NEWS

WATER RESOURCES RESEARCH INSTITUTE

OF THE UNIVERSITY OF NORTH CAROLINA

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CONTENTS

EDITORIAL

WATER CONSERVATION: IS THERE A NEED?

By James M. Stewart

On March 13 the State Building Codes for North Carolina were revised to require water-saving fixtures in new homes and buildings beginning April 1, 1980. In earlier action in 1978 the Environmental Management Commission and the Department of Human Resources adopted a priority point system which would encourage water conservation among municipalities seeking clean water bond funds. Beyond the two items, where is the water conservation emphasis and direction?

Water conservation is important to North Carolina since it is not immuned to the problem of severe droughts; competition between municipal, industrial, agricultural and energy; uneven distribution of water resources; high cost of new storage sites and construction; and water supply emergencies. These problems call for conservation measures.

The benefits derived from wise water use are numerous and include: (1) cost saving in treatment and construction for both water and wastewater, (2) reduced energy costs, (3) extended use of a limited number of high-quality water sources, (4) extended life of existing facilities, (5) reduced unnecessary environmental impacts, and (6) improved on-site treatment facilities or septic tank performance with decreased wastewater flows.

(continued on page 2)

Water conservation is still questioned by some as being important. Perhaps those communities that periodically run short or have difficulty locating additional safe water sources may have second thoughts.

Water conservation needs a home in some State water agency where the issues can be clearly defined and effective technical and educational programs developed and implemented. A conservation program should be developed that meets the need of the State rather than waiting and reacting to federal initiatives. Why not let State initiatives set the stage and have major input to federal water conservation efforts?

MORE ACTION ON WATER CONSERVATION

The News reported earlier that the Environmental Management Commission and the Department of Human Resources had adopted regulations providing additional priority points for water and wastewater projects receiving state grants when the communities involved adopted specific water conservation practices. The Commission also petitioned the State Building Code Council to amend the State Plumbing Code to require water-conserving devices in homes, hotels, and institutions. On March 13, 1979, the Council amended the State Plumbing Code to require water-conserving water closets and shower heads for all new installations after April 1980. The maximum flushing capacity of water closets will be limited to three and one-half gallons and shower heads to a flow of three gallons per minute. This action is expected to reduce water use in new or reconstructed housing by about one-third, lawn watering excluded.

COMPUTER MODELS TO PREDICT CHANGES IN NATION'S GROUND-WATER SUPPLIES

Because ground water will likely play an expanded role in meeting the Nation's future water needs, the U. S. Geological Survey, Department of the Interior, has begun a program to develop computer models of the major regional ground-water systems throughout the country.

USGS hydrologists said the program is designed to provide a better understanding of existing ground-water flow systems and water quality changes on a regional scale and also to provide a capability to predict the hydrologic consequences of expected ground-water development.

With the current budget, studies are now underway of aquifers (underground water-bearing rock units) that underlie parts of 21 states. These investigations cover the northern Great Plains region, the High Plains region, the Central Valley of California, the sandstone aquifers of the northern Midwest, the alluvial valleys of the Southwest, and the limestone aquifers of Florida, Georgia, and neighboring states.

Gordon Bennett, a hydrologist at the USGS National Center, Reston, Va., and Coordinator of the Regional Aquifer-System Analysis program, said, "The amount of ground water in storage in the United States is many times larger than the amount of surface water stored in all our reservoirs, lakes, and rivers. At the same time, not all of the ground water is readily retrievable, and it does not flow at high rates in channels convenient for ready collection and distribution as does surface water. Ground water currently provides about 20 percent of our daily water needs.

"Because large ground-water supplies are available and because they offer certain advantages over surface supplies, such as greater resistance to drought, development of the Nation's ground water is expected to increase in the coming decade," Bennett said.

"Such development, however, could create new problems," he said. "For example, large-scale withdrawals of ground water can have undesirable side effects such as depletion of stream flow or subsidence of the land surface. These potential effects must be considered and, if possible, predicted to help planners and managers develop ground-water resources intelligently.

"An example of the economic value of ground water," Bennett said, "is the drought of 1977 that caused widespread shortages in surface-water supplies for irrigation throughout the Western states. In many areas, particularly in the Central Valley of California, farmers were able to increase their pumpage of ground water to maintain adequate irrigation supplies throughout the growing season. As a result, the drought's impact on at least some major agricultural areas was greatly reduced."

The general aim of the program is to develop a computer model, or simulation, for the overall aquifer system of each region, supported by more detailed simulations of local problem areas. The models will assist in forming an understanding of the natural (pre-pumping) systems and of the changes brought about by human activities. They will also provide a means of predicting the areal effects of present and future stresses, such as increases in pumping, artificial recharge, or waste disposal. The results of each study will be summarized in a series of reports. For additional information on the Southeastern Carbonate aquifer study contact Richard Johnston, Atlanta, GA, (404) 881-4395.

DEPARTMENT OF NATURAL RESOURCES PROPOSED BY PRESIDENT

President Carter has announced a plan to consolidate the federal government's natural resource programs under a single Department of Natural Resources. The new department would bear the responsibility for oceanic and atmospheric resources, as well as public lands, including related timber, wildlife, mineral, and recreational resources.

The Department of Natural Resources, to be based on the existing Department of the Interior, would have a budget of $7.4 billion and employ 89,800 persons. It would include the Department of Agriculture's U. S. Forest Service, the Department of Commerce's National Oceanic and Atmospheric Administration, and all the following agencies of the Department of the Interior: Bureau of Indian Affairs, Bureau of Land Management, Bureau of Mines, Bureau of Reclamation, Fish and Wildlife Service, U. S. Geological Survey, Heritage Conservation and Recreation Service, National Park Service, Office of Surface Mining Reclamation and Enforcement, Office of Territorial Affairs, and Office of Water Research and Technology.

The new department would contain four major administrative units: (1) oceans and atmospheric resources; (2) public lands, forests, and water resources; (3) resource sciences and data; and (4) parks, recreation, heritage, and wildlife.

WATER RESOURCES COUNCIL RELEASES SECOND NATIONAL WATER ASSESSMENT

Release of the U. S. Water Resources Council's Second National Water Assessment has been announced by Cecil D. Andrus, Chairman of the Council.

"This national assessment presents for the first time nationally consistent current and projected water use and supply information by region and subregion for the entire United States," Andrus said in a transmittal letter to President Carter.

"This information will provide basic data for the Administration and the Congress to decide water policy and program direction," Andrus said.

The report is a summary of "The Nation's Water Resources--1975-2000," a four-volume study prepared by the Council. The remaining three volumes are expected to be released in June.

The 86-page publication covers water supply and water use and identifies critical water problems, including surface-water supply, overdraft of ground water, pollution, flooding, erosion and sedimentation, dredging, drainage of wetlands, and degradation of bay, estuary, and coastal waters.

"Significant achievements have been made in preserving water and harnessing its power," the report states. "Although interest in water conservation and environmental protection is growing, still greater efforts are needed. Without intensified dedication to careful management of water resources, pressures from our technological society will continue to deplete and degrade the Nation's water supply."

Leo M. Eisel, Director of the Water Resources Council, said, "State and local governments, as well as Congress and Federal agencies, will find the assessment useful in making policy decisions and in setting priorities for action and funding."

The summary report is for sale for $3.25 by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402. The stock number is 052-045-0051-7.

DROESSLER TO ASSUME POSITION WITH NOAA

Earl G. Droessler of North Carolina State University has been designated as Director of University Affairs for NOAA. Droessler is currently Professor of Geosciences and Vice Provost and Dean for Research at the University. As the Director, he will develop policies and programs designed to improve NOAA's relations with the academic and research communities and coordinate within NOAA the implementation of the new policy and program guidelines. He will also review NOAA planning for grant and contract research, facilitate the exchange of scientists with the academic and research communities, and serve as a focal point for communications and inquiries from these communities.

Droessler will take on his new job July 1. He has previously held positions in the Federal government at the Office of Naval Research, the Office of the Secretary of Defense, and the National Science Foundation. Additionally, he has held various academic posts, including Professor of Atmospheric Sciences and Vice President for Research and Development at the State University of New York at Albany, where he served prior to joining North Carolina State University in 1971.

EXPERIMENTAL OZONE CHAMBERS INSTALLED IN SOUTH CAROLINA

The South Carolina Department of Health and Environmental Control has installed two ozone generating chambers in runoff ditches in the Murrells Inlet area in an experimental effort to control pollution caused by storm runoff. The shellfishing grounds at Murrells Inlet have repeatedly been closed due to pollution from runoff.

The experimental use of chlorine treatment chambers for this purpose previously has been only partially successful. Five chlorine treatment chambers were installed in the ditches two years ago under a grant from the Economic Development Administration, and three have been added since. Last winter's cold weather prevented the chlorine from dissolving properly and, although proper chlorine treatment requires about 30 minutes of water retention in the chambers, holding tanks were not built due to the danger of flooding they presented.

While use of the ozone chambers is experimental, they are thought to be potentially more effective in treatment than the chlorine chambers. Ozone is effective immediately, poses little or no danger to aquatic life, is unaffected by temperature, and kills viruses as well as bacteria.

While the chlorine chambers must have the chlorine replenished on a regular basis, at a cost of $20,000 per year for the eight chambers, the ozone chambers require only electricity. Air is passed through an ultraviolet light which converts oxygen into ozone. The ozone is then bubbled through the water to effect treatment.

The water treated by the ozone chambers will be sampled weekly and, if the results and availability of funding are favorable, they may ultimately replace the chlorine chambers.

Further information is available from J. Luke Hause, Director, Division of Shellfish and Recreational Waters, South Carolina Department of Health and Environmental Control, 2600 Bull Street, Columbia, SC 29201.

.....*The Marine Newsletter*

WICKED IDEA

The Dutch, as their country keeps growing at the expense of the Atlantic Ocean, have long had the problem of improving soil drainage and stabilization to make it safe for construction. An invention of several years ago, since used in the United Kingdom and other places, and definitely useful in similar soggy situations in the U. S., is a giant polyester wick (immune to soil acids and chemicals, bacteria, frost, and ultraviolet) which literally sucks moisture out of the soil. Information on this process is available from George Wynne at the Council for International Urban Liaison, 818 18th Street, NW, Washington, DC, 20006.

.....*International City Management Association*

THE OXIDATION DITCH PROCESS: SUPERIOR PERFORMANCE AND RELIABILITY AT LOW COST

The Municipal Environmental Research Laboratory (MERL) of the Office of Research and Development, U. S. Environmental Protection Agency (USEPA), Cincinnati, Ohio, has recently published "A Comparison of Oxidation Ditch Plants to Competing Processes for Secondary and Advanced Treatment of Municipal Wastes," a comprehensive review of oxidation ditch plants, their design, operation, performance, and reliability. The report also includes capital as well as operation and maintenance (O&M) cost information which, along with the performance and reliability data, is compared to competing processes for secondary and advanced municipal wastewater treatment. Results from this report dramatically show that the oxidation ditch process should be seriously considered for all wastewater treatment plant designs under 10 mgd. For details write Jon H. Bender, Sanitary Engineer, Wastewater Research Division, Municipal Environmental Research Laboratory, USEPA, Cincinnati, Ohio 45268.

WATER REUSE IN VIRGINIA HIGHWAY REST AREAS DEMONSTRATED

Highway rest areas in the Commonwealth of Virginia have experienced problems with both water supply and wastewater disposal. To supply an adequate amount of fresh water to those facilities is expensive and means either trucking in water, increasing existing well capacities, or laying miles of water line. Wastewater problems have occurred as a result of stringent standards requiring, in some cases, tertiary treatment.

As a result, the Virginia Highway and Transportation Research Council sponsored a study to investigate the possibility of recirculating toilet flush water at the rest areas. It was projected that 90 to 95 percent of the water used at rest areas goes to flush water closets and that 10 to 20 cycles would be required to reach an equilibrium with the input of 5 to 10 percent sewered potable water from handwash basins and other miscellaneous uses.

The final design, a culmination of five years of bench-scale research and development was incorporated in 1976 into the modification of an existing wastewater treatment system at a rest area on Interstate 81 (I-81), near Fairfield, Virginia, south of Staunton.

Research results have indicated water reuse at rest areas is more economical than a mineral oil system and should be considered a viable alternative by other states. Other major conclusions are as follows:

a. Effluent from the biological extended aeration treatment of rest area wastewater can be filtered by a granular pressure filter to produce water that can be recycled and reused a multiple number of times for toilet flushing. Water recycled at least 20 times does not produce a readily detectable or objectionable odor or appearance.

b. The potable water input amounted to 5.8 percent of the total water used at the rest area and resulted in a water balance of approximately 95 percent recycle.

c. Biological oxidation of organics was not hindered by the quality of the recycled water.

d. Extended aeration biological treatment employed to treat recycled and reused water will function at conditions such as low pH levels and high ammonia nitrogen levels which are not normally experienced when these systems are used to treat domestic wastewater.

e. Water use characteristics of a rest area significantly affect the unit sizes of a recycle system and the construction cost.

.....*Municipal Wastewater Reuse News*

NEW INSTITUTE PUBLICATION

A Water Management Model for Shallow Water Table Soils by R. W. Skaggs.

This report presents the results of a study conducted to develop and test a water management model, DRAINMOD, for shallow water table soils. The objective was to develop a model for soils that normally require artificial drainage, either surface or subsurface, for efficient crop production. The model has the capability of simulating on a day-to-day, hour-by-hour basis the water table position, soil water content, drainage, ET and surface runoff in terms of climatological data, soil properties, crop parameters, and the water management system design. By simulating the performance of alternative system designs over several years of record, an optimum water management system can be designed.

The basis of the model is a soil water balance in the soil profile. It is composed of a number of separate components, incorporated as subroutines to evaluate various mechanisms of water movement and storage in the soil profile. These components include methods to evaluate infiltration, subsurface drainage, surface drainage, potential evapotranspiration (ET), actual ET, subirrigation and soil-water distribution.

The model is given in full in an Appendix to the report. Documentation includes a program listing with definition of terms, a description of each subroutine and examples of input data and computer output. Suggestions for improving various components of the model are given in the Recommendations section.

Tests of the validity of DRAINMOD were conducted on three field sites with a total of five water management treatments over a five-year period of record. Each site had subsurface and surface drainage systems with provisions for water table control or subirrigation. Rainfall and water table depths were recorded continuously on each site, and the observed water table elevations were compared to predicted day end values for the duration of the experiments. Soil property input data were measured for each site using field and laboratory procedures. Soil property data for five additional soils were also obtained and are predicted in the report.

Comparison of predicted and measured water table elevations were in excellent agreement with standard errors of estimate of the daily water table depths ranging from 7.5 to 19.6 cm. The average deviations between predicted and observed water table depths for 21 plot years of data (approximately 7400 pairs of daily predicted and measured values were compared) was 8.1 cm.

Application of the model was demonstrated with four examples. The first example consisted of an evaluation of alternative designs for combination surface-subsurface drainage systems for two soils. The use of controlled drainage and subirrigation was considered in the second example. DRAINMOD can also be used to determine hydraulic loading capacities for systems for land application of wastewater, and an example was given to demonstrate this use of the model. Finally, an example was given to show how DRAINMOD can be used to determine the effects of rooting depth limitations on the number of days and the frequency that a crop suffers from drought stress.

Copies of the Report are available from the Institute free for North Carolina residents and $4 for out-of-state residents.

FARMERS' HOME ADMINISTRATION IN NORTH CAROLINA LEADS NATION IN WATER GRANTS AND LOANS

Paul Parks, Chief of Community Programs with the Farmers' Home Administration, speaking at a recent state meeting of the North Carolina Rural Water Association, stated that North Carolina led the nation for the seventh straight year in grants and loans for rural water systems. During FY 78 FmHA made 42 water and waste disposal grants for $10,904,600 and 54 loans for $29,127,000. FmHA also made 12 industrial development grants and 74 community facilities loans last year.

Parks indicated that FmHA will soon have personnel in nine district offices to work directly with managers of water systems to increase the level of services offered. In addition, it is anticipated that FmHA will employ at least one full-time person to work with local water system managers to provide technical assistance.

North Carolina is experiencing a growth of county involvement in water systems. According to Parks, 25 counties in this State are now in the water business with Farmers' Home Administration funding.

SEPTIC SYSTEMS: A PERMANENT ALTERNATIVE

General Accounting Office investigators have asserted that the EPA should make a greater effort to promote septic systems. Generally, septic systems have been considered a temporary measure in wastewater disposal, but the GAO blamed this on ineffective controls on such systems. If properly designed and operated, the GAO said, septic systems should not fail and should be "as permanent as central treatment facilities." The GAO report said that EPA should set minimum standards for public management of septic systems and "emphasize to public entities that grant assistance is available for major rehabilitation and upgrading of septic systems." Copies of this report (CED-78-168) are available from the GAO Distribution Section, Washington, DC 20548.

.....*Georgia Waterline*

REPORT PREPARED ON SMALL-SCALE HYDROELECTRIC DEVELOPMENT

To provide interested parties with information on small-scale hydroelectric development in North Carolina, the Energy Institute has published its first brief (5 pages) report on the topic. The report gives descriptions of low-head hydroelectric power efforts nationwide. For details, contact John L. Warren, Box 12194, Research Triangle Institute, Research Triangle Park, NC 27709, Phone: (919) 541-6971.

NOW 130,000 ENTRIES IN WATER INFORMATION SYSTEM

The Southern Water Resources Scientific Information Center (SWRSIC), a center which serves the Southeastern states with a computerized, on-line search system that will locate and print references, has been updated to include an abstract file of more than 130,000 entries relating to water and land resources.

The SWRSIC terminal, located in the D. H. Hill Library at N. C. State University with the support of the Water Resources Research Institute, is used most frequently by researchers, consulting engineers, planning agency personnel and students because it stores abstracts of all research reports collected from across the nation by the Water Resources Scientific Information Center in the U. S. Department of the Interior. In addition to core topics, the system provides ready access to such fields as law, economics and sociology as they relate to water or land problems. Each citation includes title, author, key words, abstract, and a variety of other material. The service is free to anyone in the state upon brief (two-sentence), written request, which should include key words or author names. To request a search or for further information, contact Jean Porter, Southern Water Resources Scientific Information Center, D. H. Hill Library, North Carolina State University, P. O. Box 5007, Raleigh, NC 27650, (919) 737-2683.

NEW OWRT CAPSULE REPORTS

The Technology Transfer Program of the Office of Water Research and Technology has recently published two Water Research Capsule Reports.

The first, "Water Well Location by Fracture Trace Mapping," is concerned with a new method of fracture-trace mapping that is very effective in increasing the number of successful water-well drilling operations. The technique was developed at Pennsylvania State University, and the project was funded in part by OWRT.

The second report, "Conservation of Water, Chemicals, and Energy in Dyeing Nylon Carpet," explains how one industry can cut down on the amount of water needed in its production processes by altering those processes. The project was carried out in the School of Textile Engineering at the Georgia Institute of Technology and was funded by OWRT.

Copies of these reports for distribution and other parts of the capsule report series are also available: "Scale-Free-Vapor-Compression Evaporation" and "Water Conservation Devices: Residential Water Conservation."

.....*News and Announcements*
WRC University of Illinois

CONFERENCES AND WORKSHOPS

Workshop in Water Quality Modeling - *Program Objectives.* The development and use for predicting the quality of rivers and estuaries is the focus of this workshop. The program is designed to instruct participants in the following:

* developing models for such constituents as BOD, oxygen, nutrients, and biomass

* evaluating the parameters in models using field data

* making predictions with models to simulate the quality of waste receiving waters

* using models for water quality management

The workshop is taught at a level appropriate for advanced undergraduate and graduate students. A background in calculus is desirable. The course assumes participants have no knowledge in computer programming.

The Workshop will be held May 15 and 16 at the University of North Carolina at Chapel Hill. For further information contact: Bettye Clark, Office of Continuing Education, UNC-CH School of Public Health 251H, Chapel Hill, NC 27514, (919) 966-4032.

Water Supply Engineering Short Course - The Department of Environmental Sciences and Engineering, with cooperation from the Continuing Education Program of the UNC School of Public Health, is conducting a short course in Water Supply Engineering: Quality and Treatment on May 21-23 in Chapel Hill.

The course will focus primarily on the Safe Drinking Water Act and its ramifications and will include discussions relating to the proposed organics regulations. Featured topics include turbidity, viruses, trace organics and metals and their health implications, coagulation and filtration, disinfection, chemical oxidation and adsorption. Case studies from Philadelphia, PA, and Louisville, KY, will be presented.

The course will be conducted at an advanced level for people actively engaged in the water supply field; consultants, utility employees, regulatory agency personnel, and researchers in academic, industrial, consulting and governmental institutions are encouraged to attend.

For more information, contact Dr. Philip C. Singer or Ms. Phyllis Carlton, Department of Environmental Sciences and Engineering, School of Public Health 201-H, University of North Carolina, Chapel Hill, North Carolina 27514.

Conference to Feature Alternatives for Recycling Wastes on Land - New Solutions to Waste Problems Facing Cities, Industries, and Agriculture will be the thrust of the 1979 Composting and Waste Recycling Conference to be held May 2-4, 1979, in Philadelphia, PA.

Speakers at this conference include: Marwan Sadat, Director of New Jersey's Sludge Management Program; Larry Waldorf, executive director of the Alternative Wastewater Management Assn.; Luis Diaz, president of Cal Recovery Systems; William Sopper of Penn State University Institute for Research on Land and Water Resources; Nina McClelland, vice-president of the National Sanitation Foundation.

Public officials, waste authority members, consultants, researchers, corporate executives, water quality officials, farmers and concerned citizens are invited to attend the Ninth Annual Composting and Waste Recycling Conference. Commercial equipment in the waste recycling and composting field will be exhibited and public education material will be available.

For further details, write Mildred Lalik, COMPOST SCIENCE, Box 351, Emmaus, PA 18049.

Institute in Water Pollution Control - The 24th Summer Institute in Water Pollution Control will be held at Manhattan College in 1979.

Two one-week courses will be offered concurrently. May 21st - May 25th, for advanced study in:

Biological Waste Treatment
Mathematical Modeling of Natural Water Systems

Enrollment, on a pre-registration basis, will be limited. Tuition for each of the five-day courses is $350.

This continuing engineering educational program is designed for practicing engineers and scientists in governmental agencies, industrial concerns, consulting engineering offices, research organizations and academic institutions.

For further information contact: Kathryn King, Program Coordinator, Environmental Engineering and Science Program, Manhattan College, Bronx, NY 10471.

Stormwater Impact on Receiving Water Bodies - A conference will be held at Orlando, Florida, on November 26-28, 1979, to discuss responses of receiving water bodies to urban and non-urban stormwater runoff. Prospective participants are invited to submit abstracts for evaluation by the selection committee. Topical areas will include: Rainfall-Runoff relationships, Prediction of runoff water quantity and quality from urban and non-urban areas, Impact of runoff water on lakes/rivers/estuaries, Fate of pollutants including heavy metals/nutrients/toxic substances, and Management techniques to control stormwater effects.

Information about the conference should be requested from: Dr. Yousef A. Yousef, P.E., College of Engineering, CEES Department, University of Central Florida, P. O. Box 25,000, Orlando, FL 32816.

Project Review - *Economic and Environmental Impacts of Rural Water Systems in North Carolina.* A review of a research project which examines the impacts of rural water systems is scheduled for May 4, 1979 at 10 a.m. in Room 9136 Archdale Building, Raleigh. This research effort is being conducted by Dr. Raymond J. Burby, III, Department of City and Regional Planning, University of North Carolina at Chapel Hill.

This research is designed to provide water system planners and managers and county, regional, and state officials with an improved base of information to use in making water system development and expansion investment decisions. In addition, it will suggest appropriate regional and state project review procedures to insure that, as required by recent State legislation and policy statements, rural water system investment decisions reflect full consideration of the economic and environmental consequences which they can be expected to produce.

For details on the review call the Water Resources Research Institute at (919) 737-2815.

POSITIONS AVAILABLE

Michigan State University has an opening for the position of Director of the Institute of Water Research. This is a twelve-month appointment at the rank of Associate Professor or Professor with salary and rank commensurate with experience.

Applicants should send a resume including the name and address of at least three references to: Dr. Niles R. Kevern, Chairman, Search Committee, Department of Fisheries and Wildlife, Michigan State University, East Lansing, Michigan 48824, before May 15, 1979.

The Wyoming Water Resources Research Institute currently has position openings for a Groundwater Hydrologist, Surface Water Hydrologist and a Water Quality Specialist for which they are soliciting applications. For details, contact: Paul A. Richard, Director, Water Resources Research Institute, P. O. Box 3067, University Station, Laramie, Wyoming 82071, Telephone: (307) 766-2143.

Public Utilities Director, Raleigh, NC, Capital City, Population 156,000. Resp. for 175 empl. dept. providing water supply and dist., sanitary sewer col. and wastewater treatment service. Require extensive management experience in water and wastewater utility systems. B.S. in Civil or Sanitary Engineering and registration or ability to obtain registration as Professional Engineer in NC. Salary range $25,256 - $35,536. Ecx. benefits. Send resume to Personnel Director, City of Raleigh, P. O. Box 590, Raleigh, NC 27602, no later than June 15, 1979. EOE M/F.

WATER RESOURCES CONDITIONS IN NORTH CAROLINA

Streamflow was well above normal for the third consecutive month. Many large Coastal Plain streams were flooding the first week of the month from rains of February 24-25th. Heavy general rains ranging up to 10 inches on the 4th and 5th caused minor flooding across the state with streams at or slightly above bankfull. Locally intense rains the 23rd and 24th caused localized flooding, particularly in Charlotte and Mecklenburg County where floods damaged some homes and other property. The frequency of floods in Charlotte was about 7-10 years.

At month-end streamflow was about normal. Groundwater levels fell and were at long-term average levels in the Coastal Plain and rose and were above long-term average levels in the mountains and Piedmont.

WATER RESOURCES LEGISLATION IN NORTH CAROLINA

Bills Introduced

Senate

S 420 Carolina Beach beach funds

"To appropriate funds to the Department of Natural Resources and Community Development for beach protection at Carolina Beach in New Hanover County." Appropriates from General Fund to Dep't of Natural Resources and Community Development $1,718,500 for each year of 1979-81 biennium to pay up to 80% of nonfederal cost share of federal hurricane flood protection and beach erosion control project at Carolina Beach in New Hanover County. Effective July 1, 1979.

S 525 Sedimentation control review board

"To amend the Sedimentation Pollution Control Act of 1973." Amends GS 113A-58 to require prior issuance of written notice of alleged violation at least 30 days before institution of civil proceedings under GS 113A-58 or -65. Adds new GS 113A-67 to establish Sedimentation Pollution Control Review Board to be composed of three members qualified in area appointed by Governor for staggered three-year terms. Requires board to hear and issue decisions on appeals from notices of alleged violations. Outlines provisions relating to board meetings and operation, appointment, and removal of hearing examiners. Provides two members of board constitutes quorum and affirmative vote of two members required for official action. Board authorized to issue subpoenas, take depositions, etc. and hearings and records must be open to public. Board required to proceed according to GS 1A-1 or adopt other rules and may issue orders for contempt, citations, and "stop orders". Requires hearing examiner submit report to board and outlines provisions relating to review of report by entire board before it becomes final order of board.

S 571 Seaward boundary of private property

"To clarify the boundary between private land tide waters owned by the state." Rewrites title of GS Ch. 77, "Rivers, Creeks, and Coastal Waters", and adds new Art. 3. Provides that seaward boundary of property in NC, not owned by state, is mean high water mark. Prohibits any agency from adopting any other boundary.

S 574 No ground cover for erosion

"To amend Section 113A-57(3) of the Sedimentation Pollution Control Act to provide that the planting or otherwise providing for a ground cover to restrain erosion whenever no further active construction is being undertaken upon a tract shall not be required when such tract is part of a project for which there is an approved erosion control plan with devices for retention of the sediment within the project boundaries." Amends GS 113A-57 (mandatory standards for land-distributing activity) as title indicates.

S 627 Septic tank waste disposal

"To authorize counties, cities, sanitary districts, water and sewer authorities, metropolitan water districts, and metropolitan sewerage districts to provide for wastewater collection and disposal by means of septic tank systems and other on-site disposal facilities or systems." Extends powers of following governing bodies to operate and finance (by taxation, borrowing, special assessments, etc.) sewage collection and disposal using septic tanks and other on-site systems: counties, cities, county service districts, water and sewer authorities, metropolitan water districts, and metropolitan sewerage districts.

<u>House</u>

H 731 Rutherford water, sewer service

"To amend Chapter 130, Section 128 of the North Carolina General Statutes." Amends GS 130-128 (9) (b) (gives sanitary district board the power to contract with persons, corporations, or local gov'ts to supply water and sewer service) to apply provision to Rutherford County.

H 812 County engineer enforce stream law

"To allow the county engineer to enforce laws dealing with obstruction of streams." Allows county engineer in counties over 325,000 population to enforce GS 77-13 and -14 (making obstructing streams and drainage ditches misdemeanor).

H 831 Chicod Creek Watershed funds

"To appropriate funds for watershed improvement in the Chicod Creek Watershed in Pitt and Beaufort Counties." Appropriates $100,000 from General Fund to Dep't of Natural and Economic Resources for additional cost-sharing for construction of cited project. Effective July 1, 1979.

H 912 Land warranty for septic tanks

"To create an implied warranty in certain circumstances concerning the suitability of real estate for septic tank use." Adds GS 39-32.10 to provide that anyone selling real estate not served by public or community sewage disposal system to purchaser intending to construct single family residence on property impliedly warrants to purchaser that property suitable for installation of septic tank system to serve single-family residence, in accordance with applicable laws and regulations. Warranty may be waived only if seller provides purchaser before entering into agreement of sale with statement prepared by local health dep't to include following: (1) description of characteristics and porosity of soil, and other technical data, percolation rate, described in bill as well as any other characteristics of and limitations upon real estate relevant to determination whether property is suitable for installation of septic tank system to serve single family residence; (2) statement as to whether property "appears" to be suitable for installation of system; (3) statement advising purchaser that local health dep't reserves right to deny issuance of improvements permit required by GS 130-166.25 or state permit required by GS 130-160 if property later determined not to meet requirements for issuance for permits; and (4) advises that issuance or denial of improvements permit depends on size of residence to be constructed. Purchaser, upon breach of warranty, has right to treble damages, attorney fees, and any other legal or equitable remedy against seller. Effective July 1, 1979.

Amendments and Committee Substitutes

House

H 582 Water resource development projects (digested in April News, p. 11) Amendment adopted in House 3/29/79 exempts small watershed projects reviewed by Soil and Water Conservation Comm'n from water resources development projects that Sec'y of Natural Resources and Community Development may accept applications for grants for nonfederal costs.

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.

"The Colorado Water Study: Directions for the Future," 10/78, by Off. of the Exec. Dir., CO Dept. of Natural Resources, 1313 Sherman St., #718, Denver, CO 80203. (NC F.S.)

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"Small Low-Head Hydroelectric Power," (Proc. Midwest Reg. Conference, May 23-25, 1978), 8/78, MI State U., avail. from NTIS, US Dept. of Commerce, Springfield, VA 22161. (E/W)

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Water Quality Management

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Water Quantity Management

"Interacting Effects of Minimum Flow and Fluctuating Shorelines on Benthic Stream Insects," (#A-052-IDA), 8/78, by M. A. Brusven, *et al*, WRRI, U. of ID, Moscow, ID. (02E Flow Needs)

"The Law of Surface Water Allocation in Georgia," (ERC 0278), 9/78, by J. Owens Smith, ERC, GA Inst. of Technology, Atlanta, GA 30332. (06E)

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SPECIAL

ENVIRONMENTAL MANAGEMENT IN NORTH CAROLINA

by A. F. McRorie
Director, Division of Environmental Management
N. C. Dept. of Natural Resources and Community Development

Editor's Note: Presentation made at the North Carolina Water Management Conference on April 3.

Good afternoon, Ladies and Gentlemen.

My topic this afternoon is to be "Environmental Management in North Carolina." I'll be placing emphasis on the water quality aspects of that issue.

I'd like to review with you this afternoon the goals and objectives which the Division of Environmental Management has set for 1979. In going over these and commenting on our programs and progress in regard to each, I believe you can get a good picture of what we are doing. After this review, I'd like to take a few minutes to go into some detail on the conclusions and recommendations developed in the first round of water quality management planning - also called "208" planning. These conclusions and recommendations are very important for environmental quality in North Carolina. The organizations and agencies represented here today need to understand and comment on these proposals by the Division of Environmental Management. Perhaps there will be time for some questions and answers during the course of the afternoon.

The legislatively defined goal for the Environmental Management Program is to achieve and maintain for the citizens of the State a total environment of superior quality and to secure for the people the beneficial uses of water, air and integrally related natural resources.

In 1979 the Division has identified six objectives designed to help us reach our goal:

1. To implement a "one stop permit shop" for permits issued by this Department. Under this system, citizens working through regional offices will have a single, local source for all information and material necessary to secure Departmental permits.

The Division has been very active in the one-stop permit shop development. It is consistent with our desire to move programs to the field where possible. This program is underway and will expand as the regions and Raleigh gain experience and proficiency in this process.

2. To maintain compliance with water quality standards in the 16,511 stream segments presently in compliance and to attain compliance in 20 of the 1,621 stream segments not now in compliance by assuring continued compliance with final effluent limits by 1,388 dischargers of wastewater and bringing 144 additional discharges into compliance.

In examining the water quality standards compliance figures, we can see the impact of our work in permitting, facilities, grants and several other activities. This "water quality" is "the bottom line" for these diverse efforts.

We also have proposed revisions to our water quality standards. These are being considered by the Environmental Management Commission now. These changes include standards for heavy metals and toxics and represent the first revision in five years.

3. To attain and maintain air quality equal to the primary and secondary National Ambient Air Quality Standards. To preserve the quality of presently clean air through the continued development and implementation of a realistic "Prevention and Significant Deterioration" program. To continue to ensure compliance with Air Quality Emission Standards by 99 percent of all air pollution sources.

Although air quality is not the primary concern of this group, I feel it needs to be brought before you. None of us is so provincial as to be concerned about what we drink while having no interest in what we breathe.

As a result of the 1977 Clean Air Act, many changes have occurred. The "Prevention of Significant Deterioration" program - also called "PSD" - is an attempt to limit the rate and extent of air quality degradation in areas which have air cleaner than the ambient standards. This principle will have implications for industrial siting in North Carolina and across America.

Programs to correct problems in areas which already violate ambient standards will also make the news. Motor Vehicle Emissions Inspection and Maintenance also called "Tail Pipe Testing" is required in certain areas. Under federal guidelines, the Charlotte/Mecklenburg area will be one of these.

You will be hearing soon about vegetative damage from air pollutants. Recent work by Division staff has identified areas where industrial emissions of materials other than those covered under current federal law is harming trees and plants for great distances around these facilities. We are on our own here and are beginning studies to tie down the problem and to identify solutions.

A specific case in point is our examination of air emissions from C. F. Industries on the Chowan River. Algae blooms have been serious. Nitrogen has been identified as the cause. Preliminary work on groundwater movement has not shown that to be a great source. We have no firm data as yet but our first impression is that particulate and perhaps other emissions may be settling out in the basin and contributing nitrogen in that way. We have learned that we must take an ecosystem view of this problem.

4. To provide $171,000,000 in grants for the construction of publicly owned wastewater treatment works and to ensure the proper operation of wastewater treatment plants in the State by improving operator capability by certifying 850 new wastewater treatment plant operators.

Of the $171 million available, we expect to commit about $82 million this year. There is no way to overestimate the water quality benefits of a well-designed waste treatment system operated by a skilled plant operator.

Let me also note that the Division has scheduled two sessions in the near future to help people better understand the "201" process.

Later this week, the Division and EPA, Region IV, will host a session for local elected leaders and consultants to explain the newest regulations regarding 201 grants. This will include land acquisition, minority business enterprise and industrial pre-treatment among other topics. This will be held April 5.

On the 18th and 19th of April the Division will co-sponsor a session on land treatment of wastes. This will be a "hands-on" experience for design engineers featuring experts from around the country. This approach to waste treatment can be useful and beneficial for communities in certain circumstances and the Division is determined that this alternative will be thoroughly and properly studied. EPA, WRRI and the Professional Engineers of North Carolina are co-sponsoring this event with the Division.

5. To intensify efforts in the Chowan River Basin to identify the cause(s) of the recurrent algae bloom. To initiate development of a management plan to control the algae problem.

I have already mentioned our air and groundwater efforts on the Chowan. Let me add that monitoring is also going on up and down the river, and we are meeting regularly with citizens in the basin.

On March 9th, Governor Hunt invited officials of Virginia, of local governments in the basin and of dischargers to meet with him in Raleigh. At that time, he laid out very clearly and in no uncertain terms the State of North Carolina's commitment to solving the Chowan algae problem. All segments of society in the basin--industrial, agricultural, municipal--will be asked to reduce their input of nutrients to the river. Cooperative, long-term commitment to this goal is the key, he noted.

6. To encourage, receive and review public comment on the initial Areawide Waste Treatment Management Plan for the State. To achieve certification by the Governor and the approval by the Environmental Protection Agency for the Plan. To begin to implement the Plan. To initiate second phase 208 planning with emphasis on estuarine eutrophication.

Although I'll go into more detail on this in just a minute, let me say here that I believe the "208" Plan offers us all the chance to "clean up our act" especially in regard to the non-point, or indirect, sources of pollution.

The draft plan is now out for comment. It will go to the Environmental Management Commission in May and is scheduled to reach the Governor and then EPA, Region IV in June.

Before I go into some detail on "208," let me add that the Division will be monitoring the Falls and Jordan projects to see how water quality in those lakes is doing. Should problems begin to develop, corrective actions will be put forward.

I'd now like to go over with you what the draft water quality management plan says about our current situation and about prospects for the future.

These excerpts are from the Executive Summary of the plan:

Point Sources - Trends indicate that the total number of facilities in compliance has been increasing at an annual rate of approximately 7 percent. Statewide totals from 1978 indicate that just over 1,342 of the 2,217 discharging facilities identified, or 61 percent, are now in compliance with permit limits.

The control of point sources discharges through the permit system and grants for building waste treatment plants has been directed toward the major sources and problems. This effort should be continued, but several other aspects of point source pollution need to be addressed in future planning efforts.

Advanced Wastewater Treatment - North Carolina will probably require nutrient removal from discharges from upstream of eutrophic bodies of water sometime after a nutrient standard is adopted. In some instances, non-point sources may be the significant nutrient contributors to the water body. In such instances, nutrient removal from point source discharges could prove to be a costly investment resulting in little or no improvement in water quality.

Cost Reductions - A winter-summer effluent limit policy is being developed to allow relaxed effluent limitations during the winter months when treatment efficiency is down and streams can assimilate more waste. This should eliminate the need to overdesign a treatment facility to meet effluent limits at all times, even though the critical period is only during warm weather and low stream flows. Also, a new regulation will allow small discharges of 15,000 gallons per day to undergo less stringent treatment if the costs of providing that treatment would result in "substantial adverse economic" impact.

These reductions in treatment levels will be allowed on a case-by-case basis.

Toxic Control - Much of the existing effort in point source pollution abatement has been directed toward maintaining a minimum level of dissolved oxygen in the water. Since dissolved oxygen is one of the baisc requirements of a healthy stream, it was believed that this policy would ensure the survival and propagation of aquatic life. Further efforts must be directed at determining if toxic constituents in the waste discharges are degrading the aquatic life, even though the dissolved oxygen is maintained at an adequate level.

Non-point Sources - The strategy for controlling non-point sources focuses on preventing or minimizing the production of the pollutants. The primary evaluation of compliance is made by noting whether specified land management practices, known as "best management practices" (BMPs), have been utilized. BMPs vary for land use activities according to the nature of the activity, the type of slope or soil in which it is taking place, and the proximity to a watercourse.

Three basic types of BMPs can be used to limit the introduction of non-point source pollutants into waters of the State. The first involves the prevention of pollutant generation either by not conducting that activity in areas where runoff or seepage is likely to occur (for example, next to a stream) or by employing devices to control water flow in the vicinity of the activity. Secondly, since some pollutants will probably be generated, vegetated buffer zones can be used to filter or trap pollutants. Finally, if the disturbance is too intense, pollutant trapping devices may need to be positioned in the areas leading to streams and ditches to mechanically prevent delivery of pollutants to the watercourse.

Although almost everyone is, one way or another, responsible for non-point source pollution, almost no one eagerly accepts responsibility for clean-up. At the risk of oversimplification, it is fair to say that our 208 plan's approach to non-point source pollution abatement has been to stress the role of the owner of the land from which the pollution emanates. Stewardship of the land, whether by the farmer, the mine operator, the timber owner, the homeowner, the developer, or the sanitary landfill owner, is the most important element in non-point source control. The State and local governments are of secondary importance and can never be expected to protect the waters if the people themselves do not voluntarily assume a large part of the responsibility.

And now a more detailed look at the non-point sources:

1. Agriculture - The North Carolina Soil and Water Conservation Commission was delegated the responsibility for preparing the 208 Agricultural Plan. The Commission was assisted by the agencies forming the existing 208 Agricultural Task Force: the Agricultural Extension Service, the Department of Agriculture, USDA-Soil Conservation Service, Farm Bureau Federation, and the State Grange.

   Farms cover approximately 42 percent of the State's land area. Agricultural activity creates a significant potential for non-point source water pollution since rainfall runoff from fields can carry sediment, pesticides, and nutrients into nearby streams. While an estimated 64 percent of the total annual soil erosion in North Carolina comes from cropland, almost 80 percent is estimated to come from agricultural land (cropland, pasture, other land such as farmsteads). That portion of eroded soil actually discharged to large rivers as sediment (usually less than 25 percent) can, in excessive amounts, adversely affect aquatic organisms, shorten the expected life of reservoirs, and scour streambanks. Though sediment is considered, by volume, to be the greatest potential pollutant, pesticides and nutrients, in sufficient concentration, can also cause water quality problems. Pesticides and nutrients are used extensively in agriculture and may, under runoff conditions, be transported to streams attached to sediment or dissolved in the runoff water. Pesticides, already regulated by State and Federal law, are potential threats to human health and aquatic life if used or handled improperly.

   Many traditional soil conservation practices such as terracing, grassed waterways, contour cropping, and diversions can effectively control erosion. However, it is estimated that only 16 percent of the cropland in North Carolina with an erosion hazard is adequately protected from erosion at the present time. Use of soil tests and proper nutrient application practices can reduce the amount of nutrients available for transport from cropland. However, only one-third of the cropland acreage was tested in 1977, and the yearly increase in fertilizer usage is expected to continue. Existing regulations appear to have been effective in limiting improper or excessive pesticide usage, but no intensive water quality monitoring studies have confirmed this. Planned actions under these existing regulations and the continued development and application of Integrated Pest Management (IPM) techniques should reduce the potential for pesticide water quality impacts in the future. These practices and techniques have potential as Best Management Practices (BMPs) for protecting water quality. Further evaluation of the cost-effectiveness of these practices in protecting water quality will continue.

   It appears that existing trends in erosion control and nutrient management will not result in significant changes in water quality in the near future. However, regulatory approaches to controlling agricultural non-point sources were evaluated and deemed inappropriate.

2. Urban Runoff - Water quality studies conducted in Winston-Salem, Raleigh, and Asheville have resulted in an awareness of how complex the urban stream pollution problem is. Non-point source problems may be compounded by polluted groundwater, leaking sewers, and unregulated small point sources. Monitoring data show frequent violations of proposed standards for metals and fecal coliform. In biological sampling, only those organisms characteristic of highly polluted waters were present in the six streams that were sampled. The restoration of degraded stream segments near urban areas may require massive infusions of technology and money to restore fish life.

   Until the relative contributions of each source are broadly quantified, it is unwise to prescribe complete pollution control. Moderate control measures have been recommended on an experimental/demonstration basis. Street cleaning, catch basin cleaning, and covering of industrial chemical stockpiles are maintenance activities that can be initiated with moderate capital and managerial time investment. Three methods of hydrologic control--detention basins, infiltration strips and grassed waterways, and depressed areas for detention in parking lots--are low-cost structural methods for reducing the velocity and concentration of pollutants of stormwater.

The efficacy of these management practices will be observed in a major study in Winston-Salem over the next three years. Promotion of the recommended practices in other urban areas will be accomplished by mass media methods for the general citizenry and specialized communications with urban managers, city engineers, flood control experts, and other professionals concerned with stormwater control.

3. Construction - Construction of highways, utility lines, homes and commercial space affects an estimated 15,000 acres of North Carolina annually. This activity can expose streams and lakes to severe sediment damage from erosion and from intentional movement of the soil into the water for fill or disposal. Sampling in North Carolina has demonstrated severe impacts on aquatic life in streams below highway projects paralleling water courses. The reduction in fish food organisms and game fish on these sites can be expected in virtually every area where adequate erosion control is not carefully planned and faithfully executed.

   Although construction site erosion poses a serious threat to water quality, the Act provides an adequate legislative basis for effective control. The major recommendations of the Construction Plan are:

   - Reenact the Sedimentation Pollution Control Act in the 1979 General Assembly.
   - Improve coordination between local building, zoning and subdivision programs and erosion control programs.
   - Emphasize adequate erosion control on State government projects so they set an example for all projects in the State.
   - Increase the State staffing level.
   - Provide for approval of erosion control plans prior to beginning construction on a site.
   - Develop simpler guidelines for developers.

4. Mining - Mining in North Carolina affected approximately 18,000 acres last year. Principal minerals extracted are stone, gravel, sand, clay, feldspar, and mica. Much of this mineral extraction occurs adjacent to streams, which is why it is of concern in the State's water quality management planning.

   The control of discharges from processing plants at mines has significantly improved water quality in the State, particularly in the mountains. Sampling has demonstrated that careful point source controls can and are preserving adequate water quality. However, sampling has also confirmed that sediment eroded from inactive mining areas, from haul roads, and waste piles is having a significant adverse impact on several mountain streams. Lack of installation and maintenance of adequate preventive measures has turned trout streams into sucker and minnow streams. Significant adverse impacts from mining have been observed for several miles below some mines.

   Use of good management practices in planning and operating a mining site can avoid many of the problems observed by the staff. In fact, many mines do appear to utilize good practices.

   Major recommendations of the Mining Plan are:

   Reenactment of the Mining Act - Under the Sunset Law enacted in 1977, the Mining Act will expire on July 1, 1979, if it is not specifically reenacted. The Act is of crucial importance to adequate water quality protection and should be reenacted.

   Mining Operator Workshops - Formal workshops should inform mining operators of erosion control problems observed by the State and of successful approaches to preventing sediment damage.

5. Silviculture - Forestry on both industry-owned lands and small farm woodlots provides a substantial portion of North Carolina's economic base. It also contributes to a small proportion of the acreage which suffers soil disturbance each year. Harvesting trees or preparing sites for tree-planting leaves unprotected soil vulnerable to erosion. Nearby streams can suffer severe, localized sedimentation which harms fish and the aquatic food web. Sediment was identified as the most significant water pollution problem from silviculture. However, this problem is envisioned to be only local in nature because the contribution of forestry activities to the statewide erosion problem was estimated to be only .4 percent.

6. On-site Wastewater Disposal - Approximately half of the people in North Carolina use septic systems to dispose of household wastewater. The current installation rate is about 50,000 annually, with almost 1.5 million units already in the ground. Although many of these existing and new units function adequately, poor soil, high groundwater tables, and high density development contribute to a failure of a number of those systems.

   Sampling by the State has related septic system usage in the New Hanover County area with shellfish waters closed due to bacterial contamination. Although the coastal area appears to be the only portion of the State with significant surface water quality problems related to high density development using septic systems, there may be much more widespread contamination of underground water supplies. Hundreds of violations of bacterial standards are recorded each year for community water supplies. The extent of contamination from disposal of septic system sludge, also called septage, is unknown.

   The major recommendations of the On-site Wastewater Disposal System Plan are:

   Public Education - Informing septic system owners of needed maintenance can increase the longevity and improve the performance of existing systems. Informing prospective land purchasers of septic tank approval requirements and procedures can improve the chances that land unsuitable for septic systems will not be purchased with unfounded expectations for development.

   Control of Septage - Improved record-keeping would assure that septage is disposed of in environmentally safe ways. Increasing the number of approved disposal sites would assure that economical disposal is available to septage haulers. Administration of these requirements should be executed in a manner compatible with the Solid Waste Management Act.

   Vertical Separation - The emphasis existing in current State regulations on lateral rather than vertical separation of septic systems from surface and subsurface waters should be amended. This recommendation is made for the entire State, although the most critical area in terms of water quality degradation would be the Areas of Environmental Concern--estuarine shorelines--on the coast. The Coastal Resources Commission should use its authority to establish an increased vertical separation requirement in these AEC's.

7. Solid Waste Disposal - Each year more than 5 million tons of solid waste must be disposed of in North Carolina. Both the amount and chemical complexity of this waste is increasing, while at the same time citizen concern over location is growing. The net result is an increasingly complicated disposal problem. Sanitary landfills, regarded as the most environmentally acceptable means of solid waste disposal, are used almost exclusively in North Carolina. The few remaining open dumps are scheduled for closure by mid-1979. However, sanitary landfills can have major adverse impacts on adjacent surface waters and underlying groundwater. Groundwater monitoring was conducted in two coastal landfill areas and one Piedmont landfill. In two coastal areas where residents complained of well water contamination, a Division of Environmental Management study was conducted. Although well water quality was degraded in both cases, in only one was landfill operation believed responsible. A petroleum dump was responsible for the other problem. Groundwater under a landfill in the Piedmont was also found to be degraded in groundwater sampling conducted by the Division.

Major recommendations of the Plan are:

<u>Groundwater Classifications and Standards</u> - The degree to which groundwater should be protected from landfill operations will remain an issue until standards are adopted.

<u>Site and Operation Review Procedures</u> - Formal procedures for interagency review should assure that available expertise is effectively employed and that affected agencies have adequate opportunity to comment on proposed sites and operational plans.

<u>Erosion Control</u> - Erosion control on landfills should be assured by the Sedimentation Control Commission acting under the authority of the Sedimentation Pollution Control Act.

<u>What Will the Plan Do?</u>

It is difficult to predict what the actual impact of the 208 plan will be. The recommendations which I have summarized range from educational efforts and voluntary compliance to more effective use of strengthening of existing regulatory programs. Although local government, industry and individuals are important in North Carolina's water quality management program, the draft plan concentrates on actions State agencies can and should take. This reflects the view that the State and its programs must take the first steps in water quality management if local government and the private sector are to follow and support this effort.

In almost all cases, our recommendations are directed at protecting water quality from future activities; hence, there are several situations in which water quality degradation is not expected to improve as a result of this Plan. They include the significant biological degradation of streams impacted from urban runoff, the areas of closed shellfishing waters resulting primarily from septic tank leachate, and the localized but almost permanent degradation of groundwater from poorly located landfills. Cost-effective solutions to reversing these types of degradation are simply not available. This plan does point out that there are many actions which <u>can</u> be taken to solve significant water quality problems in North Carolina.

So then these are the goals and objectives for the Division of Environmental Management with a special examination of the Water Quality Management (or 208) Plan. I welcome your comments on our program, especially the 208 proposals and I look forward to working with you toward these goals.

ITEMS OF INTEREST:

May 4 - Project Review on Impacts of Rural Water Systems, page 7

May 11 - N.C. Water Resources Congress Annual Luncheon Meeting, cover page

May 15-16 - Workshop on Water Quality Monitoring, page 6

May 21-23 - Water Supply Engineering Short Course, page 7

SPECIAL - Environmental Management in North Carolina, page 13

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YOU ARE INVITED TO THE

WATER RESOURCES CONGRESS MEETING MAY 11

The North Carolina Water Resources Congress will hold its annual luncheon meeting in Raleigh on May 11 at the Velvet Cloak Motor Hotel in Raleigh.

Registration for this meeting will start at 9:30 a.m. and the business meeting at 10:00 a.m. A status report on water resources planning and development in North Carolina will be presented. The program includes presentations by the North Carolina Water Resources Institute, Wilmington and Charleston District Corps of Engineers, and the Soil Conservation Service.

Dr. Neil Grigg, Assistant Secretary, Department of Natural Resources and Community Development, will be the luncheon speaker and will present the N. C. Water Resources Development Plan and Program.

For details write the Water Resources Congress, P. O. Box 12204, Raleigh, North Carolina 27605 or telephone 919:733-4064.