

Marketing Dredged Sediment for Beneficial use



Project Partners

- ◆ **U.S. Army Corps of Engineers**
 - Buffalo District
 - Detroit District
 - Chicago District
- ◆ **Great Lakes Commission**
- ◆ **Moffat & Nichol**
- ◆ **State Agencies**
- ◆ **Great Lakes Dredging Team=Advisory Team**



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GLDT Membership

- ◆ Corps of Engineers
- ◆ EPA
- ◆ MARAD
- ◆ USFWS
- ◆ NRCS
- ◆ NOAA
- ◆ Coast Guard
- ◆ Great Lakes Commission
- ◆ New York
- ◆ Pennsylvania
- ◆ Ohio
- ◆ Indiana
- ◆ Illinois
- ◆ Michigan
- ◆ Wisconsin
- ◆ Minnesota



Dredging in the Great Lakes

- ◆ Army Corps responsible for ~130 Great Lakes harbors and channels
- ◆ ~4 million cu yds.
- ◆ Traditional Dredged Material Management
 - Open water disposal
 - CDF placement
 - On or near shore placement
- ◆ Great Lakes CDFs
 - 40 built since 1960
 - Many are closed or filling up

CDF	50%
Open Lake	32%
Beach Nourishment	12%
Other Beneficial Use	6%



Overview Of Dredged Material Management in the Great Lakes

◆ A lot of uncontaminated sediment is placed in CDFS

◆ Open water Disposal

- Decreasing public acceptance
- Policy shifts to decrease practice
- Ohio Example:
 - largest GL project (~720,00 cu yds/yr)
 - State wants to phase out open water disposal

Open Water Placement	
IL	Y
IN	Y
MI	Y
MN	N
OH	Y
NY	Y
PA	Y
WI	N

◆ Beneficial use is preferred, but except for beach nourishment, is rare in our region

◆ Why? And what can we do?



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Great Lakes Dredging Team: Promoting Beneficial Use

◆ Regional Guidance

- “White paper” clarifies federal and state regulatory and policy requirements (1998)
- Regional Framework for testing and evaluating material for *upland* beneficial uses (2004)

◆ Outreach

- Web site active since 1998
- GL dredging brochures
- Articles in trade journals
- Presentations at Conferences & Workshops
- Case Studies



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Great Lakes Beneficial Use Publications

www.glc.org/dredging/benuse

- ◆ *Testing and Evaluating Dredged Material for Upland Beneficial Uses: A Regional Framework for the Great Lakes (2004)*
 - Step-by-step guide to identifying upland beneficial use opportunities, evaluating suitability, and implementation using a risk-based approach.
 - Walks through 8 different upland beneficial use scenarios using relevant state contaminant criteria.

- ◆ *Annotated Bibliography: Testing and Evaluating Dredged Material for Upland Beneficial Uses (2004)*
 - Companion to the Regional Framework document.
 - 245 annotated references of documents, articles, etc. useful in evaluating dredged material for beneficial uses.

- ◆ *Waste To Resource: Beneficial Use of Great Lakes Dredged Material (2001)*
 - 16-page full-color booklet answers common questions.
 - Case studies and a map of projects around the Great Lakes.

- ◆ *Beneficial Use of Great Lakes Dredged Material: A Report of the Great Lakes Beneficial Use Task Force (2001)*
 - 2-year effort, produced 18 recommendations
 - Examples of more than 30 beneficial use projects
 - Profiles of each Great Lakes state's regulatory framework



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Beneficial Use of Dredged Material in the Great Lakes

(selected U.S. projects)

Key

-  Great Lakes watershed
-  Beach / littoral nourishment
-  Multiple areas of beach nourishment
-  Capping
-  Construction materials
-  Habitat restoration
-  Land creation / improvement
-  Topsoil creation / enhancement



Capping

Capping is the placement of clean or relatively clean dredged material on top of other land areas or in aquatic environments. Usually this is done to provide a layer of cleaner material over more contaminated material so that the contaminated area will not harm human health or the environment. In this way, the dredged material serves as a "cap" on top of other land / materials.

Land creation / improvement

Land creation or improvement includes the building of dikes and berms for shore protection; filling, raising and protecting submerged and low-lying areas; and applying material to areas where the quality of existing land is poor, such as mineland or brownfields reclamation. Land creation and improvement with dredged material is often associated with other benefits, such as capping or habitat creation.

Topsoil creation / enhancement

Topsoil enhancement usually involves allowing dredged material to dry out and applying it alone or mixing it with other materials to make topsoil. Dredged material is commonly composed of silt, clay, and organic matter – all important components of topsoil. However, it often requires the addition of some components, such as biosolids or manure, to make it a valuable topsoil (Green Bay and Milwaukee are demonstration projects).

Beach / littoral nourishment

Beach/littoral nourishment is the placement of dredged material along the shore or in the nearshore area to provide a source of nourishment for natural sand (littoral) movement or recreational beach improvement and creation.

Construction materials

Construction materials can use the sand portion of dredged material in road construction and rip-rap. Dredged material can also be used as an ingredient in the manufacture of bricks, ceramics, and concrete.

Habitat restoration

Habitat restoration using dredged material can occur in aquatic, wetland, or upland environments. Upland wildlife habitats can be created by dredged material containment areas that are no longer used as well as by placement of dredged material on degraded lands or habitats. Native vegetation is then re-established to provide food and cover for wildlife. Strategic placement of dredged material can also be used to restore and establish wetlands and to create aquaculture ponds for fisheries.

Marketing Dredged Sediment For Beneficial Use

◆ GL Sediment Data Base

- **Great Lakes harbors and CDFs**
 - Geo-political data and info
 - Sediment quality
 - Sediment quantity
 - Transportation access (road, rail, water)
- **End Users**

◆ Market analysis of potential users and market demands for dredged sediments

- **Transportation feasibility model**



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A Great Lakes solution to the disposal of dredged materials

a brief discussion of the use of a “Transportation Model”



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RE-USE OF SEDIMENT FROM CDF HAS BENEFITS

- ◆ The “myth” of conserving dirt
 - Perceived as more efficient than simply “dumping” it
 - But treating and transporting costs can be overwhelming
 - “dirt cheap” – not CDF-reuse-cheap
- ◆ The economics *may* be favorable
 - Dynamic market for clean fill
 - Mostly local, mostly small orders
 - A new supplier may be welcomed
- ◆ Challenges of reusing “foreign” dredged materials
 - Environmental – known & unknown
 - Transportation costs
 - Marketing

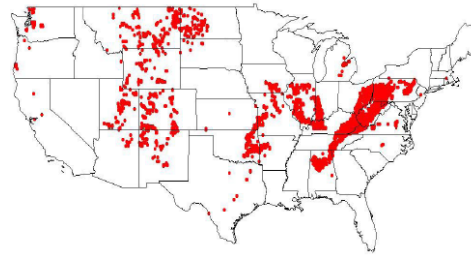


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ALLOWABLE LOCATIONS MAY BE HARD TO SITE

- ◆ Assumption of toxicity
 - Muck that has collected under our industrial past
 - Distrust of “foreign” waste
- ◆ Testing and treatment is expensive
 - Bark Camp, PA Shown
 - Permitting required for both dumping and transportation
- ◆ Volumes must be large
 - Sites with largest capacities are fewer and farther between
 - May compete with coal-ash or garbage



Abandoned Mines



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TRANSPORTATION COSTS ARE SUBSTANTIAL

- ◆ Rivals only treatment & permit costs
 - Heavy, low-value commodity
 - Handling and effort to move short distances is substantial
- ◆ Semi Dump Trucks
 - 12~16 cu.yd capacity
 - Approx. \$3/truck-mile all-in for transportation
 - \$.20/cu.yd-mile
- ◆ Gondola or Hopper Railcars
 - 100~120 net ton (60~70 cu.yd) capacity
 - \$1,000 ~ \$3,000 per load excludes un/loading facilities
 - \$.07~\$.18/cu.yd-mile
 - **HIGHLY** volume dependent



Duffield Hauling, King George, VA



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A REGIONAL APPROACH WILL YIELD BENEFITS

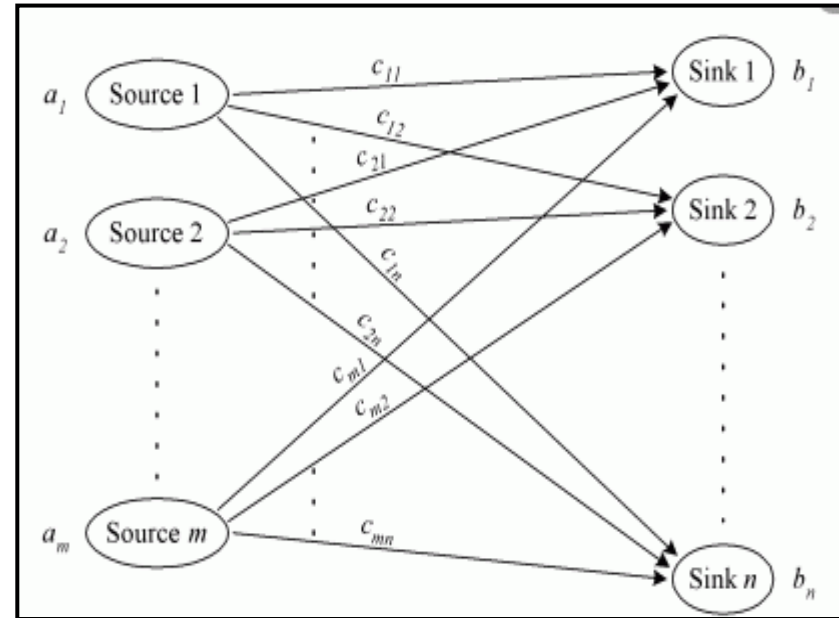
Networks of interdependence

- Global solution can be shared
- Interstate commerce can offer efficient solutions (e.g. SW Michigan sites for Chicago silt)



MULTIPLE SUPPLY => DEMAND MATCHES

- ◆ Approximately 44 “Sources”
 - CDF’s with their volume, characteristics, and location of supplied material
- ◆ 170+ “Sinks”
 - Known and potential uses of dredged materials
 - With locations and volumes
 - Potential uses at the centroids of (groups of) counties . . . based on construction activity
- ◆ Truck and/or rail transportation
 - Between each Source-Sink
 - Estimated cost per cu.yd
 - These are the decision variables



OPPORTUNITIES FOR IMPROVEMENT

- ◆ “Best” solution
 - Minimizes transportation costs
 - Subject to Source/Sink limits
- ◆ Incremental cost of those limits
 - Shadow prices, Right-hand side
 - May be explored, tested
 - “What if?” questions may be tested and answered

Microsoft Excel - locate.xls

	Site 1	Site 2	Site 3	Site 4	Treated volume per commune	Volume to be treated	Slack
31							
32							
33	Selector	1	-	1			
34	Comm_1	-	6'270.00	-	6270.00	6270	0
35	Comm_2	-	7800.00	0.00	7800.00	7800	0
36	Comm_3	-	2500.00	-	2500.00	2500	0
37	Comm_4	-	1800.00	0.00E+00	1800.00	1800	0
38	Comm_5	-	-	0.00	2300.00	2300	0
39	Comm_6	-	0.00	-	4200.00	4200	0
40	Comm_7	-	-	-	1000.00	1000	0
41	Comm_8	-	-	-	3800.00	3800	0
42	Comm_9	0.00	-	-	5300.00	5300	0
43	Comm_10	-	-	-	3400.00	3400	0
44	Treated volume per	0	18370	0	20'000		
45	Avail capacity	-	20'000	-	20'000		
46	Slack	-0	1'630	-0	-		

	Site 1	Site 2
51		
52		
53		
54		
55		
56		
57		
58		
59	Comm_1	0.00
60	Comm_2	0.00
61	Comm_3	0.00
62	Comm_4	0.00
63	Comm_5	0.00
64	Comm_6	0.00

	Site 1	Site 2
58		
59	Comm_1	1529890.00
60	Comm_2	2691000.00
61	Comm_3	584989.54
62	Comm_4	35999.76
63	Comm_5	0.00
64	Comm_6	0.00

	Site 1	Site 2
58		
59	Comm_1	1529890.00
60	Comm_2	2691000.00
61	Comm_3	584989.54
62	Comm_4	35999.76
63	Comm_5	0.00
64	Comm_6	0.00

Costs

	Site 1	Site 2
51		
52		
53		
54		
55		
56		
57		
58		
59	Comm_1	1529890.00
60	Comm_2	2691000.00
61	Comm_3	584989.54
62	Comm_4	35999.76
63	Comm_5	0.00
64	Comm_6	0.00

Paramètres du solveur

Cellule cible à définir: \$C\$51

Égale à: Max Min Valeur: 0

Cellules variables: \$C\$33:\$F\$43

Contraintes:

- \$C\$33:\$F\$33 = binaire
- \$C\$34:\$F\$43 >= 0
- \$C\$44:\$F\$44 <= \$C\$46:\$F\$46
- \$G\$34:\$G\$43 >= \$H\$34:\$H\$43



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FINDING MARKETS FOR DIRT “RECYCLED SOIL”

- ◆ Dirt/Fill “brokers” exist
 - Popularizing supply for users
 - Creating an incentive for new demand
- ◆ Sub-contract to local specialists
 - Dynamic market makers for clean fill
 - Finding many local, small orders
 - A new supplier will affect the market
- ◆ Contaminated fill is a different challenge
 - Local rules increase costs, by jurisdiction
 - Permits and treatment

DirtFill.com HOME MY ACCOUNT MY LISTINGS SEARCH SUPPORT CONTACT US
Connecting those with excess fill and those who need it...since

Test Drive Material Results

[REGISTER](#) to view mapbook coordinates, addresses, and contact info

Click on headings to sort columns: [Dirtfill Definitions](#)

Est Miles	City or Suburb	Need or Have	Kind of Fill	No. of Cubic Yards	Pricing	\$ per Yard	Load	Haul
14.1	Oak Creek	Need	Any Topsoil, Sandyclay, Clay, Clean Fill	250				yes
24.2	Big Bend	Need	Clean Fill	1000	Negotiable			

Results 1 - 2 of 2

Go to Page: 1
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Dumpsites**NOW**.com

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Toledo Harbor

The Start of a Marketing Analysis



20,000 cy/yr of “*Nu-Soil*” – 2007 actual
Potential for 130,000 cy “*Soil Plus*” – Construction Soil
Potential for Brick Manufacturer within 5 years

Soil Conservation – CREP, Buffer Strips, etc

WLEB Feasibility Study – Identifying watershed needs
Great Lakes Regional Sediment Management Marketing Analysis
Great Lakes Tributary Modeling – Auglaize, Swan Creek

Maumee Bay Habitat Restoration Unit
Wynn Road Coastal Wetlands
Quarries to wetlands

Draft WRDA – New Regional Sediment Management opportunities
- \$5M Pilot Project for Mine Reclamation

