NEWS
WATER RESOURCES RESEARCH INSTITUTE
OF THE UNIVERSITY OF NORTH CAROLINA

Number 97 February 1974

CONTENTS

PRESIDENT NIXON PROPOSES $7 BILLION FOR FISCAL 1975 ENVIRONMENTAL PROGRAMS

The President's budget request for FY 1975 for environmental programs is approximately $7 billion, an increase of $1.7 billion over 1974.

The largest portion of environmental expenditures is for pollution control and abatement activities. This reflects the expansion of the construction grants program for sewage treatment facilities under the 1972 Water Pollution Control Act (Public Law 92-500). The outlays for such grants will be $3.35 billion, 70 percent of all pollution control and abatement activities. While the construction grant program is the largest component of this category, it is only one of a number of programs to fight pollution conducted by 15 Federal agencies. Other abatement and control activities are reflected in the following table:

POLLUTION CONTROL AND ABATEMENT ACTIVITIES BY FUNCTION
(in millions of dollars)

Type of activity	Budget authority			Outlays		
	1973 actual	1974 estimate	1975 estimate	1973 actual	1974 estimate	1975 estimate
Financial aid to State and local governments[1].........	7,242	4,362	[2] 371	908	2,282	3,632
Research and development	599	688	735	489	644	719
Federal abatement and control operations	217	263	297	215	265	304
Manpower development	16	13	11	14	13	12
Reduce pollution from Federal facilities	311	270	321	174	344	392
Other pollution control and abatement activities	135	171	194	125	166	204
Total	8,521	5,768	1,929	1,925	3,714	5,263

[1]These figures include water and sewer programs of the type funded by FHA and OEO.

[2]Contract authority for the EPA in 1975 was made available in 1974 as provided by law, and therefore appears in the 1974 column for Budget Authority instead of the 1975 column.

Among the media, water receives the greatest share, largely as a result of grants and loans for construction of municipal water treatment facilities.

POLLUTION CONTROL AND ABATEMENT ACTIVITIES--
BY MEDIA OR POLLUTANT (in millions of dollars)

Media or pollutant	Obligations		
	1973 actual	1974 estimate	1975 estimate
Media polluted:			
Water:			
Construction grants and loans	3,299	4,478	5,159
Other	431	561	696
Air	461	630	701
Land	61	62	66
Other (e.g., living things, materials)..	293	279	292
Multimedia (i.e., more than 1 of above).	131	114	145
Total	4,676	6,124	7,059
Selected pollutants:[1]			
Solid wastes	150	198	200
Pesticides	61	68	71
Radiation	181	192	236
Noise	66	88	62

[1]Funds for selected pollutants are included in the "media" breakdown above.

DATES TO REMEMBER

July 22-24 - Institute Short Course on Environmental Assessment and Impact of Water Resource Development at Appalachian State University.

September 26-27 - National Symposium on the State of America's Drinking Waters at the University of North Carolina at Chapel Hill.

NATIONAL WATER COMMISSION REPORT

Commencing in the June issue of the News, the Institute started to summarize the more important findings and recommendations of the National Water Commission. This issue continues the chapter-by-chapter review.

Chapter 7

Making Better Use of Existing Supplies

This chapter deals with improvement in the practices, procedures, and laws relating to existing water use. The purpose of the recommended changes is to secure greater productivity from existing water supplies. The first half of the chapter was covered in the January issue.

A Permit System for Riparian States

The purpose of this section is to set forth principles applicable to a system of regulated withdrawals of water for municipal, industrial, and agricultural use in a riparian jurisdiction while simultaneously providing protection within the system for instream values having importance to riparian landowners and to the public.

While the Commission asserts that no crisis in water use exists generally in the humid East, it recommends that riparian states direct attention to regulation of water withdrawals before a crisis arises. When competition for water supply intensifies, the court-administered riparian legal system of allocation will not be adequate to meet social needs. It is ponderous, expensive, and uncertain in result. In time, most riparian jurisdictions are likely to require a system of water allocation that facilitates development by providing security of investment while protecting social and environmental values of instream uses. The basic approach is to establish minimum flows to protect such social and ecological values as esthetics, recreation, and the biosphere. The water remaining is subject to development for use in producing goods and services. The basic features of the permit system recommended by the Commission are presented. More important recommendations are:

1. Permits should be required for all withdrawals of water--surface or ground,
2. There should be no restrictions on who may apply for a permit or on the location where water may be used,

3. Permits should be subject to cancellation after a specific period of nonuse,
4. Permits may be limited in time, but initial period should be long enough for the permittee to amortize his investment comfortably, and renewal should be automatic unless the permit agency finds the water is necessary for a higher public purpose,
5. Definite rules for allocating water in periods of shortage should be adopted before shortages occur, and
6. Permits should be freely transferable to promote the reallocation of water to more productive uses.

Reducing Water Losses by Improved Efficiency

One means of making more efficient use of available water supplies is to reduce losses in existing systems. These losses occur from evaporation, leakage in storage and transmission systems, and careless use of water by ultimate recipients, whether they be farmers, householders, or manufacturers. Not all losses can be eliminated, and not all those capable of being reduced should be, since the value of the water saved should exceed the costs of saving it. Nevertheless, improved water conservation practices give promise of significant savings at acceptable costs. Recommendations pertain to irrigation and urban use. Since the irrigation use is more applicable to the arid West, only the recommendations applicable to urban use are given here:

1. Effective leak control programs should be instituted and meters to measure individual water use should be installed by water supply agencies,
2. Water prices and sewer charges for individual service should be set at levels which fully cover the costs of amortizing and operating the facilities necessary to provide these services, and a municipal water supply rate structure should be adopted which encourages intelligent, rather than excessive, water use,
3. Amendments to plumbing codes should be adopted, requiring the installation of water-saving fixtures and appliances in all new construction, and whenever existing water-using appliances or fixtures are replaced,
4. The water supply should be managed to accommodate sequential uses of water, such as using effluent from treatment plants for irrigating parks and golf courses and for industrial use within the area, and irrigation uses should be timed to coincide with low water demand periods to conserve reservoir and pipeline capacity, and

5. A public relations program should be conducted to encourage wise water use, pointing out to consumers the benefits to the city and its inhabitants to be realized through conservation of the water supply.

Reuse of Municipal and Industrial Wastewater

This section considers the technological, economic, and managerial problems of wastewater reuse. It should be recognized that reuse occurs at the present time. One-third of the Nation's population currently depends on municipal withdrawals from streams containing, on the average, one gallon of previously used water out of 30 gallons of flow. In some cases, as much as one gallon out of five of municipal water supply has been used before. Ordinarily, these supplies have received only conventional purification.

The rate at which the Nation will move toward greater reuse of wastewater depends on advances in treatment technology, costs, and the indirect consequences of more stringent water pollution controls. Present treatment technology is already adequate to permit reuse of municipal effluents for purposes not involving human consumption. In several localities, municipal wastewater is being treated and recycled directly into a system for reuse for industrial, recreational, and ground water recharge purposes. Many of the changes in treatment which would be required for direct reuse of wastewater for industrial purposes will be required in any event by higher water quality standards. Direct reuse of industrial effluents will become progressively more attractive. The controlling factor in direct reuse for industrial purposes is the cost of alternative sources of supply. As costs of alternative supplies rise or as quality of wastewater improves, direct reuse should increase materially. When it does, much of the water supply which industry would otherwise use can be released for other purposes, including human consumption.

The prospects for direct reuse of municipal effluent for human consumption depend both upon technology and public acceptance. Existing treatment technology can produce water that meets current federal drinking water standards in terms of physical, chemical, and bacteriological criteria. However, those standards were not designed for application to municipal wastewater effluents. They do not take into account possible toxic ingredients sometimes found in wastewater. As a result, some public health groups are concerned about (1) possible viral hazards, and (2) trace amounts of new chemicals for which possible adverse health effects are not now predictable. These concerns stem both from the unpredictability of effects of reuse for human consumption and from the great difficulty of proper monitoring and operation of waste treatment facilities. At present, most sewage treatment plants are susceptible to breakdown. Presumably, proper design for contingencies, similar to those for water treatment plants, will be necessary if direct reuse for human consumption is to become a reality. If and when these public health concerns are mitigated by further research, large-scale direct reuse of wastewater for human consumption will become a distinct possibility.

Recommendations were:

1. The potential for reuse of wastewaters should occupy a prominent spot in future planning for overall water resource utilization,
2. In regions where a high-quality source of water is used for irrigation of cropped fields or recreation turf areas such as golf courses and a source of treated municipal wastewater is available, arrangements for water exchange should be considered. Nutrient-rich municipal wastewater could be used for irrigation and exchanged for high-quality water which could be used for domestic and industrial use,
3. Direct reuse of water for human consumption should be deferred until it is demonstrated that virological and other possible contamination does not present a significant health hazard. The Commission endorsed the research program proposed by the American Water Works Association, and
4. The net cost of treatment of water for reuse should be compared with the costs of such alternative sources of water as desalting and interbasin transfers before any such alternative is adopted.

<u>ULTIMATE DISPOSAL OF WASTEWATERS AND THEIR RESIDUALS</u> (New Institute Publication)

Treatment of wastewater is basically the separation of a valuable substance--water--from its pollutants. The residual substances remaining normally have little positive economic value and must be degraded or disposed of. There is little objection to returning clean water to rivers, lakes, oceans, and aquifers. On the other hand, the residual substances are usually an economic liability and may become pollutants.

The Federal Water Pollution Control Act Amendments of 1972 established as "the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985." Elimination of these waters leaves only three places where it is practical to ultimately dispose of polluting substances: air, land, or the oceans. Another alternative is to avoid generation of the wastes, often termed in industry, in-plant reduction. Wastewater treated to the quality levels indicated may find many applications for reuse.

The rapid pace of development in these important topics warrants searching inquiry and examination of present trends and consequences. The Research Triangle Universities of North Carolina, the Environmental Protection Agency, and several national societies concerned with water pollution control sponsored a National

Symposium on Ultimate Disposal of Wastewaters and Their Residuals on April 26 and 27, 1973, in Durham, N. C. The Symposium Proceedings are the record of that Symposium.

The 315 page printed Proceedings are now being distributed to Symposium registrants and are available to others, through the Institute, at $8 per copy prepaid or $10 per copy if billed.

NEW SERIES OF INSTITUTE PUBLICATIONS

The Institute is undertaking a new series of popularized, summary reports to accompany technical project completion reports where these will be of wide interest to the public, officials, planners, engineers, and other groups. The brief, fold-out reports will contain a summary of the research objectives, findings, conclusions, recommendations, and application to water and related land planning and management. The more comprehensive and technical completion reports will continue to be available for persons desiring a more detailed description of the research carried out under the projects.

Research Specials available to date are:

Reservoir Authorization and the Land Market, by Drs. Raymond J. Burby, III, Thomas G. Donnelly, and Shirley F. Weiss, Center for Urban and Regional Studies, University of North Carolina at Chapel Hill.

Pamlico River Estuary - Past, Present, and Future, by Drs. J. E. Hobbie and B. J. Copeland, Department of Zoology, North Carolina State University at Raleigh.

Pollution from Urban Land Runoff, by Dr. Newton V. Colston, Department of Civil Engineering, North Carolina State University at Raleigh.

These may be ordered without charge by contacting the Institute. Future titles will be announced in the Newsletter.

NEW INSTITUTE REPORTS

Annual Report - FY 1972-1973

The Institute Annual Report has been published and is now being distributed. The new format is intended to increase readability. A brief summary is provided in the introduction for those who wish only a brief overview. Each project is covered in sufficient detail to give meaningful insight into accomplishments.

Report No. 3 (Revised)

Water Resources Research Interests in the
Colleges and Universities of North Carolina

January 1, 1974

A current listing of all faculty members in the senior colleges and universities of North Carolina who have expressed an interest in water resources research. Compilation includes name, department, and water-related research interest.

Report No. 4 (Revised)

Inventory of Active Water Resources
Research Projects in North Carolina

January 1, 1974

An inventory of all active water resources research projects underway in North Carolina. Includes 14 colleges and universities, Wrightsville Marine Bio-Medical Laboratory, Research Triangle Institute, 10 private industries and electric utilities, and 7 state and federal agencies.

INSTITUTE RESEARCH PROGRAM FOR 1973-74 (Brochure)

The Institute's research program for fiscal year 1973-1974 is supported by an annual allotment and ten matching grants from the Office of Water Resources Research, U. S. Department of the Interior; matching State appropriations; matching funds from the Pickle Packers International; and grants from the U. S. Environmental Protection Agency and Office of Water and Air Resources, North Carolina Department of Natural and Economic Resources.

All senior colleges and universities in North Carolina are eligible to participate in the Institute's Program. Projects for the present year are being conducted at East Carolina University, N. C. State University at Raleigh, the University of North Carolina at Chapel Hill, and Duke University.

A recently published brochure, available from the Institute, describes briefly 32 research projects currently sponsored by the Institute. The brochure also lists 97 reports, proceedings, and other publications of the Institute.

WATER RESOURCES GRADUATE PROGRAMS

North Carolina State University and the University of North Carolina at Chapel Hill offer a wide spectrum of opportunities for graduate training in water resources. Their programs lead directly to specialized graduate degrees in water related disciplines or may be utilized for graduate minors or supporting programs.

General information regarding the Water Resources Graduate Program can be obtained from:

Dr. Edward H. Wiser, Chairman
Water Resources Committee
Graduate School
North Carolina State University
Raleigh, North Carolina 27607

Dr. Maynard M. Hufschmidt, Chairman
Water Resources Committee
Graduate School
University of North Carolina
Chapel Hill, North Carolina 27514

or from the Institute. A newly revised Water Resources Graduate Program brochure for 1974-1976 is now available from the Institute.

LISTING OF ENVIRONMENT AND NATURAL RESOURCES FILMS

Sale and rental of some 35 National Park Service films covering a wide range of scenic, natural history, historic site preservation and other subjects, are handled by the Harpers Ferry Historical Association, a National Park Service affiliated cooperating association. A catalog describing each title and detailing ordering procedures is available on request by writing to: Film Librarian, Harpers Ferry Historical Association, P. O. Box 147, Harpers Ferry, West Virgina 25425.

CAPE HATTERAS FISHING DISPUTES

New policies aimed at ending conflicts between commercial and sport fishermen at Cape Hatteras National Seashore, N. C., have been announced by the National Park Service. The disputes have been caused by increasing competition between sport and commercial fishermen on the Outer Banks, some of the Nation's best fishing waters for striped bass and other saltwater species.

Under new rules recommended by a State-Federal task force, the National Park Service will:

1. Restrict commercial fishing permits to legal residents of established Outer Bank villages.
2. Step up a public information program to acquaint park visitors with the commercial fishing heritage of the area. When Congress established the Seashore in 1937, it gave Outer Bankers the right to continue earning a livelihood by fishing with the National Seashore.

3. Intensify educational programs on the rights of groups as well as their responsibilities. Commercial fishermen have complained that "sport" fishermen illegally sold their catches.
4. Expand efforts for concurrent Federal-State enforcement of fishing regulations.
5. Keep careful records on the numbers of vehicles and people using the Seashore for either commercial or sport fishing, and promptly investigate conflicts.

The new rules will be reevaluated in one year.

NOTICE OF PUBLIC HEARING ON AREA-WIDE WASTE TREATMENT

The North Carolina Department of Natural and Economic Resources will conduct a public hearing at the Parquet Room, Cone Student Center at the University of North Carolina at Charlotte, at 10:00 a.m., March 20, 1974.

The purpose of this hearing is to gather public advice on the matter of whether the Governor of North Carolina should designate a planning area and an agency to be responsible for preparing an area-wide waste treatment management plan. The proposed area to be considered includes all of Mecklenburg County, much of Gaston County, all of Cabarrus County, part of Stanly County, part of Rowan County, and part of Iredell County.

The agency which is proposed as the agency responsible for planning within the area is the Centralina Council of Governments.

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

	Plant			Sewer Cost Index		
Location	Values Dec.1973	% Change Dec.1972	% Change Sept.1973	Values Dec.1973	% Change Dec.1972	% Change Sept.1973
Atlanta	169.34	6.9	2.5	181.55	6.9	2.4
National	187.51	6.7	1.6	206.01	7.8	2.0

USGS EVAPORATION REPORT AVAILABLE

"Evaporation from Lake Michie, North Carolina, 1961-71," by W. L. Yonts, G. L. Giese, and E. F. Hubbard, reports on a 10-year study as part of a comprehensive investigation of water resources of the upper Neuse River Basin. It explains a unique, simple method of determining evaporation from other lakes of the Piedmont.

The Geological Survey also has released 300 maps showing areas subject to flooding along streams and estuaries of the State. The above are available from USGS, P. O. Box 2857, Raleigh, NC 27602.

APPOINTMENTS APPROVED

Dr. Donald E. Francisco, Acting Director of the Wastewater Research Center, Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, and W. D. Hines, City Manager of Valdese, have been appointed to the State Board of Certification for Wastewater Treatment Plant operators. The Board of Water and Air Resources has approved their appointments to terms expiring June 30, 1976.

RECENT ENVIRONMENTAL IMPACT STATEMENTS OF INTEREST

Final environmental impact statement, Brunswick Steam Electric Plant, Units 1 and 2, Carolina Power and Light Company, January 8, 1974.

Revised draft Environmental Statement related to the proposed construction of the Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4, Carolina Power and Light Company, January 14, 1974.

COURT RULES ON IMPOUNDMENT OF SEWAGE TREATMENT CONSTRUCTION FUNDS

The U. S. Court of Appeals, District of Columbia, has ruled (No. 73-1705, January 23, 1974) in the City of New York and the City of Detroit v. Russell B. Train, as Administrator of the United States Environmental Protection Agency, that the trial court was correct in holding that the suit was not barred by the principle of sovereign immunity and that the EPA Administrator <u>must</u> make full allotments under Sections 205 (a) and 207 of the Federal Water Pollution Control Act.

President Nixon had directed the Administrator to allot "$2 billion of the amount authorized for the fiscal year 1973, and no more than $3 billion of the amount authorized for the fiscal year 1974," an action which has been labeled "Presidential impoundment." Congress had authorized to be appropriated for the fiscal year 1973, not to exceed $5 billion, and for fiscal year 1974, $6 billion dollars.

It should be noted that, in the words of the appellant, that "allotment ... is not an act that of itself commits the government to any obligation." The court expressed no opinion as to whether or what extent the administrator could legally withhold funds at the obligation stage; that question must await further resolution.

STATE SUPREME COURT RULES POLLUTION ABATEMENT AID TO INDUSTRY UNCONSTITUTIONAL

The North Carolina Supreme Court (Nos. 80, 81, 82, October 10, 1973) has ruled that the North Carolina Pollution Abatement and Industrial Facilities Financing Act, which authorizes county authorities' issuance of tax-exempt municipal revenue bonds to finance construction of pollution control facilities by private industry, violates Article V, Section Z of the State Constitution because such aid does not serve public purposes. The issue arose in cases involving pollution abatement authorities in Halifax, Jones, and Northampton Counties.

SANITARY LANDFILL WATER QUALITY MONITORING PROJECT

The University of North Carolina at Charlotte was recently awarded a contract by Mecklenburg County to assist the county with a ground and surface water quality monitoring project at the Harrisburg Park Sanitary Landfill project. This is a continuation of a project begun a year ago when the background levels of water quality were determined prior to beginning of the landfilling operation. Professor Richard Phelps is the principal investigator.

GAO REVIEW OF FEDERAL WATER QUALITY R & D

The Comptroller General has reported (B-166506, Vol. 1) to the Congress on Federal research and demonstration (R & D) programs to find new ways to make the water of the United States cleaner. The GAO found that during fiscal year 1969-73, 12 Federal departments and agencies spent about $495 million--including $238 million spent by the Environmental Protection Agency (EPA)--for water pollution R & D. In fiscal year 1973, EPA funding decreased from $50 to $42 million. The GAO finds it doubtful, at current funding under the water pollution R & D, that the 1985 deadline for zero discharge will be met.

The study summarized the water pollution R & D needed to achieve the water quality goals of the 1972 Federal Water Pollution Control Act as follows:

1. Processes-and-effects research needed to support water pollution control programs. High priority R & D areas include effects and control of thermal discharges from power plants, effects of water pollution to set standards for fish and marine, and health effects to set standards for drinking and recreational waters.
2. R & D needed for minimizing the cost of treating municipal sewage.
3. Technology needed to control pollution from industrial and non-point sources. At current funding it would take over 45 years to develop the technology to achieve the goals stated in the 1972 Act.
4. Need for a water pollution control strategy. EPA has not developed a strategy setting forth its R & D goals, objectives, and priorities since it was formed in December 1970.
5. Making EPA's R & D program more responsive to operating programs. According to the Comptroller General, the objective of EPA's R & D program is to support establishing and enforcing water quality standards and financial assistance programs for state and municipal water pollution control.

6. Need for national plan to improve coordination of water pollution R & D.
7. Need for a Federal focal point to coordinate the dissemination of research information.

IS THE EPA R & D PROGRAM ADEQUATELY FUNDED?

Municipal technology (research and development) R & D funding has decreased 64 percent over the last 7 years, while funding of the U. S. Environmental Protection Agency (EPA) construction grant program has increased about 3,200 percent. In 1967, when the Federal Government obligated $150 million for the grant program, $26.2 million was applied to the technology development program; in 1973, about $3 billion was obligated for the grant program compared to only $9.5 million, or about 0.3 percent, for technology development.

In comparison, the Department of Transportation's Urban Mass Transportation Administration, which has $1 billion for its annual capital grants program, is spending about 8 percent, or $80 million, on research. Also, the national average of research expenditures by industry is about 4 percent of net sales.

EPA officials estimate that $225 million is needed for fiscal years 1973-78 to meet municipal technology development objectives. At the present funding level of $9.5 million, this would take about 24 years.

(Source: GAO)

ABBREVIATED DIRECTORY: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Waterside Mall, 4th and M. Sts., S.W., Washington, D. C. 20460
755-2673 (202)
Administrator: John R. Quarles, Jr.
Director, Office of Legislation: Robert G. Ryan
Associate Administrator, Office of International Activities: Fitzhugh Green
Director, Office of Civil Rights and Urban Affairs: Carol M. Thomas
Director, Office of Federal Activities: Sheldon Meyers
Director, Office of Public Affairs: Ann L. Dore
Assistant Administrator for Planning and Management: Alvin L. Alm
Director, Contracts Management Division: Edward Rhodes
Assistant Administrator for Enforcement and General Counsel: Alan G. Kirk, II
Deputy Assistant Administrator for Water Enforcement: Richard Johnson
Associate General Counsel, Water Quality: William Frick
Assistant Administrator for Hazardous Materials Control: Charles L. Elkins (Acting)
Assistant Administrator for Air and Water Programs: Roger Strelow (Acting)
Deputy Assistant Administrator for Water Program Operations: John T. Rhett
Deputy Assistant Administrator for Water Planning and Standards: Lillian Regelson
Director, Policy Analysis and Ocean Disposal: Michael Lerner
Director, Municipal Waste Water Systems Division: Harold Cahill
Director, Water Quality and Non-Point Sources Control Division: Albert Erickson

Director, Effluent Guidelines Division: Allen Cywin
Director, Monitoring and Data Support Division: Edmund Notzen
Director, Water Planning Division: Mark Pisano
Assistant Administrator for Research and Development: Dr. Stanley M. Greenfield
Deputy Assistant Administrator for Environmental Engineering: Albert C. Trakowski, Jr.
Deputy Assistant Administrator for Environmental Sciences: Dr. Herbert L. Wiser
Deputy Assistant Administrator for Monitoring Systems: Willis B. Foster
Director, Office of Program Management: Dr. David G. Stephan
Chief, Technology Transfer Staff: Robert E. Crowe
Director, Municipal Pollution Control Division: William A. Rosenkranz
Director, Industrial Pollution Control Division: William J. Lacy
Director, Non-Point Pollution Control Division: Dr. Thomas Murphy
Director, Health Effects Division: Dr. J. Wesley Clayton (Acting)
Director, Ecological Processes and Effects Division: Dr. Frank Wilkes (Acting)
Director, Environmental Studies Division: Dr. Peter House
Deputy Assistant Administrator for Pesticides Programs: Henry J. Korp
Deputy Assistant Administrator for Radiation Programs: Dr. William D. Rowe
Deputy Assistant Administrator for Solid Waste Management Programs: Arsen J. Darnay, Jr.
National Environmental Research Center, Research Triangle Park, N. C. 27711, 549-2281 (919), Director: Dr. John F. Finklea
National Environmental Research Center, Cincinnati, Ohio 45268, 684-8201 (513), Director: Dr. Andrew W. Breidenbach
National Environmental Research Center, P. O. Box 15027, Las Vegas, Nev. 89114, 736-2969 (702), Director: Dr. Delbert S. Barth
National Environmental Research Center, 200 S.W. 35th Street, Corvallis, Ore. 97330, 752-4314 (503), Director: Dr. A. F. Bartsch
National Water Quality Laboratory, 6201 Congdon Boulevard, Duluth, Minn. 55804, 727-6548, Director: Dr. Donald I. Mount
National Marine Water Quality Laboratory, P. O. Box 277, West Kingston, R. I. 02892, 528-4371 (401), Director: Dr. Eric Schneider (Acting)
National Ecological Research Laboratory, NERC, 200 S.W. 35th Street, Corvallis, Ore. 97330, 752-4401 (503)
Southeast Environmental Research Laboratory, College Station Road, Athens, Ga. 30601 546-3134 (404), Director: Dr. David W. Duttweiler
Edison Water Quality Research Laboratory, Edison, N. J. 08817, 548-3402 (201), Director: Dr. Peter B. Lederman
Water Supply Research Laboratory, South Ferry Road, Narragansett, R. I. 02822, 847-8175 (401), Head: Dr. Benjamin H. Pringle
Water Supply Research Laboratory, P. O. Box 158, Dauphin Island, Ala. 36528, 861-2962 (205), Head: Richard Hammerstrom
Water Supply Research Laboratory, Columbia Parkway Building, Cincinnati, Ohio 45268, 684-8311 (513), Head: Gordon Robeck
Robert S. Kerr Water Research Center, P. O. Box 1198, Ada, Okla. 74820, 253-2224 (405) Director: William C. Galegar
Western Fish Toxicology Laboratory, 3080 S.E. Clearwater Drive, Corvallis, Ore. 97330, 752-4344 (503), Chief: Dr. John Garten
Newtown Fish Toxicology Station, 3411 Church Street, Cincinnati, Ohio 45244, 684-8601 (513), Chief: William B. Horning
Mine Drainage Pollution Control Project, P. O. Box 5555, Riversville, W. Va., 343-6181 (304), Chief: Robert B. Scott
Region IV - 1421 Peachtree Street N.E., Atlanta, Ga. 30309, 526-5727 (404) Administrator: Jack E. Ravan

STATUS OF WATER IN NORTH CAROLINA

Streamflow was above normal during the month of January and excessive in the mountains and western Piedmont. Scattered rains caused moderate rises on most streams at various times during the month, and minor flooding occurred in the upper French Broad River basin on January 1. Flows at the U.S.G.S. index gaging stations ranged from 1 1/4 times normal flow in the Neuse River near Clayton to more than 2 times normal flow in the South Yadkin River near Mocksville.

Streamflow at the end of the month ranged from about 1 1/4 times the normal January flow in the mountains to about 2 times normal flow in the eastern Piedmont.

Ground-water levels rose during January as recharge from above normal rainfall over the past two months began affecting the aquifer systems. Most water levels were above the long-term averages for the month except for some in the heavily pumped areas of the Coastal Plain.

—— U. S. Geological Survey

WATER RESOURCES LEGISLATION IN THE NORTH CAROLINA LEGISLATURE

Bills Introduced

Senate

S. 959
H. 1372

Redemption of beverage containers

"To control beverage container litter." Adds new Art. 13C to GS Ch. 130 (Public Health). Provides that all "beverage containers" (glass, plastic, or metal containers filled with beer, carbonated soft drinks, etc.) must have refund value of at least five cents, unless State ABC Board certifies that container can and will be used by more than one manufacturer (then allows not less than two-cent refund value). Dealers (retailers) and distributors must accept and pay refunds on containers they sell, except in the case of dealers when Board approves establishment of "redemption center" accepting kind of beverage containers sold by dealers. Requires containers indicate their refund value, except for glass containers with refund value of at least five cents as of Sept. 1, 1974, and permanently marked with brand name. Prohibits sale of metal "pop top" beverage containers. Violators subject to criminal penalties (misdemeanor - $1,000 fine and/or one year) or license revocation by Board or State Dept. of Agriculture. Effective Sept. 1, 1974.

S. 972
H. 1373

Coastal area management

"Relating to management of the coastal area of North Carolina." Enacts Coastal Area Management Act of 1974 providing for cooperative State-local program of land use planning and land use management within the "coastal area" of NC (defined as 22 listed counties bounded or intersected by the ocean or a sound, to the limits of seawater encroachment, as defined).

Organization--Sets up an eleven-member Coastal Resources Comm'n (CRC) appointed by Governor, consisting entirely of citizens interested in and expert in coastal area conservation and development. Comm'n to make regulations and policy. Also creates 43-member Coastal Resources Advisory

Council for direct representation of local gov'ts in the area, regional planning agencies, and six designated State depts. State planning functions to be supervised by Dept. of Administration, and controls to be administered and enforced by Dept. of Natural & Econ. Resources.

Land use planning--Authorizes each coastal area county to adopt land use plan, consistent with objectives of Act. State to prepare guidelines for local plans and review (and approve) local plans. Counties may delegate plan preparation to lead regional organizations (LRO's) or cities. State or LRO will prepare plan for any county failing to do so.

Land use management--Authorizes Coastal Resources Comm'n to designate "areas of environmental concern," which may include beaches, sand dunes, coastal marshlands, estuarine waters, and other important natural features. Requires single permit for development within an area of environmental concern, replacing existing controls on cutting sand dunes, dredging or filling in estuaries or coastal wetlands. Local governments to issue permits for "minor developments," as defined; CRC to issue permits for "major development." Enforcement shared by State and localities.

Timing--First hearing on designating interim areas of environmental concern to be held within 15-75 days after effective date of act; local land use plans to be completed within 17 months after effective date of act; new permit system to be installed no later than 27 months after effective date of act. Effective July 1, 1974.

S 973 Mountain area management
H 1374

"Relating to management of the mountain area of North Carolina." Enacts Mountain Area Management Act of 1974 providing for cooperative State-local program of land use planning and land use management within the "mountain area" of NC (defined as 24 listed counties bounded or intersected by Blue Ridge, Great Smoky, Brushy or South Mtns., or draining into Miss. River system, or with any elevation over 3,000 feet.

Organization--Sets up an eleven-member Mountain Resources Comm'n (MRC) appointed by the Governor, consisting entirely of citizens interested in and expert in mountain area conservation and development. Comm'n to make regulations and policy. Also creates 43-member Mountain Resources Advisory Council for direct representation of local gov'ts in the area, regional planning agencies, and six designated State depts. State planning functions to be supervised by Dept. of Administration and controls to be administered and enforced by Dept. of Natural and Econ. Resources.

Land use planning--Authorizes each mountain area county to adopt land use plan, consistent with objectives of Act. State to prepare guidelines for local plans and review (and approve) local plans. Counties may delegate plan preparation to lead regional organizations (LRO's) or cities. State or LRO will prepare plan for any county failing to do so.

Land use management--Authorizes Mountain Resources Comm'n to designate "areas of environmental concern," which may include areas above 3,500 feet, areas within specified distances of State or National Parks or Blue Ridge Parkway and other important natural features. Requires permit for development within an area of environmental concern. Local governments to issue permits for "minor developments," as defined; MRC to issue permits for "major development." Enforcement shared by State and localities.

Timing--First hearing on designating interim areas of environmental concern to be held within 15-75 days after effective date of act; local land use plans to be completed within 17 months after effective date of act; new permit system to be installed no later than 27 months after effective date of act. Effective July 1, 1974.

S 974
H 1375

Coastal area management funds

"To appropriate funds to implement the Coastal Area Management Act of 1974." Appropriate $350,000 to Dept. of Natural & Econ. Resources to be spent in cooperation with Dept. of Administration in implementing Coastal Area Management Act of 1974 (S 972, H 1373). Effective July 1, 1974.

S 975
H 1376

Mountain area management funds

"To appropriate funds to implement the Mountain Area Management Act of 1974." Appropriates $350,000 to Dept. of Natural and Econ. Resources to be spent in cooperation with Dept. of Administration in implementing Mountain Area Management Act of 1974 (S 973, H 1374). Effective July 1, 1974.

S 994

Effluent standards equal federal

"To amend G.S. 143-215 relating to effluent standards." Adds new subsection to indicated section to provide that Board of Water and Air Resources in adopting effluent standards to be guided by same considerations and criteria set forth in federal law for federal agencies. Expresses intent that standards of Board to be substantially equal to federal standards.

S 1007
H 1433

New River as scenic river

"To designate the New River as a scenic river area." Adds new GS 113A-35.1 to provide that portion of New River located in Ashe and Alleghany Counties be part of scenic rivers system.

S 1027

Counties appoint trash warden

"To authorize counties to appoint a warden to enforce the litter laws of North Carolina." Adds new GS 153A-138 to authorize county to appoint one or more trash wardens to have same power of arrest as sheriff and to have full-time duty of enforcing ordinances and laws on garbage, refuse and solid waste collection and disposal, including GS 14-399 (misdemeanor to place trash on right-of-way of public road). Amends GS 14-399 to empower sentencing court to require defendant to work on cleaning trash from public roads.

S 1029
H 1420

Sanitary sewage single residence

"To amend Article 13, Chapter 130 of the North Carolina General Statutes relating to water and sewage sanitation." Amends GS 130-160 to require person owning single or multi-family residence (now, two-family) to provide sanitary system of sewage disposal to be approved by Comm'n for Health Services.

S 1030
H 1504

Add'l mosquito control funds

"To appropriate funds to the Department of Human Resources for mosquito control." Appropriates add'l $100,000 from General Fund to Dept. for Division of Health Services for matching funds for local mosquito control programs.

S 1031
H 1487

Emergency sewer operation

"Creating emergency authority to operate water or sewer utility." Adds new subsection (b) to GS 62-116 to empower Utilities Comm'n, on request or on own initiative, to grant emergency operating authority to persons furnishing sewer and water service. To grant such authority Comm'n must find that real emergency exists, that the relief requested is in public interest, and that person authorized to provide service is capable of alleviating the emergency. Once emergency situation ends, the emergency operating authority to automatically expire. Emergency defined as imminent danger of losing adequate water or sewer utility service or the actual loss thereof. Effective Oct. 1, 1974.

S 1032 Abandonment water, sewer utilities
H 1488

"Restricting the abandonment of service by water and sewer utility systems without prior Commission approval." Amends GS 62-118 by adding new subsections (b) and (c). Subsection (b) establishes procedure whereby the Utilities Comm'n may apply for court order to prevent the abandonment of water or sewer service in cases where emergency would be caused by abandonment. Emergency defined as imminent danger of losing adequate water or sewer service or actual loss thereof. Court's order may restrict lands, facilities, and rights-of-way used in furnishing water and sewer services during emergency, may appoint operator of services, and may require reasonable compensation for use of property during emergency.

Subsection (c) empowers Comm'n after notice and hearing to authorize abandonment of water and sewer services that are inadequate and there is little prospect of improving. Abandonment limited to those customers who are unable or unwilling to advance fair share of capital necessary for required improvements. Effective Oct. 1, 1974.

S 1033 Water, sewer regulations enforced
H 1489

"To authorize enforcement of Chapter 62 and of the rules, regulations and orders of the Utilities Commission." Adds new subsection (b) to GS 62-310 to provide that Utilities Comm'n may apply to superior court and court may issue orders to restrain violation of any provision of Ch. 62 or rule, regulation or order to Comm'n (except as to reasonableness of rates and charges) applicable to water or sewer utilities in provision of utility services. Effective Oct. 1, 1974.

S 1034 Small utility rate setting
H 1490

"To authorize setting of rates in small utility cases by less than full commission hearing." Amends GS 62-137 to create new subsection (b) empowering Chairman of Utilities Comm'n to refer request for rate increase to division of Comm'n or to hearing commissioner in those cases where total annual revenue requested or total annual revenue increase requested is less than $50,000. Effective Oct. 1, 1974.

S 1035 Water, sewer rate guidelines
H 1491

"Establishing guidelines for establishing charges and setting rates of water and sewer utilities." Exempts "certain water and sewer utilities" from rate-making standard of GS 62-113(a) ("fair both to the public utility and to the consumer") and adds new subsection (f) (apparently not intending to repeal present subsection (f) added to GS 62-113 by SL 1971, Ch. 1092) to provide that in fixing rates for water or sewer utility, Utilities Comm'n may base rates on basis of operating expenses to operating revenues, at ratio to be determined by Comm'n. Adds new subsection (g) to authorize water or sewer utilities to contract with non-users of its services within subdivision or development for payment of charge, which may not exceed minimum rate for user customers of utility, for availability of service, or to assume by assignment such contracts entered into between developer and purchasers of lots.

S 1064 Refuse containers by road
H 1563

"To authorize the location of garbage collection containers by municipalities and counties on the state highway system rights-of-way." Adds new GS 136-18.3 to authorize Board of Transportation to issue permits to counties and municipalities for location of garbage containers on rights-of-way of state-maintained highways. Containers allowed only with written approval and subject to rules and regulation of Board. No containers to be located on fully controlled access highways. Exempts placing garbage in containers from provisions of GS 14-399 (penalty for littering right-of-way) and provides Board's approval no guarantee state owns right-of-way and no barrier to suit for compensation by true owner. Failure to comply with rules or with order to remove or relocate container, allows Board's revocation of permit, and removal or change after that to be done by Board at expense of county or municipality.

S 1073 (Joint Res) Study solid waste recycling

"Creating a commission for the study of solid waste recycling." Creates six-member comm'n (three app'ted by Speaker of House, three by President of Senate) as title indicates. Report on feasibility of instituting such programs in NC to be submitted by Apr. 1, 1975, to General Assembly.

House

H 1530 Watershed improvement districts

"To amend Chapter 387 of the 1973 Session Laws, which amended G.S. 139-39, to authorize the board of county commissioners to establish watershed improvement districts in areas of the counties of Camden, Pasquotank and Perquimans." Modifies GS 139-39 as it applies to Pasquotank and Perquimans Counties (same change made for Camden in 1973) to provide that county comm'rs by resolution may establish watershed improvement district in part of county or in county as whole and call election in area of county where watershed district established to determine whether special tax will be imposed (now, only county-wide vote to levy watershed improvement tax authorized). Provides that watershed improvement district is local unit of gov't and specifies that if county-wide district established all area districts previously established merge with county-wide district. Makes conforming changes in GS 139-40(b) and (d) as they apply to two counties.

Amendments

House Bills

H 1373 Coastal area management (original bill on previous pages)

Committee substitute adopted in House 1/25/74 which: (1) adds to Coastal Resources Commission (CRC) one additional member, connected with or experienced in coastal land development financing, and provides for chairman of CRC (now, 12 members) to have tie-breaking vote only; (2) adds to Coastal Resources Advisory Council (CRAC) 4 additional members representative of cities (making a total of 8 and increasing CRAC to 47 members); (3) deletes sentence stating that regional planning agencies shall coordinate and supplement local governments; (4) directs that copies of state guidelines be sent to Senate and House Principal Clerks; (5) makes clear that permits under act are supplementary to existing state and local permits; (6) expressly authorizes CRC to identify offshore limits of state jurisdiction; (7) directs CRC to delegate plan-making authority to any city (within its zoning jurisdiction) upon finding that city possesses adequate planning staff and is currently enforcing zoning, subdivision controls and State Building Code; (8) limits to areas of environmental concern (AEC's) the applicability of original provision requiring consistency between local ordinances and local land use plans (was entire county), and adds provision for CRC to review ordinances affecting portions of county outside AEC's and to recommend ordinance modifications needed to bring about consistency with land use plans; and (9) corrects typographical errors.

WATER RESOURCES LEGISLATION IN THE CONGRESS

Bills Introduced

Senate

S. 2922 To amend the Outer Continental Shelf Lands Act in order to conduct a comprehensive study of the Outer Continental Shelf, to promote the development of Outer Continental Shelf oil and gas resources, to provide for protection of the environment, to promote competition in the production of oil and gas from the Outer Continental Shelf, and to authorize the payment of a portion of the revenue under the act to the coastal states.

House

H.R. 12189
H.R. 12321 To establish a National Energy Information System, to authorize the Department of the Interior to undertake an inventory of U.S. energy resources on public lands and elsewhere.

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 organizations issuing the publication. The addresses are provided by the News for this purpose.)

Abbreviations used throughout as follows:

EPA	- Env. Protection Agency	USDC	- U. S. Dept. of Commerce
NCDNER	- N.C. Dept. Nat'l. & Econ. Res.	USDI	- U. S. Dept. of the Interior
NSF	- National Science Foundation	USGPO	- U. S. Gov. Printing Office
NTIS	- Nat'l. Tech. Information Serv.	VPI	- Virginia Polytechnic Institute
NWC	- Nat'l. Water Commission	WPC	- Water Pollution Control
OWAR	- Off. of Water & Air Resources	WQS	- Water Quality Standards
OWP	- Office of Water Programs	WRC	- Water Res. Center
OWRR	- Office of Water Res. Research	WRRI	- Water Resources Res. Institute
TVA	- Tennessee Valley Authority	WRSIC	- Water Res. Sci. Infor. Center

Water Resources Planning

"Benefits of Water Pollution Control on Property Values," (EPA-600/5-73-005), Oct. 1973, by D. M. Dornbusch, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price $1.

"State-of-the-Art Review: Water Pollution Control Benefits and Costs - Vol. I," (EPA-600/5-73-008a), Oct. 1973, by S. G. Unger, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price $1.45.

"Research Needs and Priorities: Water Pollution Control Benefits and Costs - Vol. II," (EPA-600/5-73-008b), Oct. 1973, by D. L. Jordening, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price $2.10.

"The Delaware Esturay System, Environmental Impacts and Socio-Economic Effects," by Academy of Nat. Scs, U. of DE, and Rutgers U., for NSF RANN Prog., Wash., DC 20550 as follows:

"Delaware River Estuarine Marsh Survey," Dec.1973, by T. E. Walton, III, et al.

"Upper Estuary Pollution and Transfer Relationships," Sept. 1973, by H. Baker.

"A Discussion of the Effects of Certain Potential Toxicants on Fish and Shellfish in the Upper Delaware Estuary," Dec. 1973, by A. Scheier, et al.

"Economic and Social Problems of the Delaware Estuary Region," Sept. 1973, by P. G. Gosselink.

"Annex to Vol. 1, Management Agency Problems in the Delaware Estuary," Apr. 1973.

"The Economic Efficiency of Inter-Basin Agricultural Water Transfers in Utah: A Mathematical Programming Approach," (PRWG100-3), June 1973, by J. E. Keith, et al, Water Res. Lab., Col. of Eng., UT St. U., Logan, UT 84322.

"The Role of Water in the Energy Crisis, Proceedings of a Conference," Oct. 23-24, 1973, by K. E. Stork, WRRI, 212 Agricultural Eng., U. of NE, Lincoln, NE 68503.

"Analyzing the Environmental Impacts of Water Projects," (AD-766-286), March 1973, by L. Ortolano, Stanford U., avail. from NTIS, USDC, Springfield, VA 22151.

"Planning for Environmental Quality, Phase II," (Series #C.P.A.-1034.01), Dec. 1973, by R. A. Paul, Off. of St. Planning, avail. from NTIS, 2285 Port Royal Road, Springfield, Va. 22151.

"The Great Lakes, Part I: The 1973 Floods and Activities of the International Joint Commission, United States and Canada," Hearings before the Subcommittee on Inter-American Affairs of the Com. on Foreign Affairs House of Rep., Ninety-third Congress, First Session, March 23, 26, and May 1, 1973, USGPO, Wash., DC, 20402, $5.10.

"Preliminary Indicators of Income/Wealth Redistribution Associated with Bureau of Reclamation Projects," (PRCWRR816-1), Oct. 1973, by R. Willis, et al, Water Res. Lab., Col. of Eng., UT St. U., Logan, UT 84322.

"The Northeast Water Resources Information Terminal: An Experiment in Information Storage and Retrieval," (Tech. Rpt. #73), Oct. 1973, by M. C. Ahn, et al, Cornell U. Water Res. and Marine Sc. Cntr., Ithaca, NY 14850.

"A Study of Water Institutions in Utah and Their Influence on the Planning, Developing, and Managing of Water Resources," (PRWG79-1), Sept. 1973, by F. W. Haws, Water Res. Lab., Col. of Eng., UT St. U., Logan, UT 84322.

"Water Supply Management Alternatives for Rhode Island," (TR-319), Oct. 1973, by R. J. Martel, for USDI, The Analytic Sciences Corp., 6 Jacob Way, Reading, MA 01867.

"A Three-Dimensional Model for Estuaries and Coastal Seas: Vol. I, Principles of Computation," (R-1417-OWRR), Dec. 1973, by J. J. Leendertse, et al, for OWRR, avail. from The Rand Corp., Santa Monica, CA 90406.

"National Water Commission Report," Hearings before the Subcommittee on Water and Power Resources of the Com. on Interior and Insular Affairs United States Senate, Ninety-third Congress, First Session, June 28 and July 17, 1973, USGPO, Wash., DC 20402.

"Interregional Planning of Water Resources Allocations by System Analysis Approach, A Summary Report," (PRWG 100-5), July 1973, by J. E. Keith, et al, Water Res. Lab., Col. of Eng., UT St. U., Logan UT 84322.

"Water Resources as a Basis for Comprehensive Planning and Development in the Christian River Basin," Apr. 1973, by J. Tourbier, WRC, U of DE, Newark, DE 19711.

"Decision Analysis on Water Resources Planning and Management for an Arid Metropolitan Center in West Texas," (TR-54), Oct. 1973, by C. S. Shih, et al, TX WRI, Texas A&M U., College Station, TX 77843.

"Public Water Supplies of North Carolina, Part 2, Southern Piedmont," July 1973, by N. M. Jackson, Jr., by USDI, Geo. Survey, in coop. with NC OWAR, Raleigh, NC 27611.

"Restoring the Recreational Potential of Small Impoundments, The Marion Millpond Experience," (Tech. Bul. #71), 1973, by S. M. Born, et al, Dept. of Nat. Res., U. of WI, Madison, WI 53706.

"Regional Environmental Systems Analysis, A Research Proposal Submitted to the National Science Foundation Research Applied to National Needs," Feb. 1973, C. W. Craven, Jr., Oak Ridge Nat'l. Lab., Oak Ridge, TN 37830.

"Community Well-Being as a Factor in Urban Land Use Planning," (ERC-0174), Jan. 1974, by L. D. James, et al, Env. Res. Cntr., GA Inst. of Tech., Atlanta, GA 30332.

"Statistical Analysis of Hydrograph Characteristics for Small Urban Watersheds," (Tracor Proj. # 077-014), Oct. 1973, by C. W. Morgan, 6500 Tracor Lane, Austin, TX 78721.

"New Directions in U. S. Water Policy--Summary, Conclusions and Recommendations," (from the Final Report of the NWC, avail. from USGPO, Wash., DC 20402, Price $2.50.

"A Methodology Study to Develop Evaluation Criteria for Wild and Scenic Rivers," (Rpt. #10), Dec. 1973, by E. L. Michalson, et al, WRRI, U. of ID, Moscow, ID 83843.

Water Quality Management

"Cation Adsorption and Desorption Rates in Natural Water Studies," (Rpt. #45), Dec. 1973, by G. K. Pagenkopf, MT U. Joint WRRC, Bozeman, MT 59715.

"U-Tube Aeration," (EPA-670/2-73-031), Sept. 1973, by R. C. Mitchell, for EPA, avail. from USGPO, Wash., DC 20402, Price $2.

"Aerial Detection of Spill Sources," (EPA-R2-73-389), Sept. 1973, by C. L. Rudder, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price 55¢.

"Environmental Applications of Advanced Instrumental Analyses: Assistance Projects FY 72," (EPA-660/2-73-013), Sept. 1973, by A. L. Alford, avail. from USGPO, Wash., DC 20402, Price 85¢.

"Effects of Baffles on the Performance of Anaerobic Waste Stabilization Ponds," (PRWR17-2), Apr. 1973, by S. B. Nielson, et al, Water Res. Lab., Col. of Eng., UT St. U., Logan, UT 84322.

"Processing Chemical Composition and Nutritive Value of Aquatic Weeds," (Pub. #25), Nov. 1973, by L. O. Bagnall, et al, U. of FL, Gainesville, FL 32601.

"Chalk Point Cooling Tower Study," Feb. 1973, sponsored by Power Plant Siting Program, MD Dept. of Nat. Res., coordinated by WRRC, U. of MD, College Pk., MD 20742.

"Batch Disinfection of Treated Wastewater with Chlorine at Less Than 1°C," (EPA-660/2-73-005), Sept. 1973, by R. C. Gordon, et al, avail. from USGPO, Wash., DC 20402, Price 65¢.

"Water Pollution by Dairy Farm Wastes as Related to Method of Waste Disposal," (WRRI Bul. #18), Oct. 1973, by T. A. McCaskey, et al, WRRI, Auburn U., Auburn, AL 36830.

"Modeling the Eutrophication Process," (Workshop Proceedings) (PRWG136-1), Nov. 1973, by E. J. Middlebrooks, et al, Water Res. Lab., Col. of Eng., UT St. Univ., Logan, UT 84322.

"Investigations of Freshwater Surface Microlayers," (Bul. 64), Feb. 1974, by R. F. Hatcher, et al, WRRC, VPI and St. U., Blacksburg, Va. 24061.

"Treatment of Hazardous Material Spills with Floating Mass Transfer Media," (EPA-670/2-73-078), Sept. 1973, by B. W. Mercer, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price $1.25.

"Aquatic Invertebrate Recovery in the Clinch River Following Hazardous Spills and Floods," (Bul. 63), Dec. 1973, by J. S. Crossman, et al, WRRC, VPI and St. U., Blacksburg, Va. 24061.

"Crop Response to Warming Soils (Heat) Above Their Natural Temperatures," (Spec. Rpt. 385), Jan. 1974, by K. A. Rykbost, et al, Agri. Exp. Sta., OR St. U., Corvallis, OR 97331

"Soil and Air Temperature Changes Induced by Subsurface Line Heat Sources," (Spec. Rpt. 402), Dec. 1973, by K. A. Rykbost, et al, Agri. Exp. Sta., OR St. U., Corvallis, OR 97331.

"A Study to Predict the Effects of Thermal Additions (Heat) in the Bay River and Neuse River Area of North Carolina," Nov. 1973, by D. B. Horton, et al, The Res. Inst. of the Gulf of Maine, 96 Falmouth St., Portland, ME 04103.

"Recycling Municipal Sludges and Effluents on Land," July 1973, by Nat'l. Assoc. of St. U. and Land-Grant Colleges, One Dupont Circle, N.W., Wash., DC 20036.

"Survey of Facilities Using Land Application of Wastewater," (EPA-430/9-73-006), July 1973, for EPA, avail. from USGPO, Wash., DC 20402.

"Ecological Implications of Dimethyl Mercury in an Aquatic Food Chain," (PRSG105-2), June 1973, by L. P. Kolb, et al, Water Res. Lab., Col. of Engr., UT St. U., Logan, UT 84322.

"Precipitation as a Nutrient and Hydrogen Ion Source for Forested Watersheds in the Missoula Vicinity," (Rept. #46), Dec. 1973, by L. K. Forcier, et al, MT U. Joint WRRC, Bozeman, MT 59715.

"Selective Nutrient Removal from Secondary Effluent," (EPA-670/2-73-076), Sept. 1973, by J. L. Eisenmann, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price $1.75.

"Fabric Boom Concept for Containment and Collection of Floating Oil," (EPA-670/2-73-069), Sept. 1973, by P. E. Bonz, for EPA, avail. from USGPO, Wash., DC 20402, Price $1.

"The Interaction of Water with Organic Solute Species," (ERC-1473), Sept. 1973, by C. L. Liotta, et al, Env. Res. Cntr., GA Inst. of Tech., Atlanta, GA 30332.

"A Study of the Factors Determining the Oxygen Uptake of Benthal Stream Deposits," Oct. 1973, by J. V. Hunter, et al, WRRI, Rutgers U., The St. U. of NJ, New Brunswick, NJ 08903.

"Survival of Enteric Pathogens and Indicator Organisms in Natural Water," (Res. Rpt. #25), Nov. 1973, by J. D. Womack, et al, WRRC, U. of TN, Knoxville, TN 37916.

"Removal of Phosphate from Waste Water by Aluminum and Iron, Phase III," Nov. 1973, by P. H. Hsu, WRRI, Rutgers U., The St. U. of NJ, New Brunswick, NJ 08903.

"Effect of Polyester Fiber Processing Effluents on Water Quality," (ERC-1673), Nov. 1973, by W. C. Tincher, Env. Res. Cntr., GA Inst. of Tech., Atlanta, GA 30332.

"Pleistocene-Holocene Sediments Interpreted by Seismic Refraction and Wash-Bore Sampling, Plum Island-Castle Neck, Massachusetts," (T.M. #40), July 1973, by E. G. Rhodes, U. S. Army Coastal Engr. Res. Cntr., avail. from NTIS, ATTN: Operations Div., 5285 Port Royal Rd., Springfield, VA 22151.

"Parabiotic Growth Characteristics of Selected Sewage Bacteria," (ERC-0973), July 1973, by E. L. Fincher, Env. Res. Cntr., GA Inst. of Tech., Atlanta, GA 30332.

"Integrated Measurement of Soil Moisture by Use of Radio Waves," (PRWG103-1), Nov. 1973, by D. G. Chadwick, Water Res. Lab., Col. of Eng., UT St. U., Logan, UT 84322.

"Effects of Temperature on the Toxicity to the Aquatic Biota of Waste Discharges - A Compilation of the Literature," (PRWG105-1), Oct. 1973, by E. J. Middlebrooks, et al, Water Res. Lab., Col. of Eng., UT St. U., Logan, UT 84322.

"Regulation Relation to Monitoring and Reporting Wastewater Discharges and Their Effects Upon Receiving Waters," Board of Water and Air Res., NCDNER, OWAR, P. O. Box 27687, Raleigh, NC 27611.

Water Quantity Management

"An Application Study in Water Distribution Control," (G. E. Doc. #47SD200), Jan. 1974, by R. DeMoyer, Jr., et al, General Electric Co. Re-entry & Env. Systems Div., 3198 Chestnut St., Philadelphia, PA 19101.

"Proceedings Ninth Biennial Conference on Ground Water," (Rpt. #26), Dec. 1973, WRC, U. of CA, Davis, CA 95616, Price $4.

"Investigation of the Effects of Urbanization on Precipitation Type, Frequency, Areal and Temporal Distribution," Oct. 1973, by M. D. Shulman, et al, WRRI, Rutgers U., The St. U. of NJ, New Brunswick, NJ 08903.

"Water Balance of a Small Lake in a Permafrost Region," (Rpt. #IWR-42), Sept. 1973, by C. W. Hartman, et al, Inst. of Water Res., U. of AK, Fairbanks, AK 99701.

Miscellaneous

Annual Reports: State Water Resources Research Institutes

Alabama
Delaware
Virginia

"1973 Annual Report - Missouri River Basin Commission," J. W. Neuberger, Chrmn., Suite 403, 10050 Regency Circle, Omaha, Neb. 68114.

"Federal Water Resources Research Program for 1971," (Annual Report) (Stock #3800-00160), USGPO, Wash., DC 20402, Price $1.70.

"Annual Report of the Tennessee Valley Authority - Vol. I - Text," (FY ended 6/30/73), avail. from Treasurer, TVA, Knoxville, TN 37903, Price 50¢.

"Project Skywater, 1972 Annual Report," (REC-ERC-73-17), Nov. 1973, USDI, Bureau of Reclamation, avail. from NTIS, Oper. Div., Springfield, VA 22151.

"Reprints from XXIIIrd International Navigation Congress (Ottawa 1973)," avail. from U. S. Army Coastal Engr. Res. Center, 5201 Little Falls Rd., N.W., Wash., DC 20016, as follows:

"Ocean Navigation," Section II, General Report, (Reprint 26-73), by T. Saville, Jr.

"Ocean Navigation," Section II, Paper (Reprint 25-73), by G. M. Watts, et al.

"Water Resources Publications Related to the State of Delaware," Oct. 1972, by R. W. Sundstrom, WRC, U. of DE, Newark, DE 19711.

OTHER PUBLICATIONS OF INTEREST

These publications are not available for loan or purchase through the Institute but may be ordered, prepaid, from the National Technical Information Service, Springfield, VA 22151

"Bibliography on Ocean Waste Disposal," Interstate Electronics Corp., Anaheim, CA, 114 p., PB-224 452/3GA, $4.25.

"Directory of Managers, Engineers and Scientists in Ocean Waste Disposal and Related Environmental Science Fields," Interstate Electronics Corp., Anaheim, CA, 73 p., PB-224 459/8GA, $3.50.

"Toxic Materials Analysis of Street Surface Contaminants," URS Research Co., San Mateo, CA, 143 p., PB-224 677/5GA, $1.45.

"Pilot-Demonstration Project for Industrial Reuse of Renovated Municipal Wastewater," Central Contra Costa Sanitary District, Walnut Creek, CA, 140 p., PB-224 507/4GA, $1.45.

"Impact Characterization of Noise Including Implications of Identifying and Achieving Levels of Cumulative Noise Exposure," Environmental Protection Agency, Wash., DC 296 p., PB-224 408/5GA, $6.50.

"State-of-the-Art Report on Marine Sanitation Devices," Automation Industries, Inc., Vitro Labs Div., Silver Spring, MD, 168 p., AD-768 682/7GA, $4.75.

"Capital and Operating Costs of Pollution Control Equipment Modules. Vol. 1, User Guide," IGARUS Corp., Silver Spring, MD, 265 p., PB-224 535/5GA, $4.90.

"Volume II, Data Manual," 190 p., PB-224 536/3GA, $3.90.

"Quantification of Aquatic Environmental Impact of Electric Power Generation," Massachusetts Institute of Technology, Energy Lab, Cambridge, Mass., 176 p., PB-224 642/9GA, $5.25.

"Chemical Analyses for Water Quality. Training Manual," Environmental Protection Agency, Cincinnati, Ohio, 394 p., PB-224 212/1GA, $8.

"Industrial Liquid Waste Surveys: Training Manual," Environmental Protection Agency, Cincinnati, Ohio, Office of Water Program Operations, 154 p., PB-224 155/2GA, $4.75.

"Indexed Bibliography of Thermal Effects Literature 3," Oak Ridge National Lab., TN, 230 p., ORNL-NSIC-110/GA, $12.

"A Systems Analysis of Water Quality Survey Design," Clemson U., Col. of Engr., SC, 40 p., AD-768 865/8GA, $3.

Water Resources Research Institute
of The University of North Carolina
124 Riddick Building
North Carolina State University
Raleigh, North Carolina 27607

PRINTED MATTER