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WATER RESOURCES NEWS

NEBRASKA WATER RESOURCES RESEARCH INSTITUTE
212 AGRICULTURAL ENGINEERING BUILDING

THE UNIVERSITY OF NEBRASKA
LINCOLN, NEBRASKA 68503

Volume 5 Number 3 March 1973

FROM THE DESK OF THE DIRECTOR . . .

Increasing demands on our water supplies dictate that all reasonable alternatives to supplement these important resources be explored. As waste treatment processes are improved and the procurement and development of natural water sources becomes increasingly expensive and difficult, water reuse merits consideration as a viable alternative for meeting local or regional requirements. Various technologies for water reuse will be implemented more frequently as time goes on and the demand for usable water supplies is intensified.

Municipal and industrial wastewaters constitute a large virtually untapped resource, but the social and technical mechanics of reusing these waters presents a challenge. Recent technological advances show that it is not only practical but economically feasible to treat and use a spectrum of wastewaters for many purposes. Such uses would preclude the waste of billions of gallons of water to the oceans. (Well over one-half million acre-feet of water are discharged to the Pacific Ocean by the sewerage systems of the Los Angeles coastal plain area each year.)

There is great potential for reuse of treated municipal, industrial and agricultural wastewaters. The magnitude is clear if one notes that reuse of 80 percent of a town's wastewater would result in an effective increase of usable water resources by 400 percent. Presently available technology can solve most problems but further studies of chemical and biological safety of reclaimed water will be needed to promote acceptance.

Present technology can produce water chemically equivalent to drinking water at a cost lower than desalination of sea water. Although the cost is relatively high (about 40 cents per thousand gallons), the net cost of treating for reuse could be considerably less if strict effluent standards are imposed.

Creation of recreational lakes, groundwater recharge and formation of barriers to salt water intrusion are important uses for properly treated wastewater, but the largest consumer will be industry. By substituting reclaimed water for natural water, industry will be able to free large amounts of good supplies for other uses. In this way, wastewater reuse can increase water resources without the possibility of harmful consequences.

As natural sources of water become more committed, wastewater reclmation will play an increasing role in supplementing local supplies for a variety of every-day needs.

INTERDISCIPLINARY WATER RESOURCES SEMINAR

This year's Water Resources Seminar theme is "Regional Planning for Natural Resources with Special Emphasis on the Missouri River Basin." The seminar is held every Monday at 4:00 p.m. in Room 206 Ag. Engineering on the East Campus. All interested persons are welcome to attend.

Seminar topics and speakers for the coming month are as follows:

DATE	TOPIC	SPEAKER
April 2	Platte Level B Study	Carroll M. Hamon, Director Platte Level B Study Missouri River Basin Comm.
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

REGIONAL NEWS

NITROGEN IN NEBRASKA'S ENVIRONMENT

The Nebraska Agricultural Extension Service will sponsor a conference entitled "Nitrogen in Nebraska's Environment" on April 18-19, 1973 at the Nebraska Center for Continuing Education, University of Nebraska, Lincoln, East Campus. A select audience will comprise varied disciplines from the university community, state and federal agencies and other groups interested in nitrogen and the environment.

The main objectives of the conference are: (1) to provide a forum for common understanding of nitrogen aspects in relation to human and animal health; (2) to bring professional people up-to-date on the status of nitrogen in the environment; (3) to review the effects of nitrogen on the land and water environment.

The conference is aimed at county agents and professionals in state, federal and local agencies and commodity-oriented associations who may deal with these problems in a public or educational way.

A published proceedings will be available. For further information, contact Mr. Deon Axthelm; Water Resources Specialist; 214 Ag. Engineering Building; University of Nebraska; 68503.

COTTONWOOD WATERSHED GETS AWARD

Officials of the Cottonwood Watershed Project were recently presented with the 1973 Lincoln Sunday Journal and Star Watershed of the Year Award.

The watershed is located in Saunders County and covers 34,133 acres of land owned by 1,360 persons in one of the few areas in Nebraska still dominated by small diversified farming operations.

Gil Savery, news editor of the Lincoln Journal, presented the plaque, and Bill Dobler, editor of the Lincoln Star, presented a check for $150 to the district to enable it to send one or more delegates to the National Watershed Congress where Cottonwood Watershed will represent Nebraska as the state's entry in a national contest.

Numerous other certificates recognizing individual and organizational contributions were also presented.

Frank Zybach of Columbus was credited with the development of the first successful center pivot irrigation system. He was awared a pioneer irrigation award by Dr. James Zumberge, Chancellor of the University of Nebraska-Lincoln.

Dr. Zumberge also presented a progress award to representatives of the Clay, Hamilton, Seward, and York County ground water conservation districts for their efforts in wise use and effective conservation of groundwater.

WATER CONFERENCE AT NEBRASKA CENTER

Public officials, businessmen and citizens concerned about water resources development in Nebraska attended the 1973 Nebraska Water Conference at the Nebraska Center for Continuing Education March 5 and 6, 1973.

Numerous topics were discussed including federal and state legislation on water, the controversial National Water Commission Report, weather modification, financing water development and energy availability and pricing.

Guest speakers included: Carl Bronn, Executive Director of the National Water Resources Association; Jerry Svore, Regional Director, Environmental Protection Agency; State Senator, Maurice Kremer of Aurora; and Dr. Warren Viessman, Jr., Director, Nebraska Water Resources Research Institute.

NATIONAL NEWS

NEW SENIOR SPECIALIST IN ENGINEERING AND PUBLIC WORKS

Effective March 19, Dr. Edward G. Altouney assumed duties as Senior Specialist in Engineering and Public Works in the Environmental Policy Division of the Congressional Research Service, Library of Congress, Washington, D.C. 20540.

Dr. Altouney was formerly Staff Assistant to the Assistant Secretary for Water and Power Resources in the Department of the Interior.

The new position is one formerly held by Theodore M. Schad, now Staff Director of the National Water Commission

NEW OFFICERS FOR NWRA

J. A. Riggins, Jr. will succeed Milo Hoisveen as President of the National Water Resources Association. Other officers include: J. R. Barkley, Colorado, first Vice-President; Robert Chuck, Hawaii, second Vice-President; John Simmons, Texas, Treasurer; and Carl Bronn, Executive Director.

Serving on the Executive Committee are: Homer Engelhorn, South Dakota; John Rosholt, Idaho; and Ed Southwich, Utah.

Chairman Wayne N. Aspinal, a lifetime member of the NWRA, was presented the title "Mr. Reclamation, U.S.A." for his dedicated service to the state of Colorado and Congress working on behalf of reclamation.

James R. Smith, Assistant Secretary of the Interior, received the honor of Water Statesman 1972.

RAIN BOMBS

Senator Claiborne Pell, D-RI, introduced a treaty banning the use of weather modification as a defense weapon.

Pell told the Senate that "Rainmaking as a weapon of war may well lead to the development of vastly more dangerous environmental techniques whose consequences may be unknown and which may cuase irreparable damage to our global environment. This is why I believe the United States should move quickly to ban all environmental or geophysical modification techniques from the arsenals of war."

INSTITUTE FOR ENVIRONMENTAL STUDIES AT ILLINOIS

The University of Illinois has recently established an Institute for Environmental Studies which will house the Water Resources Center, the Task

Force on Heavy Metals and the Center for Human Ecology. Prof. Benjamin B. Ewing was appointed acting director of the institute.

The Illinois Board of Higher Education says the institute should provide for:

--Active participation of qualified faculty and researchers employed at othe public and private institutions in the state.
--Inclusion of concerned board staff in the planning and evaluative functions of the Institute.
--Public service activities which will include teaching as well as dissemination of research findings, and consultation in governmental and private sections.
--Student involvement in instructional research through participation in faculty-directed, problem-oriented task forces.

An effort will be made to identify at least one additional major interdisciplinary task force. It is anticipated that by the 1973-74 academic year a nucleus of environmental courses at both graduate and undergraduate levels will be developed.

WATER POLLUTION STUDY: PUSHBUTTON? ? ?

The Environmental Protection Agency dedicated a $1 million environmental simulator created by Dr. Walter M. Sanders for use in water pollution studies. Dr. Sanders heads the pollutants fate research program at the Athens Laboratory.

The Aquatic Ecosystem Simulator evaluates movement, fate and impact of pollution on rivers, and will bring lab experiments and uncontrolled field studies together.

The simulator is 72 feet long, 12 feet wide and 9 feet high. It shelters an experimental stream that is 64 feet long, 18 inches wide and 24 inches deep. Air temperature, humidity, and lighting can be carefully controlled.

The simulator (AecoS) cannot duplicate all conditions found in the natural environment, but it provides EPA with an aquatic research capability which is not reproduced anywhere else in the world. Capabilities for predicting and managing water quality are greatly increased.

SUPERPORT SITES FOR OIL TANKERS

According to the U.S. Army Corps of Engineers, sites in the Atlantic Ocean, 13 miles off the New Jersey coast at Long Branch in the north, or off Cape May in the south, would be the most logical sites for superports. The ports will service giant oil tankers. The most efficient and economic site is 13 miles from Long Branch. Stone Beach, Delaware, a prime site, is unavailable because of Delaware's Coastal Zone Act of 1971. The Corps also recommended a site in Raritan Bay.

The main environmental problems of a port would be dredging and spoils disposal, oil spills and pollution and the effect on the adjacent land. There is a lack of sufficient knowledge of ways to build and operate this system without spillage, techniques capable of handling major spills and of total impact on oil spills on the ecosystem.

Studies completed by the Council on Environmental Quality indicate that from an environmental view, offshore sites are preferred to estuarine locations.

Private firms should construct the port, but the federal government should set guidelines to assure compliance with environmental standards and establish a permit system to govern the construction.

Col. Carroll D. Strider, Corps' Philadelphia District engineer said, "I would recommend that the state in whose territory this facility comes ashore and all other states into which it leads be required to furnish assurances that the facility will not create or otherwise induce undesirable social and environmental conditions."

William Cahill rejected the Corps' proposal. He stated, "The superport sites currently recommended by the Army Corps of Engineers are unacceptable to New Jersey." Russell W. Peterson, Governor of Delaware, said he expected the oil industry to continue efforts to modify his state's coastal development ban so that it could build in that area.

REPORT ON IRRIGATION IN BULGARIA ANNOUNCED

Maurice N. Langley, Chairman of the U.S. Committee on Irrigation, Drianage and Flood Control, has announced the availability of "A Brief Reivew of Water and Land Operations in Bulgaria."

The full-color, 22-page book provides a comprehensive survey of water resource development activities in Bulgaria. Included are summaries of the major projects, statistics of crop and livestock production, and descriptions of major hydroelectric power systems. Included also are several pages of full-color photographs showing project features, crops, and points of interest.

The report is available in limited quantities from: U.S. Committee on Irrigation, Drainage and Flood Control; P.O. Box 15326; Denver, Colorado 80215. The price is $3.75 postpaid.

WORLD CLIMATIC DATA

Climatic Data Press has announced the publication of a 522-page volume WORLD CLIMATIC DATA by Prof. F. L. Wernstedt of the Geography Department of the Pennsylvania State University.

The volume is a compilation of average long-term monthly and annual temperature and/or precipitation data for a network of nearly 19,000 world climatic stations. The stations selected for inclusion have been chosen, where possible, on the basis of longer periods of record and in numbers sufficient to permit the reader to document the variety of climates within each country. The normal values represent at least ten years of record, more often twenty or thirty years or more. It is organized with six major geographical-continental areas. They are: Africa; Latin America and the Caribbean; Europe; Eastern, Central and Southwestern Asia; Southern Asia; Australasia and the Ocean Island; and North America.

The data presentation includes information as to the length of the recording period, the elevation of each station above sea level, its geographic coordinates and the average temperature and precipitation for each month and the year.

WORLD CLIMATIC DATA is available in single copies (either bound, soft-cover or as loose sheets) for $12.00 postpaid, or $10.00 each for orders of six or more copies. Loose sheet copies of each geographic area also are available separately for $3.00 each. Write: Climatic Data Press; P.O. Box 413; Lemont, Pennsylvania 16851.

CONFERENCES

REMOTE SENSING OF WATER RESOURCES

The Canada Centre for Inland Waters and the American Water Resources Association will sponsor an International Symposium on "Remote Sensing of Water Resources." The Symposium will be held June 11-14th, 1973 at the Centre in Burlington, Ontario. The talks will cover the applications of airborne and satellite sensing, and the role of remote sensing in integrated water resources management systems.

For further information, contact: Dr. R. K. Lane, Head; Lake Resources Subdivision; Canada Centre for Inalnd Waters; P.O. Box 5050; Burlington, Ontario, Canada.

SHORT-COURSE ON INDUSTRIAL & MUNICIPAL WATER POLLUTION CONTROL

The University of Michigan will host a one-week short course on "Industrial and Municipal Water Pollution Control--Physicochemical Processes" from August 20-24, 1973.

The course is designed to provide an in-depth analysis of conventional and advanced physicochemical processes for treatment and reclamation of industrial and municipal wastewaters, process concepts, specific applications, and economics.

For further information, contact: Prof. Walter J. Weber, Jr.; Dept. of Civil Engineering; The University of Michigan; Ann Arbor, Michigan 48104.

ENVIRONMENTAL ENGINEEPING EDUCATION CONFERENCE

The Third National Conference on Environmental Engineering Education will be held at Drexel University from August 13-15, 1973. This conference is a follow-up to conferences held in June, 1960 at Harvard and August, 1967 at Northwestern. The format for the conference will be similar to that of its predecessors.

The conference report, scheduled for publication in Demceber, 1973, will serve as guidelines for the development of academic environmental engineering programs over the next few years.

For further information, write: Professor P. W. Purdom; Center for Urban Research and Environmental Studies; Drexel University; Philadelphia, Pennsylvania 19104.

SYMPOSIUM ON MUNICIPAL WATERSHED MANAGEMENT

"Management of Municipal Watersheds Symposium" will be held at the Pennsylvania State Universtiy on September 11-12, 1973 and at the University of New Hampshire on September 19-20, 1973.

The focus of this symposium is on the results of research and practical applications in the management of municipal watersheds. Areas to be emphasized are: Effects of management practicies on water quality and quantity; Current management practices on municipal watersheds; Multiple-use management on municipal watersheds; Income from forest management; Recreation problems and opportunities; Impact of construction and cultural activities; Chemicals in timber and reservoir management programs; Meeting future drinking-water quality standards; State technical assistance programs; and consultant's role in municipal watershed management.

For further information, contact: Dr. William E. Sopper; Symposium on Municipal Watershed Management; Land and Water Research Building; The Pennsylvania State University; University Park, Pennsylvania 16802.

FIRST WORLD CONFERENCE ON WATER RESOURCES

The International Water Resources Association is sponsoring the First World Congress on Water Resources entitled "Water for Human Environment." The conference will be held in Chicago, Illinois on September 24-28, 1973. Anyone interested may attend.

For further information, contact: Dr. G. M. Karadi; Secretary General; IWRA: (414) 963-5166.

INTERNATIONAL CONFERENCE ON LAND FOR WASTE MANAGEMENT

The Canadian Society of Soil Science is organizing an "International Conference on Land for Waste Management" to be held in Ottawa, Canada October 1-3, 1973.

The purpose of the conference is to collect and disseminate information on waste disposal and waste utilization in soils, to evaluate systems of waste management on land, and to identify the problem areas requiring research and development. The three day conference will be organized around the following themes: climate, vegetation and soils as factors in waste disposal, including special problems in the North; soil properties and processes in relation to waste recycling and disposal; hydrogeology and geomorphology as factors in waste management; nature of wastes in relation to disposal on land; socio-economic and land use planning for waste disposal, including health and legal aspects; land waste disposal systems - present and future designs.

For fruther information and instructions for submitting papers, write to: Mr. M. K. Ward, Executive Secretary; International Conference on Land for Waste Management; National Research Council; Ottawa, Ontario, Canada K1A 0R6.

RESEARCH REVIEW

PROJECT TITLE: Mobility and Deactiviation of Herbicies in Soil-Water Systems

PRINCIPAL INVESTIGATOR: T. L. Lavy

Project objectives: A. To investigate methods which could be used to deactivate or remove herbicides present in aqueous systems.

B. To measure the mobility of four herbicides (alachlor, butylate, atarzine, and picloram) in three Nebraska profiles.

Significance of Research:

Several of our commonly used herbicides have been shown to be quite mobile in soils low in clay and organic matter content. Due to recent advances in irrigation technology many of these originally less productive but more vulnerable soils are now being used much more intensively. Little concern has been expressed concerning the possibility of contaminating subsoil or groundwater supplies in spite of the fact that previous studies indicate that considerable herbicide leaching should be expected in coarse textured soils where ample to excessive moisture is readily available.

When water soluble, mobile herbicides are used on these coarse textured soils which have a high water table (perched or native) the possibilities of limited work has been done on mobility of herbicides

in soil under center pivot irrigation systems a real need exists for information regarding the mobility of herbicides under these systems.

Progress to Date:

Water from wells in four locations have been treated with 0.1 and 10 ppm of each of the four herbicides. Tracer amounts of the ^{14}C labeled herbicides have been placed in these samples to facilitate analyses. Extraction and thin layer identificaiton techniques have been worked out for all of the chemicals. Atrazine, alachlor, and picloram can be analyzed using gas chromatography.

Evidence of herbicide contamination or a natural phytotoxin has been located in subsoils of two sites under center pivot irrigation.

Research Planned:

Mobility of herbicides in soil from center pivot irrigation systems will be studied both in the field and in laboratory leaching columns. The laboratory studies will rely heavily on use of ^{14}C labeled compounds while both bioassays and ^{14}C labeled compounds will be used in the field of studies. Additional work is planned to develop a sensitive rapid method using algae as a bioassay organism. Studies are underway which will allow us to convert butylate to a form readily detectable by an electron capture detector on a gas chromatograph.

Removal of herbicides from water using different resin and filter systems will be investigated.

PUBLICATIONS

1. National Weather Service River Forecast System Forecast Procedures, U.S. Dept. of Commerce, December 1972.

2. Some Meteorological Aspects of the Seasonal Distribution of Precipitation in the Western United States and Baja, California, C. B. Pyke, University of California, October 1972.

3. Ecological and Physiological Implications of Greenbelt Irrigation, V. B. Yougner, W. D. Kesner, University of California, A. R. Berg, L.R. Green, Forest Fire Laboratoyr, 1972.

4. A Study of Phytoplankton Dynamics in Lake Fayetteville As A Means of Assessing Water Quality, R. L. Meyer, University of Arkansas, August 1971.

5. Investigation of Use of Gel Material for Mine Sealing, N. K. Chung, for EPA, January 1973.

6. Concepts, Methodology and Summary Data, 1972 Obers Projectsion, Regional Economic Activity in the U.S., U.S. Water Resources Council Vol. I, 1972.

7. BEA Economic Areas, 1972 Obers Projections, Regional Economic Activity in the U.S., U.S. Water Resources Council, Vol. II, 1972.

8. Water Resources Regions, 1-8, 1972 Obers Projections, Regional Economic Activity in the U.S., U.S. Water Resources Council, Vol. III, 1972.

9. Water Resources Regions, 9-20, 1972 Obers Projects, Regional Economic Activity in the U.S., U.S. Water Resources Council, Vol. IV, 1972.

10. States, 1972 Obers Projectsion, Regional Economic Activity in the U.S., U.S. Water Resources Council, Vol. V, 1972.

11. Planning and Evaluation of Multiple Purpose Water Resource Projects in a Multiobjective Environment: An Overview and Post-Audit Analyses, for Office of Water Resources Research, December 1970.

12. Steady Flow in Pipe Networks by the Simple Loop Method, T. R. Fietz, University of New South Wales, October 1972.

13. Hydraulic Investigation of Critical Gradients for Approachs to Farm Water Storages, R. T. Hattersley, K. C. Yong, University of New South Wales, May 1972.

14. Physical and Climatic Characteristics of the Western and Hacking Catchments of the University of New South Wales, D. H. Pilgrim, University of New South Wales, March 1972.

15. Funding Nebraska's Future Natural Resources Development, Nebraska Natural Resources Commission, December 1972.

16. Public Response to Planned Environmental Change: A Study of Citizen Views and Actions on the Proposed Ames Reservoir, G. Bultena, D. Rogers, V. Webb, Iowa State University, January 1973.

17. Offical Registrer, 1973, American Society of Civil Engineers.

18. Nutrients in the Pamlico River Estuary, N.C., 1969-1971, J. E. Hobbie, B. J. Copeland, W. G. Harrison, N. C. State University, December 1972.

19. Spectroanalytical Parameters of Fungal Metabolities. II. Luminescence of Griseofulvin, W. C. Neely, J. R. McDuffie, Auburn University, November 1972.

20. Plankton Populations and Some Effects of Mine Drainage on Primary Productivity of the Coeur d'Alene River; Delta; and Lake, F. W. Rabe, R. C. Wissmar, R. F. Minter, Universtiy of Idaho, January 1973.

21. The Participatory Role of Citizen Advisory Groups in New England Water Resources Planning: A Preliminary Study, Dr. Madge Ertel, University of Massachusetts, June 1972.

22. The Nebraska State Irrigation Association, Proceedings of the 77th Annual Convention, Ogallala, Nebraska, December 3-5, 1969.

23. Minutes Iowa State Water Resources Research Institute Advisory Board and Council Seventh Annual Meeting, Iowa State Water Resources Research Institute, August 1972.

24. Influence of Water Quality in Maintaining Whiteness when Laundering White Fabrics, C. M. Janecek, North Dakota State University, September 1971.

25. An Analysis of Local Water-Related Districts in North Dakota, R. B. Crokett, North Dakota State University, June 1972.

26. USIHD Bulletin, The Lobal Water Balance, U.S. National Committee for the International Hydrological Decade, by M. I. Lvovitch, January 1973.

27. Washout Processes in Lake Systems, J. I. Frea, Ting Y. Li, R. M. Sykes, October 1972.

28. Utilization of Spray Irrigation for Waste Water Disposal in Small Residential Developments, T. C. Williams, Williams & Works, Presented at Pennsylvania State University Seminar on August 24, 1972.

29. Water Resources Seminar Series No. 2, Papers Presented January 1970 to May 1972, Water Resources Research Center, University of Hawaii, December 1972.

30. Analysis of the Injection of a Heated, Turbulent Jet into a Moving Mainstream with Emphasis on a Thermal Discharge in a Waterway, J. R. Campbell, J. A. Schetz, Virginia Polytechnic Institute and State University, December 1972.

31. Evaluation of Pollution Abatement Procedures, Moraine State Park, J. W. Foreman, D. C. McLean, for EPA, January 1973.

32. Solvent Extraction Status Reprot, L. F. Mayhue, National Petrochemical Wastes Research Program, for EPA, December 1972.

33. A Search: New Technology for Pavement Snow and Ice Control, D. M. Murray, M. R. Eigerman for EPA, December 1972.

34. A Selected Annotated Bibliography on the Analysis of Water Resource Systems, Third Volume, U.S. Department of the Interior, 1972.

35. Development and Demonstration of Nutrient Removal from Animal Wastes, R. C. Loehr, T. B.S. Parakasam, E. G. Srinath, Y. D. Joo, for EPA, January 1973.

36. Studies on Benthic Nematode Ecology in A Small Freshwater Pond. T. W. Merritt, Jr., Auburn University, February 1973.

37. The Beneficial Use of Storm Water, C. W. Mallory, for EPA, January 1973.

38. Systematic Development of Methodologies in Planning Urban Water Resources for Medium Size Communities (Expectation of Life in Indiana, 1950-1970_ E. R. Cooper, L. Z. Breen, H. R. Potter, Purdue University, January 1973.

39. The Impact of Institutional and Political Factors on Water Management in the Upper Wabash Basin, M. C. Quinn, Purdue University, January 1973.

40. Hydraulics of Shallow Flows Over Stable Eroded Sand Surfaces Defined By Area Spectra, J. R. Burney, L. R. Huggins, Purdue University, February 1973.

41. Streamflow Characteristics of the Monongahela River, M. S. Baloch, E. N. Henry, W. H. Dickerson, Vol. II, Part A, West Virginia Department of Natural Resources, 1973.

42. Ground Water Atlas of Nebraska, Conservation and Survey Division, University of Nebraska.

43. Treatment of Ferrous Acid Mine Drainage with Activiated Carbon, C. T. Ford, J. F. Boyer, Jr., for EPA, January 1973.

44. The Disposal of Cattle Feedlot Wastes by Pyrolysis, Dr. W. Garner, Dr. Ivan C. Smith, for EPA, January 1973.

45. Water Law and its Relationship to Environmental Quality: A Bibliography of Source Material, G. E. Radosevich, D. R. Allardice, G. A. Swanson, K. R. Koebel, Colorado State University, January 1973.

46. Water Infiltration Control to Achieve Mine Water Pollution Control, F. J. Zaval, J. D. Robins, for EPA, January 1973.

47. Cooperative Action for the Beneficial Utilization of Riverine and Estuarine Resources, Idres Institute for the Development of Riverine and Estuarine Systems.

INQUIRES

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