United States Environmental Protection Agency

Office of Water (WH-585)

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EPA Contaminated Sediments News

Contaminated Sediment Management Strategy: A Proposal for Discussion

A draft outline of the *Contaminated Sediment Management Strategy: A Proposal for Discussion* has been distributed to members of the Sediment Strategy Workgroups for comment. This outline incorporates comments made by Deputy Administrator Habicht in tne September 1991 strategy briefing. Additional pollution prevention activities and an outreach strategy have also been added. Once workgroup member comments have been incorporated, other federal agencies, as well as the general public, will have an opportunity to make suggestions and recommendations. Three public meetings scheduled for Spring of 1992 will focus on key areas of the strategy: further defining the nature and extent of the problem; building alliances with others, especially other federal agencies; and developing an outreach/public awareness program. For more information contact Tim Kasten, EPA HQ, at (202)260-5994.

Sediment Activities Around the Country

EPA Headquarters

GREEN BOOK UPDATED

The *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual*, commonly referred to as the "Green Book," contains technical guidance on determining the suitability of dredged material for ocean disposal in U.S. waters. The Green Book has recently been updated by a joint working group of EPA and Army Corps of Engineers personnel to reflect dredging program experience and to incorporate improvements in evaluative testing.

A substantial component of the revised manual is a tiered testing procedure that incorporates decision points for determining compliance with the limiting permissible concentration (LPC) requirements of the United States Ocean Dumping Regulations.

The 1991 Green Book also provides numerical models to evaluate dilution of dredged material during the initial mixing phase of ocean disposal.

In addition to updating the dredged material evaluation guidance through the publication of the 1991 Green Book, EPA is also revising the Ocean Dumping Regulations to improve their clarity, reflect dredging program experience, and incorporate various statutory changes. The 1991 Green Book will be modified as needed to comply with the revisions to the regulations. To receive a copy of the 1991 Green Book, write to Ms. Billie Skinner, Green Book Mailing, USACE-WES (EP-D), 3909 Halls Ferry Road, Vicksburg, MS 39180-6199.

SEDIMENT CRITERIA DOCUMENTS

The first five proposed sediment criteria documents have been com-
(continued on p. 2)

Contaminated Sediment Activities Timeline

February 9-14, 1992. American Society of Limnology and Oceanography, Aquatic Sciences Meeting. Sante Fe, NM. Contact Susan Weiler at (509)527-5961

February 11-13, 1992. ARCS All Work Group Meeting and RAP Workshop. EPA Region V, Chicago, IL. Contact Dave Cowgill at (312)353-3576.

March 8-12, 1992. Coastal Engineering Practice '92. Long Beach, CA. Contact Steven Hughes, Waterways Experiment Station, 30909 Halls Ferry Road, Vicksburg, MS 39180-6199

April 28-30, 1992. 2nd ASTM Symposium on Environmental Toxicology and Risk Assessment. Pittsburgh, PA. Contact Chris Ingersoll at (314)875-5399.

June 21-24, 1992. Forest Products Research Society Annual Meeting. Charleston, SC. *Theme: Remediation of Sites Contaminated With Wood Preservative.* Contact Doris Robertson at (608)231-1361.

CS News is produced by EPA-OWRS to exchange relevant 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.

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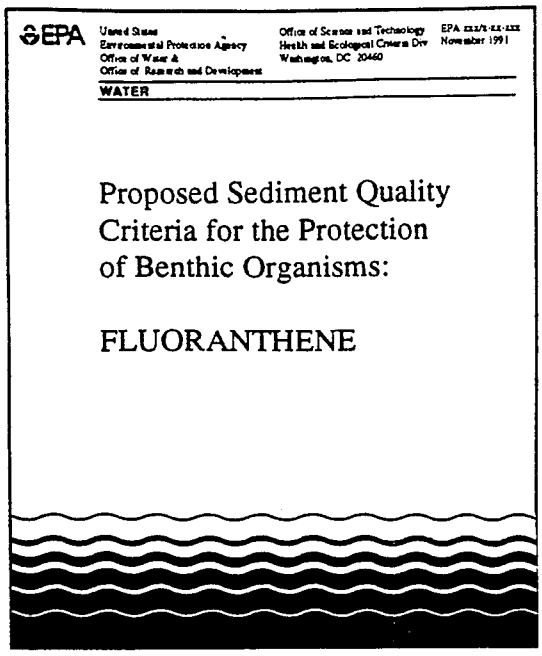
pleted and will be distributed for review and comment shortly. The review procedure includes the following steps: (1) the documents will be distributed to a variety of EPA programs that have expressed interest in receiving them; (2) a formal Red Border review (lasting about 3 weeks) involving appropriate EPA offices will be held; and (3) after comments from this review have been incorporated into the documents, they will be published in the *Federal Register* for a 60-day public comment period. Additionally, OMB has requested to review the documents and sign off on the criteria. A decision on this matter is pending.


EPA

Office of Science and Technology
Health and Ecological Criteria Div
Washington, DC 20460

November 1991

WATER

Proposed Sediment Quality Criteria for the Protection of Benthic Organisms:

FLUORANTHENE

The sediment quality criteria (SQC) are being developed using a methodology called the Equilibrium Partitioning Approach. This approach was selected after considering a variety of approaches that could be used to assess sediment contamination because it specifically addresses the issue of bioavailability. EPA's Science Advisory Board conducted a technical review of the methodology and supporting science to provide an additional evaluation of their appropriateness. All of the proposed SQC for non-ionic organic chemicals are based on equilibrium partitioning, which uses the organic carbon partition coefficient (K_{oc}) and ambient Aquatic Water Quality Criteria to derive an SQC concentration (expressed as micrograms chemical per gram organic carbon). The proposed SQC apply to sediments with ≥ 0.2 percent organic carbon. These proposed criteria have been derived after consideration of all comments received. The documents to be distributed for review include the following:

- *Technical Basis for Deriving Numerical National Sediment Quality Criteria for Non-Ionic Organic Chemicals for the Protection of Benthic Organisms*
- *Sediment Quality Criteria for the Protection of Benthic Organisms: ACENAPHTHENE*
- *Sediment Quality Criteria for the Protection of Benthic Organisms: DIELDRIN*
- *Sediment Quality Criteria for the Protection of Benthic Organisms: ENDRIN*
- *Sediment Quality Criteria for the Protection of Benthic Organisms: FLUORANTHENE*
- *Sediment Quality Criteria for the Protection of Benthic Organisms: PHENANTHRENE*

Although comments are being sought on all aspects of these documents, comments on the sections that identify new concepts and issues will be particularly valuable. The topic areas of special interest include the following:

- The technical basis and applications of the SQC documents
- The use of site-specific criteria modifications for sediment criteria
- The acceptability of using combined SQC for both fresh water and marine environments, and
- The appropriateness, except for commercially important benthic species, of using other levels of protection instead of the proposed 95 percent level of protection.

To receive these documents, contact Margarete Heber, EPA HQ, at (202)260-7144. For more information on technical issues, contact Chris Zarba, EPA HQ, at (202)260-1326.

SEDIMENT CLASSIFICATION METHODS COMPENDIUM

A draft final version of the *Sediment Classification Methods Compendium* has been completed. It describes the various methods used to evaluate sediment contamination, including their advantages, limitations, and existing applications. The report has been reviewed by the Science Advisory Board and is being revised. The final report will include additional references; suggestions for establishing an appropriate sampling program; information on sample collection, handling, and storage; and general and method-specific QA/QC procedures. The final report will be available some time in 1992. If you are not already on the mailing list, contact Esther Williams at (202)260-7301.

FIELD STUDIES COMPLETED

EPA has completed two field studies to demonstrate the validity of the analytical procedure contained in EPA's draft guidance document, *Assessment and Control of Bioconcentratable Contaminants in Surface Waters.* The field studies were designed to demonstrate that the analytical procedures for assessing bioconcentratable pollutants in effluents and sediments are reasonably accurate at projecting resulting tissue residues. EPA is currently preparing the final reports on these field studies. For further information, contact William Morrow, EPA HQ, at (202)260-9531.

DEVELOPMENT OF INLAND TESTING MANUAL FOR DREDGED MATERIAL

EPA and the Army Corps of Engineers (COE) are developing a national testing manual that will provide guidance on how to evaluate the acceptability of dredged material for disposal in inland and near coastal waters (Clean Water Act waters). The

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manual, *Evaluation of Dredged Material Proposed for Discharge in Inland and Near Coastal Waters - Testing Manual*, should provide a level of protection to inland and near coastal waters that is consistent with that provided for ocean waters. Though national in scope, it will provide for regional flexibility in implementation and application, as appropriate. Manual development will proceed through regular meetings of the 18-member joint EPA/COE workgroup, public consultations, and consultation with EPA's Science Advisory Board. The projected publication date is fall 1993. For further information contact Mike Kravitz, EPA HQ, at (202)260-8085, or Kirk Stark, COE, at (202)272-1786.

OFFICE OF WATER REORGANIZES

The Office of Water (OW) was recently reorganized to consolidate and strengthen OW's science and technology support, to integrate and balance program functions better across the Office, to focus more on ecological risks, and to improve OW's ability to target geographic areas and ecosystems. To accomplish these goals, the seven former program offices were consolidated into four program offices: Office of Wastewater Enforcement and Compliance (OWEC); Office of Science and Technology (OST); Office of Wetlands, Oceans and Watersheds (OWOW); and Office of Ground Water and Drinking Water (OGWDW). Additionally, a Policy and Resources Management Office (PRMO) has been created to replace the Water Policy Office and the Resources Management and Administration Office.

National Estuary Program

DELAWARE ESTUARY PROGRAM

The Delaware Estuary Program has completed its first year of scientific characterization studies. This work included a status and trends analysis of toxic pollutants (metals and organics) in the Estuary. The objectives of this study were to compile an annotated bibliography of available toxics data; assess the status of the Estuary with regard to levels of toxic pollutants; examine the data for evidence of temporal trends between 1970 and 1990; and construct a database using water column, tissue, and sediment data included in the status and trends analysis.

The second and third years of estuary characterization will include trace element speciation, surveys of macrobenthic and megabenthic populations, tissue and sediment analysis, and surveys of migratory and resident fish species. For more information contact Eric Stern, Region II, at (212)264-5283.

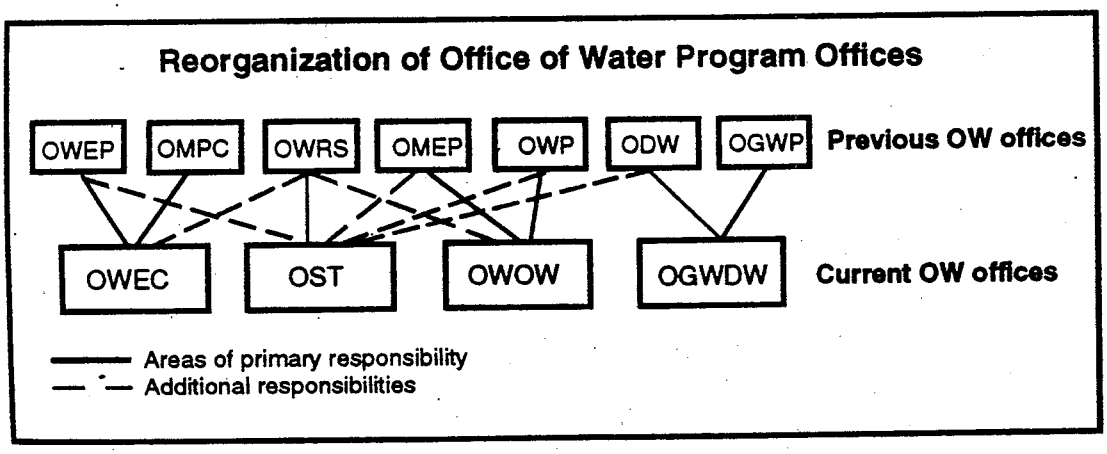
ALBEMARLE-PAMLICO ESTUARINE STUDY

Over 400 data points have been sampled over the last 4 years to establish a comprehensive baseline of heavy metals and phosphorus within the organic-rich muds of the Albemarle-Pamlico Estuary, North Carolina. Efforts focused on estuarine reaches of the Neuce River and its tidal creeks, the Tar Pamlico River and tributaries, and western Albemarle Sound. Serving as Principal Investigator, Dr. Stan Riggs of East Carolina University found relatively high concentrations of metals in sediments located near point source discharges and waste disposal sites. Some of these same areas will again be sampled and sediments sent to the Gulf Breeze Environmental Research Laboratory for biological effects (biotoxicity and bioaccumulation) studies in early 1992. For more information, contact Ted Bisterfeld, Region IV, at (404)347-1740.

PUGET SOUND ESTUARY PROGRAM

In recent years, the Puget Sound Protocols, compiled and published by EPA Region X's Puget Sound Estuary Program (PSEP), have been increasingly relied on by local researchers and regulatory programs as generally accepted, consistent methods for sample collection, testing and analysis, and presentation of data for water quality, sediment quality, tissues, and benthic infauna. During the past year, a number of protocols pertinent to sediment evaluation have been revised based on new information and/or regulatory experience. These include chemical analysis for metals and organics, and bioassay test procedures. For further information or to obtain copies, contact Jerry Larance, Region X, at (206)553-2581.

ORD Activities



ERL-ATHENS

Chemists at ERL-Athens have provided accurate octanol/water partition coefficients (K_{ow}) for use in forthcoming sediment quality criteria documents for acenapthene, dieldrin, endrin, phenanthrene, and fluoranthene. K_{ow} values in the peer-reviewed literature for individual chemi-

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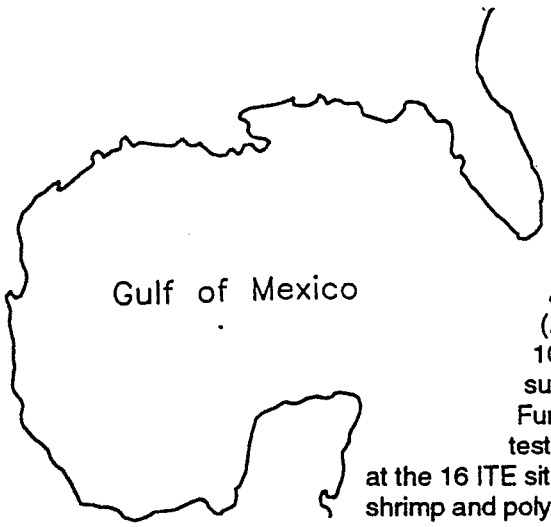
Focus: Gulf of Mexico



EMAP Monitoring in Gulf of Mexico Estuaries

In July 1991, the estuarine component of the Environmental Monitoring and Assessment Program (EMAP-E) began its efforts to assess the ecological status of estuaries in the portion of the Gulf of Mexico encompassed by the Louisianian Province. This province spans from Anclote Anchorage, FL, to the Rio Grande and includes all estuarine water bodies greater than one square mile in surface area.

The program concentrates on ecological response and exposure indicators collected from 202 locations in the Louisianian Province during July and August 1991. Several of these indicators include contaminants in sediments, sediment toxicity, and contaminants in fish and shellfish tissues. EMAP scientists are evaluating all 202 sites with regard to 98 constituents in sediments including PAHs, aliphatic hydrocarbons, heavy metals, pesticides, PCBs, acid volatile sulfides, butyltins, and organic carbon. All of these contaminants, except PAHs and aliphatics, are being analyzed from muscle tissue of selected fish and shellfish from the sites. In addition, whole body and liver concentrations of all the above contaminants are being determined for 16 sites of known environmental quality (i.e., indicator testing and evaluation sites, ITE). Finally, sediments from each of the 202 sites are being tested for acute toxicity using amphipods (i.e., *Ampelisca abdita*) and mysids (*Mysidopsis bahia*) for 10-day and 4-day exposure tests, respectively. Further sediment toxicity testing is being completed at the 16 ITE sites using penaeid shrimp and polychaetes.

The purpose of this program is to assess the status (extent of "degradation") of estuarine resources in the Gulf of Mexico and to evaluate (through time by means of monitoring surveys) trends in the ecological status of estuaries in the Gulf. The results of these analyses will be included in a statistical summary report expected to be available in June 1992. For more information contact Kevin Summers, ERL-Gulf Breeze, at (904)934-9200.

Special Studies in Gulf of Mexico Estuaries

EPA Region VI has conducted ambient toxicity studies for three Gulf of Mexico estuaries: Houston Ship Channel and tidal San Jacinto River, TX (1988-90); Calcasieu Estuary, LA (1988-90); and Bayou Trepagnier, LA (1988). Priority pollutant toxicity testing of sediments was performed by EPA or state laboratories, while amphipod tests using *Ampelisca abdita* were contracted out to SAIC at the Environmental Research Laboratory, Narragansett, RI.

During the Houston Ship Channel study, sediment toxicity was found at three of the ten stations tested. These stations were located in relatively industrialized areas, and in one case near the mouth of a tributary to the Ship Channel (Sims Bayou). Organic contamination was higher in tidal tributaries than in the main channel, probably because of the relatively frequent maintenance dredging and disturbance of bottom sediments as a result of ship traffic. The Region has recently completed the study report, *Water Quality, Ambient Toxicity and Biological Investigations in the Houston Ship Channel and Tidal San Jacinto River.*

The Calcasieu Estuary Study sediment analyses served to pinpoint the point source discharger that is primarily responsible for the bioaccumulation of hexachlorobenzene and hexachlorobutadiene found in seafood. These analyses helped to justify listing Bayou d'Inde and portions of the Calcasieu River on the Clean Water Act section 304(l) "short list of toxic waters." Being put on the short list gave EPA the authority to require more stringent point source controls for bioaccumulative substances. Bayou Verdine, another tidally influenced tributary to the estuary, was also determined to be a toxic hot spot, because of the presence of priority pollutants, particularly zinc and nickel, in the water column and sediments. This water body was also included on the 304(l) short list. Sediment toxicity ranged from 99 percent to 100 percent mortality. Overall, sediment toxicity was found at 26 of the 38 stations tested. More recent follow-up studies indicate that sediment toxicity in Bayou d'Inde is a persistent phenomenon. The Region published a study report in March 1990, *Toxics Study of the Lower Calcasieu River*, which is available from NTIS.

The Bayou Trepagnier study was primarily a state effort to document water quality and sediment quality in Bayou Trepagnier and Bayou LaBranche, which receive a finery discharge and are tidal tributaries to Lake Pontchartrain. A high degree of sediment contamination was found. The parameters of greatest concern were zinc, chromium, and lead. This *(continued on p. 5)*

water body was listed on the 304(l) short list, which is resulting in more stringent controls for zinc and whole effluent toxicity. All four sites tested using *Ampelisca* were significantly toxic. The Louisiana Department of Environmental Quality has completed a study report entitled *Impact Assessment of Bayou Trepagnier. Ampelisca* data are contained in a brief report by EPA-Narragansett entitled *Report of Bayou Trepagnier Sediment Toxicity Tests.* For more information contact Kathy Hollar, Region VI, at (214)655-6680.

Hazardous Substance Research Center/South and Southwest

The recently established Hazardous Substance Research Center/ South and Southwest (HSRC/S&SW), is a three-institution consortium consisting of Louisiana State University, Georgia Institute of Technology, and Rice University. The overall research mission of the HSRC/S&SW is to promote both short- and long-term investigations on the management of hazardous substance problems in EPA Regions IV and VI. Investigations fall within two general categories: (1) contaminated sediments and dredged materials associated with aquatic environment, and (2) unique hazardous substance problems in Regions IV and VI. The Center has recently received 21 proposals for FY92 monies. Project selections will take place early in 1992. For more information contact Catherine Fox, Region IV, at (404)347-1740; Kathy Hollar, Region VI, at (214)655-6680; or Bob Engler, COE, at (601)634-3624.

Gulf of Mexico Sediment Quality Inventory

The Toxic Substances and Pesticides Subcommittee for the Gulf of Mexico (GOM) Program is in the process of developing a gulf-wide monitoring program, part of which concerns the identification of contaminant levels in coastal sediments. Currently, both Region IV and Region VI are compiling inventories of sediment quality information (sediment chemistry, biotoxicity, bioaccumulation, grain size, and sample location) from federal, state, and academic contacts for their respective geographic areas. Region IV's database is now available and will soon be evaluated to determine the nature and extent of coastal sediment contamination in the Southeast. The GOM Program will use these Regional databases, supplementing their information with data from other key agencies, to evaluate the nature and extent of coastal sediment contamination in the Gulf of Mexico. Specific objectives include (1) determining the spatial distribution and contaminant levels in the coastal sediments of the Gulf, (2) identifying key pollutants of concern, (3) identifying gaps in the data, and (4) prioritizing areas of concern and suggesting rationale. For more information contact Catherine Fox, Region IV, at (404)347-1740.

Gulf of Mexico Pollutant Source Inventory

The Toxics and Pesticides Technical Subcommittee has also initiated the compilation of an inventory of the industrial and agricultural toxic releases from the coastal counties of the five Gulf of Mexico states. Information on each industry, POTW, location, type and amount of discharge, and receiving waters has been collected from the Toxic Release Inventory System (TRIS) and the Texas Railroad Commission (produced waters). Data will be evaluated in terms of the pollutant toxicity, amount discharged, and volume of receiving waters to determine potential impacts and develop effective management programs. For more information contact Catherine Fox, Region IV, at (404)347-1740.

Gulf of Mexico Sediment Workshop

On August 27-29, 1991, the U.S. EPA Gulf of Mexico Program sponsored a workshop on Contaminated Sediments in the Gulf of Mexico. Speakers presented the status of contaminant sediment monitoring in the Gulf, assessment methodologies, sediment quality criteria, and enforcement remediation. To receive a copy of the proceedings, contact Fred Kopfler, GOMP, at (601)688-3726.

Florida's Approach to Contaminated Sediments

Florida's Department of Environmental Regulations is developing a framework for deriving state sediment quality assessment guidelines. The framework is based on an approach presented in NOAA Technical Memorandum NOS OMA 52, *The Potential for Biological Effects of Sediment-sorbed Contaminants Tested in the National Status and Trends Program.* The state's framework is intended to provide guidance for assessing the likelihood of the occurrence of adverse biological effects due to contamination.

To deal with the extensive range of natural conditions and anthropogenic influences, the Department developed a method to identify and compare estuarine sediments with elevated metals contamination. The method improves evaluation of the effectiveness of pollution controls, helps target areas for further monitoring, and promotes uniformity in permit decisions. It does not identify sediments that are toxic (i.e., where benthic communities are impacted). This interpretive tool was the subject of the EPA Assessment and Watershed Protection Division June 1991 report *Water Quality Program Highlights.* For more information on the above activities, contact Fred Calder or Gail Sloane, DER, at (904)488-6221.

cals span three orders of magnitude, and it is difficult, if not impossible, to select the most reliable value by reviewing the articles in which these data are reported. The Athens laboratory applied three different measurement methods: shake-centrifugation, generator column, and slow-stir-flask. They also used two estimation methods - CLOGP and SPARC, a new computational chemistry method developed at the Athens laboratory (SPARC performs automated reasoning in chemistry).

For each of the five chemicals, the values derived from application of SPARC were judged to be the ones most likely to represent the true values, based on the chemists' knowledge of the inherent shortcomings of each of the measurement methods when applied to specific chemicals and the errors associated with the CLOGP method for each chemical. Because computational methods have no legal precedence, the values judged to be most accurate among the measured values were recommended for use in developing sediment quality criteria. Because of the extreme variation in laboratory measured data and the sound theoretical basis for computation by SPARC, the Athens chemists believe that SPARC-generated values will be broadly accepted for a number of chemical and physical properties in the future. For more information contact Frank Stancil, ERL-Athens, at (404)546-3197.

RISK REDUCTION ENGINEERING LABORATORY

The Risk Reduction Engineering Laboratory (RREL) is the EPA engineering laboratory responsible for the development, testing, and evaluation of technologies for preventing, treating, controlling, and disposing of solid and aqueous wastes. Prior to designing and initiating a research program addressing the remediation of contaminated sediments, RREL sought to identify specific areas requiring research. First, a survey was distributed during the May 1991 meeting of EPA's Sediment Technical Oversight Committee. Later that month, an expert panel was convened in Cincinnati to further identify research areas.

The survey participants and expert panel were in general agreement as to the areas requiring research. Based on the recommendations received, the FY92 research program will address (1) in situ containment and treatment, (2) high volume/low concentration treatment, and (3) separation technologies. RREL's research program will focus on areas that hold the promise of significant gains.

In Situ Containment and Treatment: The geochemistry of contaminant/sediment interaction will be examined with an eye toward designing in situ containment and treatment techniques. The FY92 effort will address the applicability of in situ containment and in situ treatment strategies and will help to focus later research into in situ remediation techniques.

Data currently available will be evaluated to determine the current state of the art for in situ containment. Situations where in situ containment has potential will be identified, and the effectiveness of various containment approaches will be evaluated.

High Volume/Low Concentration Treatment: Treatment approaches evaluated under this section will involve dredged sediments. Methods to treat contaminated sediments in confined disposal facilities either biologically or chemically will be examined up to pilot scale. The FY92 effort will involve the use of pilot-scale bioreactors at RREL's Test and Evaluation Facility.

Separation Technologies: Methods that result in a volume reduction of contaminated material through physical separations will be studied. Research will focus on hydrometallurgical technologies such as hydrocyclones and various flotation techniques.

Cost-benefit data will be collected within each of the above research areas so that risk reduction can be maximized. Research on remediation techniques will focus on providing tools for the effective management of contaminated sediments.

ERL-DULUTH

ERL-Duluth is currently working on the following activities:

- Participating in a national workgroup to recommend methods for testing dredged material regulated under the section 404 program.

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Sediment Communication Network

A contaminated sediment communication network has been approved and is being established at ERL-Duluth. The purpose of this network is to provide a communication link between recognized technical experts and those who require information concerning the assessment and remediation of contaminated sediments. The network will be staffed by specialists who can answer questions, provide hardcopy information, and direct calls to the appropriate technical experts.

This network will enhance the two-way flow of information between researchers and the user community. The contaminated sediment research area is relatively new, and state-of-the-art techniques often are not widely known. This type of information needs to be disseminated in a timely manner. Also, users are facing new situations requiring different applications for assessment and remediation techniques. These situations could provide researchers with field opportunities for application of new research.

Procedures for accessing this sediment communication network will be announced during February 1992. For more information contact Gary Ankley, ORD-Duluth, at (218)720-5603.

REGION IX

On June 20, 1991, the California State Water Resources Control Board (SWRCB) adopted a workplan for the development of sediment quality objectives for enclosed bays and estuaries in California. The approach taken in this workplan is to generate a broad body of information in order to bring several estimators of sediment quality together into a single sediment quality objective. The estimators to be used are the following:

- The Equilibrium Partitioning (EqP) Approach developed by EPA;
- The Apparent Effects Threshold (AET) Approach developed for use in Puget Sound; and
- The Spiked Bioassay Approach used for general characterization of toxicity responses.

Several tasks are presented for the work elements associated with each of the estimators. The initial tasks will focus on the calibration and verification of the efficacy of the approaches. Additional tasks are described for developmental work designed to refine assessment capabilities. To order this report, please contact the Office of Legislative and Public Affairs, State Water Resources Control Board, P.O. Box 100, Sacramento, CA 95812-0100, or call (916)657-2390. Refer to publication number 91-14-WQ when ordering. For additional information, call Stefan Lorenzato, SWRCB, at (916)657-1040, or Brian Melzian, Region IX (ERL-N), at (401)782-3163.

Region IX, the U.S. Army Corps of Engineers' (Corps) South Pacific Division, the Corps San Francisco District, and the Corps Los Angeles and Honolulu Districts are in the process of developing regional sediment testing agreements. These agreements will complement the EPA/Corps 1991 publication entitled *Evaluation of Dredged Material Proposed for Ocean Disposal : Testing Manual* (EPA-503/8-91/001), commonly referred to as the "Green Book." Some of the topics under consideration include (1) determination of the "chemicals of concern" for sediments and tissues of marine organisms, (2) appropriate bioassay and bioaccumulation test species, and (3) information on the ocean dredged material disposal program for permittees. For additional information contact Patrick Cotter, Region IX, at (415)744-1163, or Brian Melzian, Region IX (ERL-N), at (401)782-3163.

REGION X

Multiuser Confined Disposal Site Program Study

The 1989 Puget Sound Water Quality Management Plan directed the Department of Ecology to study and evaluate the utility and viability of establishing a system of multiuser confined disposal sites for contaminated sediments dredged from Puget Sound. These sediments would be those that exceeded the allowable contaminant levels for disposal in unconfined open-water sites, but were not sufficiently contaminated to be categorized as a "hazardous waste".

Ecology has prepared issue papers on seven topics that have a bearing on multi-user site feasibility, as well as a report, *Multiuser Confined Disposal Sites Program Study*, that details the main findings of the issue papers and makes recommendations on the viability and utility of a multi-user site program. The final report was released in December 1990 and concludes that a multi-user site (or sites) will be needed to ensure progress in sediment cleanup programs and to provide acceptable (from both economic and environmental perspectives) disposal capacity for navigation dredging.

A second report, *Multiuser Sites for the Confined Disposal of Contaminated Sediments from Puget Sound*, has also been prepared. It builds on the earlier report and recommends that the state move forward to establish a system of multi-user sites. The final report became available in October 1991.

An interagency workgroup, which includes EPA Region X, the Seattle District of the Corps of Engineers, other state agencies, local governments, and state port associations, has been established. Funding for initiation of the study is being pursued at the state and federal levels.

Copies of both reports may be obtained from Tom Luster, Sediment Management Unit, Washington Department of Ecology, (206)438-7493.

Other Sediment Management Efforts

Interagency efforts, under a Department of Ecology lead, are moving forward on a number of sediment-related issues. These include regulatory implementation of the recently adopted Sediment Management Standards for Puget Sound estuarine waters, refinement of freshwater sediment testing methods (including development of sediment-chemical criteria), and development of human health criteria for evaluating contaminated sediment. Preparation of Ecology's Dredged Material Management Standards, the companion regulations to the Sediment Management Standards, was stalled but has been reinitiated. The Standards are scheduled for adoption in 1992.

Region X completed additional research supporting the theory that there is a relationship between juvenile growth and reproductive success using the 20-day *Neanthes* sublethal sediment bioassay. A final report (dated July 1991) is available from John Malek, Region X, at (206)553-1286. The PSDDA agencies (EPA, COE, Ecology, DNR) have convened a *Neanthes* Bioassay Technical Experts committee. The committee most recently met in Seattle in November 1991. PSDDA will consider recommendations by the Technical Experts committee in deciding whether to incorporate the 20-day test into the PSDDA suite of tests.

A new report, *Dioxin and Furan Concentrations in Puget Sound Crabs*, was completed by EPA Region X. The report represents the results of a reconnaissance-level study to determine contaminant levels in crabs living near potential sources of dioxins and furans in the Sound. An "agency

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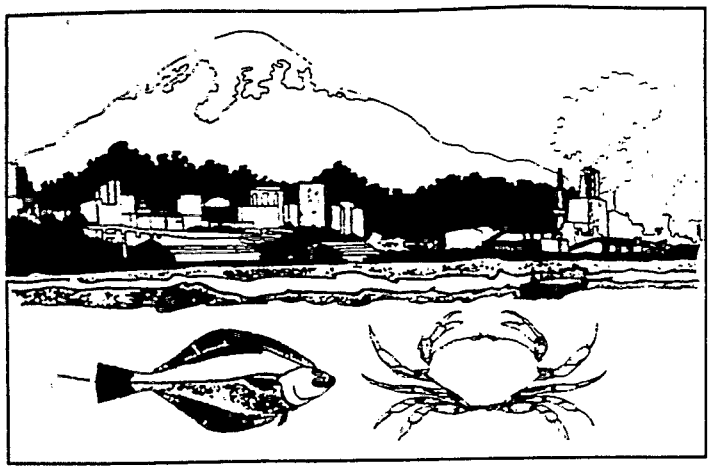
preface" attempts to put the findings of the study in perspective. The preface was prepared because of the potential for misinterpretation of the data and because dioxin and furan contamination, human health risk assessment, and seafood (crab) consumption are all of great interest to the public. The report may be obtained from John Armstrong, Region X, at (206)553-1368.



LEGISLATION HIGHLIGHTS

Recent Legislative Proposals Highlighting Sediment Activities:

Coastal Protection Act of 1991 (S. 1070, Sen. Mitchell et al.). Estuaries and coastal waters are to be designated as high priorities requiring accelerated point and nonpoint source controls if they have sediment contamination problems. * EPA must promulgate numerical standards for coastal water quality and sediment quality. * If material to be dredged contains pollutant concentrations in excess of sediment quality standards, dumoing of this material must be restricted to certain times and sites and must employ best management practices.

Great Lakes and Coastal Sediment Assessment and Restoration Act (S. 31, Sen. Moynihan). Establishes a national program of research and technology development for the management, removal, and restoration of contaminated sediment. * Provides for a comprehensive national survey of sediment contamination in the Great Lakes and coastal waters of the United States. * Directs EPA to develop sediment quality criteria and stan-dards to clearly identify sediments that are contaminated. * Directs EPA and the Corps to develop guidelines for the implementation of contaminated sediment restoration projects. * Direct the Corps to implement contaminated sediment restoration projects in certain areas.

Operation Coastal Shield of 1991 (H.R. 2029, Rep. Studds et al.) Protects coastal waters, and the waters of the Great Lakes, and extends the authorization for the Federal Water Pollution Control Act. * Requires a national survey on the extent of sediment contamination. * Directs EPA to develop sediment quality criteria and standards. * Directs EPA and the Corps to develop guidelines for the implementation of restoration and cleanup projects.

Water Pollution Prevention and Control Act of 1991 (S. 1081, Sen. Baucus). Requires each state to adopt water and sediment quality standards within 3 years of publication of EPA criteria. * Must ensure protection of human health and ecosystems, including sediments.

ASTM Meeting

The American Society for Testing and Materials (ASTM) Subcommittee E47.03 on Sediment Toxicology met November 2 and 3, 1991, before the 12th annual SETAC meeting in Seattle, WA. The activities of the following Task Groups were discussed at the meeting: (1) revisions to the freshwater toxicity document (E 1383-90; annexes for cladocerans, mayflies, mollusks, *Diporeia* sp., tubificid oligochaetes, and *Lumbriculus* sp.); (2) revisions to the marine and estuarine amphipod document (E 1367-90; annex for *Leptocheirus plumulosus*; (3) design of sediment toxicity tests; (4) polychaete testing; (5) bioaccumulation testing (fish and invertebrates); (6) oyster testing; (7) echinoderm testing; (8) bacteria testing; (9) earthworm testing; and (10) sediment resuspension.

The Subcommittee also discussed the option of developing an ASTM "proposal" before a "standard" is developed. An ASTM proposal is "a document...for information and comment prior to its consideration for adoption as a Standard."

The next Subcommittee meeting will be Tuesday, April 28 (9:00 A.M. to 12:00 A.M.), Wednesday, April 29 (1:00 to 5:00 P.M.), and Thursday, April 30 (9:00 A.M. to 12:00 A.M.), 1992, at the Pittsburgh Hilton in Pittsburgh, PA. The Subcommittee meetings will be held in conjunction with the 2nd ASTM Symposium on Environmental Toxicology and Risk Assessment. Poster and platform presentations will be integrated with the Subcommittee meetings (i.e., morning Subcommittee meeting followed by afternoon symposium on "Sediment Methods").

Please contact Chris Ingersoll at (314)875-5399 for more information or to be put on the Subcommittee mailing list.

- Initiating studies at a field site near Joplin, MO, that is heavily contaminated with zinc, to evaluate the role of AVS in metal partitioning.

- Continuing a series of laboratory spiking experiments with several pesticides in support of sediment quality criteria to be issued for DDT, DDD, DDE, and chlorpyrifos.

- Continuing field validation efforts at a DDT-contaminated site in Huntsville, AL. The first two sets of benthic and sediment samples have been collected.

ERL-Duluth recently completed (1) a dieldrin spiking experiment that supported the Equilibrium Partitioning Approach as an exposure model for predicting the availability of nonpolar organics and (2) a series of studies looking at copper bioavailability in freshwater sediments.

REQUEST FOR DATA SETS

ERL-Duluth is evaluating the reasonableness of proposed sediment quality criteria by analyzing existing freshwater data sets to determine relationships between the concentration of nonpolar organics and the benthic community structure. They are currently using data sets from the Great Lakes. Please contact Gary Ankley, ERL-Duluth, at (218) 720-5603 if you have or are aware of freshwater data sets that were synoptically collected and include the following parameters: organic carbon, chemical concentrations, and some measure of benthic community structure.

CENTER FOR ENVIRONMENTAL RESEARCH INFORMATION

A seminar series on contaminated sediments was held in five regional cities to transfer technical information on assessing and remediating sediment contamination. Attendees were provided information on sediment evaluation, dredging, and treatment technologies. Treatment technologies described included thermal, extraction, and stabilization. An accompanying handbook, *Remediation of Contaminated Sediments*, was developed, and can be obtained from CERI at (513)569-7562. Request EPA publication 625/6-91/028.

Regional Programs

REGION I

Region I conducted a contaminated sediment inventory project to determine the reasonableness of the proposed EPA sediment criteria. Existing sediment contamination data for Boston Harbor, Massachusetts Bay, and Cape Cod Bay, Massachusetts were compiled into one database using a GIS format (ARC INFO) showing the extent of violations from the proposed criteria. Region I tested the hypothesis that the violations would occur in areas of known expected contamination, such as harbors, whereas offshore areas would have relatively little contamination and therefore fewer violations.

Data were collected from many sources: NOAA Status and Trends reports, U.S. Army Corps of Engineers dredging reports, EPA's Quincy Bay studies, Massachusetts Water Resources Authority (MWRA) studies, and independent researchers. The following parameters were selected for analysis: metals, organics, total organic carbon (TOC), and station location. To evaluate trends, five contaminants were analyzed spatially: copper, mercury, total PCBs, phenanthrene, and benzo(a)pyrene. These contaminants were chosen to represent metals and organics for which adequate data existed. For each of the five contaminants, approximately 25 to 50 data points were graphically presented. Percent TOC was collected in order to compare sediment contamination from organic compounds to interim sediment quality criteria (SQC).

The criteria used to evaluate these data points varied. For organics, criteria evaluated included EPA interim sediment criteria and Washington state (Apparent Effects Threshold) standards. Massachusetts state standards are in draft form at this time, and are divided into low (1 percent) and high (4 percent) organic carbon content. For metals, criteria included Washington state criteria (AET) and Massachusetts state criteria. These criteria are based on bulk sediment.

The results indicate that for all of the contaminants studied, the offshore areas rarely violated sediment criteria while nearshore sites sometimes violated both criteria. However, occasional offshore sites such as the MWRA-planned outfall site exceeded EPA SQC for phenanthrene. These results suggest that the criteria are probably adequate in their level of protection. For more information contact Matthew Liebman, Region I, at (617)565-4866.

REGION IV

Investigations of coastal sediment quality are becoming increasingly common in the Southeast. This year alone, it is likely that as much sediment chemistry and biological effects data will be generated as in the last 5 years combined. In addition to the large amount of information generated through EPA's Environmental Monitoring and Assessment Program (EMAP), studies are continuing in Tampa Bay (NOAA's Status and Trends Program) and Perdido, St. Andrew, Apalachii and Mobile Bay (FWS), while others are being initiated for the first time, e.g., Sarasota Bay (EPA).

Region IV's Ocean Disposal Program has recently strengthened its testing requirements for dredged material to be disposed of offshore. Thus, it is anticipated that all harbors with potentially contaminated sediments proposed for offshore disposal in the Southeast will be retested within the next 2 years. This more rigorous testing program has already been used to investigate potential contamination of sediments from Cape

(continued on p. 8)

Canaveral, and Miami River and Harbor, in Florida. Sampling and analytical plans are also being developed for Kings Bay, GA, and Wilmington Harbor, NC. Region IV's Wetlands Program has also adopted a similar sediment quality testing approach for investigating potential contamination of dredged material in section 404 waters.

Region IV has recently compiled a Coastal Sediment Quality Inventory of the Southeast. The database contains over 40,000 records with information on all six coastal states, the majority of which is concentrated in Florida. A preliminary scan of the inventory indicates significant variability in assessment methodologies and available QA/QC information, as well as potential lead and copper contamination problems in parts of Florida, Mississippi and South Carolina. An extensive evaluation of the inventory is currently under way to (1) determine the nature and extent of coastal sediment contamination in the Southeast, (2) identify existing gaps in the data, and (3) prioritize areas for further action.

Established in April 1991, Region IV's Contaminated Sediments Workgroup is made up of individuals from 18 regional programs, the Environmental Research Laboratories in Athens and Gulf Breeze, and the Environmental Services Division in Athens. The purposes of the workgroup are to provide input on the development of the Agency-wide Sediments Management Strategy and to develop and implement a regional strategy for addressing contaminated sediments concerns in the Southeast. Plans are also under way to organize an Inter-Agency Contaminated SedimentsTask Force within a year.

For more information on the above activities, contact Catherine Fox, Region IV, at (404)347-1740.

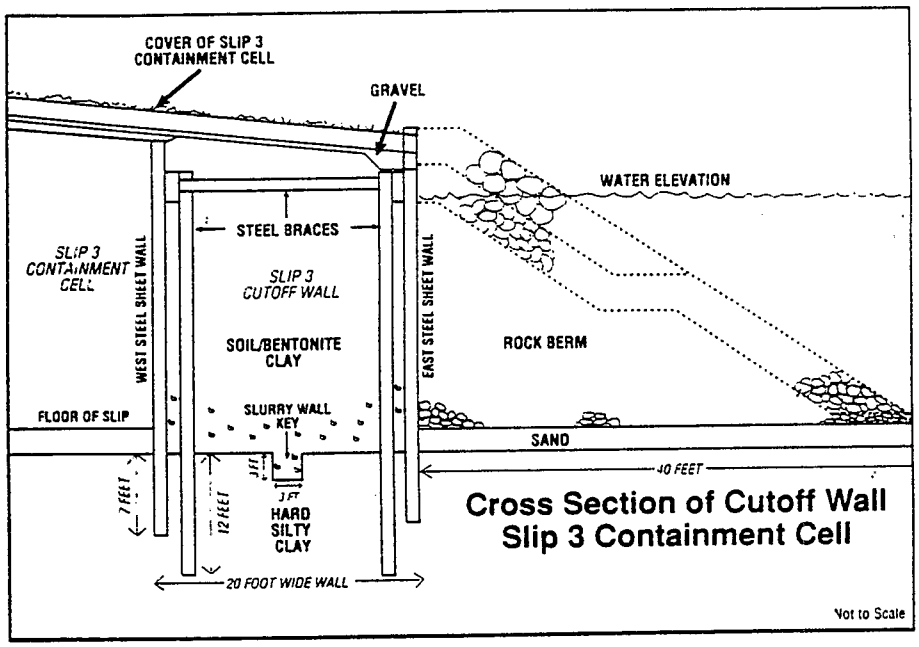
REGION V

Region V and LTV Steel Corporation have agreed, in principle, to a consent decree calling for sediment remediation at the number two intake flume on LTV's property in East Chicago, IN. This oil-contaminated intake flume opens to Lake Michigan and is adjacent to the Indiana Harbor Canal. The remediation efforts will take 3 to 5 years to complete and will cost approximately $3 million.

Additional remediation activities are being conducted by USX Gary, a steel corporation, to evaluate the quality of sediments over a 13-mile stretch of the Grand Calumet River in northwest Indiana. The steel giant will then submit a draft remediation plan to clean up 5 miles of the river and prepare a feasibility study for potentially recycling the sediments back through the steel-making process. For more information on the above activities, contact Ron Kovach, Region V, at (312)886-1441.

Cleanup activities are under way at the Outboard Marine Corporation (OMC)/ Waukegan Harbor Superfund site, located in Waukegan, IL. EPA estimates that there are over 1 million pounds of PCBs at the site (about 700,000 pounds on OMC property and about 300,000 pounds in soil and sediment in Slip 3 and Waukegan Harbor). Slip 3 is being made into a permanent containment cell and will receive dredged material from the upper portion of Waukegan Harbor. A wall is being constructed across the mouth of the slip. After completion of the cutoff wall, a 3-foot-wide slurry wall will be built around the remainder of Slip 3. The slurry wall will extend from about 3 feet above ground to about 25 to 30 feet below the ground's surface.

Highly contaminated sediments/soils from Slip 3 and other contaminated areas will be "dewatered" in a temporary pond located in a containment cell. Once the soils and sediments have dried, they will be treated using the Taciuk process. This process is a thermal treatment system that will be used to separate PCBs from soils andsediments. It will take place in a single enclosed unit called an anaerobic thermal processor (ATP) in an area within a containment cell. The ATP will separate PCBs from the soils and sediment by vaporizing them at a temperature of around 1100° F. When the vapor is cooled, the PCBs will condense into a liquid that will be destroyed at an off-site facility.



Cross Section of Cutoff Wall
Slip 3 Containment Cell

When the Taciuk process is finished, at least 97 percent of the PCBs will be removed from the treated sediment. This sediment will then be disposed of in a containment cell. The Taciuk process has been used at only one other Superfund site to remove low levels of PCB contamination from soil. This is the first time it will be used to remove PCBs from sediment and soil. For more information contact Cindy Nolan, Region V, at (312)886-0400.

RELEVANT LITERATURE

Ankley, G.T., G.L. Phipps, E.M. Leonard, D.A. Benoit, V.R. Mattson, P.A. Kosin, A.M. Cotter, J.R. Dierkes, D.J. Hansen, and J.D. Mahony. 1991. Acid Volatile Sulfide as a Factor Mediating Cadmium and Nickel Bioavailability in Contaminated Sediments. *Environmental Toxicology and Chemistry* 10:1299-1307.

Ankley, D.T., M.K. Schubauer-Berigan, and J.R. Dierkes. 1991. Predicting the Toxicity of Bulk Sediments to Aquatic Organisms with Aqueous Test Fractions: Pore Water versus Elutriate. *Environmental Toxicology and Chemistry* 10:1359-1366.

Ankley, G.T., M.K. Schubauer-Berigan, J.R. Dierkes, and M. Lukasevycz. 1991. Sediment Toxicity Identification Evaluation: Phase I (Characterization), Phase II (Identification), Phase III (Confirmation) Modifications of Effluent Procedures. *U.S. Environmental Protection Agency, National Effluent Toxicity Assessment Center* EPA-600/6-91/007.

Burton, Jr. G.A. 1991. Assessing the Toxicity of Freshwater Sediments. *Environmental Toxicologv and Chemistry* 10:1585-1627..

Di Toro, D.M., C.S. Zarba, D.J. Hansen, W.J. Berry, R.C. Swartz, C.E. Cowan, S.P. Pavlou, H.E. Allen, N.A. Thomas, and P.R. Paquin. 1991. Technical Basis for Establishing Sediment Quality Criteria for Nonionic Organic Chemicals Using Equilibrium Partitioning. *Environmental Toxicology and Chemistry* 10:1541-1583.

Schubauer-Berigan, M.K., and G.T. Ankley. 1991. The Contamination of Ammonia, Metals, and Nonpolar Organic Compounds to the Toxicity of Sediment Interstitial Water from an Illinois River Tributary. *Environmental Toxicology and Chemistry* 10:925-939.

Handbook: Remediation of Contaminated Sediments. 1991. *U.S. Environmental Protection Agency,* EPA Publication 625/6-91/028. To receive a copy, call (513)569-7562.

Managing Contaminated Sediments - EPA Decision-Making Processes. 1990. *U.S. Environmental Protection Agency,* EPA Publication 506/6-90/002.

Standard Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Toxicological Testing. E 1391-90. *American Society for Testing and Materials.* Contact Chris Ingersoll at (314)875-5399.

Standard Guide for Conducting Sediment Toxicity Tests with Freshwater Invertebrates. E 1383-90. *American Society for Testing and Materials.* Contact Chris Ingersoll at (314)875-5399.

Standard Guide for Conducting 10-day Static Sediment Toxicity Tests with Marine and Estuarine Amphipods. E 1367-90. *American Society for Testing and Materials.* Contact Chris Ingersoll at (314)875-5399.

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