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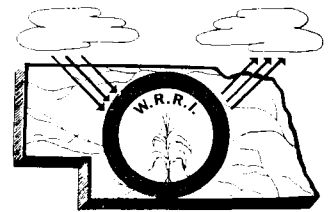
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# WATER RESOURCES NEWS

NEBRASKA WATER RESOURCES RESEARCH INSTITUTE  
212 AGRICULTURAL ENGINEERING BUILDING

THE UNIVERSITY OF NEBRASKA  
LINCOLN, NEBRASKA 68503



Volume 6 Number 1

January 1974

FROM THE DESK OF THE DIRECTOR . . .

Planning is at best hazardous because the future is unknown and only directions can be presupposed. The planning process must be: (1) dynamic, (2) continuous, (3) flexible, (4) founded on the best available data base, and (5) quantitative insofar as this is possible.

If options for changes in plans can be kept open, opportunities to avoid over- or under-design or to irretrievably commit resources to sub-optimal development can be maximized. Feedback on the current status of the system under study continually improves the planner's ability to make revisions and update plans. This is especially true when quantitative techniques are employed.

Tried and traditional planning tools are as important today as they were in the past, and no technique, quantitative or otherwise, can replace the understanding and judgment of the planner. Nevertheless, current modeling capability can materially increase the planner's horizon and provide a rapid means for comparing alternatives and screening out inferior concepts. The companion tools for this are simulation and mathematical programming. Used together they can be powerful adjuncts to traditional approaches.

In these times of complexity and rapid change, it is imperative that those engaged in planning learn to modernize and employ the best state-of-the-art technology. Universities and others with expertise in planning technologies can be useful allies to those in the planning profession. All sources of knowledge should be tapped and actively employed. If this is not done, performance will seriously lag capability.

## INSTITUTE ACTIVITIES

### 1974 Summer Institute

The Nebraska Water Resources Research Institute will once again sponsor a one-week Summer Institute July 21-26, 1974. This year's theme is "Quantitative Planning Techniques in Water Resources." The objective of the program is to provide training in the application of simulation and optimization techniques to the planning and analysis of water resources systems. Primary emphasis will be given to application. Approximately 50 percent of the program will be devoted to workshops providing participants an opportunity to manipulate operational models. A case study approach will be used to relate lecture materials to workshop activities. Both surface water and groundwater systems will be discussed. The role of quantitative models as practical planning tools will be considered.

Speakers and topics for the Institute program are as follows:

Introduction to Water Resources Systems	Warren Viessman, Jr., Director Water Resources Research Inst.
Simulation Model Structuring - Surface Water Components	Gary L. Lewis, Ass't Professor Dept. of Civil Engineering University of Nebraska-Lincoln
Simulation Model Structuring - Ground Water Systems	Peter W. Huntoon, Hydrogeologist Conservation & Survey Division University of Nebraska-Lincoln
The Big Blue River Basin Model - A Case Study	Peter W. Huntoon
Screening Models for Water Resources Planning	D. Peter Loucks, Chairman Dept. of Environmental Engr. Cornell University
The Elkhorn River Basin - A Case Study	Gary L. Lewis
Simulation and Optimization - Combined Tools for Flood Control Planning	Gary L. Lewis, D. Peter Loucks, Isaac Yomtovian, Research Assoc. Water Resources Research Inst.

For further information on the Summer Institute program, contact: Dr. Warren Viessman, Jr., Director, Water Resources Research Institute, 212 Ag. Engineering Building, University of Nebraska, Lincoln, Nebraska 68503. Telephone (402) 472-3307.

#### Water Resources Seminar Series

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

##### February 4

"U.S. Total Energy Budget Related to National and International Food and Fiber Needs - Today and Tomorrow"

Donald M. Edwards, Ass't Dean  
College of Engr. & Tech.

John E. Lagerstrom, Chairman  
Department of Electrical Engr.  
University of Nebraska-Lincoln

##### February 25

"Development of Coal Resources in the Northern Great Plains"  
Dale O. Anderson, Director  
Water Resources Research Inst.  
North Dakota State University

Both seminars will be held in Room 206 Ag. Engineering Building, University of Nebraska-Lincoln, from 3:00-5:00 p.m.

#### Energy Conference Proceedings Available

Proceedings of a conference entitled "The Role of Water in the Energy Crisis" held October 25-26, 1973 are now available for distribution. Anyone wishing to obtain a copy should contact: Nebraska Water Resources Research Institute, 212 Ag. Engineering Building, University of Nebraska, Lincoln, Nebraska 68503.

#### FEDERAL HIGHLIGHTS

##### Feedlots Pollute Western Water

According to Dr. A.F. Bartsch, Director of EPA's National Environmental Research Center at Corvallis, Oregon, feedlot operations are major polluters west of the Mississippi River.

The more than 25 million cattle that are finish-fed in feedlots produce 3.6 tons of waste per animal, adding up to almost 90 million tons of waste running into the waterways.

Other major agricultural water polluters include siltation from cultivated land, salination of irrigated soils, overuse of chemical fertilizers and siltation of reservoirs.

The Corvallis center is sponsoring \$2.3 million in research to cover these agricultural problems, according to Dr. Bartsch. As of July 1, 1973, the Center has awarded \$807,485 to two federal agencies and twelve universities for the study of irrigation and livestock pollution.

#### Geothermal Energy Dangerous

William L. Miller, scientist with the Bureau of Mines, warned that the tapping of geothermal energy could be dangerous in that it could cause well blowouts, earthquakes, water pollution, noxious gas, noise and land subsidence. Miller cautioned that careful seismic monitoring is necessary in any proposed area because of a usual proximity to faults and volcanic areas. Miller also noted that subsidence of land could cause damage to reservoirs, pipelines, irrigation canals and buildings in some areas.

#### Water Funds On Ice

Senator Dick Clark, D-Iowa, protested to the Office of Management and Budget about the impoundment of \$150 million appropriated by Congress for rural water and sewer grants. He claimed that the Administration had no right to impound the funds since the courts had ruled "past impoundments illegal." Clark claimed EPA funds set aside for comparable programs would probably be awarded to urban areas and that the rural needs had to be financially protected.

#### Insurance Sales Up But Not Final

Federal Insurance Administrator George K. Bernstein is urging residents of the Great Lakes area to participate in the government-subsidized flood insurance program before application time expires. Even though flood insurance policies sold increased from 137,000 to 315,000 last year, there are still many communities that have not entered the program.

Application can still be made through state coordinating agencies or by contacting George K. Bernstein, Federal Insurance Administrator, HUD, Washington, D.C. 20410.

#### REAP Funds May Freeze

It is reported that \$75 million dollars of the \$175 million appropriated for the Rural Environmental Assistance Program (REAP) and another related program may be impounded by the Administration, despite opposing court rulings and strong objections from members of Congress. The funds were originally appropriated as part of the Agriculture, Environmental and Consumer Protection bill (H.R. 8619) that was passed by Congress and signed by the President.

#### River Moratorium Continued

A bill passed by the House of Representatives (H.R. 4864) would extend for five years a moratorium on development of 27 rivers being studied for inclusion in the National Wild and Scenic Rivers System. The bill also authorizes an additional \$20.6 million for land acquisition along the eight rivers entered into the system in 1968.

In addition, the House passed H.R. 9492 which added the Chattooga River in South Carolina, North Carolina and Georgia to the system. The bill authorized \$2 million for land acquisition and \$809,000 for development. The Chattooga River was one of the 27 rivers selected for study under the 1968 act that created the river system.

#### Do-It-Yourself Dam Plan Approved

The House Interior Committee gave a favorable review to Idaho's "do-it-yourself" plan for restoring the American Falls Dam. Senate-passed bill S. 1529 authorized the Secretary of the Interior to enter into an agreement to privately fund the \$20.6 million project. The bill also provides for the transfer of the dam's operation and maintenance to the federal government.

### Environment And Energy Headed In Same Direction

EPA Administrator Russel E. Train said that energy and the environment are headed in the same direction if precautions are not taken to conserve both. Train said that while the nation needs to tap more energy sources, it should at the same time be looking for environmental protection to accompany the new sources.

Train stated that the United States should not rely on imported oil for environmental reasons. The danger of oil spills could be so environmentally critical that the nation should consider ways to produce most of their own energy. He also warned that the United States might have to be held to a 2-3 percent energy increase per year rather than the present 5 percent.

### Pavement With Ready-Made Holes

The Environmental Protection Agency has reported the development of a new kind of porous pavement that could be used to control urban runoff. The purpose of the porous pavement is to percolate stormwater into the soil instead of allowing it to run into a sewage system.

Tests run of the porous pavement show that it is extremely stable under freeze-thaw cycles. Seventy inches of runoff water can flow through a 2½ inch thickness of the porous pavement in one hour.

The advantages of this type of system are that it will allow more adequate use of natural drainage systems and the construction of smaller sewage system units.

## PUBLICATIONS

### Pollution Publication Printed

A report entitled "Recycling on the Land: An Alternative for Water Pollution Control", by Helena Boyer and Barbara Reid, gives a favorable review to land treatment of wastes. The report explains the beneficial aspects of the land treatment process

as "an ecological approach to reducing water pollution", and for meeting the "zero discharge goal of the Federal Water Pollution Control Act of 1972 (PL 92-500)." The 23-page report says land treatment compares favorably with other tertiary systems on the basis of cost.

The report may be obtained from: Project on Clean Water, Natural Resources Defense Council, 1710 N Street, N.W., Washington, D.C. 20036.

#### Recreation Register Out

Bureau of Outdoor Recreation Director James Watt has announced the publication of "Outdoor Recreation Research Register 1973." The Register gives brief descriptions of 383 current and recently completed research projects connected with outdoor recreation. The Register is the fifth volume published by BOR in connection with the Smithsonian Science Information Exchange. (The work was previously published as "Outdoor Recreation Research: A Reference Catalog".)

The 1973 Register can be obtained from: Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, stock number 2416-00059, \$1.55/copy.

#### Wastewater Report

The Environmental Protection Agency has issued a new report entitled "Wastewater Treatment and Reuse by Land Application - Volume I - Summary" by Metcalf and Eddy, Inc. The report gives a summary of wastewater reuse for three major land application approaches: irrigation, overland flow and infiltration-percolation. Evaluations of public health considerations, environmental effects and costs were also made.

The report (EPA-660/a-73-006a, Aug. 1973) may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, for \$1.10.

#### Pollution Equipment Report

The Environmental Protection Agency has published a two-volume report designed to aid those responsible for installing or purchasing



industrial water pollution control equipment. The report, entitled "Capital and Operating Costs of Pollution Control Equipment Modules", includes tables and graphs that allow the user quick evaluation of cost/process decisions for different types of flow processing installations.

The report (EPA-R5-73-02a+b) can be purchased (Vol. I - \$2.40 and Vol. II - \$1.90) from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

#### RESEARCH REVIEW

Project Title: Biophysical Control of Water Loss

Principal Investigators: Charles Y. Sullivan, Associate Professor

E.J. Kinbacher, Professor  
Department of Horticulture and Forestry

Jerry D. Eastin, Professor  
Agronomy Department

It is well known that much of the nation's water utilization follows the soil-plant-atmosphere path. While a great deal of attention has been given to crop cultural and management practices for best utilization of the available water resources and to measurement of conditions which contribute to high evapotranspiration, relatively little attention has been given to the physiology of the plant and its role in governing water utilization and the efficient use of water in producing a marketable crop.

This project is designed to investigate the nature of plant water conservation and utilization mechanisms and physiological responses to heat and drought stress on processes such as photosynthesis, respiration, stomatal movement, flowering and seed or fruit development. Water utilization of several crop types is being related to the physiological and biophysical mechanisms of drought resistance. Methods are being developed for practical plant breeding selection of genotypes which minimize water use per unit of economic dry matter produced.

Project research has shown that marked differences occur in different plant types responding to different levels of water availability. Some react by closing their stomata much sooner than others when soil water deficits occur. Corn and pearl millet, for example, generally close their stomata sooner than the sorghums. Specific studies have related stomatal response of sorghum and corn to root water availability, leaf water potentials and desiccation tolerance. Although corn closed their stomata sooner than the sorghums, leaf water potentials decreased to lower levels in the corn, indicating that other control mechanisms for water loss in corn are less effective than those of sorghum. These other mechanisms of plant control of water loss are under investigation. Desiccation and heat tolerance tests have shown that corn has higher tolerance than sorghum, but inadequate control of water loss results in greater drought injury to the corn.

A leaf disc method has been used to select plants with high heat and desiccation tolerance. Results have shown that varieties selected for high heat and desiccation tolerance by the leaf disc method also have high water use efficiency values.

Efforts are continuing to define the range of existing plant water loss and utilization mechanisms and, in cooperation with plant breeders, to use the knowledge gained in selection and development of plant types which exhibit the most advantageous use of available water.

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4. Transactions of the American Society of Civil Engineers, Vol. 138, New York, 1973.
5. Annual Report, Federal Working Group on Pest Management, February 1972-February 1973, Washington, D.C.
6. Water Resources Bulletin, American Water Resources Association, Vol. 9, No. 6, December, 1973.
7. An Ecological Evaluation of Stream Eutrophication, Research Report No. 36, Robert C. Ball, Niles R. Kevern and Terry A. Haines, Institute of Water Research, Michigan State University, East Lansing, Michigan, 1973.
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  35. Community Well-Being as a Factor in Urban Land Use Planning, L. Douglas James, Donna R. Brogan, Eugene A. Laurent, Henri Etta Baltimore, Environmental Resources Center, Georgia Institute of Technology, Atlanta, Georgia, January, 1974.
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#### QUESTIONS AND ANSWERS

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