

# Dredging Research

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Mar. 2004

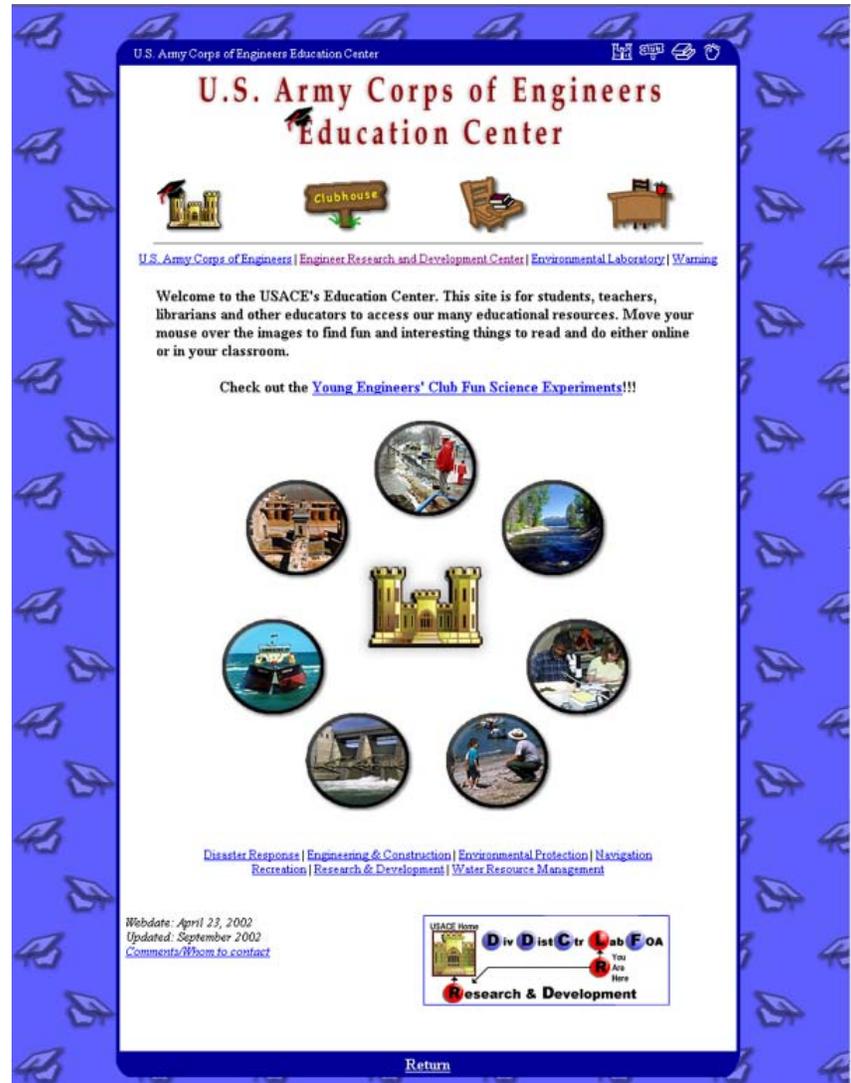
## Corps Education Center a big success

by Janean Shirley

“While it may not technically be our mission, it is certainly our *responsibility* to reach out to as many young people as we can and provide them with information about the work we do in the Corps of Engineers.”

This quote summarizes Dena Dickerson’s feelings about her work for the Corps and her involvement in the Corps’ Education Center (<http://education.usace.army.mil/>). Since its launch in April of 2002, the site has received more than 3.5 million hits, averaging 13,000 hits and more than 1,000 unique visitors per day.

About three years ago, Joe Wilson, Navigation Program Monitor at Headquarters, USACE expressed his desire to connect with the general public, especially a younger audience, with regard to the subject of dredging and to present the Corps’ dredging work in a positive light. Sheryl Carrubba at the Corps’ Portland District had put together a “notebook” of dredging information geared for kids and Joe Wilson wondered if Sheryl’s information couldn’t be translated into a Web site. Joe connected with Dena Dickerson, a research biologist at the Engineer Research and Development Center in Vicksburg, MS. Dena’s



involvement was natural because of her background as an educator and her work in the dredging arena. Dickerson developed the site with assistance from Ginny Dickerson,

the ERDC Environmental Laboratory’s Web Site Manager and Craig Theriot, Web technical support.

As originally envisioned, the Navigation Education Web site

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## Report Documentation Page

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was designed with a K-12 audience in mind. It was expected that educators would use the site along with Corps personnel going out to classrooms to give presentations. The site provides brief, easy-to-understand summaries of some of the complicated navigation technology that the Corps deals with on a day-to-day basis. A large portion of the site is devoted to “demonstrations” that break down complicated scientific principles into simple attention-grabbing lessons that can be used in a classroom or at home. As Dickerson puts it, “we are trying to show that what goes on in the classroom can be interesting and has applications in the students’ daily lives.” The demonstrations have turned out to be probably the most time-consuming portion of the Web site to create. Each demonstration needs to be tested and retested for accuracy and safety.

As the site received more and more use (3.5 million visits the first year), a surprising discovery was that a sizeable number of visitors to the site are connected to the news media, domestic as well as international. Media folks use the site for concept definition and like the Education Center because it doesn’t contain the jargon that more technical Web sites do. There are also a surprising number of visitors from the legal realm and higher-level academia. Essentially the site provides

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-----Original Message-----
From: Gloria *****[mailto:*****]
Sent: Wednesday, November 19, 2003 11:49 PM
To: Dickerson, Dena D ERDC-EL-MS
Subject: Long time not written

Hi. This is Gloria. I'm not sure if you can remember me..
I think it was last year when I had some chemistry questions to ask
you and then after that every time I needed help I asked you...
I was just writing to say hi and thank you for all your help...
It's really amazing how I can meet someone on the net and get all the
help I need ..Thank you for all your help they were really helpful ...
I hope you have a wonderful holiday and a great Christmas ..
It's bit early but school finishes in a week and a half so ...
This is the only time I get to say that ..
again thank you for everything...

Love always,
Gloria

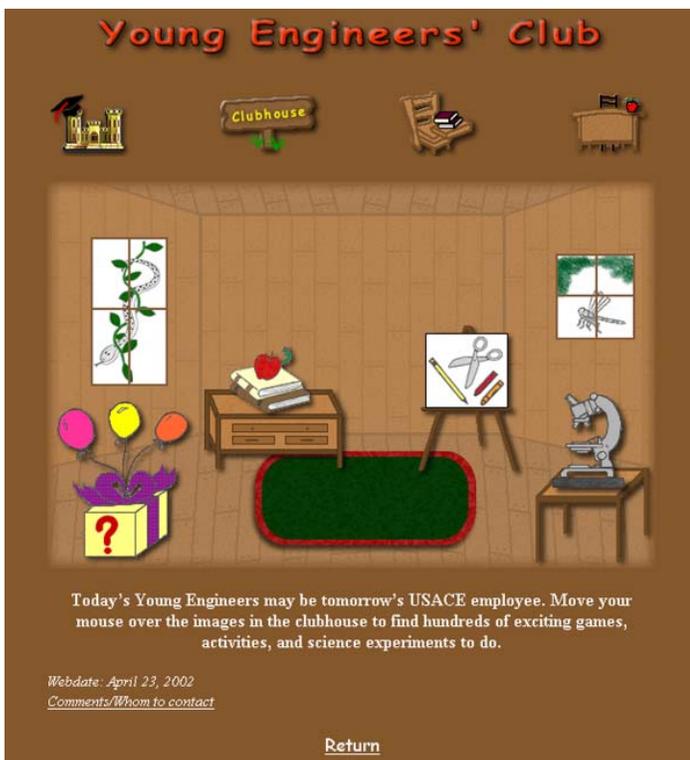
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these users with an easy-to-use avenue for gathering information.

One of the primary purposes of the Education Site has always been to give the Corps’ future employees and customers a positive feeling about the water resources (specifically, navigation) work that the Corps does and to encourage them to join the Corps’ ranks. Based upon the comments that Dickerson receives on a regular basis, she feels that that goal is being accomplished.

One of the biggest rewards for Dickerson in working with the Education Center is the contact she makes with individuals via email. At certain times of the year, Dickerson will receive as many as 50 emails per day. These daily emails are not only from K-12 educators and students but many requests are from college and graduate students, textbook companies, and other information requests from the general public. Quite a few are international and must be translated before being answered. In each case, Dickerson must first of all determine if she can respond to the email herself or refer it to another expert for handling. She notes particularly heavy traffic at Science Fair time across the country. Above is a sample of the type of email message that is particularly gratifying to Dickerson. To use her words, “Most of these (messages) really make my day. I usually have no idea how old they (the senders) are or where they live.”

Future plans for the Education Center are to continue to update the information that is already out there as well as adding links to other sites, a constant task. Dickerson would also like to give the site a “facelift” including a new front page. She also hopes to expand the area that contains lesson plans and games. For additional information, contact Dickerson at 601-634-3772 ([Dena.D.Dickerson@erdc.usace.army.mil](mailto:Dena.D.Dickerson@erdc.usace.army.mil)).



# U NEED UDMEED!!

(Upland Dredged Material Environmental Effects Database)

by Elly Best and Janean Shirley

As more restrictions are placed on the use of open-water disposal and management of dredged material, greater emphasis and use will be made of upland disposal sites. These sites must be managed in a way that minimizes risks to human health and the environment. Confined dredged material disposal must be a sustainable management practice. The risk associated with disposal of contaminated sediments in upland areas is a function of the likelihood that an organism would be exposed to contaminants within the sediment and the likelihood that those contaminants can cause adverse effects in the exposed organisms.

The Upland Dredged Material Environmental Effects Database (UDMEED; <http://www.wes.army.mil/el/udmeed/>) was developed to reduce the level of uncertainty associated with upland evaluations concerning:

- Interpreting soil toxicity tests.
- Trophic transfer potential for contaminants in dredged material.
- Effects caused by complex mixtures of contaminants in dredged material.

UDMEED is a compilation of data, taken from the literature, on measurements of biological effects and/or tissue contaminant concentrations in the same organism either

in contact with, or commonly associated with, dredged material in an upland situation. Databases are already set up worldwide that provide some of the information needed to predict residue levels and responses in populations of aquatic organisms, including two databases developed and maintained by ERDC: The Biota Sediment Accumulation Factor and Lipid Database (<http://www.wes.army.mil/el/bsaf/bsaf.html>) and the Environmental Residue Effects Database (<http://www.wes.army.mil/el/ered/index.html>). There is, however, a need to have a database that can serve as a solid and valuable source of information to assess risks from

## Upland Dredged Material Environmental Effects Database (UDMEED)

U.S. Army Corps of Engineers | Engineer Research and Development Center | Environmental Laboratory

The U.S. Army Corps of Engineers Upland Dredged Material Environmental Effects Database (UDMEED) is a compilation of data, taken from the literature, where biological effects and/or tissue contaminant concentrations were measured in the same organism either in contact with, or commonly associated with, dredged material deposited in an upland situation.

- ▶ UDMEED Main Search Page
- ▶ Introduction
- ▶ Bibliography
- ▶ Data Coverage
- ▶ Application for Management of Dredged Material in Upland Sites
- ▶ The Nature of Toxicological Effects
- ▶ Interpreting Bioaccumulation Data
- ▶ Acknowledgements

### Technical POCs:

Dr. Elly P.H. Best

Charles H. Lutz

### Support

Set Preferences



Environmental Laboratory



### Dredging Operations Technical Support (DOTS) Program

Database developed and maintained by ERDC to serve as a solid and valuable source of information to assess risks from contaminants at upland disposal sites

Two additional databases developed and maintained by ERDC to provide some of the information needed to predict residue levels and responses in populations of aquatic organisms

contaminants at upland disposal sites. UDMEED fills that need. UDMEED will improve the decision-making process by providing the basis for making quantitative assessments regarding the likelihood of adverse effects.

UDMEED contains ecotoxicological and reference data relevant to assessing the potential for impacts of concern following disposal of contaminated sediment in upland areas, including both terrestrial and wetland areas, and exposure via consumption of food organisms. The effects data have been translated into ecotoxicological endpoints, such as “No Observed Adverse Ecological Effect Level (NOAEL),” “Lethal Concentration that kills 50 percent of the population (LC50),” etc., where possible. The bioaccumulation data can be viewed (1 value) or visualized in graphs (>1 value). These data can be used in exploratory, screening-level evaluations or in more definitive assessments as described in the Upland Testing Manual (U.S. Army Corps of Engineers (USACE) 2003). These

data can also be used in screening-level, and more focused, ecological risk assessments, following the U.S. Environmental Protection Agency’s (USEPA’s) “Ecological Risk Assessment Guidance for Superfund (ERAGS): Process for Designing and Conducting Ecological Risk Assessments” (USEPA 1997), “Guidelines for Ecological Risk Assessment” (USEPA 1998), as well as in the U.S. Department of Defense’s “Tri-Service Procedural Guidelines for Ecological Risk Assessments” (Wentsel et al. 1996).

In order to make UDMEED beneficial to users, information was gathered on the types of data that the Districts need to manage dredged material for beneficial uses while adhering to regulations. The first step in developing UDMEED was to interview the District stakeholders. Interviews were used to assess user needs, regulatory guidance documents were reviewed, and analogous databases were examined. A data needs and regulations survey was conducted along with telephone interviews of

Corps District employees. A report describing the results of the interviews can be viewed in UDMEED. The existing database was tested by a limited user group in the United States (representatives of 5 Districts) and The Netherlands. Based on the comments of those users, the original database was modified and a graphical display was added.

An extensive literature search of articles published over the period 1995-2000 was performed. The approach chosen for the literature search was developed collaboratively by the project team.

Searches focused on habitats, typical for dredged material deposited in an upland situation, several broad taxonomic categories, and various contaminants (e.g., bioaccumulation and plants and metals; or toxicity and birds and PCB).

Habitats distinguished are:

- Terrestrial, natural soil.
- Terrestrial, upland dredged material.
- Wetland, natural sediments.
- Wetland dredged material.

The taxa searched were plants, insects, amphibians (frogs and

salamanders), reptiles (snakes, lizard yielded no hits), birds, and mammals (emphasis on non-domesticated animals).

The selected articles were augmented with relevant technical reports of interest published up to 2001. From all relevant literature, 80 papers were considered as very relevant, and 50 of these 80 were considered as top priority. As a result of these literature selections and prioritization, the database currently contains exposure-residue-effects data deemed relevant from the literature selections covering the period 1995-2000. Currently UDMEED contains data from 77 studies published between 1985 and 2000. From these studies, 444 distinct observations have been included online. UDMEED includes data on 20 analytes, 21 species, 7 effects classes, and 12 endpoints.

UDMEED was developed with support from Headquarters, U.S. Army Corps of Engineers, through the Dredging Operations Technical Support (DOTS) Program, Mr. Joseph R. Wilson (CECW-OD), Technical Monitor. The database

was constructed via a contract that included as participants the U.S. Army Engineer Research and Development Center (ERDC), Environmental Laboratory; Battelle Ocean Sciences Laboratory, Duxbury, MA; and Battelle Marine Science Laboratories, Sequim, WA. Data were compiled by the Battelle Marine Science Laboratories; the query software was written by the Battelle Ocean Sciences Laboratory. The database is maintained and administered by ERDC's Environmental Laboratory.

UDMEED in its current form contains exposure, residue, and effects information on several environmental contaminants of potential concern. Its creators are committed to keeping the database current by updating its contents as new information becomes available. Users are encouraged to share additional sources of appropriate data; UDMEED contains a mechanism for submitting such suggestions.

## References

- U.S. Army Corps of Engineers. (2003). "Upland testing manual," draft, U.S. Army Engineer Research and Development Center, Vicksburg, MS.
- U.S. Environmental Protection Agency. (1997). "Ecological risk assessment guidance for Superfund (ERAGS): Process for designing and conducting ecological risk assessments."
- U.S. Environmental Protection Agency. (1998). "Guidelines for ecological risk assessments."
- Wentzel, R. S. (1996). "Tri-service procedural guidelines for ecological risk assessments," U.S. Army Edgewood Research, Development and Engineering Center (ERDEC), Aberdeen Proving Ground, MD, ADA297968.

For additional information, contact Elly Best (601-634-4246, [Elly.P.Best@erdc.usace.army.mil](mailto:Elly.P.Best@erdc.usace.army.mil)).

# Dredged Material Assessment and Management Training

By Billie Skinner

During the past several years, the Dredged Material Assessment and Management Training has been held alternately in different regions of the United States. Beginning in FY04, this training will be conducted at the request of Division and Districts for training in their region. Each Division and District will be responsible for the invitees to their training. The Environmental Effects of Dredging Programs Office will remain responsible for delivering the course content desired by each Division or District as well as handling all logistics for the meeting. Inquiries regarding the conduct of a DMAM training in your area should be made to Dr. Robert Engler, tel.: 601-634-3624; email: [robert.m.engler@erdc.usace.army.mil](mailto:robert.m.engler@erdc.usace.army.mil); or Billie Skinner, tel.: 601-634-3701; e-mail: [billie.h.skinner@erdc.usace.army.mil](mailto:billie.h.skinner@erdc.usace.army.mil).



# CCS Plans Workshop . . . Comparative Risk Assessment and Multi-Criteria Decision Analysis: A Framework for Managing Contaminated Sediments

The Center for Contaminated Sediments (CCS) at the U.S. Army Engineer Research and Development Center has begun preparations for a spring workshop. The workshop, which is being sponsored by the Society for Risk Analysis, will develop a decision analytic framework specifically tailored to deal with planning issues in contaminated sediment management projects. The workshop will be co-chaired by Dr. Todd S. Bridges, CCS Director and Dr. Igor Linkov of ICF Consulting. Current organizational sponsors for the workshop include the CCS, ICF Consulting, the Cooperative Institute for Coastal and Estuarine Environmental Technology, NOAA, USEPA, the U.S. Navy, and the Sediment Management Work Group. Discussions with other potential sponsoring organizations are ongoing.

Selecting appropriate management actions for contaminated sites involves multiple criteria (cost,

benefit, environmental impact, safety, and risk). Some of these criteria cannot be easily condensed into a monetary value and this complicates making comparisons and trade-offs. Considerable research in the area of multi-criteria decision analysis (MCDA) and comparative risk assessment (CRA) has produced practical methods for applying scientific decision theoretical approaches to multi-criteria problems. This workshop will review available literature on the applications of CRA and MCDA in environmental projects and develop the decision analytic framework mentioned above.

The workshop has three primary purposes:

- To introduce the latest decision analytical methods to a broad audience of analysts and decision-makers who may deal with risk issues related to the management of contaminated sediments.
- To review methods for the development of optimal sedi-

ment management strategies in any given situation from the range of available options.

- To develop a strategy for advancing the development of comparative risk assessment and decision analysis as a continuum of tools for use in project-level decision making.

The organizational plan calls for four half-day sessions on pertinent themes, with presentations, geographically and culturally diverse respondent panels, and adequate opportunity for small group dialogue and working sessions. One day will be devoted to working group discussions. Logistical details regarding the workshop will be posted at [www.risktrace.com/sediments](http://www.risktrace.com/sediments) as they become available. For additional information, contact Dr. Todd Bridges, 601-634-3626, [Todd.S.Bridges@erdc.usace.army.mil](mailto:Todd.S.Bridges@erdc.usace.army.mil).



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## Center for Contaminated Sediments Will Co-Sponsor Upcoming Sediment Conference

Plans are being made for a fall conference in St. Louis titled "Addressing Uncertainty and Managing Risk at Contaminated Sediment Sites." This three-day conference is being cooperatively organized by the CCS, the U.S. Environmental Protection Agency, the South/Southwest Hazardous Substances Research Center, the U.S. Navy, the National Oceanic and Atmospheric Administration, and the Sediment Management Work Group.

Panels of recognized experts and practitioners on various aspects of contaminated sediments will discuss the use of risk-based approaches to manage contami-

nated sediment; the usability of various decision-making approaches will be emphasized during facilitated discussions.

The conference is open to the public and is specifically aimed at those interested in the management of contaminated sediments. Conference dates are October 26 - 28, 2004 and the conference will be held at the Marriott St. Louis Downtown, One Broadway, St. Louis, MO. The cost is \$125/person for government personnel; \$175/person for all others. The cost includes meeting materials, continental breakfasts, and refreshment breaks. A detailed agenda will be available at [www.smwg.org](http://www.smwg.org).

Please submit your **REGISTRATION FORM** electronically at [www.smwg.org](http://www.smwg.org) and forward your payment (via check only) at your earliest opportunity. Early registration will be available from 5-8 pm on October 25, 2004. Please contact the hotel directly for reservations at 1-800-228-9290 or 1 314 421-1776 and mention the Sediment Management Work Group conference to get the preferred rate of \$102/night (which is also the government rate). POC: Dr. Todd S. Bridges ([Todd.S.Bridges@erdc.usace.army.mil](mailto:Todd.S.Bridges@erdc.usace.army.mil)), meeting chair.

# Dredging Calendar



**January 11-15 – 83rd TRB Annual Meeting, Washington, DC, USA.**

**March 15-18 – CONEXPO/CON-AGG.** Construction Exposition and Concrete and Aggregate Producers Convention, Las Vegas, Nevada. Contact the National Stone, Sand and Gravel Association (NSSGA), 2101 Wilson Blvd., Suite 100, Arlington, VA 22201; phone: 800 -342-1415; 703-525-8788; fax: 703-525-7782; [info@nssga.org](mailto:info@nssga.org) or visit <http://www.nssga.org>.

**May 23-26 – Ports 2004.** Port Development in the Changing World, Westin Galleria & Westin Oakes, Houston, Texas. Sponsored by American Society of Civil Engineers and PIANC, and co-hosted by the Port of Houston Authority. Contact ASCE Conferences Department, 1801 Alexander Bell Drive, Reston, VA 20191; phone 703-295-6030; fax: 703-295-6144; [conf@asce.org](mailto:conf@asce.org) or visit [www.asce.org/conferences/ports2004](http://www.asce.org/conferences/ports2004).

**July—WEDA XXIV - Texas A&M 36th Dredging Seminar in Orlando** <http://www.westerndredging.org/>

**September 27- October 1 – WODCON XVII,** Dredging in a Sensitive Environment, World Dredging Congress XVII at CCH – Congress Centrum Hamburg, Germany. In conjunction with SMM 2004, the Shipbuilding, Machinery and Marine Technology International trade fair. Contact the Central Dredging Association, PO Box 488, 2600 AL Delft, The Netherlands.; phone +31 15 278 3145; fax: +31 15 278 7104; [ceda@dredging.org](mailto:ceda@dredging.org). More information can be found at <http://www.woda.org/WODCONXVII/index.html>

**September 27-October 1 – Hamburg, Germany.** Invitation to Post Congress Tour (pdf - 232 kb). POC: Anna Caiti, P.O. Box 488 2600 AL Delft, The Netherlands, [ceda@dredging.org](mailto:ceda@dredging.org). More information can be found at [www.woda.org](http://www.woda.org) click on “congresses.”

## Dredging Publications — 2003

### Technical Reports

ERDC/EL TR-03-7 Beneficial Use of Dredged Bedrock in the New York/New Jersey Harbor, Bansleben, J., Cox, J. C., and Will, R. J.

ERDC/EL TR-03-1 Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities — Testing Manual, U.S. Army Corps of Engineers

### DOER Technical Notes

ERDC TN DOER-C29 Review of phytoreclamation and management approaches for dredged material contaminated with lead (Jan 2003)

ERDC TN DOER-C30 A new transgenic cell line for detection of invertebrate endocrine disrupters: Laboratory protocol for its use (Feb 2003)

ERDC TN DOER-C31 Effects of confined disposal facility and vadose zone characteristics on leachate quality (Feb 2003)

ERDC TN DOER-C32 Validation of pathway analysis of metals from aged dredged material using plants and worms (Jan 2003)

ERDC TN DOER-C33 Dredged material composting at Milwaukee and Green Bay, WI, confined disposal facilities (Jan 2003)

### EEDP Technical Notes

ERDC/TN EEDP-01-49 Interim Guidance on Assessing the Risk Posed by Pathogens Associated with Dredged Material (Apr 2003)

ERDC/TN EEDP-01-50 Development of a New Bioaccumulation Testing Approach: The Use of DDE as a Challenge Chemical to Predict Contaminant Bioaccumulation (May 2003)

ERDC/TN EEDP-02-31 Development of Sediment Extracts for Rapid Assessment of Organic Contaminant Bioavailability (Apr 2003)

### Palermo Retires

On November 3, Dr. Mike Palermo retired after 36 years of service with the Federal government. Dr. Palermo is a widely known and respected leader in the Corps of Engineers, and recognized as a national and international expert in the area of contaminated sediments. Since 1998, Dr. Palermo has served as Director, Center for Contaminated Sediments (CCS), in the Environmental Laboratory at the U.S. Army Engineer Research and Development Center. Under Dr. Palermo's direction, the CCS has become recognized by the Corps, other federal agencies, and academia as one of the foremost centers of expertise in the research and development of management guidance for contaminated sediments. The *Dredging Research* staff extends congratulations to Dr. Palermo on his many career accomplishments and our best wishes as he begins this new phase of his life. Keep in touch, Mike!



Dr. Palermo with Environmental Laboratory Acting Director, Dr. Beth Fleming and Rosemary Palermo



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### Articles for *Dredging Research* requested:

*Dredging Research* is an information exchange bulletin for publication of ERDC-generated dredging research results. Included are articles about applied research projects. The bulletin serves all audiences and is accessible on the World Wide Web in addition to a paper circulation of 2,800.

Articles from non-ERDC authors are solicited for publication, especially if the work described is tied to the use of ERDC-generated research results. Research articles that complement ERDC research or cover wide field applications are also accepted for consideration. Manuscripts should use a nontechnical writing style and should include suggestions for visuals and an author point of contact. Point of contact is Janean Shirley at [Janean.C.Shirley@erdc.usace.army.mil](mailto:Janean.C.Shirley@erdc.usace.army.mil).

### *Dredging Research*

This bulletin is published in accordance with AR 25-30 as an information dissemination function of the Environmental Laboratory of the U.S. Army Engineer Research and Development Center. The publication is part of the technology transfer mission of the Dredging Operations Technical Support (DOTS) Program and includes information about various dredging research areas. Special emphasis will be placed on articles relating to application of research results or technology to specific project needs. The contents of this bulletin are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or the approval of the use of such commercial products. Contributions are solicited from all sources and will be considered for publication. Editor is Janean Shirley, [Janean.C.Shirley@erdc.usace.army.mil](mailto:Janean.C.Shirley@erdc.usace.army.mil). Mail correspondence to the Environmental Laboratory, ATTN: DOTS, Dredging Research, U.S. Army Engineer Research and Development Center, Waterways Experiment Station (CEERD-EM-D), 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, or call (601) 634-2349. Internet address: [www.wes.army.mil/el/dots/drieb.html](http://www.wes.army.mil/el/dots/drieb.html).

  
James R. Houston, PhD  
Director

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