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

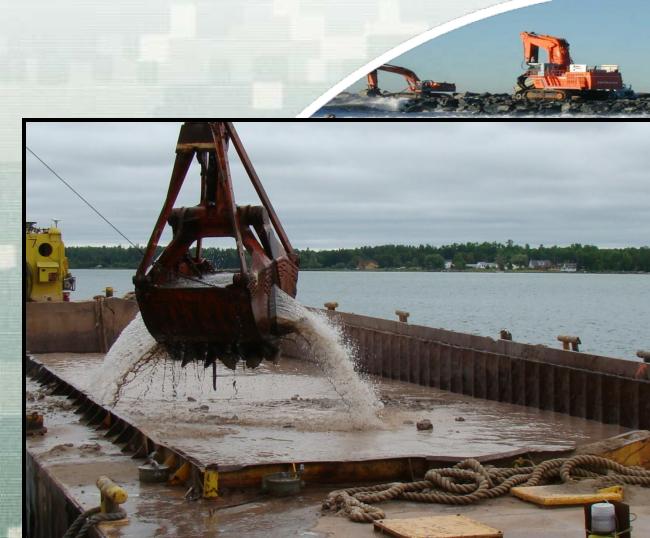
Burton Suedel, Ph.D. Joe Kreitinger, Ph.D. USACE-ERDC-EL Vicksburg, MS

Great Lakes Dredging Team Open Water Placement Summit May 20-21, 2014 Oregon, Ohio



US Army Corps of Engineers

BUILDING STRONG®



Problem Statement

- USACE annually dredges 2-5 M yards³ 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





