SEDIMENT MANAGEMENT

ANNUAL REVIEW MEETING

FINAL

MEETING MINUTES

JULY 2013

Prepared by DMMP Agencies:

United States Army Corps of Engineers
Washington Department of Ecology
United States Environmental Protection Agency
Washington Department of Natural Resources

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List of Acronyms and Abbreviations

AFDW	ash free dry weight
BMP	best management practice
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CSL	Cleanup Screening Level
CSMP	Cooperative Sediment Management Program (Washington State)
CWA	Clean Water Act
DEQ	Oregon Department of Environmental Quality
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Program
DNR	Washington State Department of Natural Resources
DY13	Dredge Year 2013
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FCR	fish consumption rate
FPM	Floating Percentile Method
LEKT	Lower Elwha Klallam Tribe
MTCA	Model Toxics Control Act
NEP	National Estuary Program
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
PCB	polychlorinated biphenyl
PLP	Potentially Liable Party
PNWA	Pacific Northwest Waterway Association
PQL	practical quantification limit
PRG	Project Review Group
PSDDA	Puget Sound Dredged Disposal Analysis
PSEP	Puget Sound Estuary Program
PSET	Portland Sediment Evaluation Team
QA/QC	quality assurance/quality control
RDT	Regional Dredging Team
RI/FS	Remedial Investigation/Feasibility Study
RSET	Regional Sediment Evaluation Team
SEF	Sediment Evaluation Framework
SL	Screening Level
SMARM	Sediment Management Annual Review Meeting
SMS	Sediment Management Standards
SQS	Sediment Quality Standards
SQV	Sediment Quality Value
SRM	Sediment Reference Material
TEQ	toxic equivalence
TOC	total organic carbon
TSS	total suspended solids
USACE	United States Army Corps of Engineers
WAC	Washington Administrative Code
Ecology	Washington State Department of Ecology

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The 25th annual review of sediment management issues in the Pacific Northwest region was held on May 1, 2013 by the Cooperative Sediment Management Program (CSMP). The Sediment Management Annual Review Meeting (SMARM) was hosted by the U.S. Army Corps of Engineers, Seattle District, at the Salish Sea Conference Room, in the new Seattle District Oxbow Headquarters Building in Seattle, Washington. Comments from the public were welcomed, with prior invitation to submit issues for consideration and discussion.

The Dredged Material Management Program (DMMP) is an interagency cooperative program that includes the U.S. Army Corps of Engineers (USACE), Seattle District; the Environmental Protection Agency (EPA), Region 10; the Washington Department of Natural Resources (DNR); and the Washington Department of Ecology (Ecology). These minutes include the DMMP's response to public issues raised at this year's SMARM meeting (Appendix I), meeting agenda (Appendix II), list of attendees (Appendix III), the speaker's presentation slides (Appendix IV), and the 2013 SMARM Clarification Papers (Appendix V).

WELCOME AND OPENING REMARKS

Justine Barton (Moderator, EPA), welcomed everyone to the 25th consecutive annual SMARM meeting. She briefly reviewed the history of the DMMP, stressing the collaborative process of the DMMP and its important role in the state's goal of cleaning up Puget Sound by 2020. According to Justine, a hallmark of the program is the civil discourse among all parties. Justine introduced the members of the head table, including Christine Reichgott (EPA, Manager, Environmental Review and Sediment Management Unit), Wayne Wagner (USACE, Chief, Management and Environmental Support), Kristin Swenddal (DNR, Manager, Aquatic Resources Division), and Jim Pendowski (Ecology, Manager, Toxic Cleanup Program). This was the first meeting in the new Corps Building and Salish Sea Conference Room. Justine advised everyone to please sign in at the back table and addressed a few "housekeeping" issues. She reminded everyone that the 30 day public comment period was June 3, to provide input on the SMARM topics and/or proposed changes to the program. The host for these meetings rotates each year, and this year the host is Seattle District. The meeting location continues to remain at the Corps because of free parking.

LTC Kevin Stoll (Deputy District Engineer). Justine then introduced LTC Kevin Stoll, Deputy District Engineer, who welcomed those in attendance at the 25th consecutive SMARM to the first meeting in the new Corps headquarters building. He then provided opening remarks and a brief summary of why the DMMP has been so successful over the past twenty-five years. He indicated that he wished it the same success for the next twenty-five years.

Justine Barton (Moderator)**,** introduced the first agency speaker, Chance Asher, Ecology.

SMS RULE: ADOPTION AND IMPLEMENTATION OF THE NEW RULE, PART 1

1. Ecology/TCP, Chance Asher, Ivy Anderson

Chance Asher (Ecology/TCP). Chance Asher presented an update on the status of the Sediment Management Standards rule revisions, which were promulgated on February 22, 2013. The goals for the presentation were to provide a summary of the rule changes, an update on the implementation plans, and to obtain feedback on the cleanup guidance which is being drafted for public review. Supporting documentation for the rule revision includes the rule language, the Concise Explanatory Statement, the

Environmental Impact Statement, a cost benefit analysis, and the Sediment Cleanup Users Manual II, all of which are available at Ecology TCP's website.

The changes to the rule only apply to Chapter 173-204 WAC Part V, Sediment Cleanup Standards, and as such are not to be used for Clean Water Act purposes. A presentation of the details of the rule changes followed, including changes to the following sections and processes:

- WAC 173-204-510: Identify sediment station clusters of potential concern.
- WAC 173-204-520: Conduct hazard assessments to identify cleanup sites.
- WAC 173-204-530: Evaluate stations clusters of potential concern.
- WAC 173-204-540: Determine appropriate site cleanup authority.
- WAC 173-204-550: Conduct site investigation to characterize:
    - Nature and extent of contamination and cleanup boundaries.
    - Identify potentially liable person(s) and contamination sources.
    - Establish background concentrations.
- WAC 173-204-550: Identify bay-wide site, sediment cleanup units, and individual sites.
- WAC 173-204-560 through -564: Establish cleanup standards for different receptors.
- WAC 173-204-570: Select remedial actions.
- WAC 173-204-575: Cleanup action decisions.
- WAC 173-204-590: When necessary, authorize a site sediment recovery zone.
- Resolve potentially liable persons responsibilities at a cleanup site.

Ivy Anderson then presented a section on how sediment cleanups will move forward with the new rule. This included a discussion of the problems associated with sediment cleanup sites, when settlement discussions are appropriate, bay-wide cleanups, and settlements for sediment cleanup units.

Chance Asher then finished with the next steps for the rule revision, which includes providing guidance and details on implementation. She ended with a slide covering the expected timeline for the process.

Chance Asher

PP1.1 Sediment Management Standards, Chapter 173-204 WAC Rule Revisions

PP1.2 Happy Anniversary!

PP1.3 Goals for today

PP1.4 SMS Rule Adoption

PP1.5 Supporting Documentation

PP1.6 SMS Rule Chapter 173-204 WAC

PP1.7 Part V Cleanup Process Under the New Rule

PP1.8 WAC-173-204-500 Expectations

PP1.9 WAC-204-505 Definitions – Apply to Part V only

PP1.10 WAC 173-204-510 – 173-204-530, Identification and evaluation of cleanup sites

PP1.11 WAC 173-204-540, Types of Cleanup Authority

PP1.12 WAC 173-204-550 RI/FS

PP1.13 WAC 173-204-560 Cleanup Framework & Background

PP1.14 WAC 173-204-561 Human Health Risk

PP1.15 WAC 173-204-562 Marine Benthic Criteria

PP1.16 WAC 173-204-563 Freshwater Benthic Criteria

PP1.17 WAC 173-204-564 Ecological Risk to Higher Trophic Levels

PP1.18 Original Rule – Establishing Cleanup Levels

PP1.19 New Rule WAC 173-204-560 Establishing Cleanup Levels

PP1.20 WAC 173-204-570 Selection of Cleanup Actions

PP1.21 WAC 173-204-570 Selection of Cleanup Actions, Minimum Requirements

PP1.22 WAC 173-204-570 Selection of Cleanup Actions, MTCA Disproportionate-cost evaluation criteria

PP1.23 WAC 173-204-575 Cleanup Action Decisions

PP1.24 WAC 173-204-590 Sediment Recovery Zones

Morning Break

1. SMS Rule: Adoption and Implementation of the New Rule (continued), Chance Asher, Ivy Anderson

***Ivy Anderson/Chance Asher,Ecology*,** continued discussion on SMS Rule Revision.

Ivy Anderson

PP1.25 Sediment Sites: Now What Dow We Do With Them?

PP1.26 Why Are Sediment Sites So Difficult?

PP1.27 When are settlement discussions appropriate?

PP1.28 How to deal with a large bay-wide site? Sediment Cleanup Units

PP1.29 Settlements for sediment cleanup units

PP1.30 De minimus settlement at a Bay-wide Site

PP1.31 Settlement for a Bay-wide Site

PP1.32 How cleanup fits with long term SMS goals

Chance Asher

PP1.33 Next steps for the SMS Rule

PP1.34 Sediment Cleanup Users Manual II – Update

PP1.35 Sediment Cleanup Users Manual II – Issues Identified by Advisory Group

PP1.36 Rule Implementation Timeline

Comments and Questions

- **Q Clay Patmont**: ITRC almost done with detailed 400 pg guidance on sediment cleanup that deals with similar issues (out this summer?). Is ECY involved with this, coordinating, using anything?

  Chance Asher (ECY): There are no participants from ECY in ITRC effort (although Chance did see a draft and has incorporated some of the information). She thought will be completed in 2014. She'd be interested in seeing the final version and incorporating appropriate information. Could Clay provide contact?

- **Q Maura O'Brian (ECY):** Re. Fresh Water Benthic criteria. There are other receptors and pathways aside from benthic risk. How does framework address these?

  Chance Asher (ECY): (Showed the slide showing how CLs established). The new framework accounts for and incorporates all the different receptors and pathways since the lowest is chosen to develop the cleanup level.

  Teresa Michelsen (Avocet): Actual equations for Human Health risk are in SCUM II (newest version). There is lots more detail there than in the rule itself.

- **Q Tad Deshler (Coho Environmental):** Has ECY put boundaries on the concept of "technical possibility"? If there's enough $$, anything is possible.

  Chance Asher & Michael Filcamp (ECY): "Technical possibility" is defined in MTCA and will be teased-out in guidance. Sometimes certain types of remediation causes more harm than good so that aspect will be factored into how cleanup levels are established. The ability to reliably maintain Cleanup Levels over time will vary between sites. Recontamination from non PLP sources is part of "technical possibility". What is technically possible will also depend on regulatory background levels.

- **Q Bob Johnston (Navy)**: Bay-wide or watershed cleanups – What priority given to recovery of other functions aside from cleaning up sediments? PLPs could potentially improve a watershed more with other actions (restoration, storm water) aside from sediment cleanup. What flexibility will there be to incorporate other actions? ECY needs to consider a larger perspective on restoration than sediment removal. There is only so much money to go around.

  Chance Asher (ECY) and Ivy (AG): Good point. For sediment sites, they expect cleanup to be the near-term goal. Typically there is some tie-in to habitat restoration and NRDA with cleanups. All is done together but not on a large bay-wide scale necessarily like Pt Gamble. Expect that over time cleanup and source control will be tied-in with pollution prevention (agency-side efforts to reduce toxics).

  NRDA deals with restoration and is not tied to cleanup. Attempts are typically made to link NRDA studies with MTCA studies as it is often beneficial to bring up habitat issues up at beginning of cleanup process.

  Kathy Taylor (ECY): ECY can work with other partners interested in restoration (not just NRDA). ECY tries to engage those organizations when possible.

- **Q Kathy Godfredson (Windward):** Lots of parties want to provide input on SCUM. Will there be the opportunity to do that this summer? Any plans for a workshop? Will ECY accept comments right now?

  Chance Asher (ECY): We are considering updating the draft and sending it out for comment. More engagement of interested parties will be considered. It's more a question of fitting it in time-wise. There's still a huge workload to do.

  Dave Bradley (ECY): What topics need engagement earlier?

- **Q Doug Hotchkiss (Port of Seattle)**: It's a real disadvantage for SCUM II to not have more meetings with affected parties and the regulatory group to sort out issues. There is lots of concern about what comes out in SCUM II. More interaction needed before draft is out the door in Sept.

  Dave Bradley (ECY): ECY needs to balance feedback opportunities with time constraints. We are trying to structure things and focus on most critical issues.

  Kathy Godfredson (Windward): ECY should get more feedback on SAPs for regional background from a bigger group (not just people in those locations) before drafted.

  Dave Bradley (ECY): We hear that and will try to do better for the Elliott Bay SAP. ECY is fully committed to doing this.

  Doug Hotchkiss (Port of Seattle): Who made the deadlines? Can't we change them to increase participation? Don't use arbitrary deadlines as excuse to not get a workable regulation. There is lots of stuff in definitions (such as practicality) that really need scrutiny.

Chance Asher (ECY): Ecology made the effective date of the new rule 6 months from adoption in order to work on implementation. Part of that is drafting the guidance and regional background sampling.

- **Q Ian Wingard**: What other Bays are scheduled for developing regional background?

  Chance Asher (ECY): Currently there is money for Port Gardener, Port Angeles and Elliot Bay. This type of work all depends on money and staff. ECY can't yet commit to Budd Inlet and other embayments. Are there other priorities that stakeholder want to bring up for consideration? Padilla Bay was considered but, based on analysis of the current data, ECY has decided that there isn't an appreciable difference between natural and regional background for this location since it is small and it would be hard to separate the urban influence from the cleanup site there. Bellingham is also being considered.

- **Q Tom Gries:** How does new rule address "other deleterious substances (ODS)" - especially wood waste – legally and practically? Are we allowed to use other states guidelines on ecorisk?

  Chance Asher (ECY): Yes, there is flexibility to use guidelines from other states as long as these meet the requirement of the SMS rule. ODS hasn't changed in the new rule, we still use bioassays and chemical criteria to make decisions on wood waste sites.

2. Status Updates to DMMP & SMS Programs:

Larval Rockfish in Puget Sound Surface Waters, Correigh Greene, NMFS

Coreigh Greene,NMFS, provided a brief summary of larval rockfish collected study effort over eleven month period at six of the DMMP disposal sites, as well as from the broader nearshore areas as part of a comprehensive seven month study effort. Listings of three rockfish species as threatened or endangered in Puget Sound have resulted in consultations between the National Marine Fisheries Service (NMFS) and the US Army Corps of Engineers (ACOE) to evaluate potential impacts of dredge sediment disposal into pelagic waters. Larval rockfish are known to occur in surface and subsurface waters after hatching from eggs, so it is possible that sediment disposal could negatively affect rockfish at larval stages. However, little knowledge of larval rockfish densities exists by which NMFS could infer impacts to stocks or ACOE could mitigate for sediment disposal by changing the timing or placement of disposal, and what little research has been done is limited in space or time.

In an effort to incorporate broad spatial and seasonal components into our understanding of larval rockfish distributions, we sampled juvenile fish and larval fish at 79 sites across Puget Sound over seven months (April-October 2011), and at six sediment disposal sites from April 2011 – February 2012. This sampling was part of a larger project funded by the EPA to understand the ecological condition of the Puget Sound nearshore pelagic foodweb. Larval fish were collected using a 500 □ mesh net (1 m diameter x 3 m long), and samples collected from the net were identified in the lab to the most detailed

taxonomic resolution possible. Due to lack of diagnostic characteristics, rockfish larvae specimens could be identified to genus level (*Sebastes*) only.

Based on several subsets of the data (66 samples at disposal sites, 163 samples at nearshore index sites), we found several patterns in abundance over 11 months across Puget Sound's 6 major basins. Rockfish larvae exhibited a bimodal abundance peak, with high densities in May and August. After September, densities quickly tailed off, and very few rockfish were detected from October – February. We also noted several areas of Puget Sound with relatively high rockfish densities, including Admiralty Inlet, and areas around Anacortes, Everett, Seattle and Commencement Bay, and Nisqually Reach. These sets of findings are relevant to determining optimal windows of sediment disposal for sites within Puget Sound.

In addition, we also found that across months and sub-basins, rockfish larval densities were positively correlated with several environmental factors, including salinity, shoreline development, and nitrogen:phosphorus, and phytoplankton production. They were also negatively correlated with salinity, pH, and salmon densities. These patterns suggest a variety of determinants to larval rockfish abundance, including abiotic and foodweb factors, and both natural and anthropogenically influenced constraints. Better models that control for covariation among these variables can help tease out the important drivers of larval abundance in Puget Sound.

Correigh Greene

PP2.1 Rockfish larvae in Puget Sound: When, Where, and (Maybe) Why

PP2.2 Acknowledgements

PP2.3 Background

PP2.4 Questions, When, Where, and Why

PP2.5 The Survey

PP2.6 The Survey (continued)

PP2.7 The Analysis

PP2.8 Analysis by the numbers

PP2.9 When?

PP2.10 Where?

PP2.11 Where? (continued)

PP2.12 Where? (continued)

PP2.13 Where? (continued)

PP2.14 Why?

PP2.15 Why? (continued)

PP2.16 Why (continued)

PP2.17 Why (continued)

PP2.18 Why (continued)

PP2.19 Adult abundance?

PP2.20 Summary

PP2.21 Future efforts

Questions and Answers.

- **Q Bob Johnston (Navy):** Is there a strong density dependence between larvae and adults?

  Correigh Greene (NOAA): We weren't sampling for adults so we don't know the densities at the sites. WDFW has done some surveys with ROVs and will collaborate on this study.

SMS Guidance – Proposal to Develop New Biomass Endpoint, Russ McMillan

Russ McMillan,Ecology/TCP. During the Department of Ecology's public outreach for the Sediment Management Standards revisions, it was recommended Ecology consider the biomass endpoint that has received increasing attention for sediment characterization. One of the challenges in establishing biological standards for freshwater sediments is the few available bioassays using organisms that are representative of regional benthic invertebrates, and that meet the desired level of protocol development and frequent use by regional laboratories. Only two bioassay organisms met these expectations, the freshwater amphipod *Hyalella azteca*, and the midge larvae *Chironomus dilutus*, so the possibility of improved performance for tests using either of these test species was encouraging.

The biomass endpoint takes into account both survival and growth (now looked at as separate endpoints) and is thought to better accommodate the confounding effects these can have on each other. It has also been reported to be more sensitive than either of the other endpoints. Much of the work comparing these has been on limited data sets, so Ecology was interested in examining these potential improvements using the large freshwater data set from which the freshwater sediment criteria were developed.

This effort will compare the biomass endpoint to outcomes for growth and mortality and a combined outcome. Ecology will explore what caused any differences and the advantages or disadvantages attributable to the new endpoint. The study is led by a team at Ecology (Arthur Buchan, Brendan Dowling and Russ McMillan) and has contracted much of the analytical work to Teresa Michelsen, Avocet Consulting, with statistical support from Nancy Musgrove of GeoEngineers. When the evaluation is wrapped up in late 2013, the decision will be made whether to add the biomass endpoint to the suite of other available freshwater bioassay endpoints.

If you have any questions regarding this study, please contact Russ McMillan at 360-407-7536 or russ.mcmillan@ecy.wa.gov.

Russ McMillan

PP3.1 Intro Slide

PP3.2 Biomass Endpoint Goals for today

PP3.3 Freshwater Biological Standards Technical Considerations

PP3.4 Freshwater Sediment Bioassays

PP3.5 What is the Biomass Endpoint? And Why should we care?

PP3.6 What is the Biomass Endpoint? And Why should we care? (continued)

PP3.7 How are we evaluating the Biomass Endpoint?

PP3.8 How are we evaluating the Biomass Endpoint? (continued)

PP3.9 Next steps & review opportunities

PP3.10 Questions?

PP3.11 Statistical methods for comparing test sediment to control

PP3.12 Freshwater Biological Standards

There were No questions.

Afternoon Lunch Break

3. Status Papers and Proposed Clarifications to DMMP and SMS

DMMP Clarification Paper: Modifications to Sulfide and Ammonia Thresholds and Purging Procedures for Toxicity Testing, Laura Inouye, Ecology

Laura Inouye, Ecology, presented the clarification paper, "Modifications to ammonia and sulfide triggers for purging and reference toxicity testing", written for the DMMP agencies by Laura Inouye, Erika Hoffman (EPA) and David Fox (Corps). A brief history of previous guidance clarifications was presented. Previous clarification papers provide guidance for ammonia for all marine bioassays except the larval, and sulfide triggers are missing for larvae and amphipods. The approach and new triggers proposed by the DMMP agencies were presented, as well as the rationale behind the proposed approaches. The DMMP agencies are continuing deliberations on the approach outlined at the SMARM based on comments submitted after SMARM, and triggers and media being measured are being reconsidered but no final decision has been made at the time of the release of the minutes. The DMMP final decisions on the approach to be implemented will be inserted into the SMARM minutes in the Response to Comments (Appenidix I) when finalized. Use of purging would be determined in consultation with the DMMP agencies. Due to the late finalization of this clarification paper, the comment period was extended to July 3.

Laura Inouye

PP4.1 Modifications to Ammonia and Sulfide Triggers for Purging and Reference Toxicant Toxicity Testing

PP4.2 Introduction

PP4.3 Problem Identification

PP4.4 Literature and Data Review

PP4.5 Why set purging triggers at NOEC?

PP4.6 Why focus on overlying water measurement?

PP4.7 Proposed Triggers (overlying water)

PP4.8 To Purge or not to Purge

PP4.9 Case-by-case considerations

PP4.10 Purge method clarification

PP4.11 See clarification paper for more

PP4.12 Questions?

Comments and Questions

- **Q Helen Botcher (EPA):** Is there a time specified for beaker equilibration before taking ammonia/sulfide measurements pre-test?

  Laura Inouye (ECY): Timing for those measurements would be same as indicated by the typical test procedure (when animals would typically be added post set-up).

DMMP Status Updates, Kelsey van der Elst (Corps)

Kelsey van der Elst, Corps. Updates to four current topics in the DMMP program were briefly discussed. First, an updated guidance document for the Puget Sound Sediment Reference Material is now available on the DMMO's website. This updated document includes the +/- 50% acceptance limits for PCB congeners developed from a 10-lab round robin testing. These values will be considered advisory during DY14. A summary of the number of bottles requested and data collected for DY12 and DY13 was also presented. Second, the DMMP agencies conducted a review of the ability of projects and laboratories to achieve practical quantitation limits (PQLs) below the 2011 screening levels for four problem chemicals: hexachlorobutadiene, total chlordane, dieldrin, and heptachlor. The majority of projects have had no problem meeting the lower SL values for these compounds; however the DMMP agencies will continue to use BPJ as necessary and may request the use of SIM methods in order to achieve the

necessary reporting limits. The status report paper describing the SL/PQL review in more detail is available on the DMMO website. Third, the DMMO is continuing the process of transferring testing data from the DAIS database to Ecology's EIM database. All new projects are expected to submit data to the DMMO in EIM spreadsheets. Guidance documents on how to prepare EIM spreadsheets are available from the DMMO on request. Fourth, the updated 2013 DMMP User Manual will be available on the DMMO website on June 16th.

Kelsey van der Elst

PP5.1 Summary of DMMP Status Updates, 2013 SMARM

PP5.3 Updates

PP5.4 Puget Sound SRM

PP5.5 Puget Sound SRM (continued)

PP5.6 SL/PQL Review

PP5.7 SL/PQL Review (continued)

PP5.8 EIM transition

PP5.9 2013 DMMP Users Manual

PP5.10 2013 DMMP Users Manual (continued)

PP5.11 Questions?

Comments and Questions:

- **Q Joyce Mercuri (ECY):** Are there dioxin acceptance limits for the Puget Sound SRM?

  Kelsey Van der Elst (COE): Yes. These are already posted on COE web site.

Q Kathy Taylor (ECY): FYI - ECY sediment data coordinator for EIM (input and format), Tuan Vu is retiring June 30th and will be replaced by Jenifer Hill, the new EIM data coordinator for sediments/TCP

4. DMMP Updates:

Corps: DY2013 Testing Activities, David Kendall, Corps

***David Kendall, Corps*,** discussed Dredged Material Management Program activities during dredging year 2013. Those testing activities are required due to existing regulations, current guidelines, to evaluate sediment quality concerns relative to potential dredged material suitability for open-water disposal and/or beneficial reuse. During DY13 (June 16 2012 ti June 15, 2013) completed decision documents included suitability determinations relative to open-water disposal and beneficial reuse, including other

evaluations such as ranking, recency extensions, frequency determinations, exclusion from testing, volume revisions, antidegradation determinations, and upland disposal of either contaminated sediments, and/or upland beneficial use. For dredging year DY13, there were 11 suitability determinations , one volume revision, one recency revision, one frequency determination, six antidegradation determinations, one no-test termination, and two projects with upland material, one with upland contaminated sediments and one project with upland beneficial re-use. The volume tested in DY13 amounted to 2.19 million cubic yards, with 2.1 cubic yards being suitable for open-water disposal, and 78,000 cubic yards found to be unsuitable for open-water disposal.

Of the five projects with unsuitable material, 39,000 cy from Berths 2 & 3 , and 3,000 cy from the Swantown Boatworks in Olympia were based on presumed dioxin concentrations based on existing data, and the dredged material was not tested. Underlying Z-samples at Berth 2& 3 failed anitidegradation and the DMMP agencies and Ecology TCP are still deliberating on remedies for the exposed new surface (clean sand cover). The Z-sample at the Swantown Boatworks passed antidegradation. The second project with unsuitable material at the Port of Anacortes, Pier 2, resulted in 3,250 cy of unsuitable material relative to elevated TBT concentrations in the surface dredged material prism. Z-samples examined passed antidegradation underlying the elevated TBT material. The third project at Salmon Bay Marina, had 3,563 cy of material with elevated TBT and dioxin. The proposed remedy, relative to antidegradation, was to dredge an additional foot into the native layer. The fourth project, at Olympia Yacht Club had 6,892 cy of material with elevated dioxin. The antidegradation evaluation will be accomplished after the dredging is completed. The last project with unsuitable material was the Corps Navigation Improvement Project in Grays Harbor, which had 22,400 cy of unsuitable material based on bioassay results emanating from a Benzyl alcohol exceedance. The underying z-samples passed antidegradation.

David then acknowledged special and emerging chemicals of concern that the DMMP agencies are paying attention to, and those are Tributyltin (TBT), dioxin/furans, and PBDE's (fire retardants). All but PBDE's are routinely evaluated in dredging projects. PBDEs are being assessed in DMMP onsite monitoring, and in a subset of selected federal O&M projects to gather data on these emerging COCs. Lastly, it was acknowledged that PCB congeners will have to be addressed in the future, as the DMMP agencies move from an Aroclor based to a congener based assessment of PCBs.

David then briefly summarized the types of open-water disposal in Washington State within Puget Sound, Grays Harbor, Willapa Bay, and the Washington side of the lower Columbia River and Snake River. He noted that within Puget Sound disposal at the eight open-water disposal sites is significantly down since 2008 relative to historical averages (1990-2007).

He then briefly summarized out of the seventeen completed projects, ten had chemical testing, eight had dioxin testing, two had bioassay testing, and none had bioaccumulation testing. Of the projects with dioxin testing, three had failures based either entirely or partially to dioxin. Those were as previously discussed above. Five projects passed dioxin guidelines for all material. David reviewed testing history within the DMMP over the past twenty-five years, which has averaged around 1.9 million cubic yards per year, with only around five percent of the material tested being found unsuitable for open-water

disposal. Five of seventeen projects had at least some unsuitable material, and only one of the seventeen projects had all material unsuitable.

David then reviewed ongoing, but uncompleted projects in the DMMP pipeline. In Puget Sound, they were the Duwamish Yacht Club maintenance dredging project, a screening level assessment at the Kenmore navigation channel and vicinity, the Mukilteo Multimodal project, Dunlap/West Bay Marina dredging project, Port of Tacoma, Pier 4 project, Silver King Boat Launch maintenance dredging project, USN Bangor Project, Corps Hylebos maintenance dredging, MJB Properties in Anacortes, and the Port of Seattle Terminal 5 maintenance dredging project. There were three ongoing projects in the Columbia and Snake River, and they were Longview Fibre, Kittitas County Boat Launch, and the Snake River O&M project.

David encouraged everyone to visit the newly revised and improved DMMO website, where a wealth of DMMP and sediment management related information was available. That concluded David's presentation.

David Kendall

PP6.1 Dredged Material Management Program Testing Activities, Dredging Year 2013

PP6.2 DMMP Purpose

PP7.3 Dredging Year Actions

PP6.4 DY13 Completed Actions

PP6.5 Suitability by Volume Tested

PP6.6 Projects with unsuitable material

PP6.7 Special Chemicals of Concern

PP6.8 Disposal

PP6.9 Current Geographical Focus

PP6.10 Puget Sound Disposal Sites

PP6.11 Puget Sound Disposal History (1989 – 2013)

PP6.12 Dredging Year 2013

PP6.13 DY13 Project Locations

PP6.14 DY13 Testing

PP6.15 Dioxin Testing 2013

PP6.16 DMMP Testing History

PP6.17 Suitability Overview

PP6.18 Projects under evaluation but incomplete

PP6.19 Please check out our newly revised website

PP6.20 DMMP still needed in 2013

PP6.21 Questions?

Comments and Questions:

- **Q Bob Johnston (Navy):** What is the dredging activity in Canada as compared to Puget Sound – more or less? Are there different testing requirements? What kind of cross border coordination has there been?

  David Kendall (COE): Since 9/11, we have limited ability for us to participate in meetings in Canada (and vise versa). Canada does primarily ocean disposal (vs our 404 inland water disposal). Does Jonathan Freedman (EPA) have anything further to add?

  Jonathan Freedman (EPA): Ocean vs. inland is more an administrative determination since Canadian disposal sites are "ocean sites" although they are in Salish Sea.

  Bob Johnston (Navy): Are there volume differences between Canada and DMMP programs?

  David Kendall (COE)/Jonathan Freedman (EPA): We don't know. We wish we had more opportunity for coordination.

  Bob Johnston (Navy): Note that Puget Sound Partnership will soon be announcing date in 2014 for next Salish Sea conference in Seattle.

DNR: Disposal Site Management Activities, Celia Barton, DNR

Celia Barton, DNR. The 25 year history of monitoring at the disposal sites has verified the adequacy of the dredged material management process. To date, use of the disposal sites had not caused adverse impacts at, or adjacent to, any of the non-dispersive sites. Cumulative volumes since last monitoring event are 118,000 at Anderson/Ketron; 182,500 cy at Port Gardner; 433,000 cy at Commencement Bay. The Elliott Bay disposal site has received 481,600 cy since the dioxin monitoring in 2007, however it has received 603,000 cy since the last partial monitoring in 2002. Monitoring trigger points are a pre-determined volume marker to evaluate whether monitoring is needed. That evaluation includes frequency of use at the site, source and character of dredged material, and past monitoring results at the site. DNR would like to conduct some level of chemical/biological monitoring at Elliott Bay this

summer. To evaluate the physical monitoring question, the Corps conducted a bathymetric survey of the Elliott Bay site on April 1, 2013. There is a 30 foot profile of a mound that is entirely within the site perimeter.

The Aquatic Land Dredged Material Disposal Account was established by State Statute which restricts what the funds can be used for. Disposal site use fees are meant to cover the cost of monitoring and management of the disposal sites. In exchange for disposal site fees, the Corps has responsibility to conduct physical monitoring at all the disposal sites.

Disposal fee revenue from DNR managed disposal volumes (excluding Federal Navigation without a Sponsor) have fluctuated over the years, with 2012 showing the lowest disposal volume for Puget Sound since the program began in 1989. There has been a slight rebound in 2013, but generally a significant downtrend in disposal fee revenue since 2005. In addition - there have been 11 monitoring events/studies in the last 8 years that were funded by this account; compared to 11 monitoring events/ studies in the previous 13 years. The account used to pay for environmental monitoring and management of the disposal sites is weak. There is less dredging, and more beneficial use. Coupled with increased cost of monitoring and shoreline permits, the account is close to the reserve of $300,000 for emergency monitoring needs.

For the long-term fix - we are in a new paradigm that will need new solutions.

No comments/questions

Celia Barton

PP7.1 Disposal Site Management Activities

PP7.2 Site Monitoring

PP7.3 Site Monitoring (continued)

PP7.4 Cumulative Volumes Since Last Monitoring (Anderson/Ketron)

PP7.5 Cumulative Volumes Since Last Monitoring (Port Gardner)

PP7.6 Cumulative Volumes Since Last Monitoring (Commencement Bay)

PP7.7 Cumulative Volumes Since Last Monitoring (Elliott Bay)

PP7.8 What is a “Soft Trigger”?

PP7.9 Monitoring – DY 2013, Corps Multibeam Bathymetric Survey, Elliott Bay

PP7.10 Monitoring – DY 2013, Corps Multibeam Bathymetric Survey, Elliott Bay

PP7.11 Monitoring – DY2013, Elliott Bay?

PP7.12 Aquatic Land Dredged Material Disposal Site Account

PP7.13 Aquatic Land Dredged Material Disposal Site Account (continued)

PP7.14 DNR Management – Grays Harbor Annual Disposal Volumes

PP7.15 DNR Management – Puget Sound Annual Disposal Volumes

PP7.16 DNR Puget Sound Disposal Volumes with monitoring

PP7.17 Future

PP7.18 Questions?

5. Public Issue Papers (no public issue papers were submitted, so none were presented)

6. 25th Anniversary Celebration

What We've Done: 25 Years of Sediment Management, Dave Fox

Dave Fox, Corps, presented a summary of dredged material evaluation and disposal activities; site monitoring; and program changes over the last 25 years of the Dredged Material Management Program. Some 303 projects and 52 million cubic yards of sediment were tested. About 75% of those projects were in the Puget Sound basin but Grays Harbor dominated in terms of sheer volume. Approximately 5% of the tested material was found unsuitable for open-water disposal, with most of that occurring in Puget Sound. A series of maps was presented showing the distribution of project locations over time, frequently-sampled areas, project size, and types of projects. Graphics showed tested volume by project proponent and disposal volumes at the DMMP open-water sites. Disposal site monitoring events and results were discussed briefly. Important developments in the program, such as the addition of the *Neanthes* chronic sublethal bioassay, OSV Bold survey, dispersive site fate and transport study, and development of the Puget Sound sediment reference material were discussed. Finally, the importance of collaboration with ports, consultants, tribes, environmental groups and other agencies was acknowledged.

Dave Fox

PP8.1 Opening – DMMP, 25-year review

PP8.2 Implementation dates

PP8.3 Testing Summary

PP8.4 Time Travel

PP8.5 DMMP Project Locations - 1989

PP8.6 DMMP Project Locations - 1990

PP8.7 DMMP Project Locations - 1991

PP8.8 DMMP Project Locations - 1992

PP8.9 DMMP Project Locations - 1993

PP8.10 T DMMP Project Locations - 1994

PP8.11 DMMP Project Locations - 1995

PP8.12 DMMP Project Locations - 1996

PP8.13 DMMP Project Locations - 1997

PP8.14 DMMP Project Locations – 1998

PP8.15 DMMP Project Locations - 1999

PP8.16 DMMP Project Locations - 2000

PP8.17 DMMP Project Locations - 2001

PP8.18 S DMMP Project Locations - 2002

PP8.19 DMMP Project Locations - 2003

PP8.20 DMMP Project Locations - 2004

PP8.21 DMMP Project Locations -2005

PP8.22 DMMP Project Locations -2006

PP8.23 DMMP Project Locations – 2007

PP8.24 DMMP Project Locations – 2008

PP8.25 DMMP Project Locations – 2009

PP8.26 DMMP Project Locations – 2010

PP8.27 DMMP Project Locations – 2011

PP8.28 DMMP Project Locations – 2012

PP8.29 DMMP Project Locations – 2013

PP8.30 Frequently Sampled Areas

PP8.31 Duwamish Waterways (1989 – 2013)

PP8.32 Tacoma Waterways (1989 – 2013)

PP8.33 Everett (1989 – 2013)

PP8.34 Bellingham (1989 – 2013)

PP8.35 Anacortes (1989 – 2013)

PP8.36 Swinomish Channel (1989 – 2013)

PP8.37 Grays Harbor (1989 – 2013)

PP8.38 Proportional Project Volumes

PP8.39 Ports and Other Waterborne Commerce

PP8.40 Marinas

PP8.41 Federal Projects

PP8.42 Project Proponents

PP8.43 Puget Sound Disposal Sites

PP8.44 Grays Harbor and Willapa Bay Disposal Sites

PP8.45 Disposal Summary

PP8.46 Puget Sound Disposal Volumes

PP8.47 Pacific Coast Disposal Volumes

PP8.48 Disposal Site Monitoring Events

PP8.49 Disposal Site Management Objectives Achieved?

PP8.50 Beneficial-Use Projects

PP8.51 Major Developments

PP8.52 Major Developments (continued)

PP8.53 2008 OSV Bold Sampling Stations

PP8.54 The 2010 Commencement Bay SEIS established new volume ceiling of 23 mcy and shifts disposal coordinates over time to flatten the disposal mound.

PP8.55 Disposal Site Fate and Transport Study

PP8.56 Puget Sound Sediment Reference Material

PP8.57 Collaboration

PP8.58 1988 – 2013 (mirror)

Panel: The PSDDA Study – Before, During, and After, Justine Barton, Moderator

Justine Barton then introduced the panel and provided a brief biographical sketch on each of the seven panelists.

Before - For the period that preceded the PSDDA Study Carl Kassebaum (formerly at EPA, Region 10) and Jim Thornton (formerly at Ecology) provided a snapshot of the dredged material management paradigm in place before the PSDDA Study was initiated. Prior to NOAA studies in Commencement Bay and Elliott Bay during the early 1980s, the prevailing thought that Puget Sound was a relatively pristine water body. This idea was severely challenged by NOAA studies that highlighted sediment contamination and English Sole with liver lesions and tumors.

Jim and Carl both emphasized that there were no existing clear guidelines for evaluating dredged material, and on an interim basis they developed a sampling and testing procedure for dredged material that initially focused on elutriate testing and then developed a process that focused on a non-degradation approach at each of the DNR disposal sites, which focused on analyzing a relatively modest list of chemicals-of-concern and comparing the concentrations observed in the dredged material to the background concentrations observed at specific disposal sites (e.g., 4-Mile Rock criteria; Port Gardner criteria; Commencement Bay criteria; Interim Puget Sound criteria, as compared with the Puget Sound Background criteria). These criteria were put in place to evaluate dredged material suitability for unconfined-open-water disposal. At the time, there was no active monitoring of any of the DNR sites, and no consistent standard that applied across Puget Sound. The criteria in place at the 4-Mile Rock site (4MR) were the highest of the criteria in place and the most contentious from the standpoint of people living in Magnolia, overlooking the 4-Mile-Rock disposal site. A citizen activist from Magnolia, Bonnie Orme testified at a Seattle of Seattle Shoreline hearing regarding renewal of the shoreline permit for the 4MR site. The subsequent withdrawal of the shoreline permit for the 4MR site created a crisis, which ultimately lead to Ecology, DNR, and EPA approaching the Corps in a 1984 EPA letter requesting the Corps be the lead agency for an interagency study to develop new disposal sites, evaluation procedures, and management plans for managing the disposal sites. The 4.5 year study that ensued cost $4.5 million dollars and resulted in two overlapping EIS's, and multiple technical appendices and reports supporting the proposed program.

During – Frank Urabeck (retired Corps of Engineers) and Dr. David Jamison (retired DNR) gave a brief background on the organization and structure of the PSDDA Study and its considerable controversy outside the region, because of its precedent setting cooperative and technical and policy framework of shared resources and decision-making. Frank Urabeck was the PSDDA study director for this effort, and assembled an impressive interagency team for the intensive four-year long effort. Keith Phillips (formerly with Seattle District, then went to Ecology, and was Governor Christine Gregoire's Environmental Policy advisor, and is now Governor Jay Inslee's Environmental Policy advisor) chaired the evaluations procedures work group that developed the fundamental framework for the PSDDA evaluation procedures. After Keith's departure, John Wakeman (Corps) became the Chair of the Evaluation Procedures Work Group for the second phase of the study. Dr. David Kendall chaired the

Disposal Site Selection Workgroup that was responsible for the identification and siting of the eight PSDDA disposal sites in Puget Sound and the Strait of Juan de Fuca. Dave Jamison briefly reviewed the siting criteria used to identify "Zones of Siting Feasibility" (ZSFs) based on mapping some 19 siting criteria that were to be avoided. Map overlays with the siting criteria were made, and areas with no or few conflicts displayed as ZSFs. Steve Tilley (DNR) chaired the Management Plan Work Group that developed the plan for effective dredged material management, which also included developing a monitoring plan for monitoring the sites on a periodic basis. Each workgroup also had representatives from each of the cooperating agencies, as well as interested public, Ports, and Indian Tribes, and Resource Agencies participating and providing feedback on technical and policy development. The draft EIS was held up by Corps headquarters, and ultimately took a letter signed by the entire Washington State congressional delegation and both Senators, along with other letters of support for releasing the EIS from the newly formed Puget Sound Water Quality Authority, and individual PSDDA cooperating agencies. Corps headquarters relented after some minor changes were made to the draft documents, and the Record of Decision (ROD) for the 1st EIS covering central Puget Sound dredging areas was signed in December 1988, and with the ROD signing, the implementation of the PSDDA program commenced. The second EIS was finalized in December 1989 with the signing of the 2nd ROD for the north and south areas of Puget Sound.

After - Doug Hotchkiss (Port of Seattle) gave his perspective as a member of the Port community on the success of the PSDDA program, now the DMMP. Doug lauded the program's success over the first twenty years of implementation, but feels that the DMMP has strayed away from some of the tenants that made it successful over the past five years, particularly relative to engaging stakeholders in developing policy guidance for subsequent implementation. John Malek (formerly EPA) gave a national perspective on the twenty-five years of implementation. John participated on a number of national forums, where PSDDA and DMMP was initially given a skeptical appraisal by folks outside the region. John was successful in his national role during development of national manuals such as the Inland Testing Manual in providing input to the manual from a PSDDA technical/policy perspective. PSDDA, now DMMP, slowly gained acceptance and accolades as implementation demonstrated how effective it was in managing dredged material. Monitoring demonstrated the effectiveness of the evaluation procedures in evaluating dredging projects and provided a positive feedback loop on the adequacy of the program.

Lastly, David Kendall provided his perspective on twenty-five years of implementation. He acknowledged the large number of past and present DMMP colleagues from each of the four implementing agencies who did so much and worked so hard to make the program successful and relevant. He iterated that the success of the program relied on the professionalism and integrity of the interagency team-members over the twenty-five years. The PSDDA agencies were strongly committed to successful implementation of the program after experiencing the out of region opposition and skepticism of many folks within the region during the study and early implementation. The implementation got off to a bumpy start, but the energetic staff focused on adaptive management to learn from mistakes and improve the process. Over time elements of the implementation that worked such as the strong interagency teamwork, monthly technical/policy meetings, annual review, biennial

reports and brainstorming technical and policy issues were incorporated as basic tenants of the program. David acknowledged that the enthusiasm, professionalism, technical skills, and integrity of his DMMP interagency teammates has made working in the PSDDA/DMMP program a singular pleasure.

Frank Urabeck

PP7.1 Puget Sound Dredged Disposal Analysis Study and Background Summary

PP7.2 PSDDA Study Goals

PP7.3 PSDDA Study Objectives

PP7.4 Puget Sound Disposal Sites

PP7.5 Key Organizational Elements

PP7.6 Key Organizational Elements (continued)

PP7.7 Key Organizational Elements (continued)

PP7.8 Key Organizational Elements (continued)

PP7.9 Key Organizational Elements (continued)

PP7.10 Questions?

Dave Jamison

PP8.1 Disposal Site Selection

PP8.2 Additional Criteria applied

PP8.3 Proposed Disposal Sites

PP8.4 Selected Disposal Sites

SUMMARY AND CLOSING

Justine Barton, thanked everyone for coming to the 25th SMARM. She invited those attending to join the DMMP agencies for refreshments and cake in celebration of the 25 years of implementation. She concluded the 25th annual SMARM by announcing that the clarification and issue papers were currently on the website and that the SMARM presentation will be posted to the website soon.

Meeting Adjourned

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APPENDIX I

DMPP Response to Public Issues

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APPENDIX II

Meeting Agenda

SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING | 2013

25th Anniversary SMARM — Corps of Engineers, Seattle District — May 1, 2013

8:30	REGISTRATION AND COFFEE	
9:00	Meeting Open	Justine Barton, EPA, Moderator
9:10	Welcome	Lt. Col. Kevin Stoll, Deputy District Engineer Seattle District Corps of Engineers
9:15	*SMS Rule: Adoption and Implementation of the New Rule*	Chance Asher, Ecology
10:15	BREAK	
10:30	*SMS Rule: Adoption and Implementation of the New Rule*, cont.	Chance Asher, Ecology
11:10	Status Updates to DMMP & SMS Programs	
	• *Larval Rockfish in Puget Sound Surface Waters*	Correigh Greene, NMFS
	• *SMS Guidance - Proposal to Develop New Biomass Endpoint*	Russ McMillan, Ecology
11:40	LUNCH	
12:45	Status Papers & Proposed Clarifications to DMMP & SMS Programs	
	• *DMMP Clarification: Modifications to Sulfide and Ammonia Thresholds and Purging Procedures for Toxicity Testing*	Laura Inouye, Ecology
	• *DMMP Summary of other Clarifications & Activities* Including Puget Sound SRM, new User Manual, DAIS to EIM, PQL SL review	Kelsey van der Elst, Corps
1:15	DMMP Updates	
	• *Corps: DY2013 Testing Activities*	David Kendall, Corps
	• *DNR: Disposal Site Management Activities*	Celia Barton, DNR
1:50	BREAK & POSTER SESSION	
2:10	Public Issue Papers Public issue papers are targeted proposals for the DMMP program, and need to include a problem statement and proposed solutions. Submit requests for Public Issue Papers to the DMMO by Wednesday, April 24, 2013.	
2:30	25th Anniversary Celebration	
	• *What We've Done: 25 Years of Sediment Management*	David Fox, Corps
	• *Panel: The PSDDA Study--Before, During & After* Panel participants: Jim Thornton, Carl Kassebaum, David Jamison, Frank Urabeck, Doug Hotchkiss, John Malek, David Kendall	Justine Barton, Moderator
4:00	WRAP UP AND ADJOURN TO 25TH ANNIVERSARY RECEPTION Please join us for appetizers and cake in the atrium	

Deadline for SMARM comments is June 3, 2013

APPENDIX III

List of Attendees

2013 Sediment Managment Annual Review Meeting Attendees List

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APPENDIX IV

PowerPoint Slides for Each Speaker

Sediment Management Standards
Chapter 173-204 WAC
Rule Revisions

SMARM

May, 2013

PP1.1

Happy Anniversary!

- 25 years: SMARM Silver Anniversary.
- 22 years: SMS Rule Anniversary
- 21 years: SMS Rule Revision Anniversary (kind of)

2

PP1.2

Goals For Today

- Provide a summary of the Sediment Management Standards (SMS) rule changes.
- Provide an update on Ecology's rule implementation plans.
- Hear your feedback on finalizing the cleanup guidance.

3

PP1.3

SMS Rule Adoption

4

PP1.4

Supporting Documentation

- **Rule Language:**
  - OTS version: Official rule with rule sections that had changes (underline and strikeout).
  - Reader Friendly version: Includes all rule sections with (underline and strikeout).
  - Formatted version: Stay tuned for a clean copy.
- **Concise Explanatory Statement**: Includes all rule changes, comments received, and Ecology's responses.
- **Environmental Impact Statement**: Includes different alternatives Ecology considered for the revised rule, environmental impacts, and the preferred alternative.
- **Cost Benefit Analysis**: Includes analysis of the costs and benefits of the rule revisions.
- **Sediment Cleanup Users Manual II:** Published in 1991. Being updated to reflect revised rule, new policies, and science.

5

PP1.5

SMS Rule Chapter 173-204 WAC

- Part I General Information
- Part II Definitions
- Part III Sediment Quality Standards
- Part IV Sediment Source Control
- **Part V Sediment Cleanup Standards**
- Part VI Sampling and Testing Plans/Recordkeeping
- 1991 rule Parts I – VI promulgated under: WPCA, MTCA, Puget Sound Water Quality Authority Act, Pollution Disclosure Act, Water Resources Act, and SEPA
- 2013 rule Part V promulgated under MTCA and is not to be used for Clean Water Act purposes.

PP1.6

Part V Cleanup Process Under the New Rule

- WAC 173-204-510: Identify sediment station clusters of potential concern.
- WAC 173-204-520: Conduct hazard assessments to identify cleanup sites.
- WAC 173-204-530: Evaluate stations clusters of potential concern.
- WAC 173-204-540: Determine appropriate site cleanup authority.
- WAC 173-204-550: Conduct site investigation to characterize:
  - Nature and extent of contamination and cleanup boundaries.
  - Identify potentially liable person(s) and contamination sources.
  - Establish background concentrations.
- WAC 173-204-550: Identify bay-wide site, sediment cleanup units, and individual sites.
- WAC 173-204-560 through -564: Establish cleanup standards for different receptors.
- WAC 173-204-570: Select remedial actions.
- WAC 173-204-575: Cleanup action decisions.
- WAC 173-204-590: When necessary, authorize a site sediment recovery zone.
- Resolve potentially liable persons responsibilities at a cleanup site.

PP1.7

WAC 173-204-500 Expectations

Original SMS Rule	New SMS Rule
Adopted under Clean Water Act and Model Toxics Control Act.	**Adoption Authority**: Adopted under Model Toxics Control Act.
SMS silent on this issue.	**Widespread Contamination**: Recognizes issue of ubiquitous contaminants from multiple diffuse sources resulting in large scale (baywide) cleanups.
SMS silent on this issue.	**Recontamination**: Recognizes issue of recontamination and allows a settlement for PLP responsibilities at a site by addressing their sources and all requirements in the Consent Decree.
Included site unit concept.	**Site Units**: Clarification of site unit role and how fits with concept of large scale (baywide) cleanups.
	Restoration Time Frames/Cleanup Actions: Emphasis on active cleanup and restoring site as soon as practicable. Recognizes large scale cleanups will require longer time frames and more use of passive cleanup actions.
	Relationship between cleanup standards/actions: Explains terminology and how each is related.
SMS silent; MTCA requirements apply	**Grandfather Clause:** Cleanup sites with approved Cleanup Action Plans are not automatically subject to new provisions.

PP1.7

WAC 173-204-505 Definitions – Apply to Part V Only

Original SMS Rule	New SMS Rule
All definitions in 173-204-200.	**Cleanup definitions moved from section 173-204-200 to -505.**
Applicable Laws: Included local, state, and federal laws.	**Applicable Laws:** Relevant/appropriate requirements may include tribal laws.
Biologically Active Zone: Silent.	**Biologically Active Zone:** Site specific flexibility to establish depth to accommodate freshwater environments and Abiotic factors.
	Contaminant: MTCA definition.
	Natural Background: MTCA definition.
	Point of Compliance: MTCA definition.
Practicable: Did not consider cost.	**Practicable:** MTCA definition, considers cost during remedy selection.
	Regional Background: Includes chemical concentrations from diffuse sources.
Sediment: Applicability not clear.	**Sediment:** Clarified applicability.
Cleanup Standard: Included concentration or level of biological effects.	**Sediment Cleanup Standard:** Concentration/effects & point of compliance.
	Technically Possible: MTCA definition.

9

PP1.8

WAC 173-204-510 - 173-204-530 Identification and evaluation of cleanup sites

Original SMS Rule	New SMS Rule
Included a narrative standard – site specific development of criteria.	Includes freshwater numeric chemical and biological benthic criteria.
Included the human health narrative standard.	Clarifies how human health risk applies to identify & evaluate cleanup sites.
Included non-anthropogenic background.	Includes regional background to identify & evaluate cleanup sites.
Ranking of cleanup sites required SEDRANK.	Ranking of cleanup sites flexible.
Station clusters for human health must be a CSL exceedance for ANY three stations. Exceedances equate to identification of a cleanup site	Station clusters for human health and regional background must be a CSL exceedance for ALL three stations. Exceedances equate to potential identification of a cleanup site or area for further investigation.

10

PP1.9

WAC 173-204-540
Types of Cleanup Authority

Original SMS Rule	New SMS Rule
Included MTCA and WPCA authorities.	MTCA authority clarified as it applies to a release or threatened release.
Unique SMS terminology.	Terms clarified to be consistent with MTCA.
SMS not clear on CERCLA role or authority.	Role of CERCLA clarified.
	Partial cleanup subsection removed.
	Voluntary cleanup language changed to other party initiated cleanup.

11

PP1.10

WAC 173-204-550 RI/FS

Current Rules: SMS and MTCA	New SMS Rule
RI/FS , Clean up Action Plans (CAP), and Sediment Recovery Zone (SRZ) process were mixed throughout multiple sections.	RI/FS process included in one section. SRZ and CAP requirements moved to one section (-590).
Remedy selection criteria was mixed with RI/FS and CAP criteria.	Remedy selection process in a separate section (-570).
	Terminology changes to be consistent with MTCA.
	MTCA requirements for a RI/FS work plan and report included: • Data gaps analysis. • CSM (receptors and exposure pathways). • Public participation requirements.
	RI/FS Report requirements added.
	Land use classification consideration added.
	Proposed cleanup levels and points of compliance.
	Proposed monitoring plan and schedule.

12

PP1.11

WAC 173-204-560 Cleanup Framework & Background

Current Rules: SMS and MTCA	New SMS Rule

SMS only included non-anthropogenic background.	Regional Background:
	• How it fits into the two tier framework.
	• Definition.
	• Specific -560(5) parameters and caveats added:
	  • Established by Ecology.
	  • Ability to default to NB if necessary.
	  • Ability to require PLPs to sample.
	• Part of the Cleanup Screening Level framework.

MTCA natural background requirements apply under a one tier framework.	Natural Background: • How it fits into the two tier framework. • MTCA definition. • Part of the Sediment Cleanup Objective framework.
Station by station compliance approach.	Ability to use tissue to evaluate compliance. Ability to use averaging approach for bioaccumulatives to evaluate compliance.

13

PP1.12

WAC 173-204-561 Human Health Risk

Current Rules: SMS and MTCA	New SMS Rule
SMS narrative Standard "No significant risks to human health" for SCO and CSL.	SCO/CSL established at different risk levels.
SMS silent on specific risk levels. MTCA risk levels apply.	Risk levels established: • 10^{-6} (SCO) or 10^{-5} (CSL) for carcinogens. • Hazard quotient = 1 for non carcinogens.
SMS silent on Reasonable Maximum Exposure (RME) scenario. MTCA RME requirements apply.	Risk assessment based on a Reasonable Maximum Exposure scenario.
SMS silent on fish consumption rates. MTCA default recreational scenario applies.	Fish consumption rate to be established based on default tribal exposure scenario.
SMS silent on exposure parameters. MTCA exposure parameters apply.	Exposure parameters of fish diet fraction and site use factors included; default based on tribal exposure scenario.
Silent on toxicity parameters. MTCA toxicity parameters apply.	Toxicity parameters through EPA – IRIS database.

14

PP1.13

WAC 173-204-562 Marine Benthic Criteria

Original SMS Rule	New SMS Rule
Part V included Cleanup Screening Level (CSL) criteria.	Part V includes Sediment Cleanup Objective (SCO) as well as CSL criteria.
	Clarified minor adverse effects level as between SCO and CSL.
Detection limit included.	Clarified MDL requirements and included PQL.
TOC normalization narrative.	TOC normalization narrative and equation.
Biological criteria were in text format.	Biological criteria text removed and added in tabular format.
Performance standards in Part III.	Performance standards from Part III added.
Biological criteria: No larval reference performance standard.	Larval performance standard for reference added.
	Clarified other deleterious substances.

15

PP1.14

WAC 173-204-563 Freshwater Benthic Criteria

Original SMS Rule	New SMS Rule
Freshwater narrative standard: Criteria established on a case by case basis.	Freshwater chemical benthic SCO and CSL criteria.
	Freshwater biological benthic SCO and CSL criteria.
	Allows flexibility to establish site specific criteria at certain types of sites (e.g. mining impacted).
	Framework mirrors the current marine benthic criteria: • Biological override of chemistry • What is a SCO and CSL chemical and biological exceedance
	Chemical criteria based on dry weight.

16

PP1.15

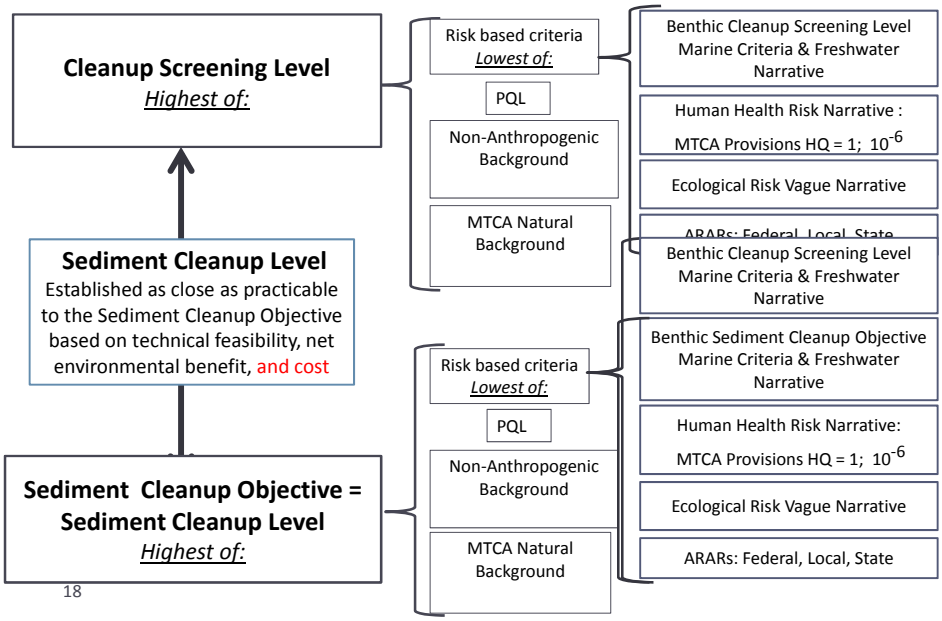
WAC 173-204-564 Ecological Risk To Higher Trophic Levels

Original SMS Rule	New SMS Rule
Risks to higher trophic levels not clearly addressed.	Assessment process identified and consider: • Evaluation of species utilizing the site. • Effects to reproduction, growth, survival. • Species life history.
	Screening for bioaccumulatives included.
	SCO and CSL established at no adverse effects level.
	Coordination with Federal for ESA purposes included.

17

PP1.16

Original Rule - Establishing Cleanup Levels



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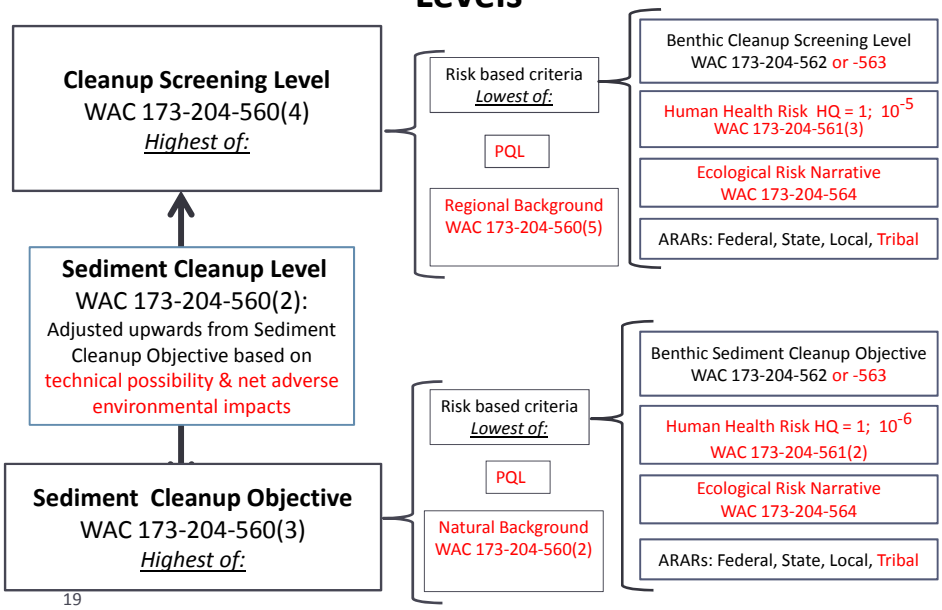
PP1.17

New Rule WAC 173-204-560 Establishing Cleanup Levels



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PP1.18

WAC 173-204-570 Selection of Cleanup Actions

Original SMS Rule	New SMS Rule
Criteria in three separate SMS sections. MTCA criteria apply.	Criteria consolidated into one SMS section and includes MTCA requirements.
Net environmental effects, relative cost-effectiveness, and technical feasibility included.	Replaced with MTCA disproportionate cost analysis.
Restoration time frame of 10 years not clear as to when it started and what standard needed to be met.	10 year restoration time frame clarified to start "after completion of construction of active components".
Sediment recovery zone required if sediment cleanup objective was not met.	Sediment recovery zone required if sediment cleanup level is not met within a 10 year restoration time frame.
Long term effectiveness evaluation not clear.	Sediment specific hierarchy for evaluating long term effectiveness.
MTCA requirements apply.	Use of permanent solutions to the maximum extent practicable.

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PP1.19

WAC 173-204-570 Selection of Cleanup Actions Minimum Requirements

- Protect human health and the environment.
- Comply with all applicable laws.
- Comply with sediment cleanup standards.
- Use permanent solutions to the maximum extent practicable.
- Provide for a reasonable restoration timeframe with preference for shorter timeframe.
- Where source control necessary, measures that are more effective in minimizing accumulation of contaminants caused by discharges.
- Sediment Recovery Zone must meet Section -590 requirements.
- Cleanup actions cannot rely exclusively on monitored natural recovery and institutional controls and monitoring where a more permanent cleanup action is technically possible to implement.
- Provide an opportunity for public review and comment.
- Provide adequate monitoring.
- Provide for periodic review.

PP1.20

WAC 173-204-570 Selection of Cleanup Actions MTCA Disproportionate-Cost Evaluation Criteria

- Overall protectiveness of human health and the environment.
- The degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances.
- The cost to implement the alternative.
- Long term effectiveness of the alternative.
- Short term risks to human health and the environment and ability to manage.
- Ability to be implemented.
- The extent community concerns have been addressed.

PP1.21

WAC 173-204-575 Cleanup Action Decisions

Original SMS Rule	New SMS Rule
Not clear.	Approval mechanism under different authorities clarified.
Not clear or consistent with MTCA.	Public involvement requirements clarified.
	MTCA – Ecology issues Cleanup Action Plan incorporates decision into order or decree.
	CERCLA – EPA decision may be used by Ecology if: • Decision consistent with SMS. • State concurs with decision. • Opportunity for public comment.
	Public Involvement – Must provide public notice and opportunity for review and comment; can combine notices, hearings.

23

PP1.22

WAC 173-204-590 Sediment Recovery Zones

Original SMS Rule	New SMS Rule
Sediment recovery zone required when the sediment cleanup objective (SCO) is not met.	Sediment recovery zone required when the sediment cleanup level, which could be above the SCO, is not met within restoration time frame.
	When a sediment recovery zone is applicable has been narrowed and better defined.
	Linked restoration time frame, applicable standards, practicability analysis, and sediment recovery zone requirements.
	Added renewal/extension process.
	More clearly tied to remedy selection process.

24

PP1.23

25

PP1.24

Sediment Sites: Now What Do We Do With Them?

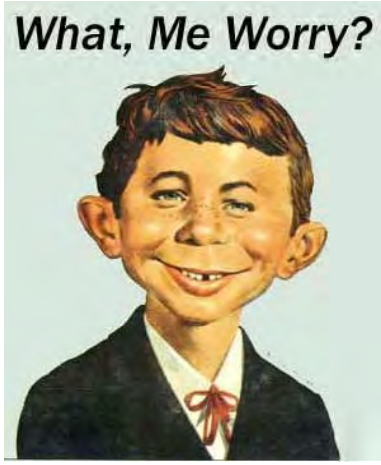
Ivy Anderson, Assistant Attorney General, Ecology Division

26

PP1.25

Why Are Sediment Sites So Difficult?

- Upland component.
- Multiple potentially liable persons.
- Individual site within a larger site or commingled sites.
- "Bay-wide" or Watershed-wide problems.
- Limited remedial technologies.
- Source control and recontamination issues.
- Federal permitting, CERCLA and EPA involvement.



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PP1.26

When are Settlement Discussions Appropriate?

- Sediment Cleanup Unit vs. Site
  - Sediment cleanup unit settlement for a complete cleanup of that unit may be entered into with one or more of the PLPs.
  - De minimus settlement for the site with appropriate PLP(s) may be expedited.
  - Settlements for the site must be offered to all PLPs (no expedited settlement).
- Identification of the contaminant "release" is important to determine prior to settlement discussions.
  - In a sediment media you might have an extensive bay-wide or watershed-wide site and there is usually an upland component.
  - The *site* is distinguished from *the area needing to be cleaned up* – which is where contamination is located above the cleanup level.
- Knowledge about upland contribution to the sediment is important to determine the extent of the site which is upland and recontamination potential.
  - Could impact timing of in-water remediation work, as well as settlement for sediment cleanup units.

28

PP1.27

How to deal with a large bay-wide site? Sediment Cleanup Units

- Units can be defined by a number of factors including:
  - Chemical signature, habitat features, physical features, development related projects.
- Ecology may enter into a settlement with one or more PLP(s) for complete cleanup of a unit.
- Benefits of settlement:
  - Incentivize a quicker cleanup.
  - Encourage PLPs to take an early look at source control.
  - Ability to focus cleanup in nearshore areas that typically pose higher risk to humans and the environment. This leads to a significant and faster reduction in overall risk.

29

PP1.28

Settlement for Sediment Cleanup Units

- PLP may receive a partial consent decree for the site.
  - Consent decree is tailored to the sediment cleanup unit:
    - The PLP remains liable for the remainder of the larger site.
    - Consent decree for unit includes covenant not to sue and contribution protection.
  - For a complete cleanup of the unit need:
    - RI/FS and cleanup action plan detailing remedial action for the unit.
    - Cleanup level requirements.
    - Post-cleanup monitoring.
  - Consent decree will contain reopener.
    - Ecology reserves the right to institute legal or administrative actions to require the PLP to perform additional remedial actions at the unit (and pursue cost recovery) in certain circumstances.
    - Requirement for the PLP to fulfill their obligations at the remainder of the site.
- Ecology's policy: a PLP is not responsible for recontamination from sources out of the PLP's responsibility.
  - PLP has the burden to show they are not the source of recontamination.
  - If there is high risk of recontamination, Ecology is unlikely to settle.

30

PP1.29

De minimus Settlement at a Bay-wide Site

- When practical and in the public interest, Ecology may expedite a settlement with a person whose contribution is insignificant in amount and toxicity.
- Public comment (and public hearing if requested) allow for input from others regarding appropriateness of settlement.
- Payment via settlement could provide funds for bay-wide source control, cleanup actions, and long term bay-wide monitoring.
- Payment would go into a cleanup settlement account and may be spent only after appropriation. RCW 70.105D.130(1), (2)(a)(i)

31

PP1.30

Settlement for a Bay-wide Site

- Settlement discussions will likely take place after site investigation, identification and cleanup of "hot spots".
- Settlement would be offered to all PLPs at a site.
- Anticipate the PLPs determining allocation among themselves.
- PLP "credit" for sediment cleanup units or source control work needs to be determined.
- Anticipate remaining work at site is limited to source control and monitoring.
- Can there be a "cash out" option?
- Require PLPs to determine allocation of the costs.
- Payment to Ecology goes to State Toxics Control Account/require appropriation for use.
- How would the bay-wide work be done?
- All PLPs contribute funds for the remaining work and Ecology uses that funding (e.g., PSAMP monitoring, source control work).
- One PLP continues the bay-wide work with contribution to costs from other PLPs.

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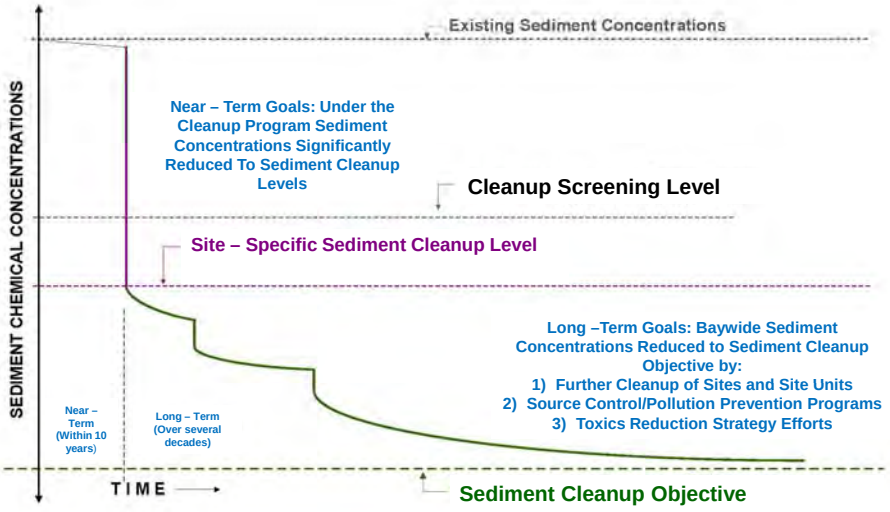
PP1.31

How Cleanup Fits with Long Term SMS Goals



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PP1.32

34

Next Steps for the SMS Rule

- **Guidance**
  - Update to the Sediment Cleanup Users Manual II.
  - Biomass endpoint evaluation.

- **Implementation:**
  - Background:
    - Regional background sampling in select bays.
    - Natural background statewide establishment.
  - MyEIM updates to reflect freshwater criteria.
  - Internal Ecology staff training.
  - 303(d) policy update to reflect Part V as adopted under MTCA.

- **Process:**
  - Clean version of the revised rule.
  - Regional Sediment Evaluation Team coordination and updates as appropriate.
  - Science Panel: Considering a number of issues for guidance.

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PP1.33

Sediment Cleanup Users Manual II - Update

- Reorganization to follow the cleanup process and reflect the rule changes.
- Identify/evaluate stations clusters of potential concern and screening CoCs.
- Remedial investigation and field sampling to characterize:
  - Nature and extent of contamination.
  - Area for cleanup.
  - Identify potentially liable person(s) and contamination sources.
  - Establish sediment cleanup units.
  - Establish background concentrations.
- Field sampling methods.
- Chemical analysis and biological testing.
- QA/QC procedures.
- Establish cleanup standards:
  - Benthic chemical and biological criteria.
  - Evaluate human health risk.
  - Evaluate higher trophic level risk.
  - Establishing practical quantitation limit.
- Identify bay-wide site, sediment cleanup units, and individual sites.
- Establishing background.
- Remedy selection: DCA process, hierarchy of technologies.
- Sediment recovery zones.
- Compliance monitoring.

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PP1.34

Sediment Cleanup Users Manual II Issues Identified by Advisory Group

- Establishing regional and natural background concentrations.
- Establish cleanup standards: How technical possibility and net adverse environmental impacts works.
- Remedy selection:
  - DCA process.
  - Hierarchy of technologies.
  - How the practicability analysis works with remedy selection and how it integrates with cleanup levels determination.
- Compliance monitoring - Tissue analysis, area averaging.
- Freshwater criteria:
  - Determining alternate methods for mining sites.
  - Biomass endpoint development.
- Tribal regulations as "relevant and appropriate".
- Identify bay-wide site, sediment cleanup units, and individual sites and resolving responsibilities at a site or unit.
- How the baywide strategy fits with overall sediment quality goals.
- Recontamination
- Source control and source identification

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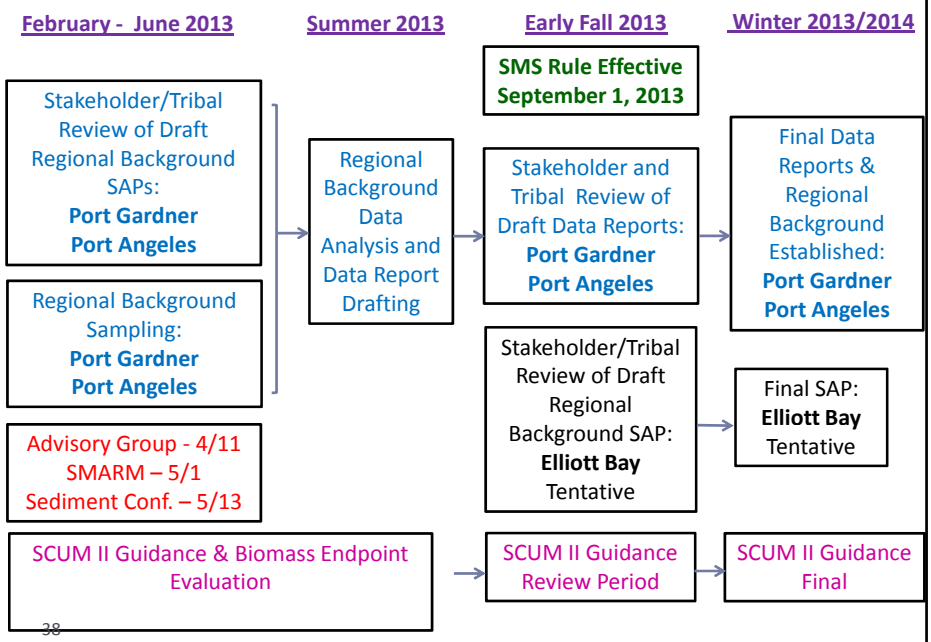
PP1.35

Rule Implementation Timeline



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PP1.36

Rockfish larvae in Puget Sound: when, where, and (maybe) why

Correigh Greene, Alicia Godersky, Casey Rice, Josh Chamberlin, Jason Hall, and Jessica Randall

Northwest Fisheries Science Center

PP2.1

Acknowledgements

Funding
EPA, Department of Natural Resources, NOAA Fisheries

Assistance
Dan Tonnes
Sean Naman, Dana Rudy, Anne Baxter, Linda Rhodes
Many hard working volunteers!

Additional sample processing
Sariha Mcintyre, Sara London

PP2.2

Background

Basic knowledge of rockfish life histories in Puget Sound is lacking

Starting points: California Current, some historical work in Puget Sound

Most work is limited in time or space, often focused on older age classes

PP2.3

Questions

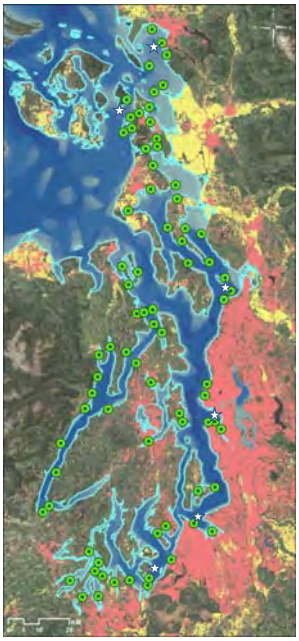
When are rockfish larvae present in Puget Sound?

Where are they most abundant?

Why do these spatial and temporal patterns occur?

PP2.4

The survey



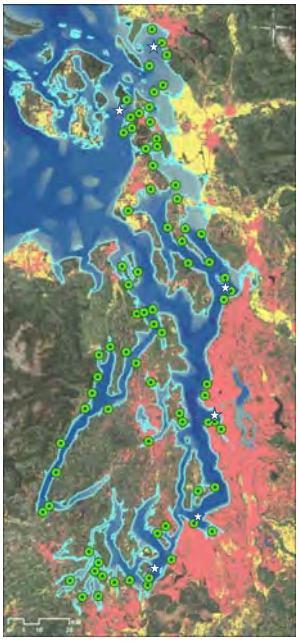
Examine major aspects of the nearshore pelagic foodweb

Examine broad-scale spatial and temporal variation
- All major basins
- April-October

Regression design to detect possible effects of land use

PP2.5

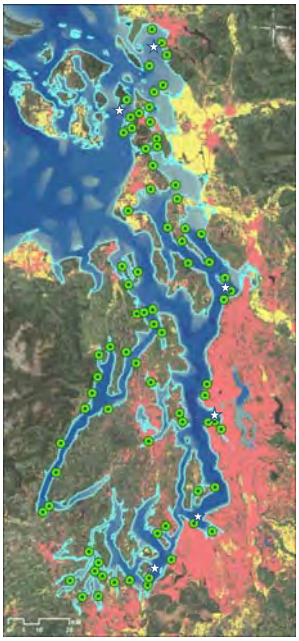
The survey



Sampling at each site:
Water column metrics
Dissolved inorganic nutrients
Bacterial and phytoplankton abundance
Bacterial diversity
Heterotrophic microbial production
Small zooplankton
Large zooplankton and larval fish
Forage fish and juvenile salmon
(size, abundance, biomass, and growth)
Jellyfish (size and biomass)
Stable isotopes (fish & invertebrates)
Birds and marine mammals

PP2.6

The analysis



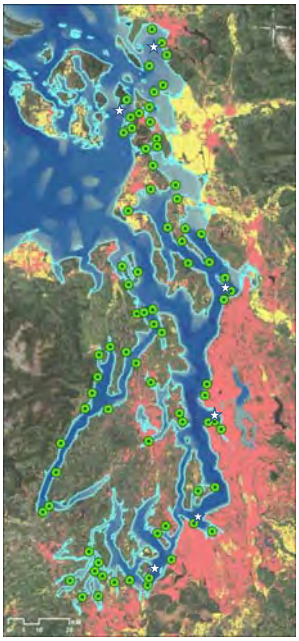
1) DMMP sediment disposal sites April-February

2) April-October across all basins

3) All sites in August

PP2.7

Analysis by the numbers



79 sites * 7 months + 6 sites * 11 months = 619 samples collected

157 samples processed

997 rockfish identified

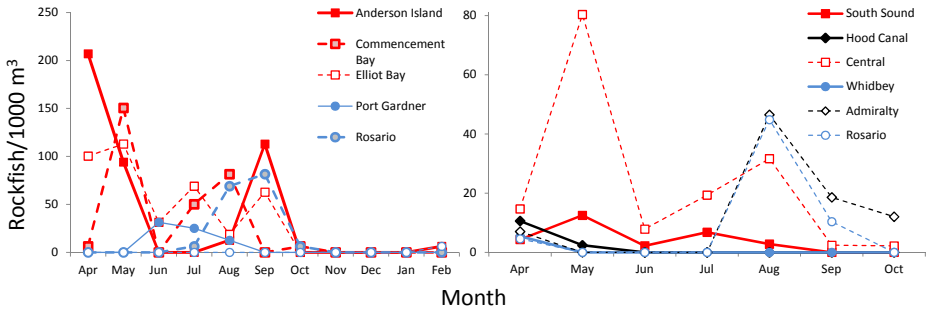
0 boccacio, canary, yellow-eye identified

PP2.8

When?

Army Corps Disposal sites
April – February

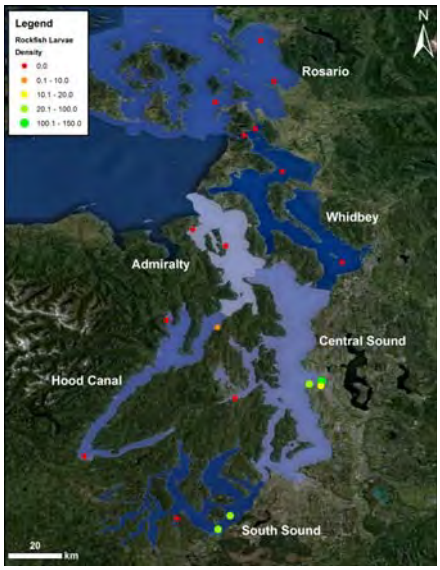
Subset of 16 sites across all basins
April-October



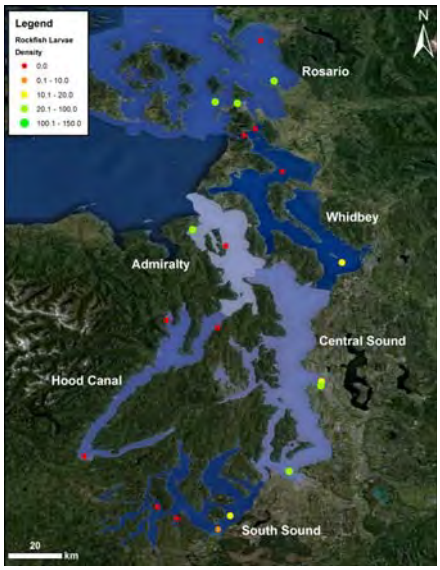
PP2.9

Where?

May



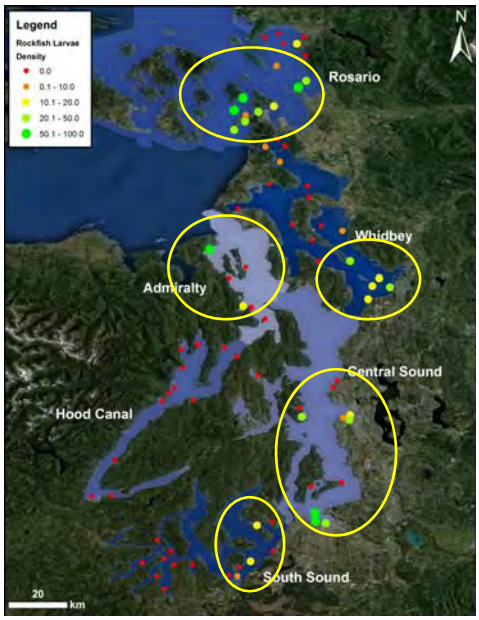
August



PP2.10

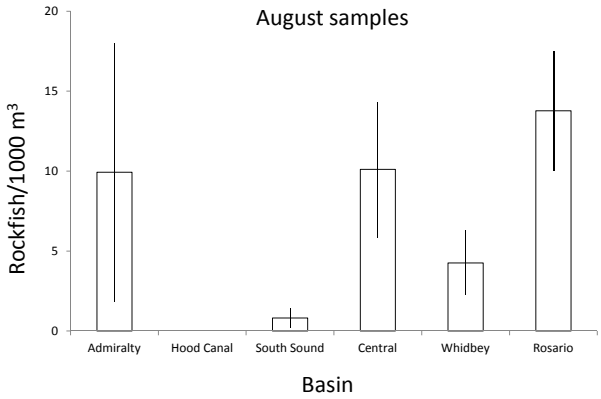
Where?

August, all sites



PP2.11

Where?



PP2.12

Why?

Mechanisms that may influence
distribution and abundance of rockfish larvae

Pelagic habitat conditions
Rocky habitat
Productivity gradients
Predator distributions
Circulation patterns
Adult abundance

PP2.13

Why?

Mechanisms that may influence
distribution and abundance of rockfish larvae

Pelagic habitat conditions
Rocky habitat
Productivity gradients
Predator distributions
Circulation patterns
Adult abundance

Temperature	**-0.279***
DO	0.162
PAR	-0.081
pH	**-0.371**
Salinity	**0.300**
Turbidity	-0.177

*$p < 0.05$

PP2.14

Why?

Mechanisms that may influence distribution and abundance of rockfish larvae

Pelagic habitat conditions
Rocky habitat
Productivity gradients
Predator distributions
Circulation patterns
Adult abundance

Shoreline development	**0.193**

PP2.15

Why?

Mechanisms that may influence distribution and abundance of rockfish larvae

Pelagic habitat conditions
Rocky habitat
Productivity gradients
Predator distributions
Circulation patterns
Adult abundance

N:P	**0.259**
Chl A	0.156
Phytoplankton	**0.184**
Bacterial Productivity	-0.170
Synechococcus	**0.208**

PP2.16

Why?

Mechanisms that may influence
distribution and abundance of rockfish larvae

Pelagic habitat conditions
Rocky habitat
Productivity gradients
Predator distributions
Circulation patterns
Adult abundance

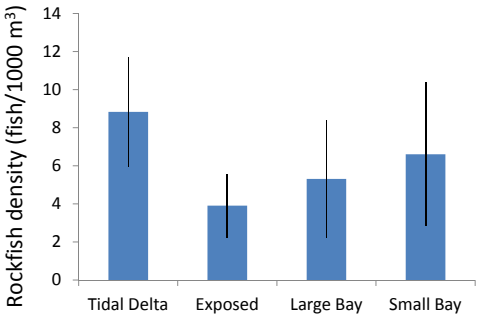
Salmon	**-0.310**
Jellies	-0.018
Forage fish	0.006
Pelagics	-0.088

PP2.17

Why?

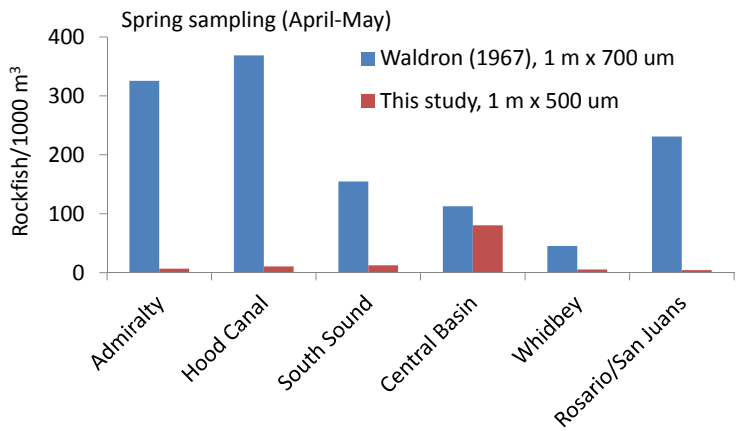
Mechanisms that may influence
distribution and abundance of rockfish larvae

Pelagic habitat conditions
Rocky habitat
Productivity gradients
Predator distributions
Circulation patterns
Adult abundance



PP2.18

Adult abundance?



A 28-98% "decline"

PP2.19

Summary

When Spring and Summer peaks, absent in fall & winter

Where Central Basin, Admiralty Inlet, San Juan Islands

Why Correlations of density with pelagic environment, land use, productivity, and salmon

Interpretations colored by huge changes in abundance?

PP2.20

Future efforts

1) More sample processing – eggs and larvae for all samples in spring. All April samples have now been processed.

2) More species – Other key groups including forage fish and flatfish have been keyed out and analyzed.

3) More sophisticated analyses.

4) Examinations of rockfish and other larvae in salmon diets.

PP2.21

Biomass Endpoint
Freshwater Sediment Bioassay

SMARM
May 1, 2013

Arthur Buchan
Russ McMillan
Brendan Dowling

DEPARTMENT OF ECOLOGY
State of Washington

PP3.1

Biomass Endpoint
Goals For Today

- Present the basis for exploring the Biomass Endpoint.
- Provide a status report on our effort.
- Touch on what comes next.

PP3.2

Freshwater Biological Standards Technical Considerations

- Objectives in development of biological standards.
  - Protect functions and integrity of a benthic community - Multiple species/sensitive life-history stages.
  - Discern a range of effects bounding minor adverse effects levels.

PP3.3

Freshwater Sediment Bioassays

- Limited Options Compared to Marine
  - 2 Species
  - Endpoints
    - Mortality
    - Growth

PP3.4

What is the Biomass Endpoint? and Why should we care?

- Takes into account both survival and growth but normalizes to initial count.
- Calculated as:

$$Biomass = \frac{Weight\ of\ Surviving\ Organisms}{Number\ of\ Initial\ Organisms}$$

Weight = Dry weight for *H. azteca*; Ash-free dry weight for *C. dilutus*

PP3.5

What is the Biomass Endpoint? and Why should we care?

- Less prone to confounding factors.
- Appears to be more sensitive.
- Suggested it may be a better indicator of a population's standing crop.

PP3.6

How are we evaluating the Biomass Endpoint?

- Using existing data from which the FW chemical criteria were developed.
  - *H. azteca* – 28-day 75 Stations
  - *C. dilutus* - 10-day 525 Stations
- Calculate Hit/No-Hit lists based on:
  - Statistical difference only
  - Statistical difference plus a threshold

PP3.7

How are we evaluating the Biomass Endpoint?

- Comparisons using Hit/No-Hit lists
  - Biomass to Growth
  - Biomass to Mortality
  - Biomass to Combined Growth and Mortality
- Examine causes for differences.
  - Do responses differ with variance in data?
  - Do responses differ with degree of mortality?
  - Better correlated to chemical concentrations?
- Draft report summer 2013.

PP3.8

Next Steps & Review Opportunities

- Report:
  - Include recommended calculations and statistical tests.
  - Identify differences and advantages.
  - Recommend interpretation criteria.
  - Receive additional review by expert panel.
- Ecology will fold Biomass into SMS guidance document (SCUM II).
  - Public review September 2013

PP3.9

Questions?

PP3.10

Statistical methods for comparing test sediment to control

Outcome of Shapiro-Wilke's Test	Outcome of Levene's Test	Statistical Test of Experimental Hypothesis
Normal Distribution	Variances Homogeneous	Student's t-test
Normal Distribution	Variances Heterogeneous	Approximate t-test
Non-Normal Distribution	Variances Homogeneous	Mann-Whitney test
Non-Normal Distribution	Variances Heterogeneous	Rankit Analysis

PP3.11

Freshwater Biological Standards

- Bioassay suite to include at least:
  - 2 Species
  - 3 Endpoints
  - 1 Chronic Test
  - 1 Sublethal Endpoint
- Interpretation
  - SQS: Single SQS level hit
  - CSL: 2+ SQS level hits; 1+ CSL level hit

PP3.12

Clarification Paper:

Modifications to Ammonia and Sulfide Triggers for Purging and Reference Toxicant Toxicity Testing

Laura Inouye (Ecology), Erika Hoffman (EPA) and David Fox (Corps) for the DMMP agencies

May 1, 2013

PP4.1

Introduction

The potential for ammonia and sulfides to complicate bioassay evaluations of dredged material has been addressed previously:

- DMMP (1993) The *Neanthes* 20-day Bioassay – Requirements for Ammonia/Sulfides Monitoring and Initial Weight
- DMMP (2001) Reporting Ammonia LC_{50} data for Larval and Amphipod Bioassays
- DMMP (2002) Ammonia and Amphipod Toxicity Testing
- DMMP (2004) Ammonia and Sulfide Guidance Relative to *Neanthes* Growth Bioassay.

PP4.2

Problem Identification

- Ammonia: No ref tox or purging triggers for larval tests
- Sulfides: No purging triggers for amphipod or larval tests
- Bulk measurements likely not representative of bioassays conditions
- Measurements taken at start of testing may be too late to initiate purging
- Amphipod purge triggers based on NOECs while *Neanthes* triggers based on minor effects levels
- High level of effort and sediment volume needed for interstitial measurements

PP4.3

Literature and Data Review

- Peer reviewed literature, meeting presentations, and laboratory reference toxicity test data were gathered and reviewed (appendices A and B).
- Due to range in NOECs, LOECs, and LC_{50}/EC_{50}, overlaps in the values existed.
- After consideration, the DMMP agencies decided to use the NOEC and 0.5 NOEC values for overlying water SLs for triggering RefTox testing and purging.

PP4.4

Why set Purging Triggers at NOEC?

- Purging triggers based on effects levels could result in bioassay data that are rejected for use or difficult to interpret
- LC_{50}/EC_{50} would be less conservative since based on shorter exposure times and overlap within the same species
- Using lower threshold in overlying water increases chances that sulfides and ammonia in interstitial water will be below effects thresholds

PP4.5

Why Focus on Overlying Water Measurement?

- Eliminates potential for porewater extraction procedure to alter ammonia/sulfide concentrations
- Collecting adequate sediment volume for the sacrificial beakers needed for interstitial measurements can be a problem for some projects

PP4.6

Proposed Triggers (overlying water)

Trigger	Bedded sediment tests				Larval tests	
	Neanthes	*Ampelisca*	*Eohaustorius*	*Rhepoxynius*	*Bivalve*	*Echinoderm*
Unionized Ammonia (mg/L) Ref Tox	0.23	0.118	0.4	0.2	0.02	0.007
Unionized Ammonia (mg/L) Purge	0.46	0.236	0.8	0.4	0.04	0.014
Hydrogen Sulfide (mg/L) Purge	3.4	0.0094	0.122	0.099	0.0025	0.01

PP4.7

To Purge or not to Purge

Measure ammonia and sulfides in test beakers PRIOR to starting bioassays:

- One beaker for larval tests and one for bedded sediment tests
- Measure total ammonia, total sulfides, pH, salinity and temperature in the OVERLYING water
- Calculate unionized ammonia and hydrogen sulfide and compare to triggers
- Consult with DMMP agencies regarding need to purge

PP4.8

Case-by-Case Considerations

- If site COCs include volatiles, purging may be disallowed or restricted in duration
- If ammonia or sulfides themselves are COCs (e.g. wood waste), purging may not be allowed

PP4.9

Purge Method Clarification

Purging for larval tests must use aeration only

- Purging via water changes may result in loss of colloids/suspended sediments that are a critical part of the sediment evaluation
- If aeration does not reduce ammonia concentrations below the NOEC, the Ref Tox data will help with data interpretation

PP4.10

See Clarification Paper for More

- Options for project-specific purging regimes
- Reporting requirements
- Appendices with details of literature and data review

PP4.11

Questions?

- Comments due by July 3 (extended time due to late release of the paper)

PP4.12

Summary of DMMP Status Updates

2013 SMARM

PP5.1

Kelsey van der Elst
kelsey.vanderelst@usace.army.mil

Updates

1. Puget Sound SRM
2. SL/PQL review
3. Transition to EIM database
4. New 2013 DMMP User Manual

PP5.2

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

1. Puget Sound SRM

- Updated SRM guidance document available on DMMO website:
  - PCB congener acceptance limits
  - +/- 50% limits
  - Advisory for DY14
- Use SRM for validating:
  - Dioxin: method 1613B
  - PCBs: Aroclor method 8082

PP5.3

1. Puget Sound SRM

DY12

- 5 bottles requested
- 3 projects
  - 1 DMMP
  - 1 EPA
  - 1 Ecology
- Received results from 2 of those projects

PP5.4

2. SL/PQL review

- 2011 adoption of RSET screening levels:
  - 4 chemicals with SLs lower than current PQLs

	Old SL	2011 SL
Hexachlorobutadiene	29	11
Total Chlordane	10	2.8
Heptachlor	10	1.5
Dieldrin	10	1.9

  - Reviewed laboratories' ability to get detection limits below 2011 SL for these chemicals

PP5.5

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

2. SL/PQL review

- Summary:
  - Labs have been able to meet the new SLs the vast majority of the time
  - SIM methods may be required to lower detection limits
  - DMMP will continue to use BPJ
- Status report is available on the DMMO website
  - Comment deadline: June 3rd

PP5.6

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

3. EIM transition

- Process of transferring data from DAIS to EIM is ongoing
- All projects must submit results to DMMO in EIM format.
  - Guidance for filling out EIM spreadsheets available from DMMO
  - Contact us with any questions!
- Status update paper available on DMMO website

PP5.7

4. 2013 DMMP User Manual

- Will be available on the DMMO website for the start of the 2014 Dredging Year: **June 16th**
  - Up-to-date
    - Reflect current process and procedures
    - Incorporate all SMARM clarification papers
  - Easy to update
  - More chapters: antidegradation, beneficial use
  - Available as pdf and web-based version

PP5.8

4. 2013 DMMP User Manual

- Highlights
  - Chapter 6: Preparing a SAP
  - Dioxin
    - User Manual is go-to place for all dioxin analysis, reporting and validation information
  - EIM database
  - COC list
    - Will be revised once SMS rule is promulgated

PP5.9

Questions?

- DMMO website:

http://www.nws.usace.army.mil/Missions/CivilWorks/Dredging

PP5.10

Dredged Material Management Program Testing Activities

Dredging Year 2013

David R. Kendall, Ph.D.
US Army Corps of Engineers
Seattle District

PP6.1

DMMP Purpose

Given:

existing regulations, current guidelines, and project proposal

Evaluate:

potential dredged material for suitability for open-water disposal and/or beneficial reuse

PP6.2

Dredging Year Actions

- DY 2013:
  16 June 2012 to 15 June 2013
- Decision Documents:
  - Suitability Determinations
  - Others:
    - Ranking
    - Recency Extension
    - Frequency Determination
    - Exclusion from Testing
    - Volume Revision
    - Antidegradation Determination
    - Upland (Contaminated & Beneficial Use)

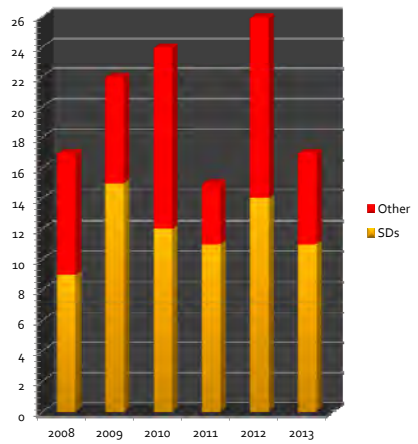
PP6.3

DY13 Completed Actions

Suitability Determinations (11)

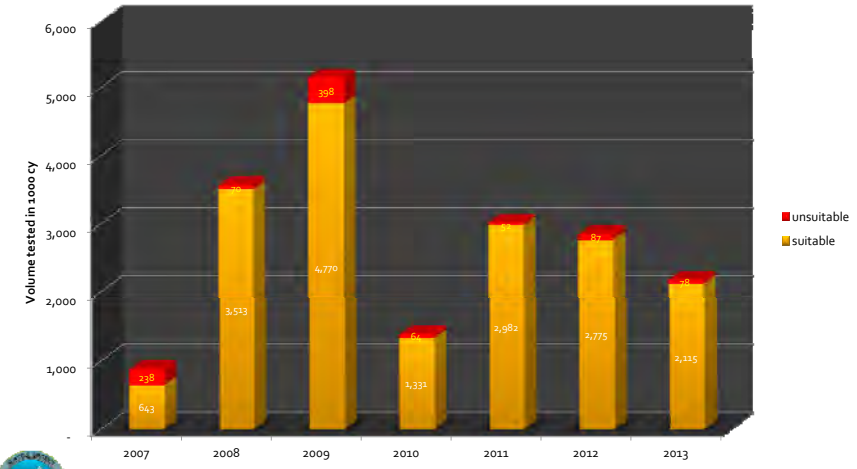
Others:

- Volume Revision (1)
- Recency (1)
- Frequency (1)
- Antidegradation (6)
- Ranking (1)
- No Test (1)
- Upland – Contaminated-Beneficial Use (3)



PP6.4

Suitability by Volume Tested



PP6.5

Projects with unsuitable material

Project	Suitable (cy)	Unsuitable (cy)	Reason	Comments
Port of Olympia				Z-samples: Fail
Berths 2 & 3	0	39,000*	Dioxin	Antidegradation (AD)
Swantown Boatworks	0	3,000*	Dioxin	Z-samples: Pass AD
Port of Anacortes, Pier 2	5,450	3,250	TBT	Z-samples: Pass AD
Salmon Bay Marina	8,337	3,563	TBT, Dioxin	Dredge additional foot into native layer
Olympia Yacht Club	9,349	6,892	Dioxin	AD to be performed after dredging completed
USACE Grays Harbor NIP	1,951,412	22,400	Benzyl Alcohol, Bioassays	Bioassay retests confirmed ; Z-samples: Pass AD

*proposed dredged material not tested, presumed unsuitable due to existing dioxin data

PP6.6

Special Chemicals of Concern

- Tributyltin
- Dioxin/Furans
- PBDE congeners (Fire Retardants) – emerging COC (no guidelines yet established)
- PCB congeners (No existing guidelines, existing PCB guidelines Aroclor based)

PP6.7

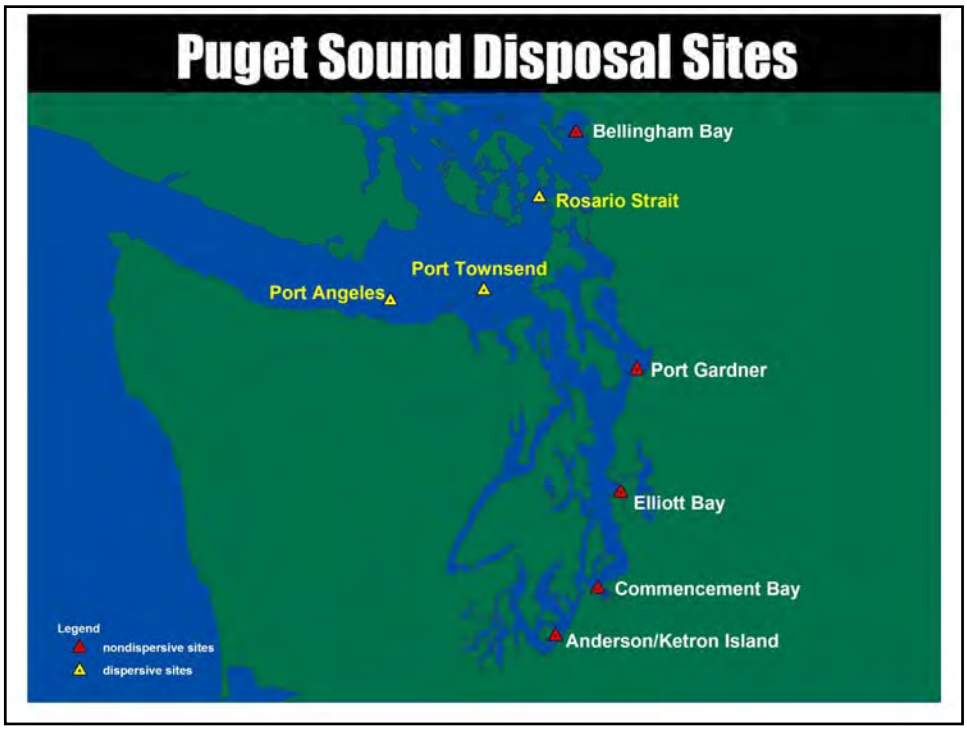
DISPOSAL

PP6.8

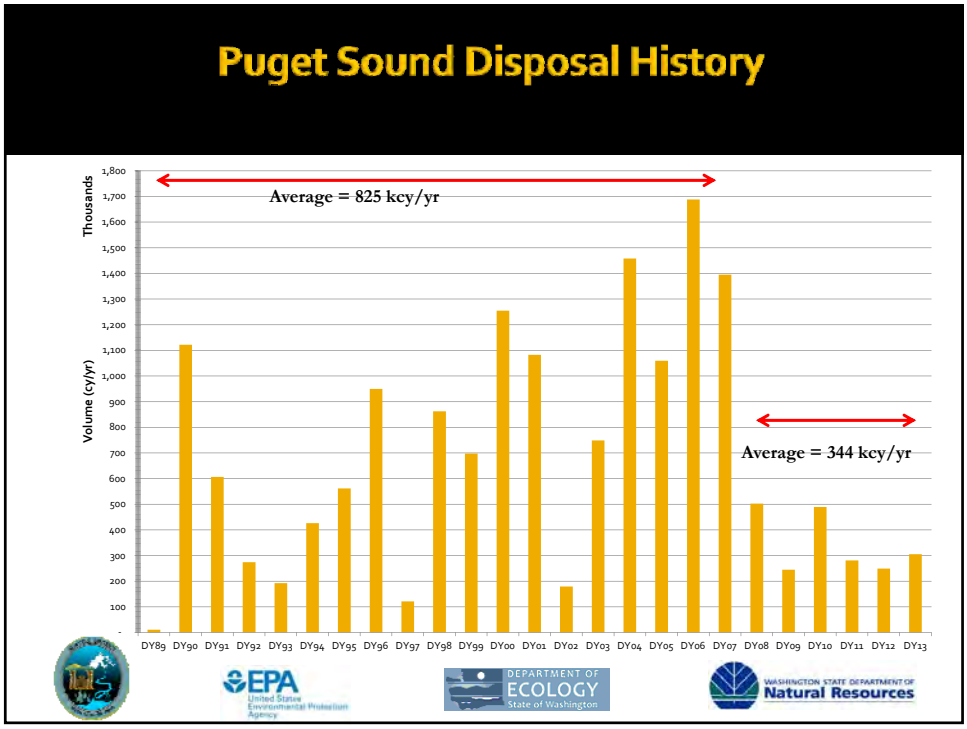
Current Geographic Focus

- Puget Sound (8 open-water disposal sites: 5 non-dispersive sites, 3 dispersive sites)
- Grays Harbor (2 estuarine dispersive sites, 2 beneficial use sites, 1 ocean disposal site currently deactivated)
- Willapa Bay (2 estuarine dispersive disposal sites, site-specific "flow lane disposal")
- WA side of the Lower Columbia River & Snake River (flow lane disposal)

PP6.9



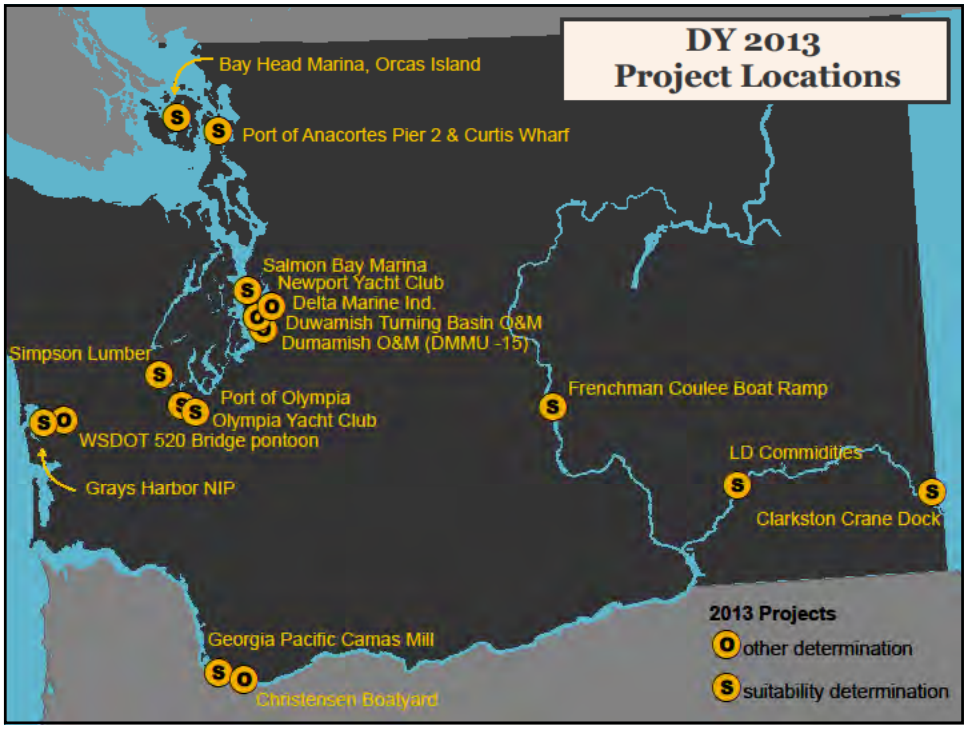
PP6.10


Puget Sound Disposal History
Average = 825 kcy/yr
Average = 344 kcy/yr
Volume (cy/yr)
Thousands
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
-
DY89 DY90 DY91 DY92 DY93 DY94 DY95 DY96 DY97 DY98 DY99 DY00 DY01 DY02 DY03 DY04 DY05 DY06 DY07 DY08 DY09 DY10 DY11 DY12 DY13
EPA
United States Environmental Protection Agency
DEPARTMENT OF ECOLOGY
State of Washington
WASHINGTON STATE DEPARTMENT OF
Natural Resources

PP6.11

DREDGING
YEAR 2013

PP6.12



PP6.13

DY 13 Testing

- Out of 17 completed actions:
  - 10 Projects - chemical testing
  - 8 Projects - included dioxin testing
  - 2 Projects - bioassay testing
  - *No* bioaccumulation testing

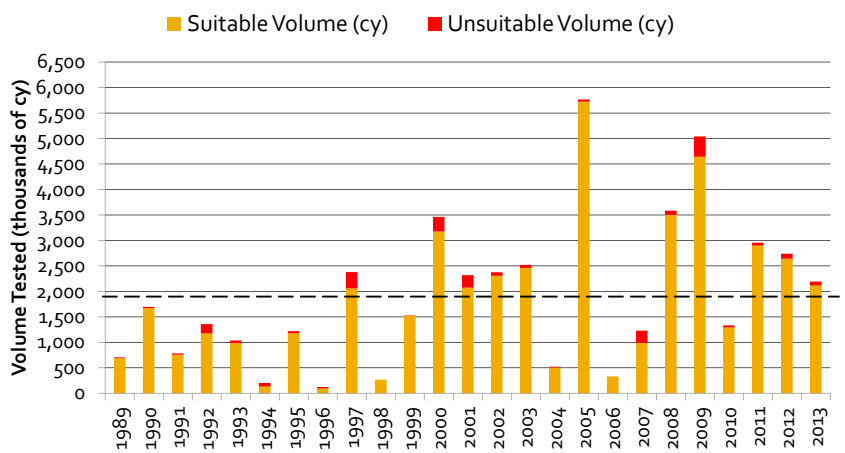
PP6.14

Dioxin Testing 2013

- 3 projects had failures based on dioxin or partially due to dioxin
  - Port of Olympia: Berth's 2 & 3; Swantown Boatworks
  - Salmon Bay Marina
  - Olympia Yacht Club
- 5 projects passed dioxin guidelines for all material

PP6.15

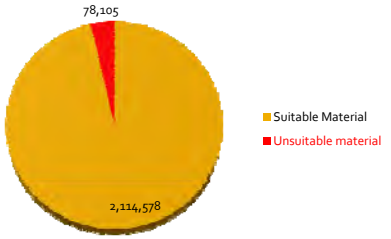
DMMP Testing History



PP6.16

Suitability Overview

- 5/17 projects had at least *some* unsuitable
- Only 1/17 projects with all material unsuitable



PP6.17

Projects under evaluation, but incomplete

Puget Sound area

Duwamish Yacht Club
Kenmore Navigation Channel & vicinity
Port of Kingston Marina
Mukilteo Multimodal
Dunlap W. Bay Marina
Port of Tacoma Pier 4
Silver King Boat Launch
USN Bangor, Kitsap
USACE Hylebos O&M
MJB Properties, Anacortes
Port of Seattle Terminal 5

Columbia & Snake River

Longview Fibre
Kittitas County Boat Launch
Snake River O&M

PP6.18

Please Check Out Our Newly revised Website

- More User-Friendly
- Easier search tools
- Simpler URLs

- Website URL:
- http://www.nws.usace.army.mil
  - Search for: Dredged Material Management

PP6.19

DMMP still needed in 2013

" Despite years of cleanups, bans on certain chemicals and increasingly stringent regulations, pollution in Puget Sound remains pervasive." Seattle PI, October 10, 2006.

PP6.20

PP6.21

Disposal Site Management Activities

Celia Barton
Department of Natural Resources
SMARM 2013

PP7.1

Site Monitoring

History of program has 25 years of testing and monitoring of the disposal sites

- Monitoring surveys provide positive feedback to verify the adequacy of the dredged material management process
- Site monitoring to date shows dredged material disposal has not caused adverse impacts at or adjacent to any of the non-dispersive sites

PP7.2

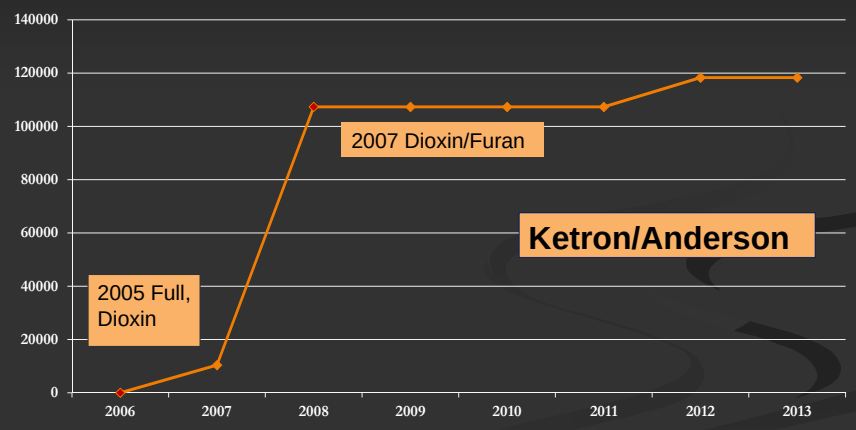
Site Monitoring

Moved to volume based monitoring trigger in 1997 and reduced frequency and scope of monitoring based on past documented compliance with site management objectives.

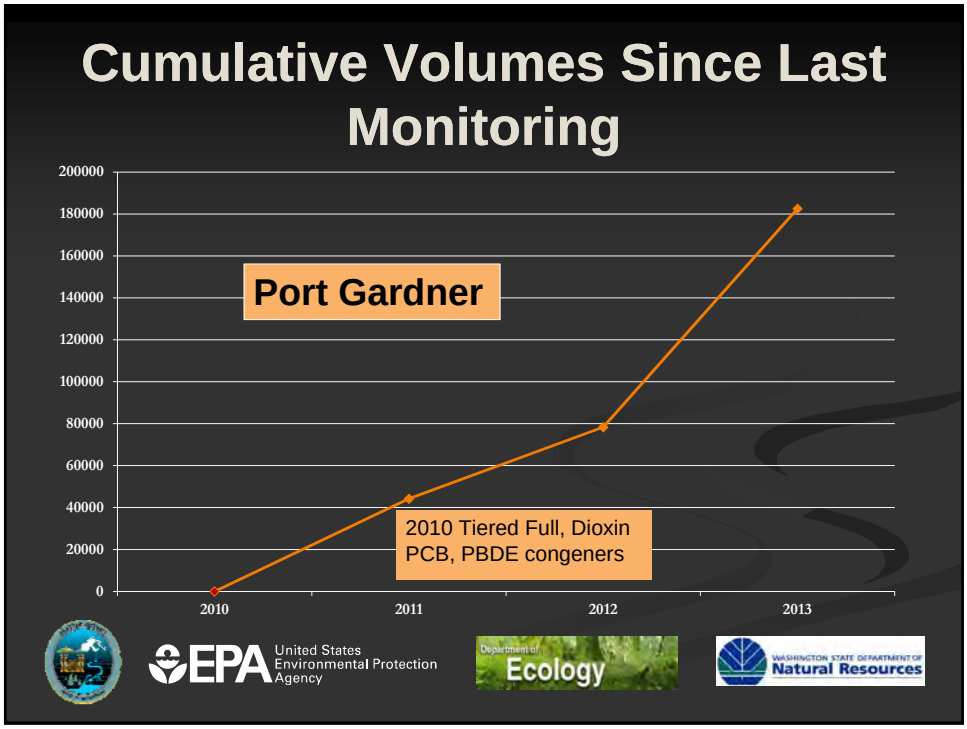
- Following 2002 SMARM increased disposal volume trigger to 500,000 cubic yards at Commencement Bay, Elliott Bay and Port Gardner
- Left trigger at 300,000 cubic yards for Bellingham Bay and Ketron/Anderson Island due to infrequent use

PP7.3

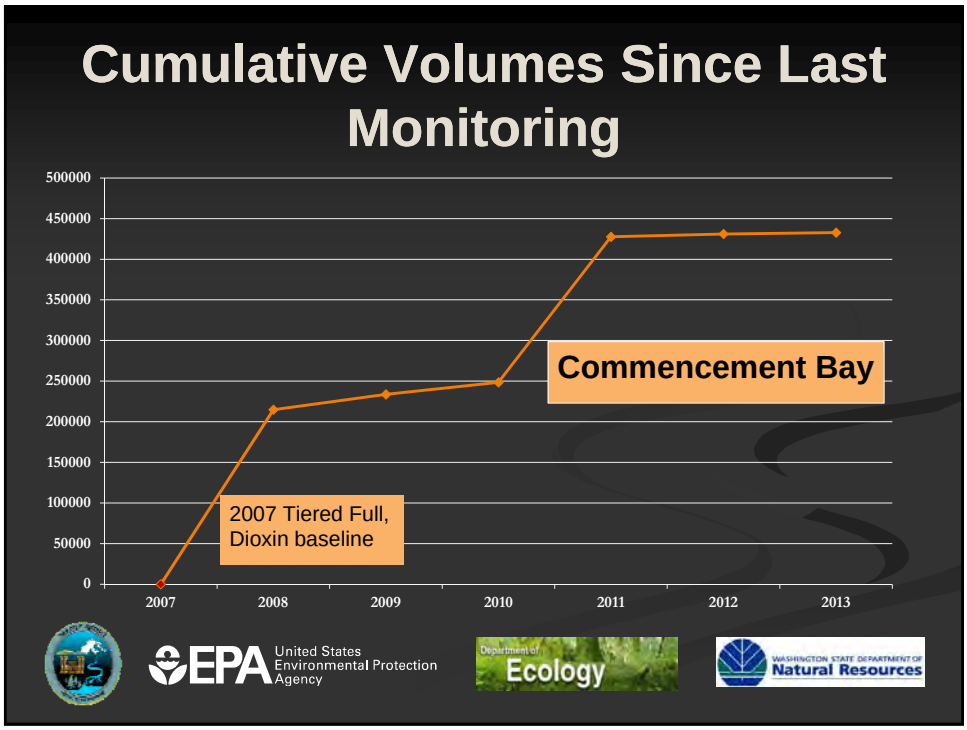
Cumulative Volumes Since Last Monitoring



PP7.4

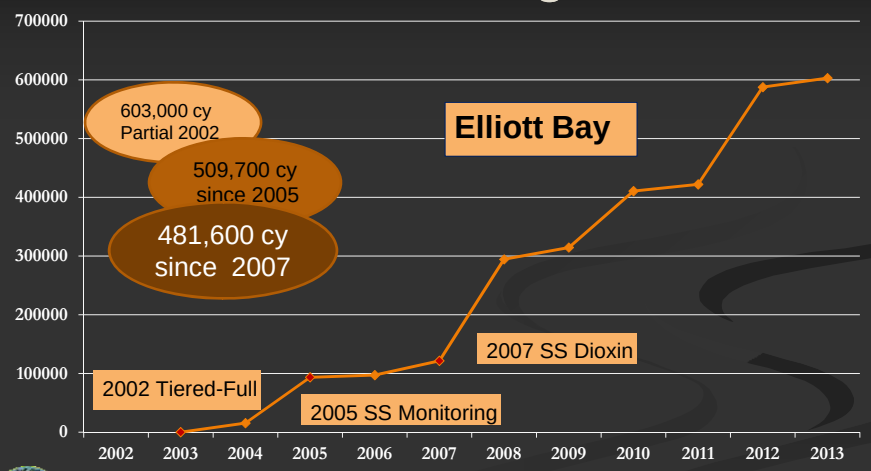

Cumulative Volumes Since Last Monitoring
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
2010
2011
2012
2013
Port Gardner
2010 Tiered Full, Dioxin PCB, PBDE congeners
EPA United States Environmental Protection Agency
Ecology
Natural Resources

PP7.5


Cumulative Volumes Since Last Monitoring
500000
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
2007
2008
2009
2010
2011
2012
2013
Commencement Bay
2007 Tiered Full, Dioxin baseline
EPA United States Environmental Protection Agency
Ecology
Natural Resources

PP7.6

Cumulative Volumes Since Last Monitoring



PP7.7

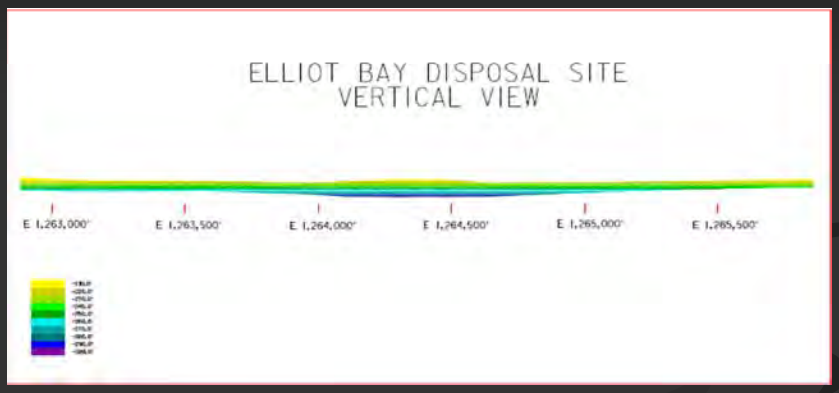
What is a "Soft Trigger"?

When cumulative volumes reach trigger guideline, DMMP agencies evaluate whether or not a monitoring event is needed

- Analyze frequency of use
- Source and character of material disposed
- Source and character of material to be disposed in near future
- Past monitoring results relative to site use

PP7.8

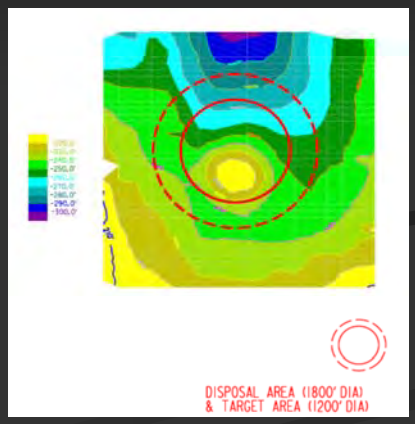
Monitoring – DY 2013
Corps Bathymetric Survey



PP7.9

Monitoring – DY 2013
Elliott Bay Bathymetric Survey

- Disposal mound within Target zone and Disposal zone
- Coordinates moved South 300 feet in early 1990's to stabilize edge drift



PP7.10

Monitoring – DY 2013

- Elliott Bay dioxin – now that dioxin is monitored in the dredge prism
  - Should not see elevated dioxin levels at disposal sites in future
- Would like to conduct tiered monitoring at Elliott Bay this summer

PP7.11

Aquatic Land Dredged Material Disposal Site Account

- Established in Statute "all funds received by the department from users of aquatic land dredged material disposal sites" (RCW 79.105.510)
- "Moneys in the fund may be spent only for the management and environmental monitoring of aquatic land dredged material disposal sites" (RCW 79.105.510)

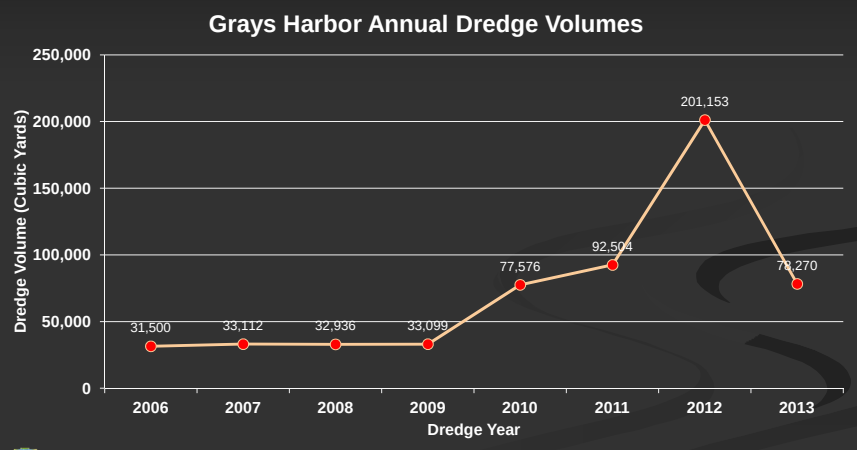
PP7.12

Aquatic Land Dredged Material Disposal Site Account

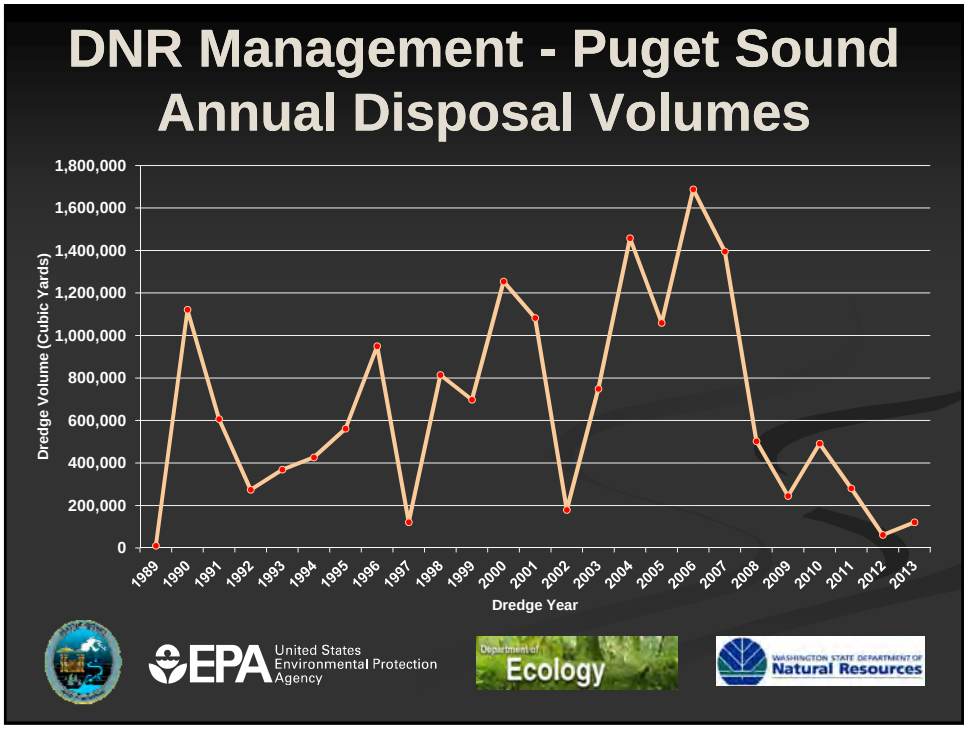
- Fees will be charged at rates sufficient to cover all department costs associated with management of the sites (WAC 332-30-166)
- Army Corps of Engineers navigation channel maintenance projects where there is no local sponsor are exempt from this fee schedule. (WAC 332-30-166)

PP7.13

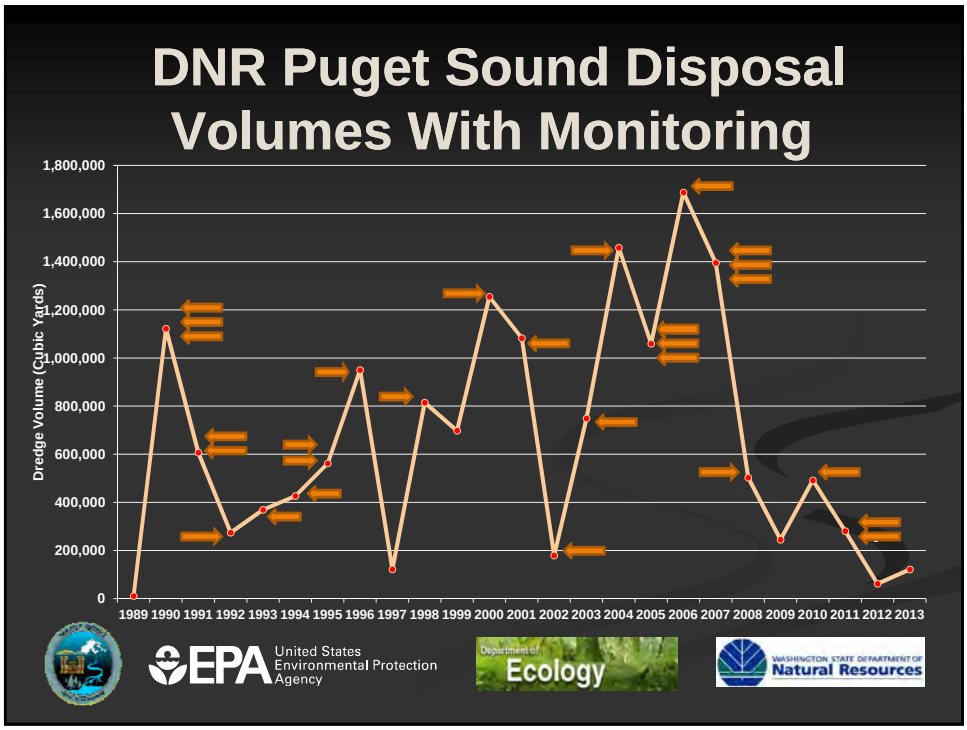
DNR Management – Grays Harbor Annual Disposal Volumes



PP7.14


DNR Management - Puget Sound Annual Disposal Volumes
Dredge Volume (Cubic Yards)
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Dredge Year
EPA United States Environmental Protection Agency
Department of Ecology
Washington State Department of Natural Resources

PP7.15


DNR Puget Sound Disposal Volumes With Monitoring
Dredge Volume (Cubic Yards)
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
EPA United States Environmental Protection Agency
Department of Ecology
Washington State Department of Natural Resources

PP7.16

Future

- Aquatic land dredged material disposal site account fund is weak
  - Less dredging, more beneficial use
  - Increased cost of monitoring and Shoreline Permits
- Keeping reserve of $300,000 in account for emergency monitoring event if needed
- Long term fix - new paradigm will need new solutions

PP7.17

QUESTIONS?

PP7.18

DMMP

25-year review

May 1, 2013

Prepared by David Fox

PP8.1

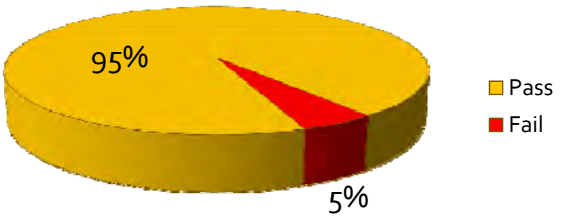
Implementation dates

- Puget Sound Dredged Disposal Analysis
  - Phase I – December 1988
  - Phase II – December 1989
- Grays Harbor/Willapa Bay
  - June 1995
- Columbia River
  - November 1998

PP8.2

Testing Summary

- 303 project tested
  - 232 in Puget Sound Basin
  - 56 in Grays Harbor, Willapa Bay or other coastal locations
  - 15 in the Columbia River Basin
  - 275 marine and 28 freshwater
- 52 million cubic yards tested

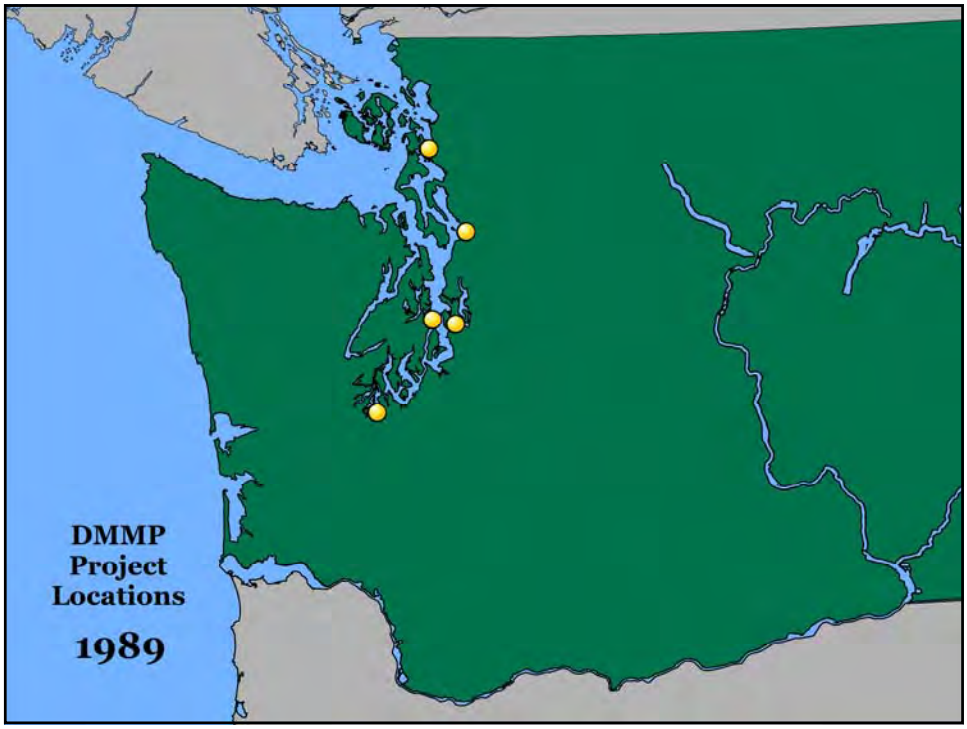


PP8.3

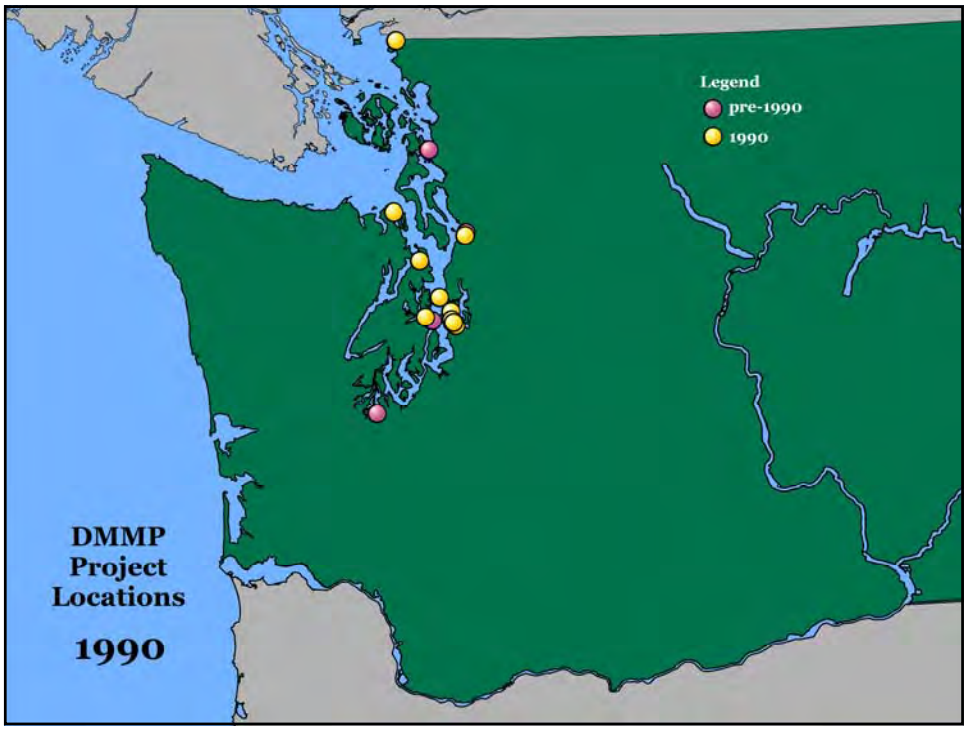
Time Travel

- Map Series – things to keep in mind
  - Current year in yellow, prior years in pink
  - Dredging years, not calendar years
  - The designated year corresponds to the date of the suitability determination
  - Only non-port projects on the Washington side of the Columbia River

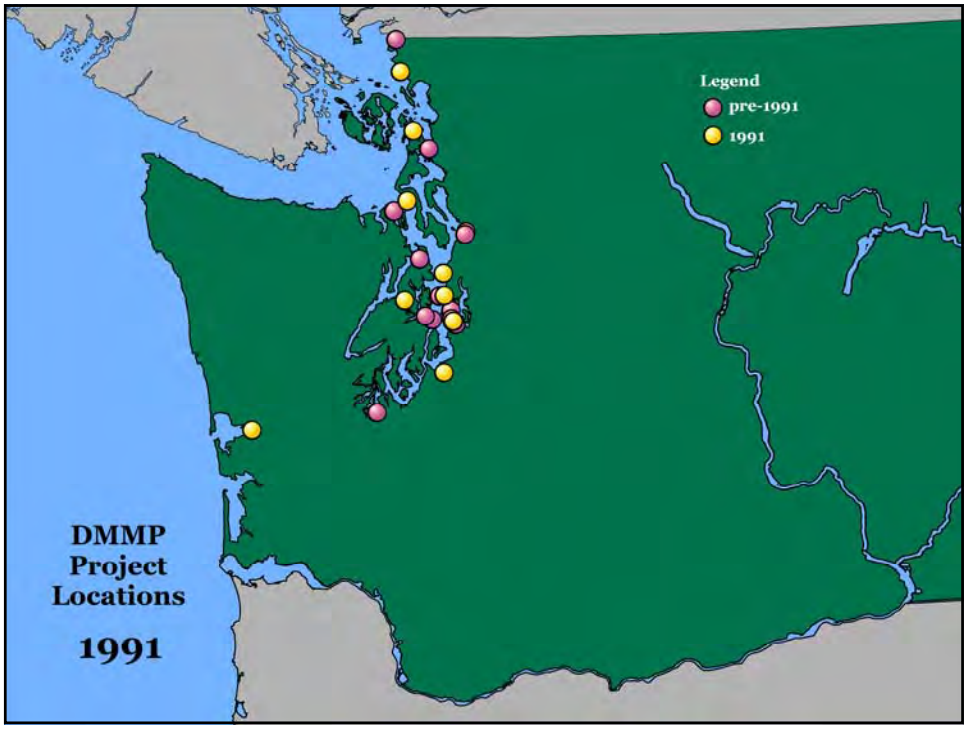
PP8.4


DMMP
Project
Locations
1989

PP8.5


Legend
pre-1990
1990
DMMP
Project
Locations
1990

PP8.6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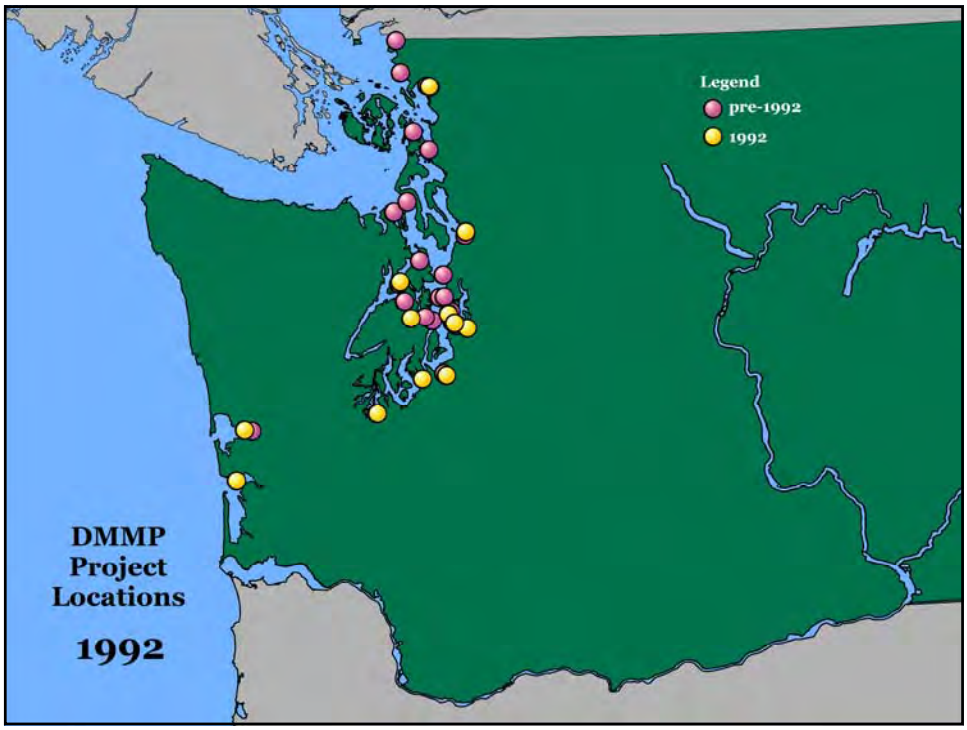
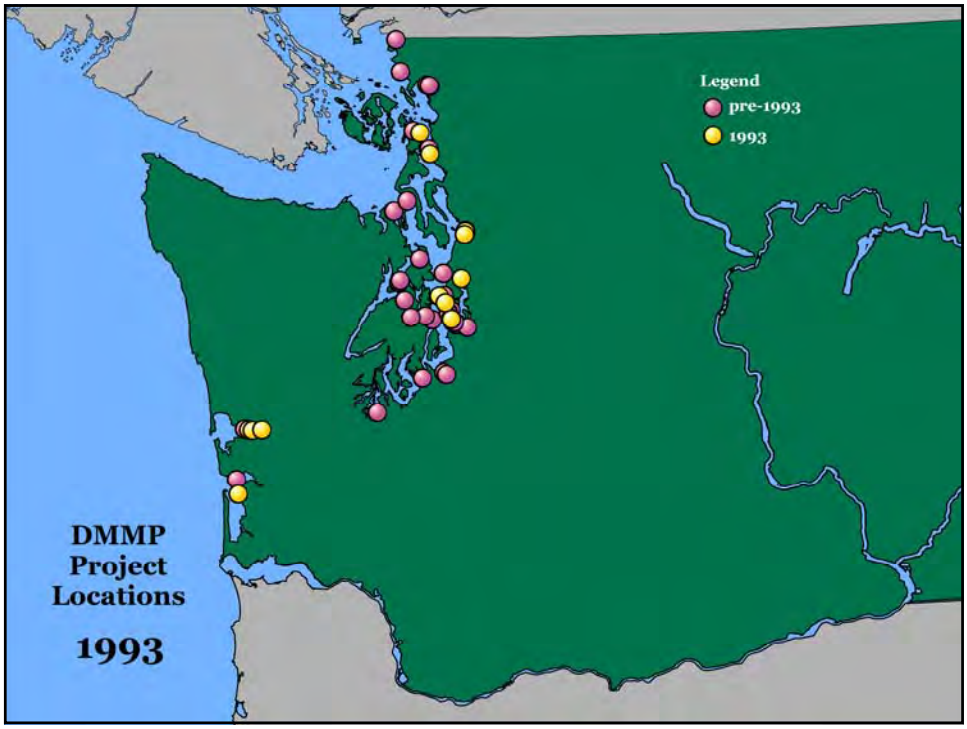
pre-1991
1991
DMMP
Project
Locations
1991

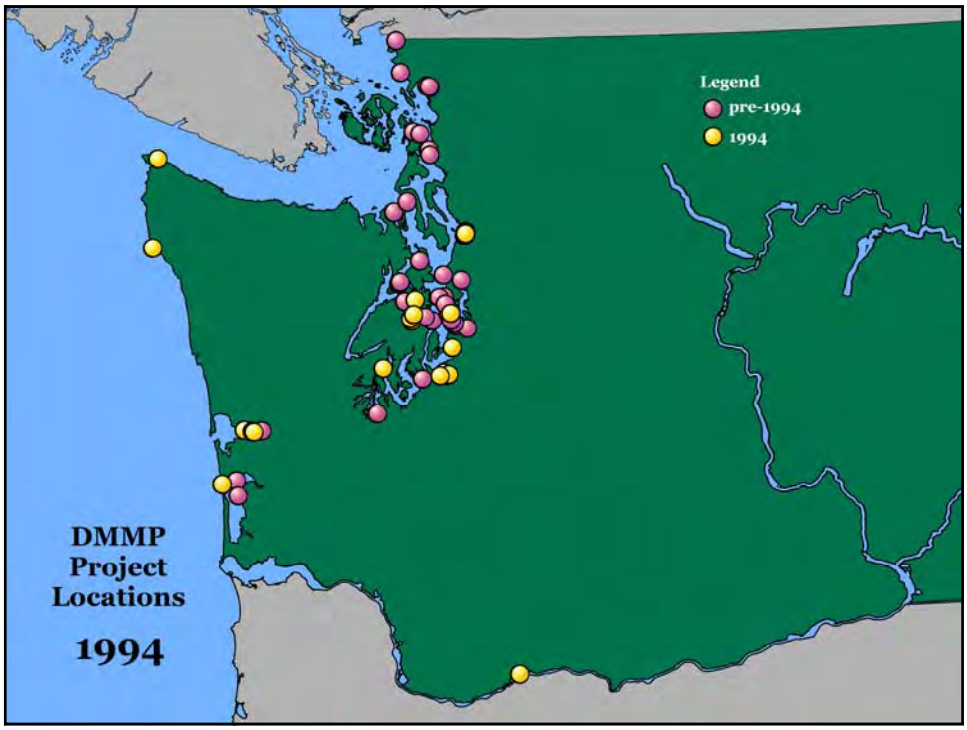
PP8.7


Legend
pre-1992
1992
DMMP
Project
Locations
1992

PP8.8


Legend
pre-1993
1993
DMMP
Project
Locations
1993

PP8.9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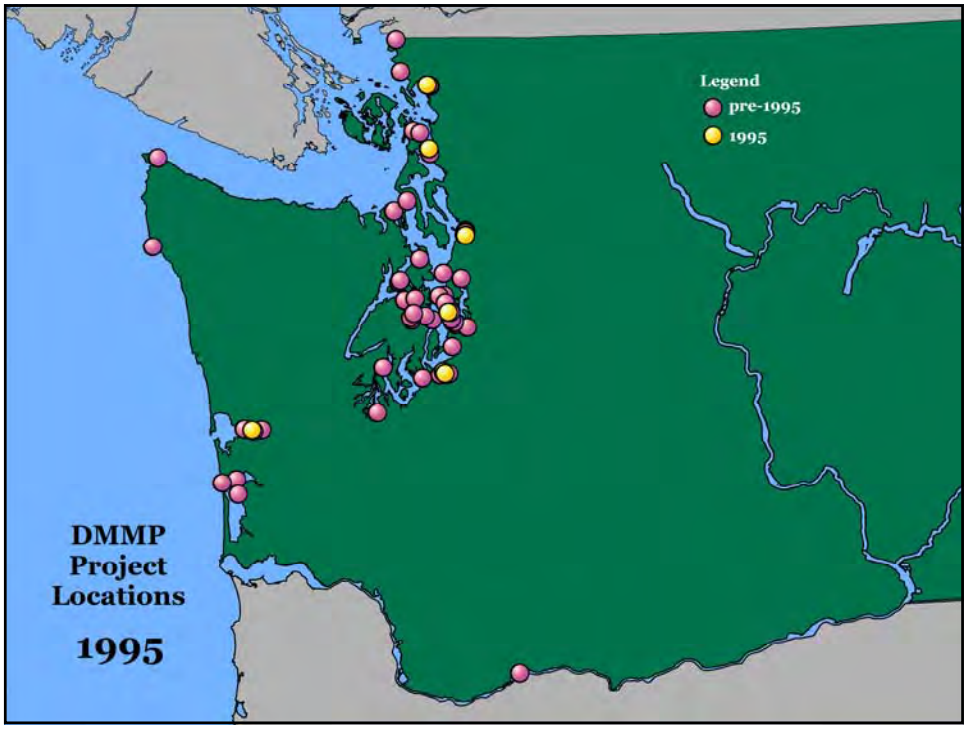
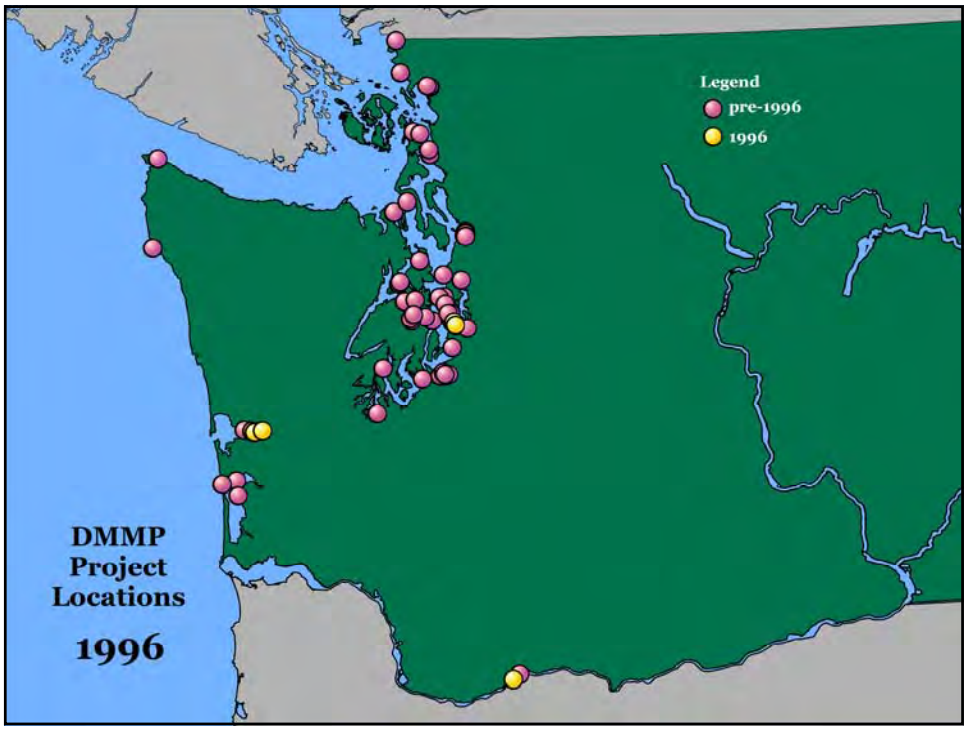
pre-1994
1994
DMMP
Project
Locations
1994

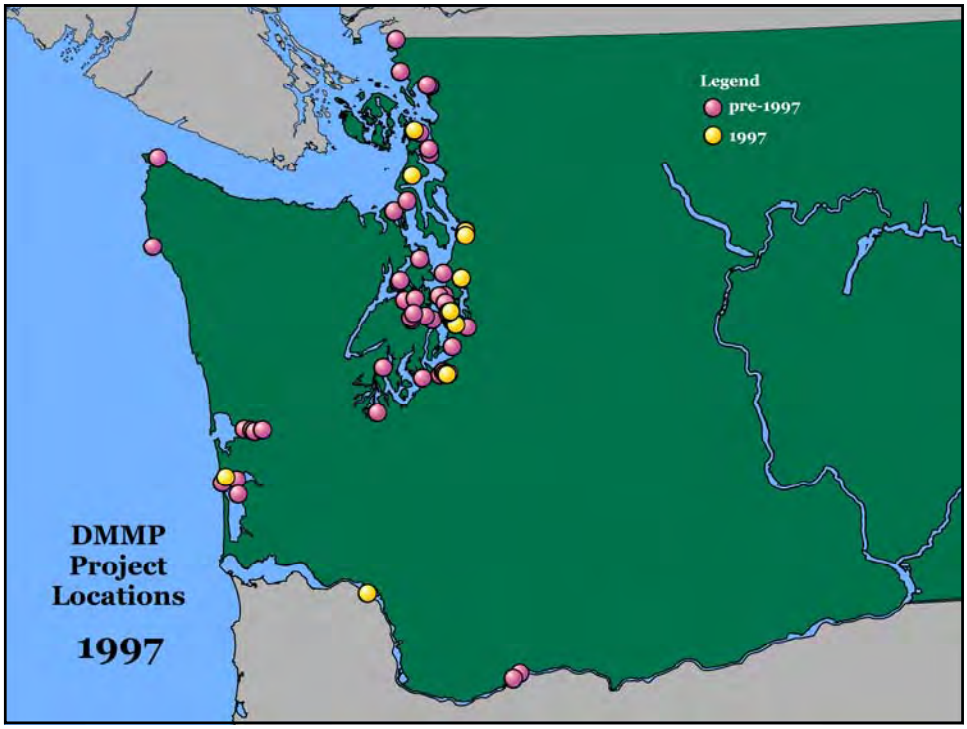
PP8.10


Legend
pre-1995
1995
DMMP
Project
Locations
1995

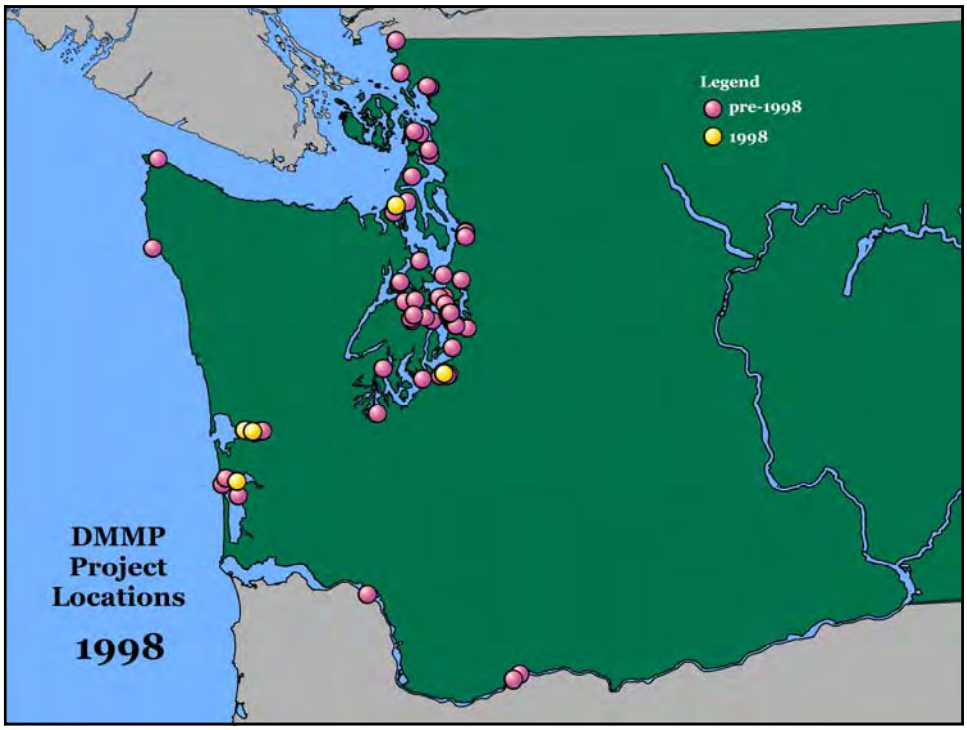
PP8.11


Legend
pre-1996
1996
DMMP
Project
Locations
1996

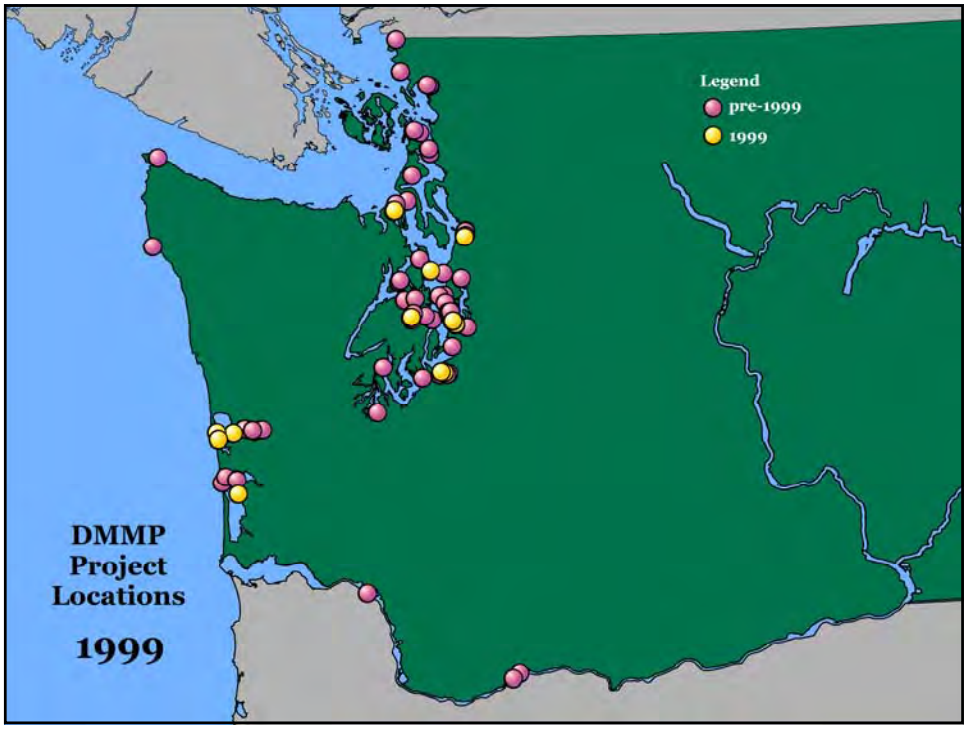
PP8.12


Legend
pre-1997
1997
DMMP
Project
Locations
1997

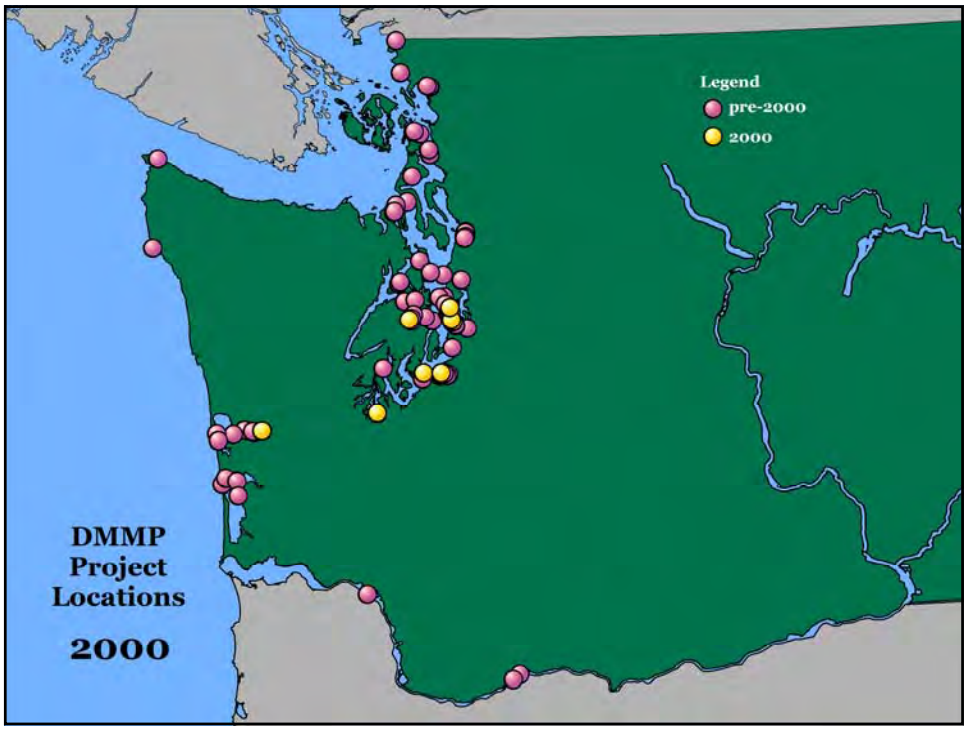
PP8.13


Legend
pre-1998
1998
DMMP
Project
Locations
1998

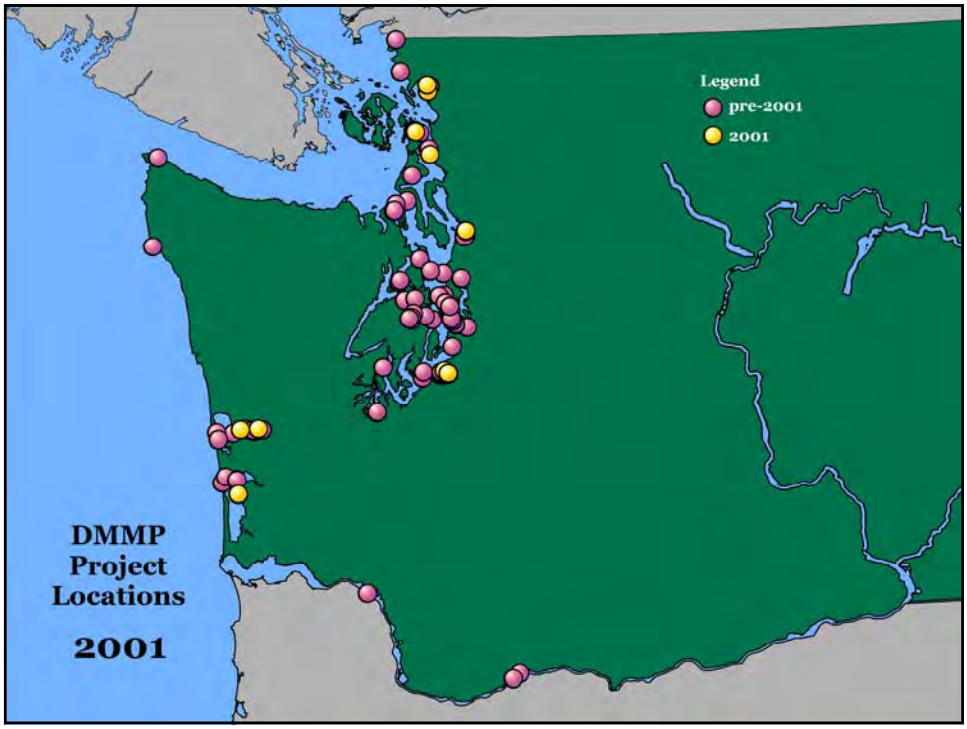
PP8.14


Legend
pre-1999
1999
DMMP
Project
Locations
1999

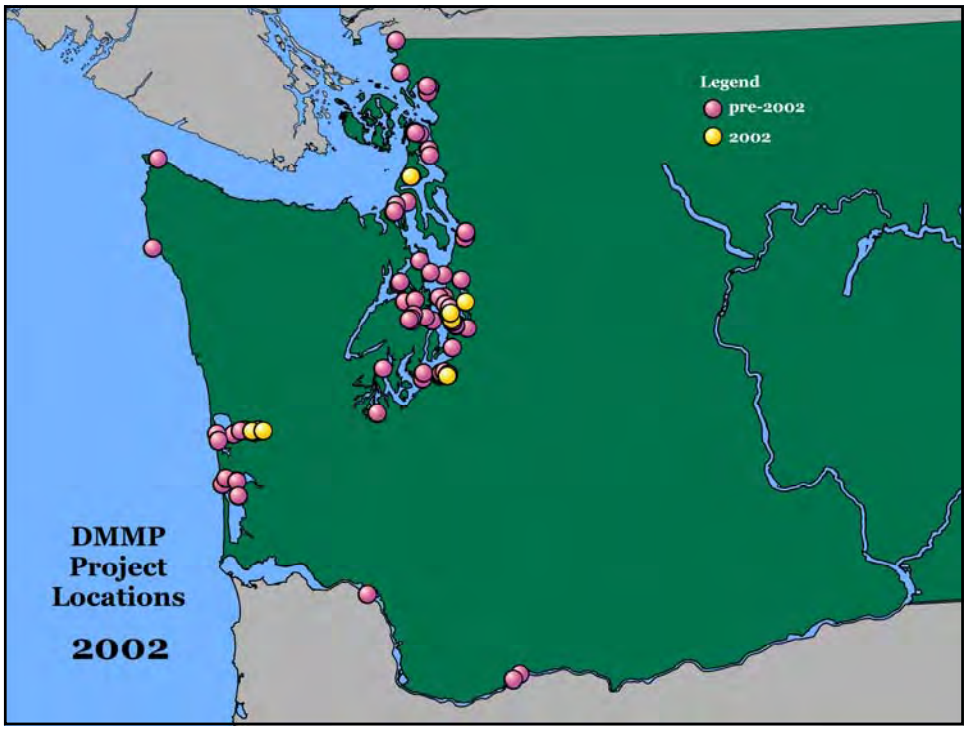
PP8.15


Legend
pre-2000
2000
DMMP
Project
Locations
2000

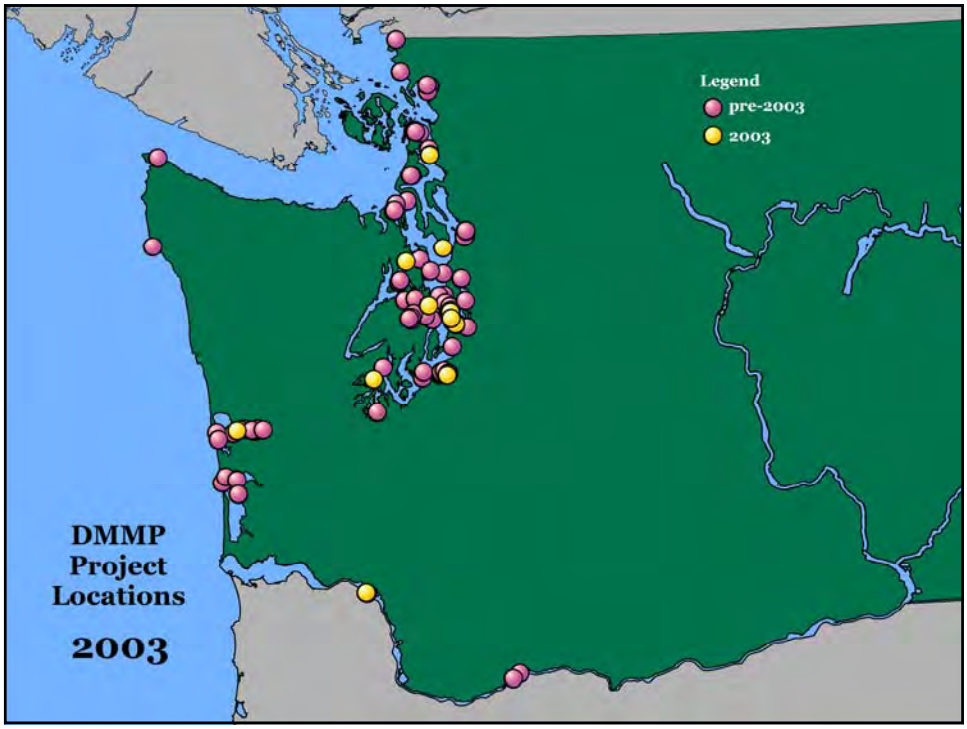
PP8.16


Legend
pre-2001
2001
DMMP
Project
Locations
2001

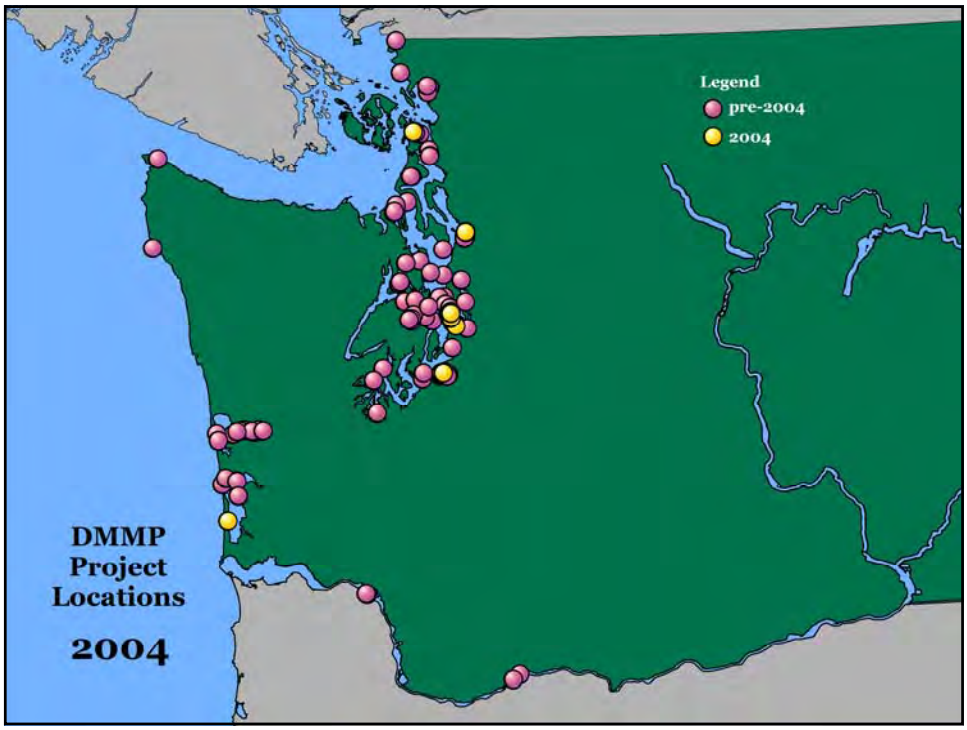
PP8.17


Legend
pre-2002
2002
DMMP
Project
Locations
2002

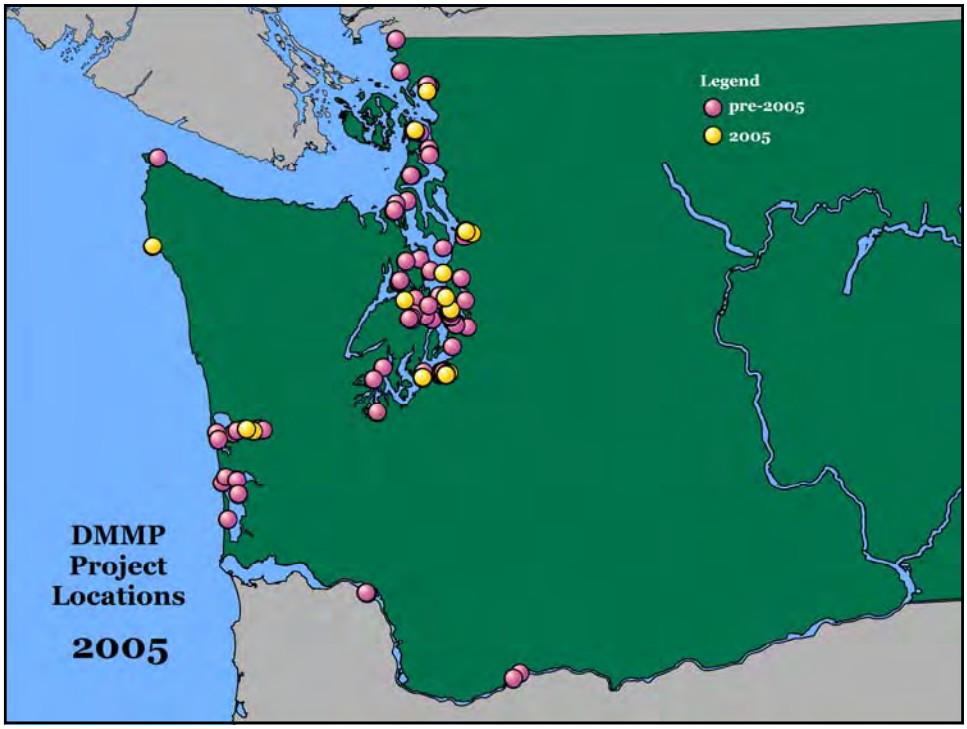
PP8.18


Legend
pre-2003
2003
DMMP
Project
Locations
2003

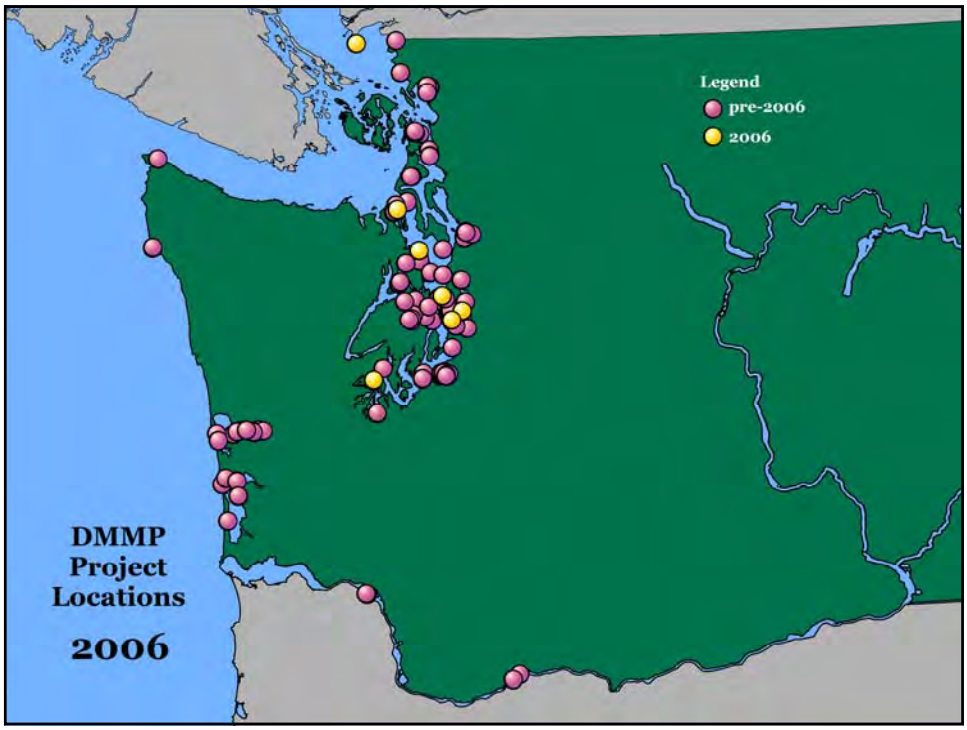
PP8.19


Legend
pre-2004
2004
DMMP
Project
Locations
2004

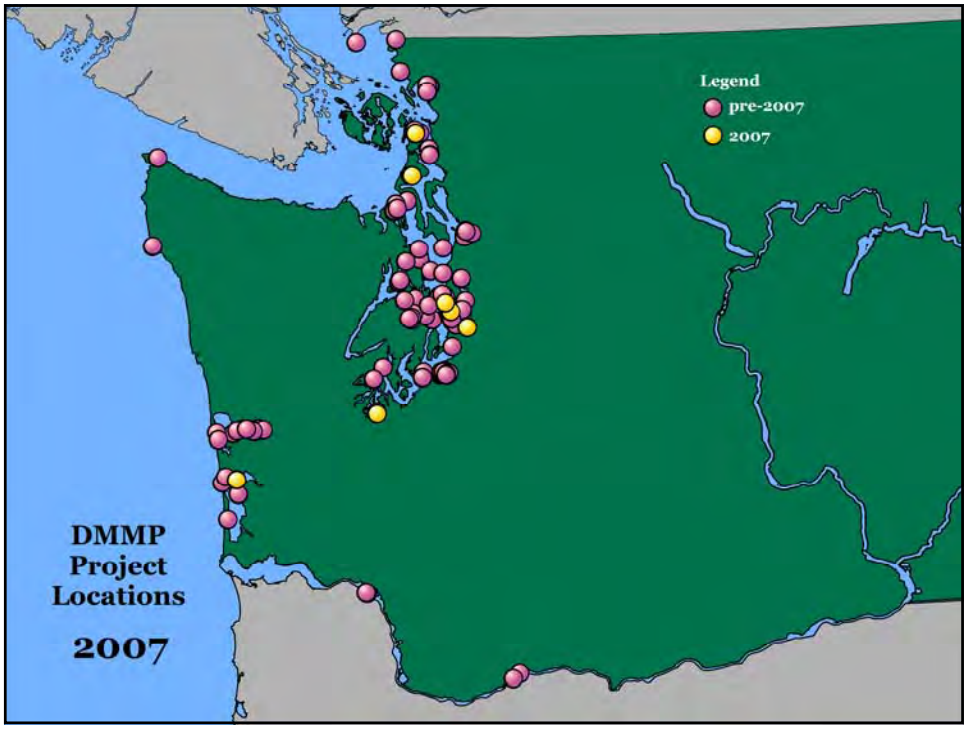
PP8.20


Legend
pre-2005
2005
DMMP
Project
Locations
2005

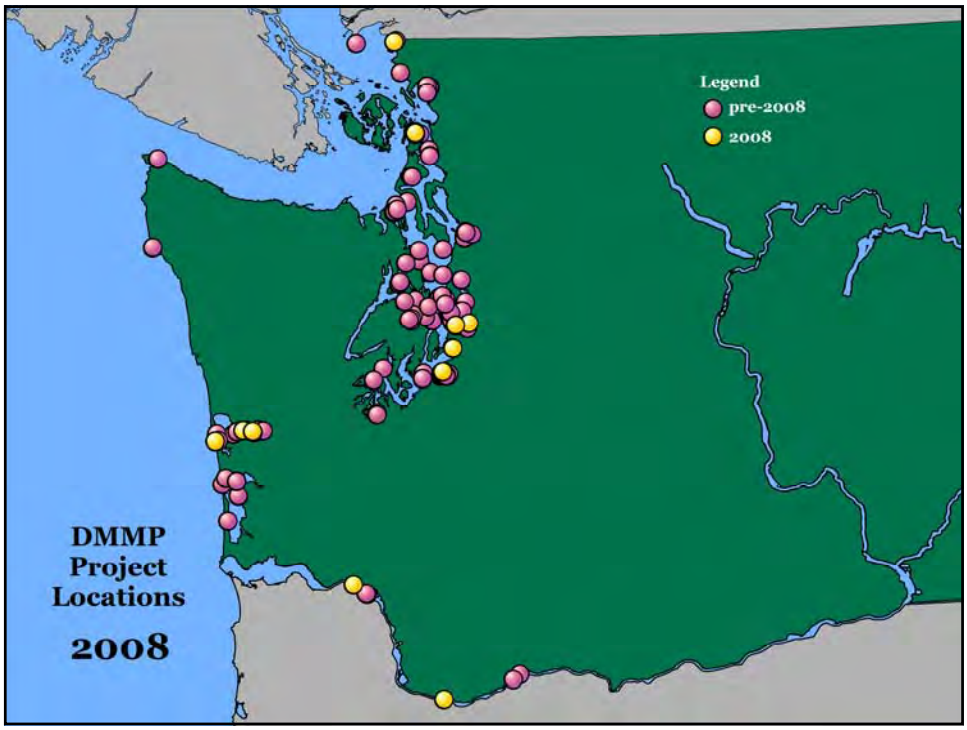
PP8.21


Legend
pre-2006
2006
DMMP
Project
Locations
2006

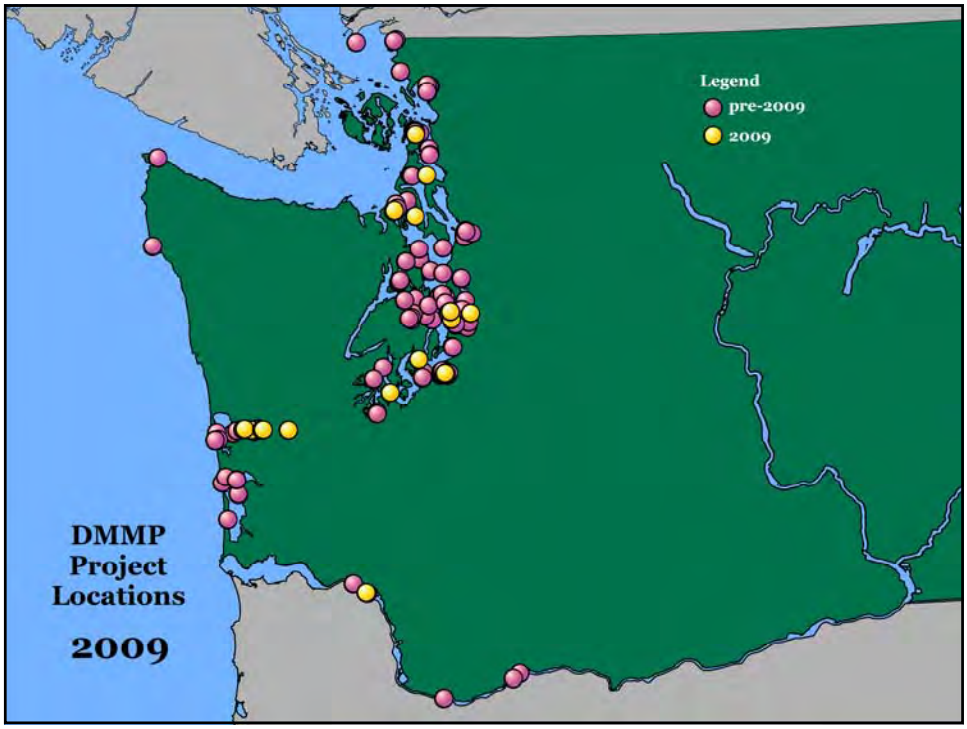
PP8.22


Legend
pre-2007
2007
DMMP
Project
Locations
2007

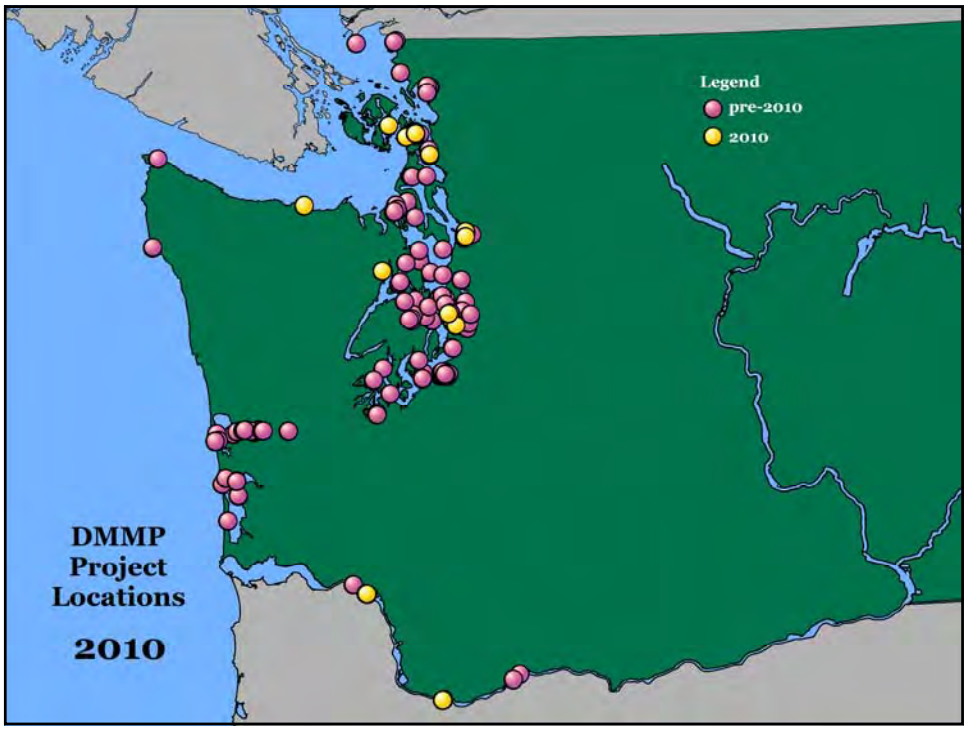
PP8.23


Legend
pre-2008
2008
DMMP
Project
Locations
2008

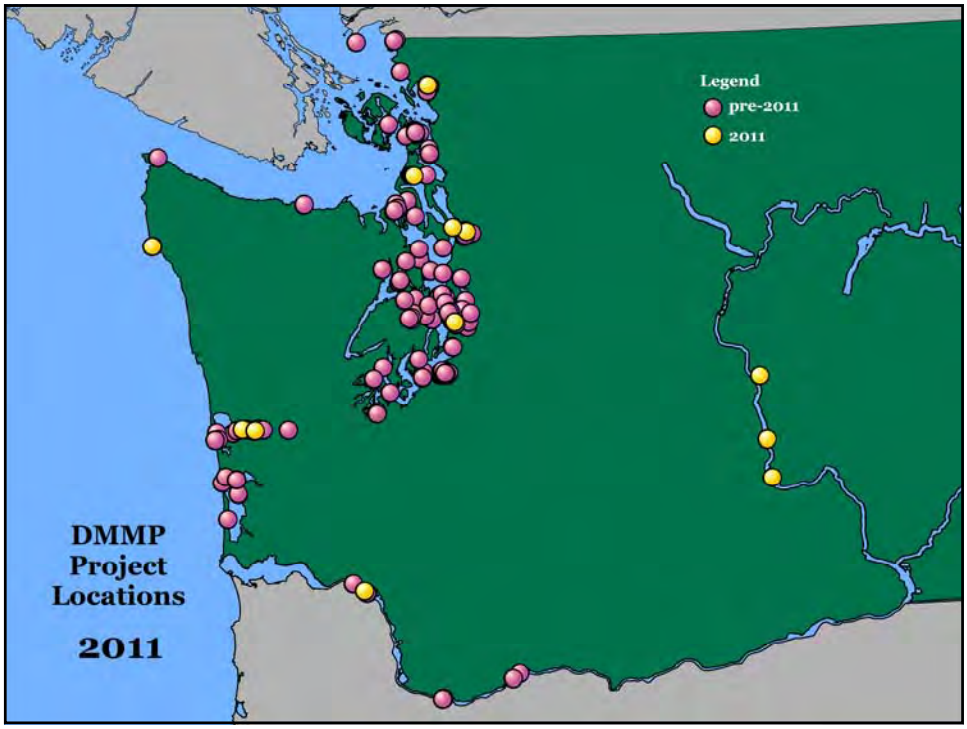
PP8.24


Legend
pre-2009
2009
DMMP
Project
Locations
2009

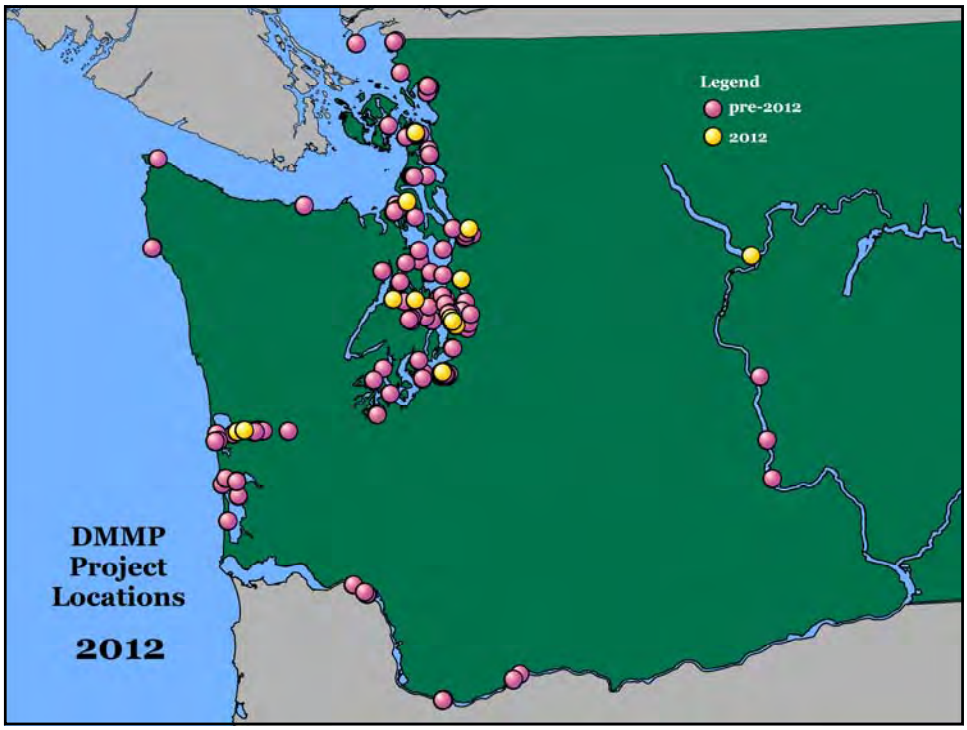
PP8.25


Legend
pre-2010
2010
DMMP
Project
Locations
2010

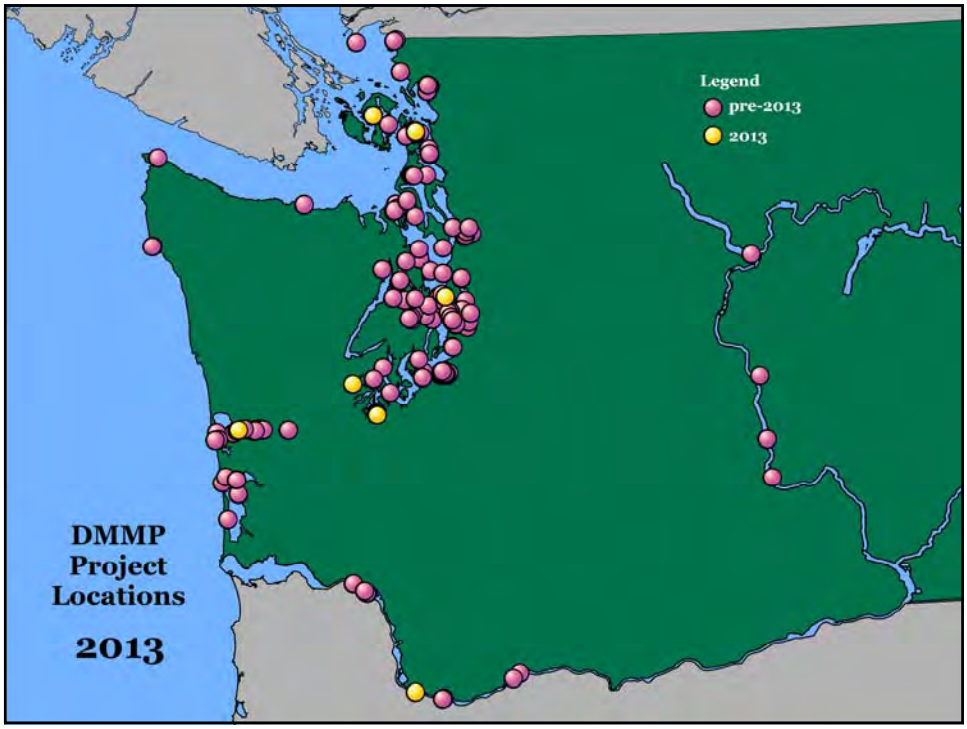
PP8.26


Legend
pre-2011
2011
DMMP
Project
Locations
2011

PP8.27


Legend
pre-2012
2012
DMMP
Project
Locations
2012

PP8.28

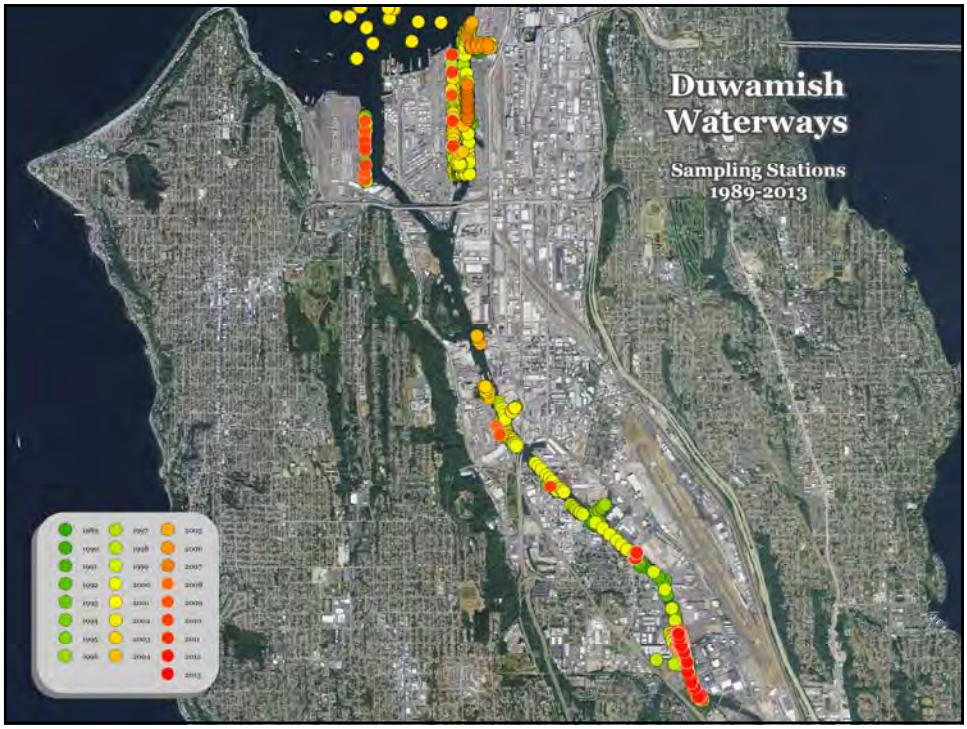


PP8.29

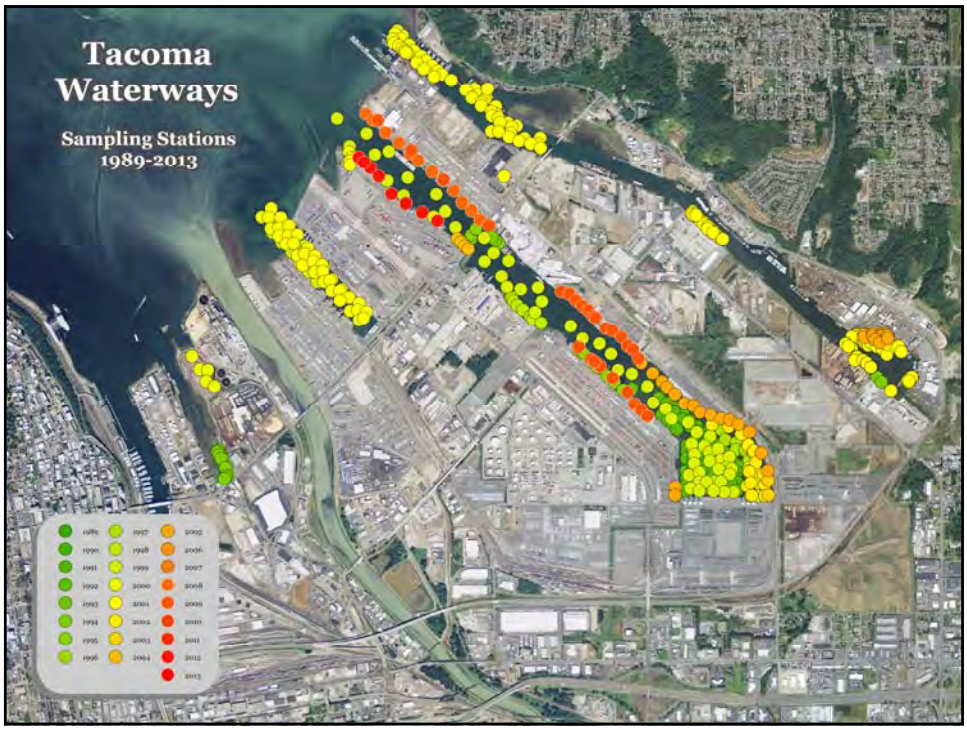
Frequently Sampled Areas

- Duwamish River and Waterways
- Tacoma Waterways
- Everett
- Bellingham
- Anacortes
- Swinomish Channel
- Grays Harbor

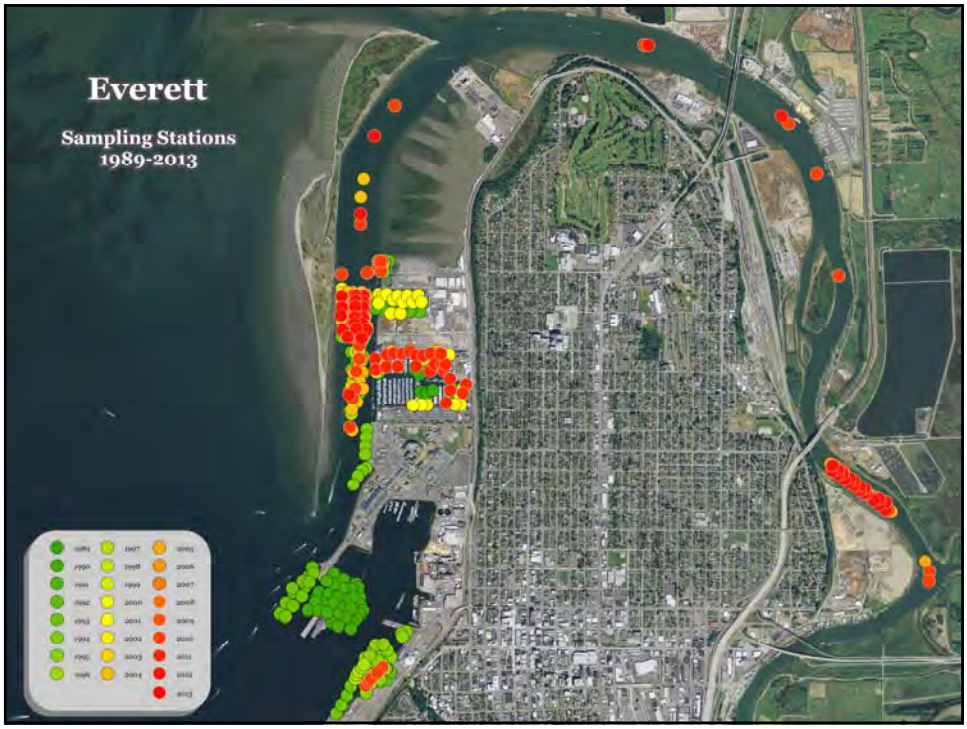
PP8.30


Duwamish
Waterways
Sampling Stations
1989-2013

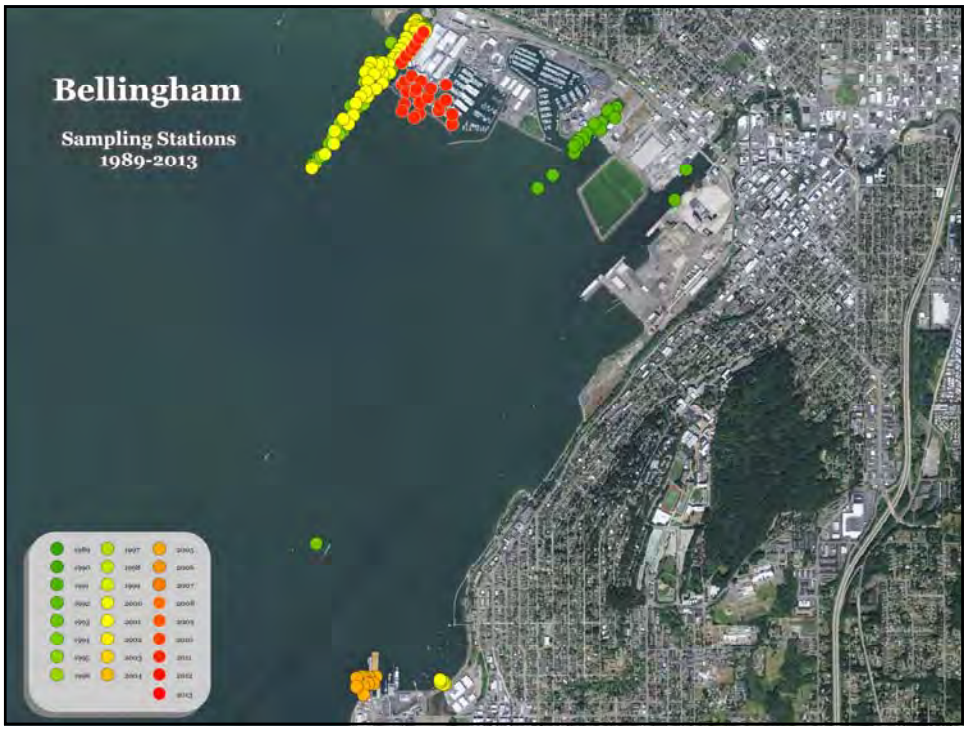
PP8.31


Tacoma
Waterways
Sampling Stations
1989-2013

PP8.32


Everett
Sampling Stations
1989-2013

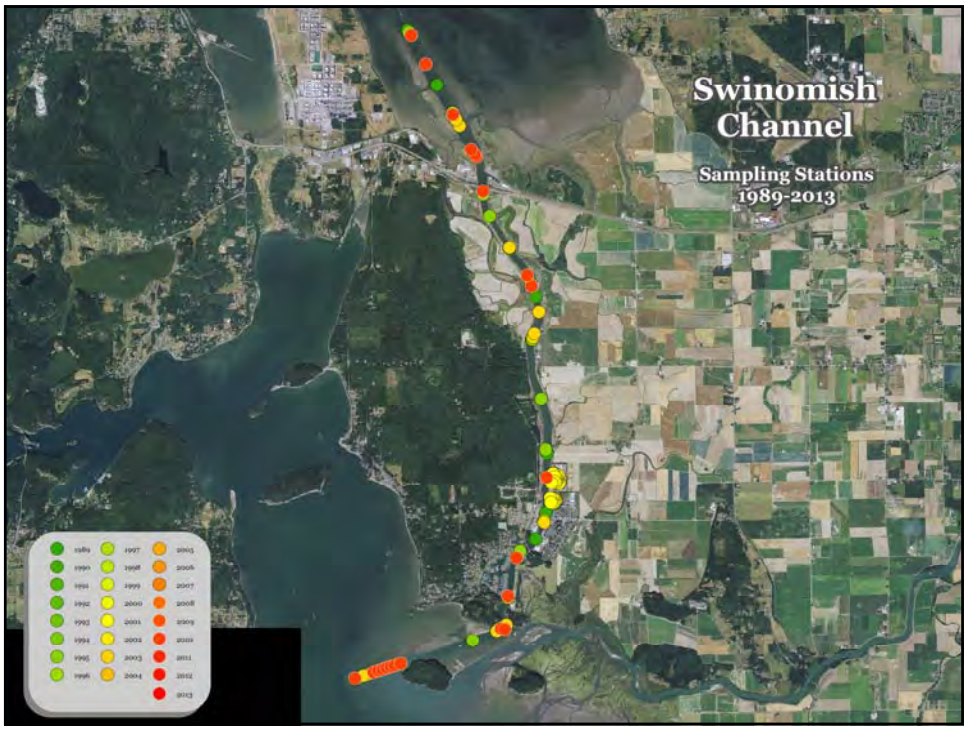
PP8.33


Bellingham
Sampling Stations
1989-2013

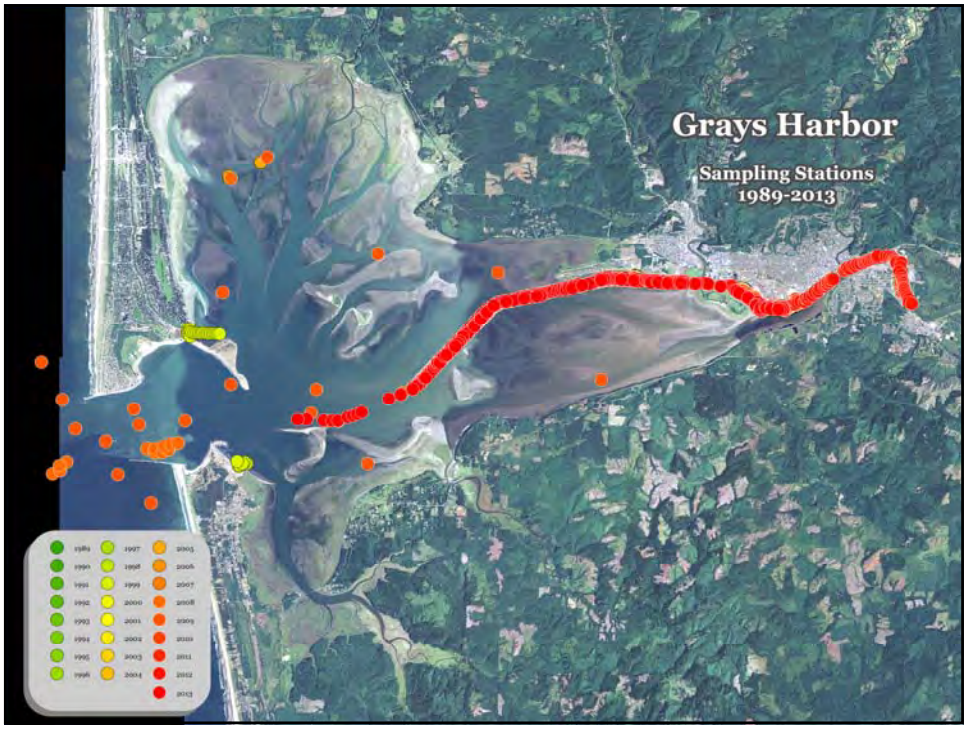
PP8.34

Anacortes
Sampling Stations
1989-2013

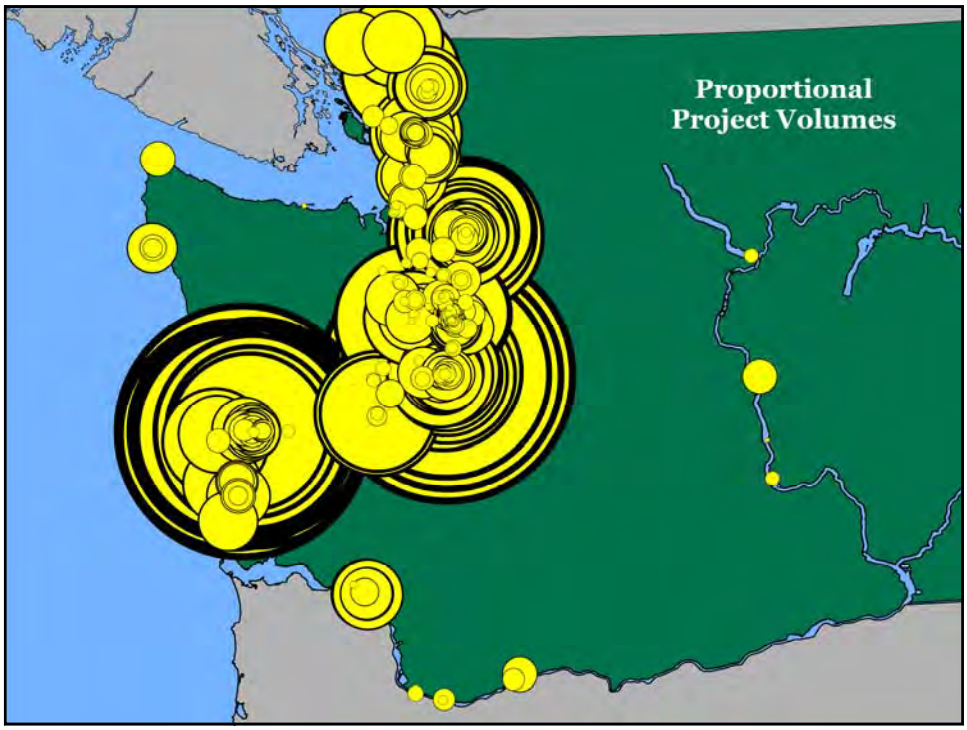
PP8..35


Swinomish
Channel
Sampling Stations
1989-2013

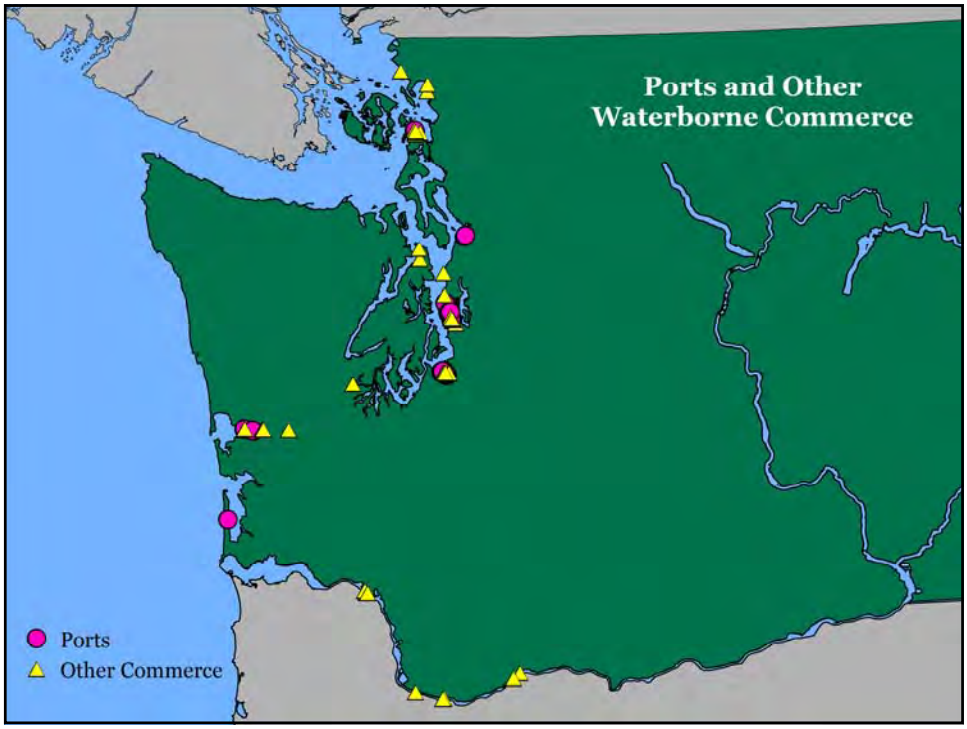
PP8.36


Grays Harbor
Sampling Stations
1989-2013

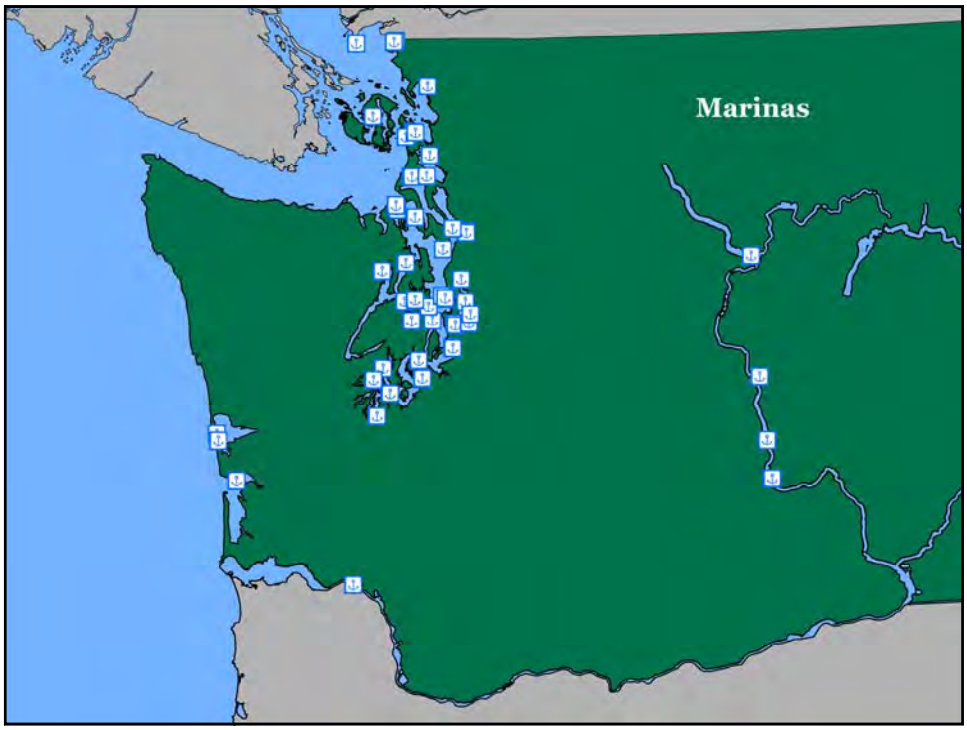
PP8.37


Proportional
Project Volumes

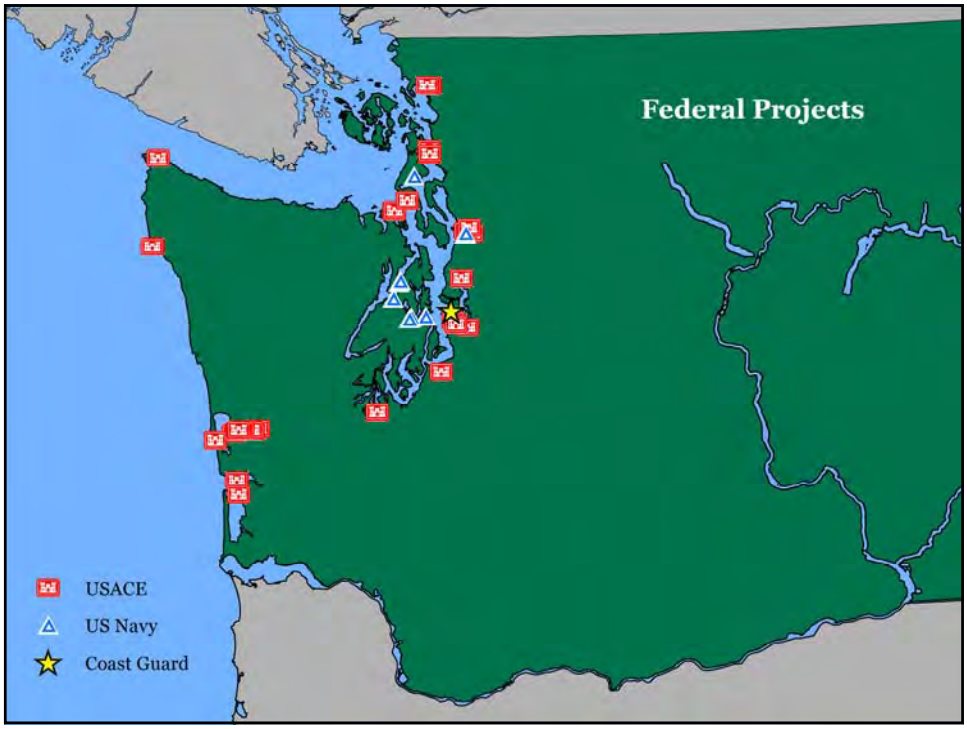
PP8.38


Ports and Other
Waterborne Commerce
Ports
Other Commerce

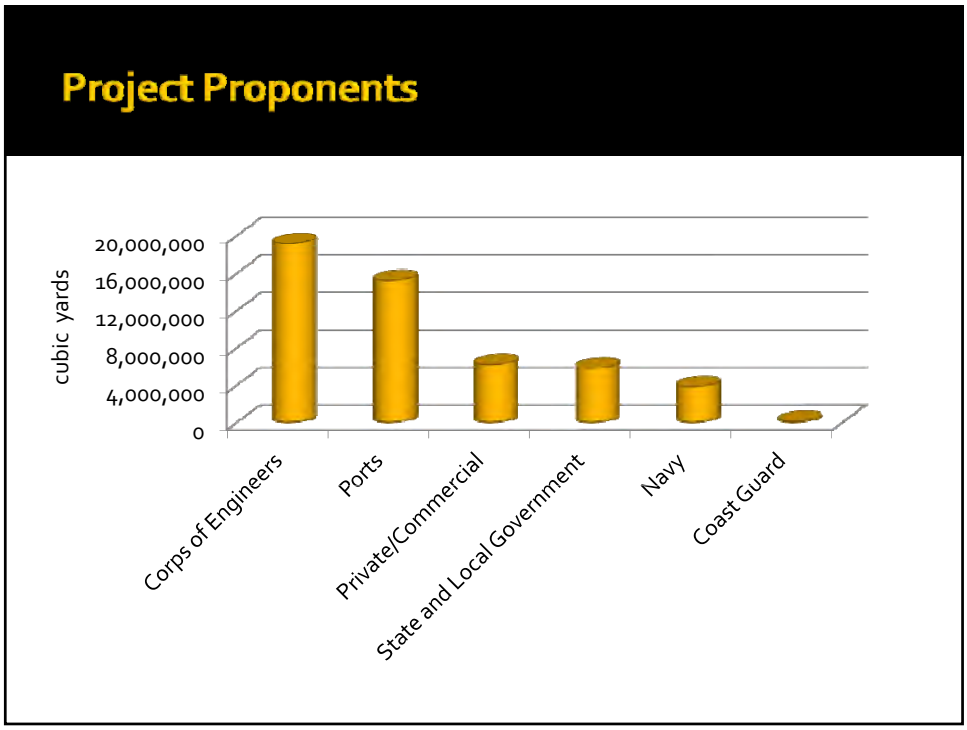
PP8.39


Marinas

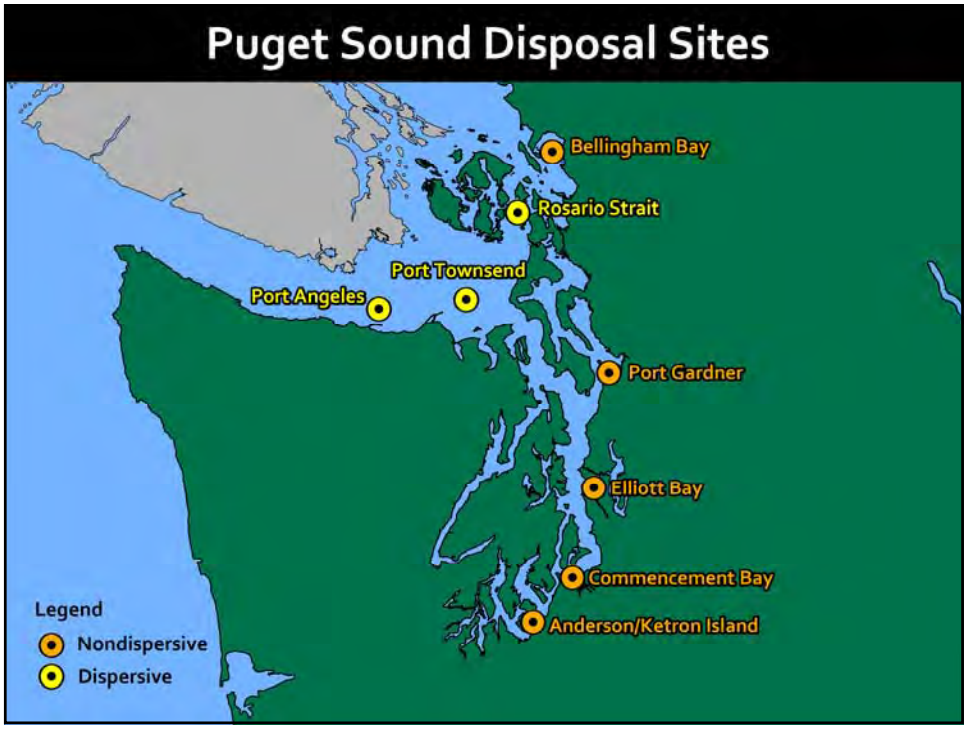
PP8.40


Federal Projects
USACE
US Navy
Coast Guard

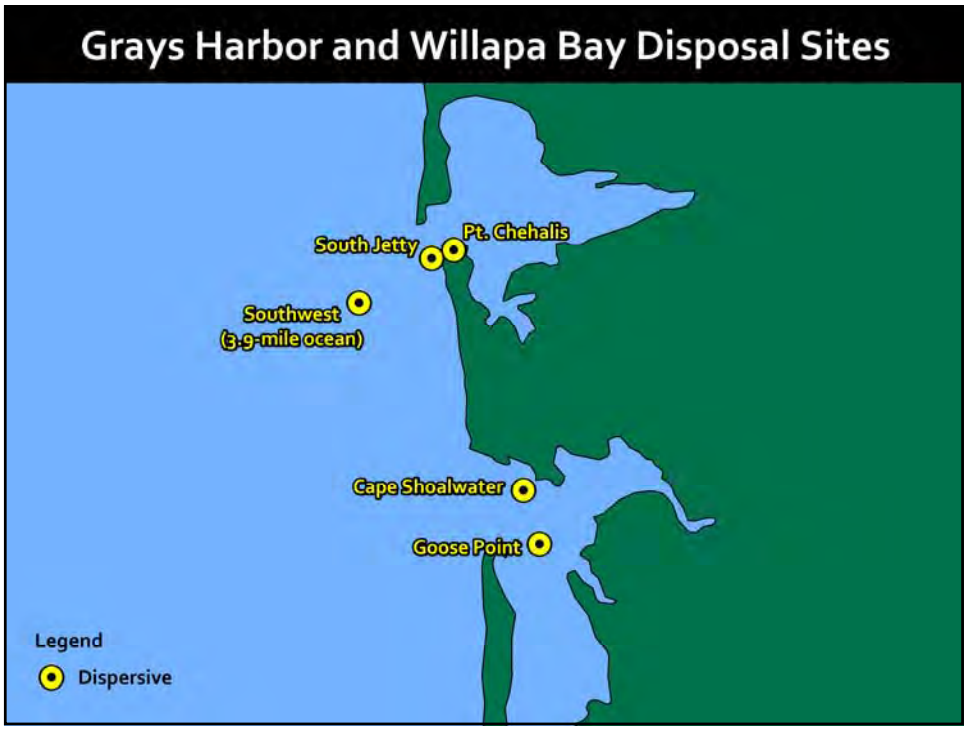
PP8.41


Project Proponents
cubic yards
20,000,000
16,000,000
12,000,000
8,000,000
4,000,000
0
Corps of Engineers
Ports
Private/Commercial
State and Local Government
Navy
Coast Guard

PP8.42


Puget Sound Disposal Sites
Bellingham Bay
Rosario Strait
Port Townsend
Port Angeles
Port Gardner
Elliott Bay
Commencement Bay
Anderson/Ketron Island
Legend
Nondispersive
Dispersive

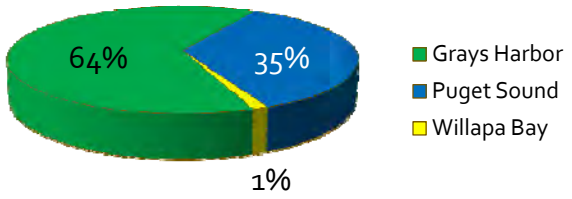
PP8.43


Grays Harbor and Willapa Bay Disposal Sites
South Jetty
Pt. Chehalis
Southwest
(3.9-mile ocean)
Cape Shoalwater
Goose Point
Legend
Dispersive

PP8.44

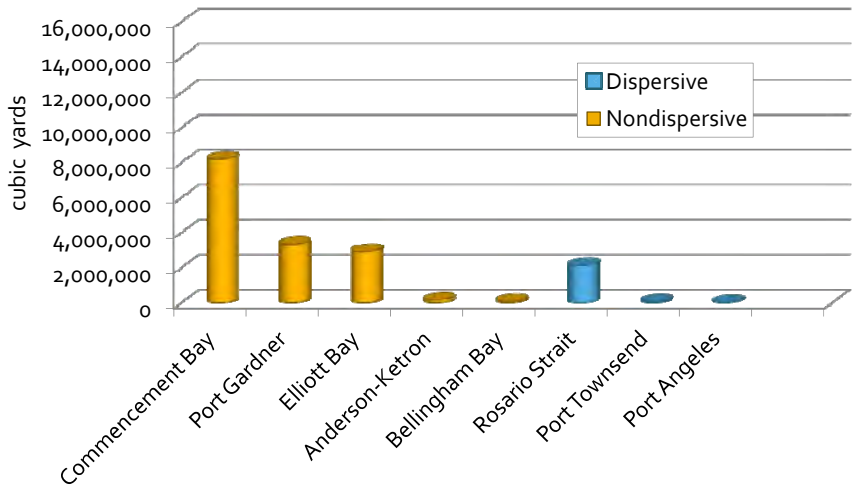
Disposal Summary

- Puget Sound sites = 16.9 million cy
- Grays Harbor sites = 30.5 million cy
- Willapa Bay sites = 0.6 million cy

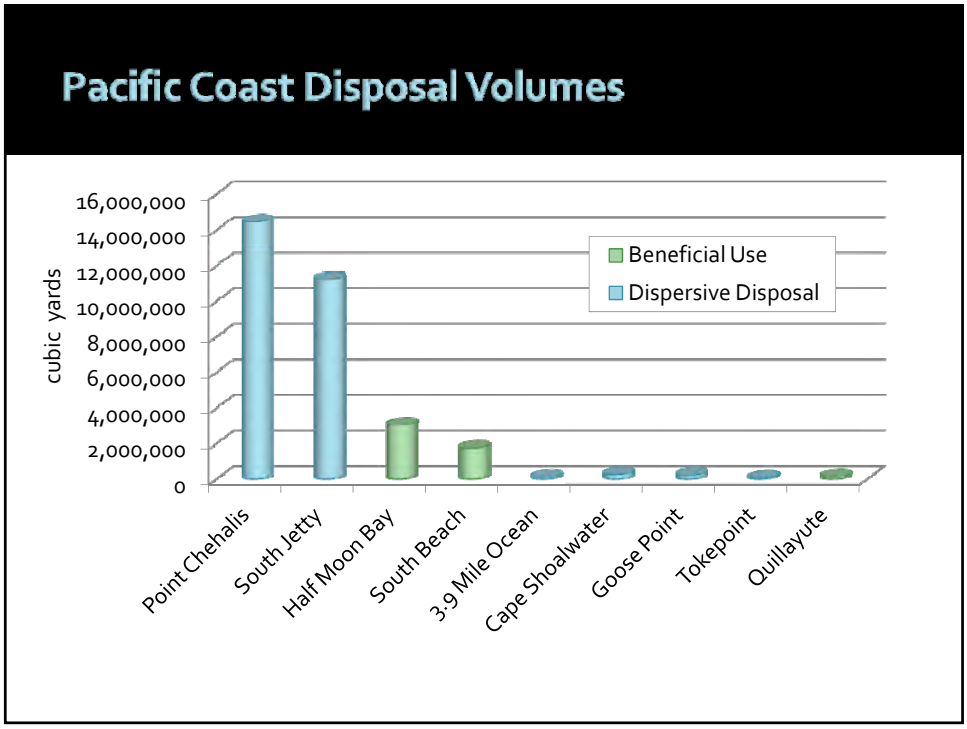


PP8.45

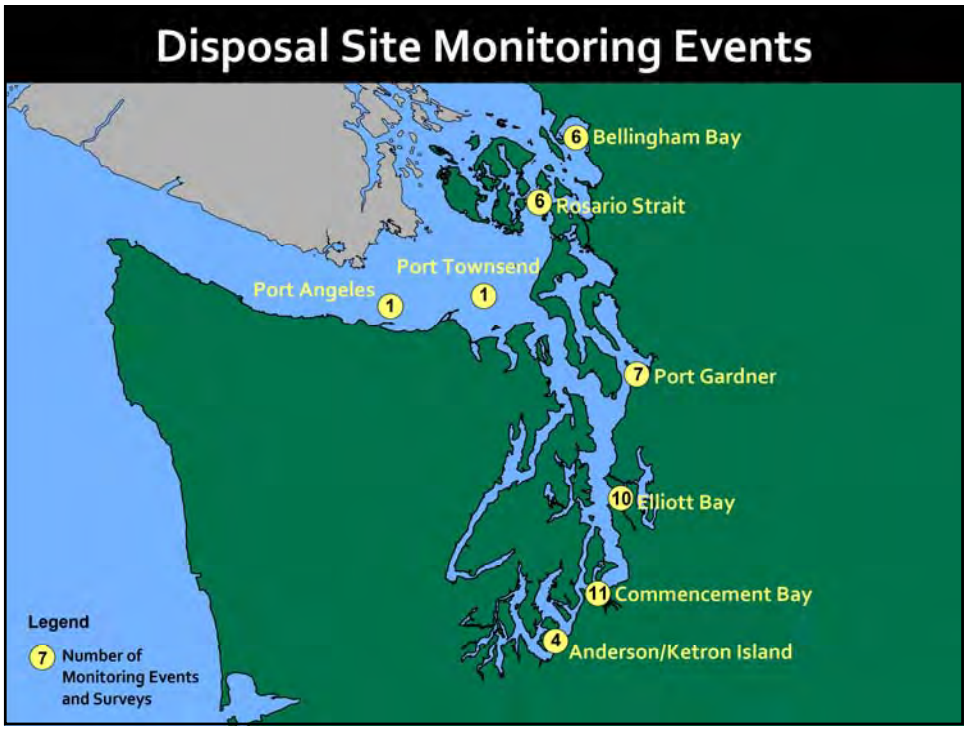
Puget Sound Disposal Volumes



PP8.46


Pacific Coast Disposal Volumes
cubic yards
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Beneficial Use
Dispersive Disposal
Point Chehalis
South Jetty
Half Moon Bay
South Beach
3.9 Mile Ocean
Cape Shoalwater
Goose Point
Tokepoint
Quillayute

PP8.47


Disposal Site Monitoring Events
6 Bellingham Bay
6 Rosario Strait
Port Townsend
1
Port Angeles
1
7 Port Gardner
10 Elliott Bay
11 Commencement Bay
4 Anderson/Ketron Island
Legend
7 Number of Monitoring Events and Surveys

PP8.48

Disposal Site Management Objectives Achieved?

(Revelas, Kendall and Barton – 2012 PIANC presentation)

		Dredging Year														
		1990	1992	1993	1994	1995	1996	2000	2001	2002	2003	2004	2005	2006	2007	2010
1) SPI Mapping	CB					YES	YES		NO		NO	NO	NO		YES	
	EB		YES					YES		YES						
	PG	NO			YES									YES		YES
	BB			YES												
	AK												YES			
1) Perimeter Chemistry	CB					NO	YES		YES		NO	YES	YES		YES	
	EB		NO					YES		YES						
	PG	YES			NO									YES		YES
	BB			YES												
	AK												YES			
2) Onsite Sediment Chemistry	CB					YES	YES		YES		YES	YES	NA		YES	
	EB		YES					YES		YES			YES			
	PG	YES			YES									YES		YES
	BB			YES												
	AK															
2) Onsite Bioassays	CB					YES	YES		YES		YES	YES	NA		YES	
	EB		YES					YES		YES						
	PG	YES			YES									YES		YES
	BB			YES												
	AK												YES			
3) Offsite Tissue Chemistry	CB					YES	NA		YES		YES	NA	NA		YES	
	EB		NA					NA		YES						
	PG	YES			NA									YES		NA
	BB			NA												
	AK												YES			
3) Offsite Benthic Infauna	CB					YES	NA		YES		YES	NA	NA		YES	
	EB		YES					NA		YES						
	PG	YES			NA									YES		NA
	BB			NA												
	AK												YES			

YES = Management Goal Achieved; NO = Additional Evaluation; YES = Change Not Due to Disposal; NO = Management Change Implemented

PP8.49

Beneficial-Use Projects

- Habitat Development
  - Jetty Island - Everett
  - Squalicum Harbor habitat bench - Bellingham
- Capping
  - Denny Way outfall
  - Pier 53 - Seattle
  - Pier 64 - Seattle
  - Pacific Sound Resources Superfund– Elliott Bay
  - Eagle Harbor Superfund

PP8.50

Major developments

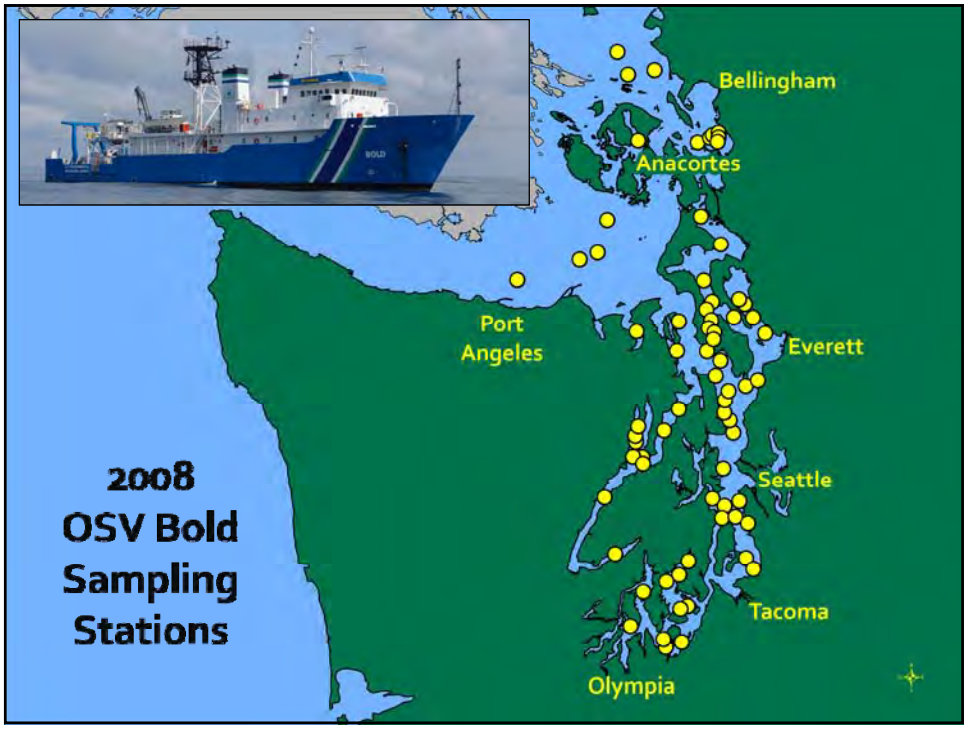
- Dredged Analysis Information System – 1990
- Neanthes chronic sublethal bioassay – 1992
- Refinements of PSDDA bioassays - 1993
- TBT guidelines – 1996, 1998
- Statistics guidelines and BioStat software – 1996, 1998
- Revisions to screening and maximum levels – 1998

PP8.51

Major developments

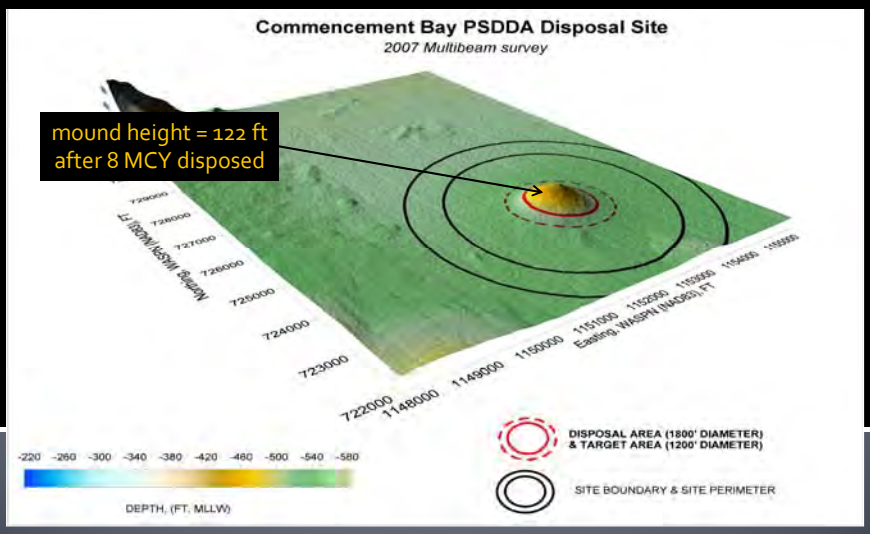
- Revisions to list of bioaccumulative chemicals of concern – 1998, 2003, 2007, 2009
- OSV Bold survey – dioxin background – 2008
- Dioxin guidelines - 2010
- Commencement Bay SEIS – 2010
- Fate and transport study – 2012
- Survey of larval rockfish at Puget Sound disposal sites - 2012

PP8.52



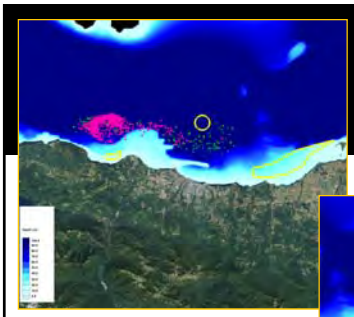
PP8.53

The 2010 Commencement Bay SEIS established a new volume ceiling of 23 MCY and shifts the disposal coordinates over time to flatten the disposal mound.

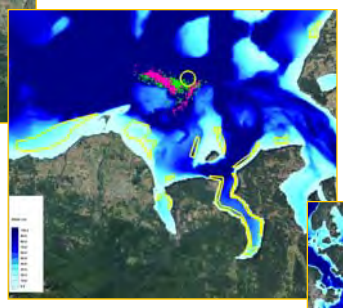


PP8.54

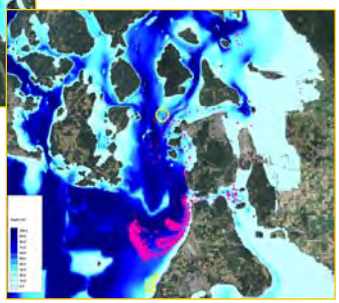
Dispersive Site Fate and Transport Study



Port Angeles



Port Townsend



Rosario Strait

PP8.55

Puget Sound Sediment Reference Material

PP8.56

Collaboration

- Regional Sediment Evaluation Team (RSET) – Sediment Evaluation Framework
- NOAA – rockfish BiOp and survey
- Puget Sound Partnership, Tribes, Ports, Environmental groups, Consultants – dioxin guidelines
- Analytical and bioassay labs – protocol development, workshops, Puget Sound Reference Material round robin
- MTCA and CERCLA – woodwaste areas and cleanup projects

PP8.57

PP8.58

Puget Sound Dredged Disposal Analysis (PSDDA) Study and Background Summary

May 1, 2013

Frank Urabeck, Retired
PSDDA Study Director
Seattle District

United States Environmental Protection Agency

Department of Ecology State of Washington

Washington State Department of Natural Resources

PP9.1

PSDDA Study Goal

"Publically acceptable guidelines governing the environmentally safe unconfined, open-water disposal of dredged material,

thereby, improving consistency and predictability in the decision-making process"

United States Environmental Protection Agency

Department of Ecology State of Washington

Washington State Department of Natural Resources

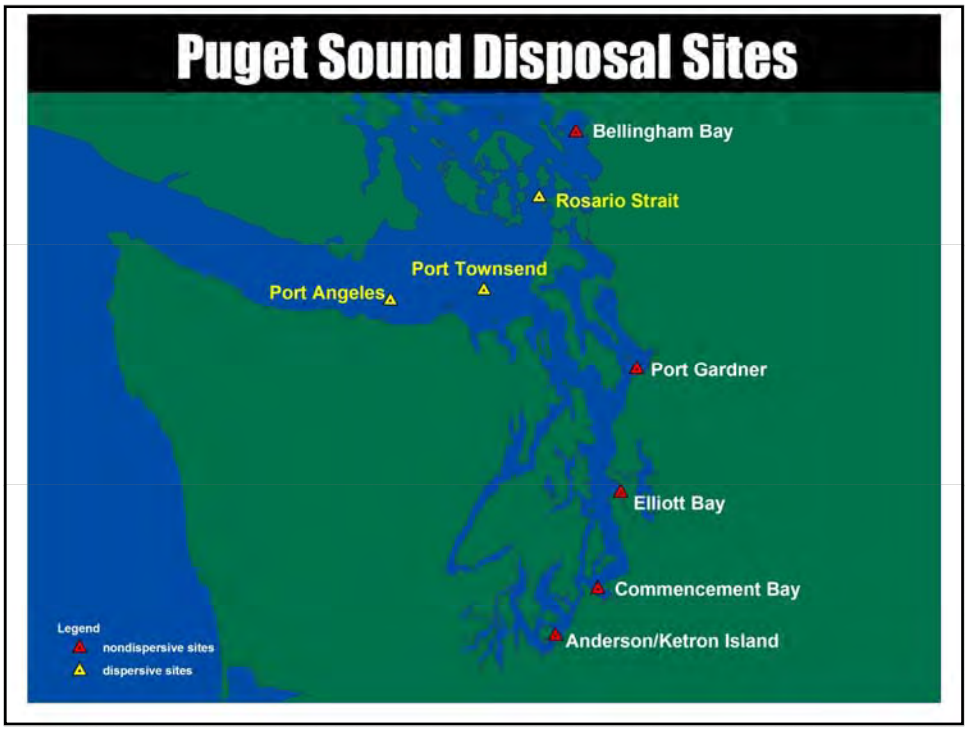
PP9.2

PSDDA StudyObjectives

- Identify acceptable public multi-user unconfined-open-water disposal sites
- Define consistent and objective evaluation procedures for evaluating dredged material to be placed at those sites
- Formulate Site Use Management Plans for monitoring sites that will ensure adequate site use controls and program accountability

EPA United States Environmental Protection Agency
DEPARTMENT OF ECOLOGY State of Washington
WASHINGTON STATE DEPARTMENT OF Natural Resources

PP9.3



PP9.4

Key Organizational Elements

Study Director:

- Frank Urabeck (Seattle District)
- Justine (Smith)Barton (Assistant to Study Director, Seattle District)

Policy Review Committee:

- Colonel Philip Hall, Chairman (District Engineer/Seattle District)
- Christine Gregoire (Director, Department of Ecology)
- Brian Boyle (Commissioner of Public Lands, DNR)
- Robie Russell (Regional Administrator, EPA, Region 10)

PP9.5

Key Organizational Elements (cont.)

Technical Steering Committee:

- Dwain Hogan, Chair (Seattle District)
- Greg Sorlie (Department of Ecology)
- John DeMeyer (DNR)
- Ron Lee (EPA, Region 10)

PP9.6

Key Organizational Elements (cont.)

Evaluation Procedures Work Group:

- Keith Phillips, Phase 1 Chair (Seattle District)
  John Wakeman, Phase II Chair (Seattle District)
- Jim Thornton (Department of Ecology)
- Dr. David Jamison (DNR)
- John Malek (EPA, Region 10)

PP9.7

Key Organizational Elements (cont.)

Disposal Site Work Group:

- Dr. David Kendall, Chair (Seattle District)
- Kevin Anderson (Department of Ecology)
- Dr. David Jamison (DNR)
- Carl Kassebaum/John Malek (EPA, Region 10)

PP9.8

Key Organizational Elements (cont.)

Management Plans Work Group:

- Steve Tilley, Chair (DNR)
- Jim Thornton (Department of Ecology)
- Dr. David Jamison (DNR)
- John Malek (EPA, Region 10)

PP9.9

PP9.10

Disposal Site Selection

Nineteen Site Selection factors were applied to identify potential sites with minimum human use and natural resource conflicts by overlaying factors on maps.

- Fish/shellfish habitat & harvest areas
- Wetlands
- Threatened/endangered species
- Cultural sites
- Aquaculture sites
- Recreational uses
- Navigation
- Current patterns
- Pollution sources
- Bathymetry and substrate
- Water resources

Areas meeting these constraints were carried forward in EIS as alternatives after appropriate studies were completed to assess available resources and possible sites.

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PP10.1

Additional Criteria applied

Non-dispersive

- Areas with peak 1% bottom current speeds less than 25 cm/second
- In water depths between 120 and 600 feet
- Greater than 2500 feet from biological resources
- Greater than 2500 feet from shoreline

Dispersive

- Areas with average current speed greater than 25 cm/second
- Deeper than 180 feet
- Minimum of 1 nautical mile from shorelines and human use areas

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PP10.2

Proposed Disposal Sites

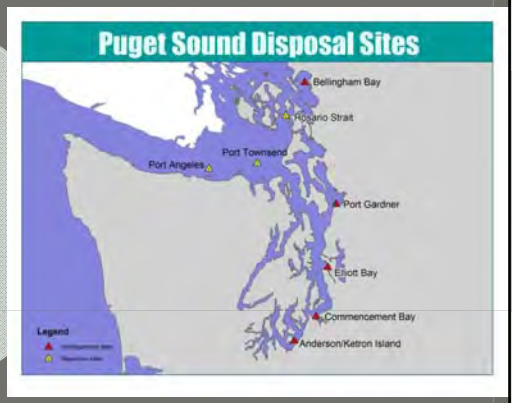
Areas meeting these constraints were carried forward in EIS as alternatives after appropriate studies were completed to assess available resources and possible sites.

PP10.3

Selected Disposal Sites

Puget Sound:

- 8 disposal sites
  - 5 non-dispersive sites
  - 3 dispersive sites



PP10.4