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EPA Contaminated Sediments News

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CS News is produced by the EPA Office of Science and Technology (OST) to exchange information on contaminated sediments and to increase communication among interested parties. To obtain copies of this report or to contribute information, contact Jane Marshall Farris, EPA OST, mail code 4305, 401 M Street S.W., Washington, DC 20460 at (202) 260-8897.

To be added to the mailing list or to make changes to your address, please fax your request to Jane Marshall Farris at (202) 260-9830.

ORD Contaminated Sediments Conference Draws 230+ Attendees

More than 230 professionals from a variety of governmental agencies and the private sector attended a national conference on the management and treatment of contaminated sediments, which was sponsored by the EPA Office of Research and Development.

The conference had two major purposes:

- To inform persons involved with the clean up of contaminated sediments about current cleanup options and about ongoing research into the development of new approaches and technologies.
- To obtain feedback from the participants about needed research and future directions for the management and treatment of contaminated sediments.

Held in Cincinnati, Ohio on May 13 and 14, 1997, the conference featured two dozen speakers from EPA and other organizations, including the U.S. Army Corps of Engineers, Environment Canada, the National Research Council, private sector developers, engineering firms and academic researchers.

In an adjoining exhibit hall, 23 vendor booths were open to the attendees for dissemination of information about technologies and discussion of case studies of sites that have been remediated.

Presentation Topics

Presentations on May 13 were focused on currently available technologies and approaches. The topics presented were:

- U.S. EPA's National Sediment Quality Survey.
- Roles of the U.S.EPA and U.S .Army Corp of Engineers.
- Strategies and Technologies for Cleaning Up Contaminated Sediments (based on a report by the National Research Council).
- Solving Great Lakes Contaminated Sediment Problems.
- A Perspective on Remediation and Natural Recovery.
- Case Studies, including Natural Recovery; In-Situ Capping; Brownfields and Sediment Disposal at Indiana Harbor, East Chicago, Indiana; Environmental Dredging and Disposal; In-Situ Treatment; Ex-Situ Treatment Technologies (New York Harbor); and FIELDS (Fully Integrated Environmental Location Decision Support System).

The second day of the conference was devoted to ongoing research, additional systems to facilitate decision making, and future research directions. Presentations were given on the following topics:

- Remediation Strategies and Demonstration of SEDTEC (a Directory of Contaminated Sediment Removal and Treatment Technologies) by Environment Canada. (See page 4 for details.)

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- Demonstration of ADDAMS (Automated Dredging and Disposal Alternatives Modeling System).
- U.S.Environmental Protection Agency and U.S. Army Corps of Engineers Research Overviews.
- Biological Research and Microbial Dechlorination of PCBs.
- Phytoremediation.
- Treatment of Metal Bearing Solids Using a Buffered Phosphate Stabilization System.
- Treatment by Thermal Desorption.
- Treatment by a Solvent Extraction Process.
- Containment.

Panel Discussion

A panel of representatives from the federal government, academia, and a representative from the Sierra Club discussed future research needs and responded to questions from the audience at the conclusion of the conference. Some of the issues raised were stability of caps in a turbulent environment, beneficial uses and the marketability of dredged sediments, the need for a framework to help evaluate treatment options and the effort of the International Joint Commission for the Great Lakes Region, and the need to address watershed management to reduce further contamination of sediments from point and nonpoint source discharges.

A conference proceedings is planned. For more information, please contact Joan Colson of the National Risk Management Research Laboratory, (513) 569-7501 (e-mail: colson.j@epamail.epa.gov).

Regional Activities

Sediment Assessment and Remediation Team Continues Great Lakes Efforts

EPA's commitment to cleaning up contaminated sediments remains strong.

Region 5's current Agenda for Action lists contaminated sediments as a priority.

Formed by the Great Lakes National Program Office (GLNPO) in 1994 to continue work begun under the Assessment and Remediation of Contaminated Sediments (ARCS) Program, the Sediment Assessment and Remediation Team continues to focus on the problem of contaminated sediments.

The Team's activities include:

- Performing and providing support for sediment assessments throughout the Great Lakes.
- Providing support for sediment-based mass balance modeling and risk assessment activities.
- Providing technical support toward the selection and implementation of remedial alternatives.
- Fostering partnerships among Great Lakes stakeholders to promote sediment clean-up activities.
- Providing outreach and communications to the Great Lakes community on contaminated sediment issues.

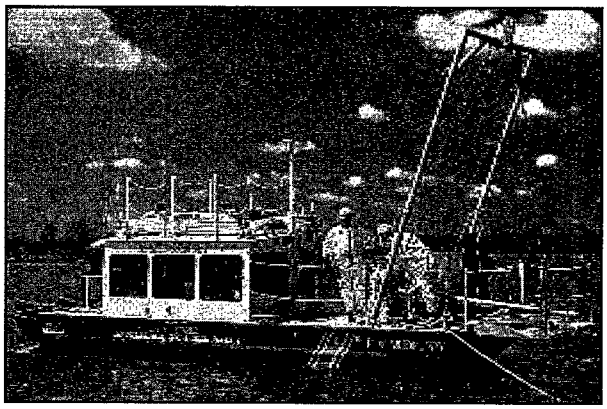
The Team works cooperatively with states, EPA regions, and other federal agencies to help address contaminated sediment problems around the Great Lakes basin. Team members also coordinate with the EPA Region 5 Sediment Team and Remedial Action Plan (RAP)

and Lakewide Management Plan (LAMP) activities to ensure resources are brought to bear on the most pressing contaminated sediment problems.

Other Resources

GLNPO also has created a Sediment Database, which contains all of the sediment chemistry, toxicity, and benthic data generated by GLNPO-funded projects. Built in Microsoft Excel™, the database employs a standard data-reporting format for both laboratory and field data. This information is available for any interested parties.

Another major resource provided by GLNPO is the services of the R/V *Mudpuppy*, a 32-foot, flat-bottom boat designed specifically for sediment sampling in shallow rivers and harbors. First used during the ARCS Program, and profiled in *Contaminated Sediments News* issue 16, the *Mudpuppy* is now available to GLNPO grantees for use during their projects. The boat has already been used in sediment assessments at 19 Great Lakes locations.



The R/V Mudpuppy *on station in the Great Lakes.*

For more information, please contact Marc Tuchman, Sediment Team Leader, U.S. EPA, GLNPO, at (312) 353-1369 (e-mail: tuchman.marc@epamail.epa.gov).

Moving Mud Documents Sediment Assessment and Remediation Program Successes in the Great Lakes Basin

From 1993 through 1996, EPA's Great Lakes National Program Office (GLNPO) awarded $5.3 million in grants for 34 projects to 14 state, tribal, and federal agencies and educational institutions to address contaminated sediments throughout the Great Lakes. These projects exemplify the significant progress being made toward restoring clean sediments, a building block for a healthy, vibrant ecosystem. Thanks in part to these projects:

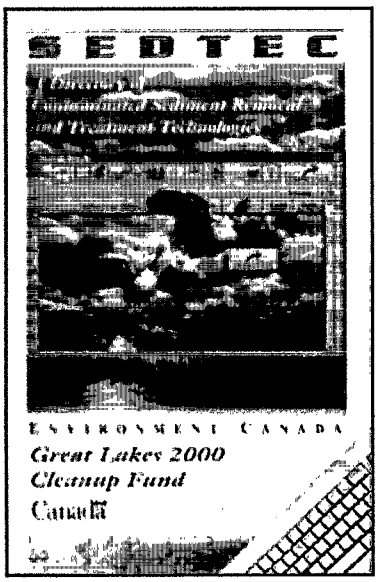
- Much more is known about the nature and extent of the sediment contamination at many Areas of Concern (AOCs), setting the stage for future actions, including mass balance modeling and remediation.
- New assessment technologies, such a hydroacoustic profiling, are being researched.
- Remedial treatment technologies are being evaluated.
- Full-scale remediations are being designed and demonstrated.
- Strong community partnerships between government, private industry, and citizen groups are being formed to plan for and carry out remediation actions.
- Actual remediation, or "moving mud," which refers to several options including dredging and capping, will soon be a reality at many AOCs.

A synopsis of the sediment grants program is now available in a document which focuses on those 34 projects. The report, *Moving Mud: Remediating Great Lakes Contaminated Sediments,* demonstrates the impact of GLNPO resources provided for sediment projects during the 4-year period. It illustrates the many assessments that have been completed and highlights new, innovative technologies being developed to assess contaminated areas. *Moving Mud* also focuses attention on bridging the gap between assessment and on-the-ground remediation, emphasizing the development of strong community partnerships to plan and carry out remediation actions.

For copies of the report, please contact Brian Stage, U.S. EPA Great Lakes National Program Office, at (312) 353-3565 (e-mail: stage.brian@epamail.epa.gov).

Environment Canada Announces Sediment Technology Directory

As contaminated sediment removal and treatment technologies have been developed, demonstrations of them have increased in scope and complexity. Initially, demonstration projects involved one dredging technology and one treatment technology used on less than 1,000 cubic meters of contaminated sediment over a 3-5 day period.



As each demonstration provided new data and greater hands-on experience, subsequent projects become more wide-ranging and complex. A typical demonstration project today features up to 6 interlocked technologies involved in the removal and treatment of more than 10,000 cubic meters of material for up to 3 years.

Over time, the private sector, various levels of government, academia, and technology manufacturers and vendors have requested information about removal and treatment technologies. In response, Environment Canada has produced the *Sediment Technology Directory* (SEDTEC©). Environment Canada also has begun providing project management services.

The Directory

SEDTEC© is a user-friendly computer software program which lists removal, treatment, and support technologies for contaminated sediment. Based on a worldwide inventory of technology manufacturers and vendors, SEDTEC© originally was developed to provide outlines of technologies suitable for dealing with contaminated sediment in the Great Lakes Basin.

Its scope has been expanded to identify suitable technologies for site-specific needs, provide project case studies, and list contacts for stakeholders, project funding agencies, and technology manufacturers and vendors worldwide. The directory is helpful for anyone seeking information on sediment remediation technologies.

SEDTEC© is available on CD-ROM or 3½-inch diskettes and costs Can$250. Updates listing supplementary information and related technologies are planned.

The Service

Through SEDTEC©, Environment Canada also will provide:

- Problem delineation
- Data analysis
- Remedial options identification
- Cost evaluation
- Definition of project goals
- Funding negotiation and partnership
- Technology selection
- Environmental assessment
- Public consultation
- Formulation of scope of work documents
- Technology audits for implementation
- Follow-up

Workshops and Seminars

Besides project management advice, Environment Canada will offer information exchange and technology transfer through workshops and seminars targeted for specific interest groups. Related areas of expertise that can be incorporated into the training include:

- Pollution prevention specific to remediation or evaluation
- Regulatory and corporate issues relating to liability
- Development of a range of solutions, including phased strategies for remediation
- Site-specific costs
- Implications of remedial activities.

For more information, contact Ian Orchard of Environment Canada at (416) 739-5874 (e-mail: ian.orchard@ec.gc.ca).

To purchase a copy of the directory, contact Marianne Woods of the Ontario Center for Environmental Technology Advancement, 63 Polson St., 2nd Floor, Toronto, Ontario, M5A-1A4. Her phone number is (416) 778-5264 (e-mail: oceta@oceta.on.ca). The directory may also be purchased online at http://www.oceta.on.ca.

Assessing the Toxicity and Bioavailability of PAH Mixtures in Sediments: Science Advisory Board Consultation

Over the past 15 years, a research team from the EPA Office of Water (OW) and Office of Research and Development (ORD) has investigated the toxicity and bioavailability of sediment contaminants to benthic organisms. As a result of this effort, the EPA has proposed the guidance document *Technical Basis for Deriving Sediment Quality Criteria for Nonionic Organic Contaminants for the Protection of Benthic Organisms by Using Equilibrium Partitioning Theory* (EPA-822-R-93-011), which establishes the foundation for developing sediment quality criteria (SQC).

The Agency has developed SQC for the pesticides dieldrin and endrin, and anticipates releasing these final documents in 1998. Individual criteria have also been proposed for the polycyclic aromatic hydrocarbons (PAHs) acenaphthene, fluoranthene and phenanthrene. However, since PAHs invariably occur in the environment as mixtures rather than as individual chemicals, the research team has continued to investigate the toxicity of PAH mixtures in sediment.

Numerous efforts previously have sought to address and estimate the toxicity of PAH mixtures (Long et al., 1995; Barrick et al., 1988). However, the resultant sediment quality guidelines have engendered considerable controversy over such issues as the correlative vs. causal relations between dry weight sediment chemistry and biological effects, the bioavailability of sediment contaminants, the effects of covarying chemicals and mixtures, and ecological relevance. The EPA team concluded, based on additional investigation, that individual PAH criteria would not be adequately protective of benthic organisms or ecologically relevant.

An approach and methodology have been identified which address the issues of bioavailability and toxicity of PAH mixtures. The equilibrium partitioning theory (EqP) provides an approach for identifying and quantifying the bioavailable and toxic fraction of PAHs. The EqP presumes that a chemical partitions into a state of equilibrium between the sediment organic carbon, the organism lipid, and the pore water based upon the fugacity of the chemical contaminant. The application of this approach has been validated in laboratory and field experiments. Based on their water column toxicity, PAHs are identified as "narcotics." The study of narcotic chemicals has revealed two properties critical to developing a PAH SQC:

- The water-column toxicity of narcotics is inversely proportional to the octanol/water partition coefficient.
- The toxicity of narcotic chemical mixtures is additive (i.e., the toxicity of the mixture is equal to the sum of the toxicities of the individual chemicals).

An empirical model which accurately predicts the toxicity of PAH mixtures has been developed by Dr. Richard Swartz, formerly of EPA-Newport, and his research team. It is based on the combination and use of the EqP, quantitative structure activity relationships (QSAR), narcosis theory, and concentration response models. This model's application has been validated by comparison to the toxicity of field-collected sediment samples for a mixture of PAH chemicals. There was an 86.6 percent correlation and no significant difference between the predicted and observed toxicity in these PAH-contaminated sediments. Thus, the EqP-based PAH model provides a method to address causality, account for bioavailability and mixtures, and predict toxicity and ecological effects. It applies to all narcotic compounds and provides a unifying synthesis of other guidelines. The synthesis of these elements provides the foundation for a sediment quality criterion for PAH mixtures.

Response from SAB

On May 13, 1997, the research team delivered a presentation on "Assessing the Toxicity and Bioavailability of PAH Mixtures in Sediments" to the

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Matching Sediment Chemistry and Toxicity Data Are Being Compiled to Evaluate the Predictive Ability of Sediment Quality Guidelines

Over the past 7 years, MacDonald Environmental Sciences Ltd. (MESL), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Environmental Protection Agency (EPA), and the U.S. Geological Survey (USGS) have been involved in studies to develop numerical sediment quality guidelines (SQGs) for freshwater, estuarine, and marine ecosystems. These studies have been implemented cooperatively with Environment Canada, the Minnesota Pollution Control Agency, and the Florida Department of Conservation.

The SQGs have been used in a wide variety of sediment assessments in Canada and the United States; however, many users have indicated the need to further evaluate the predictive ability of SQGs and develop additional tools for assessing contaminated sediments. Therefore, we are compiling an independent database that can be used to further support sediment quality assessment.

Post-1993 Publications Needed

In order to develop this database, we need to obtain matching sediment chemistry and toxicity data including data from laboratory toxicity tests or benthic community surveys conducted on field-collected sediments or sediment spiking studies from freshwater, estuarine, and marine locations. Therefore, we would like to take this opportunity to request copies of any recent publications (post-1993) that contain relevant information that could be incorporated into the database. Please let us know if the data are available in an electronic format.

In addition, we would appreciate knowing about any other relevant studies that you may be aware of on effects of sediment-associated contaminants. Please let us know if you are interested in receiving copies of any reports or publications that are prepared during this study. We plan to make the compiled database available in 1999 or 2000. Thank you in advance for your consideration of this request.

For More Information

For more information, contact Donald D. MacDonald, MESL, 2376 Yellow Point Road, RR #3, Ladysmith, BC at (250)753-1583 (e-mail: sffmesl@island.net; L. Jay Field, NOAA, 7600 Sand Point Way, NE, Seattle, WA 98115, (206) 526-6404, (e-mail: jayfe@hazmat.noaa.gov; Jim Keating, U.S. EPA, 401 M St. SW, MS4305, Washington, DC, 20460, (202) 260-3845 (e-mail: keating.jim@epamail.epa.gov; and Chris Ingersoll, USGS, 4200 New Haven Rd., Columbia, MO 65201 (573) 876-1819, (e-mail: chris_ingersoll@usgs.gov).

SCIENCE ADVISORY BOARD CONSULTATION

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Science Advisory Board (SAB). The objectives of the SAB consultation were to evaluate the proposed approach, identify remaining issues which require further investigation, and determine whether it is reasonable to pursue the development of an SQC for PAH mixtures. The response from the SAB was unanimously favorable. The SAB identified the proposed approach as a "significant advancement in the state of the science for evaluating PAHs in sediments." SAB chairperson Bill Adams summarized the consultation by saying that "the research team is on the right track. We agree that SQC for individual PAH compounds would be underprotective in practice and that a more meaningful SQC for PAHs should be based on total PAH."

The OW/ORD team anticipates preparing a first draft of a PAH guidance document in 1997. Research and validation will continue for the next 1-2 years to respond to the identified research needs and uncertainties. At that time, the guidance will be updated, peer reviewed, and published.

For more information, contact Heidi Bell, (202) 260-5464 (e-mail: bell.heidi @epamail.epa.gov); Ross Elliott, (202) 260-1311 (e-mail: elliott.ross@epamail.epa.gov); or Mary Reiley, (202) 260-9456 (e-mail: reiley.mary @epamail.epa.gov).

EPA Publishes *Deposition of Air Pollutants to the Great Waters, Second Report to Congress*

In June 1997, EPA published its second report to Congress on the atmospheric deposition of pollutants to the Great Waters (EPA-453/R-97-011).

Section 112 of the Clean Air Act (CAA) provides the legislative basis for hazardous air pollutant (HAP) programs directed by the U.S. Environmental Protection Agency (EPA). In response to mounting evidence that air pollution contributes to water pollution, Congress included section 112(m), "Atmospheric Deposition to Great Lakes and Coastal Waters," in the 1990 CAA. Under this statute, EPA is required to periodically report to Congress on the results of the program. Concurrent with the second report to Congress, EPA is to determine the adequacy of section 112 to prevent adverse effects to public health and serious or widespread environmental effects associated with atmospheric deposition of hazardous air pollutants to the Great Waters.

Future Directions

A list of future directions which EPA may take to support CAA section 112(m) is provided in the report's executive summary. Within that list are future actions which may involve sediment monitoring and sediment data analysis. They include:

- Perform exposure and effects studies that will build on the recent Great Lakes Water Quality Criteria, which consider biomagnification. These studies will be coordinated with an integrated research strategy on the persistent pollutants, their distribution and concentrations, exposure routes, and associated effects.

- Improve modeling efforts to estimate atmospheric loadings to Great Waters. For example, adapt and apply the comprehensive approach developed for the Lake Michigan Mass Balance Model to additional water bodies.

- Increase efforts to identify specific emissions sources of atmospheric deposition to the Great Waters, both nearby and relatively distant from the water body, to develop risk management strategies, as well as investigate the impact from cycling of pollutants that are no longer used or manufactured in the United States.

- Continue to promote pollution reduction in the Great Waters, including identifying and quantifying, where possible, economic impacts associated with exposure and effects indicators such as fish advisories, habitat decline, diminished species diversity, fish kills, and declining or contaminated shellfish and fish populations.

Great Waters Defined

The water bodies collectively referred to as the "Great Waters" in this report are the Great Lakes, Lake Champlain, Chesapeake Bay, and specific coastal waters (i.e., defined in the statute as coastal waters designated through the National Estuary Program and the National Estuarine Research Reserve System). The contribution of atmospheric deposition to overall pollutant loadings in the Great Waters continues to be studied. Atmospheric loadings of pollutants result from wet and dry particle deposition, and through air-water gas exchange. This report describes monitoring and modeling studies relevant to atmospheric deposition occurring at the major water bodies of the Great Waters.

Pollutants of concern to the Great Waters have not changed since the first report to Congress was published in 1994. The list of 15 pollutants (see table) including pesticides, metal compounds, chlorinated organic compounds, and nitrogen compounds. These pollutants have been selected based on information regarding their health and environmental effects and evidence that they are atmospherically deposited to the Great Waters. Most are bioaccumulative chemicals that persist in the environment for long periods. Many of these pollutants are listed as chemicals of concern on toxics lists for individual water bodies at the local and state levels.

More information on this report is available on the Internet at the EPA address: http://www.epa.gov/oar/gr8water/.

The 15 Great Waters Pollutants of Concern

- Cadmium and cadmium compounds
- Chlordane
- DDT/DDE
- Dieldrin
- Hexachlorobenzene (HCB)
- a-Hexachlorocyclohexane (a-HCH)
- Lindane (g-hexaphlorocyclohexane: g-HCH)
- Lead and lead compounds
- Mercury and mercury compounds
- Polychlorinated Biphenyls (PCBs)
- Polycyclic Organic matter (POM)
- Tetrachlorodibenzo-p-dioxin (TCDD; dioxins)
- Tetrachlorodibenzofuran (TCDF; furans)
- Toxaphene
- Nitrogen compounds

USGS Completes Sediment Assessment Report of Upper Mississippi River

The U.S. Geological Survey (USGS) has been monitoring the Upper Mississippi River (UMR) since 1987 to document the fate and transport of contaminants associated with sediments.

The UMR is that part of the river upstream of the confluence with the Ohio River at Cairo, IL. It consists of a series of 26 navigational pools created by a lock and dam system extending from Minneapolis, MN to St. Louis, MO. The navigational pools are shallow, lake-like areas which trap and store large quantities of fine-grained sediments during normal river flows. Concern with the redistribution of the river sediments arose after the flood of 1993.

This project was designed to evaluate the status of sediments in the UMR by:

- Measuring the concentrations of contaminants in sediments of the UMR.
- Evaluating the toxicity of sediments collected from the river.
- Determining the bioaccumulation of contaminants from UMR sediments using field-collected and laboratory exposed oligochaetes.
- Determining the benthic community structure in fine-grained sediments within the river.

Sediments are often a sink for water-borne contaminants and a source of contaminants to the overlying water. Also, sediments may accumulate significant concentrations of contaminants even when water quality criteria are met.

Sediment and Organisms Sampled

To conduct these assessments, sediment samples and benthic organisms were collected from 24 of the 26 navigational pools in the river and from 1 pool in the Saint Croix River. Two types of sediment samples were collected from the pools. One sediment sample was a composite of 15 to 20 sediment grabs along 1 to 5 transects across the downstream one-third of each pool (B samples). The other sediment sample was a composite of grabs from 1 station on 1 transect within each pool (C samples). The latter stations were selected based on historical chemistry data and the potential to collect oligochaetes. Samples were not collected from the main navigation channels.

Report Contents

Chapter 1 of this report describes whole-sediment toxicity tests which were conducted for 28 days with the amphipod *Hyalella.* Chapter 2 describes the bioaccumulation of contaminants from sediments using field-collected oligochaetes and 28-day bioaccumulation studies conducted in the laboratory with the oligochaete *Lumbriculus variegatus.* Chapter 3 assesses the benthic community in all 24 C samples. Using the Sediment Quality Triad approach, the status of UMR sediments was assessed by integrating sediment chemistry, laboratory toxicity tests and benthic community measurements.

Oligochaetes and Chironomids

The benthic community was dominated by oligochaetes and chironomids in 14 of the 23 sediment samples from the UMR and the 1 sediment sample from Saint Croix River. Fingernail clams comprised a large portion of the community in 3 of the samples and exceeded 1,000/m^2 in 5 of the samples. Total abundance values of invertebrates ranged from 250/m^2 (station 1C) to 22,389/m^2 (station 19C) and were comparable to previously reported values of the UMR. The frequency of chironomid mouthpart deformities was only 3 percent, which is consistent with the incidence of mouthpart deformities from uncontaminated sediments. Correlations be-

tween benthic measures, sediment chemistry, or other abiotic parameters exhibited few strong or significant correlations indicating benthic communities are most likely controlled by factors independent of contaminant concentrations.

Sediment Quality Triad

The Sediment Quality Triad (Triad) is a weight-of-evidence approach used to assess the contamination of sediments by integrating sediment chemistry, laboratory toxicity testing, and benthic community measures. Results from the Triad analysis indicated 88 percent of the samples were classified as not affected based on sediment chemistry, laboratory toxicity, and benthic measures. These results are consistent with the bioaccumulation study in which concentrations of contaminants in tissue were less than other U.S. sites that the laboratory (the Environmental Contaminant Research Center in Columbia, MO) has previously studied. In addition, pools in about the lower third of the river had lower sediment contaminant concentrations, less accumulation of contaminants in tissue, and greater taxa richness.

The results of the present study indicate that the UMR is not severely contaminated compared to other sites that have been studied in the United States. Perturbations that may occur could be attributed to channelization, sedimentation from surface runoff, or long-term changes in the river's natural flow conditions due to lock and dam construction.

This study conducted only a partial assessment of the UMR sediments and included no assessment of river water. Further, this study was a one-time assessment that was conducted after a major flood event and does not evaluate temporal or spatial variability of sediment contamination within the pools. Future research on, or management of, the Upper Mississippi River should evaluate the limitations of this study.

For More Information

This report is available on the Internet at http://www.msc.nbs.gov/pubs/umr.html. For copies of the report, specify report number EPA 823/R/97-005 and contact: U.S. EPA, National Center for Environmental Publications and Information, 11029 Kenwood Road, Cincinnati, OH 45242 (513) 489-8910.

1996 *Listing of Fish and Wildlife Advisories* Now Available

The 1996 update for the database, *Listing of Fish and Wildlife Advisories (LFWA)*, is now available from the EPA.

This database includes all available information describing state- tribal-, and federally issued fish consumption advisories in the United States, the District of Columbia, 4 U.S. territories, and the 12 Canadian provinces and territories.

The number of advisories in the United States rose by 453 in 1996 to a total of 2,193, representing a 26 percent increase over 1995. The number of water bodies under advisory represents 15 percent of the nation's total lake acres and 5 percent of the nation's total river miles. In addition, 100 percent of the Great Lakes waters and their connecting waters and a large portion of the nation's coastal waters are also under advisory. The number of advisories in the United States increased for 4 major contaminants (mercury, PCBs, chlordane, and DDT).

The 1996 version of the **LFWA** is PC-based and is available to the public free of charge on both 3.5 inch diskettes (EPA document number EPA-823-C-97-004) and CD-ROM (EPA document number EPA-823-C-97-005). For copies contact:

U.S. Environmental Protection Agency
National Center for Environmental
Publications and Information
11029 Kenwood Road
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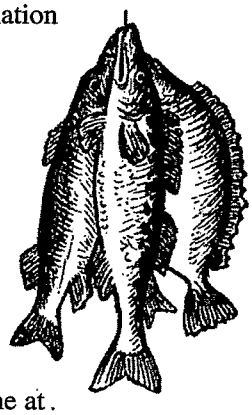
(513-489-8190)



In addition, the database may be downloaded from the Internet through the URL: http://www.epa.gov/OST/fishadvice/.For more information concerning the National Fish Contamination Program, contact: Jeffrey Bigler by phone at (202) 260-1305, fax (202) 260-8930, or e-mail: bigler.jeff@epamail.epa.gov.

Volume II: Risk Assessment and Fish Consumption Limits Revised by EPA

The U.S. Environmental Protection Agency (EPA) is pleased to announce the availability of the **Second Edition** of the *Guidance for Assessing Chemical Contaminant Data For Use in Fish Advisories Volume II: Risk Assessment and Fish Consumption Limits* (EPA 823-B-97-009).

The document provides the states, tribes, and other interested parties with the methods recommended by EPA for calculating consumption limits for reducing health risks associated with contaminated fish and shellfish.

The **Second Edition** provides new information pertinent to selected chemical contaminants, as well as updated guidance on methods for developing fish consumption advisories. Updated information is provided on mercury, PCBs, PAHs, TBT, and arsenic.

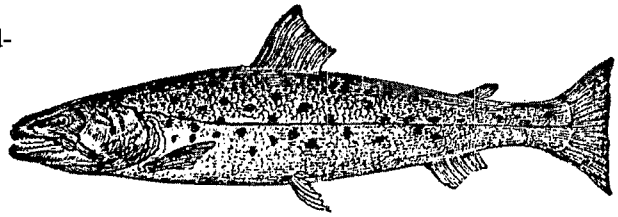
The **Second Edition** is part of EPA's four-volume series of documents developed to provide guidance to professionals responsible for assessing the health risks associated with exposure to chemical contaminants in noncommercial fish and shellfish. This manual is the **Second Edition** of Volume II. *Volume I: Fish Sampling and Analysis, First Edition* was released in September 1993, with a Second Edition released September 1995. *Volume II: Risk Assessment and Fish Consumption Limits* was first published in June 1994. *Volume III: Risk Management* was published in June 1996. *Volume IV: Risk Communication* was published in March 1995.

These guidance documents were developed cooperatively with state, federal, tribal and local government agencies. All four of these documents should be used together, as no single volume addresses all of the topics necessary for developing fish consumption advisories.

Copies of all four volumes may be obtained by writing to the U.S. Environmental Protection Agency, National Center For Environmental Publications and Information, 11029 Kenwood Rd., Cincinnati, Ohio, 45242, or calling 513-489-8190. Volumes I, II, and III are available on the Internet at http://www.epa.gov/OST/fishadvice.

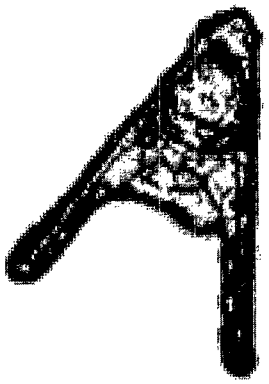
For More Information

For questions related to the development or use of this series of documents, please call Jeffrey Bigler of the EPA Fish Contamination Program at (202) 260-3051 (e-mail: bigler.jeff@epamail.epa.gov).



Creature Feature

I was exposed to pore water in sediment quality surveys, and after 48 hours this is what I look like. Can you identify me?



The Creature Feature is the echinopluteus phase of the sea urchin, *Arbacia punctulata*.

CSN Activities Timeline

February 9-13, 1998
1998 Ocean Sciences Meeting
Town & Country Hotel
San Diego, California

Designed specifically for oceanographers, limnologists, meteorologists, and scientists working in related areas. Subdisciplines for the meeting are atmospheric sciences, hydrology, estuarine sciences, limnology, oceanography, and ocean technology.

Sponsored by the American Geophysical Union and the American Society of Limnology and Oceanography. Cosponsored by the Acoustical Society of America, the American Meteorological Society, the Estuarine Research Foundation, the Marine Technology Society, The Oceanography Society, and the Virginia Institute of Marine Science.

For details, contact:
American Geophysical Union
Phone: (800) 966-2481 or (202) 462-6900
Fax: (202) 328-0566
e-mail: meetinginfo@kosmos.agu.org
Web: http://www.agu.org

April 14-18, 1998
SETAC -Europe 8th Annual Meeting
Bordeaux, France

"Interfaces in Environmental Chemistry and Toxicology: from the global to the molecular level."

For more information, contact:
SETAC-Europe
Av. E. Mounier 83
Box 1, 1200
Brussels, Belgium
Phone: 32 2 772 7281
Fax: 32 2 770 53 86
e-mail: 100725.3525@compuserve.com

August 31 - September 3, 1998
3rd International Conference on Hydroscience and Engineering
Cottbus/Berlin, Germany

The conference will cover the latest ideas in the field of hydroscience and engineering, including the scientific aspects of modelling (conceptual, physical-mathematical models, field observations, computer science application, and computer implementation).

Conference topics will include surface and subsurface hydrodynamics; estuarine, coastal, and nearshore processes; river mechanics; reservoir management; erosion and sedimentation modeling; pollutant transport and dispersion in free surface and ground water; data investigation and uncertainty analysis; numerical methods and techniques; parameter estimation and control applications; software development and model building; and management and decision support systems.

Sponsors include the International Association for Hydrological Sciences and the International Research and Training Center on Erosion and Sedimentation

For more information, contact:
Conference Secretariat
Brandenburg University of Technology at Cottbus
Institut fuer Bauinformatik
Karl-Marx-Strasse 17
D-03044
Cottbus, Germany
Phone: +1-49-355-69-2262
Fax: +1-49-355-69-2262
e-mail: lfb@bauinf.tu-cottbus.de
Web: http://www.bauinf.tu-cottbus.de/ICHE98/

October 5-7, 1998
Fifth International Conference on Remote Sensing for Marine and Coastal Environments
San Diego Princess Convention Center
San Diego, California

Organized by ERIM. Sponsors include NASA, NOAA/NESDIS. U.S. DOE Nevada Operations and Remote Sensing Lab, GER Corporations, RadarSat International, and National Wetlands Research Center.

For details, contact:
ERIM Marine Conferences
Box 134001
Ann Arbor, Michigan 48113-4001
Phone: (313) 994-1200 ext. 3234
Fax: (313) 994-5123
e-mail: wallman@erim.org

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EPA Standards and Applied Science Division is developing a list-server (electronic mailing list service) called SASD-NEWS. As a subscriber to the list server, you will be able to receive electronic copies of various Division publications including newsletters (*Water Quality Standards* and *Contaminated Sediment News*) and other announcements and information about upcoming meetings and programs.

Beginning with the next issue of *Contaminated Sediments News*, we are making copies available via e-mail to requesters with an e-mail address. To become a subscriber to SASD-NEWS, please send a special e-mail message to listserver@unixmail.rtpnc.epa.gov. The subject header of the message should be left blank or contain a few spaces, and the body of the message should contain the following text: **Subscribe SASD-NEWS.**

Or, you may fill out the following form and mail it to: Jane Marshall Farris, Standards and Applied Science Division—MC 4305, U.S. EPA, 401 M Street SW, Washington, DC 20460.

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