3. EPA Superfund Year-in-Review - Ravi Sanga, EPA

Summary

Ravi Sanga has been a Remedial Project Manager at EPA Region 10 for 14 years. He has worked on sediment sites including the Lower Duwamish Waterway, Harbor Island East Waterway, and Pacific Sound Resources. This presentation highlighted work done on Superfund sites in Puget Sound. Notes are included with slides where applicable, to add important detail.

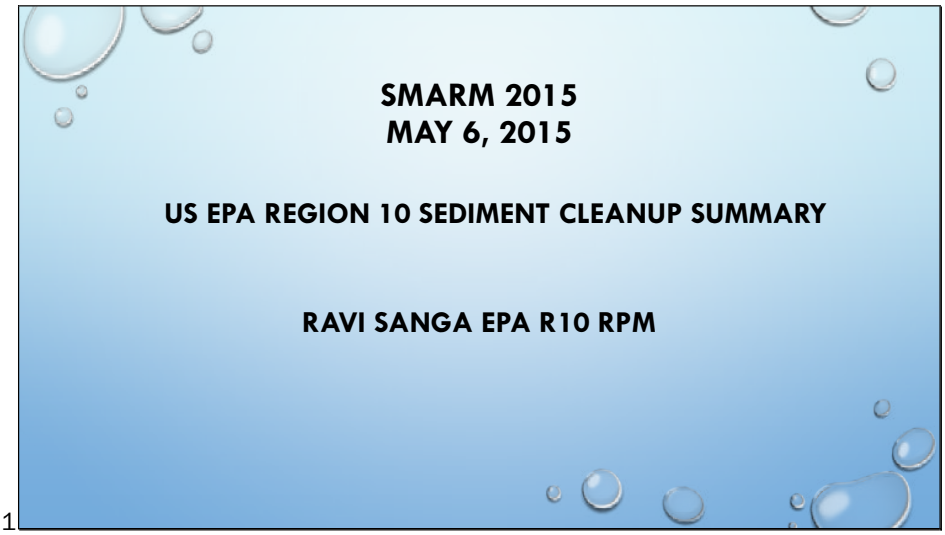
Discussion

Q: Linda Anderson-Carnahan (EPA) – Has the percent PCB loading from air sources been determined for the Lower Duwamish?

A: Ravi Sanga (EPA) – I don't think so.

A: Jim Pendowski (ECY) – I think that Ecology has funded some atmospheric source studies to determine this.

Slides



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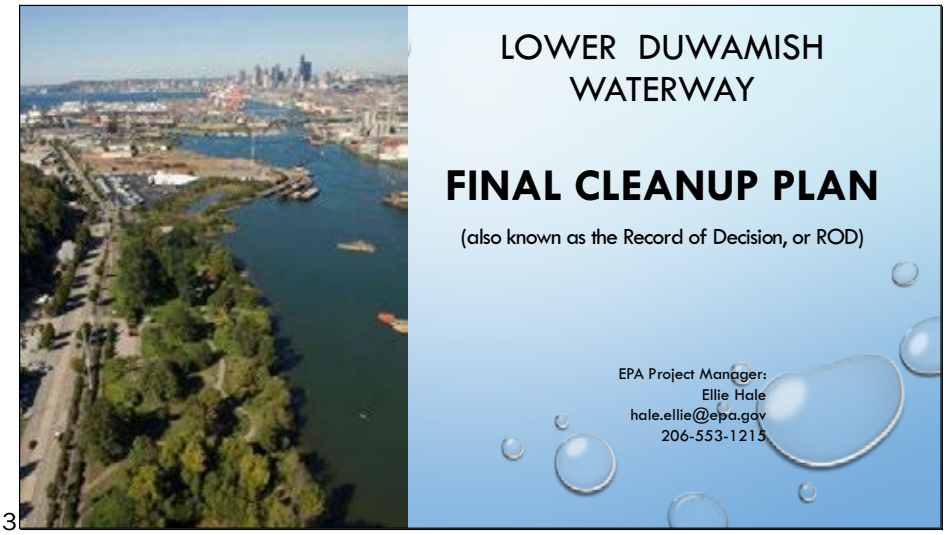
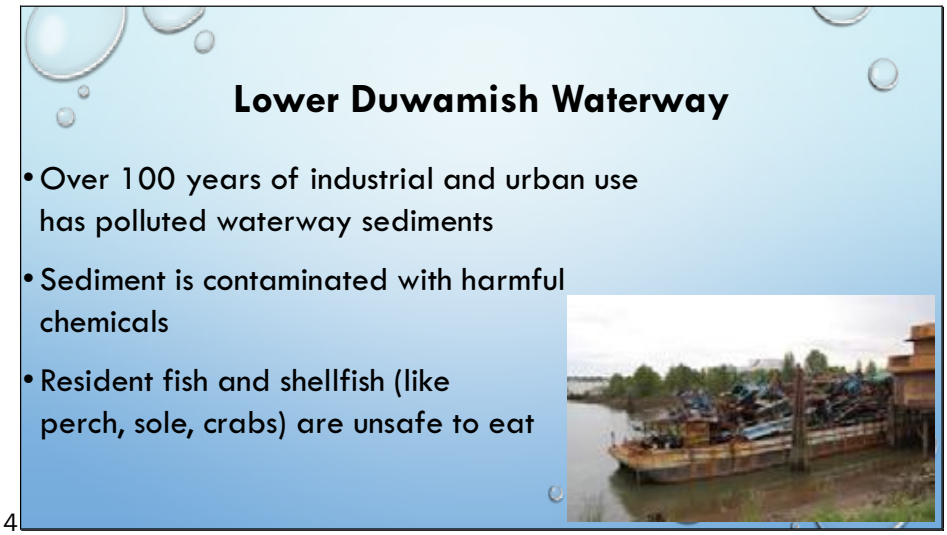


This presentation gives a broad overview of what's in the ROD, signed 11/21/14.

What is the Final Cleanup Plan or the Record of Decision or ROD?

- EPA's decision on how to clean up contamination in the in-waterway portion of the Lower Duwamish Waterway to protect human health and the environment
- Considers the technical information developed during the remedial investigation and feasibility study, and public comments on the Proposed Plan
- Significant milestone in the Superfund process – culmination of the previous 14 years of work
- Allows us to move forward with designing and implementing the remedy

Slide 4



Slide 5

Cleanup Objectives (RAO's)

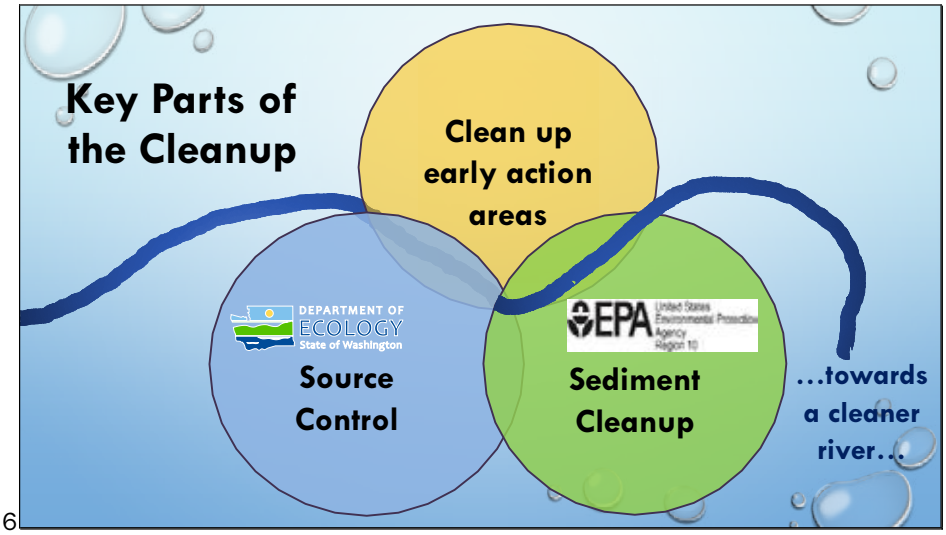
Reduce risks to:

1. People who eat resident fish and shellfish.
2. People coming into contact (skin contact and ingestion) with contaminated sediments.
3. Bottom-dwelling organisms, such as crabs and clams.
4. Fish, birds, and mammals.



Slide 6

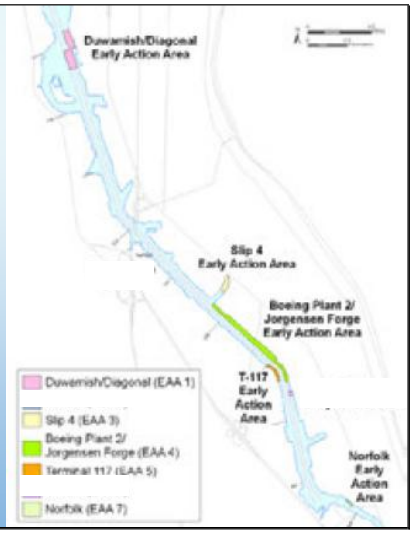
Key Parts of the Cleanup



Slide 7

Clean Up Early Action Areas

- Most completed by 2015
- Address 29 acres of the most contaminated areas in the waterway
- Remove approximately 280,000 cubic yards of contaminated sediments
- Projected to reduce surface sediment PCB concentrations by 50%



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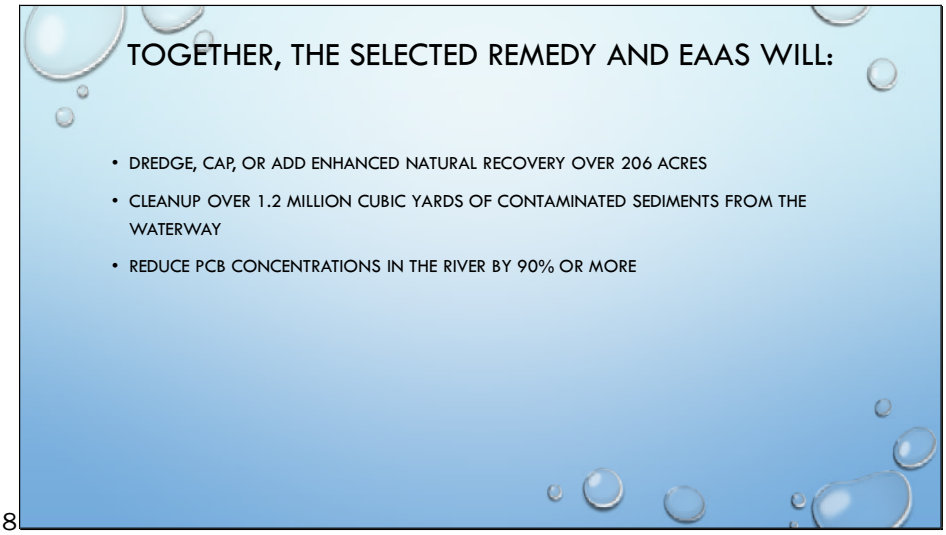

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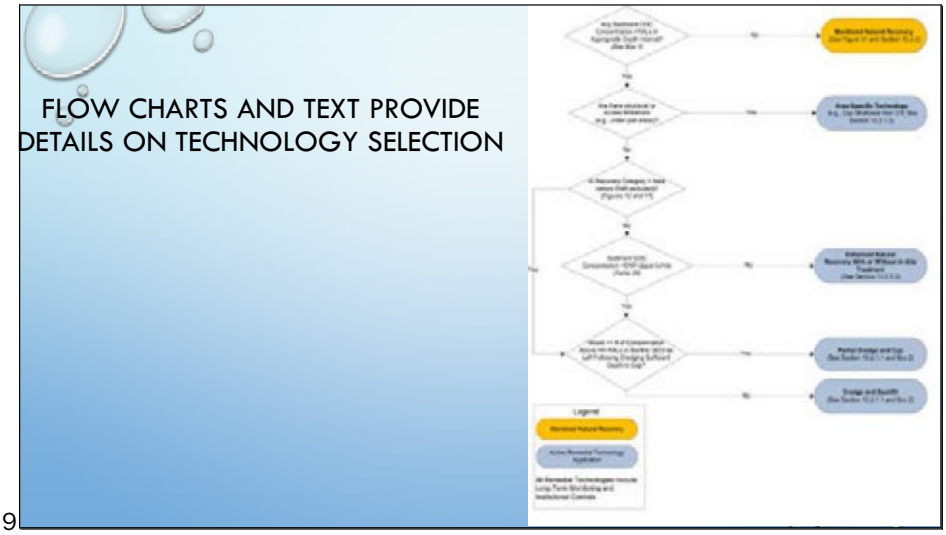
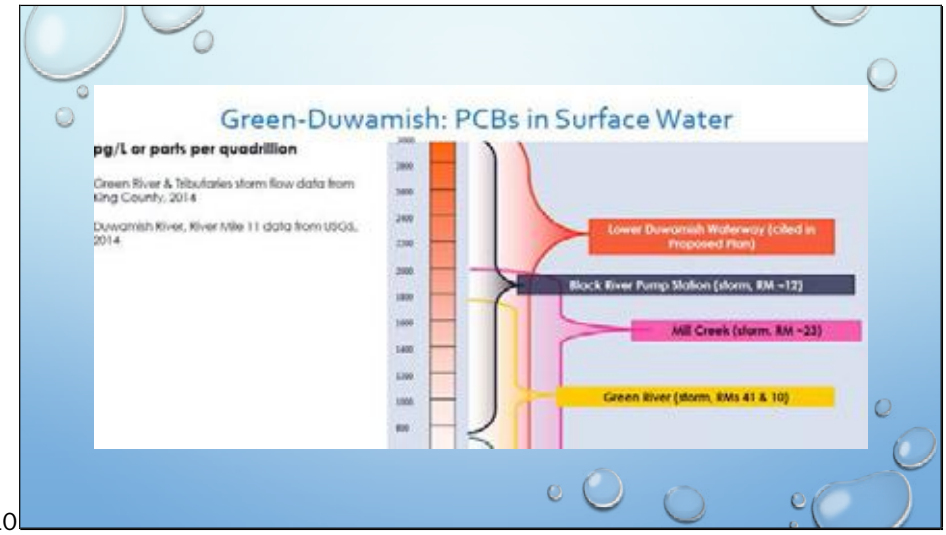


Major Components of the remedy are dredging, capping, ENR and MNR.

- "Monitored natural recovery" relies on the natural flow of sediment form upriver to cover contaminated sediments in the lower water, and includes long term monitoring. We considered this option for the Duwamish because a large amount of cleaner sediment from the Green River Watershed deposits in the Duwamish.
- "Enhanced natural recovery" uses a thin layer of sand to cover the contamination and speed up natural recovery.

Slide 10



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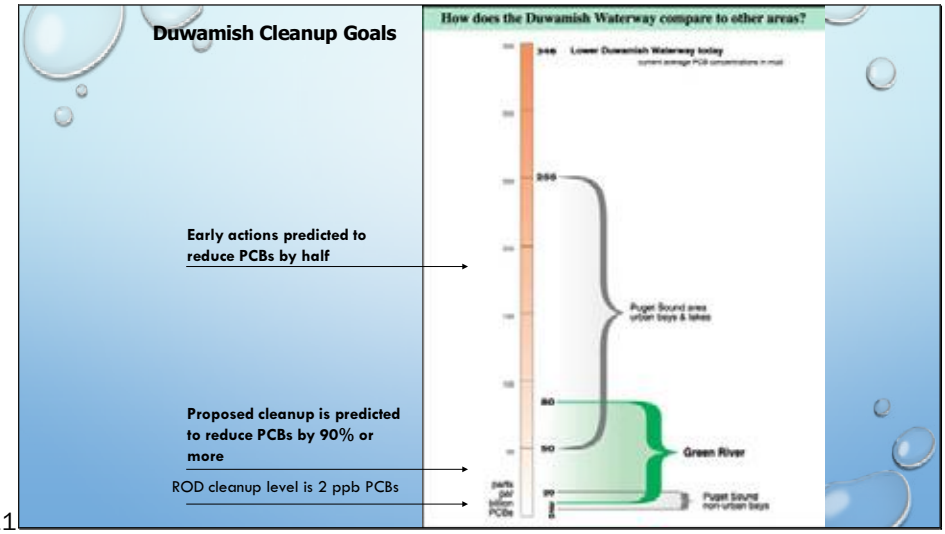
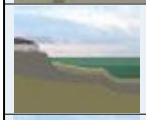
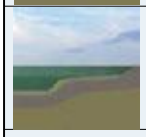


What will we achieve from the cleanup?

- Using PCBs as an example, we estimate the early actions will reduce PCB contamination in surface sediments by 50%.
- The goal of our cleanup plan after the EAA cleanups is to get the Duwamish as clean as non-urban areas in Puget Sound. We honestly don't know if this is achievable. We think our cleanup plan will at least get us 90% there, but there is much uncertainty beyond that 90% mark, because new sediments will continue to deposit from the Duwamish and Green River Watersheds, which cover more than 400 square miles.
- If we were to clean up the entire waterway to the 2 ppb goal – our long-term prediction is that concentrations would then increase over time to somewhere around the 90% mark.
- The increment between the "90% reduction" arrow and the "proposed goal" arrow is where the uncertainty lies.
- This is because at those concentrations the incoming sediments from the Green River will dictate the long-term concentrations in the waterway.
- As noted on this chart, it will take more than just cleaning up the contaminated sediment in the Duwamish to get the sediments clean in the long-term.
- How we use this watershed will have a big impact on the long-term health of the Duwamish.

- Our plan includes long-term monitoring and evaluation and consideration of whether additional work is needed if we don't achieve our goals. In the Agencies' view, the selected remedy provides the best balance of protectiveness, effectiveness and cost.
- Alternatives that remove less contamination – less permanence.
- Alternatives that remove more contamination - increased short-term impacts and cost, without much improvement in permanence.
- Best balance of minimizing short-term risks over a 7 year construction period, while reducing remaining contamination relatively quickly through MNR.
- Takes into consideration multiple future uses of the waterway: industrial/commercial, residential, recreational, and habitat.
- Over 90% reduction in concentrations of human heath contaminants of concern.
- Reach protective levels for wildlife and sediment-dwelling organisms.
- Safe for people coming into contact (skin contact and incidental ingestion).
- Safer for people who eat resident fish and shellfish.

Slide 12

Remedy	Area	Time	Cost	Follow-Up
 ***Dredging***	105 Acres	7 Years	**$342 Million**	
 ***Capping***	24 Acres			
 ***Enhanced Natural Recovery (ENR)***	48 Acres			
 ***Monitored Natural Recovery (MNR)***	235 Acres	10 Years		
	412 Acres	**17 Years**		

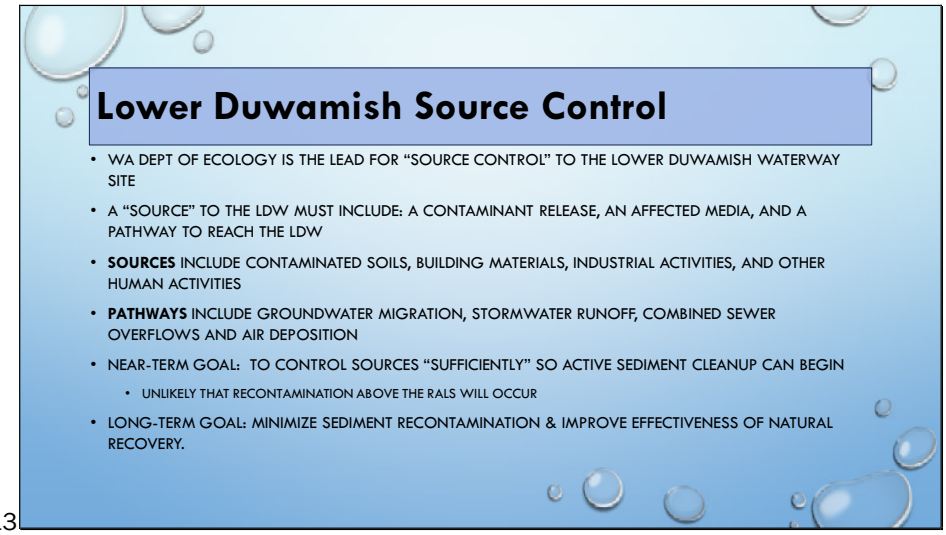
There are a total of 177 acres of *active* cleanup.

Dredge and cap are used in the most contaminated areas and those most susceptible to scour or erosion.

ENR is used in moderately contaminated areas. MNR is used only in areas with low levels of contamination and where potential for recovery is high

Why so much MNR? LDW contamination consists of hot spots with large areas of very low levels of contamination. Hot spots get more aggressive cleanup; lower levels get MNR, in-between get ENR.

Slide 13



Note that Ecology is the lead for source control in the LDW, but not for the neighboring East Waterway and West Waterway sites. Examples of source control components:

- Contaminated site: Historical waste disposal via infiltration (the contaminant release) resulted in contaminated soil and groundwater (the affected media) and the groundwater is seeping into stormwater pipes through cracks (the pipe is the pathway to the LDW).
- Stormwater runoff: Historically allowed PCB-containing building materials, such as caulking and paints, are deteriorating (the contaminant release) and getting picked up in stormwater runoff (the affected media) which is then discharged to the LDW (the stormwater conveyance is the pathway to the LDW).

Source control activities focus on controlling sources and pathways of pollution to the LDW. LDW sediment cleanup will begin after EPA has entered into agreements with one or more parties, baseline and remedial design sampling has occurred, and sources are sufficiently controlled such that it is unlikely that sediments will become recontaminated above the RALs.

Over the long term, source control will help to minimize recontamination of sediments and will improve the effectiveness of natural recovery. Source control actions have already achieved significant reduction in contaminants entering the waterway.

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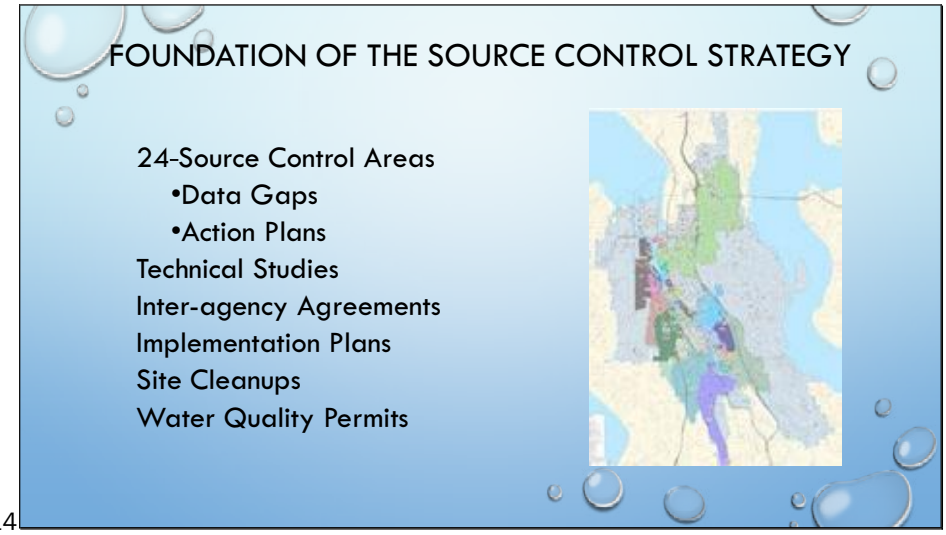

Foundation of the strategy is culmination of over a decade of work:

1. Extensive research in 24 source control areas generated data gaps reports and action plans with high, medium and low prioritized actions for each source control area. Ecology tracks action items in a database.
2. Technical studies and interagency agreements – most completed but some still underway -Examples of Technical Studies: Outfall inventory, SWPPP project, Industrial Facility Sampling, Green River Loading, Air deposition
3. IA's: Interagency agreements betweej TCP & local govts/quasi govts to leverage funds and accomplish timely and informed source control. Substantial amount of source tracing data collected over multiple years.
4. Implementation Plans: Source Control Work Group members are developing Implementation Plans to describe priorities and specific source control actions they will take over the next 5 years (City of Seattle, King County, Ecology, WDOT and EPA)
5. Site Cleanup: Ecology currently has 18 sites under Orders in the LDW (includes Ecology-led RCRA sites). At least fourteen more sites need cleanup orders. Ecology is also performing 195 site hazard assessments to determine if there are additional sites that need to be addressed.
6. Water Quality Permits: There are approximately 110 NPDES permits in the LDW source area (6 different types). CSOs are scheduled for control in accordance with federal Consent Decree requirements. Industrial stormwater is receiving more treatment and the most recent general permit includes additional requirements for data collection and line cleaning. Adaptive management efforts are underway for municipal stormwater. Ecology is also increasing their inspection resources for the Green-Duwamish watershed.

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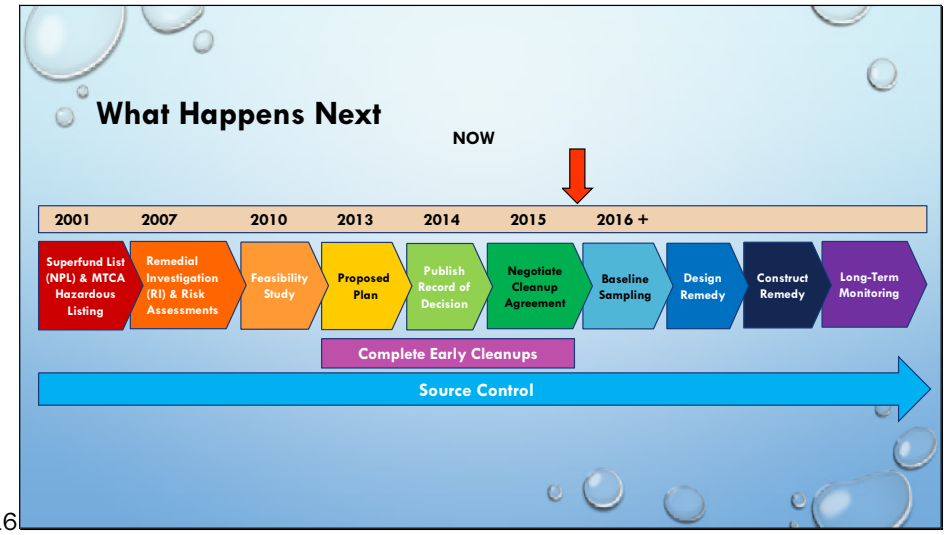

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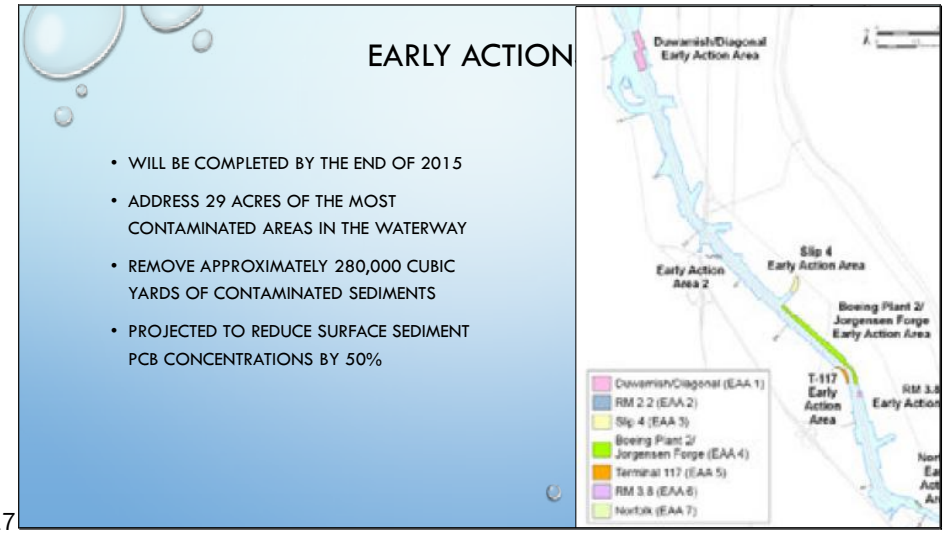

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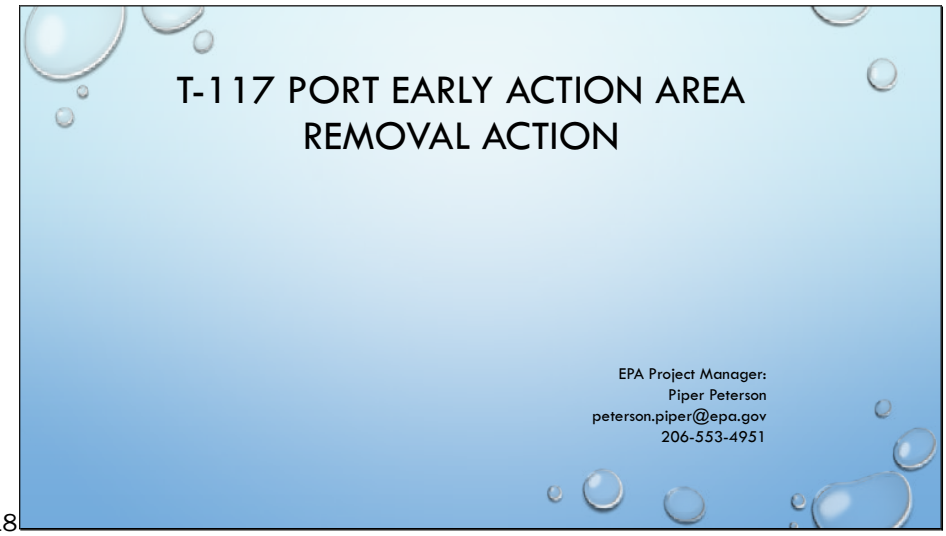

T-117 UPLAND SOILS/BANK REMEDIATION

- CLEANUP BY THE NUMBERS
  - 8,000 TONS OF DEMOLITION DEBRIS
    - 2,500 TONS REUSED/SALVAGED
    - 3,500 RECYCLED
  - REMOVED 57 CREOSOTE-TREATED WOOD PILES
    - REPLACED WITH 4 STEEL PILES AND A POLYETHYLENE DEBRIS DEFLECTOR

T-117 Riverbank Pre-construction

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T-117 UPLAND EXCAVATION

- EXCAVATED 77,000 TONS (48,000 CUBIC YARDS) OF UPLAND SOIL
- ONLY 2 EXCEEDANCES (FOR DIESEL EXHAUST) AMONG ~180 DAYS (SHIFTS) OF AIR, NOISE, LIGHT MONITORING

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T-117 UPLAND EXCAVATION

- PLACED 53,000 TONS (88,000 CY) OF BACKFILL
- 860 FEET RIVER BANK REPLACED

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T-117 SEDIMENT

- 14,000 CY DREDGED SEDIMENTS OVER 64 DAYS OF WORK
- 25,000 TONS OF CLEAN SAND BACKFILL AND ARMOR STONE
- REMOVAL/BACKFILL FROM ADDITIONAL 25 FEET OF ADJACENT RIVER BANK

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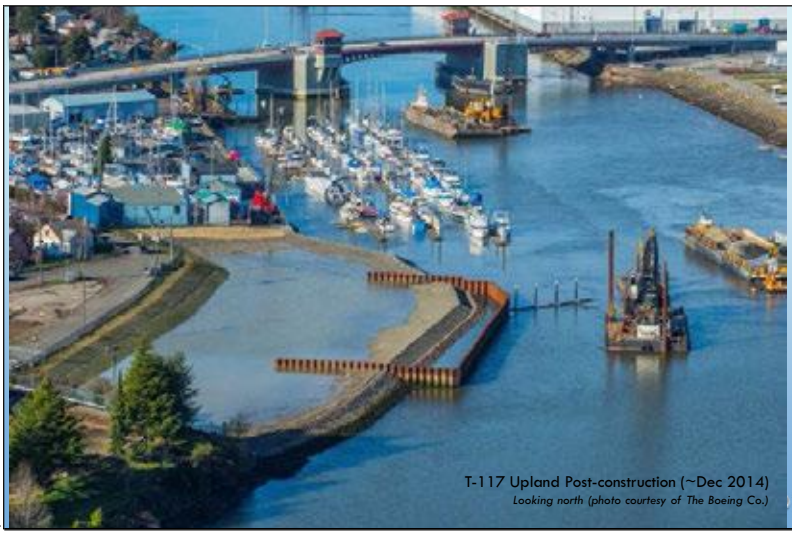

Temporary sheetpile wall will remain in-place until 2016, when habitat restoration is scheduled.

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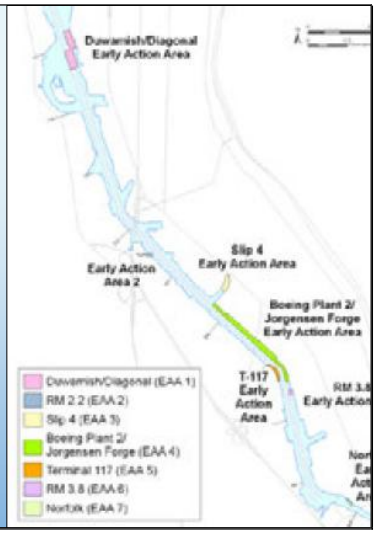
ANOTHER EARLY ACTION
EMJ/JORGENSEN



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EMJ REMOVAL ACTION

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EMJ BACKGROUND

- EAA OF THE LDW- ADJACENT TO BOEING PLANT 2
- PRP-LED NTCRA(STARTED: 2003; EECA 2008-2011; REMOVAL ORDER: 2012)
- METAL FOUNDRY (FORMERLY BETHLEHEM STEEL)
- PRIMARY COCS: CO-LOCATED PCBS AND METALS (AS, CD, CR, CU, PB, HG, AG, ZN)
- SEDIMENT SITE: ~12000 YDS^3 SEDIMENT, 3000 YDS^3 BANK
- UPLANDS IS ECOLOGY MTCA SITE
- "24" PIPE" RUNS ALONG THE NORTHERN PROPERTY LINE WITH BOEING PLANT 2

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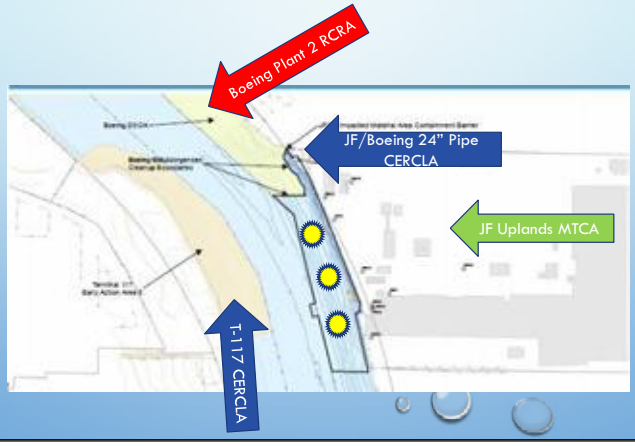
EMJ BACKGROUND



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EPA'S ACTION MEMORANDUM

- * COMPLETE EXCAVATION OF ALL BANK AND SEDIMENTS WITHIN EAA EXCEEDING RVALS;
- * STORMWATER MANAGEMENT;
- * LONG-TERM SEDIMENT AND GROUNDWATER MONITORING.

COC	RvAL (mg/kg)
PCBs	12 ppm OC
Cadmium	5.1
Lead	450
Chromium	390
Mercury	0.41
Silver	6.1
Zinc	410
Arsenic	51

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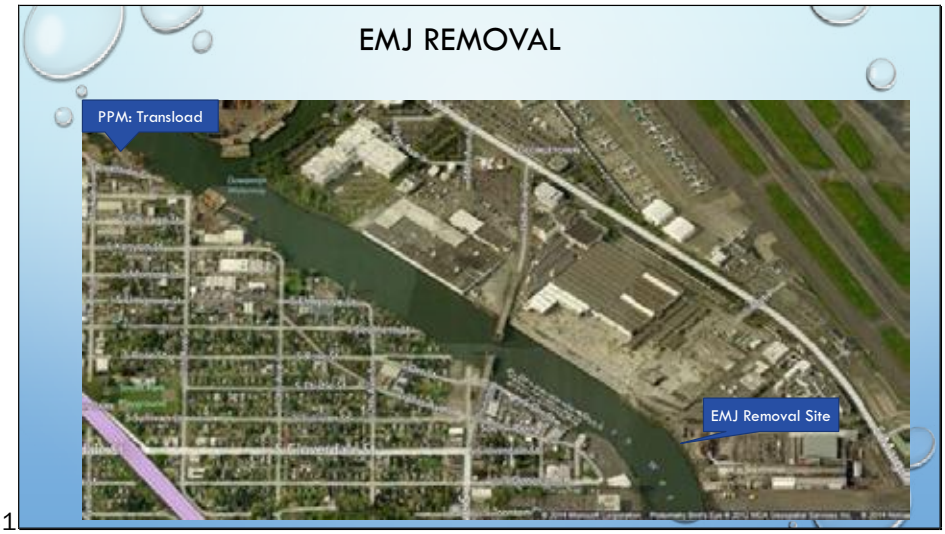

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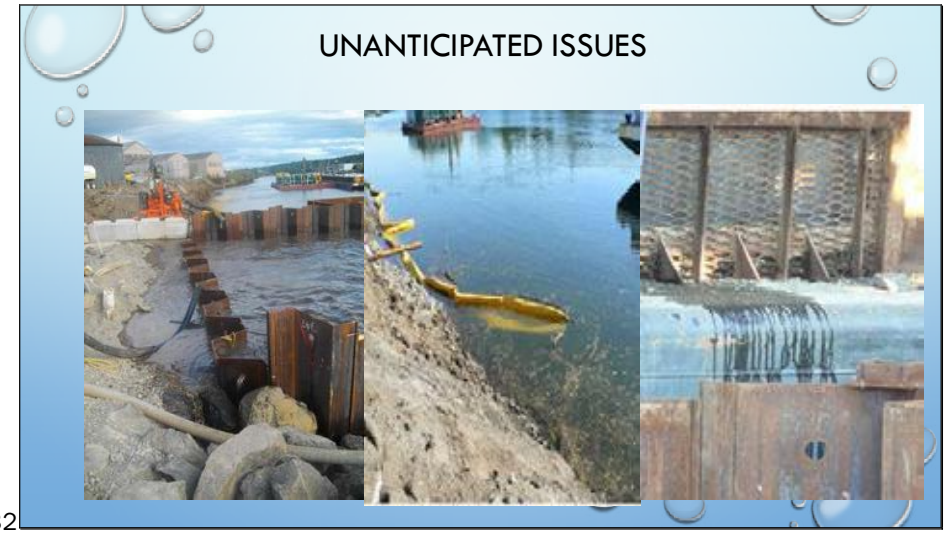

Problems at EMJ/Jorgensen:

- Overflowing cofferdam during dredging- so clearly that defeats the purpose of keeping the material out of the LDW.
- Didn't attach the silt curtain to prevent the bank material from getting in to the LDW.
- TSCA barge was leaking via the scupper. Realized it wasn't actual TSCA de-water leaking through scupper- but shut down the site until we had that- and many, many other problems- under control.

LOCKHEED WEST SEATTLE SUPERFUND

- RD/RA CLEANUP ACTIVITIES

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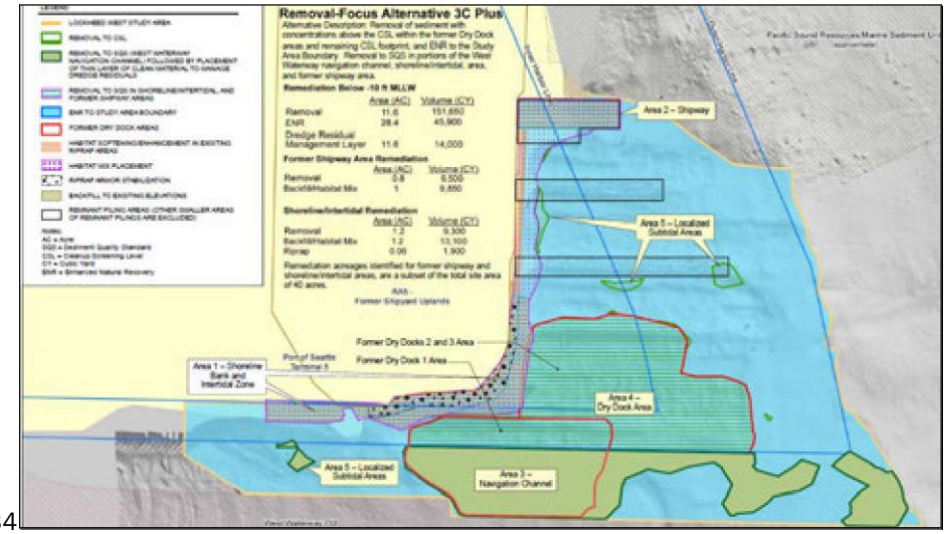

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SITEWIDE REMEDIATION TOTALS

- DREDGING: 13.6 ACRES AND 167,450 CY
- BACKFILL SHORELINE AND INTERTIDAL AREAS: 2.2 ACRES AND 22,950 CY OF HABITAT MIX
- THIN COVER FOR DREDGE RESIDUALS MGM'T/ENR LAYER: 40 ACRES (ENTIRE SITE) AND 59,900 CY
- $ 47.7 MILLION, CAPITAL COST ($48.1 MILLION DISCOUNTED RATE)

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NEXT STEPS

- UAO ISSUED MARCH 5, 2015
- UAO EFFECTIVE APRIL 13, 2015
- START RD/RA
  - NAME RD/RA CONTRACTOR 10 DAYS AFTER UAO EFFECTIVE DATE – TETRA TECH
  - RD WORK PLAN SUBMITTED 60 DAYS AFTER UAO EFFECTIVE DATE
  - PRELIMINARY DESIGN (30%) SUBMITTAL 60 DAYS AFTER SUBMITTAL OF THE PRE-REMEDIAL DESIGN DATA REPORT

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EAST WATERWAY OPERABLE UNIT (OU) OF THE HARBOR ISLAND SUPERFUND SITE

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EAST WATERWAY OU

- SUPPLEMENTAL REMEDIAL INVESTIGATION
- CURRENTLY REVIEWING FEASIBILITY STUDY
- PROPOSED PLAN EXPECTED 2016
- ROD/CLEANUP DECISION 2018

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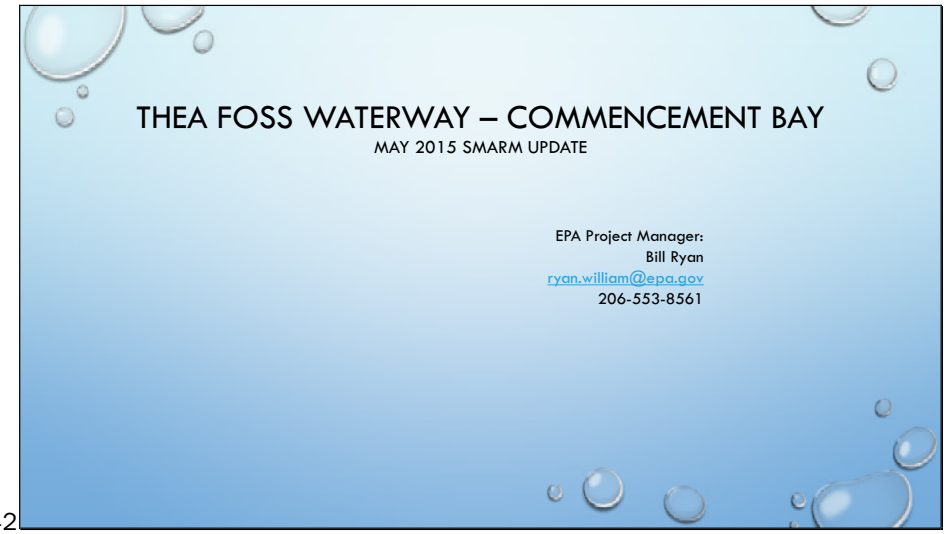
The PSR 5 year review completed at the end of Sept 2014. Remedy continues to be protective of the environment and human health.

Additional cap material was placed in late 2013 in subtidal areas where cap material was thinnest.

One of the issues identified with the 2005 capping project was the lack of accuracy in barge positioning during placement. In order to address this issue the Dredge Quality Management tool (DQM) was used to monitor the barge positioning during placements. The design called for the centroid of the barges to remain within a 50 ft radius of the target during placement.

Product continues to be removed. SPME analysis demonstrated that upwelling did not break through sediment cap.



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Bridge debris fell into the waterway.

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THEA FOSS WATERWAY – COMMENCEMENT BAY

MAY 2015 SMARM UPDATE

- DISPOSAL
  - DREDGED MATERIALS WERE PLACED IN WATER-TIGHT CONTAINERS ON BARGE
  - CONTAINERS TRANSFERRED DIRECTLY TO TRUCK AND THEN TO TRAIN
  - TRANSPORTED TO ROOSEVELT LANDFILL FOR DISPOSAL
- POST-CONSTRUCTION MONITORING
  - CONCENTRATIONS WELL BELOW SQOS
- FINAL WATERWAY DEPTHS RANGED BETWEEN -6" TO +12" OF PRE-PROJECT DEPTHS

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BLAIR WATERWAY TBT REMOVAL ACTION

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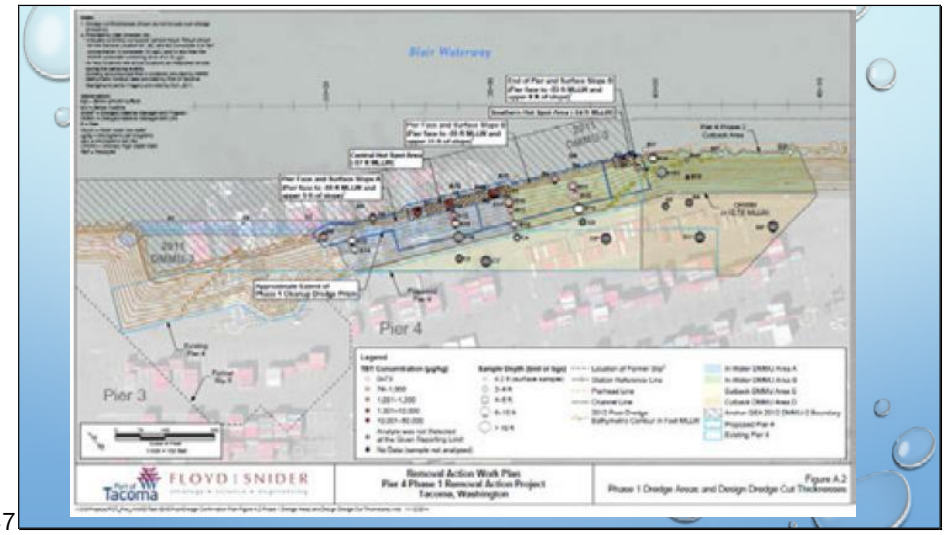

Some of the highest TBT Concentrations in the world were found here. Nobody knows where it came from.

The TBT was discovered during the Port's regular sediment characterization work for DMMP as part of a permit for Pier 4 reconfiguration and reconstruction. The project now has two distinct work phases: The Phase 1 Removal Action which will first address 49,000 cy of overlying TBT-contaminated sediments, and Phase 2 which is in the permitting process as originally planned and includes reconfiguration of the pier and additional cutback and dredging of 500,000 cy. The project is planned to be completed over 3 years, with work scheduled to be conducted between 2015 and 2018.

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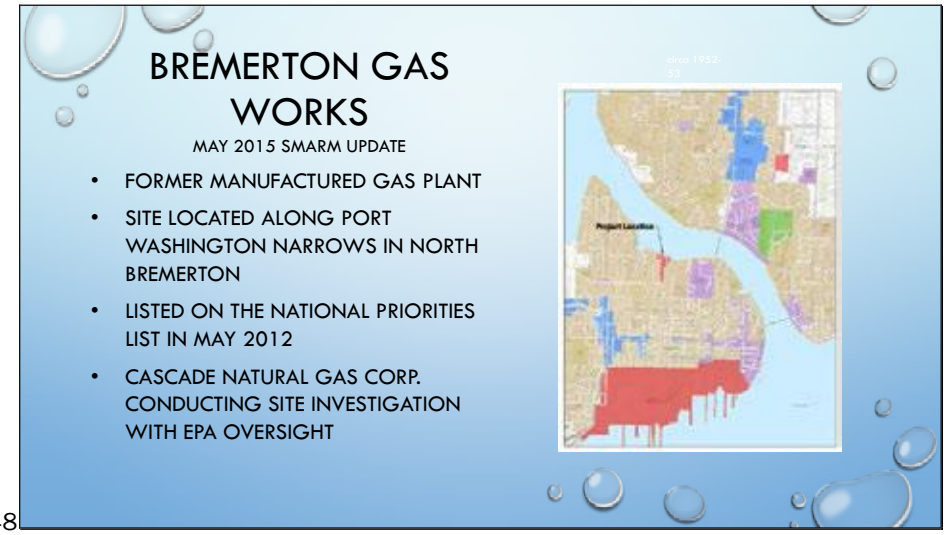

Example of continued investigation and listing by EPA of contaminated sediment sites.

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BREMERTON GAS WORKS (CONTINUED)

MAY 2015 SMARM UPDATE

Beach Sediments – October 2010
Prior to First Removal Action

- 2 REMOVAL ACTIONS ON THE BEACH
  - NOVEMBER 2010 (PRE-LISTING)
  - OCTOBER 2013
- CONTAMINATION HAS BEEN FOUND IN UPLAND SOILS, GROUNDWATER AND SEDIMENTS
- PRIMARY CONTAMINANTS OF CONCERN
  - PAHS, METALS, BTEX

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BREMERTON GAS WORKS (CONTINUED)

MAY 2015 SMARM UPDATE

- RECENTLY FINALIZED RI/FS SCOPING MEMO (MARCH 2015)
- DRAFT RI/FS WORK PLAN CURRENTLY UNDER DEVELOPMENT – HOPE TO FINALIZE AND BEGIN FIELD INVESTIGATION IN LATTER PART OF 2015

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Newly installed cap – October 2013
After completion of second Removal Action