/ NEWS
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NEW INSTITUTE DIRECTOR NAMED

Dr. Neil S. Grigg has been named as the new Director of the Water Resources Research Institute by its Board of Directors and by The University of North Carolina Board of Governors. Dr. Grigg comes to the Institute from Colorado State University where he was Director of International Education and Associate Professor of Civil Engineering. He also has been affiliated with Sellards and Grigg, Inc., a Denver area consulting firm since 1968.

Grigg has a background in hydrology and hydraulics, sediment transport, urban stormwater management, and water resources planning. He has expressed interest in developing relationships between universities and engineers working for consulting firms and agencies. His degrees are from the U. S. Military Academy, Auburn University, and Colorado State University. An Alabama native, he is married with three children.

Grigg has worked as a consultant and researcher for and with a number of agencies. Among these are - Office of Water Research and Technology, The United Nations (in Egypt and Brazil), the City of San Francisco, and several local and regional agencies.

HOWARD LEE SECRETARY OF NATURAL AND ECONOMIC RESOURCES

Howard N. Lee has been named by Governor James B. Hunt, Jr. to head the Department of Natural and Economic Resources. Governor Hunt said in making the announcement that "Howard Lee was an excellent mayor of Chapel Hill. He displayed the kind of aggressive, innovative leadership in solving community problems that I believe should be applied statewide in North Carolina. His pioneering efforts in developing a mass transit system and in city planning and management demonstrate his ability."

Lee, 42, has been on leave from his job as Director of Human Development at Duke University.

Governor Hunt has indicated that he plans to restructure the Department of Natural and Economic Resources. He plans to take the department's industrial development division out and put it into the Department of Commerce.

HOWELLS PRESENTED CONSERVATION SERVICE AWARD

Secretary of Interior, Thomas S. Kleppe, recently presented the Conservation Award to David H. Howells, Professor Emeritus. The citation presented by Secretary Kleppe in a special awards program in Washington read as follows:

> "In recognition of the outstanding roles he has played in the conservation of water resources, water supply, pollution control, and the environmental sciences.
>
> "The influence he has exerted in the water-oriented community has been immense both as a researcher and an administrator. Technically competent and dedicated to improved management and planning in the water resources field, he has worked diligently and effectively as an individual and as a member of numerous committees. Among these committees is the Universities Council on Water Resources which, when he was chairman, was especially effective in coordinating the efforts of the Council and the National Association of State Universities and Land-Grant Colleges in drafting legislative changes to improve the cooperative Federal-State water resources research program. As Director of the Water Resources Research Institute at the University of North Carolina at Raleigh, where the program is part of a Federal-State cooperative endeavor administered by the Department of the Interior, he contributed importantly to the development and organization of the Institute. Also as a consultant to various institutions he has contributed importantly in decisionmaking processes and in the development and conduct of the U. S. National Committee on the International Hydrological Decade Conferences and the annual conferences of the Office of Water Research and Technology, both of which are attended by conservation leaders and constitute forums for discussion, information exchange, conservation education and water resources planning. In recognition of his numerous efforts and significant contributions to the water resources research program, David H. Howells is granted the Conservation Service Award of the Department of the Interior."

NORTH CAROLINA WATER RESOURCES FRAMEWORK STUDY NEARS COMPLETION

A document outlining priorities for the expenditure of millions of public dollars for water resource projects in North Carolina will soon be published by the Department of Natural and Economic Resources.

The 332-page report, The North Carolina Water Resources Framework Study, contains the first overall State water planning policy ever developed in North Carolina.

The study presents an overview of the water resource situation in the State, including problems of flooding, drought, erosion and uneven distribution of water. Alternative frameworks for future water resources development are offered along with a priority list of projects proposed for consideration in 1977.

Water related problems, needs and opportunities are described from a statewide perspective in the Framework Study. Special concerns which are highlighted include areas where competition and conflicts between water users have put pressure on available water resources.

The Framework Study is the product of a year-long planning effort coordinated by DNER water resource professionals in conjunction with local and Federal agencies and water-using industries. Existing legislative and administrative policies regulating planning for water resources are compiled into a comprehensive guide. A statement of overall State objectives in the Study will help planners achieve a greater continuity in working toward the rational development of water resources. Individuals and groups involved in water resource projects will use the Framework to compare proposed projects with the State's long term goals

The Framework is a flexible, working guide for planning. "As conditions and needs change, the Framework policy can be changed in an orderly and consistent manner," according to John Wray, Study Director. The Framework Study was presented to the Environmental Management Commission on January 13 for review.

Approximately 1000 proposed water resource projects for the State are listed in alternative development frameworks. Projects under consideration by Federal, State, local and private groups are included in the framework alternatives, which include structural measures such as flood control projects, multipurpose reservoirs, regional water and sewer lines and harbor and navigation projects and nonstructural measures which include proposed greenways, parks and wilderness areas, access to designated public fishing streams and water trails, and land to be acquired for future needs.

Also identified are water-rich areas recommended as suitable for wet industry, potential sites for electric power generation, and areas in need of special study because of water supply needs, flooding, or environmental considerations.

North Carolina is divided into eleven hydrological study areas of one or more river basins. Three frameworks are given for each area. Projects designed primarily to increase the value of the State's goods and services are included in the Economic Development Framework. The second framework includes projects to preserve or enhance the quality of the environment. The Mixed Objective Framework contains a combination of projects objectives from the other two frameworks. Social considerations influenced the projects chosen for the Mixed Objective Framework. These include public health and safety, community services and cultural and recreational opportunities, and emergency preparedness.

The Framework Study recommends the State establish an interim high priority list of projects to be used as a basis for State action and funding. The list will be revised annually as more information on costs, feasibility and needs is obtained.

The Framework Study was funded in part by Federal matching funds under Title III of the Water Resources Planning Act of 1965 (PL 89-80).

For further information contact John Wray, Division of Environmental Management, Raleigh, North Carolina 27611. 919-829-4740.

FUNDS FOR WATER REUSE RESEARCH

The Office of Water Research and Technology has announced that FY 1977 funds will be available for water reuse research and development projects. Investigators desiring support should submit proposals to the Water Resources Research Institute by February 18, 1977. Instructions and procedures are available from the Institute.

Proposals which deal with the following OWRT - designated topics will be given priority in OWRT's selection process: (1) Evaluation of national and regional water reuse needs and potential, (2) Evaluation of existing and advanced technology for reuse application, (3) Research and developemnt support of selected municipal, industrial, and agricultural reuse applications, (4) Research and development of advanced processes using a mobile treatment unit, (5) Treatment processes and systems, and (6) Planning and management aspects of water reuse. Additional details on these topics are also available from the Institute.

DEADLINE FOR ANNUAL ALLOTMENT GRANTS FEBRUARY 4

Applications from faculty members of senior colleges and universities in North Carolina for grants under the Institute's Fiscal Year 1977-78 Annual Allotment Program will be accepted until February 4, 1977. No exceptions will be made to this cutoff date.

The purpose of the Annual Allotment Program is to encourage new research related to the water resource problems of North Carolina and the South Atlantic Gulf Region. The Institute's "Summary of Water Resource Problems and Research Needs of North Carolina," discusses and highlights areas in which the Institute is attempting to develop research. A copy of this recently revised report is available upon request from the Institute. First consideration will be given to proposals which attempt to respond to these recognized State and regional needs.

NO CAPACITY USE FOR YADKIN

The Environmental Management Commission in its December 16 meeting voted not to declare the Yadkin River a capacity use area. After four years of trying to arrive at a decision of how much water should Duke Power be able to withdraw from the river, the Commission arrived at a decision and endorsed the following proposal:

"The North Carolina Environmental Management Commission has no objection to Duke's withdrawal and consumptive use of water from the Yadkin River provided Duke strictly complies with the following conditions and that these conditions are made a

part of any permit or license issued by the U. S. Nuclear Regulatory Commission pursuant to 42 USC 2131 et seq. and any certificate of necessity and convenience issued by the N. C. Public Utility Commission pursuant to N.C.G.S. 62-110 and 110.1.

1. Duke will make no net withdrawals from Yadkin River when the streamflow is less than 1,000 cfs (645 MGD).
2. Duke will limit net withdrawals from Yadkin River to not more than 25% of the total streamflow, or not more than that portion of this measured total streamflow that is in excess of 1,000 cfs, whichever is the lesser quantity.
3. Duke's maximum daily consumptive use of water due to forced evaporation will not exceed 112 cfs (72 MGD).
4. These conditions will be reviewed by the Environmental Management Commission at not less than 5-year intervals and will be subject to whatever modifications the Commission deems necessary to conserve and protect water resources in the public interest, including any modification that may arise from declaration of capacity use area pursuant to G.S. 143-215.11 et seq. and/or issuance of an order pursuant to N.C.G.S. 143-215.13(d).
5. That Duke establish a suitable system for monitoring and reporting water withdrawals and water releases which is acceptable to the Director, Division of Environmental Management.
6. That as a part of its findings, should it issue a Certificate of Convenience and Necessity, the Utilities Commission find that the use of mechanical draft cooling towers is necessary to the construction and operation of the Perkins Plant wherever located, this stipulation is made solely in light of the Environmental Management Commission's concern for the quantity of water consumed by cooling towers and the fact that it presently appears to be law in the Fourth Circuit that the EPA cannot require cooling towers in lieu of cooling lakes and that cooling lakes evaporate significantly less water than do cooling towers.

COST OF METHODS OF LAND APPLICATION OF WASTEWATER COMPARED

A detailed study of the comparative costs of various methods of land disposal of wastewater has been completed by C. Edwin Young, Adjunct Assistant Professor of Agricultural Economics, affiliated with the Pennsylvania Institute and the Economic Research Service of the U.S. Department of Agriculture. "The Cost of Land Application of Wastewater: a Simulation Analysis."

Six land application techniques were studied: (1) solid-set spray irrigation (buried); (2) center pivot irrigation; (3) border strip irrigation; (4) ridge and furrow irrigation; (5) overland flow techniques; and (6) infiltration basins.

Under the assumed price relationships, the irrigation technique with the lowest average total cost was found to be center pivot, while solid-set was the most expensive. Border strip and ridge and furrow irrigation were the highest cost options for small facilities (less than 0.5 million gallons per day).

Most of the economies of scale for construction were realized in treatment plants with design capacities of 10 million gallons per day or more. Average land costs were relatively constant for all facility sizes. Average labor costs were the only component of average operating costs subject to economies of scale, and only up to a facility size of five million gallons per day. The model assumes that there are no economies of scale in farming operations using wastewater on cropland.

With the passage of the 1972 Amendments to the Federal Water Pollution Control Act (P.L. 92-500), municipalities have two new incentives to consider the use of land application of wastewater: official policy and subsidies.

Dr. Young's study explores the variation in costs among the methods of land application of wastewater and compares them with other methods of sewage treatment. It also deals with variations in costs among large and small facilities.

Changes in four price variables influence operating costs: wage rates, the cost of materials, the electric rate, and the price of chlorine. Crop prices have variable effects on the total net operating costs. The sensitivity of the cost estimates to variations in design flow, application rate, storage, transmission distances, reserve land, sewer and sewage treatment plant construction costs, land costs, discount rate, discount period, wage rate, materials costs, electric rate, chlorine price, and crop (alfalfa) revenues were evaluated. The variables which have the largest impact on cost variations were sewer construction cost index, capital subsidies, design flow, storage, application rate, and crop selection.

The study is available from: James Sayre, Information Division, ERS, USDA, Washington, D.C. 20250.

EPA CONSIDERS " NON-COMPLIANCE FEE"

Russell E. Train, Administrator for the U.S. Environmental Protection Agency, said in a recent letter to Office of Management and Budgets (OMB) that one of the new areas for legislative consideration is an amendment to the Federal Water Pollution Act entitled "Non-Compliance Fee." Train said, "the new section would authorize the imposition of a fee upon non-complying point sources other than publicly owned treatment works. The fee, which would supplement existing enforcement authority, would be automatically imposed and would approximate the economic value of non-compliance. The proposed system would be administered by EPA with possible delegations to States with approved 402 permit programs. The point sources covered by the fee would be required to submit estimates of the cost of complying with the applicable limitation. When point sources are unable to make such an estimate, EPA or the State could impose a fee based on the estimated value of non-compliance. A final accounting would be provided for upon achievement of compliance so that the fee charged will accurately reflect the economic savings of non-compliance.

It is intended that the non-compliance fee would serve the dual functions of providing an incentive towards rapid compliance and equalizing the competitive positions of the cooperative and recalcitrant point sources."

INFLUENCE OF NEW WATER AND SEWER SYSTEMS ON POPULATIONS OF SMALL TOWNS

The following is the summary of a study by Jerome M. Stam of Economic Research Service in the U.S. Department of Agriculture showing the influence of new water and sewer system investments in Colorado, Mississippi, North Carolina, North Dakota and Oklahoma. All towns with a 1960 population of 75 to 10,000 which built new, first-time community water and sewer systems after 1950 were analyzed. The primary objective was to determine if the construction of new, first-time community systems subsequently led to population growth, or possibly whether population increases ultimately led to the construction of community systems for the first time.

Based on average 1970 community size, towns building new systems during 1950-1973 were compared with towns having systems built before 1950, lacking systems, and all towns. In terms of 1970 population, towns building new water systems during the 1950-1973 period were only 57.7 percent as large as those building new sewer systems during the same span. Towns building water and sewer systems between 1950-1973 were, respectively, 22.5 and 29.3 percent of the size of those towns having old (pre-1950) systems, but were significantly larger than those places still lacking community systems. For both water and sewer systems, towns building were larger if they were incorporated, were inside a Standard Metropolitan Statistical Area (SMSA), or did not receive FmHA assistance.

Although towns building new water and sewer systems during 1950-1973 grew rapidly, their overall growth rates were slightly less than those of towns having pre-1950 systems. However, they were much greater than the increases shown by places lacking systems. Towns building during 1950-1973 tended to be larger places, unincorporated, inside an SMSA, or did not receive FmHA assistance. Even though the unincorporated places were small, enough were located near large rapidly growing urban centers so as to greatly influence the growth rate of the entire group.

Secondly, towns were analyzed to see if population growth tended to precede or follow after the date of new system construction. The 1950-1969 period was subdivided into four segments of five years each. For each of these 5-year periods, percent population changes were compared for the 1950's and 1960's. The data showed more rapid rates of population growth during the decade of installation. Overall, the net result is that population growth was most rapid during or prior to construction of the systems.

Next data for the 1950-1969 period for each of the states were analyzed in a similar manner. Each were examined for both water and sewer systems to determine if more rapid rates of population growth (or smaller rates of population decline) occurred during the decade in which the new systems were installed. Results generally show that more rapid rates of population growth (or smaller rates of decline) occurred during the decade in which the new systems were built. Major exceptions were places, unincorporated or located inside an SMSA, building new sewer systems.

The majority of evidence, based on data from six selected states, suggests that the construction of new, first-time community water and sewer systems has been consistent with the model of development via shortage of social overhead capital - that is, population growth led to the need for these community facilities rather than vice versa. This may be because the towns involved felt that to invest in excess social overhead capital typically is a very expensive luxury. It may also be related to the policies of federal agencies to put limited grant and loan funds where current needs are greatest. There were exceptions, of course, where declining places built costly systems.

STUDY OF THE INFLUENCE OF ROOTED WATER PLANTS ON CHOWAN RIVER COMPLETED (Report No. 120)

The following are findings of a study titled "Primary Productivity and Mineral Cycling In Aquatic Macrophyte Communitites of the Chowan River, North Carolina," by Drs. Mark M. Brinson and Graham J. Davis, Department of Biology, East Carolina University, Greenville, North Carolina.

Brinson found the aquatic macrophyte communities of the lower Chowan River are dominated by the yellow water lily (Nuphar luteum) and the water willow (Justicia americana). Aerial surveys (370 m altitude) made in 1974-75 by means of overlapping photography of the shoreline revealed about 27 hectares of aquatic macrophyte stands in a 52 km sector of the river north of Albemarle Sound. An estimated 99 percent of the coverage was by Nuphar. Peak biomass of Nuphar ranged between 115 and 300 grams dry weight per square meter at three sites and net primary productivity was estimated at 222 grams dry weight per square meter per year based on turnover rate of leaves and growth increments of rhizomes and roots. About 77 percent of the Nuphar biomass was in the sediments (roots and rhizomes) while 92 percent of the annual net primary productivity occurred in aboveground structures (leaves, petioles, and reproductive parts).

A radioisotope technique was employed to trace bidirectional movement of phosphorus in Nuphar. Upward translocation followed root absorption and downward translocation followed submersed leaf absorption of phosphorus. The two pathways occurred simultaneously in the same plant with the former dominating year round. These events, in addition to the summertime secretion by submersed leaves of phosphorus that was absorbed by roots, constitute a phosphorus "pump", whereby phosphorus is transferred from the sediments to the overlying water.

The study concludes that aquatic macrophytes are unlikely to affect the water quality and other uses of the lower Chowan River if current conditions prevail. Because of the restricted area of the shallow littoral, it is doubtful that aquatic macrophytes will have a significant impact on the productivity of nutrient status of the river system in the future.

Copies of this report may be obtained by North Carolina residents free and are available to non-residents for $4.00.

OPEN SPACE AND URBAN WATER MANAGEMENT PHASE II: CASE STUDIES AND FINDINGS (Report No. 122)

Karl Elfers and Maynard Hufschmidt of Department of City and Regional Planning, University of North Carolina at Chapel Hill, have recently completed a report relating to open space and urban water management.

The basic purpose of this report was to make a detailed examination of local goals, criteria, and planning strategies for the preservation of open space and the related management of urban water resources. The key elements of the report are two extensive case studies of small, urbanizing watersheds in the Piedmont Region of North Carolina. The two watersheds offer good examples of the diverse problems, issues, goals, and criteria that may be involved in open space preservation and related urban water management.

The Crabtree Creek watershed, near and including part of Raleigh, North Carolina, offers a rich case study in which (a) several City and County agencies have been involved in open space and related urban water management activities, (b) the State is expanding a major State park, (c) the Soil Conservation Service is helping to implement a system of flood control impoundments, (d) the Environmental Protection Agency is reviewing the probable impacts of a proposed major sewer interceptor, and (e) the Corps of Engineers and the Bureau of Outdoor Recreation are studying alternative flood control/recreation plans for the main stem of the Crabtree Creek within Raleigh.

The Eno River watershed near Durham, North Carolina, offers an important contrast in that the watershed is more rural and scenic with steep valleys and narrow floodplains.

Thus, interest has focused on preserving much of the river valley in its natural state and on creating a State park.

The opening chapter of the report presents the State and regional background for the two case studies. This background includes emerging State policies on environmental quality and land use planning, State park and recreation planning programs, State water resource planning and policies, and the regional plans and programs of the Triangle J multi-county region in which both watersheds are located.

The final chapter presents an extensive listing and description of findings and recommendations for open space preservation and related urban water management. The recommendations fall into two basic categories: (1) those of a planning strategy or procedural nature which should be applicable to all areas of the country; and (2) those consisting of planning criteria and standards of a quantitative nature which, although expressed in terms of acceptable ranges of values, are directed toward the Piedmont Region of the southeastern United States.

Copies of this report may be obtained by North Carolina residents free and are available to non-residents for $4.00.

STATEWIDE LAND USE STATUTE UPHELD BY OREGON VOTERS

Oregon voters reaffirmed land-use planning in November when they rejected a proposal to repeal the state's model land use law. The vote on the referendum had been considered a major test of land use controls nationally, and a way of protecting open spaces and prime agricultural land.

At issue was an Oregon law, enacted in 1973, that requires the state's Land Conservation and Development Commission to establish statewide planning goals consistent with regional, county, and city concerns; to prepare inventories of land uses and planning guidelines; coordinate planning efforts of state agencies, and to review and recommend to the legislature lands for critical area designations. The law provides for public participation in the development of planning goals and guidelines.

Virginia Water News

LIONS CLUBS ADOPT WATER CONSERVATION PROJECT NATIONALLY

As the first nationally sanctioned fund-raising project in the history of the Lions Clubs, members will be able to sell shower flow control devices. The plastic device which was developed at Virginia Tech reduces the flow from a shower head to about 3 gallons a minute. Shower heads usually flow 7 to 10 gallons a minute. A packet of two devices costs one dollar.

CONFERENCES, SYMPOSIUMS, AND SEMINARS

1977 National Conference on Water

The U.S. Water Resources Council will hold a National Conference on Water on May 23-25, 1977, in St. Louis, Missouri. This is the second such national conference to

be held by the Water Resources Council. The first took place in April, 1975, in Washington DC.

According to the Department of the Interior, "The 1975 National Conference on Water brought together diverse interest to discuss the difficult questions of water use, quality and supply, and the institutional means of solving the conflicts. Clearly responsible local, state, and federal officials and interest groups must continue to confront and examine our national policies and priorities for water. The 1977 Conference will continue the dialogues."

Assistant Secretary of the Interior, Jack O. Horton, head conference planner, asks that views, opinions and suggestions from interested parties be sent to 1977 National Conference on Water, Water Resources Council, 2120 L Street, NW, Suite 800, Washington DC, 20037.

Wanchese Harbor Seminars

Citizens of Dare and surrounding counties are being offered a six-part series covering the environmental, economic, and cultural impact of the Wanchese Harbor Project.

The series begins January 27 at 8:00 PM. It runs on consecutive thursday evenings through March 3. Presentations will be held at the North Carolina Marine Resources Center/Roanoke Island.

East Carolina's Environmental Education Program and the National Park Service are co-sponsors of the series. Continuing Education Units will be granted by East Carolina University to those individuals fulfilling the attendence requirements. The C.E.U.'s can be applied towards teacher renewal credit.

Municipal Wastewater and Sludge Recycling

Enactment of the Federal Water Pollution Control Act Amendments of 1972 (PL92-500) has resulted in considerable interest in land application of treated municipal wastewater and sludge. Most land application systems being designed or in operation include both crop land, and forest land, there is a general lack of readily available information concerning the utilization of forest land. One of the purposes of this Symposium is to review and discuss current knowledge related to the environmental impact resulting from the application of municipal sewage effluent and sludge in forest ecosystems. Topics to be discussed include: Wastewater Renovation, Ground Water Quality, Vegetation Responses, Heavy Metals, Microorganisms, Soil Fauna, Economics, Application Rates, Public Health, Aerosols, Microclimate, Wildlife, Systems Design, Mosquitores, Soil Properties, Nutrient Recycling.

The second purpose of this symposium is to review and discuss current knowledge related to the feasibility of using municipal sewage effluent and sludge for the revegetation of land distrubed by mining activities.

Location and Date: The symposium will be held at the Marriott Motel (City Line Ave.) Philadelphia, Pennsylvania, on March 21-23, 1977.

Sponsored by: Institute for Research on Land and Water Resources and the School of Forest Resources in Cooperation with Continuing Education, The Pennsylvania State University; The Pinchot Institute for Environmental Forestry Research of the Northeastern Forest Experiment Station, Forest Service, USDA; U.S. Forest Service, SEAM; U.S. Environmental Protection Agency.

Additional Information: For additional information on the symposium program, registration, and housing, contact: Dr. William E. Sopper, Institute for Research on Land and Water Resources, The Pennsylvania State University, University Park, PA 16802.

Waste Heat Management and Utilization

Since the August 1968 National symposium on Thermal Pollution, much knowledge has been developed on thermal effects by engineers, scientists and government specialists whose expertise touches on this important subject. However, reputable sources forecast that increasing electrical energy demands during the balance of this century will be met in large part by the construction of thermal stations - both fossil and nuclear. At the same time, the pattern of future site development apparently tends toward larger thermal power plants than has been the case in the past. The Federal Power Commission has estimated that approximately 395 new sites will be needed by 1990 for large thermal stations (nuclear and fossil plants). Many of these stations will exceed 1000 MW_e because large stations are generally more efficient and economical than small stations. The effort to "standardize" nuclear units to reduce licensing lead times (currently near 10 years) will also encourage large identical design mult-unit stations (Mini-energy centers). This trend heightens the need for environmentally sound waste heat management schemes.

Beneficial uses of waste heat need to be investigated. Aquaculture, greenhouses, home heating and low temperature difference engines can use the low-grade waste heat that is available in abundance.

This symposium will be a forum for exchange of ideas between people involved in different facets of the problem. BIOLOGISTS, PHYSICISTS, ENGINEERS, and ADMINISTRATORS should approach the problems from a system viewpoint to achieve consensus regarding enviornmental standards, utilization and management of waste heat.

The general objectives of the workshop are:

(1) To provide a forum for representatives of industry, regulatory agencies, research establishments and universities to exchange ideas.

(2) To provide a comprehensive state-of-art assessment of waste hear research.

(3) Identification of specific problem areas in engineering application.

(4) Recommendation for future research and development needs.

(5) The development of a document which will provide technical experts

and managers a basis for decisions.

(6) Dissemination of new technology to the user.

Presented by: Department of Mechanical Engineering, University of Miami

Sponsored by: National Aeronautics and Space Administration - Kennedy Space Center; Nuclear Regulatory Commission; United States Environmental Protection Agency; Duke Power Company; Florida Power and Light Company; School of Continuing Studies, University of Miami.

In cooperation with: American Society of Mechanical Engineers, Miami Section.

For Conference details contact: Waste Heat Management and Utilization, Department of Mechanical Engineering, University of Miami, P.O. Box 248294, Coral Gables, FL 33124.

POSITIONS AVAILABLE

Research Hydrologist Postion in the USDA Hydrograph Laboratoy. This position is part of a multidisciplined program that involves areas of expertise in: (1) hydrology, (2) watershed engineering, (3) meteorology, (4) soil physics and agronomy, (5) hydrogeology, and (6) water quality. Contact the United States Department of Agriculture, Agricultural Research Service, Northeastern Region, Agricultural Research Center, Beltsville, Maryland 20705.

Engineer Hydrologist to work in Malawi. Candidates must hold a university degree in science (physics, mathematics, geography) or in civil engineering, with specialization in hydrology. Contact The Secretary-General, World Meteorological Organization, Case postale No. 5, CH-1211 GENEVA 20, Switzerland.

WATER RESOURCES CONDITIONS IN NORTH CAROLINA FOR DECEMBER 1976

Streamflow in the State during December was above normal in the western Piedmont and near normal elsewhere. Runoff from widespread rains during the weeks of the 7th and 14th caused moderate rises on most streams, but no flooding was reported.

Monthly-mean flows at the USGS index gaging stations ranged from normal at Neuse River near Clayton to over twice normal flow in the South Yadkin River near Mocksville. Flows at the end of the month, however, had declined to only about one-half of the long-term normal for December.

Ground-water levels rose seasonally. Levels remained above the long-term average in the Mountains and Piedmont and slightly below average in the Coastal Plain region.

NEW PUBLICATIONS RECEIVED BY THE INSTITUTE

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

Abbreviations used throughout as follows:

ARS	- Agricultural Res. Service	OWP	- Office of Water Programs
ASCE	- American Society of Civil Engineers	OWRT	- Office of Water Research & Technology
CEQ	- Council on Environmental Quality	RTI	- Research Triangle Institute
DEM	- Division of Environmental Management	SCS	- Soil Conservation Service
EDS	- Environmental Data Service	TVA	- Tennessee Valley Authority
EMC	- Environmental Management Comm.	UNC-SG	- University of N. C. Sea Grant
EPA	- Environmental Protection Agency	USDA	- U. S. Department of Agriculture
ERC	- Engineering Research Center	USDC	- U. S. Department of Commerce
ERS	- Economic Research Service	USDI	- U. S. Department of the Interior
GAO	- General Accounting Office	USGPO	- U. S. Government Printing Office
IWR	- Institute for Water Resources	USGS	- U. S. Geological Survey
NAS	- National Academy of Sciences	WPC	- Water Pollution Control
NCDNER	- N. C. Dept. of Natural & Economic Resources	WQS	- Water Quality Standards
NERC	- National Environmental Research Center	WRC	- Water Resources Council
NOAA	- National Oceanic & Atmospheric Adm.	WRI	- Water Resources Institute
NPS	- National Park Service	WRRC	- Water Resources Research Center
NSF	- National Science Foundation	WRRI	- Water Resources Research Institute
NTIS	- National Technical Information Service	WRSIC	- Water Resources Scientific Information Center
NWC	- National Water Commission		

Water Resources Planning

"Methods for Determining Recreational, Environmental and Economic Consequences of Alternative Development Programs for the Bear Lake Area," 6/76, by J. F. Hoagland, *et al*, Dept. of Forestry and Outdoor Rec., UT St. U., Logan, UT 84322.

"A Selected Annotated Bibliography on the Analysis of Water Resource Systems," Vol. 7, (OWRT/WRSIC 76-201), 11/76, ed. by D. P. Loucks, avail. from WRSIC, OWRT, USDI, Wash., DC 20240.

"Workshop Proceedings: Citizen Participation in Water Resources Decision-Making," (76), 8/76, by M. Ertel, *et al*, WRRC, U. of MA, Amherst, MA 01002.

"Preparing a Long-Range Study for Crossing Requirements and for the Development of the Delaware River and Bay," 11/76, by WRRI, Rutgers U., New Brusnwick, NJ 08903.

"Environmental Evaluation of Water Resources Development," (TR-76), 7/76, by W. P. James, TX WRI, TX A&M U., College Station, TX 17843.

"Effectiveness of Information Transfer Through Water Resources Researcher/User Group Interaction," (#73), 6/76, by R. Kreplick, *et al*, WRRC, U. of MA, Amherst, MA 01002.

"Draft National Safe Drinking Water Strategy One Step at a Time," 11/76, by Off. of Water Supply, USEPA, 401 M Street S. W., Wash., DC 20460.

"User Preferences of Policy Alternatives: The Case of Recreational User Attitudes Toward Development and Regulation at Lake Monroe, Indiana," (#4) 1/75, by C. Wise, IN U., School of Public & Env. Affairs Library - F, Bloomington, IN 47401.

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