

# Beneficial Use of Contaminated Sediments: A Literature Review for the Sediment Management Work Group

Barr Engineering Co.

Deltares

Windward Environmental LLC

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# What is Beneficial Use?

- Dredged sediment can:
  - Go to a disposal facility
  - Be used as a resource (“beneficial use”)
- Beneficial uses
  - Coastal resiliency management
  - Locally manufactured building materials
  - Wetland/other natural habitat restoration and enhancement
  - Land reclamation
- Beneficial uses can involve pre-treatment

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# Sustainability Mindset

- Beneficial use advantages:
  - Reduces demand for limited landfill space
  - Promotes development of pre-treatment technologies
  - Helps satisfy demand for construction fill
  - Encourages circular use of locally available material
  - Lowers energy use, greenhouse gas emissions
  - Improves ecosystem quality by enhancing habitat

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# White Paper – SMWG

- Commissioned deliverables:
  - White paper – 170+ citations
  - Annotated bibliography – 50+ annotations
- Present the findings of a literature review on beneficial use of sediments in North America and Europe
  - Identify the current state of the practice
  - Successes, barriers, existence in regulation, and examples
- Explicit focus on contaminated sediments

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# Background

- Beneficial use has examples throughout the last 30 years but most regulatory entities in North America and Europe regulate dredged material as if it were a waste
- Recent updates to certain programs consider select beneficial use scenarios, when environmentally appropriate
  - US Army Corps of Engineers 2021; EPA 2021
  - Regional programs
- Short-term appeal to landfill solutions:
  - Typically lower upfront costs than treating and using the sediment
  - Fear over chemical exposure
  - Lack of streamlined process for beneficial use means those options require time and creativity
  - Lack of need for more creative, sustainable solutions
- Commitments to sustainability (i.e. European Union's Green Deal) promote changing how we think of beneficially using sediment

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# Barriers to Beneficial Use

- Permitting and licensing for beneficial use are complex, sometimes unclear, and require extensive consultation with multiple parties
- Conservative screening criteria, even if exposure pathways have been reduced
- Public trust or acceptance in incorporating products that used contaminated sediment as a raw material

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# What Works

- Thinking about “clean” sediments as a resource is a good starting point
- Regional efforts are important at providing precedent for national and international regulation updates
- Pre-planning and regional coordination are commonly cited as essential to successful acceptance and permitting of beneficial use
- Education and early involvement of stakeholders where beneficial use can be incorporated

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# Decision Making Frameworks

- Since 2017, several studies have suggested new decision-making frameworks for sediment remediation
  - Green and Sustainable Remediation (GSR)
  - Sediment Life Cycle Assessments (LCAs)
  - Offer various criteria and incentives for environmental and socio-economic benefits
  - Better account for long-term effects than previous evaluation frameworks
- Most papers called for research focus in improving beneficial use technologies to:
  - Improve versatility of beneficial use options
  - Reduce environmental impact of using contaminated sediment as a resource



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# Key Observations

- ◆ Pre-treatment of contaminated sediment expands beneficial use options
  - Reduces bioavailability/mobility of contamination which could support public acceptance
- ◆ Sustainability evaluations are becoming more common
  - Innovation in sustainability evaluations & international commitment for sustainable solutions increases demand for beneficial use solutions.
  - Computing project life cycle costs, including indirect benefits and costs, finds beneficial use options favorable over landfilling sediment.

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# Key Observations

- ◆ Addressing broad concerns about contamination can reduce stigma
  - Designing beneficial use solutions with stakeholders helps incorporate their perspectives and demonstrate why beneficial use makes sense for their priorities.
  - Early inclusion, communication, and education all facilitate this process.
    - Need to find a way to have healthy discussions about environmental risks and benefits
- ◆ Adaptive management strategies must be incorporated to better understand how to beneficially use sediments
  - End use of contaminated sediment affects both risk and risk acceptability.
  - Environmental risk assessment can and must improve to better evaluate potential risk exposure from sediment in specific settings.

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# Key Observations

- ◆ Sediment management has become an issue, therefore approaching management options through sustainability evaluation creates opportunities rather than barriers.
  - Effective sediment management will be an ongoing collaborative process requiring participation from regulators, researchers, and stakeholders.
  - This literature review identified numerous precedents for incorporating beneficial use in sediment management options.

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# For more information

- To get a copy of the white paper, contact Sediment Management Work Group <https://www.smwg.org/>
- Resources in the white paper:
  - Tables documenting sediment management programs
  - Adaptive management overview
  - Annotated bibliography
  - Beneficial Use Project Examples
    - *New Jersey / New York Harbor*
    - *Montezuma Wetland Restoration*
    - *Ports of Long Beach / Los Angeles*
    - *St. Louis River / Interlake / Duluth Tar (SLRIDT)*
- Contact us directly:
  - Eric Hedblom, Barr Engineering ([EHedblom@Barr.com](mailto:EHedblom@Barr.com))
  - Eric Dott, Barr Engineering ([EDott@Barr.com](mailto:EDott@Barr.com))
  - Luca Sittoni, Deltares ([Luca.Sittoni@Deltares.nl](mailto:Luca.Sittoni@Deltares.nl))
  - John Toll, Windward Environmental ([JohnT@WindwardEnv.com](mailto:JohnT@WindwardEnv.com))