



Contaminated Sediments News



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CS News is produced by EPA
OST to exchange information
on contaminated sediments
and to increase communica-
tion among interested parties.
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or to contribute information,
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To be added to the mailing
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request to Jane Marshall
Farris at (202) 260-9830.

The views expressed in this
publication do not neces-
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EPA Progress on the Contaminated Sediment Management Strategy

Purpose of the Strategy

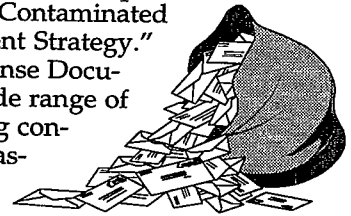
EPA proposed its Contaminated Sediment Management Strategy in August 1994. "The purpose of the Environmental Protection Agency's (EPA's) Contaminated Sediment Management Strategy is: to describe EPA's understanding of the extent and severity of sediment contamination, including uncertainties about the dimension of the problem; to describe the Agency's cross-program policy framework in which EPA intends to promote consideration and reduction of ecological and human health risks posed by sediment contamination; and to describe actions EPA believes are needed to bring about consideration and reduction of risks posed by contaminated sediments." Additionally, the fourth goal of the Strategy is to develop and consistently apply methodologies for analyzing contaminated sediments.

The Strategy is an Agency work plan issued in support of EPA's regulatory and policy initiatives and is Agency guidance only. The Strategy does not propose new regulation.

Progress on Responses and Response to Public Comments Document

Nearly 500 pages of comments were received from 126 organizations on the proposed Contaminated Sediment Management Strategy. EPA's Office of Science and Technology (OST) within the Office of Water (OW) has drafted a 375-page "Comment and Response Document," which is being reviewed by four EPA workgroups

that developed the Strategy. The chapters of the "Comment and Response Document" are organized to reflect the chapter organization of the "Contaminated Sediment Management Strategy." The Comment Response Document addresses a wide range of comments concerning contaminated sediment assessment, prevention, abatement and control, remediation, dredged material management, research, and outreach.

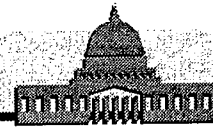


Public Comments on the Strategy

The comments address legal, policy, and technical issues. Major technical concerns include the following:

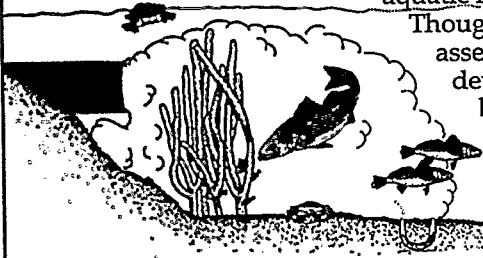
- Uncertainties regarding the extent and severity of the contaminated sediment problem.
- The availability of methods to assess contaminated sediment.
- Understanding of the sources of sediment contamination.
- The validity and use of numerical sediment quality criteria.
- The use of fate and transport models, particularly for permitting programs (404 permits, NPDES permits).
- The need for cost/benefit studies of regulatory alternatives.
- Selection of appropriate remediation technologies and development of new ones (especially for decontamination).
- Appropriate handling and disposal of contaminated dredged material.
- Additional research including Quantitative Structure Activity Relationships (QSARs), assessment methods, fate and transport models, and causes of toxicity.

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Preparation of New Document on Bioaccumulation Testing and Interpretation

The presence of bioaccumulative substances in sediments may pose risks to aquatic life, wildlife, and humans.



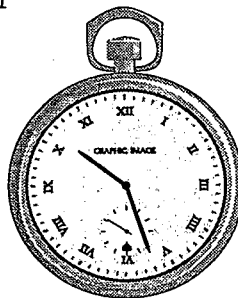
Though a number of sediment assessment methods have been developed to determine the bioaccumulation potential of contaminants in sediments, overall guidance on interpretation of test results in the evaluation of ecological and human health effects is lacking. To begin to address this concern, EPA formed a "Bioaccumulation Analysis Workgroup" consisting of 40 headquarters and regional participants. The workgroup is overseeing the production of a document, which will provide background information and report on the status of bioaccumulation testing and interpretation in various EPA programs—and programs of other federal agencies—for the purpose of sediment quality assessment. A first draft is being reviewed by the workgroup. The following types of information will be presented in various chapters of the paper:

- Information associating the presence and quantity of potentially bioaccumulative chemicals in sediment with uptake in the tissues of aquatic and terrestrial organisms and with the effects of those chemicals on the organisms.
- Different methods and techniques that have been developed for measuring and modeling bioaccumulation.
- Brief synopses of current research on and uses of bioaccumulation testing in several federal agency programs to support regulatory activities.
- A summary of what has been learned, what appears to be lacking in data and tools, and ideas that could direct future studies and the development of guidance on interpreting bioaccumulation data for the purpose of sediment quality assessment.

The document is expected to be completed this winter (1997), and a progress report was presented at the National Sediment Bioaccumulation Conference, scheduled for September 11-13, 1996, in Bethesda, Maryland (see "Announcements" in the last issue of *CS News*). For further information on this document, contact Mike Kravitz, OST, (202)260-8085, or Stephen Kroner, OSW, (703)308-0468.

MANAGEMENT STRATEGY

Continued from page 1



Current Schedule to Finalize EPA's Contaminated Sediment Management Strategy

EPA is planning to finalize and announce completion of the Strategy and comment/response document in the *Federal Register*. For more information contact Jane Farris, EPA OST, at farris.jane@epamail.epa.gov or at (202) 260-8897.

Identifying Potential Contributors of Contaminants to Impacted Waterbodies

The Office of Enforcement and Compliance Assurance (OECA) is working on a project to identify and screen federal, industrial, and municipal facilities that may contribute to human health and aquatic life impacts. The ultimate goal of the project is to work with other EPA program offices, regions, and states to develop and implement

strategies to reduce point and nonpoint source loadings of problem contaminants to impacted waterbodies.

To carry out the analyses, facility discharges were estimated using the Toxics Release Inventory and Permit Compliance System databases. Then the discharges were linked to fish consumption advisories and contaminated sediments sampling locations characterized by similar problem chemicals within the same river reach. Compliance and enforcement records of the potentially contributing facilities were then compiled using OECA's Integrated Data for Enforcement Analysis (IDEA) System, evaluated, and mapped using ArcView.

The preliminary results identified 126 potential contributors of problem chemicals to fish consumption advisories within the same river reach in 1993. One hundred forty-six potential contributors of problem chemicals to areas containing elevated sediment contaminants were also identified for the same year. Many of the identified facilities were found noncompliant with their

water discharge permits; however, more than 50% of facilities were discharging within their permit limits. Both compliant and noncompliant potentially contributing facilities were identified to some extent in all EPA regions.

The next steps in the project include data verification, facility list modification, and prioritization by EPA headquarters and the regions. Identification of possible linkages of other data types, such as contaminated fish tissue links, to point and nonpoint sources of contaminants (e.g., pesticide application data), as well as estimation of potential exposure of these contaminants to minority, poverty, and Indian tribal populations, are also under way. Out of these activities, a list of possible short- and long-term strategies will be developed that EPA could use to reduce loadings of problem contaminants to impacted waterbodies.

For further information on this project, contact Catherine Fox at (202)564-4299 (phone) or fox.catherine@epamail.epa.gov (e-mail).

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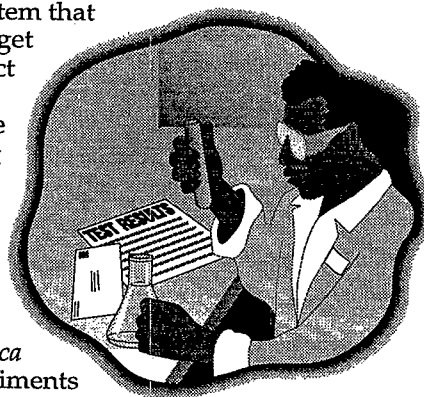
ORD Activities

ORD-Duluth

Predicting Ammonia Toxicity from Pore Water Concentrations

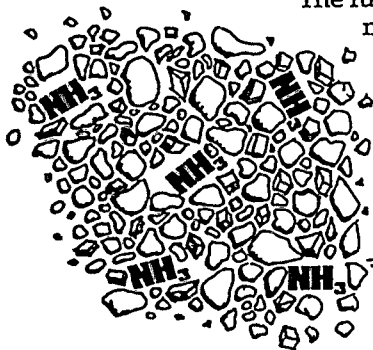
Ammonia is commonly present at detectable concentrations in overlying and interstitial water (pore water) in solid-phase sediment toxicity tests, and it is often desirable to discern ammonia toxicity from that caused by other contaminants. The University of Wisconsin-Superior, in collaboration with ORD-Duluth, conducted a series of experiments to evaluate whether the bioavailability of ammonia in sediments could be predicted based on concentrations in the interstitial water. The study compared the toxicity of ammonia in water-only exposures and spiked sediment exposures with an oligochaete (*Lumbriculus variegatus*), a midge (*Chironomus tentans*), and an amphipod (*Hyalella azteca*). Exposures were con-

ducted in a specialized test system that enabled the maintenance of target concentrations. To enable direct comparison of water-only and spiked-sediment exposures, the same test conditions (including pH) were used for each. There was good correspondence of LC50 values between the water-only tests and spiked-sediment tests (based on interstitial water concentrations) for the oligochaete and midge. *H. azteca* seemed to avoid the spiked sediments and were frequently observed in the less contaminated overlying water, thus limiting evaluation of the pore-water exposure model for the amphipod. Overall, at least for some benthic species, ammonia bioavailability and toxicity can be accurately predicted from ammonia concentrations in the interstitial water; however, the model might be less robust for more epibenthic organisms, such as *H. azteca*.



Continued on page 4

ORD ACTIVITIES *Continued from page 3*



The full article describing these experiments was published in *Environmental Toxicology and Chemistry* (Volume 15, Number 5, pp. 794-801). For more information contact Dave Mount at (218)720-5616 or Gary Ankley at (218)720-5603 at ORD-Duluth.

Journal Article Series on Metal Bioavailability

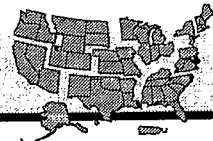
In January 1995, EPA staff scientists and collaborators briefed the Agency's Science Advisory Board concerning approaches for predicting the bioavailability of cationic metals in sediments. Included in the briefing was a proposal for deriving sediment quality criteria (SQC) for the metals cadmium, copper, nickel, lead, and zinc. Based on information presented at that meeting, a series of 14 journal articles has been developed and submitted for publication in *Environmental Toxicology and Chemistry*. The

papers deal with a range of technical issues, including the use of metal acid volatile sulfide (AVS) relationships and/or interstitial water chemistry to predict metal toxicity in short-term, life-cycle laboratory studies with spiked sediments and long-term (greater than 1 year) field studies with metal-spiked sediments. Also included in the series are papers describing key metal-binding phases in addition to AVS in sediments (e.g., organic carbon) and models and associated data for predicting stability of metal-sulfide complexes, for example, in conjunction with bioturbation. The lead manuscript in the series presents the technical basis of, and a proposal for, deriving SQC for metals, and the final paper evaluates the proposed criteria using more than 300 marine and freshwater samples collected in conjunction with EPA's Environmental Monitoring and Assessment Program.

The papers should be published in final form toward the end of this calendar year, or early in 1997. For further information on the series, contact Gary Ankley, (218)720-5603.

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Regional Activities



Region 6

Bivalve Sediment Toxicity Test Method Evaluation

In FY95 the regional office funded development of an acute standard toxicity test method for the bivalve *Mulinia lateralis*. This method was developed to supplement existing marine sediment toxicity testing methods with a method using a representative Gulf of Mexico species. This fiscal year the office has contracted with Battelle to conduct a method evaluation using the new 10-day bulk sediment testing protocol. This evaluation will involve comparing the toxicity of several chemicals for the bivalve and amphipods, conducting water-only reference toxicity tests, conducting spiked sediment toxicity tests,

and testing field-contaminated sediments. Several private and government laboratories have been selected to participate in this evaluation, including the Regional Laboratory in Houston. The Houston lab has already completed a preliminary test to assess survival and growth in commercially available artificial seawater versus natural seawater. For more information contact Wanda Boyd at (214)665-6696 or Philip Crocker at (214)665-6644.

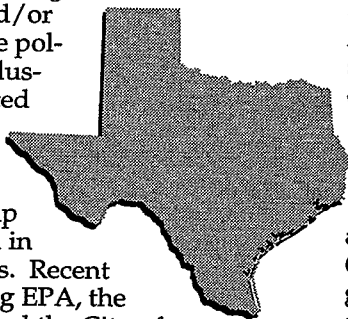
Sediment Assessment: Corpus Christi Area Stormwater Outfalls

The regional office participated on a subcommittee to draft a scope of work for a project entitled "Sediment Quality

Assessment of Storm Drain Outfalls and other Targeted Sites in the Corpus Christi Bay National Estuary Program Study Area." This project, which will be initiated this fall, will involve collection of bottom sediments for assessing benthic community, toxicity, and chemistry (sediment quality triad). Scientists from the National Biological Service, University of Texas Marine Science Institute, and Texas A&M University will carry out the project, which is funded for \$150,000. For more information contact Philip Crocker at (214)665-6644.

Patrick Bayou Pollutant Source Study

At the request of the regional office, several industries are voluntarily participating in a study to assess sources and quantify loadings of persistent and/or bioaccumulative pollutants. The industries are permitted dischargers to Patrick Bayou, a tributary to the Houston Ship Channel located in Deer Park, Texas. Recent studies involving EPA, the State of Texas, and the City of Houston have found water quality standards violations and a high degree of sediment contamination in the bayou. The study will involve sampling of both process and pollutants of concern, including dioxins, PCBs, HCB, and mercury. The region is coordinating with industry and the state on the design of the project. For more information contact Philip Crocker at (214)665-6644.



Region 9

Capping of Contaminated Sediments in San Diego Bay

EPA Region 9 recently permitted a novel *in situ* capping project in very shallow waters of San Diego Bay to remediate sediment heavily contaminated with PCBs. The remediation project, to be carried out under a Cleanup and Abate-

ment Order from the State of California, will include construction of a subaqueous containment berm, placing first a layer of geotextile fabric over the area of existing contamination, followed by an internally-armored cap. This method was required by the state to isolate the contamination from the water column to protect various wildlife such as the endangered California least tern and burrowing organisms while using the thinnest possible overall cap. Project construction should begin by the end of 1996. For more information contact Brian Ross at (415) 744-1979.

Region 10

Creation and Analysis of Freshwater Sediment Quality Values

Data from 34 studies in Washington State and portions of Oregon were merged into a single database to derive freshwater Apparent Effects Thresholds (AETs) for sediments and to evaluate other sediment quality values. Sediments from 245 stations were analyzed for several chemical contaminants and were tested using at least one bioassay. Bioassays tested included *Hyalella azteca*, *Daphnia magna*, and *Chironomus tentans* mortality; *Ceriodaphnia dubia* reproduction and growth; and Microtox luminescence reduction. Adequate sample size and range of response were available to derive AETs for *Hyalella* and Microtox for organic-carbon-normalized PAHs, pesticides and PCBs, dry-weight-normalized metals, phenols, and chlorinated phenols.

The ability of these AETs to predict response in any bioassay at the sites in the database was compared with other sediment criteria or guidelines (e.g., Ontario Ministry of Environment and Energy (OMEE) Sediment Quality Guidelines, Environment Canada (EC) Interim Sediment Quality Values, Quebec's Sediment Quality guidelines, EPA's proposed sediment criteria based on equilibrium partitioning, and Ecology's marine sediment management standards). Measures of sensitivity (number correctly predicted to be impacted/number impacted) and efficiency (number correctly predicted/number predicted) were compared. A draft report indicates that the dry-weight-normalized organics values were consistently more sensitive and efficient than the organic-carbon-normalized samples. The

Data from 34 studies in Washington State and portions of Oregon were merged into a single database to derive freshwater AETs for sediments and to evaluate other sediment quality values

Announcements



BASINS Workshops to Be Held in FY '97

EPA's Office of Water will hold formal training on the water quality model, BASINS, in FY'97. One workshop will

be held at each EPA regional office. Stay tuned to *CS News* for exact dates.

BASINS is an integrated water quality model that supports analyses of water quality problems caused by point and nonpoint source loadings. BASINS makes use of several existing water quality models.

FRESHWATER SEDIMENT VALUES *Continued from page 5*

efficient than the organic-carbon-normalized samples. The EC Threshold Effects Levels (TELs) were consistently the most sensitive (fewest missed effects errors [Type II]) but the least efficient (most false alarm errors [Type I]). The *Hyaella* AETs were highly efficient, but were also less sensitive. The draft report will be available for public review in the future. For more information contact Brett Betts, Ecology, at (360)407-6914, or John Malek, EPA, at (206)553-1286.

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CSN Activities Timeline

October 22-23, 1996.

Mercury in the Midwest. Cosponsored by the EPA and EPRI. Allerton Hotel, Chicago, Illinois. Contact Jeanette Collins (312-886-0152) or Karen Turner (312-886-1437) of U.S. EPA Region 5.

October 23-26, 1996.

Sixth Biennial Watershed Management Conference. Stateline, Nevada. Sponsored by the University of California, Centers for Water and Wildland Resources. For information call 916-752-8070 ext. 133 or E-mail at cww@uc-davis.edu.

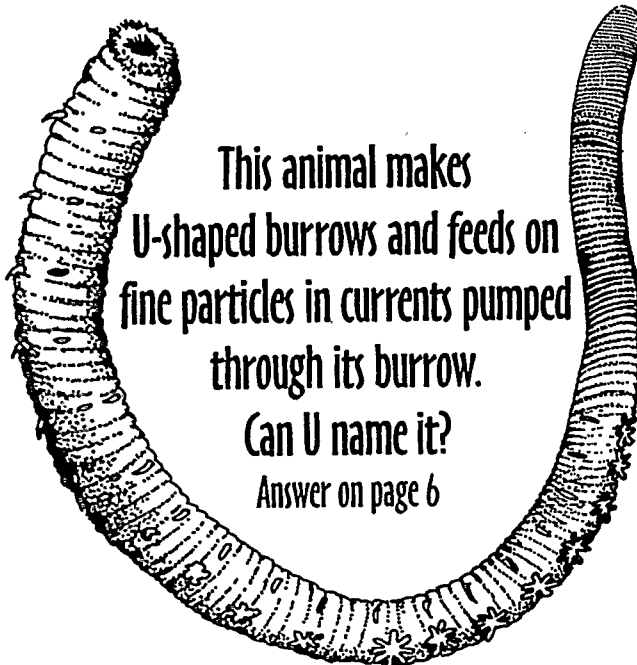
November 17-21, 1996.

Society of Environmental Toxicology and Chemistry 17th Annual Meeting. Washington, DC. Contact SETAC office at (904) 469-1500.

December 2-5, 1996.

Third Marine and Estuarine Conference: The Interrelationship Among Habitats and Their Management. Atlantic City, New Jersey. Cosponsors include the U.S. EPA, U.S. Army Corps of Engineers, Maryland Department of Natural Resources, and New Jersey Department of Environmental Protection. Contact Edward Ambrogio at 215-566-2758 or E-mail at ambrogio.edward@epamail.epa.gov.

Creature Feature



This animal makes
U-shaped burrows and feeds on
fine particles in currents pumped
through its burrow.

Can U name it?
Answer on page 6

(Lugworm)
Arenicola cristata

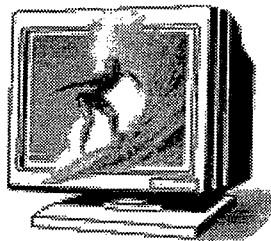


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accessible through OST's home page (<http://www.epa.gov/OW/OST/>). By clicking on the high-lighted

October *CS News* the reader will "pull up" an Internet version of *CS News*. This version of *CS News* contains fewer graphics but may be more easily viewed and printed on most printers.



The Internet version of *CS News* has a slightly different look, but is more easily

saved and printed in the new format. New issues of *CS News* will appear on EPA OST's homepage approximately 3 times a year.

New Video Released

A new video titled *Wetlands Water Quality Standards* is available on loan. The 28-minute production shows, through a series of interviews, how states and Indian tribes are using water quality standards to protect wetlands within their jurisdictions.

The video can be obtained from the following:

Wetlands Hotline: 1-800-832-7828
Water Resource Center: (202)260-7786

Beginning in 1997 *CS News* will be primarily available via the INTERNET at <http://www.epa.gov/OW/OST/> (select Information).

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