Control Of Algae In Hyrum Reservoir Studied By Students

The blue-green algae in the Hyrum Reservoir could be under control by next summer, according to Douglas Drury, a graduate student, Donald B. Porcella, Associate Professor, UWRL, and Robert A. Gearheart, Associate Professor, Agricultural and Irrigation Engineering.

Dr. Porcella reports that a process called destratification can cause the water in the reservoir to mix, discouraging the growth of the blue-green algae. He explains that during the heat of the summer, the water in the bottom half of the reservoir moves very little and is low in oxygen. Under such conditions, plant nutrients from the bottom of the reservoir are released encouraging the growth of these small plants.

When the water in a reservoir mixes, these conditions are altered. Mr. Drury states that mixing of the water can be started by pumping air into the deepest part of the reservoir. Drury is studying the control of the blue-green algae on Hyrum Reservoir to help fulfill the requirements for his doctor’s degree.

A report on this study was made at a Cache RC&D Wildlife and Recreation Committee Meeting in Hyrum recently. The meeting, under the leadership of Arthur Mendini was attended by committee members, the Hyrum Town Board, and local citizens.

A study of the problem was requested by the Cache RC&D Wildlife and Recreation Committee about two years ago.

A massive buildup of algae on the reservoir each summer disrupts the use of the reservoir for recreation and causes other problems. Blue-green algae are toxic to fish and animals, cause a bad odor, can make water skiing difficult, and can cause a rash on swimmers. Algae also add to the buildup of plant nutrients in the system.

Drury said that during the past summer he has studied the temperature of the water, the oxygen content at different levels, and the bacterial count in the reservoir.

He explained that other students have studied the plant nutrients in the water and in the sediment at the bottom of the reservoir. They have found a large buildup of nitrogen, phosphorus, and other plant nutrients. This buildup has come from various agri-practices and decaying plants in the water.

According to Dr. Porcella and Drury, an air compressor will be put on the shore of the reservoir next summer, a pipeline run out into the deepest water, and air will be pumped in to cause mixing so that its effect can be studied on the reservoir.

(Continued on page 2)
Allotment Program
For FY74 Planned

The first step in the preparation of the allotment program for the Utah Center for Water Resources Research for Fiscal Year 1974 was taken with the transmittal of a request for allotment project suggestions which went out on December 12. This request was further emphasized by a December 18 letter to UCWRR Research Associates. Interested persons were advised that their preliminary research suggestions were due at the Center by February 5 for consideration at the Council meeting February 12. Those suggestions most nearly meeting the Center's research criterion were asked to prepare complete proposals from which the Center's program will be adopted at the next meeting scheduled March 12.

The allotment program finally adopted by the Council will be transmitted for the concurrence of the Office of Water Resources Research. At that time, barring unexpected changes in research direction or available funding, a grant of $100,000 will be approved to finance the allotment portion of the Center's program in FY 1974.

The Council considered 36 suggestions last year. Of these, three new research projects were selected for funding and four projects previously initiated were funded for an additional year. Of the seven allotment projects now underway, six will be completed by the end of the current fiscal year.

Algae In Hyrum Reservoir Studied

(Continued from page 1)

Fluctuation of the water level was discussed as a means of aiding in the control of blue-green algae. The local people said that years ago when the water level was lowered during the irrigation season that algae was not such a problem as it is today.

According to Dr. Gearheart, this may help in the control, but he pointed out that because of the buildup of nutrients in the bottom of the reservoir he did not expect this method would give as complete control as it did in the past.

The use of the reservoir as an aid to flood control was also discussed. Those present felt that if the water could be drawn down in years when heavy runoff is expected, it would provide more protection below the reservoir during the flooding season.

Refrigerating Water Improves Taste Scientists Prove

In communities where the tap water contains a high percentage of unpalatable minerals, refrigerating the water greatly improves its taste, two scientists have just proven. But they are still uncertain if the coolness people like, or whether the cooler temperature dulls perception of the undesirable tastes.

The two scientists, Rose Marie Pangborn and Linda L. Bertolero, reported on their five-week study in the Journal of the American Water Works Association. Commenting on the results of the tests, Eric F. Johnson, Executive Director of the Water Association said, "One reason for the popularity of bottled water is that people store it in the refrigerator. The tests indicate that comparable results could be achieved if people filled their own bottles with water from the tap."

The tasters in the test were 10 men and 9 women, ranging in age from 22 to 50. All had previous experiences in evaluating the taste of mineralized solutions. Judging was conducted in partitioned booths with samples selected in random order.

Waters were judged at four temperatures selected to represent ice water, room temperature, body temperature, and maximum toleration. Six drinking waters collected from wells throughout California by the State Department of Health were among those studied. An additional finding of the research was that heating water also reduced taste intensity.

(Taken from Environmental Quality Report, Vol. 3, No. 10.)

CUSUSWASH Meets

The January semi-annual meeting of the Council of United States Universities for Soil and Water Development in Arid and Sub-Humid Areas, Inc. (CUSUSWASH), was held in San Francisco, California, on January 3, 4 and 5. The meeting was attended by approximately 20 representatives from the member universities, the Soils Consortium and the Agency for International Development. Representation from CUSUSWASH consisted of members of the Board of Trustees, members of major committees.

Discussions centered around such subjects as:
1. Implementation of the objectives outlined at the time of incorporation.
2. Coordination of objectives of the Soils Consortium and CUSUSWASH and possibly other consortia.
3. Attainment of the purposes of AID grants made under Section 211(d).
4. Organizational and financial requirements for the broadened activities of CUSUSWASH.

A set of bylaws was adopted; a job description covering the activities of the Executive Director was adopted; and the ad hoc Committee on the Reorganization of CUSUSWASH was dissolved, having completed the assignment given to it in Logan in July, 1971. Several new committee assignments were made and one new committee on programs was organized on a trial basis.

The consensus of the conference seemed to be that the meeting was a most timely, valuable and productive one. Those attending from Utah State included Bruce Anderson, Byron Palmer, William I. Palmer, Dean F. Peterson and Howard Peterson.
Dr. Middlebrooks Named Head Of New Environmental Division

E. Joe Middlebrooks was recently named new head of the Division of Environmental Engineering by the Institutional Council of USU.

The Council approved Dr. Middlebrooks' appointment to head the division which was created to administer the program for graduate students in environmental engineering. The division is an interdisciplinary unit operating primarily within the College of Engineering, but with support from other colleges.

Dr. Middlebrooks is professor of Civil and Environmental Engineering and is active in research at the Utah Water Research Laboratory.

Hill To Head Weather Modification Project

Dr. Geoffrey E. Hill has joined the Utah Water Research Laboratory staff as Project Leader for the Wasatch Weather Modification Project, and Associate Professor in the Department of Soils and Biometeorology at USU.

Dr. Hill received the B.S. and M.S. degree in meteorology from the Massachusetts Institute of Technology in 1954 and 1959, and recently the Ph.D. from the Pennsylvania State University.

His employment experience encompasses industry, government, and education. In education, Dr. Hill was an Associate Professor in the Meteorology Department at the Lowell Technological Institute where he taught undergraduate courses in meteorology.

In industry he was a senior scientist at the Avco Corporation Geophysics Section. During this work he published many papers and reports concerning the behavior of the disturbed ionosphere.

In government he was assigned to the Dynamics Branch, Meteorology Laboratory of the Air Force Cambridge Research Laboratories. Here he developed a grid telescoping technique for numerical weather prediction. Some of his other published studies were concerned with the development of clear air turbulence and the orientation of convective cloud bands.

In addition to his primary employment, he has been engaged in professional consulting work and television weather shows.

Dr. Hill is a member of the American Meteorological Society, American Geophysical Union, Meteorology Society of Japan, and the U.S. National Commission of U.R.S.I. 3.

He was awarded a Science Faculty Fellowship by the National Science Foundation in 1971, and at present he is a member of the Society of Sigma Xi and Phi Kappa Phi.

Favorable Report Issued On Safe Drinking Water Act

The Senate Committee on Commerce has issued a favorable report on the proposed "Safe Drinking Water Act of 1972," and recommends Federal controls over what currently is a state responsibility. As recommended, the Federal responsibility would be assigned to the Environmental Protection Agency.

The proposed legislation provides:
1. That EPA establish minimum Federal drinking standards setting maximum limits for contaminants as well as standards for the operation and maintenance of drinking water systems; 2. That the States be responsible for enforcing the standards with Federal enforcement if necessary; 3. That a National Drinking Water Council be established; 4. EPA conduct and promote research and training for water supply occupations, and 5. That citizens be authorized to bring in injunctive suits against violators of primary drinking water standards and against the Administrator for failing to perform mandatory duties.

Overall, the Committee estimated the cost of the program will scale upward from $25 million in fiscal 1973 to $66 million in fiscal 1977.

(Taken from Environmental Quality Report, Vol. 3, No. 10.)
On-Site Accumulation And Storage Of Data Is Topic Of Report At UWRL

Duane G. Chadwick is author of a recently completed report, "On-Site Digital Accumulation and Storage of Hydrologic Data for Use in Data Acquisition Systems."

In this project completion report, methods are discussed for measuring wind, water, and temperature, and recording the information in digital form at some given location remote from conventional 110 volt power source. Measurements of wind direction, wind miles, water level, rainfall, temperature, and the happening of miscellaneous events can all be recorded on standard 8-hole paper tape. The system is operable for several months, unattended. The data are recorded at precise predetermined intervals. Dry cell batteries supply the necessary power to operate the system.

The report (PRCWR21-1) is available from the Utah Water Research Laboratory for $1.50 per copy.

Logan Residents Use 500 Gal. Water Daily

Every man, woman and child in Logan used an average of almost 500 gallons of water each day in 1973, the city's commission report for January, indicates.

The report, released yesterday, says that the city water department's annual report shows 1972 total consumption hit 4,339,184,000 gallons in 1972. This is a difference of almost 300,000 over the amount of water consumed in 1971. The water department report bases its figures on an estimated population of 24,000.

Where did the water come from? Over 3.5 million gallons came out of the city's spring and the remaining amount was provided by the city wells.

And peak demand for water occurred on Aug. 3 when 18,890,000 gallons were used. This averages out to 787 gallons for each of the city's residents.

Citizens Cast Vote For Environmental Protection

Citizens across the country cast a solid vote in favor of environmental protection on November 7—as well as expressing a willingness to pay for it. Results in various states included:

- New Yorkers, who gave resounding approval to a $1 billion bond issue for clean water in 1965, reaffirmed their concern by passing—by a 2-1 margin—another record-setting state environmental bond issue. This totals $1.15 billion for water and air pollution control, improved solid waste disposal, and land preservation.

- Californians voted to control shoreline development via new state and regional bodies. They also authorized up to $200 million in revenue bonds for state loans to industry for constructing pollution control facilities, but defeated another proposal to exempt such facilities from property taxes.

In the State of Washington, voters approved bond issues of $225 million for water pollution control and $75 million for water supply and distribution facilities.

- Floridians endorsed a bond issue empowering the state to spend $240 million to acquire environmentally endangered lands and lands for outdoor recreation.

- Alaska approved a $33 million bond issue for water supply and sewer construction.

- North Carolina and Massachusetts approved referenda recognizing that environmental protection is a state duty.

- Colorado citizens voted against spending state money for the 1976 Winter Olympics, an action in which environmental concern played an important role. Denver also voted against spending city funds for the games.

(Taken from Water in the News, compiled by the Soap and Detergent Association, December 1972.)
Utah Water Legislation Summarized

By Richard E. Griffin
Assoc. Prof. and Water Res. Specialist
Ag. and Irrigation Engineering, USU

The 1973 Utah Legislature had a monumental task shifting, studying and deciding on all the bills which came before them.

The Senate had a total of approximately 198 bills and resolutions to act upon, while the House had approximately 253. Of these, six bills were passed and signed by the Governor which affect Utah's water in one way or another.

Senate Bill No. 226 entitled "Cloud Seeding to Increase Precipitation" came about as the result of interest throughout the state in cloud seeding.

The bill assigns and limits cloud seeding project control to the Division of Water Resources. Any person or group who wants to undertake a cloud seeding project must register with the

Division of Water Resources and must meet the qualifications which will be established by the Division of Water Resources. This Division will also keep a permanent record of all cloud seeding activities and research projects.

The bill also states that all water derived from cloud seeding shall be part of Utah's basic supply and subject to existing rights.

The intentions of the bill are not to inhibit cloud seeding, but rather to establish a state clearinghouse for this activity and to permit the Water Resources Division to incorporate this technology into state development and planning considerations.

Senate Bill No. 121, "Provo-Jordan River Parkway Authority," met with considerable opposition and it was thought by many that it should be defeated. The bill provides for a board to be established under the Department of Natural Resources. The board will establish and coordinate programs for the development of recreational areas, water conservation, flood control, reclamation and wildlife resources on the Provo and Jordan Rivers and their tributaries. It also provides for the restoration and preservation of points of historical interest and for 3 million dollars for the authority.

Senate Bill No. 40 transfers and assigns the functions of the Utah Geological and Mineralogical Survey to the Department of Natural Resources. The present advisory board is abolished and a new board comprised of seven members appointed by the governor shall be the policy making body. The survey shall retain the same responsibility for the investigation and inspection of mineral resources, topography and geology of the state.

Senate Bill No. 64, "Geothermal Energy and Associated Resources Act,

(Continued on page 2)
Hubert C. Lambert Dies in Ogden

Hubert C. Lambert, Utah State Engineer since 1965, died March 5, 1973, in an Ogden hospital of complications following surgery.

Mr. Lambert received the B.S. degree from the University of Utah in geological engineering mineralogy, and the M.S. degree in geology and mining engineering. He also attended Cornell University where he did graduate study in geology.

He taught at Weber State College for three years and at the University of Utah for two years. He also taught extension classes at Brigham Young University for four years.

He had published several papers on engineering, geology, mineralogy, and biology for Weber State College, University of Utah, and Utah Geological-Mineralogical Society. Mr. Lambert was former national chairman for the Interstate Conference on Water Problems.

Survivors include his widow and nine children, and nine grandchildren.

UTAH WATER LEGISLATION SUMMARIZED

(Continued from page 1) gives authority to the Division of Water Rights to require that all wells used for geothermal energy production be drilled, operated, and maintained in a safe manner.

House Bill No. 113 relates to the notice required for the creation of Special Improvement Districts. It also provides the manner in which the notice shall describe the district.

House Bill No. 115 provides for an increase in the number of members of the Soil Conservation Commission from five to ten members, and designates that six members shall be Soil Conservation District Supervisors recommended by the Soil Conservation Commission and appointed by the Governor.

After much debate and controversy over what, if anything, should be done with the Great Salt Lake, a joint resolution was passed authorizing the Legislative Council to make a comprehensive long-range plan for the development of the Great Salt Lake and submit this to the 41st Legislature.

Administrators Attend OWRR Conference

The Eighth Annual Conference on Water Resources Research, sponsored by the Office of Water Resources Research, U.S. Department of the Interior, was held April 11-12, 1973, in Washington, D.C.

Dr. Jay M. Bagley, Mr. William I. Palmer, and Mrs. Anne P. Humble attended the conference as representatives of the Utah Center for Water Resources Research. Also in attendance from Utah State were Dr. Jay C. Anderson, Department of Economics; and Dr. Wade H. Andrews, Institute for Social Science Research in Natural Resources. Representatives from 50 states and Puerto Rico took part in the discussions and workshops dealing with “Water Research—Its Needs, Priorities, and Communication.”

During the course of the conference the states were divided into seven geographical regions. The OWRR-related centers of each region will be forming a consortium which will seek to identify and prioritize water problems within the region and will initiate research on specific regional problems. The Utah Center is to become a member of the Colorado River-Great Basin Consortium, with Dr. Norman Evans, Colorado State University, appointed as Chairman. The directors of the Water Research Centers for the seven states within this region will meet in a series of workshops during the coming year with state and federal agency officials to discuss problems dealing with water in the Colorado River-Great Basin and to determine research priorities.

OWRR staff members were available throughout the week for individual program review, and conferences to analyze the operational and administrative problems of the centers.

Dee C. Hansen Named State Engineer

Dee C. Hansen, a native of Ephraim, Utah, was named by Governor Calvin L. Rampton to succeed the late Hubert C. Lambert as State Engineer.

Mr. Hansen has been with the Utah Division of Water Rights since 1956. During the four years he spent in the Cedar City office, Mr. Hansen received the “Spoke” award as outstanding first-year member. He later received the John Quinn Award as outstanding Cedar City J.C. of the year.

In 1964 Mr. Hansen was named area engineer for the Division’s northern Utah area, with offices located in Logan, where he served until his new appointment.

He is presently president-elect for the Northern Utah Chapter of the National Society of Professional Engineers and an associate member of the American Society of Civil Engineers for which he has served as contact member for northern Utah.

Mr. Hansen is married to the former Linda Godfrey of Clarkston, where he also serves on the Town Board. The couple has two children.

Mr. Hansen is a graduate of Utah State University with a degree in Civil Engineering.

DEE C. HANSEN...Named State Engineer.
Edmundo Valencia, the Bolivian Ambassador to the United States, visited the Utah State University campus February 22 and 23, to present Dr. Boyd Wennergren of the Economics Department a decoration, “El Condor de los Andes,” the highest civilian decoration given by the Bolivian Government. While at USU he visited the Utah Water Research Laboratory for a program review and tour of the water research facilities with UWRL administration. Ambassador Valencia was accompanied by Juan Jose Loria, his Ministry Adviser and Percy Aitken, Honorary Consul.

W. I. Palmer Resigns UCWRR Position To Direct CUSUSWASH

William I. Palmer, Executive Secretary for the Utah Center for Water Resources Research, resigned his position April 1 to assume the full-time position of Executive Director for CUSUSWASH, Council of U.S. Universities for Soil and Water Development in Arid and Sub-Humid Areas.

Mr. Palmer has been with the Utah Center since 1970 and has devoted much time and effort in making an effective contribution to the water research program at Utah State University. His contribution extends also beyond the bounds of the Utah Center and had had some important impacts on the national program.

Palmer Elected Chairman U.S. Irrigation Committee

William I. Palmer has been elected chairman of the United States Committee on Irrigation, Drainage and Flood Control within the organization of the International Commission on Irrigation and Drainage.

The International Commission on Irrigation and Drainage is made up of more than 70 nations worldwide. “It is a who’s who in irrigation, drainage and flood control,” Mr. Palmer said.

In his new assignment he will attend meetings of the ICID in Czechoslovakia in June.

Mr. Palmer has been serving as executive secretary for the Utah Center for Water Resources Research, and executive director of the Council of United States Universities for Soil and Water Development in Arid and Sub-Humid Areas, Inc. (CUSUSWASH).

Wayne D. Criddle, a partner in Clyde, Criddle and Woodward of Salt Lake City, is Vice President of the International Commission of Irrigation and Drainage. He is a former State Engineer for Utah, and former USU faculty member, and presently serves as an advisor to Utah State University for water resources research.

Middlebrooks Represents U.S. At Argentina Seminar

E. Joe Middlebrooks represented the United States at a Seminar on Water Pollution Control in Buenos Aires, Argentina, sponsored by the Organization of American States and the Republic of Argentina.

The seminar participants were composed of two representatives from each of the American States and a contingency of six engineers and scientists from Israel.

State organizations, universities, and industry were represented and presented technical papers at the seminar. In addition to the official representatives of the nations, many of the international organizations and assistance programs were represented; i.e., Agency for International Development, Food and Agricultural Organization of UNESCO, Pan American Health Organization, Peace Corps.

“The seminar was scheduled so that ample opportunity existed for informal discussions with both the official representatives and the international assistance observers. This provided an opportunity to learn of the problems throughout the American States and to develop friendships that will allow Utah State University to broaden its participation in helping South America with its pollution problems,” Dr. Middlebrooks said.

Proceedings of the seminar will be published and should be available within six months. Copies may be obtained by writing to:

Ingeniero Roberto Luís Casanás
Subsecretaria de Recursos Hidráulicos
25 de Mayo 459 - 5º Piso Oficina 504
Buenos Aires - Republica Argentina

AQUARIUS
A newsletter of the Utah Center for Water Resources Research
Utah Water Research Laboratory
Utah State University
Glen L. Taggart . . . . . . . . . . . . President, USU
D. F. Peterson . . . . . . . . . . . . Chairman, UCWRR
Jay M. Bagley . . . . . . . . . . . . Director, UWRL
William I. Palmer . . . . . . . . . Secretary, UCWRR
Donna Falkenborg . . . . . . . . . . . . Editor

We invite you to submit your news items for inclusion in the Aquarius newsletter.

The newsletter will be sent free of charge to those requesting it.
New Publications

New publications recently completed at the Utah Water Research Laboratory include:


PRWG40-8 "Hydrologic Inventory of the Bear River Study Unit," by Frank W. Haws and Trevor C. Hughes. March 1973. ($2.50)


Proceedings of the First Annual Conference of the Utah Section of the American Water Resources Association, "The Great Salt Lake and Utah's Water Resources." ($5.00)


Salinity Management Seminar Held To Discuss Research Possibilities In CRB

A Seminar on Salinity Management within the Colorado River Basin was held May 4 at Utah State Univ.

The objectives of the seminar, chaired by Dean F. Peterson, Vice President for Research at USU, were to outline past and current research programs at USU related to the area of salinity management, and to identify additional research areas in salinity management within the Colorado River basin which could involve unique expertise and facilities available at USU.

Eleven papers were presented at the seminar, which was concluded with a summary and discussion led by Dr. Jay M. Bagley, Director of the Utah Water Research Laboratory, and Warren A. Hall, Director of the Office of Water Resources Research in Washington, D.C.

Those presenting papers were: D. Wayne Thorne, Director of the Agricultural Experiment Station and former Vice President for Research at USU; J.T. Maletic, U.S. Bureau of Reclamation, Denver, Colo.; J. Paul Riley, Professor of Civil and Environmental Engineering at UWRL; G.E. Hill, Associate Professor, Soils and Biometeorology, and R.W. Hill, Instructor, Civil and Environmental Engineering, both at UWRL; G.E. Hart, Associate Professor, R.H. Hawkins, Associate Professor, and R.L. Meyn, Lecturer, all of Forest Science; G.F. Gifford, Associate Professor, G.B. Coltharp, Associate Professor, and F.E. Busby, Extension Range Specialist, all of the Watershed Science Unit, College of Natural Resources; R.J. Hanks, Professor, Soil Science and Biomechology, and L.G. King, Associate Professor, Agricultural and Irrigation Engineering; J.S. Williams, Professor Emeritus of Geology; Calvin G. Clyde, Associate Director of UWRL; H.H. Fullerton, Assistant Professor, Agricultural Economics, J.C. Andersen, Associate Professor, Economics, and J. Baden, Assistant Professor of Political Science.
Five Matching Grant Projects Funded
By OWRR For $191,000

Five matching grant projects at USU have been approved for funding by the Office of Water Resources Research. The Utah projects represent $191,000 of federal funds.

First phase of a study, "A Technique for Predicting Aquatic-Ecosystem Responses to Weather Modification," will be headed by J. Paul Riley. Other principal investigators on the project are: Robert H. Kramer, George Shih, Clair B. Stiahaker, and Eugene K. Israelien. The primary objective of the proposed study is to examine the current definition of the linking processes between the meteorological and hydrological systems, and to study the possible effects of weather modification practices upon the aquatic ecosystem of the total ecosystem of mountain watersheds. OWRR will provide $82,000 to support this project.

In the Economics Department, $35,250 was awarded for a two-year project, "Regional Development: An Econometric Study of the Role of Water Development in Effectoring Population and Income Changes." Project leaders are Herbert H. Fullerton, W. Chris Lewis, and Jay C. Andersen. This project is designed to test whether and how specific types of water resource investments affect regional population, employment, and income. The results should provide direction for a more efficient allocation of those public funds designated to promote changes in these variables.

"The Isolation, Identification, and Role of Specific Natural Organic Compounds in Regulating Photosynthetic-Heterotrophic Relationships" will be studied by Donald B. Porcella, aquatic biologist, and V. Dean Adams, water chemist, over a two-year period, with a matching grant of $33,000. The intent of this project is to isolate and characterize specific compounds from a highly productive lake (Hyrum Reservoir) which does not receive municipal or industrial wastes. These compounds will then be tested for their biostimulatory and toxic effects to microorganisms in an attempt to ascertain their role in the functioning of natural ecosystems.

A. Bruce Bishop and Calvin G. Clyde, UWRL, have been awarded $23,995 to conduct the second phase of the project, "Evaluating Water Reuse Alternatives in Water Resource Planning." The project will continue to explore water reuse and recycle as a formal option in water resource planning.

"Process Studies and Modeling of Self-Cleaning Capacity of Mountain Creeks for Recreation Planning and Management" will be carried out over the next two years by C.L. Chen and Donald B. Porcella, UWRL, with a matching grant of $17,241. A model will be devised which will predict the results of the self-cleaning capacity of streams with much greater accuracy than at present both for planning and for designing corrective measures.

These five projects were selected by OWRR from 19 submitted through the Center for Water Resources Research last fall.

W.I. Palmer Retires

William I. Palmer, Executive Director for the Council of U.S. Universities for Soil and Water Development in Arid and Sub-Humid Areas (CUSUS-WASH), and former Executive Secretary for the Utah Center for Water Resources Research, retired from that position July 1.

Mr. Palmer has been with Utah State University since 1970.

UWRL Receives Grant Of $222,759 For Water Quality Study

Utah Water Research Laboratory has been awarded a grant of $222,759 by the Environmental Protection Agency to study "Separation of Algal Cells from Wastewater Lagoon Effluent."

Dr. E. Joe Middlebrooks, Professor and Head, Division of Environmental Engineering, and Dr. Robert A. Gearheart, Associate Professor of Civil and Environmental Engineering, will head the 18-month study. The research objective is to develop a practical, reliable, cost-effective method for the removal and disposal of algae cells from waste stabilization lagoon effluents.

The project will be conducted at the Logan City Wastewater Stabilization Ponds in cooperation with the City of Logan. Both sand filtration and soil mantle disposal will be investigated on essentially full scale facilities.

Approximately 90 percent of the wastewater lagoons in the United States are located in small communities of 5,000 people or less. These communities, many with an average daily wastewater flow of only 175,000 to 200,000 gallons, do not have the resources to keep men at lagoon sites throughout the day. Such communities also find advantage in the simple operation, not requiring a high degree of technical knowhow. Often only periodic inspection or maintenance is carried out by the general municipal work force. The removal and disposal of algae from these stabilization ponds becomes the major operational problem. Therefore, the development of a relatively inexpensive method that does not require sophisticated equipment and extensive maintenance is needed.
UCWRR Announces Project Funding

Five new projects, and three continuing projects have been funded by the Office of Water Resources Research through the FY74 allotment appropriation to the Utah Center for Water Resources Research.

J. Paul Riley, Calvin G. Clyde, and William J. Grenney, Utah Water Research Laboratory, are principal investigators of a project, "Development of a Model for Examining Alternative Management Schemes on Great Salt Lake." The initial phase of this project will receive $14,500 from the allotment program. The research will explore the possibility of developing a comprehensive physical model of the lake and the associated watershed which would reflect considerations that are important to the development of the entire watershed. The model will provide a logical basis for the formulation of comprehensive and long-range management plans for the water resources of the Great Salt Lake.

"Effects of Artificial Desaturation on Microbial Activity in Huyrum Reservoir" will be studied for two years with a 1st year allotment of $8,874 to Donald B. Porcella, UWRL, and Robert A. Gearheart, Civil and Environmental Engineering.

Duane G. Chadwick, UWRL, will direct research on "Measurement of Soil Moisture by Use of the Latent Heat of Vaporization" which gives promise of an improved method of making measurements of soil moisture in situ. Funding level for this research will be $7,016 during FY74.

"The Hydrologic Impact of Burning and Grazing on a Chained Pinyon-Juniper Site in Southeastern Utah" will be studied over the next three years by Gerald F. Gifford and Frank E. Busby, Range Watershed Science, with $19,410 for FY74.

Wade H. Andrews and Dennis C. Geertsen, Institute for Social Science Research in Natural Resources, will study "The Effects of Shifting and Conflicting Multiple Water Uses on an Interstate Lake Development Decision." The research will be conducted at Bear Lake, under an FY74 allotment of $12,500.

The continuation of a project under the direction of J.J. Jurinak, Soil Science and Biometeorology, "The Chemistry of Heavy Metals in Soil-Water Systems: Sorption Dynamics," was approved for $8,000.

"Present and Potential Multiple Uses of Canal Systems" will be concluded this fiscal year under the direction of Komain Unhanand, Agricultural and Irrigation Engineering, and James J. Kennedy, Forest Science, with an additional $12,900 in allotment funds.

The second and final year for the project, "Field Test and Evaluation of Model for Predicting the Effect of Irrigation Management Practices on Water Quality of Return Flow" under the direction of R.J. Hanks, Soil Science and Biometeorology, was awarded $7,635.

In response to the announcement of research funding under the allotment program, 28 research suggestions were received by the Center for consideration.
L. M. Thatcher Honored On 40th Anniversary

Lynn M. Thatcher, Deputy Director of Health in the Utah State Division of Environmental Health, was honored recently at a luncheon at Utah State University.

The luncheon, presented by the Utah Water Research Laboratory, was given on Thatcher's 40th anniversary with the Division of Environmental Health, August 1.

Thatcher is a graduate of USU, and joined the Division in 1933. He has been in charge of the sanitary or environmental engineering program during the entire 40 years. He has also served as State Sanitary Engineer of Utah during that time, and has received numerous honors for his effective and dedicated work.

News Notes

Drs. Richard W. Hawkins, George Shih, and J. Paul Riley hosted a meeting of the Hydrology Subcommittee of the Coniferous Forest Biome Program held at Utah State University June 8-9. The subcommittee members consist of professional staff from Oregon State University, the University of Seattle, and USU. Discussion was centered on the research activities of various committee members as they relate to the objectives of the Coniferous Biome Program. “The hydrologic simulation model which is being developed at USU will be used as the basic subsystem model to which other dimensions are being added,” Dr. Riley explained.

The Western Resource Conference, an ongoing cooperative program of education and research in the effective management of the natural resources of the west and the nation was held July 9-10 at the University of Colorado in Boulder. This year the focus was on Salinity in Water Resources: An Assessment of Its Management and Control.” Representing USU at the conference were Craig W. Colton, Robert W. Hill, and J. Paul Riley, who presented their views on “Socio-Technical Interaction Related to Salinity on the Bear River Basin.”

LYNN M. THATCHER (left) was recently honored at USU as he celebrated his 40th anniversary with the Division of Environmental Health. Posing with him are: Calvin Clyde, Mike Miner, and Howard Hurst.

Matching Grant Proposals Due Sept. 24

The Utah Center for Water Resources Research is now accepting Sec. 101 Matching Grant research proposals for submission to OWRR. Proposals must be received by the Center by September 24. Research which will contribute to the solution of energy and land-use problems, to improvement of the environment, and to more efficient resource management will receive full consideration.

OWRR has identified the following major subject areas for priority research in the FY75 program:

- Analysis of planning, managerial, financial, operating, and regulatory policies of water resource institutions
- Water resource policy and political institutions
- Hydrologic systems analysis
- Urban and metropolitan water resources problems
- Ecologic aspects and environmental consideration of water resources planning and management
- Evaluation of economic importance of various uses of water, cost allocation, cost sharing, pricing, and repayment
- Analysis and evaluation of water resources projects
- Groundwater supply, management, and protection
- Protection and rehabilitation of estuarine resources
- Thermal loading problems
- Water demand considerations
- Guidelines for preparing matching grant proposals are available from the Utah Center for Water Resources Research, UMC 82, Utah State University, Logan, Utah 84322.
Effects Of Baffles On Waste Stabilization Ponds is Topic Of New UWRL Research Report

"Effects of Baffles on the Performance of Anaerobic Waste Stabilization Ponds" is the title of a new UWRL project report written by Stephen B. Nelson, E. Joe Middlebrooks, and Donald B. Porcella.

Waste stabilization ponds are the most common method of wastewater treatment in areas where large parcels of inexpensive land are available and a high quality effluent is not required at all times. There are some disadvantages associated with the performance characteristics of these stabilization ponds including hydraulic short circuiting, long hydraulic detention times, and high concentrations of effluent suspended solids. The purpose of this study was to determine if baffles could improve the performance of waste stabilization ponds.

Copies of the report are available for $2.00 from the Utah Water Research Laboratory, UMC 82, Utah State University, Logan, Utah 84322. Please request PRWR17-2.

D. F. Lawrence Accepts Chairmanship Of PSIAC In Behalf Of State Of Utah At Meeting

Daniel F. Lawrence, Director of the Utah Division of Water Resources, accepted the Chairmanship of the Pacific Southwest Inter-Agency Committee (PSIAC) in behalf of the State of Utah at the quarterly meeting held in San Francisco, June 21. This is the first time in the 25-year history of the organization that a state delegate has held the chairmanship (rather than a federal representative).

The PSIAC was established in 1948 to provide coordination of policies, programs, and activities of the Federal Departments of the Interior; Commerce; Labor; Agriculture; Health, Education & Welfare; Army; Federal Power Commission; and the PSIAC state agencies in the field of water and related land resources.

Member states include Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming. Mr. Lawrence will act as the governor’s representative in chairing the committee.

Water Laws, Programs Summarized In Digest

"A Summary Digest of Federal Water Laws and Programs," edited by John L. DeWeerdt and Philip M. Glick, has been issued by the National Water Commission, and copies are available from the Superintendent of Documents at the Government Printing Office.

The summary-digest is one of a series of 63 study reports prepared to provide background and data for the Commission's report on Water Policies for the Future, which was submitted to the President and Congress in June. The summary-digest provides information on existing federal water laws and programs, detailing the statutory responsibilities of nine cabinet departments and more than 40 federal agencies concerned with water-related activities.

Cost of the report is $1.75 if mailed, or $1.50 at the GPO bookstores.

Middlebrooks Made Fellow

Dr. E. Joe Middlebrooks has been made a Fellow in the American Society of Civil Engineers, it has been announced by Eugene Zwoyer, Executive Director of ASCE, who said "The advancement in grade of members who have demonstrated a proficiency in engineering skill enhances the prestige of ASCE and the profession of Civil Engineering."

Utah Center for Water Resources Research
Utah Water Research Laboratory
UMC 82
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Rainmaker Simulates Rainstorms At UWRL

Development of a rainmaker, or rainfall simulator at UWRL is one phase of a three-part study underway for the Transportation Department of the Federal Highway Administration. The UWRL was granted $250,000 to find a way to predict what the runoff from moving storms will be along highways so that proper drainage inlet structures can be built to help alleviate flooding.

The rainmaker is a means of gathering information to meet the objectives of this study.

General director of the project is Dr. Cheng-hung Chen, who is also heading the analytical, or mathematical analysis phase of the problem. The field phase, which includes measuring actual rainfall and runoff from two sections of a freeway, is headed by Joel E. Fletcher. The rainmaker is part of the laboratory phase of the study which includes the design and construction of equipment and is headed by Frank W. Haws.

The rainmaker can actually simulate a rainstorm. It is designed so that the storm can move across a test section.

It can begin slowly, increase in intensity, and move from one side of the test section to another, just as a storm pattern might move along a highway section. The desired rainstorm is programmed and controlled by computer, explained Mr. Haws.

The rainmaker is 20 feet square and is composed of 100 individual modules, each 2 feet square. There are 68,200 raindrop formers, and each of the 100 modules is controlled separately.

Rainstorm intensity through these modules can be varied from 0 to 31 inches per hour in increments of 1 inch per hour, according to Mr. Haws, and the energy of impact can be changed by moving the rainmaker closer to the flume or further away.

A tilting bed fits beneath the rainmaker. It is also 20 feet square and is designed to hold a layer of soil 2 feet deep. Water up to one foot deep can flow over the top of the soil on the bed which may be tilted up to a 45 degree angle. Presently grass is being grown on the bed as part of the infiltration study.

The data collection system for the rainmaker and bed can measure runoff in 2-foot widths on the bed, measure moisture content of soil, and measure profile of water surface flowing over the top of the soil. A vacuum can be introduced underneath the soil cover to help simulate different infiltration rates, Mr. Haws said.

The rainmaker is operational now as the study for the Federal Highway Administration is drawing to a close. Data gathered in all three phases of the study will be analyzed and reported at the termination of the project.

When this study is concluded, the rainmaker will be used for such things as soil erosion studies, infiltration studies, and for any other study where there is need to simulate a rainstorm.
Recommendations Made For Improving Future Water Resources Policies

Planning for water development must be linked to planning for water quality and coordinated with land use planning.

More efficient use of water in agriculture, industry, and for domestic and municipal purposes is essential to reduce waste.

Sound economic principles must be adopted to encourage better use of water resources. The Commission considers consumer willingness to pay to be the most reliable economic indicator of proper water use, as it is coordinated with government regulation of environmental protection.

Updated laws and legal institutions are needed if future water policies are to be successfully implemented.

Development, management, and protection of water resources should be controlled by the level of government (federal, state, local, or regional) that is closest to specific problems and capable of fairly representing all interests involved.

About one-fourth of the Commission’s 232 recommendations concern land and water planning and interrelationships among various aspects of water resource programs. About 20 percent of the recommendations deal with changes in legal systems that regulate and control use of water. They include improvement of state laws relating to use of ground and surface waters, changes in state laws to increase recognition of the social values of water, improvement of procedures for recording and transfer of water rights, development of permit systems for regulating water use under riparian water law in the eastern states, and a proposed federal statute to reduce conflicts between federal and state systems of water law.

The Commission believes that since the West has been won, there is no reason to provide additional interest-free money for new irrigation development in the 17 western states as provided in the Federal Reclamation laws. The Commission points out that more than three-fourths of the irrigated land in the west has been developed without federal subsidy and offers data revealing that federal irrigation projects have contributed to crop surpluses.

In the field of water pollution control, the Commission rejects the zero discharge goal of the 1972 amendments to the Federal Water Pollution Control Act as unattainable, and calls instead for achievement by 1983 of the water quality standards established under the Water Quality Act of 1965, which could cost as much as $200 billion.

The report culminates almost 4½ years of effort during which the Commission met 54 times. More than 60 background studies were prepared to support the Commission’s work, and were released during the course of the study.


Papers Presented At Conference

Two papers by Utah Water Research Laboratory staff were presented at the Ninth American Water Resources Conference to be held in Seattle, Washington, October 21-25.

Daniel H. Hoggar, Assistant Director, UWRL, presented a paper “Regional and River Basin Planning Organization” in the Water Resources Management—River Basin Planning Session.

A. Bruce Bishop and W. J. Gremmey presented a paper “Planning Optimal Strategies to Upgrade and Consolidate Treatment Plants for Regional Wastewater Management” in the session entitled: River Basin Modeling as a Decision Tool: Optimization and Statistical Models.

The five-day conference includes 19 sessions, and is under the General Chairmanship of Dr. S. P. Gessel, who is Dean, College of Natural Resources, University of Washington, Seattle.
Bagley Completes AID Assignment

Jay M. Bagley has just completed a short assignment with the U.S. Agency for International Development. Dr. Bagley was one of a team of consultants organized to survey the drought situation in the Sahel region of Africa and develop recommendations for a program of U.S. assistance.

The team spent about 10 days in Washington, D.C. and two weeks in Europe visiting with officials and technicians from the African countries affected, the donor organizations, and the technical assistance organizations.

An on-site visit to the African countries was deferred until the many international programs—bilateral and multi-lateral—can be reviewed in terms of how the U.S. program might best complement and augment them from a medium or long-term standpoint.

Social Well Being Themes Water Resources Conference

Social Well Being—Quality of Life Dimension in Water Resources Planning and Development was the theme of a conference held this summer at Utah State University.

A major organizational objective of the conference was to bring social scientists and agency people together to discuss problems and perspectives in order to assist the researchers to achieve greater understanding of these problems and to sharpen their perceptions as to the kinds of information needed, Wade H. Andrews, Chairman, explained.

In addition, the meeting was designed to provide the agency people with a view of the progress of investigators and their needs. About 75 people participated representing 30 states from coast to coast. The major social science disciplines and almost all major water related government agencies were represented as well as some state and private organizations.

The conference was structured to include formal papers dealing with the background and technical research aspects of social well being and quality of life evaluation and measurement. As a specific feature the conference included technical responders to the formal papers. These people not only critiqued the papers but included their own perspective of the problem, Dr. Andrews said. They were carefully selected to present public and private organizations that had specific interests and views, and they were also called upon for inputs in general discussion.

Much discussion centered around the problems of measurement of social well being and quality of life elements, the agencies need for evaluation, measurement techniques and theory for this field.

The organizers of the conference were a task group of the Education and Social Science Committee of the University Council on Water Resources and included Dr. Andrews, Chairman, Utah State University; Rabel J. Burdge, University of Kentucky; Harold R. Capener, Cornell University; W. Keith Warner, Brigham Young University; and Kenneth P. Wilkinson, Pennsylvania State University.

The sponsors of the conference were the Office of Water Research of the U.S. Department of the Interior, the University Council on Water Resources, the Institute for Social Science Research on Natural Resources of Utah State University, and the Center for Water Resources Research at Utah State University.

AQUARIUS
A newsletter of the
Utah Center for Water Resources Research
Utah Water Research Laboratory
Utah State University
Glen L. Taggart . . . President, USU
D.F. Peterson . . . Chairman, UCWRR
Jay M. Bagley . . . Director, UWRL
Donna Falkenborg . . . . Editor

We invite you to submit your news items for inclusion in the Aquarius newsletter.

The newsletter will be sent free of charge to those requesting it.
New Publications

New publications recently completed at the Utah Water Research Laboratory include:

"Ecological Implications of Dimethyl Mercury in an Aquatic Food Chain," by Lawrence P. Kolb, Donald B. Porcella, and E. Joe Middlebrooks, PRWG105-2, June 1973. ($2.50)

"The Economic Efficiency of Inter-basin Agricultural Water Transfers in Utah: A Mathematical Programming Approach," by John E. Keith, Jay C. Andersen, and Calvin G. Clyde, PRWG100-3, June 1973. ($3.00)


A new publications list has been completed and is available on request.

For more publication information, or to order these publications, write:

Mrs. Blanche Taylor
Utah Water Research Laboratory
UMC 82
Utah State University
Logan, Utah 84322

Research Proposals Now Being Accepted By OWRR For Fiscal 1975 Support

The Office of Water Resources Research, U.S. Department of the Interior is now accepting unsolicited research proposals in the field of water resources for consideration for fiscal year 1975 support, beginning July 1, 1975, pursuant to Title II of the Water Resources Research Act of 1964, as amended. The Title II research program of OWRR will be directed primarily toward support of certain current priority objectives of the Department of the Interior. These include:

- Solving Energy Problems
- Encouraging Indian Self-Determination and Improvement in the Quality of Life on Indian Reservations
- Solving Land Use Problems
- Promotion of Efficient Allocation and Conservation of Scarce Water and Water-Related Resources in a Manner Compatible with Environmental Considerations
- Developing means of achieving more efficient resource management such as reuse and recycling of water, reassessing the economic value of additional agricultural development and improved irrigation efficiencies in order to save resources, thus reducing the need for large capital investments of the future.

Improving the Quality of Our Physical Environment

In addition to the above Department objectives, OWRR has also identified general subject areas of prime interest. This priority list can be obtained from the Utah Center.

OWRR will also consider funding other subject areas of research not included on this priority list if the research proposal provides convincing reasons that the subject area is of high priority and within the purview of Title II of the Water Resources Research Act of 1964, as amended.

Guidelines for proposal preparation may be obtained upon request from the Utah Center for Water Resources Research, UMC 82, Utah State University; 752-4100 Ext. 7992.