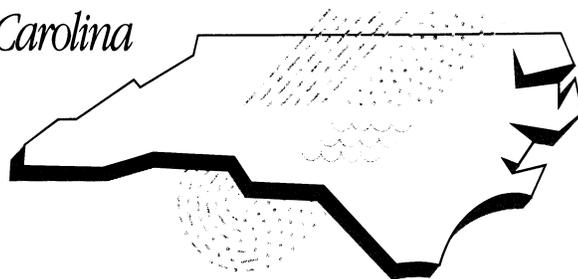


Water Resources Research Institute News

of The University of North Carolina



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Mountain sedimentation tops list of WRI Advisory Committee's research priorities

The people who advise WRI on North Carolina's water resources research needs say that the top priority for the next funding year should be evaluating the effectiveness of the State's erosion and sediment control program in the mountain region. Meeting in May, the Institute's Advisory Committee agreed that there is a great need to know whether current erosion and sedimentation regulations are adequate to protect sensitive mountain streams and lakes in the face of an emerging development boom in that region.

WRI's Advisory Committee is a group of people representing organizations with a broad range of interests related to water resources. Chaired by John Morris, Director of the N.C. Division of Water Resources, the committee includes:

- representatives of a number of divisions of the N.C. Department of Environment and Natural Resources;
- representatives of federal agencies, including the U.S. Geological Survey, the Natural Resources Conservation Service, the U.S. Army Corps of Engineers and TVA;
- representatives of local governments, including the N.C. League of Municipalities, the N.C. County Commissioners Association, and various councils of government;
- representatives of private industry;
- representatives of engineering and environmental consultants;

- representatives of environmental groups.

Each year the WRI Advisory Committee meets to discuss issues and needs related to water resources research, consider potential research topics, and vote on the research topics for which WRI should solicit proposals in the next funding year.

Once WRI has issued its Fiscal Year 2001 Call for Proposals and university researchers across the state have submitted proposals to address the stated research priorities, another WRI advisory group, the Technical Committee,

will review proposals for scientific merit and recommend which should receive funding. The Technical Committee is composed of university scientists with extensive research experience and therefore provides peer review of the design and methodology of proposed research.

Through this two-step process, WRI assures that research it funds addresses the needs of state policy makers and that research projects are scientifically sound and likely to produce useful results.

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Director's Forum

Water supply, sediment pollution, nitrogen pollution —are we nearing the point of no return?

Kenneth H. Reckhow, Director, Water Resources Research Institute

Scientists should not try to tell policy makers what to do. I firmly believe that scientists should evaluate the scientific implication of policy options but not offer recommendations about which particular policy should be adopted. I state my attitude about the role of scientists in policy making up front, because I want to speak directly to policy makers in this column, and I don't want to be misinterpreted.

Without suggesting any policy changes, I feel compelled to warn that scientific knowledge suggests we are nearing the point on certain issues where holding to the current course will lead to permanent or long-term environmental damage and costly corrective measures. These issues—limited water supply, sediment pollution, and excessive nitrogen—are not new, but they are emerging as recurrent problems, and there is evidence that our beliefs that resources are always adequate and that the environment is fully resilient may be wrong. It is possible that, unless we in North Carolina voluntarily change our practices and even lifestyles substantially, we may in the near future be forced to accept a reduction in our quality of life and environment.

Water Supply

It has become increasingly common for cities in North Carolina to experience water shortages in the summer, and current low supplies have recently led some Piedmont communities to limit growth and development. Of particular concern, however, is the significant depletion of groundwater in the Coastal Plain. Leading North Carolina hydrogeologists Harry LeGrand, Ralph Heath, and Richard Spruill have expressed a sense of urgency in recent correspondence (the latter two scientists provided scientific background in the January/February 1999 issue of the *WRRRI*

News). To help address the situation, the N.C. Department of Environment and Natural Resources' Division of Water Resources has proposed a Central Coastal Plain Capacity Use Area that would require development of a Water Management Plan in a 15-county region. This is clearly an important step in the right direction, but as Heath and Spruill

warn, "Failure to act immediately and effectively will result in irreparable harm to the groundwater system."

Sedimentation

Sediments have been recently described as the "greatest threat" to water quality in some areas of North Carolina (see the January/February 1999 issue of the *WRRRI*

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WRRRI offices are located at 1131 Jordan Hall

on the North Carolina State University campus

Mailing address: Box 7912, NCSU, Raleigh, NC 27695-7912

Telephone: (919) 515-2815 General Email: water_resources@ncsu.edu

WRRRI Staff

Director/Kenneth H. Reckhow (Ken_Reckhow@ncsu.edu)

Associate Director/ Robert E. Holman (Robert_Holman@ncsu.edu)

Newsletter Editor and Tech Transfer Spec/ Jeri Gray (Jeri_Gray@ncsu.edu)

Business and Administrative Officer/ Mary Sanford (Mary_Sanford@ncsu.edu)

Secretary/ Julie Mason (Julie_Mason@ncsu.edu)

Accounting Technician/ Barbara Yde (Barbara_Yde@ncsu.edu)

News). In basic terms, any land disturbance can result in soil erosion, and particularly in areas with relatively steep slopes adjacent to surface waters, the eroded soil becomes a water pollutant. Aside from loss of a resource (soil), sediment pollution in surface waters results in loss of aquatic habitat, reduction in reservoir storage capacity, and diminishment of aesthetic value. I suspect that everyone has observed sediment-laden storm water runoff from construction or agricultural activity. As a scientist, I know of the aquatic habitat impacts, I see the aesthetic effects, and I understand the direct economic consequence of lost reservoir capacity. As a member of the N.C. Sedimentation Control Commission, I also understand that, while the technology is fairly basic, it still is effective, and the problem largely results from inadequacies in state and local enforcement. As Phillip Gibson notes (in the January/February 1999 issue of the *WRRRI News*), enforcement deficiencies exist primarily because we simply are not funding enough state and local staff positions to keep up with inspection needs in a rapidly developing and growing state. Restoration of soil to the land, restoration of lost habitat, and restoration of lost reservoir capacity are costly (if not effectively impossible). As with Coastal Plain groundwater supply, the sedimentation problems are well documented and solutions exist, but the harm under current practice may in some cases be irreparable.

Nitrogen

In the Coastal Plain, about 60 percent of streamflow originates as groundwater discharge. Thus nitrogen applied to land that infiltrates into the groundwater may eventually re-emerge as surface water contamination. The impact of current land application practices is difficult to assess because it may take 40 to 50 years for nutrient-laden groundwater to travel through the groundwater system from upland recharge areas to riverine discharge areas.

Thus, it is possible that accepted nutrient application practices across the

Coastal Plain landscape may be contributing to unacceptably high nutrient concentrations throughout broad segments of shallow Coastal Plain aquifers. Over time the cumulative impact of these increasing concentrations may lead to the long-term contamination of shallow aquifers and the discharge of nutrient-enriched groundwater into the stream network. Contributing sources to this nutrient loading include the land application of wastes and fertilizer. The receptors at risk include groundwater supplies serving small communities and rural families and the stream networks receiving the nutrient-enriched groundwater discharge.

Thus, we should plan now to define sustainable rates of nutrient application to the land. Otherwise, if we are exceeding and continue to exceed the capacity limits of the groundwater system, future generations will face an irreversible legacy of nutrient-enriched groundwater contaminating the State's coastal rivers, similar to the contamination we now face in the lower Neuse River.

Concluding Thoughts

Sustainability is a popular concept now. Yet, due to time lags both in environmental response and in implementing lifestyle changes, we may already be past the sustainability point in some cases (the 30% reduction in nitrogen loading to the Neuse is an example of the need to backtrack to reach a potential sustainable point). Beyond the basic determination and achievement of sustainability is the challenge to maintain a sustainable environment in the face of population growth and economic development. Two primary concerns arise. In the policy arena, the public and elected officials must determine what sustainability means in terms of environmental quality and socioeconomic consequences. To assist that decision process, scientists must undertake reliable assessments and facilitate understandable interpretations of the science for management and policy analysis. Those scientific tasks are, and will continue to be, essential to the role for the Water Resources Research Institute.

URBAN STORM WATER MANAGEMENT CONFERENCE AND SYMPOSIUM

NOVEMBER 1, 2, 3, 1999

MCKIMMON CENTER,
N.C. STATE UNIVERSITY,
RALEIGH



With expansion of federal and state requirements for storm water control, erosion and sedimentation control programs are becoming increasingly intertwined with issues of storm water quality and quantity, including on-site and off-site effects. This conference will examine the relationship between erosion and sediment control and storm water control. Related wetland topics will also be discussed. PDHs will be available for the conference.

**Sponsored by
N.C. Sedimentation Control Commission
N.C. Division of Land Resources, Land Quality Section
Water Resources Research Institute**

Put this conference on your calendar and look for a brochure to be mailed about one month prior to the conference date, or check the WRRRI website for conference details.

WRRRI Research priorities *continued*

In addition to mountain sedimentation, the WRRRI Advisory Committee recommended the following research topics be given top priority for funding in fiscal year 2001:

- Evaluate aquifer storage and recovery as a water supply management measure in the N.C. Coastal Plain.
- Investigate watershed-level impacts of hydrologic changes caused by urbanization and flow regulation on aquatic habitat and water quality and evaluate corrective measures.
- Determine safe yield of Coastal Plain Cretaceous aquifers by documenting total recharge and discharge, migration of chlorides, and the effect of land subsidence.
- Investigate the measurement and monitoring techniques that can determine the effectiveness of stream and wetland restoration.
- Conduct a comprehensive economic evaluation of the public and private costs and technical feasibility of converting animal waste lagoons to more environmentally protective waste treatment technologies.
- Determine the biological, hydrologic, and geological characteristics that identify intermittent and perennial streams.
- Investigate the possibilities for and the criteria and protective standards required for the indirect or direct reuse of water for municipal use.
- Investigate the nutrient contribution of ground water sources to rivers in the Coastal Plain.
- Define the minimum water quality and buffer protective measures that are required to protect the public when reclaimed water is used.

Will the Y2K bug infect N.C. water and wastewater systems?

It's a couple of hours after midnight on December 31, 1999, in a medium-sized U.S. city. In older sections of town, water transmission lines begin to rupture when a pump in the town's distribution system malfunctions. Leaks erupt at numerous locations. While the public works director scrambles to get crews to respond to the water line breaks, a flow monitor at the wastewater treatment plant goes haywire and bypasses thousands of gallons of untreated wastewater into a low-flow stream.

At the same time, in a nearby town, temporary power interruption caused by "Year 2000" (Y2K) malfunctions in the local power grid shuts down a wastewater treatment plant, which then bypasses raw sewage. A week later the same town has to shut down its water treatment plant when its regular shipment of chemicals fails to arrive because of transportation system interruptions.

How likely are these Y2K scenarios? According to the U.S. General Accounting Office (GAO), too little information has been collected to assess the risk of water and wastewater systems disruption on a nationwide basis. In North Carolina, the situation is somewhat better, but, even here, there are gaps in information about water and wastewater systems' preparedness for Y2K.

Many water and wastewater treatment systems are highly reliant on automated functions controlled by embedded microchips. Some of these embedded systems—which control valves, pumps, switches, flow monitors, and other devices—may not function properly when the year changes to 2000. Possible consequences of malfunctioning microprocessors range from small discharges of untreated waste by package treatment plants, to major upsets in treatment processes at large plants caused by over- or under-dosing of chemicals, to multiple failures and bypasses. Consequences for the owners and operators of systems that do experience problems could include fines by regula-

tory agencies and law suits by customers experiencing damage to property or business.

Automated control equipment may appear as black boxes but contain layer upon layer of embedded systems. According to one estimate 10% of the microchips in water and wastewater systems have date functions, and 4% of those will malfunction some time after the date changes to 2000. Locating and testing embedded microchips in systems is difficult and time-consuming. In addition, water and wastewater systems are vulnerable to even short-term interruption of other basic services if they have not prepared. GAO fears that many water and sewer facilities are not aware of all the potential problems or are simply not making adequate efforts to assure that they can provide reliable water and sewer services after December 31, 1999.

According to a report released in April (*Year 2000 Computing Crisis: Status of the Water Industry* GAO/AIMD-99-151), few state regulatory agencies can offer evidence that water and wastewater systems are checking for Y2K compliance, and water and wastewater industry associations are not getting good responses to their surveys on Y2K awareness and readiness. GAO suggests that the President's Year 2000 Conversion Council conduct a national survey of water and wastewater providers, and if response to the survey is low, ask Congress for legislation requiring Y2K reports from facilities.

N.C.'s efforts to assess Y2K readiness of water and wastewater systems

In North Carolina, the majority of water and wastewater utilities are regulated by two different agencies. The N.C. Department of Environment and Natural Resources (DENR) oversees compliance with health and environmental regulations by all water and wastewater

systems. Privately owned water and wastewater utilities are also regulated by the N.C. Utilities Commission, which oversees the “business end” of these systems. The “business end” of water and wastewater systems owned by municipalities and special districts is subject to monitoring by the Local Government Commission, which is part of the Office of State Treasurer. All of these agencies participate in the State’s Year 2000 Project. However, the primary focus of that effort is assuring that state government computer systems are ready for the year 2000. Efforts to help the State’s many “regulated communities” prepare or to assess preparedness are spotty.

Neither DENR’s Public Water Supply Section nor Division of Water Quality has surveyed the systems they regulate to assess Y2K readiness. The GAO report lists North Carolina among the “inactive” states in regard to assessing public water supply systems’ Y2K compliance and among states “disseminating information but not assessing Y2K progress” of publicly owned wastewater facilities.

According to Assistant Secretary Bill Holman, DENR does not plan to assess Y2K readiness of water and sewer systems. However, DENR does plan to send letters advising systems of its Y2K policy—essentially, that systems will be held responsible for violations of drinking water and wastewater regulations that result from Y2K problems. (Read the DENR policy at website: <http://www.ehnr.state.nc.us/EHNR/files/y2k.htm>)

As part of the N.C. Statewide Year 2000 Project, the Utilities Commission’s Public Staff, in spring 1998, surveyed all the utilities it regulates to assess awareness of the Y2K problem and efforts to prepare. From the early response (or lack thereof) to its survey, the Public Staff concluded that of all the utilities it regulates, water and sewer companies had the least understanding of the potential impacts of the Year 2000 problem and the possible consequences of remaining unprepared. It therefore

prepared information packages for private water and sewer utilities and distributed them along with a letter mandating response (under threat of fine) to the survey. According to Shilda Winstead of the Public Staff, virtually 100% of privately owned water and wastewater utilities surveyed have now responded and indicated that they have got the Y2K problem “under control.”

However, private utilities in North Carolina are fairly small, providing services primarily to residential subdivisions or mobile home parks, and these systems may not be as reliant on microprocessor-controlled automated equipment as medium and large systems that serve towns and cities. Information collected on Y2K readiness of larger publicly owned systems is less complete and less reassuring.

When the N.C. Local Government Commission conducted its 1998 audit of local governments in the state, it asked for a report on Y2K readiness. However, data about Y2K readiness of water and wastewater facilities have not been aggregated, so no overall picture is available. The N.C. League of Municipalities (NCLM) has done the only analysis that offers some clue to Y2K readiness among publicly owned water and wastewater facilities. When NCLM conducted its biannual survey of water and sewer systems last year, it included a question about Y2K compliance. Four hundred towns and cities with water and/or wastewater systems were surveyed; 239 responded (60%). Of the 223 towns and cities with water systems that did respond, 16.7% said they didn’t know if their systems were Y2K ready and 38.2% said the question was not relevant to their systems. Of the 229 towns and cities with wastewater systems, 15.7% said they didn’t know about Y2K readiness and 47.1% said the question was not relevant to them.

The NCLM survey was conducted by Dr. Lee Mandel. According to his report, the number of systems responding that the Y2K question is not relevant to them is puzzling, if the assumption is correct that most water and wastewater

systems do rely to some degree on embedded microprocessors. The response might indicate that many water and wastewater system operators think that if they do not use computers their systems are not vulnerable to the Y2K bug. On the other hand, it may indicate that many systems have retained manual operations or are prepared to revert to them to avoid Y2K problems.

Without more detailed surveys and better response rates, overall Y2K readiness of publicly owned water and wastewater systems in North Carolina remains uncertain. It may be fairly safe to assume that, if Y2K problems do surface in municipal water and sewer systems in North Carolina, they will most likely occur in smaller towns and cities. Most large municipal systems have undertaken Y2K diagnosis and remediation programs, and many have made information on their programs available on websites as part of their municipalities’ Year 2000 Readiness Disclosure statements.

However, no matter how carefully any system combs its operations for embedded microprocessors, plans for backup power, and stocks up on needed supplies, it may still be tripped up by another effect of the Y2K bug—public over-reaction. Some in the water industry are now worried that consumers will fill bathtubs and other containers with water on December 31, creating unusual demand and problems with water pressure. Water managers can respond to this scenario with water conservation measures but face the uncertainty of other public Y2K reactions.

North Carolinians interested in Y2K readiness of state agencies, utilities, banks, schools, transportation systems, health care facilities, and, in some cases, local governments, can find information through the N.C. Statewide Year 2000 Project website: <http://year2000.state.nc.us/>.

Public hearings on the Neuse River Riparian Area Protection Rules are being scheduled for early September. Check the WRRRI website for details.

July action of the N.C. Environmental Management Commission

At its regular meeting on July 8, the N.C. Environmental Management Commission took the following action:

- Delegated authority to the Secretary of Environment and Natural Resources to carry out certain activities necessary to facilitate implementation of the Dry-Cleaning Solvent Cleanup Act of 1997. The activities are to be carried out by the N.C. Division of Waste Management, Superfund Section.
- Approved a Division of Waste Management (DWM) request to publish in the *North Carolina Register* of Notice of Rulemaking Proceedings to establish minimum management practices for the storage and handling of dry-cleaning solvents. (Not realizing that the EMC must approve publication, DWM had already published a Notice of Rulemaking Proceedings for the minimum management practices rule. The notice will be published again.) The rule will establish practices that all dry-cleaning facilities must demonstrate they have met in order to be eligible for the Dry-Cleaning Solvent Cleanup Program. For information on this program and proposed rules contact Lisa Taber with the N.C. Superfund Section at (919) 733-2801 or go to the Dry Cleaning Solvent Cleanup Act website <http://wastenot.ehnr.state.nc.us/SFHOME/SFHOME.HTM>
- Approved holding public hearings on the adoption of permanent rules to control odors from animal operations. The proposed permanent rules are somewhat different from temporary rules now in effect. According to Tom Allen with the Division of Air Quality, the permanent rules include revised best management practices, shortened time lines, and fewer allowed revisions to odor management plans. The draft permanent rules are available on the Division of Air Quality website at <http://daq.state.nc.us/Rules/Draft/Draftodorrule.pdf> Check the DAQ website for dates and locations of public hearings.
- Approved holding public hearings on amendment of the permit exemption rule for non-Title V K and Ka tanks, incinerator rules, and municipal solid waste landfill rules. Details about these rule amendments and public hearings can be found on the Division of Air Quality's website at <http://daq.state.nc.us/Rules/Hearing/>.
- Confirmed the appointment to the Water Pollution Control System Operators Certification Commission of Michael R. Garrett of New Bern, Donald W. Register of Fayetteville, and Gregory F. Young of Boone.
- Approved the priority listing of applications for wastewater treatment and collection facility grants, revolving loans, and bond loans. The priority listing was established by DWQ's Construction Grants and Loans Section for funding available under the N.C. Clean Water Revolving Loan and Grant Act of 1987 and the Clean Water and Natural Gas Critical Needs Bond Act of 1998. The recommended projects total \$103,823,468 in grants and \$5,498,205 in loans.
- Approved holding public hearings on proposed Tar-Pamlico River Basin Nutrient Sensitive Waters Management Plan for Nonpoint Sources. Stakeholder teams developed four separate rules (agriculture, urban storm water, nutrient management, and riparian buffer protection) aimed at reducing nitrogen by 30% and holding phosphorus loads at 1991 levels in the Tar-Pamlico River Basin. A Notice of Rulemaking Proceedings for the Tar-Pamlico rules has been published in the *North Carolina Register*, and the comment period on the subject matter notice is open until July 30. This notice included text of the proposed four rules plus a statement that the EMC wants comments on the advisability of initiating rulemaking on control of atmospheric emissions of ammonia. Comment on the possibility of rulemaking on atmospheric emissions of ammonia will continue to be taken during the 60-day comment period on the proposed rules, which is expected to run from August 1, to September 30. In large measure, the four proposed Tar-Pamlico rules mirror rules established to reduce nitrogen in the Neuse River Basin, but there are differences. Two public hearings on the proposed rules will be held on two different evenings at locations in the upper and lower basin. Hearings are being planned for late August and/or early September and are tentatively to be held in Nash and Pitt Counties. For a copy of the proposed rules and more information on public hearing dates and locations, contact Rich Gannon with DWQ at (919) 733-5083, Ext 356 or visit the DWQ website at <http://h2o.enr.state.nc.us/wqhome.html>.
- Approved the Tar-Pamlico River Basinwide Water Quality Plan. This five-year plan is different from the special nutrient reduction plan.
- Approved the agricultural accountability process established under the Neuse River Nutrient Sensitive Waters Management Strategy. The accountability process includes use of the Nitrogen Loss Estimation Worksheet (NLEW) to estimate nitrogen loading at field edge. According to Tom Jones, Neuse Basin Coordinator with the N.C. Division of Soil and Water Conservation, in order to use NLEW, a statistically valid survey of agricultural land uses and practices within the basin must be conducted, and funding for this survey is needed. Jones asked the EMC to help the workgroup that developed the accountability process in its quest for funds to contract with a consultant conduct the survey.

■ Approved holding public hearings on the proposed changes to state water quality standards and classifications as recommended by a stakeholder committee set up to address the federal Clean Water Act requirement to conduct a triennial review. The proposed changes would (1) add a rule to require development of site-specific management strategies to protect or improve water quality at sites where federally listed threatened or endangered aquatic animals occur, (2) amend a rule to require development of site-specific management strategies to protect or improve water quality at sites where nutrient over-enrichment is resulting in nuisance growths of aquatic vegetation, (3) provide guidance on procedures for determining permit limits for copper, zinc, iron, and silver, (4) amend a rule to allow the use of dissolved metals for determining permit limits for cadmium and nickel and to provide guidance on conducting dissolved metals studies and determining permit limits, and (5) amend a rule to reduce the number of marina slips allowed in coastal Outstanding Resource Waters to less than 10 to protect shellfishing waters. For information on these proposed changes and public hearing dates, contact Diane Reid at (919) 733-5083 Ext 568.

■ Heard from Chairman David Moreau that the Steering Committee will soon recommend initiating rulemaking to establish by rule a process for petitions for declaratory rulings.

■ Heard from Assistant DENR Secretary Bill Holman that, in spite of the General Assembly's failure to fully fund his lagoon phase-out plan, Governor Hunt still expects the EMC to develop performance standards for animal waste management systems.

July action of the EMC Water Quality Committee

In a 4-hour meeting on July 7, the N.C. Environmental Management Commission's Water Quality Committee took the following action:

■ **Tar-Pam resolutions.** Approved a goal for wetlands restoration in the Tar-Pamlico Basin and confirmed the N.C. Wetlands Restoration Program as lead agency for wetlands restoration under the Tar-Pamlico Nutrient Sensitive Water Management Plan for Nonpoint Sources. The committee, however, voted to retract its approval of a resolution asking the General Assembly for \$60 million for wetlands restoration in the Tar-Pam, saying that wetlands restoration needs in all 17 river basins should be assessed before making funding requests.

The EMC had approved the wetlands funding resolution in May along with other resolutions recommended by the Tar-Pamlico rulemaking stakeholder teams. Other resolutions approved ask the General Assembly for funding for research to (1) quantify and control atmospheric emissions of ammonia from confined animal operations, (2) quantify and reduce nitrogen loading from onsite wastewater systems in the Tar-Pam, and (3) better quantify nutrient loading from land disturbing activities and improve erosion and sediment control technology. One resolution also asks the General Assembly for additional funding for training for sediment control personnel and for more enforcement officers and asks the N.C. Sedimentation Control Commission to develop rules that strengthen controls in Nutrient Sensitive Waters and mandate training and certification for construction contractors and developers.

■ **Neuse buffer variance.** Approved a request for a variance from the Neuse

River Riparian Area Protection rule from Agora Developments, L.L.C. for addition of six new retail stores and associated parking at the Falls Village Shopping Center in Raleigh. The expansion plans will destroy 450 feet of riparian buffer and add 3-4 acres of impervious surface but was judged by the committee to provide equal water quality protection through the use of a detention pond/wetland system.

■ **Neuse storm water program delay.** Extended for 60 days the deadline for development of a model program for controlling nitrogen from urban storm water in the Neuse River Basin. Under the Neuse River Basin Nutrient Sensitive Waters Management Strategy (Neuse River rules), the EMC was supposed to approve a model program by August 1, 1999. The Neuse River rules provide that the N.C. Division of Water Quality (DWQ) and affected local governments are to develop the model program, and a group called the Neuse Storm Water Team has been working on the model program for several months. The Neuse River rules mandate that designated local governments adopt storm water plans with the following components:

- Review and approval of storm water management plans for new development to ensure that:
 - (1) nitrogen loading from storm water is held at 70% of the average nitrogen load contributed by the 1995 land uses of the non-urban areas of the Neuse River basin (3.6 pounds per acre per year),
 - (2) there is no net increase in peak flow leaving the site from the predevelopment conditions for the 1-year, 24-hour storm, and
 - (3) plans comply with the Neuse River rules for protection and maintenance of riparian buffers.
- A program to identify and remove illegal discharges to storm sewers
- Identification of appropriate sites for fitting storm water BMPs into existing urban areas

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Water Quality Committee *continued*

■ A public education program

Bradley Bennett of DWQ presented what he apparently thought was the Neuse Storm Water Team's consensus model program to the Water Quality Committee, but Committee Chairman Charles Peterson took the unusual step of allowing a member of the team, Mark Senior of the City of Raleigh, to present objections to the model plan on behalf of several local governments in the Upper Neuse Basin. Senior said the objections to the model program are: (1) Wake County is required to implement a storm water program but several municipalities within the county are not, presenting an implementation problem; (2) urban areas are required to implement controls on a quicker time schedule than agriculture; (3) the science available to account for nutrient loading and reductions is inadequate; (4) no fiscal note on the storm water requirements has been prepared; (5) regional approaches are not adequately provided for; and (6) the public education component is too specific and too constraining, setting up a basinwide educational program and requiring local governments to fund two new positions for the NCSU Cooperative Extension Service's Neuse River Education Team.

EMC Chairman David Moreau pointed out that several things local governments object to are in the Neuse River rules and are not a problem of the model program. He said the model program is a service to local governments in that it tells them what criteria the Commission will use to determine if their programs meet the requirements of the Neuse River rules. The Water Quality Committee instructed DWQ staff to go back to work with local governments on the model program. Extending the deadline for the model program also extends the deadline for presentation and implementation of local storm water programs.

May action of the N.C. Sedimentation Control Commission

The North Carolina Sedimentation Control Commission (SCC) met in May and took the following action:

- Adopted a rule allowing the Director of the Division of Land Resources to assess a one-time civil penalty of up to \$500 when an initial violation of the Sedimentation Pollution Control act or rules is found. Additional penalties of up to \$500 per day for each day the site remains out of compliance may also be assessed after the violator has been given an opportunity to bring the site into compliance. The SCC also voted to ask the Governor to implement the requirements as a temporary rule until the permanent rule becomes effective.
- Delegated to the N.C. Department of Transportation authority to approve erosion and sedimentation control plans for stream and wetlands mitigation projects. DOT forecasts that it will have to provide mitigation for 2 million linear feet of stream disturbance in its current 6-year Transportation Improvement Program.
- Voted to provide \$50,000 from its education fund to help N.C. State University begin developing an erosion and sedimentation control research and training facility as part of its National Training Center for Land-Based Technology and Watershed Protection.
- Approved testing in three regions of the state of an Erosion and Sedimentation Risk Assessment Method, designed to assess how likely it is that off-site sedimentation or other resource damage may occur at a particular construction site. The method will be tested in the Asheville, Raleigh and Washington Regions.

Carrboro uses hot water to kill weeds

The Orange County town of Carrboro, NC, is using a machine that superheats water and dispenses it in a carefully controlled stream to kill weeds without using chemical herbicides.

The machine produces a steady stream of near-boiling water that kills weeds by melting the waxy outer coating of their leaves. It is mounted on a small truck with hoses connected to long-handled applicator wands. A quick spray on unwanted weeds kills them; the plants darken almost immediately and turn brown within a few hours. The flow of water is low and cools quickly. While the results look very much like that of a contact herbicide, there is no toxic residue and the area is immediately safe for human contact.

Carrboro is testing the equipment to implement the town's Integrated Pest Management policy, adopted in March 1999. The policy calls for phasing out use of conventional pesticides, including herbicides, on town property, but does not apply to the local residents, their property or businesses. The town is using a comprehensive approach to weed management, including a biodegradable herbicide made from corn gluten, propane flamers which kill plants by singeing them, thick mulch on plant beds to smother weeds, and now hot water.

The hot water system, on loan to Carrboro until the end of June, is being used by town staff, who are also demonstrating it for other interested parties. At the conclusion of the trials, a final decision will be made whether or not the town will purchase the equipment.

—Agricultural Resources Center

Landfill to fuel greenhouse, glass- blowing, and ceramics facilities

Western N.C.'s Blue Ridge Resource Conservation and Development (RC&D) Council recently kicked off a project that



**Announcing the N.C. Urban Water Consortium website:
<http://www2.ncsu.edu/ncsu/CIL/WRRI/uwc>**

The North Carolina Urban Water Consortium is a group of municipal and special district water, wastewater, and storm water agencies in North Carolina which, in partnership with WRRI, sponsors research and technology transfer on the special water-related issues that urban areas face.

The NCUWC's new website is now online, providing access to back issues of the group's newsletter, summaries of research reports, and special publications, including *Xeriscape North Carolina*, a guide to water-conserving landscaping. In the future, this site will also provide customers of these systems access to drinking water Consumer Confidence Reports, water conservation information, and other consumer information.

Members of the N.C. Urban Water Consortium are: Burlington, Charlotte, Durham, Fayetteville, Greensboro, Greenville, High Point, OWASA (Orange Water and Sewer Authority), Raleigh, and Winston-Salem.

will put to good use methane released by a landfill used by Yancey and Mitchell counties. Methane will be converted to a fuel that will heat four greenhouses and a glass-blowing and ceramics studio and have the same effect on greenhouse gas reduction as taking 20,000 cars off the roads. Partnering with Blue Ridge RC&D on the project are HandMade in America, Mayland Community College, and the Penland School of Crafts.

—NRCS

Bill would make Wilson Creek part of National Wild and Scenic Rivers System

In May, N.C. 10th District Representative Cass Ballenger introduced in the U.S. House a bill that would make Wilson Creek in Avery and Caldwell counties a

component of the National Wild and Scenic Rivers System. H.R. 1749, requested by a delegation of Caldwell County elected officials, would designate a 2.9 mile segment of Wilson Creek from its headwaters below Calloway Peak in Avery County to its confluence with Little Wilson Creek as a scenic river; a 4.6 mile segment from Little Wilson Creek to the confluence of Crusher Branch, as a wild river; and a 15.8 mile segment from Crusher Branch to the confluence of Johns River as a recreational river. According to an article in *CountyLines* (newsletter of the N.C. Association of County Commissioners) Caldwell County devoted several years to gathering support among land owners and elected officials in Avery and Caldwell counties before taking the request to Ballenger.

Aquatic weed discovered in nurseries and gardens in N.C.

Add Giant Salvinia (*Salvinia molesta*) to the list of invasive exotic plants that threaten North Carolina waterways. According to Dr. David DeMont with the N.C. Division of Water Resources, the weed has turned up in a number of ornamental ponds and has been traced to aquatic nurseries and dealers. Many people find the weed attractive and are unaware of its invasive nature or that it is illegal to import or sell it.

Native to South America, giant salvinia is an aquatic fern that, under favorable conditions, can double its biomass in about 2 days. It forms floating mats that shade and crowd out native plants, reduce oxygen, and degrade water quality for fish and other aquatic organisms. It has caused severe ecological and economic problems in New Zealand, Australia, and South Africa. In the United States, infestations have been confirmed in Hawaii, Texas, Mississippi, Alabama, Louisiana, and Florida.

In North Carolina the weed has been found at aquatic dealers, aquatic nurseries, botanical gardens, and manmade ponds in Carteret, Craven, Jones, Lenoir, New Hanover, Orange, Pitt, Sampson, and Wake counties. So far, it has not been reported in natural water bodies or streams. According to David Patterson with the N.C. Department of Agricultural and Consumer Services' Plant Protection Division, when the division finds this and other noxious plants at nurseries and dealers, it issues stop sale orders and tries to help businesses rid their stocks of the weeds. If noxious weeds cannot be separated from legal plants, then entire stocks must be destroyed. NCDA&CS is working with dealers and nurseries to prevent the establishment of Giant salvinia in natural waters. For more information visit the NCDA&CS's plant protection website at <http://www.agr.state.nc.us/plantind/plant/weed/salvinia.htm>.

Current action of the 1999 Session of the N.C. General Assembly

RATIFIED BILLS

In addition to bills reported in the last issue of the News, the 1999 Session of the N.C. General Assembly has passed the following bills, as of July 8. These bills have been signed by the Governor and are now law. This is not a complete listing of environment-related bills passed. An expanded listing, with links to bill text on the General Assembly web server, is available in the html version of the July/August *WRRRI News* on the WRRRI website: <http://www2.ncsu.edu/ncsu/CIL/WRRRI/news/318.html>. In addition, other important environment-related bills (including a clean water bill, a clean air bill, and a bill to strengthen the Sedimentation Pollution Control Act) were still being worked on when the *WRRRI News* went to press.

H 1008 (CH SL 99-82) An act to provide for the regulation of certain excavation and grading activities under the Sedimentation Pollution Control Act of 1973 instead of the Mining Act of 1971. Excludes from the definition of "Mining" "excavation or grading where all of the following apply: (1) The excavation or grading is conducted to provide soil or other unconsolidated material to be used without further processing for a single off-site construction project for which an erosion control plan has been approved in accordance with Article 4 of Chapter 113A of the General Statutes. (2) The affected land, including nonpublic access roads, does not exceed five acres. (3) The excavation or grading is completed within one year. (4) The excavation or grading does not involve blasting, the removal of material from rivers or streams, the disposal of off-site waste on the affected land, or the surface disposal of groundwater beyond the affected land. (5) The excavation or grading is not in violation of any local ordinance. (6) An erosion control plan for the excavation or grading has been approved in accordance with Article 4 of Chapter 113A of the General Statutes."

S 249 (CH SL 99-209) An act to extend the moratorium on the issuance of shellfish cultivation leases in Core Sound, to require the Division of Marine Fisheries and the Primary Investigator to report the results of the shellfish mapping and human use mapping of Core Sound to the Joint Legislative Commission on Seafood and Aquaculture and the Marine Fisheries Commission, to authorize rather than require the Secretary of Environment and Natural Resources to require fisheries license agents to post bonds, to establish an interim crab license, to establish a 1999 grace period for the issuance of marine fishing licenses, to provide that the Division of Marine Fisheries may issue licenses prior to the end of each license year and may retain revenues from those licenses during the following license year, to clarify the cruelty to animals statute, and to exempt persons who take fish by means of a gig for recreational purposes from the recreational commercial gear license requirement.

S 878 (CH SL 99-213) An act to allow certain nonprofit water corporations to be eligible for revolving loans and grants from the Drinking Water Treatment Revolving Loan Fund. Provides that nonprofit organizations incorporated under Chapter 55A of the General Statutes may apply for loans and grants from Drinking Water Treatment Revolving Loan Fund established by G.S. 159G-5(d) subject to approval by the Local Government Commission.

S 1047 (CH SL 99-0143) An act to prohibit the taking of shellfish within one hundred fifty feet of a publicly owned pier beneath which the Division of Marine Fisheries has deposited cultch material.

S 1048 (CH SL 99-0162) An act to create a grants committee to set priorities for, review applications to, and award grants under the Fishery Resource Grant Program and to make clarifying, conforming, and technical changes to the Fishery Resource Grant Program statute.

S 1140 (CH SL 218) An act to ban new or replacement billboards on a portion of U.S. Highway 52 and North Carolina Highway 752 in Surry County.

S 1159 (CH SL 99-198) An act to expand the circumstances under which the Department of Environment and Natural Resources may allow the use of land-use restrictions to protect public health at contaminated sites.

H 168 1999-2001 State Budget. Among the provisions of the budget bill are the following:

- Establishes the Beaver Damage Control Advisory Board and provides \$500,000 each of the next two fiscal years for beaver damage control.
- Provides \$3.6 million for 1999-2000 and \$3.4 million for 2000-2001 for science and nature museums.
- Provides that the Appropriations Subcommittees on Natural and Economic Resources in the Senate and House shall study the current organization of the Department of Environment and Natural Resources (DENR) and report recommendations to the 2000 Regular Session of the 1999 General Assembly no later than May 1, 2000.
- Provides that DENR may use funds in the Scrap Tire Disposal Account to support a position to provide regulatory assistance to local governments to develop programs to prevent scrap tires from outside the State from being brought to N.C. disposal sites.
- Provides that DENR shall study the feasibility and benefits of implementing a one-stop environmental permitting system.
- Establishes the North Carolina Water Quality Workgroup and funds a Rivernet Monitoring System Pilot Program. Provides that DENR and N.C. State University shall jointly establish the N.C. Water Quality Workgroup with 15 members to be appointed by the Secretary of DENR and the

chancellor of NCSU. The Workgroup shall work cooperatively with the appropriate divisions of the Department of Environment and Natural Resources and North Carolina State University, the Scientific Advisory Council on Water Resources and Coastal Fisheries Management, the Environmental Management Commission, and the Environmental Review Commission to identify the scientific and State agency databases that can be used to formulate public policy regarding the State's water quality, evaluate those databases to determine the information gaps in those databases, and establish the priorities for obtaining the information lacking in those databases. The Workgroup shall have the following duties:

- (1) To address specifically the ongoing need of evaluation, synthesis, and presentation of current scientific knowledge that can be used to formulate public policy on water quality issues.
- (2) To identify knowledge gaps in the current understanding of water quality problems and fill these gaps with appropriate research projects.
- (3) To maintain a web-based water quality data distribution site.
- (4) To organize and evaluate existing scientific and State agency water quality databases.
- (5) To prioritize recognized knowledge gaps in water quality issues for immediate funding.

Provides that the N.C. Water Quality Workgroup shall develop a water quality monitoring system to be known as Rivernet. The Rivernet system shall be designed to implement advances in monitoring technology and information management systems with web-based data dissemination in the waters that are impaired based on the criteria of the State's basinwide water quality management plans. Water quality and nutrient parameters shall be continuously monitored at each station, and the data shall be sent back to a centralized computer server. The Rivernet system shall have the capabilities to trigger alarms and notify the appropriate member of the Workgroup when monitoring stations exceed defined limits indicating a spill or a significant water quality or nutrient measurement event. Provides for pilot testing of the Rivernet system in an area of impaired waters within one of the State's river basins to be selected by the workgroup.

Appropriates for N.C. State University \$300,000 for 1999-2000 and \$300,000 for 2000-2001 for operating costs of the Rivernet systems and pilot project including personnel to maintain the system, archive and disseminate the data.

Appropriates for N.C. State University \$500,000 for 1999-2000 for the purchase of monitoring equipment, installation of data transfer network and installation of computer hardware and software to archive the data and sustain the web-based data system.

Appropriates \$400,000 for 1999-2000 and \$400,000 for 2000-2001 to be held in a fund to be administered by the Scientific Advisory Council on Water Resources and Coastal Fisheries Management for research projects recommended by the N.C. Water Quality Workgroup to promote collaborative work among DENR and constituent institutions of UNC to close knowledge policy gaps with regard to the State's water quality and the nutrient levels of impaired waters.

- Creates a Commission to Address Smart Growth, Growth Management and Development Issues. The commission is to be established in the General Assembly and is to consist of 37 members from the General Assembly, government, business, environmental interests, the professions and citizens. The Commission shall study growth, growth management, and development issues and recommend initiatives to promote comprehensive and coordinated local, regional, and State planning, and growth management to: (1) Preserve natural and cultural resources; (2) Promote smarter infrastructure; (3) Foster more balanced economic development in rural and urban areas; (4) Foster compatible land-use patterns; (5) Preserve and improve air quality in this State; (6) Protect housing affordability and assure consumer choice; and (7) Enhance the quality of life for the citizens of North Carolina. Provides that the Commission submit and interim report to the 2000 Regular Session of the 1999 General Assembly and a final report by Jan 15, 2001, to the General Assembly, the Governor, and the citizens of the State. The report may include recommendations to (i) enact and implement a program of comprehensive planning, supportive infrastructure development, and growth management and (ii) address the issue of continued oversight of growth and development in the State, including whether a permanent commission should be established.
- Provides that the Department of Transportation expand its use of recycled materials in its construction and maintenance programs. Consistent with economic feasibility and applicable engineering and environmental quality standards, DOT is to use rubber from tires in road pavements, subbase materials, or other applications; recycled materials for guard rail posts, right-of-way fence posts, and sign supports; and recycling technology, including hot in-place recycling in road and highway maintenance. DOT shall review and revise bid procedures and specifications to eliminate any explicit discrimination against and encourage use of recycled materials. DOT is to report to DENR each year on amounts and types of recycled materials that were specified or used in contracts entered into during the previous year.
- Provides that DOT shall develop and implement a plan to plant the State tree, the pine, including the loblolly pine, and the State flower, the dogwood, along the State's roads and highways in DOT right-of-way.
- Requires the Secretary of Environment and Natural Resources to provide to the General Assembly a written report itemizing all environmental studies authorized by the General Assembly from July 1, 1979, to April 1, 2000, along with: (1) identity of principal investigators or managers of studies; (2) summary of cost of each study and funding sources; (3) a synopsis of findings, conclusions and recommendations; (4) explanation of actions taken in response to studies, including changes in rules or policies; (5) a report of status, preliminary conclusions, and estimated time of completion of all studies in progress.

Digest

In-stream turbidity monitoring at construction sites. As a result of a negotiated settlement with the Sierra Club, the Georgia Environmental Protection Division (EPD) has issued a draft amended NPDES General Permit for storm water associated with industrial activity which requires monitoring of receiving waters at construction sites for violations of the state's turbidity standard. Georgia EPD reached the settlement with the Sierra Club after an administrative law judge (ALJ) ruled EPD's general NPDES permit was invalid because it included a "numeric effluent limitation" yet failed to impose monitoring of storm water discharges as required by state and federal NPDES permit regulations. EPD had appealed the ALJ's decision but dropped the appeal when a settlement with the Sierra Club was reached. The proposed permit applies to construction sites larger than 5 acres or smaller tracts that are part of a larger development. It requires that permittees monitor turbidity of the receiving stream and submit monthly reports summarizing monitoring results. The proposed permit must be approved by the Georgia Board of Natural Resources following a public comment period. The draft permit and a fact sheet can be read on the Internet at <http://www.ganet.org/drn/environ/branches/waterprot/webver25.htm>.

Neuse land owners survey. According to a "willingness to pay" survey conducted by Dr. John C. Whitehead of East Carolina University, owners of farmland in the Neuse River Basin are less willing to pay for improved water quality than owners of non-farmland. Further, owners of farmland express less willingness to pay for improved water quality when they perceive that water quality is not safe. The investigator says that the latter result may indicate that farmers do not believe that environmental policy can improve water quality or that they reject the scenario presented to them. Partici-

pants in the survey were asked if they would be willing to pay various annual amounts for water quality improvement programs if they knew the money would be used to make sure water quality in the Neuse River is safe. Sixty-nine percent of the participants expressed willingness to pay something greater than zero for water quality improvement. Thirty-six percent considered the Neuse to be safe for boating but not swimming or fishing. Twenty-five percent considered the Neuse not to be safe for swimming, fishing or boating. In general, willingness to pay increased with income and educational level and decreased with age and dollar amount of proposed payment. A report on the survey can be read on the Internet at <http://www.econ.edu.edu/neuse/execsumm.htm>.

Oversight hearing on Clean Water Action Plan. In his 1998 State of the Union message, President Clinton announced a new initiative called the "Clean Water Action Plan." The plan was developed at the request of Vice President Gore by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA) in collaboration with other federal agencies. The plan is composed of 111 different "actions," including preparation by states of Unified Watershed Assessments, issuance by EPA/USDA of a Unified National Strategy for Animal Feeding Operations, a new push for implementation of states' Coastal Nonpoint Pollution Control Programs, and development by EPA of national and regional numeric nutrient standards. States were required to complete Unified Watershed Assessments by October 1, 1998, to be eligible for funding under the Clean Water Action Plan. In March, Vice President Gore announced completion of the final Unified National Strategy for Animal Feeding Operations. Other parts of the Clean Water Action Plan are under development. However, some state agencies and agriculture-related organizations are not happy with the plan, and on May 13, the Senate Committee on Environment and Public Works held an

oversight hearing on the plan. The administrator of the State of Wyoming's Water Quality Division told senators that his agency had refused to prepare the Unified Watershed Assessment called for by EPA because it duplicated efforts mandated under the Clean Water Act section 305(b) and 303(d). He said the Clean Water Action Plan is a "command and control document that goes far beyond the tenants of the Clean Water Act" and that it was developed without stakeholder input "in a very short period within the beltway" and is not sensitive to stakeholder concerns. In February, the Wyoming Association of Conservation Districts filed notice of intent to sue EPA and USDA to halt implementation of the plan. The National Association of Conservation Districts also submitted a statement opposing the method by which the Clean Water Action Plan was developed and urging that states retain the leadership role in regulating large animal operations. The American Farm Bureau Federation also submitted a statement opposing the Clean Water Action Plan, largely because it is based on states' 305(b) reports, which blame agriculture for 70 percent of stream pollution and which, the Farm Bureau asserts, is "severely flawed and scientifically invalid." The Farm Bureau also asserts that the Unified National Strategy for Animal Feeding Operations (AFO) "is unlawful to the extent that it seeks to treat runoff from precipitation as a type of discharge that can be regulated under the NPDES program," and that "EPA's proposal to condition (AFO) permits on adoption of . . . best management practices . . . clearly exceeds the authority delegated to the agency by Congress to address nonpoint sources of pollution." Statements made at the oversight hearing can be read on the Senate Environment and Public Works Committee web site: http://www.senate.gov/~epw/stm1_106.htm#05-13-99.

WRRI report available

WRRI has recently published a peer-reviewed technical completion report on a research project for which it provided funding. Single copies of WRRI reports are available free to federal/state water resource agencies, state water resources research institutes, and other water research institutions with which exchange agreements have been made. Single copies of publications are available to North Carolina residents at a cost of \$4 per copy prepaid (\$6 per copy if billed) and to nonresidents at a cost of \$8 per copy prepaid (\$10 per copy if billed). Send requests to WRRI, Box 7912, North Carolina State University, Raleigh, NC 27695-7912 or call (919) 515-2815 or email: water_resources@ncsu.edu.

Development of the Technical Basis and a Management Strategy for Reopening a Closed Shellfishing Area **Report 321 June 1999**

*James D. Reilly
and William W. Kirby-Smith
Duke University Marine Laboratory*

Fecal coliform bacteria are indicators of the presence of intestinal pathogens resulting from fecal contamination by warm-blooded animals. Pathogens from fecal contamination may reach shellfishing waters by direct deposition, surface wash-off, or subsurface seepage and may become concentrated in the tissue of oysters and other filter-feeding shellfish. If people eat shellfish from contaminated waters raw or not fully cooked, they may become ill. Therefore, the Shellfish Sanitation Program of the N.C. Division of Environmental Health closes an area of water to shellfishing when the median or geometric mean fecal coliform most probable number (FC-MPN) exceeds 14/100ml and more than 10% of the samples from the area are in excess of 43 FC-MPN/100 ml.

In North Carolina, more than 350,000 acres of shellfish waters are closed to shellfishing, and the area of closure is increasing.

In this study, investigators used a small watershed in Carteret County, NC, to develop a model strategy for reducing fecal coliform contamination and reopening areas of shellfishing waters in coastal North Carolina. Basing their strategy on knowledge of fecal coliform ecology, they hypothesized that sources of fecal coliform contamination are localized and that, therefore, measures to control contamination and reopen shellfishing waters must be focused locally.

Investigators studied patterns of fecal coliform contamination in a 600-acre watershed drained by Cow Pen Creek, which empties into the North River Estuary in Carteret County. In the 1970s, Cow Pen Creek had been channelized and two smaller drainage canals had been dug. The watershed contains two housing developments and other scattered housing, all on septic systems; about 90 acres of agricultural fields, about 75 acres of hardwood and pine mixed forest; and a tidal salt marsh. In 1990, the State closed the creek and canals to shellfishing, and in 1994, closed an additional 25 acres beyond the creek's mouth, including two shellfish leases. The area around the creek mouth remains open and the closure has not been enlarged since 1994.

Sanitary surveys by the Shellfish Sanitation Branch had not turned up significant problems with septic systems, and the investigators observed no septic problems. They therefore focused attention on wildlife and pet sources of fecal coliform. They used a system of "pinpoint" identification, tracking increasing fecal coliform counts at a scale of meters within the creek. They found fecal coliform concentrations generally higher in the upper reaches of the watershed and found high levels following dry periods as well as periods of significant rainfall.

Site visits revealed evidence that pet feces from kennels were being placed in

a tidally influenced ditch that empties into upper Cow Pen Creek. Through site visits investigators also learned that recent logging and regrowth in the forested area had improved habitat for raccoon and that residents perceived the raccoon population had increased significantly. They also found evidence of significant populations of mallard ducks frequenting the area, possibly because they were being fed.

The investigators suggest that the best options for reducing fecal coliform within the creek is to (1) control the sources and (2) control transport of the bacteria. They suggest first consideration be given to controlling wildlife sources by trapping and removing raccoon or by modifying their habitat and eliminating certain sources of food, such as garbage and home gardens. They also suggest conducting a general public education effort in the area neighborhoods to inform pet owners of the effects of improper disposal of pet waste and to inform residents of the consequences of attracting wild waterfowl. They also suggest that hydrological measures, such as weirs, that would slow the transport of fecal coliform and allow it to die before reaching shellfish waters might be effective.

However, the investigators say the first step toward reopening Cow Pen Creek to shellfishing must be sharing the results of the study with landowners, shellfish resource users, and applicable government and non-government entities in a way that assures no blame is implied. They also suggest several sources of funds for restoration projects.

In May the American Canoe Association filed an administrative appeal of the N.C. Division of Water Quality's 401 water quality certification of the proposed Randleman Dam on the Deep River. That appeal has been consolidated with one filed by the Deep River Citizens Coalition. The appeals will be heard by Administrative Law Judge Robert Reilly in late August. For information on the date and place of the hearing call the N.C. Office of Administrative Hearings (919) 733-2691 in mid-August.

Insufficient spring rains heighten drought concerns

According to the U.S. Geological Survey, drought conditions began to prevail across North Carolina beginning in summer 1998 and worsened until December 1998. Rains during December 1998 through May 1999 helped in many areas to alleviate the drought's effects and return streamflows to normal. However, rainfall totals were still below normal and were insufficient to completely recharge the groundwater sources that sustain stream base flows. Thus streamflow levels at many USGS gaging stations across North Carolina displayed a significant decline in May, particularly in the latter half of the month. While streamflow levels in all areas of the State were decreasing by the end of May, streams in the Piedmont and Coastal Plain appeared to be most affected by the drought. At the end of the month, streams in these areas were typically in the range of 20 to 50 percent of daily medians as compared to streams in the Blue Ridge where levels were observed at 50 to 80 percent of daily medians.

When the N.C. Drought Monitoring Council met on June 18, the situation had not improved. During the first half of June, streamflows in Coastal and Piedmont watersheds were generally in the range of 30-50% of normal, with some Coastal and Piedmont streams as low as 10% and 25%, respectively. According to the Council's June 22 bulletin, the rainfall and cooler weather of mid-June provided some temporary relief for most of the State, however, streamflows were already returning to below normal and significant rainfall deficits remain. Toward the end of June rainfall in the western part of the state returned stream flows to normal.

According to the Council, the summer outlook calls for above normal temperatures and near normal rainfall. However, continuing La Niña effects may mean a return to drier than normal conditions this fall and winter.

People

David S. Vogel has been named director of the N.C. Division of Soil and Water Conservation. Vogel was previously Soil and Water Conservation Administrator in the Florida Department of Agriculture and Consumer

Services. He replaces Dewey Botts, who was appointed Assistant Secretary for Natural Resources in the N.C. Department of Environment and Natural Resources in December.

Alan Clark, who previously coordinated basinwide planning for the N.C. Division of Water Quality (DWQ), is now Supervisor of the Management Planning and Development Unit within DWQ's Water Quality Planning Branch. He serves as the state's nonpoint source program coordinator and supervises staff responsible for developing the Neuse and Tar-Pamlico NSW rules, administering of the 319 Program and coordinating the Unified Watershed Assessment program.

Darlene Kucken has replaced Alan Clark as Supervisor of Planning and Assessment within DWQ.

Tom Bean, formerly with the N.C. Wildlife Federation, is director of the new Upper Tar River Land Trust. This new land trust, which will focus on protecting significant aquatic resources in the Upper Tar River region, was established by the N.C. Coastal Land Trust with help from a Z. Smith Reynolds grant. The office will be in Rocky Mount.

Stuart Leavenworth, long-time environment and growth reporter for the *Raleigh News & Observer*, has returned to California to cover growth issues for the *Sacramento Bee*.

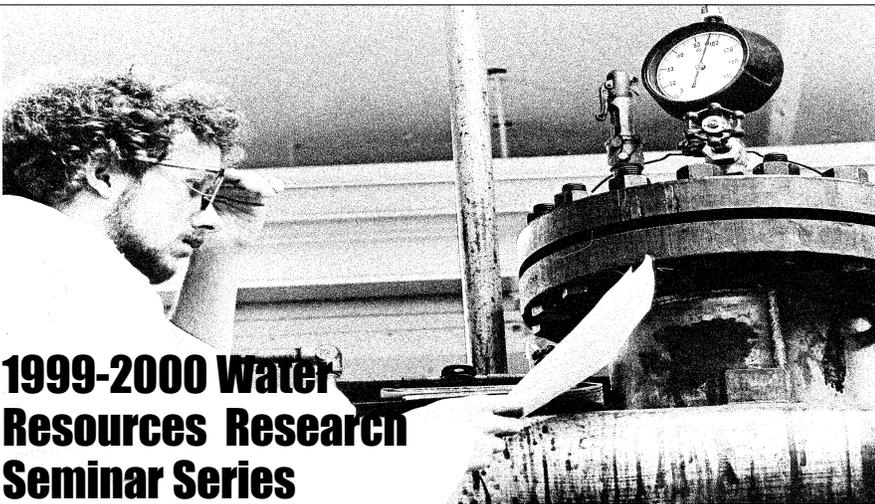
North Carolina Precipitation/Water Resources

	May	June
Rainfall (+/- average)		
Asheville	2.53" (-1.90")	4.39"(+0.16")
Charlotte	1.50" (-2.32")	4.02"(+0.63")
Greensboro	1.00" (-3.02")	4.26"(+0.45")
Raleigh	0.58" (-3.34")	1.16"(-2.52")
Wilmington	8.16" (+3.73")	3.91"(-2.07")

Streamflow Index Station (County, Basin)	May mean flow (CFS) (% of long-term median)	June mean flow (CFS) (% of long-term median)
Valley River at Tomotla (Cherokee, Hiwassee)	372 (156%)	361 (224%)
Oconaluftee River at Birdtown (Swain, Tenn)	715 (150%)	472 (118%)
French Broad River at Asheville (Buncombe, FB)	1,490 (66%)	1,190 (63%)
South Fork New near Jefferson (Ashe, New)	299 (61%)	222 (52%)
Elk Creek at Elkville (Wilkes, Yadkin/Pee-Dee)	60 (54%)	40 (44%)
Fisher River near Copeland (Surry, Yadkin/Pee-Dee)	157 (72%)	78.1 (50%)
South Yadkin River near Mocksville (Rowan, Yadkin/PD)	260 (76%)	113 (37%)
Rocky River near Norwood (Stanly, Yadkin/Pee-Dee)	663 (130%)	227 (35%)
Deep River near Moncure (Lee, Cape Fear)	927 (96%)	154 (28%)
Black River near Tomahawk (Sampson, Cape Fear)	575 (111%)	280 (67%)
Trent River near Trenton (Jones, Neuse)	135 (134%)	28.3 (34%)
Lumber River near Boardman (Robeson, Lumber)	1,741 (171%)	388 (46%)
Little Fishing Creek near White Oak (Halifax, Pamlico)	62.6 (58%)	16.9 (21%)
Potocasi Creek near Union (Hertford, Chowan)	25.4 (19%)	9.65 (11%)

Groundwater Index well (Province)	May depth below surface (ft) (departure from average for month)	June depth below surface (ft) (departure from average for month)
Blantyre (Blue Ridge)	28.60 (na)	5.83 (-1.14)
Mocksville (Piedmont)	16.55 (-0.75)	17.47 (-1.13)
Simpson (Coastal Plain)	6.01 (-1.42)	4.99 (+0.19)

Source: U.S. Geological Survey's *Water Resources Conditions in North Carolina*



1999-2000 Water Resources Research Seminar Series

Following is the tentative schedule for WRRI's continuing seminar series on water resources research in North Carolina. Presentations take place in the Ground Floor Hearing Room of the Archdale Building in downtown Raleigh or in Room 1132 of Jordan Hall on the N.C. State University campus. Presentations begin at 3 pm unless otherwise noted. This schedule is also posted on the WRRI website, and any changes will be posted there. (<http://www2.ncsu.edu/ncsu/CIL/WRRRI/2000seminars.html>) For additional information contact Associate Director Robert Holman at (919) 515-2815 or Robert_Holman@ncsu.edu.

Monday, Sept 20, 1999, Archdale
Remediation of
Groundwater Contaminated
by Industrial Solvents
*Professor Casey Miller, UNC-Chapel
Hill Dept Environmental Sciences
and Engineering*

Monday, Oct 11, 1999, Jordan
Network Analysis
for Evaluating the Consequences of
Nitrogen Loading
*Professor Robert Christian, East
Carolina University Dept Biology*

Monday, Nov 22, 1999, Archdale
Examination of Long-Term
Nutrient Data in
the Neuse River Watershed
*Professor Craig Stow, Duke Univ
Nicholas School of the Environment*

Tuesday, Jan 18, 2000, Jordan
Algal, Bacteria, and BOD
Responses to Nutrient Gradients in
Coastal Plain Watersheds
*Research Associate Michael Mallin,
UNC-Wilmington Center for Marine
Science Research*

Monday, Feb 21, 2000, Archdale
Predicting Long-term Wetland Hydrology
Using Hydric Soil Field Indicators
*Professor Michael Vepraskas,
NC State Univ Dept Soil Science*

Monday, Mar 27, 2000, Jordan
Soil Processes Impacting Groundwater
Quality in the North Carolina Piedmont:
Contamination by Organic
Agrochemicals
*Asst Professor Dharni Vasudevan,
Duke Univ Nicholas School of the
Environment*

Monday, April 24, 2000, Archdale
Impact of Sediment Processes
on Water Quality in
the Neuse River Estuary
*Asst Professor Marc Alperin, UNC-
Chapel Hill Dept Marine Science*

Monday, May 22, 2000, Jordan
Benefits of Quality Improvements in
N.C.'s Water Resources
*Asst Professor Dan Phaneuf,
NC State Univ Dept Agricultural and
Resource Economics*

Publications

Getting Started on TMDLs is a 96-page document intended to serve as an introduction to the science, policy, and societal elements of the Total Maximum Daily Load (TMDL) program. This white paper, sponsored by YSI Incorporated as a public service, was written by environmental scientist and TMDL expert Dr. Wesley Jarrell. To download the paper from the YSI website, go to <http://www.ysi.com> and click on Environmental.

The U.S. EPA has published online materials prepared for and from its April 20 public meeting on *Effluent Guidelines for the Construction and Development Industry*. Available are a Briefing Package and a Question and Answer sheet. Also available at the website are background documents on the rulemaking, including a schedule. Go to <http://www.epa.gov/ost/guide/construction/>

The April 15 issue of *Marine Ecology Progress Series* (Vol 179:301-310, 1999) includes a "Comment" authored by JoAnn M. Burkholder, Michael A. Mallin and Howard B. Glasgow, Jr. in which they dispute the assertion in a 1998 article by Hans Paerl and others (*Mar Ecol Prog Ser* 166:17-25) that finfish kills in the Neuse River were the result of hypoxia or anoxia. Burkholder et al. assert that kills of surface-schooling fish in the Neuse should not be attributed to low or no oxygen in bottom water but are more likely the result of the toxic *Pfiesteria* complex.

Web Sites

Checking on local drought conditions just got easier thanks to a new online service from the U.S. Geological Survey. The new service (located at http://water.usgs.gov/dwc/national_map.html) provides a color-coded map of current stream flow conditions around the country.

The N.C. Department of Environment and Natural Resources announced in June that it

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Neuse Education Team Storm Water BMP Tours

In October, the N.C. Cooperative Extension Service's Neuse Education team will conduct two tours of storm water best management practices (BMPs) useful to developing communities.

Friday, October 8, 1999 Coastal Plain Storm Water BMP Tour

The tour will start in Goldsboro and will include sites in Johnston, Wilson, Lenoir, and Craven counties.

Wednesday, October 27, 1999. Piedmont Storm Water BMP Tour

The tour will start at the Jane S. McKimmon Center in Raleigh and will include sites in Orange, Durham, and Wake counties.

(This tour will be held the day following the Neuse Conference '99: Partnerships in Progress)

Cost of the tours is \$15. For information contact Bill Hunt, Cooperative Extension Specialist, at N.C. State University. Bill_Hunt@ncsu.edu; (919) 515-6751.

Web Sites *continued*

will place **information about environmental fines** on the Internet. DENR will provide monthly updates on civil penalties assessed by the following divisions: Land Resources, Water Quality, Air Quality, Environmental Health, Waste Management and Coastal Management. The website address is <http://www.enr.state.nc.us/ENR/novs/>.

Consumers concerned about the **safety of bottled water** might want to read a recent news release by the National Sanitation Foundation on the subject: <http://www.nsf.org/press/bottledwaterstudy.html>. NSF also makes available online a list of bottled water companies that it has certified

as meeting high consumer and health standards: http://152.160.209.3/listings/Bwselect_inf.cfm.

The **N.C. Division of Land Resources** has a new web site providing access to information about the **N.C. Mining Program, the N.C. Dam Safety Program and the N.C. Erosion and Sediment Control Program**: <http://www.dlr.enr.state.nc.us>.

The UNC-CH Environmental Resource Program has constructed a website featuring information about the **public health issues and regulation of intensive swine operations**. Go to http://checc.sph.unc.edu/rooms/library/hogpage/hogsite.htm#health_directors

North Carolina Water Resources Association

NCWRA

North Carolina Section of the American Water Resources Association

Luncheon and Forum Schedule

Sept 13, 1999	Storm Water: NPDES Phase II
Dec 6, 1999	Cape Fear Basin: Water Quantity Issues
Feb 14, 2000	Mitchell River Watershed: Case Study
April 10, 2000	Capacity Use
Sept 11, 2000	Land Use Planning

All luncheon/forums take place at 11:30 am at the Jane S. McKimmon Center on the N.C. State University campus. For additional information call Robert Holman at WRRRI (919/515-2815).

WATER RESOURCES RESEARCH INSTITUTE OF THE UNIVERSITY OF NORTH CAROLINA

BOX 7912
NORTH CAROLINA STATE UNIVERSITY
RALEIGH NC 27695-7912

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