United States
Environmental Protection
Agency

Office of Water
(WH-585)

823N92001b

Number 8
May 1993

EPA Contaminated Sediments News

Status of EPA's Contaminated Sediment Management Strategy

In March 1992, EPA distributed a draft outline of the Strategy to government agencies, industry, consulting firms, law firms, environmental groups, and academia as a proposal for discussion. With the transmittal of the draft outline, EPA solicited written public comments and issued an invitation to attend three public forums (*Proceedings of EPA's Contaminated Sediment Management Strategy Forums*, EPA 823-R-92-007). The formal public comment period ended July 15, 1992, but comments were accepted until August 31, 1992.

The Strategy now fully describes EPA's understanding of the extent and severity of sediment contamination.

Written comments were received from federal and state agencies; municipal agencies; business, trade, and industry organizations; environmental consulting companies; environmental organizations; government coalitions; and law firms. The areas that received the most comments were implementation of sediment quality criteria, cross-program consistent minimum testing, and point versus nonpoint source control. Comments were also provided on the definition of contaminated sediments, extent and severity of the problem, human health risks from contaminated sediments, coordination of strategy implementation, the national inventory of contaminated sediment sites, prioritization of remedial actions, natural recovery, enforcement-based remediation, dredged material management, and EPA's research strategy for contaminated sediments.

EPA's responses to the oral and written comments received have been incorporated into a complete version of the draft Strategy. The 146-page draft Contaminated Sediment Management Strategy is divided into 15 sections: Purpose; Definition; Background; Why EPA Needs an Agency-Wide Strategy; Coordination of Strategy Implementation; Policy

CS News is produced by EPA-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 Beverly Baker, EPA HQ, at (202)260-7037.

Contaminated Sediment Activities Timeline

May 10-11, 1993. *National Technical Workshop on PCBs in Fish Tissue.* Washington, DC. Sponsored by EPA. Call (703) 246-0596.

May 10-14, 1993. *Toxicity Assessment and On-Line Monitoring, sixth international symposium.* Berlin, Germany. Contact Prof. P.D. Hansen, Technische Universitat Berlin at 49-30-81-696981.

May 23-27, 1993. *Aquatic Ecosystem Health and Environmental Bioassay Techniques.* Blacksburg, VA. Contact Dr. Munawar at Fisheries and Oceans, Canada Centre for Inland Waters, 867 Lakeshore Rd., Burlington, Ontario, Canada L7R4A6.

June 6-10, 1993. *International Association for Great Lakes Research Annual Meeting.* DePere, WI. Special session on ARCS Program, June 9. Contact John Kennedy, Green Bay Metropolitan Sewerage District, at (414) 432-4893.

June 8-11, 1993. *Metal Speciation and Contamination of Aquatic Sediments.* Jekyll Island, GA. Contact Herb Allen, University of Delaware, at (302) 831-3640.

June 14-16, 1993. *International Association on Water Quality.* Milwaukee, WI. 1st International Specialized Conference on Contaminated Aquatic Sediments: Historical Records, Environmental Impacts, and Remediation. Contact Erik Christensen at (414) 229-5422.

June 17-18, 1993. *Bioremediation Risk Assessment Workshop.* Duluth MN. Sponsored by EPA and Environment Canada. Contact Barbara Wiremen, ERL Gulf Breeze at (904) 934-9241.

Printed on Recycled Paper

SM-XH

Framework; Goals; Principles; Preventing Sediment Contamination; Abatement and Control Strategy; Remediation Strategy; Dredged Material Management Strategy; Research Strategy; and Outreach Strategy.

Specific topics have been added to the Strategy as suggested by commenters, and other areas have been made more explicit and expanded. The Strategy now fully describes EPA's understanding of the extent and severity of sediment contamination, including uncertainties about the dimension of the problem; the cross-program policy framework in which EPA intends to promote consideration and reduction of ecological and human health risks posed by sediment contamination; and the specific actions each EPA office will take to bring about consideration and reduction of risks posed by contaminated sediments.

This version of the Strategy is not yet available for public distribution. A briefing on the Strategy for the EPA Sediment Steering Committee is being scheduled, and a briefing for the EPA Administrator will follow. Availability of the draft Strategy will be noticed in the *Federal Register* with a request for formal public comment.

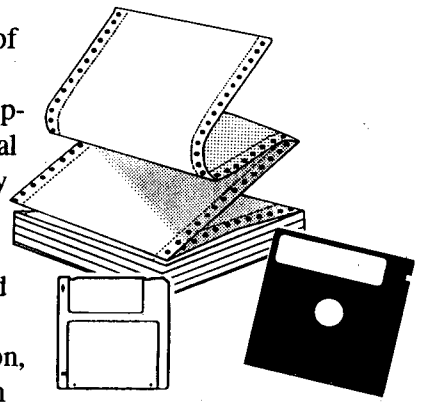
For more information on the Strategy, contact Tom Armitage, EPA OST, at (202) 260-5388.

Sediment Activities Around the Country

EPA Headquarters

National Sediment Inventory

To meet the objectives of the National Sediment Strategy and to comply with the mandates of the Water Resources Development Act of 1992, EPA has initiated the development of the National Sediment Inventory (NSI). To further this effort, the NSI Workshop was held on March 30-31, 1993, in Washington, DC, with more than 40 persons from EPA programs and Regions, as well as other federal and state agencies, in attendance. The purpose of the 2-day workshop was to present an overview of the recently completed *Framework for the Development of the National Sediment Inventory* and solicit input regarding critical issues remaining: (1) inventory design and minimum data elements, (2) data structure and systems, and (3) data quality evaluation procedures.



The first day of the workshop consisted of an open discussion among workshop speakers and others on various aspects of the development and management of sediment inventories, including the identification and prioritization of data sets for incorporation, distribution, and update by the Regions, and evaluation of the NSI to determine potential and probable areas of concern. The second, more formal day of the workshop began with a presentation by Betsy Southerland of EPA's Contaminated Sediments Program explaining potential uses of the NSI. Next, Chris Zarba described his interest in using the NSI to identify chemicals of concern for sediment quality criteria development and verification. This was followed by presentations from NOAA (Kostas Daskalakis and Tom O'Connor), USGS (Frank Manheim and Jack Hathaway), USACE (Tom Wright and Charlie Lutz), and FWS (Daniel Olson) on their ongoing inventory activities and personal observations. Catherine Fox gave an update on the NSI, and Tom Armitage gave an update on the National Source Inventory. Ken Klewin and Marc Tuchman presented Region 5's Sediment Inventory as an example of scoring for the prioritization of sites. Demonstrations of databases also took place: Jack Hathaway demonstrated the USGS Contaminated Sediments Database, representatives of Region 5 demonstrated their Inventory Data Retrieval Program, and Roberta Feins demonstrated the Puget Sound Database. The afternoon discussion sessions focused on minimum data elements, data quality evaluation procedures, and data management approaches, including NSI review by the Regions.

Based on workshop recommendations, planning activities will be finalized and compilation is scheduled to begin May 1, 1993. A preliminary evaluation primarily based on sediment chemistry (with associated biological, pollutant source, and QA/QC documentation) and preparation of regional data sets are scheduled for late fall.

To receive a copy of the *Framework for the Development of the National Sediment Inventory* or if you have any additional questions or comments, call Catherine Fox at (202) 260-1327.

OPPTS-Exposure Assessment Branch Developing Test Guideline for Contaminants in Aquatic Environments

The risk associated with the release of toxic chemicals into the environment is determined by considering both the hazards (i.e., toxicity, mutagenicity, carcinogenicity) associated with the chemical and the relative exposure of

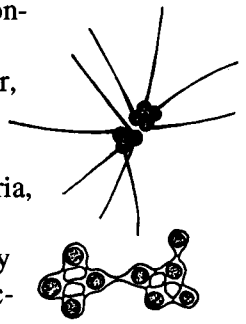
humans or the environment. Exposure is affected by various fate processes, including such physical, chemical, and biological processes as sorption, biotransformation, hydrolysis, and photolysis.

As part of the risk assessment process, the Exposure Assessment Branch (EAB), in the Economics, Exposure and Technology Division (EETD) of OPPTS, assesses the potential fate in the environment and the potential exposure of humans and the environment resulting from chemical releases. Often, data on the biodegradation of a chemical in the environment are not readily available.

EAB is currently developing a test guideline to assess the biodegradability of chemicals in aquatic environments.

Because biodegradation is a potentially important process in the ultimate fate of a chemical in the environment, EAB is currently developing a test guideline to assess the biodegradability of chemicals in aquatic environments. The test guideline uses a model test system called an "ecocore." The ecocore, a microcosm containing water and benthic sediments, was originally developed and extensively tested by researchers at EPA's Gulf Breeze ERL.

While other existing test guidelines such as the Organization for Economic Cooperative Development (OECD) Ready Biodegradability guidelines provide data relevant to aquatic biodegradation processes, there is a need for a higher-tier test employing a system that models both water and sediment biodegradation processes, as well as the interactions between them. Such currently used laboratory protocols as the shake flask "die away" and continuous activated sludge tests, as well as on-site field studies, are well established but have limitations. For example, laboratory studies are usually designed to assess the fate of a chemical in specific environmental compartments (e.g., water, sediment, plant roots) or populations (e.g., bacteria, fungi, algae) and do not adequately assess the interaction and importance of abiotic and biotic components of a natural ecosystem. On the other hand, because environmental properties such as pH, temperature, sunlight intensity, and moisture are not easily controlled in field studies, results from this type of study may be difficult to interpret. In addition, comprehensive field studies are resource-intensive and not easily replicated for the purpose of assessing statistical certainty.



In short, existing test guidelines, laboratory protocols, and field methods are not wholly suitable for predicting the fate of a chemical in a natural environment. In contrast, sediment/water microcosms, such as the ecocore test system, model complex environmental fate processes such that environmental properties may be more easily controlled and sufficient replication may be achieved to address variability.

The draft Sediment/Water Microcosm Biodegradation Test Guideline has been submitted for comment to EPA's Contaminated Sediments Tiered Testing Workgroup and others involved in bioassay standardization. For a copy of the draft microcosm test guideline, or for additional information, contact H. Kay Austin at (202) 260-3927.

Gulf of Mexico Contaminated Sediments and Pollutant Source Inventories

The Gulf of Mexico's Toxics Release Inventory (TRI) is now complete. The report (with accompanying database and user manual) describes the amounts and kinds of point and nonpoint source (pesticide usage and produced waters) pollutants discharged to Gulf coastal estuaries in 1989 and 1991. Estuaries are also ranked in terms of potential risk posed by the chemical discharges based on the toxicity of the chemical and the volume of receiving water.

The Draft GOM Contaminated Sediments Inventory (CSI) has also been completed, with the final report, database, and user manual scheduled for completion early this summer. This report describes the compilation and evaluation of historical sediment quality data on the Gulf coast with estuaries ranked by potential risk from in-place pollutants.

The Toxics Characterization Report is being prepared and is scheduled for completion early this summer. The report will integrate the results of the TRI and CSI, along with fish advisory information, in order to "tell a toxics tale" on each estuary of the Gulf coast. In other words, discharged chemicals of concern and in-place chemicals of concern will be compared and data gaps identified for further monitoring. Fish advisory information will also be considered for each estuary in order to estimate potential environmental and human health impacts from contaminated water and sediments.

The Toxics and Pesticides Committee of the GOMP hopes that this information will lead to further understanding of the impacts caused by toxics to the GOM and will promote more regional and site-specific assessment and management (prevention and

remediation) by federal and state environmental programs.

To receive a copy of the reports or if you have any additional questions or comments, call Catherine Fox at (202) 260-1327.

Regional Activities

Region 9

Improvements for Dredged Material Permit Application Procedures

Region 9 is leading an interagency effort under the Long-Term Management Strategy (LTMS) for dredged material from San Francisco Bay to improve management of data collected, submitted, and evaluated for dredged material permit applications. The project involves designing a data entry package for project administration, sediment chemistry, bioassay, and bioaccumulation data that satisfies the needs of all Bay Area regulatory agencies. The ultimate goal of the project is to facilitate and encourage the submission of permit applications in an entirely digital format. Each agency can then either construct individual software applications or use Region 9's own Dredged Material Tracking System (DMATS), which contains report-generating and Geographic Information System (GIS) linkage features. For more information contact Shelley Clarke, Region 9, at (415) 744-1162 or Dr. Brian Melzian at (415) 744-1161.

Sampling of Mercury-Contaminated Sediments

This spring, Region 9 is completing a preliminary study of mercury-contaminated sediments in Clear Lake, CA, in conjunction with a Remedial Investigation/Feasibility Study of the Sulphur Bank Mercury Mine Superfund Site. Researchers in the preliminary lake study collected spatially distributed mercury and methylmercury data in sediment, benthic invertebrates, phytoplankton and zooplankton, and various fish species across Clear Lake to determine the correlation between mercury levels in biota and higher sediment concentrations near the Sulphur Bank Mine. Future studies are planned to develop a site-specific sediment clean-up goal for mercury. For more information contact Carolyn d'Almeida at (415) 744-2225 or Dr. Brian Melzian at (415) 744-1161.

Region 10

National Benthic Experts Workshop

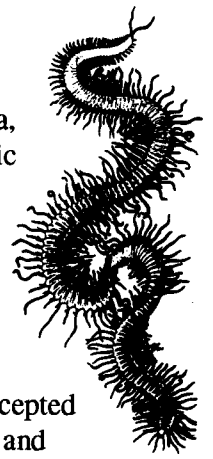
On February 25, 1993, the Washington Department of Ecology, EPA Region 10, and the Puget Sound Water Quality Authority sponsored a workshop of nationally recognized benthic ecologists to provide recommendations for improving methods used by programs in the Puget Sound region to interpret benthic community data.

The workshop objectives were to:

- identify and evaluate the technical adequacy of selected methods used to assess adverse effects of benthic communitites in marine sediment,
- evaluate the current interpretive methods used in Puget Sound programs to identify adverse effects; and
- develop recommendations for improving the current benthic interpretation methods used in Puget Sound programs to identify adverse effects.

Regulatory assessments of adverse environmental impacts are frequently based on the monitoring and evaluation of benthic invertebrates. These sediment-dwelling organisms, being sedentary, respond to both short-term acute and long-term chronic anthropogenic stresses at a single geographic point and are excellent indicators of environmental conditions.

Analysis and interpretation of benthic data can be complicated by a number of factors. Investigators of benthic communities have used widely different approaches to analyzing benthic data, reflecting their specific study objectives or personal preferences. In developing the Puget Sound Estuary Protocols, an attempt was made to specify consistent, broadly accepted methods of analyzing and interpretating benthic data. Not unexpectedly, this effort raised numerous questions and concerns.



Several regulatory and monitoring programs within Puget Sound rely on these concensus analyses and interpretations as a primary base for decision-making, including the state Sediment Management Standards, Puget Sound Dredged Disposal Analysis Program, Puget Sound Ambient Monitoring Program, and individual Superfund and Urban Bay Action efforts.

Prior to the workshop, the available information on methods used to identify adverse benthic effects was compiled and provided to the experts. Recommendations for improving the techniques used in Puget Sound programs were provided verbally during, and in writing following, the panel. Copies of the workshop minutes are available, and a final report is expected to be available in May 1993. For more information contact Sandra Manning, Washington Department of Ecology, at (206) 438-7514 or John Malek, Region 10, at (206) 553-1286.

Cooperative Aquatic Land Use Planning Related to Superfund

An interagency planning group consisting of members both inside and outside the Superfund process initiated a short-term study to identify and resolve land use conflicts associated with efforts to remediate contaminated sediments and restore damaged habitat in Elliott Bay and the Duwamish River in Seattle, WA. The group also worked to develop a generic methodology that could be used elsewhere in Puget Sound.

Six months of biweekly meetings produced an interim understanding among the participants about the degree of conflict and possible resolutions.

The process involved:

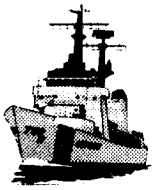
- an agency-by-agency description of applicable laws, regulations, and policies dealing with management of the area of interest;
- subdivision of the bay and river into 17 management units, with descriptions of the physical and land use characteristics of each unit;
- development of a list of issues of concern to be discussed in terms of identification of conflicts;
- a matrix evaluation of identified conflicts between issues of concern;
- mapping of major uses to identify potential conflicts within management units; and
- development of negotiated management strategies for each unit to directly resolve identified conflicts and/or to identify future actions needed to resolve the conflicts.

The agencies are continuing to review the results of this initial effort and will address by mid-1993 the need for further conflict-resolution actions. Funding for this planning effort was provide by DNR, NOAA, EPA, the Port of Seattle, and the Elliott Bay/ Duwamish Restoration Fund.
For more information contact David Jamison, DNR, at (206) 902-1070.

Port of Seattle's Terminal 3 Project

The Port of Seattle recently formulated a Harbor Development Plan that contemplates eventual conversion of many existing industrial shorelines into container terminal shipping facilities. One proposed element of this plan has set the stage for the convergence of many significant laws and policies relating to sediment contamination, including the federal Clean Water Act, the Rivers and Harbors Act, CERCLA, RCRA, NEPA, the Puget Sound Dredged Disposal Analysis program, the state Sediment Management Standards, the state Model Toxics Control Act (MTCA), and the State Environmental Policy Act (SEPA). Appropriate uses of constitutionally established State Harbor Lands, as well as significant neighborhood concerns, are also important factors.

One of the first properties that became available was a former shipyard owned by Lockheed. This property has about 25 acres of uplands and 27 acres of aquatic land. All but 7 acres of the aquatic land is leased from the state. This 52-acre site, which was intensively used for shipbuilding and ship repair from 1949 to 1987, contains varying degrees of soil and sediment contamination. The site requires a significant cleanup before it is converted to a container facility, and both RCRA and the state's MTCA establish applicable requirements. Adjacent to the Lockheed property are 22 upland and 7 aquatic acres currently and historically used for wood-treating. This property is also contaminated, and EPA is considering the application of CERCLA. The Port would like to add these two properties to those adjacent properties which they own as part of their redevelopment of Terminal 3.



In response to the Port's plan, local, state, and federal agencies have decided to work together to combine their many mandates to prepare a joint document written by the Port, the Corps, the state, and EPA. Other agencies and the public are being actively involved. The document will function as an RI/FS under RCRA and MTCA, as well as an EIS under NEPA and SEPA. All pertinent requirements and procedures of other laws will be incorporated into the consolidated document.

Extensive investigations are under way, including upland and aquatic sampling and a sophisticated modeling effort to assess the confinement potential for nearshore disposal of contaminated sediments. Side-by-side comparisons of standard hazardous waste tests and newer leachate tests are also being conducted. The Port has consistently emphasized that it is focused on conducting an efficient cleanup that would allow future beneficial uses of the property. Other options being considered include disposal of contaminated sediments at an upland site, capping in place, or placement in deep water. If constructed, a large nearshore confined disposal site could create a facility capable of receiving several hundred thousand yards of contaminated sediment from other Port lands that also need clean-up action.
(continued on p. 7)

Focus:

Enforcement-Based Remediation

On March 9, 1993, the U.S. Environmental Protection Agency and Department of Justice announced the signing of a multimillion-dollar, precedent-setting consent decree with Inland Steel Corporation. The consent decree settled a 1990 lawsuit that alleged violations of federal water, hazardous waste, and air laws at the company's East Chicago, Indiana, steel mill.

Consent Decree Summary

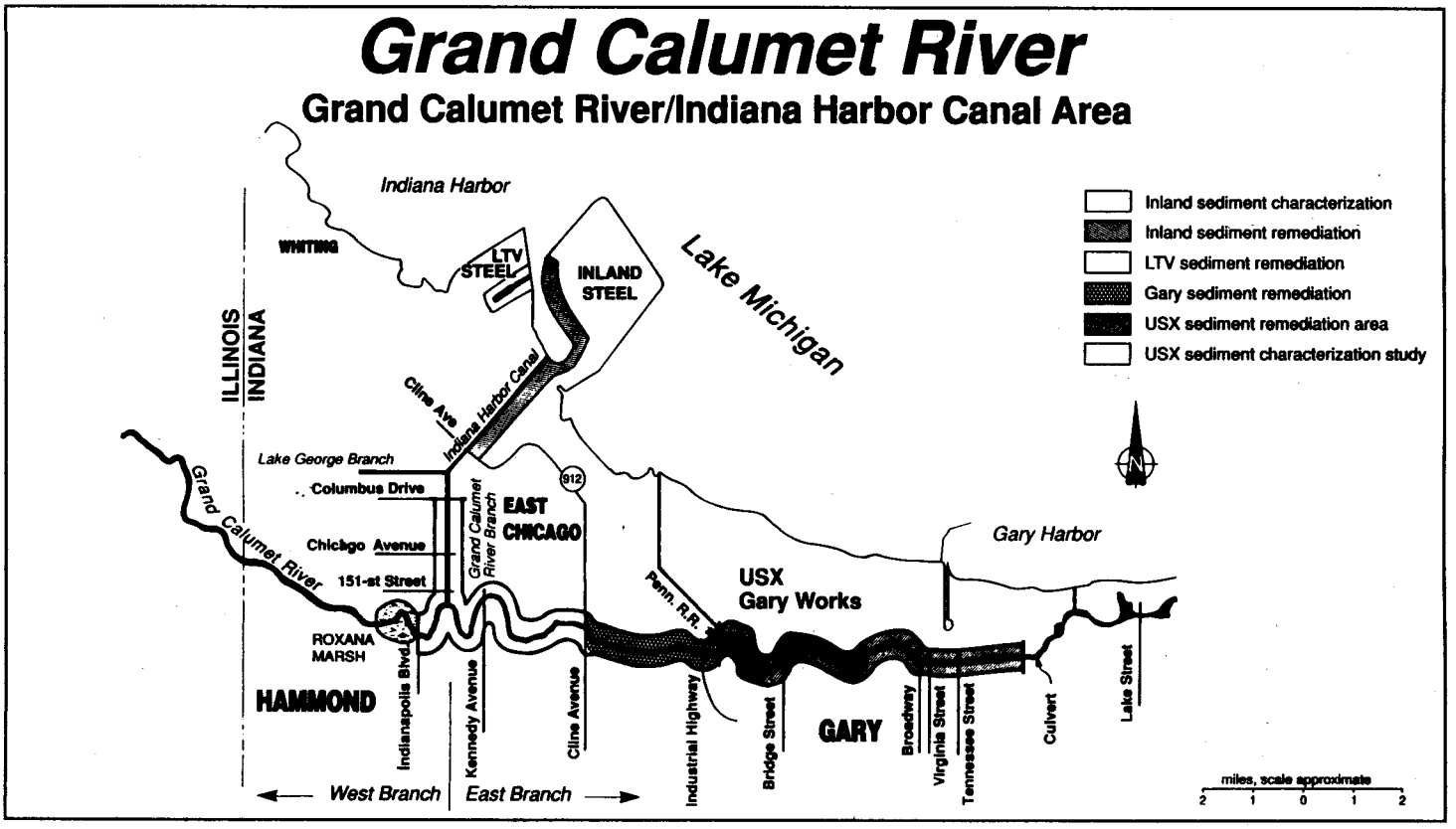
Under the consent decree, Inland Steel will pay a $29.5 million civil penalty consisting of a $3.5 million cash fine, a $19 million contaminated sediments remediation Supplemental Environmental Project (SEP), and $7 million for other SEPs to prevent or reduce pollution at the facility beyond levels required by federal law. The company will also begin a comprehensive clean-up program, costing about $25 million, to comply with water and air requirements and to correct numerous hazardous waste problems at its 2,400-acre facility. In addition, Inland must clean up sediments in the canal along its dockfaces.

Contaminants of Concern

Based on previous studies of the Indiana Harbor Canal done by EPA and the U.S. Army Corps of Engineers, the contaminants found in high concentrations are heavy metals (up to thousands of parts per million of lead and zinc, hundreds of parts per million of chromium, copper, and nickel), oil and grease (several percent), polychlorinated biphenyls (PCBs; over 50 parts per million in places), polycyclic aromatic hydrocarbons (PAHs; tens of parts per million of many PAHs), and volatile organic compounds (such as benzene, toluene, and xylene). These contaminants are the source of local toxicity to biota and are being carried into Lake Michigan by canal flow and the action of vessels.

Sediments Study and Remediation Project

The sediment remediation SEP will consist of two phases. In the first phase, Inland will study and sample 3 miles of sediments in Indiana Harbor and Ship Canal and Roxana Marsh, a neighboring wetland. In the second phase, Inland will remediate



sediments in the canal adjacent to its facility, most likely by dredging. EPA estimates that as much as 750,000 yd^3 of sediments could be remediated under the SEP and another 25,000 yd^3 at Inland's dockfaces. EPA further estimates that if 750,000 yd^3 of sediment were removed, about 575,000 lb of lead, 2,580,000 lb of zinc, and 5,000 lb of PCBs would be removed from the canal. Disposal options for the removed sediment will be determined by a process set up in the consent decree in which Inland will define disposal options based on the results of the study and EPA will approve the selected options.

The U.S. Army Corps of Engineers estimates that 157,000 yd^3 of contaminated sediments move into Lake Michigan annually from the Grand Calumet River/Indiana Harbor Canal system. The sediment remediation project under this consent decree would remove a substantial proportion of those contaminants and prevent them from entering the lake.

Other Enforcement Actions

The Inland settlement is the third thus far obtained by EPA's sediment enforcement efforts on the Grand Calumet River/Indiana Harbor Canal system. Previous settlements were obtained for LTV Steel across the canal and the USX Gary Plant and the City of Gary upstream from the canal. Development of remediation plans by LTV, USX, and Gary is in progress. The LTV and USX projects will most likely involve dredging of substantial volumes of contaminated sediments followed by disposal in hazardous waste landfills. Additional actions are filed by the Agency at a number of other sites in the area as part of the Northwest Indiana Geographic Enforcement Initiative. For more information contact Phillippa Cannon, Region 5, at (312) 353-6218.

(Port of Seattle continued from p. 4)
Information gained and administrative techniques developed through this effort are expected to assist future regional actions and could affect similar situations nationwide. The next 2 years will show whether such a complex convergence of laws and interests can be made to yield effective and efficient results. For more information contact Tom Elwell, Ecology, at (206) 459-6053 or John Malek, Region 10, at (206) 553-1286.

ORD Activities

ERL-Narragansett/Newport

ERL-Narragansett/Newport is currently working on the following sediment research issues:

Sediment Quality Criteria

- Revising SQC documents for acenaphthene, dieldrin, endrin, fluoranthene, and phenanthrene following concurrence of all Red Border reviewers.
- Preparing SAB briefing document on SQC for metals with Office of Water.
- Focusing research on the technical basis of SQC for metals on acid volatile sulfide and secondary metals binding phases, developing a model of the kinetics of metals and sulfide cycles, researching the role of metal binding in relation to chronic exposure of benthic organisms, and studying marine sediments contaminated with metals from the field.

For more information contact Dave Hansen at (401) 782-3027.

Combined PAH SQC Model

Researchers developed a model to predict the toxicity of field-collected marine sediments contaminated by PAHs. This model predicts toxicity using PAH sediment concentrations, EqP, QSAR, and additivity. Researchers measured toxicity using four amphipod species and sediments from six sites; literature data was obtained from three other studies. The prediction of presence or absence of toxicity was 82.5 percent accurate for tests conducted at Newport and 88.5 percent accurate for tests from the literature. A manuscript on this method is in preparation. For more information call Rick Swartz at (503) 867-4031.

Toxicity Test Development

Toxicity tests for the Coot clam (Mulinia lateralis):

- Embryo/larval test - Advantages include high sensitivity, duration <24 hours, and sublethal endpoint. Preliminary results indicate normal development in clean sediments and abnormal development in contaminated sediments. For more information call George Morrison at (401)782-3016.
- Juvenile 7-day test - Growth and mortality endpoints were studied. Mortality endpoint shows similar sensitivity to amphipod mortality endpoint; growth endpoint is more sensitive than amphipod mortality endpoint. Manuscript submitted to Environ. Toxicol. & Chem. For more information call Robert Burgess at (401) 782-3106.
- Settlement - Chronic ELS test. Settlement success, growth and survival endpoints were studied. Preliminary culture results are promising. For more information call Dave Hansen at (401) 782-3027.

Ten-Day Sediment Lethality Test for Hawaiian amphipods: Researchers developed test protocols using *Corophium acherusicum* and *C. insidiosum*. Sensitivity of the *Corophium* spp. was comparable to that of *Rhepoxynius* and greater than that of *Eohaustorius* with water spiked with cadmium. Survival of *Corophium* was less than that of *Eohaustorius* in pyrene-spiked water and comparable to *Eohaustorius* in pyrene-spiked sediment. Pyrene-spiked sediment was not toxic to either species. For more information call Janet Lamberson at (503) 867-4043.

Chronic Sediment Toxicity Test for Marine Benthic Amphipods: Researchers developed research methods for assessing the chronic toxicity of contaminated marie and estuarine sediments using the benthic amphipod *Leptocheirus plumulosus*. The final report is completed. For more information call Ted De Witt at (503) 867-5030.

Marine Sediment TIE Methods Development

Two approaches are currently being used to develop TIE methods for marine sediments:

- Adapt marine effluent TIE methods to interstitial waters. Interstitial water TIE Phase I results of New Bedford Harbor indicate that acute toxicity was not associated with either metals or PAHs. PCBs or a co-eluting compound may be responsible for the toxicity.

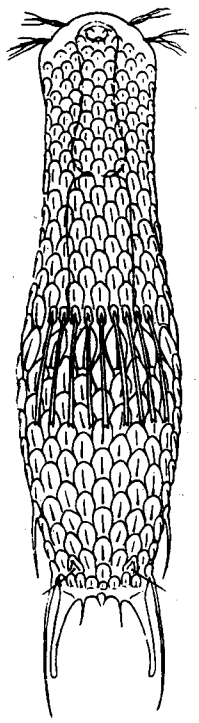
- Conduct TIEs on whole sediments. Preliminary whole-sediment TIE method development demonstrates that EDTA and C_{18} pellets reduce toxicity in metal- and organic-spiked marine sediments, respectively. For more information call Kay Ho at (401) 782-3196.

Chesapeake Bay Program

The Chesapeake Bay Program's Toxics Subcommittee sponsored a "Chesapeake Bay Contaminated Sediment Critical Issue Forum" on December 10, 1992, as part of the larger, ongoing reevaluation of the Chesapeake Bay Basinwide Toxics Reduction Strategy. The forum was structured to seek a technical consensus on the nature, magnitude, and extent of contaminated sediments within Chesapeake Bay. Regional and national experts were invited to join participants from various Chesapeake Bay Program state and federal agencies, research institutions, and public interest groups in addressing the contaminated sediments issue.

Creature Feature

Test your sediment skills and name this friendly face found as part of the meiobenthos in both marine and fresh waters. Answer on p. 11.



Not actual size

There was general consensus among the forum participants that there are three contaminated sediment "hot spots" in Chesapeake Bay—Baltimore Harbor, Anacostia River and Elizabeth River—and that there is not a ubiquitous contaminated sediments problem in the Bay. Other areas with elevated levels of sediment contaminants were limited in their geographical extent, as demonstrated through the series of sequential presentations of NOAA National Status and Trends Program, EPA Environmental Monitoring and Assessment Program, and Chesapeake Bay Contaminated Sediment Monitoring Program data for the Bay's tidal waters. Sediment toxicity data from a variety of sources, presented as part of the forum, showed adverse effects were limited to the three "hot spots" and a few other areas with elevated sediment contaminant levels.

To receive a copy of the *Chesapeake Bay Contaminated Sediments Critical Issue Forum Proceedings*, call Rich Batiuk, EPA Chesapeake Bay Program Office, at (410) 267-0061.

NOAA

Regional Surveys

As a part of its National Status and Trends Program, NOAA is conducting a series of regional surveys of sediment toxicity in selected bays and estuaries. The objectives of these surveys are (1) to determine the spatial patterns and extent of toxicity, (2) to estimate the severity of toxicity, and (3) to determine the relationships between toxicity and chemical contamination.

Thus far, surveys have been completed in San Francisco Bay and the bays adjoining Long Island Sound. The tests employed in these surveys

include a solid-phase amphipod survival test, an elutriate or porewater test with invertebrate larvae or gametes, and an organic extract Microtox™ test. The following is an update on the progress of the surveys that are under way.

Hudson-Raritan Estuary (NY/NJ)

An estuary-wide survey of this study area was completed in Phase I in 1991-92; 117 samples were tested for toxicity. Toxicity data have been compiled and evaluated. Chemical analyses of selected samples are under way with funding from EPA Region 2. Samples for Phase II were collected in February/March 1993 by EPA Region 2 and the Army Corps of Engineers. Phase II focuses on Newark Bay and vicinity. Toxicity tests will be conducted by Science Applications International Corporation, and chemical analyses will be performed by the U.S. Fish and Wildlife Service (FWS). The chemical analyses will include quantifications of dioxins and furans.

Tampa Bay (FL)

Ninety samples collected throughout the estuary were tested for toxicity in Phase I (1991); many were analyzed for chemical concentrations, with funding by the Florida Department of Environmental Regulation (FDER). An additional 75 samples from four regions were tested in Phase II (1992): northern Hillsborough Bay, western Old Tampa Bay, lower Boca Ciega Bay, and along the St. Petersburg shoreline. Chemical analyses of these samples are currently under way.

Southern California (CA)

Toxicity was determined in 99 samples from San Pedro Bay and vicinity in 1992 in a joint project with the California State Water Resources Control Board. Chemical analyses of selected samples are under way.

About 120 samples will be collected in March/April 1993 in San Diego Bay and vicinity for toxicity testing and chemical analyses. The sampling, toxicity tests, and chemical analyses are being conducted by the California Department of Fish and Game.

Western Florida Panhandle (FL)

Samples will be collected in Pensacola Bay and St. Andrew Bay in 1993 and in Choctawhatchee Bay and Appalachicola Bay in 1994 in a joint project with FDER. Toxicity tests will be conducted by the FWS. A modified EMAP randomized-block sampling plan is being used in these surveys.

Charleston Harbor (SC)

Samples will be collected during May 1993 in Charleston Harbor, Winyah Bay, and vicinity by the National Marine Fisheries Service (NMFS) and tested for toxicity by NMFS, the University of South Carolina, and the FWS. In a cooperative effort, the Charleston Harbor Project also will test additional samples for toxicity.

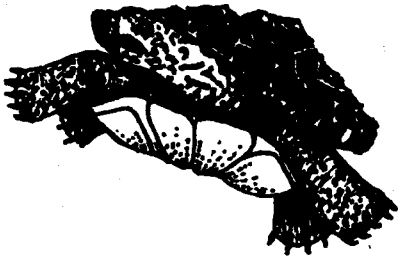
Boston Harbor (MA)

Samples will be collected in June/July 1993 throughout Boston Harbor by a contractor yet to be selected. In a cooperative effort, the Massachusetts Bay Estuary Project will test additional samples with the same methods.

Sediment Quality Guidelines

The database originally used by Long and Morgan (1990) was significantly revised and expanded with new data in a cooperative effort with FDER, Environment Canada, and MacDonald Environmental Services, Ltd. The data from the toxicity surveys listed above will be incorporated into the ever-expanding database as they become available, and revised guidelines will be developed.

For more information contact Ed Long, NOAA/ORCA, at (206) 526-6338 in Seattle.



U.S. Army Corps of Engineers

USACE and EPA Jointly Develop Technical Framework for Environmental Evaluation of Dredged Material Alternatives

Background

The U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) share the responsibility of regulating dredged material management activities under the Marine Protection, Research, and Sanctuaries Act (MPRSA) and the Federal Water Pollution Control Act Amendments of 1972, also called the Clean Water Act (CWA). Such management activities must also comply with the applicable requirements of the National Environmental Policy Act (NEPA). But there is often disagreement and confusion within USACE Divisions and Districts, EPA Regions, and other agencies over how to manage dredged material and how to evaluate proposed disposal alternatives from the environmental standpoint.

The USACE and EPA have recently published a revised dredged material testing manual for evaluation of material to be discharged at MPRSA ocean disposal sites (commonly called the Green Book). A similar updated manual for evaluation of CWA discharges in U.S. waters is under development. However, these documents do not provide guidance on how to evaluate the full range of dredged material management alternatives that can be considered.

The Framework is intended to be applicable to all proposed actions involving the management of dredged material.

To meet this need, the USACE and EPA have jointly developed a consistent Technical Framework for the evaluation of dredged material management alternatives (USACE/EPA 1992).

The need for a comprehensive strategy or framework for the evaluation of alternatives was recognized early on. In the mid 1980s, the USACE developed a Management Strategy (Francingues and others 1985) for evaluation of dredged material alternatives that focused on contaminant testing and controls (see November 1984 newsletter, Vol. D-84-6). EPA later initiated development of a similar management strategy focusing on environmental considerations of disposal alternatives. But neither of the strategies fully addressed the full range of alternatives and materials.

A USACE/EPA work group was subsequently formed for the purpose of developing an approach that would meet the needs of both agencies. The work group was composed of representatives from USACE and EPA headquarters, several USACE Divisions and Districts, several EPA Regions, EPA research labs, and the USACE Waterways Experiment Station. For over a year, the work group developed and revised the Technical Framework, incorporating comments from all USACE Divisions and Districts and EPA Regions. The final joint Technical Framework has now been endorsed by both agencies.

Objectives of the Framework

The Technical Framework is intended to serve as a consistent "road map" for USACE and EPA personnel to follow in evaluating the environmental acceptability of dredged material management alternatives. Specifically, its major objective is to provide the following:

- A general technical framework for evaluating the environmental acceptability of the full continuum of dredged material management alternatives (open-water placement, confined (diked) placement, and beneficial use applications).
- Additional technical guidance to supplement present implementation and testing manuals for addressing the environmental acceptability of available management options for the discharge of dredged material in both open-water and confined sites.
- Enhanced consistency and coordination in USACE and EPA decision-making in accordance with federal environmental statutes regulating dredged material management.

Overview of the Framework

The Technical Framework is designed to meet the procedural and substantive requirements of NEPA, CWA, and MPRSA in a technically consistent manner and is intended to be applicable to all proposed actions involving the management of dredged material. This includes both new construction and navigation project maintenance, both clean and contaminated materials, and the broad array of management alternatives, including confined (diked intertidal and upland) disposal, open-water(aquatic) disposal, and beneficial use applications.

The Technical Framework can be applied nationwide and is relatively general, but comprehensive. Because the Technical Framework provides national guidance, flexibility is necessary. It should not be followed rigidly; rather, it should be used as a technical guide to evaluate the commonly important factors to be considered in managing dredged material in an environmentally acceptable manner. These broad steps are followed:

- Evaluation of dredging project requirements.
- Identification of alternatives.
- Initial screening of alternatives.
- Detailed assessment of alternatives.
- Alternative selection.

The steps are designed to meet the regulatory requirements of NEPA, MPRSA, and CWA as they pertain to the required consideration of alternatives.

Detailed Assessments

For both open-water and confined placement alternatives, the detailed assessment of alternatives includes the following broad steps:

- Determining the characteristics of disposal sites.
- Evaluating direct physical impacts and site capacity.

- Evaluating contaminant pathways of concern.
- Evaluating control measures.
- Retaining environmentally acceptable alternatives.

For beneficial use applications, the detailed assessment includes the following:

- Determining beneficial use needs and opportunities.
- Evaluating physical suitability of material for proposed uses.
- Evaluating logistical and management requirements.
- Evaluating environmental suitability.
- Retaining environmentally acceptable alternatives.

Application of the Framework

Application of the Technical Framework will allow for consistency in decision-making across statutory boundaries and consideration of the full continuum of dredged material discharge options. For example, application of the Technical Framework will help ensure that open-water discharge does not hinder the development and use of other options, such as confined upland sites. The guidance established by the Technical Framework should reduce confusion by both regulators and the regulated community in all future evaluations.

To obtain a copy of the Technical Framework, contact Pat Humphries at:

U.S. Army Engineer WES
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
(601) 634-2696.

Center for Contaminated Sediments

The U.S. Army Engineer Waterways Experiment Station (WES) has recently established a Center for Contaminated Sediments (CCS) to focus existing expertise on the problems of contaminated sediments including identification, assessment, evaluation, and management.

These activities encompass endangerment assessments, risk analysis, restoration, remediation, and management activities.

Activities of the Center will include (1) technical and regulatory assistance, (2) training, (3) technology transfer, (4) research and development, (5) workshops and seminars, and (6) response to general information requests.

The CCS will incorporate appropriate expertise from all WES elements in responding to these activities, as well as expert input from outside WES as needed. The WES staff has more than two decades of experience in various aspects of identifying, delineating, assessing, remediating, and managing contaminated sediments. This expertise is a direct result of research, development, and reimbursable activities executed in support of the Corps of Engineers dredging mission, work related to military clean-up activities, EPA's Superfund Program and Assessment and Remediation of Contaminated Sediments (ARCS) Program, and NOAA's Natural Resource Trustee Program. For more information contact Dr. Robert Engler, WES, at (601) 634-3624.

RELEVANT LITERATURE

Francingues, N. R., Palermo, M. R., Peddicord, R. K., and Lee, C. R. 1985. *Management strategy for the disposal of dredged material: Contaminant testing and controls.* Miscellaneous paper EL-85-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

McGee, B.L., S.S. Schlekat, and E. Reinharz, 1993. Assessing sublethal levels of sediment contamination using the estuarine amphipod *Leptocheirus plumulosus.* Env. Tox. and Chem. 12:577-587.

USACE/EPA. 1992. *Evaluating environmental effects of dredged material management alternatives—A technical framework.* EPA 842-B-92-008. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, Washington, DC.

Creature Feature Answer: Chaetonid gastrotrich.

United States
Environmental Protection
Agency (WH-585)
Washington, DC 20460

Official Business
Penalty for Private Use
$300