



Beneficial Uses of Dredged Material



Habitat Development, Beach Nourishment
Topsoil, Construction Fill, Remedial Cover

Richard A. Price
ERDC-Environmental Laboratory
601-634-3636
richard.a.price@erdc.usace.army.mil



Why Beneficial Uses of Dredged Material?

- Annually, 300 to 400 million cubic meters of sediment
- Must continue to build and maintain waterways
- Restrictions on open-water disposal
- Space for upland disposal at a premium
- Reuse for beneficial purposes can save



Old Approach: Spoil New Approach: Resource

- Matching resources with needs
- Converting a liability into a desirable commodity



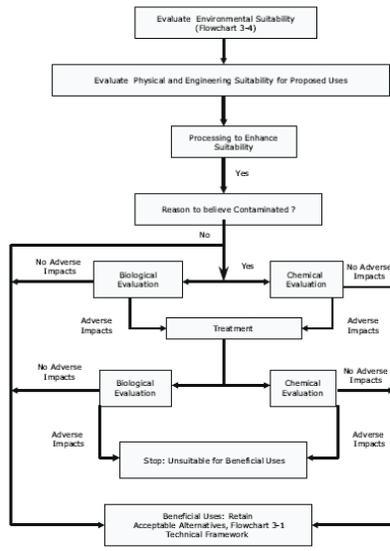
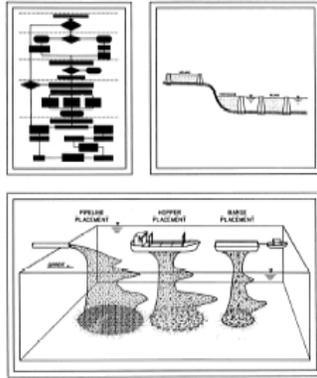
Beneficial Uses of Dredged Material

- Summary literature
 - Engineering Manual on Beneficial Uses (EM 1110-2-5026)
 - Over 1300 documented examples
 - Proceedings of national and regional seminars
 - Corps/EPA Manual, "Identifying, Planning, and Financing BU Projects Using Dredged Material"
 - Great Lakes Commission, "Testing and Evaluation Dredged Material for BU."



United States Environmental Protection Agency
 Department of the Army U.S. Army Corps of Engineers
 EP 600/3-B-03-008 Revised May 2004

Evaluating Environmental Effects of Dredged Material Management Alternatives—A Technical Framework



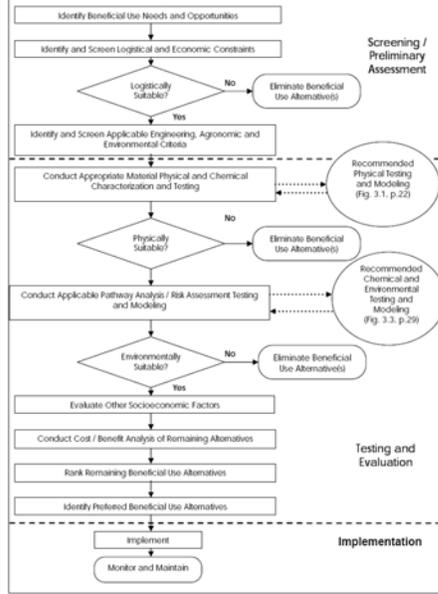
Testing and Evaluating Dredged Material for Upland Beneficial Uses: A Regional Framework for the Great Lakes



September, 2004
 Second Edition

With references to:
 Upland Beneficial Use of Dredged Material Testing and Evaluation
 Annotated Bibliography

Figure 0-1: Framework for Dredged Material Beneficial Use Evaluations



Program Support

Dredging Operations and Environmental Research



- Develop/update guidance
- Evaluate beneficial use projects
- **New Product:** Summary of Available Guidance for Determining Suitability of Dredged Material for Beneficial Uses

DOER Technical Notes

- DOER-C2Dredged Material Characterization Tests for Beneficial Use Suitability May 1999
- DOER-C3Evaluation of Dredged Material for Phytoreclamation Suitability May 1999
- DOER-C4Screening Tests for Assessing the Bioreclamation of Dredged Material May 1999
- DOER-C5Bioremediation of PAH-Contaminated Dredged Material at the Jones Island CDF: Materials, Equipment, and Initial Operations September 1999
- DOER-C6Manufactured Soil Screening Test May 1999
- DOER-C7Case Studies: Characterization Tests to Determine Dredged Material Suitability for Beneficial Uses July 1999

Beneficial Uses of Dredged Material

- Industrial / commercial
- Recreation
- Agriculture / Aquaculture
- Habitat development
- Beach nourishment
- Misc. / innovative

Beneficial Uses of Dredged Material

Industrial / Commercial



Beneficial Uses of Dredged Material

Recreation

PLAY Metropolitan Golf Links





Beneficial Uses of Dredged Material

Agriculture / Aquaculture



Beneficial Uses of Dredged Material

- Habitat development
 - Wetland
 - Aquatic
 - Upland
 - Island



Times Beach CDF



Saginaw CDF



Beneficial Uses of Dredged Material

Beach Nourishment





Beneficial Uses of Dredged Material

- Misc. / innovative
 - Strip mine reclamation
 - Manufactured soil





Topsoil Production

- Toledo Harbor, Ohio
- New York Harbor, New York
- Mobile Harbor, Mobile, Alabama
- Jacksonville Harbor, Jacksonville, Florida
- St. Lucie Estuary, St. Lucie, Florida
- Pearl Harbor, Hawaii
- Grand Haven, Michigan

Soil Fertility

Lab Number : 00983 Sample Id : 1 G. HAVEN MI Signature : *Richard Lorge*

Test	Results	SOIL TEST RATINGS					Calculated Cation Exchange Capacity
		Very Low	Low	Medium	Optimum	Very High	
Soil pH	7.5						46.9 meq/100g
Buffer pH							
Phosphorus (P)	84 LB/ACRE						Calculated Cation Saturation
Potassium (K)	132 LB/ACRE						
Calcium (Ca)	22030 LB/ACRE						
Magnesium (Mg)	804 LB/ACRE						
Sulfur (S)	552 LB/ACRE						
Boron (B)	3.4 LB/ACRE						
Copper (Cu)	15.8 LB/ACRE						
Iron (Fe)	680 LB/ACRE						
Manganese (Mn)	66 LB/ACRE						
Zinc (Zn)	54.4 LB/ACRE						
Sodium (Na)	76 LB/ACRE						%K 0.3
Soluble Salts							%Ca 52.8
Organic Matter	5.3 % ENR 150						%Mg 6.6
NO3-N	186 LB/ACRE						%H 0.0
							%Na 0.4
							K : Mg Ratio
							0.05

SOIL FERTILITY GUIDELINES

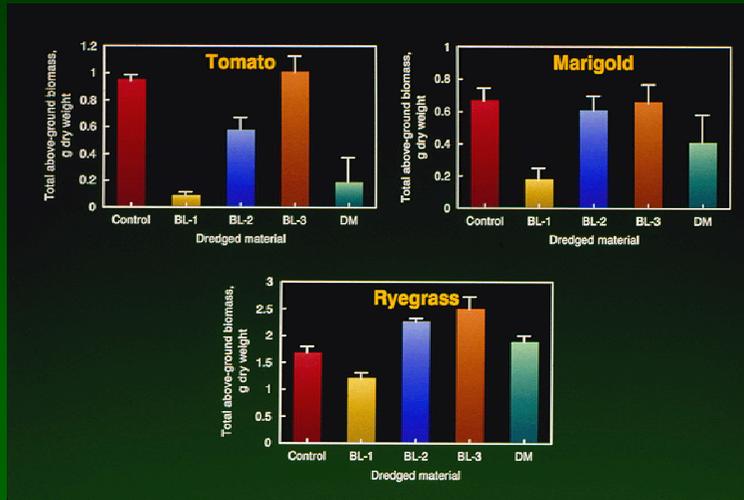
Blending for Success

- Dredged material can be blended with local waste products to meet specific needs
 - Cellulose (yard wastes or wood and paper products)
 - Animal manures or other biosolids
 - Industrial by-products

Greenhouse Screening



Greenhouse Results



Dredged Material to Landscapes

- Toledo Harbor DM



Mobile, AL



Grand Haven Greenhouse Tests

- Leaf compost was blended with dredged material to select best performing blend
- This approach can be tailored to address specific needs



Grand Haven, MI



Formula for Success

- A four-part formula is usually required for success
 - Technical feasibility
 - Legal / regulatory concerns
 - Public support
 - Economics

Challenges

- Negative press
- Perceptions on contaminated material
- Finding willing stakeholders
- Sustainable markets for materials produced
- Liability

Web Resources

- **Dredging Operations Technical Support**
<http://www.wes.army.mil/el/dots>
- **Beneficial Uses of Dredged Material**
<http://www.wes.army.mil/el/dots/budm/>
- **Dredging Operations and Environmental Research Program**
<http://el.erdc.usace.army.mil/dots/doer/doer.html>

Beneficial Uses of Dredged Material

U.S. Army Corps of Engineers | Engineer Research and Development Center | U.S. Environmental Protection Agency



Introduction



Engineered Uses



Environmental Enhancement



Agricultural/ Product Uses



Most dredged material can be a valuable resource and should be considered for beneficial uses. The purpose of this site is to demonstrate potential beneficial uses of dredged material by presenting existing case studies as examples. Category descriptions, procedural outlines, and reference resources are also provided.

This site is a collaborative effort between
U.S. Environmental Protection Agency and U.S. Army Corps of Engineers