

8-1-1970

## Water Resources News, Volume 2, No. 7, August 1970

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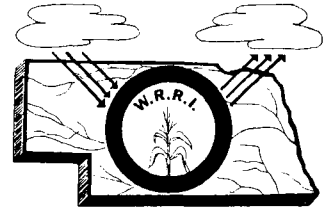
"Water Resources News, Volume 2, No. 7, August 1970" (1970). *Water Current Newsletter*. Paper 48.  
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# WATER RESOURCES NEWS

NEBRASKA WATER RESOURCES RESEARCH INSTITUTE  
212 AGRICULTURAL ENGINEERING BUILDING

THE UNIVERSITY OF NEBRASKA  
LINCOLN, NEBRASKA 68503



Volume 2 Number 7

August 1970

## NEW PROTECTION AGENCY PROPOSED

President Nixon recently proposed the creation of a new Environmental Protection Agency which would consolidate the Federal government's major air and water pollution control programs. So far the widespread speculation that the Corps of Engineers' civil works functions would be transferred to some other agency or department did not pan out.

During hearings before the House Government Operations Committee, Administration spokesmen indicated that additional changes would be recommended in the government's natural resources program.

President Nixon in his transmittal message stated: "I think \*\*\* it is better to proceed a step at a time.\*\*\* As we see how these changes work out, we will gain a better understanding of what further changes -- in addition to these -- might be desirable."

It has even been suggested that the Corps' civil works functions might be transferred to the Interior Department. Chemical and Engineering News reports: "Some White House observers predict that Mr.

Nixon may well combine what's left of Interior with some elements of the Agriculture Department -- the Forest Service, for instance, and maybe the Army's Corps of Engineers -- to form a Department of Natural Resources."

## NEW OCEANIC GROUP

President Nixon has also recommended creation of a National Oceanic and Atmospheric Administration (NOAA) to be located in the Department of Commerce.

This new agency would combine all government oceanic programs -- which are located in six different department and agencies -- and handle such far-reaching proposals as coastal zone management and regulations.

The only opposition to the NOAA plan has come from conservationists. Some oppose the transfer of the marine sport fish program to the new agency from the Bureau of Sport Fisheries and Wildlife and others don't want NOAA in the Commerce Department because they claim it represents the "industrial & economic viewpoint".

Congr. Alton A. Lennon, chairman of the House Subcommittee on Oceanography, contends NOAA would champion and conserve the environment.

### ENVIRONMENTAL CHANGES BENEFICIAL

A recent statement by a committee of the Soil Conservation Society of America said change is inherent in the conservation of natural resources. "If conservation is to be effective, changes must occur in the use of such resources as land, water and air", the committee said. Changes in the environment can be helpful as well as harmful.

Par Pond in Aiken, South Carolina is a good example which receives the water discharged by a nuclear plant.

The Wall Street Journal reports this: "Thermal pollution may be bad, but the fish in nearby Par Pond don't seem to know it."

In fact, scientists here say they are finding that the very thermal pollution that threatens fish in some bodies of water seems to make them grow faster and bigger in Par Pond."

### MYTH CRITICIZED

Dr. William T. Pecora, director of the U.S. Geological Survey, delivered a message stating that the current concern over air and water pollution is caused by man.

Dr. Pecora stated: "It is believed by many people in this country that it is man who is degrading and polluting his environment because of our modern industrial society. Some myths, however, need to be destroyed."

Dr. Pecora also added: "The rivers of our Nations are being called dirty because of the works of man". "We must understand that rivers are the natural transport systems for sediment and

humus (organic matter) washed downhill by the rains that fall upon the land."

### DIRTY RAIN DAMAGES BUILDING

When sulphur dioxide and carbon dioxide in the air are dissolved by fog or rain, the result is a weak air-borne acid which may eventually eat away at the stone, concrete and even metal foundations of buildings.

Limestone, marble and colomite are particularly susceptible to corrosion by sulphates.

Calcium in these rocks combines with sulphur from the air to form gypsum, which is 32 times more soluble than limestone.

The changes in humidity in dry climates are sufficient to cause a shrinking and swelling of gypsum subjecting the pores and cracks to high pressures and eventually weakening the stone in the building.

### HARVESTING ALGAE

A West German Company has developed a low-cost method for transforming a green variety of algae into a power product that can be used as a protein source in food having between 50 and 56 percent protein content.

The product can be used in soup powders, cookies and pastas.

Early reports indicate that a medium size plant, in a subtropical climate, producing 200 tons of algae a year on 7.6 acres can be built for \$300,000.

It is estimated that an individual's protein needs can be met for as little as 4.8 cents a day.

### MERCURY POLLUTION SPREADING

According to federal health officials, millions of pounds of mercury may be flowing undetected in the nation's waterways. The health officials also suspect that cases of mercury poisoning do exist but have escaped correct diagnosis because of the relatively recent detection of the problem.

Tests by the Food and Drug Administration have shown "significant" amounts of mercury contamination in some waters of Alabama, Georgia, New York, Louisiana, Kentucky, New Jersey, Michigan, Pennsylvania, Ohio, Texas, West Virginia, Tennessee, Vermont and Wisconsin.

Onondaga Lake near Syracuse, N.Y. has been closed to fishing and warnings have been issued for parts of Lake Champlain, Lake Erie, the St. Lawrence River, the Tennessee, the Wisconsin, the Tombigbee, the Mobile and the Tensaw Rivers.

Federal officials originally believed that mercury would not dissolve in water. However, further tests have shown that the metal dissolves into a toxic chemical that is immune to the destructive effects of other chemicals in water and is said to last 100 years before becoming harmless.

### POTOMAC RIVER SITES FOR DESALTING TESTS

For the next six months the Office of Saline Water will run desalting tests on Potomac River Water as part of a project designed to determine the role of desalination in the rehabilitation of the nation's surface water supplies.

OSW Director, Dr. Chung-ming Wong, said that the program will include tests of irrigation return flows, saline mineral springs and community water supplies with a high level of undesirable constraints, such as selenium. Water to be used in the Potomac tests contain up to 4,000 parts of dissolved solids per million parts of water.

### WATER POLLUTION CONTROL RULES

New regulations applying to federal water programs require that:

- (1) New treatment facilities for comprehensive river basin-wide programs for pollution abatement must be developed before projects become eligible for federal aid;
- (2) In evaluating new applicants the FWQA may demand detailed data on pollution in the entire basin, volume of discharge from each source, effluent types, treatment, and water quality effect;
- (3) No new federal grant may be made to any system designed for industrial wastes only. Industry must pretreat wastes going to municipal systems;
- (4) Industries will assess a share of the operating costs and costs of amortizing the debt in proportion to their contributions to the total cost of waste treatment;
- (5) Once a year for the first three years the State Water Pollution Control Agencies must inspect new federally aided facilities for efficiency and economy;
- (6) Design of any new treatment plant must be approved in advance as economical, efficient and effective under FWQA requirements.

These regulations, offered by President Nixon in February, were first published in March with a 45-day period allotted for changes.

### PRICE INCREASES TO IMPROVE ENVIRONMENT

A recent survey of the cost of Water Quality Control shows that the nation's leading chemical manufacturing companies spent approximately \$140 million last year with 50 percent invested in the purchase of equipment to do the job.

Information from 14 companies showed that they spent more money on water quality management than on any other environmental improvement. A few companies reported price increases were due to pollution control spending, but several said that increased plant efficiencies due to more rigid process control offset some of the cost of environmental improvement projects.

Delays caused by overlapping government regulations were cited as a cost factor.

Precipitate legislative reaction is seen as a threat to orderly improvement because of specific equipment lacks.

### WATER MANAGEMENT SYMPOSIUM

A national symposium on watershed management will be sponsored by the American Water Resources Association from June 18-22, 1972. The symposium will be held at Colorado State University, Fort Collins, Colorado.

The symposium will include pre-meeting and post-meeting trips for members and their families to such exciting locations as Rocky

Mountain National Park, Air Force Academy and the Colorado Springs area, the Colorado-Big Thompson Irrigation Project, and tours in Denver and surrounding area.

Inquires are to be sent to: General Chairman, A.I. Johnson, Chief, Water Resources Division Training Center, U.S. Geological Survey, Federal Center Denver, Colo. 80225.

### RESEARCH REVIEW

Project Title: "Physiological and Biochemical Responses of Plants to Different Internal Water Potentials"

Principal Investigators: Dr. E. J. Kinbacher, Dr. C. Y. Sullivan, Dr. Jerry D. Eastin

Dates: July, 1969 to June, 1972

The objectives of this research are:

1. To investigate the biochemical effects of internal water stress on some physiological (biochemical) processes such as photosynthesis, respiration and dark fixation carbon dioxide during stress and the recovery period.

2. To investigate the mechanisms by which plant water potentials and water use (transpiration) are controlled or influenced by the plants.

Accomplishments: The photosynthetic rate of attached sugar beet and bean leaves were monitored. Radiation intensities between .05 to .09  $\mu\text{E}/\text{cm}^2/\text{sec}$  caused similar photosynthetic rates for individual leaves in a leaf chamber. Photosynthesis proceeded at the same rate with a range in relative

humidity of 60 to 90% when the soil was near field capacity. Sugar beet leaves recorded the maximum photosynthesis rates when the leaf temperature was about 35 C. It was found that the Hill reaction by chloroplasts isolated from sorghum, corn and pearl millet, which had been exposed to drought stress, was more susceptible to thermal inactivation than those from irrigated controls. There was no apparent effect of drought stress on cyclic photophosphorylation. Chloroplasts from pearl millet were the most stable in their ability to carry on photochemical activity after stress. Graduate Research Assistants have been given special training and problems in plant water relations.

The effect of internal water deficits on photosynthesis and transpiration will be investigated with an improved experimental system. Net photosynthesis and transpiration of individual leaves and entire plants will be monitored during several drying cycles. The effect of furrow irrigation and subsurface irrigation on plant water potentials and leaf diffusivity will be investigated. The effects of water and temperature stress on photochemical activity by isolated chloroplasts from other crop species, varieties and lines will be compared with results obtained to date. Carbon dioxide compensation points of leaves will be studied at different water potentials. This study will provide information concerning the efficiency of carbon dioxide utilization within a leaf. The use of large tanks for hydroponic growth of plants for water relations studies will be expanded. The effects of drought stress at several stages of growth and recovery rates or prolonged effects

of drought stress will be investigated.

It is well known that much of the utilization of the nation's water resources follows the soil--plant--atmosphere pathway. Availability of soil water and atmospheric demand both markedly influence this utilization, but the response of the plant to it's influential in regulating this utilization. Much is unknown about the biochemical and physiological responses of plants to water deficits, and for maximum production, or most efficient plant water use, we must understand the internal effects of different water potentials. For example, our finding of specific photochemical reactions which are affected by drought conditions, and the finding of significant differences between crop species and varieties will greatly aid plant breeders in developing species which are efficient in water utilization.

NEW PUBLICATIONS RECEIVED  
BY INSTITUTE - 1970

1. "Groundwater Levels in Nebraska 1969", by C. F. Keech, University of Nebraska, Conservation & Survey Division, May 1970.
2. "A Hydrometeorological Study Related to the Distribution of Precipitation and Runoff Over Small Drainage Basins - Urban Versus Rural Areas", by R. G. Feddes, R. A. Clark, & R. C. Runnels, Texas A & M University, June 1970.
3. "Conjunctive Use of Ground and Surface Waters", by R. S. Harnsberger, Partial Technical Completion Report, University of Nebraska, June 1970.
4. "Intermediate Products in the Bacterial Decomposition of

Hexadecanol and Octadecanol", by W. D. Langley, Texas A & M University, June 1970.

5. "Influence of Transpiration Suppressants, Sprinkler Irrigation and Moisture Levels on Transpiration and Evapotranspiration", by C. J. Gerard, Texas A & M University, May 1970.

6. "Ground-Water Levels in New Mexico, 1968", by F. E. Busch & J. D. Hudson, U.S. Geological Survey, 1970.

7. "Systems Simulation for Management of a Total Water Resource", by Texas Water Development Board & Water Resources Engineers, Inc., May 1970.

8. "Report of Water Resources Research July 1, 1968-June 30, 1969", by U. S. Geological Survey, January 1970.

9. "Applied Mathematical Programming in Water Resources, Vol. 1 & 2, sponsored by Nebraska Water Resources Research Institute --Civil Engineering & Ag. Engineering, University of Nebraska, Summer Institute July 25-August 7, 1970.

10. "Eutrophication Program, University of Wisconsin, May 1970.

11. "Sedimentation", U.S. Department of Agriculture & National Science Foundation, Washington D.C., 1967-68.

12. "The Progress of Hydrology", University of Illinois, July 13-25, 1969, Vol. 1 & 3.

13. "Sixth Annual Report of University of Idaho Water Resources Research Institute", University of Idaho, July 1970.

14. "Annual Report of the Iowa State Water Resources Research Institute for FY 1970", University of Iowa & Iowa State University, July 1970.

15. "Sixth Annual Report for University of Puerto Rico for FY 1970", University of Puerto Rico, July 10, 1970.

16. "Report of the University of Kentucky Water Resources Institute for FY 1970", University of Kentucky, July 1970.

17. "Flood Series for Gaged Pennsylvania Streams", B.M. Reich, Pennsylvania State University, December 1969.

18. "Seminar--Modifying the Soil and Water Environment for Approaching the Agricultural Potential of the Great Plains", Vol. II, Kansas State University, March 17-19, 1969.

19. "Eutrophication Program", University of Wisconsin, May 1970.

20. "Annual Report 1969-1970", University of Alaska, 1969-70.

21. "The Numerical Solution of Transient Supercritical Flow by the Method of Characteristics with a Technique for Simulating Bore Propagation", J. J. Zovne, Georgia Institute of Technology, May 1970.

22. "An Analysis of the Law Governing Six Selected Washington Water-Oriented Special Districts", M.D. Garvey, J.D. Morgan, and K. L. Schubert, University of Washington and Washington State University, June 1970.

23. "A Summary", or preceding listing of Part A & B, University of Washington, Washington State University, June 1970.

24. "Research on Water Quality", R. Coppock, University of California, July 1970.

25. "Virus Movement in Groundwater Systems", W. A. Drewry, University of Arkansas, September, 1969.

26. "Requirements and Costs of Alternative Systems for Treating Peach Cannery Wastes", G. H. Liner & J. M. Stepp, Clemson University, April 1970.

27. "The Persistence of Pesticides in Impounded Waters", R. A. Lauderdale, University of Kentucky, 1969.

28. "Use of Interrelated Records To Simulate Streamflow", L. R. Beard,

Corps of Engineers Technical Paper No. 1.

29. "Optimization Techniques For Hydrologic Engineering", L. R. Beard, Corps of Engineers Technical Paper No. 2.

30. "Methods for Determination of Safe Yield and Compensation Water From Storage Reservoirs", L.R. Beard, Corps of Engineers Technical Paper No. 3.

31. "Functional Evaluation of a Water Resources System", L. R. Beard, Corps of Engineers Technical Paper No. 4.

32. "Streamflow Synthesis For Ungaged Rivers", L. R. Beard, Corps of Engineers Technical Paper No. 5.

33. "Pilot Study For Storage Requirements for Low Flow Augmentation", A. J. Fredrich, Corps of Engineers Technical Paper No. 7.

34. "Worth of Streamflow Data for Project Design A Pilot Study", D.R. Dawdy, H. E. Kubik, L. R. Beard, E. R. Close, Corps of Engineers Technical Paper No. 8.

35. "Economic Evaluation of Reservoir System Accomplishments", L. R. Beard, Corps of Engineers Technical Paper No. 9.

36. "Survey of Programs for Water Surface Profiles", Bill S. Eichert, Corps of Engineers Technical Paper No. 9.

37. "Hypotetical Flood Computation For a Stream System", L. R. Beard, Corps of Engineers Technical Paper No. 12.

38. "Maximum Utilization of Scarce Data in Hydrologic Design", L. R. Beard, A. J. Fredrich, Corps of Engineers Technical Paper No. 13.

39. "Techniques For Evaluating Long-Term Reservoir Yields", A.J. Fredrich, Corps of Engineers Technical Paper No. 14.

40. "Hydrostatistics-Principles of Application", L.R. Beard, Corps of Engineers Technical Paper No. 15.

41. "A Hydrologic Water Resource System Modeling Technique", L. G. Hulman, D. K. Erickson, Corps of Engineers Technical Paper No. 16.

42. "Hydrologic Engineering Techniques For Regional Water Resources Planning", A. J. Fredrich, E. F. Hawkins, Corps of Engineers Technical Paper No. 17.

43. "Estimating Monthly Streamflows Within a Region", L. R. Beard, A. J. Fredrich, E. F. Hawkins, Corps of Engineers Technical Paper No. 18.

44. "An Approach to Reservoir Temperature Analysis", L. R. Beard, R. G. Willey, Corps of Engineers Technical Paper No. 21.

45. "A Finite Different Method For Analyzing Liquid Flow in Variably Saturated Porous Media", R. L. Cooley, Corps of Engineers Technical Paper No. 22.

46. "Research Reports", supported by Office of Water Resources Research under Water Resources Research Act of 1964, U.S. Department of the Interior, Washington, D.C., July 1969-June 1970.

47. "FY 1970 Annual Report". North Dakota Water Resources Research Institute, North Dakota State University, University of North Dakota, July 1970.

48. "Annual Report 1970", Texas A & M University Water Resources Institute, July 1970.

49. "Annual Report of Activities for Fiscal Year 1970", University of Illinois Water Resources Center, Annual Report No. 6, July 1970.

50. "Sixth Annual Report Fiscal Year 1969-70", Clemson University, July 1970.

51. "Irrigation Water Supply: Efficiency and Cost Aspects", R. D. Cacek, M.S. Thesis, University of Nebraska, May 1970.

52. "Input-Output Analysis of Water Use for Nebraska Industries", A.W. Epp, M. Baker, University of Nebraska, Technical Research



Project Completion Report, Project A-004-NEB, August 1970.

53. "Water Quality Aspects of the State of Washington", B. W. Mar, D. A. Nunnallee, W. Mason & M. Rapp, University of Washington, June 1970.

54. "Environmental Quality", First Annual Report of the Council on Environmental Quality, Transmitted to Congress, August 1970.

55. "Annual Report 1970", Institute of Water Research, Michigan State University, July 1970.

56. "The Application of Phase Selective Alternating Current Polarography to the Analysis of Heavy Metals in Water", P. E. Sturrock, R. L. Poole, Jr., Georgia Institute of Technology, June 1970.

NEWSLETTER ITEMS

Newsletter items and inquiries should be sent to : Dr. Warren Viessman, Jr., Director, N.W.R.R.I., 212 Agricultural Engineering Building, East Campus, Lincoln, Nebraska 68503.