

Leveraging Habitat Planning to Reduce Remedy Cost



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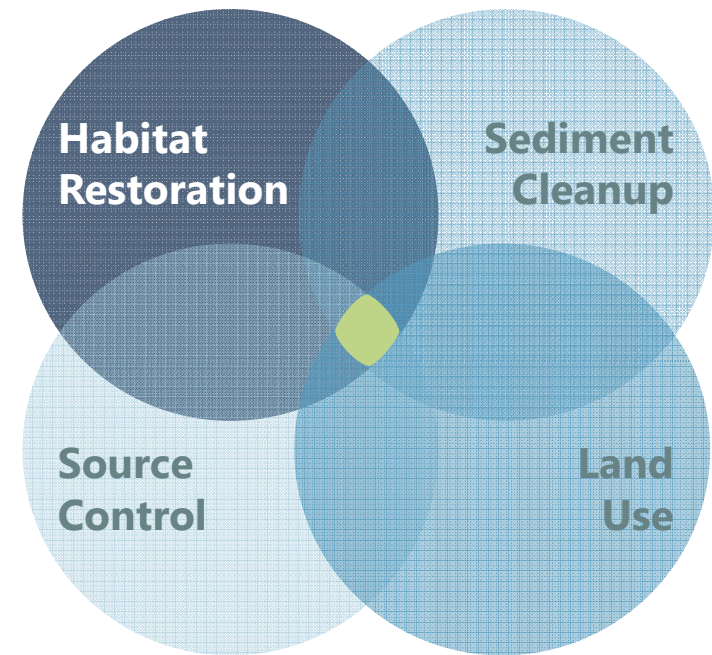
Overview



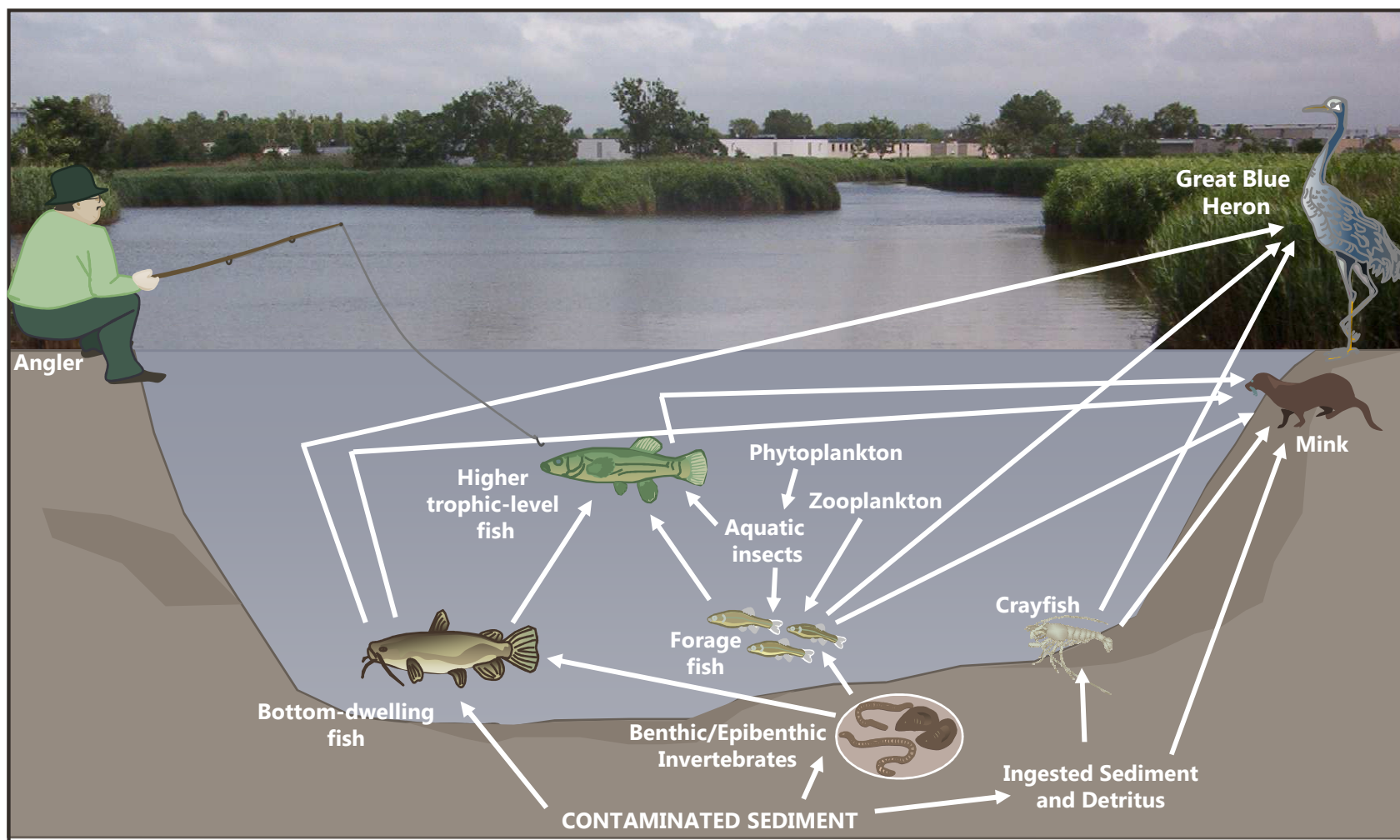
- Habitat restoration in the CERCLA process
 - Opportunities for effective and efficient integration
 - Addressing sediments with levels that pose a threat to human health or environment
 - The big dig doesn't solve all of the problems
 - Focus on risk reduction and ecosystem function
- Justify and leverage more cost-effective remedial alternatives
- Approach and examples

Begin with the End in Mind

- Develop vision framework early
- Process for stakeholder input
- Timing of community feedback
- Mine feedback for elements that are useful
- Impact of cost-effective enhancements and access
- Perception of success linked to visual elements

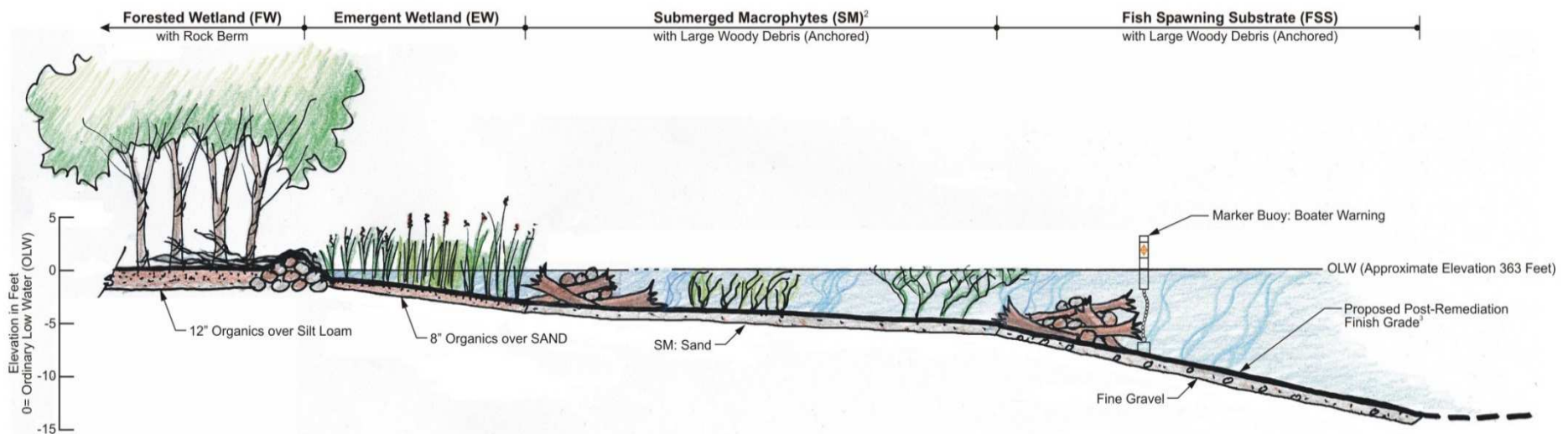


Remedial Investigation to Develop Conceptual Site Model



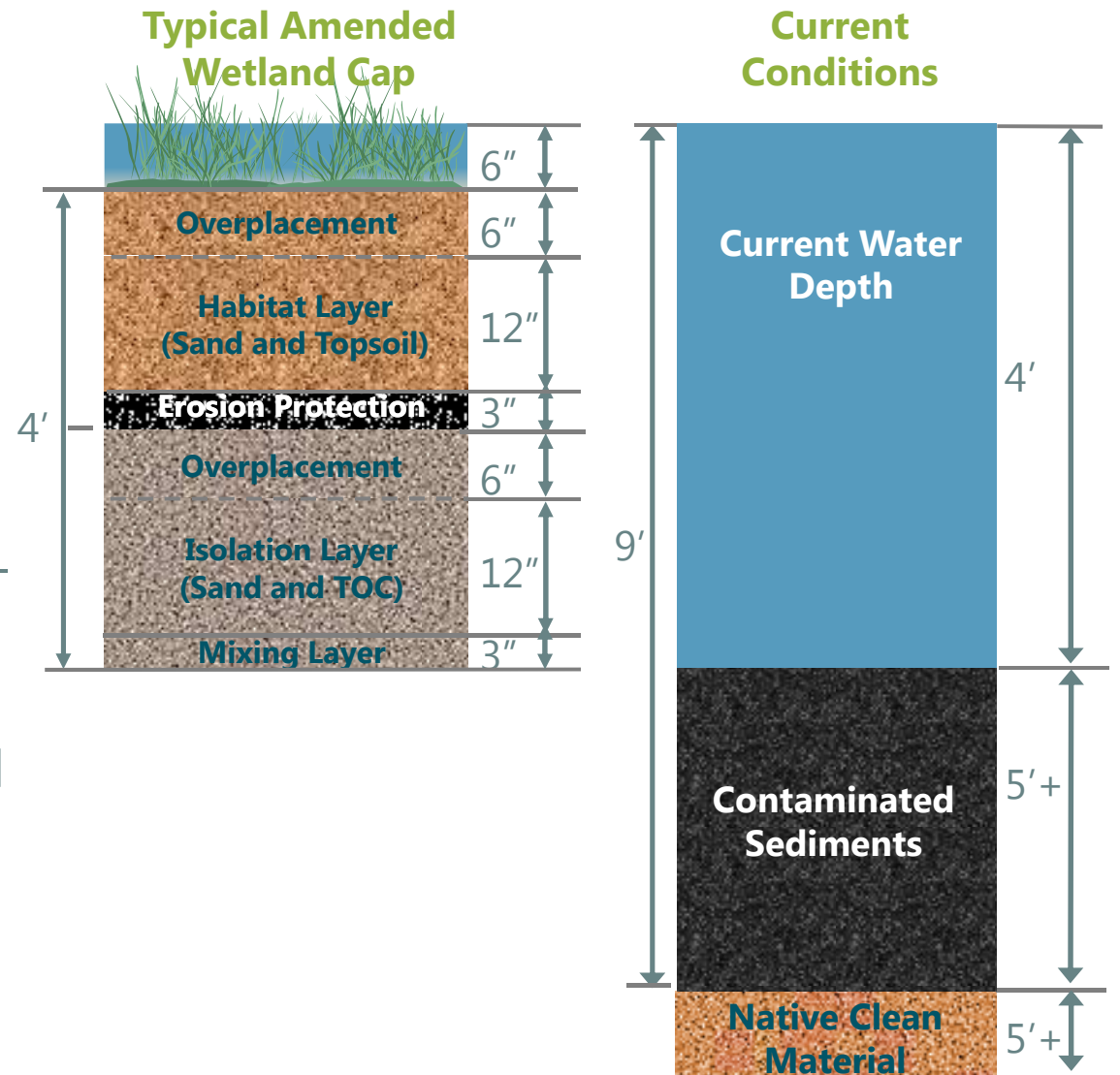
Integrating Restoration into FS Process

- Understand CSM and site conditions from RI
- Initial screening of potential alternatives
- Optimize diverse, high-functioning habitats
 - Support multiple types of species
 - Use of community and agency feedback

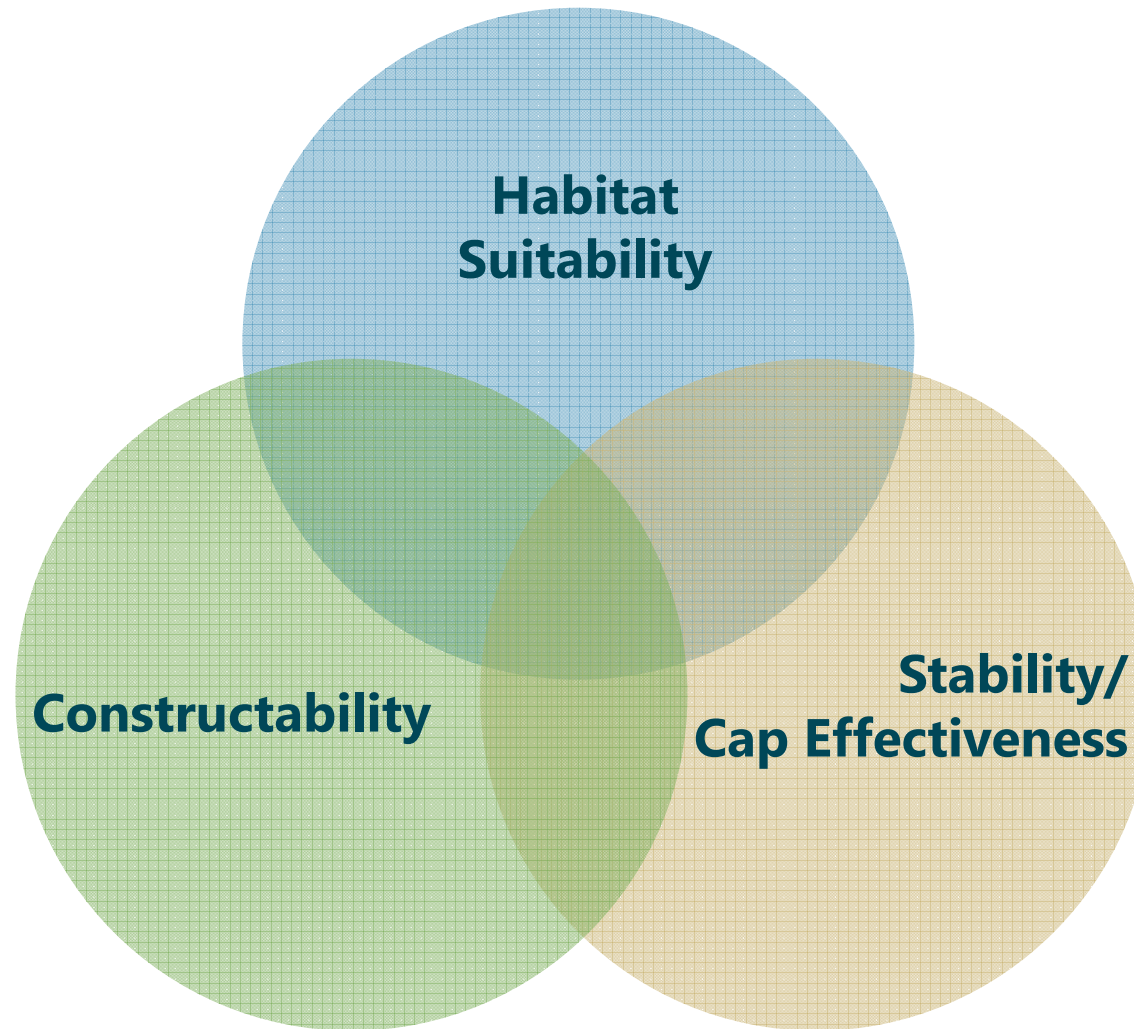


Cost-Effective Remedial Alternatives

- Control removal due to cost of dredging and disposal
- Use in FS process
 - Holistic vision for restored condition
 - Identify desired post-remedy water depth
 - Alternative remedy focused on increased function of diverse shallow water habitats



Substrate Requirements



Integrated Strategy for Material Sourcing

- Early evaluation of local material sources and beneficial reuse opportunities
- Understanding of in situ grain size distribution
- Multiple materials required for restoration and cap elements
 - Grain size distribution
 - TOC
- Early buy-in supports cost-effective approach and future design specs
 - Limits screening, processing, and handling
 - Enhanced sustainability



Use to Develop Key Relationships

- Regulatory decision makers
 - Agency management
 - Fish and wildlife staff
- Community
 - Leverage local NGO feedback
 - Key stakeholder involvement
- Message vs. messenger
 - Lines of communication
 - Independent technical credibility



NYSDEC
FW&MR



Project Examples

Onondaga Lake: Syracuse, NY

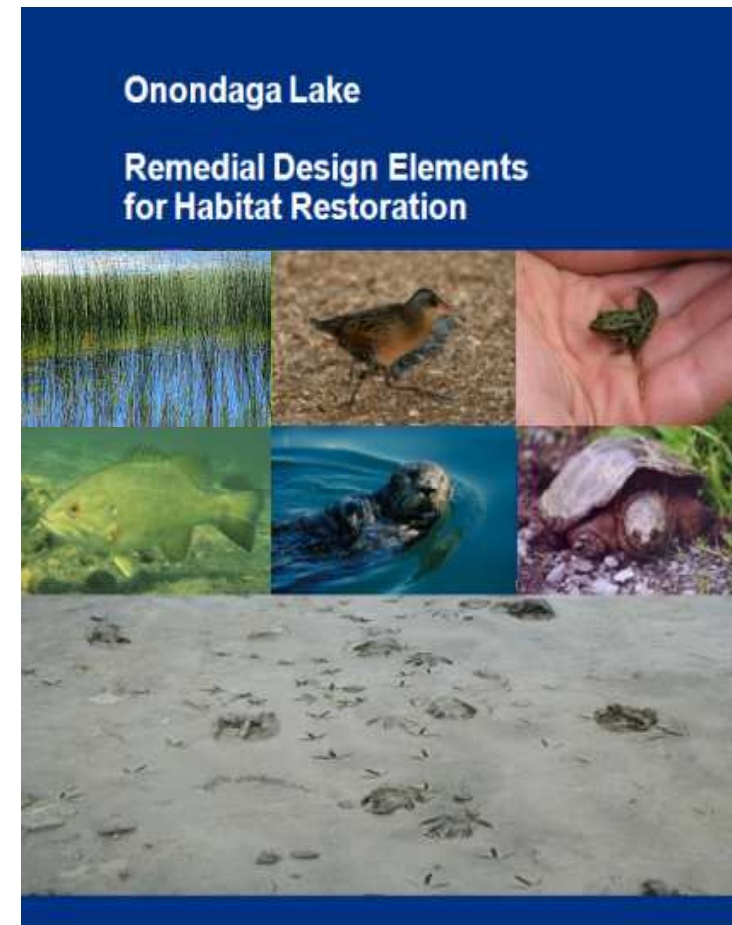
GP Log Pond: Bellingham Bay, WA

St. Paul Waterway: Commencement Bay, WA

Remediation and Restoration Program: Southeast

Onondaga Lake Habitat Restoration

- Large scale remedy including MNR, capping and dredging
- Holistic habitat planning process
 - FS focus led to inclusion in ROD
 - Representative species
 - Public input
 - Driver for conceptual design
- Focus on enhancing habitat
 - Shallow water environments
 - Wetlands



Leveraging Agency and Community Feedback

- Modified barrier wall alignment
 - Agency staff wanted naturalized shoreline
 - Community feedback for deep water fishing access
- Shoreline wetlands
 - F&W staff focus on northern pike spawning habitat
 - 14-acre shoreline location
 - Developed design with local university input



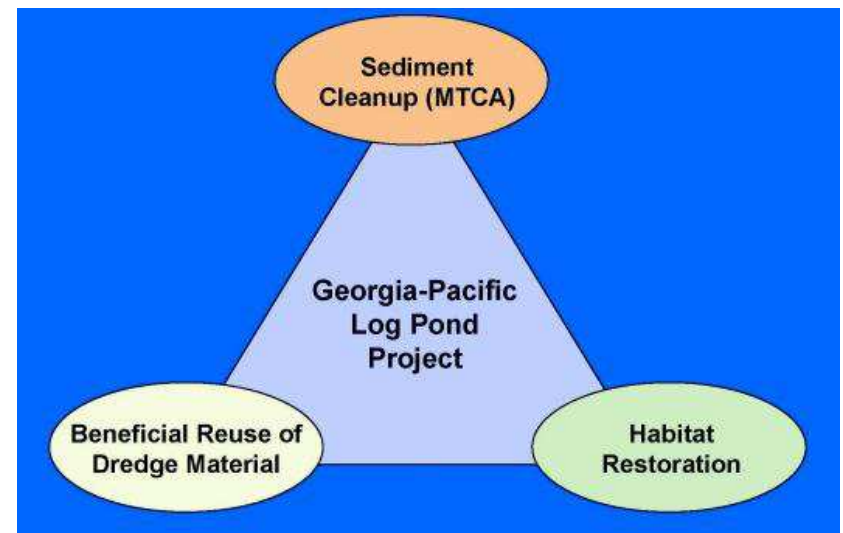
Integrated Wetland Mitigation Approach



- Maximize area outboard of barrier wall
- Increase connected wetlands adjacent to the lake
- Pike spawning habitat used to support 1:1 mitigation ratio
- Planting of diverse native species to support spawning

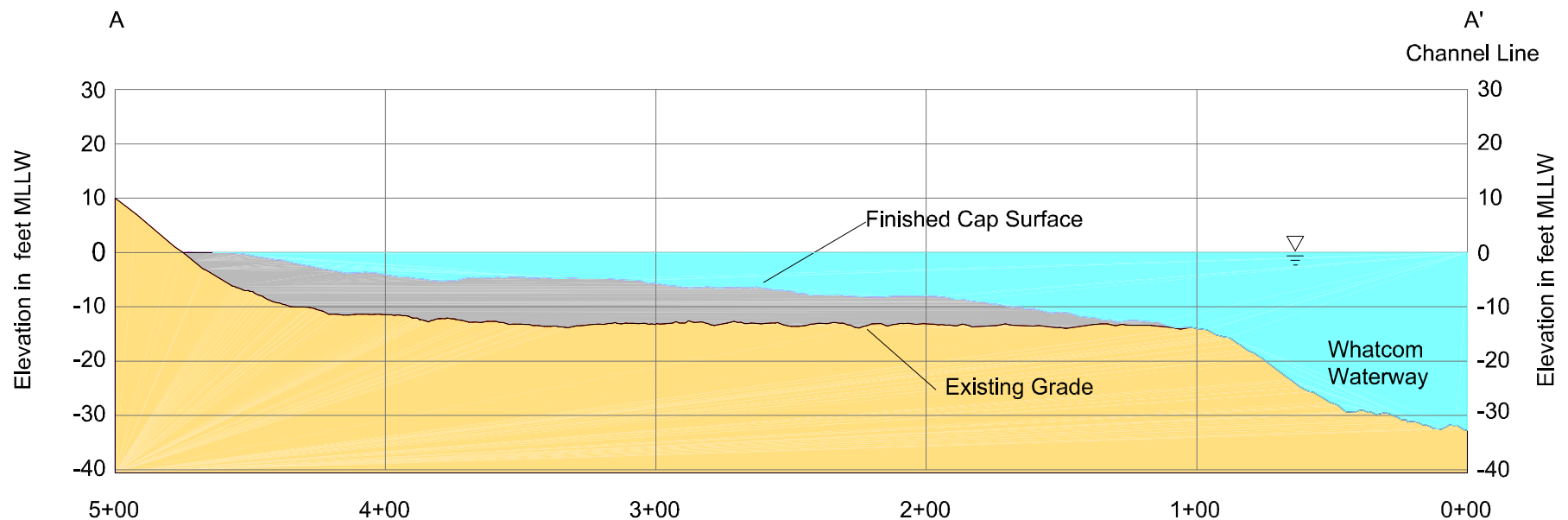
GP Log Pond Site – Integration of Remediation and Restoration

- 5.6 acre industrial pond with mercury in sediments
- Comprehensive strategy identified shallow water aquatic restoration need in salmon estuary
- Bellingham Bay EIS and Whatcom Waterway MTCA both identified capping/filling as preferred alternative
- Dredging an inferior remedy
 - Short-term water quality impacts
 - Structural impacts to facilities
 - Higher cost with fewer benefits
- Natural recovery timeframes too long



Log Pond Capping/Habitat Restoration

- 3-foot cap thickness required for remedy
- Up to 10 feet placed to create intertidal habitat
- Beneficial reuse from channel and harbor dredging
- Enhancement to salmon estuary



Monitoring Confirmed Restoration Success

- Collaborative project with Huxley College
- Cap continues to be protective
- Highly productive benthic, epibenthic, and riparian communities established in several years
- Major increase in utilization by salmon and numerous forage fish
- Eelgrass meadow restoration after several years



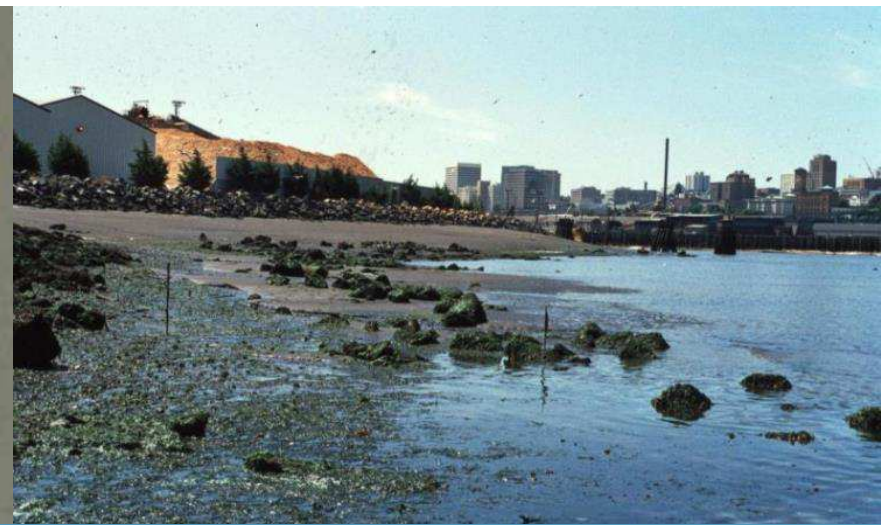
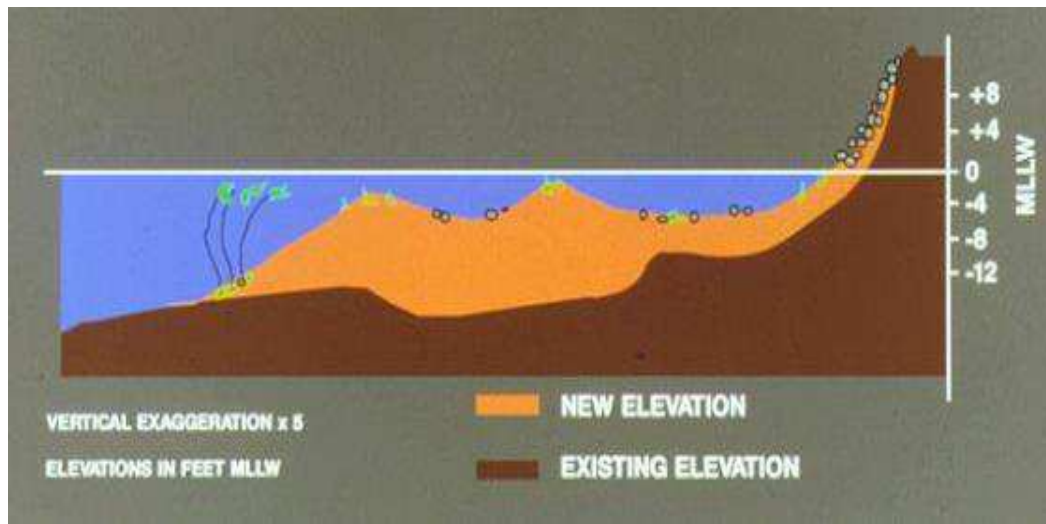
St. Paul Waterway Project



- Part of Commencement Bay Superfund Site
- Accelerated cleanup prior to Superfund decision
 - Part of Simpson acquisition in mid 1980s
 - Concurrent with mill site purchase process
 - Integrated habitat restoration
- Cleanup and natural resource damage resolution
- Considerable stakeholder involvement
 - Audubon Society, Sierra Club, and Puyallup Tribe
- Consistent with water use at mill

Remediation and Restoration Overview

- Up to 20 feet of clean sediment placed over a 17-acre area to restore intertidal habitat
- Hydraulically dredged sands from nearby river delta
- Cobbles and boulders placed in intertidal and shallow subtidal areas to ensure long-term beach stability and improve habitat diversity



Benefits from Approach

- Cooperative projects have multiple benefits
 - Process and implementation efficiencies
 - Highly cost-effective
- Integrated intertidal habitat restoration and cleanup
- Success confirmed with long-term monitoring
 - Rapid recolonization
 - Same as reference areas within a few years
 - Monitoring now tied to episodic events (e.g., storm surges and earthquakes)



Remediation/Restoration Program – Southeast

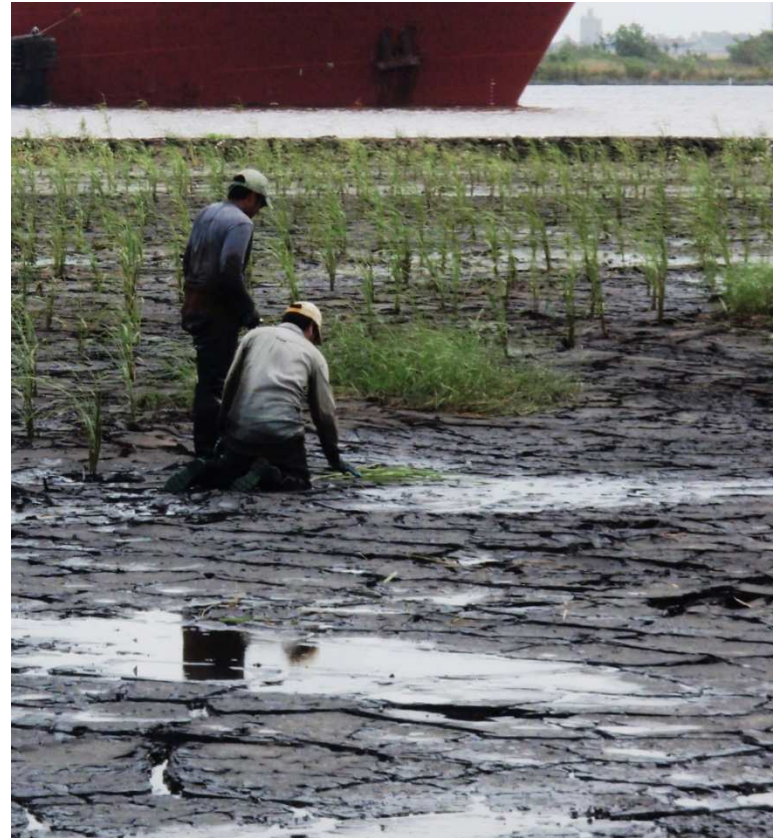
- Impacted wetland
 - Approximately 140 acres
 - Contaminated by industrial effluent
 - Vegetation loss due to decades of subsidence
- Leveraged water depth and restoration opportunity to limit removals
- Selected remedy included thin layer cap and restoration



Sediment Placement

Beneficial Re-use and Post-remedy Wetland Restoration

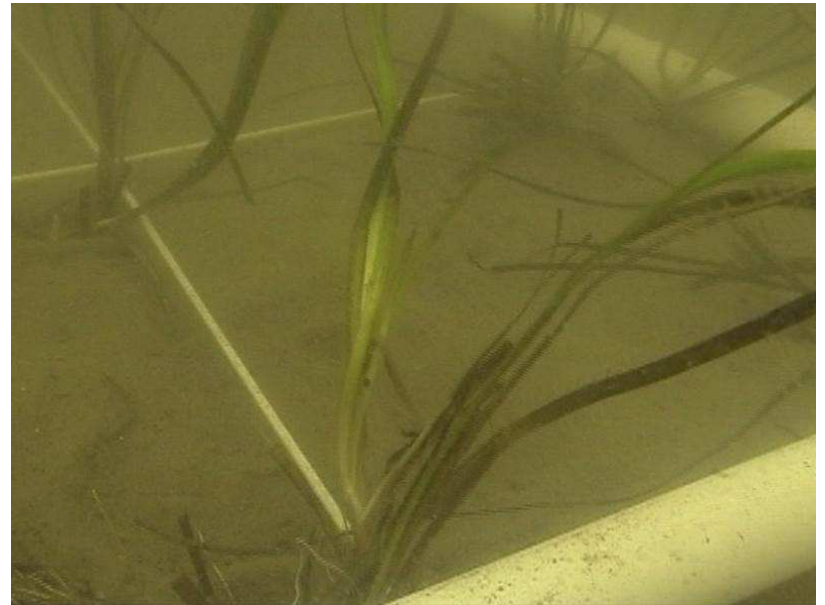
- Integrated remedy with beneficial re-use and restoration
 - Thicker sediment cover to establish marsh platform
 - Re-use of sediment dredged for nearby port development
 - Re-establish wetlands



Wetland Planting

Challenges to an Ongoing Process

- Building a house of cards
- Understand investment and ROI
- Expectations of restored condition
- Single- vs. multi-party considerations
- Federal and state regulatory environment
- Agency experience and turnover
- Trustee influence

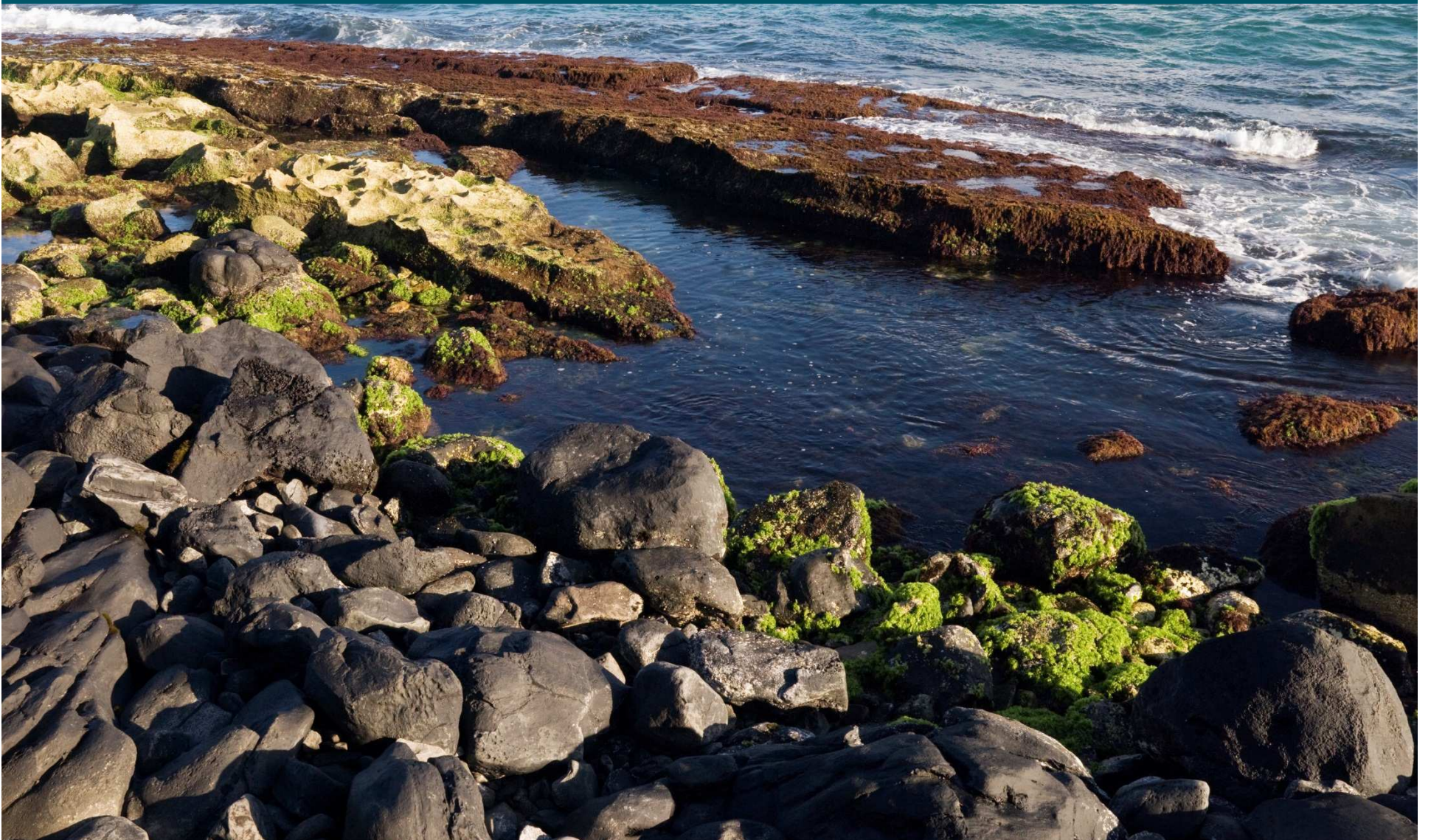




Benefits

- Focus priority on end result, not dredge volume
- Restoration elements less expensive than removal, transport, and disposal
- Relationships with key decision makers
- Public involvement and perception
- Integrated mitigation strategy
- Potential NRD credits

Questions/Discussion



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