Sediment Priority Action Committee
Great Lakes Water Quality Board
International Joint Commission

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Commission mixte internationale

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SEDIMENT MANAGEMENT FOR ECOSYSTEM RECOVERY

Background

Contaminated sediment is an ongoing source of contamination to lakes and rivers, and contributes to many forms of environmental degradation. From 1985-1989 over 15 million m^3 were dredged for more efficient navigation through rivers and harbors of the Great Lakes; 51% of this material had to be placed in confined disposal facilities due to high contaminant levels.

From an environmental cleanup point of view, there are currently few ecologically-based decision-making tools available for pinpointing the most effective contaminated sediment management strategies, and often decisions become overwhelmed by regulatory complexity. Sediment contaminants still represent a major factor limiting our ability to reach a healthy, sustainable environment and economy.

Management of Contaminated Sediment Considers Restoration of Beneficial Uses

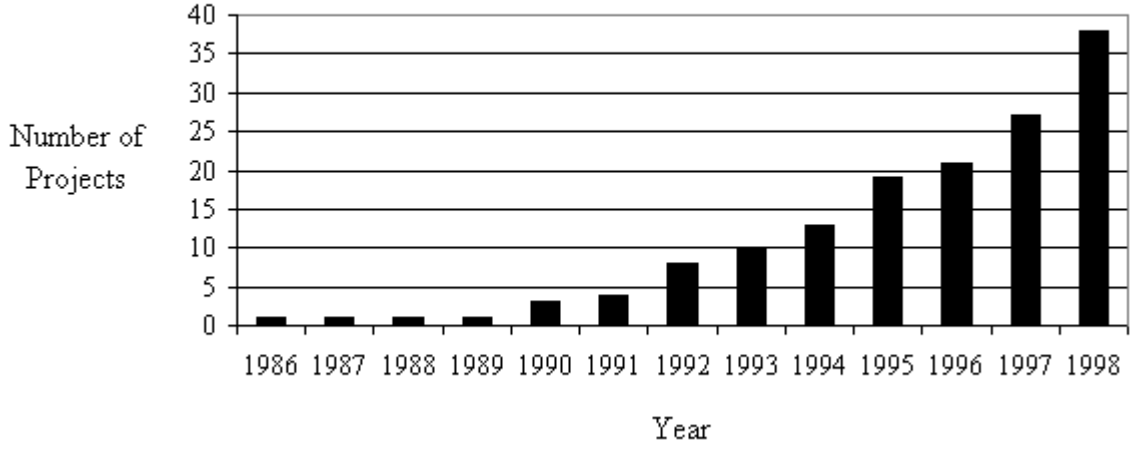
All 42 Areas of Concern in the Great Lakes basin have contaminants in sediment that exceed chemical guidelines, but their effects on the ecosystem are only partially quantified. However, there are clear linkages to restrictions on fish and wildlife consumption, fish tumors or other deformities, loss of fish and wildlife habitat, degraded natural communities, and other ecosystem effects identified in Annex 2 of the Great Lakes Water Quality Agreement.

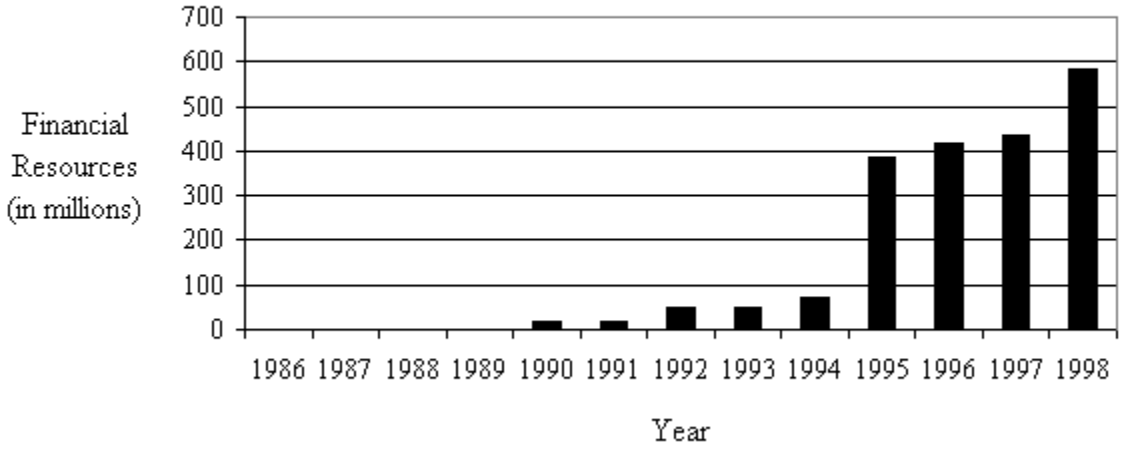
In most Areas of Concern, the sediment problem has not been quantitatively coupled to ecological impairments. Therefore, deciding on volumes of sediment to be cleaned up, why, and what ecological improve-ments can be expected over time has been challenging. It is important not only to know the existing degree of ecological harm associated with sediment contaminants, but also the circumstances under which those relationships and threats might change, making contaminants more bioavailable or detrimental under different environmental conditions. The ability to forecast the expected degree of recovery and the ecological improvements from sediment cleanup must be demonstrated.

A better understanding of the relationships between contaminated sediment and environmental quality would provide stronger justification for a particular sediment management strategy. It would help in making management decisions among the following options: source control and natural recovery; removal and containment; removal and treatment; *in situ* capping, and *in situ* treatment. If relationships between contaminated sediment and beneficial uses were better understood, more compelling cases could be made to fund sediment cleanup. Better public support for sediment management decisions would result, and more corporate involvement could be expected.

Greater Emphasis Must be Placed on Monitoring the Ecological Effectiveness of Sediment Cleanup

From 1986-1999, over $580 million have been allocated for 38 remediation projects in 19 Areas of Concern. In addition, the rate of increase has accelerated in recent years as shown in the two figures.





Unfortunately, of these projects, few have produced information on ecological effectiveness gained by monitoring the recovery of environmental quality after a cleanup has taken place. Measuring ecological effectiveness of sediment cleanup is also important where a new environmental technology has been tested, in order to improve innovative approaches. Benefits of effective sediment management have been demonstrated in Collingwood Harbour, Waukegan Harbor, and Black River, where monitoring continued once sediment remediation was completed.

Collingwood Harbour

In Collingwood Harbour, Ontario, approximately 8,000 m^3 of contaminated sediment were removed using an innovative dredging technology. This was the first true application of a biologically-based decision that defined the extent of sediment cleanup. Toxic levels of metals have now been eliminated. Additional post-project monitoring is underway.

An important lesson learned was that communicating clearly the environmental consequences of sediment contaminants to the local Public Advisory Committee and community was necessary. This helped reach multi-stakeholder consensus on the need for sediment remediation to achieve PAC goals. Cleaning up sediment in a partnership helped industry from having to "go it alone" in the future. The broad-based partnership benefitted all funding partners. The cleanup contributed to removing the stigma of an Area of

Concern for the community, and is believed to have positively affected property values.

Waukegan Harbor

In Waukegan Harbor, Illinois, a 1989 U.S. EPA Superfund Consent Decree resulted in the removal and treatment or disposal of approximately 453,600 kg (1 million pounds) of PCBs in 38,254 m^3 of sediment and soil at a cost of more than $49 million (U.S.) for the entire site remediation. By monitoring the effectiveness of sediment removal, Illinois EPA was able to measure a significant decline in PCB levels in fish as a direct result of the cleanup. As a consequence, the harbor fish advisory has been removed. Property values have increased due to the cleanup.

The Remedial Action Plan (RAP) process helped Illinois EPA look beyond traditional water programs to focus on restoring beneficial uses. Team building within the Waukegan Harbor Citizens Advisory Group helped secure funds for remediation costs from the U.S. Army Corps of Engineers when Illinois EPA had none. Good facilitation helped elicit private sector contributions also. Communication tools such as kiosks, a home page, and a video were effective in delivering the message that use restoration requires partnerships.

Black River

A 1985 Consent Decree resulted in the removal of approximately 38,000 m^3 of PAH contaminated sediment from the Black River, Ohio at a cost of $1.5 million (U.S.). As a result of this sediment remediation project, PAH levels in sediment have declined substantially and cancerous liver tumors have now been eliminated in the resident brown bullhead population.

Sediment Management is Incremental and Integrated

In cases where sediment remediation was undertaken as a result of regulatory action, the projects were designed to remove the worst masses of contaminants to reduce environmental risks. These projects were very effective in meeting the regulatory requirements, and are consistent with the step-wise incremental approach to management of contaminated sediment called for by the Great Lakes Water Quality Board. After remediation of the worst sites, an integrated evaluation of all sources, including sediment, must be undertaken to determine whether or not further remediation is required and to ensure that remediation is sustainable.

Much more effort should be placed on forecasting and measuring the extent and pace of ecological recovery. This will help in future efforts to make decisions on the most appropriate sediment management strategy, thereby advancing restoration of beneficial uses in Areas of Concern.

The International Joint Commission (IJC)

The IJC is a binational organization established under the 1909 Boundary Waters Treaty. The Treaty recognizes that each country may be affected by the others actions in shared lake and river systems along the boundary. The IJC was created to assist governments in preventing and resolving disputes in use of these resources. Under the Great Lakes Water Quality Agreement, the IJC was assigned responsibilities to assist the governments in meeting their commitments under the Agreement and to assess progress by the govern-ments in restoring and maintaining the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem.

The Sediment Priority Action Committee (SedPAC)

In recognition of the scope of the contaminated sediment problem and the limited progress in addressing it, the IJC identified contaminated sediment as a program priority and assigned this priority to the Great Lakes Water Quality Board (WQB). SedPAC was formed to review the contaminated sediment problem and provide

advice to the Board, and in turn the IJC, on means to overcome obstacles to sediment remediation.

For More Information

Additional information, contact persons, and SedPAC publications can be obtained from the IJC web page: www.ijc.org or by calling: (519) 257-6702 or faxing: 257-6740