Sediment dredging has fallen short of achieving cleanup goals at many contaminated sites

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At many projects to dredge contaminated sediments from U.S. rivers and other bodies of water, it has not been demonstrated that dredging has reduced the long-term risks the sediments pose to people and wildlife, says a new report from the National Research Council. Many dredging projects have had difficulty meeting short-term goals for reducing pollution levels.

Whether dredging alone can reduce long-term risks was difficult to determine at many sites because of inadequate monitoring data and other limitations, the report says. It calls on the U.S. Environmental Protection Agency to improve and intensify its monitoring at dredging and other projects intended to remediate contaminated sediments at the nation's Superfund sites.

Dredging's ability to achieve cleanup goals depends on a site's characteristics, the report also concludes. If a particular site has one or more unfavorable conditions -- the presence of debris such as boulders or cables, for example, or bedrock lying beneath the contaminated sediment -- then dredging alone is unlikely to be sufficient. The presence or absence of such conditions should be a major consideration in deciding whether to dredge at a site, said the committee that wrote the report.

Contaminated sediments can be found at the bottoms of many U.S.

rivers and other water bodies near former mining, agricultural, or industrial sites. Tainted with polychlorinated biphenyls (PCBs), heavy metals, or other toxic substances, the sediments can pose risks to people, fish, and aquatic animals. Many of these sites are slated for cleanup by EPA under federal Superfund legislation, and a minimum of 14 of them are sediment "megasites" -- sites where the cost of remediating sediments is expected to reach at least $50 million, or has already done so. Decisions about whether to dredge at these sites have proved controversial, so Congress asked the Research Council to evaluate the method's effectiveness. To inform its conclusions, the committee examined 26 dredging projects, five of them at megasites, and evaluated whether they had attained their cleanup and risk-reduction goals.

Dredging is effective at removing contaminated sediment mass permanently from the environment, the report says. But removing mass may not be enough to achieve desired cleanup levels or long-term goals for reducing risks, because dredging inevitably leaves residual contamination behind. Dredging alone achieved expected cleanup results at only a few of the sites the committee analyzed. At many others, capping -- placing a layer of uncontaminated material over the tainted sediments -- was also necessary to contain the remaining contamination at acceptable levels. Assessments of the sites also revealed that the dredging process releases contaminants into the water, which in the short term can have adverse effects on fish and other aquatic animals and could potentially raise health risks in people who consume them.

Dredging remains one of the few approaches available for cleaning up contaminated sediments, the report says, and EPA should continue to consider its use among other methods. In locations where buried contaminated sediments could be dislodged by storms, for example, dredging the sediments to prevent them from being transported may reduce risks. If dredging is used, planners need to recognize that residual contamination and releases of chemicals into the water will invariably

occur; they should estimate the effects of these processes in advance, and employ best practices to minimize them, the committee said. Using a combination of methods should also be considered, particularly if a site has any characteristics unfavorable to dredging.

The typical Superfund approach, in which EPA conducts an investigation and a feasibility study that establishes a single path to remediation, is not the best way to choose remedies for these sites, the report says. Given the long time frames and many unknowns involved in cleaning up megasites, adaptive management -- which uses monitoring data to review progress and adjust plans when needed -- should be used to select and implement cleanup methods. In addition, dredging and other remediation projects should be designed to meet long-term goals for reducing risks to people and wildlife, instead of objectives not directly related to risk, such as removing a specified amount of sediment.

The report emphasizes that without adequate monitoring before and after dredging, it is impossible to evaluate the degree to which cleanup objectives have been reached. EPA should invest in better and more consistent measurement tools to monitor conditions in the field reliably and efficiently. Monitoring data should also be made available to the public in electronic form, so that evaluations of remedies' effectiveness can be independently verified.

In addition, to help ensure that megasites with contaminated sediments are cleaned up as effectively as possible, EPA should centralize resources, responsibility, and authority for these sites at the national level, the report recommends. Such a shift would help the agency make sure that monitoring is adequate and that adaptive management and best practices are followed.

Source: The National Academies