

Beneficial Reuse of Dredge Sediment on MTCA Sites

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Introduction

- Waterway sedimentation had led to requiring short loading ships
- Emergency dredge of ~ 10,000 CY necessary to remedy issue
- Material unacceptable for open water disposal based on minor chemical exceedances
- Not enough time to perform bioaccumulation testing to potentially allow for open water disposal
- Port cleanup/redevelopment at nearby upland site requiring ~ 100,000 CY fill presented a beneficial reuse opportunity



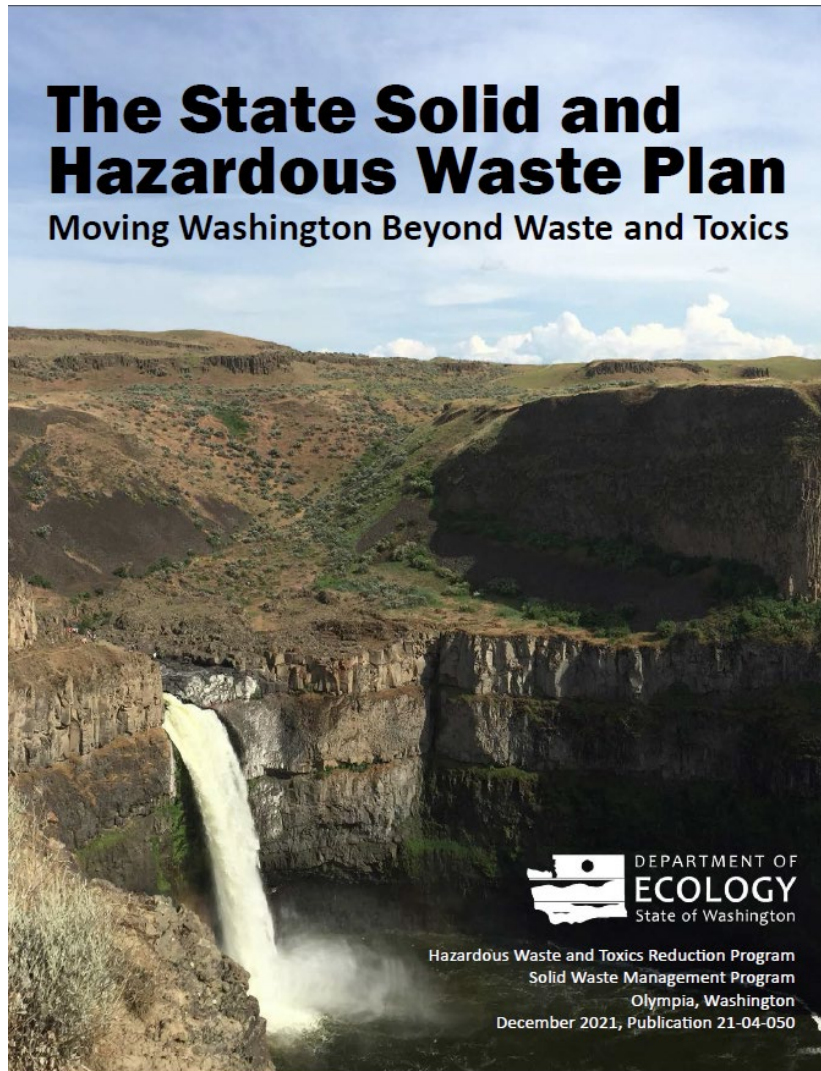
Source: <https://www.portoftacoma.com/>

Chapter 70A.205 RCW

SOLID WASTE MANAGEMENT—REDUCTION AND RECYCLING

- .005(3): “Considerations of natural resource limitations, energy shortages, economics and the environment make necessary the development and implementation of solid waste recovery and/or recycling plans and programs.”
- .005(4): “Waste reduction must become a fundamental strategy of solid waste management.”
- .005(6)(a): “It should be the goal of every person and business to minimize their production of wastes”
- .005(6)(b): “It is the responsibility of state, county, and city governments to provide for a waste management infrastructure to fully implement waste reduction”
- .005(8): Waste reduction is the top priority for solid waste management

State Waste Reduction Goals



- 2021 Ecology Plan: “The State Plan’s 30-year vision - to eliminate most wastes and toxics and use remaining waste as resources - supports the waste management hierarchy established in the solid and hazardous waste statutes, which identify waste reduction as the highest priority, followed by recycling, and then safe disposal.”

- 2018 update to Solid Waste Handling Standards (Ch 173-350 WAC)
- “Clean dredged material ... includes dredged material that contains one or more contaminants from a release and when moved from one location to another for placement on or into the ground:
 - (a) Does not contain contaminants at concentrations that exceed a cleanup level under chapter 173-340 WAC, Model Toxics Control Act— Cleanup, that would be established for existing land use at the location where soil is placed; or
 - (b) Contains contaminants that affect pH, but pH of the soil is between 4.5 and 9.5 or within natural background pH limits that exist at the location where soil is placed.”
- Per WAC 173-350-020(2)(g), clean dredged material is excluded from all Chapter 173-350 WAC requirements
 - Therefore, not a waste!

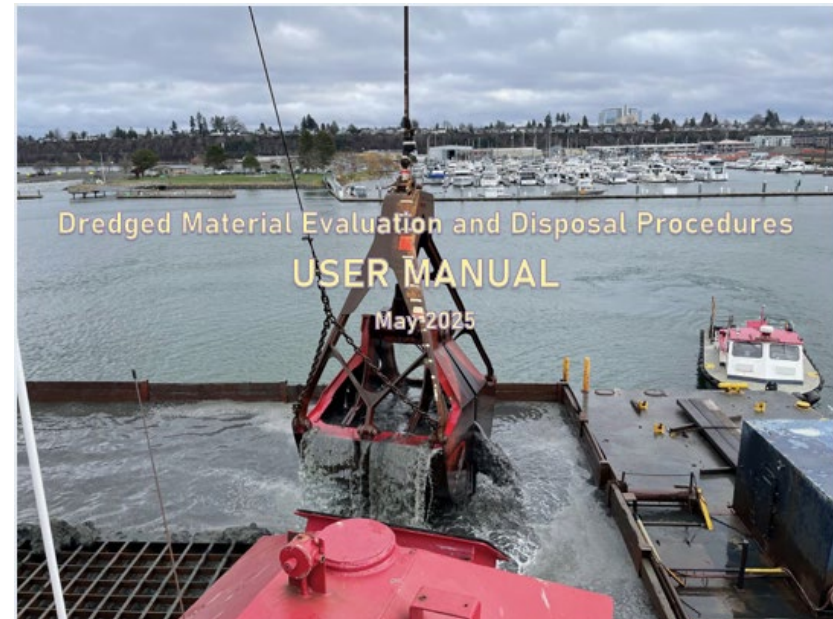
Fill Acceptance Criteria



- Developed site-specific soil cleanup levels for the DMMP laboratory analytes that would satisfy the “clean dredged material” definition.
- The soil cleanup levels were protective of:
 - Method C (industrial) soil cleanup levels
 - Soil-to-groundwater cleanup levels protective of:
 - Method B surface water cleanup levels
 - Method C (industrial) groundwater vapor intrusion screening levels
- General Criteria:
 - Geotechnically suitable
 - No listed or characteristic hazardous or dangerous waste
 - pH between 4.5 and 9.5

Key Ecology Concerns

- Ensuring SAP/QAPP is adequate
- Are the soil cleanup levels at the upland site stringent enough?
 - Final cleanup levels have not been established at the upland site
 - Will the dredged material introduce new or more contamination on the upland site?
 - Some soil cleanup levels > current site conditions
 - Statistical compliance
- Sampling frequencies:
 - Is DMMP frequency enough?
 - Post-dredge sampling frequency?



Implementation Steps



- Ecology
 - Involved Ecology Site Manager early and often in the process
 - Fill acceptance criteria approval for the receiving upland site
 - Negotiated with Ecology Site Manager and resolved Ecology concerns during each step
- Sampling and Evaluation
 - Reviewed dredging characterization SAP/QAPP
 - Proposed that the DMMP sampling frequency was a suitable frequency for evaluating this dredged material for fill acceptance
 - Evaluated and documented DMMP dredge material sample results relative to the fill acceptance criteria
 - Sampled post-dredge material on the barges for select analytes
 - Evaluated and documented post-dredge sample results relative to the applicable fill acceptance criteria

Dredge Sample Results



- Dredged sediment satisfied all of the general fill acceptance criteria
- All analyte results in the 6 **applicable DMMU** dredged sediment samples were < soil cleanup levels for the upland site, except:
 - Slight copper and mercury exceedances in 1 sample
 - Cu/Hg cleanup levels based on 90% natural background
- Ecology agreed to post-dredge sampling and statistical compliance to further evaluate acceptability of reusing dredged sediment
 - Agreed on 1 post-dredge sample per 500 CY
 - Analyzed all samples for copper and mercury
 - Ecology further requested analyses for arsenic, lead, nickel
- All **post-dredge** sample results were < soil cleanup levels, except:
 - Slight copper and mercury exceedances in 1 sample
 - However, copper and mercury results satisfied statistical compliance requirements in WAC 173-340-740(7)

Sampling Frequency



- Sampling frequency was a **big** point of contention for this project
 - Ecology typically uses its “Guidance for Remediation of Petroleum Contaminated Sites” to determine required sampling frequencies
 - This guidance for small point-source petroleum sites is not appropriate for non-point source dredging projects
 - Using this sampling frequency guidance for a dredging project would typically be cost prohibitive

Table 6.9 Typical Number of Samples Needed to Adequately Characterize Stockpiled Soil (1)	
Cubic Yards of Soil	Number of Samples for Chemical Analysis
0-100	3
101-500	5
501-1000	7
1001-2000	10
>2000	10 + 1 for each additional 500 cubic yards
(1) Source: 1995 Guidance for Remediation of Petroleum Contaminated Soil.	

Sampling Frequency

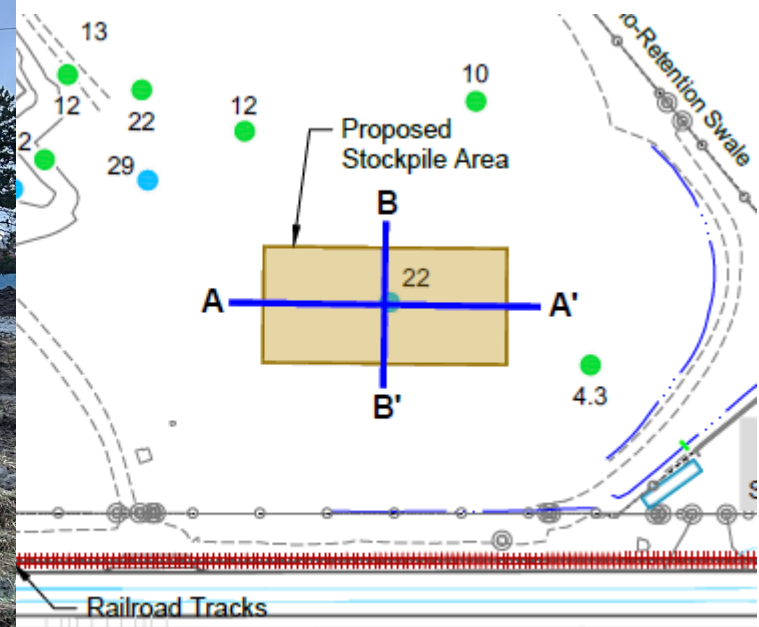
- Ecology Site Manager generally wanted higher sampling frequencies
 - Original inclination was that DMMP frequency was not enough
 - Still requiring high frequency for virgin quarry sources
- We eventually prevailed on:
 - No additional in-place sediment sampling beyond DMMP sampling
 - 1 sample per 500 CY for post-dredge sampling on the barges (rather than Ecology's petroleum guidance frequency)



Project Logistics



- How to safely sample on the barges
- Where to transload sediments
- How to dewater dredged material to allow for shipment to upland site
- How to handle the dredged material once on site to allow for additional dewatering

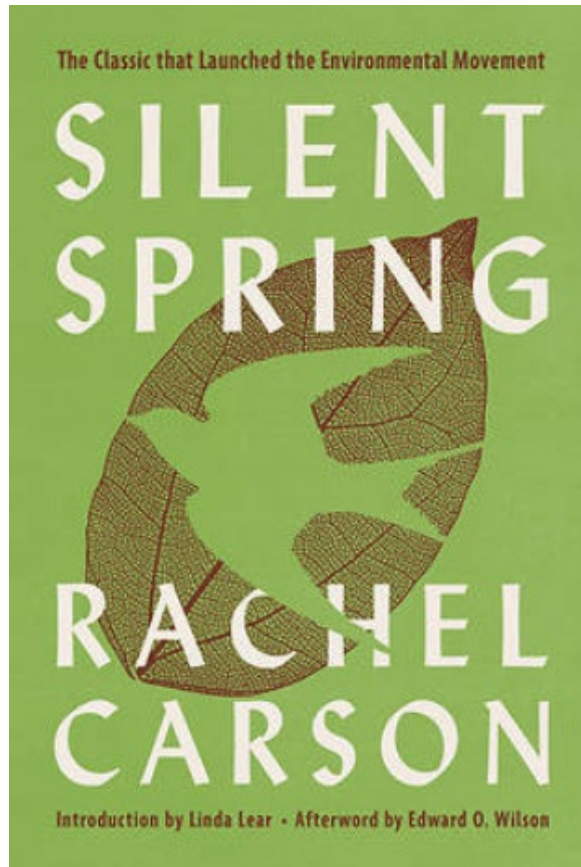


Conclusions

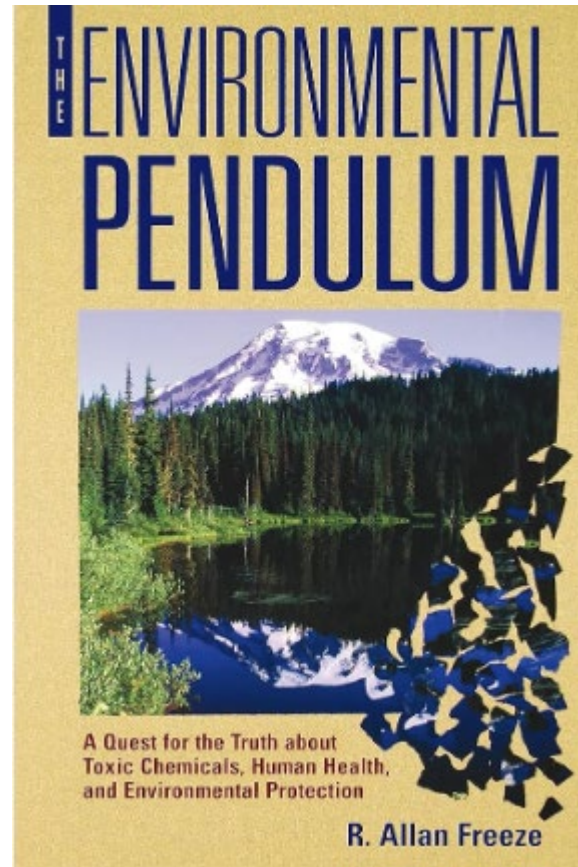


- Ecology ultimately approved the reuse of all dredged sediment for fill at the upland site in March 2025
- All dredged sediment transported to the upland site by April 2025
- The Port's out of the box approach:
 - Reduced waste generation
 - Reduced mining and importing quarry material
 - Reduced costs for two projects
- This same approach can be used by all Ports
- The Port community has an opportunity to present Ecology, stakeholders, and leaders with a uniform framework and mindset change to solve an ongoing problem

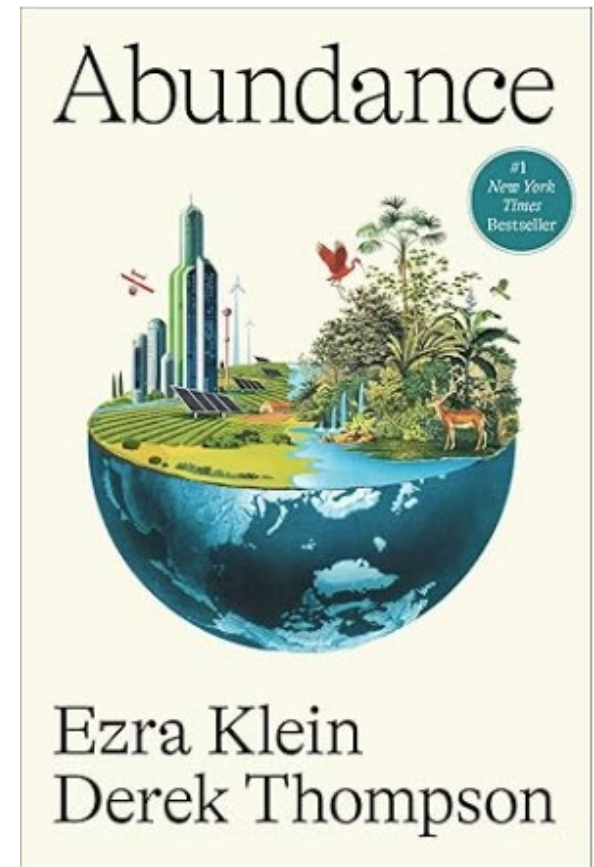
Mindset Change



1962: "We are not the only creatures who have reason to fear the poisons of the modern world"



2000: "The unpleasant truths about waste management" and "the social costs of overkill and underkill"



2025: "We prefer that projects go badly by the book. We minimize some risks but make delay and high costs routine"

Let's collectively encourage and empower regulators, stakeholders, and leaders to embrace smarter and more efficient dredge disposition

Some key messages:

- State's waste reduction goals
- View dredge material as a useful product rather than a waste
- Beneficial reuse, sustainability, and circular economy
- Negative tradeoffs associated with in-water or landfill disposal
- The actual toxic risks will be addressed to protect HH&E
- Uniform framework >> individual regulator preferences
- Outcomes not process

Contact Information

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