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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

User-centered Design

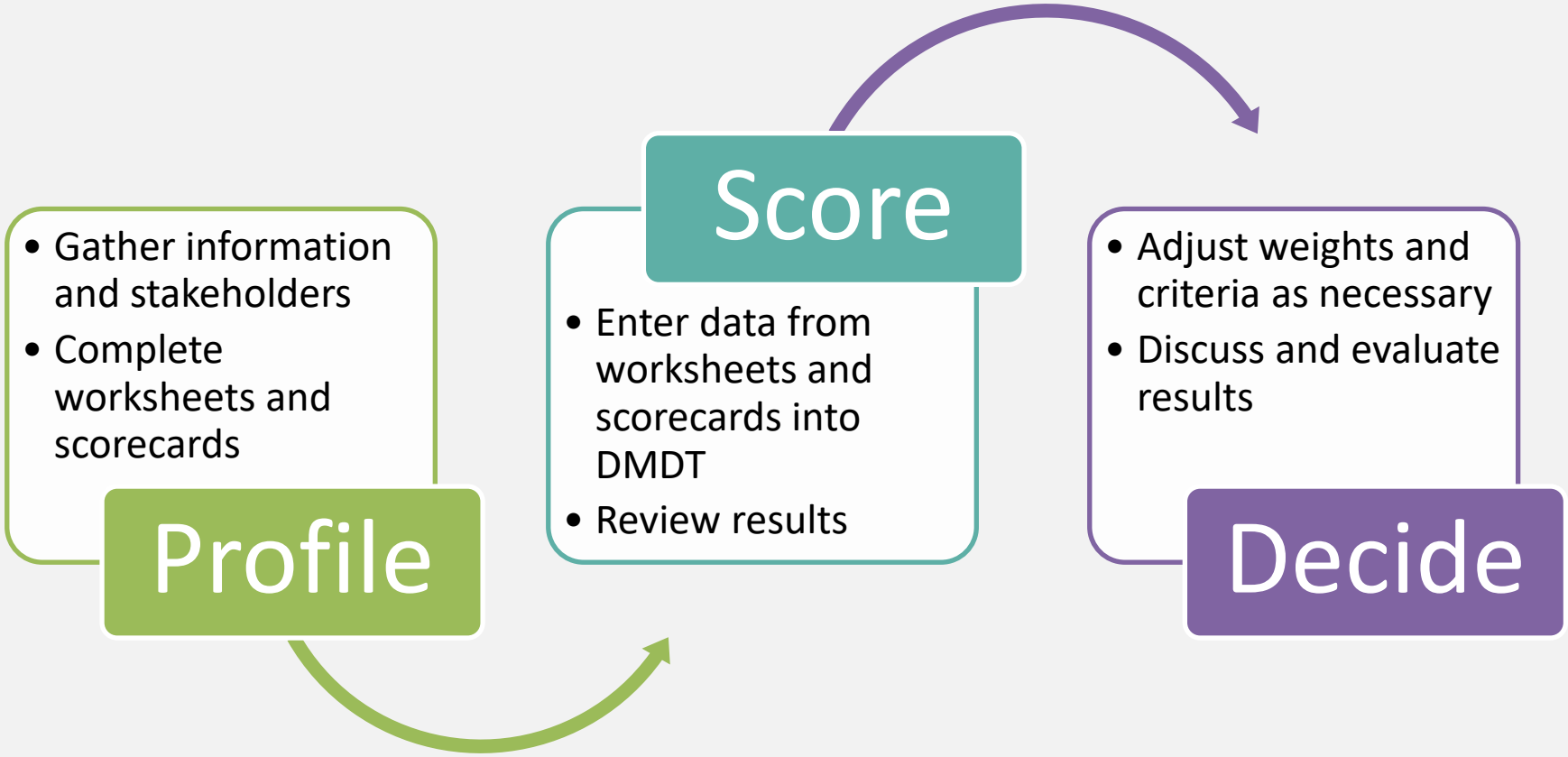
https://usability.gov/what-and-why/user-centered-design.html

- DMDT and subsequent iterations are based on user-centered 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



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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

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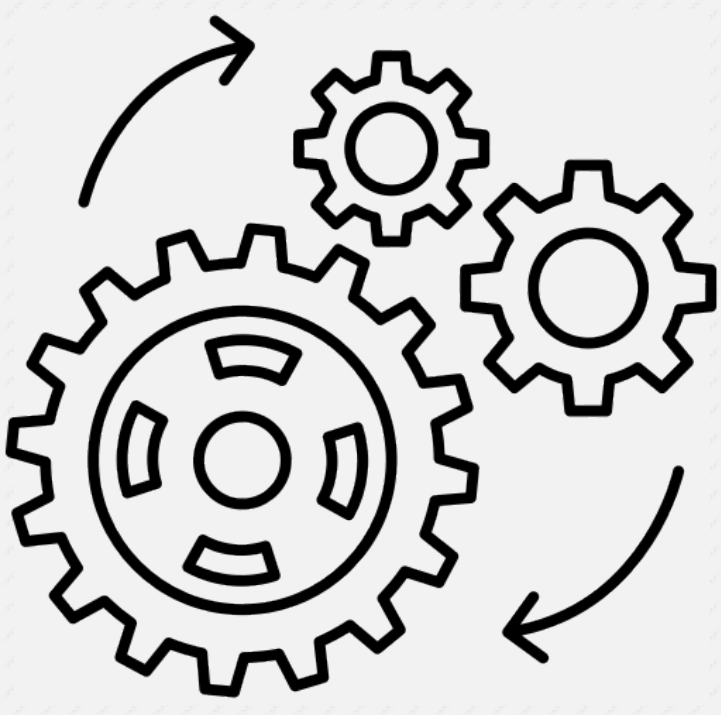
Worksheet: Economic Costs & Benefits

- Funding pathway secured
- Application prepared
- Partnerships established
- Partnerships identified
- Transportation is feasible
- Project can accept materials (<5 years)
- Project can accept materials in the long-term
- 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/

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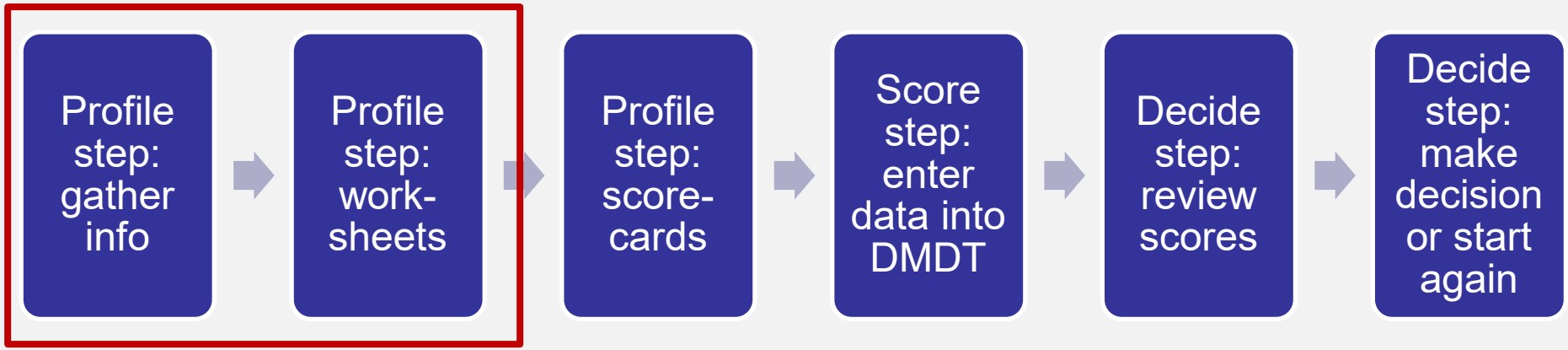

Project and Site Information

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 Re
Mode of transportation	
Barge:	☑
Pipeline:	☑

Governance			
Maintain navigations channels:			
Yes	☑	**Likelihood (of action):**	High
No	☐	**Magnitude (impact of action on alternative):**	High
Unsure	☐	**Direction (how does action impact alternative feasibility):**	More feasible
Consideration of liability (past, present and future for project/ project site):			
Yes	☑	**Likelihood:**	High
No	☐	**Magnitude:**	High
Unsure	☐	**Direction:**	More feasible
Enrolled in a voluntary program (often assessment/clean-up support):			
Yes	☐	**Likelihood:**	Low
No	☑	**Magnitude:**	Low
Unsure	☐	**Direction:**	Neutral
Able to be completed inside of relevant environmental windows:			
Yes	☑	**Likelihood:**	High
No	☐	**Magnitude:**	High
Unsure	☐	**Direction:**	More feasible
Referred to or included in existing guidance documents:			
Yes	☑	**Likelihood:**	High
No	☐	**Magnitude:**	High

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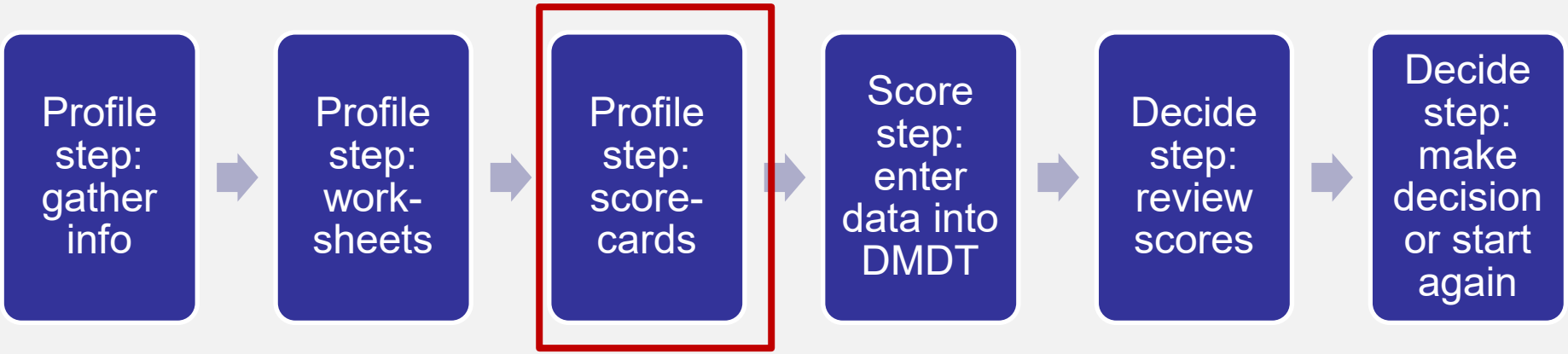

Scorecard A: Likert Scale

		Impact Characterization (likelihood, impact, feasibility)					
		5 Definite	4 High	3 Moderate	2 Somewhat	1 Low	N/A
Social	Improve access to parks or natural spaces		X				
	Potential for indirect job creation				X		
	Improve aesthetics	X					
	Community engagement	X					
	Reduced human exposure to contaminants		X				
	Improved access to ecosystem services		X				
	Improved infrastructure condition			X			
	New/improved infrastructure services for community			X			

		Impact Characterization (likelihood, impact, feasibility)					
		5 Definite	4 High	3 Moderate	2 Somewhat	1 Low	N/A
Governance	Maintain navigation channels	X					
	Enrollment in voluntary program					X	
	Able to complete within Environmental Windows		X				
	Included in existing guidance documents		X				
	Permitting timeline conducive with project timeline			X			
	Meets zoning requirements	X					
	Flexible timeframe				X		
	Replicable			X			
	Site ownership	X					

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Scorecard B: Binary Choice

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

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Scorecard C: Ranking

Scorecard C: Ranking		
	Criteria	**Rank**
Biophysical	Rivers and streams habitat quantity gain/loss	
	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	

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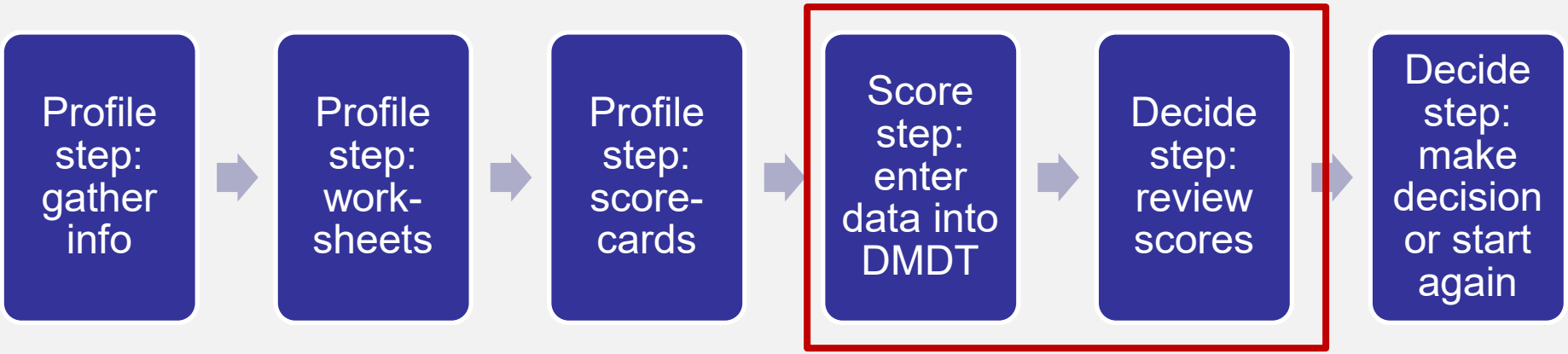

Enter Project Data

	A	B	C	D
1	Duluth-Superior Harbor Working 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; Alternative 3: 50K		
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>		
15	Prepared on	<Enter Date>		
16	Checked by	<Enter Name>		
17	Checked on	<Enter Date>		

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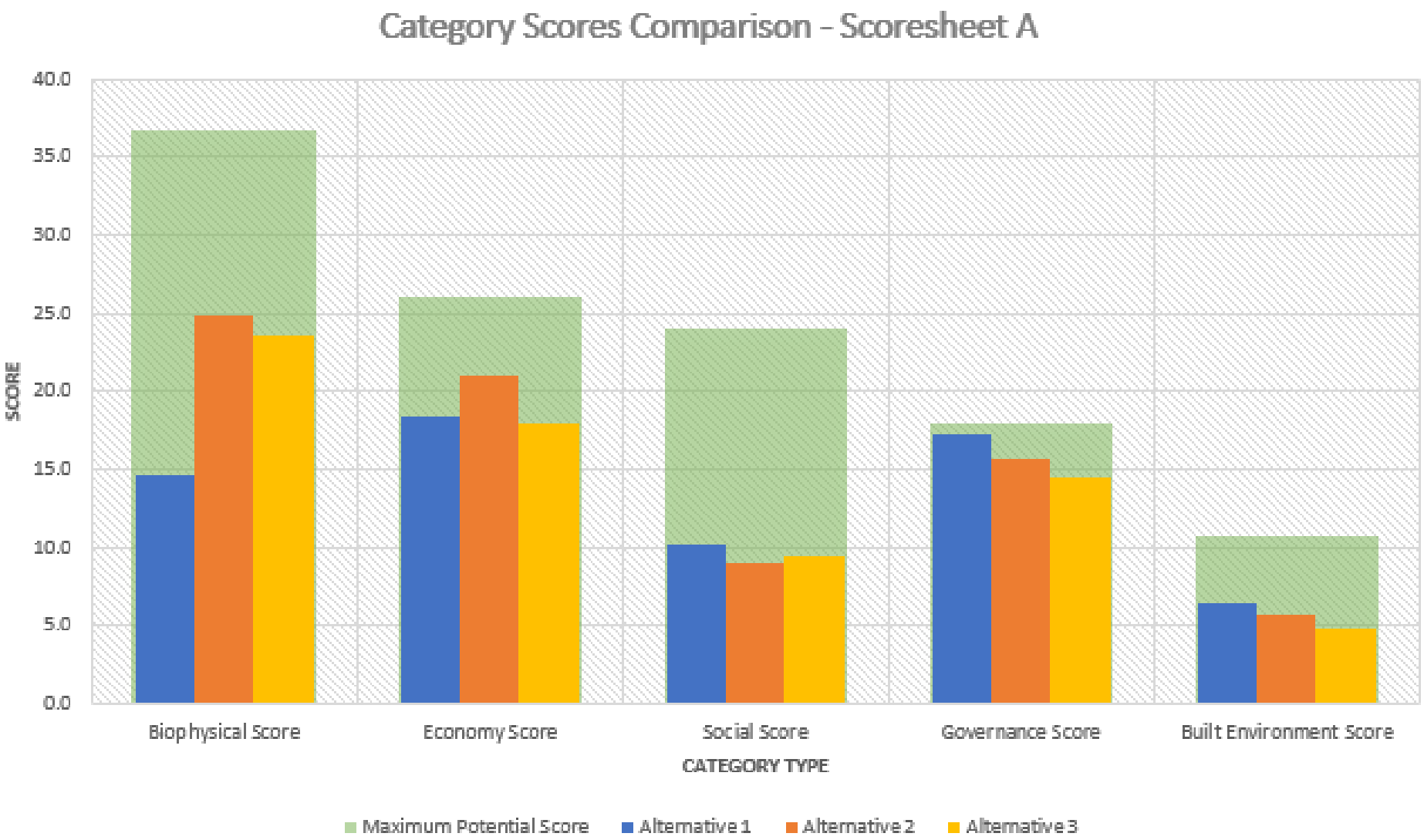
Enter Data in DMDT

A	B	C	K	L	M	N	O	P	Q	R	S
Category	Criterion	C Rank	*U*	*W*	*C*	*U*	*W*	*C*	*U*	*W*	*C*
Biophysical Environment (16)	Aquatic habitat gain/loss	2	1	1.0	38%	4	3.9	62%	3	2.9	59%
	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	
	Wetland habitat improved/harmed	26	1	0.5		1	0.5		1	0.5	
	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	

Graphical Output



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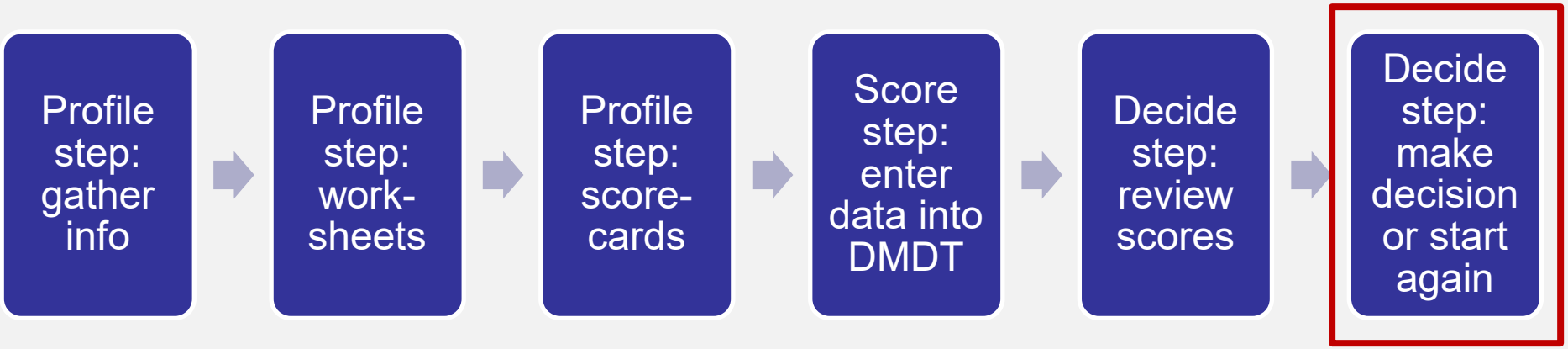

Photo source: Minnesota Land Trust

Informational Resource

- Additional informational resource
  - Database of examples
- Materials available
- https://www.epa.gov/research/dredged-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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