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AOC Revitalization and the Beneficial Use of Dredged Materials

*Collective decisions and the **Dredged Materials Management Tool** (DMDT)*

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Mini-session Overview

- Dredging overview
  - Great Lakes dredging needs
- Dredged material beneficial use
  - Why is beneficial use a good option for revitalization?
  - Potential uses
  - Challenges
  - Examples
- Dredged Materials Decision Tool (DMDT)
  - Explanation
  - Application
  - Demonstration

Great Lakes Shipping

Superior Entry: https://dredgeresearchcollaborative.org

Dredging in the Great Lakes

- "Excavation of material from a water environment"
- USACE mandate under Section 10 of Rivers & Harbors Act of 1899 for O&M
- 2-5 million cubic yards annually for O&M
  - ➢Where can it go?!
    - CDF, open water disposal, or BU

Mprnews.org

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Dredged Materials Beneficial Use

- “productive and positive uses of dredged material, which cover broad use categories ranging from fish and wildlife habitat development, to human recreation, to industrial/commercial uses” (USACE Beneficial Uses of Dredged Material, Engineer Manual 1110-2-5026)
    - Beach nourishment
    - Habitat construction
    - Brownfield reconstruction
    - Material/product creation
    - Terrestrial capping

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Dredged Materials Beneficial Use

- Duluth Harbor examples:

Interstate Island

Stlouisriverestuary.org

21st Ave West Restoration Site

Stlouisriverestuary.org

Dredged Materials Beneficial Use

- Duluth Harbor examples:

Atlas Industrial Park

Northlandconnection.com

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Dredged Materials Beneficial Use

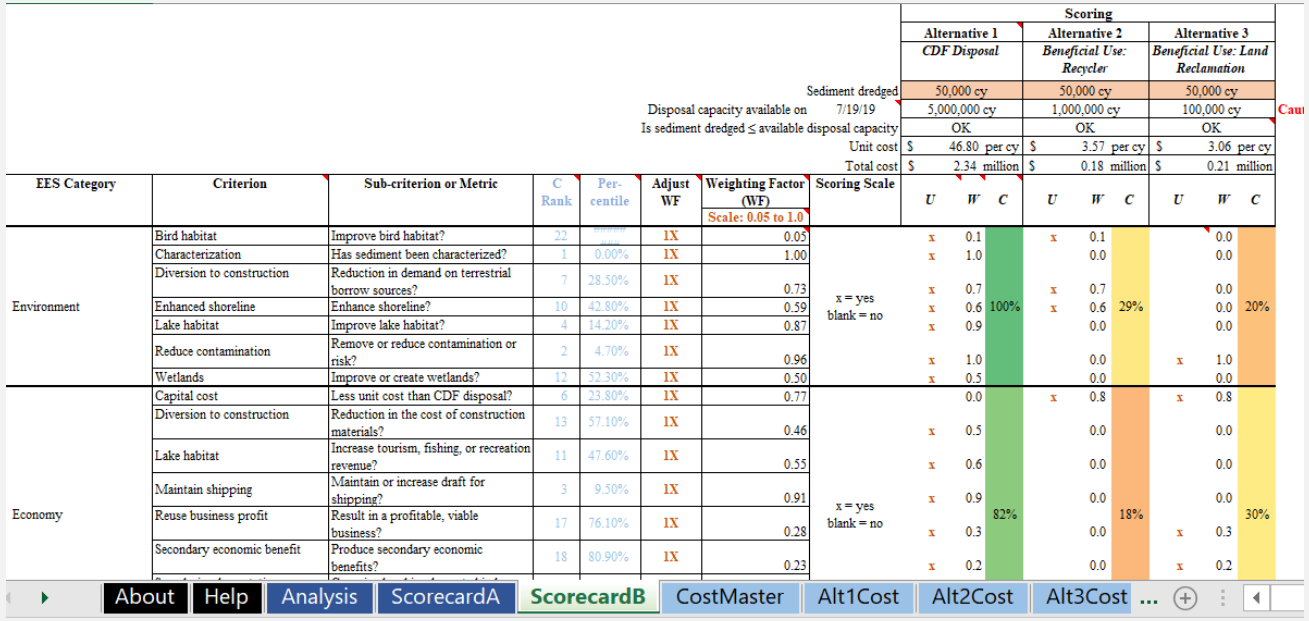
- Typical challenges:
  - –Funding / cost
  - –Timing
  - –Regulations
  - –Material characteristics matching
  - –Complex stakeholder coordination

- How can beneficial use become a bigger piece of dredged materials management solutions?

Great Lakes Dredge & Dock

Dredged Materials Decision Tool

- Originally developed under contract by EPA Region 5 for use in Cleveland, OH



								Scoring								
								Alternative 1			Alternative 2			Alternative 3		
								CDF Disposal			*Beneficial Use: Recycler*			*Beneficial Use: Land Reclamation*		
							Sediment dredged	50,000 cy			50,000 cy			50,000 cy		
							Disposal capacity available on 7/19/19	5,000,000 cy			1,000,000 cy			100,000 cy		Caut
							Is sediment dredged ≤ available disposal capacity	OK			OK			OK		
							Unit cost	$ 46.80 per cy			$ 3.57 per cy			$ 3.06 per cy		
							Total cost	$ 2.34 million			$ 0.18 million			$ 0.21 million		
EES Category	Criterion	Sub-criterion or Metric	C Rank	Per-centile	Adjust WF	Weighting Factor (WF) Scale: 0.05 to 1.0	Scoring Scale	U	W	C	U	W	C	U	W	C
Environment	Bird habitat	Improve bird habitat?	22		1X	0.05	x = yes blank = no	x	0.1	100%	x	0.1	29%		0.0	20%
	Characterization	Has sediment been characterized?	1	0.00%	1X	1.00		x	1.0			0.0			0.0	
	Diversion to construction	Reduction in demand on terrestrial borrow sources?	7	28.50%	1X	0.73		x	0.7		x	0.7			0.0	
	Enhanced shoreline	Enhance shoreline?	10	42.80%	1X	0.59		x	0.6		x	0.6			0.0	
	Lake habitat	Improve lake habitat?	4	14.20%	1X	0.87		x	0.9			0.0			0.0	
	Reduce contamination	Remove or reduce contamination or risk?	2	4.70%	1X	0.96		x	1.0			0.0		x	1.0	
	Wetlands	Improve or create wetlands?	12	52.30%	1X	0.50		x	0.5			0.0			0.0	
Economy	Capital cost	Less unit cost than CDF disposal?	6	23.80%	1X	0.77	x = yes blank = no		0.0	82%	x	0.8	18%	x	0.8	30%
	Diversion to construction	Reduction in the cost of construction materials?	13	57.10%	1X	0.46		x	0.5			0.0			0.0	
	Lake habitat	Increase tourism, fishing, or recreation revenue?	11	47.60%	1X	0.55		x	0.6			0.0			0.0	
	Maintain shipping	Maintain or increase draft for shipping?	3	9.50%	1X	0.91		x	0.9			0.0			0.0	
	Reuse business profit	Result in a profitable, viable business?	17	76.10%	1X	0.28		x	0.3			0.0		x	0.3	
	Secondary economic benefit	Produce secondary economic benefits?	18	80.90%	1X	0.23		x	0.2			0.0		x	0.2	

About | Help | Analysis | ScorecardA | ScorecardB | CostMaster | Alt1Cost | Alt2Cost | Alt3Cost ...

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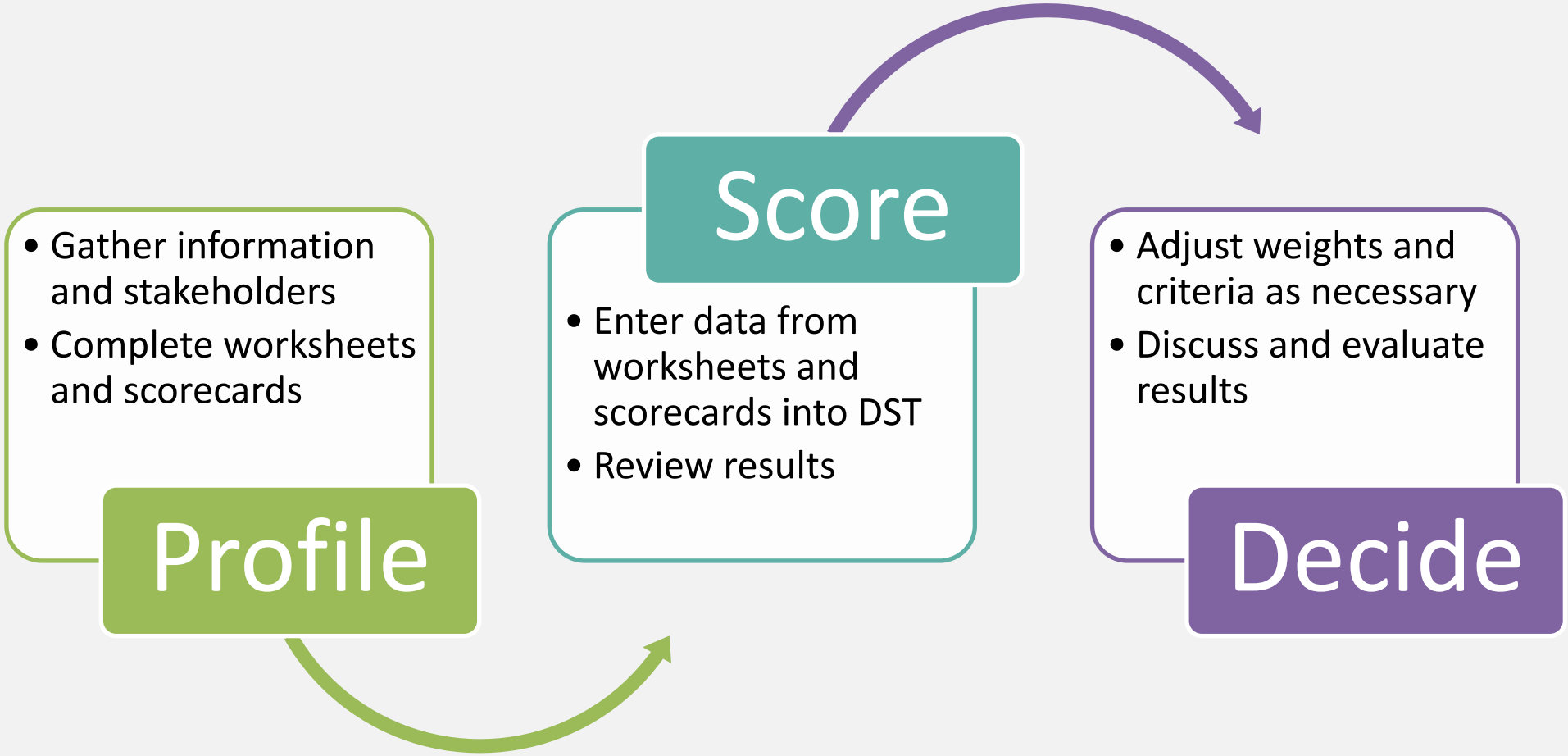
Dredged Materials Decision Tool



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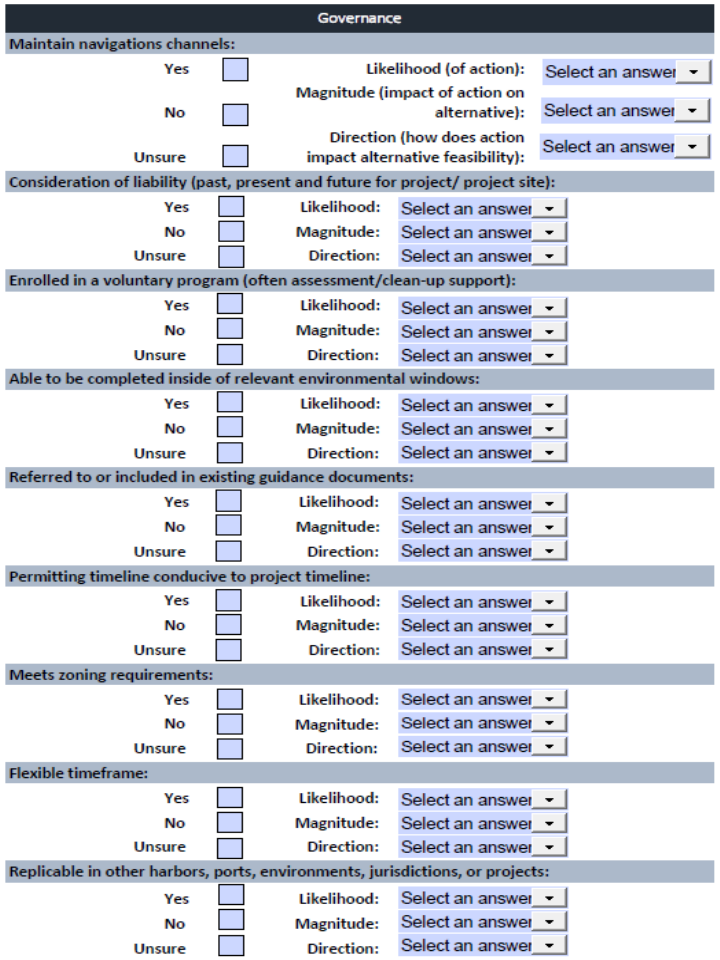
Stakeholder Assembly - DMDT

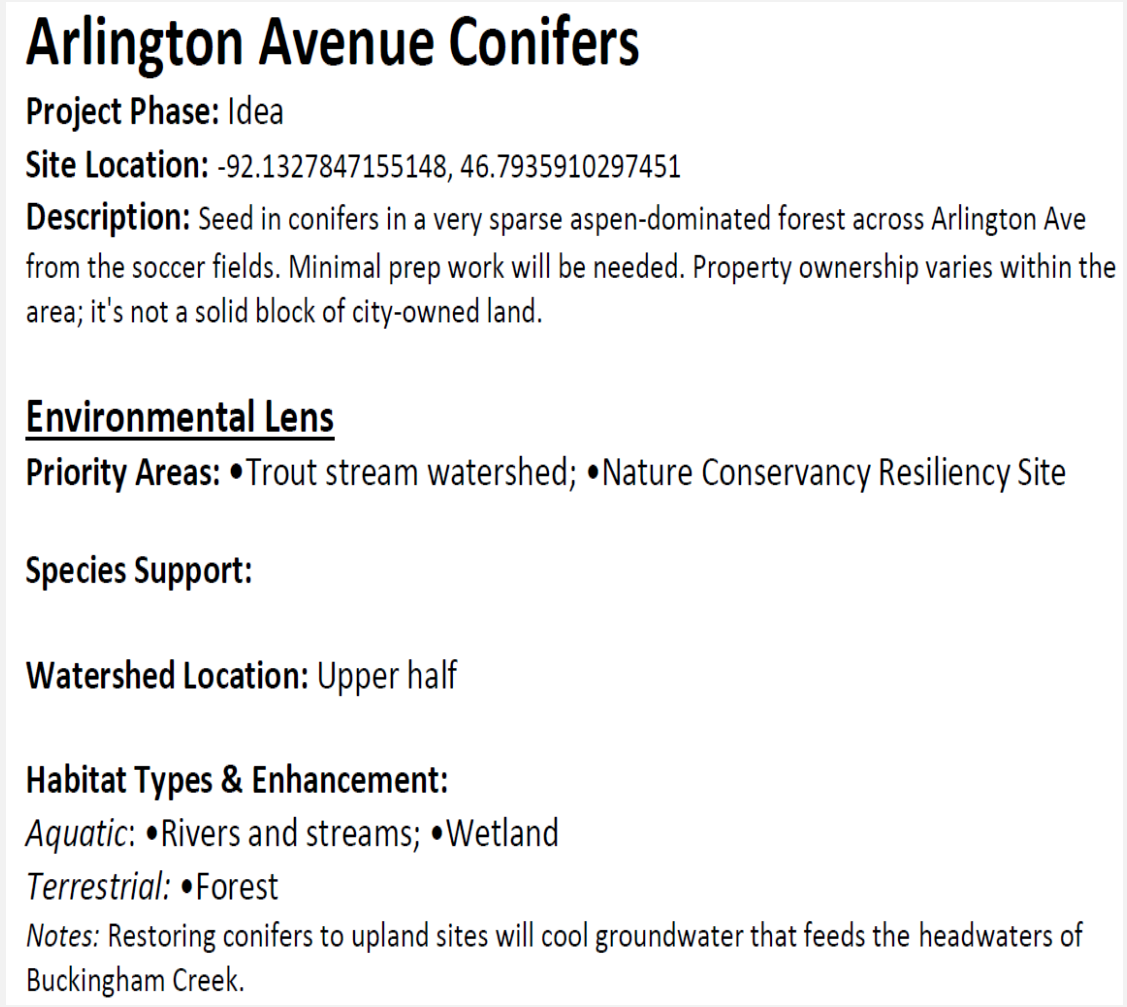
- Resource managers
- Local government
- US Army Corps of Engineers
- EPA
- NGOs
- Community groups
- Local business

Information Gathering - DMDT



Governance			
Maintain navigations channels:			
Yes	☐	Likelihood (of action):	Select an answer
No	☐	Magnitude (impact of action on alternative):	Select an answer
Unsure	☐	Direction (how does action impact alternative feasibility):	Select an answer
Consideration of liability (past, present and future for project/ project site):			
Yes	☐	Likelihood:	Select an answer
No	☐	Magnitude:	Select an answer
Unsure	☐	Direction:	Select an answer
Enrolled in a voluntary program (often assessment/clean-up support):			
Yes	☐	Likelihood:	Select an answer
No	☐	Magnitude:	Select an answer
Unsure	☐	Direction:	Select an answer
Able to be completed inside of relevant environmental windows:			
Yes	☐	Likelihood:	Select an answer
No	☐	Magnitude:	Select an answer
Unsure	☐	Direction:	Select an answer
Referred to or included in existing guidance documents:			
Yes	☐	Likelihood:	Select an answer
No	☐	Magnitude:	Select an answer
Unsure	☐	Direction:	Select an answer
Permitting timeline conducive to project timeline:			
Yes	☐	Likelihood:	Select an answer
No	☐	Magnitude:	Select an answer
Unsure	☐	Direction:	Select an answer
Meets zoning requirements:			
Yes	☐	Likelihood:	Select an answer
No	☐	Magnitude:	Select an answer
Unsure	☐	Direction:	Select an answer
Flexible timeframe:			
Yes	☐	Likelihood:	Select an answer
No	☐	Magnitude:	Select an answer
Unsure	☐	Direction:	Select an answer
Replicable in other harbors, ports, environments, jurisdictions, or projects:			
Yes	☐	Likelihood:	Select an answer
No	☐	Magnitude:	Select an answer
Unsure	☐	Direction:	Select an answer

Criteria Worksheets



Arlington Avenue Conifers

Project Phase: Idea

Site Location: -92.1327847155148, 46.7935910297451

Description: Seed in conifers in a very sparse aspen-dominated forest across Arlington Ave from the soccer fields. Minimal prep work will be needed. Property ownership varies within the area; it's not a solid block of city-owned land.

Environmental Lens

Priority Areas: •Trout stream watershed; •Nature Conservancy Resiliency Site

Species Support:

Watershed Location: Upper half

Habitat Types & Enhancement:

Aquatic: •Rivers and streams; •Wetland

Terrestrial: •Forest

Notes: Restoring conifers to upland sites will cool groundwater that feeds the headwaters of Buckingham Creek.

Project Site Profiles

Collective Values - DMDT

Economy	Funding pathway identified
	Funding application prepared
	Partnerships established
	Potential partnerships identified
	Feasible transportation of dredged materials to the placement site
	Accept materials (5 years)
	Accept materials long-term (20 years)
	Lead to creation/growth of viable business
	Secondary benefits created
	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

Criteria List

	A	B	C	D
28	Category	Criterion	C Rank	Per-centile
29				
30	Biophysical Environment (16)	Aquatic habitat gain/loss	2	2.20%
31		Shoreline habitat gain/loss	20	42.20%
32		River habitat gain/loss	12	24.40%
33		Wetland habitat gain/loss	25	53.30%
34		Terrestrial habitat gain/loss	42	86.60%
35		Aquatic habitat improved/harmed	3	4.40%
36		Shoreline habitat improved/harmed	21	44.40%
37		River habitat improved/harmed	13	26.60%
38		Wetland habitat improved/harmed	26	55.50%
39		Terrestrial habitat improved/harmed	43	88.80%
40		Priority habitat	35	73.30%
41		Species of management concern	31	66.60%
42		Restore or manage native vegetation	48	97.70%
43		Reduce invasive vegetation	16	33.30%
44		Stormwater control or protection	45	91.10%
45		Reduce contamination	6	11.10%
46		Funding pathway	10	20.00%
47		Application information prepared	23	48.80%
48		Established partnerships	29	62.20%

Criteria Ranking

Project Scoring - DMDT

								Scoring								
								Alternative 1 *CDF Disposal*			Alternative 2 *Beneficial Use: Recycler*			Alternative 3 *Beneficial Use: Land Reclamation*		
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	Diversion to construction	Reduction in demand on terrestrial borrow sources?	7	28.50%	1X	0.73		x	0.7		x	0.7			0.0	
	Enhanced shoreline	Enhance shoreline?	10	42.80%	1X	0.59		x	0.6	100%	x	0.6	29%		0.0	20%
	Lake habitat	Improve lake habitat?	4	14.20%	1X	0.87		x	0.9			0.0			0.0	
	Reduce contamination	Remove or reduce contamination or risk?	2	4.70%	1X	0.96		x	1.0			0.0		x	1.0	
	Wetlands	Improve or create wetlands?	12	52.30%	1X	0.50		x	0.5			0.0			0.0	
Economy	Capital cost	Less unit cost than CDF disposal?	6	23.80%	1X	0.77	x = yes blank = no		0.0		x	0.8		x	0.8	
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Project Scoring - DMDT

Sheet Page	Project Name	Total Score	Environment	Priority Areas	Economy	Social	Governance
16	Hartley Pond & Tischer Creek Warm Water Mitigation (Design & Construction)	11.40	5.49	1.07	2.77	0.38	2.76
4	Buckingham Creek Headwaters Preservation	10.48	6.07	0.81	1.86	0.13	2.42
9	Chester Creek at Rice Lake Road	9.73	5.23	0.81	2.70	0.13	1.67
28	Regional Planning (LCD, 1W1P, DuWAC)	9.29	5.58	1.16	2.32	0.13	1.26
7	Buckingham Creek Restoration Phase 2	9.09	5.81	0.55	0.73	0.13	2.42
5	Buckingham Creek Phase 2 (Design)	8.99	4.97	0.55	1.47	0.13	2.42
6	Buckingham Creek Phase 2 (Construction)	8.99	4.97	0.55	1.47	0.13	2.42
11	Coffee Creek Culverts near Arlington	8.89	5.23	0.81	1.86	0.13	1.67
25	Minnesota Point Dune & Rare Species Protection	8.44	5.33	0.61	1.31	0.13	1.67
22	Lower Knowlton Creek Fish Passage (Design & Construction)	8.04	3.31	0.81	3.06	0.00	1.67
20	Keene Creek at Grassy Point (Design & Construction)	7.96	4.23	0.81	1.93	0.13	1.67
24	Minnesota Point SNA Living Shoreline Demonstration Project	7.64	2.06	0.26	3.06	0.51	2.01
17	Hartley Tier 1 Areas: NW, SC, & SE Corners	7.47	4.49	1.07	1.31	0.00	1.67
23	Miller Creek Restoration (Between Swan Lake Road and Airport Road)	7.37	5.23	0.81	0.17	0.13	1.84
12	Dam Removal on Keene Creek	6.91	5.06	0.64	0.22	0.13	1.50
15	Goose Management Plan	6.74	2.83	1.16	1.77	0.13	2.01

0.Main Ranking Sheet | 01.Arlington Ave Conifers | 02.Bird Monitoring | 03.Black Ash Restoration ...

Duluth-Superior Harbor Working Group DMDT Workshop (March 2020)

										Alloue: Bay Group 1			Alloue: Bay Group 2			Alloue: Bay Group 3		
									Sediment to be dredged	50,000 cy			50,000 cy			50,000 cy		
									Disposal capacity available on 7/19/19	1,000,000 cy			1,000,000 cy			1,000,000 cy		
									Is sediment dredged ≤ available disposal capacity	OK			OK			OK		
Criterion	C Rank	Per-centile	Adjust WF	Weighting Factor (WF) Scale: 0.05 to 1.0	WF Sum	WF Share	Scoring Scale Min = 1	Max = 5		U	W	C	U	W	C	U	W	C
Aquatic habitat gain/loss	2	2.10%	IX	0.98						5	4.9		5	4.9		4	3.9	
Shoreline habitat gain/loss	20	41.30%	IX	0.61						5	3.1		5	3.1		4	2.4	
River habitat gain/loss	12	23.90%	IX	0.77						5	3.9		3	2.3		1	0.8	
Wetland habitat gain/loss	25	52.10%	IX	0.51						5	2.6		5	2.6		5	2.6	
Terrestrial habitat gain/loss	42	86.90%	IX	0.17						1	0.2		3	0.5		1	0.2	
Aquatic habitat improved/harmed	3	4.30%	IX	0.96						5	4.8		5	4.8		4	3.8	
Shoreline habitat improved/harmed	21	43.40%	IX	0.59						5	3.0		5	3.0		4	2.4	
River habitat improved/harmed	13	26.00%	IX	0.75						5	3.8		3	2.3		1	0.8	
Wetland habitat improved/harmed	26	54.30%	IX	0.48	8.8	36%	1 to 5			5	2.4	88%	5	2.4	83%	5	2.4	65%
Terrestrial habitat improved/harmed	43	89.10%	IX	0.15						1	0.2		3	0.5		1	0.2	
Priority habitat	35	71.70%	IX	0.32						5	1.6		5	1.6		4	1.3	
Habitat quality objectives	35	71.70%	IX	0.32						5	1.6		5	1.6		4	1.3	
Species of management concern	31	65.20%	IX	0.38						5	1.9		5	1.9		5	1.9	
Restore or manage native vegetation	48	97.80%	IX	0.07						5	0.4		5	0.4		5	0.4	
Reduce invasive vegetation	16	32.60%	IX	0.69						5	3.5		5	3.5		4	2.8	

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Dredged Materials Decision Tool

- Demonstration – switch over to MS Excel for criteria ranking exercise

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DMDT Wrap-Up

Link to DMDT material downloads:

- *https://www.epa.gov/research/dredged-material-decision-tool-dmdt*

Link to DMDT Project Report:

- *https://www.epa.gov/sciencematters/finding-beneficial-uses-sediment-dredged-waterways*

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THANK YOU!

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