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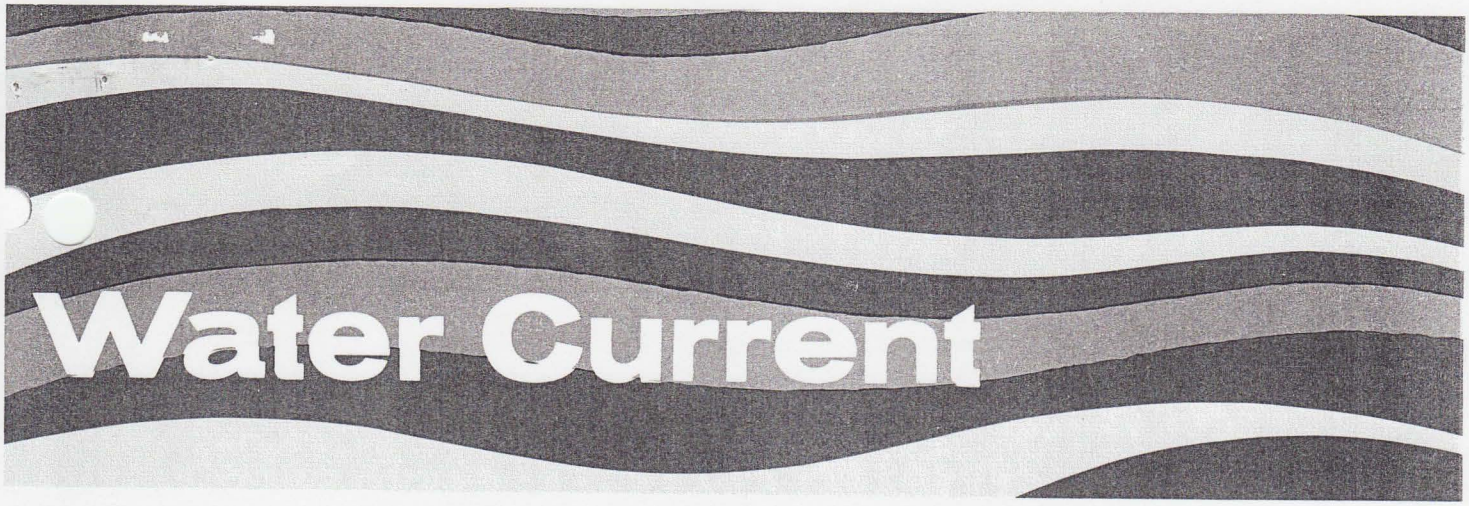

Volume 7 Number 2 February 1975

FROM THE DESK OF THE DIRECTOR . . .

The mission of the Nebraska Water Resources Research Institute (NWRRI) is to help Nebraskans solve water problems. Political, social, legal, economic, technologic and environmental issues are explored.

Since 1965, over 40 projects dealing with supply, conservation, quality, efficiency of use, legal structure, management, planning and development have been supported. Results are being used by state agencies, Natural Resources Districts, landowners, federal agencies, private firms and others.

The NWRRI has assigned a high priority to research on planning and management processes. New technologies for problem solving are needed, but the ability to evaluate a regional water budget at some future time under alternative schemes of development and management is essential if we are to succeed in preserving a viable economy, maintaining an acceptable environment and providing a meaningful future for new generations. A quantitative approach is required--one which permits answering questions about future groundwater levels, surface water availability, costs of providing water and disposing of wastes, and the best alternatives for meeting objectives.

The Nebraska watershed modeling program is developing the needed quantitative planning and management models. These computer representations of actual river basins allow: assessment of future changes under proposed or expected levels of development; selection of the best alternatives for overcoming water shortages, evaluation of proposals for allocating surface and groundwater supplies, determining economic feasibility of plans; and assessing the impact of legal and institutional structures on the future use and development of the state's water resources. Assisting the Natural Resources Commission, Natural Resources Districts and others to develop better plans for the use of Nebraska's water is the principal goal of this application-oriented program.

The research and training programs of the Institute are recognized as important components of the state water resources planning and development effort. The future holds promise of even greater service to the people of Nebraska.

I would like to thank all of the researchers, administrators and staff who have helped make the Nebraska Institute one of the finest in the nation.

NEBRASKA WATER RESOURCES RESEARCH INSTITUTE

ON THE HOMEFRONT

INSTITUTE DIRECTOR RESIGNS

Dr. Warren Viessman, Jr., Director of the Nebraska Water Resources Research Institute, has announced his resignation effective March 8, 1975. Dr. Viessman will assume a position as Senior Specialist in Engineering and Public Works at the Congressional Reference Service of the Library of Congress.

Dr. Viessman became Director of NWRRI in December of 1968. Prior to that time he was Director of the Water Resources Center at the University of Maine.

Dr. William Splinter, Chairman of the Department of Agricultural Engineering, has been named Acting Director of the Nebraska Institute.

SEARCH FOR NWRRI DIRECTOR UNDERWAY

Nominations and applications of candidates for the position of Director of the Water Resources Research Institute, University of Nebraska-Lincoln are solicited by the Search and Screening Committee. Application materials should be received by March 27 and should be transmitted to Committee Chairman R. W. Kleis, 218 Agricultural Hall, UN-L. Other members of the committee are Dr. Lucas (NP), Dr. Carlson (Cons. & Surv. Div.), Dean Hanna (Eng.), Dr. Andersen (CE), Dr. Splinter (AE), Dr. Harnsberger (Law), Dr. Swoboda (Ext.), Dr. Lavy (Agron.), Dr. Lawson (Geog.), Dr. Fischer (Ag. Ec.), Dr. Janovy (Life Sci.), Dr. Sharp (UNO) and Mr. Yomtovian (Grad. Student).

The University of Nebraska is an Equal Opportunity Employer.

NWRRI RESEARCH SEMINAR

On Thursday, March 20 the Nebraska Water Resources Research Institute will sponsor a "Research Overview" at the Nebraska Center for Continuing Education. The purpose of the seminar is to present a brief review of the current research program of the Institute. Principal investigators will make presentations on present studies in progress, accomplishments to date and future research plans. The seminar is open to the general public, state and federal agency representatives, university faculty and students and other interested persons.

Five main areas of research will be presented: (1) irrigation; (2) water quality; (3) water resources modeling; (4) energy; and (5) basic research. Time will be allotted after each presentation for questions and discussion.

For further information on the seminar, contact: Nebraska Water Resources Research Institute, 212 Agricultural Engineering Building, University of Nebraska, Lincoln, Nebraska 68503. Telephone 472-3307.

INSTITUTE PUBLICATIONS

The Water Resources Research Institute announces a new publication entitled "NWRRI - A Profile." This brochure provides information on the objectives, administration, research program and education and technology transfer programs of the Institute. It will be useful to those interested in learning what the NWRRI does, what it has accomplished, and how it has helped to solve some of Nebraska's water problems.

The Institute also has updated Publication No. 6 entitled "University of Nebraska Faculty with Competence in Water Resources." This publication provides a basis for identifying individuals with special competence and expertise for research and/or teaching in the water resources field. It is expected that this listing will be useful in the future development of both individual and interdisciplinary research project activities.

Anyone interested in obtaining a copy of these publications should contact: Nebraska Water Resources Research Institute, 212 Ag. Engineering Building, University of Nebraska, Lincoln, Nebraska 68503.

REGIONAL NEWS

MRBC WATER RESOURCES PRIORITIES SET

At the February 5-6 meeting of the Missouri River Basin Commission (MRBC), priorities were set on numerous water and related land resources activities that will be used by federal officials in financing various projects. The MRBC effort, termed prioritizing, is designed to rate various projects wanted by individual states in terms of total needs in the 10-state Missouri River Basin area. The ranking of water and land resources activities in six separate categories will be forwarded to the federal Water Resources Council, the President's Office of Management and Budget and to Congress.

Nebraska wound up with some projects high on the priority list and others relatively low. For the entire MRBC territory, Nebraska's controversial Mid-State Reclamation Project at Grand Island received a ranking of fourth for construction. Listed as fifth most important was the North Loup Project, while the controversial project to build a dam on the Niobrara above O'Neill was ranked sixth.

For implementation studies that could lead to construction, the Highland Unit irrigation project in Madison and Platte counties was ranked fourth most important in the MRBC territory. In the category of regional or river basin studies (similar to the Platte River Basin Study now under way) a proposed three-state study of the South Platte and Republican River Basins received a second most important ranking.

In proposed financing of basic data collection, MRBC ranked as most important Nebraska's desire for accelerated soil surveys of the Fort Union coal area. Ranked second most important was a Nebraska and Montana request to gather groundwater data in the Madison Formation that affects Nebraska.

The listing of land and water resources activities approved by MRBC at their February meeting was the second such effort attempted. The prioritizing effort completed in 1974 was approved by MRBC only as a trial run. However, the current listing which will be forwarded to Washington is not considered a trial run. In submitting its list of priorities, MRBC noted that the effort still needs some refinements.

FEDERAL HIGHLIGHTS

SAFE DRINKING WATER BILL SIGNED

President Ford has signed into law P.L. 93-523, the Safe Drinking Water Act. The objective is to provide for the safety of drinking water supplies throughout the United States by establishing and enforcing national standards.

The legislation will affect virtually all water supply systems in the country--both municipal and investor owned community water supplies that serve at least 15 service connections or 25 individuals.

Primary regulations were issued soon after the legislation was signed. Interim regulations are to be published by March 17, 1975, and revised interim regulations will be published by June 16, 1975 and will become effective on December 17, 1975.

The Environmental Protection Agency will conduct a two-year study of the maximum allowable contaminants in drinking water as well as the existence of contaminants that cannot be determined by present analytical techniques. The National Academy of Standards (NAS) or another scientific organization will be engaged for this study. The NAS report will be submitted to Congress by December 17, 1977 and must include a summary and evaluation of published and unpublished studies of drinking water, a statement of methods used in its research, general recommendations and criteria for operation, maintenance, siting and intake water quality. This report is to be published in the Federal Register and EPA is to provide an opportunity for comment. Within 90 days after publication, the EPA administrator shall publish the "Revised National Primary Drinking Water Regulations" which will supersede the interim regulations.

States may continue to enforce existing laws and regulations pertaining to drinking water supplies until the national interim primary regulations become effective, and thereafter if local standards are equal to or greater than federal regulations. If a state has not assumed primary responsibility, or does not exercise its authority adequately after two years from enactment of federal drinking water standards, the EPA administrator is authorized to require compliance provided adequate notice is given.

The Safe Drinking Water Act also provides for the protection of underground sources. The program would allow the EPA administrator to establish requirements to protect underground sources of drinking water within one year of the Act's passage. Regulations cannot be established which would interfere with oil or natural gas production, unless such regulations would be essential to prevent danger to underground drinking water sources.

The Act gives comprehensive authority to conduct research and studies on drinking water supplies and related problems, including health and technological and economic problems. Specific mandates for several studies are provided including a study of viruses, contamination, and a study of sources of carcinogens in drinking water in addition to a provision for a rural water survey.

Aid will be provided to states to improve their drinking water programs through technical assistance, training of personnel and grants up to $25,000. A loan guarantee provision is included to assist smaller water systems that cannot obtain financing to meet the regulations.

A 15-member National Drinking Water Advisory Council is to be established to advise the EPA administrator on scientific and other specific responsibilities of the Act. Appropriations totaling $156 million are authorized for fiscal years 1975, 1976 and 1977 to establish and enforce the act.

GRADUATE STUDY IN WATER RESOURCES

Opportunities for graduate training and research in water resources are available in the College of Engineering of the University of Colorado. A strong interdepartmental program has been developed by the Department of Civil & Environmental Engineering and the Department of Chemical Engineering to provide in-depth training in water quality control and management and broad based studies in water management and engineering. Administered through the Center for Urban Engineering Studies in cooperation with the two departments, several forms of financial assistance are available to participating students with backgrounds in engineering, chemistry, biology, or related sciences. These include research assistantships, departmental teaching assistantships and fellowships and scholarships.

Applicants interested in graduate programs in water resources engineering or the chemical and biological aspects of water resources may apply to: Dr. J. Ernest Flack, Director, Water Resources Training Program, Engineering Center, OT 4-34, University of Colorado, Boulder, Colorado 80302.

CONFERENCES

NATIONAL CONFERENCE ON WATER

Rogers C. B. Morton, Chairman of the Water Resources Council, has announced that a National Conference on Water will be held in Washington, D.C. April 22-24, 1975 at the Washington-Hilton Hotel. The objectives of the Conference will be to: (1) examine the role of water in national affairs through 1985; and (2) consider the adequacy of existing and proposed policies and programs in fulfilling this role.

The Conference will extend from a plenary session into seven panels to consider the following subjects: (1) water and energy; (2) water and food and fiber; (3) water and transportation, commerce, municipalities and industry; (4) water and the environment; (5) flood damage reduction; (6) water laws, water rights and institutional arrangements; and (7) the role of federal, state and local governments.

Representatives from the Congress, state and local governments, various national organizations and industry, agriculture, labor, commerce, water user groups, environmental groups, as well as the general public will be invited. Each panel will include representatives with a variety of backgrounds and diversified interests so that there may be a comprehensive exchange of views and consideration of choices.

SEVENTH NATIONAL AGRICULTURAL WASTE MANAGEMENT CONFERENCE

A conference on "Energy, Agriculture and Waste Management" will be held at the Hotel Syracuse, Syracuse, New York on April 16-18, 1975. The conference is sponsored by Cornell University and the National Science Foundation.

Agriculture requires significant energy resources for food and fiber production. New energy demands have also been created by controlling wastes to meet the public's demand for a cleaner environment. These two areas of concern are related since recent studies emphasize the possibility of converting wastes to energy sources. This conference will focus on: (1) energy consumption of agriculture; (2) technology and energy consumption for controlling wastes; and (3) potential for producing energy from agricultural wastes.

Conference registration is $25 and will include a copy of the proceedings which will be available shortly after the conference. Hotel accommodations should be made directly with the Hotel Syracuse, Hotel Syracuse Square, Syracuse, New York 13202, telephone (315) 422-5121.

For additional information, contact: Dr. William J. Jewell, 202 Riley-Robb Hall, Cornell University, Ithaca, New York 14853.

CONFERENCE ON NONPOINT SOURCES OF WATER POLLUTION

Virginia Polytechnic Institute and State University in Blacksburg, Virginia and the Virginia Water Resources Research Center are sponsoring a Conference on Nonpoint Sources of Water Pollution to be held May 1-2, 1975. Conference sessions will include discussions on agricultural, forest land use, mining and urban contributions to nonpoint water pollution.

For further information, please contact Dr. Peter M. Ashton, Water Resources Research Center, 225 Norris Hall, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061, telephone (703) 951-5624.

WATER-ENERGY CONFERENCE

The University of Arizona will host a two-day conference on May 8-9, 1975 entitled "Water Requirements for Lower Colorado Basin Needs." Three sessions will cover energy and water requirements (an overview), water and energy required to develop new fuel sources, and treatment, reuse and environmental impact.

For additional information contact: Mr. Charles Bowden, Office of Arid Lands Studies, University of Arizona, Tucson, Arizona 85719, telephone (602) 884-1955.

EARTH RESOURCES SYMPOSIUM PLANNED

A major Earth Resources Symposium, sponsored by the Lyndon B. Johnson Space Center in Houston, will be held June 8-13, 1975 at Houston's Shamrock Hilton Hotel.

The primary focus on the symposium will be on practical applications of earth resources survey data gathered by satellites and aircraft. Such data are being utilized and evaluated in a variety of applications, including regional planning, environmental impact assessment, energy and mineral resource location, water resources management and agriculture.

Invitations are being extended to individuals in federal, state and local government, private industry, universities and to the international scientific community. The symposium is intended to bring together those who have developed the technology for remote sensing of the earth's resources and those who are using or could use this information.

The symposium will include papers on the results of experiments with remote sensing data obtained from LANDSAT (formerly the Earth Resources Technology Satellite--ERTS), from the earth resources experiment package carried aboard the Skylab manned orbiting space laboratory, and from various low and high altitude earth resources survey aircraft programs. Papers discussing the need for new data systems as well as those describing utilization of existing data will be invited.

Additional information on the symposium may be obtained from the Earth Resources Program Office, Code HB, Lyndon B. Johnson Space Center, Houston, Texas 77058. Telephone (713) 483-4691.

PUBLICATIONS

NEW SCIENTIFIC BOOK ON THE ENVIRONMENT

"Water Resources: Utilization and Conservation in the Environment," edited by M. C. Blount, is a new scientific book on the environment which is now available for distribution. The book is the proceedings of a symposium held at Fort Valley State College on February 27 - March 1, 1974 and contains 23 chapters, each written by one or more outstanding scientists.

The multidisciplinary approach presents a cross section of research reviews and approaches taken by various state and federal agencies on the utilization of water, available supplies, future needs and maintenance of water quality standards. Included are treatments of physical and chemical properties related to soil drainage, public and private rights related to water use, and some reflections on the Water Act. Each chapter suggests important areas of future research.

The price of the book is $14.00. Advance payment and 50¢ postage are required on all orders outside the United States. Orders should be addressed to: The Taylor County Printing Company, P.O. Box 311, Reynolds, Georgia 31076.

RESEARCH REVIEW

Project Title: Investigation of Laser Ramen Spectroscopy for Analysis of Water Quality

Principal Investigator: Frank G. Ullman, Professor of Electrical Engineering and Physics, University of Nebraska, Lincoln

This project was initiated to determine the applicability of laser-Raman-spectroscopy to the detection of low-level concentrations of impurities, both conventional and exotic, in water. The Raman effect, discovered by C. V. Raman in 1928 (for which he received a Nobel Prize in 1930) is an inelastic scattering of light by the quantized vibrations or rotations of molecular constituents. The spectra of the discrete changes in frequency of the incident light and their amplitudes and bandwidths are a direct measure of the frequency and amplitude of the molecular modes of motion excited by the incident energy. Since the spectra of such modes are characteristic of the molecular constituents involved, the Raman effect, much like infrared spectroscopy, can be used for chemical analysis. Unlike infrared methods, it is not restricted to thin samples but

on the other hand, the scattered light intensities are very much weaker than the direct light used in conventional spectroscopic techniques. The advent of high-powered lasers, however, has made Raman spectroscopy a straightforward analytical tool. With incident intensity "to burn", the scattered intensities can be detected quickly and efficiently; in fact, even very weak, previously unobservable, higher-order scattering processes can now be detected.

Prior to initiation of this project, laser-Raman analysis of air pollutants had been reported. Two reports of water analysis - one for nitrates, sulfates and phosphates and one for 2-4D salts - had also appeared but were sketchy and did not give sufficient information to determine the detectability limits for these contaminants. Consequently, we initiated studies, using the UNL Physics Department laser-Raman spectrometer, to determine the detectability limits of sulfates, nitrates, phosphates and selected herbicides and insecticides to establish the feasibility of this approach to water-quality analysis.

At this time, direct measurements on deliberately-contaminated pure water samples have been made. It is now clear that a broad diffuse (with frequency) background, intrinsic to water, is the limiting factor in this technique. At a concentration of the order of 10 impurity units per liter of solution, the signal "disappears" into the background. More precise values of sensitivity for each contaminant of interest are currently being sought. However, it is apparent that water itself is the major limiting factor. Methods for reducing the background such as addition of polar salts, cooling and heating have not produced significant changes. Thus, improved sensitivity will require the elimination of the water, perhaps by solvent exchange. Such possibilities are now being considered.

QUESTIONS AND INQUIRIES

Newsletter items and inquiries should be sent to: Editor, Nebraska Water Resources Research Institute, 212 Agricultural Engineering Building 7R, East Campus, University of Nebraska, Lincoln, Nebraska 68503; or phone (402) 472-3307.

NEWSLETTER ITEMS SOLICITED

The Water Current Newslatter will publish, without charge, announcements, programs for up-coming conferences, employment opportunities or other newsworthy items on hydrology, water resources or related topics. To insure timely publication, submit items before the 25th of every month.

PUBLICATIONS RECEIVED BY THE INSTITUTE

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2. Geologic and Hydrologic Control of Chloride Contamination in Aquifers at Brunswick, Glynn County, Georgia, Geological Survey Water-Supply Paper 2029-D, U.S. Government Printing Office, Washington, D.C.

3. Development of a Dynamic Water Management Policy for Texas, W.L. Meier, James C. Helm, Guy L. Curry, Texas Water Resources Institute, Texas A & M University, June 1973.

4. Alternate Solutions to Water Resource Development--A Case Study, David R. Basco, K.M.A. Rahman, Texas Water Resources Institute, Texas A & M Univ., May 1974.

5. An Evaluation of Obers Projections of Texas Agricultural Production in 1980, 2000, and 2020, J. P. Warren, W. L. Griffin, W. L. Trock, Texas Water Development Board, Texas Water Resources Institute, Texas Agricultural Experiment Station, August 1973.

6. State of Nebraska Continuous Planning Process, prepared by Nebraska Natural Resources Commission, in cooperation with Nebraska Dept. of Environmental Control and Nebraska State Office of Planning and Programming, August 1974.

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8. Numerical Simulation of Transient Open-Channel Flow, D. L. Fread, T. E. Harbaugh, January 1971.

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10. Synthetic Streamflows, Myron B. Fiering, Barbara B. Jackson, American Geophysical Union, Washington, D.C., 1971.

11. Patterns in Water Resources Planning; Some Comparisons Between Planning in NM, WI, ID and ME, Edgar A. Imhoff, University of Nebraska, Lincoln, NE, February 28, 1972.

12. Simulation Program for the Transient Hydraulics Produced by Gradually Breached Earth Dams, D. L. Fread, T. E. Harbaugh, University of Missouri-Rolla, Rolla, Missouri, May 1971.

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14. Ground Water Atlas of Nebraska, Conservation and Survey Division, University of Nebraska, in cooperation with Water Resources Division, U.S. Geological Survey, June 1966.

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19. Ground-Water Resources of Hamilton County, Nebraska, Geological Survey Water-Supply Paper 1539-N, prepared in cooperation with the Conservation and Survey Division, University of Nebraska.

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22. Research In Action -- Technology for Implementing Water Research Results, Proceedings of a Conference, December 5-6, 1974, Nebraska Water Resources Research Institute, University of Nebraska, Lincoln, Nebraska.

23. Analysis of Theories and Methods for Estimating Benefits of Protecting Urban Floodplains, Edward Greenberg, Charles L. Leven, Alan Schlottmann, submitted to the U.S. Army Engineer Institute for Water Resources, Kingman Building, Fort Belvoir, VA, by Institute for Urban and Regional Studies, Washington University, St. Louis, Missouri, November 1974.

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28. Inventory of Materials Available for Planning and Governmental Agency Programs, Deon Axthelm, Agricultural Extension Service, University of Nebraska, Lincoln, Nebraska, January 1975.

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9. Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations, Dr. James C. Dukes, Dr. Richard C. Axtell, Dr. Kenneth L. Knight, Water Resources Research Institute, University of North Carolina, 124 Riddick Bldg., North Carolina State Univ., Raleigh, North Carolina, December 1974.

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31. Evaluation of Adjustment Assistance Programs with Application for Pollution Control, A. Myrick Freeman, III, Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C., September 1974.

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35. The Economic and Environmental Benefits from Improving Electrical Rate Structures, Mark Sharefkin, Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C., November 1974.

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