

Foreword

What does it mean to go *forward* on the problem of nutrient over-enrichment in water? In 1972, with the very first section of that year's landmark Clean Water Act, the United States committed itself to the goal of ending the discharge of pollutants into navigable waters by 1985. Almost no one believed that goal was attainable, and so Congress also set an interim goal that by 1983, United States waters, "wherever attainable.... [would] provide for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water." Forty years later, despite much progress, neither goal nor interim goal has been fully met. One of the most widespread and intractable water pollution problems continues to be nutrient over-enrichment. These conference proceedings document an important, fascinating exploration of this problem as it appeared in 2012.

Understanding what counts as forward progress on eutrophication surely requires an understanding of where we have been. In the same year, 1972, that Congress set the "fishable, swimmable" goal for the nation, the State of North Carolina faced massive algal blooms in the Chowan River. The green, eutrophic waters of the Chowan were a catalyst for political action on the environment in Raleigh. Many important features of North Carolina's present approach to water pollution control were set in motion by nutrient over-enrichment in the Chowan: among them a supplemental water classification for nutrient sensitive waters, a water-quality standard of 40 µg/l for chlorophyll-a, and an active state-funded program of cost-share assistance for agricultural water pollution controls. But the nutrient problems did not remain confined to the Chowan basin, and the state, local and federal responses have spread and evolved as well. This conference delivered high-level reviews of the history of efforts to solve the nutrient problem through the presentations and responses to questions by the speakers who were directly involved with those efforts.

Understanding forward progress on nutrients in one state's waters also surely requires some sense of what has been tried elsewhere. At this time, the entire nation is in the middle of a contentious period of experimentation with nutrient standards and controls. The State of Florida has been litigating with the U.S. EPA over EPA's directive to set in-stream standards for nitrogen and phosphorus, the primary nutrients of concern. The federal push to move all states along to better management of eutrophication has led not only to lawsuits, but also to a very dynamic period of policy experimentation and development nationally. This conference provided explanations and points-of-view on those experiments from many of the people who are trying to craft new and better standards and controls around the country.

The nutrient over-enrichment problem is rooted in cutting edge science—cutting both deep into the complex ecology of water bodies and cutting across the many scientific disciplines needed to understand pollutants that wash off land, come out of wastewater pipes, and are deposited out of the air, and that then have highly variable transport and fates in the water. For the algae themselves, neither the taxa nor the toxins are well-characterized. For the waters, the variability among stretches of rivers and portions of lakes, given different flows, canopies, aquatic and benthic communities, presents formidable challenges for monitoring and modeling. For the nutrients themselves, their sources and pathways to the water, there is also much variation, across space and time. To go further and try to understand the interaction of all these things scientifically—the biology, ecology, hydrology, chemistry and movement of pollutants—is daunting. North Carolina is fortunate to have national and global leaders in these scientific realms. This conference brought together their viewpoints with those of scientists working on nutrient over-enrichment all across the country.

Even with the relatively clear goal of use attainability in waters, the meaning of forward progress on nutrient over-enrichment is complicated by the many competing social goals and potentially huge costs involved in nutrient control. So the economics of the problem are a vital piece of the puzzle. How much do we really value this aspect of clean water? Can we analyze and communicate the most efficient means of nutrient control? What are the trade-offs in any given path forward? Conference participants explored these economic dimensions with a range of formality from “back of the envelope” to state of the art contingent valuation studies.

A final critical dimension in understanding what progress means for managing nutrient over-enrichment is that the problem is not an abstract one; it’s a very real, concrete problem facing real-world decision makers, including local, state and federal politicians, in real time, with real resource constraints. There is quite a long way to go to get to a shared understanding of the way forward on addressing nutrient pollution among experts and political leadership. In the political and institutional dimensions, the conference embodied exactly the attributes that will be needed to bridge this gap between knowledge and action: direct involvement of the key decision-makers, broad participation from experts with divergent interests and backgrounds, and openness to unbridled discussion and debate.

In other words, this conference was exactly the sort of event needed to spark the creative problem-solving that will be needed to figure out the way forward on the problem of nutrient over-enrichment. Thanks are due to the presenters for their hard work and concise presentations, to the audience for their questions in and between sessions, and to the panel members who collected and posed those questions—Jacqueline A. Jarrell, PE, of the Charlotte-Mecklenburg Utilities Department, an experienced wastewater plant superintendent; Grady McCallie, policy director for the North Carolina Conservation Network, one of the region’s most thoughtful critics of environmental policy and management; Stephen T. Smith, Chairman of the N.C. Environmental Management Commission, with direct responsibility for guiding the State forward on this problem; and the Hon. Darryl D. Moss, Mayor of the City of Creedmoor and a member of the Environmental Management Commission, who articulately represented the views and concerns of the local leaders that ultimately must implement the way forward. To the primary conference organizers—Alan Clark, Dianne Reid and Jay Sauber, all of the NC Division of Water Quality—everyone who values clean water owes a debt of gratitude for helping us see the way forward more clearly.

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