

Geographic Information Systems for Environmental Management



LimnoTech uses geographic information systems (GIS) to help our clients find answers to complex questions about their environmental problems. We use GIS to construct maps and to answer the basic question, “Where?” We also use GIS’s data management and analytical tools to dig far deeper, helping to answer, “What, when, how, and why?”

GIS provides fundamental tools across the spectrum of LimnoTech projects. We use it to help our clients manage stormwater, control combined sewer overflows, and protect water quality. If government agencies or corporations are attempting to strategically place green infrastructure or redevelop urban waterfronts, LimnoTech can use GIS to ensure that their investments are effective and sustainable. Remediation of sediments or brownfields requires a clear understanding of the distribution of contaminants across a site. LimnoTech uses GIS to accurately estimate where contaminants are, saving time and money for large, expensive remediation projects. GIS is absolutely essential as LimnoTech helps our clients develop watershed protection strategies and plan the restoration of aquatic and riparian habitats.

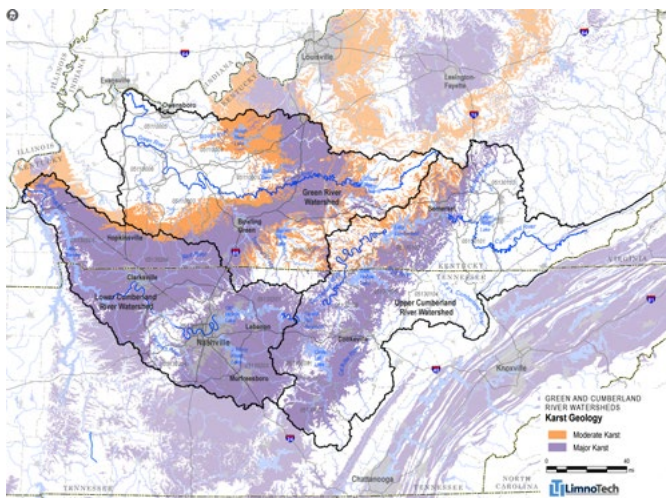
LimnoTech has long used GIS to organize and burrow through complex layers of mapped data. We use the power of GIS to explore the interrelationships of landscape features that have a profound influence on the quality and flow of

water. LimnoTech understands the capability of maps to convey large amounts of valuable information, allowing our clients to understand their issues and to convey information to regulators or the public.

Examples of the ways that LimnoTech utilizes the power of GIS for our clients

Sanitation District No. 1 of Northern Kentucky. GIS provides a foundation for much of the work that LimnoTech does to support SD1 as it applies adaptive watershed management to control combined sewer overflows and protect the waters in the southern Cincinnati suburban area. LimnoTech developed the GIS-based Watershed Assessment Tool to prioritize expensive water quality investments. We analyzed and mapped dozens of spatial datasets to characterize the watersheds in the 580-square-mile service area. GIS data is essential for the LimnoTech-developed Stream Condition Index that SD1 is using to track the progress of its programs.

Federal Triangle Flooding, Washington, D.C. A massive rain event in summer 2006 caused extensive and costly flooding in the heart of the nation’s capital. Working with and for the National Capital Planning Commission, FEMA, and DC Water, LimnoTech was hired to model storms, surface flows, and sewer system responses. We compiled and improved detailed GIS data to create model inputs and support the reliability of alternative flood control scenarios.



We understand the capability of maps to convey large amounts of information to help our clients to understand complex issues.

Green Infrastructure Feasibility in Cleveland, Ohio.

Working with URS, LimnoTech helped the Northeast Ohio Regional Sewer District plan the innovative use of green infrastructure to control combined sewer overflows and provide alternatives to traditional “gray” infrastructure. We created a GIS-based spatial index to rank small neighborhoods in terms of the likelihood of siting effective measures to control stormwater flow from the urban landscape into the combined sewer system, allowing to district to target expensive investments.

Watershed Assessments for Stormwater Management.

Anne Arundel County, Maryland, near Washington and Baltimore, contracted with LimnoTech to conduct several major watershed assessments to support the county as it works to meet the requirements of its municipal stormwater permit. Using mobile GIS technology and GPS, LimnoTech staff assessed 400 miles of streams. We recorded locations and conditions of stream habitats, utility crossings, outfalls, and sites of erosion. We recorded channel geomorphic data and also sampled for water quality. LimnoTech compiled and refined a geodatabase with more than 4,000 stormwater BMPs in the watersheds.

Bathymetry of Forest Preserve Lakes. The Forest Preserve District of Cook County has over fifty lakes ringing Chicago, Illinois. To better manage their water resources for fishing and other recreation, they contracted with LimnoTech to map the underwater surface of each lake. Working with the Cook County Department of Geographic Information Systems, LimnoTech used GIS to plan and conduct the bathymetry surveys, to process the field-collected data, to map the surfaces, and to create elevation contours. The results were published in a series of maps popular with the fishing public.

GIS Data Improvements for Local and State governments.

LimnoTech’s extensive experience with data compilation, database design, and GIS enables us to help local and state governments improve their GIS data and gain value from their expensive GIS investments. For example, LimnoTech improved the Duluth, Minnesota, stormwater geodatabase, helping them better meet the demands of state stormwater regulators. For another example, LimnoTech is improving GIS data layers depicting imperviousness and BMPs in the rights of way and properties of the Maryland State Highway Administration. The improved spatial data will enable MDSHA to better document its contributions to meeting TMDL goals for local and regional waters.

Contaminated Sediment Mapping. LimnoTech uses sophisticated modeling techniques to accurately model the distribution of contaminated sediments in rivers and lakes. GIS and geostatistics are vital to that work. We use GIS to support the design of judicious and effective remedial actions such as dredging and capping in large complex sites such as the Lower Fox River in Wisconsin, the Tittabawassee River in Michigan, and the Hudson River in New York.



GIS analysis benefits the entire spectrum of LimnoTech’s work, supporting projects including stormwater best management practices, combined sewer overflow control, contaminated site remediation, green infrastructure development, coastal and mixing zone studies, urban waterfront redevelopment, and more.