Water Resources Research Institute News
of The University of North Carolina

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Kelly Porter joins WRRI as Environmental Education and Communications Coordinator

In October WRRI will launch a new initiative to improve electronic communications and expand educational offerings for environmental professionals in North Carolina when it welcomes Kelly Porter to the staff. Kelly joins WRRI in a new position created when Jeri Gray retired as Assistant Director for Information and Communications.

Kelly brings to WRRI considerable experience in web development, which she will put to work revamping and improving the WRRI website. She will also manage and maintain the WRRI-News list serve and will be the point person in convening the WRRI Annual Conference. In addition, she will organize other environment-related seminars, workshops, and conferences and will work closely with WRRI staff to develop, organize, and support educational programs for environmental professionals.

Kelly earned a BS in forestry from the State University of New York (SUNY) and an MS in forestry from NC State University. Her graduate research project was directed by Drs. H. Lee Allen and Robert C. Kellison and focused on productivity and leaf area relationships in southeastern hardwood plantations.

From 1999-2000 she worked with the N.C. Division of Soil and Water Conservation (DSWC) as Environmental Specialist, assisting in implementing the Conservation Reserve Enhancement Program. She helped coordinate the First Annual National Conservation Reserve Enhancement Program Conference and the 1999 USDA Forest Service research conference. She also maintained the DSWC web site.

For more than two years, Kelly has been Internet and Communication Specialist with Triangle Solutions, Inc. in Raleigh. There she was responsible for the company's web site and newsletter.

WRRI is excited about the potential that Kelly brings for enhancing our services to the community of environmental scientists and professionals in North Carolina.

Kelly Porter, WRRI Environmental Education and Communications Coordinator

In this issue **September/October 2300**

Director's Forum

University-government collaboration benefits State's environment

Jeri Gray, Assistant Director for Information and Communications (retired), WRRI

Because connecting universities with public agencies involved in water resource management is a core mission of WRRI, it has been my distinct good fortune to work at the interface between academia and management agencies and to observe the many ways in which they work together. While I don't know that the extensive collaboration between universities and environmental and natural resource management agencies is unique to North Carolina, I certainly believe it is a major reason that North Carolina historically has been and continues to be ahead of the curve in many areas of natural resource protection and management. This relationship should be acknowledged and celebrated.

The WRRI Annual Program included in this issue illustrates one of the most important ways in which universities and agencies collaborate—research targeted to specific agency needs. The link that WRRI has established between universities and agencies means that research funded by WRRI supports management decision making. Directors of several divisions of the Department of Environment and Natural Resources (DENR) are members of the WRRI Advisory Committee. They bring their management problems and insights into emerging problems to the WRRI priority-setting process, and the institute solicits research to address those problems.

On projects funded by the N.C. Water Quality Workgroup through WRRI, university faculty and personnel of the Department of Environment and Natural Resources actually work side by side on projects. Some of these are also described in the Annual Program.

But research collaborations managed by WRRI are just a small part of the beneficial interactions between universities and agencies.

In a similar process, the UNC Sea Grant College Program brings the expertise of university scientists to bear, through research and technical outreach, on resource issues along the North Carolina coast.

Under grant programs managed by the Department of Environment and Natural Resources—such as the Clean Water Act 319 program—agencies can have university experts test ideas and technologies. Our Annual Program also includes an example of this.

Moreover, at campuses across the state, scientists win funding from federal agencies, foundations, and other organizations to conduct water-related research. Some of this research is also targeted to local resource problems and provides valuable information to management agencies.

Universities also collaborate with agencies on development of management tools and technologies. For instance, DENR turned to faculty in the NCSU Department of Soil Science to develop the nitrogen and phosphorus loss assessment tools without which the Neuse and Tar-Pamlico nitrogen reduction strategies could not have been implemented. University researchers are also working to develop new sedimenta-

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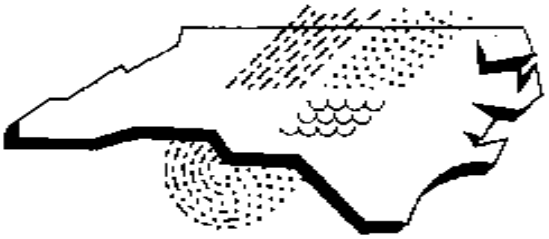

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tion control and stormwater control technologies that agencies can offer to the development community to meet regulatory requirements.

Individual university faculty make enormous contributions to environmental and resource management through public service. Faculty bring their expertise to the Environmental Management Commission, the Sedimentation Control Commission, the Coastal Resources Commission, the Wildlife Resources Commission, the Marine Fisheries Commission, and other regulatory bodies. University scientists are especially effective on regulatory commissions because they are trained to be objective and, being accustomed to the culture of Academe, tend to call it as they see it. University faculty also bring their expertise to licensing and certification boards such as the Water Pollution Control System Operators Certification Commission.

University faculty serve on untold numbers of technical advisory committees that provide scientific expertise for development of policies and practices adopted by environmental agencies. These committees function very much off the radar screen, so collaborative work of this kind is usually unrecognized.

University faculty also provide expert advice to management agencies under legislative mandate. It is not unusual for the General Assembly to direct an agency to conduct a study of an issue and provide that the agency may call upon any university experts they need. Sometimes agencies are even directed to confer with certain university departments.

Many doors are open between North Carolina universities and agencies responsible for environmental and resource management. These connections are of great value and should be maintained and used to the fullest extent.

As many readers of this newsletter already know, I have retired after 17 years with WRRI. I'll continued to provide material for the WRRI News for some time, but as of October 27, the duties of my position are in the capable hands of Kelly Porter. My sincerest thanks to all those who have sent me notes and emails and spoken to me personally.

Rejection of stormwater rules could trigger separation of powers challenge

Is it a violation of the separation of powers provision of the North Carolina Constitution for the General Assembly to delegate veto power over executive branch rules to an independent commission that it appoints? If a showdown that appeared in September to be developing between the N.C. Rules Review Commission (RRC) and the N.C. Environmental Management Commission (EMC) materializes, the N.C. courts could be asked to answer that question.

The legislative, executive, and supreme judicial powers of the State government shall be forever separate and distinct from each other.

North Carolina State Constitution Article 1, Section 6.

At the conclusion of the September EMC meeting Commissioner Dan Besse told the rulemaking body, " If the Rules Review Commission insists on major policy changes to the stormwater rules, I would ask the EMC to consider undertaking litigation on the question of constitutionality [of the RRC's authority to veto administrative rules]."

Besse asked EMC Counsel Frank Crawley to examine the question of RRC authority and the EMC's options for a challenge. His request came in response to a report from staff of the Division of Water Quality (DWQ) that RRC may reject permanent rules approved to implement the federal NPDES Stormwater Phase II program on the basis that they are unclear and ambiguous and that parts of the rules could be rejected on the basis that the EMC does not have authority to adopt them.

The RRC had been expected to act on permanent rules to implement the federally mandated stormwater program at its August 21 meeting but accepted a staff recommendation to extend the period of review. However, two commissioners publicly expressed opinions challenging EMC authority—one questioning authority to require local governments to adopt rules and one questioning authority to adopt rules "taking away property rights." The RRC is now scheduled to take up the Stormwater Phase II rules at its October 16 meeting. (See report page 9.)

RRC staff has suggested to DWQ staff that, to make them clear and unambiguous, the NPDES Phase II Stormwater rules need to be separated into several pieces. Commissioner Charles Peterson cautioned that breaking up the rules into several packages could result in some parts being approved and other parts being vetoed. Peterson, who is chair of the EMC's Water Quality Committee, has repeatedly said that for fairness and effectiveness, the rules must be implemented as one package.

A precedent: *Wallace v. Bone*

Rejection by the RRC of the stormwater rules could set the stage for the second challenge by the EMC to the North Carolina General Assembly's exercise of legislative control over administrative rules. The first challenge—*Wallace v. Bone*—came in 1982. A review of the consequences of that case and subsequent actions by the General Assembly may help explain the current relationship between the Rules Review Commission and executive branch boards and commissions such as the EMC and the

continued page 4

Separation of powers
continued

possible bases for litigation by such rulemaking bodies.

In 1980, the General Assembly passed an act requiring the appointment of four legislators to the Environmental Management Commission. In 1981, with four legislators appointed and serving, gubernatorial appointee James C. Wallace filed a legal petition and request seeking to have the statute that added legislators to the commission declared unconstitutional on the basis that it violated the separation of powers provision of the State Constitution. In Superior Court, the judge concluded that legislators may serve on the EMC without violating the separation of powers provision if there is no evidence of an attempt to usurp functions of the executive branch. The case then went directly to the N.C. Supreme Court, which ruled to the contrary— that legislators cannot constitutionally sit on the EMC.

The decision in *Wallace v. Bone* applied directly only to the EMC, but the Supreme Court's interpretation had implications for dozens of other executive branch boards and commissions on which legislators served. The decision also had implications for a number of legislative committees and commissions which, by statute, had been given direct control over the state employees and teachers hospitalization and medical insurance program, receipt and expenditure of federal block grants, and transfer of more than 10% of appropriated funds from any line item of the state budget. Also implicated was the legislative Administrative Rules Review Committee, which had been authorized to suspend regulations issued by state agencies and departments.

In the months that followed the decision in *Wallace v. Bone*, the N.C. Attorney General and the N.C. Supreme Court issued advisory opinions on the unconstitutionality of several of the legislature's practices, and legislative leaders established the joint House-Senate Committee on Separation of Powers to address constitutional questions. As a result, the Separation of Powers Act of 1982 prohibited legislators from serving on 32 boards and commissions (including the EMC) and instead provided that the full General Assembly would appoint non-legislators to these bodies. Another act removed the legislative Administrative Rules Review Committee's power to delay administrative rules. (Budget powers and other encroachments on administrative responsibilities were also addressed.)

Evolution of the RRC and its authority

In 1983 the General Assembly created the Governor's Administrative Rules Review Commission (GARRC) with ten members – four appointed by the Governor and six by the General Assembly (Session Law 1983-927). Funds appropriated for the legislative Administrative Rules Review Committee were transferred to the Office of the Governor for the GARRC and the commission was authorized to delay permanent rules and veto temporary rules. This attempt at legislative/executive cooperation apparently did not work out.

In 1985, the General Assembly replaced the GARRC with the Administrative Rules Review Commission (ARRC). The ARRC had eight members, all appointed by the legislature upon recommendation of the Speaker of the House and President of the Senate (Session Law 1985-1028). The ARRC was given the responsibility of reviewing rules adopted by State agencies to determine whether they (1) are within the authority delegated to the agency by the General Assembly, (2) are clear and unambiguous, (3) are reasonably necessary to enable the administrative agency to perform a function assigned to it by statute or to enable or facilitate the implementation of a program or policy in aid of which they were adopted.

The law provided that agencies could file rules over the objection of the commission but that the objection must be noted when the rule was filed. The RRC could send a report of its objection to the General Assembly, which could then enact legislation disapproving the rule.

Session Law 1987-1111 made the ARRC an independent agency under Article 111, Section II of the State Constitution. Session Law 1991-418 dropped "administrative" from the title of the commission to designate it as it is now known—Rules Review Commission. That law extensively revised the Administrative Procedure Act (APA) but retained the provision allowing agencies to file rules over objection of the RRC.

By the mid 1990s, commissions had filed a number of rules over objection of the RRC. In 1994, the Wildlife Resources Commission filed rules for designating critical habitat for threatened and endangered species over the RRC's objection. "Aggrieved parties" expressed displeasure to the General Assembly and filed a request for declaratory judgment in Wake Superior Court as provided by the APA. By that time, resentment of the burden of federal and state regulations was running high among businesses and local governments. Numerous bills to accomplish "regulatory reform" were introduced in the U.S. Congress and the N.C. General Assembly.

In 1995, no fewer than seven bills were introduced in the General Assembly to slow the pace of rulemaking in one way or another. Session Law 1995-507 (The Expansion and Capital Improvements Act of 1995) incorporated provisions of several of those bills. It required agencies to develop fiscal notes for rules having an economic impact of $5 million in a 12-month period before publishing rule text in the *North Carolina Register*. It strengthened the role of the RRC by providing that rules objected to by the RRC and not changed to satisfy objections could not be codified. It also strengthened control of the legislature over administrative rules by creating the Joint Legislative Administrative Procedure Oversight Committee to review rules and providing that rules—even those approved by the RRC—could not become effective until the legislature had

an opportunity to consider a bill disapproving the rule. It also again revised the APA, most significantly to require publication of notice of rulemaking and comment prior to publication of rule text. It became possible for two years to pass between the time a rule was introduced and the time it became effective.

However, temporary rules did not have to be reviewed by the RRC. Agencies were permitted to adopt temporary rules only if they were required by one of the following: (1) A serious and unforeseen threat to the public health, safety, or welfare. (2) The effective date of a recent act of the General Assembly or the United States Congress. (3) A recent change in federal or State budgetary policy. (4) A federal regulation. (5) A court order. (A sixth pertained only to the State Medical Facilities Plan.) The Codifier of Rules was given the job of deciding whether the criteria for temporary rules were satisfied, but if the codifier objected and the commission or agency resubmitted the rule, it became effective anyway.

In a 1995 interview with the *Wall Street Journal*, Office of Administrative Hearings (OAH) Director Julian Mann predicted the effect of the new rulemaking requirements (then proposed) would be a deluge of temporary rules, and RRC Director Joseph DeLuca worried that requiring legislative approval would clog the process without reducing the number of rules.

Whether nor not OAH was deluged with temporary rules, the EMC did adopt at least 24 temporary rules between 1995 and 2003. Many, if not most, were authorized or required by the General Assembly to enable the EMC to bypass the required rulemaking process to get legislatively mandated programs into place. However, a few controversial temporary rules (Neuse and Tar-Pamlico buffer rules and the isolated wetlands permitting rules implemented over the objection of the Codifier) angered property owners and the business community.

In its 2003 session, the General Assembly passed HB 1151 (Session Law 2003-229) again amending the APA to revise the rulemaking process. (See July/August 2003 *WRRI News*, EMC report.) This legislation gives the RRC the authority to veto temporary rules as well as permanent rules.

With passage of HB 1151, few agencies or commissions** can implement either a temporary or permanent rule without approval of the RRC. Even RRC approval does not guarantee that a rule will be implemented, as it cannot become effective until the General Assembly has had an opportunity to review and disapprove it.

Back to the future?

In March 1982 in the wake of the *Wallace v. Bone* decision, a senior deputy attorney general told the legislature's Administrative Rules Review Committee that, in his opinion, its power to delay regulations issued by state agencies and commissions was unconstitutional. It would appear that with the 1995 legislation requiring legislative approval (or at least lack of disapproval) for rules to become effective, the same separation of powers issue that existed in 1980 exists today.

The constitutionality of the "legislative veto" has not been directly challenged in North Carolina, and according to EMC Commissioner Dan Besse, "I will be interested to know what the Attorney General's office has to say about that."

*** Exceptions to statutes establishing a uniform system of administrative rule making and adjudicatory procedures are found in Chapter 150B, Article 1 of the General Statutes and include in full: (1) The North Carolina National Guard in exercising its court-martial jurisdiction. (2) The Department of Health and Human Services in exercising its authority over the Camp Butner reservation. (3) The Utilities Commission. (4) The Industrial Commission. (5) The Employment Security Commission. Other agencies are provided partial exceptions.*

But said Besse, there are two more likely theories under which constitutionality of RRC authority could be challenged:

"The fact that the RRC is an entirely legislatively appointed entity acting in an executive role with final authority over administrative rules appears to violate the separation of powers doctrine," he said.

And said Besse, "Even if you agree that vetoing administrative rules is an appropriate legislative function, it could be argued that what the legislature has done with the RRC is improperly delegate authority to a sub-entity."

Session Law 2003-229 provides that if a rulemaking body decides not to change a rule to meet objections of the RRC and the RRC returns the rule (essentially vetoing it), the rulemaking body may file an action for declaratory judgment in Wake County Superior Court. This provision opens the door to the courts for the EMC, which could then raise the question of constitutionality of RRC authority. Whether or not the EMC pursues this course of action, Commissioner Dan Besse believes that the RRC's authority will eventually be challenged.

"It is inevitable that some rulemaking body prevented from carrying out its responsibilities will turn to litigation," said Besse.

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September, October action of the N.C. Environmental Management Commission

The N.C. Environmental Management Commission did not meet in August. At its regular meeting on September 11, 2003, the commission took the following action:

■ Confirmed the reappointment of C.L. Gobble, Wayne Bryant and John Boykin and the appointment of Karl Shaffer as members of the Water Pollution Control System Operators Certification Commission. Shaffer, an extension associate with the NCSU Department of Soil Science, replaces Dr. Don Francisco of UNC-Chapel Hill, who is retiring.

■ Approved an $18 million supplemental loan from the Clean Water State Revolving Fund for the City of Wilson for improvements to its wastewater treatment system.

■ Approved a temporary rule and approved proceeding to public hearing with a permanent rule to codify the Swift Creek Outstanding Resource Waters reclassification and management strategy established by the 2003 N.C. General Assembly in House Bill 566. In July 2002, the EMC had approved reclassifying Swift Creek (Edgecombe, Franklin, Nash, Vance and Warren counties in the Tar-Pamlico River Basin) to Class C Outstanding Resource Waters/Nutrient Sensitive Waters (NSW), Class C NSW+ and Water Supply IV NSW+. While only part of the Sandy-Swift Creek watershed was reclassified to ORW, the same management strategy was applied throughout the watershed to protect populations of the threatened Tar River Spineymussel and the Dwarf Wedgemussel. According to Tom Reeder, Supervisor of the Classifications and Standards Unit of the Division of Water Quality (DWQ), this watershed has the greatest concentration of these federally listed endangered freshwater mussels in the state. The management strategy was put into place to comply with the Clean Water Act which requires states to protect existing uses of waterbodies. Reeder said that none of the 13 local governments affected by the management requirements objected and that of 30 written comments received during the public comment period, only three objected. Nevertheless, the General Assembly passed House Bill 566 in August 2003 prohibiting implementation of the management strategy in waters and lands located east of Nash County State Road 1003. The EMC is to reconsider options to protect endangered species in this area of the watershed and make recommendations to the 2004 regular session of the General Assembly. For information on the public hearing for the permanent rule contact Reeder (Tom.Reeder@ncmail.net).

■ Approved reclassifying a section of He Creek, Jerry Branch, and Henry Fork (Burke County, Catawba River Basin) from Water Supply (WS) I to WS V. The City of Morganton and Burke County requested the reclassifications. All the waters retain the ORW classification.

■ Approved delegating authority to permit gravity sewers, pump stations, and force mains that connect to their sewerage system to the Fayetteville Public Works Commission.

■ Approved delegating authority to permit sewer extensions within their utility service area to the City of Concord.

■ Approved amendments to the NPDES Stormwater Phase II rules in response to comments from staff of the Rules Review Commission (RRC). The commissioners approved some technical changes and replaced language on "vested rights" that was added to the rules after the public hearings with the original language that went to public hearing. RRC staff advised that the changes made after public hearings were major and not consistent with the Administrative Procedure Act. Commissioner Kevin Martin noted that the "vested rights" language had been added in response to public comment and was added to take the burden of proof off property owners and avoid the kind of problems that have arisen with Neuse and Tar-Pamlico buffer rules. DWQ staff are to prepare a new general rule on vested rights to be considered in December.

■ After lengthy discussion upheld the decision of an Administrative Law Judge (ALJ) in a contested case, *Citizens Against the Asphalt Plant, a Chapter of the Blue Ridge Environmental Defense League, Inc. v. DENR and John L. Pace Enterprises, Inc, Intervenor*. The petitioners challenged an air permit issued to Tar Heel Paving for an asphalt plant in Hendersonville contending—among other things—that, in modeling emissions from the plant, the Division of Air Quality (DAQ) had not included some sources of formaldehyde that it should have. The ALJ had issued summary judgment upholding issuance of the air permit. In EMC discussion of the case, it emerged that, in fact, emissions from a "combustion source" had not been included in modeling but that the source is exempt under the rules and will not be subject to MACT (maximum achievable control technology) rules for many years. That realization concerned several commissioners until they concluded that, while the source is not subject to MACT requirements, ambient air quality standards can be enforced to prevent health threats from the asphalt plant and that DAQ had

performed studies to ensure that the plant did not pose a threat.

■ Upheld an ALJ's decision upholding a civil penalty of $5,061.24 against Joe Fred Ledbetter of Stanly County for failure to correctly close two underground storage tanks.

At its October 9, 2003, meeting, the EMC took the following action:

■ Approved county-level implementation strategies for achieving the Tar-Pamlico agriculture rule's 30% nitrogen reduction goal. The strategies were developed by Local Advisory Committees and approved by the Tar-Pamlico Basin Oversight Committee. According to DWQ's Rich Gannon, agricultural producers in the Tar-Pamlico Basin achieved a 34% reduction in nitrogen loss from fields between 1992 and 2001. The decrease was due to decreases in fertilization rates, a shift from corn to cotton production on large acreages, crop acreage reductions, and BMP implementation. Some counties near the estuary did not accomplish a 30% reduction, and these counties will be a focus of efforts in the coming year. During discussion of the Tar-Pam local nitrogen reduction strategies, staff of DWQ informed the EMC that the Bush administration has proposed to eliminate all funding under the Clean Water Act Section 319 program for agricultural nonpoint source control. Staff requested that the EMC adopt a resolution urging the North Carolina congressional delegation to support continuation of the 319 funding. Water Quality Committee Chairman Charles Peterson noted that a significant portion of the funding for efforts to reduce agricultural nitrogen losses in both the Neuse and Tar-Pamlico River Basins have come through the 319 program. The EMC adopted the resolution unanimously. It is printed in its entirety on page 8.

■ Approved changes to the Catawba River Basin riparian buffer rules in response to objections by the RRC. The commission approved reverting to original language on vested rights after the RRC ruled that language on vested rights adopted after public hearing amounted to a major change and was not in compliance with the Administrative Procedure Act.

■ Discussed for nearly two hours an ALJ's ruling in a contested case, *Ronald Gold Overcash v. DENR.* Overcash had been fined nearly $126,000 for violations of rules governing management of underground storage tanks (USTs) at four locations, and the ALJ had upheld the fines. Discussion revolved around whether fines for failure to install corrosion protection should be reduced for the years in which it appeared DENR might have indicated that the tanks were in compliance. Because inspection documentation did not clearly state that the tanks were in compliance with corrosion protection requirements, commissioners decided—after two failed amendments to the motion—to uphold the ALJ.

■ Upheld an ALJ's decision in *Lawndale Service Center, Inc. C. Valley v. DENR* to uphold penalties assessed for violation of UST rules. No one was present for the petitioner.

■ Heard the annual progress report on implementation of the Neuse agricultural rule. DWQ's Lin Xu reported that in 2002 agricultural producers in the basin as a whole achieved a 37% reduction in nitrogen export from the 1991-1995 average baseline. (The goal is a 30% reduction.) Nitrogen reduction in 2001 was 36%, so 2002 saw an increase in nitrogen export from agricultural fields, largely because acreage shifted from corn to cotton or soybeans earlier was shifted back to corn, which has a higher nitrogen application rate. There was 10% more acreage in corn in 2002 than in 2001.

September, October action of the EMC's Water Quality Committee

At its regular meeting on September 10, 2003, the N.C. Environmental Management Commission's Water Quality Committee took the following action:

■ Approved Water Supply Watershed Protection ordinances for the City of Burlington and Pender, Person and Wilkes counties.

■ Approved changes to the Swift Creek reclassification/management strategy rules (see EMC report).

■ After another lengthy consideration of a request for a major variance from the Neuse River Riparian Area Protection Rule for Al Hunter of Raleigh (see Water Quality Committee report in July/August 2003 WRRI News), granted the variance but required payment of the full mitigation cost. The decision made no one happy, as neighbors of the proposed project (in attendance) hoped to see the variance denied, and the applicant hoped to reduce the amount he had to pay into the Riparian Buffer Restoration Fund by providing nitrogen reduction beyond that required by the Neuse nitrogen reduction rules. The discussion—and denial of neighbors' request to speak—raised questions about how third parties can be notified about and intervene in major variance requests. Chairman Charles Peterson noted that a procedure for third party intervention might be appropriate for the committee to consider, with Commissioner Anne Barnes adding "before another variance request gets to us."

At its meeting on October 8, 2003, the Water Quality Committee took the following action:

continued page 8

Water Quality Committee *continued*

■ Approved a revised Water Supply Watershed Protection Ordinance for the Town of Garner. In 1995, the EMC approved allowing high density development in the town on the understanding that a regional stormwater pond would be constructed. However, the regional pond has not been built and it appears that it will not be. The new Garner ordinance requires that new high density development must have on-site stormwater management. The town has agreed to a schedule to retrofit development that was supposed to utilize the regional pond with on-site controls.

■ Approved sending the draft Tar-Pamlico River Basinwide Water Quality Plan to public meetings. Meetings will be held in December. For information contact Cam McNutt (cam.mcnutt @ncmail.net). The Tar-Pam basinwide plan will be the first in which support ratings will be assigned using criteria for swamp waters.

■ Approved sending local strategies for nitrogen control developed by Local Advisory Committees under the Tar-Pamlico Agriculture Rule to the EMC (see EMC report). As he has previously, Chairman Charles Peterson expressed concern about who is responsible for accounting for nitrogen reduction on agricultural land that is developed. Conversion of agricultural lands to other uses accounts for part of the reduction in nitrogen export from agricultural lands. But, when agricultural land is developed, stormwater runoff and nitrogen loading is likely to increase. Peterson asked staff to examine the rules to determine how the likely increase in nitrogen export from land conversion is accounted for.

■ Heard the annual progress report on implementation of the Neuse Agriculture Rule (see EMC report).

ENVIRONMENTAL MANAGEMENT COMMISSION
NORTH CAROLINA DEPARTMENT
OF ENVIRONMENT AND NATURAL RESOURCES

RESOLUTION
Support for FY 2004 319 Federal Funding
to Address Agricultural Nonpoint Pollution Sources

WHEREAS, agricultural nonpoint source pollution is documented to be a major source of surface water degradation in North Carolina; and

WHEREAS, Congress has recently provided increased funding for installation of agricultural best management practices through the US Department of Agriculture (USDA) Environmental Quality Incentive Program (EQIP); and

WHEREAS, the Government Accounting Office (GAO) is recommending that most of the agricultural component of the Environmental Protection Agency's (EPA) Section 319 Clean Water Act funding be eliminated because of a perception of program overlap between the USDA and the EPA programs; and

WHEREAS, the North Carolina Environmental Management Commission (EMC) disagrees with the perception that this would result in overlap of federal funding, noting that Section 319 Clean Water Act agricultural nonpoint source program places priority emphasis on investigating where pollution originates, what cost-effective management practices to fund, how to direct federal funding to the most environmentally appropriate locations and to provide assessment of the water quality benefits of agricultural cost-share funding; and

WHEREAS, the federal Government Accounting Office's proposed holding back $42 million of FY 2004 319 funds will prevent states from accomplishing water quality improvements already identified and submitted through state grant applications; and

WHEREAS, the EMC notes that the recent funding of the EQIP program will not be sufficient to meet the Clean Water Act goals of restoring the quality of all streams degraded by agriculture in our state; and

NOW THEREFORE BE IT RESOLVED: that the North Carolina Environmental Management Commission believes that a joint effort of the Section 319 program and the USDA EQIP program is essential to achieve clean water goals and urges the North Carolina Congressional delegation to support the continued funding of the FY 2004 Section 319 grant program as was initially proposed.

Court says ditches are point sources

In July, the U.S. District Court for the Eastern District of North Carolina ruled that ditches that drain water from wetlands and discharge it into nearby waters are point sources of pollution and require a National Pollutant Discharge Elimination System (NPDES) permit. The ruling in summary judgment came in a lawsuit, *North Carolina Shellfish Growers Association, et al. v. Holly Ridge Associates, et al*., filed by the Southern Environmental Law Center on behalf of the Shellfish Growers Association and the N.C. Coastal Federation. The suit claims that wetlands drainage ditches constructed by Holly Ridge Associates were polluting Stump Sound, an area know for productive oyster beds. The court ruled that discharges from the ditches contained sediment, which is a pollutant under the Clean Water Act. The court also said that the drainage activity should have had an NPDES Phase I Stormwater permit required for construction and development sites larger than five acres.

Holly Ridge attorneys argued that the drainage activities were exempt silvicultural activities on forest lands. However, the court ruled that the Clean Water Act includes ditches in its definition of point sources and that since ditches are not nonpoint sources, the silvicultural activity is not exempt.

The decision is binding only in the Eastern District of North Carolina

According to Tripp van Noppen with the Southern Environmental Law Center, Holly Ridge attorneys have asked the court to reconsider the decision and, if that is denied, to "certify for immediate appeal" the ruling that the ditches are not exempt from Clean Water Act requirements.

Other issues related to CWA Section 404 permitting requirements are unresolved and will go to trial.

According to van Noppen, early in the case Holly Ridge attorneys had moved to dismiss the suit, contending, among other things, that the citizen suit provisions of the Clean Water Act violate the separation of power provisions of the U.S. Constitution. The U.S. Department of Justice (DOJ) intervened in the case to defend the constitutionality of lawsuits brought by private citizens to enforce federal environmental laws. DOJ lawyers argued that citizen suits are a valuable complement to federal enforcement and that ruling against them would have negative implications for all major environmental laws. The court ruled in 2001 that the citizen suits do not violate constitutional separation of powers.

Rules Review Commission objects to storm-water phase II rules

Shortly before the *WRRI News* went to press the N.C. Rules Review Commission (RRC) met and considered rules adopted by the Environmental Management Commission (EMC) to implement the federal NPDES Phase II Stormwater program (15A NCAC 2H .0126 and 15A NCAC 2H .1014). The RRC voted to object to both rules because the formatting creates ambiguity, because it is unclear whether certain parts are meant to apply to counties, and because the EMC lacks authority to require units of government that do not own or operate separate storm sewer systems to adopt stormwater ordinances or programs. The rules now go back to the EMC for changes that will satisfy the objections. The chair of the RRC said that there are additional issues of both ambiguity and authority that may be raised when amended rules are submitted.

U.S. Supreme Court will consider what constitutes addition of a water pollutant

The U.S. Supreme Court has agreed to hear in its current term a little publicized case that could make new law about what constitutes the "addition" of a pollutant under the Federal Water Pollution Control Act. In the case, South Florida Water Management District v. Miccosukee Indian Tribe of Indians, the Miccosukee Tribe asserts—and lower courts have agreed—that an NPDES (National Pollutant Discharge Elimination System) permit is required in order to transfer water from a canal to a water conservation area in the Everglades because the water from the canal has a higher phosphorus level than the water in the conservation area.

South Florida Water Management District (SFWMD) moves water from a canal through a levee into a conservation area to prevent flooding of a portion of Florida's populated Broward County. Both the canal and the conservation area are within the Everglades. SFWMD contends that in their rulings lower courts have misinterpreted Congressional intent in a section of the Clean Water Act and that requiring an NPDES permit for the water transfer would place restrictions on Everglades restoration. National and regional groups representing water and wastewater utilities and flood and stormwater management agencies have filed briefs supporting SFWMD's position.

The lower courts decision in Miccosukee follows an appeals court decision holding that when the New York City Department of Environmental Protection moves turbid drinking water from a reservoir through an 18 miles tunnel to a creek that flows to a larger reservoir, it "adds" a pollutant to the creek and that that action requires an NPDES permit.

WRRI reports available

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.

Assessment of Changing Land-Use Practices on Basin Sediment Yields and Provenance in Western North Carolina Using Multivariate Finger Printing Techniques

Report 345 June 2003

Jerry R. Miller, Larry Kolenbrander, Mark Lord, Steve Yurkovich, Department of Geosciences and Natural Resources Management, Western Carolina University

Sediment pollution of streams and sediment accumulation in reservoirs in the North Carolina mountains is widely acknowledged to be a major problem. It is generally assumed that most of the sediment impacts result from land-use alteration, particularly those associated with development activities. However, there have been few attempts to quantify the impacts of land-use alterations on upland erosion in the southern Appalachians. Particularly lacking is a coherent, quantitative understanding of (1) the natural rates of sediment production associated with "pristine" conditions, and (2) a quantitative assessment of the relative contributions of sediment to the region's water bodies from differing forms of land-use practices and rock types.

Because of problems associated with traditional approaches to calculating basin sediment yields, many investigators have turned to physical and geochemical fingerprinting techniques to determine sources of sediment. More recent investigations have relied on multiple fingerprinting parameters, more rigorous statistical methods, and sediment mixing models that allow a more accurate assessment of the relative contribution of material derived from source areas. When combined with studies of reservoir sedimentation, these methods can be extremely useful in determining the impact of land-use alterations on both sediment provenance and basin sediment yields.

In this project, investigators examined the use of geochemical fingerprinting techniques and sediment mixing models to determine if they can be effectively utilized in the steep terrain of western North Carolina. Specifically, the study sought to determine the relative contributions of sediment, at any given time, to Fairfield Lake near Cashiers in Jackson County from specific geologic units and delineated land-cover types (e.g., forests, roads, lawns, etc.). The authors believe this investigation is the first to apply these procedures in the southern Appalachians.

The Fairfield Lake Watershed is underlain by crystalline rocks of the Blue Ridge Geological province. The geology of the area, like much of the Blue Ridge Province of western North Carolina, is dominated by high-grade metamorphic rocks (the Tullaulah Falls Formation) that have been intruded by igneous plutons (the Whiteside Granite) during multiple episodes of mountain building.

The lake is 0.3 km^2 in areal extent and has a drainage area of 7.27 km^2. Treys Island Creek and its tributary, Long Branch, enter the north end of the Lake and provide the bulk of its inflow. The headwaters of Treys Island Creek and Long Branch flow off a high elevation plateau. Because of the low relief of the plateau, it is undergoing rapid residential development. In the west and southwest sections, the watershed topography moderates, yet the slopes remain steep. It is in these portions of the watershed that extensive residential development has taken place. Fairfield Lake was impounded in 1890 and contains a continuous sediment record of nearly 111 years.

The investigators collected a representative suite of rock samples from the Tullulah Falls Formation and the Whiteside Granite and subjected them to standard thin section analyses. Each sample was analyzed for 16 elements as well as two isotopes of selenium and 4 isotopes of lead. They also obtained and analyzed 19 cores from Fairfield Lake to determine the general depositional patterns that occurred during the past 111 years.

Stratigraphic data from the cores indicate that sedimentation within Fairfield Lake has been limited since dam closure in 1890. Most of the sediment that enters the lake is deposited near the mouth of tributaries, creating deposits on the order of 10 to 100 cm in thickness. Deep-water areas located along the axis of the reservoir that are removed from the direct influx of tributary sediment have received only limited debris.

Statistical treatment of geochemical data from sediments overlying the rock units suggest that they exhibit a unique geochemical fingerprint defined by copper, manganese, tin, uranium, and zinc. Similarly, materials from differing sediment sources within the Whiteside Granite, including forests, roads, lawns, and alluvial deposits along upland streams can be defined on the basis of silver, bismuth, chromium, manganese, molybdenum, nickel, antimony, tin, and zinc. Thus, results from linear discriminant analysis suggest that it is possible to use sediment mixing models to determine the quantity of material derived from differing lithologies or land-cover types.

The investigators developed a separate sediment mixing model using the parameters defined in the discrimi-

continued

The Economics of Structural Stormwater BMPs in North Carolina

Report 344 May 2003

Ada Wossink, Department of Agricultural and Resource Economics, and Bill Hunt, Department of Biological and Agricultural Engineering, NC State University

Stormwater best management practices (BMPs) are becoming commonly used throughout the United States. One of the questions facing design engineers and developers is what is the optimum practice to select for a particular watershed size, land cost, and target pollutant. In this report, the authors present an economic decision-making tool for choosing the best BMPs for North Carolina conditions given a particular size and type of watershed as described by curve number range, soil type, and pollutant type.

The costs of BMPs include both installment (construction and land) and annual operating costs (inspection and maintenance). Construction costs and annual operating costs were statistically analyzed for effects of scale by means of the estimation of BMP specific nonlinear equations relating the costs to watershed size. Structural stormwater BMPs require initial capital investments and annual operating costs. To estimate total economic impacts the Present Value of Costs approach was used. Annual costs were related to the area treated and to the removal effectiveness of the specific BMP for proper economic evaluation. BMPs examined were wet ponds, stormwater wetlands, sand filters, and bioretention/rain gardens.

Based on the analysis presented in this report, the following conclusions can be reached with respect to structural stormwater BMPs in North Carolina:

Costs per acre treated

- All BMPs, except for bioretention not in sandy soil, display economies of scale within the practice — the construction cost and the maintenance cost per acre treated decrease with the increase in the size of the watershed.
- There are large differences in the annual costs per acres treated between the BMPs analyzed.
- Based on the cost per acre treated, the installation of bioretention areas is to be preferred over sandfilters or wet ponds in smaller watershed where sandy soil prevails (less than 10 acres).
- A stormwater wetland is the least expensive BMP for larger watersheds and sandy soils (over 10 acres), assuming a stormwater wetland can be reasonably installed (i.e., access to dependable water sources is not an issue).
- For watersheds on non-sandy soil, bioretention is the most economical option up to about 6 acres followed by wet ponds for mid size watersheds and stormwater wetland for watersheds over 10 acres.
- Bioretention areas are substantially less expensive than sand filters except in extremely high land-cost situations. Similarly, stormwater wetland are substantially less expensive than wet ponds except in extremely high land-cost situations.

Removal efficiency

- No significant relationship could be assessed between removal efficiency and watershed size for the four BMPs analyzed.
- Pollutant removal rates for stormwater wetlands were lower than expected. In North Carolina it has been assumed that stormwater wetlands work substantially better than wet ponds in removing most types of pollutants. However, for TSS, TP, and NO_3, wet ponds and stormwater wetland function was found to be comparable.

Costs per percent pollutant removed

- Based on the cost per percent of total phosphorus and zinc removed, the

continued page 12

Multivariate Finger Printing *continued*

nant analysis to (1) assess the relative contributions of sediment derived from the different bedrock units that underlie the watershed, and (2) define the contributions of materials to the lake from four different upland sediment sources. The model was able to differentiate between bedrock sources reasonably well. However, it appears to have been unable to distinguish between sediment derived from the Tallulah Falls Formation and sediment from a micaeous, more mafic-rich unit of the Whiteside Granite.

Modeling of the relative contributions of sediment from forests, lawns, roads, and upland alluvium shows promise in that the model was able to define systematic changes in core geochemistry that are related to changing sediment sources. In addition, the estimated influx of sediment from roads and lawns generally coincides with the onset of land-use alterations as defined by cartographic information obtained from aerial photographs. However, the model appears to have overstated the contributions of sediment from lawns during periods of sediment influx from rocks with a Tallulah Falls type fingerprint. Moreover, it appears that the geochemical signal of lawns, roads, and forests may be muted by geochemical processes as the sediments are transported through upland streams to depositional sites within the lake.

The authors make several recommendations for improving the discrimination of upland sediment sources and for reducing the effects of elemental loss on mixing model results.

Economics of BMPs
continued

conclusion are similar to those based on cost per acre treated.

■ Based on nitrate, the conclusion is more mixed. Where the opportunity cost of land is very high (commercial use), a wet pond is preferable over a bioretention area for small watersheds (2 acres or less).

■ A comparison of BMPs by cost per percent of total suspended solids and total nitrogen removed was not possible because of lack of data.

Management

■ All BMPs need to be maintained, money should be set aside for maintenance up front. Approximate amounts can be determined from this study.

■ Watershed administrators should expect to see more bioretention areas designed and installed if small-scale practices are mandated.

Establishing Spatial and Temporal Trends of Atmospheric Nitrogen Deposition in Eastern North Carolina

Report SRS-23 December 2002

David R. Whitall and Hans W. Paerl, Institute of Marine Sciences, UNC-Chapel Hill

The Neuse River Estuary is an ecologically and economically valuable resource that exhibits symptoms of elevated nitrogen inputs from a variety of sources.

The objectives of this study were: (1) to quantify the spatial and temporal amounts and variabilities of wet atmospheric deposition of nitrogen (AD-N) in the Neuse River Basin; (2) to use these basinwide measurements of AD-N to calculate the relative importance of AD-N to the externally supplied or "new" nitrogen budget for the estuary; and (3) to quantify the temporal variability of ambient particulate and gaseous reduced nitrogen.

In a fifty-six month study from July 1996 to April 2001, the weekly wet deposition of inorganic and organic nitrogen was calculated at 13 sites on a northwest-southeast transect in the watershed.

Wet deposition was fairly evenly divided between nitrate (34%), ammonium (32%), and dissolved organic nitrogen (34%). Wet deposition varied between the seasons with the average weekly total nitrogen deposition (inorganic + organic) highest in the summer (June-August) and lowest in the winter (December-February); this was not driven by precipitation amount. There was also spatial variability in atmospheric deposition of nitrogen. In general, the middle portion of the basin received the highest total deposition on an annual basis.

Estimates of watershed nitrogen retention and in-stream riverine processing of atmospheric deposition of nitrogen showed that this flux contributed from 15% to 45% of the total "new" nitrogen input to the estuary, with direct deposition to the estuary surface accounting for 24% of the total annual atmospheric deposition of nitrogen flux and 5% of the total "new" nitrogen input.

Ambient atmospheric concentrations of gaseous ammonia and particulate ammonium were measured at 12-hour intervals at the Institute of Marine Sciences, Morehead City, NC. The average 12-hour concentrations of ammonia gas and particulate ammonium were 0.47 $\mu gN/m^3$ (S.D.=0.46) and 0.48 $\mu g/m^3$ (S.D.=0.41), respectively. Seasonally, ammonia concentrations are significantly higher in the summer and fall months. Total reduced N concentrations (gas plus particulate) are greatest in the summer. Gaseous ammonia dominates the total reduced N concentrations in the summer and fall, with particulate ammonium being more prevalent in the winter and spring. Modeled dry deposition velocities are needed to use these concentration measurements to calculate dry depositional fluxes.

The authors conclude that wet atmospheric deposition of nitrogen is an important source of "new" nitrogen to the Neuse Rive Estuary that needs to be considered in an integrated, basinwide nutrient management strategy.

Regional curves for N.C. Coastal Plain Streams

Regional curves for North Carolina Coastal Plain streams have been published in the August 2003 issue of the *Journal of the American Water Resources Association*. Details of the study are contained in a paper titled "Bankfull Hydraulic Geometry Relationships and Recurrence Intervals for North Carolina's Coastal Plain" by Billy Sweet and Jens Geratz of EcoScience Corporation. The paper presents bankfull hydraulic geometry relationships (regional curves) and recurrence intervals for the Southeastern Plain ecoregion and the flatwoods subtype of the Middle Atlantic Coastal Plain ecoregion found within N.C.'s Coastal Plain physiographic province.

The Coastal Plain regional curves will complement regional curves already developed for the Mountain and Piedmont regions of the state and will provide guidance for sizing bankfull geometry and discharge by drainage area. An abstract of the article can be found at the AWRA website: http://www.awra.org/jawra/papers/J02013.html. The full paper may be purchased there. Or the results can be found at www.ecosciencenc.com.

Studies

Study says ammonium aerosols should be examined

Ultra fine particles ($PM_{2.5}$) produced when ammonium reacts with other compounds in the air can invade the lungs and cause health problem as well as act to modify the Earth's radiation budget and thus influence the warming/cooling of the planet. The authors of an article published last year in *Atmospheric Environment*, say that given these concerns and the significance of domestic animals and agriculture to global ammonia emissions, more study should be devoted to the formation of atmospheric aerosols in agricultural areas.

In the article*, North Carolina scientists Wayne P. Robarge, John T. Walker, Ronald B. McCulloch, and George Murray report on their yearlong study of concentrations of ambient ammonia, ammonium aerosol, and acid gas at a site in the N.C. Coastal Plains. They collected chemical and meteorological measurements continuously from Oct 14 to Dec 18, 1998, and from Jan 20 to Sept 13, 1999, at the Clinton Horticultural Crops Research Station near Clinton, NC. Land at the site is used for yield trials on a variety of horticultural crops. There are three swine production facilities located between 1.5 and 3.2 km to the east/northeast and east/southeast of the site. There are also three swine production facilities between 3.2 and 5 km northwest of the site.

The scientists measured ammonia, ammonium, hydrochloric acid, chloride, nitrate, nitric acid, nitrous acid, sulfate and sulfur dioxide concentrations. The annual mean ammonia concentration measured was 5.5 μgm^{-3} and the mean summer concentration was 10.54 μgm^{-3}. By comparison, ammonia concentrations above a hardwood forest have been measured at 0.21 μgm^{-3} and above a grassland at 4.75 μgm^{-3}. Ammonia concentrations measured in this study are in agreement with the range of values and the annual mean value measured in studies in the Netherlands, which experiences the largest ammonia emission densities in Europe.

Ammonia itself does not last long in the atmosphere but is efficiently dry deposited to wet surfaces and vegetation within 24 hours. However, ammonia in the atmosphere can be converted rapidly to ammonium, which can react with sulfuric, nitric, and hydrochloric acids to form ammonium sulfate, bisulfate, nitrate, and chloride aerosols. These aerosols can stay in the atmosphere for days and travel hundreds of miles. They contribute to $PM_{2.5}$, which has significant health implications, and the various species of particulate matter act to scatter and/or absorb solar and terrestrial radiation

The scientists compared mean concentrations of chemicals measured in their study to South Central region mean concentrations measured by the EPA's clean air status and trends network. A lower concentration of nitric acid together with a higher nitrate concentration at the study site indicates that the formation of nitrate through the reaction of nitric acid with ammonia is not limited by ammonia availability to the extent experienced at sites in the regional network. Measurements also showed that, in general, there is sufficient ammonia present to almost completely neutralize sulfate to form ammonium sulfate.

Statistical analyses of ammonia concentrations and temperature revealed an exponential relationship—that is as temperature increases, ammonia concentrations increase exponentially, indicating that the source strengths of ammonia emissions increase exponentially. Therefore, the authors say, ammonia inventories may be improved by applying a seasonal correction factor to agricultural sources based on temperature.

The investigators also say that their demonstration that ambient ammonia concentration within an area of intensive animal and crop production is positively correlated with air temperature indicates the potential existence of a negative feedback between ammonia emissions and radiative forcing from ammonium nitrate and sulfate aerosols.

The investigators conclude that given the public health issues related to fine aerosol and the radiative properties of sulfate and nitrate aerosols, the formation of ammonium aerosols in agricultural regions should be examined in greater detail. Specifically, the emissions of ammonia from animal production facilities and fertilized soils needs to be better characterized, and ammonia deposition velocities for N.C. Coastal Plain ecosystems need to be experimentally determined to improve understanding of the relationships between deposition, ambient ammonia concentrations, and temperature.

*Wayne P. Robarge, John T. Walker, Ronald B. McCulloch, and George Murray. "Atmospheric concentrations of ammonia and ammonium at an agricultural site in the southeast United States." Atmospheric *Environment* 36(2002): 1661-1674. (Corresponding author: walker.johnt@epamail.epa.gov)

Macroalgae contribute to eelgrass decline

Scientists at Woods Hole, MA, conducted macroalgal enclosure/exclosure experiments within eelgrass populations in two estuaries (one with a low and one with a high nitrogen loading rate) to evaluate how increased macroalgal biomass affects density, recruitment, growth rate, and production of eelgrass. They documented lowered redox conditions and potential toxic concentrations of ammonium imposed by the presence of macroalgal canopies. They identified an approximate 9-12 cm critical macroalgal canopy height at which eelgrass declines. Hauxwell, Jennifer, Just Cebrian, Christopher Furlong, and Ivan Valiela. "Macroalgal canopies contribute to eelgrass (*Zostera Marina*) decline in temperate estuarine ecosystems. *Ecology* 82 (4): 1007-1022.

Private community water systems must do water supply planning

Legislation establishes Drought Management Advisory Council

In its 2003 session, the N.C. General Assembly passed House Bill 1062 which establishes the Drought Management Advisory Council within the Department of Environment and Natural Resources. The purpose of the council is to (1) improve coordination among local, State, and federal agencies; public water systems; and water users to improve the management and mitigation of the harmful effects of drought, and (2) provide consistent and accurate information to the public about drought conditions.

According to Woody Yonts of the N.C. Division of Water Resources, the new Drought Management Advisory Council has a broader role than the Drought Monitoring Council that it replaces. The new council is charged with crafting drought advisories to fit varying conditions in different parts of the state.

"This system will avoid the problems that some states have experienced in declaring drought warnings statewide, when conditions did not warrant it in all parts of the state," said Yonts.

The law also makes drought response provisions mandatory in local government water supply plans and extends water supply planning responsibility to all community water systems (including private systems) that serve one thousand or more connections or three thousand or more individuals.

People

John Dorney, Supervisor of the 401/Wetlands Unit in the N.C. Division of Water Quality (DWQ), was presented a special "Friend of Wetlands" Award at the Environmental Management Commission in September. The award was given by EPA Region 4. Dorney has spent two decades with DWQ and has been supervisor of the 401/Wetlands Unit for 12 years.

Conferences and workshops

Southeastern Regional Conference on Stream Restoration. June 21-24, 2004, Winston-Salem NC. Hosted by the North Carolina Stream Restoration Institute. This conference will showcase stream and wetland restoration efforts from Maryland to Florida. Details at http://www.bae.ncsu.edu/programs/extension/wqg/sri/2004_conference/index.html.

North Carolina Precipitation/Water Resources

	July	August
Rainfall (+/- average)		
Asheville	10.91 (+7.04")	6.80 (+2.50")
Charlotte	8.30" (+4.51")	10.35" (+6.63")
Elizabeth City	4.20" (-0.75")	4.22" (-0.38")
Greensboro	7.58" (+3.14")	9.22" (+5.51")
Raleigh	4.38" (+0.09")	8.57" (+4.79")
Wilmington	4.69" (-2.93")	6.33" (-0.98")

Streamflow **Index Station** (County, Basin)	**July mean flow (CFS)** (% of long-term median)	**August mean flow (CFS)** (% of long-term median)
Valley River at Tomotla (Cherokee, Hiwassee)	410 (332%)	202 (176%)
Oconaluftee River at Birdtown (Swain, Tenn)	580 (175%)	337 (110%)
French Broad River at Asheville (Buncombe, FB)	3,140 (231%)	2,540 (178%)
South Fork New near Jefferson (Ashe, New)	610 (179%)	598 (201%)
Elk Creek at Elkville (Wilkes, Yadkin/Pee-Dee)	220 (323%) Rcrd hgh mnth dschr	238 (433%)
Fisher River near Copeland (Surry, Yadkin/Pee-Dee)	381 (269%)	422 (383%)
South Yadkin River near Mocksville (Rowan, Yadkin/PD)	450 (192%)	398 (194%)
Rocky River near Norwood (Stanly, Yadkin/Pee-Dee)	2,320 (611%)	1,860 (594%)
Deep River near Moncure (Lee, Cape Fear)	1,650 (480%)	3,300 (880%)
Black River near Tomahawk (Sampson, Cape Fear)	3,310 (936%) Rcrd hgh mnth dschr	2,430 (651%)
Trent River near Trenton (Jones, Neuse)	695 (833%)	333 (487%)
Lumber River near Boardman (Robeson, Lumber)	2,880 (545%) Rcrd hgh mnth dschr	2,720 (438%)
Little Fishing Creek near White Oak (Halifax, Pamlico)	99.4 (223%)	197 (614%)
Potecasi Creek near Union (Hertford, Chowan)	89.6 (235%)	275 (556%)

Groundwater **Index well (Province)**	**July depth of water level below land (ft)** (departure from average for month)	**August depth of water level below land (ft)** (departure from average for month)
Blantyre (Blue Ridge)	26.52 (+4.71)	27.68 (+4.57)
Mocksville (Piedmont)	15.54 (+2.90)	15.27 (+2.71)
Simpson (Coastal Plain)	3.47 (+2.11)	4.69 (+0.70)

Source: U.S. Geological Survey's *Water Resources Conditions in North Carolina http://nc.water.usgs.gov/monthly/*

17th Annual National Conference on Enhancing the States' Lake Management Programs: Monitoring Lakes and Reservoirs. April 20 - 23, 2004, Congress Plaza Hotel, Chicago, Illinois. For further information, contact: Bob Kirschner, Chicago Botanic Garden: bkirschn@chicagobotanic.org.

2004 Water Sources Conference and Exposition: Reuse, Resources, Conservation. January 11-14, 2004. Austin, TX. Sponsored by American Water Works Association, Water Environment Federation and others. Information at: http://www.awwa.org/conferences/sources/.

Stormwater: Emerging Issues for Local Communities. April 19-21, 2004, The Grove Park Inn, Asheville, North Carolina. Sponsored by:North Carolina State University, WRRI, N.C. Department of Environment and Natural Resources, and US EPA. Information at: http://www.soil.ncsu.edu/swetc/stormwaterconf/main.htm.

Publications

EPA's catalog of funding opportunities for source water protection activities is available at http://www.epa.gov/safewater/protect/pdfs/guide_swp__swp_funding_ matrix.pdf.

The N.C. Division of Water Quality has announced the availability of the 2002 Chowan, Hiwassee, Little Tennessee, Neuse, Pasquotank, Savannah, Watauga and 2003 Broad and Yadkin-Pee Dee River **Basinwide Water Quality Plans**. They can be downloaded in pdf format at the Basinwide Planning website: http://h2o.enr.state.nc.us/basinwide/

The American Society of Civil Engineers' **2003 Progress Report for America's Infrastructure** examines trends affecting 12 categories evaluated in the 2001 Report Card for America's Infrastructure—and the findings are not good. Reportcard for America's Infrastructure at: http://www.asce.org/reportcard/

Other resources

The National Environmental Training Center for Small Communities (NETCSC) has compiled a list of **water- and wastewater-related rules and policies that may affect small communities**. The list describes applicable regulations; the size of communities impacted; specific rules for different size communities; and current and future Safe Drinking Water Act and Clean Water Act regulatory dates. Included are contacts and sources and a glossary of acronyms and important terms. The NETCSC Regulations List is available online at http://www.netc.wvu.edu/netcsc_regs.html

Protecting Children and Their Families: New CD Offers Environmental Advisory Tools. This new special CD collection of community advisory projects is derived from EPA's EMPACT Program (Environmental Monitoring for Public Access and Community Tracking). Titles include community-designed projects in drinking water and stormwater monitoring, air quality, ultraviolet radiation, residential lead contamination, and bird migration projects. Also featured are school study guides and risk communication tools to help residents understand and act on environmental advisories. Each project includes case studies and suggestions that can be used by communities to design and maintain their own environmental monitoring, data management and delivery, and community outreach programs. Until the new CD, called "The EMPACT Collection," is released later this fall, any single project can be viewed online at NRMRL Research Highlights October 2003: http://www.epa.gov/ORD/NRMRL/news.htm

Call for Abstracts and Exhibitors for the WRRI 2004 Annual Conference

Beginning November 17, 2003, WRRI will accept abstracts for its 2004 Annual Conference to be held March 30-31, 2004, at the Jane S. McKimmon Center in Raleigh.

Abstracts will be accepted until January 6, 2004.

Guidelines and instructions for submission will be posted on the WRRI website (http://www2. ncsu.edu/ncsu/CIL/WRRI/2004_annual_ conference.html) by November 17.

Papers and posters on all aspects of water research and management are invited. The N.C. Water Resources Association will present awards for the best student posters.

A limited amount of exhibitor space will be available in the break room. Exhibitor information will also be available on the WRRI website by November 17, 2003.

Sediment and Erosion Control Solutions for the Southeast
March 17-19, 2004
Charlotte, North Carolina

Objectives

- Provide the latest information on topics of interest to professionals in erosion and sediment control, including slope technology, storm water management, stream restoration, vegetative establishment, and wetlands.
- Provide training opportunities in areas important to the industry.
- Exchange ideas and network among professionals.

The latest information on new products, designs, and rules and regulations will be presented by researchers, practitioners, and government officials from all over the Southeast.

Four pre-conference workshops are also scheduled which will provide additional training opportunities for attendees:

- SedCAD Training
- Erosion and Sediment Control Design
- Certified Professional in Storm Water Quality (CPSWQ)
- Natural Channel Design & Stream Restoration Overview

Information and registration at:
http://www.soil.ncsu.edu/swetc/ieca/main.htm

Sponsors
Southeast Chapter - International Erosion Control Association, N.C. Sedimentation Control Commission, N.C. Land Quality Section, North Carolina State University, and N.C. Water Resources Research Institute,

NCWRA
North Carolina Water Resources Association

2003
Luncheon and Forum Schedule

December 1, 2003
The North Carolina Water Reuse Regulations: How Do They Measure Up?
Dr. Helene Hilger, UNC-Charlotte

Feb 2, 2004
Morgan Creek and Little Creeks Local Planning Initiative
Bonnie Duncan, N.C. Wetlands Restoration Program
Jason Doll, Tetratech, Inc.
Please note new meeting location.

All luncheon/forums take place at 11:30 am
at the College of Textiles Building on Centennial Campus
N.C. State University. For directions, go to website:
http://centennial.ncsu.edu/howtogethere/htgh.htm

For information about NCWRA visit the website:
http://www.ncsu.edu/waterquality/ncwra/home.htm

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