

Overview of the Study Report

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ADOPTING A SYSTEMATIC RISK-BASED APPROACH

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I would like to begin with a statement: Ports and waterways are of strategic importance to the economic well-being of the United States. According to the Maritime Administration, ports handled approximately 3 billion metric tons of cargo in 1992; supported the employment of 15 million Americans, which is about 17 percent of our total population; and added nearly \$800 billion to the gross domestic product and another \$525 billion to personal income. Ports contributed another \$210 billion in taxes at all levels of government.

Contaminated sediments slow decision making and the implementation of dredging, which is needed to keep ports and waterways safe and efficient. Every year about 283 million yd³ (216 million m³) of material are dredged, of which about 5 to 10 percent are estimated to be contaminated. Beyond that, the management of contaminated sediments goes beyond port operations and can benefit other important things, such as recreational areas, fishery habitats, and the overall quality of life along our waterways and coastal areas.

Some time ago, I was at a congressional briefing on coastal engineering and heard some estimates batted around that the revenues generated in coastal areas from foreign and domestic tourism and other activities exceed the revenues generated from agriculture and energy. Clearly, the effective management of contaminated sediments is of strategic importance to the economic well-being of ports, waterways, and coastal areas.

I will provide you with an introduction to the 1997 National Research Council (NRC) report and try to focus on the findings relevant to the topics to be discussed in this symposium. I hope that you have had a chance to read the report, which assessed the best management practices and emerging technologies. Among the elements of the committee's task was the appraisal of interim control measures and methods of evaluating risks, costs, and benefits that can be used to help guide decision making. Overall, the report was intended to assess existing knowledge and identify the research needed to improve and develop technologies. Although the task was broad, it did not allow the committee to address all of the issues relating to contaminated sediments.

The committee met seven times over a three-year period, often with various liaisons from agencies such as the U.S. Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA). The committee reviewed relevant reports and was briefed by federal, regional, state, and local officials; port authorities; and public interest groups. Committee members visited the USACE's Waterways Experiment Station in Vicksburg, Mississippi, and the Port of Tacoma, Washington. They held two workshops on dredging and remediation technologies. They also compiled case histories of six projects. A major part of the study process was a review and assessment of interim and long-term controls and technologies on

the basis of maturity, applicability, limitations, costs, and research needs.

Although many people wish there were a “silver bullet,” there is no single technology, now or on the horizon, for treating large volumes of contaminated sediments effectively and economically. Given this lack of a simple solution, the committee determined that a systematic, risk-based approach incorporating improvements in current practice is essential for the cost-effective management of contaminated sediments.

The committee focused on evaluating management practices and technologies but also found it essential to address a number of tangentially related issues, such as regulations, source control, and site assessment, because problems in these areas can impede best management practices and technologies.

As Dr. Wulf noted, the regulatory framework for contaminated sediments management is extremely complex. At least seven federal agencies and six comprehensive Acts of Congress influence remediation or dredging opportunities for managing contaminated sediments in settings ranging from the open ocean to inland reaches of estuaries and wetlands. The overlapping jurisdictions of federal, state, and local agencies further complicate the situation. For example, states are authorized to establish water quality standards within their jurisdictions and can block sediment dredging and disposal that violate these standards.

The committee compiled six case histories of contaminated sediments projects. These projects were selected as representative of particular conditions, regulatory constraints, and classes of contaminants. The delay between the discovery of a problem and implementation of a solution can range from 3 to 15 years or even more. The problem is often due to the adversarial nature of relationships among stakeholders and the convoluted regulatory path.

As many of you know, contaminated sediments can best be managed if the problem is viewed as a system, composed of interrelated issues and tasks. The overall goal is to manage the system in a way that optimizes the results. In particular, a systems approach is advisable with respect to the selection and optimization of interim and long-term controls and technologies. The committee grouped its conclusions and recommendations into three topic areas: decision making, remediation technologies, and project implementation.

It is important that decision makers be aware of, and understand, applicable laws and regulations. To this I say, “Good luck.” I certainly do not know about, or understand, all of them. Outreach to stakeholders is critical. The early involvement of stakeholders is important for heading off disagreements and building

consensus. Systems engineering can enhance the cost-effectiveness of contaminated sediments management. Three tools can be applied to inform and improve decision making. Risk analysis and cost-benefit analysis are familiar concepts but are not widely applied to contaminated sediments management. Decision analysis is a newer concept for resolving problems with multiple variables. It is hoped that all of these issues will be discussed and debated during the course of the symposium.

With regard to remediation technologies, the committee found that high-volume, low-cost technologies are the first choice, if feasible, when remediation is necessary. Because treatment is expensive, reducing volume is also very important. Treatment is usually applied to just a small volume of highly contaminated sediments. In most cases, advanced treatment is too costly for low-level contamination. There are also problems with the cost data associated with available technology. The problems include a lack of standardized documentation and the lack of a common basis for defining all relevant benefits and costs. In addition, research and development (R&D) and demonstration projects are needed to improve existing remediation technologies and reduce risks associated with the development and use of innovative approaches for treating marine sediments.

With respect to project implementation, the committee found that upstream generators of contaminants often cannot be identified and held accountable, leaving ports with the burden of managing the problem. They found that states, which benefit economically from dredging and customarily engage in watershed management, might assume more responsibility for source control. They also found that new and improved techniques are needed to reduce the cost and improve the precision of site assessments. Although few data are available on the effectiveness of interim controls, the committee found a number of measures that appear to be practical and likely to reduce risk.

Also of significance is the fact that dredged material has been used for many beneficial purposes. Some contaminated sediments have been transformed successfully into wetlands, and research is under way on the safe use of contaminated sediments for landfill covers, manufactured topsoils, and other applications. However, the funding for this research is limited, and technical guidelines have yet to be developed.

Finally, as we search for the elusive silver bullet, there are many opportunities for incremental improvements in decision making, remediation technologies, and project implementation. We hope that this symposium can help move us ahead to the next steps.