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SOUTHEASTERN CONFERENCE ON WATER SUPPLY AND WASTEWATER IN COASTAL AREAS, APRIL 2-4, 1975,

AT WRIGHTSVILLE BEACH

Background

Among the most valuable resources of the Southeastern United States are its coastal lands and waters. The coastal areas, and in particular their estuaries, are among the most biologically productive regions of the nation, spawning major sports and commercial fisheries. The extremely high recreational and esthetic values of coastal land and waters carry the seeds of their own destruction through their attractiveness for economic development.

In recent years these areas and their fragile ecosystems have been threatened with increasing pressures for development. Unless these pressures are controlled and directed in a conscious way, the very features of the coast that make it economically, esthetically, and ecologically rich will be damaged, even destroyed. A major problem associated with increasing population growth and economic development in these areas is the provision of safe and adequate water supplies and management of wastewater discharges in a manner consistent with public health and welfare and environmental protection.

Purpose of the Conference

The Conference will review the "State of the Art" of proper planning and management of water supply and wastewater disposal in coastal areas. Special attention will be paid to defining technological and institutional alternatives, their relation to land use planning and environmental protection, and to identifying those water and wastewater problems of significance in coastal areas.

Intended Audience

This Conference should be of interest to government officials at federal, state, and local levels; to engineers, scientists, planners, developers, and financiers professionally active in coastal areas; to the university community involved in coastal areas; to the university community involved in coastal area research; and to journalists, conservationists, and citizens with an active, continuing concern about the coastal environment.

Program

Speakers and their topics will include:

- Col. Paul S. Denison - "Water and Wastewater Planning and Problems in Coastal Areas: An Overview"
- Phillip N. Storrs - "Ocean Outfall Disposal Systems"
- David R. Hopkins - "Environmental Assessment of Marine Outfalls"
- W. Jake Wicker - "Brainstorming Management and Financing Alternatives for Waste Disposal in the Coastal Areas"
- Frank J. Humenik - "Land Disposal of Wastewater"
- A. C. Turnage, Jr. - "Shallow Subsurface Disposal of Wastewater"
- Charles W. Sever - "Deep-Well Disposal of Wastewater"
- James C. Brown - "Traditional Wastewater Disposal"
- Harry E. LeGrand, Jr. - "Water Supply From Groundwater"
- Walter L. Barnes, Jr. - "Water Supply From Saline Waters"
- F. Eugene McJunkin - "Water Supply by Wastewater Reuse"
- Billy L. Edge - "Summary: Technological Alternatives for Water Supply and Wastewater Disposal in the Coastal Area"
- James C. Wallace - "Man Discovers the Coastal Environment: A Footprint in the Sand"
- James R. Hinkley - "Water, Wastewater, and Land Use Planning"
- Ronald M. North - "Economic Implications of Coastal Waste Disposal Alternatives"

Benjamin C. Dysart, III - "Public Participation in Water and Wastewater Planning"

B. J. Copeland - "Impact of Water Supply and Wastewater on the Coastal and Marine Environments"

The Conference is sponsored by the Coastal Plains Center for Marine Development Services, the North Carolina Sea Grant Program, and the Water Resources Research Institute. The Institute is serving as the secretariat. The University of North Carolina at Wilmington is the host institution. The Sea Grant and Water Resources Research Centers of South Carolina and Georgia are cooperating sponsors.

Brochures and further information are available from the Institute.

U. S. COURT OF APPEALS HOLDS NORTH CAROLINA INDUSTRY LIABLE FOR STREAM POLLUTION
EVEN THOUGH WASTES ARE DISCHARGED TO A MUNICIPAL SYSTEM

The case of David Springer et al., Appellants, v. Schlitz Brewing Company, Appellee, was decided January 14, 1975, by the United States Court of Appeals for the Fourth Circuit. This case is of far wider interest and effect than merely the litigants as illustrated by the following excerpts from Judge Butzner's opinion for the majority:

"This North Carolina diversity case raises the question of the liability of an industry to downstream riparian owners when its wastes overload a city's treatment facilities and cause water pollution. The plaintiffs, David and Diana Springer, own an interest in a large farm on the Yadkin River. Seeking an injunction and compensatory and punitive damages, they contend that, beginning in late 1969, wastes from a new brewery owned by Joseph B. Schlitz Brewing Company in Winston-Salem, North Carolina, overloaded the city's sewage treatment plant, causing it to pollute the Yadkin and interfere with their riparian rights. The Springers introduced evidence, which, viewed in the light most favorable to them, showed that Schlitz knew, or in the exercise of reasonable care should have known, that the city sewage plant lacked the capacity to treat the brewery's waste; that in discussions with the city, Schlitz underestimated the quantity and harmfulness of the waste; and that the company violated the city sewage ordinance. The evidence also established that in the spring and summer of 1970, after Schlitz reached full production, inadequately treated sewage from the overloaded plant caused six unprecedented fish kills and otherwise impaired the quality of the Yadkin River.

"At the close of the Springers' case, the court directed a verdict for Schlitz on the ground that North Carolina absolves the user of a municipal sewer system of liability for the city's failure to adequately treat its sewage. We reverse because we believe the case is controlled by exceptions to North Carolina's rule of immunity.

"In North Carolina, a riparian landowner has a right to the agricultural, recreational, and scenic use and enjoyment of the stream bordering his land, subject, however, to the rights of upstream riparian owners to make reasonable use of the water without excessively diminishing its quality. Though he does not own the fish in the stream, the riparian owner's rights include the opportunity to catch them. Interference with riparian rights is an actionable tort, and a riparian owner may join several polluters as joint tortfeasors. See generally, Aycock, Introduction to Water Use Law in North Carolina, 46, N.C.L. Rev. 1, 11-13 (1967).

"Nevertheless, an industry that uses a municipal sewage system to dispose of its waste is not liable to a riparian landowner for the pollution caused by the city's failure to provide adequate treatment." (Here the court quotes from two previous N.C.

cases.) The district court considered itself bound by these decisions to enter a direct verdict for Schlitz.

"The Springers claim that their proof is sufficient to invoke exceptions to the general rule of immunity. Specifically, they contend that Schlitz should be held liable if it violated the city sewage ordinance, or if Schlitz knew, or should have known, of the inability of the city to adequately treat the brewery's wastes. Since no North Carolina court has considered these exceptions, we must determine the common law of the state by examining the rationale for the established rule, developments on this point in other states, and analogous areas of the state's common law.

"In February 1970 the City of Winston-Salem enacted a comprehensive sewage ordinance to take effect in May. The ordinance requires every user of industrial sewers to have a discharge permit. Users may discharge only wastes containing 2500 ppm BOD or less, and they are forbidden to release sewage containing a wide variety of dangerous or difficult-to-treat substances. The ordinance imposes surcharges for BOD pound loading caused by a concentration above 300 ppm. Originally, it allowed the city to furnish advice and technical assistance, but it did not provide for variances or exemptions. By state law, its violation is a misdemeanor.

"Schlitz's effluent contained more than 2500 ppm BOD until April 1971. Beginning in May 1970, the city billed, and Schlitz paid, all BOD surcharges. The brewery and other industries, however, were allowed to operate in violation of the ordinance and without permits as long as they submitted schedules for compliance and conformed to them. It received its permit, one of the first issued to any industry, in May 1971.

"The violation of a municipal sewage ordinance which is intended to protect downstream riparian owners can subject an industrial sewage source to private civil liability. *Hampton v. Spindale*, 210 N.C. 546, 548, 187 S.E. 775, 776 (1936), expressly restricts freedom from liability to those persons who use the sewers in the way prescribed by law. Although this is dictum, it is consistent with the rationale for the private user's immunity. When an industry turns over the control of its sewage to the city, it can reasonably expect that the city will safeguard riparian property by effective treatment. But it is not reasonable for an industry to expect a city to safely treat prohibited sewage. Consequently, the reason for granting immunity does not then apply.

"...the discharge of sewage prohibited by Section 23-2(2) (Winston-Salem ordinance) is a crime, and under North Carolina law it is actionable if it proximately causes damage to riparian property. Section 23-2(2) states in part:

'(2) Except as hereinafter provided, it shall be unlawful for any person to discharge or cause to be discharged any of the following described materials, waters, liquids, or wastes into any public sanitary sewer:

'(g) Liquid wastes containing any toxic or poisonous substances in sufficient quantities to (i) interfere with the biological processes used in a sewage treatment plant, or (ii) which, in combination with other liquid wastes, upon passing through a sewage treatment plant will be harmful to persons, livestock, or aquatic life utilizing the receiving streams into which water from a sewage treatment plant is discharged.'

"In order to establish that Schlitz's violation of the ordinance was negligence, the Springers would have to prove that the brewery wastes had the characteristics forbidden by Section 23-2(2). Viewed in the light most favorable to them, the evidence showed that the brewery's wastes had a toxic or poisonous effect on bacteria that are essential to the sewage treatment process. The evidence also showed that after passing

through the plant the wastes were harmful to aquatic life in the receiving stream. The jury should therefore be allowed to determine whether or not the discharge violated the ordinance. If it did, this was negligence, and the jury should then decide whether it proximately caused damage to the Springers' property.

"Schlitz argues that its discharges of brewery wastes is not actionable because the city's officials did not require compliance with the ordinance until May 1971, except for the payment of surcharges. This contention lacks merit. Section 23-4 (d) of the ordinance authorized the water and sewer officials to:

'consult with and furnish technical assistance and advice to industrial users of the city's sewerage system in order to assist them in devising procedures and constructing equipment to reduce or eliminate from industrial wastes objectionable characteristics or properties which may not otherwise be discharged into the public sanitary sewers under Section 23-2.'

While this provision recognized that compliance was not instantly attainable and allowed city officials to furnish technical assistance and advice, its terms gave them no power to affect the rights of third parties. A statute protecting life or property creates a private right not to be harmed by its violation unless the legislature specifically provides otherwise.

"It is argued, however, that the ordinance should not be read literally because the only reasonable construction is one which would allow city officials to dispense with its requirements. While it is true that the city's director of water and sewers believed that immediate, rigorous enforcement would be undesirable because it would 'shut down just about every industry in Winston-Salem,' there is no conflict between the public interest in keeping a factory open and the private right to recover damages for pollution. The two may be reconciled by requiring the source of pollution to pay damages while allowing it to operate.

"As an alternative ground of recovery, the Springers argue that Schlitz should be held liable if it knew, or in the exercise of reasonable care should have known, that the city could not adequately treat the brewery's waste. The validity of this claim depends on an analysis of the underlying reasons for the general rule of immunity.

"In absolving the user of a municipal sewage system from liability, North Carolina follows the leading case of Carmichael v. Texarkana, 116 F. 845 (8th Cir. 1902)... Carmichael involved a suit by a riparian owner against a city and its inhabitants. The court affirmed the dismissal of the complaint against the inhabitants, holding that the city alone was responsible for the nuisance created by its sewer system. . . Carmichael correctly analyzed the relation between the inhabitants and the city. The city controls the choice of methods that will be used to achieve the desired result, and the individual sewer user lacks authority to control the city's performance.

"...A manufacturing company is in a position to know enough about its own operations to understand the nature of its wastes and the problems of treating them. If it has not yet selected a plant site, it may have a choice among cities and disposal systems. It may also be large enough to pre-treat or properly dispose of its own sewage. When the company represents a desirable source of jobs and tax revenues, the local authorities can be expected to provide it with technical information about the municipal sewers. In brief, a large industrial sewer user can make an informed decision whether to use a city sewer system to render its wastes nuisance free.

"According to the Springers' evidence, Schlitz, which has more than a century of experience in brewing beer, considered several cities in the Southeast before selecting Winston-Salem for a brewery site. As part of its investigation, the company requested information about the city's sewage facilities, and its representatives toured the treatment plant. Had the company inquired, it would have learned that the plant was operating at or over its daily capacity of 18 million gallons of sewage containing

76,000 pounds of BOD. The city assured Schlitz that it would adequately treat its wastes after Schlitz advised the city to expect 15,000 pounds of BOD per day. Before the brewery had been open a year, however, it was discharging 56,000 pounds of BOD per day into a system which had previously reached its 76,000 pound capacity. Brewery wastes are known by sanitary engineers to be difficult to treat and to interfere with the treatment of other wastes.

"These facts disclose that Schlitz knew the characteristics of its own sewage and that it exercised control over its selection of a site and of the sewage system which would dispose of its waste. The evidence also indicates that Schlitz could not rely on the city's acceptance of its sewage, because it had not furnished the city accurate information. Finally, the proof supports an inference that Schlitz knew, or in the exercise of reasonable care it should have ascertained, that the city could not adequately treat its brewery wastes. The jury might reasonably have decided that Schlitz negligently selected the city of Winston-Salem to treat its sewage. Drawing upon North Carolina's common law principles governing the liability of an employer of an independent contractor, we conclude that Schlitz is not, as a matter of law, immune from liability. Accordingly, on remand, the district court should submit the issue of Schlitz's liability on the Springers' alternative theory.

"The record discloses that after the 1970 fish kills, Schlitz expended more than \$1,300,000 for sewage treatment facilities and it is now in compliance with the effluent quality standards of the city ordinance. The city has doubled the size of its treatment plant, and it can now properly treat the waste from the brewery. In view of this evidence, it is unlikely that an injunction is appropriate under North Carolina law.

"On remand, the court should instruct the jury that the Springers cannot recover if the evidence discloses only that Schlitz's waste, after passing through the Winston-Salem treatment plant, polluted the Yadkin, killed fish, and caused other damage to the Springers' riparian property. Under North Carolina's general rule of immunity, Schlitz cannot be held liable if the evidence discloses no more than those facts.

"The jury should be told that in order for the Springers to recover they must prove by a preponderance of the evidence that Schlitz violated Winston-Salem's sewage ordinance by discharging sewage prohibited by Section 23-2(2) or that Schlitz knew, or in the exercise of reasonable care should have ascertained, that the city's treatment plant could not adequately treat its sewage. In either event, the Springers must also prove that the brewery's waste proximately caused their injury; that is, that it was foreseeable that Schlitz's waste, along, or in conjunction with other waste, would damage the Springers' riparian property. This outline of the elements of the plaintiffs' claim, of course, is not intended to preclude the court from charging the jury about defenses Schlitz may present when the case is fully tried.

"The judgment of the district court is vacated, and this case is remanded for a new trial. The Springers shall recover their costs."

JUDGE ORDERS DEVELOPERS TO RESTORE WETLAND

A. U. S. District Court Judge has ordered a Florida housing developer to restore a mangrove wetland which he drained without obtaining a permit from the U.S. Army Corps of Engineers, according to the Wildlife Management Institute.

The Corps had refused to grant the developer an after-the-fact permit and informed him to restore the important wildlife area to its original condition, including replanting the mangrove fringe and filling all canals. The developer protested and the case was referred to the U.S. District Court of southern Florida.

The Court ruled in favor of the Corps and directed that the restoration be carried out. It also permanently enjoined the developer from "selling, conveying, or disposing" of any real property involved until restoration is complete.

The Court stated that it had "no desire to create a hardship upon the presumably innocent, albeit negligent, property owners" that had bought from the developer. "However," the Court said, "now that enforcement of our environmental laws is the rule and not the exception, future reliance upon the compassion of the Court and the Government is not warranted."

Source: Outdoor News Bulletin (Jan. 31, 1975)

CORPS OF ENGINEERS GUIDELINES FOR WATER RESOURCES PLANNING

On February 5 the Army Corps of Engineers proposed guidelines for assistance to the states for water resources planning, river basin studies, and aquatic plant control. The guidelines ask for agreement on mutual goals and avoidance of duplication of effort and inter-agency level A (framework and assessments) and level B (regional or river basin) studies as defined by the U.S. Water Resources Council. See the Federal Register of that date for detail (40FR 5484).

NEW INSTITUTE PUBLICATION

Annual Report FY 1973-74

A comprehensive report of Institute organization and program during Fiscal Year 1974. Includes a brief review of each research project, information dissemination, research application, and other activities.

GET A HORSE!

QUESTION: Does slow and steady still win the race?

Dr. Frederick O. Smetana asked his engineering students studying technology and contemporary society of N.C. State University whether it would conserve energy to ride a horse instead of driving a car on a cross-country trip to California.

The way the slide rule jockeys finally figured it, Detroit has made a better hay-burner.

A seven-day automobile ride to the West Coast in a compact car would use about 100 gallons of gasoline, Cost: \$50. Energy use: 1.8 million BTUs (a BTU is the amount of energy required to raise the temperature of a pound of water one degree).

A horse on the other hand, would take up to 100 days to complete the 2,800-mile journey and consume about 40 pounds of hay and oats per day. Cost: \$200. Energy use: 20 million BTUs.

"Compared to a horse," said Smetana, "a car ends up with a quarter of the cost, expends only a tenth as much energy and is 15 times faster."

Smetana said he gives students the problem to show that people who want to turn back the clock to so-called simpler days don't consider the costs.

"If you go back in time," he said, "you quickly find out that things weren't always energy efficient in the old days."

By Rick Nichols - The News and Observer
Jan. 23, 1975

STATE OF THE ART SUMMARIES

The research and development program in EPA has commenced a series of state-of-the-art papers to be issued by the R&D Program in Region IV Atlanta. The first two issues are:

- I Lake Restoration - Procedures and Their Effectiveness
- II Nutrient, Bacterial, and Virus Control as Related to Ground-Water Contamination

Copies are available from Mr. Edmond P. Lomasney, Chief R&D Program, EPA, Region IV, 1421 Peachtree St., NE, Atlanta, GA 30309.

INDUSTRIAL WASTES RESEARCH HIGHLIGHTS

Cheese Wastes Used for Animal Feed

Interested in the use of whey from cheese-making as an animal feed supplement? The final report of Phase I of an EPA study of Protein Production from Acid Whey via Fermentation (EPA 660/2-74-025) helps to answer this question. Phase II on operation and evaluation is now underway. For information contact Max Cochrane, tel. 503-752-4211 (extension 306) or write the Pacific Northwest Environmental Research Laboratory, EPA, 200 SW 35th St., Corvallis, Oregon 97330.

Reclamation of Poultry Wastewaters

An EPA demonstration project conducted at the 300 gpm water reclaiming plant at the Sterling Processing Corporation, Oakland, Md., showed that potable water could be obtained in a practical, economical manner in this plant situation.

Laboratory analyses by the Maryland State Department of Health and Mental Hygiene demonstrated that the reclaimed processing water consistently complied with the Federal drinking water standards for bacteriological, chemical, and physical characteristics. Turbidity resulting from colloidal carryover remained a problem. However, when flocculation and sedimentation facilities were added, the turbidity standard was met.

Annual operating cost of the microstraining, flocculation, and sedimentation and sand filtration system was 27 cents per 1,000 gallons (7.1 cents/1000 liters). Capital cost was about \$3.12/gpd capacity.

The final report, Poultry Processing Wastewater Treatment and Reuse (EPA-660/2-74-060), was published in March 1974. For information telephone Jack Witherow--503-752-4211, ext. 461.

PRETREATMENT STANDARDS FOR THE SEAFOOD PROCESSING INDUSTRY

The Environmental Protection Agency has proposed performance standards for new sources and pretreatment standards for new and existing sources in the canned and preserved seafood processing industry. These will amend regulations promulgated on June 26, 1974. Interested persons should see the Federal Register for January 30, 1975 (40FR 4608).

STUDY BY GEORGIA-PACIFIC LEADS TO NEW METHOD FOR RECOVERING MERCURY FROM INDUSTRIAL WASTE WATER

A team of 13 Georgia-Pacific chemists, engineers and technicians has moved from the laboratory to a full scale mercury recovery plant under an EPA R&D grant.

Georgia-Pacific, a major forest products, chemical and gypsum manufacturer, uses mercury cells to produce chlorine and caustic at the Bellingham plant. Small amounts of mercury are lost during the operation of mercury cells.

In addition to causing industrial waste problems, lost mercury represents lost dollars. Mercury recently has been quoted at \$275 a flask (2/3 of a gallon) or \$3.62 per pound.

The Bellingham plant is now saving up to 97 percent of the mercury once considered irrecoverable from effluent waters. The process also enables Georgia-Pacific to recover up to 99 percent of the mercury from process sludges.

A sulfide precipitation process is used for water treatment, and high-temperature roasting is used for the sludge treatment. Details are outlined in a new Environmental Protection Agency publication titled "Mercury Recovery From Contaminated Waste Water and Sludges."

Single copies of the publication are available in limited quantity through the Office of Public Affairs, National Environmental Research Center, 200 SW 35th Street, Corvallis, OR 97330.

CONSTRUCTION GRANT APPLICANTS REQUIRED TO CONSIDER COST EFFECTIVENESS

Applicants for municipal sewage treatment plant grants must consider land application as an alternative waste management system, and if it can be demonstrated

that land treatment is the most cost-effective alternative, proposals for using other systems should be rejected, according to a memorandum from Environmental Protection Agency Deputy Administrator John R. Quarles to EPA regional administrators.

Quarles cited Cost Effectiveness Analysis Regulations, promulgated by EPA September 10, 1973, which require grant applicants to identify alternative waste management systems including those using land or surface disposal techniques.

Land treatment technology "is a viable alternative to be considered as part of waste management systems," Quarles said, and where it is cost-effective, consistent with the environmental assessment, and satisfies applicable tests, the EPA regions, "should insist" that it be used.

. . . VPI News

CHANGES RECOMMENDED IN FEDERAL WASTE TREATMENT GRANTS PROGRAM

EPA Administrator Train has approved an internal review recommending comprehensive changes to the Agency's construction grants program. The review concluded that the multi-billion dollar program has operated inconsistently between the 10 regions. Most problems were attributed to inadequate staffing and guidance. The two options cited are to increase manpower or to delegate more authority to the states. If the required staffing increases are not forthcoming, the study envisioned delegating all functions permitted under law, supporting early passage of legislation that would promote delegations through incentive funds, and eventually seeking amendments that would transform the current program into a "block grant" program.

DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FILED FOR DISMAL SWAMP

The State of North Carolina currently owns 14,343.5 acres of the Great Dismal Swamp. The property lies west of US Highway 17, bordering the Dismal Swamp Canal. The primary objectives for the property involve preserving the unique features and managing the site for appropriate recreational uses. Three policy alternatives are discussed and presented as a possible strategy for development. The property is presently designated a North Carolina Game Land. This is one of three alternatives considered. The other two involve developing a nature interpretation program.

The 206-page EIS, prepared by the Division of Parks and Recreation, North Carolina Department of Natural and Economic Resources is available at \$10.30 from the N.C. Office of Intergovernmental Relations, 116 West Jones Street, Raleigh, N.C. 27603. It may be inspected during office hours at the Office of State Planning Library, same address, or at the Office of the Albemarle Regional Planning and Development Commission in Edenton, N.C.

FIRST COLONY FARMS APPLIES FOR CORPS PERMIT

First Colony Farms, Inc., has applied for a Department of the Army permit to perform maintenance and improvement excavation of existing drainage canals within their own property in Hyde, Dare, Tyrrell, and Washington Counties.

The application and plans propose maintenance and expansion of canals in six areas of the First Colony property.

1. Insley Road - located in Tyrrell County in the south-central section of the farm property adjoining the Atlantic Intracoastal Waterway (AIWW). Estimated quantity of material to be excavated is 70,000 cubic yards.
2. Shavender Road - located in Tyrrell County in the south-central section of the farm property adjoining the AIWW. Estimated quantity of material to be excavated is 50,000 cubic yards.
3. Grapevine Road - located in Tyrrell County generally in the center of the farm holdings adjoining the Alligator River at Grapevine Landing. Estimated quantity of material to be excavated is 80,000 cubic yards.
4. Dillon Road - located in Tyrrell County in the north-central section of the property adjoining the Alligator Creek. Estimated quantity of material to be excavated is 55,000 cubic yards.
5. Laurel Bay Road - located in Dare County in the northeast section of the farm adjoining Alligator River. Estimated quantity of material to be excavated is 30,000 cubic yards.
6. Alligator Road - located in Dare County in the east-central section of the property adjoining the Alligator River. Estimated quantity of material to be excavated is 60,000 cubic yards.

First Colony has applied to the North Carolina Department of Natural and Economic Resources for a water use permit in a capacity use area and has initiated coordination with the Environmental Protection Agency and other cognizant State, Federal, and local agencies.

Written comments or questions regarding the proposed work or the operation or plans of the First Colony complex will be received in the Wilmington District office, ATTN: Mr. Charles W. Hollis, until 4:45 p.m., 17 March 1975.

In a further effort to identify factors of agency or public concern, the District Engineer will conduct a Public Meeting in Washington, North Carolina at the Beaufort County Court House in the Court Room beginning at 7:00 p.m., 10 April 1975. All persons having an interest in the proposed work or in the overall activities of the First Colony complex are invited to attend this meeting and to express their interest either verbally or by written statement. All comments received either as a result of this notice or the Public Meeting will be referred to the applicant for the inclusion of appropriate emphasis in the environmental assessment which, upon its completion, will be given extensive agency and public circulation along with further opportunity for comment.

EPA SEWAGE TREATMENT PLANT AND SEWER CONSTRUCTION COST INDEX (1957 - 1959 = 100)
 FOR DECEMBER 1974

Location	Plant			Sewer		
	Values Dec.1974	%Change Dec.1973	%Change Sept.1974	Values Dec.1974	%Change Dec.1973	%Change Sept.1974
Atlanta	208.0	22.8	6.2	221.9	22.2	5.0
Baltimore	218.3	23.3	4.0	251.6	16.0	10.6
National	225.6	20.3	3.2	242.6	17.8	3.3

1974 Average Values

Location	Plant		Sewer	
	1974 Values	% Change 1973 Avg.	1974 Values	% Change 1973 Avg.
Atlanta	188.7	13.9	202.9	14.5
Baltimore	202.0	17.2	230.2	11.3
National	207.4	13.6	225.1	12.8

CONFERENCE ON NON-POINT SOURCES OF WATER POLLUTION

The Virginia Polytechnic Institute and State University, Blacksburg, Virginia, is sponsoring a conference on non-point sources of water pollution on May 1 and 2 with sessions on agricultural, forest land use, mining, and urban sources. Contact Dr. Peter M. Ashton of the Water Resources Research Center, 225 Norris Hall, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061, (703) 951-5624 for further information.

EPA SCIENTISTS PROPOSE SOLUTION TO SMALL-TOWN SEWAGE PROBLEMS

An answer to sewage disposal problems of small communities may be found in recent research on the overland flow process.

An 18-month pilot study, conducted by the U.S. Environmental Protection Agency, shows that overland flow is a practical, low-cost treatment method with potential for year-round use in rural areas where ample land is available and the temperature seldom drops below freezing.

The process costs less than a municipal sewage plant, yet produces effluent that more than satisfies criteria for secondary waste treatment. One acre of land is needed to handle the wastewater for each two hundred persons in the community.

Project design and findings are reported in "Feasibility of Overland Flow for Treatment of Raw Domestic Wastewater," published by EPA's National Environmental Research Center at Corvallis, Oregon.

The report was written by EPA scientists R. E. Thomas, K. Jackson, and L. Penrod of the Center's Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma, who directed the research.

Overland flow is the term used to describe the process of trickling wastewater over sloping ground to remove nitrogen, phosphorous, suspended solids and biochemical oxygen-demanding substances. Although the method has been widely used by the food processing industry, there is little information to document its effectiveness and potential for other types of wastewater.

The scientists say that "The treatment efficiency ... is contingent on many factors and the quality of the effluent produced can vary greatly." It is this aspect of the overland flow process that was investigated by the research team.

In the pilot study, raw wastewater containing well-pulverized solids was applied through a specially designed distribution system to the experimental plots at the Ada test site.

Nitrogen and phosphorous, elements that speed algae growth in fresh water, were effectively reduced. Tests indicated that an efficient overland flow system should produce effluent with less than 10 milligrams per liter of suspended solids and biochemical oxygen demanding substances. There was 90 percent nitrogen removal in summer, but considerably less in winter. Phosphorous removal was consistent--about 50 percent.

Single copies of the report are available from the Public Affairs Office, National Environmental Research Center, 200 SW 35th St., Corvallis, Oregon 97330. Ask for EPA-660/2-74-087.

Editor's Note: The overland flow technique is currently under investigation at N.C. State University's Department of Biological and Agricultural Engineering under the joint sponsorship of the Agricultural Experiment Station and the Water Resources Research Institute. Dr. Michael Overcash is the Principal Investigator.

STATE HYDROLOGIC UNIT MAPS AVAILABLE

The U.S. Water Resources Council has announced the availability of the first of a new series of State maps. The "State Hydrologic Unit Maps" are designed for use in water and land resources planning, including the National Assessment of Water and Related Land Resources. Such maps will be of great use to officials involved in water planning, at every level of government.

Published jointly by the U.S. Water Resources Council and the U.S. Geological Survey, maps covering Maine, New Hampshire, Vermont, Rhode Island, Massachusetts,

Connecticut, Maryland, Delaware, New Jersey, Ohio, Indiana, Pennsylvania, West Virginia and the District of Columbia are available. Maps for the remaining 37 States will be completed during the coming months.

The new maps present information on drainage, culture, hydrography and hydrologic boundaries of Water Resources Regions, Water Resources Subregions, National Water-Data Network Accounting Units, and Cataloging Units of the Geological Survey's "Catalog of Information on Water Data."

The maps, at a scale of 1:500,000 or 1 inch equals nearly 8 miles, show river basins larger than 700 square miles in each state and assign a distinctive computer code to each basin. This gives a consistent geographical basis for data storage and water-resources planning at every level of government.

Copies of the State Hydrologic Unit Maps for the States now available can be purchased by mail (prepaid) or over-the-counter from the Distribution Branch, U.S. Geological Survey, 1200 South Eads Street, Arlington, Virginia 22202, for \$1.00 per copy.

U.S. GEOLOGICAL SURVEY ASSISTANT DISTRICT CHIEF RETIRES

Nathan O. Thomas, hydrologist with the U.S. Geological Survey, retired on December 31, 1974, after 36 years of Federal service. Thomas has served as the Assistant District Chief of the North Carolina district for the past 11 years. A successor has not been named.

A native of Kinston, N.C., Thomas received a B.S. degree in Civil Engineering at the University of South Carolina in 1937. He was employed by the U.S. Geological Survey as a hydraulic engineer in 1938, and has remained with the Survey except for a three-year tour of duty with the Navy Civil Engineers Corps during World War II.

Thomas is a registered Professional Engineer in North Carolina and Kentucky and the author of many scientific reports and articles. His outstanding performance was recognized in special awards presented by the Survey in 1967 and 1974.

ATMOSPHERIC QUALITY AND CLIMATIC CHANGE

A Conference to review current knowledge of the nature, magnitude, and causes of climatic change, and to assess the likely impact of such changes on future environments, populations, and societies will be held on March 20-21, 1975, at the Carolina Inn, Chapel Hill, N.C. Sponsors include the Department of Geography, University of North Carolina at Chapel Hill, U.S. Environmental Protection Agency, and the Department of Geosciences, North Carolina State University.

For further information contact: Dr. Richard J. Kopec, Department of Geography, University of North Carolina, Chapel Hill, N.C. 27514.

ATOMIC POWER PLANT LICENSING REORGANIZED

On October 11, 1974, the Energy Reorganization Act (P.L. 93-438) was enacted. Pursuant to the Act the regulatory and licensing functions of the Atomic Energy Commission were transferred to the New Nuclear Regulatory Commission on January 19, 1975, (see Presidential Executive Order 11834, dated January 15, 1975).

The Act provides that all licensing proceedings pending before AEC shall continue without interruption under the auspices of the NRC, and all actions taken in those proceedings prior to the creation of NRC continue in effect. The names "Atomic Safety and Licensing Board Panel" and "Atomic Safety and Licensing Board" continue unchanged.

The Nuclear Regulatory Commission issues construction and operating permits for atomic power plants such as the Carolina Power and Light's proposed Shearon Harris Plant in Wake County.

EPA PROPOSES AMENDMENTS TO WATER POLLUTION CONTROL ACT

The Environmental Protection Agency has sent three draft bills to the Congress which would amend the 1972 Federal Water Pollution Control Act with respect to ad valorem taxes, toxic substances, and State water pollution control assessment reports.

Briefly, the amendments would:

1. Section 204(b) -- authorize construction grant applicants to adopt a user charge system based on ad valorem taxes for funding of operation and maintenance costs.

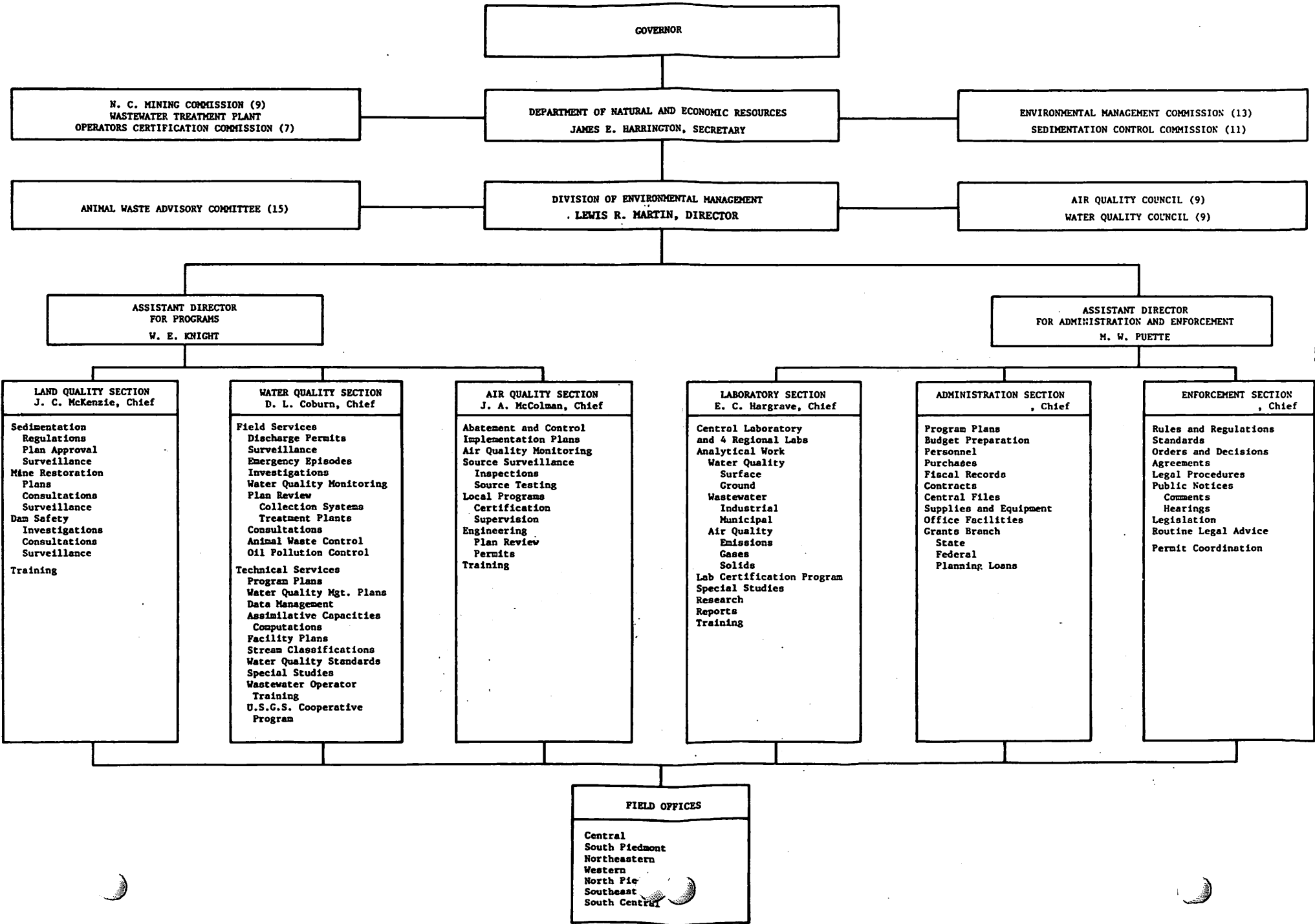
Note: Critics of this proposal view a user charge system based on ad valorem taxes as weakening incentives for water and process material conservation at a time when such incentives are increasingly needed.

2. Section 307(a) -- change procedural requirements to authorize EPA to schedule public hearings more than 30 days after the proposal of a toxic effluent standard and to extend the statutory one-year compliance schedule for up to three years if it is determined to be technologically feasible for a source to comply within one year.
3. Section 305(b) -- allow States to prepare and submit reports on water quality assessment and projection biennially rather than annually.

ORGANIZATION OF N.C. ENVIRONMENTAL MANAGEMENT COMMISSION

The following three pages reproduce organization charts of the North Carolina Environmental Management Commission. This agency was known as the North Carolina Office of Water and Air Resources until July 1, 1974.

ORGANIZATION CHART
DIVISION OF ENVIRONMENTAL MANAGEMENT



DIVISION OF ENVIRONMENTAL MANAGEMENT
 WATER QUALITY SECTION
 FIELD OFFICES

NORTH PIEDMONT
 Mr. Robert Carter
 Regional Engineer
 3528 Vest Mill Road
 Winston-Salem, N.C. 27103

919/765-6300

NORTH CENTRAL
 Mr. T. F. Armstrong
 Regional Engineer
 3800 Barrett Drive
 Raleigh, N.C. 27609

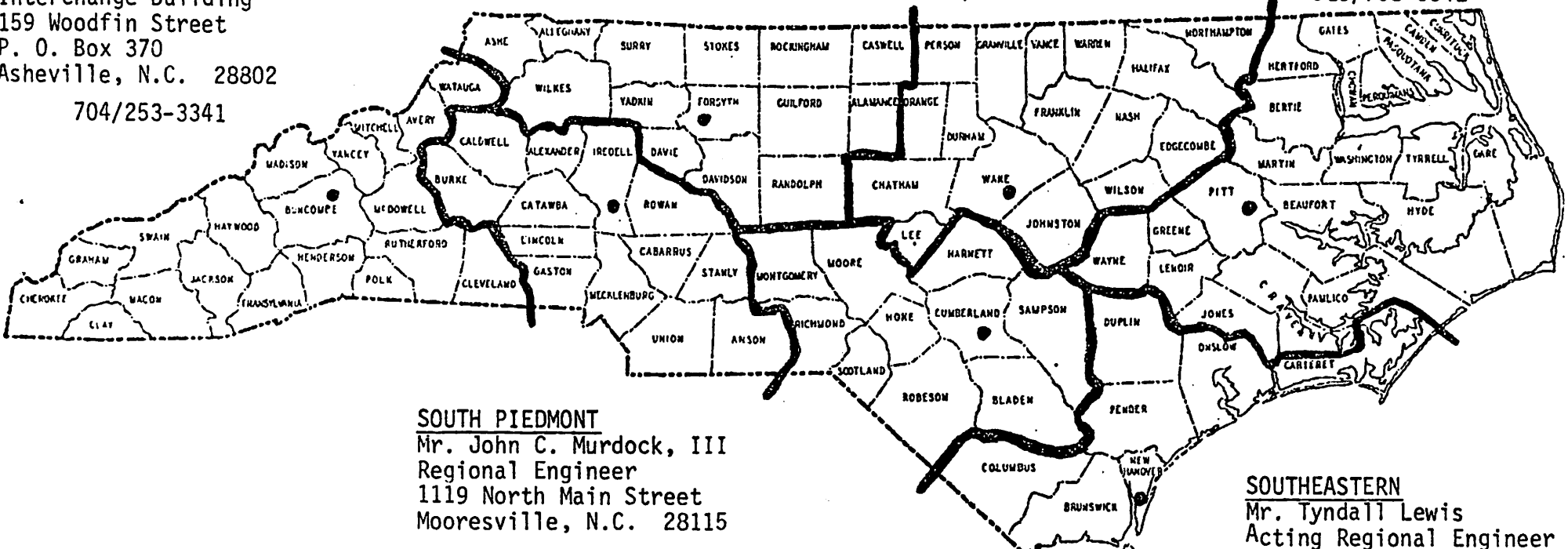
919/829-2314

*NORTHEASTERN
 Mr. A. C. Turnage, Jr.
 Regional Engineer
 209 Cotanche Street
 Greenville, N.C. 27834

919/758-0642

WESTERN
 Mr. Roy Davis, Regional Engineer
 Interchange Building
 159 Woodfin Street
 P. O. Box 370
 Asheville, N.C. 28802

704/253-3341



SOUTH PIEDMONT
 Mr. John C. Murdock, III
 Regional Engineer
 1119 North Main Street
 Mooresville, N.C. 28115

704/664-4627

SOUTH CENTRAL
 Mr. Jeff Wendle
 Acting Regional Engineer
 Wachovia Building
 Suite 714
 Fayetteville, N.C. 28301

919/485-8117

SOUTHEASTERN
 Mr. Tyndall Lewis
 Acting Regional Engineer
 3143 Wrightsville Avenue
 Wilmington, N.C. 28401

919/762-3394

*Temporary location of Field Office

WATER QUALITY SECTION
FIELD OFFICES

<u>WESTERN FIELD OFFICE</u>	<u>NORTH PIEDMONT FIELD OFFICE</u>	<u>SOUTH PIEDMONT FIELD OFFICE</u>	<u>NORTH CENTRAL FIELD OFFICE</u>
<p>Roy Davis Regional Engineer</p> <p>Richard Jensen Office Manager</p> <p>Interchange Building 159 Woodfin Street P. O. Box 370 Asheville, N.C. 28802</p> <p style="text-align: center;">704/253-3341</p> <p>Avery Madison Buncombe McDowell Cherokee Mitchell Clay Polk Cleveland Rutherford Graham Swain Haywood Transylvania Henderson Watauga Jackson Yancey Macon</p>	<p>Robert Carter Regional Engineer</p> <p>Joe Robertson Office Manager</p> <p>3528 Vest Mill Road Winston-Salem, N.C. 27103</p> <p style="text-align: center;">919/765-6300</p> <p>Alamance Guilford Alleghany Rockingham Ashe Randolph Caswell Stokes Davidson Surry Davie Yadkin Forsyth Wilkes</p>	<p>John C. Murdock, III Regional Engineer</p> <p>Ray Mathis Office Manager</p> <p>1119 North Main Street Mooresville, N.C. 28115</p> <p style="text-align: center;">704/664-4627</p> <p>Alexander Iredell Burke Lincoln Cabarrus Mecklenburg Caldwell Rowan Catawba Stanly Gaston Union</p>	<p>T. F. Armstrong Regional Engineer</p> <p>Clarance Shimer Office Manager</p> <p>3800 Barrett Drive Raleigh, N.C. 27609</p> <p style="text-align: center;">919/829-2314</p> <p>Chatham Nash Durham Northampton Edgecombe Orange Franklin Person Granville Vance Halifax Wake Johnston Warren Lee Wilson</p>

<u>SOUTH CENTRAL FIELD OFFICE</u>	<u>*NORTHEASTERN FIELD OFFICE</u>	<u>SOUTHEASTERN FIELD OFFICE</u>
<p>Jeff Wendle Acting Regional Engineer</p> <p>Lafayette Jones Office Manager</p> <p>Wachovia Building Suite 714 Fayetteville, N.C. 28301</p> <p style="text-align: center;">919/485-8117</p> <p>Anson Moore Bladen Robeson Cumberland Richmond Harnett Sampson Hoke Scotland Montgomery</p>	<p>A. C. Turnage, Jr. Regional Engineer</p> <p>Whit Morrow Office Manager</p> <p>209 Cotanche Street Greenville, N.C. 27834</p> <p style="text-align: center;">919/758-0642</p> <p>Beaufort Gates Bertie Greene Camden Hertford Chowan Hyde Craven Jones Currituck Lenoir Dare Martin</p>	<p>Tyndall Lewis Acting Regional Engineer</p> <p>Steve Hooks Office Manager</p> <p>3143 Wrightsville Avenue Wilmington, N.C. 28401</p> <p style="text-align: center;">919/762-3394</p> <p>Brunswick New Hanover Carteret Onslow Columbus Pender Duplin</p>

*Temporary location of Field Office

WATER RESOURCES CONDITIONS IN NORTH CAROLINA FOR JANUARY

Above normal rainfall, augmented by high carryover from December, caused above normal flows in streams across the State. Monthly mean flows ranged from slightly above normal in the western mountains to almost 2 1/2 times normal flow in streams in the eastern Piedmont. Heavy runoff from rains on the 11th and 12th caused moderate rises on streams in the Piedmont region. Minor flood damages to several homes in low-lying urban areas occurred in Charlotte on the 11th. Most of the flooding, however, occurred on small streams; flows in the larger rivers generally remained within banks. Flows in most streams had receded to near normal at the end of the month.

Ground-water levels rose seasonally during the month. Except for water levels affected by several heavily pumped areas in the Coastal Plain, ground-water levels were generally above the long-term averages for the month.

. . . U.S. Geological Survey

WATER RESOURCES LEGISLATION IN THE NORTH CAROLINA LEGISLATURE

Bills Introduced

Senate

S. 84 Water supply wells sanitation
"To provide reasonable sanitation standards for the protection of residential and certain other water supply wells." Adds new art. 13C to GS ch. 130 to empower State Board of Health to promulgate rules and regulations governing location and construction of water supply wells serving residences and such food or lodging establishments as subject to sanitation regulations of Board.

. . . Daily Bulletin - The General Assembly of
North Carolina Institute of Government,
University of North Carolina at Chapel Hill

WATER RESOURCES LEGISLATION IN THE 94th CONGRESS

Bills Introduced

Senate

S. 288 To amend the Land and Water Conservation Fund Act of 1965 so as to authorize the development of indoor recreation facilities in certain areas.
S. 327 To amend the Land and Water Conservation Fund Act of 1965, as amended, to establish the National Historic Preservation Fund.
S. 470 To amend the Coastal Zone Management Act of 1972 to suspend until no later than June 30, 1976, Federal oil and gas leasing in areas seaward of State coastal zones.

House

H.R. 1776 To amend the Coastal Zone Management Act of 1972 to authorize financial assistance to Coastal States to enable them to study, assess, and plan the effects of offshore energy-related facilities and activities in or on the Outer Continental Shelf on their coastal zones.

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:

ARS	- Agric. Res. Service	**OWRR	- Office of Water Res. Research
ASCE	- American Society of Civil Engrs.	SCS	- Soil Conservation Service
EPA	- Env. Protection Agency	TVA	- Tennessee Valley Authority
ERC	- Engr. Res. Center	USDA	- U.S. Dept. of Agric.
IWR	- Inst. for Water Resources	USDC	- U.S. Dept. of Commerce
NAS	- Nat'l. Academy of Sciences	USDI	- U.S. Dept. of the Interior
NCDNER	- N.C. Dept. of Natural & Econ. Res.	USGPO	- U.S. Gov. Printing Office
NERC	- Nat'l. Env. Res. Center	USGS	- U.S. Geological Survey
NPS	- Nat'l. Park Service	WPC	- Water Pollution Control
NTIS	- Nat'l. Tech. Information Serv.	WQS	- Water Quality Standards
NWC	- Nat'l. Water Commission	WRC	- Water Resources Council
*OWAR	- N.C. Off. of Water & Air Resources	WRRI	- Water Resources Res. Institute
OWP	- Office of Water Programs	WRSIC	- Water Res. Sci. Information Center

Water Resources Planning

- "Chicod Creek Watershed, Final Environmental Impact Statement," (Rev.), 12/74, Pitt and Beaufort Counties, NC, USDA, SCS, PO Box 27307, Raleigh, NC 27611.
- Vol. I - Environmental Statement
 Vol. II - Appendix - Comments
 Vol. III - Appendix B - Economics
 Appendix C - Sedimentation
 Appendix D - Coastal Zone Resources Corp.
 Vol. IV - Appendix E - Court Opinion and Soil Conservation Serv. Response
 Appendix F - Inquiries and Response for Permits
- "Chowan River Basin, Virginia and North Carolina," (Phase I Feasibility Rpt.), 1/75, Dept. of Army, Corps of Eng., Ft. Norfolk, 803 Front St., Norfolk, VA 23510.
- "The Role of Citizen Advisory Groups in Water Resources Planning," (#43), 7/74, by M. Ertel, WRRC, U. of MA, Amherst, MA 01002.
- "Costs of Land Subsidence Due to Groundwater Withdrawal," (TR-57), 7/74, by J. P. Warren, et al, WRI, TX A&M St. U., College Station, TX 77843.
- "Crabtree Creek, Wake County, North Carolina, Draft Environmental Impact Statement," (EPA 904/9-75-001), 1/75, EPA, Region IV, 1421 Peachtree St., NE, Atlanta, GA 30309.
- "Design and Assembly of an Automatic Hydrologic Data Acquisition System," (#44), 6/74, by P. N. Turbide, WRRC, U. of MA, Amherst, MA 01002.
- "A Study of the Effectiveness of Water Resources Planning Groups, A Final Report," (PRWG110-1), 3/74, by D. H. Hoggan, et al, WR Lab., Col. of Eng., UT St. U., Logan, UT 84322.
- "Control of Environmental Impacts from Advanced Energy Sources," (EPA-600/2-74-002), 3/74, by E. E. Hughes, et al, from EPA, avail. from USGPO, Wash., DC 20402.
- "Water Use and Coal Development (Energy) in Eastern Montana: Water Availability and Demands," (#59), 12/74, by K. L. Stroup, et al, MT U. Joint WRRC, Bozeman, MT 59715.
- "Energy, Environment and Water Resources," (Proceedings UCOWR Annual Meeting), 7/74, WRRI, 212 Agric. Eng., U. of NE - E. Campus, Lincoln, NE 68503.
- "Project Independence, Water Requirements, Availabilities, Constraints, and Recommended Federal Actions," (Final Task Force Report), 11/74, by WRC, avail. from USGPO, Wash., DC 20402, Price \$1.95.
- "North Carolina Water Plan, Water Resources Aspects of the Proposed Perkins Station Nuclear Power Plant - Area Management Plans - the South Atlantic Gulf Region, Yadkin-Pee Dee River Basin," (TR IV-21-C (#1)), 10/74, NCDNER, Div. of Res. Plan. & Eval., PO Box 27687, Raleigh, NC 27611.
- "Displacement of Persons by Major Public Works, Anthropological Analysis of Social and Cultural Benefits and Costs from Stream Control Measures--Phase 5," (Res. Rpt. #80), 12/74, by C. R. Smith, et al, WRRI, U. of KY, Lexington, KY 40506.
- "Water and Energy Self-Sufficiency, A Staff Analysis and Selected Materials on Water Use in Energy Production," (Serial #93-51 (92-87), 93rd Congress, 2nd Session), 1974, for Comm. on Int. & Insular Affairs, avail. from USGPO, Wash., DC 20240.
- "Proceedings of the Workshop on Research Needs Related to Water for Energy," (Res. Rpt. #93), 11/74, by G. E. Stout, WRC, 2535 Hydrosystems Lab., U. of IL, Urbana, IL 61801.

*Agency name changed to N. C. Division of Environmental Management, NCDNER.

**Agency name changed to Office of Water Research & Technology, (OWRT) as of July 29, 1974.

- "Water Law Bibliography 1847-1965, Source Book on U. S. Water and Irrigation Studies: Legal, Economic and Political," (Supplement 2 1968-73), by J. M. Jacobstein, et al, Jefferson Law Book Co., Wash., DC 20240 & Cincinnati, OH 45202.
- "Development of a Dynamic Water Management Policy for Texas," (TR-52), 6/73, by W. L. Meier, et al, WRI, TX A&M U., College Station, TX 77843.
- Decision Analysis on Water Resources Planning and Management for an Arid Metropolitan Center," (TR-54), 11/73, by C. S. Shih, et al, WRI, TX A&M U., College Station, TX 77843.
- "Planning, Management and Accountability in Water Resources Research," (Bul. #21), 11/74, by J. C. Warman, et al, WRRRI, Auburn U., Auburn, AL 36830.

Water Quality Management

- "A Study of Naturally Occurring Algicides Produced by Freshwater Algae," (Rpt. #79), 12/74, by D. O. Harris, et al, WRRRI, U. of KY, Lexington, KY 40506.
- "Effect of Geographical Variation on Performance of Recirculating Cooling Ponds," (EPA-660/2-74-085), 12/74, by E. L. Thackston, Vanderbilt U., for EPA, avail. from USGPO, Wash., DC 20402.
- "Impact of the Cranberry Industry on the Quality of Ground Water in the Cape Cod Area," (#42), by K. H. Deubert, WRRRC, U. of MA, Amherst, MA 01002.
- "Predictive Capabilities of the Specific Activity Hypothesis for Cs and Zn in Freshwater Systems," (TR #42), 1975, by J. G. Seelye, et al, Inst. of WR, MI St. U., 334 Natural Res. Bldg., E. Lansing, MI 48824.
- "Feasibility of Overland Flow for Treatment of Raw Domestic Wastewater," (EPA-660/2-74-087), 12/74, by R. E. Thomas, et al, Robert S. Kerr Env. Res. Lab., for EPA, avail. from USGPO, Wash., DC 20402.
- "Economic Disincentives for Pollution Control: Legal, Political and Administrative Dimensions," (EPA-660/5-74-026), 7/74, by W. A. Irwin, et al, Env. Law Inst., for EPA, avail. from USGPO, Wash., DC 20402, Price \$3.35.
- "Feasibility of Overland-Flow Treatment of Feedlot Runoff," (EPA-660/2-74-062), 12/74, by R. E. Thomas, R. S. Kerr Env. Res. Lab., for EPA, avail. from USGPO, Wash., DC 20402.
- "Beef Cattle Feedlot Site Selection for Environmental Protection," (EPA-R2-72-129), 11/72, by R. D. Kreis, et al, R. S. Kerr Env. Res. Lab., for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.
- "Hydrogeochemical Investigation of Selected Watersheds in Southwestern Montana," (#60, Comp. Rpt.), 12/74, by M. R. Miller, MT U. Joint WRRRC, Bozeman, MT 59715.
- "Evaluation of Land Application Systems," (EPA-430/9-74-015), 9/74, EPA, OWP Operations, Wash., DC 20460.
- Certain Recommendations of the Water Pollution Control Federation for Improving the Law and Its Administration," (P.L. 92-500), Water Pol. Control Fed., 3900 WI Ave., NW, Wash., DC 20016.
- "Water Pollution Control Action-Reaction-Inaction," (Law), (Proceedings Paper #303), 8/74, ed. by J. S. Gladwell, et al, WRRRI, U. of ID, Moscow, ID 83843.
- "Mercury Recovery From Contaminated Waste Water and Sludges," (EPA-660/2-74-086), 12/74, by R. Perry, Georgia-Pacific Corp., for EPA, avail. from USGPO, Wash., DC 20402.
- "Proceedings of Seminar on Methodology for Monitoring the Marine Environment," (EPA-600/4-74-004), 10/74, by S. S. Verner, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price \$4.90.
- "Used Oil Law in the United States and Europe," (EPA-600/5-74-025), 7/74, by W. A. Irwin, et al, Env. Law Inst., for EPA, avail. from USGPO, Wash., DC 20402, Price \$3.65.
- "A Conceptual Model for the Movement of Pesticides Through the Environment," (EPA-660/3-74-024), 12/74, by J. W. Gillett, et al, for EPA, avail. from USGPO, Wash., DC 20402.
- "Slope Stability of Overburden Spoil Dumps From Surface Phosphate Mines in Southeastern Idaho," (PRWG 140-1), 4/74, by R. W. Jeppson, et al, WR Lab., Col. of Eng., UT St. U., Logan, UT 84322.
- "Sources of Phosphorus Inputs from the Atmosphere and Their Significance to Oligotrophic Lakes," (Res. Rpt. #92), 11/74, by T. J. Murphy, WRC, U. of IL, 2535 Hydrosystems Lab., Urbana, IL 61801.
- "Water Recycle/Reuse Possibilities: Power Plant Boiler and Cooling Systems," (EPA-660/2-74-089), 12/74, by G. R. Nelson, for EPA, avail. from USGPO, Wash., DC 20402.
- "Dissolved Silica in Laurel Lake: Influx, Uptake, and Differential Accumulation During Summer Stratification," (#39), 6/74, by M. Soukup, WRRRC, U. of MA, Amherst, MA 01002.
- "Propagation of Spartina alterniflora for Substrate Stabilization and Salt Marsh Development," (TM #46), 8/74, by W. W. Woodhouse, et al, Coastal Eng. Res. Center, Kingman Bldg., Ft. Belvoir, VA 22060.
- "Waste Control and Abatement in the Processing of Sweet Potatoes," (EPA-660/2-73-021), 12/74, by C. Smallwood, Jr., et al, NCSU, for EPA, avail. from USGPO, Wash., DC 20402.
- "The Effect of Temperature and Chemical Pollutants on the Behavior of Several Estuarine Organisms," (Bul. #11), 12/74, by J. W. Meldrim, et al, Ichthyological Assoc., Inc., 100 S. Cass St., Middletown, DE 19709.
- Effects of Temperature on the Toxicity of Oil Refinery Waste, Sodium Chlorate, and Treated Sewage to Fathead Minnows," (PRWG105-4), 9/74, by C. C. Shifrer, et al, WR Lab., Col of Eng., UT St. U., Logan, UT 84322.

- "A Continuous Flow Kinetic Model to Predict the Effects of Temperature on the Toxicity of Waste to Algae," (PRWG105-3), 6/74, by J. H. Reynolds, et al, WR Lab., Col. of Eng., UT St. U., Logan, UT 84322.
- "Continuous In-plant Hot-Gas Blanching of Vegetables," (EPA-660/2-74-091), 12/74, by J. W. Ralls, et al, Nat'l. Cannery Assoc., for EPA, avail. from USGPO, Wash., DC 20402.

Water Quantity Management

- "Water Salvage Potentials in Utah, Vol. I, Open Evaporation and Monolayer Suppression Potential," (PRWA22-1), 9/74, by T. C. Hughes, et al, WR Lab., Col. of Eng., UT St. U., Logan, UT 84322.
- "Steady Flow Analysis of Pipe Networks, An Instructional Manual," 9/74, by R. W. Jeppson, UT Water Res. Lab., Col. of Eng., UT St. U., Logan, UT 84322, Price \$6.50.
- "Surge Facility for Wet and Dry Weather Flow Control," (EPA-670/2-74-075), 11/74, by H. L. Welborn, Y-T-0 & Assoc., for EPA, avail. from USGPO, Wash., DC 20402.
- "Hydraulic and Flow Studies Related to Sediment Transport, Kentucky River, Kentucky," (Res. Rpt. #81), 12/74, by B. R. Moore, et al, WRRRI, U. of KY, Lexington, KY 40506.
- "Hydrodynamics of Artificial Ground-Water Recharge," (Tech. Com. Rpt.), 2/74, by R. R. Brock, Sch. of Eng., U. of CA, Irvine, CA 92664.
- "Hydrology of the Dismal Swamp, Virginia-North Carolina," (Rpt. 74-39), 1974, by W. F. Lichtler, et al, USGS, 200 W. Grace St., Richmond, VA 23220.
- "Simulation of Steady and Unsteady Flows in Channels and Rivers," (PRYNE-074-0-1), 4/74, by R. W. Jeppson, WR Lab., Col. of Eng., UT St. U., Logan, UT 84322.
- "Some Effects of Spring Snowmelt Runoff on Aquatic Invertebrate Populations in a High Mountain Stream," (WR Series #50), 4/74, by W. R. Good, WRRRI, U. of WY, Laramie, WY 82070.
- "Development of a Shallow-Water Wave Direction Gage," (Reprint 8-74), 9/74, by R. J. Hallermeier, et al, Coastal Eng. Res. Center, Ft. Belvoir, VA 22060.
- "CERC Field Wave Gaging Program," (Reprint 5-74), 9/74, by H. G. Peacock, Coastal Eng. Res. Center, Kingman Bldg., Ft. Belvoir, VA 22060.
- "Results from the CERC Wave Measurement Program," (Reprint 7-74), 9/74, by E. F. Thompson, Coastal Eng. Res. Center, Kingman Bldg., Ft. Belvoir, VA 22060.
- "Finite Spectrum Analyses of Wave Records," (Reprint 6/74), 9/74, by D. L. Harris, Coastal Eng. Res. Center, Kingman Bldg., Ft. Belvoir, VA 22060.
- "Wave Refraction Phenomena Over the Continental Shelf Near the Chesapeake Bay Entrance," (TM-47), 10/74, by Y. Y. Chao, Coastal Eng. Res. Center, Kingman Bldg., Ft. Belvoir, VA 22060.

Miscellaneous

Annual Reports: State Water Resources Research Institutes

Alabama
Massachusetts
Rhode Island

- "Annual Report," 1974, Missouri River Basin Com., Suite 403, 10050 Regency Circle, Omaha, NE 68114.
- "Annual Report of the Tennessee Valley Authority," (Vol. I--Text), 6/74, Treasurer, TVA, Knoxville, TN 37902, Price 50¢.
- "Proceedings of a Conference on Coastal Management," (UNC-SG-74-16), 9/74, Sea Grant Prog., 1235 Burlington Lab., NCSU, Raleigh, NC 27607.
- "Technical Operations Manual for the Blue Crab Industry," (UNC-SG-74-12, Special Sci. Rpt. #28), 10/74, by T. M. Miller, et al, UNC Sea Grant Prog., 1235 Burlington Lab., NCSU, Raleigh, NC 27607.
- "Soil Survey of Wayne County, North Carolina," 6/74, USDA, SCS, avail. from USGPO, Wash., DC 20402.
- "Soil Survey, Pitt County, North Carolina," 11/74, USDA, SCS, avail. from USGPO, Wash., DC 20402.
- "Solid Waste Disposal by Land Burial in Southern Indiana," (TR #45), 11/74, by D. B. Waldrip, et al, WRRRC, Purdue U., Lafayette, IN 47907.

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