NEWS
WATER RESOURCES RESEARCH INSTITUTE
OF THE UNIVERSITY OF NORTH CAROLINA

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CONTENTS

LAND USE PLANNING IN THE 1974 GENERAL ASSEMBLY

(Editor's note: the following comments are condensed from notes prepared by Prof. Milton S. Heath, Jr., Associate Director, Institute of Government, University of North Carolina, Chapel Hill.)

In 1974 the General Assembly tackled in earnest the subject of land use legislation, and laid the foundation for a coordinated state-local program of planning and managing the use of land for environmental and other objectives. The most prominent of these new laws is the Coastal Area Management Act of 1974, which pre-occupied the General Assembly from the introduction of the bill on the second day of the session to its enactment on the next-to-last day of the session. Companion measures enacted this year were the State Land Policy Act and the Land Conservancy Law.

The land use package was funded by substantial appropriations--$200,000 for coastal area management*; $125,000 for implementation of the Land Policy Act; $20,000 for demonstration grants for local planning studies in the mountain area; $5.5 million for State parks land acquisition (including $500,000 toward acquisition of Jockey's Ridge); and $3 million for development of State parks and water recreation areas.

Coastal Area Management Act

This lengthy Act was extensively abstracted by the Editor in the May NEWS.

State Land Policy Act

Along with the coastal and mountain area bills, after introduction in 1973 the land policy bill was held over for public hearings during the summer and fall. Early in 1974 it was revised by the Senate Committee on State Policies. The committee amendments were generally consistent with the amendments to the coastal area bill, stressing expanded input from local governments. The land policy bill cleared the Senate without opposition and, once the coastal bill received House approval, was accepted by the House also without opposition.

The Act calls for development of a land classification system for all land in North Carolina, to be used as the basis for evaluating land capability and suitability for major use classifications. Not less than four nor more than eight classifications are to be established. A substantial opportunity for local input is guaranteed by a provision that the recommended classifications must be revised in light of consensus proposals of local planning agencies.

The Act also directs that state land policies be articulated to govern the use of publicly owned lands and to provide guidance for such processes as advanced land acquisition, location of new towns, and review of projects of regional impact. All of these functions will be the responsibility of a State Land Policy Council, which will consist of cabinet officers, legislative leaders and local government spokesmen. (This Council in fact pre-dated the Act, having been created by Executive Order of the Governor in 1973. The Act modified its composition by adding the legislative and local government representatives. At the time of enactment of the Land Policy Act the original Land Policy Council had already initiated some of the programs contemplated by the Act.)

The Land Policy Act was not "necessary" legislation, in the sense of granting new powers or defining new functions. (The Senate opponents of the coastal area bill

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*Out of funds available from State appropriations and federal double-matching funds, the Department of Natural and Economic Resources hopes to have on hand something on the order of one half million dollars during the 1974-75 fiscal year to assist local planning efforts under the Coastal Area Management Law.

implied as much when they endorsed the Land Policy Act as making the coastal bill unnecessary.) However, the Act will have some significant consequences.

In the first place, the Act gives structure and direction to land use programs at the state level. Certain tasks--i.e., the development of the land classification system and of state land policies--are to be performed under mandated schedules. Second, it provided a basis for increased funding of state land use planning programs. $125,000 were appropriated for this purpose this year, which will probably attract federal matching funds. Third, as enacted, the Act provided avenues for local and legislator input to what would probably otherwise have been simply a state administrative function. Finally the Land Policy Act provides a coordinating mechanism for regional programs such as the coastal area law, and a foundation for continuing to explore and develop further regional programs or unified state programs.

Outline of Main Features of State Land Policy Bill

Organization

A new 14-member Land Policy Council (LPC) advisory to Governor and consisting of the Lieutenant Governor, Speaker, a Senator selected by the Lieutenant Governor, a representative selected by Speaker, one designee each of League of Municipalities and Association of County Commissioners, and 8 cabinet members (or their alternates) serving ex officio - Heads of Departments of Administration, Agriculture, Cultural Resources, Commerce, Natural and Economic Resources, Revenue, Human Resources, and Transportation is to be established within Department of Administration, be provided with staff services primarily by the State Planning Office, and be advised by 24-member Land Policy Advisory Committee appointed by Governor and consisting of citizens and elected local officials.

The Land Policy Council is to develop and propose State Land Policy and State Land Classification System, and to perform related functions.

Timing

Recommended State Land Policy is to be prepared by the Land Policy Council by July 1, 1976, (2 years after effective date of Act) and presented to the next General Assembly by the Governor.

A State Land Classification System is to be prepared by the Land Policy Council and recommended to the Governor by July 1, 1976, revised in light of majority of recommendations of local planning agencies, and transmitted to next General Assembly and implemented by January 1, 1979.

State Land Classification System

Not less than four nor more than eight land classifications are required. These classifications are to recognize land as a basic resource; to provide for orderly growth and development; to protect resources in areas of environmental concern; and to focus on problems of areas impacted by key facilities and other large scale developments.

Procedures for development of the classifications are specified and the Land Policy Council is required to develop criteria for classification.

State Land Policy

The "State Land Policy" is to include:

(a) principles and methods for State and local government transactions involving land use, management, ownership, etc.,
(b) a compilation of relevant State laws, regulations, decisions, etc., and
(c) policies concerning such matters as advance land acquisition, utility right-of-way use, large-scale public projects (including land assemblage) determination of areas of environmental concern, new towns, projects of regional impact, etc.

When adopted, the State Land Policy will guide and determine administrative procedures, decisions, consistent with existing laws.

Funding

$125,000 by separate bill, with matching funds to be sought.

GOVERNOR DESIGNATES 20 COUNTIES UNDER COASTAL AREA MANAGEMENT ACT

Governor James E. Holshouser, Jr. has begun implementation of the Coastal Area Management Act passed by the 1974 General Assembly session. (An abstract of the Act was published in the May NEWS).

He has designated 20 counties as making up the "coastal area" and established procedures for local government nominations to the commission that will administer the law. The counties are Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington.

The law is aimed at insuring that "the development or preservation of the land and water resources of the coastal area proceeds in a manner consistent with the capability of the land and water for development, use, or preservation based on ecological considerations."

INSTITUTE ADVISORY COMMITTEE REAPPOINTMENTS

University President William C. Friday has reappointed to the Institute's Advisory Committee the following members whose terms expired recently:

Mr. Jesse L. Hicks, State Conservationist, U.S. Soil Conservation Service,

Dr. Thomas L. Linton, Director of Marine Affairs, North Carolina Department of Administration and North Carolina Department of Natural and Economic Resources, and

Mr. John Morrisey, General Counsel, North Carolina Association of County Commissioners.

INSTITUTE TECHNICAL COMMITTEE CHANGES

Two members of the Institute's Technical Committee have recently completed their terms:

Dr. Frank J. Humenik, Department of Biological and Agricultural Engineering, North Carolina State University, and

Dr. Allen Stiven, Ecology Curriculum, University of North Carolina at Chapel Hill.

Dr. A. Ray Jennings, formerly with the Department of Geology, East Carolina University has resigned from the Committee due to a recent change in employment.

Drs. Humenik, Stiven, and Jennings and their colleagues on the Advisory and Technical Committees have been of tremendous assistance in assuring that the Institute's research program is relevant to North Carolina's needs and is scientifically meritorious.

Dean Ralph E. Fadum, Chairman of the Institute's Board of Directors, has appointed two new members to the Technical Committee. They are:

Dr. Edward J. Kuenzler, Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, and

Dr. R. Wayne Skaggs, Department of Biological and Agricultural Engineering, North Carolina State University.

NOTICE: WATER RESOURCES RESEARCH GRANTS

Applications from faculty members of the senior colleges and universities in North Carolina for grants under the Institute's Fiscal Year 1975-76 Matching Grants Program will be accepted until August 30, 1974.

The purpose of the Matching Grants Program is to provide long-term research support (two or three years) for projects directed toward the solution of State-Regional water resources problems. Highest priority will be given to proposals which deal with problems of recognized regional as well as State significance. A report on Water Resources Problems and Research Needs of North Carolina (revised 1974) is available from the Institute upon request. The Institute is currently involved in the analysis of regional problems in cooperation with other Institutes of the South Atlantic-Gulf Region. Investigators are encouraged to discuss their research interests with the Institute Director or Associate Director to assure that proposals reflect this broader regional interest.

Federal funds are requested from the Office of Water Resources Research (OWRR), U.S. Department of the Interior. The Institute will assume responsibility for non-federal matching funds for projects approved by OWRR. Projects not funded under this program will subsequently be considered under the Institute's Annual Allotment Program.

Particular attention is called to those sections of the proposal dealing with objectives, procedures, and literature review. These are inadequately treated in most proposals and the principal cause of disapproval. Research objectives and procedures must be explicit and sufficiently detailed to give a convincing picture of work to be undertaken. Search of the literature and related discussion must be rigorous enough to satisfy reviewers that investigators are familiar with past and current work and have taken this into consideration in the preparation of proposals. A thorough job in the preparation of proposals greatly enhances probability of approval. Proposals must cover all items included in the Instructions to Applicants.

Instructions to Applicants and Financial Forms can be obtained from the Office of the Director, 124 Riddick Building, North Carolina State University, Raleigh, North Carolina 27607, Telephone Code 919: 737-2815.

REVISED INSTITUTE REPORT

Report No. 2 (Revised)

Water Resource Problems and Research Needs of North Carolina — A Reassessment

by

David H. Howells
Director
Water Resources Research Institute
of The University of North Carolina

The report is a summary of North Carolina's water resource problems and research needs and was prepared as a source of orientation for the Institute's research program. The subject matter is presented within the broad categories of water resource planning, water pollution control, and water quantity management. The problems and needs discussed represent those areas in which the Institute is attempting to encourage a research response from potential investigators.

Current and needed studies and research referred to in this report reflect the collective statewide effort of public agencies, industry, and the university community. Twenty-three priority research needs are separately listed.

Three appendices are devoted to "Declaration of Public Policy and Goals for Water Related Land Resources," "New State Legislation and Utility Commission Rules," and "Basic Data Systems."

DATES TO REMEMBER

July 21-25 - Institute Short Course on Environmental Assessment and Impact of Water Resource Development, Continuing Education Center, Appalachian State University, Boone. An excellent staff has been assembled, including representatives from the Environmental Protection agency, the Army Corps of Engineers, the Department of Natural and Economic Resources, and the University of North Carolina at Chapel Hill. Attendance is by preregistration only. Enrollment will be limited but a few openings yet remain. Please contact F. Eugene McJunkin at the Institute.

September 26-27 - National Symposium on the State of America's Drinking Water at the University of North Carolina at Chapel Hill. Contact F. Eugene McJunkin at the Institute or the University of North Carolina at Chapel Hill.

REORGANIZATION OF THE NORTH CAROLINA DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES

(Again our thanks to Prof. Milton S. Heath, Jr. for his analysis.)

In Chapter 1262 (effective July 1, 1974) the continuing process of state government reorganization under constitutional mandate was extended to the Department of Natural and Economic Resources (DNER) -- an act that also reorganized the Department of Corrections.

Following the general principles of previous reorganization bills, Chapter 1262 centralized administrative functions in the cabinet-level Secretary, who will look to one general policy-advisory board and a number of separate commissions for policy guidance and formulation. The commissions will generally retain rule-making powers, and (to some extent) decisional powers in individual quasi-judicial matters, but will no longer perform the detailed administrative functions hitherto performed by some of them. Under the standard reorganization terminology, there will be two additional levels of statutory bodies within the Department -- the "councils" and "committees," each performing designated advisory functions. Chapter 1262 also specifies that the Department shall be divided into at least six "divisions" for administrative purposes.

Chapter 1262 structures DNER along the following lines:

<u>6 statutory divisions</u>: Environmental Management (formerly Water and Air Resources), Commercial and Sports Fisheries, Earth Resources, Community and Economic Development, Forest Resources, and Parks and Recreation. Other divisions may be established administratively.

<u>1 general policy board</u>: The Board of Natural and Economic Resources (succeeding the Board of Conservation and Development)

<u>7 commissions</u>: The Wildlife Resources Commission, Environmental Management Commission, Marine Fisheries Commission (essentially succeeding the Commercial and Sports Fisheries Committee of the old C & D Board), Mining Commission (formerly "Council"), Sedimentation Control Commission, State Soil and Water Conservation Commission (formerly "Committee"), and the Wastewater Treatment Plant Operators Commission of Certification.

<u>9 councils</u>: The Earth Resources Council, Community and Economic Development Council, Forestry Council, Parks and Recreation Council, Zoological Park Council (Transferred from the Department of Administration), Water Safety Council, Air Quality Council, Water Quality Council, and National Park, Parkway and Forests Development Council.

<u>4 (+) committees</u>: The Commercial and Sports Fisheries Committee, Science and Technology Committee, Federal Reservoirs local committees, and North Carolina Trails Committee.

The scope of this article does not permit a full description of the reorganization bill, but a few specific aspects of the bill should be noted.

The old Board of Conservation and Development is substantially restructured as a Board of Natural and Economic Resources, responsible for assisting the Secretary in the "development of major programs and recommend priorities for programs." The new Board will have 25 members, of whom only 10 will be members-at-large appointed by Governor. (The old C & D board had 27 members, all citizens appointed by the Governor.) Augmenting the citizen members on the new NER board will be the chairman and one designated member from each of the following commissions and councils within the department: the Wildlife Resources Commission, Environmental Management Commission, Marine Fisheries Commission, Earth Resources Council, Community and Economic Development Council, Forestry Council, and Parks and Recreation Council.

The act preserves the unique independence of the Wildlife Resources Commission (WRC), loosely affiliated with the Department, that was embodied in the original 1971 reorganization legislation. Main features of this special status are that the WRC "shall exercise all . . .statutory powers independently of the Secretary"; shall be subject to departmental direction and supervision "only with respect to the management functions of coordination and reporting"; and shall appoint its own Executive Director.

The act, in renaming the Board of Water and Air Resources as the Environmental Management Commission, conveys a suggestion of broader ultimate responsibilities for this agency than water and air resources, though this concept remains to be fleshed out by actual addition of further functions. The act spells out in detail a number of functions now lodged by statute in the BWAR that will be transferred to the Department, in keeping with the basic thrust of the reorganization effort, and eliminates the job titles and job specifications for the Director and Assistant Director of Water and Air Resources that were a legacy of the 1967 reorganization of water and air functions. (Ed. Note: More detailed comments on this Commission appear in the subsequent article.)

The act transfers from the Department of Administration into DNER the functions of the North Carolina Zoological Park under the Zoological Park Council. It also eliminates from DNER the functions of the Law and Order Committee. (The exact administrative location of the Law and Order Committee remains unsettled, at least until action by the Governor, because the bill transferring the Committee from DNER to Administration failed to pass.)

BOARD OF WATER AND AIR RESOURCES BECOMES ENVIRONMENTAL COMMISSION ON JULY 1

In the newest phase of State government reorganization, the Board of Water and Air Resources will become the North Carolina Environmental Management Commission.

The change, to be effective July 1, 1974, is contained in Chapter 1262 (HB 1129) of the 1974 General Assembly Session Laws. The statute gives the Environmental Management Commission "the power and duty to promulgate rules and regulations to be followed in the protection, preservation, and enhancement of the water and air resources of the State."

The Commission, as did the Board, will consist of 13 members appointed by the Governor for six year staggered terms (after the initial appointments). Initial appointees will be those members of the Board who meet the statute's standards for Commission membership, generally like those established for Board membership by a 1971 law. The first members will serve for a period equal to the remainder of their current terms on the Board (four until 1975, five until 1977, and four until 1979).

The Governor will designate the Chairman of the Commission, to serve at the Governor's pleasure, and the Vice Chairman will be elected by the Commission members for a two-year term or until his appointed term expires.

The Wastewater Treatment Plant Operators Commission will replace the Wastewater Treatment Plant Operators Board of Certification, with the same qualifications and duties. The seven members will be appointed by the Secretary of Natural and Economic Resources with the approval of the Environmental Management Commission.

Changes are in store also for the Air Control Advisory Council and the Water Control Advisory Council.

The new Air Quality Council will advise the Commission in the development of rules, regulations, and quality standards for air and on any other matters the Commission may refer to it.

The Water Quality Council will advise the Commission in the development of rules, regulations, and quality standards for water and on any other matter the Commission may refer to it.

Each of the new councils will consist of nine members appointed by the Governor and with the same qualifications as for the predecessor groups. The members will serve staggered six-year terms (initially, three for two years, three for four years, and three for six years). The Governor will designate the Chairman to serve at the Governor's pleasure.

NATIONAL WATER COMMISSION REPORT

Beginning with the June 1973 issue, the NEWS has summarized chapter-by-chapter the more important findings and recommendations of the National Water Commission.

Chapter 11

Improving Organizational Arrangements

This chapter of the Commission's report examines a number of organizational arrangements for the planning, development, and management of the Nation's water and related land resources and makes recommendations for improving them.

The Commission first discusses the U.S. Water Resources Council. The Council's major tasks are to coordinate the water activities of the various Federal agencies among themselves and with the States, to review major river basin plans throughout the Nation, and to assure that Federal water policies and programs are adequate to meet the Nation's water needs. The Commission concludes that while the Council has accomplished many things, it generally has been unable to review and coordinate the policies and programs of the Federal agencies, to confront difficult policy issues and resolve them, and to resolve interagency conflicts. A policymaking component with an ability to enforce decisions when consensus cannot be reached, should be built into the Council mechanism. The Commission recommends that the Council be placed within the Executive Office of the President and have an independent, full-time, presidentially appointed Chairman reporting to the President.

Other recommendations for improving the Council include central funding through the Council of planning studies by interagency committees and river basin commissions: extending the duration of the program of grants to the States for water planning; coordination of grant applications from various agencies of a State seeking funds from various Federal agencies for water resources planning and programs; coordinating Federal participation in the negotiation and administration of water compacts; and revising the statutory membership of the Council.

The need for an independent board of review in the Federal Government to examine federally funded water development proposals, river basin plans, and water development grant programs is discussed. The Commission recommends that such a review board be established.

Possible new functions for certain of the Federal water agencies are considered. Recommendations are made that the functions of the National Oceanic and Atmospheric Administration and the United States Geological Survey be combined into a new agency in the Department of the Interior, and that a new Office of Water Technology also be established in Interior. Recommendations are made for changing the engineering design and construction activities of the Soil Conservation Service, the Bureau of Reclamation, and the Army Corps of Engineers.

The chapter then turns to an examination of various organizations for water planning and management for river basins and other regions. First, various intrastate arrangements are discussed, particularly the Texas river authorities. The Commission concludes that these authorities have been an important force in developing the water resources of Texas, and that other States should consider using them for entire river basins or subbasins where other governmental entities are inadequate. The Gulf Coast Waste Disposal Authority in Texas appears to be an especially useful mechanism for attacking problems of water pollution on an intrastate regional basis.

The Commission then examines certain multistate arrangements for river basins, including ad hoc and interagency committees and river basin commissions for planning, and interstate and Federal-interstate compact commissions. The Commission recommends the Federal-interstate compact as the preferred institutional arrangement for water resources planning and management in multistate regions. Nevertheless, it recognizes that the traditions, institutions, politics, and water problems of various portions of the United States vary greatly, that organizational arrangements which work well in one region may not work elsewhere, and that in each case the selection of an organizational arrangement for water resources planning and management must be appropriate to the circumstances.

As between the river basin planning commissions and the ad hoc and interagency committees for planning, the river basin commissions are preferred. Unless another entity for basin planning and implementation is substituted for a river basin commission, a commission should, after initial completion of its plan, (1) keep the plan up to date, (2) continue the coordination of planning efforts, and (3) reestablish and revise priorities in the light of changing circumstances.

Interstate and Federal-interstate compacts, if they affect a national or Federal interest, require the consent of Congress. Such compacts have been widely used for water resources management. The Commission encourages their continued use and makes a number of recommendations for improving them. There are certain kinds of water compacts, such as administrative agreements, agreements for local planning and zoning, and for interstate metropolitan water management, to which Congress should grant advance consent. The presence of a Federal representative should be required during negotiations of future water compacts so that the States involved may be apprised of the Federal interest in the compact. Future water compacts should clearly state the role of the compact commission with respect to existing Federal agencies and programs, especially with regard to project construction, water quality, and regulatory functions. Finally, Congress should enact legislation granting the Federal district courts original jurisdiction over any case or controversy arising under an interstate water compact, and waiving the sovereign immunity of the United States to permit the United States to be made a party defendant in such a suit.

The final chapter then explores the possible uses of a federally chartered corporation, a type of organization that has not yet been utilized for water management. Such a corporation appears to have a variety of uses, particularly in conjunction with an interstate or Federal-interstate compact or a river basin commission. A regional corporation, because of its flexibility and relative isolation from political control and responsibility, lends itself best to operational tasks rather than planning or regulatory activities intended to be binding upon outside parties. Federally chartered corporations may be able to play important roles in facilitating joint efforts by local government units of two or more States sharing a waterway to handle such limited functions as water treatment and supply.

The last section discusses institutional arrangements for the Great Lakes. Recommendations are made to establish a task force for negotiating a Federal-interstate compact for the Great Lakes and to analyze the impact of alternative management strategies on the Lakes.

FISH DISEASE BREAKS OUT IN NORTH CAROLINA RESERVOIRS

Organic water pollution is apparently creating conditions for widespread disease among game fish in some of North Carolina's best fishing lakes. That is the preliminary finding of an initial study to discover why diseased fish in 10 popular lakes on the Catawba and Yadkin River chains have been showing up in increasing numbers. It was estimated last winter that some 34,000 fish have died in Badin Lake, and the total so far may be much higher.

Sportsmen and the N.C. Wildlife Resources Commission are concerned because the fish most directly affected seem to be those most popular among fishermen. Striped bass, white bass, white perch, largemouth bass, bluegills, green sunfish, robin and warmouth are among the hardest hit, and diseased fish have been found in virtually every large impoundment on the Catawba and Yadkin River Chains.

A joint study by the N.C. Wildlife Resources Commission's Division of Inland Fisheries under the direction of Dr. Norris B. Jeffrey and the Southeastern Cooperative Fish Disease Project at Auburn University showed that Badin Lake had apparently the highest number of diseased fish; however, significant numbers of diseased fish have also been found in High Rock and Tuckertown Lakes--but not Blewett's Falls--on the Yadkin River system. Though the Yadkin River system appeared most severely affected, diseased fish were also found in all of the major lakes on the Catawba River system where samples were taken, including Lake Norman, Lake James, Lake Rhodhiss, Lake Hickory, Mountain Island Lake, and Lake Wylie.

Fishermen first reported the disease during the summer of 1972. At first, there were not enough diseased fish to give an accurate idea of either what was causing the problem or how widespread it might be. In 1973, however, the numbers of diseased fish increased significantly.

During November 1973, Dr. John A. Plumb of the Southeastern Cooperative Disease Project worked with the Wildlife Resources Commission in gathering samples and information. Plumb's report along with preliminary results from Wildlife Commission studies, indicated that the two organisms primarily responsible for the disease were Epistylis, a protozoan and Aeromonas liquefaciens, a bacterium. Light infestations of Dactylogyrus and a costia-like protozoan were also found on the gills of fish.

The two main diseases show up as lesions or sores on the skin, scales and mouths of affected fish, thus prompting the common name of "red sore disease." With Epistylis--the most common disease found--the parasite attaches itself to the hard parts of the fish (scales, fins, spines, or exposed bones) and can cause a small sore. Later, as the parasites increase or grow, the sore increases in size, and pit-like, inflamed sores occur. Infestations on fish may range from mild with only one or two small sores to severe, with large sores covering up to 75 percent of the fish's body. Epistylis rarely causes death to the host fish by itself, but does render the fish unacceptable to most fishermen. Epistylis often leads to secondary bacterial infections of Aeromonas liquefaciens. This frequently occurs in severe cases of Epistylis and these secondary infections are more likely to cause the death of fish. These bacterial infections generally occur when fish have low resistance and have trouble producing antibodies to ward off bacterial disease.

"Plumb's study indicates that though the fish may have these sores, the fish can be safely eaten if properly cleaned and cooked," observed Dr. Jeffrey, "I seriously doubt, however, that many fishermen will find that very comforting, and this in no way lessens the potential impact of this problem."

Dr. Plumb's report indicates that Badin Lake produced the highest percentage of diseased striped bass (100 percent of those checked), with white perch running 57 percent, white bass 67 percent and warmouth 50 percent. Largemouth bass were severely affected in all three of the Yadkin River system lakes with infestations running from 17 percent in High Rock Lake, and 64 percent in Tuckertown Lake, to 100 percent (one bass) in Badin Lake. Most of the diseased bass were moderately to heavily infested.

According to Dr. Jeffrey, parasites are always present in every fish population. It is a natural condition for fish to have some parasites, and a rather delicate equilibrium is established between parasites and fish. However, it is unusual to have conditions where the parasites are as abundant as they are in this case.

Dr. Plumb observed that "red sore disease" or Epistylis has been diagnosed from virtually all the Southeastern states during the past 10 years, and is found most frequently during the fall and winter months.

The disease may occur in any type of water. Still, according to Dr. Plumb, organically enriched waters--pollution from sewage disposal, certain industrial wastes, cropland runoff, and the like--appear to be most favorable for the occurrence of severe outbreaks of Epistylis. As waters become more enriched, more and more fish are affected, and individual fish are more likely to have serious infestations. The parasites apparently use the organic matter, along with water-borne bacteria as a food source. Although Epistylis can be controlled under fish hatchery conditions by treatment with certain chemicals, no therapy has been tried on larger bodies of water because of the obvious impracticality. The most logical approach may be to strive to reduce the organic load in the water, thereby reducing the parasites' food supply.

Dr. Plumb's fish disease report is available on request from the North Carolina Wildlife Resources Commission, Albemarle Building, 325 N. Salisbury Street, Raleigh, N.C. 27611.

MOVEMENT OF WASTES FROM WINSTON-SALEM AREA STUDIED

Effluent from the Winston-Salem sewage-treatment plant takes more than 55 hours to flow along Salem Creek, Muddy Creek, and the Yadkin River to reach Highrock Lake, according to a report released by the U.S. Geological Survey, Department of the Interior. The report further states that during periods of low flow the water entering the Yadkin River from Muddy Creek does not mix completely at first, but tends to flow along the near bank for more than 10 miles downstream.

The study, sponsored by the City of Winston-Salem and the North Carolina Board of Water and Air Resources completes an investigation of travel times and longitudinal and lateral dispersion characteristics of the 40.8 mile reach from Winston-Salem.

Geological Survey hydrologist and author of the report, K. L. Lindskov, said, "One needs only the discharges at the U.S. Geological Survey gaging stations Muddy Creek near Muddy Creek and Yadkin River at Yadkin College as input to use the report in computing the traveltimes of the leading edge, peak, centroid, and the trailing edge to any downstream location."

"Traveltime varies between high and low flow," said Lindskov. Total traveltime for the 40.8 mile reach when the discharges at the Muddy Creek and Yadkin College gaging stations are 400 and 8,000 cubic feet per second respectively are about 24 hours for the leading edge and about 33 hours for the trailing edge. In contrast, when the discharges are 100 and 2,000 cubic feet per second the traveltimes are 39 and 55 hours."

Lindskov went on to say, "Longitudinal dispersion causes the maximum concentrations to decrease significantly as water travels downstream. A relation is presented so the maximum concentration can be estimated at any location downstream from a point of injection."

He also noted, "Although water entering the Yadkin River from Muddy Creek during low-flow periods does not completely disperse laterally for more than 10 miles below the confluence, lateral mixing is complete within a few miles below the confluence when the Yadkin River discharge is above 5,000 cubic feet per second."

Copies of the report titled, "Movement and dispersion of soluble materials in Salem Creek, Muddy Creek, and Yadkin River between Winston-Salem and Salisbury, North Carolina," by K. L. Lindskov may be obtained at no charge from: District Chief, U.S. Geological Survey, P. O. Box 2857, Raleigh, N.C. 27602.

GROUNDWATER RESOURCES OF THE UPPER CAPE FEAR RIVER BASIN

A cooperative report of the North Carolina Department of Natural and Economic Resources and the U.S. Geological Survey describes the occurrence, availability, chemical quality, and cost of development of the groundwater resources in the upper Cape Fear River Basin.

Surprisingly, perhaps, 42 percent of the basin population is supplied with water from groundwater sources. Groundwater supplies can be developed in all parts of the basin. However, in many places, development of large supplies is not feasible.

The report, "An Appraisal of the Groundwater Resources of the Upper Cape Fear River Basin North Carolina," Groundwater Bulletin Number 20, is available free of charge from the U.S. Geological Survey, P. O. Box 2857, Raleigh, N.C. 27602 or the Groundwater Division, Office of Water and Air Resources, Department of Natural and Economic Resources, P. O. Box 27687, Raleigh, N.C. 27611.

NEW WATER QUALITY DATA

The U.S. Geological Survey recently published a new report, Water Resources Data for North Carolina, Part 2, Water Quality Records - 1973. The report contains data on the quality of surface water (chemical, sediment, and temperature) in North Carolina. The data were collected from numerous stream sites across the State during the 1973 water year, the period from October 1, 1972, to September 30, 1973. The report contains 195 pages and is free upon request to:

U.S. Geological Survey
P. O. Box 2857
Raleigh, North Carolina 27602

EPA SEWAGE TREATMENT PLANT AND SEWER CONSTRUCTION COST INDEX FOR APRIL 1974

	Plant			Sewer Cost Index		
Location	Values Apr.1974	% Change Apr.1973	% Change Jan.1974	Values Apr.1974	% Change Apr.1973	% Change Jan.1974
Atlanta	178.28	6.1	4.6	191.07	7.4	4.9
National	196.10	8.0	4.2	214.20	9.0	3.6

WATER RESOURCES CONDITIONS IN NORTH CAROLINA FOR MAY

As a result of above normal rainfall during the month, streamflow across the State was excessive (in the upper 25 percent of record for the month); however, flooding was only minor and limited mostly to small tributary streams in the western part of the State. Streamflow at the U.S. Geological Survey index gaging stations ranged from 1-1/2 times normal flow for the month at the French Broad River at Asheville to almost twice normal flow at the Neuse River near Clayton gaging station. Flows at the end of the month were generally within about 25 percent of normal.

Groundwater levels rose slightly in the western part of the State, remained stable in the central Piedmont, and declined slightly in the Coastal Plain. Except for several heavily-pumped areas in the Coastal Plain, levels in most wells continued to remain above the long-term averages for the month.

WATER RESOURCES LEGISLATION IN THE CONGRESS

New Public Laws

House

H.R. 9492 — Designating the Chattooga River in N.C., S.C., and GA., as a component of the National Wild and Scenic Rivers System. Signed May 10, 1974.

Bills Introduced

Senate

S. 3493 — To authorize the establishment of the Atlantic Wetlands Research Center.

House

H.R. 14843 — To amend the Act of March 10, 1966, providing for the establishment of the Cape Lookout National Seashore in N.C.

NEW PUBLICATIONS RECEIVED BY THE INSTITUTE

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Abbreviations used throughout as follows:

EPA	Env. Protection Agency	USDA	U.S. Dept. of Agriculture
NCDNER	N.C. Dept. Nat'l. & Econ. Res.	USDC	U.S. Dept. of Commerce
NERC	Nat'l. Env. Res. Cntr.	USDI	U.S. Dept. of the Interior
NSF	Nat'l. Science Foundation	USGPO	U.S. Gov. Printing Office
NTIS	Nat'l. Tech. Information Serv.	WPC	Water Pollution Control
NWC	Nat'l. Water Commission	WQS	Water Quality Standards
OWP	Office of Water Program	WRC	Water Res. Center
OWRR	Office of Water Res. Research	WRRI	Water Resources Res. Institute
SCS	Soil Conservation Service	WRSIC	Water Res. Sci. Infor. Center

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