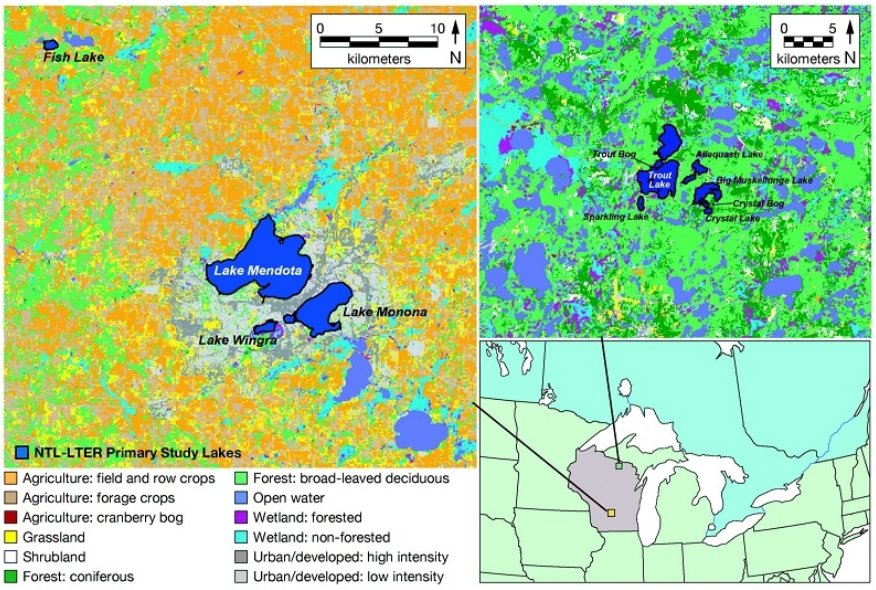
North Temperate Lakes LTER (NTL)

Lakes are conspicuous, ecologically-important, and socially-valued components of landscapes. Lakes collect water, energy, solutes and pollutants from the land and atmosphere, provide habitats and resources for organisms, and affect and are affected by diverse human activities. The North Temperate Lakes Long-Term Ecological Research program aims to understand the ecology of lakes in relation to relevant atmospheric, geochemical, landscape and human processes. Our overarching research question is "How do biophysical setting, climate, and changing land use and cover interact to shape lake characteristics and dynamics over time (past, present, future)?".

Site characteristics

The NTL site is comprised of two geographically distinct regions. The Northern Highlands Lake District (NHLD) and the Yahara River Lake District (YRLD) lie in formerly glaciated terrain of Wisconsin, USA and are the principal study regions for the NTL-LTER program. Lakes are the focal landforms of both regions, providing unique habitats, ecosystem services, and foci of human activity. At present, Dane County (site of YRLD) and Vilas County (site of NHLD) are the two counties of Wisconsin with the highest per-capita rates of population growth. Ecological research began in the YRLD in the 1880s and in the NHLD in the 1920s.

Despite these similarities, the lake districts have many differences. The NHLD, one of the most lake-rich regions of the world, is largely forested and sparsely settled. Outdoor recreation centered on the 7,600 lakes of the region is a mainstay of the economy. The YRLD is an agricultural, but urbanizing, landscape with scattered remnants of presettlement ecosystems. The diverse economy involves service industries, emerging technologies, some light industry, state government, and the state's flagship university. Collectively, these two lake districts afford a unique opportunity for analyses of the Western Great Lakes region and their gradients have allowed us to pioneer new ways of thinking about how aquatic systems are structured and function - from the role that their position in the landscape plays in constraining lake characteristics, to the interactions between socioeconomics and human use of our aquatic resources.



Research Focus

Ecosystems are complex systems in which change occurs from multiple factors acting across a range of spatial and temporal scales. Disentangling cause and effect requires long-term monitoring, and we continue to build and use our long-term database. Our long-term research provides an opportunity for studying natural and human disturbances through analysis of regional variability, historic data, and both episodic and chronic events. We also use whole-lake experiments to help us understand how lakes respond to particular environmental changes. Ours is an interdisciplinary approach, integrating perspectives and models of economists and sociologists with those of ecologists and limnologists, which will allow us to continue to make fundamental contributions to both the natural and social sciences and inform future generations of managers and lake lovers alike.

The contrasting regional settings and long histories of ecological research have led us to new insights about the role of spatial location of lakes in landscape dynamics, the reflexive interactions of human and ecological processes, and the interactive effects of geomorphic setting, climate and human activity on long-term change in lake districts. The understanding of integrated landscape-lake-social systems developed through our LTER program will be useful in decisions of individuals and institutions concerned with the future of the Western Great Lakes region and the welfare of its residents. We include these individuals and institutions in an extensive outreach program that starts with an exemplary Schoolyard LTER at its core and expands to engage lake associations and government agencies. For more detail and additional examples of all of our research and outreach efforts as well as access to our core datasets go to http://lter.limnology.wisc.edu.