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WATER RESOURCES NEWS

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THE UNIVERSITY OF NEBRASKA
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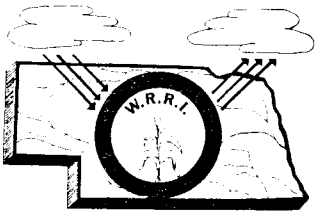

Volume 5 Number 6 June 1973

FROM THE DESK OF THE DIRECTOR . . .

In the May issue of the NWRRI Newsletter, a summary of findings of a state workshop to identify critical research needs was included. In this issue a brief discussion of a regional analysis by university and state and federal personnel in the Missouri River Basin is presented.

The findings of both workshops were mutually reinforcing in terms of important issues identified. These included:

(1) Efficiency of Water Use;

(2) Nonpoint Source Pollution;

(3) Meeting Water Requirements;

(4) Energy-Water Relationships;

(5) Maintenance of Environmental Quality; and

(6) Conjunctive Management of Ground and Surface Water Systems.

These are areas in which substantial research input must be generated to permit effective implementation of alternatives for solving contemporary problems.

The Nebraska Institute plans to rely heavily upon analyses such as these in identifying priorities for research funding beginning in fiscal year 1974. Investigators should carefully review their interests to determine if projects now being conceived can be directed towards one or more of the problem areas identified as critical. Since the selection of projects for funding will be based in part on priority of the research needs, investigators should review their interests with the Institute Director to assure productive research and minimal rejection of projects on the grounds of low priority.

INSTITUTE ACTIVITIES

Deadlines for Research Proposals

The deadlines for filing research proposals with the Water Resources Research Institute have now been established. Matching Grant proposals must be received not later than September 15, 1973 and Allotment proposals not later than December 15, 1973.

Prospective principal investigators should make an appointment to discuss their proposals with the Institute Director before they begin writing.

For further information, contact: Dr. Warren Viessman, Jr., Director, Water Resources Research Institute, University of Nebraska, 472-3307.

Dr. Stanton Ware Visits

Dr. Stanton J. Ware, Staff Scientist of the Office of Water Resources Research, visited the Nebraska Institute June 25-29. The purpose of Dr. Ware's visit was to review the Nebraska program. Meetings were scheduled with principal investigators to discuss research in progress and results to date. Dr. Ware also met with the Institute Executive Committee and prospective researchers to discuss OWRR's research goals and answer pertinent questions.

On June 28-29, Dr. Ware, Chancellor Zumberge and eight other University faculty members toured the Central Nebraska Public Power and Irrigation District. This Tri-County tour was arranged by the Institute Director and provided an excellent opportunity to observe a variety of practices and problems related to Nebraska's irrigation development.

Regional Research Workshop

On June 11-12, the Nebraska Water Resources Research Institute sponsored a regional research workshop. The objective was to identify critical problems of the Missouri River Basin, analyze these and determine research needed for cost-effective problem solutions. The workshop was attended by Institute Directors from eight Missouri River Basin states as well as representatives from state and federal agencies in this region.

The workshop identified 23 problems in the Basin and selected three of these to be analyzed for research needs. The highest priorities were assigned to:

(1) Water Planning, Management and Allocation

- Physical Availability of Water

Definition: Inadequate base for decision-making in water resource development.

(2) Water Pollution and Water Quality Control

- Nonpoint Source Pollution

Definition: Degradation of water quality from nonpoint source pollution.

(3) Water Use Efficiency

Definition: Minimize water use per unit output.

Each Institute Director in the Missouri Basin will review the material developed by the workshop and circulate it to selected state personnel for review and additional input. A final report will then be compiled as a summary of the problem analysis format, research needs identification, etc. It is hoped that this exercise will benefit each state in developing its research program to impact on problems of regional importance.

REGIONAL NEWS

Summer Institutes at the University of Nebraska

Two one-week Summer Institutes for practicing professionals and academicians will be presented at the University of Nebraska. Institute I, entitled "Planning and Management of Urban-Metropolitan Water Systems" will be held from July 15-20, 1973. The objective of this course is to present state-of-the-art technology for planning and managing urban-metropolitan water resources systems. Case studies will be used to illustrate application of new techniques.

Institute II, entitled "Multiple Objective Water Resources Planning Techniques" will be held from July 22-27, 1973. The objective of this course is to acquaint participants with state-of-the-art techniques for evaluating social, environmental and

economic objectives. Case studies will be used to illustrate the multi-objective planning process.

Special rates will be available for a limited number of academic personnel. These will be assigned on a first-come, first-served basis.

For further information, contact: Dr. Warren Viessman, Jr., Director, Water Resources Research Institute, 212 Agricultural Engineering Bldg., University of Nebraska, East Campus, Lincoln, Nebraska 68503.

Seminar Proceedings Available

Proceedings of the 1973 Interdisciplinary Water Resources Seminar entitled, "Regional Planning for Natural Resources with Special Emphasis on the Missouri River Basin," are now available.

The seminar was sponsored by the Nebraska Water Resources Research Institute. All papers presented at the seminar are included in the Proceedings.

Copies may be obtained by contacting: Dr. Warren Viessman, Jr. Director, Nebraska Water Resources Research Institute, University of Nebraska East Campus, 212 Ag. Engineering, Lincoln, Nebraska 68503, or phone 402-472-3307.

Nitrogen in Nebraska's Environment

A conference proceedings on "Nitrogen in Nebraska's Environment" is now available. It presents an excellent overview of the nitrogen situation and problems from the viewpoint of several disciplines. The price is $2.00 per copy, and a check may be sent to the Agricultural Engineering Department, University of Nebraska, Lincoln, Nebraska 68503. For further information, write to Deon D. Axthelm, Water Resources Specialist, at the above address.

Papers include discussions of nitrogen needs and effects on human and animal health. The topic of nitrogen sources and removal includes a "state-of-the-art" discussion on removal of domestic water supplies. The Proceedings also includes papers on industrial and feedlot activities. Investigations and reports of findings regarding city water supplies, irrigation and feedlots, and specific studies of a county survey and soil and water nitrogen content in Nebraska are given.

FEDERAL HIGHLIGHTS

National Water Commission Report Issued

Major overhaul of the Nation's water policies and programs is recommended in the final report of the National Water Commission. The 570-page report of the seven-man Commission contains 232 specific recommendations for improving future water resources policies to adapt them to future needs.

The need to protect the environment by coordinating land use and water planning functions is emphasized in the report, which also calls for greater reliance on state and local governments and non-government groups to implement water development programs and improve water quality, better data collection and R&D programs, modifications of laws and institutions that regulate present policies, more economy and efficiency in the use of water and conservation of energy which affects water use.

A major thrust of the report indicates that there is enough water to meet essential needs, but not enough to waste, and that water is no different from any other natural resource except that it is more essential than many others. Water should, therefore, be considered as an economic resource, and the Commission believes all users receiving an economic return from water should pay full costs of services.

Seven basic themes pervade the 17 chapters of the report and provide a foundation for conclusions and recommendations reached by the Commission:

(1) The demands for water in the future are not predetermined, but depend largely on policy decisions that can be controlled by society.

(2) Future water programs should shift emphasis from water development to preservation and enhancement of water quality.

(3) Planning for water development must be linked to planning for water quality and coordinated with land use planning.

(4) More efficient use of water in agriculture, industry and for domestic and municipal purposes is essential to reduce waste.

(5) Sound economic principles must be adopted to encourage better use of water resources. The Commission considers willingness to pay to be the most reliable economic indicator of proper water

use, if it is coordinated with government regulation of environmental protection.

(6) Updated laws and legal institutions are needed if future water policies are to be successfully implemented.

(7) Development, management and protection of water resources should be controlled by the level of government (federal, state, local or regional) that is closest to specific problems and capable of fairly representing all interests involved.

Copies of the Commission report, "Water Policies for the Future," are on sale by the Superintendent of Documents, U. S. Government Printing Office, and cost $9.30 if mailed or $8.75 at the GPA bookstores.

Water Pollution Control Research Fellowships

The Environmental Protection Agency has announced a program of research fellowships in water pollution control to provide opportunity for specialized study at the predoctoral and post-doctoral levels. Applicants at the predoctoral level must have completed one year of graduate study. Grants will pay cost of tuition and research requirements plus an allowance for living expenses and dependents. The deadlines for application are July 1 and November 1.

Further information and forms are available from: Grants Administration Division, Environmental Protection Agency, Washington, D.C. 20460.

State Environmental Center Measure Revived

Legislative Bill S. 1865, which would create state environmental centers at educational institutions within each state and grant them up to $500,000 by fiscal year 1976, has been revived by Senator Henry Bellmon, R-Utah. The objectives of the state environmental centers would be to: (1) plan and implement research, investigations and experiments relating to the study of environmental pollution, natural resource management and other local, state and regional environmental problems; (2) train environmental professionals; (3) establish, operate and maintain a comprehensive environmental education program; (4) disseminate useful and practical information on subjects relating to the protection and enhancement of the nation's environment; and (5) coordinate efforts in the several areas required to achieve the purposes and objectives of the bill. This bill is patterned after legislation creating water resoruces research institutes in each state and territory.

H.R. 5464 Approved by House

The House Interior Committee has approved a $15.8 million budget for F.Y. 1974 for the Office of Saline Water. This is substantially above the $9.2 million proposed by President Nixon.

Representative Craig Hosmer, R-Calif., who tried unsuccessfully to block the bill (H.R. 5464), said government support of many desalting research and development programs was no longer needed because private industry was now sufficiently advanced to move ahead without the protection of a "bureaucratic umbrella." Continued funding was urged, however, by Representatives Harold T. "Bizz" Johnson, D-Calif., Sam Steiger, R-Arizona, and John Dellenback, R-Oregon.

CONFERENCES

Conference on Energy and Water Resources

The University of Nebraska Water Resources Research Institute will host a two-day conference on all aspects of energy-water relationships in October, 1973. Issues such as water use and development with decreased energy requirements as well as water needs in energy production will be explored. Research needs and priorities will be emphasized. For further information, contact: Dr. Warren Viessman, Jr., Director, Water Resources Research Institute, 212 Agricultural Engineering Bldg., University of Nebraska-East Campus, Lincoln, Nebraska 68503.

Underground Waste Management and Artificial Recharge

A short course entitled "Symposium on Underground Waste Management and Artificial Recharge" will be held in New Orleans from September 25-28, 1973. The one-week seminar is co-sponsored by the American Association of Petroleum, the U. S. Geological Survey, and the International Association of Hydrologic Sciences.

The symposium will be exposed to the latest thinking of government, industry, and academia--both foreign and domestic--on the state-of-the-arts of injecting wastes underground and of artificially recharging underground reservoirs.

For further information, write: UWM II SYMPOSIUM, P. O. Box 979, Tulsa, Oklahoma 74101.

Rural Environmental Engineering: Water Pollution Control in Low Density Areas

A conference focusing on water supply and water polluton control in rural areas will be held in Sugarbush Inn, Warren, Vermont, on September 26-28, 1973. Co-sponsored by the University of Vermont Water Resources Research Center and the University of Maine Land and Water Resources Center, the conference objectives are to define the problems of pollution control in rural areas as well as provide an insight into new solutions involving environmental engineering. Some of the general conference topic areas in which papers are requested are:

(1) Untreated wastewater discharge effects

(2) Septic tank usage and effects

(3) Groundwater pollution

(4) Rural water supply problems

(5) Nonpoint pollution sources

(6) Low-cost wastewater treatment facilities for rural areas.

For further information and abstract submission forms, contact Dr. William J. Jewell; Department of Civil Engineering; University of Vermont; Burlington, Vermont 05401.

RESEARCH REVIEW

Project Title: Dynamic Model for Urban Hydrologic Systems

Principal Investigator: Alvin J. Surkan, Associate Professor, Department of Computer Science, UNL

HYDRA: A Distributed Hydrologic Network (Modeling Package Implemented in Fortran)

A significant package of computer programs for hydrologic modeling has been completed by an innovative computer applications group of the Department of Computer Science at the University of Nebraska at Lincoln. The research has been done over the past two years with the support of OWRR matching grant B-016-NEB received through the Nebraska Water Resources Research Institute

and from other Institute funds. The package written in FORTRAN is designed to model storm hydrographs or continuous streamflow in hydrologic channel networks. The main programs and supporting systems of subroutines, called HYDRA, are implemented in a sufficiently general form for useful application in modeling either the natural networks of watersheds and river basins or the man-made channel systems of storm sewers or irrigation ditches.

HYDRA consists of three main sets of programs. The first set accepts numerically coded channel geometry used in modeling the network, then directs a plotter to graph the segments joining the nodes, and finally constructs within the computer a set of circularly-linked lists which facilitate program manipulation of networks. The second set of programs provides options for converting raw data on relative lengths and areas between network nodes to absolute values in standard units for area and travel time.

The third set of programs embodies the simulator of storm event runoff and streamflow modeling. Results obtained from the first two are used as input to this set of programs. These lead to simulated flow versus time functions for either the hydrograph of a single event or the continuous streamflow at any selected point of interest on the channel network.

The algorithms for simulating the hydrologic behavior of spatially distributed networks have been applied to urban storm sewer systems. In particular the program package has been partially tested by encoding the network geometry of storm sewer networks from both Lincoln, Nebraska and Baltimore, Maryland and comparing the shapes of the predicted and observed storm runoff curves.

Effective techniques for preparing map-measurable data on the network geometry have been developed. The programs have been designed to introduce these data as coordinates of unordered network segments and relative values for lengths and areas. Tests for improper data and graphical display of the network nodes allow the package to help the user ensure that the network entered into the computer is correct. The program package has three main components for the functions of: (1) network entry; (2) optionally calculating segment and total travel times; and (3) simulating storm and streamflow hydrographs.

One method for ascertaining the correctness of the simulator has been the demonstration of the equivalence of the hydrographs generated for a moving constant storm and for a

stationary intensity-modulated storm of the appropriate duration. Also the results of testing the runoff prediction for an urban watershed in Baltimore have shown exceedingly good agreement between simulated and predicted hydrographs.

The HYDRA simulation package is versatile, economical of computer resources and can accomodate networks described with the details of many thousands of stream segments.

PUBLICATIONS

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2. Hurrican Agnes Environmental and Ecological Impact: Summary Report, U.S. Army Corps of Engineers, May 1973.

3. The Effects of Waste Discharges from Radford Army Ammunition Plant on the Biota of the New River, Virginia, Bulletin 57, J. Cairns, Jr., K. L. Dickson, Virginia Polytechnic Institute, April 1973.

4. Environmental Effects on Toxaphene Toxicity to Selected Fishes and Crustaceans, W. R. Courtenay, Jr., M.H. Roberts, Jr., for EPA, April 1973.

5. Formation of Public Policy on Issue Out-of-Basin Diversion of Connecticut River Flood Waters to Boston Metropolitan Area, B. B. Berger, University of Massachusetts at Amherst, Publication No. 28, 1973.

6. A Formula for Dismantling the Nation's Water Resources Program, W.J. Hull, National Waterways Conference, Inc., 1973.

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8. Irrigation Efficiency, A Bibliography, Water Resources S cientific Information Center, April 1973.

9. Weather Modification: Precipitation Inducement: A Bibliography, Water Resources Scientific Information Center, March 1973.

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11. The Elkhorn River Basin of Nebraska, R. Bentall, University of Nebraska, Resource Atlas No. 1, December 1971.

12. The Economic Impact of Irrigated Agriculture on the Economy of Nebraska, T.W. Roesler, F.C. Lamphear, M. David Beveridge, University of Nebraska, September 1968.

13. National Meat-Packing Waste Management Research and Development Program, J. L. Witherow, S. C. Yin, D. M. Farmer, for EPA, March 1973.

14. Prediction Modeling for Salinity Control in Irrigation Return Flows, A.G. Hornsby, for EPA, March 1973.

15. Directory of Environmental Research Faculty, Colorado State University, December 1972.

16. An Inventory of Environmental Resources Research in Progress, Colorado State University, July 1972.

17. Adsorption of Chlorinated Hydrocarbons from Seawater by a Crosslinked Polymer, G.R. Harvey, for EPA, March 1973.

18. Annotated Bibliography of Lake Ontario Limnological and Related Studies, Vol. III Physical, J. Baldwin, R. A. Sweeney, for EPA, March 1973.

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20. Carrying Capacity Controls for Recreation Water Uses, J.A. Kusler, Inland Lake Renewal and Shoreland Management Demonstration Project Report, 1972.

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26. Fish and Food Organisms in Acid Mine Waters of Pennsylvania, R.L. Butler, E.L. Cooper, J. Crawford, D. Hales, W. Kimmel, C. Wagner, Pennsylvania State University, for EPA, February 1973.

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29. Limnology of Yellowtail Reservoir and the Bighorn River, J.C. Wright, Montana State University, R.A. Soltero, Eastern Washington State College, for EPA, February 1973.

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47. Proceedings of Conference on Disposal of Treated Municipal Effluent on Land, College of Agric., University of Missouri, March 20, 1973.

48. A Guide to Planning and Designing Effluent Irrigation Disposal Systems in Missouri, University of Missouri, College of Agric., March 1973.

49. Operations of the National Weather Service, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, October 1972.

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51. The Flood that Strikes in a Flash, Reprinted from NOAA, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, July 1972.

INQUIRES

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