

URBAN WATER CONSORTIUM



News

May 1987

Volume 1, No. 1

The Urban Water Consortium is a cooperative program of The University of North Carolina Water Resources Research Institute and The Cities of Raleigh, Durham, High Point, Winston-Salem, and Burlington, and the Orange Water and Sewer Authority.

Advancing Water Supply and Wastewater Management Is Consortium's Purpose

Established in 1985, the Urban Water Consortium is a program conducted cooperatively by The University of North Carolina Water Resources Research Institute and several of North Carolina's larger cities and special water/sewer districts.

Its primary purpose is to support research and provide technology transfer that will result in high quality and more cost-effective water services to urban residents.

Current priority areas for research and development include the following:

- * management under drought conditions
- * watershed protection and management
- * operation, maintenance, and replacement of water distribution and waste collection systems
- * water and sewer extension policies
- * financing of capital improvements
- * rate-setting
- * computerization of operations
- * legal aspects of water management
- * management of flood plains
- * development of cost-effective methods for controlling the flow of storm runoff
- * evaluation of changes in federal and state rules and regulations that will affect municipal water and wastewater

systems, including those that have been proposed and those that should be proposed

* improving efficiencies in the operation of urban water and wastewater systems.

Funding

The work of the Consortium is funded by 1) membership dues paid by cities and authorities 2) externally funded grants 3) support from the N.C. Department of Natural Resources and Community Development 4) appropriations from the N.C. General Assembly through the UNC system and 5) a Water Resources Research Institute waiver on overhead charges. Individual Consortium members may also provide project enhancement funds to support research of special benefit to them.

Administration and Organization

The Director of the UNC Water Resources Research Institute manages the Urban Water Consortium as its executive secretary. Operations of the Consortium are overseen by the Advisory Committee to the Urban Water Consortium, which is composed of one representative from each member unit. Current members are the Cities of Raleigh, Durham, High Point, Winston-Salem, and Burlington, and the Orange Water and Sewer Authority.

The Advisory Committee specifically

* approves the annual research program

* establishes and makes appropriate changes to the bylaws of the Consortium (consistent with those of The University of North Carolina)

* provides general guidance to the executive secretary in his management of the operations of the Consortium.

Cities Facing Three-Pronged Water-Sewer Service Problem

Cities in North Carolina are experiencing rapid growth in demands for water and sewer services. At the same time, they are facing more stringent limitations on the quality of the water they produce for drinking and on the quality of wastewater they discharge into the state's streams. Cities are seeking to meet these new demands and quality criteria in a period of declining federal financial assistance.

There is, therefore, a growing need for development of more cost-effective methods of providing an adequate quality and quantity of water supplies and for development of cost-effective and environmentally sensitive ways of collecting, treating and disposing of waterborne wastes.

Consortium's First Sponsored Project Investigates Biological Removal of Phosphorus from Wastewater

In 1983, the Environmental Management Commission designated Falls of the Neuse and B. Everett Jordan reservoirs as Nutrient Sensitive Waters, setting the stage for regulation of phosphorus and nitrogen in wastewater discharged into their tributaries. As the inevitable regulation began to take shape, the Consortium approved funding in 1985 for a three-part study designed to identify and evaluate alternatives for reducing the concentrations of these nutrients in discharges from Durham, Burlington and OWASA, the first Consortium members to be affected by the regulations.

The three parts of the project are

- * a study of the sources of nutrients in the communities and possible methods of reducing them at the source

- * studies of physical-chemical methods and biological methods of removing nutrients from wastewater at the treatment plants

- * studies of treatment and disposal of sludge produced by methods designed to remove nitrogen and phosphorus.

In January of this year, researchers reported the results of pilot studies of biological removal methods at the OWASA treatment plant. They concluded the biological removal of phosphorus at the OWASA plant is feasible and can have significant cost advantages over chemical removal systems. They recommended full-scale studies of one of the four biological processes they tested to develop operating procedures.

The study at OWASA is significant for other cities because it added to the understanding of principles underlying the process of biological phosphorus removal.

The final report on the overall nutrient removal project will compare and evaluate different removal approaches, with appropriate attention to nutrient removal efficiency, reliability and cost.

This, the Consortium's first project, attracted a \$200,000 matching grant from the N.C. Department of Natural Resources and Community Development under the state's assistance program for areas affected by the nutrient-sensitive designation.

EMC Ruling on Phosphorus Will Allow Use of Biological Removal Methods

The Environmental Management Commission ruled in March that treatment plants discharging into Falls and Jordan lake reservoirs must reduce phosphorus in wastewater to 2 parts per million by 1990. While the ruling means that cities and factories will have to upgrade treatment plants to meet the requirement, it is less stringent than the 1-part-per-million limit the EMC had previously imposed in some parts of the Jordan watershed. The less stringent standard makes it more feasible for treatment plants to remove phosphorus biologically.

Although biological methods remove slightly less phosphorus than chemical methods, biological removal does not require costly chemicals and produces less sludge than chemical removal. Therefore, biological removal can produce long-term

savings on sludge handling and disposal and chemical costs. A study by Hazen and Sawyer of Raleigh indicated that biological methods could produce a savings of \$12 million in lower operational costs over a 20-year period.

Phosphate Ban Could Help Improve Efficiency and Reduce Costs at Treatment Plants

While the recent ban on phosphate detergents essentially affects only households, it will result in enough of a phosphate reduction to help improve the efficiency of treatment plant removal systems, according to Dr. David Moreau, executive secretary of the Urban Water Consortium and director of The UNC Water Resources Research Institute.

In treatment plants which use chemical removal alone or chemical removal in conjunction with biological removal, reducing the input of phosphorus can reduce the cost of removing it by decreasing the amount of chemicals that must be used and by decreasing the amount of sludge that must be handled and disposed of.

Furthermore, recent investigations have shown that a major factor in the efficient performance of biological removal processes is a high ratio of BOD to phosphorus. The 20 - 30 percent reduction in phosphorus that the ban will bring about will significantly increase that ratio and therefore the performance of biological systems.

Urban Stormwater Will Be Pressing Water Quality Issue of 1990s

While most North Carolina cities still wrestle with the problem of how to control stormwater runoff to prevent erosion and flooding, EPA regulations are taking shape that also will require cities to find ways of preventing their stormwater discharges from degrading the quality of streams and other water bodies.

In the recently reauthorized Clean Water Act are stormwater provisions that are expected to bring about regulatory action. The provisions resulted from a compromise between environmentalists and municipalities.

The compromise does away with individual storm sewer permitting - the main point of contention for cities and sewer authorities - at least until 1992. EPA has estimated that some one million storm sewers exist in cities and towns, and the U.S. Conference of Mayors had said that the paperwork alone for this level of permitting could cost communities \$8 billion. The new law allows stormwater sewer permits to be issued on a system- or jurisdiction-wide basis and extends the deadline for permit applications for "large municipalities" from 1987 to 1990 and for "other municipalities" to 1992.

According to Bill Kreutzberger of the N.C. Division of Environmental Management, the EPA must define the area meant by the term "large municipalities" before it can be determined which N.C. cities will have to comply with the 1990 deadline. He said the real impact on N.C. cities is likely to come when EPA develops and enforces stormwater regulations for "other municipalities" of 100,000 to 250,000 population.

EPA must develop regulations for "other municipalities" within four years and permit applications must be filed the following year - 1992. Four years later, the cities must be in compliance, giving them nine years total to develop appropriate stormwater management programs.

However, another provision of the Clean Water Act that EPA specifically asked for allows the agency to require a permit for ANY stormwater discharges that are identified as causing water quality problems.

1988 Projects Investigate Toxics in Effluent and Assess Water Supplies

Projects approved by the Advisory Committee to the Urban Water Consortium for the 1988 fund year will assist municipal treatment plants in identifying the sources of toxics in their effluents and will evaluate primary water supplies in each of the cities in the Consortium relative to the new Safe Drinking Water Act standards.

The first project, "Protocol for Identifying Sources of Toxics in Municipal Effluents," is to be supported by a \$140,000 grant from the U.S. Environmental Protection Agency, \$20,000 from the Consortium and in-kind services from the City of High Point. It will evaluate EPA's proposed protocol for identifying the sources of toxics in municipal effluents by testing it in the City of High Point. The proposed protocol uses bioassay methods to

identify sources of toxics and to identify which components of the effluent contains the offending substance. The principal investigator will be Dr. Francis DiGiano of the UNC Department of Environmental Sciences and Engineering who interested EPA in the project with his previous research aimed at identifying specific chemicals that have been causing toxicity in High Point wastewater discharges. The results of this study will be of direct benefit to cities in establishing regulatory programs for controlling the flow of toxics into wastewater collection systems.

The second project, "Assessment of Public Water Supplies Relative to the Safe Drinking Water Act Amendments of 1986," will identify timetables for each of the 83 new water quality standards mandated by amendments to the Safe Drinking Water Act, identify the most likely origins of each of the substances, survey activities in the watershed to determine the relative importance of the 83 substances in the primary sources for each city, determine EPA recommended protocol for monitoring, and analyze water samples from each city's supplies for substances deemed likely to appear. The study will recommend corrective action when it seems necessary and the appropriate action can be determined. When causes and cures of problems cannot be determined, the study will recommend what further studies may be appropriate.