



ITRC PROJECT PROPOSAL

Strategy for Remedial Decision-Making at Contaminated Sediment Sites

Proposal Contact:

Kim Ward, NJDEP, BEMSA, 300 Horizon Center, Robbinsville, NJ 08691 Kim.Ward@dep.state.nj.us, 609-584-4280

Call for Proposals Topical Areas

CHAR/REM – Characterization/Remediation

Problem Statement (why is this project necessary and relevant to ITRC's purpose & mission?)

Quoting the USEPA Contaminated Sediment Management Strategy: "The U.S. Environmental Protection Agency estimates that approximately 10 percent of the sediment underlying our nation's surface water is sufficiently contaminated with toxic pollutants to pose potential risks to fish and to humans and wildlife that eat fish. This represents about 1.2 billion cubic yards of contaminated sediment out of the approximately 12 billion cubic yards of total surface sediments (upper five centimeters) where many bottom dwelling organisms live, and where the primary exchange processes between the sediment and overlying surface water occur." Based on current average costs for managing contaminated sediments, this volume of material could cost several trillions dollars. The primary risk pathway at contaminated sediment sites are drinking water supplies and the food chain. EPA Regions and states independently have made decisions in the absence of guidance, which has led to inconsistencies relative to geopolitical boundaries (e.g. state borders, port authorities). Debate continues regarding the latest and in some cases rapidly evolving sediment quality criteria and their appropriate application for assessing and remediating contaminated marine and freshwater sediments.

The current ITRC sediment team process is tending to the lack of understanding and sometimes the misunderstanding of bioavailability of contaminants in freshwater and marine environments. Over 25 percent of the contaminated sediment sites addressed to date in the U.S. have had State drivers. As activity accelerates, this percentage is likely to grow. This proposed guidance will contain the necessary consistency and understanding of the appropriate, cost effective, and protective elements for optimum remediation at contaminated sediment sites.

There is a major debate in the area of contaminated sediment remediation on the appropriateness of mass removal vs. natural recovery or *in situ* treatment or capping options. The pro-dredging argument focuses on mass removal and permanence; the anti-dredging arguments focus on the destructive impact on the ecosystems (cure is worse than the disease) and the inability to achieve meaningful risk reduction through costly removal of mass. High costs may rule out dredging on many contaminated sediment sites.

The ITRC Contaminated Sediment Team is developing guidance for assessing contaminant risk based upon understanding contaminant bioavailability. Regulatory agencies most often characterize the level of contamination in sediments as a bulk concentration not taking into account the actual levels of contamination that are available to impact ecological or human receptors. The Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP) are developing and transitioning innovative remedial technologies to help the Department of Defense (DoD) perform its mission, cleanup of contaminated sites.

The ESTCP and SERDP 2008 Bioavailability Symposium in Annapolis, Maryland determined two future research and demonstration needs in the area of bioavailability and their use in the risk-based remedial decision-making process at DoD sites.

(http://www.serdp.org/Research/upload/Bioavailability_Wkshp_Nov_2008.pdf)

1. *In Situ Remedies to Reduce Bioavailability of Contaminants in Sediments; and,*
2. *Demonstration and Validation of Tools and Techniques to Monitor the Effects of Remedial Action on Bioavailability.*

At the 2008 ITRC Fall Meeting, POCs identified the need to understand sediment contamination through the evaluation and characterization of contaminant bioavailability. In order to reduce risk and equate it with an appropriate site sediment remediation strategy, the Oregon POC identified that evaluation and remediation of sediments has been, and continues to be, a high priority issue for Oregon DEQ's Water and Land Quality Program.

This proposed Tech-Reg Guidance will logically transition from the current project that focuses on measurement and application of contaminant bioavailability in sediments, to strategic selection of remedial alternatives and best management practices to mitigate risk at contaminated sediment sites.

- This project supports ITRC's Missions to develop information resources and help break down barriers to the acceptance and use of technically sound innovative solutions to environmental challenges through an active network of diverse professionals.
- Supports the Strategic Element: "We will continue to develop products that accelerate smart decision-making on remediation sites."

By developing Tech-Reg documents, environmental customers may properly select and deploy the appropriate and applicable techniques in the following subject areas:

- Identify and evaluate appropriate methods, technologies, and techniques to characterize a site containing contaminated sediments.
- Identify and evaluate the various technologies or techniques, available and emerging, to mitigate exposure to contaminated sediments.
- Identify and evaluate performance monitoring techniques to secure long term stewardship.

Proposed Scope to Address Problem (what is the approach for this project?)

Project Focus:

Develop a Tech-Reg Guidance document to assist the user in the development of appropriate and effective sediment remedial strategies to mitigate exposure to sediment contamination. This will include emerging and innovative remedial and contaminant management technologies. The Tech-Reg will identify and describe the proper application of sediment remediation technologies and best management practices (BMPs) for mitigating exposure to contaminated sediments, including long term monitoring of the site. This will be based upon:

- Collection of data and information using surveys, case studies, and literature review to identify and evaluate real site tests of remedial technologies and monitoring methods at contaminated sediment sites.

This information will be used to:

- Develop a strategic decision making process for selecting applicable and effective remediation technologies, sediment contaminant management approaches and long term monitoring practices at contaminated sediment sites.

The Contaminated Sediment Remediation Strategy Tech-Reg guidance will include the appropriate use of bioavailability in the establishment of site cleanup criteria and performance metrics in order to establish an effective, achievable, and sustainable remedial strategy for the site. This will assure a net environmental and health benefit to the remedial outcome at the site. This guidance will incorporate:

- Identification and evaluation of appropriate remediation methods, technologies and approaches;
- Summarization of existing or emerging tools to remove, contain, or sequester sediment contamination;
- Assessment of the development status of technologies including advantages, limitations, acceptable contaminants, performance expectations and potential monitoring needs; and,
- Evaluation of how monitoring the bioavailable contaminants over time may enhance remediation.

Targeted Users (who will use products generated by this project?)

- Primary audience = State and federal regulators, practitioners, and other environmental professionals engaged in contaminated sediment investigation and remediation.
- Secondary audience = community stakeholders and members of the general public concerned with exposure from contaminated sediment, Port operators, water resource agencies, state and federal fish and wildlife agencies, transportation agencies. Resource management agencies (mineral, wildlife and fisheries, forest and rangeland management).

Summary of Deliverables (primary project product(s))

Product: Tech and Reg Guidance outlining remediation strategies and best management practices (BMPs) for mitigating exposure to contaminated sediments. This will include long term site monitoring and technology performance monitoring.

Impact (how will this project result in more effective environmental decision making?)

This guidance will provide:

- Streamlined decision-making within the context of a remediation strategy that considers contaminant bioavailability;
- Clarity and defensibility to an approach of strategically selecting remedial technologies that will achieve a cleanup goal at a contaminated sediment site; and,
- Improved State technical oversight based on detailed requirements for application of an acceptable remediation strategy.

Project Schedule

- 2011 – Team-building, collecting data and information using surveys, case studies, and literature review to identify and evaluate real site practices at contaminated sediment. The current Sediment Team has a baseline of 40 case studies of ongoing contaminated sediment clean-up projects.
- 2012 –Use this information and data to evaluate and provide an overview of remediation technologies including but not limited to, capping, *in situ* bioremediation, and enhanced monitored natural recovery at contaminated sediment sites.
- 2013 – Develop a Tech-Reg guidance document and associated Internet-based training curriculum that describes a defensible remediation decision-making approach for Contaminated Sediment Sites.

Proposed Personnel

Personnel: Team Leaders : Kimberly Ward (NJDEP)/John Cargill (DE-DNREC)

Supporting State Members:

- **OR** – Jennifer Sutter (Sediment Cleanup Sites PM, helped develop OR. Bioaccumulation evaluation guidance); **NJ** – Greg Neumann (Research Scientist/Risk Assessor and co-author of NJDEP Sediment Evaluation Quality Framework); **SC** – Gregory Simmons (PG, Risk Assessor, Federal Remediation Section); **NH** – Lori Siegel (PhD, PE, Ecological Risk Assessor, developed NH Guidance on the Evaluation of Sediment Quality); **WA** – Brad Helland (Lower Duwamish Waterway Project Mgr. Washington State Department of Ecology); **Following States have possible members if funded:**
- Alabama, Connecticut, New York, Florida

Following States show interest:

- Alaska, Iowa, Virginia

Skill Mix of Team Members (e.g., regulatory, engineering, scientific, etc.)

- Scientific – Biologists (marine, freshwater) , Sedimentary Geologists, Hydrogeologists
- Regulatory – Ecological Risk Assessors, Reviewers of Ecological Evaluation, Brownfield Case Managers, Superfund Site Coordinators, Site Coordinators overseeing Sediment Dredging Sites

- Educational – University of New Hampshire – Institute for Coastal and Estuarine Environmental Technology

Sectors of Team Members (e.g., federal, state, community, regulated, regulator, etc.)

- SERDP and ESTCP Sediment Expert Panel – Industry reps. RETEC, CICEET, and Alcoa;
- ITRC Sediment Bioavailability Contaminant Alliance (SCBA), US ACOE – Sediment Experts, EPA Superfund and Brownfield Divisions, EPA Great Lakes Sediment Committee, NOAA, USGS, Army Corp of Engineers, Navy, GORE, Community Stakeholders – Great Lakes area, Tribal Communities

Related Work:

The team will integrate with these groups to avoid duplication and explore partnerships.

1. The Great Lakes Dredging Team (GLDT) <http://www.glc.org/index.html>,
2. EPA-GLNPO <http://www.epa.gov/glnpo>: Realizing Remediation,
3. The Sediment Management Work Group <http://www.smwg.org>
4. RTDF: Sediments Working Group <http://www.rtdf.org/public/sediment/default.htm>
5. USACE/EPA Northwest Regional Sediment Evaluation Framework, interim final September, 2006. <http://www.epa.gov/owow/oceans/ndt/05ndtmeeting/nwregion1.pdf>
6. Northeast Waste Management Association NWMOA <http://www.newmoa.org/>
7. Hazardous Substance Research Center (HSRC): Sediments Research <http://www.hsrg.org/>

Additionally there are a number of agencies and organizations with information related to contaminated sediments. These include but are not be limited to:

1. The US Army Corps of Engineers.
2. The National Academy of Sciences and the USEPA.
3. The Sediments RTDF Action Team is currently preparing a series of white papers on sediment assessment issues.
4. EPA: The Incidence and Severity of Sediment Contamination in Surface Waters of the United States. <http://www.epa.gov/ebtpages/watewatercontaminatedsediment.html>
5. EPA: TMDL Program. <http://www.epa.gov/OWOW/tmdl/index.html>
6. EPA: CASRGW <http://www.smwg.org/brochure.htm>
7. NAS: Remediation of PCB-Contaminated Sediments. <http://www.epa.gov/HUDSON/nasstudy.htm>
8. USACE: Waterways Experiment Station. <http://el.erdc.usace.army.mil/index.cfm>
9. USACE: Reports Database - Environmental Effects of Dredging and Disposal
10. GE: Major Contaminated Sediments Sites (MCSS) Database. <http://www.ge.com/en/citizenship/ehs/remedial/HUDSON/mcss/>
11. Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) <http://ciceet.unh.edu/>.
12. State of Washington Sediment Management Standards. <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-204&full=true>