

Summer 1971

Water Resources News, Volume 3, No. 6, Summer Issue 1971

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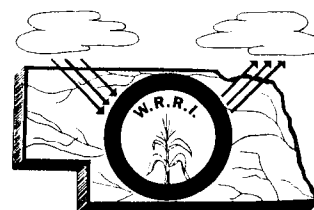
"Water Resources News, Volume 3, No. 6, Summer Issue 1971" (1971). *Water Current Newsletter*. 57.
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WATER RESOURCES NEWS

NEBRASKA WATER RESOURCES RESEARCH INSTITUTE
212 AGRICULTURAL ENGINEERING BUILDING

THE UNIVERSITY OF NEBRASKA
LINCOLN, NEBRASKA 68503



Volume 3 Number 6

Summer Issue, 1971

SUMMER INSTITUTES A SUCCESS

The Water Resources Research Institute recently sponsored two very successful one-week Summer Institutes. The titles of the Institutes were "Optimal Analysis of Water Resources Systems," and "Simulation of Water Resources Systems." Fifty students from the Bureau of Reclamation; USDA and ARS; Consulting Firms; the Corps of Engineers; State Universities; and foreign countries including Mexico, Canada, and India attended.

DR. WILLIAM GARNER NAMED RESEARCH SPECIALIST FOR EPA

Dr. William Garner was recently named research specialist for the Environmental Protection Agency (EPA) in Kansas City, Missouri. His area of operation includes Nebraska. Dr. Garner should prove to be a useful resource person for Nebraskans interested in applying for research funding through EPA.

Dr. Garner's address is:
Dr. William Garner, Research and Monitoring Representative, Environmental Protection Agency, Depart-

ment of the Interior, 911 Walnut Street, Kansas City, Missouri 64106.

TITLE II PROGRAM FOR FISCAL YEAR 1973

The Office of Water Resources Research (OWRR), U.S. Department of the Interior, Washington, D.C. 20240, is now accepting unsolicited research proposals in the field of water resources for consideration for fiscal year 1973 support, beginning July 1, 1972, pursuant to Title II of the Water Resources Research Act of 1964, as amended.

Title II of the Act authorizes the Secretary of the Interior to make grants, contracts, and matching or other arrangements with educational institutions, private foundations or other institutions, with private firms or individuals whose training, experience, and qualifications are adequate for the conduct of water research projects, and with local, State, and Federal Government agencies to undertake research into any aspects of water problems related to the mission of the Department of the Interior which he may deem desirable and which are not otherwise being studied.

EXAMPLES OF PRIORITY RESEARCH
SUBJECTS FOR TITLE II SUPPORT

- (1) Analysis of Planning, Managerial, Financial, Operating and Regulatory Policies of Water Resources Institutions
- (2) Water Resources Policy and Political Institutions
- (3) Hydrologic Systems Analysis
- (4) Urban and Metropolitan Water Resources Problems
- (5) Environmental Considerations in Water Resources Planning and Management
- (6) Evaluation of Economic Importance of Various Uses of Water, Cost Allocation, Cost Sharing, Pricing and Repayment
- (7) Analysis and Evaluation of Water Resources Projects with Special Emphasis on Identification and Evaluation of Benefits Derived
- (8) Ground Water Management and Protection
- (9) Protection and Rehabilitation of Estuarine Resources
- (10) Thermal Loading Problems
- (11) Water Demand Considerations

AMERICAN WATER RESOURCES
ASSOCIATION

The Seventh American Water Resources Conference will be held on October 25-29, 1971. The purpose of this annual conference is to review and give a comprehensive picture of water resources in the United States, including research, development, management, planning, education, technology, and information systems. The Conference includes both invited and contributed papers, discussion sessions, a gallery of exhibits by publishers, industry and government, and local field trips. The

Conference is open to all registrant. For additional information, contact: Dr. F. E. McJunkin, General Chairman, Associate Professor, Department of Environmental Sciences & Engineering, University of North Carolina, Chapel Hill, North Carolina 27514.

SOIL EROSION CONTRIBUTES TO
WATER POLLUTION

In an effort to change all of this, the Interior Department is currently engaged in a project to demonstrate new storm water erosion control methods during construction. A 200-acre watershed in a section of the "new city" of Columbia, Maryland is involved. Some of the practices planned are: (1) preparation of the site in stages to reduce the land area exposed at one time to erosion; (2) grading of slopes so the water runs off slower and doesn't concentrate in one deeply gouged streambed; (3) temporary seeding and sodding to hold soil during construction; and (4) placing of mulch on slopes to discourage erosion. The state will also construct a pond to collect the storm water and a new device called a "tube settler" will be given a fullscale test in the pond. Passage of water through a series of pipes will cause the dirt that the water is carrying to settle faster. When the water is released from the pond it will contain less sediment, thereby causing less pollution.

UCLA TO GRANT DOCTOR OF
THE ENVIRONMENT DEGREES

UCLA will have a new five-year doctoral program, open to students

with B.A. degrees, which will train men and women to diagnose environmental ills. The program will grant a Master of Environmental Science and Engineering degree after the first two years and will include a third year of seminar work and two final years similar to the internship in medicine, with students working on "real life" problems in industry or government. Among the problems doctoral candidates will consider are forecasting global air pollution for 1990 and surveying litter problems in outer space.

MULTIPLE OBJECTIVES OPPOSED BY O.M.B.

Considerable controversy has erupted over the Water Resources Council's proposed new water resources project evaluation guidelines. The Office of Management and Budget (O.M.B.) has raised strong objections to the Council's recommendation that all projects be evaluated on the basis of four objectives: environmental enhancement, economic efficiency, regional development, and social well-being. While the new criteria were contained in the Rivers and Harbors Act of 1970 as "the intent of Congress," the O.M.B. is maintaining that economic efficiency must continue to be the single deciding factor in the approval and funding of all projects.

IT'S IN THE BAG - OR BOTTLE, OR CARTON

This fall a group of students at the University of Illinois at Urbana-Champaign will be wrapping

up twelve weeks of summer research on a serious environmental problem: The effect of food and beverage packaging on household wastes. It is a totally interdisciplinary effort being carried out by fourteen students from eight different areas of study, and it is supported by the first grant to the University of Illinois under the new National Science Foundation student-originated research program. Students participating will receive a stipend, and the University's facilities will be available to them for the summer.

The project proposal, entitled "An Investigation of the Long Term Effects on Society of Alternative Methods of Packaging Food and Beverages for Household Consumption, and of the Associated Packaging Usage Patterns," grew out of an interdisciplinary honors course in which students are studying problems of technology and the environment. The objectives are to develop information to evaluate packaging and, through interdisciplinary research, find methods for handling solid-waste environmental problems.

Using the American household as a base, the students plan to investigate the feasibility of alternatives to present packaging methods. Recycling of materials - as is being done in some areas with glass, metal, and paper - is among the waste-reducing methods to be studied.

It is hoped that the project will provide information for use by communities considering legislation to reduce the quantity of solid waste generated. On a broader scale, the project should make a major contribution toward wiser use of national resources and help relieve the housewife of that "boxed-in" feeling.

NATIONAL ENVIRONMENTAL LABORATORY ACT

Thirty Senators have co-sponsored legislation to establish a National Environmental Laboratory (NEL). The NEL would be charged with finding out what technology is doing and what its effects will be on the national environment, hopefully before they occur.

The NEL would conduct basic research and analyze human activities affecting the environment. The work would include: data collection and dissemination, development of methods and devices, training and education and objective analysis of various environmental policy alternatives.

The legislation also provides that the lab could invent, test and demonstrate alternative solutions to existing and probable environmental insults, where appropriate. However, under the legislation, the lab cannot make specific policy recommendations but it can present alternatives and describe the probable results of each alternative policy.

OAK RIDGE NATIONAL LABORATORY GETS NEW ECOLOGY FACILITY

The Atomic Energy Commission will construct a new \$440,000 Aquatic Ecology facility at Oak Ridge National Laboratory, Oak Ridge, Tennessee, to study the effects of heated water on fish and other aquatic life.

The new laboratory, scheduled for completion by February 1972, will be the most advanced of its type. It will house experimental tanks, water supply and control equipment needed for study of

effects of heat and other potential water pollutants on fish and other important aquatic organisms.

The research will be supervised by Charles C. Coutant of the Laboratory's Ecological Sciences Division. Its principal objective will be to predict possible adverse and/or beneficial environmental effects in advance of constructing nuclear power plants. The data produced can be used in selecting a site for proposed plants or in design of cooling systems. The new facility will feature a long-range pumping system which will enable the ecologists to simulate thermal discharge of power plants.

Specialized research facilities will be provided to obtain needed information on the interactions of temperature, radioactivity and pollutants as they may affect living organisms. Experiments will emphasize ecological processes affected by siting, design and operation of steam electric power plants, both nuclear and fossil fueled, and will include beneficial effects of waste heat.

The scientific staff plans to study both short-term effects, such as passing organisms through the cooling water condensers, and long term effects resulting from possible changes in seasonal temperatures of water bodies.

The laboratory facility will be used in conjunction with ecological field studies being undertaken in Tennessee at the Bull Run Steam Plant and other power stations operated by the Tennessee Valley Authority. Research will be coordinated with other AEC-sponsored thermal effects studies at Hanford, Washington; Savannah River, South Carolina and several colleges and universities.

CONFERENCE ROUNDUP

The theme of the 5th Annual Conference of State and Federal Water Officials, held June 8-10, 1971 in Des Moines, Iowa was "Public Involvement in Water and Related Land Resources Planning."

States, Federal Departments, and water resource organizations were represented at the three-day conference sponsored by the Interstate Conference on Water Problems and the U.S. Water Resources Council.

Norman F. Billings, Chairman of the Interstate Conference on Water Problems and W. Don Maughan, Director of the Water Resources Council, opened the Conference with reference to the meeting theme. The Conference Agenda was divided into three major parts:

- (1) Major speeches to state the problems of public involvement.
- (2) Case studies and panel discussions to illustrate how public involvement problems arise.
- (3) Workshop sessions to provide an analysis of the major problem areas.

Published proceedings of the Conference will be available upon request without charge as long as the present supply is available. Write: Water Resources Council, Suite 900, 1025 Vermont Ave., N.W., Washington, D.C. 20005.

RESEARCH REVIEW

Project Title: Aerobic Treatment of Feedlot Runoff

Principal Investigator: Dr. Terence J. McGhee

Dates: July, 1971 to June 1973

Laboratory activated sludge units will be operated in the treatment of feedlot runoff collected from the University of Nebraska Agricultural Field Laboratory at Mead, Nebraska. The laboratory units will be operated at a temperature of approximately 25°C and at retention times of 2 to 24 hours. Operational parameters to be routinely determined for the untreated waste, treated effluent, and unit mixed liquor when applicable will include total and suspended solids, B.O.D., turbidity and color, pH, temperatures, ammonia nitrogen, nitrate, and phosphate.

The goal of the project is the determination of design parameters for satisfactory aerobic treatment of such wastes with B.O.D. and color reduction considered as the major objective. No major removal of nitrogen or phosphorus is anticipated but the level of these inorganic pollutants will be monitored.

The laboratory research is expected to provide the basis for the design and operation of a pilot plant for the treatment of feedlot runoff under field conditions.

NEW PUBLICATIONS RECEIVED BY INSTITUTE - JUNE, JULY, AND AUGUST

1. "Stochastic Population Dynamics for Regional Water Supply and Waste Management Decision-Making," P. Meier, University of Massachusetts at Amherst, August 1970
2. "A Review of Activities 1966-1971," University of Massachusetts at Amherst, Water Resources Center, 1971.

3. "Groundwater Levels in Nebraska 1970," C. F. Keech, U.S. Geological Survey, University of Nebraska, Conservation and Survey Division, May 1971.

4. "1970 Grant and Contract Awards," Environmental Protection Agency, Water Quality Office, Fiscal Year 1970.

5. "Aerated Lagoon Treatment of Food Processing Wastes," K. A. Dostal, Pacific Northwest Water Laboratory, for the Water Quality Office, Environmental Protection Agency, March 1968.

6. "Sedimentation," annotated bibliography of foreign literature for 1968 and 1969, U.S. Department of Agriculture and the National Science Foundation, 1970.

7. "Flexible Holding Tank for Pleasurecraft Sanitary Systems," Uniroyal, Inc., August 1970.

8. "An Electromembrane Process for Regenerating Acid from Spent Pickle Liquor," for Environmental Protection Agency, Water Quality Office, March 1971.

9. "Guidelines: Biological Surveys at Proposed Heat Discharge Sites," R. R. Garton, Pacific Northwest Water Laboratory; R. D. Harkins, Robert S. Kerr Water Research Center, April 1970.

10. "Vortex Separation for Oil Spill Recovery Systems," for the Water Quality Office, Environmental Protection Agency, October 1970.

11. "Beneficial Uses of Waste Heat-an Evaluation," R. R. Garton, A. G. Christianson, September 1970.

12. "Optimum Mechanical Aeration Systems For Rivers and Ponds," W. T. Hogan, F. E. Reed, A. W. Starbird, Littleton Research and Engineering Corp., November 1970.

13. "Retention Basin Control of Combined Sewer Overflows," for the Environmental Protection Agency, Water Quality Office, August 1970.

14. "Reuse of Chemical Fiber Plant Wastewater and Cooling Water Blowdown," for the Environmental Protection Agency, Water Quality Office, October 1970.

15. "Polymeric Materials for Treatment and Recovery of Petrochemical Wastes," for the Water Quality Office, Environmental Protection Agency, March 1971.

16. "Economic-Ecologic Analysis in the Charleston Metropolitan Region: An Input Output Study," Clemson University, April 1971.

17. "Conference Proceedings -- Hydrologic Models in Water Resources Management," Clemson University, March 1970.

18. "Optimal Policy for Operation of a Multipurpose Reservoir," Clemson University, January 1971.

19. "Research on Dry - Type Cooling Towers For Thermal Electric Generation - Part I," J. P. Rossie, E. A. Cecil, R. W. Beck & Associates, for the Water Quality Office, Environmental Protection Agency, November 1970.

20. "Research on Dry - Type Cooling Towers For Thermal Electric Generation - Part II," R. W. Beck & Associates, for the Water Quality Office, Environmental Protection Agency, November 1970.

21. "An Analytical and Experimental Investigation of Surface Discharges of Heated Water," K. D. Stolzenbach, D. R. F. Harleman, Massachusetts Institute of Technology, February 1971.

22. "Report on THE FRAMEWORK STUDY," Nebraska Soil & Water Conservation Commission, May 1971.

23. "A Predictive Model For normal Stratification and Water Quality in Reservoirs," M. Markofsky, D. R. F. Harleman, Massachusetts Institute of Technology, January 1971.
24. "Mathematical Models For the Prediction of Temperature Distributions Resulting From the Discharge of Heated Water into Large Bodies of Water," R.C.Y. Koh, Tetra Tech, Inc., for the Water Quality Office, Environmental Protection Agency, October 1970.
25. "A Cumulus Convection Model Applied to Thunderstorm Rainfall in Arid Regions," U.S. Army Corps of Engineers, December 1970.
26. "Potential Environmental Modifications Produced by Large Evaporative Cooling Towers," for the Environmental Protection Agency, Water Quality Office, January 1971.
27. "Secondary Treatment of Potato Processing Wastes," K. A. Postal, Pacific Northwest Water Laboratory, for the Water Quality Office, Environmental Protection Agency, July 1969.
28. "Aerobic Secondary Treatment of Potato Processing Wastes," The R. T. French Company, for the Environmental Protection Agency, Water Quality Office, December 1970.
29. "Mathematical Models for the Prediction of Thermal Energy Changes in Impoundments," for the Water Quality Office, Environmental Protection Agency, December 1969.
30. "The Effect of Detergents on Gas Absorption Processes," J.A. Caskey, R. F. Herbert, Yan Pui To, Virginia Polytechnic Institute and State University, April 1971.
31. "1971 Annual Report - F.Y. 1971 Accomplishments, F.Y. 1972 Program," U.S. Army Corps of Engineers, The Hydrologic Engineering Center.
32. "Control of Infiltration and Inflow into Sewer Systems," for the Environmental Protection Agency, Water Quality Office, December 1970.
33. "Mathematical Management Model Unconfined Aquifer," Final Report, Texas Tech University Water Resources Center and High Plains Underground Water Conservation District No. 1, October 1970.
34. "Proceedings Mississippi Water Resources Conference 1971," Mississippi State University, April 1971.
35. "Bed Roughness of A Large River in An Alluvial Channel," V. L. Zitta, M.S. Priest, Mississippi State University, May 1971.
36. "Community Leadership and Watershed Development," K. P. Wilkinson, and R. N. Singh, Mississippi State University, 1970.
37. "Inland Port Facilities and Economic Growth," A. A. Armenakis, H. J. Moore, G. T. Peden, Jr., Mississippi State University, 1970.
38. "Distribution of Selected Metals in Bottom Sediments, Water, Clams, Tubificid Annelids, and Fishes of the Middle Illinois River," B. J. Mathis, T. F. Cummings, Bradley University, University of Illinois, March 1971.
39. "Transport Processes of Particles in Dilute Suspensions in Turbulent Water Flow -- Phase I," B. G. Jones, J. A. Beoletto, C. C. Meek, R. J. Ostensen, R. Robin, University of Illinois, March 1971.
40. "Optimal Plans for the Capacity Expansion of A Municipal Water Treatment-Distribution System," H. Hinomoto, University of Illinois, January 1971.
41. "Urban Snow Hazard: Economic and Social Implications," D.D. Baumann, C. Russel, Southern Illinois University, University of Illinois, April 1971.

42. "Respiration of Aquatic Macrophytes in Eutrophic Ecosystems," A. J. McDonnell, D. W. Weeter, Pennsylvania State University.
43. "Acid Mine Drainage Formation and Abatement," Ohio State University, for the Environmental Protection Agency, Water Quality Office, April 1971.
44. "The Critical Thermal Maximum of Juvenile Spot, *Leiostomus Xanthurus*, Lacepede," D. W. Bridges, North Carolina State University, University of North Carolina, January 1971.
45. "A Computer Based Floristic Analysis of Pamlico River Phytoplankton," V. J. Bellis, East Carolina University, University of North Carolina, North Carolina State University, January 1971.
46. "Migration and Metabolism in a Stream Ecosystem," C.A.S. Hall, University of North Carolina, North Carolina State University, February 1971.
47. "Management and Administration of Ground Water in Interstate and International Aquifers - Phase 1," M.W. Bittinger and Associates, Inc., Fort Collins, Colorado, October 1970.
48. "Identification and Interrelationships of Secondary Benefits in Waterways Development," R. K. Rainer, C. R. White, Auburn University, April 1971.
49. "The Effect of Carbon on Algal Growth -- Its Relationship to Eutrophication," J. C. Goldman, D. B. Procella, E. J. Middlebrooks, D. F. Toerien, Utah Water Research Laboratory, Utah State University, April 1971.
50. "Cooper in Water - A Bibliography," U.S. Department of the Interior, Water Resources Scientific Information Center, July 1971.
51. "Zinc in Water - A Bibliography," U.S. Department of the Interior, Water Resources Scientific Information Center, July 1971.
52. "Magnesium in Water - A Bibliography," U.S. Department of the Interior, Water Resources Scientific Information, July 1971.
53. "Findings and Recommendations of the Special Task Force," Water Resources Council, July 1970.
54. "Principles For Planning Water and Land Resources," by Special Task Force, July 1970.
55. "A Summary Analysis of Nineteen Tests of Proposed Evaluation Procedures on Selected Water and Land Resource Projects," by Special Task Force, July 1970.
56. "Standards For Planning Water and Land Resources," by Special Task Force, July 1970.
57. "A Fortran IV Program to Calculate Diversity Indices of Stream Bottom Organisms," J. C. Mawson, P. J. Godfrey, University of Massachusetts, 1971.
58. "Fluid Bed Incineration of Petroleum Refinery Wastes," for the Environmental Protection Agency, Water Quality Office, March, 1971.
59. "Light - Catalyzed Chlorine Oxidation for Treatment of Wastewater," for Environmental Protection Agency, Water Quality Office, September 1970.
60. "Evaluation of a New Acid Mine Drainage Treatment Process," for the Environmental Protection Agency, Water Quality Office, February 1971.
61. "The Effect of Inorganic Sediment On Stream Biota," J. R. Gammon, DePauw University, for the Water Quality Office, Environmental Protection Agency, December 1970.
62. "Laboratory and Mathematical Simulation of Oxygen Balances Effected in Streams," W. E. Gates, Georgia Institute of Technology, April 1971.

63. "Recovery of Oil Spills Using Vortex Assisted Airlift System," for Environmental Protection Agency, Water Quality Office, July 1970.

64. "Ultrasonic Filtration of Combined Sewer Overflows," for the Environmental Protection Agency, Water Quality Office, June 1970.

65. "Strontium in Water - A Bibliography," U.S. Department of the Interior, Water Resources Scientific Information Center, July 1971.

66. "Mercury in Water - A Bibliography," U.S. Department of the Interior, Water Resources Scientific Information Center, July 1971.

67. "Manganese in Water - A Bibliography," U.S. Department of the Interior, Water Resources Scientific Information Center, July 1971.

68. "Trace Elements in Water - A Bibliography," U.S. Department of the Interior, Water Resources Scientific Information Center, June 1971.

69. "The Environmental Mercury Problem," F. M. D'itri, Michigan State University, June 1971.

70. "Prevention and Correction of Excessive Infiltration and Inflow into Sewer Systems - A Manual of Practice," for Environmental Protection Agency, Water Quality Office, January 1971.

71. "The Economics of Water Supply and Quality," Harvard Water Program, Harvard University, for the Environmental Protection Agency, Water Quality Office, February 1971.

72. "A Selected Annotated Bibliography on the Analysis of Water Resource Systems," Second Volume, C. Kriss, D. P. Loucks,

Cornell University and Marine Sciences Center, June 1971.

73. "Evaluation of Storm Standby Tanks Columbus, Ohio," for the Environmental Protection Agency, Water Quality Office, March 1971.

74. "New and Ultrathin Membranes for Municipal Wastewater Treatment by Reverse Osmosis," North Star Research and Development Institute, for the Environmental Protection Agency, Water Quality Office, October 1970.

75. "Treatment of Citrus Processing Wastes," for the Environmental Protection Agency, Water Quality Office, October 1970.

76. "Hydraulic Jump Type Stilling Basins for Froude Number 2.5 to 4.5," N. G. Bhowmik, Illinois State Water Survey, 1971.

77. "Response of Teleost Fish to Environmental Stress," L. S. Smith, J. B. Saddler, R. C. Cardwell, A. J. Mearns, H. M. Miles, T. W. Newcomb, K. C. Watters, University of Washington, for the Environmental Protection Agency, Water Quality Office, February 1971.

78. "Annual Report of Activities During Fiscal Year 1971," Annual Report No. 7, University of Maine at Bangor, July 1971.

79. "Forest Range Environmental Production System," Review Draft, K. De Bower, R. Lockard, University of Nebraska; H. G. Kaiser, U.S. Department of Agriculture; J. W. Putman, U.S. Department of Agriculture, July 1971.

80. "Legal Aspects of Water Use and Control in South Carolina - Part A," C. H. Randall, Clemson University, University of South Carolina, March 1971.

81. "Legal Aspects of Water Use and Control in South Carolina - Part B," D. H. Means, Clemson University, University of South Carolina, March 1971.

82. "Celling Crude Oils to Reduce Marine Pollution From Tanker Oil Spills," for the Environmental Protection Agency, Water Quality Office, January 1971.
83. "Selected Urban Storm Water Runoff Abstracts," Third Quarterly Issue, The Franklin Institute Research Laboratories, for the Environmental Protection Agency, Water Quality Office, April 1971.
84. "Anaerobic-Aerobic Lagoon Treatment for Vegetable Tanning Wastes," C. E. Paker, University of Virginia, for the Environmental Protection Agency, Water Quality Administration, December 1970.
85. "Proceedings of the Symposium on Transient Ground Water Hydraulics," Colorado State University, July 25-27, 1963.
86. "Limestone Treatment of Rinse Waters from Hydrochloric Acid Pickling of Steel," for Environmental Protection Agency, Water Quality Office, February 1971.
87. "Flocculation and Clarification of Mineral Suspensions," University of Minnesota, for the Environmental Protection Agency, Water Quality Office, May 1971.
88. "Quantification of the Effects of Rate of Temperature Change on Aquatic Biota," J.N. Speakman, P. A. Krenkel, Vanderbilt University, May 1971.
89. "Effect of Geographical Location on Cooling Pond Requirements and Performance," E. L. Thackston, F. L. Parker, Vanderbilt University, February 1971.
90. "Inventory of Course Offerings in Water Resources," University of Connecticut, May 1971.
91. "Storm and Combined Sewer Pollution Sources and Abatement," for the Environmental Protection Agency, Water Quality Office, January 1971.
92. "Current Practice in Sea-foods Processing Waste Treatment," M. R. Soderquist, K. J. Williamson, G. I. Blanton, Jr., D. C. Phillips, D. K. Law, D. L. Crawford, Oregon State University, for the Environmental Protection Agency, Water Quality Office, April 1970.
93. "Annual Report of Activities for Fiscal Year 1971," Annual Report No. 7, University of Nebraska, June 1971.
94. "Research Reports Supported by Office of Water Resources Research," July 1970-June 1971, Office of Water Resources Research, U.S. Department of the Interior.
95. "A Methodology Study To Develop Evaluation Criteria for Wild and Scenic Rivers," a report of History Subproject, J. J. Peebles, University of Idaho, March 1971.
96. "A Methodology Study to Develop Evaluation Criteria For Wild and Scenic Rivers," a report of Sport and Commercial Fisheries Subproject, J. Mallet, T. C. Bjornn, University of Idaho, November 1970.
97. "A Computer System For Geophysical Data Acquisition, Retrieval and Analysis," A. J. Surkan, Publication No. 4, Nebraska Water Resources Institute University of Nebraska, July 1971.
98. "Report on The Framework Study - Appendix B - Inventory of Water Resources," Nebraska Soil and Water Conservation, State Water Plan, June 1971.
99. "Water Resource Observatory Climatological Data Water Year 1970," University of Wyoming, May 1971.
100. "Precipitation and Its Measurement - A State of the Art," L. W. Larson, University of Wyoming, June 1971.
101. "Environmental Aspects of the Units Problem," J. C. Bellamy, University of Wyoming, May 1971.
102. "Potential Methods of Indexing Diurnal Weather Observations," V.E. Smith, University of Wyoming, May 1971.

102. "Geosection Indices for Environmental Data," J. C. Bellamy, University of Wyoming, May 1970.

103. "Report of Water Resources Research," Geological Survey, July 1969 - June 1970. Water Resources Division, January 1971.

104. "Report on Water Management Studies on Public Lands of Western United States," July 1969 - June 1970, Geological Survey, Water Resources Division, July 1970.

105. "Annual Report of Activities for Fiscal Year 1971," Annual Report No. 7, University of Illinois, July 1971.

106. "Inland Lakes - Analysis and Action," Office of Water Resources Research, U.S. Department of Interior, Ann Arbor, Michigan, July 1971.

107. "Quality Control in Reservoirs for Municipal Water Supplies," J. M. Symons, Quality Control in Reservoirs Committee, American Water Works Association, May 1971.

108. "Publications List," Vol. IV, No. 1, University of Hawaii, Spring 1971.

109. "Energy Balance and Spectral Properties of a Reflectorized Soybean Canopy," P.C. Doraiswamy, Thesis, University of Nebraska, June 1971.

110. "Publications Related to Water Resources Research Center Projects, 1965-71," University of Minnesota, May 1971.

111. "Microbial Release of Soluble Phosphate in An Activated Sludge Environment," C. W. Randall, B. S. Hulcher, D. W. Marshall, Virginia Polytechnic Institute and State University, May 1971.

112. "Flood Damage Abatement Study for Virginia," W. R. Walker, Virginia Polytechnic Institute and State University, April 1971.

113. "Proposed New Procedures for Evaluating Water and Land Resources: Some Comments From an Academic Viewpoint," W. R. Butcher, B. Rettig, G. M. Brown, University of Washington, Washington State University, June 1971.

114. "Water Resources Planning Study For Arkansas and Oklahoma," L. R. Heiple. H. M. Jeffus, University of Arkansas, Fayetteville 1970.

115. "Agricultural Engineers Yearbook," American Society of Agricultural Engineers, 1971.

116. "Proposed Industrial Development Program for South-eastern Nebraska," Development Planning Associates, Inc., January 1967.

117. "Evaluation Processes in Water Resources Management and Development," A report of the Task Force on Water Resources Evaluation of the Universities Council on Water Resources, Office of Water Resources Research, 1971.

118. "Effects of Zooplankton on Algae in Westhampton Lake," J. W. Bishop, University of Richmond, June 1971.

119. "Experimental and Theoretical Study of the Hydrodynamics of Dispersion in Rivers and Estuaries," Jin Wu, Hydronautics, Incorporated, April 1971.

120. "A Study of the Mechanisms and Suppression of Evaporation of Water from Soils," C. W. Wendt, Texas A & M University, February 1971.

121. "A Summary Report 1965 - 1971," Texas A&M University, J. R. Runkles, June 1971.

122. "Institutional Factors Influencing Water Development in Texas," W. L. Trock, Texas A&M University, March 1971.

123. "A Study of the Effects of Institutions on The Distribution and Use of Water for Irrigation in the

- Lower Rio Grande Basin," R. M. Gray, of Kentucky, June 1971.
- W. L. Trock, Texas A&M University, March 1971.
124. "Effect of Low-Flow Hydrologic Regimes on Water Quality Management," J. K. Sherwani, University of North Carolina, North Carolina State University, March 1971.
125. "Household Decision Processes in the Purchase and Use of Reservoir Recreation Land," R. J. Burby, III, University of North Carolina, North Carolina State University, March 1971.
126. "A Model for Simulating Residential Development in Reservoir Recreation Areas," R. J. Burby, III, T. G. Donnelly, S. F. Weiss, University of North Carolina, North Carolina State University, May 1971.
127. "Precipitation of Phosphates from Water with Ferrous Salts," K. Svanks, Ohio State University, 1971.
128. "The Influence of Suspended Microscopic Substances on the Metabolic Activities of Microorganisms Responsible for Biological Enrichment of Water," R. M. Pfister, Ohio State University, 1971.
129. "A Study of Biological Communities in the Scioto River as Indices of Water Quality," J. H. Olive, Ohio State University, 1971.
130. "Report of the University of Kentucky Water Resources Institute For FY 1971," University of Kentucky, 1971.
131. "Economic Development of Areas Contiguous to Multipurpose Reservoirs: The Kentucky-Tennessee Experience," M. B. Hargrove, University of Kentucky, 1971.
132. "Unsteady Flow Toward Partially Penetrating Artesian Wells," Y. H. Huang, University of Kentucky, June 1971.
133. "Measuring the Intangible Values of Natural Streams, Part I - Application of the Uniqueness Concept," J. A. Dearing, G. M. Woolwine, University of Kentucky, 1971.
134. "Summary of Research in Engineering and Water Resources (Completed and in Progress) 1969 - 1970," Louisiana State University, 1971.
135. "Missouri River Navigation Channel - Velocity Trends," U.S. Army Engineer District, Omaha, June 1971.
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NEWSLETTER ITEMS

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