

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Water Current Newsletter

Water Center, The

---

3-1972

## Water Resources News, Volume 4, No. 3, March 1972

Follow this and additional works at: [https://digitalcommons.unl.edu/water\\_currentnews](https://digitalcommons.unl.edu/water_currentnews)



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

---

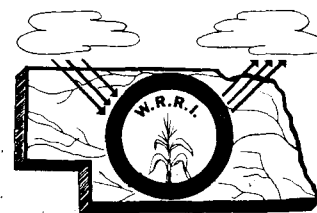
"Water Resources News, Volume 4, No. 3, March 1972" (1972). *Water Current Newsletter*. 63.  
[https://digitalcommons.unl.edu/water\\_currentnews/63](https://digitalcommons.unl.edu/water_currentnews/63)

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 RESOURCES NEWS

NEBRASKA WATER RESOURCES RESEARCH INSTITUTE  
212 AGRICULTURAL ENGINEERING BUILDING

THE UNIVERSITY OF NEBRASKA  
LINCOLN, NEBRASKA 68503



Volume 4 Number 3

March, 1972

## 1972 ANNUAL MEETING OF UCOWP

The 1972 Annual Meeting of the Universities Council on Water Resources will be held at Amherst, Massachusetts, July 24-26. The title of the conference will be "Changing Education Needs in the Field of Environmental Resources," with the principal effort being to explore various aspects of education--including formal, continuing engineering, state water agencies, the Office of Education, manufacturing industry, Federal water agencies, and the political arena is proposed. There will be a thorough look at formal education, continuing education, and informal programs, and the conference will be designed to provide valid criticism and ask for positive suggestions. In particular, the following areas are thought in need of discussion: (1) training needs, (2) an assessment of present programs and the product they are producing, (3) the role of technical institute programs, (4) degree versus continuing education and informal programs, and (5) the value of training grants.

The first presentation on Monday morning will be by a representative of the Office of Education and will be entitled "Environmental Resources Education."

This will include both pre- and post-university kinds of education. The second address will be by The Honorable John W. Oliver, state legislator from the State of Massachusetts, and will be entitled "A Legislator's View of University Education." The first afternoon presentation, entitled "Changing Needs in Water Resources Education - An Engineering Point of View," will be given by Harry L. Kinsel, Chairman of the Board, Metcalf and Eddy Engineers, Boston, Massachusetts. The second presentation will be by Kenneth S. Watson, Director of Environmental Control, Kraftco Corporation and will be entitled "Changing Needs in Water Resources Education - An Industrial Point of View." The luncheon address on the first day is to be given by Dr. Lois Sharpe, Staff Coordinator, Environmental Program and Projects, League of Women Voters. It will be entitled "Changing Education Needs in the Field of Environmental Resources."

On the second morning the first paper will be given by Edgar A. Imhoff, Director, Land and Water Resources Center, University of Maine, and will be entitled "Changing Needs in Water Resources Education - A State Water Planning Agency Point of View." The final talk, entitled "Changing Needs in Water Resources Education - A Federal Agency Point of View," will

be given by Joseph Tofani, Policy and Analysis Division, Office of the Chief of Engineers.

The banquet address, Tuesday evening, will be given by Frank Gregg, Chairman, New England River Basins Commission. The subject of his address will be "The Future of River Basin Commissions."

#### SUMMER SHORT COURSE PLANNED

The University of Nebraska, Department of Civil Engineering, will sponsor a short course entitled "Rivers Systems-Planning and Environmental Aspects" July 24 - August 5, 1972. The fee will be \$300 per person, which includes costs for river field trips.

Planning concepts from engineering, ecology and geomorphology will be used by participants to prepare a preliminary plan for river regulation. Theory and recent developments in the fields of sediment transport, channel stabilization, movable bed models, and river management will be applied to a team solution of a river problem.

Following presentation of basic theory, two days will be spent in the field to study river problems downstream from the Lewis and Clark Reservoir. An inspection of the river will be made by boat of the meandering channels above Sioux City. This trip will give participants firsthand appreciation of the river environment and of problems of planning river developments.

The course will conclude with work on large river models inspection of the navigation channels

development through the Omaha area, and a presentation and critique of workshop projects.

Participants will include ecologists, engineers, geologists, planners, and other professionals engaged in the planning, design, and operation of river controls, reservoirs, and related hydraulic systems, and teachers in these fields.

#### SIMULATION OF WATER RESOURCES SYSTEMS

The Nebraska Water Resources Research Institute will sponsor a one-week Summer Institute on Simulation of Water Resources Systems from July 9-14, 1972.

For further information contact Dr. Warren Viessman, Jr., Director, Water Resources Research Institute, 212 Agricultural Engineering Bldg., University of Nebraska--East Campus, Lincoln, Nebraska 68503.

#### INSTITUTE ON APPLICATIONS OF STOCHASTIC METHODS IN CIVIL ENGINEERING

This institute will be held from August 21 to September 1, 1972 at Colorado State University, Fort Collins, Colorado. A wide spectrum of topics in civil engineering will be covered including: management decisions; hydrology, groundwater, and water resources systems; structures, structural mechanics, and solid mechanics; transportation; hydraulics and fluid mechanics; sanitary and environmental engineering.

Concepts and use of stochastic methods will be stressed in this institute. In the interest of establishing a common foundation, there will be a set of introductory lectures on basic concepts in probability and statistics which will be supplemented by workshops to emphasize application. Following the introductory series a set of lectures including some simultaneous sessions will be presented in the topics listed and will be so arranged that the participants may select those lectures of more interest to him. The lectures will be summarized and distributed to accepted participants in advance of the institute to provide time for preview.

The institute is directed to the community of civil engineers and related professionals and offers an opportunity for continuing education. It is anticipated that a wide spectrum of background knowledge will prevail among the participants. The format of the institute is designed to take this into account. It is recommended that participants have the equivalent of a B.S. Degree in Civil Engineering with some elementary knowledge of probability and statistics.

The institute fee is \$350, which includes cost of printed lecture notes and special events. Interested persons may direct correspondence to: Professor S. Karaki; Civil Engineering Dept.; Colorado State University; Fort Collins, Colorado 80521.

#### INSTITUTE ON RIVER MECHANICS

An Institute on River Mechanics, emphasizing impacts on environment,

will be held at Colorado State University from July 31 to August 11, 1972.

The purposes of this institute are to present basic knowledge on resistance to flow, sediment transport, measurement techniques, reservoir sedimentation, and channel stability; to present lectures by leading experts on their experiences in various aspects of river behavior; to discuss selected impacts on river environment; and to illustrate river behavior by laboratory participation and demonstrations.

Participants will be individuals dealing with various aspects of rivers. The course content is "application-oriented." Special arrangements can be made for persons who attended the institute in 1970 to attend the second week only.

The \$375.00 fee for this institute includes River Mechanics Volumes I and II, edited by H. W. Shen; additional lecture notes; Icebreaker (including dinner and dancing) on Monday, July 31; field trip to the Rocky Mountain National Park area on Saturday, August 5; and a banquet on Thursday, August 10.

For additional information write to: Dr. H. W. Shen; Professor of Civil Engineering; Engineering Research Center; Colorado State University; Fort Collins, Colorado 80521.

#### WATER RESOURCES SYSTEMS - SHORT COURSE

A one-week short course for engineers and public officials interested in water resources

systems will be held May 22-26, 1972, at Case Western Reserve University, Cleveland, Ohio. The short course, entitled "Hierarchical Approach in the Planning, Operation and Management of Water Resources Systems," will be co-sponsored by Case Institute of Technology of Case Western Reserve University and the American Water Resources Association.

The purpose of this short course is to present a comprehensive survey of the applications of the hierarchical approach to large complex water resources systems. There will be four 90-minute lectures given each day, Monday through Friday. Extensive use will be made of visual aids, and a complete set of all overhead projector transparencies will be provided to the participants prior to the lectures. New methods and theory introduced in lecture will be presented and explained via simple examples. Often, while a new method is discussed, it will be simultaneously developed and applied to a water resource example problem; thus the theory and its applications are discussed in parallel. This approach provides the participant with a close grasp of and comprehension of the material discussed. Separating the lectures will be a "coffee break" and opportunity for informal discussion of the lecture material. Three out of the five 3:00-4:30 afternoon sessions will be devoted to "workshop" and problem working. In addition, optional special evening tutorial sessions will be available to those participants who need a further review of systems engineering methodologies.

The course fee is \$200 which includes complete course notes and

use of laboratory. A three-day registration fee (May 22-24) of \$150 will be charged for participants who cannot stay for the complete five-day course. Enrollment may be made by individuals or companies. Any number of persons from a single company may enroll as long as there are vacancies. To insure enrollment (class size is limited), individual names must be received by the university before May 1, 1972.

For additional information write Dr Yacov Y. Haimen; Systems Engineering Division; School of Engineering; Case Western Reserve University; Cleveland, Ohio.

#### INTERNATIONAL SYMPOSIUM ON MATHEMATICAL MODELLING TECHNIQUES IN WATER RESOURCES SYSTEMS

The Canadian Department of the Environment will sponsor an International Symposium on Mathematical Modelling Techniques in Water Resources Systems to be held in Ottawa, Canada, May 9-12, 1972.

The purpose of the symposium is to bring together international experts from all disciplines associated with the development and application of mathematical modelling techniques to the planning, design, operation and management of water resource systems. The symposium will be truly interdisciplinary with the participation of economists, engineers, political and social scientists and others associated with this field. In order to make the symposium meaningful and encourage freer discussion, attendance will be limited to about 250 persons.

The program will be made up of six sessions, each opened by a state-of-the-art speaker: Session A--Economic, Social and Political Models; Session B--Water Quality Models; Session C--Ecologic Models; Session D--Estuarine and Lake Models; Session E--Hydrologic Models; Session F--Systems Overview. Simultaneous French and English translation will be available.

Preregistration fee (prior to April 20, 1972) is \$30. Registration at the conference (if available) will be \$40. Registration fee includes reception, banquet and proceedings. The proceedings will be mailed to participants prior to the conference.

For further information write: Dr. Asit K. Biswas, Chairman; Organizing Committee; International Symposium on Modelling Techniques in Water Resources Systems; Department of the Environment; Ottawa, Ontario, Canada K1A0Z1

#### SEMINAR ON ADVANCES IN PRACTICAL HYDROLOGY

The Department of Civil Engineering of Penn State University will sponsor a seminar on advances in practical hydrology to be held September 11-15, 1972. The purpose of the seminar is to present and explain the latest proven techniques in hydrology so that they may be directly applied to water resources problems.

Subjects to be studied include: (1) graphical and statistical analysis of rainfall and stream-flow maxima; (2) design storms and the flood volume they produce in

different seasons; (3) unit hydrograph theory, application, and results; (4) flood damage, cost efficiency curves, and marginal analysis for multipurpose schemes; and (5) the state of the art of urban hydrology. Four "hands-on" evening workshops will ensure that participants can apply the methods to practical problems.

The seminar is designed for civil engineers, agricultural engineers, economists or planners with developing local, state, or federal alternatives for handling water resource problems. The fee is \$200, and advance registration is very important to the organization of the seminar as it will be limited to 25 people.

Further information is available from the Conference Center--Continuing Education; J. Orvis Keller Building; The Pennsylvania State University; University Park, Pennsylvania 16802.

#### NWRA RESOLUTIONS

The National Water Resources Association at their annual meeting in Dallas, Texas, unanimously accepted the report of the Resolutions Committee headed by Jack Ross, Denver.

The resolutions included a position on state water quality control asking that Congress continue to recognize the primary responsibility of the states to prevent and control water pollution and eliminate duplicative or parallel administrative or enforcement procedures that have been created with the Federal Government.

The Federal government is asked to give high priority to the Western U.S. Water Plan Study but that the study be reprogrammed to avoid duplication of previous study efforts and meet the intent of Congress expressed in the legislation.

#### EPA TO BE ADVISED BY EXPERTS ON SEWAGE PLANT CONSTRUCTION

The Environmental Protection Agency announced that it has formed a permanent technical advisory group to provide expert engineering advice in EPA's multi-million-dollar grants program for construction of new, expanded and updated municipal treatment facilities throughout the nation. Representatives of the American Society of Civil Engineers, the Water Pollution Control Federation, the Association of Metropolitan Sewerage Agencies, the Water and Wastewater Equipment Manufacturers Association, and the American Public Works Association are among the members.

#### GAO QUESTIONS EPA INSISTENCE ON CLEAN WASTE WATER

In a report to Congress, The General Accounting Office takes issue with the Environmental Protection Agency's position that it will not provide Federal funds for sewage projects along the river unless the states agree to secondary treatment.

The GAO estimates the cost of secondary treatment along the Missouri main stem at \$206 million, and says the money should be used

for "more pressing" needs--such as projects to stop the discharge of raw sewage into the river through construction of interceptor sewers and enlargement of existing plants. The GAO report said a 1975 deadline set for Missouri, Kansas, Nebraska, and Iowa to provide secondary treatment of municipal wastes entering the river should be reconsidered by EPA.

In disagreeing with the GAO, EPA conceded little more than that primary treatment would be better than no treatment. EPA put major emphasis on the public health benefits of "effective disinfection" of wastes achieved through secondary treatment, saying the river provides the drinking water of some 3 million people. EPA said since secondary treatment would be needed eventually in any event, it would be less costly to build a "total facility" rather than separate primary and secondary plants.

The recommendations of the GAO are not binding on the EPA. However, they might result in Congress taking another look at the program.

#### STUDY ON WATER SUBSIDIES

Taxpayers paid at least \$63 million for Federal subsidies in fiscal 1970--not counting subsidies going to reclamation and other major water projects.

A staff study of the federal subsidy system made for the Joint Economic Committee says reclamation and some other programs had to be omitted from a study of federal subsidy programs because they were too difficult to measure.

The staff report said, "A more complete investigation of natural resources will be necessary before the full costs of subsidies in this area have been determined."

The staff found government subsidies totaling some \$63 billion, even without the water subsidies. Chairman William Proxmire, D-Wis., on releasing the report in advance of hearings on the subject, said the existing system is "a mindless means" of spending the taxpayers' money--chiefly because so little is known of how subsidies work and whether they actually achieve their goals.

The study said natural resources subsidies (including construction grants for sewage treatment plants, basic water and sewer grants and other such water-related programs) totaled more than \$3 billion in fiscal 1970.

#### EPA BIAS FOR SEWAGE HINDERS FARM CLEANUP

Included in a GAO report that criticizes EPA for insisting on secondary treatment of sewage discharged into the Missouri River (see article on page 6) is a brief report on the status of farm-related pollution research.

According to GAO auditors, EPA regional officials told them that a comprehensive study of agricultural water pollution was needed in the Missouri Basin but this should not be allowed to delay programs to control municipal wastes. They complained of a shortage of funds and manpower that they said had restricted such

research work in the area. The GAO summary said further that examiners were told by EPA regional officials in October 1969 that little effort had been devoted to agricultural pollution "because they considered these problems to be primarily the responsibility of state pollution control authorities."

The Agricultural Research Service office in Lincoln, Nebraska, was visited by GAO examiners. The purpose of this visit was to look into projects on feedlot pollution under way in cooperation with the University of Nebraska's Agricultural Engineering Department. The report said no definite conclusions had been reached by the researchers, but the chief of the research team said tests of the activated-sludge method of secondary treatment had resulted in less than 50 percent removal of oxygen-demanding materials and that the method might not be practical.

#### LAND USE PLANNING

The second annual report of the Council on Environmental Quality issued in August 1971, points out that the traditional local zoning system is not suited to protect broader state, regional, and national values. Local governments have, the report contends, a limited perspective on and little incentive to protect scenic or ecologically vital areas located partially or even entirely within their borders. Development is often spurred by economic pressures, to the detriment of the environment, because of local government dependence on property taxes.



The report claims that local land use regulation alone cannot deal effectively with many of today's environmental problems--protecting lands that have natural or aesthetic value to a region, accommodating development that is necessary for a region but may not be desired by local communities, and controlling large-scale development that impacts upon more than one local government. Land use regulation aimed at overcoming these problems has been initiated by many states.

Control of land use in important geographic areas has been assumed by several states in order to preserve fragile ecological characteristics from incompatible development. An increasing number are becoming concerned about prime agricultural land near urban areas that is being taken over by housing, industrial and other complexes. This concern is based upon a desire to prevent urban sprawl and to preserve urban area open space, as well as from the wish to preserve prime farm lands.

#### RURAL DEVELOPMENT ACT (H.R. 12931) PASSED BY HOUSE

The House has passed major legislation to improve water quality and business activity in rural America. By voice vote, the Rural Development Act (H.R. 12931) was sent to the Senate on February 23. The measure was written by the House Agriculture Committee, which approved \$280 million annually in new grant authority, mostly for water and waste treatment projects in towns of less than 5,500 people. However, on the House floor, members boosted the committee's

\$200 million annual authorization for water and waste disposal projects to \$500 million. Existing authorization is only \$100 million.

Other water funds include \$30 million for water and sewer planning grants (up from \$15 million a year now) and \$75 million a year for pollution abatement and control grants to both public and private industries.

The legislation also provides, for the first time, authority for the Secretary of Agriculture to bear up to half of the cost of the storage of water for municipal and industrial uses, and for rural community water quality management. This is a major change to the Bankhead-Jones Farm Tenant Act.

Among amendments defeated on the House floor were proposals to prevent profit-making polluters from receiving subsidies, a proposal to give the public access to lakes and reservoirs built by funds from the Interior Department, and a move to prohibit granting of funds for channelization unless the Agriculture Secretary or Interior Secretary says the grants will be in the public interest.

#### SALINE WATER BILL GOES TO HOUSE

The Administration's request for \$26.8 million for the saline water conversion program for fiscal 1973 has been approved by the House Interior Committee. H. R. 12749, passed February 23, would continue the program with about \$154,000 less than in fiscal 1972. Quick House acceptance is expected.

The Committee refused the Administration's request to repeal patent policy which the Office of

Saline Water says discourages industry participation in desalting research.

The Administration wanted to decide on a contract-by-contract basis the thorny problem of "background" patents. The effect of the Committee move is to leave present law standing. Now, any developments under government contract go into the public domain --with the exception of background techniques developed earlier by individual companies. Some of the best companies, argued the Administration, were not getting into saline water research for fear of losing their earlier inventions to the public domain. Committee members said they sympathized but believe the Administration hadn't made its case.

The Committee said new language could be proposed later by the Administration for consideration in place of the present law. However, there are indications that the Office of Saline Water will let the matter drop for this year.

#### 1973 USGS BUDGET FOCUSES ON EARTH SCIENCE DATA

The U.S. Geological Survey, Department of the Interior, will step up efforts to acquire basic earth science knowledge needed for the wise management of land, energy, and mineral resources during the fiscal year 1973.

Dr. V. E. McKelvey, U. S. Geological Survey Director, said that "If the Nation is to cope successfully with clashing resource-environmental problems arising

from the need on one hand for vast amounts of natural resources, while, at the same time, recognizing the need to avoid environmental degradation, such data are fundamental requisites." McKelvey noted that the fiscal year 1973 budget estimated for the Survey amounts to \$145,665,000--an increase of \$14,615,000 over the current year appropriation. He said, "Largest increases are requested for programs involving earthquake hazards reduction, land resources analysis, Continental Shelf Investigations, geothermal resources investigations and lease management, and the Interior's EROS (Earth Resources Observation Systems) program administered by the USGS." "Working towards this goal," McKelvey said, "we are initiating a new land resource analysis survey program aimed at improving the Nation's ability to make wise, safe, and efficient use of its valuable land resources."

"Also during the coming fiscal year," McKelvey noted, "the first unmanned satellite will be launched by NASA to make repetitive surveys of the earth's features and resources, using conventional and other remote sensing devices. Results of our feasibility studies indicate that earth science data obtained from high altitudes will be a boon to the management of the Nation's natural resources."

#### PROPOSED REVISIONS TO GUIDELINES ON ENVIRONMENTAL IMPACT STATEMENTS

The Environmental Protection Agency (EPA) and environmental groups provided the only response to the CEQ request for suggested

changes in guidelines on environmental impact statements. Air/Water Pollution Report for January 17 states that no comments were received from industry by the January 11 deadline.

EPA recommended an overview statement where projects involve several agencies and several environmental considerations. The agency suggested that government agencies should notify the public if they are planning to prepare a statement to facilitate public comment prior to completion. It also proposed a benefit/cost analysis of project's environmental impact.

As a general guideline for the preparation of impact statements, EPA recommended that each agency should: (1) identify environmental considerations, (2) categorize actions likely to need a statement, (3) identify needed basic information, (4) identify time within which decision on need for project would be made, (5) set guidelines for determining if a statement is necessary, and (6) set procedures for implementing the decision reached.

The EPA is now preparing sample guidelines for the preparation of environmental impact statements for sewage treatment plants.

#### RETURN OF WASTES TO THE LAND

Muskegon, Michigan, plans to construct a \$30 million system that will put its waste effluents back on the land this year. The sewage will be piped 15 miles to an aerating lagoon where it will remain for several days while

bacteria, encouraged by the sun and air, will consume a great part of the odor-causing organisms. The wastewater will then be released into storage lagoons where solids will be settled out. The remaining wastewater will be pumped to center pivot irrigation rigs which will spray the water on 10,000 acres of what has been barren earth. The town fathers plan to make the plan pay for itself by leasing out 6,000 acres of irrigated land for animal-food and industrial-crop production. They are confident that the waste nutrients will make the land tillable and, eventually, fertile. New jobs in the area will be prompted by the system's construction and operation, thereby helping to alleviate Muskegon's high unemployment rate.

#### UNDERGROUND WATER-STORAGE TEST A SUCCESS

A test to store water by "injecting" it through wells into water-bearing subsurface rocks (aquifers) beneath Norfolk, Virginia was carried out successfully by hydrologists of the U. S. Geological Survey, Department of the Interior. USGS water scientists, in a recent trial "recharge" effort, injected about 200,000 gallons of fresh water into a natural underground reservoir containing brackish (salty) water. The reservoir underlies the Norfolk area at a depth of about 950 feet. The well was recharged at a rate of about 400 gallons a minute for more than eight hours. After leaving the fresh water in the brackish water reservoir for 16 hours, the Survey reported, they were still able to recover more than 75 percent of the

injected water, and that the well was pumped out at a rate of about 800 gallons a minute. Apparently the fresh water tends to push the brackish water away from the injection well and to form a bubble of fresh water. USGS views this as a long-range project that will eventually enable the underground storage of hundreds of millions of gallons of fresh water for several years.

#### SYSTEM FOR RATING POLLUTION-EUTROPHICATION POTENTIAL OF LAKES

In an unpublished report just released to the Maine Center, Dr. Ronald B. Davis, Associate Professor of Botany, University of Maine (Orono), reveals a system he has developed for ranking the probable vulnerability to pollution of certain Maine Lakes. The scheme is based on an analysis and comparison of lake shoreline length, lake surface area, lake mean depth, lake water volume, tributary drainage area, and geologic substrata. Inquiries should be addressed to Dr. Davis; 11 Deering Hall; University of Maine; Orono, Maine 04473. Telephone (207) 581-7861.

#### WASTEWATER RECYCLING PROGRAM IN CALIFORNIA

The Bureau of Reclamation has agreed to amend the water service contract with the Contra Costa County Water District in California to facilitate the District's participation in a major wastewater recycling program.

The program is designed to provide renovated water for further beneficial use, and the interception of the sewage pollution will aid in improving the water quality in the California Delta. Its purpose is to conserve water resources in the Central Valley project and to avoid construction of water projects when feasible by intercepting and treating stream-polluting domestic sewage and reclaiming it for industrial use and open-space irrigation. The program is expected to make 20,000 acre-feet of reclaimed water available annually.

#### OWRR INITIATES COMPUTER RETRIEVAL NETWORK

Dr. H. Garland Hershey, Director of the Office of Water Resources Research (OWRR), announced March 7th that a grant of \$99,858 had been made to the University of Oklahoma to study the operation of a national computer network of retrieval centers for water resources information and to initiate and service the first three of these centers. The three selected for the study are state water resources research institutes located at the University of Wisconsin, Cornell University, and North Carolina State University. These along with the Water Resources Scientific Information Center (WRSIC) in OWRR will be connected by remote terminals and telephone lines to the Merrick Computing Center facilities at the University of Oklahoma.

By using the innovative and proven Generalized Information Processing System (GIPSY) developed

by the University of Oklahoma's Dr. James Sweeney, WRSIC will expand its quick-response and comprehensive retrieval services to the water resources community.

Eventually, if proven feasible, additional state water resources research institutes, Federal water resource agencies, and interested groups may be added to the network. Beginning in April those desiring computer searches of OWRR-WRSIC data base comprising approximately 40,000 full-text abstracts in all fields of water resources will be able to request them from one of the three retrieval centers mentioned above. Payment to the university centers will be required to cover actual center costs for services provided.

By personally contacting a retrieval center, physical, natural, and social scientists or administrators will be able to receive virtually instant answers to their technical and research questions. They may conduct a dialogue with the computer so as to refine their questions and answers or they may request exhaustive bibliographies in current high interest or problem areas of water resources. They may also query the centers by mail or telephone for prompt and exhaustive answers to their questions.

#### HAWAII RESEARCH PROJECT IN WATER RECYCLING

The 1971 Hawaii State Legislature requested a study of the feasibility of reclaiming water from sewage and other wastewater and broadening the Oahu Water Quality Program to include a

feasibility study of recycling sewage effluents. The Water Resources Research Center, University of Hawaii, has launched a research project in water recycling by irrigation with sewage effluents at the Mililani sewage treatment plant on Oahu. "The project should have statewide impact on the conservation of water resources and the management of wastewater," said Dr. L. Stephen Lau, Director of the WRRRC and the Principal Investigator for the project.

The \$68,000 study, funded by the Board of Water Supply and the City and County of Honolulu, is divided into two companion phases. In the first phase irrigation of grass land, and later sugarcane with secondary treated sewage will be tested. The second phase of the study, now in the planning stage, will monitor the effects of sewage effluent on cane growth and sugar yield.

Dr. Lau said detailed analyses are to be made of the sewage effluent to determine its content and the percolate after passage through various depths of soil. This basic information will enable scientists to determine what materials are being passed through the soils. "When coupled with controlled laboratory data and existing general knowledge, the information should offer a sound base for determining the health hazard and mineral buildup to the existing ground-water supplies," the water researcher said. He indicated the findings should be applicable elsewhere in Hawaii and other tropical areas.

## RESEARCH REVIEW

Project Title: Measuring and Developing Methods of Attitude and Motivational Change in Implementing the Big Blue River Basin Water Plan

Principal Investigator: Dr. Edward J. McPartland

Dates: July, 1971 to June, 1973

The project is designed to measure existing attitudes toward water resources use, to compare the effectiveness of educational techniques used to convey information about water resources use, and to measure attitude change and stability. The program involves three phases. The first phase consists of four public opinion surveys in separate areas of the Big Blue River Basin. These areas are located in Gage, Saline, Seward, and York and Hamilton Counties. The second phase consists of three educational programs to be conducted in the four areas. It includes a series of public forums featuring experts on soil and water conservation, a house to house canvass to distribute literature about the Big Blue River Basin Water Plan, and a series of educational articles in a daily newspaper and a weekly newspaper. The final phase of the project consists of four more public opinion surveys in the same areas to assess attitude change and stability. A Likert-type attitude scale is being utilized.

As of mid-March 1972, phase one has been completed, phase two is nearing completion, and phase three is about ready to commence.

## NEW PUBLICATIONS RECEIVED FY INSTITUTE - MARCH

1. "Underwater Storage of Combined Sewer Overflows," for the Environmental Protection Agency, September 1971.
2. "Limitations and Effects of Waste Disposal on An Ocean Shelf," for the Environmental Protection Agency, December 1971.
3. "Nutrient Sources for Algae and Their Control," for the Environmental Protection Agency, August 1971.
4. "A Survey of Alternate Methods for Cooling Condenser Discharge Water -- Total Community Considerations in the Utilization of Rejected Heat," for the Environmental Protection Agency, November 1970.
5. "Annual Report - July, 1970 - June, 1971," Water Resources Research Institute, University of North Carolina, FY 1971.
6. "Economic Evaluation of Zoning Alternatives in the Management of Estuarine Resources in South Carolina," Clemson University, J. C. Hite, J. M. Stepp, W. W. Hall, E. A. Laurent, W. J. Steele, February 1972.
7. "Effects of Feedlot Runoff on Water Quality Of Impoundments," for the Environmental Protection Agency, August 1971.
8. "Procedures for Trace Analysis of Dissolved Inorganic and Organic Constituents in Water," G. D. Christian, University of Kentucky, 1971.
9. "A Preliminary Ecological Study of Areas to Be Impounded in the Salt River Basin of Kentucky," L. A. Krumholz, University of Kentucky, 1971.
10. "Detection and Identification of Molecular Water Pollutants by Laser Raman Spectroscopy," E. B. Bradley, University of Kentucky, 1971.

11. "Factors Regulating the Growth of Algae in Continuous Culture in Diluted Secondary Sewage Treatment Plant Effluent and Subsequent Biodegradability," E. G. Foree, C. P. Wade, University of Kentucky, 1972.
12. "Metabolic Role of Sulfates and Sulfides Producing Bacteria in Pollution of Waters," M. I. H. Aleem, University of Kentucky, 1972.
13. "Capillary-Diffusion and Self-Diffusion of Liquid Water in Unsaturated Soils," R. E. Phillips, University of Kentucky, 1971.
14. "A Preliminary Ecological Study of Areas to Be Impounded in the Salt River Basin of Kentucky," L. A. Krumholz, S. E. Neff, University of Kentucky, 1972.
15. "Multidirectional Turbulence Probe Development - Phase I: Unidirectional Turbulence Sensor Development," for the Environmental Protection Agency, October 1971.
16. "Optimization of the Regeneration Procedure for Granular Activated Carbon," for the Environmental Protection Agency, July 1970.
17. "Annual Report 1971," Institute for Water Resources, Department of the Army, 1971.
18. "Studies of Limestone Treatment of Acid Mine Drainage - Part II," for the Environmental Protection Agency, December 1971.
19. "Dewatering of Mine Drainage Sludge," for the Environmental Protection Agency, December 1971.
20. "A Quick Biochemical Oxygen Demand Test," for the Environmental Protection Agency, June 1971.
21. "Water Resources Research in New England Universities," The New England Council of Water Center Directors, January 1972.
22. "Photosynthetic Reaeration In the Upper Passaic River," J. V. Hunter, T. Tuffey, Rutgers--the State University, February 1972.
23. "Evaporation From Lowland Vegetation in the New Jersey Pine Barrens," M. F. Buell, J. T. Ballard, Rutgers--the State University, January 1972.
24. "The Politics of Water Supply in Northern New Jersey," J. A. Miri, Rutgers--the State University, November 1971.
25. "Multi-System Biological Treatment of Bleached Kraft Effluents," for the Environmental Protection Agency, December 1971.
26. "Gamma Radiation of Textile Waste-Water to Reduce Pollution," J. F. Judkins, Jr., R. H. Dinius, L. J. Hirth, J. C. Farrow, Auburn University, January 1972.
27. "Ecologic Impacts of Wading Birds on the Aquatic Environment," J. L. Dusi, R. T. Dusi, D. L. Bateman, C. A. McDonald, J. J. Stuart, J. F. Dismukes, Auburn University, June 1971.
28. "Chlorinated Municipal Waste Toxicites to Rainbow Trout and Fathead Minnows," for the Environmental Protection Agency, October 1971.
29. "Systems Analysis for Water Quality Management--Survey and Abstracts," for the Environmental Protection Agency, Water Quality Office, September 1971.
30. "Dieldrin in Water - A Bibliography," U.S. Department of the Interior, Office of Water Resources Research, January 1972.
31. "Computerized Slope Stability the Sliding Block Problem," C. Mendex, "Steady and Transient State Flow Conditions," M. B. Roy, edited by C. W. Lovell, Jr., Purdue University, February 1972.

32. "Agricultural Runoff - A Bibliography," U.S. Department of the Interior, Office of Water Resources Research, January 1972.

33. "Pesticide Inputs and Levels Minnesota Waters--Lake Superior Basin," U.S. Environmental Protection Agency, June 1971.

34. "Feasibility Studies of Applications of Catalytic Oxidation in Wastewater," for the Environmental Protection Agency, November 1971.

35. "Eutrophication of Surface Waters--Lake Tahoe Indian Creek Reservoir," for the Environmental Protection Agency, July 1971.

36. "Water Resources Review for Streamflow and Ground-Water Conditions," U.S.G.S., Department of the Environment Inland Waters Branch, Canada, February 1972.

37. "The Chemical Investigation of Recent Lake Sediments from Wisconsin Lakes and Their Interpretation," for the Environmental Protection Agency, March 1971.

38. "An Investigation of Techniques for Removal of Cyanide from Electroplating Wastes," for the Environmental Protection Agency, November 1971.

39. "Histochemical and Cytophotometric Assay of Acid Stress in Freshwater Fish," for the Environmental Protection Agency, May 1971.

40. "1971 Annual Report," FY 1971 Accomplishments, FY 1972 Program, The Hydrologic Engineering Center, Corps of Engineers, 1971.

41. "Techniques of Water-Resources Investigations of the United States Geological Survey," Chapter C3 Computation of Fluvial-Sediment Discharge, G. Porterfield.

42. "Water Resources of the Upper White River Basin, East-Central Indiana," L. W. Cable, J. F. Daniel, R. J. Wolf, C. H. Tate,

Department of the Interior, Geological Survey, 1971.

43. "Effects of Grazing on the Hydrology and Biology of the Badger Wash Basin in Western Colorado, 1953-66," G. C. Lusby, V. H. Reid, O. D. Knipe, Department of the Interior, Geological Survey, 1971.

44. "Appraisal of Stream Sedimentation in the Susquehanna River Basin," K. F. Williams, L. A. Reed, Department of the Interior, Geological Survey, 1972.

45. "Physical, Chemical, and Biological Spects of the Duwamish River Estuary King County, Washington, 1963-67," J. F. Santos and J. D. Stoner, Department of the Interior, Geological Survey, 1972.

46. "Ground-Water Levels in the United States, 1966-70 -- Northwestern States," Department of the Interior, Geological Survey, 1972.

47. "Chemical Quality of Water In the Walnut River Basin, South-Central Kansas," R. B. Leonard, Department of the Interior, Geological Survey, 1972.

48. "Airphoto Analysis of Ocean Outfall Dispersion," Environmental Protection Agency, June 1971.

49. "The Hydrology of Four Streams in Western Washington as Related to Several Pacific Salmon Species," M. R. Collings, R. W. Smith, G. T. Higgins, Department of the Interior, Geological Survey, 1972.

50. "Heated Surface Jet Discharged into A Flowing Ambient Stream," L. H. Motz, B. A. Benedict, Vanderbilt University, March 1971.