NEWS
WATER RESOURCES RESEARCH INSTITUTE
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ANNOUNCEMENT ON NEW RESEARCH PROPOSALS UNDER INSTITUTE PROGRAM

Announcements and instructions concerning new proposals under the Institute's program are being mailed to all faculty members of the state's senior colleges and universities who have expressed an interest in water resources research. Applications for grants under the Fiscal Year 1971-72 Matching Grants Program will be received until November 1, 1970.

The purpose of the Matching Grants Program is to provide long-term research support (two to three years) for projects directed toward the solution of state, regional, and national water resources problems. Federal funds are requested by the Institute from the Office of Water Resources Research. The Institute will assume responsibility for non-federal matching funds for projects approved by OWRR. Projects not funded under this program will subsequently be considered under the Institute's Annual Allotment Program without further action by the investigator.

Faculty members are encouraged to discuss their research interests with the Institute Director prior to the preparation of formal proposals.

Further information can be obtained from the Director, Professor David H. Howells, 124 Riddick Building, North Carolina State University, Raleigh, North Carolina, Telephone Code 919, 755-2815.

NEW INSTITUTE REPORTS

Report No. 35. Survey of Water Utilization and Waste Control Practices in the Southern Pulp and Paper Industry, by Professors Peder J. Kleppe and Charles N. Rogers, Department of Wood and Paper Science, North Carolina State University at Raleigh

The state of water usage and water pollution abatement in the Southern Pulp and Paper Industry was studied by surveying forty-six mills which produce about 60 percent of the total pulp and paper output of this region.

The study covered use and treatment of fresh water, reuse of water in the mills, the amount of waste water and pollutants, waste treatments, and sludge disposal.

The amount of waste water from the surveyed mills amounted to about 1200 million gallons per day containing about 2.5 million pounds of BOD which was reduced to about 1.3 million pounds after treatment. Six areas of research are recommended.

Report No. 36. Proceedings Workshop on Mosquito Control in North Carolina

The proceedings presents an up-to-date assessment of mosquito control technology and public and private control programs in North Carolina, discussion of water resource management and ecological implications, review of proposed new research, and the consensus of participants as to problems and additional research needs.

Discussions groups dealt with the following questions:

Evaluation of present practice--techniques and emphasis - advantages and disadvantages

Transition away from persistent pesticides and minimization of other forms of ecological impact

Integration of mosquito control with other facets of water-land resource management

Effectiveness of statewide coordination of operating programs, including local government

Recommendations for changes in North Carolina mosquito control programs

Research, educational and extension needs

This will be a valuable resource document for public health and water resource administrators and professional personnel and for university faculty with research and teaching responsibilities in this field of interest.

ACTIONS BY UNIVERSITIES COUNCIL ON WATER RESOURCES

The 1970 annual meeting of the Universities Council on Water Resources at Virginia Polytechnic Institute in Blacksburg, Virginia, was a stimulating experience for all concerned. The keynote papers by Gilbert White, Harold Wilm, William Ackerman, and Irving Fox set the stage for spirited discussion in the workshops which followed. Attendance and participation of Executive Director Ted Schad of the National Water Commission, Director W. Don Maughan of the Water Resources Council, and members of their senior staff, together with Commissioner Ellis Armstrong of the Bureau of Reclamation, Dr. Garland Hershey and Eugene Eaton of OWRR, and other federal officials, presented an unusual opportunity for dialogue between top federal water resource officials and the university community.

Senator William B. Spong, Jr., of Virginia presented the banquet address--a hard-hitting and forthright position on water pollution control.

The following substantive resolutions were adopted by the Council:

Safety of Public Water Supplies

Recommended that federal responsibility for the provision of safe community water systems be recognized through new legislation applicable to all public water supplies, which would establish and maintain applicable national chemical, biological, and physical drinking water standards, strengthen and encourage state and local programs, provide for adequate monitoring and supervision, and substantially increase appropriations for these purposes together with a vigorous research program to establish the safety of water supplies under varying conditions of raw water quality and water treatment technology; and that steps be taken to assure that the public water supply program be given administrative status in the Environmental Protection Agency commensurate with its importance to the public health.

Pollution from Industrial Wastes

Recommended amendment of the Water Quality Act to provide that the Commissioner of the Federal Water Quality Administration can require any industry, falling under the purview of the Act, to furnish information on the volume, strength and timing of all waste inputs into the water resource. Such information shall be collected on a continuous basis to the extent required by the Commissioner.

Pollution Control Legislation

Endorsed President's proposal to extend federal enforcement authority to all of the nation's navigable water.

Pollution from Land Runoff

Urged background studies of pollution from natural causes in land runoff to better define the effects of man's activities in the environment and their contribution to pollution from diffuse sources.

Water Resource Evaluation

Urged the Office of Water Resources Research to take action to bring about at least three Gordon-type research conferences in the area of water resource evaluation. The conferences should be concerned with (1) Ecosystemic Analysis, (2) Beneficiary Charges and Cost-sharing in the Evaluation Process and, (3) The Role of Water Resource Planning in Relation to Metropolitan Area Planning. They should be carefully planned to produce a set of published guidelines in their respective areas.

Assessment of Environmental Consequences of New Technology

Recommended that programs of technology assessment be adopted or strengthened in order to minimize the potential hazards to man and his environment due to the introduction of new materials, processes, machines, or practices.

Alternatives in Water Management

Encouraged all universities to identify and appraise examples of water projects and programs where a canvass of all feasible alternatives, evaluated in a consistent fashion, had been or could have been helpful in water resources decision making; and that UCOWR provide for interchange of findings and encourage comparative analyses of the results of such studies.

Water Resource Planning Principles and Guidelines

Recommended that the proposed principles and guidelines of the Water Resources Council be afforded a systematic multidisciplinary review by the universities, with UCOWR providing a means of exchange of views among participating universities.

Interdisciplinary training and research

Strongly encouraged academic institutions to give added support to interdisciplinary training and research directed toward discovery and formulations of innovative combinations of physical and institutional means of attaining water resources management objectives responsive to public decisions.

Participants at this year's meeting from North Carolina included Dr. Maynard Hufschmidt, University of North Carolina-Chapel Hill; Dr. B. J. Copeland and Dr. George Kriz, North Carolina State University; and Institute Director Howells.

The Council established a new standing Committee on Education and Research in Ecology. Dr. B. J. Copeland, Department of Zoology, North Carolina State University, has been invited to serve as Chairman.

North Carolina's Institute Director, David H. Howells, was reelected for a second year as chairman of the Executive Board.

COMMUNITY WATER SUPPLIES

The Public Health Service has just released two reports on its recent national study of community water supplies. The major findings from the study, in the light of today's water treatment technology are as follows:

Quality of Water Being Delivered

36 percent of 2600 individual tap water samples contained one or more bacteriological or chemical constituents exceeding the limits in the Public Health Service Drinking Water Standards.

...9 percent of these samples contained bacterial contamination at the consumer's tap evidencing potentially dangerous quality.

..30 percent of these samples exceeded at least one of the chemical limits indicating waters of inferior quality.

..11 percent of the samples drawn from 94 systems using surface waters as a source of supply exceeded the recommended organic chemical limit of 200 parts per billion.

Status of Physical Facilities

53 percent of the systems evidenced physical deficiencies including poorly protected groundwater sources, inadequate disinfection capacity, inadequate clarification capacity, and/or inadequate system pressure.

In the eight metropolitan areas studied, the arrangements for providing water service were archaic and inefficient. While a majority of the population was served by one or a few large systems, each metropolitan area also contained small inefficient systems.

Operators' Qualifications

77 percent of the plant operators were inadequately trained in fundamental water microbiology; and 46 percent were deficient in chemistry relating to their plant operation.

Status of Community Programs

The vast majority of systems were unprotected by cross-connection control programs, plumbing inspection programs on new construction, or continuing surveillance programs.

Status of State Inspection and Technical Assistance Programs

79 percent of the systems were not inspected by State or County authorities in 1968, the last full calendar year prior to the study. In 50 percent of the cases, plant officials did not remember when, if ever, a state or local health department had last surveyed the supply.

An insufficient number of bacteriological samples were analyzed for 85 percent of the water systems, and 69 percent of the systems did not even analyze half of the numbers required by the PHS Drinking Water Standards.

Editor's Note: The findings of this study coupled with the present concern over mercury levels in some waters underscore the importance of:

1. Studies to determine the limitations of present water treatment technology in dealing with polluted raw water sources. Past emphasis on bacteriological quality must be broadened to include assessment of the dissolved organic and inorganic materials now passing through treatment processes to the consumer.
2. State and federal pollution control agencies must be provided with detailed data on composition and amounts of pollutants being discharged by industry to surface and ground waters. Preoccupation

with the oxygen demand of such wastes as the principal yardstick of pollution has left a broad area of unknown concerning the array of other materials of known and questionable effects on human and animal health.

Two of the UCOWR resolutions summarized earlier in the News speak to these questions. It is time to discuss them openly without prejüdice or defense of existing institutional practices and the status quo.

D.H.H.

NEED FOR MORE INTERDISCIPLINARY EDUCATION IN SCIENCE AND ENGINEERING

In a brief, cogent article in the Sigma Xi Chapter-at-large Newsletter, Summer 1970, Dr. C. Sharp Cook, Department of Physics, University of Texas at El Paso, raised a number of important questions concerning university response to environmental problems which deserve thoughtful attention. Dr. Cook had this to say:

"The basic disciplines, which generally divide universities into departments, were formed when science appeared capable of partition into a number of relatively discrete and independent areas of interest. The trends since World War II in both the physical and biological sciences have been toward further division into specialized societies, with the consequent formation of additional journals catering only to the interests of these specialized groups. This continued proliferation of scientific disciplines into narrower and narrower fields leads to isolated cells of scientific specialists, who talk only with other specialists, and who develop their own jargon that soon becomes a foreign language to anyone outside the specialty. Of especial concern is that many of these specialists seem not to be communicating with the vast majority of the population of the United States who have not been scientifically trained.

"In the industrial world and in government laboratories, work on important problems is rarely done by a group of people from a single discipline. Instead, the trend is for more and more of this work to be project-oriented. A specialist is often needed to contribute to some specific part of these projects, but the man who runs the project, and usually a reasonably large percentage of the people working on the project, are expected to be able to understand a wide range of technical subjects. Indeed, a solution to most of the problems such as pollution, that are very much in the current news, will never be found without people with a wide range of subject-matter knowledge to serve as project leaders. One of the biggest problems many organizations have is in trying to find enough really good generalists who understand enough about a variety of scientific and engineering topics to perform efficiently the task to which they are assigned.

"I wonder at times if many of our problems may not be perpetuated by the tradition and inertia that is built into the university systems, which seem to cause each department to cling desperately to its prerogatives, sometimes, apparently, because of a fear that some other department may take a few students away from it. Because a large fraction of the science and engineering students who are granted degrees and leave the university environment must work for industry or government, where they find research and development done on a multidiscipline basis, isn't it about time to reevaluate many of the ideas that have long been considered sacred in the university environment and to see if a more truly multidisciplinary approach, even at the doctoral level, won't be more meaningful in the preparation of the student for his future life? I am not suggesting that the specialist be eliminated, nor that specialized education in the university be abolished. My primary concern is that there be an adequate parallel program to produce graduates, especially at the doctoral level, who are educated in a truly multidisciplinary or interdisciplinary atmosphere, and who have an adequate background to understand a wide range of subjects without necessarily being a specialist in any of them."

WASTE - A SOURCE OF WATER SUPPLY

The feasibility and cost of reusing municipal waste waters is under study in five Texas cities, Secretary of the Interior Walter J. Hickel has announced.

The cities cooperating in the study are Corpus Christi, El Paso, Midland, San Angelo and San Antonio.

The study, first of its kind, will develop a comparative cost analysis of facilities, processes and the treatment of waste water to acceptable standards for municipal and industrial reuse. Both desalting and advance waste treatment processes will be considered as a means of achieving the reuse quality goal.

In addition, the study will develop a simplified procedure for establishing the cost of waste water purification for reuse in any city in the United States, the Secretary said. This will serve as an excellent tool for those cities having water supplies too limited to insure meeting their increasing needs on a once-used basis, he added.

SEDIMENT CONTROL

A new publication in a series of Environmental Planning Papers will be of interest to persons concerned with soil erosion and sediment pollution. The Proceedings of the National Conference on Sediment Control (54 pages) discusses the relationship between increasing technology and its effects on soil erosion and sedimentation.

It has been reported that one billion tons of sediment are now reaching our waterways and three times that amount is creeping across fertile valleys and moving down mountainsides.

Most sedimentation problems are caused by builders of housing, industry, and highways, and most solutions are commonsense applications of basic techniques. Adequate planning, design, and maintenance are the major factors in preventing and alleviating erosion and sedimentation.

Control measures, including permanent vegetation, lateral channel diversions, outlet channels, bench terraces, and time of construction, can help prevent erosion and sedimentation. Control measures can cut down on water pollution, the threat to wildlife, and the curtailment of recreational activities.

Single copies of the publication can be obtained from: Publications Service Center, Supplies and Facilities Management Branch, Room B-258, HUD, Washington, D. C. 20410.

NEW TECHNIQUE FOR IMPROVING WASTE TREATMENT UNDER EXAMINATION

A $1-1/4 million grant has been awarded to New York City by the Interior Department to demonstrate the effectiveness and cost of substituting oxygen for air in the activated sludge treatment process. The project will be carried out at the Newtown Creek Plant where operation of the 310 m.g.d. facility must be upgraded to meet federal-state water quality standards. By using pure oxygen, higher concentrations of dissolved oxygen can be maintained in the treatment process, stepping up the efficiency.

ENVIRONMENTAL AGENCY SEEMS ASSURED

Reports from Washington indicate that Congress seems disposed to permit creation of the proposed Environmental Protection Agency at the end of the sixty-day waiting period. Not so, apparently, for the National Oceanographic and Atmospheric Administration where opposition has developed sufficiently to threaten approval.

FIRST ANNUAL REPORT OF COUNCIL ON ENVIRONMENTAL QUALITY

The first annual report of the Council on Environmental Quality was submitted to the Congress by President Nixon this month. The following recommendations concerning water pollution control were included:

1. Investment in waste treatment facilities must be significantly raised and kept at a sustained high level by enactment of the President's $4 billion program of Federal grants.
2. Management reforms must be vigorously implemented to meet water quality goals effectively and efficiently.
3. The FWQA and other Federal waste treatment assistance programs should give priority to encouraging the development of regional treatment systems in metropolitan areas based on comprehensive sewer, water, and land use planning.
4. These Federal programs must also encourage localities to impose user charges on the amount and strength of wastes to increase equity and to work toward self-financing systems.
5. Vigorous and effective enforcement of water quality standards must be implemented.
6. Increased attention must be given to encouraging changes in State and local institutions dealing with water pollution control.
7. A concerted and comprehensive attack should be made on eutrophication.
8. A program should be formulated to deal with urban runoff and pollution from combined sewer overflows.
9. State programs need to be significantly improved.
10. Professional, technical, and operator manpower must be trained.
11. A strong and consistent Federal policy should be developed to control thermal pollution.
12. A policy and programs should be developed for ocean disposal of wastes.
13. More research, development, and demonstration are needed in several areas.
14. Efforts to assure the safety of municipal water supplies should be increased.
15. More demonstrations on reuse and recycling of waste waters and sludge should be conducted.
16. Water quality management should be considered in the broader context of overall waste management.
17. The attack on problems from agricultural pollution should be intensified.
18. Mechansism may be required to protect water against a wide variety of materials that enter the environment and that are not covered under current regulatory authorities.

POLLUTION GUIDE FOR SCOUT LEADERS

A booklet on Water Pollution and Its Control for Boy Scout Leaders has been prepared by the Department of the Interior and is now available at no cost on request to the Middle Atlantic Regional Office, FWQA/USDI, 918 Emmet Street, Charlottesville, Virginia 22901. Containing a list of available teaching aids and brief descriptions and definitions of pollution and waste treatment processes, it will be useful to any layman interested in water pollution control.

FEDERAL AID FOR WATER PROJECTS

Agency	Community	Amount	Project
FWQA	Chimney Rock	$18,240	Interceptor sewer

COST OF CONSTRUCTION

FWQA cost indices for sewage treatment plant and sewer construction in the Southeast rose 11.8 percent and 10.3 percent, respectively, during the past twelve-month period. The July indices for Atlanta were 133.18 and 134.21 as compared to the 1957-1959 base of 100. The highest construction costs for treatment plants (168.49) and sewers (175.52) in the nation are found in New York, with the lowest in Birmingham (119.08 and 120.90).

STATUS OF WATER RESOURCES IN NORTH CAROLINA

The July report of the U.S. Geological Survey on Water Resource Conditions in North Carolina reported that stream flow was below normal at the end of July in all of the state except the central and eastern Coastal Plain. The deficiency was most pronounced in the western part of the Piedmont where the flow of the South Yadkin River near Mocksville continued to be below normal for the fifteenth consecutive month. Flow conditions in the eastern Piedmont and in the Coastal Plain improved considerably over the earlier month.

Ground-water levels were above normal in the Mountains and western Piedmont at the end of July and generally below normal in the eastern Piedmont and Coastal Plain.

WATER RESOURCES LEGISLATION IN THE CONGRESS

New Public Laws

H.R. 11766 — To extend authorizations for the national sea-grant college program. Signed July 23, 1970 (P.L. 91-349)

Bills Passed

S. 1708 — In lieu of H.R. 15913, to amend the Land and Water Conservation Fund Act of 1965, as amended.

Bills Introduced

S. 4138	To amend the Federal Water Pollution Control Act to promote the purposes of such act by authorizing loans to industry to abate and prevent water pollution.
S. 4192	To provide for conserving surface waters; to preserve and improve habitat for migratory waterfowl and other wildlife resources: to reduce runoff, soil and wind erosion, and contribute to food control; to contribute to improved subsurface moisture; to reduce acres of new land coming into production and to retire lands now in agricultural production; to enhance the natural beauty of the landscape, and to promote comprehensive and total water management planning.
S. 4206	To amend the Federal Water Pollution Control Act in order to authorize Secretary of Interior to incur obligations for construction grants under sec. 8 of such Act, and for other purposes.
H.R. 18641 H.R. 18796	To amend the Fish and Wildlife Coordination Act to provide additional protection to marine and wildlife ecology by providing for the orderly regulation of dumping in the coastal waters of the U.S.
H.R. 18656	To require Secretary of HEW to conduct a study and investigation of the effects of use of pesticides, and for other purposes.
H.R. 18682	To provide protection for fish resources of U.S. including fresh water and marine fish cultural industries against the introduction and dissemination of diseases of fish and shellfish, and for other purposes.
H.R. 18778	To establish an Environmental Financing Authority to assist in the financing of waste treatment facilities, and for other purposes.
H.R. 18779	To amend Federal Water Pollution Control Act, as amended, to provide financial assistance for the construction of waste treatment facilities, and for other purposes.
H.R. 18840	To amend the Federal Water Pollution Control Act to ban polyphosphates in detergents and to establish standards and programs to abate and control water pollution by synthetic detergents.
H.R. 18898	To provide a program of pollution control in selected river basins and waterways of U.S. through comprehensive planning and financial assistance to municipalities and regional management associations for the construction of waste treatment facilities.

NEW PUBLICATIONS RECEIVED BY THE INSTITUTE

(These may be borrowed from the Institute for a two-week period or may be ordered from the organization issuing the publication.)

Water Resources Planning

"Attitudes and Attitude Change Relating to Water Resources," by C. M. York, Env. Res. Center, Ga. Inst. of Tech., Atlanta, Ga. 30332, April 1970.

"Power and Decision Making in Megalopolis, with Special Reference to Env. Quality Problems," by D. C. Miller, et al, Quality of Env. Program, Resources for the Future, Inc., 1755 Mass. Ave., Wash., D. C. 20240, July 1970.

"An Economic Evaluation of Connecticut Water Law: Water Rights, Public Water Supply and Pollution Control," by R. L. Leonard, Inst. of Water Res., Univ. of Conn., Storrs, Conn. 06268, Rept. No. 11, July 1970.

"Community Water Supply Study," Analysis of Nat'l. Survey Findings and Significance of Nat'l. Findings, U.S. Dept. of HEW, Pub. Hlth. Serv., Env. Hlth. Serv., Bu. of Water Hygiene, Wash., D. C. 20402, July 1970.

"Watershed Research in Western North Carolina," TVA, Knoxville, Tennessee 27902.

"Dutchman Creek Supplemental Watershed Work Plan," Davie, Yadkin & Iredell Cos., N. C., USDA, Soil Cons. Serv., P. O. Box 27307, Raleigh, N. C. 27611, April 1970.

"Stewarts Creek - Lovills Creek Supplemental Watershed Work Plan," Surry Co., N. C., and Carroll Co., Va., USDA, Soil Cons. Serv., P. O. Box 27307, Raleigh, N. C., Feb. 1970.

"Upper Bay River Watershed Work Plan," by USDA, Soil Cons. Serv., P. O. Box 27307, Raleigh, N. C. 27611, July 1970.

Water Quality Management

"Dynamic Modeling and Simulation of the Anaerobic Digestion Process," by J. F. Andrews, et al, Env. Systems Engr. Dept., Clemson Univ., Clemson S. C. 29631, Feb. 1970.

"Requirements and Costs of Alternative Systems for Treating Peach Cannery Wastes," by G. H. Liner, et al, Water Res. Res. Inst., Clemson Univ., Clemson, S. C. 29631, April 1970.

"The Persistence of Pesticides in Impounded Waters," by R. A. Lauderdale, Univ. of Ky., Water Res. Inst., Lexington, Ky. 40506, 1969.

"Virus Movement in Groundwater Systems," by W. A. Drewry, Univ. of Arkansas, Engr. Exp. Sta., Fayetteville, Ark. 72701, Res. Rept. No. 18, Sept. 1969.

"A Working Paper on Water Pollution Control in North Carolina," by T. J. Schoenbaum, Univ. of N. C. at Chapel Hill, Law Center, Univ. of N. C. Sch. of Law, Chapel Hill, N. C. 27514, May 1970.

"Water Quality Aspects of the State of Washington, Part B," by B. W. Mar, et al, Water Res. Ctr., Wash. State Univ., Pullman, Wash, 99163, June 1970.

"Research on Water Quality," by R. Coppock, Water Res. Ctr., Univ. of Cal., Los Angeles, 90024, Rept. No. 19, July 1970.

Water Quantity Management

"Commentary on Improving the Flood-Associated Activities of the State of Washington, Dept. of Water Res.," A summary, Univ. of Wash., Water Res. Center, Wash. State Univ., Pullman, Wash. 99163, June 1970.

"Commentary on Improving the Flood-Associated Activities of the State of Washington, Dept. of Water Res.," Part B: An Analysis of the Law Governing Six Selected Washington Water-Oriented Special Districts, by M. D. Garvey, et al, Univ. of Wash., Water Res. Ctr., Pullman, Wash. 99163, June 1970.

"The Progress of Hydrology," Proceedings of the First International Seminar for Hydrology Professors, Dept. of Civil Engr., Univ. of Ill., Urbana, Ill. 61801, July 13-25, 1969, Vol. I, II & III.

"Effect of Watershed Cover on Overland Flow from a Major Storm in Southwestern Wisconsin," by North Central Forest Experiment Sta., Forest Serv., USDA, Folwell Ave., St. Paul, Minn. 55101, 1969.

"Tidal Study of Three Oregon Estuaries," by C. R. Goodwin, et al, Bull. No. 45, Engr. Exp. Sta., Oregon State Univ., Corvallis, Ore. 97331, May 1970.

"The Numerical Solution of Transient Supercritical Flow by the Method of Characteristics with a Technique for Simulating Bore Propagation," by J. J. Zovne, Sch. of Civil Engr., Ga. Inst. of Tech., Atlanta, Ga. 30332, May 1970.

The following technical papers have been received from the Corps of Engineers, Hydrologic Engr. Center, Sacramento, California:

Tech. Paper No. 1 - "Use of Interrelated Records to Simulate Streamflow," by L. R. Beard
Tech. Paper No. 2 - "Optimization Techniques for Hydrologic Engineering," by L. R. Beard
Tech. Paper No. 3 - "Methods for Determination of Safe Yield and Compensation Water from Storage Reservoirs," by L. R. Beard
Tech. Paper No. 4 - "Functional Evaluation of a Water Resources System," by L. R. Beard
Tech. Paper No. 5 - "Streamflow Synthesis for Ungaged Rivers," by L. R. Beard
Tech. Paper No. 6 - "Simulation of Daily Streamflow," by L. R. Beard
Tech. Paper No. 7 - "Pilot Study for Storage Requirements for Low Flow Augmentation," by A. J. Fredrich
Tech. Paper No. 8 - "Worth of Streamflow Data for Project Design--A Pilot Study," by D. R. Dawdy, et al.
Tech. Paper No. 9 - "Economic Evaluation of Reservoir System Accomplishments," by L. R. Beard
Tech. Paper No. 11 - "Survey of Programs for Water Surface Profiles," by B. S. Eichert
Tech. Paper No. 12 - "Hypothetical Flood Computation for a Stream System," by L. R. Beard
Tech. Paper No. 13 - "Maximum Utilization of Scarce Data in Hydrologic Design," by L. R. Beard, et al.
Tech. Paper No. 14 - "Techniques for Evaluating Long-Term Reservoir Yields," by A. J. Fredrich
Tech. Paper No. 15 - "Hydrostatistics - Principles of Application," by L. R. Beard
Tech. Paper No. 16 - "A Hydrologic Water Resource System Modeling Techniques," by L. G. Hulman, et al.
Tech. Paper No. 17 - "Hydrologic Engineering Techniques for Regional Water Resources Planning," by A. J. Fredrich, et al.
Tech. Paper No. 18 - "Estimating Monthly Streamflows within a Region," by L. R. Beard, et al.
Tech. Paper No. 21 - "An Approach to Reservoir Temperature Analysis," by L. R. Beard, et al.
Tech. Paper No. 22 - "A Finite Difference Method for Analyzing Liquid Flow in Variably Saturated Porous Media," by R. L. Cooley

Miscellaneous

Annual Reports: Rhode Island Water Res. Res. Inst.
Nebraska Water Res. Res. Inst.
Kentucky Water Res. Res. Inst.
Idaho Water Res. Res. Inst.
Iowa Water Res. Res. Inst.
Puerto Rico Water Res. Res. Inst.
South Carolina Water Res. Res. Inst.
Texas Water Resources Inst.
Illinois Water Resources Center
Oklahoma Water Res. Res. Inst.
Michigan Institute of Water Research

"Environmental Quality," The First Annual Rept. of the Council on Env. Quality transmitted to the Congress, Aug. 1970, Supt. of Doc., U.S. Gov't. Printing Office, Wash., D. C. 20402, Price: $1.75 (paper cover).

"Engineering Careers with Consulting Firms," by G&W Res. Publications, Inc., Info. Park, P. O. Box 381, Princeton, N. J., 08540, Eastern U.S. Ed., 1970.

"Grants Activities Supported by the Env. Con. Adm. of the Env. Hlth. Serv.," U.S.D.H.E.W., Pub. Hlth. Serv., Rockville, Md. 20852, Ed. by R. T. Moore, et al.

"Incinerator Guidelines 1969," by J. DeMarco, et al, Supt. of Doc., U.S. Gov't. Print. Office, Wash., D. C. 20402, Price: $1 ea.

"An Evaluation of Sanitary Engineering Education," by W. J. Kaufman, et al, Sanitary Engr. Res. Lab., Univ. of Cal., Berkeley, Cal. 94720, Jan. 1970.

"Proposals for a Refuse Disposal System in Oakland County, Michigan," by Jones & Henry Engrs. Limited for Bu. of Solid Waste Mgt., USDHEW, Public Hlth. Serv., 1970, Wash., D. C.

"Research Reports Supported by OWRR Under Water Res. Res. Act of 1964," USDI, OWRR, Water Res. Scientific Information Center, Wash., D. C. 20240, July 1969 - June 1970.

"Mathematical Modeling of Solid Waste Collection Policies," Vols. 1 & 2, USDHEW, Supt. of Doc., U.S. Gov't. Printing Office, Wash., D. C. 20402, Price: $2.25 ea.

"Comprehensive Study of Solid Waste Disposal in Cascade County, Montana," by Thomas, Dean & Hoskins, Inc., Consulting Engrs. for Bd. of Co. Comm. of Cascade County, Montana, for Bu. of Solid Waste Mgt., Pub. Hlth. Serv., Env. Hlth. Serv., USDHEW, Wash., D. C. 1970.

"Solid Waste Management: A List of Available Literature," by USDHEW, Public Health Service, Bu. of Solid Waste Mgt., June 1970.

"Developing a State Solid Waste Management Plan," by R. O. Toftner, USDHEW, Bu. of Solid Waste Mgt., 1970, Wash., D. C.

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