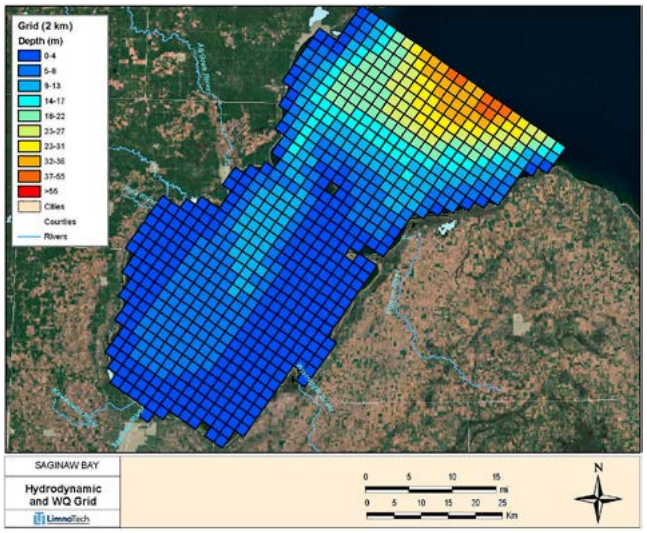
Water Quality Modeling

Water quality modeling is the linkage between sources of pollution and the in-stream water quality of a given water body. A typical water quality model consists of a collection of formulations representing physical mechanisms that determine position and momentum of pollutants in a water body. Models are tools for simulating the movement of precipitation and pollutants from the ground surface through pipe and channel networks, storage treatment units, and finally to receiving waters.



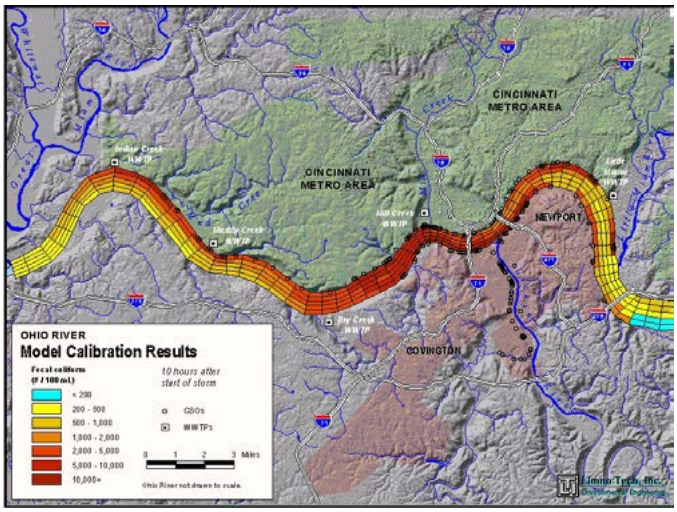
LimnoTech Expertise

The modeling of hydrologic processes and the movement of water through lake, river, estuarine, terrestrial, and groundwater systems is a fundamental and crucial part of most of LimnoTech's technical studies. LimnoTech staff have extensive experience applying dozens of public-domain, specially developed models to evaluate water systems nationwide. Models can be applied for continuous simulations to address long periods of hydrometeorological variability, or for specific events to address design or critical flow conditions. LimnoTech also pioneered the use of probabilistic modeling using Monte Carlo and other statistical techniques. This broad experience has enabled us to develop a unique understanding of model attributes, capabilities and limitations, and the ability to match appropriate modeling tools with available data, complexity of the system under study, and management needs. In addition, LimnoTech applies and develops models with a concerted focus on user and management needs.

Development and Application of Models

LimnoTech's water quality modeling skills include development and application of models for hydraulics and hydrology, watershed loads, and water quality. LimnoTech has worked with virtually all of the widely used watershed, hydraulics, water quality, and sediment transport models, including:

- Watershed: USLE, Revised USLE, GWLF, HSPF, WCS, WARMF, BASINS
- Hydraulics: HEC-2, HEC-RAS, DYNHYD, RMA-2, Unet, RivMoD, SWMM, NWS River Forecast System, EFDC
- Water Quality: QUAL2E, QUAL2E-UNCAS, CE-QUALW2, WASP, SMPTOX, DYNTOX, Multi-SMP, Stella, PULSEQUAL, SWMM, HSPF, BASINS, MINEQL, VIMS Hydrodynamic Ecosystem Model, BLTM
- Sediment Transport: HEC-6, SEDZL, DOSM, EFDC



LimnoTech's Experience

LimnoTech's water quality modeling services include:

- Selection and application of appropriate watershed and receiving water models
- Fate and transport modeling of toxics
- Evaluation of sediment impacts
- Support of NPDES permitting
- Assessment of Best Management Practices (BMPs)
- Pollutant tradeoffs and management
- Linkage of GIS and databases with watershed and water quality models
- Development of TMDLs
- Visualization of data and model outputs

The LimnoTech staff's water quality modeling experience extends from coast to coast, including watersheds in New York, Maryland, Virginia, Michigan, Washington, California, Florida, and Arizona. Urban runoff has been modeled in Detroit, MI; Washington, DC; Richmond and Alexandria, VA; Portland, OR; and Poughkeepsie, NY. Lakes modeled by LimnoTech staff include Lake Okeechobee, Lake Thonotasassa, Lake Michigan, Lake Ontario, the Occoquan Reservoir in Virginia, Lake Mead in Nevada, and numerous other lakes throughout the country. Estuarine systems modeled by LimnoTech include Narragansett Bay, Delaware Bay, Newark Bay, the Potomac Estuary, the James River Estuary, the Amelia River Estuary, San Francisco Bay, San Diego Bay, and the Columbia River Estuary.