

The Dredge Materials Decision Tool: Helping You Decide Where/Whether to Beneficially Use Sediments Since 2021

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Brief Background

- Region 5 developed a Dredged Materials Decision Tool (DMDT)
 - -As an alternative to open lake disposal
 - Help communities and agencies better beneficially use dredged materials
 - Characterize and quantify the environmental, economic, and social benefits



More Background

- 2017-18: Region 5 and Ohio stakeholders held workshops and brainstorming events
- 2018: Initial tool draft
- 2018: Region 5 began work with Great Lakes Toxicology and Ecology Division (GLTED)
 - Refine and enhance
- 2018-2020: GLTED conducted participatory research





https://usability.gov/what-and-why/user-centered-design.html

User-centered Design

- DMDT and subsequent iterations are based on usercentered design
- Ethnographic research
 - Identify decision elements
 - Defined workflow
 - Flexible
 - Iterative
- · Tested and refined with users

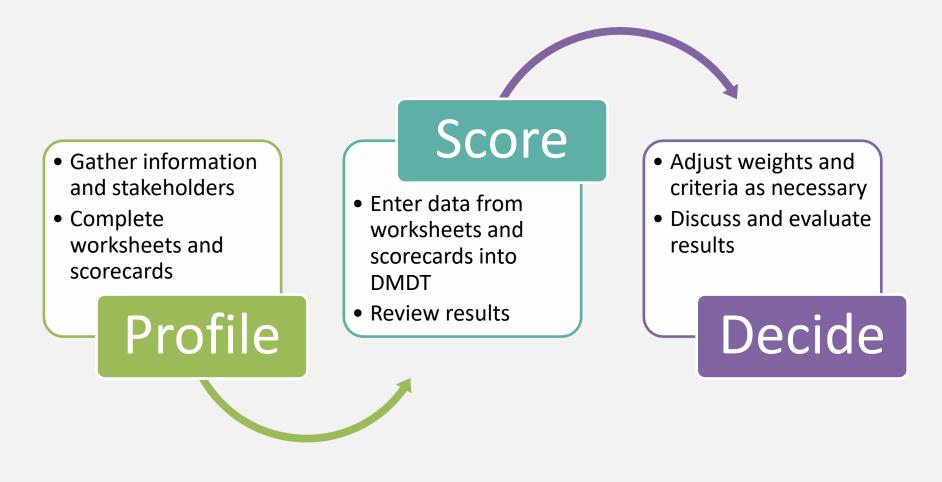


DMDT Overview

- Designed to compare multiple projects based on multiple criteria
 - Positive or negative (direction)
 - Size of change (magnitude)
 - Certainty of effect
- Criteria can be weighted to reflect importance
- DMDT is a bundle of worksheets and a spreadsheet



Flow of Information through DMDT





Criteria Categories

Category	Description
Biophysical environment	The habitat restoration applications of dredged materials
Economic	Funding details, placement costs and options, and transportation
Governance	The rules, regulations, and organizational decision factors
Social	Benefits to the community including improving ecosystems services
Built environment	How dredge is utilized for construction



Worksheet: Biophysical Environment

- Aquatic habitat
- Shoreline habitat
- River habitat
- Wetland habitat
- Terrestrial habitat
 - -Habitat quality
 - -Habitat quantity
- Priority habitat

- Restoration of native species
- Reduction of invasive species
- Stormwater management/control
- Contamination reduction



Worksheet: Economic Costs & Benefits

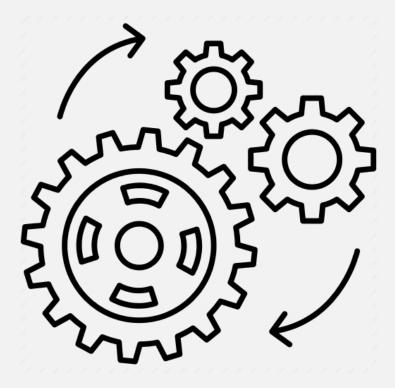
- Funding pathway secured
- Application prepared
- Partnerships
 established
- Partnerships identified
- Transportation is feasible

- Project can accept materials (<5 years)
- Project can accept materials in the longterm
- Lead to business growth
- Secondary benefits
- Long-term maintenance?



Worksheet: Governance

- Maintain navigation channels
- Voluntary program
- Environmental windows
- Included in guidance documents
- Permit timeline is reasonable
- Zoning requirements
- Contingency plan
- Replicability



https://www.iconfinder.com/icons/2940346/engineering_gears_mechanical_mechanism_technology_icon



Worksheet: Social Benefits

- Improve park access
- Potential for job creation
- Improve aesthetics
- Involve local community
- Reduce exposure
- Improve ecosystem services
- Improve infrastructure
- New infrastructure







http://duluthmn.gov



Worksheet: Built Environment

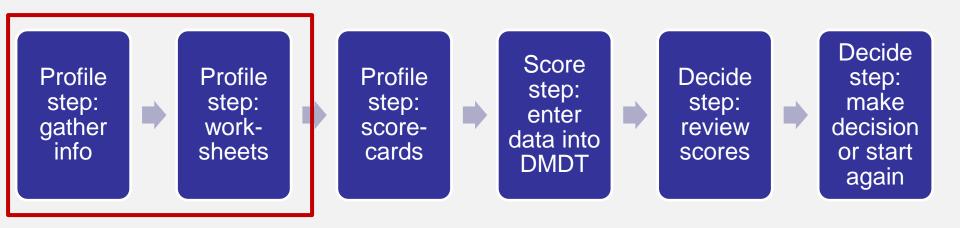
- Reduce contamination or risk of exposure
- Reduce demand on borrow sources
- Provide fill or cap
 - -Development site
 - -Construction
 - -Road
 - –Parks or greenspace



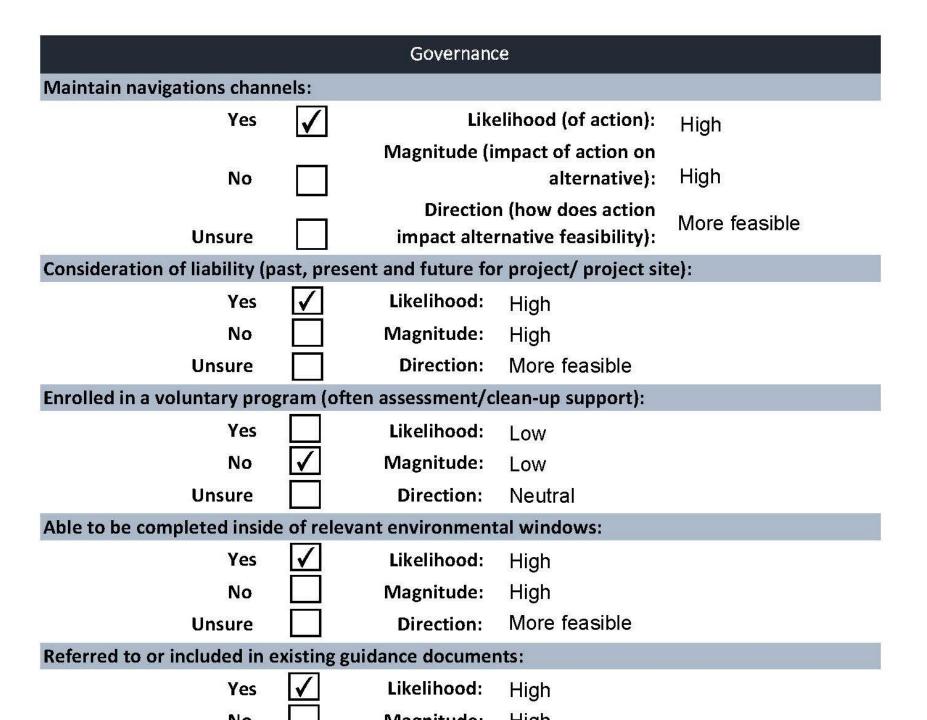
https://center4eleadership.org/built-environment/



Flow of Information through DMDT

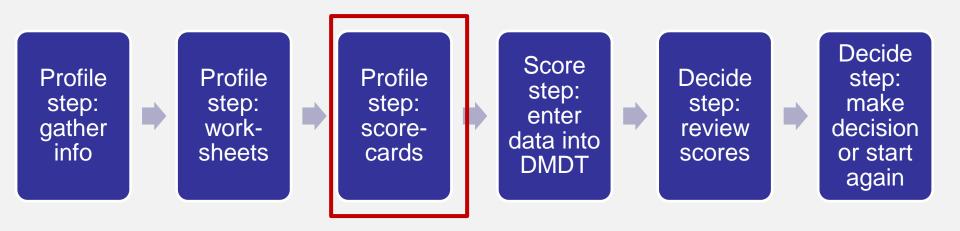


	Project and Site Information
Name of Site:	Interstate Island
Type of Site:	Shoreline erosion or recession
Owner:	State
Name of Owner:	
State:	WI, MN
Purpose of project:	Terrestrial habitat restoration, creation, development
	Dredging Information
Dredging location (lat/long):	46.749175, -92.110075
Volume (c/y):	60,000
Dredged material source:	Operation and Maintenance
Primary soil type:	Sand
List other soil types:	Organic fines
Cost:	\$ 1,000,000.00
Funding source:	Harbor Maintenance Trust Fund, US Army Corps, Great Lakes R∉
Mode of transportation	
Barge:	
Pipelipe	7





Flow of Information through DMDT





Governance

Scorecard A: Likert Scale

		Imp	act Characte	erization (like	elihood, impa	ct, feasibility)
		5	4	3	2	1	N/A
		Definite	High	Moderate	Somewhat	Low	
	Improve access to parks or natural spaces		Х				
	Potential for indirect job creation				X		
	Improve aesthetics	Х					
cial	Community engagement	Х					
Social	Reduced human exposure to contaminants		Х				
	Improved access to ecosystem services		Х				
	Improved infrastructure condition			X			
	New/improved infrastructure services for community			Х			

	Imp	act Characte	rization (like	lihood, impa	act, feasibility	1
	5	4	3	2	1	N/A
	Definite	High	Moderate	Somewhat	Low	
Maintain navigation channels	Х					
Enrollment in voluntary program					Х	
Able to complete within Environmental Windows		Х				
Included in existing guidance documents		Х				
Permitting timeline conducive with project timeline			Х			
Meets zoning requirements	Х					
Flexible timeframe				Х		
Replicable			Х			
Site ownership	Х					



Scorecard B: Binary Choice

Scorecard B: Yes/No

	Funding pathway identified	yes	
	Funding application prepared	yes	
	Partnerships established	yes	
≥	Potential partnerships identified	yes	
Economy	Feasible transportation of dredged materials to the placement site	yes	
con	Accept materials (5 years)		no
ш	Accept materials long-term (20 years)		no
	Lead to creation/growth of viable business		no
	Secondary benefits created	yes	
	Long-term maintenance required		
	Improve access to parks or natural spaces		
	Potential for indirect job creation		
	Improve aesthetics		
Social	Community engagement		
So	Reduced human exposure to contaminants		
	Improved access to ecosystem services		
	Improved infrastructure condition		
	New/improved infrastructure services for community		
	Maintain navigation channels		



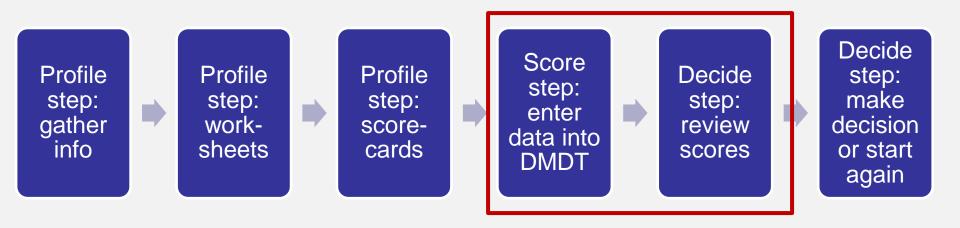
Biophysical

Scorecard C: Ranking

	Scorecard C: Ranking	
	Criteria	Rank
	Rivers and streams habitat quantity gain/loss	
L	Lakes and ponds habitat quantity gain/loss	
	Near coastal marine/estuarine habitat quantity gain/loss	
	Open water habitat quantity gain/loss	
	Wetlands habitat quantity gain/loss	
	Urban/Suburban habitat quantity gain/loss	
	Barren/rock and sand habitat quantity gain/loss	
	Rivers and streams habitat quality improved/diminished	
	Lakes and ponds quality improved/diminished	
	Near coastal marine/estuarine quality improved/diminished	
	Open water quality improved/diminished	
	Wetlands quality improved/diminished	
	Urban/Suburban quality improved/diminished	



Flow of Information through DMDT





Enter Project Data

	А	В	С	D
1	Duluth-Superior Harbor Work	ing Draft		
2	12/11/2020			
3				MAINTEN
4				
5	Port	Duluth-Superior Harbor		
6	Project No.	ABC-123		
7	Dredge Location (lat/long)			
8	Volume (cy)	Alternative 1: 50K; Alternative 2: 50K; Alternat	ive 3: 50H	ζ.
9	Soil classification			
10	Elevated contaminants			
11	Weighting factor adjusted	No adjustment		
12	Trial	001		
13	Scorecard No.	Du-2020-2-19-001		
14	Prepared by	<enter name=""></enter>		
15	Prepared on	<enter date=""></enter>		
16	Checked by	<enter name=""></enter>		
17	Checked on	<enter date=""></enter>		



Enter Data in DMDT

А	В	С	к	L	М	N	0	Р	Q	R	S
			•			r					
Category	Criterion	С									
		Rank	U	W	С	U	W	С	U	W	С
	Aquatic habitat gain/loss	2	1	1.0		4	3.9		3	2.9	
	Shoreline habitat gain/loss	20	4	2.4		5	3.0		5	3.0	
	River habitat gain/loss	12	1	0.8		3	2.3		4	3.1	
	Wetland habitat gain/loss	25	1	0.5		1	0.5		1	0.5	
	Terrestrial habitat gain/loss	42	5	0.9		3	0.5		5	0.9	
	Aquatic habitat improved/harmed	3	1	1.0		3	2.9		3	2.9	
	Shoreline habitat improved/harmed	21	4	2.3		5	2.9		5	2.9	
Displaying Environment (16)	River habitat improved/harmed	13	1	0.8	200/	3	2.3	(20)	3	2.3	500/
Biophysical Environment (16)	Wetland habitat improved/harmed	26	1	0.5	38%	1	0.5	62%	1	0.5	59%
	Terrestrial habitat improved/harmed	43	5	0.8		3	0.5		5	0.8	
	Priority habitat	35	5	1.5		5	1.5		5	1.5	
	Species of management concern	- 31	5	1.9		5	1.9		5	1.9	
	Restore or manage native vegetation	48	1	0.1		5	0.4		1	0.1	
	Reduce invasive vegetation	16	1	0.7		3	2.0		1	0.7	
	Stormwater control or protection	45	1	0.1		1	0.1		1	0.1	
	Reduce contamination	6	1	0.9		1	0.9		1	0.9	
	Funding pathway	10	5	4.1		4	3.2		5	4.1	
	Application information prepared	23	5	2.7		3	1.6		5	2.7	
	Established partnerships	29	5	2.1		5	2.1		5	2.1	



Enter Data in DMDT

А	В	с	к	L	М	N	0	Р	Q	R	S
						r			-		
Category	Criterion	С									
		Rank	U	W	С	U	W	С	U	W	C
	Aquatic habitat gain/loss	2	1	1.0		4	3.9		3	2.9	
	Shoreline habitat gain/loss	20	4	2.4		5	3.0		5	3.0	
	River habitat gain/loss	12	1	0.8		3	2.3		4	3.1	
	Wetland habitat gain/loss	25	1	0.5		1	0.5		1	0.5	
	Terrestrial habitat gain/loss	42	5	0.9		3	0.5		5	0.9	
	Aquatic habitat improved/harmed	3	1	1.0		3	2.9		3	2.9	
	Shoreline habitat improved/harmed	21	4	2.3		5	2.9		5	2.9	
	River habitat improved/harmed	13	1	0.8		3	2.3		3	2.3	
Biophysical Environment (16)	Wetland habitat improved/harmed	26	1	0.5	38%	1	0.5	62%	1	0.5	59%
	Terrestrial habitat improved/harmed	43	5	0.8		3	0.5		5	0.8	
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	Stormwater control or protection	45	1	0.1		1	0.1		1	0.1	
	Reduce contamination	6	1	0.9		1	0.9		1	0.9	
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	Application information prepared	23	5	2.7		3	1.6		5	2.7	
	Established partnerships	29	5	2.1		5	2.1		5	2.1	



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		Open water bakital quality inproved/barned	11	28.48X	11	LH	11.70			s	4.1			1.1		4	ы																				
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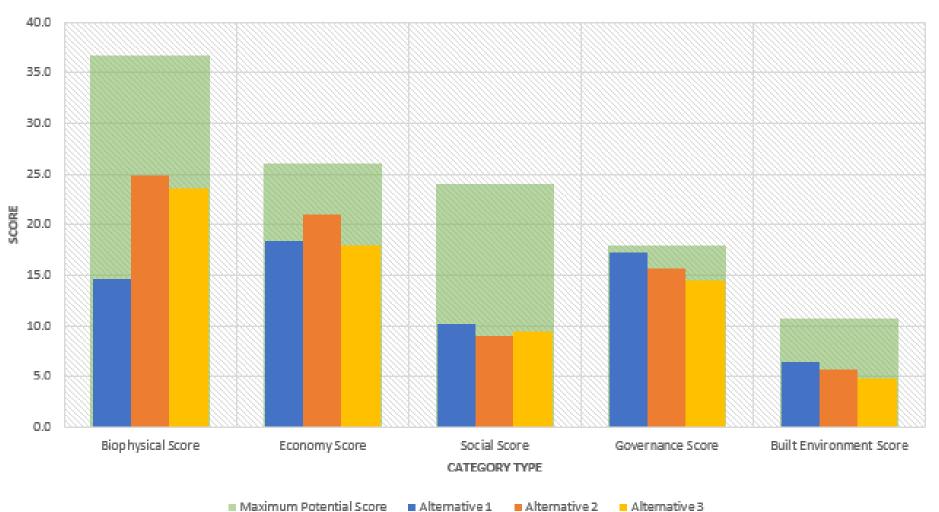
- A Biophysical Environment
- B Economy
- C Social
- D Governance
- E Built Environment
- F Total Scores
- G Project Score Columns

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	Realmention of nation regulation	45	98.68X	1X 4X	1.71	8			5	5.5 1.7		s s	5.5 5.5		4	1.7 3.5				
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	dealified	24	X6E.39X	11	1.55		5.5					5	2.8		4	2.2		s	2.1	
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10		11	\$5.48X	11	1.30	-			5	2.2		5	2.2		5	2.2	_			
	h are alian	31	\$1.28X \$3.28X	11	1.42	5			1	14		1	1.5	1	s s	2.4 2.8				
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Graphical Output

Category Scores Comparison - Scoresheet A





Flow of information through DMDT

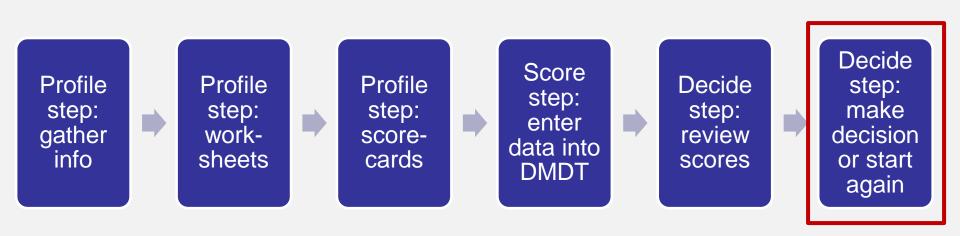




Photo source: Minnesota Land Trust

- Additional informational resource
 - Database of examples

Informational Resource

- Materials available
- <u>https://www.epa.gov/research/dredged-</u> material-decision-tool-dmdt



Other Considerations and Applications

- DMDT explicitly considers benefits
 - Assumes that dredged materials are a resource
- DMDT can be modified
 - Duluth Natural Resource Management Program
 - Minnesota Coastal Management Program
- Explicitly considers project details, program requirements, and benefits at the same time



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