



MODMON: a Comprehensive, Long Term Water Quality Modeling and Monitoring Program for the Neuse River Estuary

What is MODMON and Why Should we Care About it?

- * **MODMON** is North Carolina's first coordinated, multidisciplinary *State, University and Industry* coastal/estuarine environmental modeling and monitoring program. This effort is an outgrowth of the Senate Select Committee hearings on River Water Quality and Fish Kills, legislative requests for assistance from University scientists in solving state environmental problems, university initiatives to enhance research in areas of critical importance to the State of North Carolina, and coordinated planning by State, University and Industry personnel.
- * **MODMON** has been designed to provide a water quality model of the Neuse River Estuary that will be used to evaluate alternatives for reducing nitrogen loading as specified under House Bill 515 passed by the 1997 North Carolina General Assembly. To accomplish this MODMON quantifies chlorophyll *a*-based exceedances of the US EPA mandated Total Maximum Daily N Loads (TMDL) to the Neuse River Estuary. In conjunction with FerryMon, MODMON measures chlorophyll *a* continuously, producing a large data set (~80,000 data points per year) to evaluate the TMDL with a very high degree of statistical confidence.
- * **MODMON** serves a vital multi-agency, public informational and educational function by providing graphic environmental data communicating current water quality conditions, trends, model predictions and management options. MODMON provides a "critical mass" and a network of experts for addressing State water quality problems. Public outreach, educational programs, and presentations to civic groups by MODMON participants illustrate the State's commitment to resolving water quality problems.
- * **MODMON** provides the backbone for obtaining external (federal and private) funding for additional research on the Neuse. MODMON investigators have successfully obtained additional USDA, EPA, NOAA, NSF and Weyerhaeuser Co. funding.
- * **MODMON** provides the foundation crucial for supporting additional research on the Neuse and other NC estuaries.

How does MODMON serve the State and Nation?

- **Modeling data needs.** The MODMON monitoring component has been designed specifically to meet TMDL modeling needs in the Neuse River Estuary. The development and evaluation of the NEEM, Neu-BERN and EFDC (EPA) water quality models have relied almost exclusively on MODMON monitoring data. Continued modeling will be required to adaptively manage TMDLs into the foreseeable future and will continue to rely on spatially and temporally-intensive WQ monitoring. MODMON is ideally suited for both “event-based” and long-term intensive monitoring. Furthermore, some models require rate (i.e., algal growth, denitrification, productivity) measurements, which MODMON routinely provides.
- **Data availability and quality.** MODMON is a proven source of high quality, readily-available, verifiable water quality data comparable to State and federal agency informational data bases. MODMON has continuously provided data, collaborative assessments of that data and reports based on well-informed, nationally and internationally-respected scientific expertise.
- **Long-term monitoring needs.** Human expansion in and growing use of the Neuse watershed, combined with a predicted increase in tropical storm activity, calls for a comprehensive, long term assessment of water quality impacts. For State modeling and management purposes, it will be critical to differentiate human from “natural” drivers of water quality. Many impacts are episodic, necessitating rapid access to and evaluation of water quality and habitat responses. Because its scientific expertise and laboratories are located near the estuaries, MODMON has been effective in rapidly and intensively responding to these events. One example was the initial impact of Hurricane Floyd’s floodwaters on the Neuse R. Estuary and downstream Pamlico Sound in late 1999, which MODMON effectively captured and documented for the State.
- **Collaboration, trust, and independence.** MODMON continues to be a timely, trustworthy and productive partner for obtaining and evaluating water quality data for State and federal agencies, as well as municipalities, private industry and citizen/stakeholder groups. MODMON is an independent, easily accessible and credible source of data for developing, evaluating and adaptively managing TMDL values for the Neuse River Estuary. In effect, MODMON serves a technically-sound third party in the event of conflicting recommendations among the State and federal agencies as the TMDL is developed and revised.
- **The Bottom Line.....** MODMON is a timely and wise short- and long-term investment in one of North Carolina’s most visible, valuable and indispensable commodities, acceptable water quality! In many respects it is a “model” cooperative program that should be looked at as a template for addressing water quality problems in other NC and National estuarine and coastal ecosystems.