



Health



Environment



Technology



Sustainability

A Novel Approach to Monitoring Dredge Residuals to Inform Cost-Effective Dredge Residuals Management

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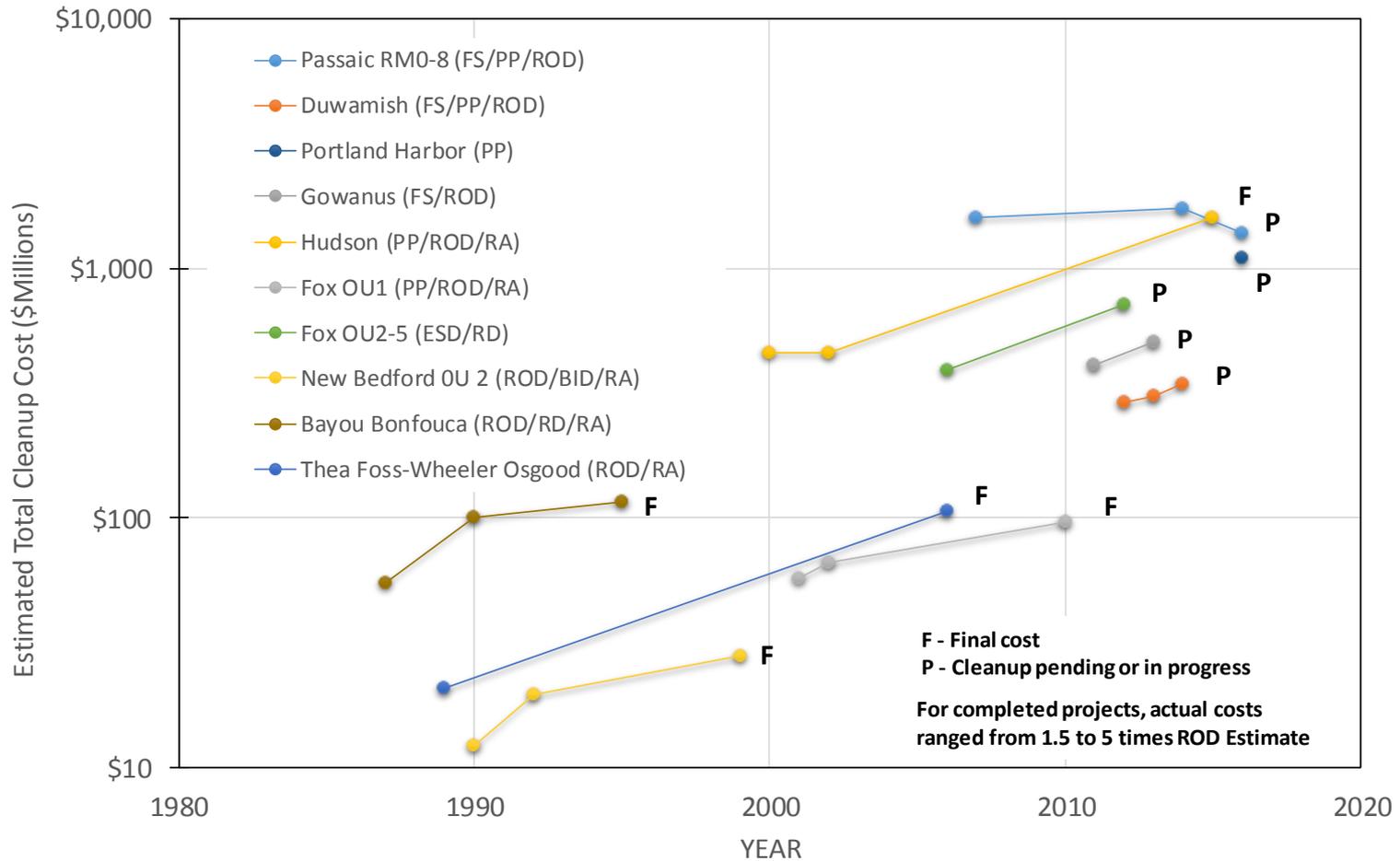
Craig Jones, Ph.D.

October 27, 2017

Sediment Megasites

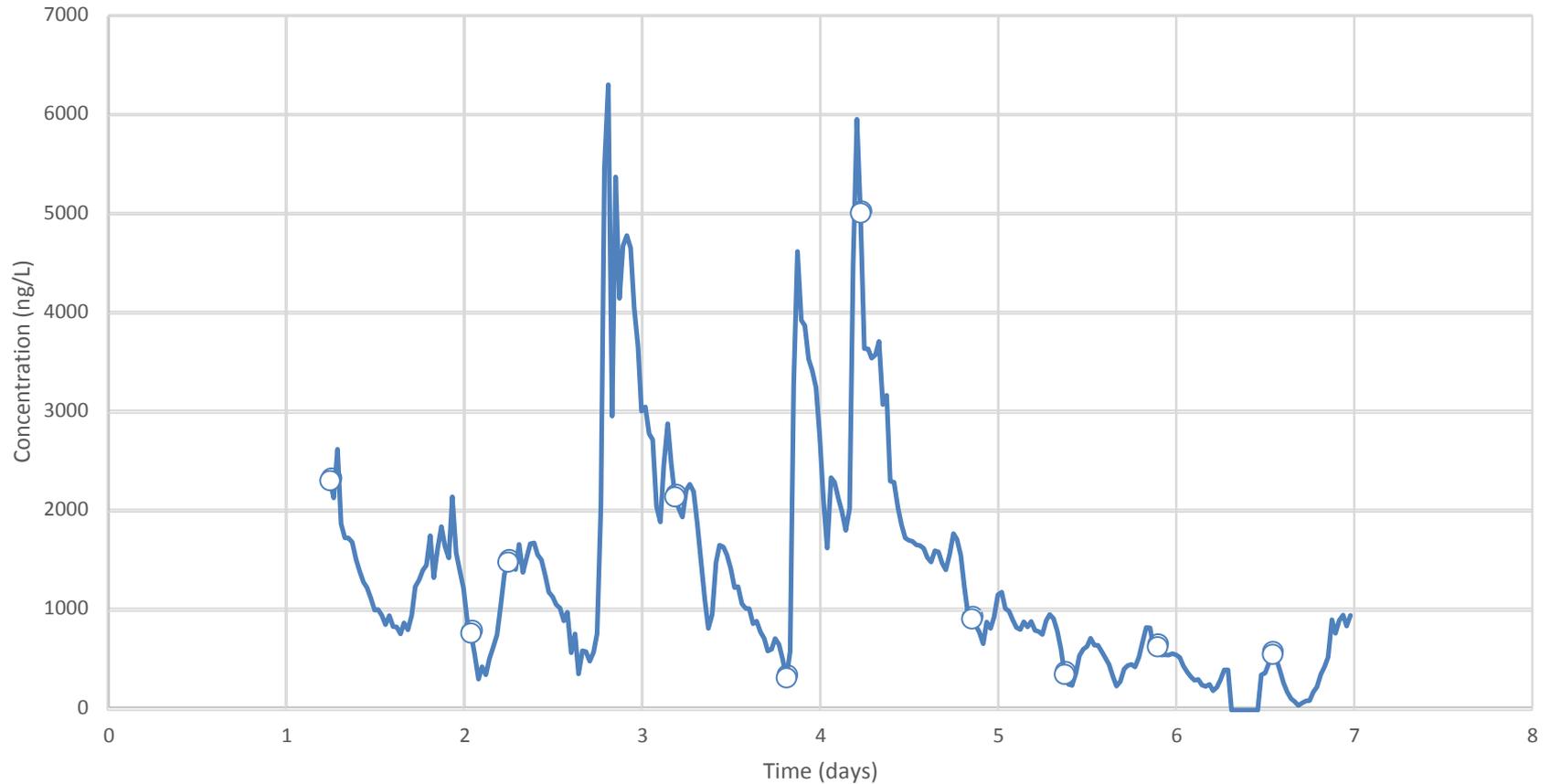


Costly Remedies



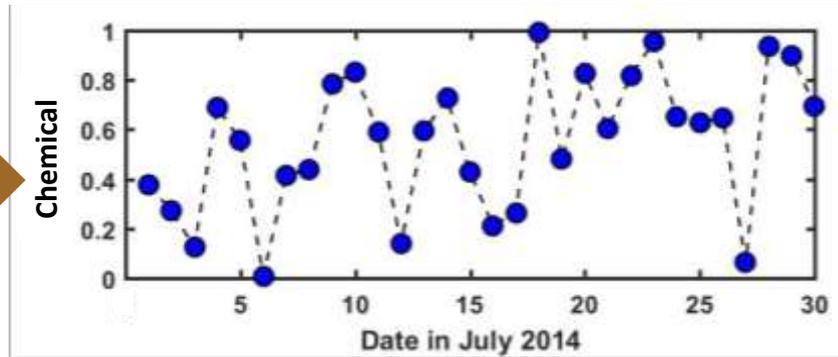
Includes "all-in" costs at various project phases (e.g., FS, ROD, RA) for preferred alternative or selected remedy. Discount rate for NPV costs varies.

Conventional Monitoring Approach

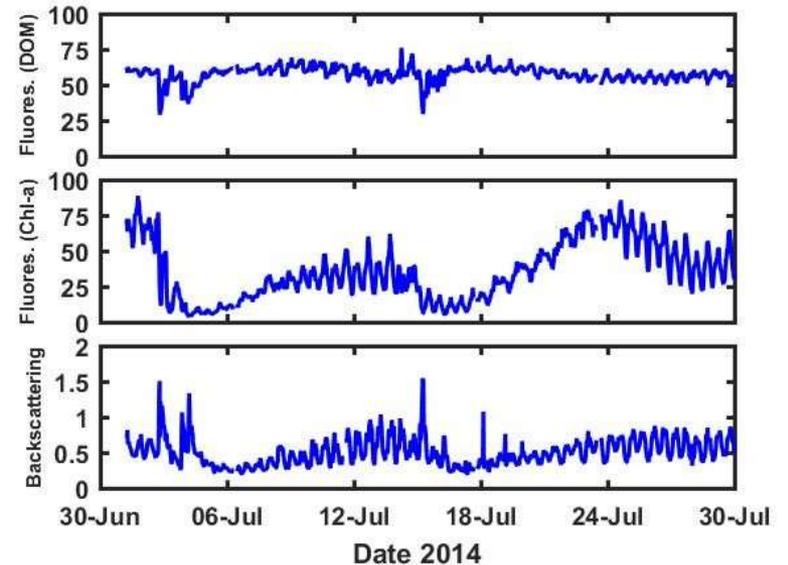


Alternative Approach

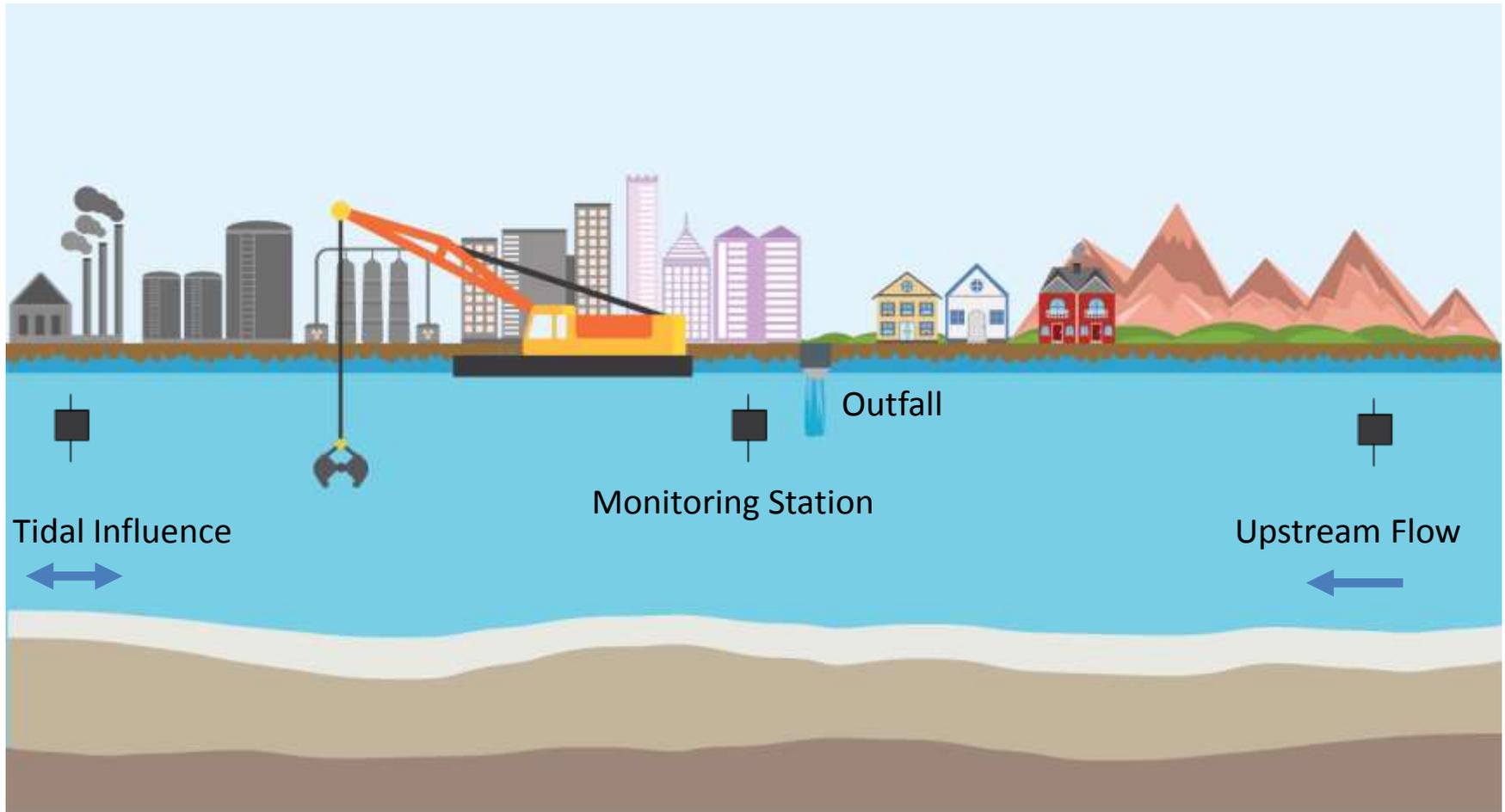
Discrete Analytical Chemistry Data



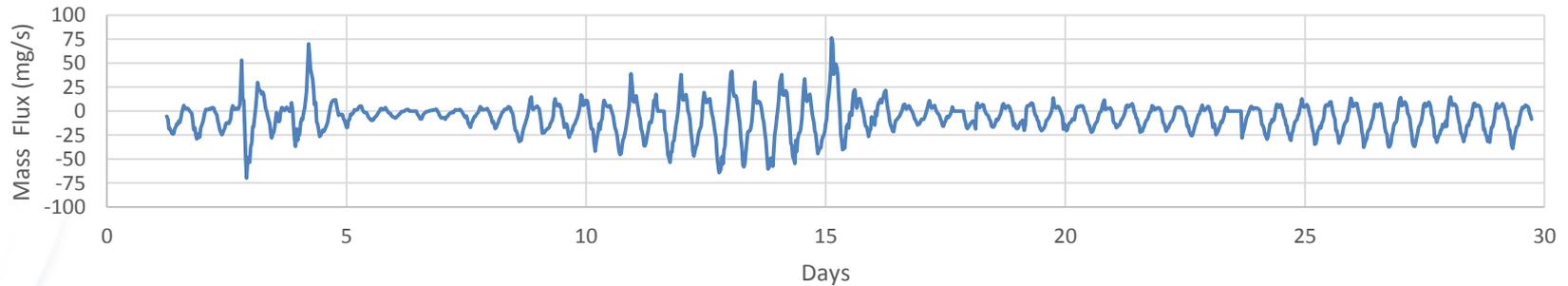
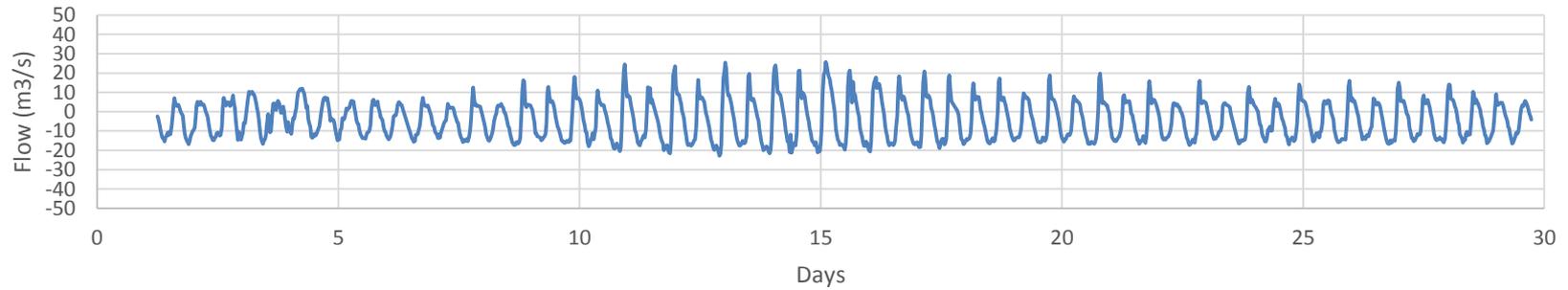
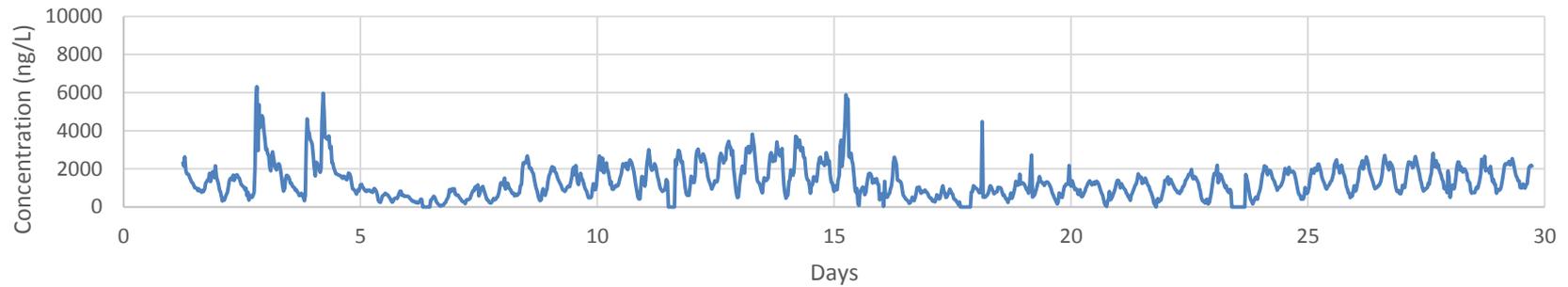
In-Situ Optical Data



Real-Time Monitoring

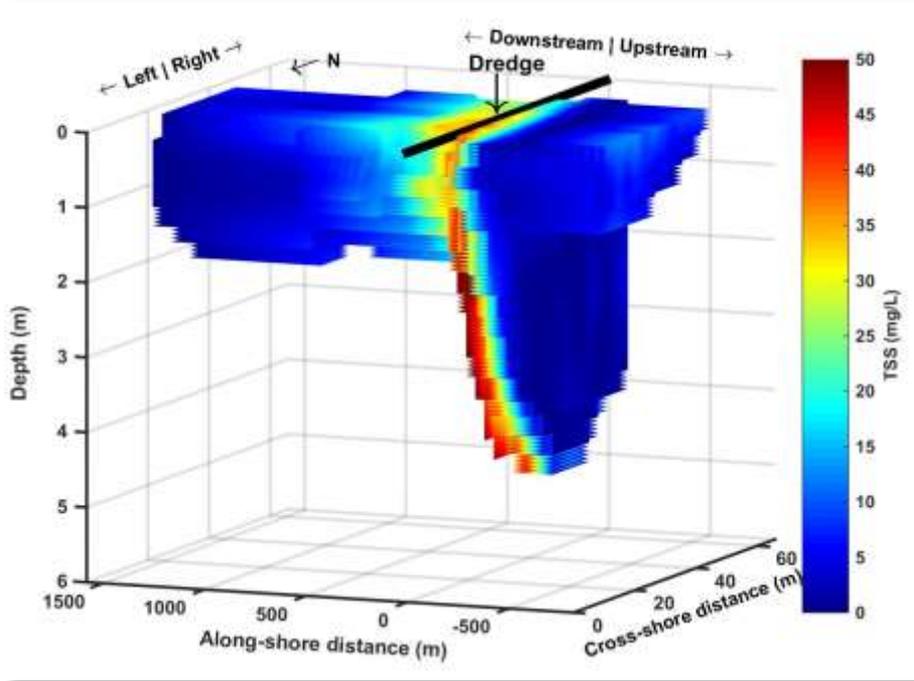


Real-Time Mass Transport

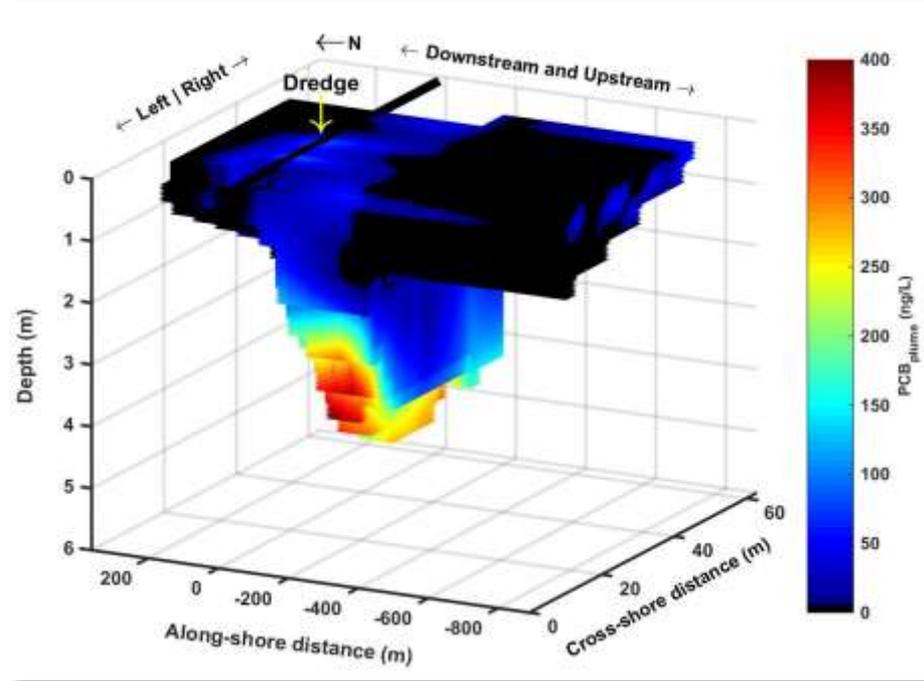


Precision Mapping of Dredge Plume

Solids

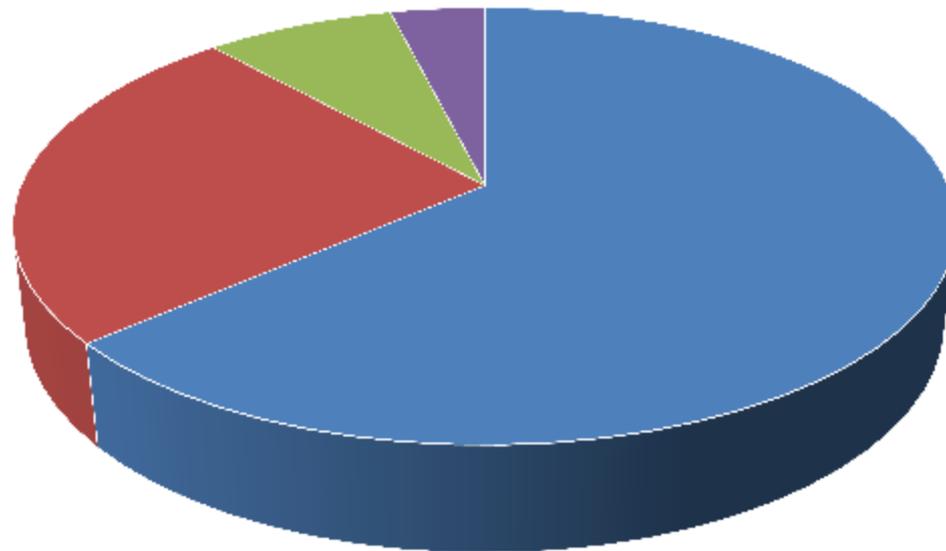


Contaminants



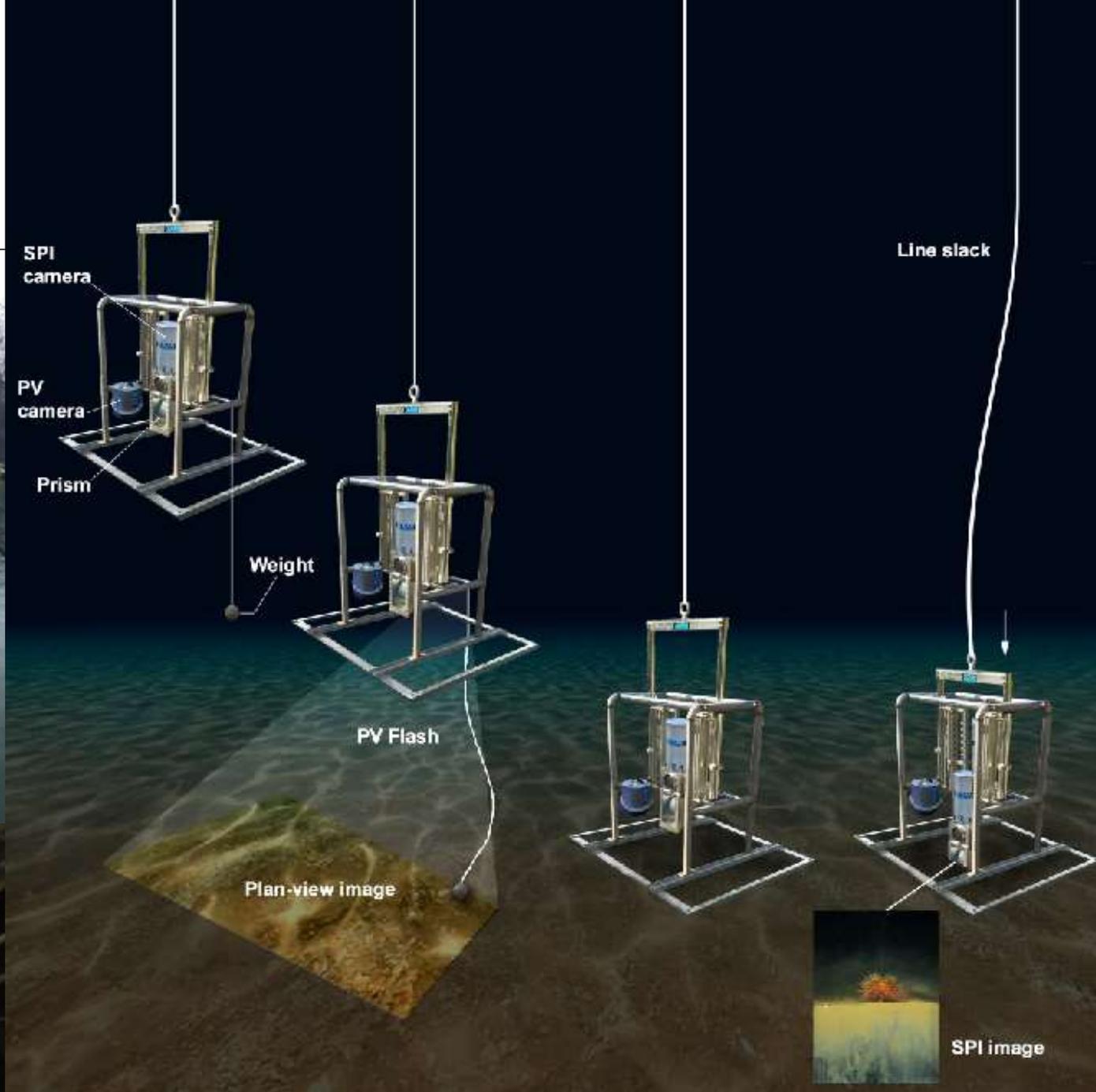
Quantification of Contaminant Sources

Contaminant Mass

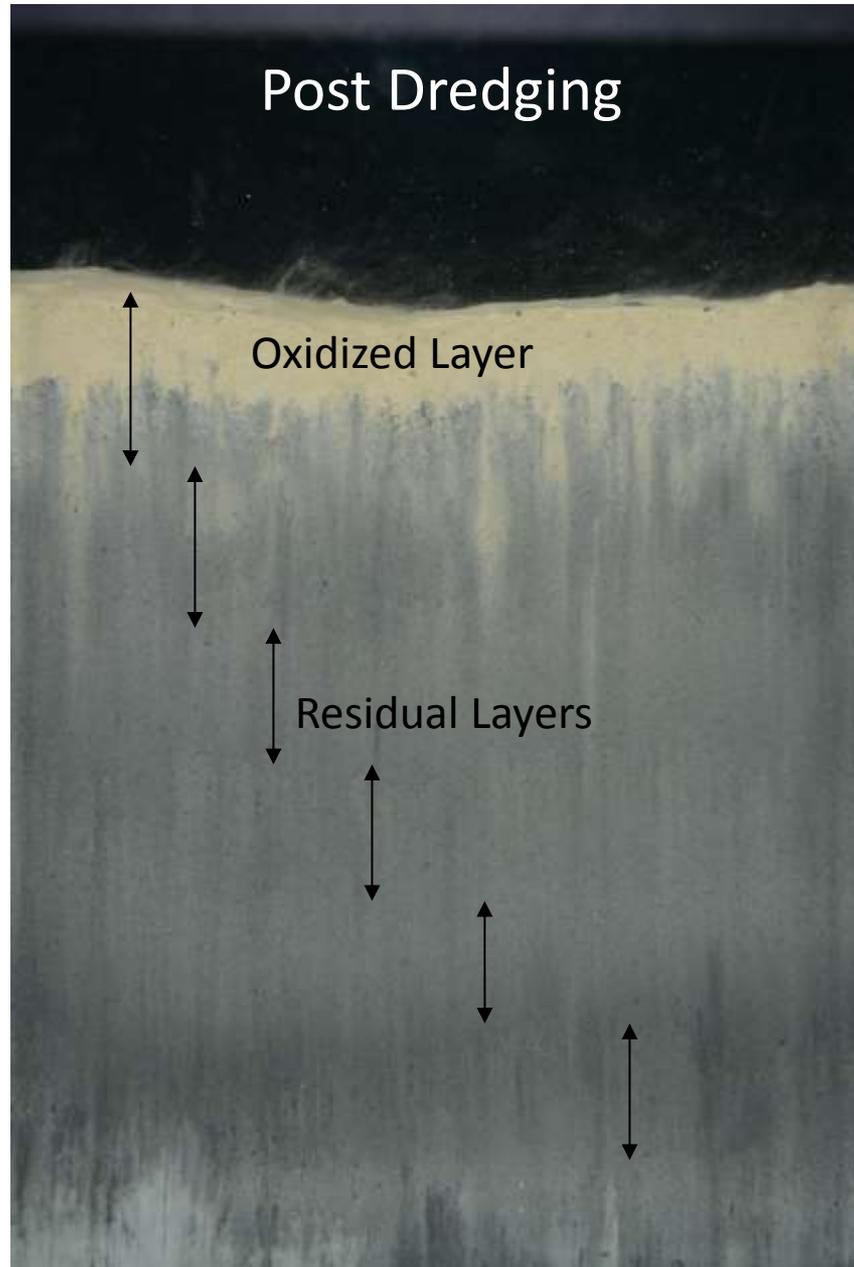


- Upstream Loading
- Outfalls/CSOs
- Tidal Flow
- Dredge Residuals

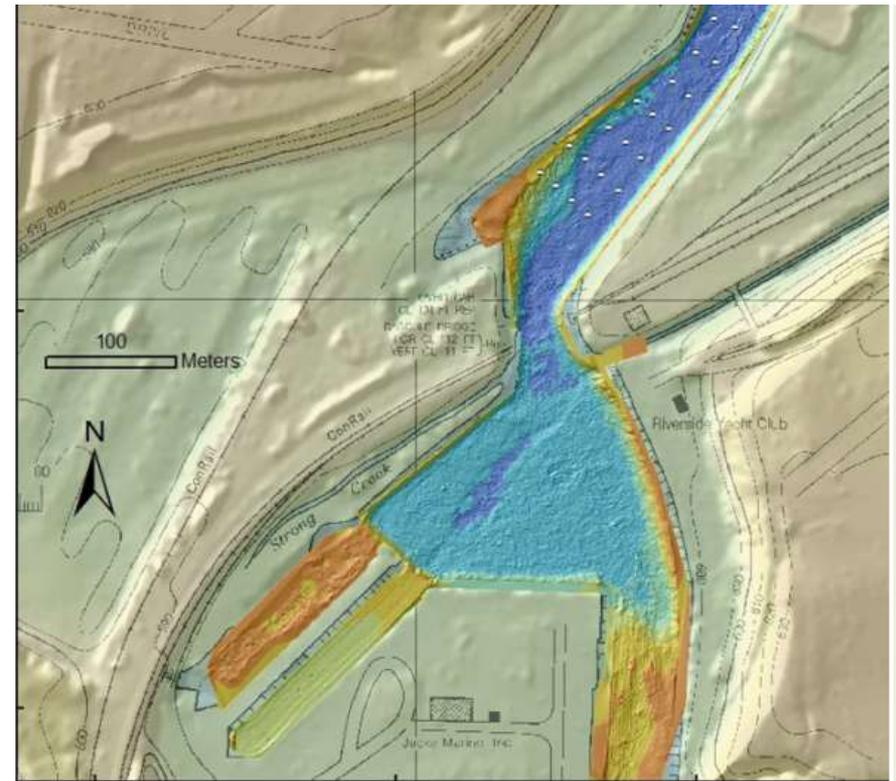
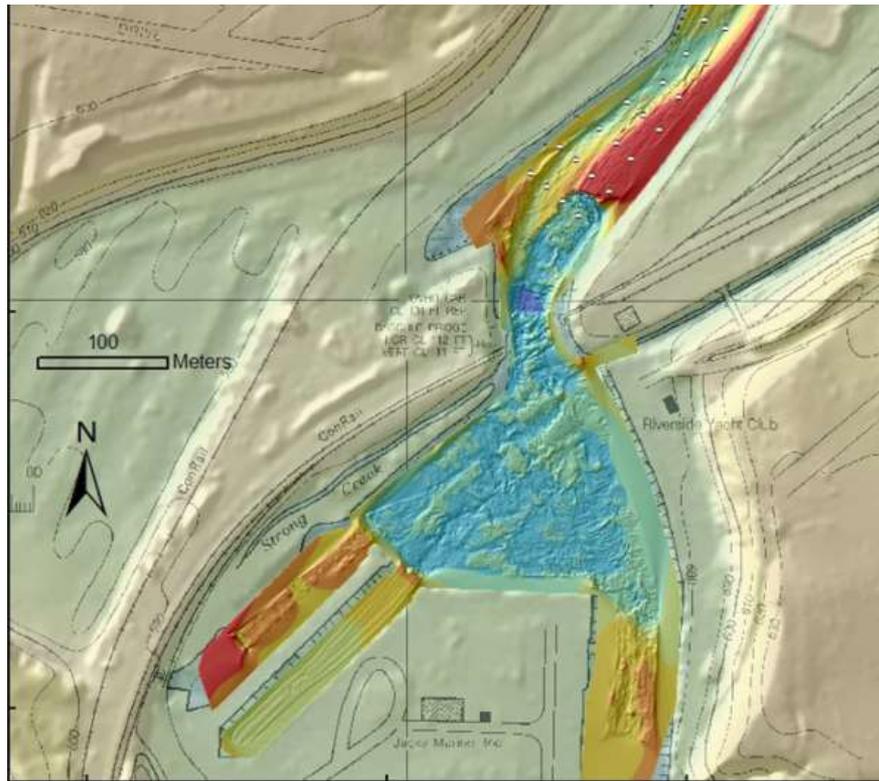
SPI/PV Image Collection



SPI

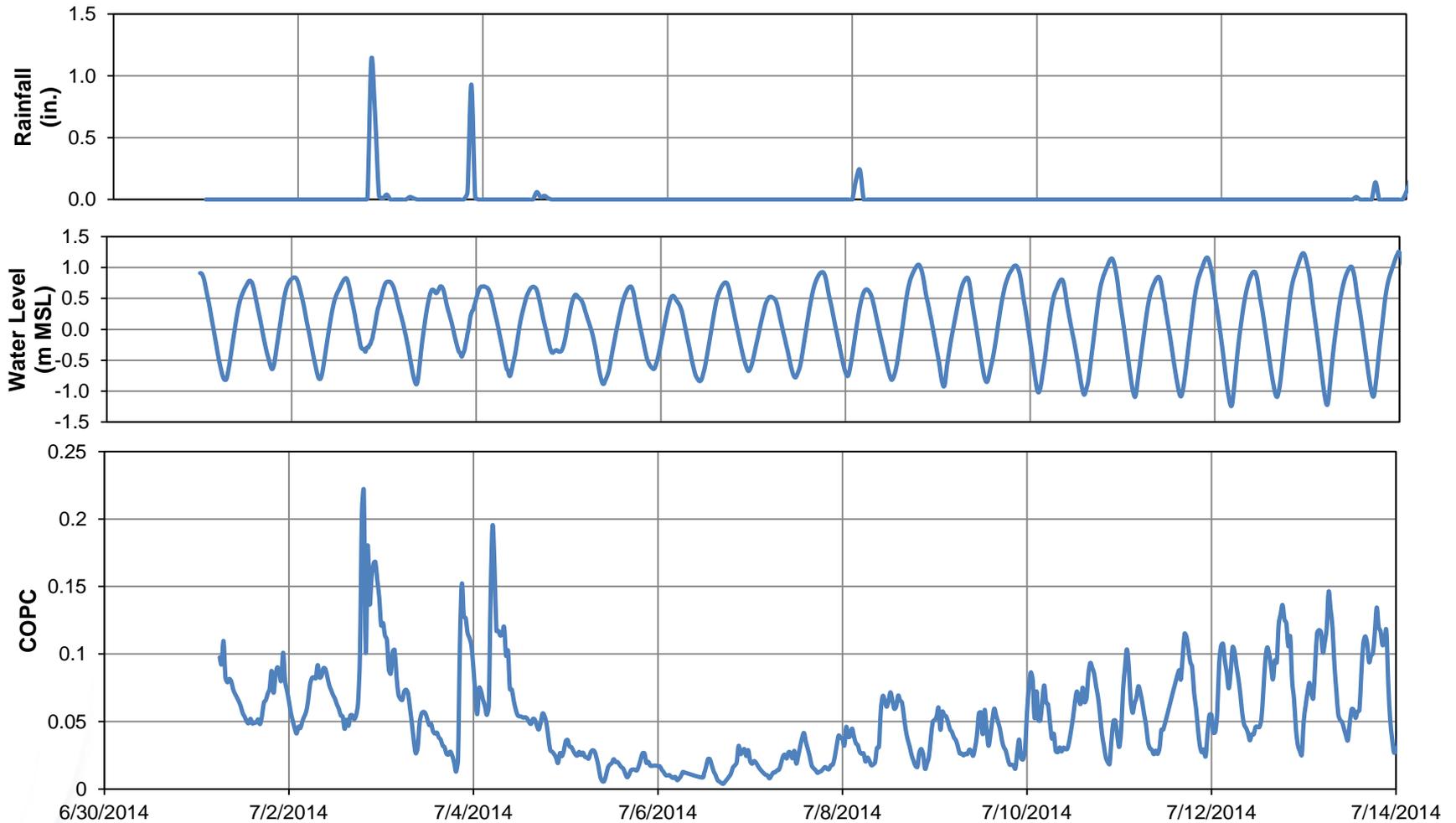


Bathymetric Surveys

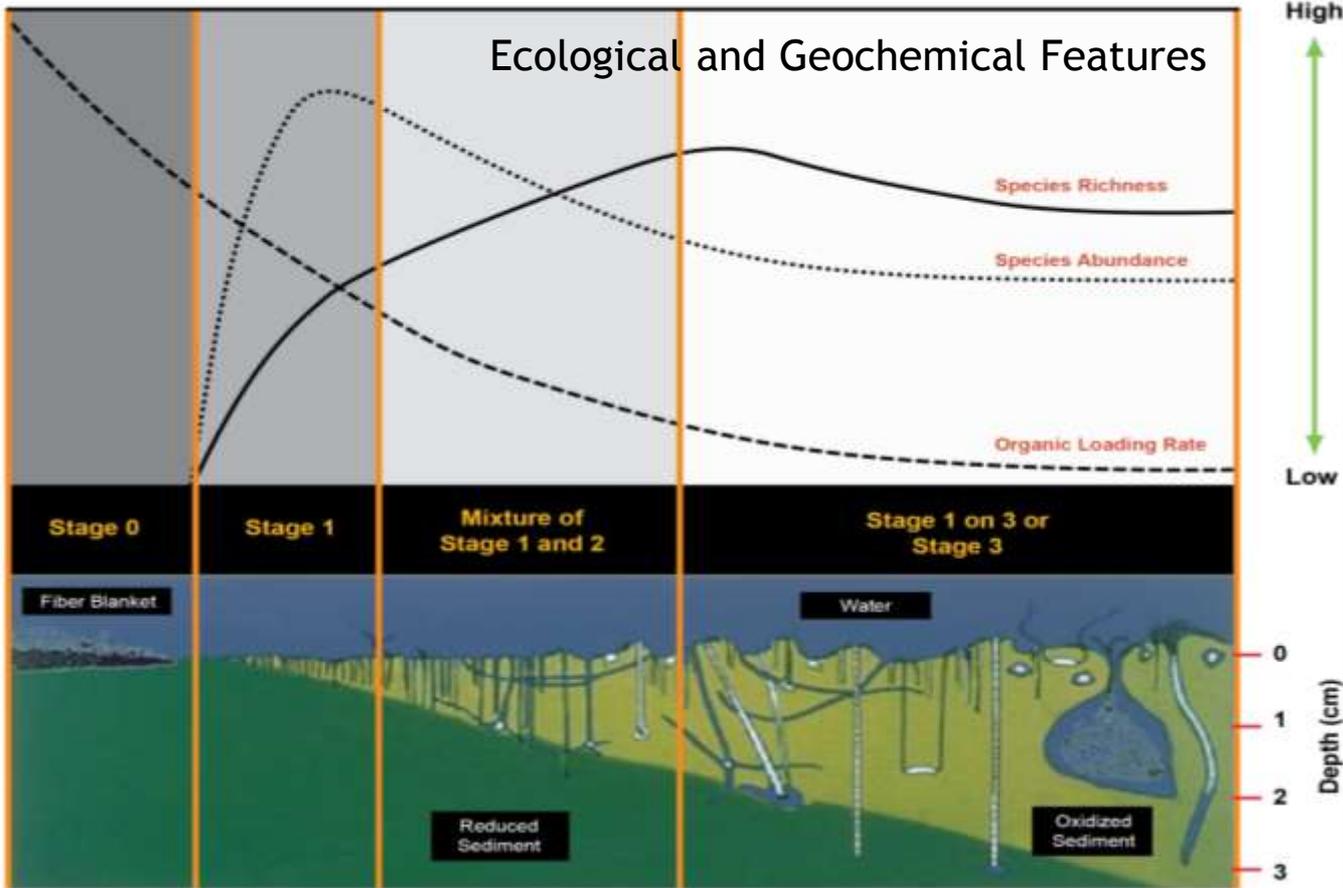


Long-Term Remedy Performance Monitoring

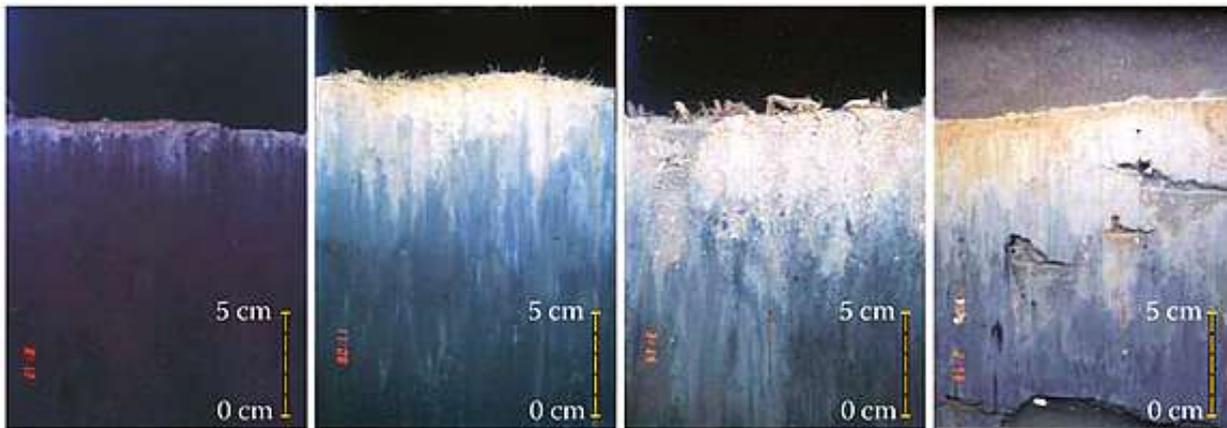
Mass Transport



Ecological and Geochemical Features



Physical Features



Potential Cost Effective Strategy

- Selected Remedy for Portland Harbor
 - Total Capital Construction Cost: \$1,170,548,000
 - Erosion and Residual Control Measures: \$27,166,335 *
 - Periodic Monitoring Costs: \$47,460,000

* Does not include cost for placement of residuals management layer which consists of 12-inch sand layer over entire dredge prism; amended with activated carbon in certain areas



Thank you!

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