

Weight-of-Evidence Approach to Assessing Recontamination Potential: River Mile 11 East Area of Portland Harbor

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Presented at:

Battelle 2019 Sediments Conference



RM11E Project Overview

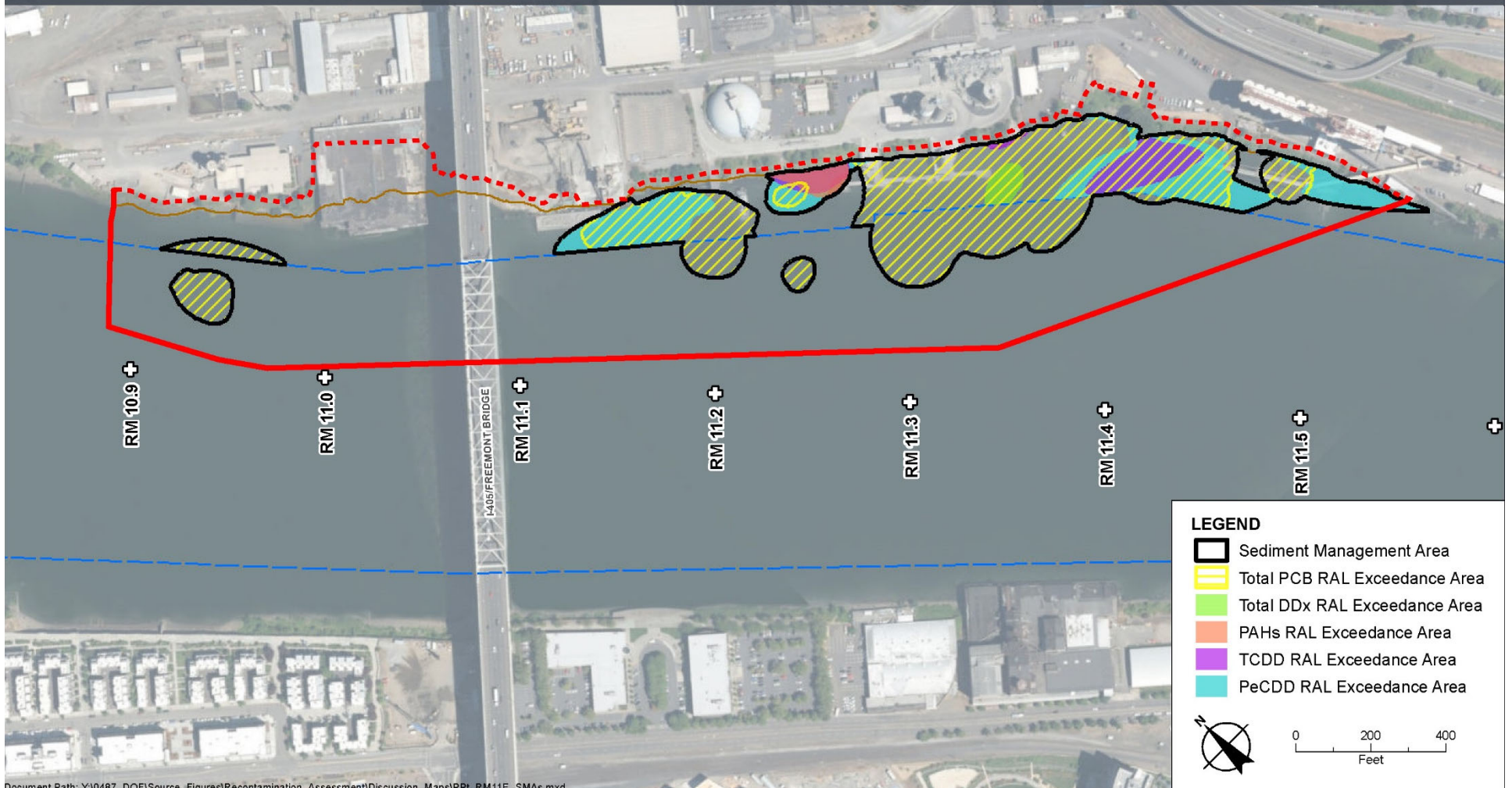


- Upstream end of the Portland Harbor Superfund Site
- Six Participating Parties: Commercial, Public, Utility
- 2013 - Group signs AOC with EPA
 - ✓ Supplemental RI/FS
 - ✓ Implementability Study Report
 - ✓ **Recontamination Assessment Report**
- 2017 - EPA Issued Sitewide ROD
- 2018 - Group signs Amended AOC to perform 100% Remedial Design

RM11E Project Area Features Area



RM11E Sediment Management Areas (SMAs)



RM11E Recontamination Assessment

Overall Objectives

- Evaluate the potential for recontamination in the RM11E area following sediment remediation.
- Identify if **additional source control actions**, beyond those already in progress, are required.
- Identify **design elements** to be considered to mitigate recontamination potential.

RM11E Approach

- Evaluate existing data to focus on only those COCs that may cause recontamination - **Recontamination Potential Chemicals (RPCs)**.
- Develop a **Recontamination CSM** to identify and evaluate the physical processes for each pathway.
- Utilized Upland Source Control **work completed by Oregon DEQ**.
- Conduct semi-quantitative **WOE approach** that varied by pathway depending on the relevance and amount of available supporting information.
- **Classify pathways and recontamination potential** based on the multiple lines of evidence considered.

What is Recontamination under the Portland Harbor ROD?

- Multiple thresholds – RALs and CULs.
- Multiple RALs for some COCs.
- MNR is large part of remedy - COCs allowed to remain in place at levels above the CULs.
- Movement of bedded sediment above CULs from MNR areas to remediated areas.
- Over what time period and spatial scale(s) is recontamination assessed?

RM11E Definition of Recontamination

“For the purpose of this assessment, recontamination is assumed to occur when, after remediation, surface sediment accumulates COCs that exceed CULs over an appropriate time frame and spatial scale.”

Identify

Recontamination Potential Chemicals (RPCs)

Fundamental Assumptions:

- Only chemicals found in current **surface sediment** data could pose a future threat of recontamination.
- Only chemicals with **sediment cleanup levels** in the ROD (Table 17) will be considered.

Narrowed list of recontamination potential chemicals to twenty-six to begin further screening.

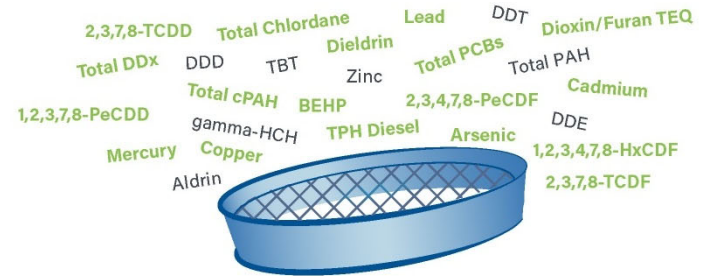


Three Step Screening Process

STEP 1 POINT-BY-POINT SCREENING

(1a) Are potential Portland Harbor COCs detected at concentrations greater than the cleanup level?
(1b) If so, are they detected at a frequency of greater than 5% and/or a magnitude greater than 3x the cleanup level?

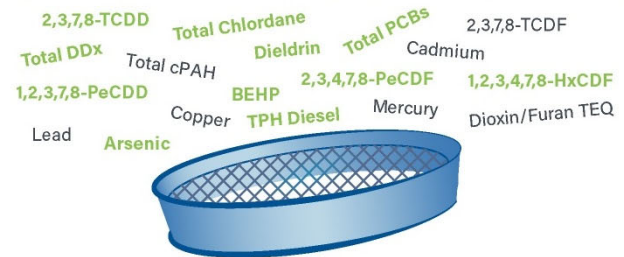
Not a RM11E Recontamination Potential Chemical (RPC)



STEP 2 RM11E SWAC SCREENING

Is the RM11E SWAC greater than the cleanup level?

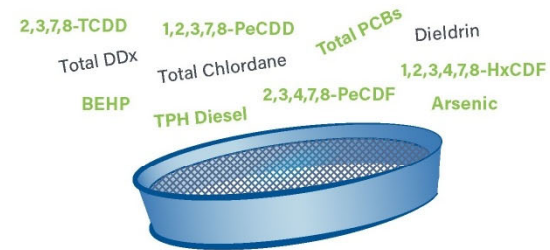
Not a RM11E RPC



STEP 3 PESTICIDE DATA EVALUATION

If the standard reduction between the high-resolution and conventional pesticide results was applied to the larger dataset would these chemicals have a SWAC greater than the cleanup level?

Not a RM11E RPC



IDENTIFICATION OF RM11E RPCs

RM11E RPCs will be carried forward into the pathway analysis for other media during development of the RM11E Recontamination Assessment



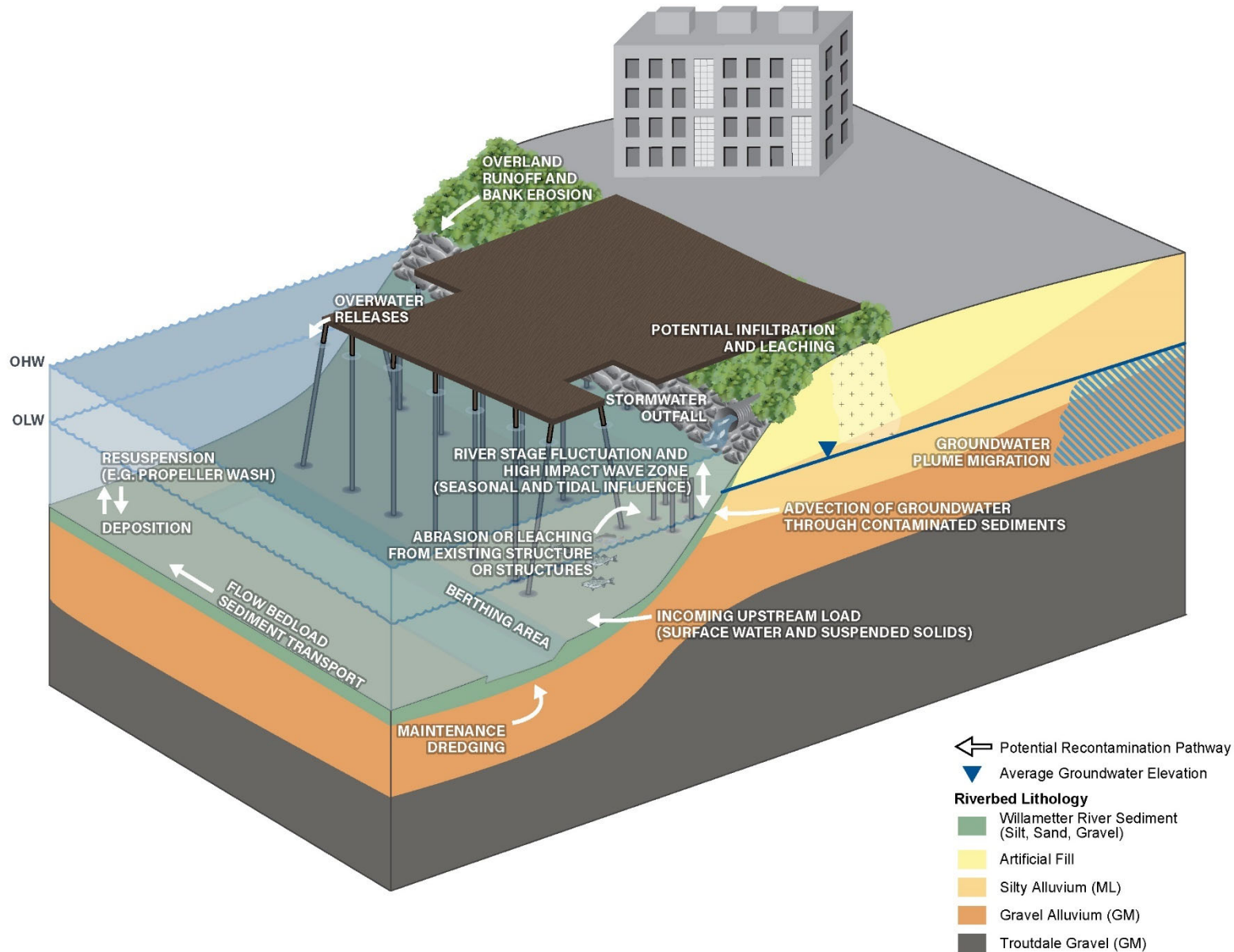
Three Step Screening Process

IDENTIFICATION OF RM11E RPCS

2,3,4,7,8-PeCDF
2,3,7,8-TCDD
TPH Diesel
Total PCBs
BEHP
1,2,3,4,7,8-HxCDF
1,2,3,7,8-PeCDD
Arsenic

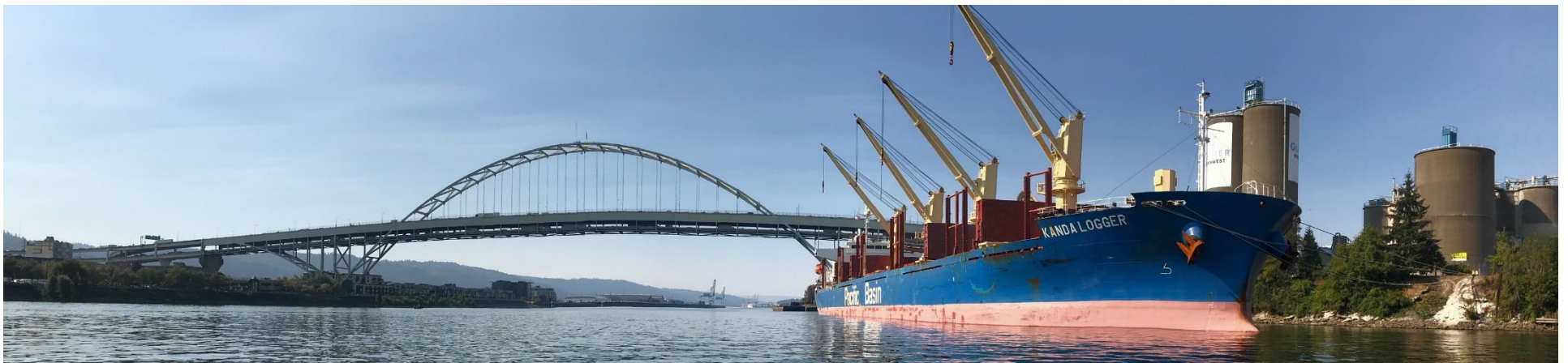
RM11E RPCs will be carried forward
into the pathway analysis for other media
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Recontamination Assessment

Recontamination CSM



Classification of Pathways

- Out of our Control (Upriver)
- Minimized by Source Control and BMPs (stormwater, site operations)
- Controlled through RD/RA (bank erosion, buried contamination, porewater advection)
- Redistribution of bedded sediment (natural hydrodynamics, prop scour)
- Groundwater plume discharges



Upriver Pathway

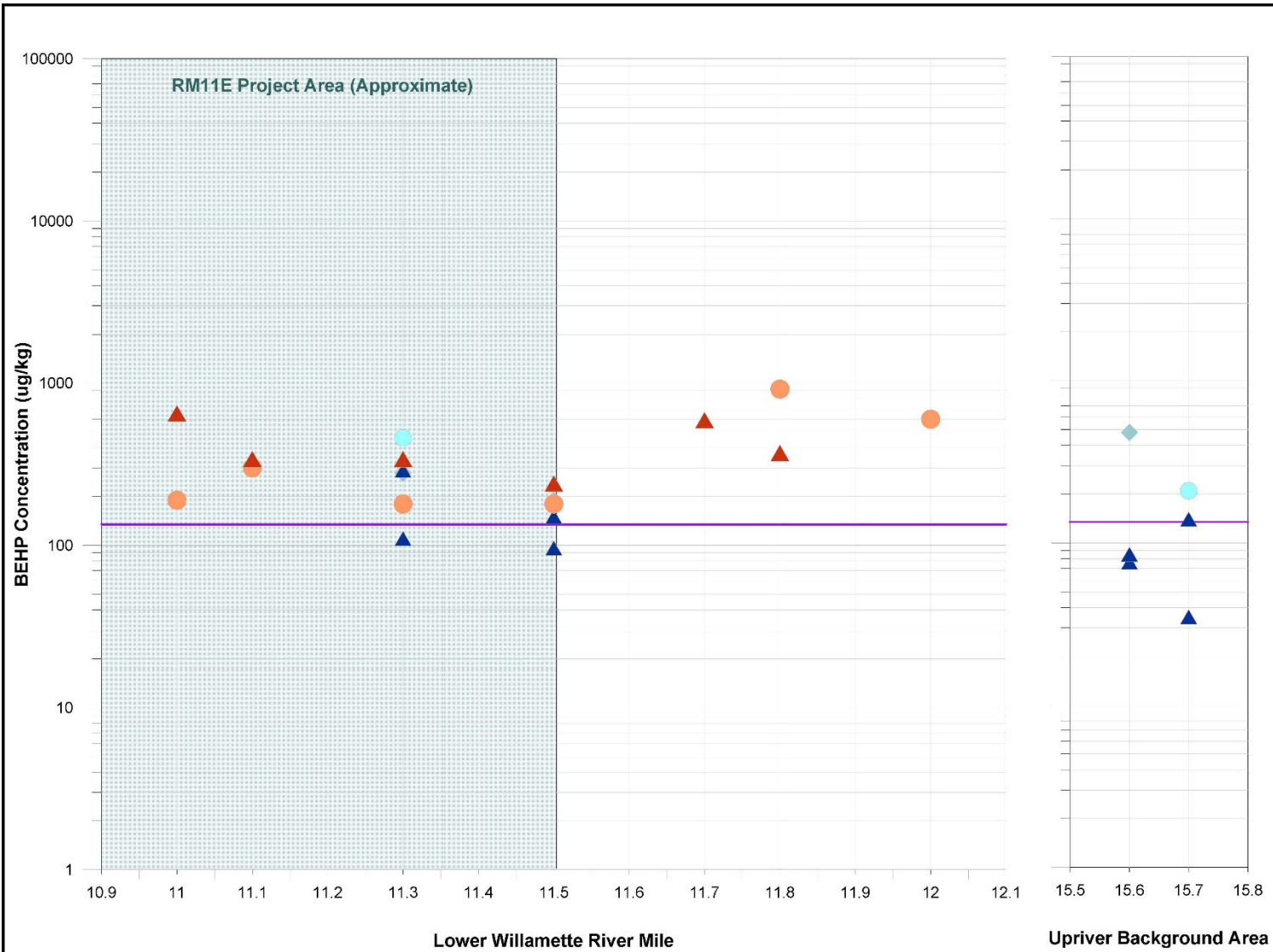


FIGURE 6.1-8
BEHP Concentrations
in Settleable Suspended Sediment
River Mile 11 to 12.1 and
River Mile 15.5 to 15.8

Recontamination Assessment Report
 River Mile 11 East

Willamette River
 Portland, Oregon

- Legend**
- ▲ 2009/2010 High Water Level
 - 2009 Low Water Level
 - ▲ 2007 High Water Level
 - ◆ 2007 Mixed Water Levels
 - 2007 Low Water Level
 - BEHP Cleanup Level



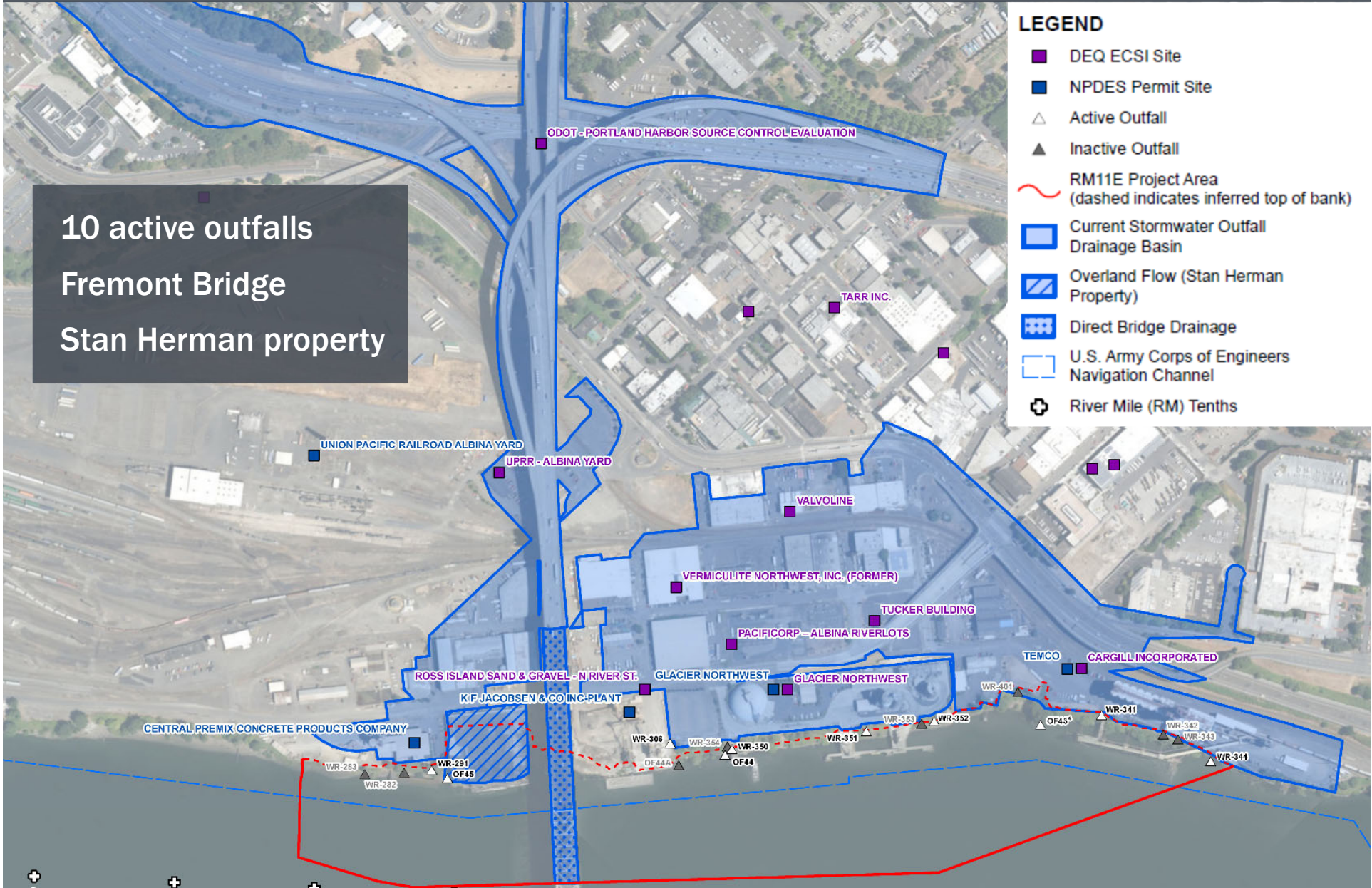
Date Modified: April 2018

Stormwater & Overwater

10 active outfalls
 Fremont Bridge
 Stan Herman property

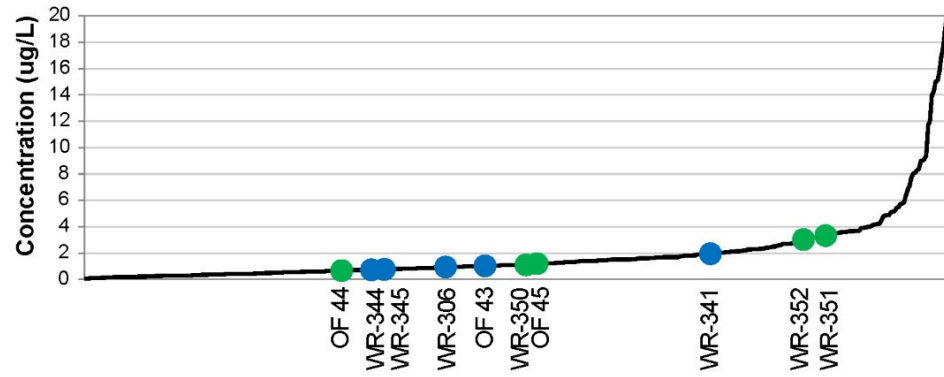
LEGEND

- DEQ ECSI Site
- NPDES Permit Site
- △ Active Outfall
- ▲ Inactive Outfall
- ~ RM11E Project Area (dashed indicates inferred top of bank)
- ▭ Current Stormwater Outfall Drainage Basin
- ▨ Overland Flow (Stan Herman Property)
- ▤ Direct Bridge Drainage
- ▭ U.S. Army Corps of Engineers Navigation Channel
- + River Mile (RM) Tenths

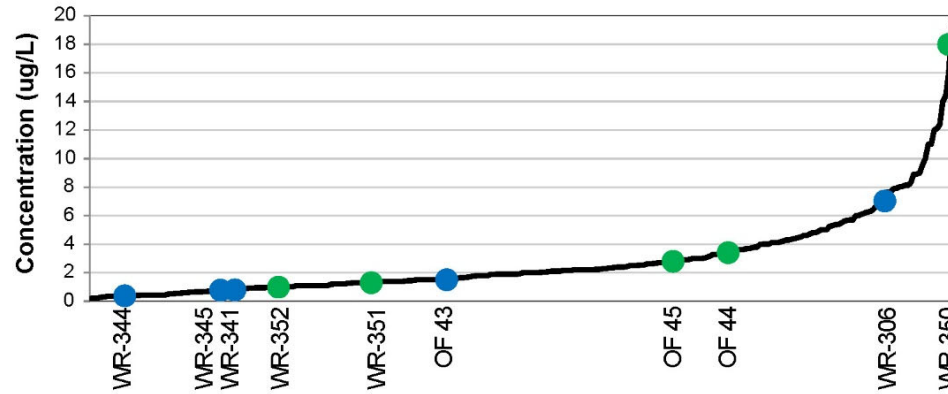


Stormwater Pathway Evaluation

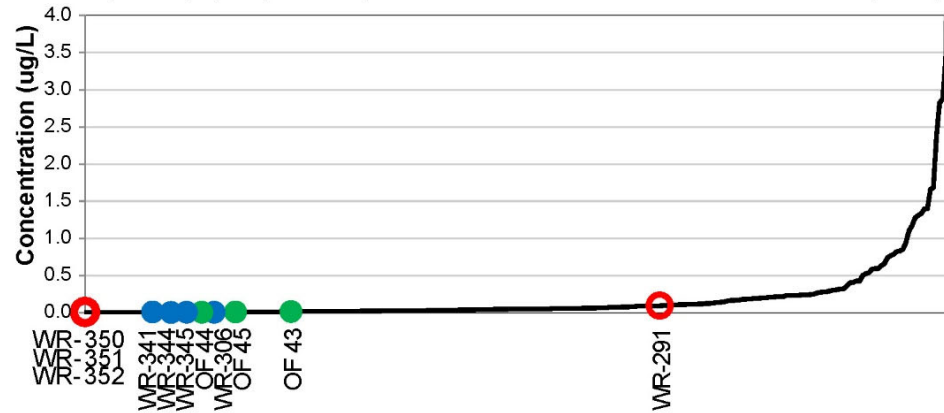
Arsenic



BEHP



Total PCBs



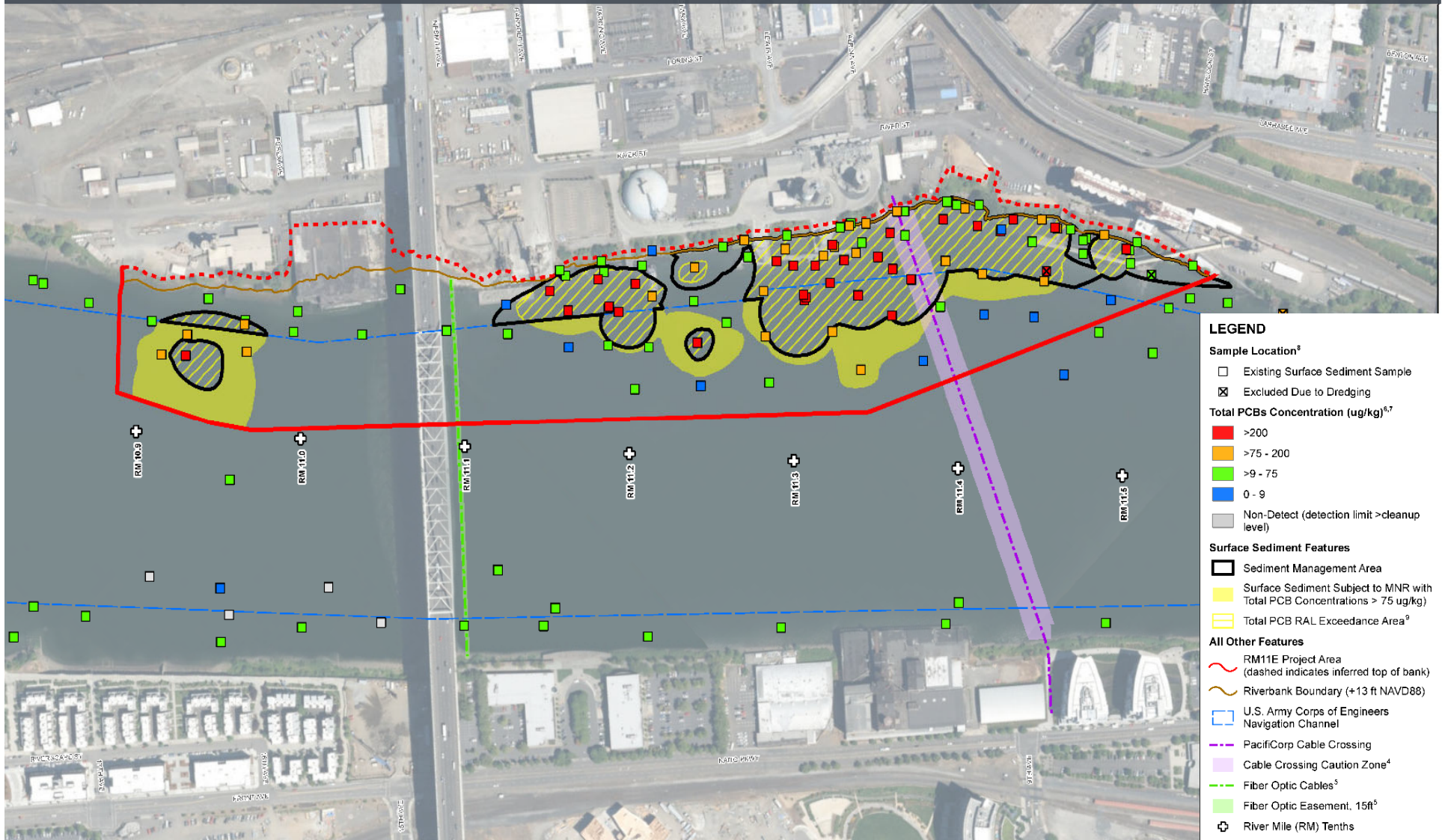
Geometric Means (Geomean):

- Pre-SCM Geomean
- Post-SCM Geomean
- Geomean Consisting of All Non-Detected Results

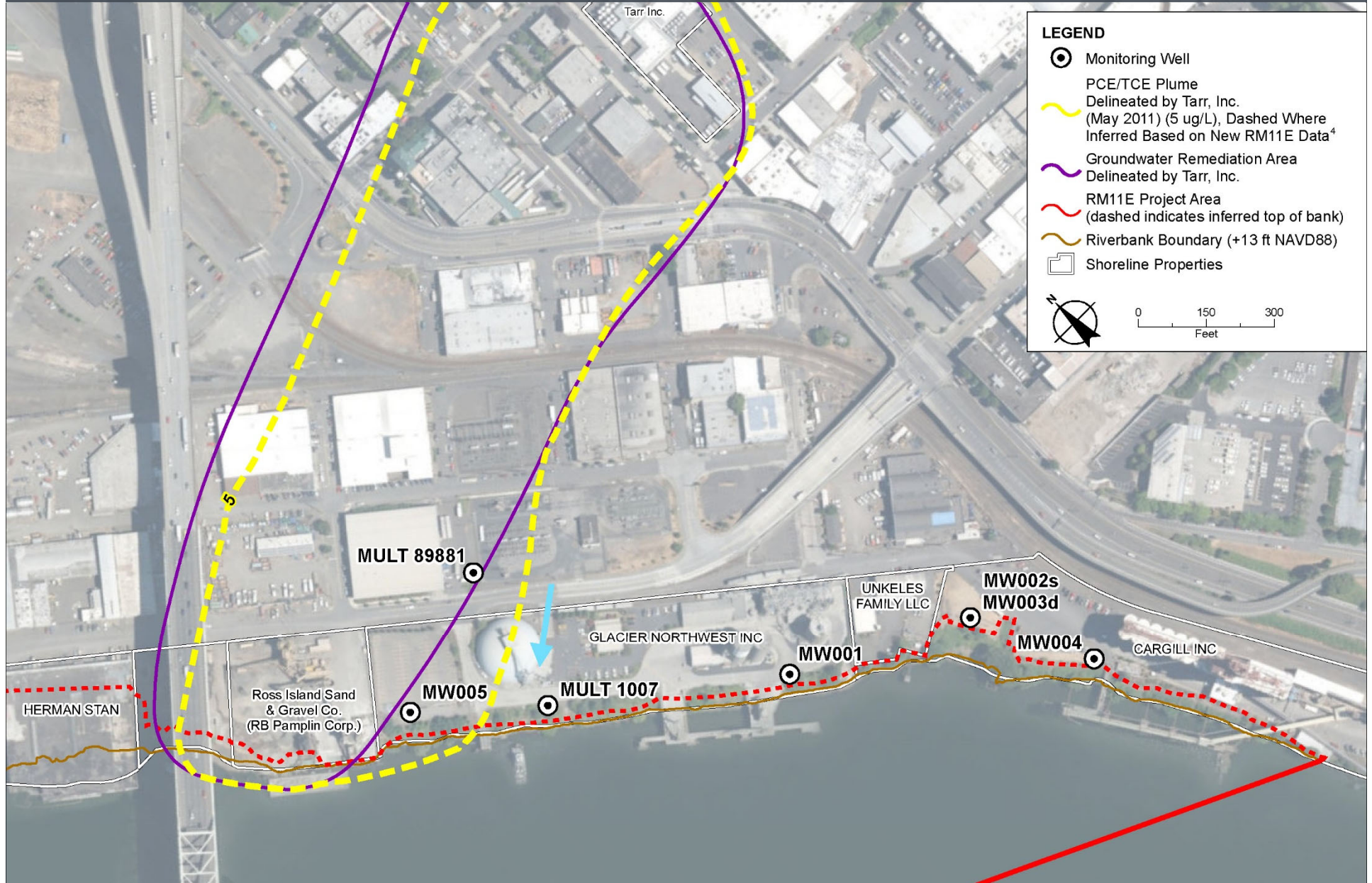
Bank Erosion and Buried Contamination



Redistribution and mixing of Surface Sediment



Groundwater Discharge Pathway



Conclusions

- Upriver
 - Represents the significant pathway
- Stormwater and overwater activities
 - Largely managed through source control and BMPs
 - Pose a low potential of recontamination
- Riverbank erosion, exposure of buried contaminated sediment, and porewater seepage
 - Recontamination potential minimized through remedy design
- Redistribution and mixing of surface sediments
 - Critical component of the Selected Remedy and is not considered recontamination
- Groundwater Pathway
 - Not considered to pose a significant risk of recontamination

Agency Reaction

- May 2018 - Draft Report submitted to EPA
- September 2018 - EPA Comments received:
 - No ongoing sources that prevent moving forward with RD/RA.
 - Recontamination cannot be evaluated until after remedy complete in 5-year reviews.
 - Must be evaluated on an appropriate time and spatial scale.
 - Change the report title to Sufficiency Assessment Report.
 - Include Sufficiency Summary table of upland sites and pathways. October 2018 - Conditional approval.
- November 2018 – Final Approval.

Closing Thoughts

- At the onset, take the time to clearly define the problem – what defines recontamination at your site and how is it measured?
- Narrow the list of COCs early in the process to avoid excessive quantitative analysis and data handling that has little impact on the outcome.
- Determine the relevance of each pathway and categorize the pathway findings in a solution-based manner that moves the project forward.
- Unpredictable Events – Two releases to the river in the RM11E project area in 2018 – oil spill reached project area through outfall, and major fire of overwater warehouse.





Questions?