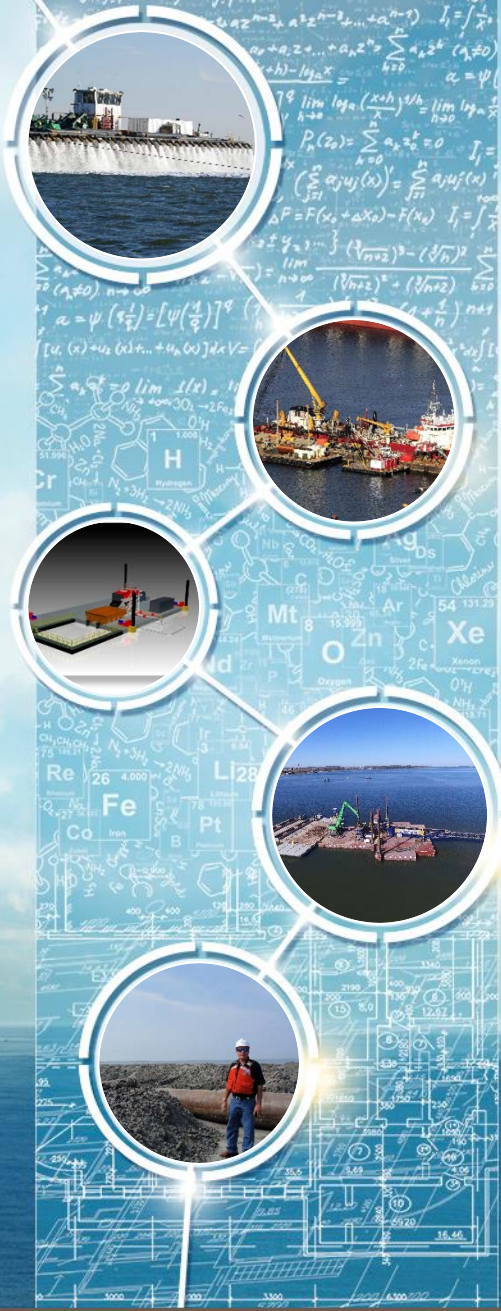




The Future of Remediation at Contaminated Sediment Sites – Update on How Dredge Companies are Evolving to Meet Current Challenges

George L. Hicks and Steven W. McGee

**WEDA – Western Dredging Association
Dredging Summit & Expo 2018
June 25-28, 2018**



- Introduction
- Evolution of Sediment Remediation Methods
- Improvements to Cap Placement Technologies – 5 Years Later (update from 33rd WEDA 2013)
 - Great Lakes Dredge and Dock Company, LLC
 - J.F Brennan Company, Inc.
 - Severson Environmental Services, Inc.
- Conclusion
- Questions

- The EPA generally recognizes three major approaches for sediment remediation:
 - Dredging, with Treatment and/or Disposal
 - In-situ Capping (with and without amendments)
 - Monitored Natural Recovery (MNR)
- The preferred remedy at large complex sites is often a combination of alternatives as each approach has its advantages and limitations
- Both the *“Use of Amendments for In Situ Remediation at Superfund Sediment Sites”* (USEPA OSWER Directive 9200.2-128FS, April 2013), and *“Contaminated Sediments Remediation: Remedy Selection for Contaminated Sediments”* (ITRC 2014), have further endorsed the use of in-situ capping as a viable remedial alternative.

- At the 33rd WEDA -2013 I presented the current state-of-the-art capping techniques, this will serve as a 5-Year Review of improvements and changes made to those techniques.
- This presentation evaluates currently available innovative in-situ capping technologies developed (and utilized) by Great Lakes Dredge and Dock Company, LLC, J.F. Brennan Company, Inc, and Severson Environmental Services, Inc to place various types of caps.
 - *Great Lakes Dredge and Dock Company, LLC, 2122 York Road, Oak Brook, IL 60523 USA*
 - *J.F. Brennan Company, Inc., 820 Bainbridge Street, LaCrosse, WI 54603 USA*
 - *Severson Environmental Services, Inc., 2749 Lockport Road Niagara Falls, NY 14305 USA*

This first project example is LOCAL and encompassed the eastward expansion of Craney Island Dredge Material Management Area (CIDMMA) and the Craney Island Marine Terminal in Portsmouth, Virginia.

- Sand was dredged from the “Atlantic Ocean Channel” borrow area (just outside the Norfolk Navigation channel)
- Discharged through a Great Lakes’ designed and fabricated spill barge
- Critical to maintain controlled thin placement of the dredged material as construction of each cross dike was limited to 2-feet.
- Concerns about potential mud waves, settlement and loss of fill material during dike construction.



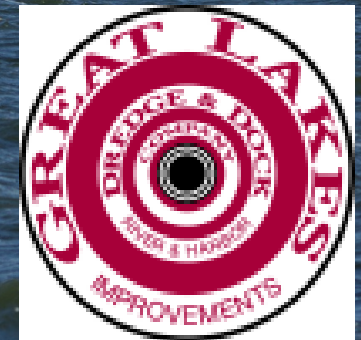
Great Lakes Dredge & Dock Company, LLC



Liberty Island



Great Lakes Dredge & Dock Company, LLC



Over the last 5+ years Great Lakes has utilized Trailing Suction Hopper Dredges on three (3) thin layer placement by hydraulic discharge:

- Craney Island
- Capping of CAD Cells in New York Harbor
- Wetland development in Jamaica Bay
- Approximately 600,000 CY over 70 acres

Advantages

- Large quantities of material distributed rapidly (High Production)
 - Placement of material between 3,500 to 4,500 CY/Hour.
 - Daily volume placed per day was over 20,000 CY
- Covers a large area
- Designed to place caps on soft sediments



- Patented Broadcast Capping System (BCS™)
 - Spreads material up to 3” in diameter
 - Reduces intermixing of cap material with underlying sediments
 - Precise, efficient placement
 - Customized Software; applies design thickness, integrates belt scales, records sample collection, and records all data.



- Over the past 5 years J.F. Brennan has improved the following on the patented Broadcast Capping System (BCS):
 - Increased positioning accuracy
 - Improved the QC monitoring software for data tracking
 - Installed thin layer caps in deeper water.
 - Developed deep water coring/sampling device.
 - Successfully installed amended caps on several projects
 - Successfully installed over 1,300 acres of caps and covers in 10 different marine environments.





Advantages

- Material is distributed with patented two-disc spreading system
- Advantage of BCS™ verses traditional methods
 - Covers a large area
 - Deceleration of each particle using the water column
 - Designed to place caps on soft sediments
 - High production
 - Can spread along shorelines and in wetlands
 - System is designed to construct the cap to meet the designer's risk modeling
 - Real-time QA/QC



Over the past 5 Years Sevenson has custom-built five of their patented slurry spreader systems for hydraulic placement of sand cap materials. The system consists of:

- Land-Based material processing
- HDPE Pipeline to convey sand slurry
- 30 x 40 foot spreader barge attached to four point anchoring system (other sizes available)
- Custom designed PLC controls to integrate with RTK DGPS and Dredgepack software. Output from the software is used to “drive” the barge along a preprogrammed cap lane.





Advantages

- Material is evenly distributed with patented system
- Advantage of Slurry Transport System verses traditional methods
 - Covers a large area
 - Production rates range from 150 to 350 tons per hour depending on pumping distance and material grain size.
 - Other materials can be mixed into the slurry system during capping operations (e.g. granular activated carbon, siderite, etc.). Placing two material types with one operation minimizes double handling of materials.



Sevenson has recently developed a capping technology using a radial telestacker conveyor system (typically used in mining operations) for the Buffalo River Capping project. The Sevenson engineered telestacker capping system consists of:

- A feed hopper with variable frequency drive and weigh belt to control discharge volume to radial stacking conveyor
- Conveyor belt system that can extend 150 feet from the center pin and retract to 75 feet while swinging nearly 180 degrees
- Real time kinematic differential global positioning system (RTK DGPS) mounted to the boom tip for horizontal accuracy of + 0.2 feet
- Dredgepack custom designed drivers for capping operations in real time





**Sevenson
Environmental
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Advantages

- Material is evenly distributed
- The system is capable of placing up to 250 CY per work hour.
- The system can place various sizes of aggregates from fine grained sand to 4 inch in diameter cobbles.
- Feed rates can be varied to place designed lift thicknesses from a few inches to several feet, before a move has to be made.
- Successfully placed >1,000,000 cy of backfill and cap materials in a multi-layer cap over Onondaga Lake



EXPERIENCE!

Company	Methodology	Total Acres Capped (to date)	Tons of Material
	Hopper Dredge to Custom Diffuser System	70 Acres	> 1 M Tons
	Broadcast Capping System	1,335 Acres	Not Provided
	Slurry Transfer System	1,005 Acres	2.5 M Tons
	Telestacker (Mechanical)	500 Acres	1.3 Tons

Experience Counts



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