Environmental Risk Associated with the Open-Water Placement of Dredged Material in the Great Lakes – A Literature Review and Synthesis

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Problem Statement

- USACE annually dredges 2-5 M yards^3 of sediment from 25-50 federal harbors and projects in the Great Lakes
- Roughly half of material dredged from Great Lakes harbors does not meet Federal guidelines for open lake placement, most of which is placed in confined disposal facilities (CDFs)
- Some Great Lakes state agencies involved in issuing water quality certification do not support or have become less accepting of open-lake placement of dredged sediment that meets Federal guidelines
- This presents a challenge for States and Corps to corroborate on mutually agreeable management alternatives for dredged material
- Many Corps CDFs are at or near design capacity

Aspects of the Problem

- Improvement in dredged material quality (problem?. . .)
- Volume of dredged material requiring management
- Some states not open to OWP
- Lack of capacity in existing Corps CDFs
- Cost and non-Federal cost-sharing requirements of construction for new CDFs
- Available sites for new CDFs
- Impact on O&M dredging costs to Federal Government and non-Federal partners
- BU costs not insignificant (cost share requirements, etc.)

Aims and Scope

Conduct literature review and synthesis – What does the science say?

Elicit state and stakeholder input and feedback

Documentation Structure

Regulatory Considerations

- Clean Water Act (CWA) Section 404(b)(1) Guidelines and Evaluation
  - "Contaminant determination" at 40 CFR 230.11(d)
    - Applicable formal Federal guidance
    - Great Lakes and Inland Testing Manuals
    - Role of State Section 401 water quality certification
  - "Greater" evaluation (i.e., in 404(b)(1) non-contaminant habitat related risk factors (e.g., turbidity, etc.)
- National Environmental Policy Act process and documentation
- Other laws (e.g., State Coastal Management Program)

Evaluation

Evaluation of Open Water Placement of Dredged Material

- Site conceptual model(s)
- Habitat component
- Ecotoxicity component

Site Conceptual Model

- Evaluate impact to the aquatic ecosystem
  - Physical, chemical and biological stressors, and impacts
  - Understanding background conditions and relative risk (cannot evaluate dredged material placement impacts in isolation)
  - Tool for assessing “unacceptable adverse impact” to aquatic ecosystems and human health

Habitat Component

- Habitat-related impacts ("contaminant determination," 40 CFR 230.11)
  - ►Identify exposure pathways, measurement endpoints and risks
    - Water quality concerns: turbidity, resuspension of sediments, nutrients, HABs, anoxia)
    - Benthic concerns: loss of sensitive habitat, migration of dredged material
    - Pelagic concerns: disruption of fish migration and reproduction, etc.

Ecotoxicity Component

- Ecotoxicity ("contaminant determination," 40 CFR 230.11[d])
  - Identify exposure pathways, measurement endpoints and risks
    - Water column (release of contaminants and toxicity) concerns: ammonia toxicity, PCB bioaccumulation, applicability of state water quality standards
    - Benthic (toxicity, bioaccumulation) concerns: ammonia toxicity, PCB bioaccumulation, PAH toxicity
    - Pelagic (toxicity, bioaccumulation) concerns: ammonia toxicity, PCB bioaccumulation, PAH toxicity

Open Water Placement (OWP) Case Studies

- OWP concerns raised in the Great Lakes are not unique
  - Addressed elsewhere under the CWA via risk management actions
- East and West coastal areas
- States supporting OWP (outside the GL)
  - Note concerns, how concerns are being addressed, risks being managed
  - Eel grass beds, etc.
- Case study examples
  - Field verification (review/synthesis of post-aquatic placement data) from historical DM placement sites being monitored

Summary/Conclusions/ Recommendations

- Study objectives
  - What was done and why
- What does the science say
- Impacts
- Dredged material placement impacts on a basin scale
- Data gaps
- Suggested paths forward
  - Collaborative processes
  - Risk management alternatives

Products and Deliverables

- Stakeholder meetings
- Webinars
- Fact sheet
- ERDC Technical Publication
- Journal article (Journal of Great Lakes Research)

Projected Schedule

- Summer 2014 — Complete draft outline
- Summer 2014 — Complete draft annotated outline
- Fall 2014 — Present progress; elicit feedback
- Winter 2014 — Complete draft manuscript
- Winter 2015 — Complete manuscript
- Winter 2015 — Submit manuscript to JGLR
- Winter 2015 — Submit Tech Report for internal review
- Summer 2015 — Publish Tech Report
- Summer 2015 — Publish manuscript in JGLR


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Questions?