ADVANCEMENTS IN THE MANAGEMENT OF DREDGED MATERIAL IN THE STATE OF NEW JERSEY

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Presentation Outline

- Introduction
- Project Experience
- Conclusions
Introduction

- The need for dredging NJ Waterways coupled with a lack of capacity in Confined Disposal Facilities (CDFs) has been the catalyst for recent advancements in the management of Dredged material (DM).
Introduction

- Dredging and subsequent management have historically been disjointed.

**IN THE PAST**, DM as placed wherever convenient and/or cost-effective (typically in a CDF or side-casted).
  - Due to economics, less strict environmental regulations, availability of spaces without neighboring concerns.

**TODAY**, a lack of funding, limited capacity and uncertainty regarding responsibility has lead to a deferment of dredging.
Introduction

- Development of a Coordinated system or model of Dredged Material “Management” that includes regulatory, administrative, public, planning, environmental and operation components.
Presentation Outline

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Sediment Characterization and Management of New Jersey’s Coastal Waterways

- Partnership between OCC and the Richard Stockton College of NJ Coastal Research Center.
- Three separate but integrated projects aimed at establishing a regional-scale framework and baseline for maintenance dredging-related activities.

The Study Program consists of three Projects:

- **Project 1:** CDF Site Characterization
- **Project 2:** Bay Water Sediments
- **Project 3:** Dredge & CDF Site Selection

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Project 1: Regional CDF Mapping and Resource Definition

- Includes:
  - Literature Review
    - Location,
    - Capacity,
    - Use History
    - Ownership
  - Define procurement streams.
  - Define characteristics of sediments.
  - Define volumes of sediments in specific size classes.
  - Provide a ‘living’ database available to all agencies (NJDEP, USACE, NJDOT, etc.)
Project 2: Characterization, Mapping and Dynamics of Sediment in NJ

- Locate areas with little or no existing sediment data.
- Characterize bay-floor resources according to physical and chemical attributes.
- Approximate volumes of various sediment types.
- Shoaling analysis to identify sediment deposition “hot-spot” areas.
I-BOAT New Jersey Shoaling Analysis

Figure X: New Jersey Dredging Locations
Dredged Material Separation

- Demonstration Project performed at USCG-TRACEN, Cape May, NJ with recycled glass provided by CMCMUA.
- Purpose:
  - Separate Clean Sand from existing DM,
  - Beneficially use separated sand, and
  - Design a mobile system to cost effectively excavate material from other CDFs.
Process

- Excavate Raw DM.
- Mechanically Load into Conveyor.
- Pass material through a series of screens.
- Remove fines with a washing and agitation process.
- Add coagulant to process water and pump to a geotextile tube.
- Mix separated sand with recycled glass from CMCMUA for potential Beneficial Use.
Process

- A test plan for process water and sediments was established in accordance with the AUD issued to the USCG by the NJDEP.
- Only separated portion of fines contained contaminants.
- Analytes found in decant water may be attributed to site water from the harbor.
- Testing results confirmed that the material met NJDOT I-13 Specifications.
Sand Separation

- Approximately 1,066 cubic yards of sand was separated during the 32 day demonstration.
- Approx. 1,000 cy of sand was mixed with 1,600 cy of crushed recycled glass.
- Produced a total of 2,000 cy of I-13 Material.
- Subsequently used as structural fill in a NJ causeway reconstruction project.
Costs

- Cost for separating such a small amount of material relatively high - $90.92 per cubic yard.
- Much of the cost derived from mobilization/demobilization and a larger scale project could significantly reduce costs.
- Separating 500,000 cy of DM is estimated to cost $17.67 per cy.
Benefits to Society

• Value of I-13 material is approx. $6 per ton.
• Large scale separation of material results in a cost of approx. $9 per ton.
• Cost of Separation greater than value of material…
• WHAT IS THE VALUE TO SOCIETY OF REUSING DM?
Terrapin Nesting Habitat

• The Diamond Back Terrapin is considered a Species of Special concern in NJ.
• Species has a high rate of road-side mortality when attempting to cross major streets.
• Project Goals:
  – GIS based assessment of areas with high road-side mortality,
  – Identify suitable areas for habitat restoration (and use DM for the actual restoration),
  – Provide permitting assistance to marinas interested in creating Terrapin Nests, and
  – Creation of Terrapin Blocks (using a fraction of dredged material) to line certain roadways and prevent turtles from crossing the roads.
Terrapin Blocks
Dredged Material Classification

- Develop a classification system for dredged geo-materials that can be easily cross-referenced to standard NJDOT soil aggregate gradation tables and other industry standards.
- Once adopted, geotechnical engineers will be able to specify DM in their construction projects, with an emphasis on high volume uses such as base and subbase applications.
- Classification of dredged geo-materials, based on testing and experience, will increase the possibilities of beneficial use.
- Testing Includes:
  - chloride content,
  - grain size,
  - California Bearing Ratio (CBR), and
  - Permeability.

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Conclusions

• Regional DM management, increased capacity in existing CDFs and new strategies for the beneficial use of DM are the best opportunities to keep NJ waterways navigable.
• New Jersey is taking a pro-active approach to developing DM management tools.
• The successful completion of the dredged material separation suggests large scale CDF mining is a viable method for reclaiming CDF space.
• Amending separated sandy portions with other recycled materials provides a resource for various industries including construction and aggregates.
• Costs must be viewed in light of the societal benefits of recycling DM, restoring capacity, beneficial uses of materials once considered “spoils” and sustainability.
• NEEDS - How do we make this a more common practice??????
Questions