LimnoTech
Water Environment | Scientists Engineers

Theodore A.D. Slawecki

Senior Engineer

Areas of Specialization:
Software Development
Data Visualization
Computer Modeling
Geographic Information Systems (GIS)

Education:
MS, Env. Health Services, Univ. of Michigan, 1987
BS, Computer Eng., Univ. of Michigan, 1983

Career Highlights:

- Leading implementation of CalLite 2.x Graphical User Interface (GUI)
- Managing Data Management and Communications (DMAC) team for the Great Lakes Observing System, a NOAA IOOS Regional Association.
- Directed development of Great Lakes Fisheries Commission's coordination website for Great Lakes Acoustic Telemetry Observation System
- Directed development of myBeachCast mobile app.
- Implemented GIS-based risk assessment methodology for watershed management.
- Created frameworks for integration of water quality models with GIS for TMDL and watershed management. applications.
- Developed interactive GIS- and Windows-based interfaces for linked watershed and water quality models.
- Developed and applied interactive models to assess the impact of land use changes on water quality.
- Developed interactive models for evaluation of conventional and toxic waste load allocations.
- Designed and implemented data visualization tools for exploratory data analysis in support of complex remediation studies.

Since joining LimnoTech in 1983, Mr. Slawecki has worked on a wide range of projects involving the development and application of information technology with environmental management. He directs LimnoTech's work with the integration of state-of-the-art water quality models with GIS to take advantage of the implicit spatial context and added precision of geographical information. Other projects include the development of a decision-support system for prioritization of watershed controls, and model integration and visualization for water resource management.

He was an integral part of the project team for the development of a user-friendly, highly understandable phosphorus runoff model for the Occoquan Reservoir in Fairfax, Virginia, and worked on the conceptualization and implementation of interactive models for the assessment of land use changes on Walloon Lake, Michigan, and Lake Sidney Lanier, Georgia. Other work includes the development of user-friendly receiving water quality models such as SMP and MULTISMP for conventional pollutants; SMPTOX for toxics; and DYNTOX for probabilistic methods in wasteload allocations. He has also developed pre- and post-processors for complex models, and is involved in the advancement of LimnoTech's environmental data management and visualization capabilities for decision support in surface water and groundwater.

Key Project Experience

CalLite GUI Development. Mr. Slawecki is the project manager and lead developer for the implementation of the Java-based graphical user interface (GUI) for the new 2.x version of CalLite. This new GUI was designed with Reclamation and California DWR to be highly flexible, with significant effort placed into the use of a framework that allows extension of the GUI without additional coding and recompilation. This capability allows the CalLite modelers to add many new model inputs to the GUI on their own without relying on GUI experts, shortening model development timelines. The GUI also provides powerful tabular and chart display options, building in many cases on existing DWR display tools.

Great Lakes Observing System Data Management and Communications (DMAC) Support. Mr. Slawecki leads the GLOS DMAC Team, which is responsible for operating and improving the infrastructure necessary to connect real-time and in-situ water resource data and model results to Great Lakes managers, planners, and decision-makers on behalf of NOAA's Integrated Ocean Observing System. In this role, he is coordinating with GLOS and agency staff, researchers, and data users to identify needs, scope out requirements for readily-accessible web-based products to address those needs, and supervise implementation, testing and release of appropriate ecosystem decision support products available at www.glos.us.

Regional Ocean Planning. Mr. Slawecki directed the integration of foundational hydrologic datasets to support the first-ever assessment of impacts on the Great Lakes from water withdrawals. The assessment by the Council of Great Lakes Governors requires standardized access to hydrologic and water use data from compiled from binational sources including Federal, State and Provincial agencies in the United States and Canada.

Great Lakes Acoustic Telemetry Observation System (GLATOS). Mr. Slawecki was the technical lead for the development of a web-based coordination and discovery application for the Great Lakes Fisheries Commission. The GLATOSWeb site promotes exploration and discovery of fish telemetry projects and associated receivers through display, search and management of project metadata.

myBeachCast. Mr. Slawecki provided technical direction and oversight for the development of an Android app to provide access to beach status information. The app, which also provides current weather and water conditions, is part of the GLRI-funded BeachCast maintained by the Great Lakes Commission through its Great Lakes Information Network.

Chicago Waterways Habitat Evaluation and Improvement Study. Mr. Slawecki directed the conversion of Excel spreadsheet-based data files into a combined relational database, and led the development of a user interface for complete access to the data. He also has developed and implemented a web-based viewing system for bank survey videos.

Assessment of Wet Weather Quality Impacts on the Ohio River. Mr. Slawecki oversaw the development of visualizations of modeling results from a linked watershed/water quality model for the 10,000-square mile watershed by Cincinnati, Ohio. This award-winning work was part of an EPA demonstration designed to develop a protocol for assessing wet weather water quality impacts on large rivers.

Watershed Characterization Plan for Sanitation District #1 (KY). Mr. Slawecki is currently directing the development and application of a relative-risk, GIS-based watershed assessment tool for the 500-square-mile jurisdiction of Kentucky's Sanitation District #1. The tool will integrate landside runoff, septic systems, and point sources in a unified framework for consistent jurisdiction-wide prioritization of watershed management activities.

Croton Watershed Assessment. Project Manager. Mr. Slawecki directed the development and implementation of GIS- based tools for identification of at-risk areas in the Croton Reservoir (NY) watershed. The tools consider point and nonpoint sources of nutrients, solids, pathogens, toxic chemicals, and inorganic carbon within the different subwatersheds, and rank areas for susceptibility.

Rouge Main 1-2 Streambank Erosion Inventory. Mr. Slawecki identified appropriate GIS and field equipment technology and led the development of a custom interactive desktop tool for the map-based review and analysis of field inventories. The tool allows local governments to quickly find and display results from a 90-mile streambank erosion inventory conducted along tributaries to Michigan's Rouge River, including more than 3,000 digital photos at 2,200 stations

Hurricane Katrina Floodwater Impacts. Mr. Slawecki assisted EPA in the investigation of the potential water quality impacts of floodwaters being removed from New Orleans after its inundation during Hurricane Katrina. During this process, he developed recommendations for readily available and rapidly deployable treatment technologies that would be suitable for the removal of solids and other constituents during high-volume dewatering operations.

Lake Lanier Water Quality Modeling Study. Mr. Slawecki served as a Task Leader for a comprehensive multi-year watershed and receiving water investigation conducted on Lake Lanier, a 44,000-acre reservoir in northern Georgia. The lake has the heaviest recreational use of any Army Corps of Engineers reservoir in the United States, while also experiencing high rates of population growth in the watershed. LimnoTech was contracted to develop and apply a modeling tool that allows planners and regulators to evaluate the impacts of various future POTW discharge and land development scenarios. Mr. Slawecki's role on this project was to develop the watershed loading portion of the modeling tool, which involved the collection of supporting data in a GIS, modification of the GWLF loading estimation program to work within a GIS framework, and development of a management framework allowing the generation and comparison of different development scenarios.

CSO and Collection System Modeling. Mr. Slawecki has been active in the development of conceptual models and the integration and visualization of model data and results for collection systems and receiving waters in Toledo, Ohio; Washington, D.C.; and Cleveland, Ohio.

Development of Water Quality Models for EPA. Mr. Slawecki has participated in the development of several water quality models for EPA, as well as the revision of existing EPA models. These have included the SMPTOX series of models, which predict the fate and transport of organic chemicals and heavy metals in the water column and sediments. Features of the SMPTOX series that were unique to the modeling field at the time of their development included use of WindowsTM-based model interface for all pre- and post-processing capabilities, calculation of the co-precipitation of heavy metals with acid volatile sulfides, and automated model sensitivity analyses. Mr. Slawecki also worked on EPA's DYNTOX model, a probabilistic stream toxic model that accounts for variability in environmental and discharge conditions.

Remediation Support. Mr. Slawecki has developed data management and visualization tools that facilitate investigation and understanding of complex environmental issues at several industrial sites. These have included river sediment characterization for the Upper Hudson River and the Fox River/Green Bay system, and hydrogeologic displays for various groundwater contamination sites.

DFLOW Incorporation into BASINS. Mr. Slawecki converted an existing Delphi implementation of the DFLOW design flow calculation software into Visual Basic 2005 for inclusion in US EPA's BASINS modeling framework. DFLOW provides both biologically based and hydrologically based methods for selecting critical low flows.