


Carolina Water


How we make a difference


University of North Carolina faculty, students and alumni lead many efforts to provide, improve and maintain water supplies across North Carolina and around the world. From finding the most pristine sources to ensuring clean pipes throughout distribution systems, Carolina Water is renowned.


IDENTIFYING DISINFECTION BYPRODUCTS (DBPs) in treated drinking water — “Disinfection byproducts” are created when chlorine and other chemicals used to clean water for drinking mix with naturally occurring substances in the water. Unintended byproducts can be harmful and have been linked with cancers of the digestive and urinary tracts. UNC School of Public Health researchers have led the way in identifying these byproducts, understanding how they are formed and finding ways to control them. We helped the U.S. Environmental Protection Agency and other national and international regulatory authorities establish regulations to minimize DBPs.


ENGINEERING NEW APPROACHES to keep disinfection byproducts (DBPs) from forming during water treatment — As federal regulations that govern the level of DBPs in drinking water were developed and tightened, many water utilities had difficulty meeting these requirements. UNC water experts developed modifications of conventional water treatment practices to reduce the formation of DBPs in water treatment plants and minimize public exposure to these compounds.


 **COLLABORATING WITH DEVELOPING** country communities in planning, building and maintaining their own water systems—In the 1970s and '80s, a number of well-intentioned groups and agencies built water systems in developing countries. They were disheartened when many of these systems were not used or maintained. UNC School of Public Health researchers helped come up with a new policy framework for planning water systems in developing countries. Along with developing country colleagues and students, they are finding ways to measure the needs of communities and their willingness and ability to pay for and maintain water system infrastructures. As communities have become involved in projects, the success rate of water systems implemented in these communities has risen.


 **EVALUATING WATER QUALITY** in U.S. distribution systems to help cities and towns maintain drinking water purity—Water treatment practices in the United States are intended to maintain even levels of disinfectants throughout distribution systems to prevent potentially harmful bacteria from growing in the water at the far ends of the system. Carolina water experts have worked with numerous U.S. water municipalities to find out why bacteria sometimes crop up again in distribution systems and to discover ways to limit re-growth.


 **DEVELOPING INNOVATIVE WAYS** to monitor water quality in lakes, rivers, estuaries and other bodies of water—UNC water experts have developed tests to quickly detect different kinds of bacteria in water that can be harmful to humans and fish. Two such tests can detect the DNA of *Enterococcus* and *E. coli*—bacteria found in fecal matter. Both tests can be completed in less than two hours. UNC water experts also co-direct FerryMon (www.ferrymon.org), an automated water-quality monitoring system aboard North Carolina Department of Transportation ferries that cross the Neuse Estuary and Pamlico Sound. FerryMon monitors these waters 365 days a year. UNC researchers collect and analyze water samples to quickly detect when water is polluted and may pose a danger to people or fish.

 **DEVELOPING WAYS TO REMOVE** dangerous chemicals from groundwater—UNC water experts and their colleagues have developed patented processes to remove chlorinated solvents like trichloroethylene (TCE) and perchloroethylene (PCE) from contaminated groundwater. Chemicals left in groundwater can be a threat to public health for hundreds of years if not cleaned up. UNC researchers are working on better technologies to remove these chemicals.

 **IDENTIFYING PRISTINE WATER** sources—The best way to deliver clean, high-quality water to people is to start with the most pristine source possible. UNC water experts have long promoted watershed protection and helped identify the most appropriate sources—in North Carolina, across the United States and abroad. An example is Cane Creek Reservoir in Orange County, N.C., which UNC researchers identified and helped develop.

 **TESTING HOUSEHOLD WATER** filtration systems in developing countries—Students and faculty work with international organizations and businesses to test how well ceramic and biosand filters work in even the poorest homes in developing countries. UNC researchers are among only a few groups to have developed and tested these filters and then proven that using filters improves health. Both kinds of filters reduced the incidence of diarrhea by up to 40 percent. Our research has given international organizations data needed to step up distribution of these filters in developing countries.

 **PROMOTING WATER RECLAMATION** as a way to manage limited water resources and protect public drinking water supplies—UNC water experts have been among the loudest voices advocating for water reuse in the United States and abroad. One strategy advanced by UNC researchers is a “dual distribution system” design with larger pipes to provide high-volume water for non-drinking purposes (like irrigation and fire protection) and smaller pipes to distribute and maintain clean water for drinking.

 **ESTABLISHING WATER RESOURCE** management agreements between North Carolina cities and towns to help them weather water shortages—UNC water experts have been leaders in creating water-sharing agreements between North Carolina municipalities, both in the Research Triangle area and eastern parts of the state, to help communities survive periods of drought.