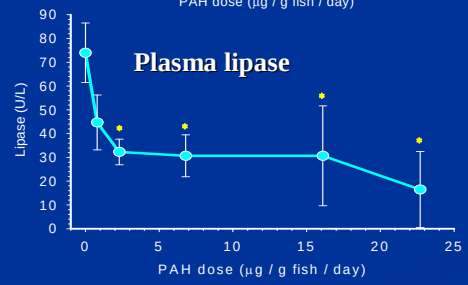
This level is within the range commonly found in sole from urban sites

8.17

PAHs affect growth and metabolism







Physiological Changes Similar To Starvation

- **Whole body lipids**
- **Plasma lipids**
- **Plasma lipase**
- **Plasma albumin**

Doses in the 2-6 ug/g fish/d range

8.18

Salmonid bile metabolites vs. PAHs in diet

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Dietary PAH concentrations of 2-6 ug/g fish/day correspond to bile metabolite levels of 3-8 ug PHN-FACs/g bile protein

Median PHN-FACs concentrations in Pacific NW juvenile chinook salmon is 2.7 ug/g protein - ~50% may be in effects range

8.19

Salmonid bile metabolites vs. PAHs in diet and water

Meador et al. 2008. Env. Toxicol. Chem. 27:845-853

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

8.20

Conclusions

- Hockey stick regression models with English sole suggest that liver lesions and other forms of injury are associated with:
  - Threshold dietary PAH concentrations in the 4-5 ug/g wet wt
  - Threshold FACs-NPH values in the 80-100 ug/g range
- Analyses of dietary PAHs vs. Bile metabolites levels in juvenile salmon suggest that adverse effects on growth and metabolism are associated with:
  - Threshold dietary PAH concentrations in the 2.7-11 ug/g wet wt range
  - Threshold FACs-PHN values in the 0.5-2.3 ug/mg protein range

Next Steps

- Refine threshold estimates with additional data
- Present analyses as white paper to RSET
- Come to consensus on how to apply and incorporate into the SEF

Sediment Quality Guidelines
Endangered Species Act
Dredged Material Management

Summary of Clarification Papers

Sediment Management Annual Review Meeting

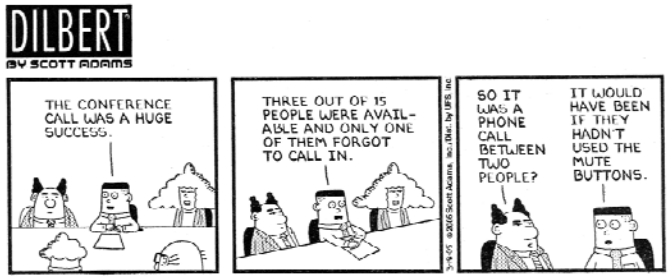
May 14, 2008

9.1

Three Clarification Papers

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

9.2



Freshwater Reference Areas

- Marine sites identified by PSDDA study
  - Refined over the years by users
- FW reference use limited in DMMP
- RSET developed and outlined a process in white paper

RSET White Paper

- Based on PSDDA (1991), Grays Harbor (1995) and Lower Willamette Study (2002)
- Focused on reference area studies, but also applicable to specific projects

9.5

Site Characteristics/ Phase I

- Away from known sources of contamination
- Available long term
  - No significant accretion or erosion
- Varied grain-size available
- Acceptable TOC, ammonia, sulfides

9.6

Site Characteristics/ Phase II

- Various grain-size classes should be analyzed for subset of chemicals of concern
- Using a decision-matrix, site should be chosen within each grain-size class
- Full suite of COCs should be run
- Bioassays should be conducted

9.7

Summary

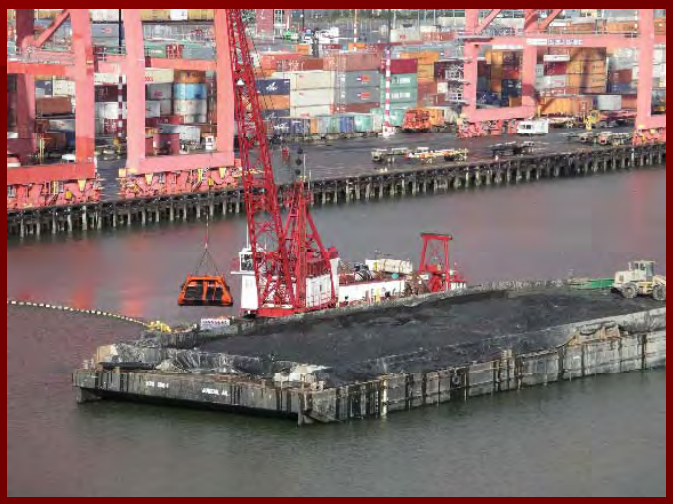
- Applicability to DMMP in FW areas
  - project specific concerns/issues
- Process already used on an ad hoc basis
- No statewide FW reference area study
  - Variability between watersheds
  - Numbers of watersheds and cost

9.8

Use of Flat-Top Barges at DMMP Dispersive Sites

- Recent requests to use flat-top barges at DMMP sites
- PSDDA Management Plan specifies bottom dump or split hull barges
  - Limits turbidity and water column mixing

9.9



9.10

Non-Dispersive and Dispersive Disposal Sites

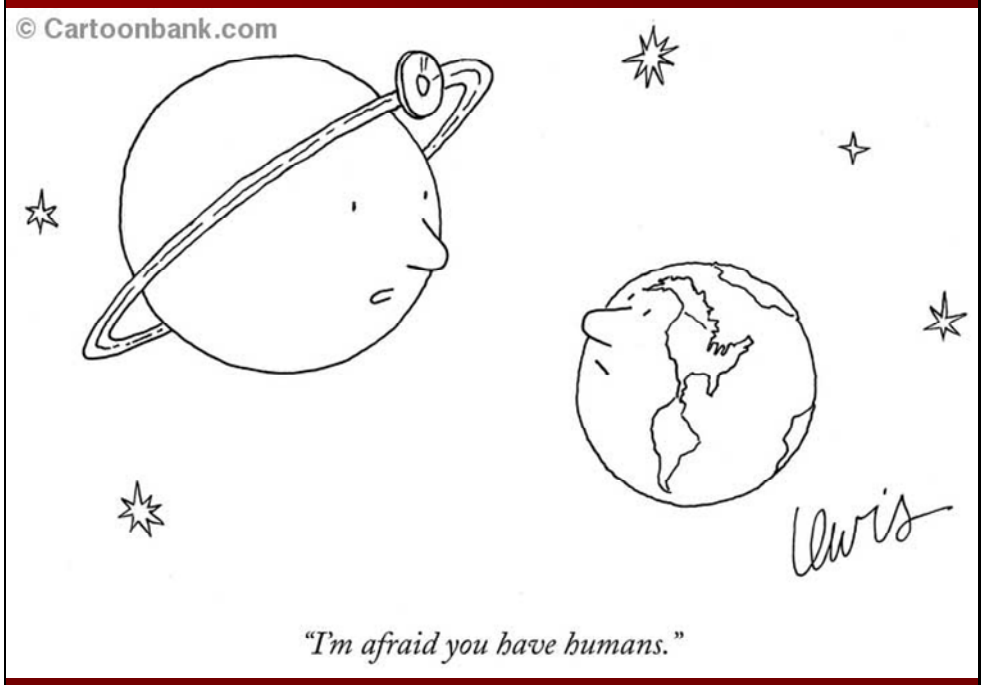
- Non-dispersive
  - Material remains on-site
  - Monitored
- Dispersive
  - Sited to transport material away from the site
  - Stricter sediment evaluation guidelines
  - Turbidity not an issue

9.11

Clarification

- Flat-top or deck barges are allowed at dispersive disposal sites
- Use limited due to safety concerns (currents, weather)
- Not acceptable for non-dispersive sites
  - Unacceptable impacts to site management goals

9.12



9.13

Quality of Post-Dredge Sediment Surface

- Anti-degradation policy in PSDDA and SMS
- 2001 DMMP clarification papers refined the DMMP approach
- This paper is further refinement, based on project experience

9.14

The Guidance: New Surface Exposed by Dredging (SED)

- 1 foot beyond overdepth sampled and archived for all projects
- Testing of SED required if:
  - Overlying sediment is unsuitable
  - Other projects in water-body have sub-surface contamination greater than surface
  - Other site-specific considerations

Possible Outcomes

- No exceedances of SL or BT or SQS
- SED has higher chemical concentrations than those in upper lift of material
- SED has chemical concentrations lower than the surface lift, but still exceeds guidelines

Actions Required

- No exceedances – no problem
- SED chemistry higher than surface lift
  - Depends on chemistry levels
    - Bioassays, bioaccumulation or overdredge and/or cap

9.17

Actions Required (2)

- SED lower than surface but exceeds SLs, BTs or SQS
  - Bioassay or bioaccumulation tests may be required
    - Lower toxicity or bioaccumulation – no problem
    - Higher toxicity or bioaccumulation – overdredge and/or cap
- SED lower than surface but exceeds ML/CSL
  - Overdredge and/or cap

9.18

Use of Best Professional Judgment

- Not all possibilities can be predicted
- Some examples where BPJ may be used
  - Some COCs higher than SL, some lower
  - Some COCs, like dioxin, don't have SMS standards or DMMP guideline numbers
  - SED resampled for bioassays may have chemistry results different from original sample
  - Compositing z-samples may be allowed

9.19

9.20

Commencement Bay Environmental Assessment

Reauthorization of the Dredged Material Disposal Site

May 2008

10.1

Purpose of this Briefing

- To inform Stakeholders of Environmental Assessment (EA) progress involving reauthorization of the Commencement Bay Dredged Material Disposal Site
- To receive feedback on proposed EA alternatives and approach

10.2

EA Progress Schedule

The DMMP agencies are preparing Draft NEPA EA under Corp's contract

- EA prepared with DNR funding (through EPA / Corps Interagency Agreement)
- Draft EA out for Public Interest Review July 28, 2008
- Notice of Availability July 28, 2008
- Public review period (30 days) for NEPA & SEPA
- Final EA to be completed by the end of September 2008

Key EA Content

- Technical Appendix (summary of environmental data collected near/at site and all monitoring conducted)
- Analysis and Impacts of selected alternatives
- Compliance with Federal, State, Tribal (U&A Trust responsibilities), and Local environmental regulations
- MDFATE (multi-disposal-fate) Analysis of the future disposal site capacity
- Analysis of Sediment Transport Potential near the disposal site

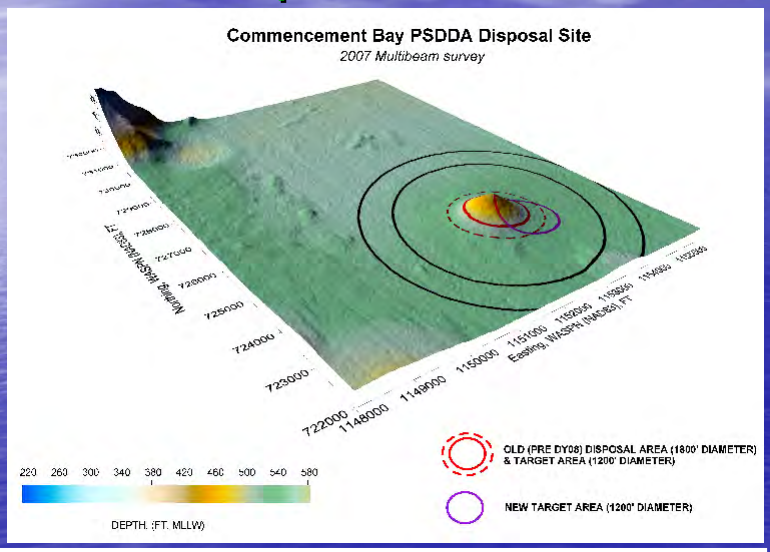
Need

- Site is approaching originally authorized Volume (9 mcy); currently at 8.0 mcy
- Continued need for disposal of suitable dredged material at reasonable cost
- Future development in Commencement Bay indicates continued strong stakeholder need for this disposal site

Commencement Bay EA
Reauthorization of the Dredged Material Disposal Site

10.5

2007 Disposal Site Mound

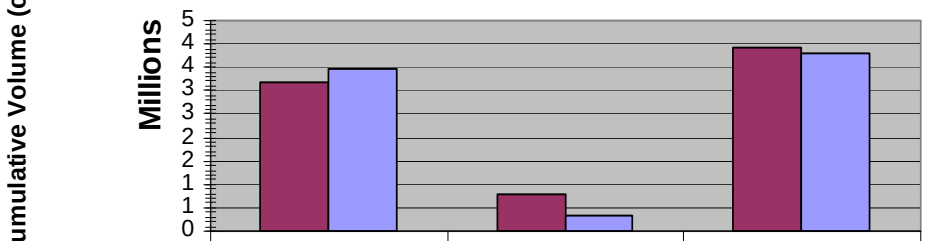


Commencement Bay DMMP disposal site 2007 bathymetry (vertical scale undistorted)

10.6

1989 - 2003 Dredging/Disposal Forecast versus Actual Volumes

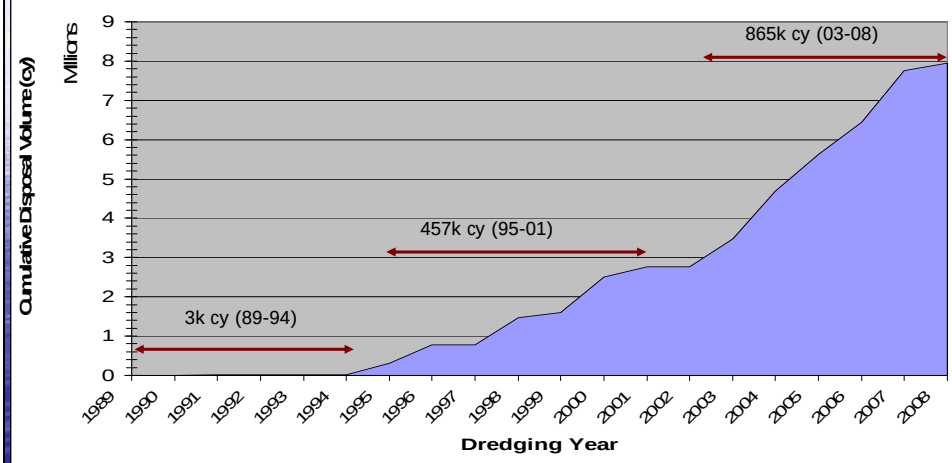
15-Year Dredging/Disposal Forecast Projections (1989-2003) for Commencement Bay



	Suitable Volume Disposed (cy)	Unsuitable Volume (cy)	Total (cy)
Predicted EIS	3,160,000	769,000	3,929,000
Actual	3,473,266	322,293	3,795,559

10.7

Cumulative Disposal Volume



10.8

Original Site Designation History (1985–1988)

- PSDDA EIS focus was on establishing non-dispersive sites where environmental impacts would be minimized
- Key Zones of Siting Feasibility (ZSF) were identified in several parts of Puget Sound, including Commencement Bay

Original Site Designation History (1985–1988) (continued)

- Siting factors focused on:
  - Avoiding areas of high energy
  - Site located within 120 – 600 foot water depths
  - Avoiding unacceptable impacts on foodfish, shellfish, marine mammals, and marine birds
  - Minimizing interferences with human uses (e.g., 2,500-foot buffer)

Preferred Commencement Bay Site Satisfied all ZSF Factors

- Low current velocities
- Water depth 540 to 560 feet
- Bottomfish, shellfish, and benthic resources either low in abundance or absent (e.g., Dungeness crab)
- Little interference with navigation or fishing

2007 Trawl Survey

- Otter trawls at six stations
- **No Dungeness crabs encountered**
- Densities of shrimp and flatfish were less than 1986
- Survey reconfirms that the disposal site remains low in demersal invertebrate and fish resources

DMMP's Management of the Site

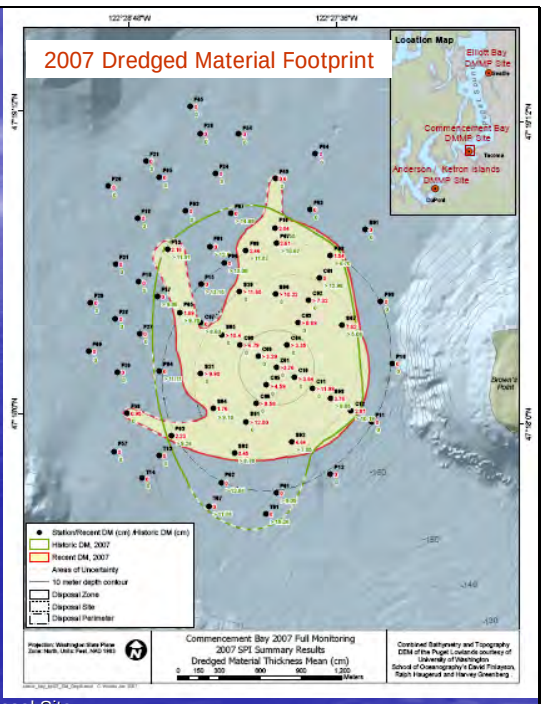
- One of the most intensively monitored disposal sites in the country
- Monitored 8 times since designation
- Results evaluated against **6 testable hypotheses** using updated Monitoring Plan
- With few exceptions the disposal site has performed within management criteria

Disposal Footprint

- Surveys show disposed material almost always stays within site boundary
- Monitoring surveys shows the site sediment quality has generally improved, with no adverse effects attributed to chemistry, toxicity, or benthic community
- Thin footprint (< 10 cm) has extended beyond site boundaries in recent years, but not in highest disposal year of 2007
- Potential offsite impacts fully evaluated; no adverse impacts documented

2007 Sediment Profile Imagery (SPI) Survey

- Thin lobes (<3 cm) of dredged material to the north, NW, & west
- Dredged material
  - Coarse to medium sand with shell particles
- Ambient sediments
  - Olive gray, water-rich silt clays
  - Medium to coarse sands near Dalco Passage
  - Homogeneous gray clay



Commencement Bay EA
Reauthorization of the Dredged Material Disposal Site

10.15

Station CBZ01/B

Onsite: Recent DM > Penetration depth

Station CBT13/C

Offsite: Fine-Grained Ambient

10.16

Post Disposal Environmental Monitoring Results Summary

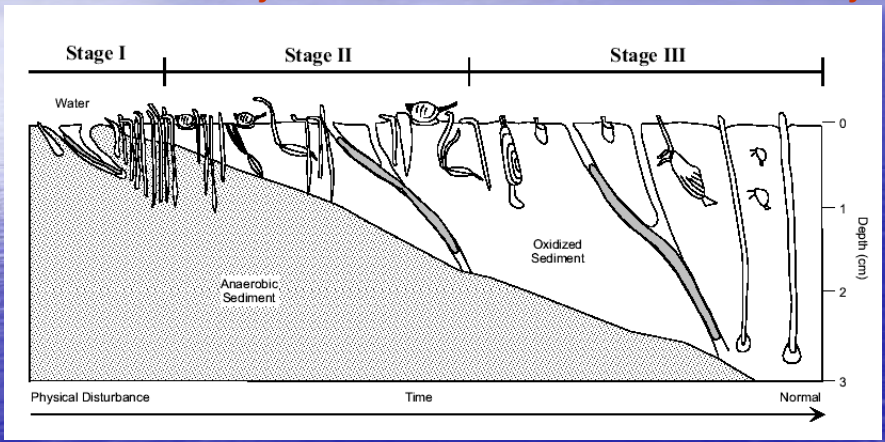
- Onsite chemistry and toxicity always met DMMP guideline
- Onsite chemistry and toxicology have improved since 1988 predisposal baseline
- SPI mapping has documented high benthic habitat quality (OSI DM mean = 9.5), and successional stage (Stage III/I)
- Offsite benthic community and tissue chemistry always met guideline, considering region-wide trends
- Offsite chemistry always met guideline (SQS), except for phenol and three other chemicals in 2003 (one-time occurrence)

OSI = Organism Sediment Index (-10 to +11; OSI > 6 = high quality benthic habitat)

10.17

Idealized Development of Infaunal Successional Stages (after Pearson and Rosenberg, 1978)

Pioneer Community → **Climax Community**



Commencement Bay EA
Reauthorization of the Dredged Material Disposal Site

10.18

Mound Height

- Surveys show mound of disposal material has smaller diameter than predicted, largely remaining within target zone
- Result is that mound is higher than the 1988 EIS prediction
- Water depth still in excess of 400 feet (at top of the mound = 121 ft)
- Disposal target was shifted in 2007 565 feet to the southeast
- Proposed DMMP Management Goal: **Mound Height <250 ft**

Commencement Bay EA
Reauthorization of the Dredged Material Disposal Site

10.19

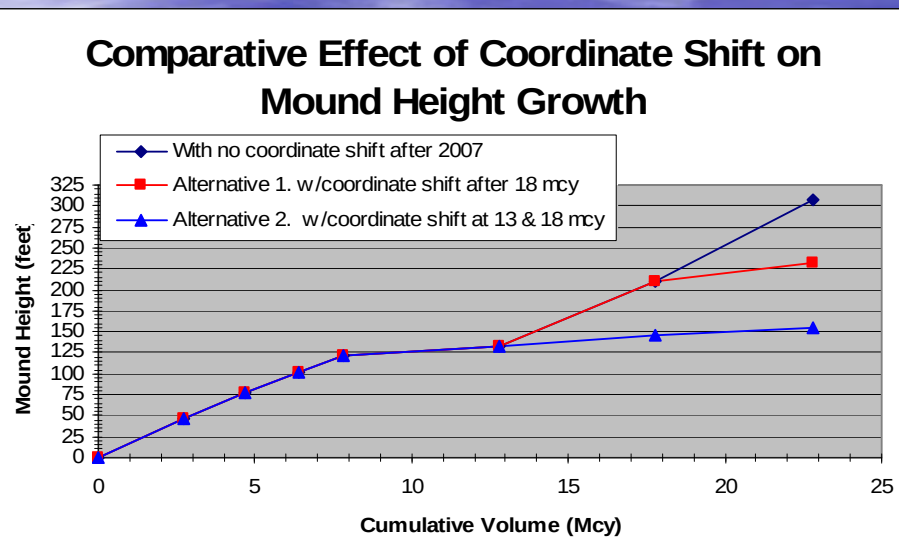
Selected Alternatives

- **Alternative 1**: Establish new permit volume of 23 mcy with SW site coordinate shift at 18 mcy (this represents revision to original Alternative 1 with all disposal at 2007 coordinates)
- **Alternative 2** : Establish new permit volume of 23 mcy with site coordinate shift SW at 13 mcy, and NE at 18 mcy, using adaptive management to meet site management objectives
- **Alternative 3**: No Action (close site)

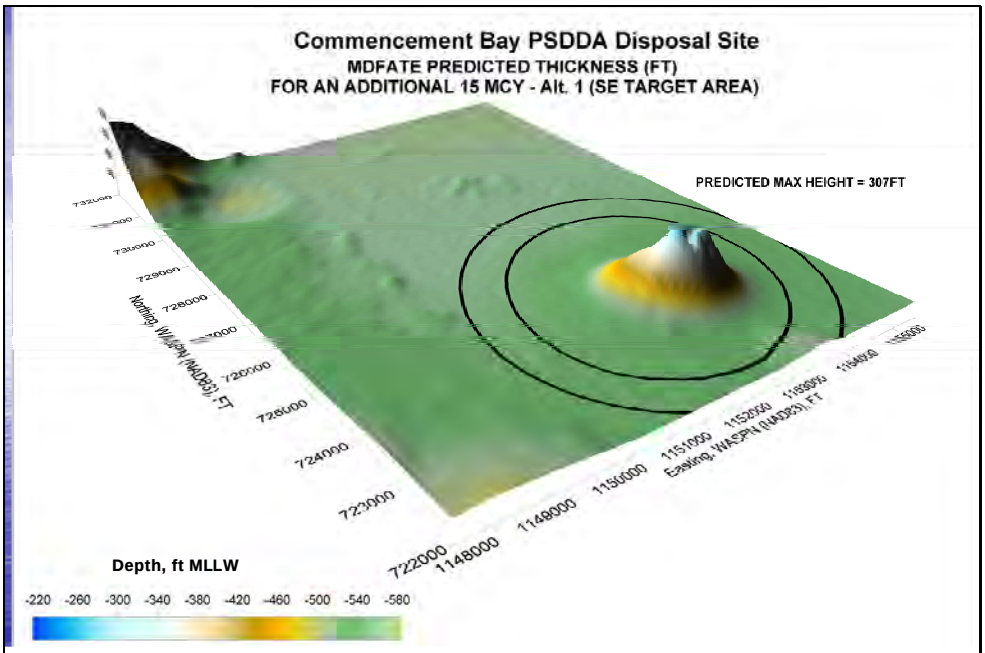
Commencement Bay EA
Reauthorization of the Dredged Material Disposal Site

10.20

Mound Height Relative to Alternatives

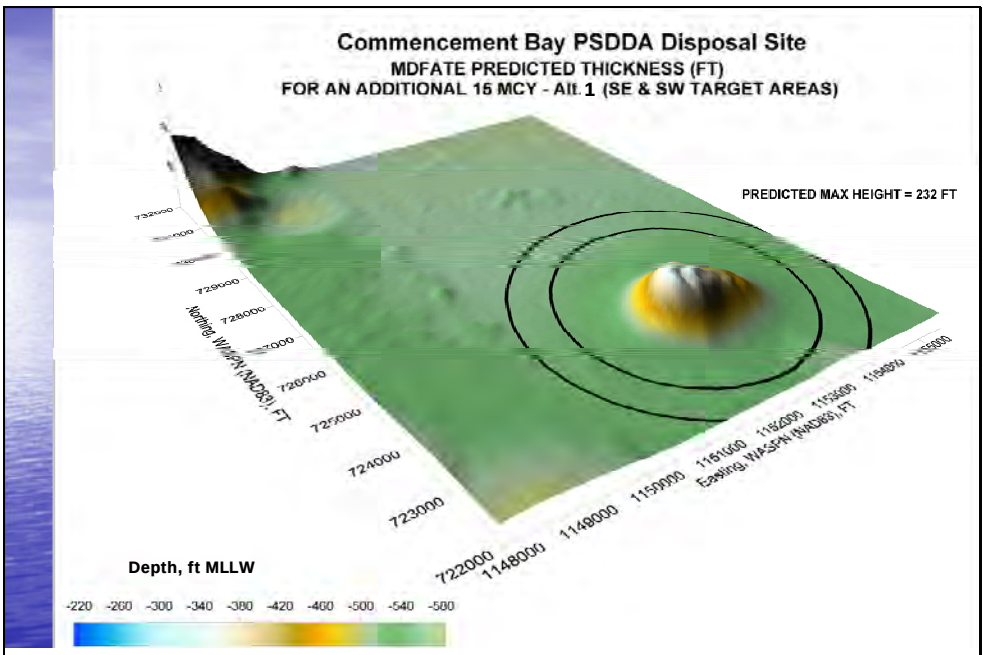


10.21



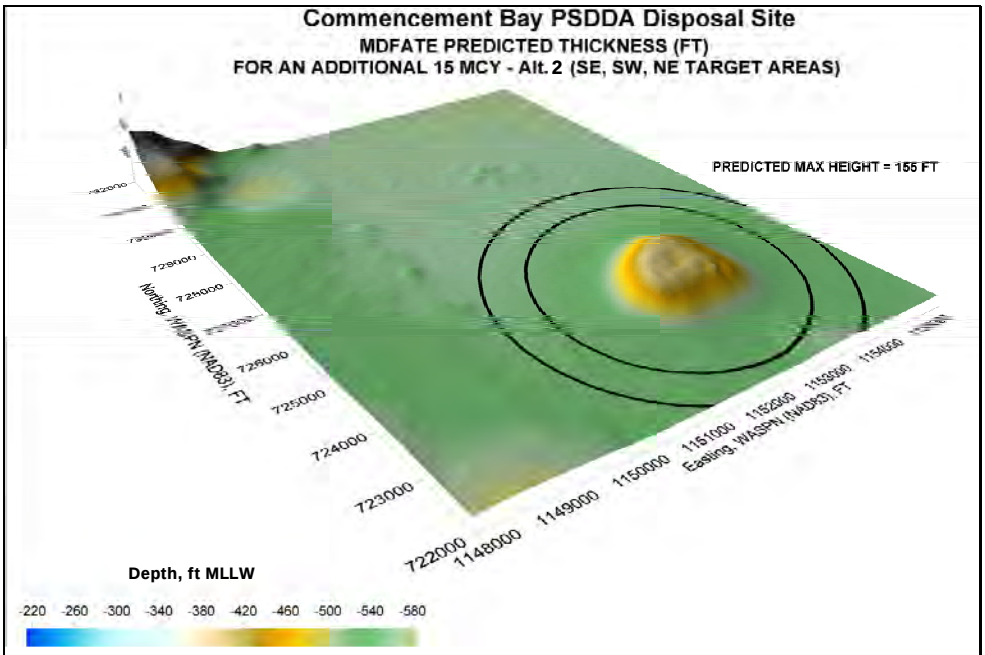
MDFATE Analysis at 23 mcy with no coordinate shifts (e.g., 2007 coordinates)

10.22



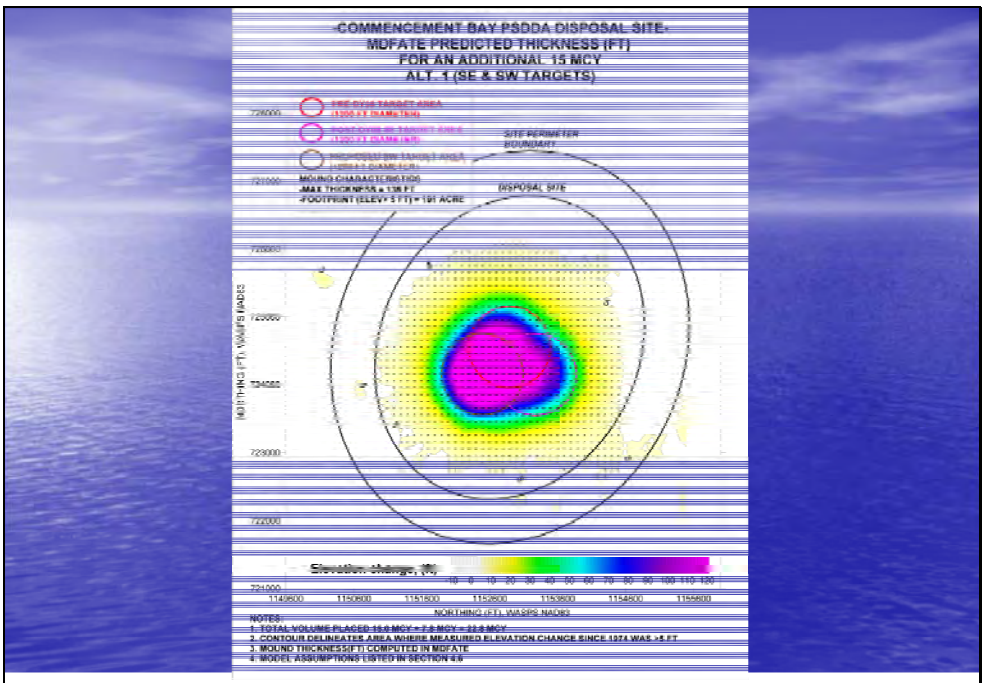
Alternative 1. MDFATE Analysis depicting disposal mound at 23 mcy with one coordinate shift (SW) at 18 mcy (coordinate shift within initial Target Zone)

10.23

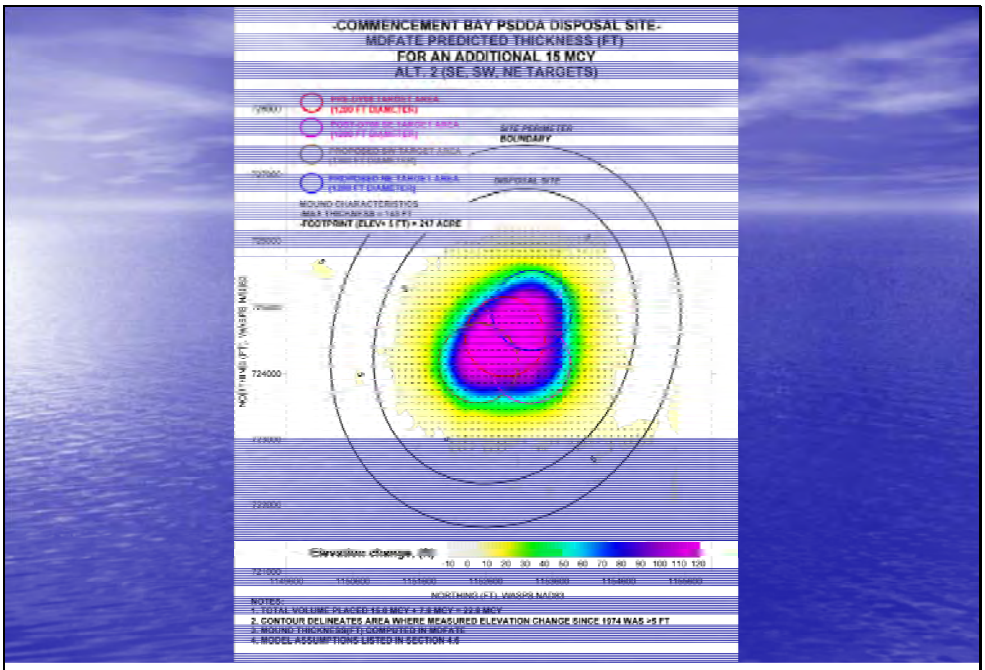


Preferred Alternative 2 at 23 mcy with coordinate shifts to SW after 13 mcy and to NE after 18 mcy respectively

10.24



Alternative 1. MDFATE Analysis at 23 mcy with coordinate shift to SW at 18 mcy



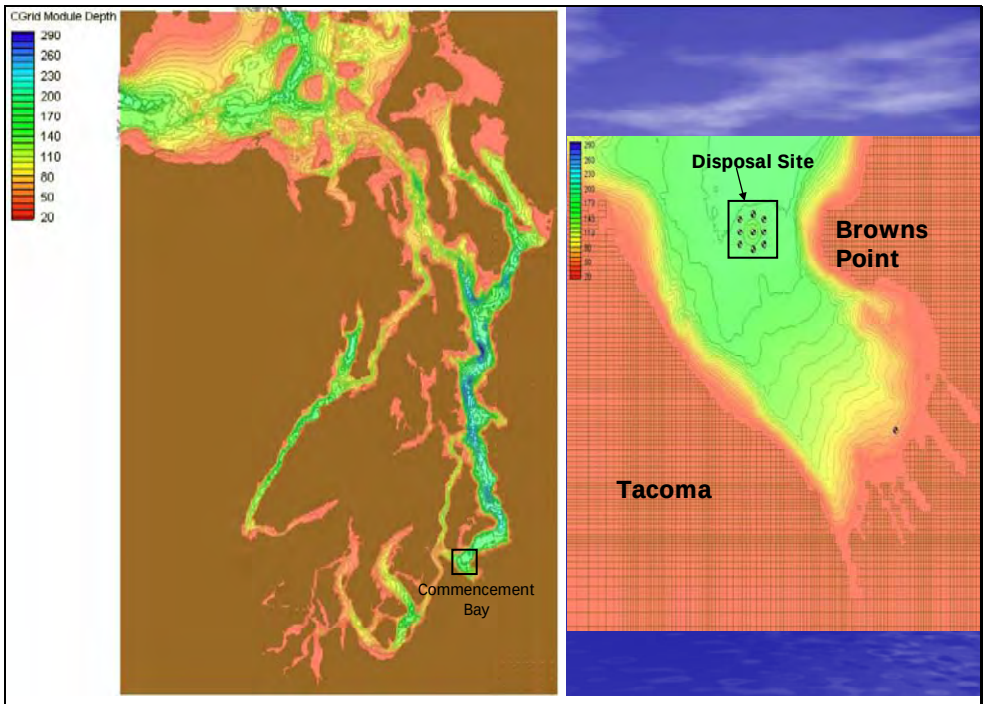
Alternative 2. MDFATE Analysis for Preferred Alternative at 23 mcy with coordinate shifts (SW) at 13 mcy & (NE) at 18 mcy (note: all coordinate shifts within initial Target Zone)

Potential for Transport of Deposited Material

- Peak modeled bottom currents are **1.1 feet/sec** (0.35 m/sec), less than the critical velocity threshold required to initiate bedload transport of deposited material (Michalsen, 2008, verified by Hamilton, 2008).
- Postdisposal monitoring confirms that deposited material has not been transported by the prevailing bottom currents.
- Analysis of recent disposal records indicate 80% of vessel headings were directed to northwest (direction of offsite drift observed during several past site monitoring surveys).
- Moving site coordinates to southeast corner of Target Zone in 2007 expected to minimize drift to the northwest, but if observed could be dampened by institutional controls to minimize northwest vessel bias during disposal.

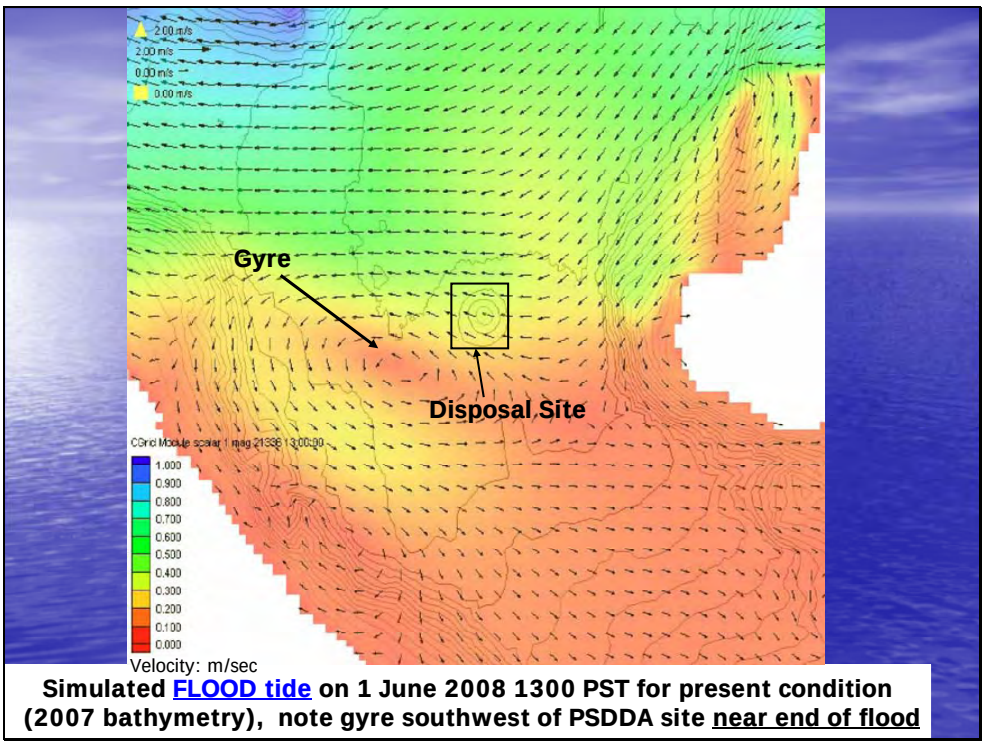
Commencement Bay EA
Reauthorization of the Dredged Material Disposal Site

10.27



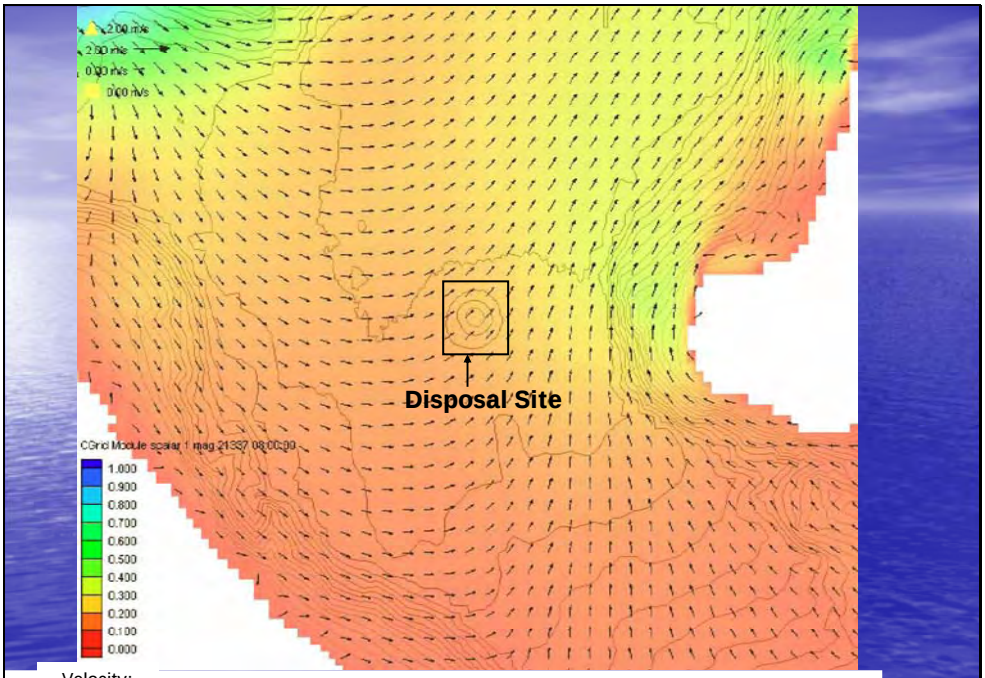
M2D Model domain and detail of Commencement Bay PSDDA site

10.28



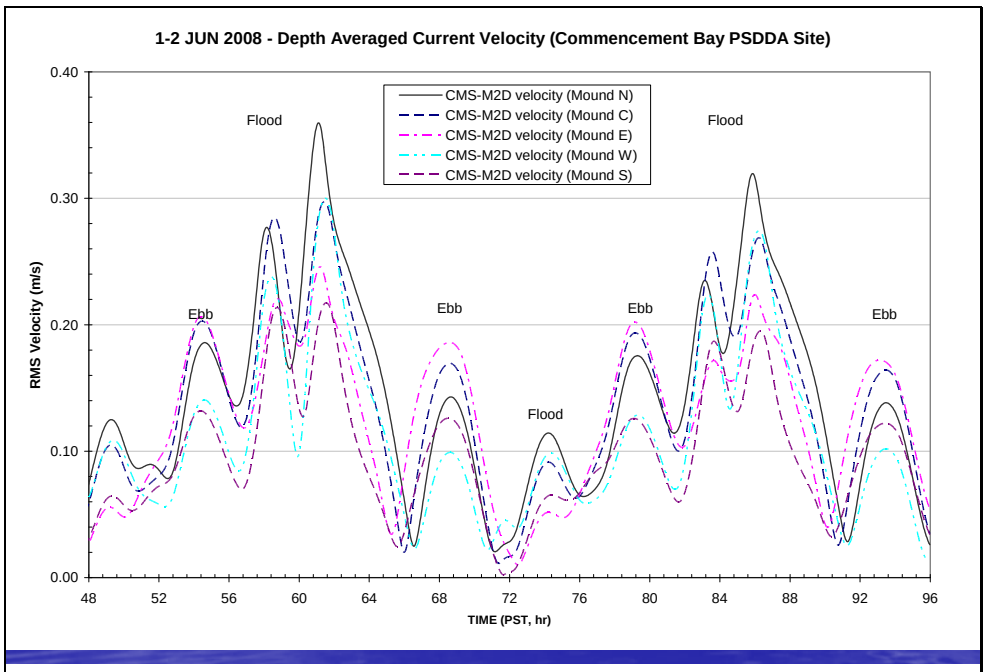
Simulated FLOOD tide on 1 June 2008 1300 PST for present condition (2007 bathymetry), note gyre southwest of PSDDA site near end of flood

10.29



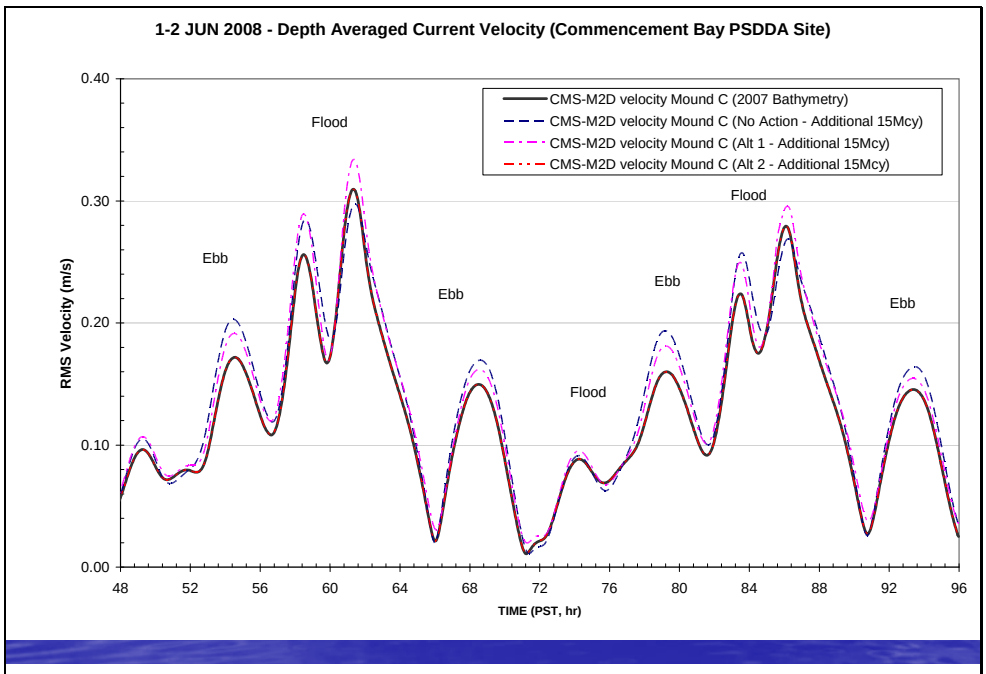
Simulated EBB Tide on 2 June 2008 0800 PST for present condition (2007 bathymetry)

10.30



Depth averaged current magnitude computed in M2D at various observation cells for present site conditions (2007 bathymetry)

10.31



Depth averaged current magnitude computed in M2D at observation cell "Mound C", center of the Commencement Bay PSDDA site (present>future)

10.32

US Army Corps
of Engineers
Portland District

Regional Sediment Evaluation Team and Sediment Evaluation Framework Update

Marci E. Cook
Project Coordinator, RSET/SEF
Portland District Corps of Engineers

11.1

US Army Corps
of Engineers
Portland District

RSET Update

- Where we've been
  - Interim Final Sediment Evaluation Framework (SEF) published in September 2006
  - Comments received and will be addressed in the next draft version of the SEF
  - Change in staff in charge of RSET/SEF
    - ✓ Jim Reese (Corps Division office) Retired
    - ✓ John Malek (EPA) Retired
    - ✓ Stephanie Stirling (Reassigned from Seattle to Portland Division office) returned to Seattle
    - ✓ Pete Gibson (Corps Division office) Retired
    - ✓ Coordination of RSET/SEF shifted to Portland District Corps of Engineers

11.2

US Army Corps of Engineers
Portland District

RSET Update

- What's Happening Now?
  - The Regional Dredging Team (RDT) tasked RSET to produce the SEF
  - Goal of RDT and RSET is to: produce a multi-agency consensus document which provides consistency to sediment testing guidelines for the region
  - Portland District Assigned Project Coordinator to coordinate RSET/SEF Activities
  - Monthly Policy Meetings have resumed
  - Re-issuing 3 existing contracts and issuing 1 new contract to help finalize SEF
  - Subcommittee's meeting on a monthly basis:
    - ✓ Bioaccumulation, Chemical Analyte and Biological Testing

11.3

US Army Corps of Engineers
Portland District

RSET Update

- What's Happening Now?
  - Bioaccumulation Update (Since Last SMARM)
    - ✓ Completed first draft of human health bioaccumulation-based tissue levels (currently under review and on hold pending outcome of below)
    - ✓ Primary task has been participating in dioxin workgroup to identify a framework for working with bioaccumulation-based criteria that are below background concentrations – overriding issue (policy/technical/public) affecting bioaccumulation implementation framework
    - ✓ Developed BCoC lists for Portland and Walla Walla Districts – Seattle is still the same
    - ✓ Beta-testing EIM and entering bioaccumulation data
    - ✓ PAH summit to evaluate methods for assessing PAH toxicity to fish and benthic invertebrates
    - ✓ Conducted SMARM-type meetings in Idaho, Oregon – outreach to public and agencies

11.4

US Army Corps of Engineers
Portland District

RSET Update

- What's Happening Now?
  - Biological Testing Subcommittee
    - ✓ White Papers Completed; Evaluation of Freshwater and Marine Biological Testing Interpretive Criteria in the Interim Final SEF (11/2/07) and Presentation of Process for Reference Sediment Area Identification (2/5/08)
    - ✓ White Papers in process; Review of Available Laboratory Freshwater Bioaccumulation Species for Laboratory Testing, Biological Testing for Fish and ESA Species, Bioassay Tool-Box (SEF Appendix), and Evaluation of Reliability of 10-day versus Longer Term Freshwater Sediment Bioassays.

11.5

US Army Corps of Engineers
Portland District

RSET Update

- What's Happening Now?
  - Chemistry Subcommittee Update
    - ✓ Replace TVS with TOC
    - ✓ Ongoing evaluation of analytical methods, detection limits, and QC criteria
    - ✓ New "Special" Analytes (site use dependent)
      - ❖ Total Petroleum Hydrocarbons (TPH)
      - ❖ Organophosphorus (OP) Pesticides
    - ✓ Evaluation of emerging chemicals (e.g. pyrethroids, PBDEs)
    - ✓ Technical support on analytical issues for sediment quality guidelines and bioaccumulation
      - ❖ Consideration of micro-extraction methods for tissue analysis
      - ❖ PCB congeners in tissue
      - ❖ Comparability reviews – TPH vs. EPH

11.6

US Army Corps of Engineers
Portland District

RSET Update

- What's Happening Now?
  - New Schedule for completion of SEF
    - ✓ Draft Final SEF Public Release in January 2009
    - ✓ 3 Public Meetings to be held in January 2009:
      - ❖ Oregon, Washington and Idaho (Exact locations yet to be determined)
    - ✓ Scheduled release date of Final SEF: May 29, 2009

If you'd like to be on the mailing list or e-mail mailing list for copies of the Final Draft SEF please contact me at: (503) 808-4765 or via e-mail at: marci.e.cook@usace.army.mil

11.7

US Army Corps of Engineers
Portland District

RSET Update

- What the Future Holds?
  - The RDT and the Corps recognizes the need to update the SEF given new science and research in the region.
  - The goal: To continue to have yearly updates to the SEF
  - Follow Seattle District's example; have yearly public meetings and updates to the SEF

11.8

Washington State Department of Ecology

Toxics Cleanup Program

May 14, 2008

12.1

Take Home Messages

- Puget Sound Initiative sediment cleanup
- Baywide sediment characterizations
- General sediment management/cleanup and SMS issues

12.2

Puget Sound Initiative

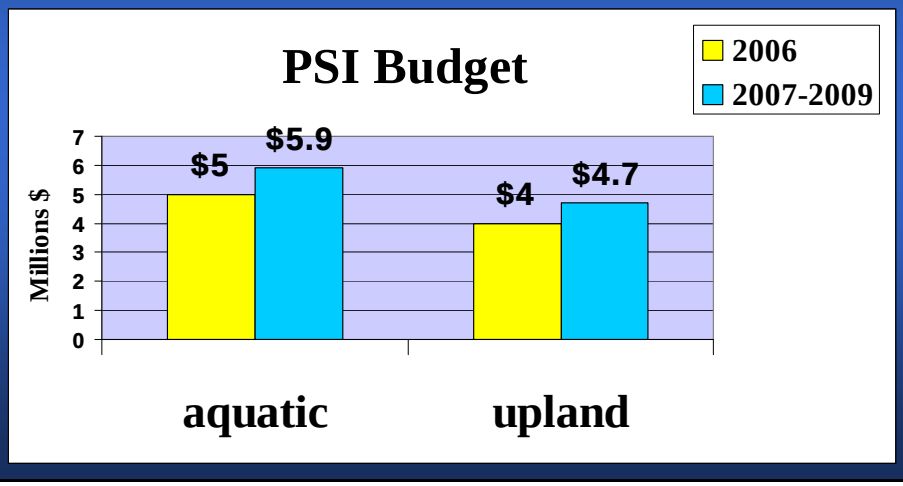
- 2005 – 07: planning
- 2007:
  - interim action
  - baywide studies
- 2008: cleanup
- Cleanup by 2020

12.3

Aquatic & Upland PSI Resources

Aquatic: 2 new staff

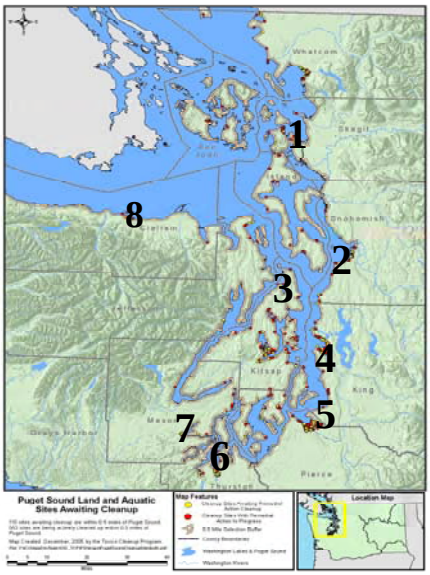
Upland: 6 new staff



12.4

PSI – Bay wide Cleanups

1. Padilla Bay / Fidalgo Bay*
2. Port Gardner /Snohomish River Estuary*
3. Port Gamble*
4. Lower Duwamish *
5. Dumas Bay*
6. Budd Inlet*
7. Oakland Bay
8. Port Angeles Harbor*



Streamlining Cleanup

- Geographic approach
- Bay wide sediment characterizations
- Interagency Agreements
- Engage stakeholders early
- Conduct parallel phases of cleanup
- Increased funding

Port Gamble

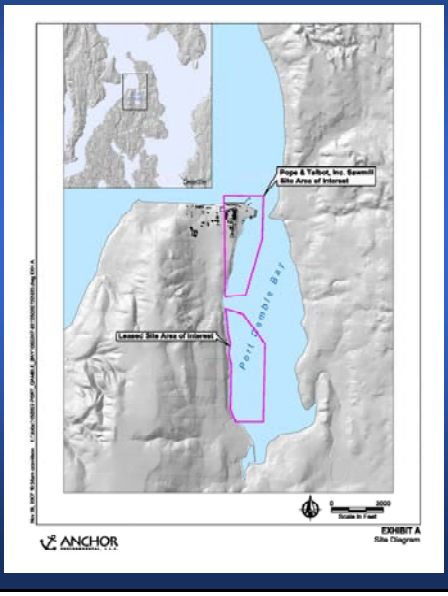
Impacted by wood waste

Supports:

- Herring
- Eelgrass
- Shellfish
  - Geoduck
  - Clams
  - Oysters

Port Gamble - Site Overview

- Two sites:
  - Mill Site
  - Leased Area
- AO Signed May '08
- RI/FS Started
- Interim Action completed '07



12.9

Port Gamble - Restoration

- Opportunities
- Cooperation

12.10

Budd Inlet Sediment Study

- **Final Data Report**
  - Ecology website
  - Comments by 6/17
- **Sediments**
  - Surface & Cores
- **Tissue**
  - Fish
  - Clams
  - Shrimp

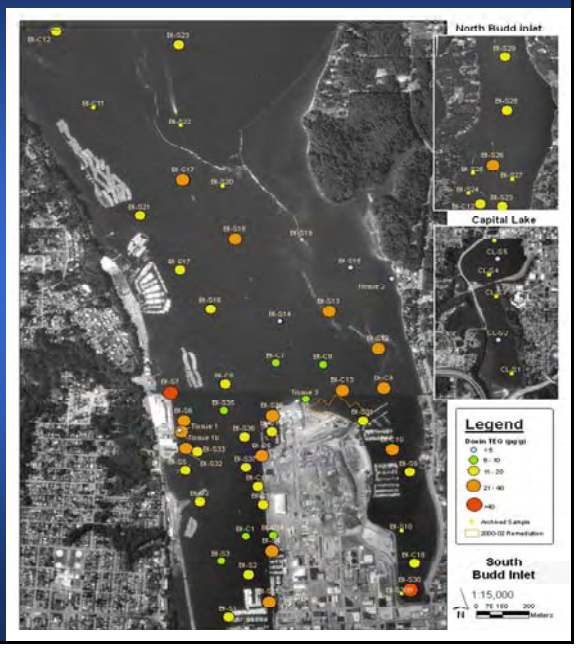
12.11

Dioxin in Surface Sediment

Concentrations 2.9 to 60.3 ppt

Concentrations decrease to the North

Concentrations highest under Port's Pier



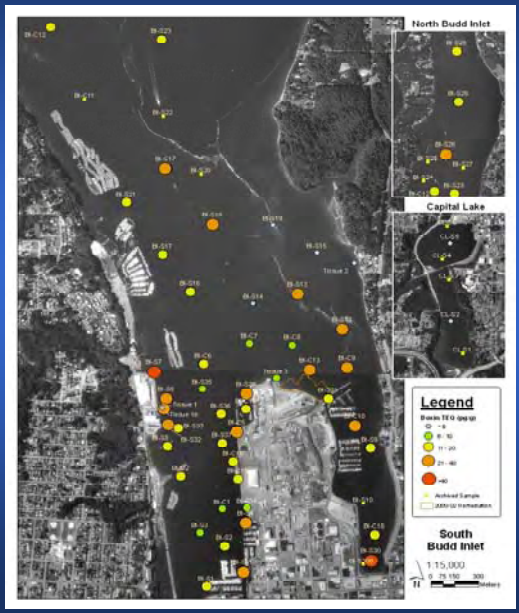
12.12

Dioxin in Tissue

Decreasing Concentrations:

- Ghost Shrimp
- Bent-nosed Clam
- Littleneck Clam
- Starry Flounder

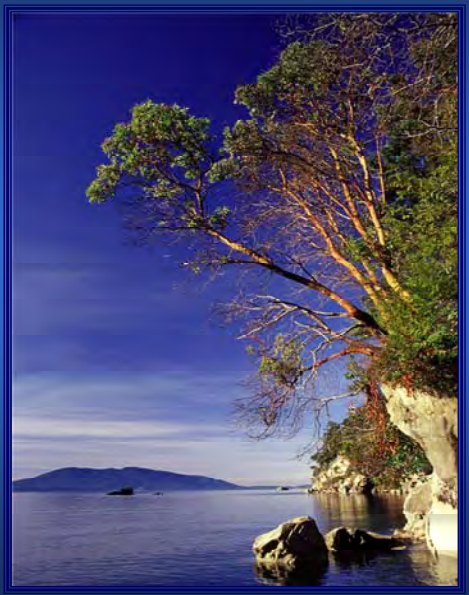
Source:
Exhibits profile of Pentachlorophenol



12.13

Fidalgo and Padilla Bays

- Support important natural resources
- Highly productive estuarine habitat
- Declining eelgrass beds

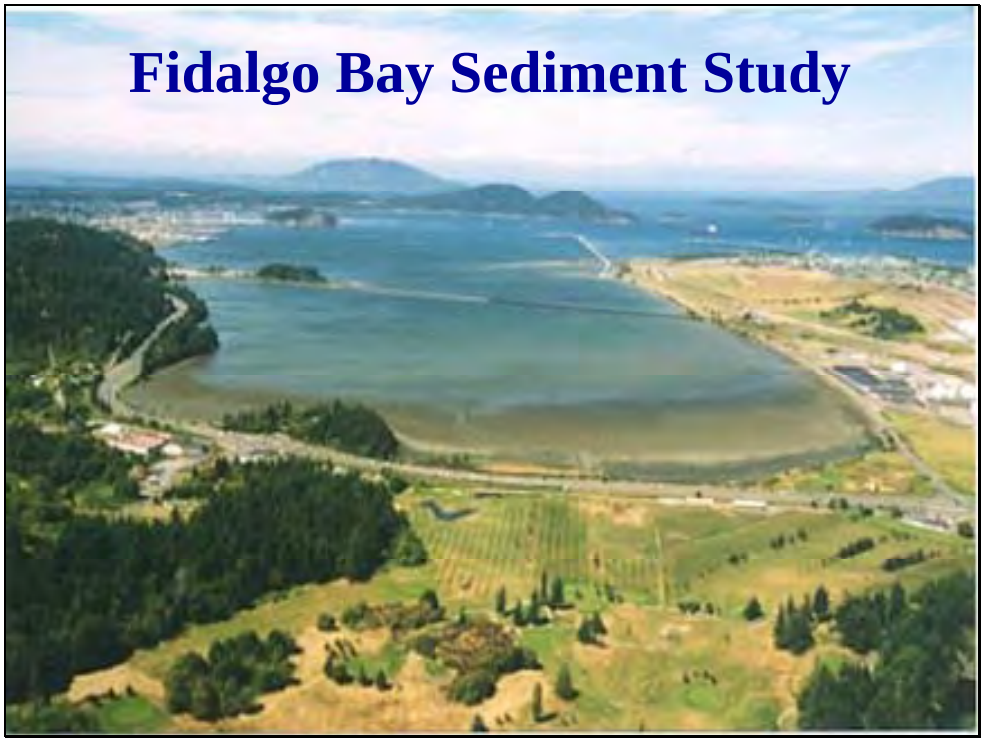


12.14

Fidalgo and Padilla Bays Cleanup Sites

- Port of Anacortes sites:
  - Former Scott Paper Mill
  - Dakota Creek Industries
  - Cap Sante Marine
  - Log Haul Out
  - Shell Tank Farm
- MJB Properties
- Custom Plywood
- Whitmarsh Landfill

12.15

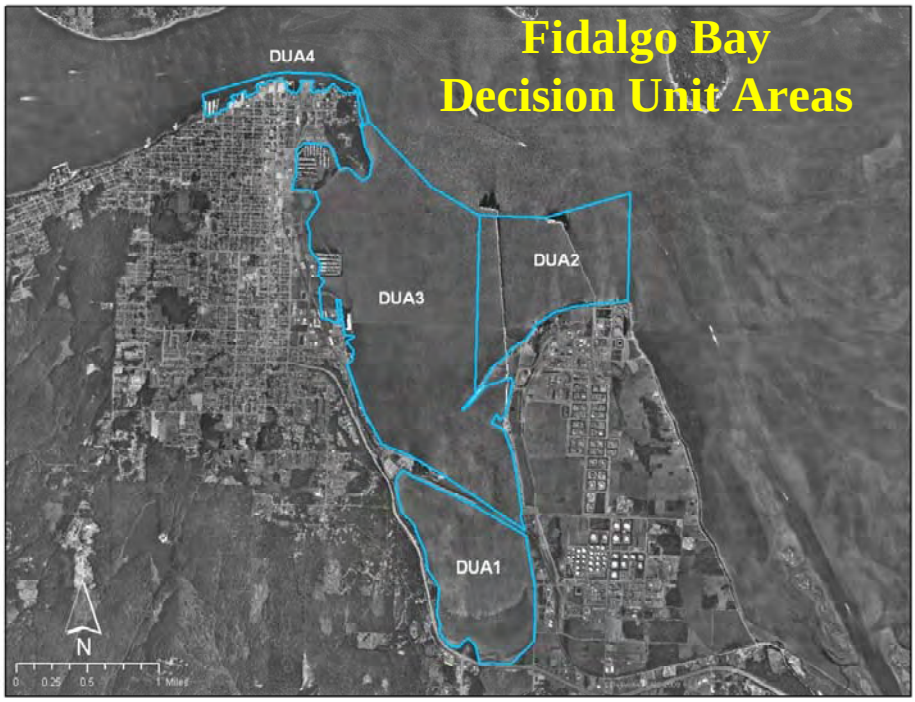


12.16

Fidalgo Bay Sediment Study

- Puget Sound Initiative – one of 7 embayments
- Provide a sediment quality "baseline"
- Provide direction on cleanup priorities
- Inform where else to focus cleanup
- An opportunity to muck in the mud

12.17



12.18

Surface Chemistry/Toxicity Sampling

129 total sampling locations

- 58 locations:
  - SMS chemistry, dioxins/furans, tributyl tin
- 25 locations: Bioassays
- 79 locations archived
  - 20 slated for future SMS chemistry and/or dioxin/furans analysis

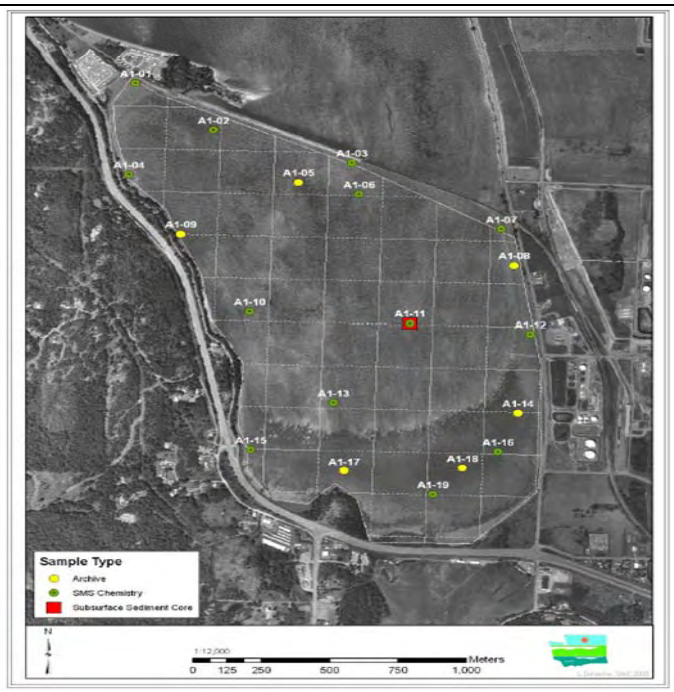


Figure 2-6. Sediment Locations in DUA 1

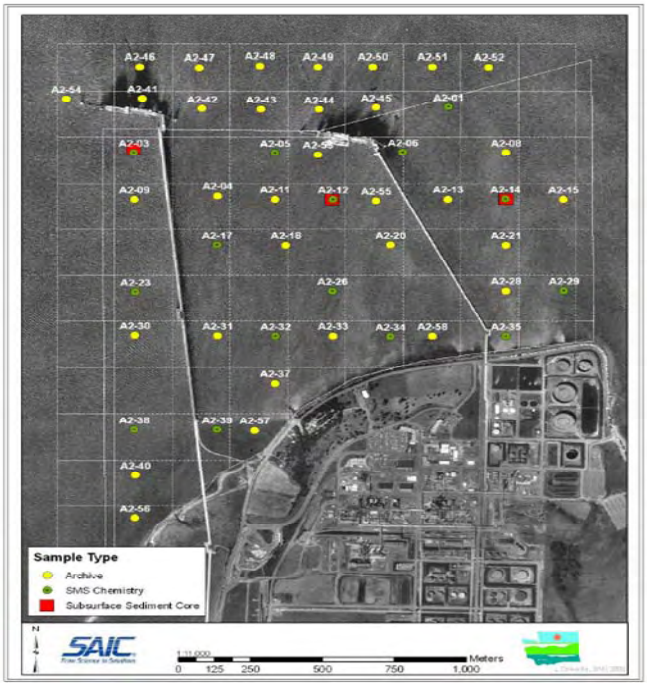


Figure 2-7. Sediment Locations in DUA 2

12.21

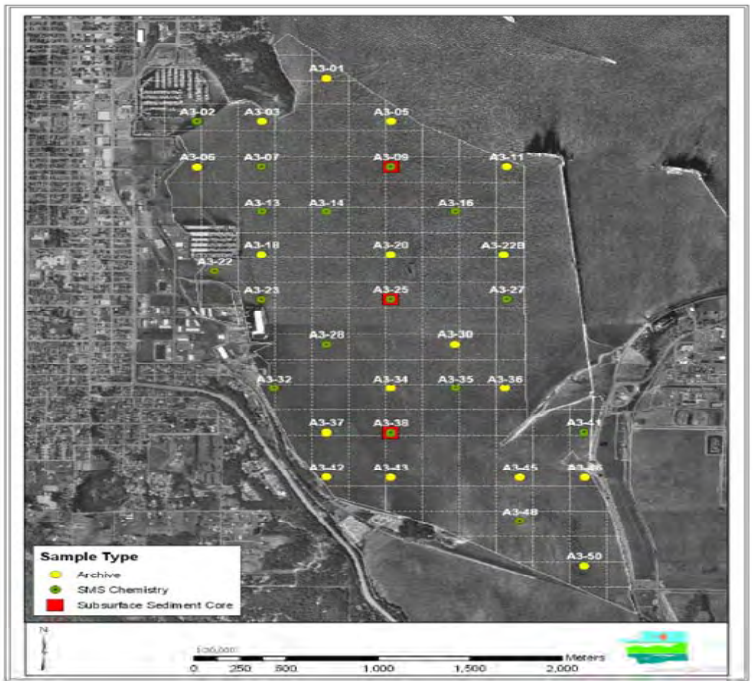


Figure 2-8. Sediment Locations in DUA 3

12.22

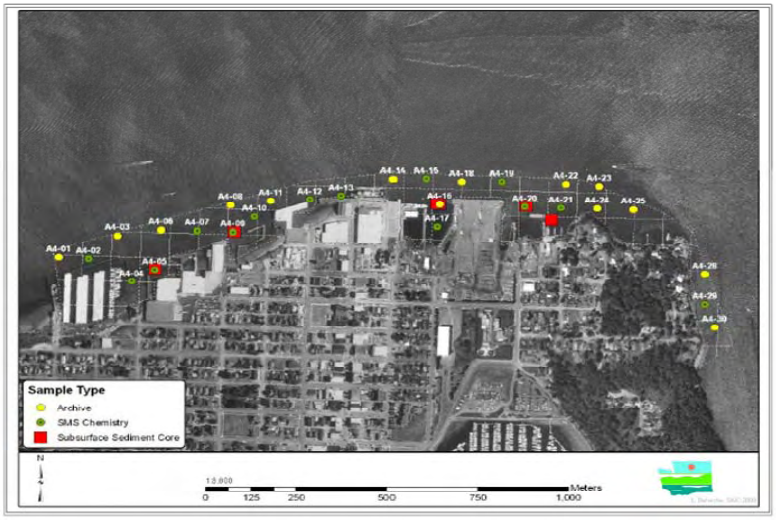
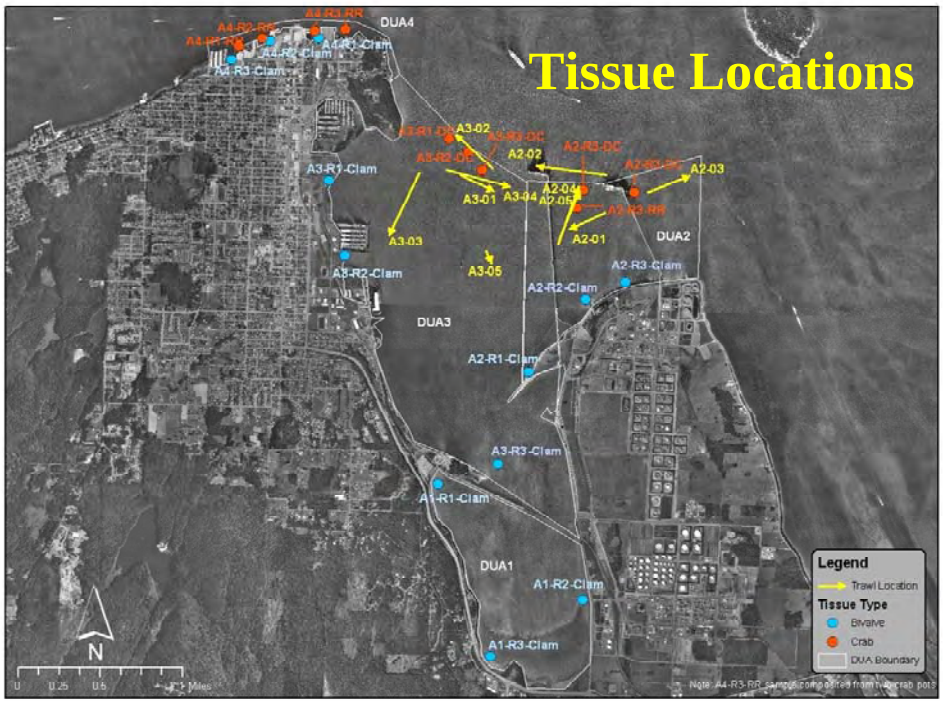


Figure 2-9. Sediment Sampling Locations in DUA 4

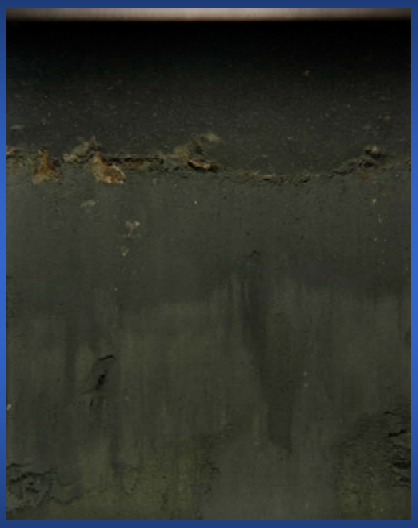
12.23



12.24

SPI Images

A3-10: unconsolidated, silty substrate, w/sea pen



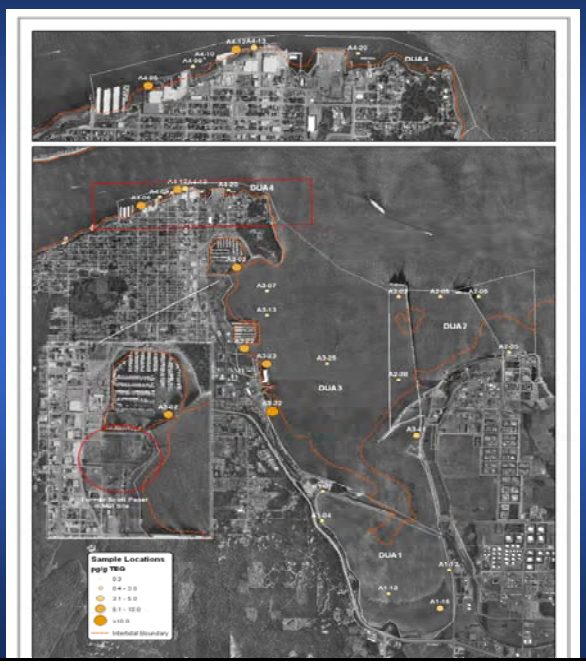
A3-22: unconsolidated, silty substrate, w/ woody debris

12.25

Data Results

12.26

Dioxin Detections



12.27

Future Analyses

- Sediment:
  - SMS suite near SMS exceedances
  - Dioxins/furans
- Tissue: metals, PCB's, dioxin/furans

12.28

Conclusions

- Areas of highest impact are along the western shore the bay proper and Guemes Channel
- Focusing cleanup at 5 sites in these areas
- Areas of biological toxicity are likely due to organic enrichment

12.29

Next Steps

- Guemes Channel area needs further evaluation
- Human Health Consult – State/County
- Continue cleanup in Northern area
- Further describe areas – archive chemistry and tissue analysis

12.30

Data Management

- SEDQUAL is now retired
- No longer accepting SEDQUAL data
- Environmental Information Management System – really cool
- New data submittal requirements:
  - SAPA appendix update

12.31

SMS Updates

- Freshwater criteria development
- SMS/MTCA harmonization
- Bioaccumulative chemicals
- SMS criteria updates - future

12.32

Questions?

EPA Region 10 Superfund Sediment Cleanup Update

Sediment Management Annual Review Meeting
May 14, 2008

Sheila Eckman, Associate Director
Office of Environmental Cleanup
EPA Region 10

13.1

EPA Puget Sound Priority

- Puget Sound has been designated a regional and national priority by EPA.
- EPA Region 10 has developed a Puget Sound Toxics Strategy.
- The overall goal for cleanup of contaminated sediments is to clean up an additional 200 acres between 2006 and 2011. Currently at 123 additional acres.
- This work will be coordinated with the Puget Sound Partnership.

13.2

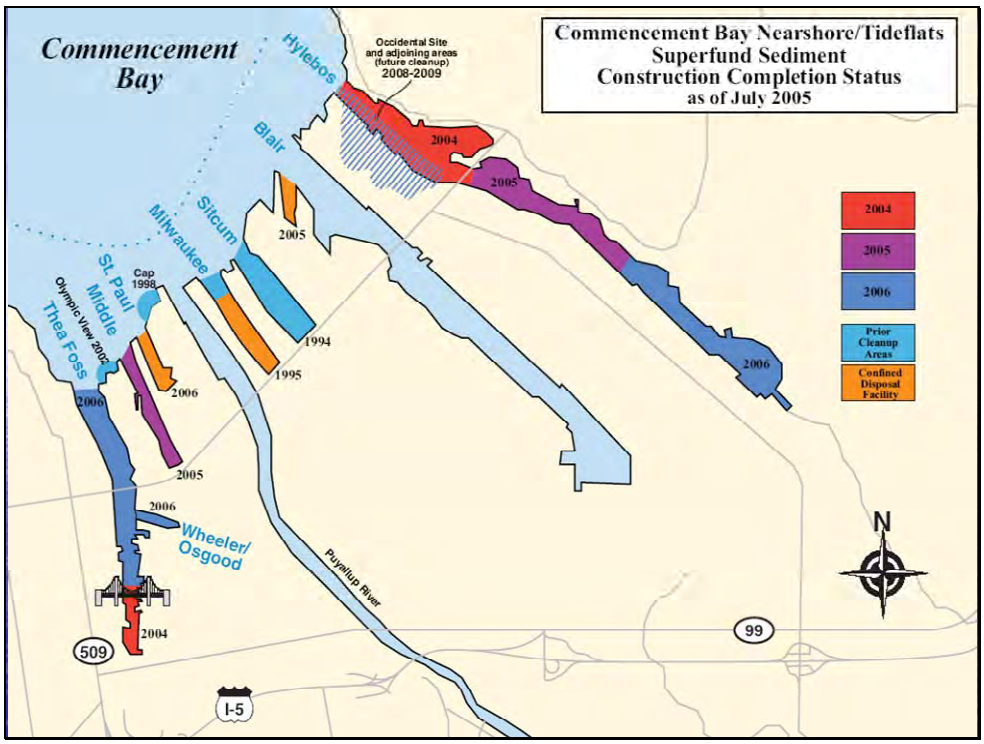
EPA Superfund Cleanup Progress in Puget Sound to Date

- 728 acres of contaminated sediment cleanup.
- 3.8 million cubic yards of contaminated sediment removed.
- 11,315+ pilings removed.
- 28,260 tons of debris removed.
- 223 acres capped.
- 22 acres of enhanced natural recovery.
- 77+ acres of habitat mitigation.

13.3

Update on Sediment Cleanup Projects

13.4



13.5

Commencement Bay 2008

- Ongoing investigation at Occidental facility.
- Pier 24-25 subtidal and intertidal capping (Hylebos Problem Area)
- Continued source control work.
- Continued monitoring, including planning for bay-wide fish tissue monitoring.

13.6

Pier 24-25 Capping Project

- Underpier capping in conjuction with pier repairs: 3.6 acres.
- Dredging/removal of debris and contaminated hot spots, followed by capping.
- Cost approx. $2 million.
- Estimated life of cap: 10-30+ years.
- Concern with dissolved arsenic breakthrough.
- Coordination with Ecology on upland/sediment interface.

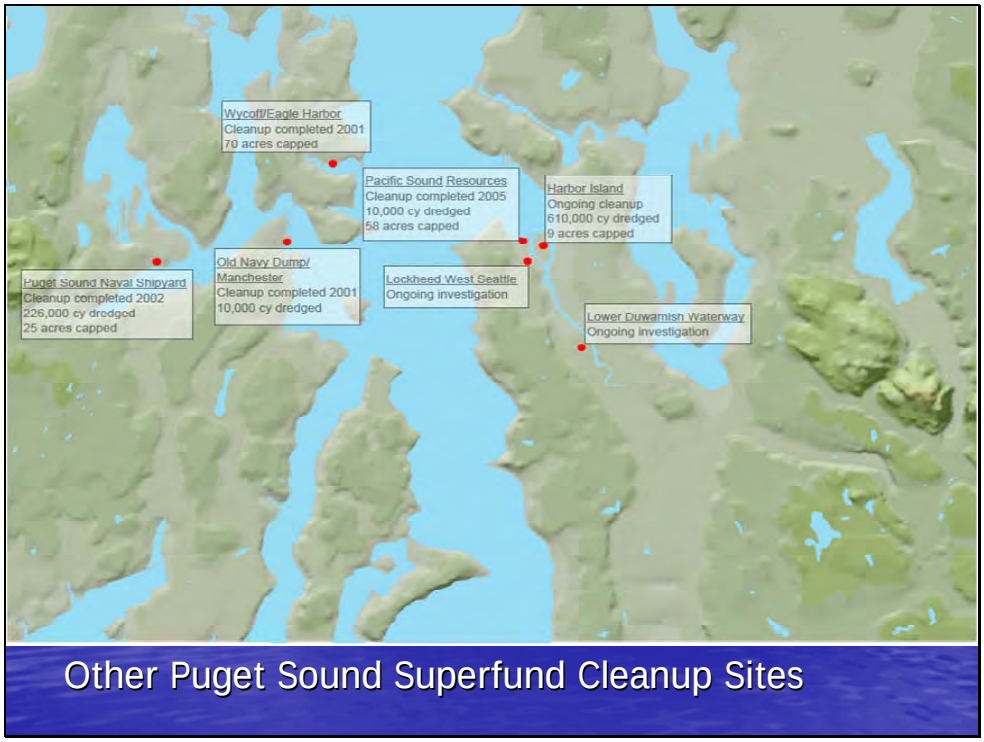
13.7

Figure 1: Preparing to place sand cap over the toe berm

13.8

Figure 1: Aerial view of gravel & cobble substrate placement at bents 35 - 37.

13.9



13.10

Harbor Island/Elliot Bay

- East Waterway - Focused RI/FS to complete cleanup.
- Lockheed West Seattle – RI/FS.
- Sediment cleanup at Todd and Lockheed shipyards and PSR are complete.

13.11

Superfund/DMMP Coordination

- East Waterway T-30, Port of Seattle.
- Navigational dredging project in Superfund Site area.
- USACE and EPA Coordination.
- Superfund program reviews suitability determinations and BMPs.
- Concern for post-dredge monitoring data.

13.12

Lower Duwamish Waterway Update

- Draft Remedial Investigation complete.
- Human Health and Ecological Risk Assessment Complete.
- Preparation of Feasibility Study.
- Source control continues.
- Final RI/FS expected 2010.
- T-117 and Slip 4 Early Action sediment cleanups delayed due to source concerns.

Oregon Sediment Projects

- Portland Harbor - RI/FS continues, two early action sites ongoing. Contact: Chip Humphrey (503)326-2678
- McCormick & Baxter – Construction complete, including sediment capping – in monitoring phase Contact: Nancy Harney (206)553-6635

13.15

EPA Contacts

- Sheila Eckman, Unit Manager, 206-553-0455
- Hylebos, Occidental - Jonathan Williams, 206-553-1369
- Thea Foss, T-117 - Piper Peterson Lee, 206-553-4951
- Middle Waterway, McCormick and Baxter - Nancy Harney, 206-553-6635
- Lockheed, Todd, Lockheed West - Lynda Priddy, 206-553-1987
- PSR, Harbor Island, East Waterway – Ravi Sanga, 206-553-4092
- Duwamish RI/FS - Allison Hiltner, 206-553-2140
- Slip 4 - Karen Keeley, 206-553-2141
- Portland Harbor – Chip Humphrey, 503-326-2678

13.16

APPENDIX 5

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

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.

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.

- 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.