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# Water Current

Gary L. Lewis, Acting Director  
Volume 11, Number 4

Karen E. Stork, Editor  
July/August, 1979

## GUEST EDITORIAL

### Public Participation and State Water Policy Development

by

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Department of Agricultural Economics  
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The Nebraska Legislature has approved the new State Water Planning and Review Process as a method for identifying water policy choices and their impacts. A public participation element is included in the water planning process but its details have not been established. This essay explores the role of public participation in the water policy process, and suggests how public participation might be made more effective.

Several different groups are involved in water policy making: (1) the Legislature and its staff, (2) state agency officials, (3) University representatives, (4) interest group representatives, and (5) the general public. The first four categories will be involved in any major water policy decisions because of their job responsibilities. The question becomes how and at what point in the policy process can the fifth group, the general public, be involved.

For purposes of discussion the policy development process can be divided into four parts:

- (1) Identification and technical evaluation of policy options. This includes identifying policy alternatives and considering the impacts of implementing different policies. This phase is significant as it identifies what options will receive preliminary consideration by decision makers. Note however, that the policies identified are not necessarily the ones that will be implemented.

- (2) Public debate on policy options. In this phase, the policy options and impacts identified earlier are compared and subjected to a political rather than a technical evaluation. The policy which emerges from this debate may not resemble any of the original options identified, but may be a combination of different alternatives or even a new approach.
- (3) Policy establishment. In this phase decision makers select a policy for implementation. If the decisionmaking group is the Legislature, the result is the enactment of legislation.
- (4) Policy implementation. The new policy is implemented, either through private or public (e.g., administrative) actions.

The trend in recent years has been to focus public participation in the first phase, the identification and technical evaluation of policy options. A contemporary example is the federally sponsored (section 208) water quality studies in Nebraska. Extensive public participation was required in the policy identification and evaluation phase. The intent apparently was that the policy debate would occur during this phase. Accordingly, the policy identification period took approximately three years, but the real public debate phase occurred in the last three months. Interestingly, the level of public participation increased dramatically when a draft report with recommendations appeared.

This not-atypical experience leads to several observations. First, the level of public participation is unlikely to be great in the policy identification and technical evaluation phase. The issues and alternatives are not concrete enough for members of the general public to participate in a meaningful sense. This phase should probably be left to the technical analysts and should not be burdened by potentially inefficient and ineffective public participation.

Second, public participation will be greatest when proposals are concrete enough to allow a citizen to answer the question "how will this change or this proposal affect me?" At this point public participation becomes informed and meaningful. The primary value of the first phase may be almost entirely educational. The options identified in the first phase as being technically feasible may be politically or socially infeasible. The policy debate should perform this political evaluation function.

Third, if public participation in the policy making process is sincerely desired, the period for public comment on concrete policy proposals or recommendations should be long enough to permit informed public comment. If the technical options identified are politically unsatisfactory, additional time will be required to develop alternative proposals.

Legislative Bill 595 charges the Public Advisory Board of the State Water Planning and Review Process with the responsibility for developing a public participation strategy for the water policy studies. The Board could play a useful role in the water policy process by recognizing that public participation is unlikely to be effective until the public has something specific to react to, and by structuring the public participation process so that sufficient time is available to permit informed public comment on water policy proposals.

## ON THE HOMEFRONT

### RESEARCH ASSISTANTSHIPS AVAILABLE

The Water Resources Center of the University of Nebraska has several graduate assistant positions available for students wishing to enroll in masters or doctoral degree programs at the University of Nebraska-Lincoln beginning in the fall 1979 or spring 1980 semester.

The selected candidates will be expected to work 1/3 to 1/2 time during the academic year and 1/2 to full time during the summer months. These positions will require persons who have taken one or more courses in Hydrology.

Two or three of the positions will be involved in a research project focusing on determining the suitability of simplified stream-aquifer-configuration equations for use with realistic stream-aquifer conditions. One of these positions will require an individual with a background in geology. Duties will consist of defining geologic cross-sections for several locations and aiding in estimating detailed aquifer properties at those locations. One or two other assistantships with this project will involve development and use of finite element and viscous flow (Hele-Shaw) groundwater models. One of these positions will require a person with a good applied mathematics background and a working knowledge of FORTRAN programming. The other will require a background in engineering or other physical science.

Another assistantship is available with a research project focused on evaluating various computer models that have been developed for use in simulating the quantity and quality of runoff from agricultural watersheds. Included in the list of models for that evaluation is an early version of HSPF--a model being developed by Hydrocomp, Inc. for the U.S. Environmental Protection Agency. Nebraska is one of the first states to have this model available for student research. Help in modification of one of these models or development of a new model to fit Nebraska conditions may also be necessary. Applicants for this assistantship should have had one or more courses in Hydrology, one or more courses related to Water Chemistry, and should be very familiar with chemical processes. In addition, familiarity with computer programming techniques and ability to use computer facilities is necessary.

Salary for these assistantships is dependent on qualifications, including immediate degree objective, and whether appointment is for 1/3 or 1/2 time. Stipends for 1/2 time service start at \$475 per month. In addition, graduate assistants are eligible for a partial remission of resident tuition. Non-resident graduate assistants are eligible for waiver of nonresident tuition as well as a partial remission of resident tuition.

Additional information may be obtained from Dr. Marvin Damm, Nebraska Water Resources Center, 212 Ag. Engineering Building, University of Nebraska, Lincoln, Nebraska 68583. Telephone: (402) 472-3805. Applications for the assistantships should include a resume of applicable work experience, names of references and a transcript(s) of college and university coursework. Also, an indication of research interests and probable course emphasis should be included with your application. Graduate school applications may be obtained from the University of Nebraska Graduate College Office.

All qualified applicants will receive consideration for the positions without regard to age, race, creed, color, sex, or national origin.

#### GRADUATE RESEARCH ASSISTANTSHIP

A Graduate Research Assistantship, on a research project sponsored by the Nebraska Water Resource Center, is available at the University of Nebraska Panhandle Station beginning October 1, 1979. The prospective candidate will be involved in a project to automate an irrigation system under the control of a microcomputer, i.e., determine evapotranspiration by some empirical technique, measure precipitation and turn the irrigation system on and off at the "appropriate" times. For half of the duration of this assistantship, the student will be in residence at the main campus of the University of Nebraska in Lincoln, and the other half at the University of Nebraska Panhandle Station in Scottsbluff.

Students with a quantitative undergraduate training (agricultural engineering, physics, agronomy, etc.) are encouraged to apply. Background in instrumentation, computer programming or microcomputers would be helpful but not necessary.

Interested students should apply to: Dr. Albert Weiss, University of Nebraska Panhandle Station, 4502 Avenue "I", Scottsbluff, Nebraska 69361. Telephone: (308) 632-2711.

#### FEDERAL HIGHLIGHTS

#### NEED FOR WATER RESEARCH STRESSED

Water resource research in the United States may be giving too much attention to immediate problems at the neglect of long-term problems, according to Joseph S. Cragwall, Jr., associate director of the U.S. Geological Survey, Department of the Interior.

In an address before the annual meeting of the Universities Council on Water Resources at Rutgers University, New Brunswick, N.J., Cragwall said that the nation

has entered into an era of increased competition for water. "This is particularly true," he said, "in the arid and semi-arid West where energy development competes with irrigated agriculture for water, and where the situation is compounded by population growth and new instream requirements for water.

"I see nothing to reverse this trend," Cragwall said. "In fact, as the nation attempts to become energy self sufficient, the competition for water will increase. As this happens, public awareness of water problems will be sharpened, as well as the need for better water management and, along with it, research and manpower."

In his address, Cragwall expressed concern that national policies aimed at improving water management neglect to emphasize the need for research and supporting technology in order to supplement the policies, despite the fact that national water supply and demand are among the top three on the priority list of critical national issues published by the Office of Technology Assessment of the Congress.

Cragwall said that a recent review of water research revealed that the federal government is spending more than \$300 million on water resources research, funded by about 22 federal bureaus and agencies. Cragwall noted, however, that much of this research is done by mission agencies that support research in efforts to better accomplish their missions.

"Whatever the total research view, on hand or in prospect," Cragwall said, "there is the larger ongoing task of hydrologic investigation, water resources assessment, environmental impact, and projections of developmental requirements. I suggest that the university community continue to make significant contributions to all such needs -- not only on research, but also on planning analysis and resource assessment as well."

Cragwall said that the highest priority water resource research areas presently within the USGS include:

- \* High- and low-level nuclear waste disposal;
- \* Regional aquifer (subsurface, water-bearing rocks) studies -- covering major aquifers of the nation;
- \* Urban hydrology;
- \* Studies of water use;
- \* River quality assessments -- including the impact of water quality changes on the ecosystem; and
- \* Drought analysis.

#### HEARINGS RESCHEDULED ON WATER BILLS

Hearings planned for July 10-11 by the Senate Environment and Public Works Subcommittee on Water Resources to consider proposed changes in the Nation's Water development and management policies were re-scheduled for July 24, and September 6-7. Chairman Mike Gravel (D-Alaska) said it was designed to give interested parties additional time to review proposals which the hearings are to address.

Society of Civil Engineers will be held November 19-20, 1979 in Minneapolis, Minnesota.

Topics will include: (1) national and state water resources policy; (2) panel of state water policy implementors; (3) legislative perspective of water policy; (4) risk analysis in design of hydraulic structures; (5) working with watershed districts; (6) water law in Minnesota; and (7) history of shipwrecks on Lake Superior.

Three concurrent workshops will also be held covering: urban runoff control--planning, design, operation and maintenance of facilities; bridge scour failures--predictions and preventative measures; and elements of comprehensive stormwater management planning.

For questions or registration materials, contact John S. Vollum or Leslie Denny, Department of Conferences, University of Minnesota, 222 Nolte Center, 315 Pillsbury Drive, S.E., Minneapolis, Minnesota 55455. Telephone: (612) 373-3157 or (612) 373-5444.

#### WATERSHED MANAGEMENT SYMPOSIUM

The 1980 Watershed Management Symposium, with the theme "Making Watershed Management Work," will be held July 21-23, 1980 in Boise, Idaho. Sponsored by the Watershed Management Committee, Irrigation and Drainage Division of the American Society of Civil Engineers, the symposium will focus on the numerous individual problems attendant to making water management effective. The purpose of the symposium is to bring together those with an interest in the many aspects of good watershed management. It will be of special interest to environmental specialists, planners, civil engineers, agricultural engineers, land managers and hydrologists.

Topics to be presented include legal, institutional and social problems; problems related to surface mining and energy production; nonpoint source pollution; managing watersheds for recreation; new techniques for improving watershed management; and field or planning experiences. Papers are solicited on, but not limited to, the following topics: (1) implications of federal surface mining legislation; (2) quantifying the hydrologic impacts of mining; (3) reclamation of mined land; (4) erosion control-surface mining/208; (5) land management practices and nonpoint source pollution control; (6) the effects of land use practices--urban, silvicultural, agricultural; (7) politics of implementing best management practices; (8) the effect of energy/minerals development on watershed management; (9) simulating land use changes through modeling; (10) watershed/groundwater interactions.

Abstracts of proposed papers should be 200 words or less and briefly describe the proposed paper. They are due by October 15, 1979.

For additional information or suggested abstract format contact: Clifton W. Johnson, NW Watershed Research Center, 1175 S. Orchard, Suite 116, Boise, Idaho 83705.

### CALL FOR PAPERS

The United States Environmental Protection Agency and The University of Texas at Dallas are seeking contributors for their conference on "Combined Municipal-Industrial Wastewater Treatment" to be held at The University of Texas at Dallas, Dallas, Texas, March 25-27, 1980.

The emphasis at the conference will be on the research, design, and operation of combined industrial and municipal wastewater treatment. Topics to be covered include pretreatment, biological and physical-chemical treatment, sludge handling and disposal, and water reuse and recycling.

Abstracts, of not more than 250 words, or requests for further information, should be forwarded to: Professor Aharon Netzer, The University of Texas, P.O. Box 688, Mail Station BE 22, Richardson, Texas 75080.

### PUBLICATIONS

#### ENVIRONMENTAL STATISTICS

A report entitled Environmental Statistics 1978 was recently released by the Council on Environmental Quality (CEQ). The publication brings together in one volume the latest statistics, all from previously published sources, on population and land use; critical areas; human settlements; transportation; industrial production and solid waste; hazardous substances; cropland, forests and grazing land; wildlife; energy; and water and air quality. There is also a chapter on water resources which includes data on freshwater surface supplies in the United States, groundwater supplies, large rivers, water withdrawals and water consumption.

This report is available from National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

#### NEW BOOK AVAILABLE ON RECLAMATION

A new book entitled "Utilization of Municipal Sewage Effluent and Sludge on Forest and Disturbed Land" has been published by The Pennsylvania State University Press. Editors are Dr. William E. Sopper, Professor of Forest Hydrology, School of Forest Resources and Sonja N. Kerr, Environmental Research Analyst, Institute for Research on Land and Water Resources. The book is a compilation of papers presented at a national symposium organized by the editors. One-half of the 44-chapter volume summarizes the current state of knowledge on the economics and environmental impacts of recycling treated municipal wastewater in forest ecosystems. The second half of the book discusses the utilization of muni-

municipal sludge to revegetate lands disturbed by the strip mining of coal. The book is especially timely because of the recent federal legislation which has encouraged the consideration of land recycling of waste products from municipal sewage treatment plants. In addition, new federal strip mine reclamation regulations, together with the rising cost of commercial fertilizer, have resulted in an upsurge of interest in the use of municipal sludge as a fertilizer substitute and soil amendment on land disturbed by coal mining activities.

The book is available from the PENN STATE Press, 215 Wagner Bldg., University Park, Pa. 16802. Cost: \$20.00.

#### USGS EARTH SCIENCE YEARBOOK AVAILABLE

A yearbook providing a comprehensive description of the accomplishments of the U.S. Geological Survey, Department of the Interior, during fiscal year 1978 is available for purchase by the public.

The highly illustrated report summarizes progress of the federal government's largest earth science agency in such activities as identifying the nation's land, water, energy, and mineral resources; classifying federally owned mineral land and water power sites; supervising the exploration and development of energy and mineral resources on federal lands, including the Outer Continental Shelf (OCS); and developing methods to delineate and mitigate hazards associated with earthquakes, volcanic eruptions, landslides, land subsidence, and floods.

The yearbook also includes a series of "Perspectives" -- earth science essays which address national issues. Subjects covered by Perspectives include: ground-water, landslide hazards, an improved prototype environmental impact statement, and petroleum exploration in the Alaskan Arctic.

Copies of "United States Geological Survey Yearbook Fiscal Year 1978" may be purchased from the USGS Branch of Distribution, 1200 South Eads St., Arlington, Va. 22202, for \$5.50 per copy. Prepayment is required with checks or money orders payable to the U.S. Geological Survey.

#### POSITIONS AVAILABLE

#### DIRECTOR SOUGHT FOR AG. EXPERIMENT STATION

The University of Minnesota is seeking a Director of the Minnesota Agricultural Experiment Station. The Director is the principal administrative officer of the Minnesota Agricultural Experiment Station and has administrative responsibility and authority over research programs, personnel and funds of the Experiment Station. The Director shares responsibility and authority with collegiate deans and with the Director of the Extension Service where personnel and programs overlap.

Candidates should have a strong background in research, including demonstrated leadership in program/project development and management. A background in agriculture, forestry, or home economics is desirable, but not essential. Candidates should be thoroughly familiar with the land-grant system and be capable of working effectively in an administrative capacity with a wide range of people and organizations. An earned Ph.D. is required. Salary is commensurate with qualifications, background and experience.

Applicants should submit a resume including previous job responsibilities and noteworthy accomplishments, as well as names and addresses of four references. Nominations will be accepted until August 15, and applications are due September 15, 1979. Nominations, applications and inquiries should be sent to: Dr. Donald C. Rasmusson, Chairman, Search Committee, Department of Agronomy and Plant Genetics, 1509 Gortner Avenue, University of Minnesota, St. Paul, Minnesota 55108. Telephone: (612) 373-1678.

The University of Minnesota is an Equal Opportunity Educator and Employer.

#### UNIVERSITY OF TENNESSEE - KNOXVILLE

The Department of Civil Engineering at the University of Tennessee - Knoxville invites applications from qualified individuals preferably with established records of teaching effectiveness and funded research in environmental engineering. Applicant must have a Ph.D. in Civil or Environmental Engineering and B.S. degree in engineering, in addition to registration as a professional engineer or have passed the EIT.

Responsibilities include: teaching undergraduate and graduate courses in water, wastewater treatment design and sludge treatment and disposal; initiating and conducting funded research; and participating in undergraduate and graduate student counseling, committee work and appropriate public service. Salary and rank are open.

Applicants should send statement of qualifications to: Dr. Roger A. Minear, Chairman of Search Committee, Civil Engineering Department, University of Tennessee, Knoxville, Tennessee 37916.

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

#### SABBATICAL RESEARCH OPPORTUNITIES IN HYDROLOGY AND WATER RESOURCES

The USDA-SEA-AR Hydrology Laboratory provides opportunities for faculty members to spend their sabbatical leaves conducting full-time research in hydrology and water resources. The Hydrology Laboratory is located at the Agricultural Research Center in Beltsville, Maryland. The Lab has excellent computer and library facilities and is located in the Washington, D.C. area near many other federal and educational institutions involved in water resources.

The areas of study that would complement the Lab's ongoing program include general hydrology, hydrologic modeling, non-point source pollution, soil physics, groundwater hydrology, applied meteorology, remote sensing, and reservoir sedi-

Candidates should have a strong background in research, including demonstrated leadership in program/project development and management. A background in agriculture, forestry, or home economics is desirable, but not essential. Candidates should be thoroughly familiar with the land-grant system and be capable of working effectively in an administrative capacity with a wide range of people and organizations. An earned Ph.D. is required. Salary is commensurate with qualifications, background and experience.

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mentation. Under certain conditions, the Hydrology Lab can possibly pay travel expenses and part or full salary.

Those interested in this opportunity who would like more information on this possibility, please contact: Dr. Edwin T. Engman, Chief, USDA-SEA-AR, Hydrology Laboratory, Room 139, Building 007, BARC-West Beltsville, Maryland 20705.

#### FACULTY POSITIONS IN ENVIRONMENTAL & SANITARY ENGINEERING

The Department of Civil Engineering at the University of Missouri-Rolla invites applications from qualified individuals to fill a tenure-track position at the assistant or associate professor level in the environmental and sanitary engineering area. Applicants must have a doctoral degree or equivalent experience and the ability to teach at the undergraduate and graduate levels, as well as to develop research. Preferred area of specialization is in water chemistry, water supply or wastewater treatment.

The Department is also looking for a one-year visiting faculty (beginning September 1979) at the assistant, associate or full professor level in the general area of sanitary engineering. The candidate is expected to teach undergraduate and graduate courses as well as to supervise graduate research.

Salary is negotiable depending on qualifications. Appointment will begin in September 1979 or January 1980.

Interested applicants should send resume to: Dr. Ju-Chang (Howard) Huang, Professor and Area Head, Environmental and Sanitary Engineering, Department of Civil Engineering, University of Missouri-Rolla, Rolla, Missouri 65401.

The University of Missouri-Rolla is an Equal Opportunity/Affirmative Action Employer.

RESEARCH REVIEW

PROJECT TITLE: Analysis of Seasonal Persistence of Climate in Nebraska

PRINCIPAL INVESTIGATORS: Merlin P. Lawson and Arthur V. Douglas,  
Climatology Program, Department of Geography  
University of Nebraska - Lincoln

COMPLETED: October 1, 1978

The purpose of this project is to develop statistical and synoptic probabilistic models for forecasting seasonal climate in Nebraska by evaluating the application of climatological contingencies, statistical regression analysis, and the interpretation of teleconnections between tropospheric pressure patterns and associated departures from normal weather conditions.

The intra-seasonal relationship between temperature and precipitation in the state tends to be inverse in all seasons (hot-dry, cold, wet). Once a seasonal anomaly (upper or lower tertial) develops, persistence can be expected. Anomalously warm temperatures in summer and fall generally persist into the subsequent season. Below normal temperatures during the spring and fall have a high probability of persistence into the next season.

Eigenvector analysis also reveals this tendency for persistence of temperature anomalies. According to the first eigenvector for Nebraska's climatic divisions, persistence of monthly temperature anomalies is strongest from late spring to early fall. Examination of mid-tropospheric data lends credence to these findings showing that month-to-month persistence of 700 mb height departures is also confined to this period -- late spring to early fall.

Apparently there is a weak tendency for reversal of temperatures or a return to normal temperatures in springs which have been preceded by cold winters. This tendency for reversal in temperatures between winter and spring is also reflected in the eigenvector analysis. In addition, the 700 mb lag correlation maps show that height anomalies (flow patterns) do not persist from late winter to early spring.

While strong persistence of temperature anomalies is apparently common in Nebraska, anomalies of precipitation are less persistent. The contingency in precipitation patterns between winter and spring, and between summer and fall. Wet springs have some tendency to be followed by dry summers in southwest Nebraska. Wet falls have a strong probability of being followed by wet winters in eastern Nebraska.

Both the contingency table and the eigenvector analyses reveal a tendency for temperature anomalies to be inversely related to precipitation anomalies. For example, cold summers are wet 73% of the time in southwest Nebraska.

An examination of 700 mb flow patterns during cold, wet months vs. warm, dry months indicates the cold, wet periods are frequently associated with major trough development in the western Great Plains. Under this regime frontal activity is more frequent in Nebraska, and moisture from the Gulf of Mexico is readily fed northwards in advance of cold fronts.

Warm, dry seasons are associated with persistent positive height anomalies in the southern and central plains. Under these conditions cold fronts are generally weaker and tropical air from the Gulf of Mexico is less likely to be actively transported into the state.

Independently produced seasonal forecasts by climatic division (64), derived from persistence models alone, were within plus or minus one class value (tertia) 92 percent of the time for temperature contingencies and 78 percent for precipitation predictions. Although statistically there is still less than 50% chance of forecasting the correct class values utilizing the contingency table data.

#### NEWSLETTER ITEMS SOLICITED

The Water Current Newsletter will publish, without charge, announcements, programs for upcoming conferences, employment opportunities or other newsworthy items on hydrology, water resources or related topics.

#### QUESTIONS AND INQUIRIES

Newsletter items and inquiries should be sent to: Editor, Nebraska Water Resources Center, 310 Ag. Hall - East Campus, University of Nebraska, Lincoln, Nebraska 68583; or phone (402) 472-3305.