Mapping and monitoring contaminated-sediment geometry and stability.

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Environment Canada's National Water Research Institute (NWRI) conducts research on freshwater contaminated sediments, much of which is focused on designated areas of concern in the Great Lakes and their connecting channels. This paper reviews new acoustic and video equipment and procedures developed to map the geometry and stability of the sediments, and describes their applications. A RoxAnn acoustic seabed-classification system is used for mapping bottom-sediment types and locating the deposits of fine-grained sediments with which contaminants are associated. The system uses the acoustic properties of sediments to distinguish textural types ranging from mud to boulders, and displays the data as they are collected. The sediment thickness is measured with a weighted video-acoustic tripod which is lowered into the sediments to refusal, and which recorded penetration with a video camera or an echosounder transducer. The stability of the contaminated sediments was monitored with a bottom-mounted, high-precision echo sounder-digitizer, which logs changes in the position of the sediment-water interface produced by erosion or deposition. The same procedure can be used in capping or dredging projects to track bottom changes as they occur, or they can be measured by pre- and post-project mapping of bathymetry and morphology with sweep-sonar or side-scan sonar equipment. The new equipment and procedures have been successfully applied to a number of areas of concern in the Great Lakes basin. They provide a faster and more detailed characterization of sediment properties and geometry than was previously available, and have been particularly effective in optimizing sampling surveys and monitoring remediation projects.

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