SERVICE AREA

Contaminated Sediment Assessment, Management, Remediation, and Research

Industries, waterfront developers, resource managers, and site owners face many challenges as they strive to remediate or control environmental impacts at contaminated sites. The process of addressing legacy pollution can be complex, exacerbated by large volumes of sediments or soils, multiple contaminants and sources, and the length of time required for assessment and implementation. Furthermore, costs for remediating and restoring rivers, lakes, estuaries, floodplains, and other sites can sometimes be staggering—up to hundreds of millions of dollars.

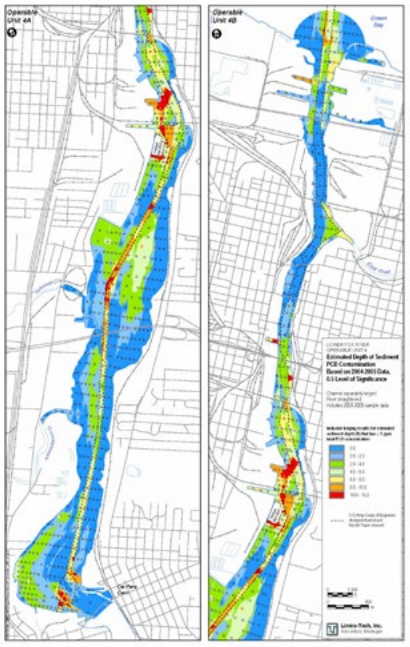
Clients need cost-effective solutions supported by sound science, as well as liability protection. In many cases, long-term pumping and treating or widespread dredging of contaminated sediments to "remove" pollutants may be ineffective. Other less expensive alternatives like bioremediation, natural attenuation, or capping can often achieve similar or better results.

Costs for remediating and restoring rivers, lakes, estuaries, floodplains, and other land sites can be staggering.

Since 1975, LimnoTech has helped clients select, design, and implement cost-effective strategies to achieve their restoration goals. During this time, we've developed new scientific modeling and analytical tools to analyze problems and explore innovative restoration approaches.

This experience includes work conducted on U.S. Superfund sites, conducting remedial investigations/feasibility studies (RI/FS), human health and ecological risk assessments, providing value engineering, assessing contribution, and designing, constructing, and operating remediation systems. In addition to the experience at Superfund sites, we've provided similar services at over 100 other contaminated sites, including contaminated sediment sites, hazardous waste facilities, landfills, state priority sites, and underground storage tank sites. More specific tasks performed during these projects include:

- Conducted innovative modeling and risk assessment studies to identify alternative in-place containment and treatment alternatives for contaminated harbor sediments.
- Conducted numerous sediment surveys for Great Lakes harbors and confined disposal facilities, documenting the extent of toxics including PCBs, heavy metals, and pesticides.
- Surveyed confined disposal facilities during dredging operations to quantify dredging and disposal impacts on receiving waters.
- At Superfund sites, evaluated remedial alternatives such as diversion, capping, removal and natural recovery.
- Developed lake management plans, including management practices such as dredging, sediment covers, lake drawdown and harvesting of macrophytes.
- Developed and implemented sampling plans to characterize sediments for dredge disposal.



Innovative modeling and risk assessment studies help identify treatment alternatives for contaminated sediments.

The following project descriptions offer a brief sampling of LimnoTech's experience in helping our clients resolve the challenges of contaminated sediment management and remediation.

Using a suite of models, LimnoTech developed remedy footprints and sediment volume estimates.

Remedial Investigation and Feasibility Study of the Buffalo River, NY. LimnoTech served as technical consultant in support of remedial investigation and feasibility study activities done as part of the Buffalo River Great Lakes Legacy Act Project Agreement. LimnoTech developed and conveyed comprehensive understanding of river hydrology and hydrodynamics, sediment transport, and analysis of the depth and distribution of organic and heavy metal contamination in Buffalo River sediments. The work was conducted under a highly compressed time frame; field investigations, numerical model development, remedial investigation reporting, and feasibility study activities were largely completed in a six-month period. LimnoTech also played a critical role in developing planning-level remedy footprints and contaminated sediment volume estimates, using a suite of geostatistical and geographic information systems (GIS).

Agricultural Management Watershed Model. The Maumee River Basin is the largest tributary source of suspended sediment to Lake Erie. To help reduce erosion from this agricultural watershed, LimnoTech is developing and applying the Annualized Agricultural Non-Point Source (AnnAGNPS) watershed model to the Blanchard River Watershed to simulate erosion and sediment delivery pathway loads; simulate fate and transport of nutrients; and project potential benefits of conservation treatment strategies and best management practices. The model will be used to evaluate agricultural management practices, and performance of land treatment (site-specific conservation practices) on reducing erosion and sediment and nutrient delivery.

Hydrodynamic and Sediment Characterization, Tittabawassee and Saginaw River, MI. LimnoTech was contracted to provide a series of river, floodplain, and sediment characterizations and analytical investigations. We first collected and summarized previous studies, helped the client develop a preliminary conceptual model of the site, and identified additional information needs. LimnoTech then developed hydraulic models of the river and floodplain, performing field studies to characterize the distribution of in-river sediments by type and thickness. LimnoTech then developed detailed hydrodynamic models. Models included broad river and floodplain models of the Tittabawassee and Saginaw River. The data and investigations being performed under this effort are being used to characterize risks posed by contaminants, and to evaluate the efficacy of proposed remedies used to address these risks.

Integrated Hydrodynamic–Sediment Transport–Water Quality Model for the Lower Maumee River and Western Basin of Lake Erie. LimnoTech is developing a linked hydrodynamic–sediment transport–advanced eutrophication model to inform restoration and management decisions in the lower Maumee River and western basin of Lake Erie. Application of the modeling framework will include evaluation of how localized sediment accretion/erosion behavior changes relative to alternatives for dredged material placement, island building, etc. This model will also be used to quantify the relationship between nutrient loads, zebra mussel density, and physical factors as stressors. The model will also support decisions on clean sediment management and watershed nonpoint source control. LimnoTech has contributed to the development of human and ecological risk assessments relative to contaminated sediments in the Ottawa River. We have also conducted an analysis of bacteria sources and fate and transport in the system.

LimnoTech helped quantify the relationship between nutrient loads, zebra mussel density, and physical factors.