

## WATER RESOURCES RESEARCH INSTITUTE OF THE UNIVERSITY OF NORTH CAROLINA

Number 139

August 1977

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### NEED FOR WATER SUPPLY PLANNING - AN EDITORIAL

"You don't miss your water  
'til your well runs dry."

That old cliché might refer to your well, river, or reservoir, but it surely means your water. Many citizens in the state are finding themselves high and dry as a result of the water shortage, and inadequate planning for coping with such a hot and dry summer.

Without adequate planning and implementation, towns like Chapel Hill-Carrboro find themselves in a desperate situation with little hope for outside help. With University Lake reservoir at a record 92 inches low they received their annual reminder that contrary to popular attitudes, the water supply is not to be taken for granted and rain is not guaranteed.

Wendell and Zebulon in Wake County experienced similar problems. Emergency measures were also necessary. These are early warnings for other municipalities. From the mountains to the outer banks, the water situation in many communities can be just as severe. If we have a dry August and September, many communities across North Carolina

will face critical water shortages. Greensboro and other Piedmont municipalities drawing water from headwaters of the Tar, Neuse and Cape Fear Rivers as well as some smaller streams could in 10-20 years, discover the rivers don't have the water necessary to meet their needs in times of drought, when they need it most; using groundwater can also be difficult for some of them because the yield from wells is poor in many areas.

Moore and Guilford are among those counties that should act now to seek additional water supplies as their present source cannot support continued growth. Wake County will be hurting unless the Falls of the Neuse reservoir is completed in the next five to ten years. If wells supplying Outer Banks communities prove inadequate, they will have to extend water lines a tremendous distance inland or dig very deep wells to obtain an adequate water supply. This will be very expensive. Asheville could tap the French Broad River to help meet their future water needs, and Lake Michie will eventually be unable to fill all of Durham's water requirements.

The time is here. If citizens of the state want to continue to enjoy such activities as washing clothes

and cars, running dishwashers, filling swimming pools, watering lawns, cemeteries, and golf courses, then they better see to it that somebody expends the energy and manpower to provide the necessary planning and implementation for adequate water supply.

The N. C. Water Resources Framework Study is a document published by the Department of Natural Resources and Community Development. Among other things, it examines water resources across the State using 11 defined river basins as study areas. It is the first step in planning best use of the State's water for the next 15-25 years. It is an overview of needs, problems and opportunities and proposes specific projects for each river basin to achieve economic, environmental and mixed objective alternatives.

The study approaches other problems relating to water supply. In Sparta, in the northwestern part of the State, the groundwater level fell below the pumps, and mechanical problems temporarily caused water shortage. Three wells were drilled to find future water supply but they did not give enough water. In Henderson the newly constructed water plant was rendered inoperable because paint lining material in the transmission pipe came off into the water. They are presently getting water from the old plant. In coastal areas, maintaining water quality is often the problem, because of salt water intrusion. The hope is that advanced planning will address problems before a crisis develops.

Everyone knows the importance of water supply, and all agree we should plan for the future. Getting popular and public support in terms of local, state, or federal funding with your tax dollars is not quite the same. Lip service must end and firm commitments for water resources planning and implementation must be made. Water supply should remain a high priority after the rains come for someday dry weather will return and some will be without adequate water again.

*John Wray, Head  
Water Resources Planning Branch, DNRCD*

### WATER SUPPLY PROBLEMS CONTINUE

Sparta, Kernersville, Henderson, Old Fort, Zebulon, Wendell, Chapel Hill-Carrboro, Waxhaw and

China Grove are among the many North Carolina towns and rural areas facing water supply problems. Lack of long, general rainfall across the state plus record temperatures have forced communities to seek additional water supplies and implement water conservation programs. Dwindling water supplies have many well-drilling companies with a three to four month backlog of requests for wells.

Some North Carolina communities are considering water rationing. Chapel Hill is one of the hardest hit communities and now has mandatory conservation measures.

Chapel Hill has under consideration two alternatives to help ease its water shortage. These include pumping water from the Haw River, in the vicinity of

of where Pittsboro now obtains its water, to a point in the University Lake watershed a distance of about 5 1/2 miles. The second alternative would be the establishment of a series of approximately 30 wells in the watershed areas to yield nearly 2 million gallons of water per day. Secretary Lee of the Department of Natural Resources and Community Development said getting water to Chapel Hill was one of the priority problems for the Department. Without supplemental water sources the town is expected to be in a serious water problem this fall.

### WATER CONSERVATION THROUGH WATER SAVING DEVICES

Much of North Carolina is experiencing severe drought. Many communities face shortages and there is talk of water rationing in some areas.

The question always arises, "What can I do about it?" and the answer is a resounding, "Don't waste water." There are several things that homeowners or apartment dwellers can do to effectively cut down on domestic water consumption. The use of water saving devices is an inexpensive alternative that can even pay for itself in water and energy cost savings. For example, a normal 5-6 minute shower utilizes about 50 to 60 gallons of water. Some of this water must be heated so there are energy costs associated with the water heating and water costs associated with the water use. At a cost for water of \$1.00 per thousand gallons and at an energy cost of 4.5¢/KWH, total cost per shower is about 15¢. With water saving devices capable of reducing water flow by 50 percent, the savings in water will be approximately 25-30 gallons, and a monetary savings of 7-8¢ per shower will result. For a family of 4 monthly savings will amount to 3000 gallons of water and \$5.00 in utilities. These savings can pay for the installation of water saving devices in less than one month and at this time, this is a very wise investment.

Shower devices are only one example of water saving devices. Other very simple devices include submerged water bottles in water closets and flow restrictors on all faucets. The purpose of these water saving devices is obvious and these savings can be accomplished by investing a few minutes time to install a very inexpensive device. For information on water saving devices contact this Institute, your local water company, or a plumbing supply company. During times of drought water is an extremely precious resource - Don't waste it!

*A. R. Rubin*

### "WHAT WE CAN DO BEFORE THE WELL RUNS DRY"

A California Water Resources Center publication #35, *Residential Water Conservation* lists a wide variety of activities which any family

can do immediately to realize about a 20 percent reduction in water consumption. These activities include changing bathing habits, altering drinking and cooking practices, changing clothes and dish washing patterns and changing general house and yard practices which

require water. These activities are all low or no cost activities which will take a concerted effort for their realization.

Other topics addressed in this summary report include wise planning tips on future water requirements around the home and future changes in laws and building codes which will promote the conservation of water.

Copies of this summary report are available on loan from the Water Resources Research Institute of The University of North Carolina and copies of the full original California Water Resources Center report are available for \$7.50 each from the Director, Water Resources Center, University of California, Davis, California 95616.

### DRY SUMMER BOOSTS DEMAND FOR FARM PONDS

The prolonged dry weather across North Carolina in recent months has brought an unusual demand for Soil Conservation Service (SCS)

assistance with farm ponds for irrigation.

The demand comes from every part of the State.

SCS personnel have been especially busy this summer helping landowners determine suitable sites and provide other technical assistance - including placing stakes where draglines and other heavy equipment may dig - on farm ponds.

Through the years, this conservation practice has been one of the most popular with farmers in N.C. More than 67,000 ponds have been installed with SCS technical assistance, and despite sharply increased costs, 500 to 600 ponds are added each year. 1977 may set a record.

Farmers seeking ponds this summer make it clear that irrigation is a prime target. "A pond can pay for itself in one summer like this" is a saying often heard by those assisting with farm ponds.

In addition to irrigation, ponds provide water for beef and dairy cattle, to contain sediment and runoff, for surface water management or fire protection. In North Carolina, where virtually all ponds are stocked, fishing is an added benefit.

### KERNERSVILLE WATER SITUATION UNRESOLVED

Some 30,000 gallons of toxic wastes entered the Kernersville Water supply reservoir on the night of

June 3 from the Destructo Chemical Corporation located about a mile upstream from the reservoir. Today, very little plant life or fish remains in the lake. Still unresolved are answers to the question of who released the waste and why.

Kernersville's water supply from its old reservoir is being supplemented by water from Winston-Salem. The town is seeking a permanent 16-inch water line to Winston-Salem. The cost for such a line is estimated

at about \$2 million and federal and state funds will be needed to build it. According to Town Manager Robert Smith, Kernersville is hopeful of getting federal assistance during the next fiscal year and State funds from the \$230 million State Clean Water Bond to be voted on in November.

Bob Carter of the Division of Environmental Management has indicated it may take a year or more for the pollutants to break down and the reservoir to clean itself.

The chemical that killed the fish still remains in doubt. Some of the wastes which entered the lake were toxic themselves and when they mixed together, new and deadly compounds were formed. An ether-based compound is believed to be the one that killed the fish. EPA officials say, however, that the killer may never be confirmed.

Materials which were spilled included petroleum based hydrocarbon compounds specifically toluene, xylenes, biphenyl, ethylbenzene and cyclohexane. Over 28,000 fish ranging through eight species were killed in the reservoir.

### CORPS STUDIES PIPING OF WATER TO VIRGINIA

While it may be a long way off, North Carolina could be called on to help ease Virginia's long-range water supply problems. Groundwater sources are expected to become critically scarce in the next decade in the more populous southeastern Virginia. The Roanoke and Chowan Rivers in North Carolina are being examined for possible sources of water for that region.

The Corps of Engineers has estimated that by the year 2030 southeastern Virginia will need 75 million gallons of fresh water per day which present sources cannot provide. The Corps indicated there would be excess water in the Roanoke, Blackwater, Appomattox, Nottoway, and James Rivers in Virginia and the Roanoke and Chowan Rivers in North Carolina.

The Corps study was outlined before a commission investigating ways to provide Virginians with adequate water supplies for the future.

Extensive legal negotiations and problems are anticipated in moving water from one state to another or even between regions in the same state.

### WATER SUPPLY PROJECTS FUNDED

State grants totaling \$8 million for water supply projects have been made to 55 local governments across the state, it was announced recently by Secretary of Human Resources Dr. Sarah Morrow and Governor Jim Hunt.

The grants comprise the 10th group of awards made pursuant to the North Carolina Clean Water Bond Act of 1971 and closes out the final regular review period under the Act.

The Act authorized \$70 million for grants to assist local governments in financing the cost of construction of water supply projects. The issuance of Clean

Water Bonds was approved by the voters in a 1972 referendum.

State grant commitments amounting to about \$67 million have been made to 375 construction and improvement projects. These projects, on which the local governments bear most of the financial burden, have total costs exceeding \$375 million.

Governor Jim Hunt has announced that a bond referendum for new State grant funds for water and wastewater projects, along with other proposals, will be put before the voters on November 8, 1977. Hunt and Morrow have revealed strong support for the referendum to ensure the people of North Carolina an adequate supply of safe water for domestic use.

### DISTRICT COURT DECISION ON JORDAN DAM

On July 28 the Middle District Court Judge Eugene A. Gordon handed down a decision on the Jordan Dam which would

permit impoundment. The controversy over the impoundment has been in litigation since August 1971.

The Court concluded "that the Corps of Engineers decision to create the Jordan Lake was not arbitrary, capricious or an abuse of discretion, and further, that this decision was made in good faith after a consideration of all relevant factors, including possible alternative or mitigative measures."

The Jordan has been operated as a "dry dam" without impoundment. The court action would permit the Corps to impound the B. Everett Jordan Dam.

Opponents of the B. Everett Jordan Dam Project have objected primarily for two reasons: (1) that the quality of the water in the proposed lake will be unsuitable for its intended use, and (2) that the Corps of Engineers failed to consider the added cost to Durham and Chapel Hill for the removal of phosphorous from its waste treatment effluent.

Proponents of the Jordan Dam state that it will provide the surrounding area, both above and below the dam site, with the benefits of flood control, water quality control, water supply, fish and wildlife conservation, and recreation.

The future of the project still remains in doubt, however, because of a planned appeal of the ruling. Chapel Hill aldermen have ordered its attorney to prepare an appeal. The Conservation Council of N. C. which brought the original suit to prevent closing of the dam gates to flood the lake, has not decided whether to appeal.

### SERIES OF THREE WORKSHOPS ON METHODOLOGIES FOR MEASURING NONPOINT SOURCES

The Water Resources Research Institute, U.S. Environmental Protection Agency, North Carolina Agricultural Extension Service and the North

Carolina Agricultural Experiment Station are sponsoring three identical water quality workshops to

be held in Raleigh, N.C. September 13-14, Atlanta, Ga. October 4-5, and Washington, D.C. October 18-19.

Nonpoint sources and the 208 planning and implementation process have become of primary concern because traditional technology is not suitable to evaluate these irregular and diffuse inputs. In appraising nonpoint source contributions on an areawide basis, the total number of sites (hundreds) is too large for complete coverage and, therefore, some method of sampling must be used. Similar sampling needs arise in evaluating urban runoff, air pollution impact and initial assessment of possible pollutant or hazardous material problems in agriculture and forestry.

This workshop is based on a 3-year study of the feasibility of using probability ("random") sampling in measuring rural runoff, carried out by an interdisciplinary team at North Carolina State University. Members of this group will present the statistical, chemical and operational methods they have developed and will discuss how the results can be applied by others.

This sampling technology is just now being applied to the water quality area. This approach allows sampling with various budget levels, precision estimates and assessment of problems on an areawide basis. This workshop will demonstrate the effectiveness of this sampling tool and its transferability to other problems and areas.

Attendance will be limited to 40 to encourage questions and discussion as the best way to "transfer technology." Session topics will range from a simplified presentation of such theory as is required to a practical account of the field sampling difficulties with emphasis on how these methods can be applied to presentday problems.

Among those expected to benefit from the workshops are:  
208 Personnel  
Council of Government  
University Scientists  
Forest Service  
Agricultural Researchers  
U.S. Geological Survey  
U.S. Environmental Protection Agency  
State Regulatory Agencies

### STORMWATER DRAINAGE REGULATIONS PROPOSED

The State Sediment Control Commission has taken action toward adoption of a storm water drainage regulation. The regulation would require that the speed of stormwater runoff from developed property not exceed the speed prior to development. Public hearings on the proposal are expected in November.

The proposed regulation would require developers to build special systems to control runoff. Among the suggested alternatives to accomplish the objectives of the regulation include:

- Promote infiltration of stormwater by, for example, paving parking lots with porous surfaces.
- Use of vegetated ditches instead of closed or paved drains to carry runoff.
- Place obstacles at drain outlets to break the flow of stormwater.

- Line waterways with erosion-resistant materials.

The proposed regulation was developed by a special committee appointed by the Sediment Control Commission. The committee was composed of developers, highway officials, engineers, city and county officials, and university representatives.

**LEE SEEKING  
ADVICE OF  
COMMERCIAL AND  
SPORTS FISHERMEN**

An invitation to coastal commercial and sports fishermen to tell how the State can help them was issued July 8, 1977 to Howard N. Lee, Secretary

of the N.C. Department of Natural Resources and Community Development.

During August and September, Lee is seeking out advice from coastal fishermen in a variety of ways, including meeting with them on their boats, in face-to-face meetings and at group meetings.

"The commercial fishing industry and commercial and sports fishermen have been ignored too long by State government. I'm not making any promises about what we can accomplish through these meetings. But I believe before things are going to get better, we've got to have the input and advice of the people our programs are affecting," Lee said.

He added, "We still are administering basically a 1950's and 1960's program, which is not satisfying the 1970's needs of the commercial fishermen. The fishing industry is changing and the state commercial fishing program needs to change with it."

Public meetings have been held at the Marine Resource Centers near Atlantic Beach and Manteo. Another public meeting is set for 8 p.m. in Southport on September 2.

**ANDRUS DISCUSSES  
WATER POLICY**

Discussing the Administration's emerging water policy at the National

Water Conference in St. Louis, Secretary of the Interior Andrus said, "It recognizes that water is limited in availability just as energy and other resources." However, many energy alternatives do exist - BUT THERE IS NO ALTERNATIVE TO WATER.

Secretary Andrus enumerated nine points that need consideration in achieving a rational and comprehensive water policy.

1. Add water conservation as an objective for consideration along with the national economic development and environmental quality objectives.
2. Give equal standing to plans which achieve our environmental conservation and economic objectives through nonstructural means and with explicit consideration of the alternative uses of the waters. Flood plain management and flood insurance should have high priority.

3. States and other non-Federal entities must be required to share a greater percentage of the burden in financing.
4. One of our most desperate needs is for reform of laws, regulations and practices governing allocation of water resources.
5. To scrutinize Federal programs to determine where we can employ programs to encourage wise water use.

Some ways we can do this are to: Require individual water meters for residences in all cities receiving water from federally aided systems.

Set water efficiency requirements for irrigation uses for those receiving federal assistance in agriculture.

Establish water efficiency standards for various types of construction where Federal Funds are involved or where federal guarantees are made for the mortgages.

6. Another tough one - Indian water rights.

In the past, the existence of federally secured Indian water rights and their early priority dates have been largely ignored from the standpoint of water resources policy development planning and use. Today, the legal entitlement of Indian tribes to the use of water from the systems serving their reservations can no long be overlooked or discounted.

7. The need for evaluation of water quality and wastes management planning with conventional water resources allocation and development planning.
8. Safety.
9. The primary goal is conservation and more efficient use of water.

**WATER POLLUTION  
A MAJOR CONCERN  
OF U.N. WATER  
CONFERENCE**

Water pollution was a major concern of United Nation Water Conference participants at Mar del Plata, Argentina, particularly

from the standpoint of diminishing safe drinking water supplies. Participants unanimously agreed upon the need to give high priority to meeting a target for providing adequate and clean drinking water for all, particularly for rural communities in developing countries. The magnitude of this task is emphasized by the results of a recent World Health Organization survey which shows that only 35 percent of the world's population presently enjoy reasonably safe drinking water and only 27 percent have some type of sewage disposal.

**SEWAGE DISCHARGE  
TO LAKE MICHIGAN  
MUST CEASE**

A federal judge has ordered a halt to the discharge of sewage by Milwaukee into Lake Michigan because the discharge is a public nuisance. Judge James F. Grady rendered the decision in the case of Illinois vs. City of Milwaukee, No. 72-C-1253.

Illinois Attorney General William J. Scott called the decision "the most significant in the history of water pollution." The case forces Milwaukee to comply with water standards similar to Illinois standards, which are stricter than those now imposed by the Wisconsin Department of Natural Resources or the U.S. Environmental Protection Agency. The order came after seven years of litigation by Illinois which claimed its residents were harmed by sewage discharged into Lake Michigan.

The City has until September 9 to report back to the court on a compliance schedule detailing improvements and repairs to the waste treatment facilities.

### PUBLICATION DISCUSSES WAYS OF REDUCING FLOOD DAMAGES

The Virginia Water Center has a new publication, *Implementation of Non-Structural Alternatives in Flood Damage Abatement*.

The 120-page volume contains the proceedings of a research needs identification conference held in May of 1976 in Durham, N.H. under Water Center sponsorship. Cooperating in the event were state water research institute directors from the Northeastern region of the U.S. Waldon R. Kerns of the Water Center staff was principal conference coordinator and editor of the proceedings.

The volume contains four state-of-the-art papers and five other papers presented at workshop sessions on insurance and rehabilitation, land management, and local implementation. In addition, there are summary reports on the discussions at each of the three workshops and on a general session discussion of the workshop reports.

Requests for single copies of the publication may be addressed to Thomas W. Johnson, Virginia Water Research Center, 617 North Main Street, Blacksburg, Virginia 24060.

### GUILFORD COUNTY WINS AWARD FOR OIL SPILL CONTROL UNIT

Guilford County, N.C. contains one of the largest petroleum products bulk storage tank farms in the country. There is a high potential for oil spills.

Recognizing this danger, the county manager, fire marshal and environmental health officer worked with municipal officials and representatives from federal, state and private agencies to design a system for quick and effective handling of any such spills. This broad participation has resulted in: formation of the Guilford County Oil Spill Control Unit; adoption of a general contingency plan; acquisition of an oil spill trailer and equipment, oil skimmer pump, boom and accessories; and continued training. The award was given as part of National Associations of Counties 1977 County Achievement Awards program at its Annual Conference.

### COASTAL RESOURCES COMMISSION APPROVES LOCAL PERMIT PLANS

Local permit-letting plans for Areas of Environmental Concern have been approved by the N.C. Coastal Resources Commission for most municipal and county governments in the twenty coastal counties.

The plans describe local programs for minor development permitting activities within Areas of Environmental Concern which will begin early next year. In general, minor developments are construction activities which occur on sand dunes, inlet lands, erosion prone areas of the ocean shorelines, and on the shoreline within 75 feet of estuarine waters.

Projects larger than 20 acres, structures which occupy more than 60,000 square feet at ground level, or activities which already require a state permit must be approved by the Coastal Resources Commission.

In communities with local permit-letting programs, applicants will be able to file their application locally and receive a prompt response from the local permitting officer. In most communities a local board will also handle initial appeals from affected parties. The Coastal Resources Commission will pay the costs of running the local permitting programs.

Nearly all eligible towns and counties have undertaken local permit-letting plans. However, Gates County has asked the Department of Natural Resources and Community Development to handle the minor development permitting in that county, citing a scarcity of Areas of Environmental Concern within the county. The state will also prepare permitting plans for portions of Carteret and Brunswick Counties.

### HYDROLOGY OF SMALL N. C. WATERSHED DESCRIBED

Streamflow, rainfall, and groundwater data were collected for four years at six sites in the Creeping Swamp watershed in Pitt,

Craven, and Beaufort Counties as part of an effort to study the effects of stream channelization on the hydrology of the watershed. A report, "The Hydrology of the Creeping Swamp Watershed, North Carolina, with Reference to Potential Effects of Stream Channelization," by M. D. Winner, Jr. and C. E. Simmons was prepared by the U.S. Geological Survey in cooperation with the North Carolina Department of Natural and Economic Resources and the U.S. Department of Agriculture, Soil Conservation Service, and describes the hydrologic conditions in the watershed.

Although plans for channelizing Creeping Swamp were dropped, the authors describe some of the people effects of channelization on the watershed based on hydrologic principles and on some data from channelized Ahoskie Creek, about 60 miles north of Creeping Swamp.

Channelization would have caused the greatest decline in ground-water levels nearest the stream, with the

decline diminishing with increased distance from the stream. Channelization also would have resulted in a decrease in overland runoff and an increase in the amount of water reaching Creeping Swamp through the ground-water system, although the total volume of runoff would not change significantly, if at all.

The water-quality characteristics of Creeping Swamp indicate that the stream is relatively free of pollution. Although it is likely that channelization would increase (1) suspended-sediment concentrations and loads, (2) stream temperatures, and (3) concentrations of dissolved solids, especially during low flows.

The report will soon be available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22151. Until the report is available from the NTIS, copies are available for inspection at Room 5B410, U.S. Geological Survey, National Center, Reston, Virginia 22092 or at the U.S. Geological Survey, Room 436; Century Station Post Office Building, Raleigh, N.C. (a limited number of copies of the report are now available to the public upon request from the U.S. Geological Survey, P.O. Box 2857, Raleigh, N.C. 27602).

### BURIED OYSTER SHELLS HAVE HIGH MARKET VALUE

Buried oyster shells with a potential raw material market value of \$90 million have been charted in the Albemarle Sound near

Dare County. Researchers from the N.C. Department of Natural Resources and Community Development made the evaluation after drilling and examining cores of earth from the bottom of the lower Albemarle Sound during the last two years.

Buried oyster shells are commercially valuable as a source of chemical grade lime, as poultry grits, as oyster clutch material for generating new oyster growth, and in the manufacture of portland cement.

From the samples taken thus far, several prospective sites have been noted between Durant Island and Manns Harbor. The researchers believe that more extensive coring in the Albemarle and Pamlico Sounds will reveal similar results throughout the area.

According to the researchers, the next logical step would be a closely supervised test dredging project in the Cedar Bush Bay area where environmental effects could be analyzed.

Rough estimates indicate that it would take over twenty years for a single dredge to extract the 30.6 million cubic yards of shells already charted. That type of operation would employ as many as ninety people and create an annual payroll of \$900,000. In addition new processing or manufacturing facilities could be established onshore to employ additional people.

The major environmental considerations include the turbidity or murkiness which would result in the

water surrounding the dredging operation, and the possibility of permanent adverse changes to the fish habitat and bottom feeding conditions. Bottom-dwelling organisms normally re-establish themselves within three years unless conditions are too greatly altered.

The researchers recommend against dredging in areas where plants supply food for water fowl unless the plant regimen will be re-established after the dredging operation.

### LAND APPLICATION OF INDUSTRIAL WASTE WORKSHOP

A course in the Land Application of Industrial Wastes sponsored by the American Institute of Chemical Engineers will be

held on November 18-19, 1977 in New York City. System components, application techniques, climatological impact, and cost and return data will be discussed with emphasis given to potential in-plant modifications to reduce pollution loads. Design and evaluation stages actually utilized in planning and implementing pretreatment and land application system will be detailed.

For information contact the American Institute of Chemical Engineers, Continuing Education, 345 East 47th Street, New York, N. Y. 10017.

### TWO FIRSTS

Appropriations providing the first state funds for direct assistance to watershed projects and to accelerate soil surveys have been approved by the North Carolina General Assembly. Over a two-year period, \$900,000 will be made available to move forward with Swift Creek, Chicod Creek, and Bear Swamp Watershed Projects; and \$400,000 will be used to supplement county and federal funds to complete soil surveys.

### POSITIONS AVAILABLE

There is an opening for the Director, Water Resources Research Center, The University of Tennessee/Knoxville. For details contact: Dean for Research, 404 Andy Holt Tower, The University of Tennessee, Knoxville, TN 37916. Telephone: (615) 974-3466.

The New Mexico Water Resources Research Institute located at New Mexico State University, Las Cruces, N.M. has announced the opening for the position of the Director of the Institute. For details contact: Samuel P. Maggard, Chairman, Search Committee, Box 3CE, N.M. State University, Las Cruces, N.M. 88003. Telephone: (505) 646-3801.

### WATER RESOURCES CONDITIONS IN N.C. FOR JULY

Drought conditions, which were mostly confined last month to about a dozen eastern counties, expanded to include most counties from the western Piedmont to the eastern part of the Coastal Plain region. Below

normal rainfall for the past 2 months has caused major streams to recede to record or near-record flows for July, and numerous small streams are dry. On the 28th, Federal officials approved emergency drought relief funds for 56 counties in the Piedmont and Coastal Plain region. Declining water supplies forced several eastern towns, including Chapel Hill, Zebulon, and Southern Pines, to enact ordinances to curb water usage until the drought ends.

Flows in larger streams in the upper Neuse and Cape Fear River basins ranged from only 5 to 20 percent of normal for July.

The prolonged drought, combined with the effects of record-breaking high temperatures, has also caused some degradation of water quality in streams receiving wastes from various sources. Dissolved solids concentrations, which are often used as indicators of stream quality, were near record highs at several sampling stations in eastern North Carolina. Concentrations of dissolved oxygen are also abnormally low in many streams, thereby endangering fish and other aquatic life.

Relative to future outlook, it is important to note that streamflows in N.C. normally reach their annual low levels in late September, October or early November. Therefore, if below-normal rainfall conditions continue over the next two to three months, the water-supply situation will become increasingly critical.

Groundwater levels declined throughout the State. Levels were generally above the long-term averages in the Mountains and western Piedmont and below average elsewhere. In eastern N.C., levels in shallow water-table wells were near record lows for the month; however, no major critical shortages of groundwater supplies have been reported.

*U.S. Geological Survey*

### WATER RESOURCES LEGISLATION IN THE CONGRESS

### BILLS INTRODUCED

#### House

H.R. 8468 To establish a loan program to provide financial assistance to drought-impacted water districts, to provide Federal assistance to water districts for acquisition and installation of residential and agricultural water conservation devices and equipment.

## 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.)

Abbreviations used throughout as follows:

- |          |  |        |   |
|----------|--|--------|---|
| APWA     | - American Public Works Association                  | NWC    | - National Water Commission                     |
| ARS      | - Agricultural Res. Service                          | ORD    | - Office of Research Development                |
| ASCE     | - American Society of Civil Engineers                | OWP    | - Office of Water Programs                      |
| CEQ      | - Council on Environmental Quality                   | OWRT   | - Office of Water Research and Technology       |
| DEM      | - Division of Environmental Management               | RTI    | - Research Triangle Institute                   |
| EDS      | - Environmental Data Service                         | SCS    | - Soil Conservation Service                     |
| EMC      | - Environmental Management Commission                | TVA    | - Tennessee Valley Authority                    |
| EPA      | - Environmental Protection Agency                    | UCOWR  | - Universities Council on Water Resources       |
| ERC      | - Engineering Research Center                        | ULI    | - Urban Land Institute                          |
| ERS      | - Economic Research Service                          | UNC-SG | - University of N.C. Sea Grant                  |
| GAO      | - General Accounting Office                          | USDA   | - U.S. Department of Agriculture                |
| IHD      | - International Hydrological Decade                  | USDC   | - U.S. Department of Commerce                   |
| IWR      | - Institute for Water Resources                      | USDI   | - U.S. Department of the Interior               |
| NAHB     | - National Assoc. of Home Builders                   | USGPO  | - U.S. Government Printing Office               |
| NAS      | - National Academy of Sciences                       | USGS   | - U.S. Geological Survey                        |
| * NCDNER | - N. C. Department of Natural and Economic Resources | WPC    | - Water Pollution Control                       |
| NCWQ     | - National Commission on Water Quality               | WQS    | - Water Quality Standards                       |
| NERC     | - National Environmental Research Center             | WRC    | - Water Resources Council                       |
| NOAA     | - National Oceanic & Atmospheric Admin.              | WRI    | - Water Resources Institute                     |
| NPS      | - National Park Service                              | WRRC   | - Water Resources Research Center               |
| NSF      | - National Science Foundation                        | WRRRI  | - Water Resources Research Institute            |
| NTIS     | - National Technical Information Service             | WRSIC  | - Water Resources Scientific Information Center |

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