

Sediment Management: Planning, Managing, Monitoring

Presentation to the NSRP
Environmental Technologies Panel

June 22, 2010



Planning, Managing and Monitoring

- Remedial Design
- Precision Removal Actions
 - ◆ Dredging
 - ◆ Capping and/or Residual Management
- Performance-based contracting
- Construction and Long Term Monitoring



Importance of Design Characterization

Dredging - resuspension, release and residuals and Minimizing water in dredged materials

Performance-based Contracting Value Engineering Minimizing footprint/reducing managed volumes

Good construction and long-term monitoring Performance criteria

Three R's: resuspension, release, residual

- **Sediment Characteristics**
 - ◆ physical, chemical, biological, debris, vegetation
- **Site Conditions (water depth, currents, waves)**
- **Site Constraints (bridges, channel size)**
- **Residuals Management**
- **Disposal Location / Transportation**
- **Volume and time frame = production rate**
- **Cost**



Performance-Based Contracting

- **Volume Reduction**
 - ◆ Coring Program – detailed mapping
 - ◆ Obstruction Identification
 - ◆ Precision dredging
- **Landfill Reduction**
 - ◆ Volume Reduction
 - ◆ De-sanding
 - ◆ Water Management



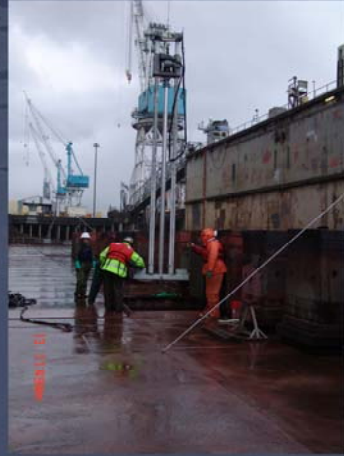
Importance of GOOD Characterization



- Sediment cores collected to bottom of contamination
- EPA identified incomplete or inadequate characterization as the main contributor to project growth
- Case in point; Hudson River the program underestimated the volume by 30 – 40%



Unique Sampling Challenges at Shipyards



Mechanical Dredges



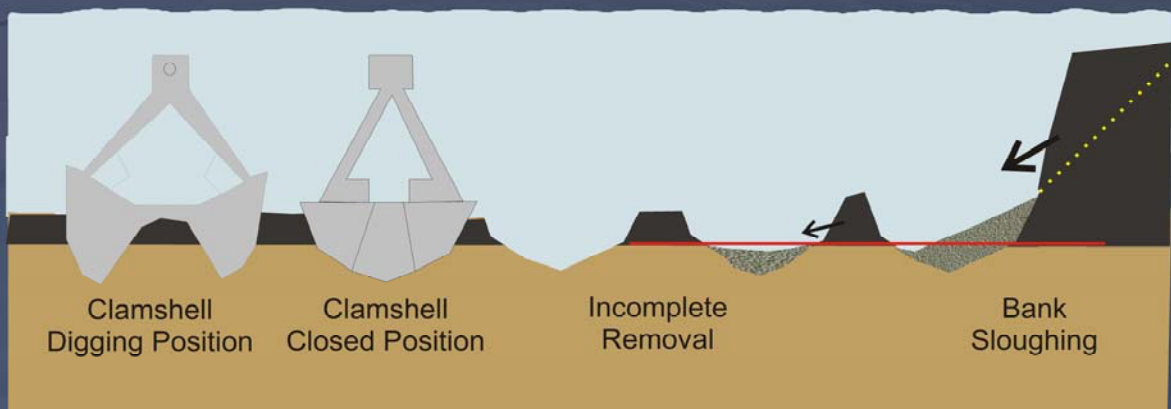
Mechanical Dredging

- Operator can't see the work
- Debris
- Gaps in bucket placement
- Over-depth dredging
- Residual Contamination
- Excess water increases disposal cost
- Sheen Control



Conventional Clamshell Dredge Cuts

- Scalloped bottom generates excess volume
- Single pass dredge cut – bank sloughing
- Poor bucket placement – ridges of contamination
- Limited positioning results in excess dredging



Precision Dredging Methods

- **Specialty Precision Excavators**

- ◆ 6-inch accuracy x,y,z
- ◆ Overlap bucket placement
- ◆ Level-cut closed bucket
- ◆ Limited spillage



Photo courtesy of Bean LLC





Water Captured by Conventional Clamshell Dredging

- Added water can increase volume of dredged material by over 50%+



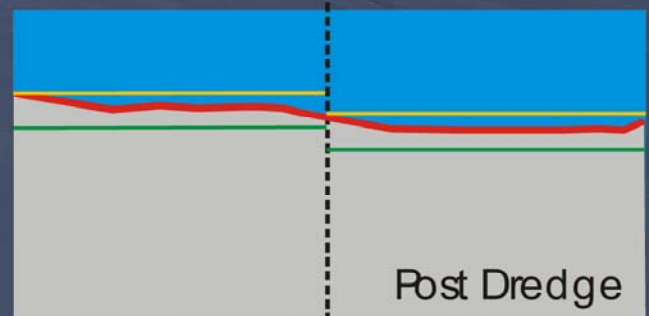
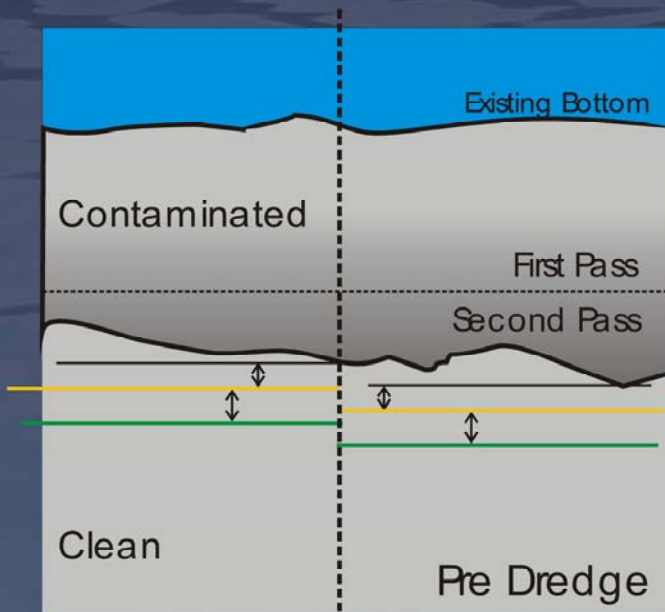
Impacts of Added Water

- Added water mixes with sediment in barge.
- Difficult to separate water once mixed.
- Consider a project involving 100,000 cy
 - ◆ 1% water = 1,000 cy = \$100,000
 - ◆ 50% water added = 5,000 cy = \$500,000



Precision 2-Pass Dredging

- Electronic Positioning
- Two Pass Dredging
- Environmental Bucket
- Reduced Volumes
- Less Spillage



Digital Display for Dredging

- 3-D Terrain Model on Dredge
- Virtual Image of Dredge Cuts
- Precise bucket placement and overlap
- Full-time inspection to adjust model

