/ NEWS
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CONTENTS

N. C.'s DUAL CHALLENGE: ENCOURAGING ECONOMIC GROWTH AND PROTECTING THE ENVIRONMENT

North Carolina is unique in that it places responsibility for natural resources and community development in the same agency, an arrangement that recognizes the need to consider both economic growth and its impact on the environment. The need for and value of this approach were stressed by Secretary James A. Summers of the N. C. Department of Natural Resources and Community Development at the recent Triangle J Council of Governments 25th anniversary dinner.

Our rapidly growing state is at a crucial point in its development, Summers said. North Carolina is the fastest-growing retirement area in the country and was identified in a Business Week survey of chief executive officers as the number one choice for location of a new industrial plant. Summers listed some of the state's accomplishments in attracting this growth as well as some important steps being taken to ensure that the environment will not suffer as a result.

More than $13 billion in new investment has been added to the state's economy, and over 200,000 new manufacturing jobs have been added to its work force. North Carolina now ranks first in the nation in attracting industry from overseas and in industries locating to another state. "We not only deserve this success, but we are prepared for it," Summers said. During the past year the state has made great progress in environmental protection efforts.

Steps included actions to strengthen water quality programs for controlling toxic chemical wastes and protecting coastal fishery nursery areas and for a program to recycle or eliminate waste materials before they become pollutants. A nutrient-sensitive watershed budget for the Falls, Jordan, and Chowan was also enacted. This budget provided cost-sharing funds for farmers to reduce sediments and nutrients flowing into the watersheds, Summers said. He praised Triangle J and the Falls and Jordan Lakes Steering Committees for work done to protect these watersheds. State actions, including the state cost-sharing program and a pilot project for maintenance of rural unpaved roads, complement local government efforts. "This is exactly the type of creative state and local partnership that is essential today," Summers said, in light of federal cutbacks and a "new sorting out of responsibilities."

Lack of financing for wastewater treatment facilities, due to changes in federal legislation, is a major concern that could threaten the state's progress as well as the environment, Summers said. This and other pollution problems are being addressed by the Pollution Prevention Pays program, which seeks to find and promote ways to reduce, prevent, and recycle wastes before they become pollutants.

A number of businesses in North Carolina are using this approach. Stanadyne, Inc., in Sanford, is reducing pollution and saving costs of $4,200 per year in their electroplating operation. Data General in Clayton realizes a $180,000 a year saving through the reduction and recovery of hazardous wastes. And G.E. Intersil, a microelectronics plant in the Research Triangle Park, has developed systems to separate toxic chemicals from their operations, thus avoiding disposal problems. Pollution Prevention Pays, said Summers, "is just one example of what we want to see statewide: a creative and innovative approach that is economically and environmentally sound."

In conclusion, Summers said, "In this state, we will not sacrifice the environment for growth. We believe that you can plan for and accomplish growth without disregarding the protection and safekeeping of the environment. In fact, we feel clean air, clean water, and protection of our natural heritage are minimum goals that our citizens expect and deserve. This administration's record clearly shows that jobs and environmental protection are not mutually exclusive. The challenge for the next governor is to continue to seek bold solutions that will ensure that the children of the 21st Century can enjoy a healthy economy in a healthy environment."

COASTAL WATER ISSUES RECEIVE INCREASED ATTENTION

The 20 coastal counties of North Carolina have extensive water resources that are heavily used for fishing, water supply, recreation, and waste assimilation. The region is undergoing tremendous growth and in some areas very dense development. Water problems are intensifying both from the local growth and use and also from upstream inputs.

The Advisory Council of the Coastal Management Commission and the staff of the Office of Coastal Management are in the process of soliciting public input on priority water quality issues. Through a series of roundtable meetings a diverse group of people are being asked to exchange ideas and information about specific coastal water concerns. Several hundred people are expected to express themselves on key water quality issues through a total of nine meetings, three held once a month in the northern, central, and southern regions of the coast.

The Advisory Council will ultimately outline the issues, and the Coastal Resources Commission is expected to suggest action and implementation.

Among some of the issues already identified are basinwide pollutant loading, cumulative impacts of development, freshwater intrusion in shellfish nursery areas, coastal and agricultural erosion, need for improved understanding of the water resources and the changes occurring, adequate wastewater facilities, nutrients and eutrophication of coastal waters, toxics in water, land drainage systems, peat mining, large-scale land clearing and conversion, industrial discharges, and landfill leaching.

These and other problems will be assessed to determine what is now known on each problem, what current policy and legislation exist to address them, what programs need strengthening, and where additional information is needed to suggest research.

For additional details regarding the process for determining priority water quality issues by the Coastal Management Commission, contact Kathryn Henderson, Staff Coordinator, Office of Coastal Management, P. O. Box 27687, Raleigh, NC 27611-7687. Telephone 919-733-2293.

WORKSHOP HIGHLIGHTS ALTERNATIVE FINANCE AND TREATMENT FOR MUNICIPAL WASTEWATERS

"Wastewater treatment financing will be one of the most important issues for the rest of the century," said Jim Summers, Secretary of Natural Resources and Community Development, at a workshop for elected officials and local public works officials. Currently, approximately 150 communities are on moratorium and cannot add new residences, businesses, and industries to their wastewater treatment systems because they have reached capacity or have inadequate wastewater facilities. These communities face the problems of rising costs and reduced federal and state funding assistance. The N. C. Clean Water fund ran out on September 30 and recently the federal cost share for wastewater facilities decreased from 75 percent to 55 percent.

North Carolina projects a need for wastewater facilities expenditures during the remainder of the century at $1.7 billion.

Dr. David Moreau, Director of the Water Resources Research Institute, described the nature of the problems facing local governments. Local governments face increased costs for constructing, operating, and maintaining water and sewer facilities. Some of the increased costs of wastewater systems include cost of construction linked to inflation, increased electric utilities rising 10-12 percent per year over the past 15 years, and increased cost for capital which has risen about 8 percent per year over the past 10 years. Dr. Moreau predicted that without intensive action at the state and local levels, we could expect water and wastewater rates to rise 11-12 percent annually like those in the power industry.

Tom Osborne, City Manager from Greensboro, suggested that local governments need to have rates high enough to maintain water and wastewater plants, do a better job of planning, and begin setting aside funds for the next addition to their plants. He said that local governments must be prepared to respond to a larger portion of the funding for new projects.

The City of Salisbury has addressed the financing problems by improving its rate structure, according to Harvey R. Mathias, City Manager. In the late 1960s and early 1970s, Salisbury had a regressive rate structure where larger water users paid less per unit. In 1977, the City changed to flat rates for water and sewer and has increased its rate. In 1982, the rates were doubled and are now adjusted annually. The City is beginning to set aside funds each year for capital improvements and to minimize the need to sell bonds.

Other speakers in the workshop gave specific examples of ways to reduce the cost of treatment plant operations and modify existing facilities to obtain better treatment and meet effluent limits.

C. D. Malone, President of Hydro Management Services, Inc., gave a number of specific examples of innovations to improve plant performance, including using holding basins to equalize flows 24 hours per day, use of methane gas to supply part of the energy needs, use of digester supernatant as a partial source of nitrogen in the treatment process, and insulation of digester covers to save energy.

Lee Fleming with the Division of Environmental Management described some innovative approaches for communities to comply with their effluent limitations, including conversion of existing facilities, use of wetlands for treatment, splitting the discharge for two receiving streams, considering seasonal permitting with spray application in the summer, and discharge in the winter when stream flows are higher.

The workshop was sponsored by NRCD's Division of Environmental Management and the North Carolina League of Municipalities.

WATER PROJECTS STRIPPED FROM FEDERAL FUNDING BILL

The House-Senate conferees on October 10 approved a large bill to finance most federal agencies for the next fiscal year. The spending measure was approved after it was stripped of controversial water projects that had prompted veto threats from President Reagan. The White House veto threats caused House democratic leaders and later House-Senate conferees to drop about $100 million in dams, ports, and other water projects that had raised administration objections. In return, the administration agreed re-

luctantly to go along with a ban of at least five months on aid to anti-government Nicaraguan rebels under conditions that make it unlikely that the moratorium would be lifted.

North Carolina projects shelved in the closing days of congressional action included the Oregon Inlet Jetty Project and the Randleman Dam. It had appeared at one point that funds might be provided for the initial land acquisition for the Randleman Project which had received strong North Carolina congressional support.

Congress has not passed a major water project bill since 1976.

CONGRESS BACKS SCENIC RIVER STATUS FOR HORSEPASTURE RIVER — Both the Senate and the House have supported legislation that would block a proposed hydroelectric project on a section of the Horsepasture River in Transylvania County, North Carolina. The project involves the diversion of water through a 4½-foot-diameter pipeline 2½ miles downstream to a power plant below Windy Falls. The project, under consideration for several years by Carrasan Power Company (an Etowah corporation), was designed to leave a minimum flow of 40 cubic feet per second in the river.

Congressional action calls for a three-year study of a section of the Horsepasture River for inclusion in the nation's wild and scenic river system. During the study period, the Federal Energy Regulatory Commission would be precluded from issuing construction permits.

Governor James B. Hunt has also called on the North Carolina General Assembly to declare the Horsepasture a state natural and scenic river. Designation as either a state or a national wild and scenic river would permanently block the hydroelectric project.

Public groups opposing the project expressed concern over possible erosion and siltation from construction along the river's steep banks. They contended that low river flows would prevent trout from spawning and would damage wildlife in the stream and on its banks.

Horsepasture River, a relatively small river, has a number of scenic waterfalls.

SENATE BILL SEEKS TO CONTROL CHEMICALS IN DRINKING WATER — A bill before the U. S. Senate to reauthorize and amend the Safe Drinking Water Act contains provisions aimed at controlling man-made chemicals in drinking water. The Senate bill, which lacks the strong groundwater protection measures of the House version, empowers EPA to set and enforce standards for 74 synthetic chemicals, according to the Bureau of National Affairs Environment Reporter. Public drinking water systems would be required by EPA to install treatment technologies including activated carbon filters to remove chemicals.

Provisions of the Senate bill would also require monitoring at least every five years for unregulated contaminants, with federal subsidies to help small drinking water systems with monitoring. Other provisions of the bill, according to the Reporter article, include requirements for public notification of violations of regulations and the establishment of criminal penalties for tampering with public drinking water supplies. Small system operators without filters would be required to install them unless they met variance requirements, to be set by EPA. Technical assistance for complying with the new rules would be available for these operators from EPA.

A demonstration program on the prevention of contamination in sole source aquifers would be provided for under the Senate bill. The House version of the bill called for a comprehensive groundwater protection program, to be funded at $85 million per year.

EPA ISSUES RULES ON MONITORING, REPORTING OF TOXIC MATERIALS — EPA has set forth final rules for industrial monitoring and reporting of toxic materials under the Clean Water Act and will be moving ahead with the national pollutant discharge elimination system (NPDES) program, said an article in the Bureau of National Affairs' Environment Reporter.

The regulations, along with the NPDES program, have been held up for several years because of court action (Natural Resources Defense Council, Inc., vs. EPA) and likely will see more litigation, according to an NRDC attorney quoted in the article. EPA has said "the new rules represent a balancing between industry and environmental interests in toxics regulation."

The rules require NPDES permit applicants to test for all toxic pollutants (including metals, organic chemicals, cyanide, and total phenols) known or believed to be discharged in concentrations above 10 ppb. The testing level for pollutants acrolein acrylonitrite, 2, 4-dinitrophenol, and 2-methyl-4, 6-dinitrophenol was set at 100 ppb.

The new rules eliminate a requirement that permittees report new toxics used or manufactured after a discharge permit application is submitted, but they must report new toxic discharges that occur on a "routine or frequent basis."

POTENTIAL FOR FLOODING REDUCES PROPERTY VALUES — Many urban centers and industrial areas are built on flood plains or low-lying lands along rivers. The advantages are access to river transportation systems and ease of development of these relatively flat lands.

However, a major disadvantage is that some of these choice locations are subject to flooding. As these communities grow, so do the damages caused by flooding. In 1969, it was estimated that average annual damages in the Susquehanna River Basin exceeded $14 million. This estimate was made prior to the Hurricane Agnes flood, which caused damages in the basin of more than 2.5 billion dollars. As a result, properties located in flood plains are usually worth less than comparable properties located elsewhere.

To estimate the effect of being in a flood plain on residential property values, researchers at the Institute for Research on Land and Water undertook a study with funding provided by The Pennsylvania State University. Multiple regression analysis techniques were used to estimate the effects of being in a 100-year flood plain (the area which will, on the average, experience a flood event once every 100 years). Properties studied were in flood plains near Harrisburg and Williamsport along the Susquehanna River. Researchers included Research Assistant Roger H. Downing, Associate Professor of Quantitative Business Analysis Richard D. Twark and Research Associate Raymond W. Eyerly.

Results indicated that potential flooding reduces the value of the average residential property by $6,000, even if the property is insured. The researchers attribute this to the possibility of inconvenience from a flood along with the co-insurance factor. By co-insurance factor, the researchers mean that the purchase of flood

insurance does not completely mitigate the damages of flooding since all insurance carries with it some co-insurance factor by which the owner of the property is co-insurer with the carrier of the insurance.

The researchers recommend that anyone contemplating building in a flood prone area be aware of this possibility.

. . . *Institute for Research on Land and Water Resources*

EPA DEVELOPS SCREENING FOR EVALUATING LEACHING POTENTIAL OF PESTICIDES

A model simulation screening methodology for evaluating the leaching potential of agricultural chemicals has been developed by the U. S. Environmental Protection Agency's Environmental Research Laboratory in Athens, GA. The technique can be used to examine the potential for contamination of groundwater by pesticides applied to crops.

The methodology is described in the "Leaching Evaluation of Agricultural Chemicals (LEACH) Handbook," which was prepared by J. David Dean and Associates at Anderson-Nichols, Inc., Palo Alto, CA. Project officer was Lee A. Mulkey of the Athens Laboratory.

Potential pesticide leaching in corn, sorghum, wheat, and cotton growing areas in the United States can be assessed using the LEACH methodology, according to Mr. Mulkey. If significant leaching below the crop root zone is predicted, the technique provides a measure of its frequency and severity or indicates the necessity for more detailed analyses.

The LEACH methodology is quickly and easily used and requires minimal background and training on the part of its users. The technique is intended to augment more detailed model simulations and field or plot studies conducted to identify significant environmental risks to groundwater.

The methodology was developed as part of the activities of the Pesticide Environmental Exposure Assessment Team, a development and application support project by the Office of Research and Development for the Office of Pesticides and Toxic Substances.

The handbook (EPA-600/3-84-068) is available, while supplies last, from ORD Publications, Center for Environmental Research Information, USEPA, Cincinnati, OH 45268.

TOKYO CUTS RESIDENTIAL WATER CONSUMPTION

The Tokyo Metropolitan Government in Japan is spending 1 billion yen (about $4.44 million) to install water-saving valves in faucets around the capital city as a means of cutting water consumption and costs. The Japanese metropolis is plagued by a water supply problem, as only 10 percent of its water supply is satisfied from sources within Tokyo. The rest comes from Saitama and Gumma prefectures. The total daily supply for Tokyo is 1.46 billion gallons.

The valve installation program will retrofit 18 million faucets in a total of some 3 million houses and apartments throughout Tokyo's 23 wards and 25 suburbs. The cost of the program will be 1 billion yen and the savings are estimated at 10 billion yen ($44.4 million) over the three initial years of the project. The valves will be installed from 1984 through 1987 and will save about 14.4 million gallons of water per day. The average family of four will save about 120 gallons of water a month and the valve is capable of saving as much as 5 to 6 percent of the water demand at a given site.

The water-saving valve is a simple, hard rubber valve which cuts the water flow in half, saving wasteful flow. It is simply inserted into the faucet in such a way that it reduces the diameter of the passage through which the water flows.

. . . *Urban Innovation Abroad*

MIDEAST MUST GO TO GREAT LENGTHS TO OBTAIN WATER

The countries of the Middle East, as poor in water as they are rich in oil, are embarking on multibillion dollar projects to develop new water supplies. Scarce fresh water throughout the ages has been the keystone of life in this region, the deciding factor in where cultures settled and the focus of conflicts. Today, the countries, pioneers in desalination, zealously guard their water treatment plants against enemies or terrorist attacks, often burying water pipes and erecting barbed wire fences and steel doors to protect control rooms.

The lengths to which the countries must go to obtain water is pointed out in a recent L. A. Times-Washington Post News Service article. Libya is spending $27 billion to tap water 170 feet underground and transport it cross-country by pipeline. New desalination plants, dams, and irrigation systems will cost Saudi Arabia $15 billion. In the Middle East, 1.2 billion gallons per day of desalinated water is being produced at a cost of about $1.35 per 250 gallons, the article said. Water-for-oil trades with the Persian Gulf states are being pursued by Japan and the Phillipines, and Kuwait is considering importing water from Europe and Japan in tankers that come to load crude oil.

Population growth, urbanization, and industrialization underscore the region's need for water. In Egypt, the Aswan High Dam is making water available, but future demands and management practices are likely to tax this resource. In an issue devoted to Egypt's environmental problems, the August 1983 Conservation Foundation Letter points out that the country's population is expected to climb to 65 million by the year 2000. Poor management practices, such as overirrigation with water provided by the dam, are a problem. The High Dam has also aggravated problems of a rising water table and poor drainage.

WATER INFORMATION THROUGH ONLINE SEARCHES

Individuals looking for water literature on a specific topic have a good selection of online services available through most document librarians in large university libraries. The following are examples and the cost of some literature searches:

DIALOG Information Services provides Water Resources Abstracts (records from 1968 to the present) at a cost of $45 per online connect hour--an average search may cost between $5 and $20 depending upon how many citations are printed and in what format.

In addition to Water Resources Abstracts, there are other databases that may be of interest. WATERNET indexes publications of the American Water Works Association (1971-present; $80 per connect hour) and AQUATIC SCIENCES AND FISHERIES ABSTRACTS, produced by NOAA, is a database on life sciences of the seas and inland waters (1978-present; $78 per connect hour).

AQUALINE is a file from the Water Research Centre in Buckinghamshire, England, and provides information on every aspect of water, wastewater, and the aquatic environment (1960-present; $35 per connect hour). AQUACULTURE is a specialized file produced by NOAA, NODC, OSG, and the National Marine Fisheries Services and cites

international sources such as books, periodicals, conferences,and symposia (1970-present; $35 per connect hour). Finally, there is OCEANIC ABSTRACTS that covers literature on marine-related subjects (1964-present; $78 per connect hour).

At North Carolina State University details and assistance for making a literature search can be obtained by calling Lisa Newman at (919) 737-3280.

VIRGINIA WATER CENTER PUBLISHES GROUNDWATER SYMPOSIUM PROCEEDINGS

The Virginia Water Center has published Virginia's Groundwater: Proceedings of a Symposium Organized by the Environmental Defense Fund, edited by Jacob H. Kahn of the Center's staff. The proceedings of a two-day conference are divided into four major sections: remedial actions and noncontaminating waste-disposal techniques; state and local approaches to groundwater protection; groundwater quality management; and groundwater protection in Virginia.

According to William Walker, Director of the Virginia Water Resources Research Center, the principal outgrowth of the symposium was a broader understanding of the groundwater issues and problems confronting Virginia in the mid-1980s from a variety of perspectives: legal, institutional, environmental, and industrial. Most importantly, the symposium opened new lines of communication among individuals, organizations, and agencies that will be involved in making critical decisions about the future management and protection of Virginia's groundwater.

Copies of the 116-page proceedings are available from T. W. Johnson, Virginia Water Resources Research Center, 617 N. Main St., Blacksburg, VA 24060-3397; Telephone (703) 961-5624. Single copies are free to Virginia residents; $8 per copy to nonresidents if payment accompanies the order, $10 per copy to nonresidents to be billed..

GROUNDWATER BROCHURE AVAILABLE FROM VIRGINIA WATER CENTER

The main uses of groundwater in Virginia are rural domestic consumption, public supplies, and industry. Of the state's 91 counties, 24 get at least 90 percent of their water from groundwater supplies. The largest groundwater users among cities are Waynesboro, Suffolk, Virginia Beach, Chesapeake, Franklin, and Manassas Park. These are just a few of the facts included in the groundwater brochure published by the Virginia Water Resources Research Center.

Facts about Virginia's Groundwater provides a basic explanation of what groundwater is, what threatens its quality, and what citizens can do to protect this vulnerable resource. The brochure also includes statistics about groundwater use in the state and a colorful Virginia map (12" x 18"), suitable for classroom use, that illustrates the state's groundwater regions.

Copies of the brochure can be obtained by writing to Terri DiRico, Virginia Water Resources Research Center, 617 N. Main St., Blacksburg, VA 24060-3397. Single copies are free; larger quantities are available to citizens' groups and educators while supplies last.

REPORT TO OUTLINE FINANCING OPTIONS FOR TREATMENT PLANTS

An EPA task force report due out later this fall will outline major options for financing sewage treatment plants through 1991. EPA Assistant Administrator for Water Jack E. Raven is quoted in the Bureau of National Affairs' Environment Reporter as saying that the report will influence what the future federal role in financing treatment plants will be, although responsibility for developing a federal funding program rests with Congress.

The federal role in financing wastewater treatment plant construction is generally expected to end by 1992, Raven said in the article. He listed the three major options given in the report: "continuing the current construction grants program; federal grants to states for establishing self-sufficient financing banks or loan programs; and public-private partnerships." States should be allowed to choose from among these options, the report will recommend. The report assumes that the level of funding for municipal sewage treatment plants will continue at about $2.4 billion per year to fund 55 percent of project costs for 1981-1982 through 1991-1992, said the article.

REPORT ON CUMULATIVE IMPACTS OF PEAT MINING PUBLISHED

Extensive peat mining on the Albemarle-Pamlico Peninsula could degrade water quality in fish and shellfish nursery areas and cause the loss of black bear and bobcat habitats, a university research team has concluded.

Some environmental impacts would be minor or preventable, the researchers said in a recently published 418-page report. Still, they said large-scale mining would mean "a loss of part or much of the state's largest and least disturbed wetland complex."

"If the 'worst case' scenario came to pass, there would really be concerns about the potential threat to estuary quality and wildlife habitat," said Dr. David A. Adams, study coordinator and associate professor of university studies and forestry at NCSU.

The Water Resources Research Institute project involved the work of 16 researchers. Team members came from NCSU, UNC-Chapel Hill, Duke University, East Carolina University and the N. C. Department of Natural Resources and Community Development (NRCD).

They have reported their findings to NRCD's Coastal Management Program, which commissioned the study last year with funds from the National Oceanic and Atmospheric Administration.

The state's Peat Mining Task Force had suggested that the long-term environmental impacts of peat mining and conversion be studied. Private companies have proposed mining the peninsula's vast peat reserves for horticultural peat and production fuels.

By April 1984 the state had issued four permits for peat mining in the study area--Washington, Tyrrell and Hyde counties--covering 22,960 acres of peatlands.

The research team did not evaluate any particular project. Instead, members developed three 20-year scenarios to look at various impacts of mining, handling and conversion of peat.

The most drastic of the 20-year scenarios assumed that all the substantial peat deposits in the area, excluding buffer strips along rivers, were mined and gradually reclaimed--a total of 94,000 acres.

Another scenario projected the impact of only the mining already permitted and proposed--17,360 acres over the 20 years.

Finally, the team developed a scenario that assumed that the peat industry failed in the 10th year after 8,520 acres had been mined. That allowed members to look at what would happen if mined land were abandoned and left to flood.

Two developments during the past year were noted by the researchers but did not affect their conclusions. A major proposal for a peat-methanol conversion operation was canceled in February, and in March about 120,000 acres mostly in Dare County became the Alligator River National Wildlife Refuge.

The team reported to NRCD that nitrogen and phosphorus could be discharged into the Alligator and Pungo rivers in quantities that would degrade the rivers and estuaries, areas where the rivers and sea meet. Those nutrients can promote algae blooms.

Under any of the scenarios, the report said, "serious water quality degradation may result from the changes in land use and from associated industrial development in this region."

Depending on water management techniques, mining also might change the salinity and levels of suspended solids, trace elements, pesticides and coliform bacteria in the estuaries, the report said.

The long-term impact of the combined changes could not be predicted, and the team recommended that an estuarine model be developed for estimating such effects. The estuaries are prime nursery areas for fish and shellfish, mainstays of the local economy.

In addition, the report said, a significant proportion of the currently existing black bear and bobcat habitat will be lost if extensive mining takes place.

The researchers also concluded that:

--Potential problems with freshwater runoff into the bays and saltwater intrusion into groundwater supplies *should be preventable*. While mining could increase freshwater runoff by up to 30 percent, the report said control techniques such as floodwater storage and filtering through wetland buffers are available. Adams said technology also exists for preventing saltwater intrusion.

--Prime Atlantic white cedar habitat would be reduced.

--Reclaimed mined land could add up to $30 million to the net value of agriculture and timber on the peninsula over the 20-year period, depending on the scenario.

--Air pollution effects cannot be predicted without an expensive, sophisticated study.

--Disposing of solid wastes generated by large-scale peat-methanol conversion could be a problem because there do not seem to be adequate disposal sites on the peninsula.

--While the peat industry could boost the local economy, time lags and uneven distribution of the new tax revenues could make it difficult for local governments to respond to associated demands for housing and services.

The team members and their fields were: David Adams, NCSU, forestry; Richard G. Broadhead, NCSU, surface water hydrology; William A. Campbell, UNC-CH Institute of Government, law and government; Leon E. Danielson, NCSU, natural resource economics; Richard T. DiGiulio, Duke, environmental toxicology; David W. Evans, Duke University Marine Laboratory, environmental chemistry; Melvin Huish, NCSU, fisheries biology; Edward Kuenzler, UNC-CH, estuarine productivity and water quality; Lee J. Otte, ECU, wetland ecology and peat resources; Margery F. Overton, NCSU, numerical modeling of estuarine hydrodynamics; Hans W. Paerl, UNC-CH Institute of Marine Sciences, marine and freshwater biology, limnology; Joseph A. Phillips, NCSU, soils, agricultural economics; Curtis J. Richardson, Duke, resource ecology, wetland ecology with emphasis on water quality; and R. Wayne Skaggs, NCSU, hydrology of soils with shallow water tables. The report, edited by Judith Gale and David Adams, is titled "Cumulative Impacts of Peat Mining," CEIP Report No. 40, and is available in limited quantities from the Office of Coastal Management, NRCD.

NEW INSTITUTE REPORT *Hydrologic and Water Quality Impacts of Peat Mining in North Carolina* by J. D. Gregory, R. H. Culbreath, and J. R. Bailey, Department of Forestry, NCSU; and R. W. Skaggs, R. G. Broadhead, and T. L. Foutz, Department of Biological and Agricultural Engineering, NCSU.

Research reported in this publication was supported by a Coastal Energy Impact Program grant administered by the Office of Coastal Management and by the North Carolina Agricultural Research Service in cooperation with First Colony Farms, Inc., and Peat Methanol Associates. Project administration was provided by the Water Resources Research Institute of The University of North Carolina.

The surface and subsurface hydrologic impacts of peat mining were studied at a pocosin site in the lower Coastal Plain of northeastern North Carolina. Runoff and water quality data were collected for discharge from field ditches draining sites being actively mined and sites with natural vegetation. A water management model (DRAINMOD) was adapted to simulate surface hydrology. Evaluations were made of the effects of peat mining on vertical seepage to a deep aquifer and lateral seepage from a nearby lake.

Researchers found that the volume, duration, and peak flow of storm discharge from field ditches was greater from the mining sites than from those having natural vegetation. Baseflow between storm events was greater from vegetated sites than from the mined sites. Reduced evapotranspiration, reduced infiltration capacity, and grading and sloping of the surface were thought to be responsible for those differences.

Relatively high concentrations of organic sediment in field ditch outflows resulted from the highly erodible state of the mined surface and the field ditch channels. However, much of the sediment load settled in the weir stilling ponds and concentrations decreased downstream in collector and main canals due to settling and dilution. Concentrations of nitrogen and phosphorus varied little among sampling sites but were considerably higher than those reported in outflow from similar sites with natural vegetation in several other studies. Mining appeared to have no significant impact on concentrations of K, Ca, Mg, and Cl in outflows.

The water management model, DRAINMOD, was coupled with a numerical flood routing model and utilized to predict the long-term hydrologic effects of mining the peat bogs and reclaiming them to agriculture. Researchers indicated that during actual mining, the volume of water entering the canals will be increased by an annual average of about 29 percent over that from a well-vegetated area. Simulated comparisons of pre- and post-mining hydrology revealed that post-mining hydrology of land under cultivation will not be much different from pre-mining hydrology except that improved water management can be exercised.

Data from drill holes to a depth of 17.8 m at 22 locations at the peat mining site were used to describe the underlying sediments. Deep seepage rate to the Castle Hayne aquifer was estimated to be 0.039 cm/yr and was not altered by mining. Mining had no effect on total seepage out of Lake Phelps.

The report, WRRI No. 214, is free to residents of North Carolina and may be purchased by non-residents for a fee of $8 by writing to the Institute.

GROUNDWATER COURSE OFFERED AT DUKE

Duke University is offering a course on groundwater. "Groundwater Hydrology and Contaminant Transport," CE 227, is now a permanent course in the Duke Department of Civil Engineering and is taught by Dr. Miguel A. Medina.

Courses dealing with groundwater have been few in North Carolina colleges and universities. This one, to be taught next in the spring of 1985, includes such topics as management of groundwater systems; overview of worldwide groundwater resources; definitions, physical properties, and fundamental principles; groundwater contamination; estimation of groundwater pollution parameters; and applications to surface impoundments and sanitary landfills.

For more information on the course, contact Dr. Medina, Department of Civil Engineering, Duke University, Durham, NC 27706. Telephone (919) 684-2434.

CALL FOR PAPERS

International Symposium on Management of Hazardous Chemical Waste Sites, October 9 and 10, 1985. This symposium will be held at Winston-Salem Hyatt Hotel, North Carolina. For further information, please contact one of the following:

Dr. Zubair A. Saleem
Technical Program Chairman
c/o Ebasco Services, Inc.
2211 W. Meadowview Road
Greensboro, NC 27407
Phone: (919) 855-7500

Prof. Norman R. Tilford
General Chairman
c/o Department of Geology
Texas A & M University
College Station, TX 77843-3115
Phone: (409) 845-9682

Twenty-eighth Annual Meeting of the Association of Engineering Geologists, whose theme will be "Site Selection, Characterization, and Design Exploration," will be held October 7-11, 1985, in the Hyatt Hotel, Winston-Salem, NC. For more information contact one of the following:

Dr. Charles W. Welby
Chairman
Technical Program Committee
c/o N. C. State University
P. O. Box 8208
Raleigh, NC 27695-8208
Phone: (919) 737-2212

Prof. Norman R. Tilford
(Same as above)

Thirty-ninth Annual Water Pollution Control Association Conference, April 29-30 and May 1, 1985, Fredericksburg, Virginia. For more information contact Jimmie D. Jenkins, P.E., Director, Wastewater Treatment Division, County of Fairfax D.P.W., 10640 Page Avenue, Fairfax, VA 22030.

Fifth International Symposium on Agricultural Wastes (ISAW-85), December 16-17, 1985, Hyatt Regency Chicago, Illinois Center, Chicago, Illinois. For further information contact Dr. John M. Sweeten, Chairman, Program Committee of ISAW-85, 303 Scoates Hall, Texas A & M University, College Station, TX 77843. Phone: (409) 845-9795.

Symposium on Small Hydropower and Fisheries, May 1, 2, and 3, 1985, at the Ramada Renaissance Hotel, Denver, CO. This is sponsored by the American Fisheries Society. Bio-engineering Section and Western Division. For more information contact Forrest Olson/Douglas Sheppard, Program Co-Chairmen, CH2M-Hill, 1500 114th Ave., SE, Bellevue, WA 98004; phone: 206/453-5000.

National Conference and Exhibition on Hazardous Wastes and Environmental Emergencies, May 13-15, 1985, Cincinnati, Ohio. For additional information, Telephone (301) 587-9390.

WORKSHOPS, CONFERENCES AND SEMINARS

Seminars on Leaking Underground Storage Tanks, to be held February 21-22, 1985, at the Cathedral Hill Hotel in San Francisco, CA, and also on March 19-20, 1985, at Stouffer's Concourse Hotel in Washington, DC.

Subjects include evolving legal concepts, leak prediction, precision testing, early leak detection and instrumentation, corrosion protection, spill response and emergency action, subsurface investigations, and case histories.

For program details and information concerning who should attend, contact Richard M. Miller, President of American Ecology Services, Inc., 127 East 59th Street, New York, NY 10022. Telephone: (212) 371-1620.

WATER RESOURCES CONDITIONS IN NORTH CAROLINA FOR SEPTEMBER 1984

Streamflow declined seasonally across the state and was below normal in the Mountains and Piedmont but remained excessive (in the highest 25 percent of record) in the southern Coastal Plain as a result of rains associated with Hurricane Diana. Severe flooding caused by Hurricane Diana was limited to the immediate coastal areas, and floods inland were not as high or as damaging as was feared. The peak recorded at Black River near Tomahawk was the highest since record began in 1951.

Monthly mean flows at selected stations as compared to long-term mean for September were:

French Broad River at Asheville (Mountains), 78 percent
South Yadkin River near Mocksville (Piedmont), 60 percent
Contentnea Creek at Hookerton (Coastal Plain), 218 percent

Groundwater levels declined seasonally but remained above long-term averages across the state.

. . . *U. S. Geological Survey*

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

"Methodologies to Predict the Mobility and Availability of Hazardous Metals in Sludge-Amended Soils," (#189), 8/84, by G. Sposito, et al., WRC, U. of CA, 2102 Wickson Hall, Davis, CA 95616. (05D Sludge)

"Flood Damage Prevention Services of the U. S. Army Corps of Engineers: An Evaluation of Policy Changes and Program Outcomes During 1970-1983 Measured Against Criteria of Equity, Efficiency, and Responsiveness," (84-D-2), 2/84, by B. Steinberg, for US Army Corps of Engineers, avail. from US Gov't. Printing Office, Washington, DC 20240. (06B)

Water Quality Management

"Ground-Water Protection Strategy," 8/84, by Office of Ground-Water Protection, USEPA, Washington, DC 20460. (04B)

"Cumulative Impacts of Peat Mining--Final Project Report," (CEIP Rpt. 40), 8/84, ed. by J. A. Gale, et al., avail. from CEIP, Office of Coastal Management, NCNRCD, PO Box 27687, Raleigh, NC 27611. Price: $20 (Energy and Water)

"Code of Practice for the Handling of Manure from Intensive Animal Feeding Units," 5/84, by J. W. Funke, et al., Water Research Commission, 710 Van Der Stel Bldg., 179 Pretorius St., Pretoria 0002. (05D Ag Wastes)

"Results of the Nationwide Urban Runoff Program--Executive Summary," 12/83, by USEPA, avail. from NTIS, 5285 Port Royal Rd., Springfield, VA 22161, Accession No. PB84-185545. (05B Urban Runoff)

"EPA's Innovative Technology Program for Waste Water Treatment Needs Better Controls," (GAO/RCED-84-70), 8/84, by US Gen. Accounting Office, Documents Handling and Information Services Facility, PO Box 6015, Gaithersburg, MD 20760. (05D)

Water Quantity Management

"Virginia's Groundwater--Proceedings of a Symposium Organized by the Environmental Defense Fund," 1984, ed. by J. H. Kahn, WRRC, 617 N. Main St., Blacksburg, VA 24060-3397, Price: $8 prepaid; $10 if billed. (05G)

Miscellaneous

"Soil Survey of Hertford County, North Carolina," (1984), by USDA SCS, PO Box 27307, Raleigh, NC 27611. (SCS)

"Water Resources Data North Carolina Water Year 1983," (NC-83-1), by USGS, PO Box 2857, Raleigh, NC 27602-2857. (USGS)

ITEMS OF INTEREST:

AND MORE . . .

WATER RESOURCES RESEARCH INSTITUTE
OF THE UNIVERSITY OF NORTH CAROLINA
225 PAGE HALL
N. C. STATE UNIVERSITY
BOX 7912
RALEIGH, NORTH CAROLINA 27695-7912