



Problem Statement

- USACE dredged material management facilities have reached or are approaching their respective capacities
- Few new dredge-management facilities are being proposed or likely to be developed
- USACE could recover capacity through Beneficial Use, and extend operational life

Project Goals

- Gather information on the USACE Detroit District CDFs
- Identify and evaluate potential beneficial use (BU) opportunities
- Develop a conceptual site model (CSM) for the life cycle analysis of one to three BU alternatives
- Perform a life cycle cost-benefit analysis for dredged material management in the Detroit District



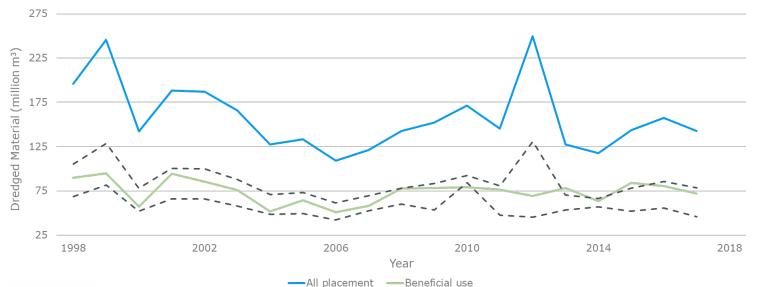


Beneficial Use and the "70/30 Goal"

WRDA 2020: maximize beneficial use of dredged material, considering environmental and economic benefits

USACE "Beneficial Use of Dredged Material Command Philosophy Notice (2023)





Data from the USACE RSM BU Database (https://rsm.usace.army.mil/BUDB).
Adapted from Searcy Bell et al.(2021).





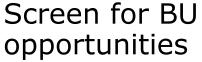
Approach



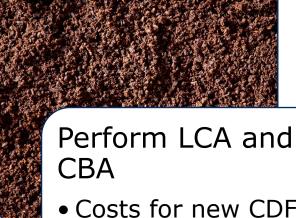


- Review harbor sediment quality
- Review dredging contract data
- Identify CDF lifecycles and costs





- Evaluate DM quality / quantity
- ID compatible reuse categories
- Identify BU
- Identify offsets / avoided costs



- Costs for new CDF
- DM BU markets
- Cost-share opportunities
- Value creation / cost offsets / unforeseen costs





Categorize Dredged Material

In-water

Beach Nourishment/Flood Risk Management, Habitat Development and Restoration

Residential

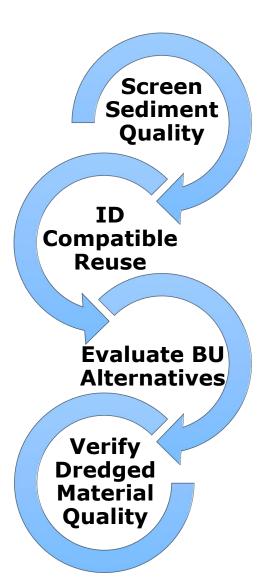
Parks and Recreation

Industrial

Construction, geotechnical

Contaminated material

Solids separation, contain/treat, repurpose for land applications



Life Cycle Analysis and Cost Benefit Analyses

- Perform LCA and CBA for value creation by recovering CDF capacity through sediment BU
- Developing BU cost estimates for future DM management options
- Facilitate creation of new markets for dredged sediment





COST

Lifecycle - Construction, Operation, Maintenance, over the project timeframe, in NPV

NPV = Net Present Value

BENEFITS

Accrued over the project timeframe (NPV) Non monetizable benefits (qualitative, quantitative biophysical units, percentage change, etc) Trade offs, risks, constraints, dependencies, uncertainties



LCA/CBA Approach

Assess
base condition
(without BU)

Assess material changes to base condition resulting from the BU

Identify and verify material benefits & costs for LCA/CBA scope with Client

Data gathering

Task 3 LCA/CBA

Analysis period

Gap in CDF capacity

Assumed maintenance costs

Assumed CDF end use once full

Negative Ledger Development

Sediment processing steps

Transportation costs

Characterization costs

Offloading costs

Extraction costs

Positive Ledger Development

Gains in CDF capacity

Beneficial uses considered

Social benefits

Environmental benefits

Economic benefits

Operational innovation /longevity

Determine time horizon

Maintenance costs

Avoidance measures

Permitting requirements

Refinement of CSM

Assess data gaps

Collect information

Verify CDF is acceptable for BU

Determine appropriate models

Execute models

Ramboll

New CDF Construction Cost Estimate

Constructed CDFs 1960-98

in 2023 dollars

• Min: \$1.78/CY

• Max: \$120/CY

Median: \$16/CY

• Mean: \$24/CY

Milwaukee DMMF Estimate

- 1.6MM CY capacity for contaminated sediment
- 2023 Bids: \$115M to \$150M
- \$72 \$79 per CY
- \$61/CY expansion to 1.9MM CY with navigation material

Cleveland DMMF

- USACE estimate \$465M
- Locally preferred alternative
 - CHEER \$300M

Recommendations

- Current DMMF costs are substantially more than historical
 - State of the art
 - Current economic and permitting conditions
- Use \$24- \$80 per CY range

Ramboll

Summary

- Repurposing CDF material is a potential solution to increasing space limitations for current and future dredge material management
- LCA/CBA results can lead to more efficient and cost-effective management of dredge material and dredge-material management facilities
- Supports USACE dredge operations mission of BU
- Supports sustainable management decisions
- Approach can facilitate project cost sharing and matching sediment supply and beneficial use opportunities
- Approach can give USACE a comprehensive look at budget alternatives

Ramboll 1