



Contaminated Sediments News



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GS News is produced by the
EPA Office of Science and
Technology (OST) to exchange
information on contaminated
sediments and to increase
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EPA Great Lakes National Program Office Publishes a Series of Articles on the Assessment and Remediation of Contaminated Sediments (ARCS) Program

Fourteen papers published in the *Journal of Great Lakes Research*, volume 22(3), report the results of the recently completed Assessment and Remediation of Contaminated Sediments (ARCS) program (Fox and Tuchman, 1996).

The ARCS program was established to help address the contaminated sediment problem at 42 Great Lakes Areas of Concern (AOCs). The program was enacted under Section 118(c)(3) in the 1987 re-authorization of the Clean Water Act and administered through the U.S. EPA Great Lakes National Program Office (GLNPO).

The objectives of the ARCS program were to: (1) assess the nature and extent of sediment contamination at AOCs; (2) demonstrate and evaluate remediation options; and (3) provide guidance on contaminated sediment problems and remediation alternatives at AOCs and other locations in the Great Lakes (U.S. EPA, 1994a,b).

Volume 22(3) of the *Journal of Great Lakes Research* contains papers developed from activities of the Toxicity Chemistry Workgroup and the Risk Assessment and Modeling Workgroup in the ARCS program. An introductory chapter by Fox and Tuchman describes the ARCS program. A paper by Burton *et al.* provides a comprehensive evaluation of a number of different toxicity tests and compares factors such as

similarity, redundancy, and selectivity among these tests.

The next paper, by Smith *et al.*, discusses long core sampling using a vibro-corer. Rathburn *et al.* then address indicator and screening analyses for inexpensive and quick estimates of sediment toxicity. Ankley *et al.* report on toxicity identification evaluations (TIEs) of pore-water samples.

Hall *et al.* then evaluate the utility of algal toxicity tests. Papoulias *et al.* and Papoulias and Buckler discuss optimization of Ames mutagenicity assays for assessing sediments. Four other papers describe approaches for integrating sediment toxicity, chemistry, and benthic community data. Canfield *et al.* reported results of benthic community assessments and the sediment quality triad while Swift *et al.* compared those results to benthic communities sampled with artificial substrates.

Ingersoll *et al.* and Smith *et al.* calculated and evaluated sediment effect concentrations including ERLs (Effect Range Low), ERMs (Effect Range Median), TELs (Threshold Effect Levels), and PELs (Probable Effect Levels). Three final papers evaluate modelling and risk assessment procedures including the use of ranking procedures by Wildhaber *et al.*, transport of contaminated sediments in the Saginaw River

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Canadian Sediment Quality Guidelines

Environment Canada (Guidelines Division, Science Policy & Environmental Quality Branch) develops Canadian sediment quality guidelines for the protection of aquatic life as part of its obligations under the Canadian Environmental Protection Act (CEPA).

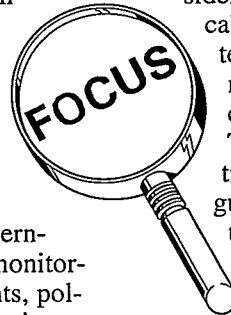
The Act dictates the Canadian government's responsibilities regarding monitoring activities, substance assessments, pollution prevention and control strategies, and regulatory activities (e.g., ocean disposal of dredged sediments). These national sediment quality guidelines are developed cooperatively with the provincial and territorial governments through the Water Quality Guidelines Task Group of the Canadian Council of Ministers of the Environment (CCME). CCME is a joint federal, provincial, and territorial council committed to intergovernmental cooperation on environmental matters in Canada.

National sediment quality guidelines for chemical substances, which are developed using toxicological information, represent concentrations of individual chemicals below which adverse biological effects are not expected. They are developed with the intention to be conservative, national benchmarks (i.e., reference

points) to protect and sustain aquatic life. These resource-use based guidelines provide scientifically defined measures to evaluate the status of, and progress toward, societal goals for the maintenance, protection, and remediation of environmental quality (Gaudet *et al.* 1995).

Although Canadian sediment quality guidelines provide a nationally consistent, scientific basis for management decisions, such as the development of substance-, site-, or issue-specific objectives or standards, they do

not directly incorporate management considerations (e.g., cost and technological limitations) nor are they intended to serve directly as management objectives without due consideration of such factors. Therefore, effective implementation of national sediment quality guidelines requires that the distinction between generic guidelines and site-specific objectives be recognized within a broader decision-making framework.



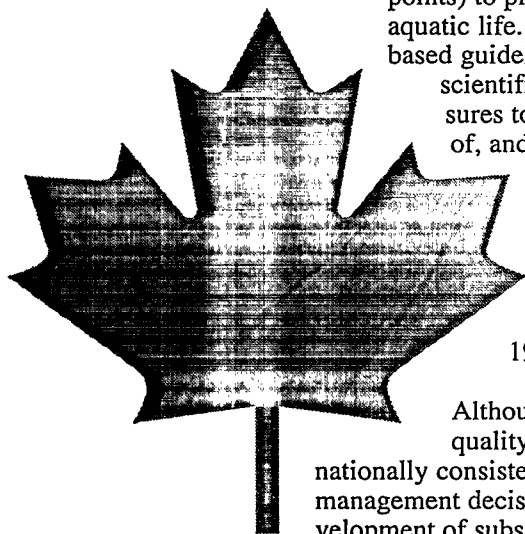
In Canada, sediment quality guidelines are developed using a nationally approved protocol (CCME 1995) to ensure consistency, transparency, and scientific defensibility in the process. Sediment quality guideline technical documents for a number of individual chemicals and groups of substances are being developed by the Environment Canada Guidelines Division. The document *Canadian Sediment Quality Guidelines for Cadmium* should be available in early 1997. The draft Environment Canada document, *Proposed Interim Canadian Sediment Quality Guidelines for the Protection of Aquatic Life*, will be available once an internal Departmental review is complete.

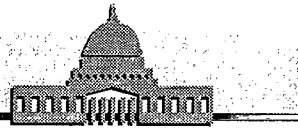
For more information, contact Sherri Smith (819-953-3082; sherri.smith@ec.gc.ca) or Karen Keenleyside (819-997-4070; karen.keenleyside@ec.gc.ca) at Environment Canada.

References Cited

CCME (Canadian Council of Ministers of the Environment). 1995. *Protocol for the Derivation of Canadian Sediment Quality Guidelines for the Protection of Aquatic Life*. Report CCME EPC-98E. Prepared by the Technical Secretariat of the Water Quality Guidelines Task Group, Winnipeg, Manitoba. 38 p.

Gaudet, C.L., K.A. Keenleyside, R.A. Kent, S.L. Smith, and M.P. Wong, 1995. How should numerical criteria be used? The Canadian approach. *Human and Ecological Risk Assessment* 1(1): 19-28.

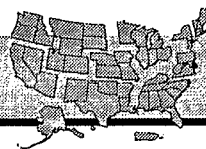




Status of EPA-OST Sediment Documents

Editor's Note: EPA's Office of Science and Technology within the Office of Water and EPA Labs within the Office of Research and Development continue to develop documents about sediment criteria, management, implementation guidance, assessment, and models. Some documents are in planning stages, while others are very near completion. The status and description of these documents is provided in this table.

Document Title	Description	Status
Users Guide for Multi-Program Implementation of Sediment Quality Criteria	Guidance on use of SQC in water quality standards programs, NPDES permitting, and TMDLs. Also includes discussion of how SQC might be used in other agency programs (e.g., CERCLA, RCRA). Contacts: Jane Farris 202-260-8897, or Ross Elliott 202-260-1311	Draft scheduled for fall 1997.
Sediment Quality Criteria (SQC) for dieldrin and endrin	Criteria document explains derivation of criteria for dieldrin and endrin. Reflects comments received in response to proposed criteria. Contacts: Mary Reiley 202-260-8897, Heidi Bell 202-260-5464	Final scheduled for fall 1997.
SQC Technical Basis Document (TBD) for Deriving SQC for Nonionic Organic Contaminants for the Protection of Benthic Organisms by Using EqP	This document will be the fundamental source describing how SQC (overall) are derived, and will reflect public comment received in response to draft TBD. Contacts: Mary Reiley 202-260-9456, Heidi Bell 202-260-5464	Final scheduled for fall 1997.
SQC Site-Specific Document for Nonionic Organic Contaminants	Document will provide the tools and algorithms for States and tribes to modify the sediment quality criteria that they adopt into their State/Tribal standards, and will reflect public comment received in response to draft Site-Specific Document. Contacts: Mary Reiley 202-260-9456, Heidi Bell 202-260-5464	Final scheduled for fall 1997.
Technical Document: Models for Sediment Quality-Based NPDES Permitting	Describes the technical aspects of applying existing hydrodynamic/water quality models for the development of sediment quality-based NPDES permits. The document discusses underlying theory, model classification, and applications to different environmental settings. Contact: Bill Tate 202-260-7052	Draft scheduled for winter 1998.
Volume 1: Draft National Sediment Quality Survey; Volume 2: Data Summary for Areas of Probable Concern (APCs); Volume 3: Sediment Contaminant Point Source Inventory; and Volume 4: Sediment Contaminant Nonpoint Source Inventory	Report to Congress required under the Water Resources Development Act of 1992. Act required that EPA, in consultation w/ NOAA and COE, conduct a comprehensive national survey of data regarding sediment quality; identify location of sediments that are contaminated and probable sources of pollutants; report to Congress the findings, conclusions, and recommendations every 2 years; and develop a system to manage, store, disseminate sediment quality data. Contact: Jim Keating 202-260-3845	Final Volumes 1-3 scheduled for fall 1997; Volume 4 is under development.
Draft EPA Protocol for Collecting, Spiking, Handling, & Manipulating Sediment Samples	Describes Agency standard field protocols for sediment sampling, handling, spiking and manipulation. Contact Bill Tate 202-260-7052	Draft scheduled for winter 1998.
EPA's Contaminated Sediment Management Strategy	Describes EPA's understanding of the extent and severity of sediment contamination, including uncertainties about the problem; describes the cross-program policy framework in which EPA intends to promote consideration and reduction of ecological and human health risks posed by sediment contaminants; and describes actions EPA believes are needed to bring about considerations and reduction of risks posed by contaminated sediments. Contact: Jane Farris 202-260-8897	Final scheduled for fall 1997.
Evaluation of Dredged Material Proposed for Discharge to Inland Waters of the United States -- Testing Manual Joint EPA-OST and U.S. Army Corps of Engineers Document	Provides a national testing framework which comprises one element of an overall decision-making process for determining whether dredged material can be discharged into CWA Section 404 waters. The manual provides consistency between dredged material evaluations under CWA and MPRSA. Regional flexibility is allowed within this national framework. Contact: Mike Kravitz 202-260-8085	Draft released for Public Comment in June of 1994. Final publication date to be announced.
Public Outreach Materials: Contaminated Sediment Information for a Pamphlet and Display	The pamphlet and display will educate the public including citizens groups and high school students on the definition and extent of contaminated sediment, sources of contamination, remediation and pollution prevention solutions, and what the citizen can do to protect sediment. Contact: Jane Farris at 202-260-8897.	Final scheduled for fall 1997.
Bioaccumulation Testing and Interpretation of Sediment Quality Assessment: Status and Needs	Provides background information and reports on the status of bioaccumulation testing and interpretation in various EPA and other Federal Agency Programs for the purpose of sediment quality assessment. Contact: Mike Kravitz at 202-260-8085.	Final scheduled for fall 1997.
Standard Methods for assessing chronic sediment toxicity to benthic organisms	Standard methods under development for chronic sediment toxicity tests using Hyalella, Chironomus, and Leptocheirus. Contact: Leanne Stahl at 202-260-7055	Final scheduled for winter 1998.



Region 1

EPA Proposes Cleanup Plan for Upper and Lower New Bedford, Mass. Harbor

After extensively studying the 18,000-acre New Bedford Harbor Superfund Site, EPA recently proposed a remedy that includes dredging 170 acres of PCB-contaminated sediments in upper and lower New Bedford Harbor and isolating the sediments in confined disposal facilities (CDFs).

From the 1940's through the late 1970's, factories near New Bedford Harbor, a tidal estuary on Buzzards Bay in southeastern Massachusetts, discharged PCB-containing industrial process wastes into the harbor and New

Bedford's sewerage system.

EPA discovered widespread PCB and heavy metal contamination in the sediments

and marine life throughout Buzzards Bay, and in 1977 the Massachusetts Department of Public Health issued a warning and closed areas of the harbor and bay to fishing. In 1982 EPA added the New Bedford Harbor Site to the National Priority List of sites eligible for Superfund cleanup funds. Massachusetts has designated the New Bedford Harbor site as its top priority federal Superfund site.

The Proposed Cleanup Plan

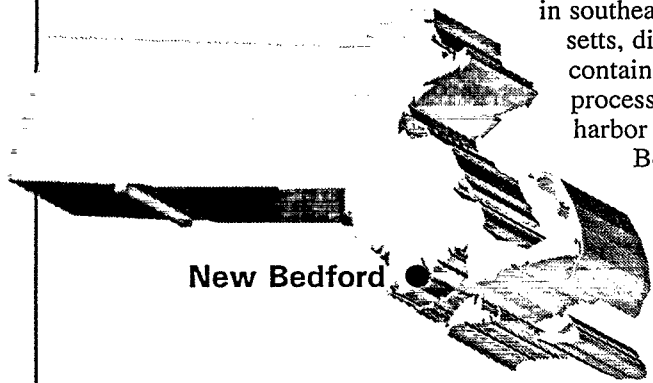
EPA proposes to design and build four shoreline CDFs and associated water treatment facilities. The CDFs would be built in contaminated areas to avoid dredging approximately 126,000 cubic yards of underlying contaminated sediment. Dredged contaminated sediments would be piped into the CDFs and passively dewatered. Groundwater monitor-

ing wells would be installed around each CDF to verify that it is operating safely.

Once construction of the first CDF is complete, dredging would commence. Approximately 450,000 cubic yards of PCB-contaminated sediment are to be dredged: in the upper harbor, sediments above 10 parts per million (ppm) PCBs would be dredged; and in the lower harbor and salt marsh areas, sediments containing more than 50 ppm PCBs would be dredged. Sediments above the target cleanup levels would be removed from the river bottom by a cutter head dredge, a type of dredge proven to be environmentally safe. The sediments would then be pumped by the dredge to one of the four CDFs. Other dredging methods may be used for deep water or salt marshes.

The air quality in nearby residential areas would be monitored throughout the dredging process, and a minimum of 2 feet of water would be maintained above the sediment during dredging operations to control airborne PCB emissions. Similarly, the water column would be sampled during dredging to ensure that sediment resuspension is below pre-established safe levels. During dredging, seawater would be drained from the sediments and treated physically and chemically to reduce levels of PCBs and heavy metals before discharge back into the harbor.

After the CDFs are filled with sediment, a preliminary cap would be installed to prevent escape of PCB dust and to allow for precipitation runoff while the underlying contaminated sediment consolidates. This consolidation process, which is expected to take approximately 3 years, is necessary to establish appropriate foundation conditions prior to construction of a final impermeable cap. When the dredged sediment has sufficiently consolidated, a



New Bedford

multi-layered cap would be constructed to prevent water infiltration into, and promote surface drainage away from, the underlying sediments.

EPA plans to work with local communities to develop appropriate plans for beneficial reuse of each CDF. For example, the City of New Bedford has expressed an interest in reusing one CDF as a commercial marine facility. As a result, the CDF could be designed with walls on the seaward side to promote docking and with a footprint that would accommodate future boat-hauling activities. Design accommodations also can be made to the other CDFs, provided that the ultimate land use is developed in advance and in conjunction with the surrounding towns.

Proposed Remedy Enhancement to Include Navigational Dredging

The Commonwealth of Massachusetts has requested an enhancement of the Superfund remedy to include dredging and disposal of an additional 1 million cubic yards of sediments generated from the maintenance dredging of navigational channels. Although these "navigational" sediments fall below the proposed target cleanup levels for PCBs, and thus do not

overlap with the sediments slated for Superfund dredging, they are still contaminated with metals and low levels of PCBs. As a result, disposal options are limited, and an alternative disposal plan is required if the harbor shipping channels are to be maintained at their originally approved depths.

This enhancement could entail removing 28,000 cubic yards of sediment from two areas for disposal in a large proposed "navigational" CDF. The benefits of this action would be the possibility of using navigational sediments as preliminary cap material, the removal of additional PCBs and heavy metals in the navigational sediments, and streamlined permitting procedures. The navigational dredging would also work in concert with the City's plans for developing the public and economic uses of the harbor. If the proposed enhancement is accepted, its implementation would be contingent on appropriate state funding and would be directed by the Commonwealth and the Army Corps of Engineers, rather than the federal Superfund program. For more information on the New Bedford Harbor Superfund Site, contact David Dickerson of EPA Region 1 at 617-573-5735.

Region 5

Agency Reviews Public Response to Planned Grand Calumet River Cleanup

EPA Region 5 is considering responses to comments from the public concerning a USX Corporation proposal to dredge a portion of the Grand Calumet River and dispose of PCB-contaminated sediments in a disposal facility to be constructed on USX property in Gary, Indiana.

USX proposes to remove about 687,000 cubic yards of contaminated sediment from the upper 5 miles of the East Branch of the river, adjacent to the USX steel production facility known as the Gary Works. Some 125,000 cubic yards of sediment are contaminated with polychlorinated biphenyls (PCBs). A USX sediment study completed in 1993 shows that the river contains the heavy metals iron,

lead, zinc, cadmium, and chromium; oil and greases; PCBs; polycyclic aromatic hydrocarbons; benzene; cyanide; and other pollutants.

The project was proposed by USX in cooperation with EPA and the Indiana Department of Environmental Management. It will be implemented according to all applicable state and federal environmental laws. USX has submitted a plan to EPA, which is reviewing it to ensure that the plan adheres to those laws. The Agency has asked the public to comment on the disposal facility and on the manner in which some of the sediments will be managed.

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Beginning in 1997 CS News will be primarily available via the INTERNET at <http://www.epa.gov/OST/Events>.

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