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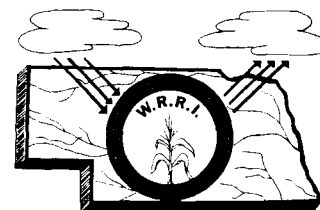
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WATER RESOURCES NEWS

NEBRASKA WATER RESOURCES RESEARCH INSTITUTE
212 AGRICULTURAL ENGINEERING BUILDING

THE UNIVERSITY OF NEBRASKA
LINCOLN, NEBRASKA 68503



Volume 4 Number 10

December 1972

FROM THE DESK OF THE DIRECTOR . . .

Once again during the spring 1973 semester the Nebraska Water Resources Research Institute will sponsor an Interdisciplinary Water Resources Seminar. These seminars have been held for the past five years and have proved quite successful. An average attendance level of 50 certifies the high level of interdepartmental interest. The intent of the seminars is to provide a forum where undergraduate and graduate students, professional persons, faculty and others can focus on timely issues related to water resources.

Seminar themes in the past have included the environmental impact of water resources development, irrigation in the Sandhills, water quality control techniques, and the political, social, legal, economic and technical impact of large impoundments. The 1973 seminar is entitled "Regional Planning for Natural Resources with Special Emphasis on the Missouri River Basin." It will be held in Room 206 Agricultural Engineering Building at 4:00 p.m. on Monday afternoons beginning January 22nd.

Topics to be discussed include: Historical perspective of the Missouri River Basin; regional planning concept; basin resources - land, water, minerals and gas; economic analyses and projections; energy requirements and potential; environmental considerations in planning; special problems of Nebraska - an overview; Platte Level B Study; Omaha river front development; regional data collection and monitoring; and comprehensive planning models.

Speakers this year will include representatives of the Missouri River Basin Commission, state and federal agency personnel and university faculty. Several guest speakers external to Nebraska will also participate. To receive credit, students should enroll under their departmental seminar number.

A complete listing of Seminar dates, topics and speakers follows on the next two pages. For further information, contact the Director, Nebraska Water Resources Research Institute, 472-3307.

SPRING WATER RESOURCES SEMINAR - 1973

Regional Planning for Natural Resources
with Special Emphasis on the Missouri River Basin

4:00 Mondays - 206 Ag. Engineering Building

<u>Date</u>	<u>Topic</u>	<u>Speaker</u>
January 22	Regional Planning Concept- Missouri River Basin Commission	Edgar A. Imhoff, Director Planning & Technical Services Missouri River Basin Comm.
January 29	Historical Perspective of the Missouri River Basin	Joseph W. Grimes, Chief Engr. Water Resources Commission Pierre, South Dakota
February 5	Basin Resources - Land	Keith F. Myers State Conservationist Soil Conservation Service
February 12	Basin Resources - Water	Gus J. Karabotsos, Chief Planning Division U.S. Army Corps of Engineers
February 19	Basin Resources - Minerals and Gas	Marvin P. Carlson Assistant Director Conservation & Survey Division
February 26	Economic Analyses & Projections	Daniel G. Piper Agriculture Economist Economic Research Service
March 5	Energy Requirements & Potential	John E. Lagerstrom, Chairman Dept. of Electrical Engineering University of Nebraska
March 12	Environmental Considerations in Planning	Steven H. Hanke, Dept. of Geography & Environmental Engr. Johns Hopkins University
March 19	Special Problems of Nebraska - An Overview	Dayle E. Williamson Executive Secretary Nebr. Natural Resources Comm.
April 2	Platte Level B Study	Carroll M. Hamon, Director Platte Level B Study Missouri River Basin Comm.

<u>Date</u>	<u>Topic</u>	<u>Speaker</u>
April 9	Omaha River Front Development	Col. B. P. Pendergrass Nebr. Center for Regional Progress Council Bluffs, Iowa
April 16	Agricultural Development	Glen Vollmar, Chairman Dept. of Ag. Economics University of Nebraska
April 23	Municipal & Industrial Development	Stanley A. Matzke, Director Dept. of Economic Development State of Nebraska
April 30	Regional Data Collection and Monitoring including the Satellite Program	James V. Drew, Assoc. Dean for Graduate Studies & Research University of Nebraska
May 7	Comprehensive Planning Models	Ernest T. Flack, Dept. of Environmental & Civil Engr. University of Colorado

REGIONAL NEWS

SUMMER INSTITUTES ANNOUNCED AT THE UNIVERSITY OF NEBRASKA

Two one-week Summer Institutes for practicing professionals and academicians have been announced for the summer of 1973 at the University of Nebraska. The first Institute will be held from July 16-20 and will be entitled "Urban-Metropolitan Water Planning and Management." Topics to be discussed include urban hydrology, quantity and quality modeling, water supply, waste disposal, regional management of urban and industrial wastes, recycling and reuse and land disposal techniques. In addition, discussions on use of optimization techniques as tools for urban water planning and management will be included.

The second Institute will be held from July 23-27 and is entitled "Assessing the Social and Environmental Consequences of Water Resources Development." Included in this Institute will be discussions of topics such as social goals related to water resources, impact of water resources activities on quality of life aspects, the nature of ecologic systems, dynamic considerations in environmental assessments, techniques for determining environmental impact, and the multiple objective planning process.

Further information on these Institutes may be obtained by writing Dr. Warren Viessman, Jr., Director, Nebraska Water Resources Research Institute, 212 Agricultural Engineering Building, University of Nebraska, Lincoln, Nebraska 68503. Complete announcements will be available in early February including course outlines and fees.

NEBRASKA FEDERAL SEWAGE FUNDS CUT

Nebraska's federal funds for sewage treatment have been cut from an original \$18 million to \$7.4 million. The state's goal for municipal sewage plant construction (originally set for 1975) now is 1978.

James L. Higgins, Director of Environmental Control, said he has not determined how much he will request from the 1973 Legislature in terms of the state's match, though he gave an estimate of \$1.5 million. This would allow \$10 million in sewage construction in fiscal 1974.

Governor J. J. Exon stated "Although this comes as no real surprise to me, I am dismayed by the President's decision to disregard the almost unanimous Congressional approval of an additional \$3 billion for construction of sewage plants." He also said the federal government grossly underestimated Nebraska's needs partly because the state Department of Environmental Control had not been consulted in the process. He also disclosed that the federal government is using a new formula based on need rather than population. This reduced Nebraska's share of sewage construction funds from 0.75% in fiscal 1972 to 0.37% in fiscal 1973 and 1974. The estimated cost of construction in the state for fiscal 1972-73-74 is \$54 million while Nebraska's actual needs are \$113 million.

FUTURE CLOUD-SEEDING EXPERIMENTS

Dr. Archie M. Kahan, Bureau of Reclamation chief of atmospheric water resources management told the Republican Valley Conservation Association that regional cloud-seeding experimentation is foreseen in the near future.

The Bureau's "Project Skywater" originated in 1961 with a \$100,000 budget. The annual budget is now \$6.6 million and involves 49 contracts with colleges, private researchers and other governmental agencies.

The experiments have been conducted on a state basis. One such experiment took place this fall near Colby, Kansas. Dr. Kahan is hopeful the research can be broadened to a regional status.

Some observations of the experiments are as follows: under some conditions, seeding may actually reduce precipitation; the overall potential for increasing seasonal precipitation is generally 10-30 percent; the benefit-to-cost ratio is high, generally about 10 to one, and benefits of 5-20 cents an acre on pasture and \$1 to \$5 on cropland are common; hail suppression also looks promising, though comparatively little research has been conducted in this country; cloud-seeding was not responsible for the Rapid City flood disaster.

Dr. Kahan stated "We may know only 10 percent of what we need to know, but there is good reason to apply that 10 percent and not wait to know everything."

Don Thompson of McCook, RVCA President, said his organization may be interested in weather experimentation in this state at a later date. At this point, Thompson said there are no future plans.

GAO VS EPA

A report issued by the General Accounting Office stated that \$350 million spent on water pollution control research was wasted by poor management. In the report investigators concluded "a considerable portion of the grants awarded by EPA and its predecessors to demonstrate new anti-pollution projects, in fact, were used to build conventional treatment plants that had been in widespread use for many years."

EPA officials were criticized for inadequate staffing of the agency network of laboratories for antipollution research. The laboratories contained expensive equipment which was idle.

The report contends that researchers spend more time administering paperwork for outside research grants than they do in their labs.

GAO found outside research projects insufficient resulting in prolonged delays before projects were funded, inadequate surveillance of projects, and in some cases, failure to require a final report from recipients of grant funds.

An EPA spokesman stated some of the programs and policies criticized in the report were implemented before the December 1970 birth of EPA. He said there is an "honest disagreement" between EPA and GOA over "what is new and what is conventional."

WORLD'S FIRST

A 2.3 million dollar advanced waste treatment facility has been constructed on Lake Shagwa at Ely, Minnesota. The third stage plant was built by the city with 95% financing from EPA and is being managed and operated by EPA's personnel for the first three years at a cost of \$575,000 a year. The facility removes 99% of the algae-feeding phosphorus in wastewater from Ely's secondary sewage treatment plant.

The demonstration at Lake Shagwa is being conducted by the Environmental Protection Agency's research center at Corvallis, Oregon. Its purpose is to determine the feasibility of the restoration of dying lakes through extracting nutrients from the municipal wastewater.

This type of project, the only one of its kind in the world, has never been conducted before. Diversion of wastewater rather than a tertiary treatment has been the most common method used in the past.

FEDERAL HIGHLIGHTS

GUIDELINES FOR PLANNING PROJECTS AVAILABLE

The Corps of Engineers recently issued guidelines to focus special attention on social, economic and environmental effects in planning future civil works projects. Section 122 of the River and Harbors and Flood Control Act of 1970, requires that consideration be given all adverse effects of proposed projects.

In evaluating the environmental impact of any recommended project, the guidelines state that, for example, the values of a stream in its natural state or of a local community as it presently exists must be taken into account.

Copies of the guidelines may be obtained from: Public Affairs Office; Army Corps of Engineers; Washington, D.C. 20314.

BUREC REPORT NOTES SHIFT IN WATER USAGE

The 1971 annual report of the U. S. Bureau of Reclamation notes that water usage has shifted away from emphasis on irrigation to emphasis on municipal and industrial (M&I) uses. Deliveries of M&I water amounted to 650 billion gallons in 1971--an increase of 13 billion gallons. It was indicated, however, that 8,130 billion gallons of water from Burec projects continued to be used for irrigation purposes.

Reclamation Commissioner Ellis L. Armstrong said: "The continuing and accelerating change from a rural to an urban economy, with a shift in federal programs and funding toward urban renewal and similar social objectives, requires a new emphasis in reclamation on meeting projected needs for municipal and industrial water. Meeting those needs now has highest priority in the Bureau."

The Bureau of Reclamation's program has recently been criticized because of its subsidization of farm production while subsidies are simultaneously being paid to reduce production. Burec's critics range from Ralph Nader in his report "Damming the West" to the National Water Commission's draft report on its \$5 million study of the nation's water needs. The shift in water usage emphasis by the Bureau provides some defense against these continuing attacks.

Burec's 1971 annual report reveals that crops with a record value of \$2.1 billion were produced on lands irrigated by federal projects. This is an increase of \$242.3 million over 1970. The report also indicates that Burec water was delivered to 10.6 million acres--another record in 1971 and an increase of 362,000 acres over 1970. The federal investment in reclamation projects was \$5.5 billion as of June 30, 1971, and approximately 90 percent of the investment is considered to be reimbursable to the Treasury.

Copies of the Burec 1971 annual report, "Federal Reclamation Projects, Water and Land Resource Accomplishments, 1971," may be obtained from the Bureau of Reclamation, Department of the Interior, Washington, D. C. 20240.

HALL APPOINTED ACTING DIRECTOR OF OWRR

Dr. Warren A. Hall has been appointed Acting Director for the Department of the Interior's Office of Water Resource Research (OWRR). He joins the OWRR staff from the position of Professor of Engineering at the University of California, Riverside. While at the University, Dr. Hall occupied various professorial positions and served for several years in the posts of Director of the Drylands Research Institute and Director of the University's Water Research Center.

Dr. Hall spent the period from September 1969 to December 1970 in Washington, D.C., as Technical Assistant to the Director, Office of Science and Technology, Office of the President and, at the same time, served as Chairman of the Committee on Water Resources Research of the Federal Council for Science and Technology with responsibility for the broad coordination and review of all federal water resources research programs.

During his career, Dr. Hall has served in several elective and appointive positions. In 1966-1968, he served as Chairman of the Universities Council on Water Resources, and during 1964-1967 as Chairman of the Western Interstate Water Conference. He also served on the Committee on Technology and Water, National Academy of Sciences; and the U. S. National Committee on the International Hydrological Decade (IHD) including service as Chairman of IHD's Subcommittee on Education and Training, member of the IHD Steering Committee, as well as a member of the U. S. IHD Delegation of Coordinating Council.

WATER RESOURCES COUNCIL RELEASES "Summary/Analysis"

A 320-page report entitled "Summary/Analysis" released recently by the U. S. Water Resources Council, summarizes the proposed "Principles and Standards for Planning Water and Related Land Resources."

W. Don Maughan, Director of the Water Resources Council, said "the purpose of the review period was to obtain the broadest possible coverage of the public's views on the Council's proposals, including an accompanying Draft Environmental Statement. The proposed Principles and Standards are for Federal activities in water and related land resources and, when implemented, will be of major importance in determining the course of these activities for a number of years to come. Because of their far-reaching significance, the Water Resources Council believes that it has been extremely important to seek, and to carefully consider, the reactions of the interested public before the Council submits its formal recommendations to the President for approval."

Copies of the report may be obtained by writing Superintendent of Documents; Government Printing Office; Washington, D.C. 20240 at a cost of \$2.75.

WASTE STORAGE UNDERGROUND

Dr. V. E. McKelvey of the Geological Survey noted that some 125,000 cubic miles of underground space in the United States could provide an additional source of waste storage. This underground space, in the form of pores, fractures, and artificial space created by tunneling, is a highly valuable resource which was hardly recognized until recently.

The use of underground caverns for waste storage is receiving more attention because of growing concern over discharge of wastes into surface waters.

NATIONAL RESOURCE AND LAND INFORMATION PROGRAM URGED

According to an official of the U.S. Geological Survey, time, economy and pressing environmental issues call for a fully coordinated and integrated national resource and land information program.

William A. Radlinski, Associate Director, USGS, revealed plans for a newly-established Interior Department Resource and Land Information (RALI) Program. "Such a program," Radlinski said, "would analyze objectively the alternatives in land use, and evaluate the trade-offs between resource development and environmental conservation."

The RALI Program would provide a national information system network using existing data acquisition capability that not only includes conventional techniques, but also sophisticated remote-sensing from aircraft and satellites. The system would also include interpretation, analysis, and a translation program to produce products that are directly applicable by the user to a particular problem.

Radlinski said that the RALI Program would operate within a functional framework of a national center, several regional centers, and a multitude of local centers. "This would permit a high degree of interaction with users at the state and local level, as well as with federal agencies," he explained, "and facilitates both the collection and dissemination of data and related analytical services, and provide for the monitoring of data uses required for an efficient systems management."

The USGS official said that the system would eventually produce for a variety of users, "finished" or "raw" information in a wide range of reports, maps, computer tapes and tabular data, providing information on such problems as topography, vegetation, wildlife, land use, soils, surface geology and lithology, surface and subsurface hydrology, water quality, esthetic-recreational potential, mineral resources, population density, resource use, flood plains, hazard areas, and sensitive ecosystems.

"The RALI Program," Radlinski emphasized, "would be greatly facilitated under a Department of Natural Resources." (One of the new Departments proposed in President Nixon's plan to reorganize the federal government).

"With the Interior Department as a nucleus," he explained, "the new department would bring together under a single wing most of the agencies now dealing with the multiplicity of earth resources, land use, and environmental problems, functions, and responsibilities."

RESEARCH REVIEW

PROJECT: "Seasonal Water Use of Irrigated Pasture Grasses Under Permanent-Set Irrigation"

PRINCIPAL INVESTIGATOR: Dr. James T. Nichols

In Nebraska and many other areas of the west, quantities of water needed for irrigation far surpass those used in all other forms of human activity. As a result, it is highly important that we understand more about the quantities of water needed and their time distribution for various purposes.

Irrigated pastures are becoming important means of forage production for livestock in the Great Plains. Significant areas of rolling topography and sandy soils are being developed for these purposes. The demand on water resources is increasing as a result, and it is now more important than ever to understand peak and seasonal water requirements and to develop information which can be used to design efficient irrigation schedules and releases.

The objectives of this project are: (1) to determine the water use of grasses under irrigation, (a) consumptive water use and distribution of use within the season, (b) water extraction pattern within the soil profile; and (2) to relate water use to the climatic factors of temperature, humidity, wind and solar radiation.

Objective 1: Each grass will be watered independently to maintain near optimum soil water conditions. Soil water will be monitored with a neutron probe to a 6-foot depth. Sampling will be periodic (approximately 3-day intervals) and from this information the amount of water needed to bring the soil to near field capacity will be calculated and applied. Gravimetric sampling of the surface-foot of soil will be used to supplement data from the neutron probe. Pillow-type lysimeters will be installed for determination of daily evapotranspiration and to supplement neutron-probe data. Determination of the amount of soil water throughout the soil profile after irrigation and prior to re-irrigating will provide data on the water extraction pattern during a specified time. This will indicate at what depth grasses utilize a major portion of the soil water.

Objective 2: Environmental factors of temperature, humidity, wind and solar radiation will be monitored with appropriate equipment and correlated to consumptive water use as determined by methods described under Objective 1. This will permit an evaluation of the effect of different climatic factors on evapotranspiration and also allow interpolation of the water use data to other areas where climatic parameters are available.

PUBLICATIONS RECEIVED

1. "Development of Method for NTA Analysis in Raw Water," J.K. Taylor, W.L. Zielinski, Jr., E.J. Maienthal, R.A. Durst, R.W. Burke, National Bureau of Standards for EPA, September 1972.
2. "The Swirl Concentrator as a Combined Sewer Overflow Regulator Facility," R. Field, Edison Water Quality Research Division for EPA, September 1972.
3. "Evaluation of Canal Lining for Salinity Control in Grand Valley," Dr. J.P. Law, Jr., Water Resources Center, EPA, October 1972.
4. "Projects of the Municipal Technology Branch Through June 1972," W.A. Rosenkranz, U.S. Environmental Protection Agency, September 1972.
5. "Concept Evaluation: Recovery of Floating Oil Using Polyurethane Foam Sorbent," C.H. Henager, J.D. Smith, Edison Water Quality Research Division, for EPA, September 1972.
6. "A Catalog of Hydroclimatological Data for Alaska's Coastal Zone," R.F. Carlson, Institute of Water Resources, University of Alaska, G. Weller, University of Alaska, May 1972.
7. "Water Resources Bulletin, Vol. 8 No. 5," October 1972.
8. "Economic Analysis of Optional Water Quality Management," A.B. Whinston, Purdue University, June 1972.
9. "Eighth Annual Report: Massachusetts," Fiscal Year 1972.
10. "An Improved Temperature Prediction Model for Small Streams," G.W. Brown, Oregon State University, October 1972.
11. "Proceedings of the Seventy-Ninth Annual Convention," Nebraska State Irrigation Association, Nebraska Water Resources Association, Omaha, Nebraska, October 20-22, 1971.
12. "Characteristics of Rainfall Runoff from a Beef Cattle Feedlot," R.D. Kreis, M.R. Scalf, J.F. McNabb, Robert S. Kerr, Water Research Center for EPA, September 1972.
13. "Cultural Benefits from Metropolitan River Recreation - San Antonio Prototype," C.A. Gunn, D.J. Reed, R.E. Couch, Texas A&M University, June, 1972.
14. "Air Modulated Vacuum Oil Recovery Collection of Spilled Oil (Foams)," C. Risley, for EPA, August 1972.
15. "Control of Mercury Pollution in Sediments," Dr. C.C. Harlin, Jr., for EPA, September, 1972.

16. "Agricultural and Water Policies and the Environment," E.O. Heady, H.C. Madsen, K.J. Nicol, S.H. Hargrove, Iowa State University, June, 1972.
17. "Identification of Polychlorinated Biphenyls in the Presence of DDT-Type Compounds," D.G. Ballinger, for EPA, October 1972.
18. "Research Needs for Irrigation Return Flow Quality Control," G.V. Skogerboe, J.P. Law, Jr., Robert S. Kerr Water Research Center, for EPA, November, 1971.
19. "Water Quality Management Problems in Arid Regions," J.P. Law, Jr. J.L. Witherow, Robert S. Kerr Water Research Center, for EPA, October 1970.
20. "National Irrigation Return Flow Research and Development Program," J.P. Law, Jr., Robert S. Kerr Water Research Center, for EPA, December 1971.
21. "Water and Land Resource Accomplishments, 1971," Federal Reclamation Projects, U.S. Dept. of the Interior.
22. "Water and Land Resource Accomplishments, 1971," Federal Reclamation Projects, U.S. Dept. of the Interior.
23. "Research Reports," Office of Water Resources Research, U.S. Dept. of the Interior, July-September, 1972.
24. "Desalination of Agricultural Tile Drainage," Robert S. Kerr Water Research Center, May 1971.
25. "Future Alternatives Affecting the Agricultural Demand for Water and Land: The Effects of Soy Protein Meats Nitrogen Fertilizer Restrictions on Future Water and Land Use," H.C. Madsen, E.O. Heady, S.H. Hargrove, K.J. Nichol, June, 1972.
26. "Denitrification by Anaerobic Filters and Ponds, Phase II," Study Conducted by Robert S. Kerr Water Research Center, June, 1971.
27. "The Effects of Agricultural Waste Water Treatment on Algal Bioassay Response," By EPA, August, 1971.
28. "Annual Report 71 Agassiz Center for Water Studies," University of Manitoba.
29. "Storage and Treatment of Combined Sewer Overflows," C.C. Oster, for EPA, October 1972.

30. "Control of Mercury Contamination in Freshwater Sediments," G. Feick, E.E. Johanson, D.S. Yeaple, for EPA, October, 1972.
31. "The Role of Sludge Worms in Eutrophication," R.O. Brinkhurst, for EPA, August, 1972.
32. "Controlling Thermal Pollution in Small Streams," G.W. Brown, J.R. Brazier, for EPA, October, 1972.
33. "Characterization of Stream Reaeration Capacity," E.C. Tsivoglou, J.R. Wallace for EPA, October, 1972.
34. "Liquid Chromatography of Carbamate Pesticides," A.D. Thruston, Jr., Southeast Environmental Research Laboratory for EPA, October, 1972.
35. "Research Report No. 36: An Evaluation of Relationships Between Streamflow Patterns and Watershed Characteristics Through the Use of Opset; A Self Calibrating Version of the Stanford Watershed Model," L.D. James, University of Kentucky, 1970.
36. "Research Report No. 58, Transport Processes of Particles in Dilute Suspensions in Turbulent Water Flow--Phase II," B.G. Jones, C.C. Meek, N. Howard, K. Salehi, P.R. Meka, University of Illinois, September 1972.
37. "Research Report No. 57, Microbial Modifications of Ground-Water," R.P. Gunsalus, J.G. Zeikus, R.S. Wolfe, University of Illinois, August 1972.
38. "Research Report No. 59, Physico-Chemical Limnology and Periphyton in a Warm-Water Stream Receiving Wastewater Treatment Plant Effluent," A.R. Brigham, R. Weldon Larimore, University of Illinois, September 1972.
39. "Research Report No. 60, Relationship of Plant Moisture Status to Irrigation Need in Corn and Soybean Crops," J.S. Boyer, University of Illinois, July, 1972.
40. "A free Floating Endless Belt Oil Skimmer," R.W. Agnew, for EPA, August 1972.
41. "Legal Aspects of Water Pollution in New Jersey and Pennsylvania," A Bibliography, U.S. Dept. of the Interior, Office of Water Resources Research, 1972, November.
42. "Handbook on the Principles of Hydrology," D.M. Gary, 1970.
43. "Quality of Surface Waters of the United States, 1967," Parts 9-11, Geological Survey Water-Supply Paper, 1972.

44. "Water Resources Review for Streamflow and Groundwater Conditions, U.S. Dept. of the Interior, Geological Survey, November, 1972.
45. "Lake Property Sanitary Surveys," J.A. Kusler, R. Owen, An Inland Lake Renewal and Shoreland Management Demonstration Project Report, 1972.
46. "Lake Deepening by Sediment Consolidation--Jyme Lake," S.A. Smith, J.O. Peterson, S.A. Nichols, S.M. Born, An Inland Renewal and Shoreland Management Demonstration Project Report, 1972.
47. "Research Report No. 35: The Stanford Watershed Model; The Correlation of Parameter Values Selected by a Computerized Procedure with Measurable Physical Characteristics of the Watershed," G.A. Ross, 1970, University of Kentucky.
48. "Expro 73, A Listing of Extramural Projects to be Funded in Fiscal Year 1973, U.S. Environmental Protection Agency, October, 1972.
49. "Research Report No. 34: Opset Program for Computerized Selection of Watershed Parameter Values for the Stanford Watershed Model," E. Yuan-Shang Liou, 1970, University of Kentucky.
50. "Water Quality Management Decisions in Colorado," S.R. Nichols, G.V. Skogerboe, R.C. Ward, Colorado State University, June, 1972.
51. "Historical, Political, and Social Factors Affecting Public Policy on River Diversion: Out-of-Basin Diversion of Connecticut River Flood Waters to the Boston Metropolitan Area," E.R. Kaynor, University of Massachusetts at Amherst, 1972.
52. "Diffusivity of Oxygen in Electrolyte Solutions," G.W. Hung, R.H. Dinius, Auburn University, October, 1972.
53. "Quality of Surface Waters of the United States, 1967," Parts 12-16, North Pacific Slope Basins, Alaska, and Hawaii and other Pacific Areas," Geological Survey Water-Supply Paper, 1972.
54. "Hydrological Aspects of Saline Water Resources," Unesco, A provisional annotated bibliography, Paris, 1972.
55. "Curricula and Syllabi in Hydrology," Unesco, Paris, 1972.
56. "Water Service Prices: A Principal Component and Regression Analysis of Determinants," P.C. Mann, West Virginia University, November, 1972.
57. "Institutions for Urban-Metropolitan Water Management: Essays in Social Theory," N. Wengert, Colorado State University, November, 1972.

58. "Analysis of the Regulation, Organization and Operations of a Regional Water Management Institution Founded in 1846," Harbridge House, Inc., November, 1972.
59. "The Discharge of Submerged Buoyant Jets into Water of Finite Depth," R.F. Robideau, General Dynamics Company, November, 1972.
60. "Urban-Metropolitan Institutions for Water Planning, Development, and Management: An Analysis of Usages of the Term "Institutions" by N. Wengert, Colorado State University, September, 1972.
61. "Searching the Social Science Literature on Water: A Guide to Selected Information Storage and Retrieval Systems - Preliminary Version," F. Hogge, N. Wengert, Colorado State University, September, 1972.
62. "Watersheds in Transition," F.J. Dragoun, J.A. Robertson, R.D. Dirmeyer, Colorado State University, 1972.
63. "Selection of Test Variable for Minimal Time Detection of Basin Response to Natural or Induced Changes," Dr. H.J. Morel-Seytoux, Colorado State University, December, 1972.
64. "The Ohio State University Version of the Stanford Streamflow Simulation Model: Part I - Technical Aspects," V.T. Ricca, Ohio State University, May, 1972.
65. "The Ohio State University Version of the Stanford Streamflow Simulation Model: Part II - The Computer Program," V.T. Ricca, Ohio State University, August, 1972.
66. "The Ohio State University Version of the Stanford Streamflow Simulation Model: Part III - User's Manual," V.T. Ricca, Ohio State University, August, 1972.

HAPPY NEW YEAR!

INQUIRIES

Newsletter items and inquiries should be sent to: Dr. Warren Viessman, Jr., Director, Nebraska Water Resources Research Institute, 212 Agricultural Engineering Building, East Campus, Lincoln, Nebraska, 68503, (402) 472-3307.