/ NEWS
WATER RESOURCES RESEARCH INSTITUTE
OF THE UNIVERSITY OF NORTH CAROLINA

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CONTENTS

QUESTIONS REMAIN ABOUT USE OF JORDAN LAKE AS WATER SOURCE

Uncertainties about the use of B. Everett Jordan Reservoir as a public water supply remain strong. Of major concern are toxic substances--synthetic organic chemicals and heavy metals such as mercury and lead--in the Jordan watershed. The watershed includes some of the most industrialized areas of the state as well as urban areas and farms.

Several communities have expressed interest in drawing water from Jordan Lake. One, the Town of Cary, has formally requested permission from the N. C. Environmental Management Commission to use the lake as a water source. Cary, which now buys water from nearby Raleigh, would like to have its own water supply to accommodate its rapidly growing population.

A recent report from the N. C. Division of Environmental Management examines the suitability of Jordan Lake as a water supply with regard to toxic substances. The report says that available water quality data have not identified any toxicants in the lake which would limit its use as a water supply. However, it also points out that very little is known about some of the toxicants in the basin, particularly synthetic organic chemicals (SOCs) and their sources. The report says, "There is information available on the potential health hazards of a relatively few chemicals, particularly SOCs, which indicates that there is reason for concern about substances not included in the water quality standards. There are also numerous chemicals as well as new chemicals being developed for which there is no information on health hazards."

Efforts are underway to collect information from industries in the Jordan basin on known or suspected organic compounds in their effluents. This information, the report says, will provide additional insight into the lake's suitability as a water supply following conventional treatment.

More is known about heavy metals in the lake and its tributaries. Data on heavy metal contributions from industrial and municipal dischargers are available for the majority of suspected toxicant sources. Also, many metals can be removed at conventional water treatment plants. For these reasons, metals are not considered to be a limiting factor in water supply use of the lake; however, continued efforts to minimize nonpoint and point source inputs of metals are warranted, the report states.

The report, which is titled Toxic Substances in Surface Waters of the B. Everett Jordan Lake Watershed: Status Report and Recommendations, lists eight main sources of toxicants in the Jordan basin. They are industries, municipalities, spills and emergencies, landfills, illegal sources, agricultural runoff, new urban areas, and old urban areas.

Nonpoint sources are considered very important sources for toxicants (especially heavy metals) in the basin. Available data for metals indicate that most of the lead comes from urban nonpoint sources. In general, amounts of copper and zinc from nonpoint sources are three times higher than from point sources, according to the report. In Burlington, point and nonpoint sources of copper and zinc are about equal. Since data on SOCs are scarce, no

easy generalization can be made as to the source of these chemicals. Both nonpoint (agricultural and urban) and point sources probably contribute significant levels of SOCs.

A promising method for controlling pollutants from developed urban areas in the basin is the detention basin. Detailed analyses applied to the larger cities in the basin indicate that detention basins designed to control runoff from about one-third of the area of major urban areas would eliminate about 50 percent of the lead and sediment and 33 percent of the copper, zinc, and phosphorus from the entire urban area. Further work with individual cities is contemplated to examine control of this source of pollutants, the report says.

A water treatment technology that should be considered is activated carbon treatment, the report states. Some uncertainty will always be present about low levels of contaminants in developed water supply watersheds. A brief review of water treatment technology suggests that granular activated carbon treatment is appropriate in situations where low levels of SOCs are suspected but specific chemicals to be removed are unknown. This treatment cannot remove all contaminants but can provide a substantial degree of protection. The report recommends that the Division of Health Services should consider a requirement for this type of treatment in many developed watersheds.

For more information or a copy of the report, contact the N. C. Division of Environmental Management, Dept. of Natural Resources and Community Development, P. O. Box 27687, Raleigh, NC 27611. Telephone (919) 733-7015.

YADKIN RIVER TRAIL TAKES SHAPE

Under the leadership of the Yadkin River Trail Association and with support from the N. C. Department of Natural Resources and Community Development, 155 miles of river trail with facilities for public recreation is closer to becoming a reality.

A $66,654 grant from the Office of Water Resources in NRCD is helping to finance six new public access sites along the river. Uses for the areas include parks, rest stops, picnicking and recreation, and portage (carrying boats overland from one point of the river to another to avoid low bridges, dams, or other water hazards). Some of the sites include boat ramps, grills and picnic tables, restrooms, and drinking water. Local governments sponsoring the sites have agreed to maintain and operate their access areas.

The Yadkin Trail runs through Wilkes, Surry, Yadkin, Forsyth, Davie, Davidson, and Rowan Counties. Over 20 access sites along the trail presently exist or will soon be completed. The Yadkin River Trail Association, which has worked toward developing the sites, is composed of individuals dedicated to the stewardship of the Yarkin River.

ROUNDTABLE SERIES ADDRESSES COASTAL WATER ISSUES

Residents of coastal North Carolina face a unique set of water issues. They must balance interests that include farming, fishing, forestry, peat mining, and development, while guarding their ground and surface waters. In addition, coastal waters are in a position to receive pollutant loading from upstream areas elsewhere in the state.

A forum for public discussion of these issues is being provided by the Coastal Resources Advisory Council's Coastal Roundtable Series. Water quality was chosen as the topic for the first series.

During this series of three meetings, roundtable representatives, who included individuals as well as members of interest groups such as fishing, farming, and business, identified water quality problems seen as needing the most immediate attention by the Coastal Resources Commission and made initial recommendations for addressing them. The Commission and the Advisory Council will be implementing the recommendations over the next year. The Commission met on March 7-8 and approved a schedule for implementation.

Nonpoint source pollution, an item of top concern to roundtable representatives, will be the first issue to be addressed. Discussion of nonpoint pollution will continue at the Commission's May meeting, and a detailed proposal will be considered for addressing problems associated with coastal development density (including marinas) and waste disposal.

A number of recommendations were set forth by roundtable representatives for dealing with nonpoint pollution. For example, a recommendation for management is that the CRC revise its policy, land use planning, and development standards to improve management of urban/stormwater runoff and consider the following:

1. Establishing "estuarine setbacks" to provide vegetated buffers between development and tidal and non-tidal waters. These buffers could vary according to the sensitivity of an area, such as those adjacent to primary nurseries.

2. Requiring porous paving for development in Estuarine Shoreline Areas of Environmental Concern.

3. Revising the standards for percentage of impermeable surface area allowed for development within areas of environmental concern. These should reflect the soil characteristics and the sensitivity of surrounding natural areas.

4. Setting standards for removal of vegetation within designated areas of environmental concern.

5. Incorporating specific water quality guidelines into land use planning requirements for all local governments.

6. Restricting density of development in Estuarine System Areas of Environmental Concern.

7. Establishing guidelines for stormwater runoff retention.

- The Department of Natural Resources and Community Development should adopt water quality standards for primary nursery areas.

- The Environmental Management Commission should consider expansion of the nutrient sensitive designation for those waters where problems related to nutrients now exist or are imminent.

- The General Assembly and the Department of Natural Resources and Community Development should continue the cost-share program for best management practices and expand it to the entire state.

- The Department of Natural Resources and Community Development should update and implement the statewide water quality management ("208") plans.

- The Department of Natural Resources and Community Development should continue its efforts to develop a cooperative program with Virginia to improve the quality of the Chowan River.

- The Department of Natural Resources and Community Development should study the potential for strengthening the soil and water conservation districts' ability to manage nonpoint source pollution.

- The Department of Natural Resources and Community Development should implement as soon as possible the NPDES program for urbanized stormwater system permitting and control.

Recommendations were also made for education and research activities on nonpoint pollution.

Nonpoint pollution is one of nine water quality issues that the roundtable series has identified and that will be addressed. Others are coastal development density (which is also to be brought up at the May meeting), cumulative impacts, comprehensive management of water resources, basinwide pollutant loading, education, wetland loss/estuarine protection, waste disposal, and ground water management.

The roundtable series was established by the Coastal Resources Advisory Council in March 1984. Its purpose is to (1) provide a means for gathering information about coastal issues which could then be used in advising the Coastal Resources Commission, (2) provide coastal residents and interest groups with more information about coastal issues, and (3) provide a mechanism for involving the public in the coastal policy-making process. Meetings in the water quality series were held at three locations along the coast--Hertford, New Bern, and Wilmington--in order to include all coastal communities. Chairman of the series is J. Webb Fuller.

A report on the series has been prepared. For copies, contact the Division of Coastal Management, Department of Natural Resources and Community Development, P. O. Box 27687, Raleigh, NC 27611-7687. Telephone: (919) 733-2293.

SCS LEADER REPORTS IMPROVEMENTS IN EROSION CONTROL

In 1984, landusers and soil conservationists working together in North Carolina saved over one million tons of soil from eroding, reported Coy Garrett, State Conservationist for the USDA Soil Conservation Service (SCS).

Soil erosion is a major agricultural problem in North Carolina. More than 40 percent of the state's cropland is being eroded at higher rates than nature can rebuild it. In the Piedmont, 70 percent of the cropland is eroding above tolerable levels, Garrett added.

Working with landowners, SCS helps them plan and design soil conservation systems that reduce erosion, improve water quality, and prevent flooding. In 1984, more than 35,000 individuals and groups received assistance from SCS. Over 260,000 acres of land were improved by their combined efforts.

Reducing soil erosion has importance beyond the farm. Sediment from eroding land is the leading pollutant, by volume, of our state's rivers and lakes, said Garrett. Attached to the sediment may be agricultural chemicals like fertilizer, pesticides, and herbicides. The problem has become severe enough in some areas that the state has enacted the Nutrient Sensitive Waters Program to reduce sediment and chemical pollution of Jordan Lake, Falls of the Neuse Lake, and the Chowan River.

One of the more popular soil conservation measures in North Carolina is no-till. Last year no-till acreage increased 45 percent in North Carolina. Stripcropping and terraces were other options often used by farmers as part of a total resource management system.

In urban areas, SCS provides technical assistance to developers in controlling erosion. Construction sites are major sources for sediment. SCS helps developers design soil conservation systems that keep eroded soil from leaving the construction site. Silt fences, settling basins, and sod cover are common practices used.

LEGISLATORS INTRODUCE CLEAN DETERGENT BILL

Seven N. C. legislators, Representatives Hackney, Etheridge, Evans, Fussell, Holt, Payne, and Colton, have filed a bill to ban the use of any household or medical detergents containing more than a half-percent (0.5%) of phosphorus by weight. The bill has been referred to the Water and Air Resources Committee.

Many North Carolina streams and lakes receiving a combination of municipal and industrial discharge and runoff from cities and agriculture are high in phosphorus and are subject to periodic nuisance algae blooms. The most serious blooms have occurred on the Chowan and Neuse Rivers.

A similar bill introduced in the 1984 General Assembly was passed by a vote of 70-27 in the House of Representatives. In the Senate, however, the bill faced strong opposition; and after a number of delays, it came to rest in a Senate Special Ways and Means Committee, where it remained until the legislative session adjourned.

Strong lobbying by the bill's opponents--headed by representatives of the Soap and Detergent Association and the North Carolina Phosphate Council--was credited with the bill's demise.

LEGISLATION SEEKS FLEXIBILITY IN ENVIRONMENTAL REGULATORS

Will North Carolina environmental regulations be more stringent than those under federal acts? A bill has been introduced in the 1985 General Assembly which would provide regulatory flexibility in the setting of water quality, hazardous waste, and air quality standards. This bill would repeal previous legislation which limited state rules, regulations, and standards to those set forth under federal laws.

The bill was introduced by Representatives Hackney, Pulley, Bruce Ethridge, Diamont, Colton, Barnes, and Payne.

SLUDGE MANAGEMENT RECEIVES INCREASED ATTENTION

Cities are faced with the problem of handling increased amounts of municipal sludge and disposing of it in a manner that will prevent environmental degradation and still be economically viable. Over 100,000 tons of wastewater sludge is generated each year in North Carolina, and the tonnage continues to grow.

A recent AWWA-WPCA-sponsored seminar held in Raleigh focused on the permitting process and alternative approaches to managing sludge.

Sludge is managed in four major ways: (1) incineration, (2) landfilling, (3) composting, and (4) land farming.

The most prevalent means in North Carolina is land treatment, or land farming. More than 90 percent of permits issued by the Division of Environmental Management over the past four years to handle sludge were for land farming. Some cities like Winston-Salem and Raleigh apply sludge to privately or publicly owned agricultural land at rates to supply the nutrient needs of crops. In the case of Winston-Salem, a contractual arrangement was made with a commercial firm to apply sludge on 194 privately owned and permitted farms in Forsyth, Davie, and Davidson Counties.

The City of Raleigh applies the majority of its sludge to land owned by the City and grows agricultural crops.

such as barley, sorgham, coastal bermuda hay, corn, and soybeans. Sales of $165,000 from these crops in 1984 are helping the City defray the cost of sludge handling and disposal.

The City of Morganton composts its sludge. With this process, the city uses the latest technology from EPA's Bangor project and USDA Beltsville research. Composting involves mixing wood bark with sludge, and under controlled processing and curing conditions it produces in about 51 days a useable soil conditioner, mulch, and potting medium. The majority of this soil amendment is purchased by a container gardner.

Some cities with limited access to land, such as Greensboro and Charlotte, rely on incineration of sludge as their disposal technique. In this process, gas is used to burn the sludge, and the remaining ash is disposed of in landfills.

Since land farming of sludge is so prevalent, readers may be interested in a series of 5 reports on land treatment published by the N. C. Water Resources Research Institute. The titles of the reports in the series are:

Report No. 1 - Policies and Procedures for Land Treatment of Wastewater
Report No. 2 - General Guidelines for Land Treatment of Wastewater
Report No. 3 - General Guidelines for Land Treatment of Sludge
Report No. 4 - General Guidelines for Subsurface Treatment of Wastewater
Report No. 5 - Application of Wastewater to Wetlands

These reports were prepared with the assistance of the following participating agencies: N. C. Division of Environmental Management, NRCD; N. C. Division of Health Services, DHR; Department of Soil Science, NCSU; Department of Biological and Agricultural Engineering, NCSU; Agricultural Extension Service, NCSU; Agricultural Research Service, NCSU; Department of Biology, ECU; and the Water Resources Research Institute of The University of North Carolina. Copies of the report may be obtained from the Institute, 225 Page Hall, Box 7912, NCSU, Raleigh, NC 27695-7912. Reports are free to North Carolina residents and $8 each for out-of-state persons.

SLUDGE STABILIZATION DEMONSTRATION

An example of a novel approach to sludge stabilization is described in Demonstration of Thermophilic Aerobic-Anaerobic Digestion at Hagerstown, Maryland by Oscar W. Haas of Union Carbide Corp. The report details the first 20 weeks of operation of a full-scale (16,400 gallons per day) dual system of sludge digestion built at the Hagerstown Wastewater Treatment Plant. The demonstration plant proved effective in the reduction of volatile solids and human pathogens in sludge.

Thickened, air-activated sludge is autothermally heated and maintained in the aerobic digester for approximately one day in the first stage of the process. This stage resulted in an average 27.2 percent decrease in volatile solids. Despite wide variations in the characteristics of the sludge, temperatures in the aerobic reactor were maintained at an average of 50.5 degrees Celsius through simple adjustments of the oxygen feed flow rates and hydraulic retention times. The heated, partially digested sludge is then fed into the anaerobic second step, where--during an average retention time of approximately 20 days--volatile matter is further broken down, resulting in the production of carbon dioxide and methane gases. Volatile solid removal rates for the entire two-stage process averaged 41.5 percent--a rate comparable to more traditional anaerobic systems with retention times of 20-50 days.

Copies of the report (No. PB84-238252) are available for $13 from National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161; Telephone (703) 487-4650. Direct any questions about the project to B. Vincent Salotto, EPA Project Officer, Municipal Environmental Research Laboratory, EPA, Cincinnati, OH 45268; Telephone (513) 684-7951.

. . . *Virginia Water News*

WATER MANAGEMENT AND GROWTH MANAGEMENT IN FLORIDA

Growth management is a big issue in Florida, a state which has seen a nearly vertical climb in population increase in recent years. The use of water availability is one tool for managing that growth.

The situation there represents something of a dilemma for managers of Florida's five water districts, says an article in the U. S. Water News. They are finding themselves "on the one hand carrying out the state growth directives, while on the other facing the wrath of local governments who charge that water districts are unfairly restricting the availability of water." Florida lawmakers are considering curbs on development, including the use of water management as a tool.

FEDERAL STORMWATER REGULATIONS

The Environmental Protection Agency has been wrestling with the problem of stormwater regulations since 1973. In response to recent court decisions, EPA revised on September 26, 1984, the NPDES Permit regulations for stormwater runoff. NPDES permits are now required for discharges from stormwater collection systems which are:

1. from lands or facilities used for industrial or commercial activities, or
2. determined by the Environmental Management Commission to significantly contribute to water pollution, or
3. located in one of the following urbanized areas designated by the Bureau of Census:

Asheville	Fayetteville	Raleigh
Burlington	Gastonia	Wilmington
Charlotte	Greensboro	Winston-Salem
Durham	High Point	

Due to the large number of stormwater outlets and the limited permitting resources, EPA has specified two priority groups:

1. Group I permits are to be issued for stormwater point sources discharges:
   a. from any industrial plant sites; or
   b. determined by the state to be significant sources of pollution.

   EPA regulations had specified that full applications, including monitoring data, be submitted for these systems by April 26, 1985. However, a decision has been made to extend that deadline to the end of the year.
2. Group II permits apply to all other stormwater systems subject to NPDES permits (i.e., discharges from commercial activities anywhere in the state and from residential areas in the designated urban areas). Current regulations specify that brief applications be submitted by December 31, 1985, to verify that these stormwater systems should not be classified as Group I.

However, EPA is proposing to modify these application procedures. All stormwater systems subject to NPDES permits would file brief applications by December 31, 1985. Group I systems needing full applications would then be determined from the brief applications.

EPA has not set and has given no indication that they will set deadlines for states to process the applications and issue permits.

The Division of Environmental Management (DEM) staff are currently investigating numerous questions relating to the new regulations including:

1. What does the term "industrial activity" include?
2. What does the term "commercial activity" include? A literal interpretation would include parking lots for stores, restaurants, etc.
3. What individual units require separate permits (e.g., residences, shopping centers, etc.)?
4. To what extent can the permits be consolidated by issuing permits to municipalities or issuing general permits?
5. How can all of these sources be notified to submit applications?
6. What control means are available to assure that stormwater discharges will comply with water quality standards?

The Commission will also have to address several issues including:

1. Does the EMC consider stormwater permitting to be a high priority?
2. How can additional staff be obtained to implement a stormwater permit program?
3. Will new regulations need to be adopted for a stormwater permit program?
4. What role can local units of government play in this stormwater program?

The new stormwater regulations should enable the state to provide important protection of water quality in North Carolina, but at the same time will significantly increase the responsibility of the Commission and the workload of the DEM staff.

LONG-TERM STUDIES BY TVA WILL DOCUMENT ACIDIFICATION CHANGES IN APPALACHIAN RESERVOIRS

On-going studies supported by TVA are underway to determine changes in acidification of fresh waters in mountain lakes caused by acid deposition. Most studies of acid deposition influence are performed in Scardinania, Canada, and the northeastern United States. Only by extrapolation of data from those regions can the impacts on southeastern United States waters be assessed.

The Southern Blue Ridge region has been selected for a long-term study because of the potential sensitivity of waters in the region. The region, composed of parts of Georgia, North Carolina, Tennessee, and Virginia, contains many man-made lakes that may have limited acid-neutralizing capacity.

Studies by TVA evaluated 54 reservoirs in the region and selected 12 reservoirs for long-term monitoring. An initial screening of the 54 reservoirs showed a pH range of 4.7 to 7.6. Eight of the reservoirs selected for long-term monitoring are located in North Carolina. The goal of the study is to determine long-term trends in water quality, and results are expected to complement similar work in other parts of the U. S.

More details regarding the studies may be obtained from Dr. Harry Olem, Environmental Engineer, Water Quality Branch, 248 401 Building, Chattanooga, TN 37401. Telephone: (615) 751-7322.

NATIONAL FOCUS ON GROUND WATER CAUSES ASSOCIATION TO CONSIDER NAME CHANGE

Members of the National Water Well Association this year will be considering changing the name of the organization to the National Ground Water Association, a change that is seen as a more accurate reflection of what the group is about and one that will benefit both the water well industry and the public.

NWWA members are, after all, ground water specialists, says an editorial in the January issue of the Water Well Journal, and they should be recognized as such. In "Ground Water: Did You Ever Think It Would Become a Household Word?" Jay Lehr, Executive Director of the NWWA, points to the growing public awareness of the importance of ground water and to a burgeoning demand for monitoring wells, ground water heat pumps, and private wells.

"As a result of this activity," Lehr writes, "the public and professionals everywhere are daily seeking assistance and knowledge concerning ground water. Requests are for ground water information rather than water well information. NWWA is the center of the knowledge they seek." The association staff works "365 days a year" and addresses over 150 organizations annually to make people aware of the availability of ground water, Lehr says. Yet, the current name does not indicate this. It often leads to confusion and misunderstanding. The new name--on letterheads, doors, and in directories--would allow instant recognition of the organization's connection with ground water.

"A decision by the membership of the National Water Well Association to change its name to the National Ground Water Association will make it possible for the association's staff to serve the industry better than ever before as a result of the rapid recognition that the new name can achieve," Lehr said.

The name change was proposed at the NWWA's 1984 convention, but delegates voted to postpone the decision until they could discuss it with members of the state associations.

WATER COULD BE NATIONAL DEBATE TOPIC

America's water resources could be the subject of widespread attention from the nation's high school students this year. "Management of Our Nation's Water Resources" is in the running, along with agriculture and nuclear power, for selection as the national debate topic for the 1985-86 high school year.

The Texas Society of Professional Engineers sponsored the effort to have water management as the topic, according to the January Water News. The three topics being considered were selected by the National Federation of State High School Associations. One will be chosen through a vote by high school coaches across the country. Water management finished among the top three in last year's selection process but was not picked by the debate coaches.

Three questions on water are being considered by the coaches. They deal with the federal government's role in control, policy making, and protecting the nation's water resources.

WETLAND BOOKLET AVAILABLE

"Wetlands of the United States: Current Status and Recent Trends" is a popular report prepared by the U. S. Fish and Wildlife Service to inform the public, government officials, and others about the status of wetlands. Copies are available for $3 each from the U. S. Government Printing Office, Washington, DC 20402.

. . . *Outdoor News Bulletin*

JUNE IS AMERICAN RIVER MONTH

Governor James G. Martin is expected to proclaim June as North Carolina Rivers Month, and the North Carolina Department of Natural Resources and Community Development will be active in promoting the celebration.

The celebration is designed to increase public awareness of the value of local rivers as community assets, focus media attention on river and stream conservation, and encourage public and private support for river protection and management. Activities will include canoe races, photo contests, river clean-up campaigns, and festivals.

According to S. Thomas Rhodes, Secretary of NRCD, his agency will publish several thousand state calendars to help groups promote their river-related events. Calendars and an attractive full-color poster proclaiming "American Rivers Month" will be sent to aid in promotion.

Groups planning special river events are asked to contact the State Coordinator for the American Rivers Month by April 1.

The American Rivers Month is being coordinated nationally by the American Rivers Conservation Council and NRCD on the state level. Last year, the celebration involved 25 different river events sponsored across North Carolina.

For details on American Rivers Month, contact Rick Shaw, Division of Water Resources, NRCD, P. O. Box 27687, Raleigh, NC 27611, (919) 733-4064.

NEW INSTITUTE PROJECT: REGIONAL WATER MANAGEMENT

Water management in North Carolina is characterized by its fragmentation, with thousands of separate small water supply and sewage disposal systems. In general, such small systems do not have the financial, technical, or personnel resources to provide adequate service at reasonable cost.

A new Institute project seeks to draw on the ten-year experience of England and Wales with its large-scale regionalization of water management and the integration of water supply, sewerage, and water pollution control. In England and Wales, 10 regional water authorities based on hydrologic boundaries serve 50,000,000 people. This research project will provide a report which assembles the findings from the England and Wales regionalization and integration of water management, with particular reference to its application in North Carolina.

The Principal Investigator for the new project is Dr. Dan Okun, Kenan Professor of Environmental Engineering, Emeritus, Department of Environmental Sciences and Engineering, UNC-Chapel Hill. The project is expected to be completed by June 30, 1985.

WORKSHOP ON DAM SAFETY, JUNE 17-18

See attached green sheet, page 9.

NONPOINT SOURCE POLLUTION CONFERENCE SET

A national conference on controlling water pollution from nonpoint sources is set for May 19-22, 1985, in Kansas City, Missouri. It is designed for 1,000 participants who have serious concerns about nonpoint source pollution. Representatives from agriculture, forestry, mining, construction, industry, conservation groups, and government will attend.

Dr. David Moreau, North Carolina Water Resources Research Institute Director, will participate in a portion of the program that addresses urban issues, especially those related to nonpoint source pollution from construction activities.

Further information on the conference is available from the North American Lake Management Society, P. O. Box 217, Merrifield, VA 22116.

GROUND WATER SEMINARS FOR APRIL

A series of 10 ground water seminars has been scheduled for individuals interested in improving their knowledge in this subject area. The seminars for April include:

Wednesday, April 10	Concepts Relating to Agricultural Drainage and Shallow Ground Water Systems -- Wayne Skaggs, Dept. of Biological & Agricultural Engineering, NCSU
Wednesday, April 24	Potential for Development of Ground Water in the Piedmont -- Charles Daniel, U. S. Geological Survey

For details regarding these seminars held on the North Carolina State University campus call the Water Resources Research Institute at (919) 737-2815.

TRIANGLE ENVIRONMENTAL CONFERENCE, APRIL 2-4

The Division of Lifelong Education announces they will cosponsor the 23rd Conference: The 1985 Triangle Conference on Environmental Technology to be held April 2, 3 and 4, 1985, at McKimmon Center.

The pre-conference workshop, "Phosphorus Removal in Small Waste Treatment Plants," will be conducted on Tuesday afternoon, April 2, 1985. The conference is scheduled for Wednesday and Thursday, April 3-4, 1985.

This conference is a national forum designed for focusing on new ideas on environmental technology and enhancement of better understanding of new research, design, operating, and regulatory techniques useful in solving practical environmental problems.

NCSU is the host institution for the conference. Cosponsors include the University of North Carolina at Chapel Hill and Duke University.

If you would like more information regarding the content of the conference, contact Professor Charles Smallwood, Civil Engineering Dept., NCSU, Telephone (919) 737-2331. To receive a brochure for registration, contact Dora Shell or Michelle Howell at the Division for Lifelong Education, McKimmon Center, (919) 737-2261.

WORKSHOPS, CONFERENCES AND COURSES

May 20-25. Finite-Element Modeling and Field Investigation of Contaminant Transport in Ground Water Systems. Holcomb Research Institute Butler University, 4600 Sunset Ave., Indianapolis, IN 46208. (317) 283-9458.

June 24-28, 1985. Flood Technology. Colorado State University, Fort Collins, CO. (303) 491-7501 or 6222.

April 22-24, 1985. Pre-treatment of Industrial Waste Water. The Center for Professional Advancement, P. O. Box 964, East Brunswick, NJ 08816-0964. (201) 238-1600.

April 16-18, 1985. Land Treatment, a Hazardous Waste Management Alternative. College of Engineering, Cockrell Hall 10.324, The University of Texas at Austin, Austin, TX 78712. (512) 471-3506.

April 15-19, 1985. Flood Plain Hydraulics. The University of Texas at Austin, College of Engineering. (512) 471-3506.

April 29-May 1, 1985, East Brunswick, NJ, and May 14-16, 1985, Chicago, IL. Groundwater Monitoring. The Center for Professional Advancement, P. O. Box H, East Brunswick, NJ 08816-0257. (201) 238-1600.

April 10-12, 1985. Pollution of Groundwater: Sources, Processes, Prevention, and Mitigation. Holcomb Research Institute, Butler University, Indianapolis, IN 46208. (317) 283-9458.

April 23-25, 1985. Non-point Pollution Abatement Symposium. Marquette University, Division of Continuing Education, 1918 West Wisconsin Ave., Milwaukee, WI 53233. (414) 224-7345.

April 10-11, 1985. Urban Nonpoint Source Pollution in Virginia, Division of Soil and Water Conservation, Fairfax, VA. (804) 786-3998.

POSITION AVAILABLE — Research Specialist II - Water Resources with the College of the Virgin Islands. Candidates must have a Master's degree in hydrology, water resources planning and management, or any other related field with a strong background in hydrology. Some experience in computer modeling of hydrologic processes is desirable. A letter of application, resume, and at least three letters of recommendation, or an equivalent placement file, should be addressed to Dr. D. S. Padda, Vice President for Research and Land-Grant Programs, Caribbean Research Institute, College of the Virgin Islands, Charlotte Amalie, St. Thomas, U. S. Virgin Islands 00802.

WATER RESOURCES CONDITIONS IN NORTH CAROLINA FOR FEBRUARY — Streamflows in the Blue Ridge and Piedmont were normal following two consecutive months of below-normal (in the lowest 25 percent of record) flows. Streamflows in the Coastal Plain were above normal (in the highest 25 percent of record).

Monthly mean flow for the selected stations, as compared to the median monthly flow for the reference period, are as follows:

French Broad River at Asheville (Blue Ridge), 100 percent,
South Yadkin River near Mocksville (Piedmont), 121 percent,
Contentnea Creek at Hookerton (Coastal Plain), 139 percent.

Water levels in unconfined aquifers rose and were above long-term averages across the state for the third consecutive month.

. . . *U. S. Geological Survey*

ADDITIONAL WATER RESOURCES LEGISLATION IN NORTH CAROLINA

Bills Ratified

House

H 129 River litigation funds.

An act to appropriate additional funds to the Department of Natural Resources and Community Development and to the Department of Justice. Upon recommendation of the Governor, there is appropriated from the General Fund for the fiscal year 1984-85 the sum of two hundred seventy thousand dollars ($270,000) to the Department of Natural Resources and Community Development and the sum of two hundred thirty thousand dollars ($230,000) to the Department of Justice for appropriate expenses in the continuation of litigation in the controversies involving the proposed diversion of water from the Roanoke River Basin to the Southside Hampton Roads area of Virginia. Ratified March 8, 1985.

Bills Introduced

House

H 139 Private sewer system permits.

To authorize the Environmental Management Commission to protect the waters of the state against pollution from package plants. Amends GS 143-215.1 (dealing with permits regulating sources of water pollution) to authorize cited Comm'n, when issuing a permit for sewer system, treatment works, or disposal system for a new private residential (more than 3 units) or commercial development, to include as a condition that owner and city or county agree before a permit is issued that in the event terms of permit are violated repeatedly and Commn'n issues written decision to that effect, city or county commits itself to take over ownership, maintenance, and operation of the system. If the city or county requests, owner must agree to give a bond or surety that it will pay the reasonable expenses of the city or county in maintaining the system for five years after Comm'n's decision. Parties to agreement may include other provisions and agreement must be approved in writing by Comm'n.

H 140 Environmental penalties for education.

To establish educational programs for sums recovered under G.S. 143-215.6(a). Amends G.S. 143-215.3(a) to authorize the Environmental Management Comm'n to conduct educational programs in air, ground water, and water pollution control. Adds new subdivision to G.S. 143-215.6(a) to permit civil penalties assessed by the Environmental Management Comm'n on or after July 1, 1985, to be used for educational programs. Limits the total amount that may be used for such programs to $100,000 in any fiscal year. Appropriates from the General Fund $60,000 to replace funds allocated from receipts collected under G.S. 143-215.6(a) (civil penalties assessed by Environmental Management Comm'n) in the budget of the Division of Environmental Management of the Dept. of Natural Resources and Community Development. Effective July 1, 1985.

H 141 Water quality LRC study continued.

Authorizing the Legislative Research Commission to continue its study of the adequacy of existing water pollution control programs to improve and protect water quality in the State. As title indicates. Authorizes reports to the 1986 or 1987 sessions.

. . . *Daily Bulletin--The General Assembly of North Carolina, Institute of Government, University of North Carolina at Chapel Hill*

NEW PUBLICATIONS RECEIVED BY THE INSTITUTE

(Residents of North Carolina may borrow these from the Institute for a two-week period. Where individual copies are desired, readers are encouraged to request copies from the organization issuing the publication. The addresses are provided by the NEWS for this purpose.)

Water Resources Planning

"Research for Managing the Nation's Estuaries, (Proceedings)," (84-08), 12/84, ed. by B. J. Copeland, et al., UNC Sea Grant College Program, Box 8605, NCSU, Raleigh, NC 27695-8605. (02L)

"Lake Restoration, Protection and Management," (EPA 440/5-83-001), 1983, by EPA, Off. of Water Regulations & Standards, Washington, DC 20460. (02H)

"Lake and Reservoir Management, Proceedings of Third Annual Conference North American Lake Management Society," (EPA 440/5/84-001), 1984, by EPA, Off. of Water Regulations & Standards, Washington, DC 20460. (02H)

"Municipal Expenditures, Revenues and Services, Economic Models and Their Use by Planners," 84, ed. by W. P. Beaton, avail. from The Center for Urban Policy Research, PO Box 489, Piscataway, NJ 08854. (06C)

"The North Carolina-Virginia Tidewater Area - Developing a Process for Resolving Water Resource Management Issues," 12/82, contact: NRCD, Box 27687, Raleigh, NC 27611. (06B)

Water Quality Management

"The Integrated Lake-Watershed Acidification Study," (EPRI EA-3221), 9/83, by Tetra Tech, Inc., for Electric Power Research Institute, 3412 Hillview Ave., Palo Alto, CA 94304. (02H Lakes)

"Groundwater Transport: Handbook of Mathematical Models," by I. Javandel, et al., avail. from AGU, 2000 Fla. Ave., NW, Washington, DC 20009. Price: $11.20. (04B)

"Groundwater-Leachate: Modeling/Monitoring/Sampling," (623767), 1984, by P. N. Cheremisinoff, et al., avail. from Technomic Publishing Co., Inc., 851 New Holland Ave., Box 3535, Lancaster, PA 17604. Price: $24.50. (04B)

"Users Manual for the Pesticide Root Zone Model (PRZM), Release 1," (EPA-600/3-84-109), 12/84, by R. F. Carsel, et al., avail. from Env. Research Lab., Off. of R&D, USEPA, Athens, GA 30613. (05B)

"Agricultural Use of Sewage Sludge: A Literature Review," (#143), 12/84, by W. D. Kelley, et al., WRRC, VPI&SU, 617 N. Main St., Blacksburg, VA 24060. (05D Sludge)

"Strategy for the Protection of Underground Water in Illinois," (#8), 10/84, by IL EPA, Springfield, IL 62708. (04B)

"Nationwide Urban Runoff Program Winston-Salem, NC - An Evaluation of Street Sweeping as a Runoff Pollution Control," (#83-07), 10/83, by DEM, NCNRCD, PO Box 27687, Raleigh, NC 27611. (05B Urban Nonpoint Runoff)

"Mathematical Models and Optimization Techniques for Use in Analysis and Design of Wastewater Treatment Systems," (#194), 11/84, by C. C. Tang, et al., WRC, U. of IL at Urbana-Champaign, 2535 Hydrosystems Lab., 208 N. Romine St., Urbana, IL 61801. (05D)

Miscellaneous

"Water Resources Development - Project Selection, Financing, and Cost-Sharing," 2/84, by ICWP, 21 Dupont Circle, NW, Suite 600, Washington, DC 20036. (06C)

WORKSHOP
ON
PROBABILISTIC RISK ASSESSMENT OF DAMS

McKimmon Center, N. C. State University
June 17 and 18, 1985

Sponsored by: Federal Emergency Management Agency in cooperation with Division of Land Resources, North Carolina Department of Natural Resources and Community Development; Civil Engineering Department, North Carolina State University; and Water Resources Research Institute of The University of North Carolina

Objectives

The purpose of the workshop is to introduce engineers involved in dam safety with methods and procedures to perform probabilistic risk and decision analyses of dams. Lectures are presented on fundamentals of probabilistic risk and decision analysis techniques and their applications to dam safety problems. The program also includes background on societal risks in other areas, uncertainty analysis and example problems. Other lecture topics discuss applications of probabilistic methods to hydrologic and geotechnical aspects of dam safety assessment. Insights that can be obtained from a risk analysis are discussed. Decision analysis methods are presented as a means to evaluate alternatives to upgrade a dam. The workshop lectures focus on the application of probabilistic risk assessment to evaluate the safety of dams. Specific methods of engineering analysis (i.e. slope stability analysis, use of HEC-1, etc.) are discussed only in the context of their use in a risk assessment.

Who Should Attend?

The workshop is intended to acquaint engineers involved in dam safety with the elements of probabilistic risk and decision analysis. The workshop lectures are presented at a technical level for those involved in making dam safety assessments. Since the problem of dam safety is a multi-disciplinary matter, lectures attempt to address the major elements of risk assessment. Risk assessment techniques are presented as a tool for the engineer to quantify in a systematic approach the integrity of a structure to withstand the events that threaten it. Decision analysis methods are presented as a means to evaluate the potential alternatives to upgrade a structure. A key element in a risk analysis is to quantify the modeling uncertainty in the analysis of a dam. Methods of uncertainty analysis are presented as a means to quantitatively assess the confidence an engineer has in the results of the risk analysis. Although the lectures are oriented more towards technical personnel, decision makers are encouraged to attend as a means to become acquainted with the basic principles and the results that can be expected from a risk-based decision analysis. Some background in the application of probabilistic methods is helpful.

Workshop Format

The workshop is a series of 2-day lectures presented by Stanford University personnel. The first day begins with presentations on risk and the applications of risk and decision analysis in dam safety. Also on the first day basic notions in probability and methods of probabilistic analysis are presented. On the second day elements of the risk assessment of dams are presented. This includes hydrologic and seismic risk analysis, evaluating the likelihood of failure due to the many events that can challenge a structure and the assessment of downstream consequences. Each participant is provided a set of workshop notes. The workshop program will run from 8:30 am to 4:30 pm each day. Registration begins at 8 am on June 17 and a continental breakfast will be provided at 8 am on June 18.

---------- Cut on dotted line) ----------

Mail to: DAM SAFETY WORKSHOP
Water Resources Research Institute
Box 7912, 225 Page Hall
North Carolina State University
Raleigh, North Carolina 27695-7912

REGISTRATION FORM

Name _____ Telephone ( ) _____

Address _____

City and State _____ (Zip) _____

Company Affiliation _____

FEE: Make checks payable to Water Res. Res. Institute. Space is limited so register early. Registration fee includes workshop written materials, breakfast (June 18 only), coffee breaks and lunch on June 17 and 18, 1985.

Workshop Lecturers

Joseph B. Franzini
Prof. of Civil Engineering
Stanford University

Edward Kavazanjian, Jr.
Asst. Prof. of Civil Engineering
Stanford University

Martin W. McCann, Jr.
Consulting Prof. of Civil Engineering
Stanford University
and
Vice President
Jack R. Benjamin and Associates, Inc.
Mountain View, California

Haresh C. Shah
Prof. of Civil Engineering and
Director of the John A. Blume
Earthquake Engineering Center
Stanford University

Lecture Topics

Application of Risk and Decision Analysis to Dam Safety

Basic Probability Concepts

Methods of Probabilistic Analysis

Framework for the Risk Analysis of Dams

Hydrologic Risk Assessment/Dam Break Routing

Geotechnical and Seismic Risk Assessment

Decision Analysis to Evaluate the Alternatives to Upgrade a Dam

Uncertainty Analysis

Registration Information

When: June 17-18, 1985

Where: Jan S. McKimmon Center, North Carolina State University, Raleigh, NC

Accommodations: Nearby accommodations to McKimmon Center include:

The Quality Inn Mission Valley
2110 Avent Ferry Road
(919) 828-3173

The Velvet Cloak Inn
1505 Hillsborough Street
(919) 828-0333

The Raleigh Hilton
1707 Hillsborough Street
(919) 828-0811

Please make your own reservations directly with one of the above, or with any other facility of your choice. All are near the main campus, but not within walking distance of McKimmon Center.

Fee: $50.00 which includes workshop written materials, continental breakfast on June 18, coffee breaks, and lunch on June 17 and 18. Workshop attendance is limited so preregistration is mandatory by June 10.

Registration Information: Call Linda Lambert or Eva McClung at (919) 737-2815.

Workshop Information: Call John Tucker, Civil Engineering Dept., N.C. State University, (919) 737-2331.

DAM SAFETY WORKSHOP
Water Resources Research Institute
Box 7912, 225 Page Hall
North Carolina State University
Raleigh, North Carolina 27695-7912

Merchants Mill Pond, Gates County, N.C. Photo by David H. Howells.

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