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ALL N.C. SENATORS AND HOUSE MEMBERS VOTE TO OVERRIDE PRESIDENTIAL VETO ON WATER RESOURCES ACT

Both the Senate and the House voted to override the President's veto of a five-year program of water resources research. The vote to pass the bill despite his objections was 87-12 in the Senate and 309-81 in the House. Only three of Reagan's 22 vetoes have been overturned since he took office in 1981. Senate and House members from North Carolina all gave positive support to the program. The fact that this is an election year made the override even more courageous on the part of Congress.

The new bill, S. 684, titled the Water Resources Research Act, provides a 5-year authorization for fiscal 1985 through 1989 including \$10 million per year in grants to state water research institutes, \$20 million per year in matching grants awarded competitively, and \$6 million for water resource technology development grants and contracts.

Beginning in 1964, the federal government has cooperated with the states in supporting a water resources research program. Under the new authorization, the Institute continues to have the responsibility to plan and support competent research; promote the dissemination and application of the results of these efforts; and provide for the training of scientists and engineers through such research, investigations, and experiments. The

Institute also has the responsibility to work closely with all colleges and universities in the state that have demonstrated capabilities for research, information dissemination, and graduate training in order to develop a statewide program designed to resolve state and regional water and related land problems. The North Carolina Institute now has research projects at five universities in the state on groundwater quality, organics in water, surface water quality, aquatic weeds, urban water management, and coastal water management.

In addition to federal support, the Institute receives funds from the State, local governments, and private sources for water resources research.

**SYNOPSIS OF WATERSHED PROTECTION EFFORTS AT FALLS AND JORDAN RESERVOIRS**

*For the past year, considerable attention has focused on water quality protection in the Falls and Jordan Reservoirs near Raleigh, Durham, and Chapel Hill. A unique cooperative effort among federal, state, regional, and local governments is evolving. This report, prepared for the NEWS by David Blaha of the Triangle J Council of Governments, provides a brief summary of events and progress to date.*

The Call for Action

Before impoundment, the water quality of Falls and Jordan Lakes was the subject of much speculation. With the

creation of Jordan (14,000 acres) in 1981 and Falls (12,500 acres) in 1983, intensive monitoring programs were undertaken by NRCDC and the Corps of Engineers. Preliminary data suggested that both lakes would be highly eutrophic and susceptible to nuisance algal blooms.

In June 1983, the Environmental Management Commission (EMC) responded to increasing public concern about these water quality projections by placing a 120-day moratorium on all new NPDES applications in the 2300-square-mile watersheds of both lakes, and initiated a reclassification study. In October 1983, the EMC reclassified most of both lakes to A-11/B, requiring a higher degree of wastewater treatment for certain pollutants and additional backup equipment for wastewater treatment plants. Because reclassification to A-11/B does not allow the State to regulate nutrients from point sources, the EMC designated both watersheds as Nutrient Sensitive Waters (NSW). Prior to this action, the Chowan River was the only water body in North Carolina so designated. NSW gives the State considerable authority for controlling nutrient discharges to the lakes. The EMC used this power to:

- Require Durham and Chapel Hill to submit compliance schedules for reducing phosphorus to 1 ppm at their treatment plants.
- Impose a 1 ppm phosphorus limit on all new discharges throughout both watersheds.
- Notify other dischargers that they might be required to remove phosphorus at their treatment plants pending further investigation.

Phosphorus removal would probably increase monthly sewer bills by two to three dollars per household.

#### State/Local Action Agenda

Although the NSW designation empowers NRCDC to regulate point sources of pollution, State agencies have little or no authority for controlling nonpoint pollution (urban and agricultural runoff). Most programs for runoff control rest with local governments and county Soil and Water Conservation Districts.

In May 1983, the Triangle J Council of Governments requested NRCDC to take a strong role in protecting these two reservoirs. Secretary Joseph Grimsley, recognizing the importance of local governments in watershed protection, responded quickly by convening a special Steering Committee of chief elected officials from the principal jurisdictions in the watershed and establishing an agricultural technical committee of local Soil and Water Conservation Districts. These committees took a comprehensive look at pollution sources in the watersheds; explored alternatives to expensive phosphorus removal at the treatment plant; and clarified State and local roles in the process.

NRCDC and the Triangle J Council of Governments worked together and proposed a "State/Local Action Agenda" to the Steering Committee. The agenda addressed major sources of pollution within the watersheds and offered a "carrot and stick" partnership between the State and local communities. NRCDC suggested that if local government took strong actions to reduce nonpoint pollution, the State might not have to impose expensive phosphorus removal requirements at local wastewater treatment plants. In December, Secretary Grimsley elaborated on his recommendation by proposing the boundaries of Water Quality Critical and Limited Industrial Areas. He also announced his intention to submit NSW and Toxic Control budget proposals to the N. C. General Assembly. Local governments agreed in principle with the proposed State/Local Action Agenda. The Steering Committee met again

in March 1984 with NRCDC's new Secretary, James Summers, announcing plans to seek legislation banning the sale of phosphate detergents. At this meeting, Secretary Summers requested each local government to submit to NRCDC by May 1, 1984, their plans for complying with the Action Agenda and other State guidelines.

#### Local Government Actions

At this time, several local governments have already adopted, or are discussing, actions to comply with the proposed guidelines. Below is a partial list of significant local accomplishments. At the time of this writing several communities are proposing additional actions.

##### Wake County

- Health Department has responsibility for regulating and monitoring waste treatment plants.
- Industrial development and most commercial activities are prohibited within the Falls watershed.
- Water Quality Critical Area with 80,000-square-foot minimum lot sizes has been established around Falls Lake to a distance of about 3,000 feet from the flood pool elevation.
- Stormwater management requirements for controlling the first half inch of runoff from impervious surfaces.
- Countywide Sediment and Erosion Control Program.
- Fifty-foot vegetated buffer strips required along all streams.

##### Raleigh

- A special Falls Lake Advisory Committee has presented recommendations for buffers, lot size, stormwater management, impervious surface limits, and zoning to the City Council's Public Works Committee. Action is expected soon.
- Local Sediment and Erosion Control Program.
- Endorsed a statewide phosphate detergent ban.

##### Durham City/County

- Will have a city/county Sediment and Erosion Control Program in place by July 1.
- City Council endorsed statewide phosphate detergent ban.
- Developing a hazardous materials ordinance.
- Additional plans to comply with development guidelines are being presented to the City's Public Works Committee.

##### Chatham County

- Planning Board is developing recommendations for Water Quality Critical Areas, zoning, lot size, and buffer requirements around Jordan Lake.

##### Orange County

- Countywide Sediment and Erosion Control Ordinance.
- "Protected Watersheds" in the county are subject to special development standards, lot sizes, impervious limits, and buffer requirements.

Chapel Hill

- Planning Board is preparing recommendations for Town Council.

Guilford County

- Has a countywide Sediment and Erosion Control Program.
- Has established an Advisory Committee to study the State's recommendations.

Greensboro

- Has developed an 11-point program to reduce phosphorus loadings to Jordan Lake.

STATUS REPORT ISSUED ON GOVERNOR'S COASTAL WATER MANAGEMENT TASK FORCE RECOMMENDATIONS

The North Carolina Department of Natural Resources and Community Development has published a report outlining progress during the

year on ten recommendations made by the Governor's Task Force on Water Management. A thirty-member task force was appointed by Governor Hunt in 1981 to address the conflict between the interests of agriculture and forestry in clearing and draining more land fisheries and wildlife in trying to maintain productive saline nursery areas and wildlife habitat in the Albemarle-Pamlico peninsula and surrounding area.

Some of the activities which respond to the original recommendations include:

- A comprehensive inventory of the land and water resources of the 12-county area is near completion and will be available in a useable form for multi-agency use.
- Permitting programs that regulate drainage have been modified and refined over the past several years to expedite permit processing. Existing federal policy discourages new drainage of marshes, but the question of drainage through federally protected areas is still under review. A general permit to allow conversion of certain forested wetlands to agricultural land has been proposed and is under consideration by the U. S. Army Corps of Engineers.
- A Flood Plain Management Study for the Lake Mattamuskeet Drainage Area was initiated in November 1983 by the USDA Soil Conservation Service (SCS). This study will provide a data base that will be applicable to other specific water management plans for the 12-county study area and similar coastal areas.
- SCS has also designed the Juniper Bay Project to provide flood protection to 8,002 acres against high wind tides and to benefit primary fin- and shellfish nursery areas in Juniper Bay. The Environmental Impact Statement for this project is under review, and the project is anticipated to be completed over the next two years.
- A demonstration project at Broad Creek in Hyde County is in the design phase, to demonstrate that water management can benefit estuarine nursery production. The Department of Natural Resources and Community Development (DNRCD) will take the lead role in this project.
- The Implementation Committee recommended that DNRCD develop a funding package to implement a water management plan that will include provision for state ownership of drainage canal outlets, their development, management and maintenance. The assumption of state ownership of outlets is intended to obligate the state

to maintain a flow of drainage water that is not restricted.

- Demonstration projects have been initiated by SCS to show innovative water management and techniques that would lessen impacts on other resources, and conserve water.
- An action plan for implementing agricultural BMP has been developed by the N. C. Soil and Water Conservation Commission and the N. C. Agricultural Task Force. A plan has also been developed by the Division of Forest Resources for increased application of BMP on forest lands. Implementation of these programs is dependent on state funding.
- Wildlife management practices have been developed and promoted to be compatible with forestry and agricultural user groups. A comprehensive document on fish and wildlife management practices applicable to the Albemarle-Pamlico peninsula and similar areas is being developed. DNRCD will seek new legislation to provide economic incentives to landowners for employing wildlife management practices or for maintaining portions of their lands in natural wildlife habitat.

The Implementation Committee in its status report recommended that DNRCD be designated as the state agency responsible for carrying out the Task Force recommendations, and that they be a top priority item in the Department's program and legislative requests.

A copy of this report may be obtained from: Division of Soil and Water Conservation, N.C. DNRCD, P. O. Box 27687, Raleigh, NC 27611, Phone: (919) 733-2302.

N. C. SURFACE WATER STANDARDS TO UNDERGO REVISIONS

The N. C. Division of Environmental Management has concluded a

series of public meetings across the state on proposed changes to the North Carolina Water Quality Standards Regulations. Comments received at the meetings will be used in the development of final proposals to be considered at a public hearing in Raleigh on June 27. The final step is adoption of the regulations by the N. C. Environmental Management Commission.

The proposed changes in the regulations reflect several purposes: (1) to update all standards using current scientific data, (2) to simplify regulations for easy public understanding, (3) to provide increased emphasis on controlling toxics in surface waters, (4) to increase flexibility in controlling pollution, and (5) meet review requirements of the federal Clean Water Act.

Among the proposed changes, one that is a major concern to municipal officials deals with streamflow criteria used to permit wastewater discharges. It would result in stricter control of toxic materials. Previously, effluent limits for toxic materials were based on a receiving stream 30-day low flow, which was estimated to occur once every two years. With the change, limits would be based on more adverse stream conditions, a 7-day low flow, which occurs once every 10 years.

Another major addition to the regulations is a new rule dealing with chemical substances requiring special attention. There are over 150 substances that may pose a hazard in surface waters, for which there is not sufficient information to set standards. The proposed rule gives DEM the authority to conduct detailed studies of potential impacts if any of these or other potentially dangerous chemicals are suspected to be present in wastewater. Suitable effluent limits can then be developed.

**WRI FORMS TOXICS  
ADVISORY COMMITTEE**

David H. Moreau, Director of the Institute, has appointed a special committee to advise the Institute on the development of a research program to assist state government in its formulation of a program to control toxic substances in drinking water. Members of the committee include: Dr. Russell Christman, Chairman of the Department of Environmental Sciences and Engineering (ESE), UNC-Chapel Hill, and a member of EPA's Advisory Committee on Drinking Water Standards;

Mr. David H. Howells, member of the N. C. Environmental Management Commission and former Director of the Institute; Dr. Alvis Turner, Professor of ESE, UNC-CH and Chairman of the Technical Advisory Committee of the N. C. Waste Management Board; Ms. Linda Seawell, Acting Assistant Chief, Environmental Health Section, Division of Health Services, N. C. Dept. of Human Resources; and Mr. Forrest Westall, Head, Operations Branch, Water Quality Section, Division of Environmental Management, N. C. Department of Natural Resources and Community Development. The committee is charged with developing a research agenda that is responsive to the special needs of North Carolina state government and is complementary to research programs in EPA and the American Water Works Association.

Because of the paucity of information about toxic substances that are in drinking water in North Carolina, the committee is concentrating initially on research needed to identify substances that are or may be prevalent in the streams and groundwater of the state. That research includes analysis of existing secondary data sources, analytical chemical and bioassay methods, design of monitoring programs, and construction of data bases for the specific identification of chemical compounds. As time permits, the committee will also address the difficult issues of providing guidance on the public health significance of substances in drinking water and methods for controlling exposure to them.

The committee expects to make a preliminary report to the Institute and state agencies by June 30, 1984.

**RESULTS OF FLORIDA STUDY  
SHOW ECOLOGICAL IMPACTS  
OF AQUATIC PLANT  
MANAGEMENT PROGRAM**

An EPA-sponsored study by scientists at the University of Florida has examined the ecological impacts of integrated biological

and chemical methods of aquatic weed control. Results suggest that environmental effects of plant management programs are determined more by the amount of vegetation controlled than by the management techniques.

An increase in aquatic weed infestation in recent decades has heightened interest in finding an effective, environmentally safe weed-management program. Scientists agree that a certain amount of plants are important for an aquatic ecosystem; however, little quantitative data are available to determine what that amount is. Also, it is difficult to assess the level of aquatic plant abundance that constitutes a weed problem.

This study was conducted to provide quantitative information on the influence of aquatic plant density and the impact of chemical and biological (grass carp) management techniques on the aquatic environment. Three separate projects were carried out on Florida lakes. Orange Lake, a large lake with an abundance of plants, was studied to determine the effect of naturally occurring fluctuations in vegetation and the effect of different vegetation types on the aquatic environment. Orange Lake was not treated for weed control. Lake Pearl, a small lake with an abundance of hydrilla, was studied to determine if chemical and biological control techniques could be integrated to provide long-term vegetation management without removing all vegetation.

Use of herbicides and grass carp in this lake was studied to determine the impact of integrated management on the aquatic environment. And pond studies were conducted to determine the environmental impact of different aquatic plant management techniques at different degrees of weed management. Effects of several herbicides and the grass carp were determined.

The study did not demonstrate definitively any direct impact of herbicides or grass carp on water quality or on invertebrate and fish populations. However, the data demonstrated that biological and water quality changes occur as abundance of vegetation is altered by natural or human-caused factors. This suggests, according to the study, that the potential environmental impact of various aquatic plant management programs will be determined more by the amount of vegetation controlled than by the control method used, whether it be herbicides (used according to label instructions) or grass carp.

The study also indicates that grass carp can eradicate submersed vegetation from lake ecosystems at a fraction of the cost of herbicide methods. But the long-term impact of complete submersed-vegetation removal is not known. One of the recommendations from this project is for a study (of at least 3-5 years) of the ultimate impact of vegetation removal.

Investigators for the project were J. V. Shireman, W. T. Haller, D. E. Colle, C. E. Watkins, II, D. F. DuRant, and D. E. Canfield of the University of Florida at Gainesville. Copies of their report, Ecological Impact of Integrated Chemical and Biological Aquatic Weed Control, are available for \$26.50 (subject to change) from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161. Telephone: 703/487-4650.

**UNIQUE WATER  
STUDY UNDERWAY**

The Adirondack Lakes Survey Corporation, established by the New York State Department of Environmental Conservation and the Empire State Electric Energy Research Corporation to study water quality and fish populations in some 1,200 Adirondack lakes, is fully staffed and underway. The project is the largest state electric industry endeavor of this nature ever undertaken.

The three-year study, costing an estimated \$4.2 million, was announced last year. It is designed to help fill the gaps in knowledge of water chemistry and its effects on fish life in the Adirondacks. It will provide extensive baseline data which will form a basis for assessing environmental changes, such as acid rain deposits, long into the future.

More than three-fourths of the study costs will be paid for by electric utilities. Included will be a mobile laboratory containing state-of-the-art analytical instrumentation to help in the survey work and field studies, which will be designed and directed by the Department of Environmental Conservation.

. . . *Wildlife Management Institute*

**NEW PUBLICATION ON NATURAL  
AND MODIFIED POCOSINS**

Pocosins are freshwater wetlands found extensively in the lower coastal

plains of Virginia, North Carolina, and South Carolina. Natural pocosins serve important functions of wildlife habitat; carbon storage; and water purification, retention, and storage. But at the same time their value is being recognized, other factors, such as improved technology, are combining to make their development more attractive. In light of this situation, the topic of pocosins is drawing interest and concern.

A publication from the U. S. Fish and Wildlife Service offers a synthesis of information in the literature on pocosins--their origin, distribution, ecological character, value, and use. It also addresses management issues and options. Natural and Modified Pocosins: Literature Synthesis and Management Options was prepared by Andrew N. Ash, Charles B. McDonald, Emilie S. Kane, and Carolyn A. Pories of the East Carolina University Department of Biology and Institute for Coastal and Marine Resources.

The publication contains chapters on the environmental impacts of pocosins alteration, regional management as a tool for effective land management, water management from on-site and off-site perspectives, current ideas concerning wildlife management, and wildlife management recommendations by land-use type and species. Sections on wildlife and water management on small and large farms and commercial forests are included primarily for individual and corporate landowners. To address the often quite different needs of state or federal wildlife and natural resources officials, sections are included on regional management, management of wildlife on natural forest-land refuges, and management for specific important coastal plain wetland species.

Pocosin is an Algonquin Indian term meaning "swamp on a hill." Seventy percent of the nation's wetlands classified as pocosins are found in North Carolina's lower and middle Coastal Plain, the report states. However, pocosin development has been extensive. In 1962, natural or slightly modified pocosins covered 2,240,000 acres in North Carolina, but by 1979 natural pocosins occupied only 695,000 acres.

Requests for this publication should be directed to Information Specialist, National Coastal Ecosystems Team, U. S. Fish and Wildlife Service, NASA/Slidell Computer Complex, 1010 Gause Boulevard, Slidell, LA 70458.

EFFECTS OF NON-PHOSPHATE DETERGENTS EXAMINED BY INTERNATIONAL COMMISSION The International Joint Commission (IJC) recently released the third and final report on the "Ecological Effects of Non-Phosphate Detergent Builders." The report focuses on inorganic builders, such as carbonates, silicates, and aluminosilicates.

Previous reports have dealt with the organic builder nitrilotriacetic acid (NTA), and with three other important organic alternatives to phosphate--citrate, carboxymethyloxysuccinate (CMOS), and carboxymethyltartronate (CMT).

IJC's Science Advisory Board created the Task Force on Ecological Effects of Non-Phosphate Detergent Builders to study the available information on alternatives to phosphates and to report on the ecological suitability of these alternatives.

The studies were initiated because restrictions on detergent phosphates have resulted in the release into the environment of many alternative materials used by detergent manufacturers.

The conclusions and recommendations of the Task Force are as follows:

Sodium Carbonate and Sodium Silicate

Carbonate and silicate are natural constituents of the environment. Their use as detergent builders will increase pH, alkalinity, and buffer capacity of receiving waters because they are not removed by wastewater treatment procedures.

There was no evidence, however, that the concentrations involved affected wastewater treatment, were toxic, or were otherwise harmful to the freshwater environment either directly or indirectly. The Task Force concluded that the use of sodium carbonate and sodium silicate is ecologically acceptable.

Type A Zeolite

Type A zeolite is not a natural product. However, it does undergo approximately 80 percent removal during conventional secondary wastewater treatment. The material, while not interfering with wastewater treatment itself, does result in greater production of waste sludge. Although the remaining zeolite can exchange various heavy metals, it appears to have no toxic or other detrimental effects in the aquatic environment, either directly or indirectly. The Task Force concluded that the use of Type A sodium zeolite is ecologically acceptable.

For further information on this study write International Joint Commission, Great Lakes Regional Office, 100 Ouellette Ave., Windsor, Ontario, Canada N9A 6T3.

. . . Water Impacts  
Institute of Water Research  
Michigan State University

EPA NATIONAL INVENTORY CITES IMPROVED WATER QUALITY

The Environmental Protection Agency's recently published Na-

tional Water Quality Inventory Report for 1982 indicates that water quality is improving in many states, with the majority of the waters assessed being able to meet the interim Clean Water Act goal (that, wherever attainable, water of fishable and swimmable quality be achieved by 1983). Point and nonpoint sources of pollution continue to cause problems, limiting water use in many parts of the country. Two issues of national concern are cited: pollution from toxic substances, and groundwater contamination and depletion. Thirty states cited violation of water standards or impairment of uses due to toxic substances. Groundwater problems due to contamination or depletion were reported in over half the states.

The national report is based on water quality reports submitted biennially by the individual states in keeping with Section 305(b) of the Clean Water Act. The section summarizing North Carolina's report notes improvement on several fronts. For instance, a few new areas in coastal waters were classified as shellfish waters, and over 100,000 fewer acres of shellfish waters were closed because of pollution. Educational efforts are paying off as people become aware of sedimentation problems and ways to control them.

The number of degraded streams or stream segments that do not meet stream standards a significant part of the time has been reduced from 410 in the last biennium to 259 at the end of 1981. The number of streams that carry dissolved oxygen and/or coliform exceptions to their standards was reduced from 35 to 27. Drinking water supplies have continued to meet all standards with very few exceptions.

Among the programs with positive impacts on the state's water quality is the now-reduced construction grants program, which has made possible the large increase in treatment plants able to adequately treat the waste they receive. The N. C. Waste Water Treatment Plant Operator Training and Certification program is also cited for its role in ensuring reliable plant operation and meeting effluent criteria.

The EPA report is No. EPA 440/2-84-006, from the EPA Office of Water Regulations and Standards, Washington, DC 20460. Copies of the North Carolina 305(b) Report may be requested from the N. C. Department of Natural Resources and Community Development, Division of Environmental Management, Raleigh, NC 27611.

USGS REPORT LOOKS AT TRENDS IN ACID RAIN

Because of the regional and international nature of the acid rain problem, it is necessary to determine the important sources, transformations, and impacts of acid precipitation. Trend analysis, with the long-term information it furnishes (such as whether an area became acidified in the last 10, 50, or 100 years), can be a useful tool in this endeavor.

The U. S. Geological Survey has published a report that evaluates published trend information about the chemical quality of precipitation and surface waters. An Evaluation of Trends in the Acidity of Precipitation and the Related Acidification of Surface Water in North America, by John T. Turk, is USGS Water Supply Paper 2249.

The paragraphs below summarize information in the report:

The acidity of precipitation in the Northeastern United States and Southeastern Canada has increased in the past, probably as a result of anthropogenic (human-caused) emissions. The increase in New England and New York occurred primarily before the mid-1950s. Since the mid-1960s, there has been no significant change in the acidity of precipitation in this region; however, sulfate concentrations have decreased and nitrate concentrations may have increased. The time of initial acidification in Southeastern Canada is not known because of a lack of historical data. In the Southeastern United States, the evaluation of whether precipitation has been acidified is complicated by meager data. The available data show that precipitation is more acidic than would be expected for sites unaffected by anthropogenic emissions. In addition, comparison of recent data with the meager historical data suggests, but does not unambiguously prove, increased acidification since the 1950s. In the Western United States, available data indicate that precipitation at individual sites has been acidified by anthropogenic emissions. The acidification generally has been attributable to localized sources, and the time of initial acidification is undefined.

Acidification of lakes and streams in the Northeastern United States has occurred in a time frame compatible with the hypothesis that acidification of precipitation was the cause. The acidification of surface waters appears to have occurred before the mid- to late 1960s. In Southeastern Canada, the best-documented cases of acidified lakes point to localized sources of acidic emissions as the cause. Sparse evidence of recent regional acidification of lakes and streams exists, but evidence for acidification of precipitation as the cause is largely lacking. In the Southeastern United States, most data on acidification of surface waters are ambiguous, and in the West, most of the data reflect local conditions. However, recent analysis of a national network of remote stream sampling stations indicates that since the mid- to late 1960s, sulfate concentrations have increased in the Southeast and the West, with a concurrent decrease in alkalinity. Additional work is needed to test the hypothesis that regional acidification of surface waters is occurring in the Southeastern and Western United States.

MERCURY CONCENTRATIONS IN JORDAN LAKE FISH WITHIN ACCEPTABLE LEVELS

The 1982 and 1983 fish tissue analyses by the N.C. Division of Environmental Management on B. Everett

Lake indicated that mercury concentrations in the fish taken from the lake were well within acceptable levels to protect human health. Levels of other heavy metals (arsenic, cadmium, chromium, copper, nickel, lead, and zinc) were either mostly below laboratory detectable levels or below levels found in fish from other studies. This information is reported in a DEM document, Mercury and Other Metals in the Fish of B. Everett Jordan Lake, N. C.

Jordan Lake is downstream from a number of industrial and municipal facilities that discharge varying amounts of metals. Since the lake is the first major impoundment below many of these dischargers, metals will have an increased affinity to settle out into the sediments and become available to the biota, the DEM report states. Since many of these metals, especially mercury, are toxic to man and fish, this could represent a potential threat to the lake's intended usage.

DEM sampled five locations on Jordan Lake for fish tissue on September 15, 1982, and April 24, 1983. One hundred and fifty samples were analyzed for mercury, and an average concentration of 0.22 mg/kg wet weight was found. This level is well below the FDA "action level" of 1.0 mg/kg. The "action level" was only exceeded by two samples, or 1.3 percent of the total number of samples. These two samples were bowfins, which have been shown in other studies to have higher mercury concentrations than most other species. The bowfin is not usually considered an edible species, and thus poses less risk to human health if mercury concentrations are elevated. Therefore, the report concludes, mercury and other heavy metal concentrations in the fish from Jordan Lake do not currently pose any problem to the environment or human health.

In a related study, Institute Investigator Dr. Mark Shuman of UNC-Chapel Hill looked at metal concentrations in streams supplying Jordan Lake. Shuman states in his report that "metal concentrations were fairly typical for streams receiving municipal and industrial wastewater effluent and were below recommended levels for drinking water." The report, Metal Loading of the B. Everett Jordan Reservoir, is No. 200.

LIMNOLOGICAL REPORT ON JORDAN LAKE RELEASED

Researchers at the University of North Carolina at Chapel Hill recently presented a

paper entitled: "The Limnology of a New Reservoir in Piedmont North Carolina: The First Two Years of B. Everett Jordan Lake." The report, authored by Charles Weiss, Don Francisco, and Peter Cambell, Professor, Lecturer, and Research Associate, respectively, in the Department of Environmental Sciences and Engineering, was presented at the 1984 Triangle Conference on Environmental Technology held at Duke University on March 8. It contains data on total and total dissolved phosphorus, total and total inorganic nitrogen, chlorophyll a, phytoplankton, and heavy metals for 1982 and 1983. Predictions about excessive levels of nitrogen and phosphorus and their stimulation of obnoxious algal blooms have been central issues concerning this project since initial construction activity began in the late 1960s. The lake covers approximately 14,000 acres, contains over 750,000 acre-feet of storage, and is considered to be one of the most significant water resource developments within the Research Triangle area as well as

within the Cape Fear River Basin. Yet, as discussed elsewhere in this issue of the newsletter, the N. C. Environmental Management Commission classified the lake as "nutrient sensitive" and restricted its use for drinking water until questions about toxic substances could be addressed. Within the past month waste dischargers on the New Hope River arm of the lake (Chapel Hill, Durham, and Durham County) have been directed by the N. C. Department of Natural Resources and Community Development to submit by May 1, 1984, proposed compliance schedules for meeting an effluent limitation of 1 mg/l on phosphorus. The report concludes that:

"While B. Everett Jordan Lake in 1982 and 1983 was probably one of the eutrophic lakes in North Carolina, the very dire predictions of the Environmental Impact Statement as well as the public predictions by many individuals and groups, in the main, have not been realized. The reservoir is currently more similar to other Piedmont reservoirs than to the predictions and seems to be acceptable for all intended purposes. ...While the flow into (the)...Lake has the highest proportion of point source wastewater flow of any North Carolina Reservoir, the health-related pollutants (metals and indicator organisms) did not indicate any reason for concern. Nutrient inputs from point sources are of concern; however, to date, these have not resulted in unacceptable conditions...."

The report points out that during the first year of operation there were unusual surges of phytoplankton productivity, but during the second year the behavior resembled other Piedmont reservoirs. The authors state that they expect this trend to continue toward equilibrium, but only time will tell.

**NEW INSTITUTE REPORT**      *Financing Water Supply and Wastewater Services in North Carolina in the 1980s* by

Dr. David H. Moreau and Dr. Dale Whittington, Department of City and Regional Planning, UNC-Chapel Hill. The costs to North Carolina cities of financing water and sewer service in the 1980s are examined in this report in light of two significant changes: the large increase in cost of financing capital investments and the sharp reduction in federal grants for water and sewer facilities. Results of a survey of 41 of the largest cities in the state are used to estimate the present levels of revenues and expenditures, and trends in those components are estimated from time series data on relevant indicators. Trends for each of those components are then projected to assess probable revenue and price increases over the next several years. Actions that can be taken by local governments to offset cost increases and grant reductions are evaluated in the context of two case studies: the provision of a new water source for the City of Durham and an evaluation of the capital improvement program for the Orange Water and Sewer Authority.

The report is No. 212. It is available from the Institute free of charge to North Carolina residents and for \$8 for out-of-state requests. A summary of this report appears as a NEWS "Special" at the end of this issue.

**NEW PUBLICATIONS RECEIVED BY THE INSTITUTE**

(Residents of North Carolina may borrow these from the Institute for a two-week period. Where individual copies are desired, readers are encouraged to request copies from the organization issuing the publication. The addresses are provided by the NEWS for this purpose.)

**CONFERENCES AND WORKSHOPS**      First National Conference on Abandoned Wells: Problems and Solutions, May 30-31, 1984, Center for Continuing Education, The University of Oklahoma. For additional information contact Debby Fairchild at the Environmental and Groundwater Institute, (405) 325-5202.

Fifth Conference on Water Chlorination: Environmental Impact and Health Effects, June 3-8, 1984, The College of William and Mary, Williamsburg, VA. For additional information, please contact Robert L. Jolley, Fifth Water Chlorination Conference, Oak Ridge National Laboratory, P. O. Box X, Oak Ridge, TN 37831. Telephone: 615/574-6838. FTS: 624-6838

**POSITION AVAILABLE**      Statistician - Joint position with the Department of Statistics and the Wyoming Water Research Center. This is a tenure track position with excellent research opportunity. Must have earned Ph.D. degree with a demonstrated interest in research in applied statistics, applied probability modelling or applied stochastic processes.

Applications will be received until June 15, 1984, or until the position is filled. Send letter of application, resume, and a list of three references to: Dr. Leon Borgman, 329 Ross Hall, University Station, Laramie, WY 82071.

**WATER RESOURCES CONDITIONS**      Streamflow was above normal in NORTH CAROLINA (March)      normal statewide. On the 28th, a fast-moving system of violent thunderstorms and heavy rains caused localized flooding on headwater streams in many parts of the eastern Piedmont and Coastal Plain regions. Tornadoes and high winds associated with this storm caused over \$100 million in property damages and claimed 44 lives in North Carolina alone. The Federal Emergency Management Agency declared the following 8 Coastal Plain counties disaster areas: Bertie, Duplin, Greene, Hertford, Pitt, Robeson, Scotland, and Wayne. Extensive damages also occurred in 10 other counties; however, assessments were incomplete at the time of this report. Damages from flooding were light and generally limited to low-lying agricultural areas and woodlands.

Mean monthly flows at selected stations, as compared to long-term means for March, were: French Broad River at Asheville (Mountains), 116 percent; South Yadkin River at Mocksville (Piedmont), 145 percent; and Contentnea Creek at Hookerton (Coastal Plain), 142 percent.

Groundwater levels in shallow wells generally declined across the State except in the western Piedmont where moderate increases occurred. As compared to long-term records, however, levels in all areas unaffected by nearby withdrawals were above normal, ranging from 1-2 feet above normal in Coastal Plain wells to 5 feet or more elsewhere. For the second consecutive month, levels in the Mocksville well, Davie County, were at record high levels.

. . . U. S. Geological Survey

Water Resources Planning

"Operation of Hydrologic Data Collection Stations by the U. S. Geological Survey in 1983," (USGS Open File Rpt. 83 662) 1983, by A. C. de la Torre, avail. from Open File Section, Western Distribution Br., Box 25425, Fed. Center, Denver, CO 80225. (USGS)

"South Carolina State Water Assessment," (#140), 9/83, by H. S. Snyder, et al., SC Water Resources Commission, 3830 Forest Dr., PO Box 4440, Columbia, SC 29240, Price - \$16. (06 State Water Plan)

Water Quality Management

"Public Policy for Chemicals: National and International Issues," (ISBN: 0-89164-062-2), by S. Gusman, et al., avail. from Publications Dept., The Conservation Foundation, 1717 Massachusetts Ave., NW, Washington, DC 20036, Price \$8.50. (05B)

"Ecological Effects of Non-Phosphate Detergent Builders: Final Report on Inorganic Builders," 11/83, by Task Force on Ecological Effects of Non-Phosphate Detergent Builders, Contact International Joint Commission, Great Lakes Science Advisory Board, 100 Ouellette Ave., 8th Floor, Windsor, Ontario N9A 6T3. (05C)

"An Issue Report Determining Unreasonable Risk Under the Toxic Substances Control Act," (ISBN: 089164-055-1) by J. C. Davies, et al., avail. from Publications Dept., The Conservation Foundation, 1717 Massachusetts Ave., NW, Washington, DC 20036, Price \$4. (05B Toxics)

"Proceedings of Fundamental Research Needs for Water and Wastewater Systems," 12/1-2/82, ed. by M. S. Switzenbaum, avail. from Dr. Desmond Lawler, Dept. of Civil Engr., U. of Texas, Austin, TX 78712. (05)

Water Quantity Management

"Urban Water Conservation," by J. E. Flack, avail. from ASCE, 345 E. 47th St., NY, NY 10017, Price \$13.25. (03D Conservation)

"Ground Water Resources of the United States," 1983, by D. K. Todd, avail. from Premier Press, P. O. Box 4428, Berkeley, CA 94704, Price - \$39. (HB)

"Water in America 1983," by USGS, for sale by Supt. of Doc., USGPO, Washington, DC 20402. (USGS)

"Surface Impoundment Assessment National Report," (EPA-570/9-84-002), 12/83, by Office of Drinking Water, WH-550, USEPA, Washington, DC 20460. (EPA)

Miscellaneous

"Environmental Quality 1982: 13th Annual Report of the Council on Environmental Quality," (#041-011-0076-9), avail. from Supt. of Doc., USGPO, Washington, DC 20402, Price - \$5.50. (CEQ)



SPECIAL

Financing Water and Sewer Services in North Carolina in the 1980s

by

David H. Moreau  
Department of City and Regional Planning  
University of North Carolina at Chapel Hill  
and  
Director, Water Resources Research Institute

A Summary of Report No. 212 of the  
Water Resources Research Institute  
of The University of North Carolina

Introduction

Two important changes have occurred within the past five to six years that will have important effects on the cost of water and sewer service in North Carolina as well as in other states. First, there has been a sharp increase in the cost of financing new construction as municipal bond rates have increased from less than six percent to a 1982 high of over 13 percent. Second, there has been a sharp reduction in federal construction grants; and with repeal of the third Clean Water Bond, grants from the State of North Carolina will be eliminated. Those factors compound the problem of providing new facilities for a state that continues to grow, in an environment characterized by persistent inflation in the construction industry.

This paper summarizes the findings of a recent study of the implications of trends in water and sewer costs and discusses the likely effectiveness of several alternative approaches to the mitigation of their impacts. It begins with the findings of a survey of revenues and expenditures for water and sewer services in 41 cities in North Carolina. Components of these costs are identified, and inflation trends for each component are examined. Finally, several strategies for reducing the impacts of these trends are discussed, and results of an evaluation of selected elements of these strategies are presented.

Current Revenues and Expenditures

The current situation in financing water and sewer services in North Carolina was estimated from two primary sources of information: (1) a survey of all cities in the state serving over 10,000 persons; and (2) a tabulation of federal and state grants and local bonded indebtedness based on information made available through the North Carolina Department of Administration. Questionnaires were sent to 53 municipalities and water and sewer authorities identified from a list maintained by the Division of Health Services in the N. C. Department of Human Resources. Follow-up letters and telephone calls produced 45 responses. Four cities were subsequently dropped from the survey because they were both marginal in size and their data were not in sufficient detail to satisfy the purposes of this study. The primary sources of information were the budget and expenditure reports published by the cities and authorities for Fiscal Year 1982 (July 1, 1981 - June 30, 1982).

There are several difficulties in using that data to make estimates of cost. Difficulties are created by the lack of a standard set of accounts both for activities and categories of expenditures. Considerable judgment is required to create a set of accounts that are common to a large number of the municipalities and to assign expenditures to those accounts. Another difficulty is the broad range of expenditures that fall under the category of "capital outlay." Entries in this category range from replacement of laboratory equipment to the extension and replacement of water and sewer lines. Most of the reports do not list these expenditures item by item, nor do they report these expenditures by subcategories. Probably the most significant difficulty arises from the fact that most of these reports are fund accounts; as such, they do not show the full set of capital assets and associated depreciation costs. Few of the cities maintain fixed assets accounts that include all assets, particularly those that are financed through developers and state and federal grants. That information is critical to an assessment of the full costs of providing water and sewer services. Thus, while the data can be used with confidence to estimate operating costs, data on capital expenditures reported in this study cannot be equated with capital costs. Capital costs are most likely in excess of the expenditures reported here.

Despite these difficulties and sources of error, useful insights can be obtained from the data. Results of the analysis are summarized in Figure 1. For all of the 41 cities, the annual operating cost was \$126 million to deliver 107,450 million gallons of water and to manage 93,670 million gallons of waste water. Of that total, \$52.3 million (41.4 percent) was clearly assignable to water services, \$47.5 million (37.6 percent) was clearly assignable to sewer services, and the balance of \$26.6 million (21.0 percent) was assigned to joint costs. If the joint costs are assigned to water and sewer services in direct proportion to the separable costs, then the operating cost for water is estimated to be \$66.2 million, and the operating cost for sewer service is estimated at \$60.2 million. Thus, the unit operating cost for water is \$0.62 per 1000 gallons and for sewer service \$0.64 per 1000 gallons.

The total operating cost can be broken down into components. Personnel costs, including salaries, wages, fringe benefits, and employer contributions to Social Security account for 42 percent of the total. Chemicals account for 6.3 percent, and utilities contribute 17 percent to the total. The balance of 35 percent covers a wide variety of other expenses.

Estimates of capital and capital-related expenditures came to a total of \$129 million. Internally financed capital outlays were estimated at \$30.2 million or 23 percent of the total. Debt service for all 41 cities came to \$46.2 million, 36 percent of the total. Unfortunately, the data did not permit a breakdown of capital outlays and debt service into water and sewer services. Because of significant fluctuations in annual grant awards due to the influence of a few large projects, a five-year average of state and federal grants over the period 1977-82 was used to

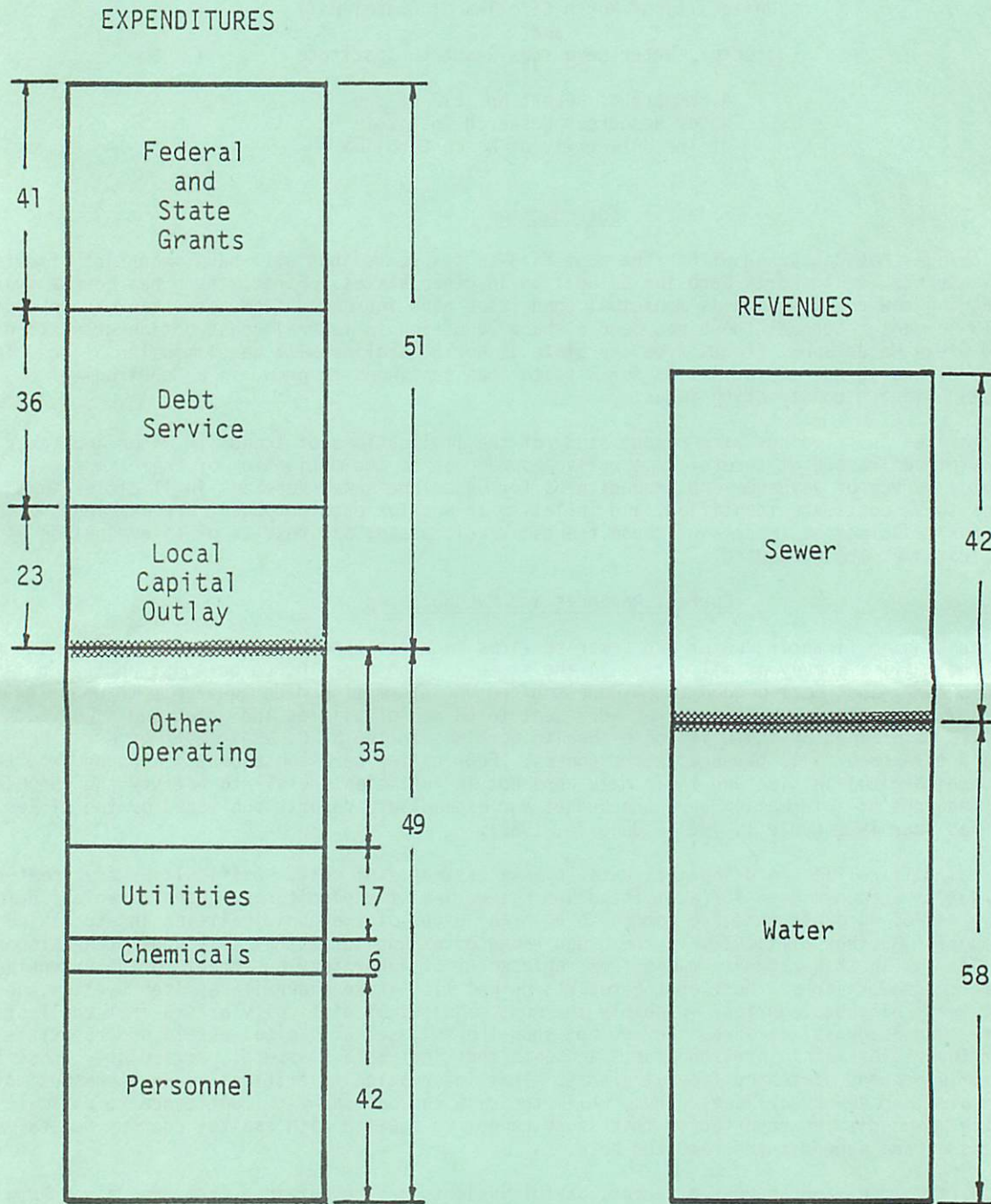


Figure 1. Revenues and Expenditures for Water and Sewer Services in NC Cities - 1982

estimate that component of capital expenditures. That average rate was \$52.7 million, 41 percent of the total. Of that amount in grants, \$7.3 million was for water projects and \$45.4 million was for sewer facilities.

Thus, the total expenditures for water and sewer services in these cities was \$255 million, approximately 49 percent for operating costs and 51 percent for capital and capital-related expenditures.

Revenues from these services, excluding grants, amounted to \$193 million. By far the largest proportion of these revenues were generated from monthly charges to customers, accounting for 84 percent of the total. Interest on investments contributed 3.4 percent and fund transfers another 3.5 percent. Service initiation fees were 2.2 percent of the total, and income from assessment projects contributed only 0.5 percent.

Of the \$162 million in revenue from monthly service charges, \$135.2 (83.4 percent from that source; 70 percent of all revenues) was broken down into water revenues and sewer revenues: \$78.3 million for water and \$56.9 million for sewer. Thus, where breakdowns were shown, 58 percent of revenues was from water services and 42 percent from sewer services. Neither the balance of \$26.8 million in monthly charges nor the \$30 million in revenues from other sources could be assigned to water or sewer accounts. However, if all of the revenues are allocated to water and sewer services according to the 58-42 percent distribution, then revenues from water services would be \$112 million, and revenues from sewer services would be \$81 million. With this allocation the average customer cost would be \$1.04 per 1000 gallons for water and \$0.87 per 1000 gallons for sewer service.

These estimates result in a ratio of water revenues to water operating costs equal to 1.67. For sewer service that ratio is 1.36. The ratio of total revenues to total expenditures is 0.76, the difference being accounted for in large part by capital grants.

There are considerable variations in these numbers from one city to another. The most significant finding in the city-by-city analysis was that 21 per cent of the cities had operating revenues less than operating costs for water service. That analysis was based on 28 cities for which it was possible to obtain reasonably complete breakdowns of revenues and costs for water services. A similar analysis on sewer service in 27 cities indicated that 19 percent had operating revenues less than operating costs.

### Trends

#### Costs

The present situation described above indicates that while the need for some changes is clearly indicated, the cost of water and sewer service in North Carolina is still quite reasonable. However, there are trends that signal sharp increases in costs may lie ahead. Increases in operating costs have had and probably will have a less dramatic effect on consumer costs than capital costs, but they have persistently increased over the past decade. Average wages for city and county employees in North Carolina have increased at an average annual rate of 6.6 percent from 1978 to 1982. Over the past decade prices for electricity have increased at average annual rates between 11 and 12 percent, approximately 10 percent per year over the past five years. Chemical prices have been erratic over that period. Caustic soda increased at an average rate of 13 percent per year over the past five years, chlorine prices remained relatively constant, and hydrated lime increased steadily at a rate near six percent per year.

More significant changes are occurring in capital and capital-related costs. Costs of construction show no significant departures from past trends despite changes in the general rate of inflation. The Engineering News Record construction cost index for Atlanta, the nearest city for which that index is maintained, increased at an average rate of 9.0 percent over the period 1967-83, at a rate of 8.1 percent over the past ten years, and over the past five years the rate has been 8.2 percent per year. That pattern is shown in Figure 2. The sewage treatment plant index developed and maintained by the U. S. Environmental Protection Agency shows cost increases ranging from 7.1 percent for a five-million-gallon-per-day (MGD) plant in Roanoke, Virginia, to 8.5 percent for a 50 MGD facility in Atlanta.

Continued inflation in construction costs is aggravated by the dramatic increases in cost of financing these facilities. Before 1978, general obligation bonds were sold at stable discount rates, generally less than six percent. However, as shown in Figure 3, those rates began to rise in 1978, increased sharply in 1981, and reached a peak in 1982. Although these rates have moderated recently, they still represent a large increase in the cost of financing. A shift from a rate of 5.7 percent to 13.4 percent represents an 85 percent increase in the cost of financing, while even a modest shift to 10 percent causes a 46 percent increase in that cost. These effects are of particular importance in a growth area such as North Carolina.

#### Reductions in Intergovernmental Support

Inflation in construction costs and increases in the cost of financing are further compounded by reductions in federal and state support. In a companion study, Whittington and Snyder (1983) have tabulated the sources of funds for capital expenditure on water and sewer facilities in North Carolina over the past decade. A summary of those expenditures by source of funds is shown in Figure 4. That data indicates that when the expenditures are adjusted to a common base of 1982 dollars, the state contributions have remained relatively constant over that time period, local expenditures have fluctuated without any definite trend, and federal sources have dropped sharply since 1976 after a dramatic rise in the early 1970s. Most of the changes in federal funds are accounted for by construction grants for waste treatment facilities. State contributions came largely from the Clean Water Bonds, \$150 million in 1971 and \$220 million in 1977. However, the third issue of those bonds was repealed by the General Assembly in 1983. Thus, state contributions will be virtually eliminated.

#### Probable Impacts

If these cities had to replace all state and federal grants with local funds, the impact would be a 6.6 percent increase in revenue requirements for water and a 56 percent increase for sewer services. Total revenues would have to be increased by 27.4 percent. If all subsidies, including grants and fund transfers, were replaced by revenues from customers, then rates would have to be increased by 32 percent.

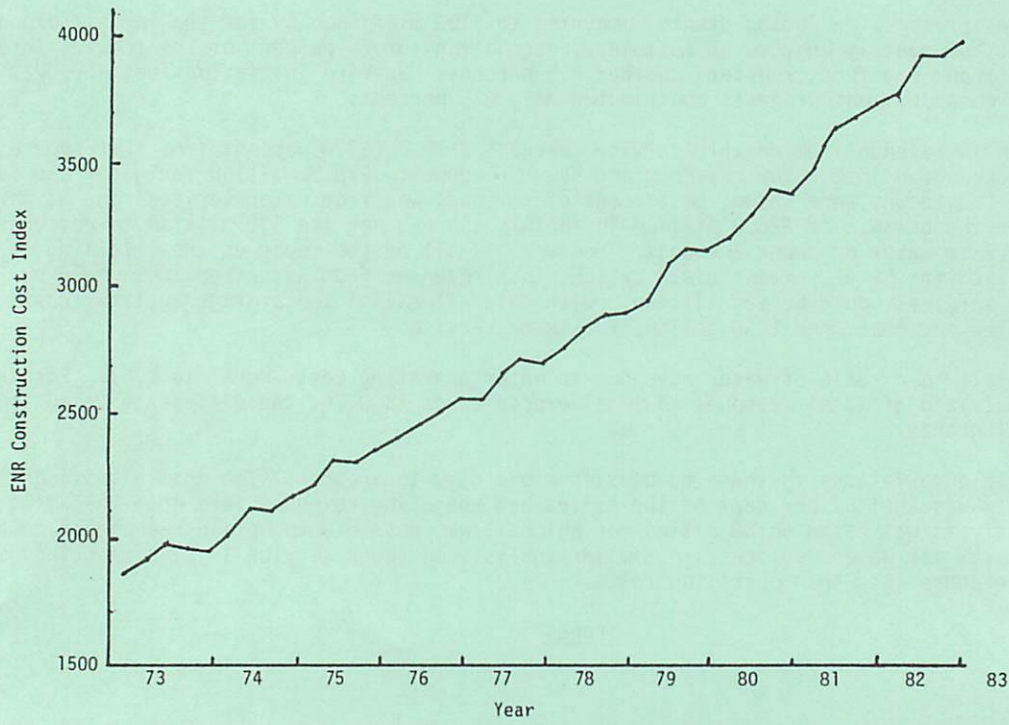


Figure 2. Trends in Construction Cost Index (Atlanta)

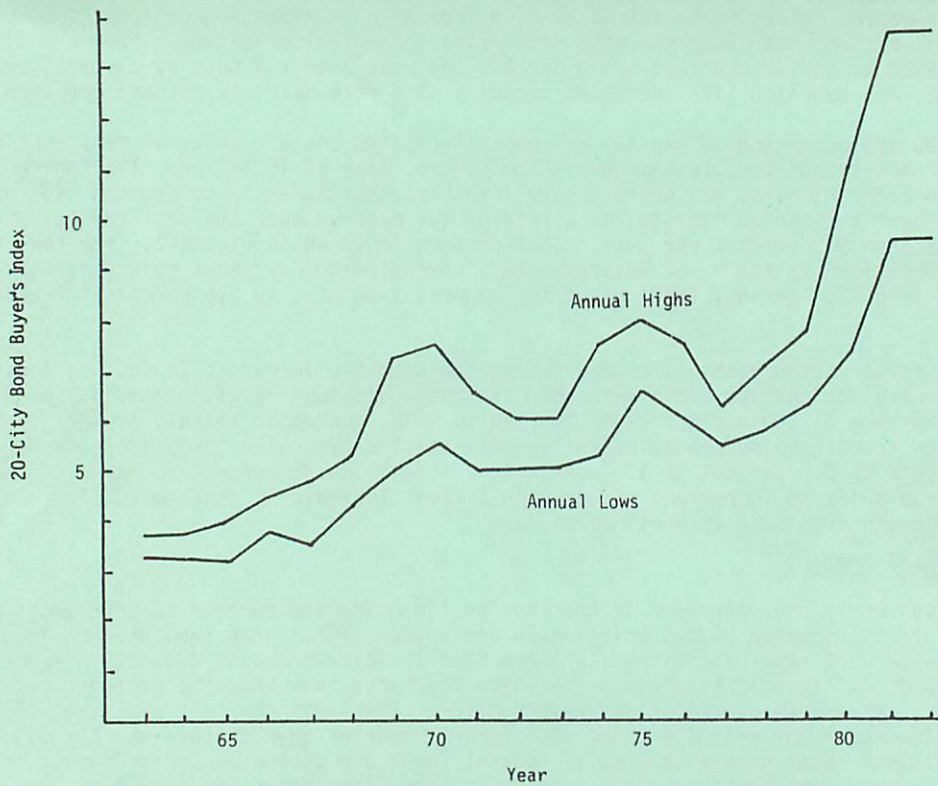
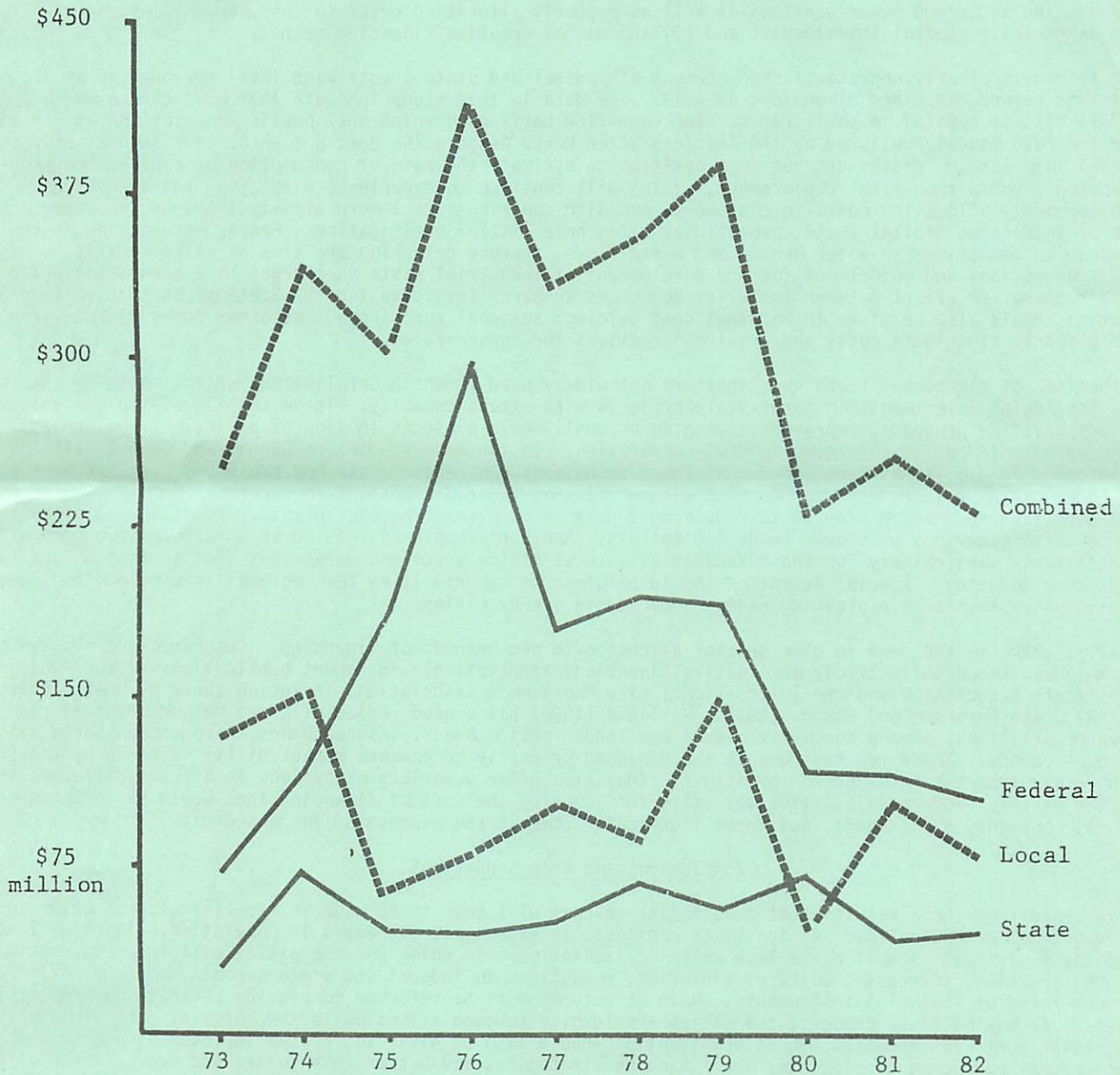


Figure 3. Twenty-City Average Rate in Municipal Bond Buyer's Index

Figure 4. Federal, State, and Local Expenditures on Wastewater Treatment and Water Supply Facilities from 1973 to 1982 in Millions of 1982 Dollars\*1



\*Local spending includes bond issues for water supply and wastewater treatment facilities each year. State spending includes Clean Water Bond commitments per year. Federal spending is the sum of EPA Section 201 grants, FmHA grants and loans, EDA grants and CDBG expenditures. Combined is Federal + State + Local.

Communities will face the impacts of grant reductions at different magnitudes and at different times depending upon local needs and financing strategies. Impacts of grant reductions will also be felt in the context of inflation in other costs. The overall effect of grant reductions and inflation can be estimated for a city representing the average of revenues and expenditures updated in the survey, by inflating each component of cost at present trends and bringing local revenues into balance with expenditures. That effect would be a 15.6 percent per year increase in consumer prices over the next five years. During that period expenditures would be increasing at a rate of 9.3 percent. These estimates are significantly higher than estimates of increase in consumer prices experienced in North Carolina over the period 1974-1980 when prices rose at a rate of 7.2 percent a year.

#### Strategies for Mitigating Cost Increases

These trends clearly indicate a need for action on the part of local governments. Greater attention must be given to the capital budgeting process, to rate reform, and to new methods for financing capital investments. Several strategies for mitigating these impacts should be explored. For convenience those strategies may be broadly described in three categories: (1) rate reform, including the development of rate structures to recover the full cost of providing water and sewer services as well as properly allocating costs to consumers; (2) strategies for deferring large-scale capital investments; and (3) the use of creative financing methods.

Rate reform is clearly necessary. Replacement of federal and state grants with local revenues is an obvious need, but rate reform has other dimensions as well. The data in this study indicate that most cities are not reflecting the full cost of capital in their rates. The cash-flow basis upon which most public agencies operate in accordance with the rate manual published by the American Water Works Association does not encourage fixed-asset accounting. Without that information, cities are not in a position to estimate the rate of consumption of capital and provide for its replacement, and without that replacement, cities will continue to experience a decaying infrastructure. Rate reform, by properly allocating costs to consumers, can also contribute to a more efficient use of the water resource. In an era of increasing capital costs, promotional rates have little justification. Proper structuring of the rates may also lead to reductions in water demand and waste flows, thereby deferring the time at which facilities must be expanded. Suggestions and guidelines for the development of industrial waste surcharges have been developed previously in a cooperative effort between the Water Resources Research Institute and the State of North Carolina (1972). Consideration should also be given to marginal cost pricing, seasonal surcharges, and other forms of rate structures that both properly distribute costs and provide incentives for conservation.

Another set of management techniques that are not widely used in North Carolina but which should be considered are those that defer investments in large-scale projects with excess capacity. These techniques include load management, conservation programs, improved sequencing of small-scale projects in lieu of a single large project, and exploiting opportunities for intergovernmental cooperation. In two case studies on Durham and Chapel Hill (Moreau and Whittington, 1983), it has been shown that these techniques can reduce costs and projected costs by more than 10 percent. Some of these techniques can be used without causing major disruptions in service. One example is the use of an odd-even lawn sprinkling program to reduce peak demands on water treatment plants. Total demand can be reduced by water-conserving devices on shower heads and toilets. Another example is leasing as an alternative to construction of new facilities, particularly for those facilities such as office space and warehouses that are not unique to the water and sewer industry. Special attention should be given to opportunities for regional interconnections that defer capital investments by exploiting excess capacity in nearby cities.

Finally, there is the need to give greater attention to new methods of financing. Comprehensive reviews of these techniques, known collectively as creative financing, are available in recent publications of the Municipal Finance Officers Association and the International City Management Association, including those by Moak (1982), Matzer (1983), and Peterson and Hough (1983). Williams (1982) has a good review of these methods as they have been used by water utilities. Among these techniques are tender option bonds, insured bonds, zero coupon bonds, and stepped coupon bonds. These new instruments are designed primarily to enhance marketability of bonds by transferring investment risks from the investor to the issuer. They also offer a variety of options to attract different segments of the market. Some possibilities may exist for lowering the cost of financing that would be incurred with conventional constant coupon bonds, but these lower costs come at the expense of increased risk.

#### Conclusions and Recommendations

It is clear from these results that substantial changes will have to be made in the financing of water and sewer services in North Carolina. As the state continues to experience increases in population, cities will have to expand these services as well as replace existing facilities. In doing so, the cities will incur increasing costs of construction, increasing costs of financing, reductions in federal and state support, and they will have to consider new forms of financial instruments. Rate structures must be reformed to provide revenues sufficient to cover costs. In making these changes, the cities should give renewed attention to the forms of rate structures that properly assign costs to consumers. Greater attention should also be given to capital improvement programs that consider the proper sequencing of projects, new financing strategies, and better inventories and depreciation of capital assets. Extended cash-flow analyses should be undertaken to show how the rates can be adjusted to cover the costs of capital facilities as well as operating costs.

State government also has a role to play. The state should consider the creation of new forms of financial assistance to local governments. Particular emphasis should be given to those cities where prior programs have created inequities in the distribution of funds and to those cities where there are insufficient funds to meet water supply and water quality needs. That support could also be used to create incentives for local governments to improve their own capital improvement programs and financial strategies.

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NOTE: Two thousand one hundred and twenty-five copies of this newsletter were printed at a cost of \$834.90, or \$0.39 per copy.

ITEMS OF INTEREST:

All N.C. Senators and House Members Vote to Override  
Presidential Veto on Water Resources Act, page 1  
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and Jordan Reservoirs, page 1  
N.C. Surface Water Standards to Undergo Revisions,  
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Mercury Concentration in Jordan Lake Fish Within  
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OF THE UNIVERSITY OF NORTH CAROLINA  
225 PAGE HALL  
N. C. STATE UNIVERSITY  
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