

WYCKOFF/EAGLE HARBOR, WA

BERNADETTE WRIGHT

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 10

Wyckoff/Eagle Harbor Site Location

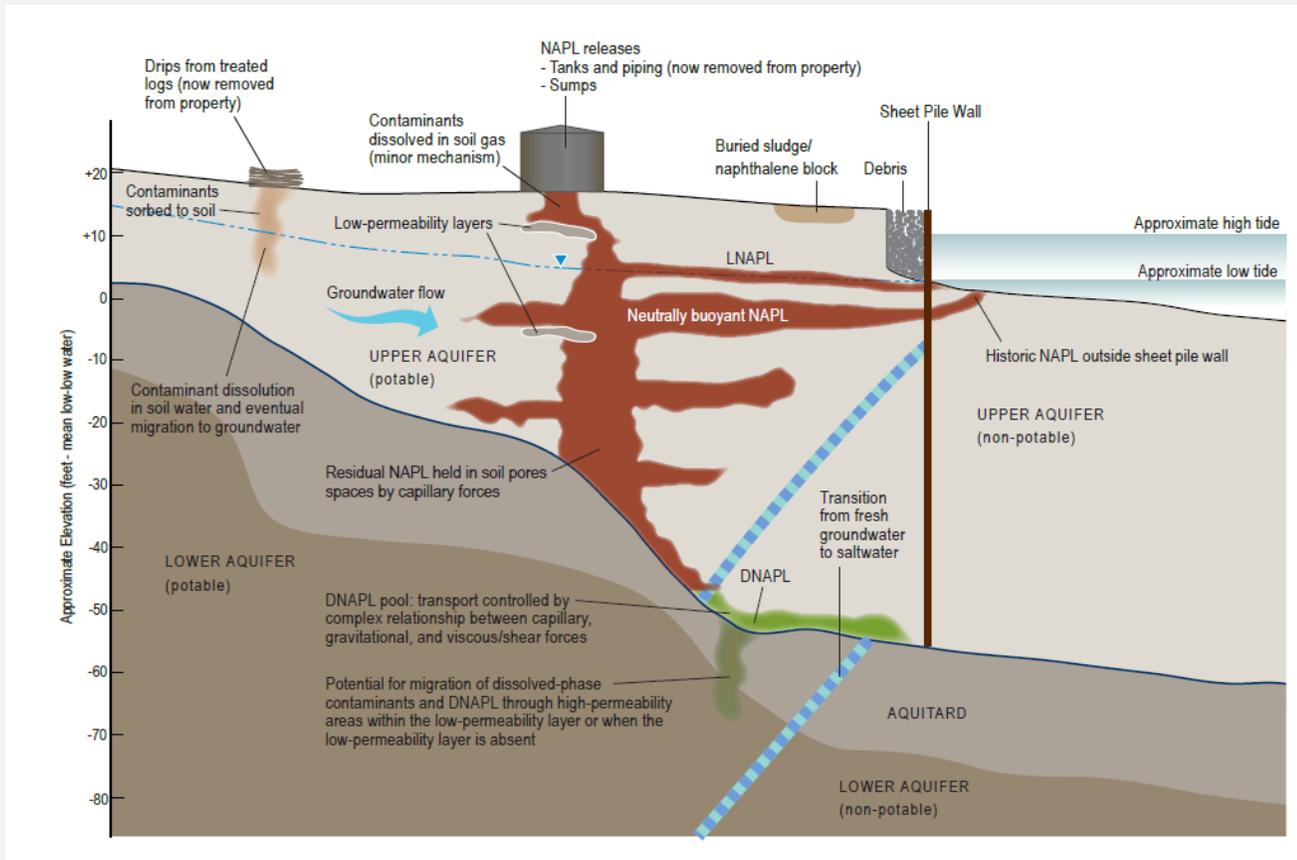


Wyckoff/Eagle Harbor Operable Units



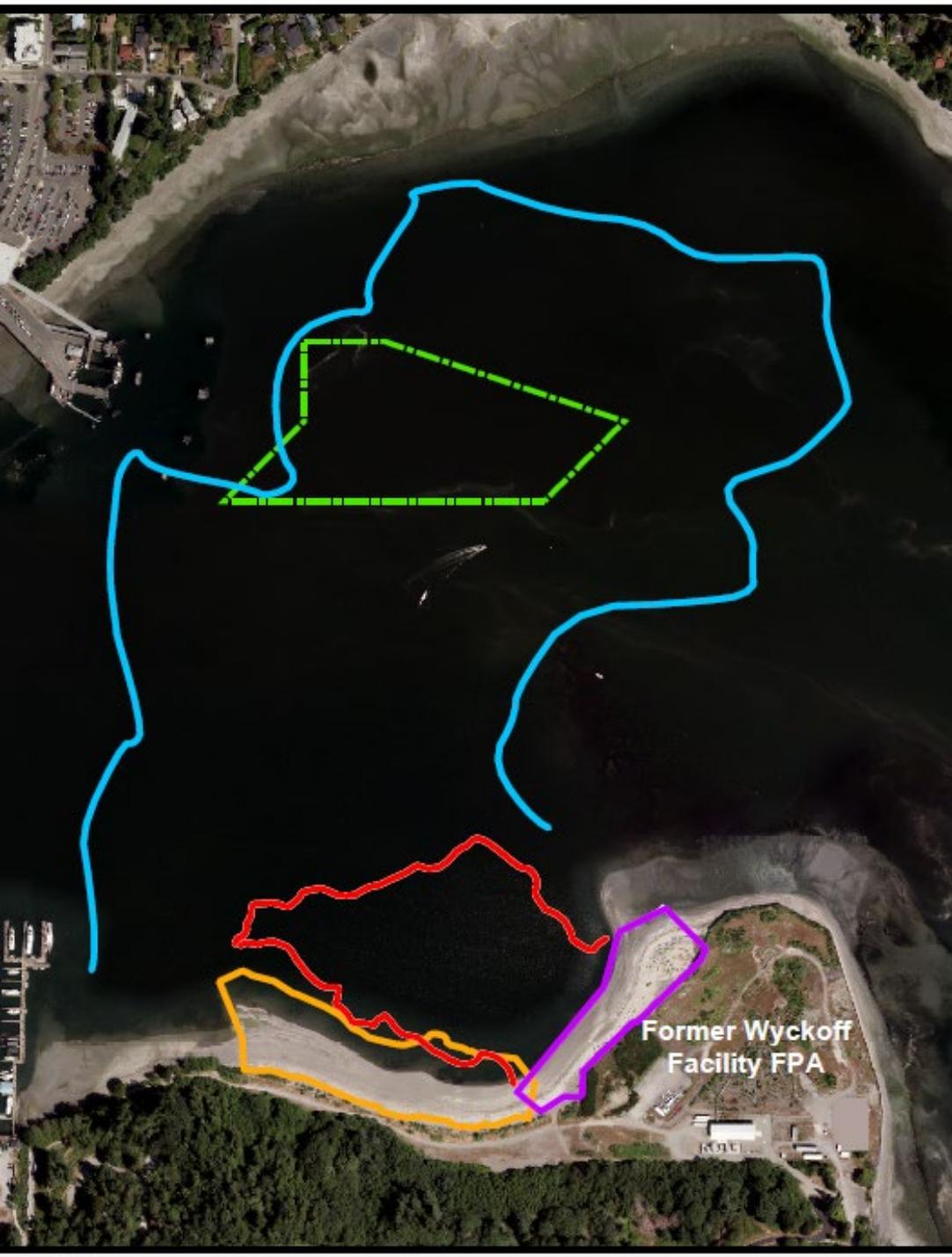
CONCEPTUAL SITE MODEL

- Significant releases (creosote & pentachlorophenol)
- LNAPL and DNAPL



Objectives of Sediment Remediation

- OU1 East Harbor COCs – PAHs and pentachlorophenol
- Sediment remedial action objectives (cleanup goals; 1994 ROD)
 - Short term: protect benthic organisms and meet state cleanup screening levels in surface sediment
 - Long term: achieve the state sediment quality standards in surface sediment and reduce contaminant concentrations in fish and shellfish to levels protective of human health and the environment

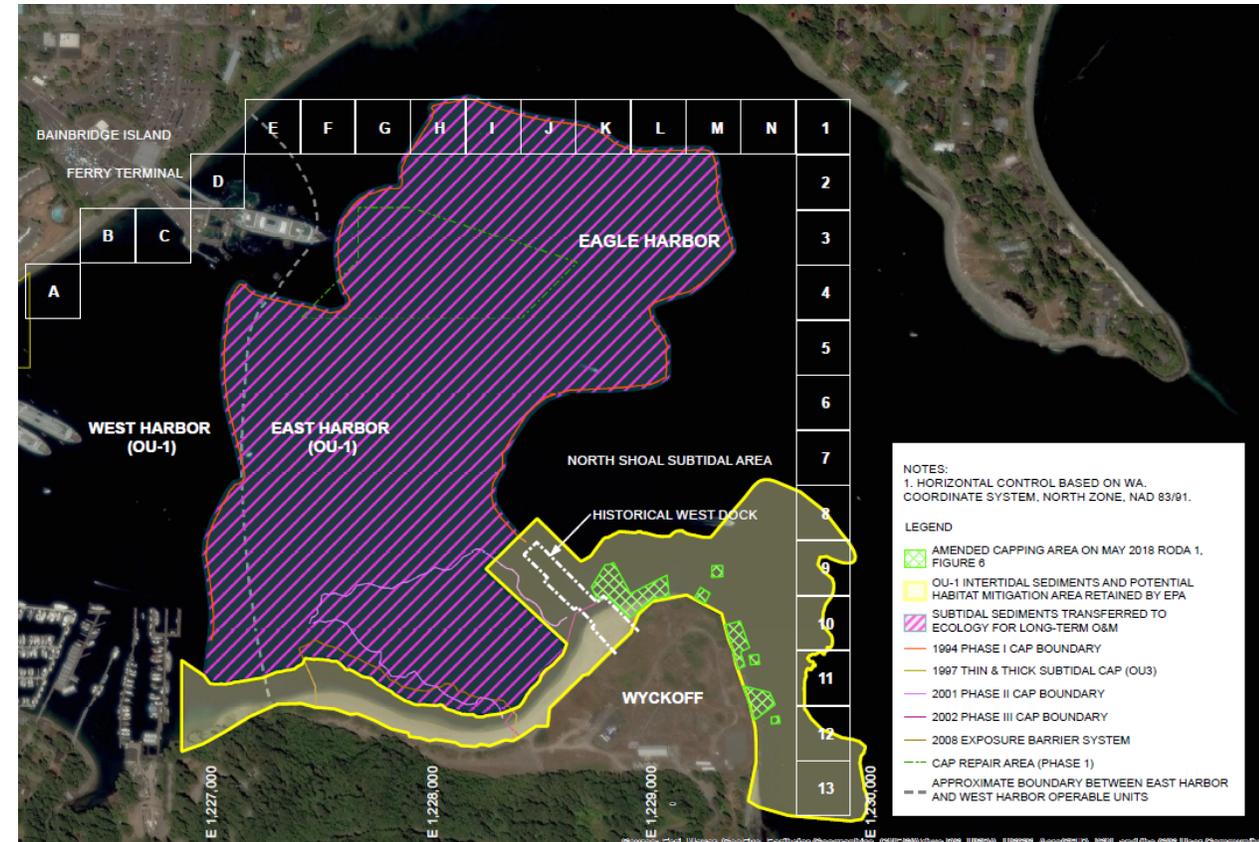


SUMMARY OF COMPLETED EARLY OR FINAL REMEDY

- Sediment Actions:
 - 1993/94 Phase I subtidal sediment cap
 - 2000 Phase II subtidal sediment cap
 - 2001 Phase III intertidal sediment cap
 - 2008 Exposure barrier system intertidal sediment cap
 - 2017 subtidal cap repair
 - Regulated navigation area
- Upland Source Control Actions:
 - 1990 Groundwater treatment plant
 - 1992/94 TCRA soil and sludge removal
 - 2001 Perimeter sheet pile wall installation
 - 2002 Thermal pilot test

Primary Pre- and Post-Remedy Effectiveness Monitoring Elements

- Subtidal sediments: Sediment chemistry, through-cap cores, video probe survey, passive porewater sampling
- Intertidal sediments: Passive porewater sampling, TarGOST laser-induced fluorescence probes, shallow pit/elutriate surveys
- Tissue: Clam tissue, liver lesions in English sole (NOAA and WDFW)

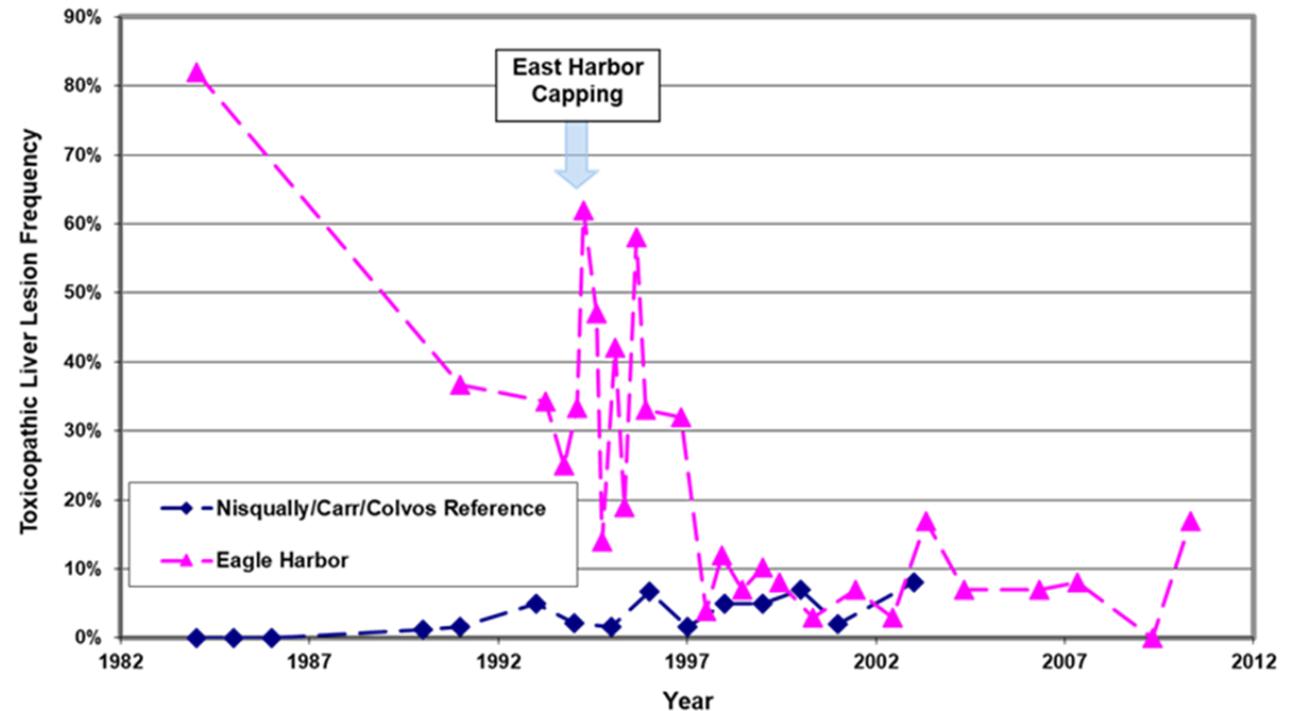


Did the Remedy Achieve Short- and/or Long-Term Remediation Objectives for Surface Sediment?

- Yes:
 - Significant reduction (five-fold) in HPAH SWAC across Eagle Harbor following subtidal capping
 - Current surface sediment PAHs < ROD cleanup standards
- No:
 - Persistent NAPL seeps in intertidal sediments
 - Cleanup goal on intertidal beaches not met after 10 years of natural recovery

Is the remedy on track to achieve long-term remediation objectives for biota?

- Subtidal cap: Five-fold reduction of the HPAH SWAC resulted in a corresponding decrease in liver lesions
- Intertidal MNR: remedy failed to meet goals



When Were External Sources Characterized and Addressed?

- Progressive source controls implemented from 1988 to present
 - Facility closure; product tanks, waste sludge, and grossly contaminated soil removal; groundwater extraction; and sheet pile wall installation
 - Groundwater extraction continues (operated by WA State Dept. of Ecology)
- Intertidal beach remediation deferred until source control measures implemented
- Source control not currently complete
- Human exposure not under control

Significant Remedy Scope or Schedule Deviations from What Was Originally Envisioned?

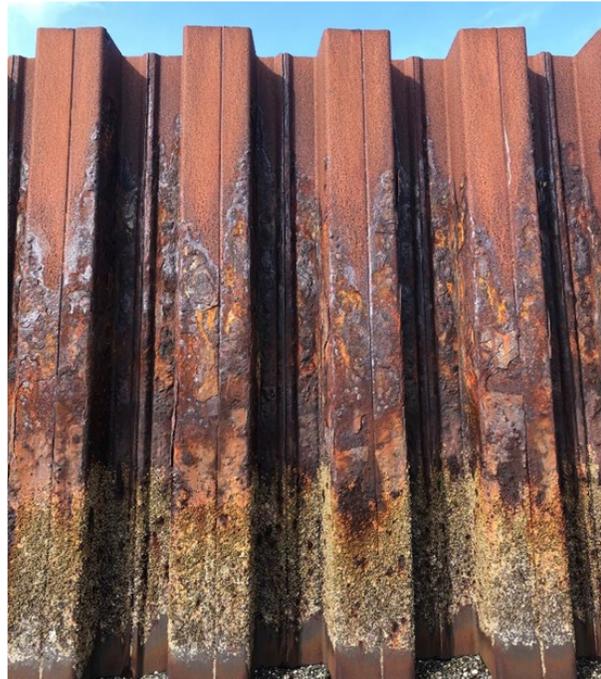
- Extensive work future planned to control upland sources, remediate intertidal beaches
 - 2018 RODA: realign access road, replace perimeter wall and dredge/cap beaches
 - 2019 RODA: in-situ solidification stabilization of soil and NAPL
- Recent (2021/22) schedule updates
 - Previous schedule estimates: construction complete complete by ~2040
 - Current design driven schedule: construction complete by 2029

Remedial Design and Remedial Action

- Upland Designs:
 - 2019 road realignment
 - USACE perimeter wall replacement
 - Wellfield realignment
 - Thermal pilot test demolition
 - Upland ISS remedy
- In-Water Work
 - USACE perimeter wall replacement
 - Intertidal beach remedy

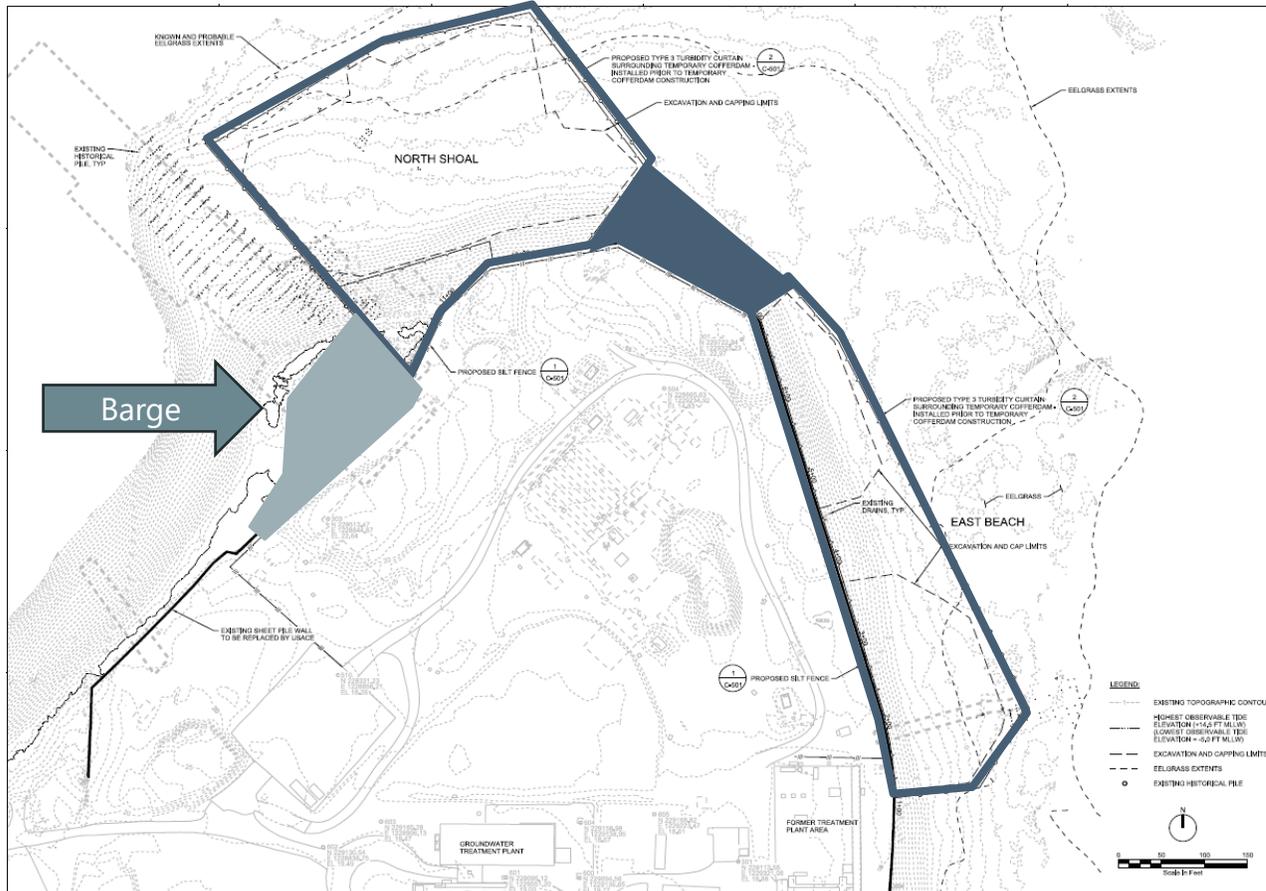
PERIMETER WALL REPLACEMENT

- Current perimeter wall is rapidly deteriorating
- In-situ solidification stabilization/cutterhead soil mix wall
- Expected to control further discharges of NAPL from upland

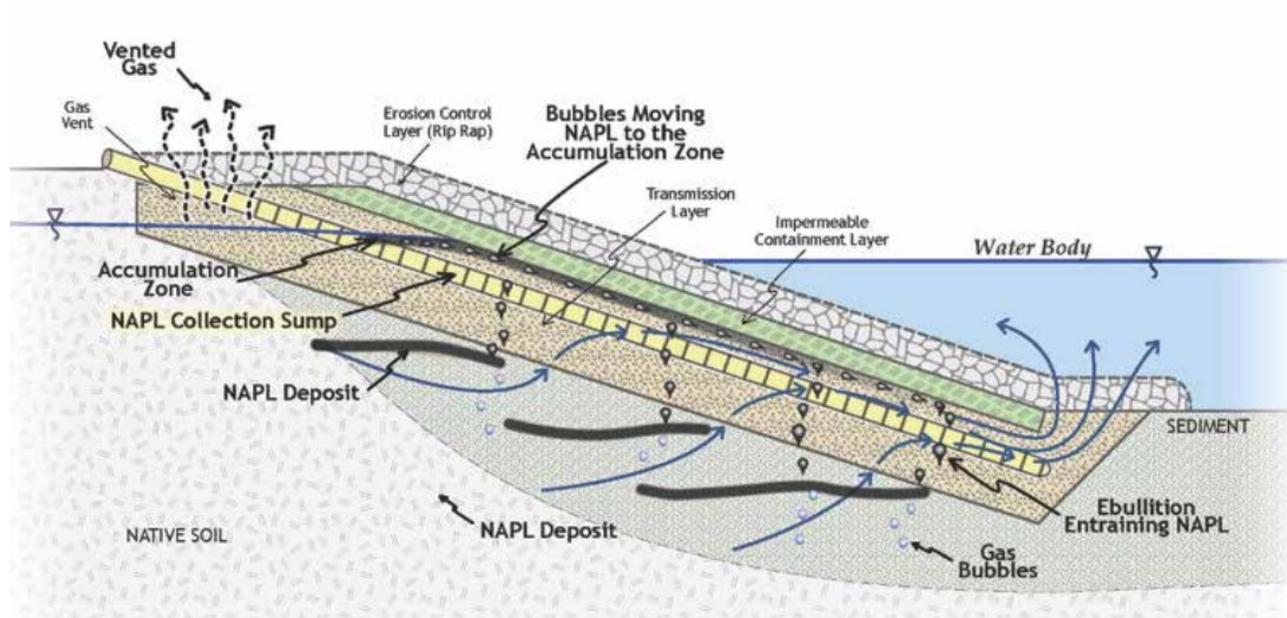


INTERTIDAL BEACH REMEDY

- Marine construction approach
- Temporary sheet pile cofferdam
- Multiple cap types



NAPL TRAPPING CAP



- Patented technology from TRC Corporation
- For active NAPL management areas
- Reduce frequency of cap replacement

Key Take-Home Messages

- Effective source control is critical to the success of any sediment remedy, especially natural recovery
- NAPL source control is complex in multimedia environments
- Capping can be effective, but monitoring and occasional maintenance and repair will be required in perpetuity
- Aggressive construction schedule made possible by:
 - Current funding environment
 - Work over last decade to monitor and documented remedy successes / failures

Key Take-Home Messages: It Takes a Village

- USEPA RPMs: Dave Tetta, Neil Thompson, Peter Rubenstein, Lori Cohen, Sally Thomas, Elly Hale, Ken Marcy, Joe Wallace, Hahn Shaw, Mary Jane Nearman, Howard Orlean, Helen Bottcher Jacob Moersen
- Long-time partnership with USACE, Seattle District
- USEPA RAC/RAF contractors and many others
- WA State Dept. of Ecology, Suquamish Tribe, and natural resource trustee agencies
- Bainbridge Island community

QUESTIONS?



SEDIMENT REMEDY EFFECTIVENESS WORKSHOP

DETROIT, MI | OCTOBER 2022