

Commencement Bay Nearshore/Tideflats

Lessons Learned

SMARM

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Kristine Koch

U.S. EPA

Superfund and Emergency Response Division



CBN/T Site Location





CBN/T Site

7 Operable Units

- **OU 01: Sediment**
- **OU 05: Sediment Sources**
- OUs 2,4,6,7: Asarco
- OU 3: Tar Pits

Each OU has cleanup plan (ROD)





Objectives of Cleanup

- Reduce fish tissue => Carr Inlet 
- Achieve specified sediment concentrations
 - Remedial Action 
 - Compensatory Mitigation (CWA 404)
 - ICs & LTMP
- Control sources 
- Maintain functional habitat and enhance fisheries 



Remedy Components

- Temporary fish advisory
- Source control
- Capping and dredging above remedial action levels (RALs)
- Monitored natural recovery (10 years)





Refinements to Remedy

- 5 Explanation of Significant Differences
- Specify
 - Areas and volumes dredged
 - Disposal locations
 - Capping areas
 - Natural recovery areas
- Added enhanced natural recovery





CERCLA Process

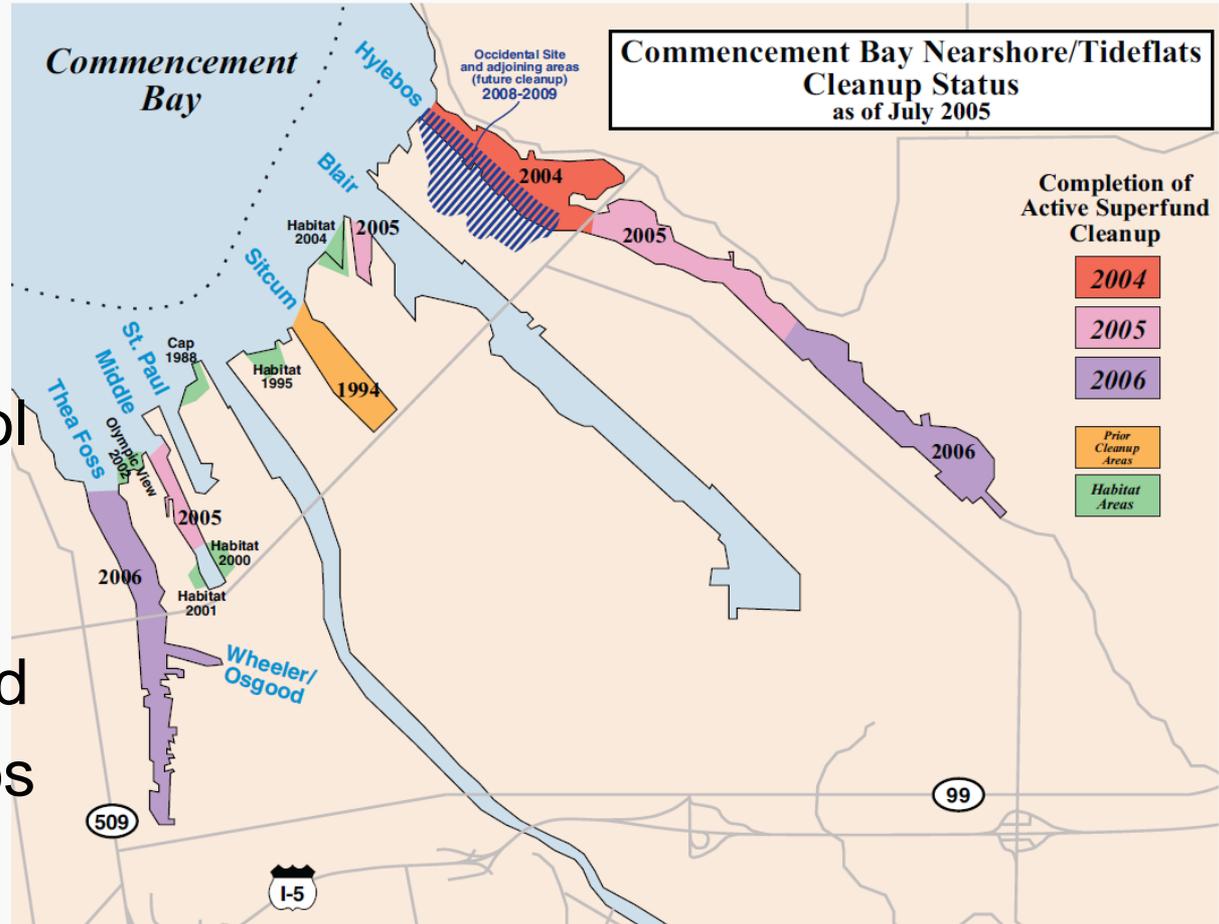
- ✓ Listing
- ✓ Remedial Investigation
- ✓ Feasibility Study
- ✓ Record of Decision
- ✓ Remedial Design
- Remedial Action
- Deletion
- Long-term Monitoring & Maintenance
Five-year Reviews





Summary of Cleanup

- 1983: Site Listing
- 1984-1989: RI/FS
- 1988 St. Paul
- 1989: ROD
- 1990s: Source Control
- 1993-2017: Sitcum
- 1997-2020: Thea Foss/Wheeler Osgood
- 1997-present: Hylebos
- 2000-2018: Middle





When is Remedial Action complete?

Dredge Only

- Source control
- Construction
- Confirmation monitoring

Cap, ENR, NR, in-situ Treatment, Mitigation

- Control sources
- Construction
- Ensure caps, CADs/CDFs, mitigation functioning
- ENR & NR monitoring
- Need to meet performance standards and cleanup goals
- Need ICs & LTMP where waste left in place



Waterway Status

- 1995: Partial Deletions Allowed
 - 1996 Blair & St. Paul
 - 2021 Middle, Thea Foss, Wheeler-Osgood
 - 2022 Sitcum and Hylebos?
- Remedial Action
 - Construction complete in all Waterways
 - Except Mouth of Hylebos Mitigation -- 2021
 - Sources controlled in all Waterways
 - Hylebos?
 - Complete for Sitcum, Middle and Head Thea Foss
 - Need LTMP for Sitcum and Middle
 - Finalizing Thea Foss/Wheeler-Osgood
 - RA Report submitted





Lesson 1

Don't forget to measure the fish.



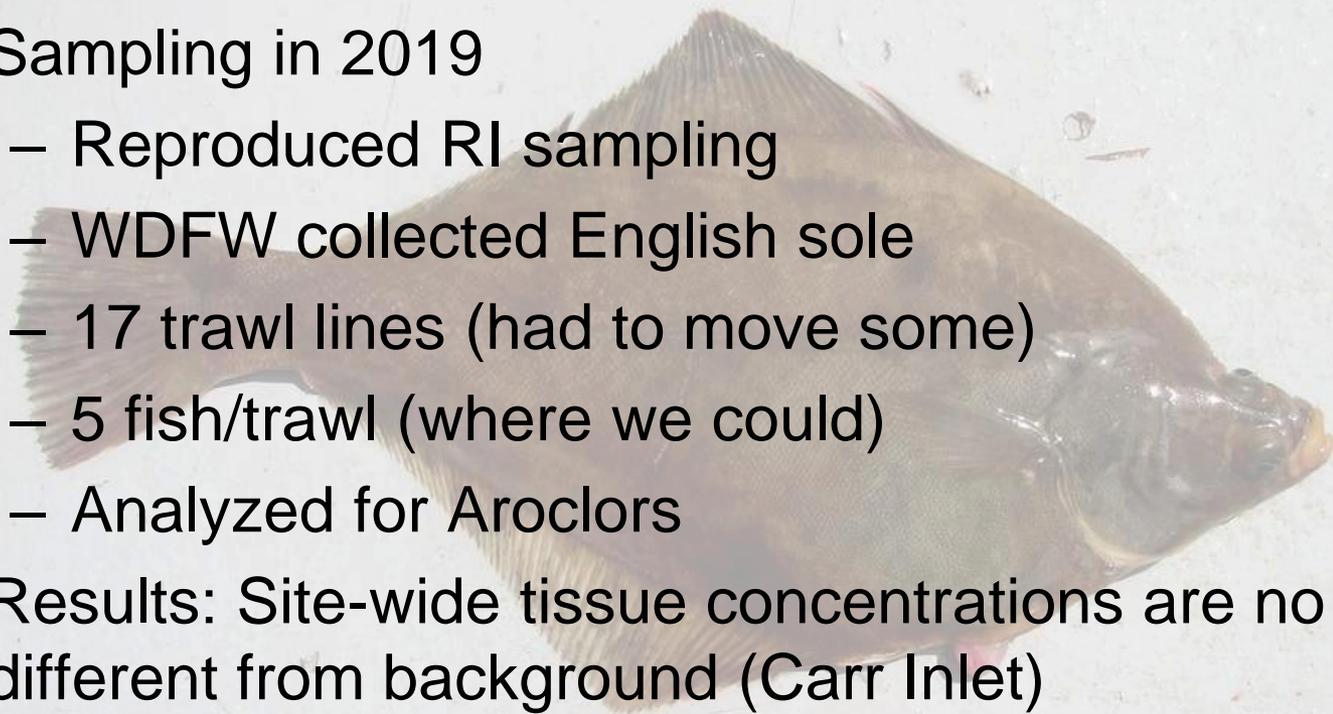
Fish Data are Important to Remedy

- Original action triggered from risk
>10⁻⁴ cancer risk
- Humans consuming fish
- PCBs was only COC
- Goal: Reduce fish concentrations of PCBs to reference (Carr Inlet)



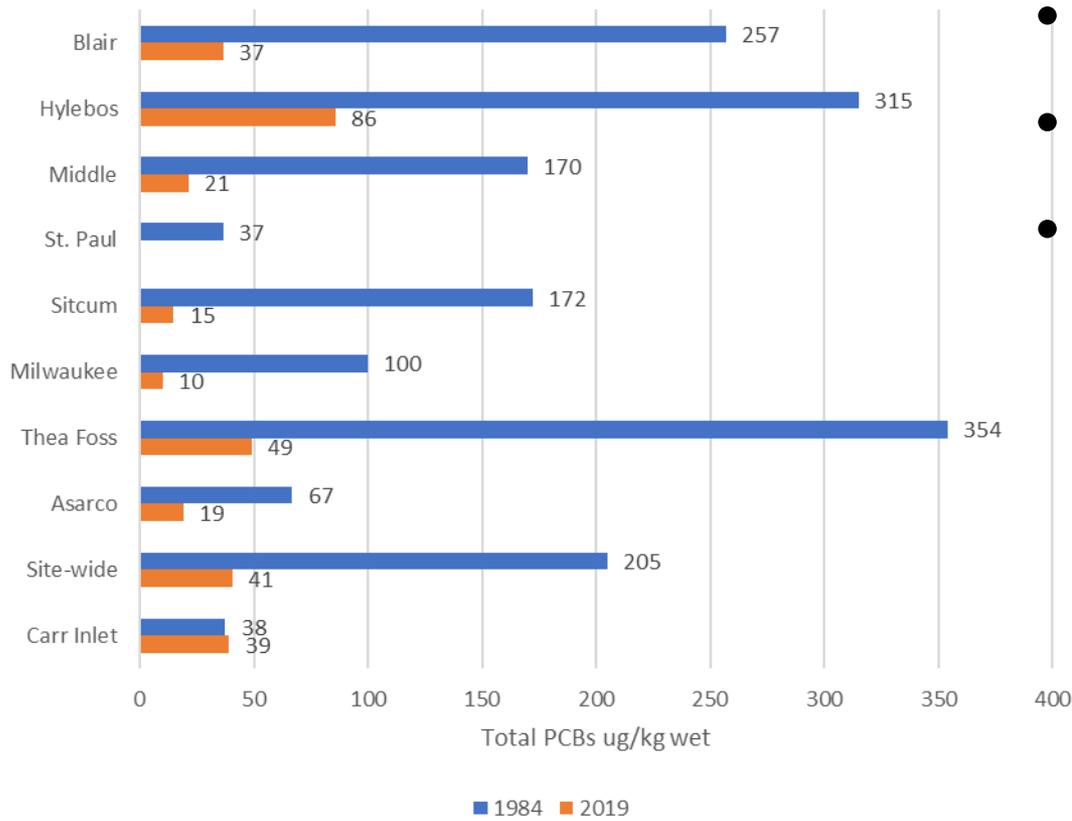
Fish Data

- RI sampling 1984
- Sampling in 2019
 - Reproduced RI sampling
 - WDFW collected English sole
 - 17 trawl lines (had to move some)
 - 5 fish/trawl (where we could)
 - Analyzed for Aroclors
- Results: Site-wide tissue concentrations are no different from background (Carr Inlet)
 - 2-sample test, $p=0.05$





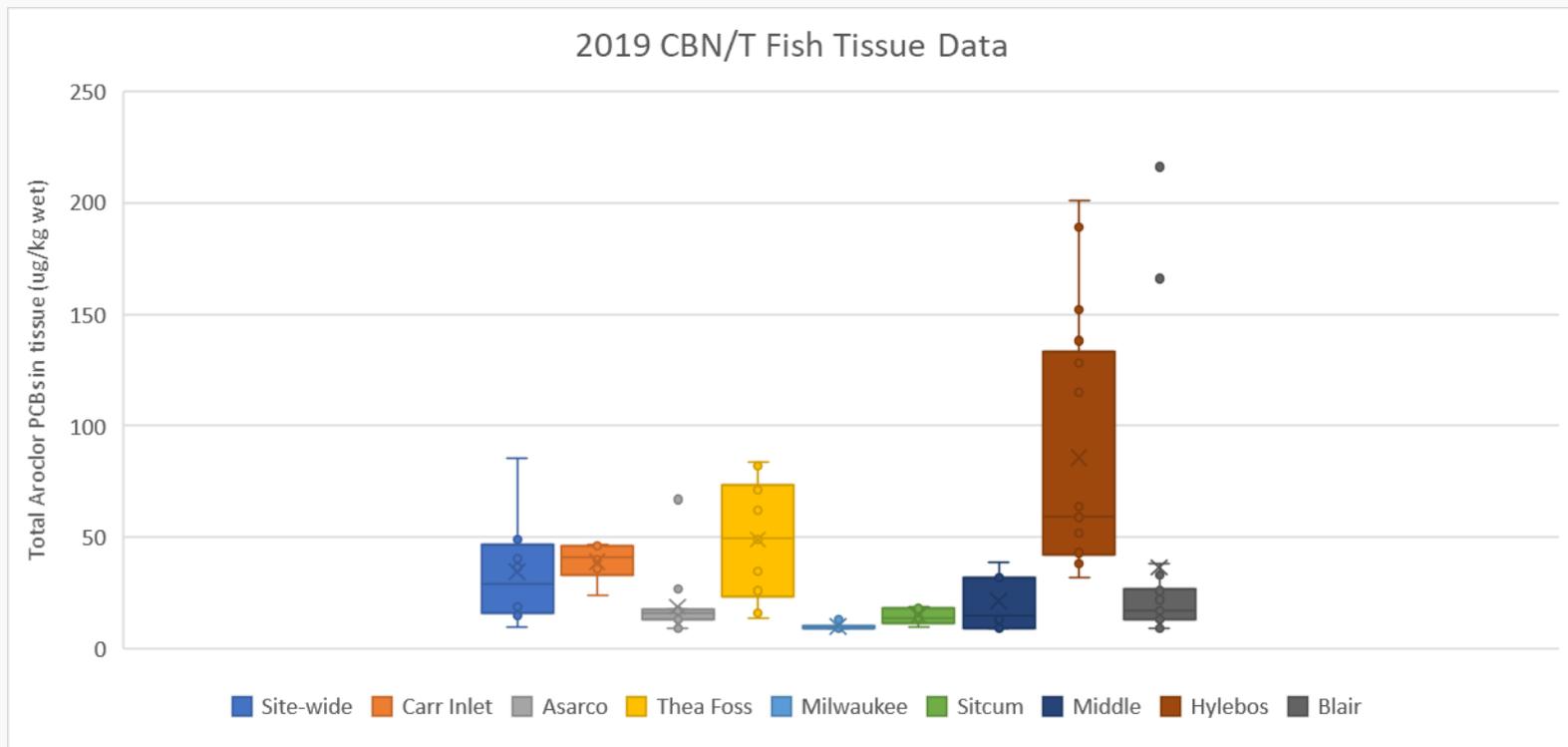
CBN/T Fish Tissue
Total PCBs from Aroclors



- Significant reductions
- Non-detects
- Waterway changes
 - Middle
 - St. Paul
 - Milwaukee



Hylebos is statistically greater than Carr Inlet and has greater variability





Lesson 2

Things change.



Land Use Changes

- Federally authorized navigation projects
 - Blair widening & deepening(Blair & Sitcum)*
- New outfalls
 - Thea Foss
 - Middle Waterway (not in the middle of habitat!)
- Mitigation projects
 - Hylebos (421B)
- Development
 - Park w/Thea Foss outfall
 - City w/Thea Foss docks
 - Expanded berths in Hylebos
 - Redevelopment of St. Paul CDF cap
- Public access
 - Water recreation
 - Boat launch

*Revealed contamination left in Sitcum Waterway



Contamination in Sediments is 3-D

- Many sites only focus on surface sediment
- Fine if no disturbance in future
- Not good in working waterways or areas where land use changes
 - Structure maintenance
 - Maintenance dredging
 - Waterway deepening
 - New outfalls & structures
 - Prop wash
- Need to know where waste left at depth



Lesson 3

Be adaptive.



Adapting to Land Use Changes

- Need good site characterization & records
- Future actions can expose deep contamination
- Need to know where waste is left at site
 - GIS map
 - Contaminants & concentrations
- Need ICs where contamination remains



Lesson 4

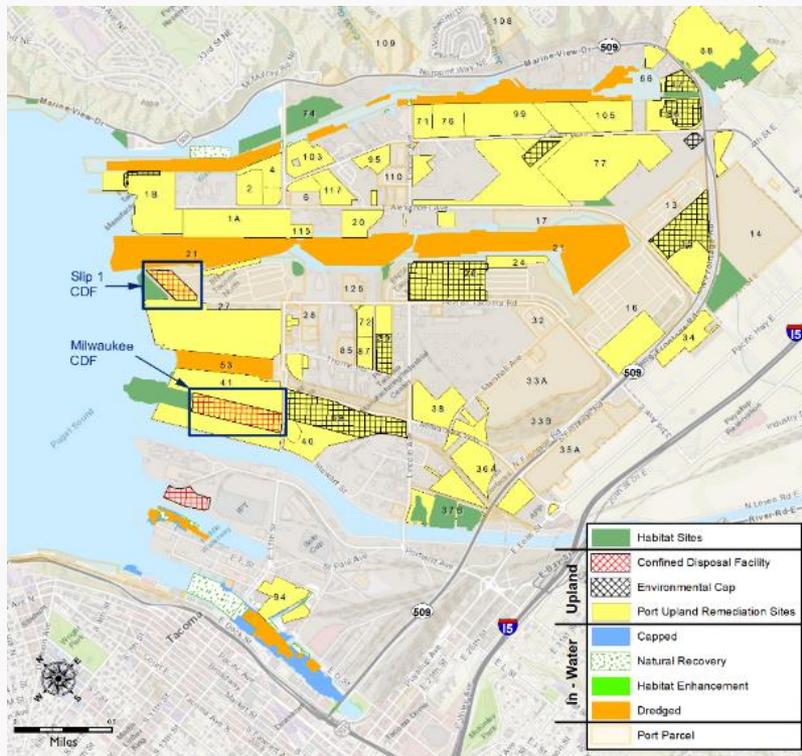
Keep track of the important pieces.



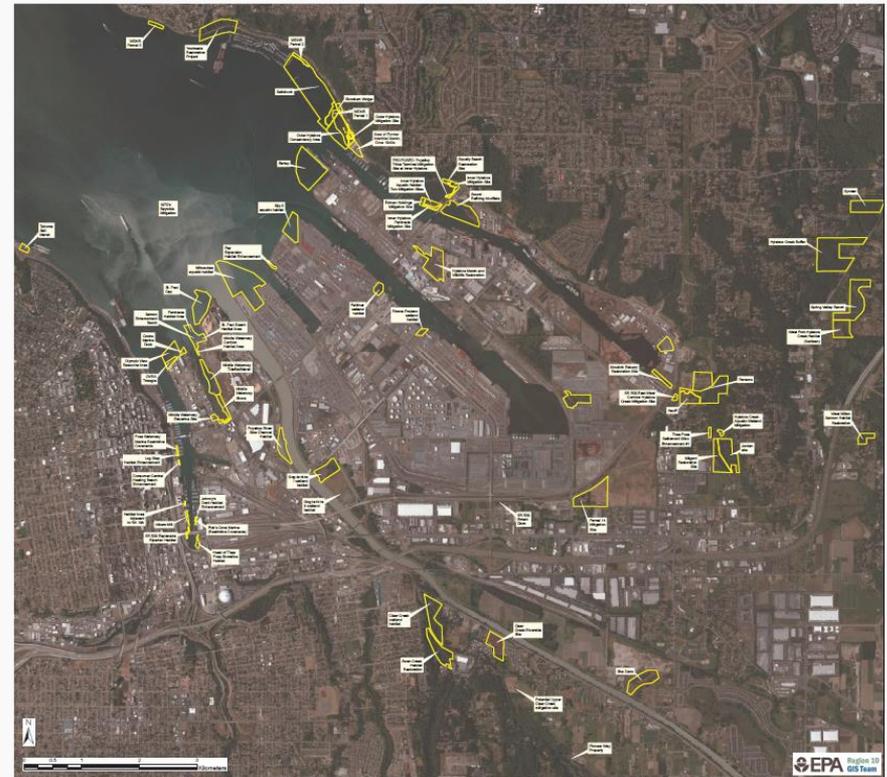
Need Comprehensive Map Showing Remedial Actions

- Develop GIS mapping layers
 - Where are the caps located?
 - Which mitigation sites associated with what CERCLA action?
 - Where was dredging done? How deep?
 - Was dredging to clean? Native layer?
 - Where is contamination left above cleanup goals?
- Need long-term management
- Helps with CERCLA Coordination
 - 75 in past 5 years

Mapping Incomplete



Source: Port of Tacoma 2019



Source: EPA 2009



Additional Information Needed

Example: Caps

- Cap as-builts and specifications
- Datums clearly marked
- Hydrographic surveys
 - Accuracy & tolerance
- Cap edges and depths
 - Defined & mapped accurately
 - Thickness



Lesson 5

Wrap up the loose ends.



Make sure ICs are in place

- Environmental Covenants - State
 - CADs/CDFs
 - 404 mitigation sites
 - Nearshore/shoreline caps
 - Waste left under structures or at depth
- Regulated Navigation Area – USCG
 - Caps/CADs in navigable waterways
 - Waste left under structures or at depth
- NPDES Permits
 - Stormwater/wastewater discharges



Compensatory Mitigation Part of RA

- Compensatory mitigation (CWA 404) - ARAR
- Not well-defined/documented (acres/type)
 - RD: make sure performance measures well-defined
 - RACR: include as-builts
 - OMMP: follow until performance measures met
 - RAR: need to document that ARAR is complete, IC (Environmental Covenant)
 - LTMP: Monitoring and maintenance



Source Control

- Pre-Remedial Action
 - Ecology's Milestone 5 Reports
- Post-Remedial Action construction
 - Monitor sediment
 - Sediment concentrations stable



Lesson 6

Plan for the long-term.



LTMP for Post-RA

- Replaces OMMP (short-term performance)
- Ensures remedy continues to perform
 - If waste left in place
 - If condition requiring mitigation exists
- Required for 5-year Review
- Consistent frequency & methodology



LTMP Consistency

- Intertidal & subtidal caps
 - 4th year of FYR
 - Hydrographic/survey
 - Visual
 - Cores
- CDFs
 - 4th year of FYR
 - Groundwater
 - Visual



LTMP Consistency (cont.)

- Habitat
 - Annual inspections
 - Debris, invasive species, encampments, spraying
 - Physical stability - erosion/deposition
- Consistent timing
 - Same schedule for all areas of Site
 - Align with 5-year Review
- Consistent report requirements/contents



Homeless Encampments



Middle Waterway



Derelict Dock Sections



OVRA Cap

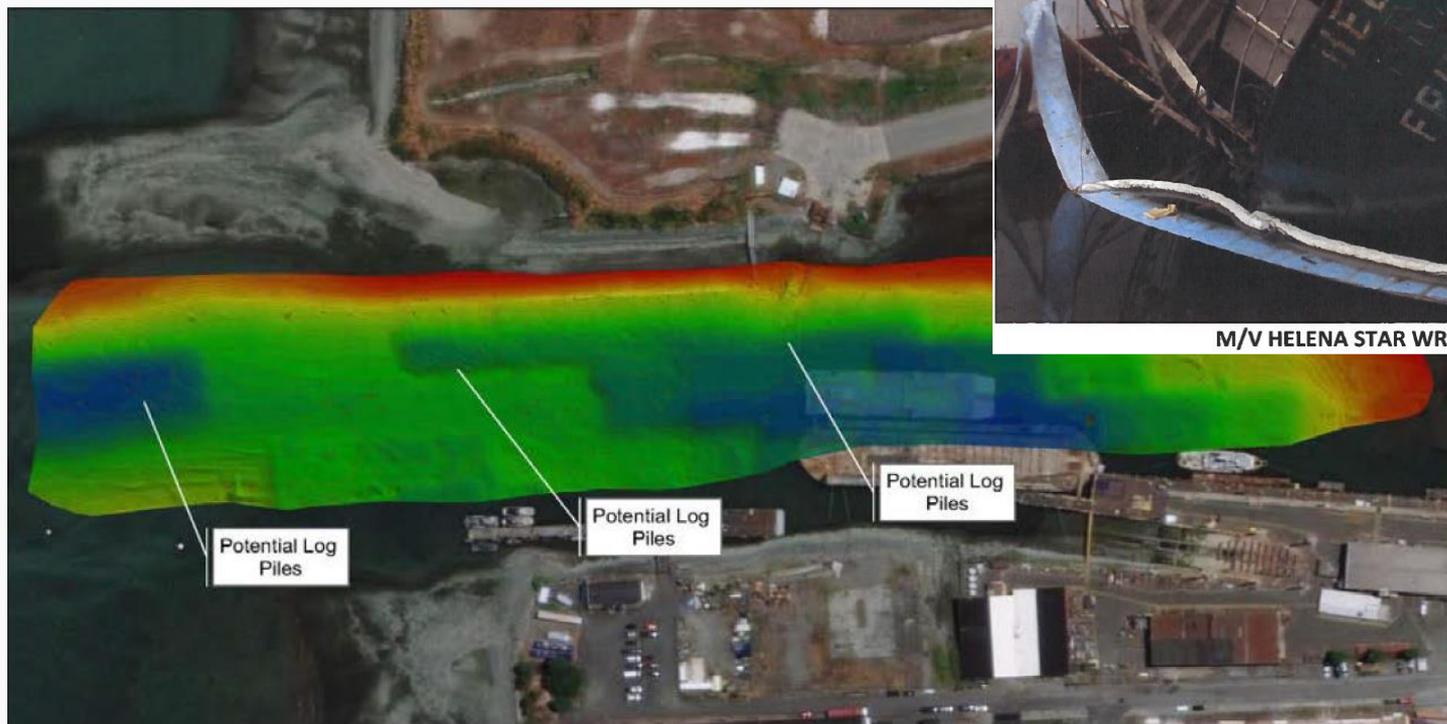


Head of Hylebos

Debris on Caps



M/V HELENA STAR WRECK REMOVAL





Questions?