

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Water Current Newsletter

Water Center, The

1-1976

Water Current, Volume 8, No. 1, January/February 1976

Follow this and additional works at: https://digitalcommons.unl.edu/water_currentnews



Part of the [Water Resource Management Commons](#)

"Water Current, Volume 8, No. 1, January/February 1976" (1976). *Water Current Newsletter*. 103.
https://digitalcommons.unl.edu/water_currentnews/103

This Article is brought to you for free and open access by the Water Center, The at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Water Current Newsletter by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Water Current

Millard W. Hall, Director
Volume 8 Number 1

Karen E. Stork, Editor
January/February 1976

GUEST EDITORIAL

Evolving Groundwater Management Policies

by

Deon D. Axthelm, Professor
Department of Agricultural Engineering

We (Nebraskans) have an opportunity to develop our own groundwater management policies and techniques. Management methods used by other states should be studied and where feasible, adapted to meet our particular needs. New innovative approaches also need to be pioneered because Nebraska's water supply, its utilization and legal framework are unique.

Many states have patterned groundwater management, particularly for irrigation uses, on techniques developed for distributing surface water supplies. Adherence to this tradition can unnecessarily place a severe limitation on sound water resource development and conservation. The origin of water in both our streams and in our groundwater reservoirs is precipitation. The storage and flow characteristics, however, are vastly different. Groundwater management policies must be developed with a recognition of the similarities and differences between the two sources of water. Wherever possible, good management also requires the coordinated use of both sources.

LB 577, the Nebraska Groundwater Management Act, does define a policy of conferring responsibility for groundwater management on local organizations. Since hydrologic conditions, water use and attitudes differ across the state, management practices will possibly be different in various areas. Management policies and practices permissible can range from no management to highly restrictive measures. Reasonable policies can be expected to prevail if study of the effects of specific management methods is undertaken.

There is some urgency for making groundwater management policy decisions. Groundwater use, groundwater level declines and local conflicts are increasing. These conditions should not stampede either state or local authorities into making hasty policy decisions. The wells will not run dry tomorrow and ill-advised actions could affect us far into the future.

Citizens of Nebraska are concerned, and a considerable effort has been mounted to evaluate problems and to determine management techniques at local district levels. Policies have not been clearly defined but are emerging. Time and opportunity to continue the testing of management methods should result in sound management policies of our groundwater supplies.

ON THE HOMEFRONT

WATER RESOURCES SEMINAR

The Water Resources Research Institute is offering an interdisciplinary Water Resources Seminar during the 1976 spring semester. The general theme is "Water Resources Policy." The seminar will meet from 3:00 to 5:00 p.m. on Wednesday afternoons in Room 312 Ag. Hall on East Campus.

Seminar topics for the next two months are as follows:

FEBRUARY 11

Water Pollution Control Act Amendments
of 1972, P.L. 92-500

Dayle Williamson, Exec. Sec'y
Nebraska Natural Resources Comm.

- A Review of Implementation Procedures

Daniel T. Drain, Director
Nebr. Department of Environmental
Control

FEBRUARY 18

Safe Drinking Water Act, P.L. 93-523

Cliff L. Summers, Director
Nebr. Department of Health

FEBRUARY 25

Water Resources Development Act,
P.L. 93-251

Richard Buse, Planning Division
Army Corps of Engineers

MARCH 3

National Environmental Policy Act (NEPA)
(and H.R. 35 Amendments)

Peter A. Krenkel, Director
of Environmental Programs
Tennessee Valley Authority

MARCH 10

A Review of National Water
Assessment Activities

William Hutchinson, Asst. Regional
Study Director for the Nat. Assess.
Missouri River Basin Comm.

MARCH 17

Emerging Water Policy Issues

Warren Viessman, Jr.
Environmental Policy Div.
Library of Congress

APRIL 7

LB 577 - Groundwater Regulation in Nebraska

- A Review of the Law

James R. Cook, Legal Counsel
Nebraska Natural Resources Comm.

- Implementation by NRD's

Lee Orton, Exec. Director
Nebraska Association of
Resource Districts

GROUNDWATER MANAGEMENT SHORT COURSE

The Civil Engineering Department, Conservation and Survey Division, the Water Resources Research Institute and Nebraska Association of Resource Districts are sponsoring a two-day short course on "Groundwater Management" March 25-26, 1976 at the Nebraska Center for Continuing Education.

The objective of the conference will be to provide technical background on the hydrology of Nebraska's groundwater resources with a consideration of the implications of LB 577 on the management of this water supply. Registration fee will be \$20.00 (includes lunches and coffees). The conference is directed mainly to the managers of the Natural Resources Districts in Nebraska, but the general public is also welcome.

Topics will include the following:

- Groundwater management alternatives;
- Ground surface water models as a management tool;
- Role of the soil moisture reservoir in groundwater management;
- Lincoln's recharge system; and others.

For further information, contact: Dr. Gary L. Lewis, Department of Civil Engineering, 225 Bancroft Hall, University of Nebraska, Lincoln, Nebraska 68588.

1976 NEBRASKA WATER CONFERENCE

The Nebraska Water Conference Committee and the University of Nebraska Board of Regents will sponsor the 1976 Nebraska Water Conference on March 29-30, 1976 at the Nebraska Center for Continuing Education. The theme of the conference is "Do We Need a State Water Management Policy?".

For additional information on conference topics and speakers, contact Dr. Leslie F. Sheffield, Extension Coordinator-Irrigation, 106 Ag. Hall, University of Nebraska, Lincoln, Nebraska 68583.

WATER RESEARCH IN NEBRASKA

MISSOURI RIVER BASIN COMMISSION

The Missouri River Basin Commission has begun a critical water use study of the Yellowstone River Basin and adjacent coal areas. According to John Neuberger, Chairman of the Commission, "the study will provide an analysis of the impacts of potential energy and agricultural developments on water and related land resources."

The 125,000 square-mile study area includes all or part of 51 counties in Montana, North Dakota and Wyoming. The study will involve state and federal agencies, interested groups, industry and private individuals and will consider national objectives as well as state and regional goals and environmental enhancement. From among conflicting goals and objectives, alternatives will be evaluated and a balanced and implementable plan for the economic, environmental and social well-being of the residents of Montana, North Dakota, Wyoming and the rest of the nation will be recommended.

BUREAU OF RECLAMATION

The Bureau of Reclamation, as part of its advance planning studies for the O'Neill Unit of the Pick-Sloan Missouri Basin Program, has developed a finite-difference groundwater model of that area.

The purposes of the model are: (1) to predict future groundwater levels, assuming present development continues; (2) to determine the level of private development that can be sustained; and (3) to assist in the planning of a conjunctive use project. Project planning uses will include location of project lands to achieve a groundwater balance and determining the needs for seepage control, if any, such as canal lining and subsurface drainage.

The modeled area is 20 by 36 miles, covering the area generally north of the Elkhorn River to 18 miles north of O'Neill, and from 6 miles west of Atkinson to 13 miles east of O'Neill.

The first stage of model verification, which is nearing completion, is to model the predevelopment groundwater levels and groundwater outflow (base flow) to Louse, Eagle, Blackbird, Redbird, Honey, and Big Sandy Creeks, assuming steady state conditions. In conjunction with model development and verification, the Bureau has made some 135 stream discharge measurements, installed 23 groundwater observation wells, drilled and electric- or gamma-logged 14 deep (200 foot +) geologic exploration holes, and run seven resistivity profiles. These supplement existing U.S. Geological Survey and U.S. Bureau of Reclamation geologic and hydrologic data. In addition, geologic and well performance data filed with the irrigation well registrations were also incorporated into the data base.

The second stage of model verification will be to model the historic changes in groundwater levels resulting from the past 15 years of irrigation well development. Present plans are to use a two-layered water table version of the finite-difference model for all nonsteady state modeling.

Input to the finite-difference model is determined by a soil moisture model of the root zone. Using monthly climatic data, along with crop, soil, and irrigation data, this model, which is based on the Bureau's Irrigation Management Scheduling program, computes monthly net recharge or pumpage for each soil or use area in the model.

U.S. GEOLOGICAL SURVEY

The U.S. Geological Survey is studying the movement of nitrogen into aquifers in the Central Platte Natural Resources District. Nine 1½-inch diameter observation wells, screened so that the upper 2 to 3 feet of the water table could be sampled, have been installed. Domestic wells, whose water quality is representative of the groundwater of the area, have been selected within ¼-mile or less from the observation wells, wherever possible. Analyses of samples collected in May and August 1975 from the observation wells indicate that concentrations of organic nitrogen make up a substantial percentage of the total nitrogen content of the water especially for those wells where the water table is very shallow. On the other hand, very little organic nitrogen was observed in samples from the adjacent domestic wells. Indications are that, in many cases, considerable nitrogen in the organic form moves rapidly into the aquifer and that substantial oxidation to inorganic forms takes place within the aquifer.

CONSERVATION AND SURVEY DIVISION

A 1974 baseline groundwater quality study has been completed in the Central Platte Region of Nebraska. Highlights of the study include the occurrence of large zones of nitrate contamination in Buffalo, Hall, Merrick, and Platte counties. As a follow-up study, nitrogen isotopes will be analyzed within the zones of contamination in order to better estimate the sources of nitrogen.

FEDERAL HIGHLIGHTS

OWRT SEEKS APPLICATIONS FOR ONE-YEAR APPOINTMENT AS RESEARCH SCHOLAR

The Office of Water Research and Technology (OWRT) of the Department of the Interior is seeking the services of an "in-house research scholar" who would be employed for a one-year period. The office is seeking names of applicants who would like to work in Washington for one year starting in the summer of 1976.

OWRT can work flexibly with the applicant's home institution so as to provide either full salary or a supplement for a partial salary such as might be needed during sabattical leave. It is hoped that this post would appeal to senior scholars in the water resources field who wish to devote one year to a creative activity which would enhance water resources research. The task of the research scholar would include being creative and supportive of the mission of OWRT, interpreting this in its broadest sense. The specific assignment of any scholar would be tailored to the individual desires and talents of the occupant of the position.

NONPOINT SOURCES CAUSING WATER QUALITY PROBLEMS

Addressing the Water Pollution Control Federation in October, Environmental Protection Agency Administrator Russell E. Train noted that nonpoint sources of pollution are responsible for more than half of the nation's water quality problems. However, the areawide management planning process under Section 208 of the Federal Water Pollution Control Act Amendments of 1972 "offers some dramatic possibilities" for handling the problem.

Train also noted that Congress will probably have to make some adjustments in the deadlines established by the Water Pollution Control Act. He predicted that the National Commission on Water Quality will recommend the easing of 1977 goals for municipalities and probably also for industries on a case-by-case basis. He noted, however, that even though the 1977 and 1983 goals cannot be met on schedule, the goals are important because they keep society's "feet to the fire."

EPA places primary responsibility of handling nonpoint sources with the states and plans to issue guidelines that will require states that have not already done so to assess their nonpoint problems and to plan for the establishment of regulatory programs.

CONFERENCES

EIGHTH ANNUAL WASTE MANAGEMENT CONFERENCE

The 8th Annual Waste Management Conference is scheduled for April 28-30, 1976 in Rochester, New York. The purpose of the Conference is to examine ways to appropriately use the land for waste disposal. Specific emphasis will be placed on: (1) institutional aspects--social, legal and economic; (2) technical aspects--capacity of the soil to assimilate wastes (organics, nutrients, metals, toxic materials, pathogens), effect on crop growth and utilization, monitoring and management, and design criteria for application of wastes to land; and (3) case histories--municipal, industrial and agricultural wastes.

For further information, contact: Agricultural Waste Management Conference, 207 Riley-Robb Hall, Cornell University, Ithaca, New York 14853.

WATER RESOURCES SYSTEMS SHORT COURSE

The Case Institute of Technology of Case Western Reserve University is sponsoring the Fifth Annual Short Course on the "Hierarchical Approach in Water Resources Planning and Management," May 17-21, 1976. The 1976 theme is "Multiobjective Analysis."

The purpose of the short course is to present the state-of-the-art in the field of large scale systems engineering as applied to the planning and management of water resources systems. In particular to discuss the applications of decomposition and multilevel optimization techniques to multiobjective functions in water resources, multiregional conjunctive use of ground and surface water resource and hydrologic systems, regional water quality control and management, flood control analysis, and recent research results and applications in current literature. This short course will document the applications of the hierarchical approach to water resources planning and management systems. The 1976 theme will focus on multiobjective and trade-off analyses in water resources systems.

The fee is \$275 which includes one set of notes, one copy of the book **MULTIOBJECTIVE OPTIMIZATION IN WATER RESOURCES SYSTEMS: THE SURROGATE WORTH TRADE-OFF METHOD**, by Y.Y. Haimes, W.A. Hall and H.T. Freeman, and one copy of the manuscript of the forthcoming book **HIERARCHICAL ANALYSES IN WATER RESOURCES SYSTEMS** by Y.Y. Haimes.

Reservations or requests for further information should be sent to: Y.Y. Haimes, Short Course Director, Systems Engineering Department, Case Western Reserve University, Cleveland, Ohio 44106. Telephone (216) 368-4076.

NATIONAL SOIL EROSION CONFERENCE

A National Soil Erosion Conference will be held May 25-26, 1976 at Purdue University, Lafayette, Indiana in cooperation with ARS and SCS.

The purpose of this conference is to discuss the present and future of prediction and control of soil erosion by water in the following fields: (1) uses of the Universal Soil Loss Equation; (2) effectiveness of present methods for controlling agricultural and nonagricultural erosion; (3) research developments and needs in erosion prediction and control; and (4) erosion and sediment yield control of the future as affected by new laws and foreseeable developments in agriculture.

For further information, contact: W.C. Moldenhauer, Agronomy Department, Lilly Hall, Purdue University, Lafayette, Indiana 47907.

INDUSTRIAL WASTEWATER CONTROL COURSE

A short course on the engineering control of industrial wastewaters will be given by Department of Environmental Engineering faculty and guests at the Cornell University College of Engineering July 5-9, 1976.

Designed for engineers and others responsible for industrial wastewater control, the course is intended both to help them understand the severe limitations that federal and state regulatory agencies are imposing on all wastewaters discharged to natural waters and to sewers, and to improve their ability to produce effluents that will meet the new standards and limitations.

Topics will include water pollution control legislation, regulations and standards; effluent monitoring; industrial wastewater disposal alternatives; effluent reclamation; biological and physical-chemical treatment process theory and applications; solids disposal; synthesis and cost estimation of wastewater treatment systems.

For further information, contact: Professor R. H. Lance, Associate Dean, College of Engineering, Carpenter Hall, Cornell University, Ithaca, New York 14853.

PUBLICATIONS

MRBC ANNUAL REPORT AVAILABLE

The Missouri River Basin Commission announces the availability of their 1975 Annual Report at no charge. The fourth Annual Report reflects the progress that has been made in achieving coordination and cooperation in water and related land resources planning among states and federal agencies and local interests in the Missouri River Basin.

To obtain a copy of the report, contact: The Missouri River Basin Commission, Suite 403, 10050 Regency Circle, Omaha, Nebraska 68114.

NEW NATIONAL WATER QUALITY MONITORING NETWORK

The U.S. Geological Survey has announced a new water-quality monitoring network designed to provide a balanced yearly picture of water quality in U.S. streams on a national and regional scale.

The National Stream Quality Accounting Network (NASQAN) consists of 345 stations that measure 46 physical, chemical, and biological water-quality characteristics, including temperature, specific conductance, and a variety of bacteria, dissolved minerals, trace elements, nutrients, and organic and biological constituents. Measurements are made either continuously, daily, monthly, or quarterly, and the network will be expanded to 525 stations by October 1976.

The USGS-designed network measures a broad range of physical, chemical, and biological characteristics that were selected in response to the information needs of groups involved in water planning and management on a national or regional scale.

NASQAN data will be published in three forms: (1) annual Geological Survey basic-data reports on a state-by-state basis; (2) an annual summary report depicting the nation's surface-water quality; and (3) a series of reports, published every three to five years, that will deal with long-term changes (or lack thereof) in water quality.

NASQAN is more fully described in a new report, "The National Stream Quality Accounting Network (NASQAN)--Some Questions and Answers," by John F. Ficke and Richard O. Hawkinson, published as U.S. Geological Survey Circular 719. Copies of the report are free upon request to the Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, Virginia 22202.

POSITIONS AVAILABLE

POSITION AVAILABLE IN LIMNOLOGY

The Institute of Water Resources at the University of Alaska is inviting applications for the position of visiting assistant to full professor of limnology. The position involves duties in on-going research projects and may involve limited teaching. A background in benthology of lakes and streams and training in fresh-water fisheries is preferred.

Rank and salary will be commensurate with experience. Employment duration will be up to one year beginning January 1, 1976 or later to December 31, 1976.

Applications should consist of biographical sketch, curriculum vitae and publications list and should be sent to: Dr. Robert F. Carlson, Director, Institute of Water Resources, University of Alaska, Fairbanks, Alaska 99701.

The University of Alaska is an Equal Opportunity/Affirmative Action Employer.

RESEARCH REVIEW

Project Title: Mapping Model for Determining Land Suitable for Irrigation

Principal Investigator: Richard O. Hoffman, Associate Professor
Department of Industrial and Management
Systems Engineering
University of Nebraska-Lincoln

This project has two purposes. The first purpose is to investigate the feasibility of using the Department of Commerce's Composite Mapping System (CMS-II) as a methodology and model. The second purpose is testing applicability of the CMS-II system for developing a map which shows land suitable for development of irrigation.

In order to develop plans for managing Nebraska's water resources, the growth and potential growth of irrigation systems must be predicted. For example, in 1972 there were 2,729 active center pivot irrigation systems in Nebraska, and in 1975 there were 8,819. To predict the potential growth the location of land suitable for irrigation must be identified.

The five steps necessary to classify or define land suitable for irrigation when using the CMS-II system are:

1. define the variables which affect the suitability;
2. develop a quantitative measure for each variable;
3. compile and code the data;
4. determine the weight or influence that each variable has in the final criteria;
5. display the alternatives in a fashion to which the various persons and disciplines can be related.

The CMS-II system has two parts to it. Part one deals with the variables and data that affect land suitability. The second part deals with the subjective weighting of these variables and the effect the weighting has on the classification of the land. The final product of the CMS-II system is a series of computer generated maps.

The growth of irrigation systems must be predicted. To predict this growth, the location and number of acres of land suitable for irrigation must be identified. Communicating this information in a map format makes it very usable to the general public. It will give the farmer a guideline as to whether or not to investigate irrigation systems, saving him time and money. Naturally, for a detailed analysis as to whether a particular quarter-section of land is suitable for an irrigation system he would go to his Soil Conservation Service office. Communicating the information in tabular and data processing format will make it usable to water resource planners, land use planners, fuel allocation planners and manufacturing marketing planners in developing their models and making decisions. This project would provide basic data for Nebraska Water Resources Research Institute projects such as Dr. Sander's "Environmentally Compatible Practices for Intensive Irrigation Development" (List, 1974). Also, Nebraska's manufacturing and sales firms associated with irrigation equipment could better plan their future growth potential.

Currently the most popular irrigation system is the center pivot sprinkler system. In 1972 there were 2,729 identifiable operating center pivot systems. This increased to 8,819 systems by August 1975. Each center pivot irrigation system now costs about \$50,000, with a high percentage of these being manufactured in Nebraska. This development of irrigation has a significant impact on industrial jobs and income. The impact on farm income due to increased yields and the switch to high cash yield crops is also significant. A map of the land suitable for irrigation would be of great assistance in planning for both the agricultural and industrial growth in Nebraska. It also would be of use to the water resource planners and researchers.