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Water Current, Volume 6, No. 11, November 1974

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"Water Current, Volume 6, No. 11, November 1974" (1974). *Water Current Newsletter*. 94.
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Water Current

Volume 6 Number 11

November 1974

GUEST EDITORIAL

by

Earl R. Kendle, Chief
Research Division
Nebraska Game & Parks Commission

While still a student at the University of Nebraska, I had the pleasure of having as an acquaintance Roy Green, who was then Dean of Engineering. At one time during a conversation with him, I indicated I was more involved in school and extracurricular activities than I had ever been before, and yet I was probably enjoying life less than ever before. His response was rather surprising to me as a student, particularly when it came from an educator of Dean Green's stature. He said, "What you need to do is set aside time to go fishing." I reflected on that for some time but it was not until many years later that I came to a conscious recognition of the value in fishing that Roy Green apparently understood so well.

Through the intervening years, conservationists have cautioned many times against assigning dollar values to human activities involving fish and wildlife. The rationale for not doing so was that the associated intangible values would not receive due recognition. Indeed, it was these intangible values that Roy Green thought were so important.

We must realize that major decisions, both public and private, are made either on the basis of a cost-benefit ratio, or a combination of political considerations and a cost-benefit ratio. Although the appropriation of water is not on an economic basis, Clayton Yeutter did suggest in 1965 ("A Legal-Economic Critique of Nebraska Watercourse Law") the granting of water rights in the state of Nebraska on the basis of marginal value productivity, an economic principle. Because of a built-in efficiency factor the state must eventually adopt an economic basis for water appropriation. Hopefully, we have the foresight to do so before we are forced into the change by dire water shortages.

So, if we are realistic, we must assign economic value to water-dependent wildlife so the use of water by such wildlife can be appropriately considered along with other legitimate water uses. Assigning such values is a complex problem and includes both tangible and intangible worth. Yet, the intangible value is real and is intangible only because of a lack of definition or explanation.

Research is desperately needed to bring these values into the realm of understanding so dollar figures can be assigned for such activities as fishing, or a trip to a marsh to take in the sights and the sounds and the smells of this environment that are alien to the urban scene. Bird-watching and photography have real value but the value is largely intangible, partly because no direct payment is made to engage in this activity and also because there is no direct measure of the value of environmental diversity to mankind. Ecologists recognize this value as do psychologists and a scattering of individuals in other disciplines. But it is excruciatingly difficult to assign a dollar figure to this value. Nonetheless, we must develop the necessary research to acquire realistic dollar values for our streams, lakes and marshes and their associated fish and wildlife. Realistic dollar values will help Nebraska take a big step toward achieving a balance in water usage--a balance vital to providing its citizens with the greatest possible benefits.

ON THE HOMEFRONT

DEADLINE FOR RESEARCH PROPOSALS

The deadline for filing annual allotment proposals for fiscal year 1976 is December 15, 1974.

Prospective principal investigators should make an appointment to discuss their proposals with the Institute Director before they begin writing. For further information, contact: Dr. Warren Viessman, Jr., Director, Water Resources Research Institute, 212 Ag. Engineering Bldg. East Campus, University of Nebraska, Lincoln, Nebraska 68503, (402) 472-3307.

NWRRI HIRES RESEARCH ASSOCIATE

The Nebraska Water Resources Research Institute announces the appointment of Leonard Sisson as Research Associate. He was previously a Research Biologist with the Nebraska Game and Parks Commission.

Leonard will be involved in the Nebraska watershed modeling program and will be responsible for independent studies and research relative to the development of simulation and screening models for the analysis of large and complex water resources systems.

REGIONAL NEWS

UNDERGROUND WATER SUPPLIES REMAIN THE SAME

At the annual joint convention of the Nebraska State Irrigation Ass'n and Nebraska Water Resources Ass'n, participants were told that this summer's drouth did not have as much effect on groundwater supplies as some earlier reports had indicated. Vince Dreeszen, Director of the Conservation and Survey Division, said that preliminary data from recorded wells across the state

showed underground water levels are about the same this year as they were in 1973. However, the annual status report on Nebraska's underground water supply for 1974 will not be completed until sometime in January.

During the pumping season this year, there was severe drawdown on underground water supplies in many areas that led to reduced flows from some wells. But once the heavy pumping stopped, underground water levels returned to earlier levels.

Dreeszen noted that the decline in underground water levels this summer was not solely attributable to pump irrigation since some of the most severe decline occurred in eastern Nebraska where there is not a great deal of such pumping. The decline in eastern Nebraska was attributable to the lower than normal rainfall this year which is the principal source for recharge of underground water supplies in Nebraska.

While the average underground water supply for 1974 may end up about the same as in 1973, Dreeszen said, pump irrigators in many instances did have water supply problems during the pumping season. This summer's problems indicate that Nebraska will either have to curb increasing drawdowns of underground water supplies until there is an underground recharge program, or else learn to live with recurring situations of water supply problems.

GREATER PRIORITY URGED FOR PLATTE LEVEL B STUDY

Greater priority was urged for the Platte River Basin Level B Study at the 10th quarterly meeting of the Missouri River Basin Commission on November 6-7.

Carroll Hamon, Director of the MRBC Platte River Basin Level B Study, reported to the Commission that work efforts are several months behind. The study is scheduled to be completed by July 1, 1975. Hamon attributed the delay to the low priority the study was receiving among participating agencies.

"Day-to-day activities that are going on within the agencies have high priorities and the Platte Study gets pushed back," Hamon noted. If the work can't be completed in the next few months, then the scope of the study will have to be narrowed in order to finish on schedule.

Hamon reported that he and other study personnel were meeting with citizens in Nebraska, particularly with Natural Resources Districts, to try to reach an understanding of problems. He said that there is continued dissatisfaction because more projects and programs did not meet federal criteria set forth when the study was funded. A list of projects that may be acceptable if federal criteria are changed will be included in a report of the study.

FEDERAL HIGHLIGHTS

COMING CRISIS -- WATER SHORTAGE??

Delegates at the recently completed World Food Conference in Rome, Italy were warned that the next global crisis will be a water shortage, and it may have already begun. Four water-short nations (India, Egypt, Bangladesh and Pakistan) introduced a resolution asking international organizations and the more affluent countries to provide \$2 to \$4 billion a year over the next decade to find new sources of water and improve conservation of the water already available.

Lester Brown, a U.S. economist and adviser to the conference, said "the water potential is by no means unlimited. In the near future the lack of fresh water rather than of land may be the principal constraint on efforts to expand world food output."

Some experts believe the conference's goal of increased world food production would decrease already depleted water supplies, especially in areas where it is needed most. As in the case of food, rich countries have been accused of extravagant use of water. The U.N. Food and Agriculture Organization figures that global demand for fresh water will increase 240 percent by the end of this decade.

Brown noted that "the irrigation potential of most of the world's major rivers (the Nile, Yellow, Indus, Ganges and Colorado) has largely been realized." Brown expressed the belief that disputes over water could lead to international conflicts and said that a world water conference should be held within five years.

EPA ORDERS STUDY OF NATION'S DRINKING WATER

The Environmental Protection Agency (EPA) has ordered an immediate nationwide study of the country's drinking water supplies to determine if they contain cancer-causing chemicals. The survey was ordered after an EPA study of the drinking water supply in New Orleans showed minute traces of 66 organic chemicals, some of which are known to cause cancer.

Russell Train, EPA Administrator, said "what we learn from this national reconnaissance survey will tell us how widespread and serious the situation is that we found in the study of the New Orleans drinking water supply. Undoubtedly these compounds have been present in drinking water for many years. Until recently chemical methods of analysis have not been sufficiently sensitive to detect them. Even with the modern techniques, the concentration of the number of the compounds could not be adequately measured even though their presence was detected."

Train noted that the nationwide study would first involve an analysis of community water supplies to determine how widespread the problem is and whether it is having an impact on health. Later the sources of the chemicals and techniques for removing them will be studied.

EPA is also studying the role of chlorination of water supplies to determine if it causes carcinogens to develop when combined with chemicals already in the water. However, Train noted that current knowledge indicates the benefits of chlorination far outweigh the risks.

WATER RESOURCES COUNCIL TO CONDUCT PROJECT COST SHARING STUDY

Congress has ordered a study of cost sharing, project evaluation standards and other issues affecting water resources development programs, and the Water Resources Council (WRC) has been given the responsibility to conduct such a study. Congress authorized the investigation after questioning the WRC's new discount rate formula last year. The study could cost as much as \$350,000 and is expected to require at least a year.

The Council is considering a series of studies on the impact of various options for changing present policies on national goals as well as water resources programs. However, the final product will be a set of recommendations to Congress which could carry considerable weight.

CORPS OF ENGINEERS REVIEWING PROJECT DEAUTHORIZATION

The Army Corps of Engineers is seeking responses from the nation's governors and local officials on their draft recommendations that long-pending water resources projects in their jurisdictions be "deauthorized." The Corps expects to send the final list to Congress in January, and it could contain up to 300 projects which are eligible for Executive deauthorization under the Water Resources Development Act of 1974.

The law requires an annual review of authorized projects which have received no funds in the previous eight years. Criteria for inclusion on the Corps list of projects recommended for deauthorization are: (1) the project is no longer considered economically feasible; (2) it lacks local support; or (3) the project is no longer required to meet current or prospective needs.

The Chief of Engineers' decision will have the effect of law unless the Public Works committees of Congress take exception regarding specific projects.

METHODS FOR CLEANER IRRIGATION RUNOFF

Runoff from agricultural land is subject to federal-state management with the objective of restoring "the integrity" of the nation's water. However, the direction this management will take is uncertain. Two schemes are provided under P.L. 92-500:

- (1) The permit system which allows discharges. Permit restrictions will become more stringent with time, leading toward the best practicable control technology, then the "best available technology economically achievable," and ultimately to no discharge of pollutants.

- (2) The second scheme for improving water quality requires (in the words of Senate Report 92-414) "technical and financial assistance for the orderly removal of excess water and the efficient use of irrigation water." The process involves having the governors (or the federal government) identify areas with substantial water quality problems. Boundaries and representative organizations capable of developing management plans would be designated. This is the Section 208 process.

Irrigators and others need to determine which method to cleaner runoff is more practicable--permits or the areawide process. Following the more practicable route may require modification or clarification of P.L. 92-500. If so, irrigators need to propose and support such change.

WATER PROPONENTS DEFEND WATER RESOURCES SPENDING

Harry N. Cook, executive vice president of "National Waterways Conference, Inc.," recently declared that the nation should "use waterways to advantage" to increase productivity, thereby overcoming the current economic recession while holding down inflation in transportation costs.

Waterway proponents contend that it would be counter-productive to cut back on investments in water resources with long-range beneficial effects on the economy, such as navigation, simply to achieve short-term federal budget austerity.

"If inflated prices and waning productivity are among our major economic problems, water resources development programs--and particularly water transportation--have much to contribute to the solutions," Mr. Cook noted. Transportation of bulk commodities by water "is the least expensive of all ways to move things," and navigation's competitive effect on other modes of travel holds down inflation throughout the transportation sector. "Cutbacks in investment in projects which actually combat inflation and increase productivity, simply to achieve austerity, is like burning the barn to get rid of the mice," he said.

EXPO '74 "TOTE BOARD" OR RESOURCE USE

A natural resource "tote board" contributed by the U.S. Geological Survey was on display at EXPO '74. It used moving digital counters to provide a continuous tally of the present consumption rate of the nation's key mineral, water and energy resources. At the close of the fair in Spokane, Washington, the "tote board" was returned to the Survey's National Center for refurbishing and public display.

As of November 3, the closing day of EXPO '74, the "tote board" showed the following total amount of resources consumed in the U.S. since January 1, 1974:

-- Iron Ore (tons)	120	million
-- Aluminum Ore (tons)	13	million

- Copper (tons) 1.6 million
- Sand and Gravel (tons). 782 million
- Energy (equivalent barrels of oil). 11 billion
- Water (gallons) 110.5 trillion

For purposes of comparison, the tote board showed the following statistics, reflecting total past consumption of the nation's resources since 1776 and future needs for these resources during the lifetimes of persons now living:

	<u>Past</u>	<u>Future</u>
-- Iron Ore (tons)	6 billion	6 billion
-- Aluminum Ore (tons)	290 million	698 million
-- Copper (tons)	72 million	86 million
-- Sand and Gravel (tons)	30 billion	42 billion
-- Energy (equivalent bbls. oil)	400 billion	585 billion
-- Water (gallons)	4.7 quadrillion	5.9 quadrillion

These statistics reveal that during the lifetimes of persons now living (assuming no change in the present per capita rate of consumption) the nation will use more resources than in all of its previous history. If per capita consumption were to increase as it has in the last few decades, total requirements during the same period would be two to three times larger. This dramatics three major challenges: (1) the urgent need to locate and develop vast amounts of mineral and energy resources; (2) the need to protect the environment from the consequences of such production; and (3) the concomitant need to bring about resource conservation by preventing waste, recycling and increasing efficiency in the use of these resources.

ERTS CAN LOCATE ENERGY RESOURCES AND PROTECT ENVIRONMENT

According to Dr. V. E. McKelvey, Director of the U.S. Geological Survey, NASA's Earth Resources Technology Satellite (ERTS) program will not only help the United States and other nations in locating energy resources but it will aid in protecting the environment also. For example, he said, images recorded by the satellite can be used to detect surface clues to possible petroleum deposits; to monitor snow cover as an aid to power generation, irrigation and flood control needs; and in monitoring the extent of strip mining. With its ability to orbit over the same spot every 18 days, ERTS provides another dimension in data-gathering and helps to fill the baseline information gap.

CONFERENCES

AWRA SYMPOSIUM ON URBANIZATION AND WATER QUALITY CONTROL

The Urban Water Resources Research Council of ASCE and AWRA are co-sponsoring a conference on "Urbanization and Water Quality Control" to be held June 30 to July 2, 1975 at Rutgers University, New Brunswick, New Jersey. The subject of the conference is a long-neglected and pressing national problem--the relationship of urban runoff and unrecorded sources to our water pollution control programs.

A keynote speaker will outline the necessity for approved planning approaches, and highly qualified speakers from both France and England will present accounts of water pollution control activities in their respective countries. In addition to invited speakers, the committee preparing the program will also consider papers from all interested parties. Subjects to be covered in the conference are as follows:

- The Environmental Quality Objective
- Sources of Pollution - Urban Runoff and Nonpoint Sources
- Technology of Data Gathering, Analysis and Treatment
- Alternative Means of Water Pollution Control
- Land Use Planning
- Water Pollution Analysis and Planning under Federal Legislation

Submissions should be sent in triplicate, consisting of a 200-300 word summary of the proposed paper, prior to February 1, 1975 to: William Whipple, Jr., Water Resources Research Institute, Box 231, Rutgers University, New Brunswick, New Jersey 08903.

PUBLICATIONS

FINAL REPORT ON ENERGY ISSUES AND CHOICES

The Energy Policy Project has just published its final report entitled A Time to Choose. The Project was established by the Ford Foundation in 1972 to make a comprehensive study of national energy issues and choices. While the study was financed by the Foundation, the final report was written solely by the Project's independent, multidisciplinary staff, under the direction of S. David Freeman. The views expressed in the final report are those of the Project's staff and no one else.

A Time to Choose concludes that the nation should trim energy growth from the 4.5 percent of the last eight years to about 2 percent per year and can do so without adversely affecting the economy or the amenities of our way

of life. To achieve major energy savings, the Project says, the nation must adopt a consistent, integrated energy conservation policy. It warns that "if the indifference and neglect that helped to create the energy gap continue, the U.S. could drift into a serious long-lasting, energy-environment crisis."

The Project analyzes the nation's energy choices by examining three different versions of possible energy futures for the U.S. through the year 2000. These three alternate futures are based upon differing assumptions about how fast energy consumption will grow. They are not predictions, but merely examples chosen from the infinite variety of real possibilities, to illustrate the broad range of energy futures that are open to the nation and to explore the implications of different growth rates.

In addition to recommending an overall energy policy direction, the final report also reaches conclusions on specific energy-related problems. The Project draws upon the more than 25 studies it commissioned from energy experts in its findings on specific energy issues.

The Energy Policy Project had a 20-member Advisory Board of leaders from business, citizen groups and the academic world, and its comments are published as a part of the report. The Board's comments range over the entire content of the report, endorsing part of it and offering strong criticism of other parts.

For further information on the Energy Policy Project's final report, write to The Energy Policy Project, 1755 Massachusetts Avenue, N.W., Washington, D.C. 20036.

NEW PUBLICATION ON WATER RESOURCE MANAGEMENT

The Agassiz Center for Water Studies announces the publication of The Allocative Conflicts in Water Resource Management. This 560-page book is a definitive work on the present state of water resource management research. Twenty-eight authors representing a variety of disciplines recommend new directions for future environmental management research not available in any other source.

The publication is available from the Agassiz Center for Water Studies, Room 230, Engineering Building, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2 at a cost of \$8.50.

SALINITY IN WATER RESOURCES

Ecology Today in conjunction with the University of Colorado announces the publication of Salinity in Water Resources - Proceedings of the 15th Annual Western Resources Conference at the University of Colorado. The text is edited by Charles W. Howe, Department of Economics, and J. Ernest Flack, Department of Civil and Environmental Engineering, at the University of Colorado.

The valuable research information contained in the book makes it the only up-to-date reference source on salinity. It contributes important facts and concepts which fit into appropriately broad social and physical systems approaches to the management of salinity.

This publication may be obtained from Ecology Today, P.O. Box 2154, Boulder, Colorado 80302 at a cost of \$10.00

RESEARCH REVIEW

Project Title: "Water Quality Study of Runoff from Agricultural Lands"

Principal Investigator: Dewey R. Andersen, Associate Professor
Department of Civil Engineering
University of Nebraska-Lincoln

The objectives of this project are: (1) to determine the quantity and quality of runoff from agriculturally oriented drainage basins; and (2) to evaluate and develop modeling programs for simulating runoff from agricultural areas. This study has been in progress for over one year, and most instrumentation is in place.

Field observations have been made of the cropping practices in the study watershed, Dee Creek. In addition, questionnaires are being prepared to obtain additional data relative to fertilizer and pesticide applications, livestock, crops and tillage and conservation practices.

Continuous recording rain gages are located at eight points on the drainage basin. Time, intensity and duration of rainfall events are being recorded.

Instrumentation is complete on the major sampling station. A footbridge across the channel has also been constructed. Streamflow at this station is being monitored continuously for pH, dissolved oxygen and temperature. Recorders for these instruments are housed in a small corrugated metal building located adjacent to the channel at the sampling station. Automatic sampling equipment for collecting samples of runoff are also housed in this structure. Since these instruments are not designed for cold weather operation, they will be removed during these periods and stream samples will be collected manually for analyses. Runoff events will also be sampled manually. Weekly samples of baseflow are also being collected.

Runoff data were not available for the study watershed for use in model evaluation. However, three models are being considered for possible use in the project.

The EPA model, one of the programs being considered, has been checked with supplied data and is operational. Consideration is being given to modifying this program in a manner so that the drainage area associated with each rain gage station is modeled.

The ARS hydrology model has also been studied and is operational. It is planned to evaluate the ARS sediment and chemical models. However, at this time these models are not available.

SIMRUN, a hydrology model developed at the University of Nebraska, is also being considered for use in this study. Some work has been done on the development of a subroutine for this model for sediment transport.

This project is designed to obtain needed data on the quantity and quality of runoff from an intermediate size agricultural drainage area and to use these data in evaluation and development of techniques for assessing the effects of nonpoint sources of pollution. Many similarities between this basin and others in the Northern Great Plains exist, and it is expected that the data will be highly transferrable.

HAS
YOUR
WATER
GONE
DOWNHILL
LATELY!

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