

SWIC focuses on water rate guidelines required by drought bill

by Jeri Gray

Under the 2008 “Drought Bill,” July 1, 2009, was the deadline for public water systems that want to be eligible for state grants and loans for extending water lines or expanding water treatment capacity to meet a number of requirements, including adopting a water rate structure that is adequate to operate, maintain, and repair the system during drought conditions when revenue will be reduced as well as under normal operation conditions. However, the bill also required that water systems use rate guidelines developed by the State Water Infrastructure Commission (SWIC), and those guidelines have not yet been finalized, so the deadline for adequate rate structures has been extended to July 1, 2010. Meanwhile, SWIC continues to work on the guidelines.

At the June SWIC meeting, faculty of the Environmental Finance Center (EFC) at UNC-CH presented their study of existing rate structures, existing residential water usage, and the relationship between rates and usage and recommended draft guidelines for rates to support sustainable infrastructure operations. The draft guidelines are in the form of yes/no questions that systems can use to determine how to structure rates to accomplish cost recovery

and insure adequate revenues during periods of reduced usage. At its July meeting, SWIC discussed issues that may arise in implementation of adequate rate structures: resistance to rate increases to assure full cost recovery, biases against fund balances, charges of unfunded mandates, failure to apply for needed grants and loans to avoid rate increases, and whether funders can make grants or loans based on a commitment to implement adequate rates. The commission also discussed how adequate rate structures can be monitored and enforced, with the Local Government Commission being seen as having primary responsibility to monitor local governments’ enterprise funds (which public water and sewer

systems are).

It is SWIC’s goal to adopt final rate guidelines by the end of the year.

Much of the information presented to SWIC in June was presented in an webinar by the EFC on June 25, 2009. The webinar, “Rate Setting Guidelines for NC Water Systems,” can be viewed at <http://breeze.unc.edu/p11556048>. Draft rate setting guidelines will be posted to the EFC website soon: <http://www.efc.unc.edu/training/webinars/>

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Researchers say modeling of potential for herbicide leaching should take soil management practices into account

Research conducted under a WRRRI grant shows that movement of the anionic herbicide 2,4-D through acidic, red-clay Ultisols of the Piedmont is significantly increased by common practices of liming and phosphorus fertilization. 2,4-D is the 4th most highly used herbicide in the United States and is among the 21 most frequently detected compounds in streams and groundwater.

In their report on the research, investigators Dharni Vasudevan and Ellen Cooper of Duke University, say it is imperative that leaching models used to predict the fate of anionic herbicides in the environment account for the inhibitory effects of residual soil phosphate and depletion of exchangeable Al ions caused by liming on sorption of these herbicides. The U.S. EPA relies upon leaching models to judge mobility potential in making decisions about registration that permits sale and use of herbicides.

For their research, the investigators collected samples of N.C. Piedmont Ultisols of the Georgeville series from a forest site, a golf course and a farm. They performed single solute sorption studies to probe the specific effects of soil properties and land use on sorption of 2,4-D, alachlor, and phosphate. They found sorption of 2,4-D (anionic) and alachlor (neutral) correlated to different soil properties. Sorption of 2,4-D was strongly related to exchangeable Al (Al^{3+}) and soil surface area for all land uses, and, in the forest and golf course samples, was also related to Fe and Al oxide content. Sorption of

alachlor was most highly correlated with organic carbon and appeared to be unrelated to soil mineralogy.

Sorption studies with phosphate and 2,4-D or phosphate and alachlor investigated the ability of phosphate to compete with herbicides for sorption in the A horizon of soils. There was no evidence of competition between phosphate and alachlor, but competition between 2,4-D and phosphate was clear across all land uses. These results confirmed the findings of the single solute studies that residual soil phosphate from fertilization has the potential to significantly limit 2,4-D retention in soils.

The researchers say that soil characteristics commonly used to estimate leaching potential appear to be suitable for non-ionic alachlor, but are not sufficient to describe anionic 2,4-D sorption.

The research was published in the journal *Environmental Science and Technology* (38 (1), pp 163–170) “2,4-D Sorption in Iron Oxide-Rich Soils: Role of Soil Phosphate and Exchangeable Al.” Dr. Vasudevan is now Associate Professor of Chemistry and Environmental Studies at Bowdoin College in Brunswick, Maine.

WRRRI Report 377: *Influence of phosphorus on the mobilization and attenuation of ionogenic herbicides in NC Piedmont soils: Implications for water quality*. Dharni Vasudevan and Ellen M. Cooper, Nicholas School of the Environment and Earth Sciences, Duke University



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WRRRI and Sea Grant fund study on vulnerability of coastal watersheds

For the first time, the Water Resources Research Institute of The University of North Carolina and N.C. Sea Grant are jointly funding a research project. The study, by Dr. Sankar Arumugam of the NCSU Department of Civil, Construction, and Environmental Engineering, will assess the potential for change in surface water flow and groundwater availability in coastal watersheds under future climate change projections.

Most studies on the impacts of climate change in coastal areas have focused on sea level rise. However, basin-level water regime changes in inland sub-watersheds could also have profound impacts on the availability of water in the Coastal Plain. With the population of North Carolina's coastal area projected to continue to increase, the Central Coastal Plain already facing groundwater withdrawal restrictions, and coastal communities looking to surface water for public supply, future downward trends in precipitation and flow in coastal rivers could spell major challenges for community planning and water management.

In this study, Dr. Arumugam will focus on the Northeast Cape Fear River Basin (NECFR). He will statistically downscale climate change projections from multiple coupled general circulation models (CGCMs) to obtain monthly precipitation and temperature over the NECFR then disaggregate the projections to obtain daily precipitation and temperature projections under various scenarios of CO₂ concentration. He will then use a distributed hydrologic model (SWAT) to project streamflows for the period 1950-2000 for various locations in the basin and compare projections to observed flows. The comparison will allow estimation of uncertainty in projections of future streamflow. Using existing "climate elasticity" estimates and the projected changes in annual precipitation and temperature under various climate change scenarios, he will estimate the percent change in annual streamflow over coastal watersheds in North Carolina. The investigator expects that this process will provide a first-order estimate of the vulnerability of water resources in coastal watersheds in North Carolina to future climate change scenarios.

Dr. Arumugam was awarded the joint WRRRI-NCSG grant for this study under a competitive process open only to junior faculty. The purpose of the jointly funded program is to encourage interest in research focusing on coastal ecosystem vulnerability among young and new researchers.

Law retains "sum and substance" of Jordan Lake nutrient-reduction rules

According to officials with the Department of Environment and Natural Resources (DENR), the approach adopted by the General Assembly to restore water quality in the nutrient-impaired Jordan Reservoir (one of the Research Triangle's main water supplies) is similar to the adaptive management approach embodied in rules adopted by the Environmental Management Commission (EMC) in 2008.

At EMC meetings in July, Coleen Sullins, Director of the Division of Water Quality, told commissioners that H 239 "An Act to Provide for Improvements in the Management of the Jordan Watershed in Order to Restore Water Quality in the Jordan Reservoir" is "in concept, in line with the EMC's rules." Robin Smith, DENR Assistant Secretary for Environment, told the EMC that the department had put forth a "tremendous effort to hold on to the sum and substance of the Jordan rules."

According to Sullins the primary differences between the EMC rules and H 239 (SL 2009-216) are that wastewater dischargers now have longer (to 2016) to upgrade for nutrient removal and that requirements for control of stormwater from existing development are to be implemented in two stages: (1) an administrative stage (public education, storm sewer mapping, removal of illegal discharges, identification of retrofit opportunities and a BMP maintenance program) and (2) a load-reduction stage having water quality triggers rather than specific implementation deadlines.

Sullins said that monitoring requirements to support the water quality triggers in SL 2009-216 will put a strain on DWQ resources. The division must monitor each arm of the Jordan Reservoir continuously and evaluate progress toward water quality goals every three years.

SL 2009-216 prohibits the EMC from requiring affected local governments to (1) install stormwater collection systems in existing development unless the land is being redeveloped, (2) acquire developed private property, and (3) require reduction of impervious surfaces in existing developed areas unless they are being redeveloped.

The law also requires establishment by July 1, 2010, of the Science Advisory Board for Nutrient-Impaired Waters. The board is to have between 5 and 10 members with stormwater expertise from specified groups and is charged with making recommendations to DENR on management and restoration of nutrient-impaired water bodies.

July action of the N.C. Environmental Management Commission

Water Quality Committee

The Water Quality Committee of the N.C. Environmental Management Commission (EMC) met July 8 in Raleigh and took the following action:

- Approved sending the final Neuse River Basinwide Water Quality Plan to the EMC for approval. The plan had been delayed twice to allow the City of Raleigh to make additional comments on the plan. Staff of the Division of Water Quality reported on major modifications made to the draft plan. Among the changes are:
 - Included an action plan to better assess sources of nitrogen in the basin, their relative contributions, and effectiveness of programs to control nitrogen, and to make recommendations to improve control. <http://h2o.enr.state.nc.us/admin/emc/documents/AttachmentBto09-38ActionPlan.pdf>
 - Changed the target date for completion of the Falls Lake nutrient management plan from 2011 to whatever date appears in legislation under consideration and specifies legislation being considered (HB 1099, which establishes a July 1, 2010, deadline.). Added text noting that due to the anticipated July 1, 2010, deadline, the planned stakeholder process will be cut short, ending in September 2009 and setting up the schedule for rulemaking. Includes text saying DWQ will evaluate possible measures to achieve nutrient loading reductions independent of rulemaking.
 - Deleted a reference to a Franklin County water intake on the Neuse.

Commissioner David Moreau noted that he and Alan Clark, head of DWQ's planning section,

had been interviewed by a U.S. House Committee responsible for reauthorizing the Chesapeake Bay Program, which was looking at the Neuse plan as a model. Moreau said he discussed the good points of the Neuse plan but also discussed the problems with paper tracking of nutrient reduction and the lack of monitoring to show where nutrients are coming from.

- Approved asking the full EMC to hold public hearings on proposed reclassification of 39 miles of the Catawba River from its source to and including the Left Prong Catawba River in McDowell County as High Quality Waters and reclassification of the entire North Fork New River watershed from its source in Elk Knob State Park in Watauga County to where it merges with the South Fork New River to form the New River proper in Ashe County as Outstanding Resource Waters—about 325 miles of streams. There are records of brook trout for several sites in North Fork New River watershed, and the rare hellbender salamander has been found on Big Horse Creek.
- Received a report on NPDES Phase II stormwater program delegations, Water Supply Watershed Ordinance approvals and enforcement actions, and Universal Stormwater Management Program ordinance approvals. According to the report, DWQ has formally notified the Town of Lattimore that it is pursuing enforcement under N.C. General Statute §143-214.5 for failing to implement a watershed protection ordinance in the Broad River watershed.
- Heard an update on current and future educational and outreach

efforts on surface water classifications and watersheds with riparian buffer protection rules. These include a fact sheet on the Goose Creek Water Quality Management Plan (<http://h2o.enr.state.nc.us/admin/emc/documents/06wqc04a.pdf>) and a pamphlet on the state's riparian buffer rules (<http://h2o.enr.state.nc.us/admin/emc/documents/06wqc04b.pdf>). The division also plans an outreach website, fact sheets, training and workshops on the Jordan Lake rules.

EMC

The N.C. EMC met July 9 in Raleigh and took the following action:

- Approved holding public hearings on a number of Air Quality rule amendments: (1) the fugitive dust rule, (2) the acceptable ambient level for acrylonitrile, (3) the NOx applicability rules, and (4) the revised health-based lead ambient standard.
- Adopted proposed idling restrictions on heavy duty vehicles. The affected sources are on-road motor vehicles excluding trailers with a gross vehicle weight rating of 10,001 pounds or greater powered in part or entirely by an internal combustion engine. An example of the smallest heavy-duty vehicles affected is the Ford F-350. School and municipal system buses along with cross-country semi-trailer trucks are included as heavy-duty motor vehicles. The rule requires operators not to idle their vehicles for more than 5 consecutive minutes in any 60-minute period. It includes exceptions for reasons of

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EMC continued from page 4
safety, health, and commerce.

- Confirmed appointment of four members of the Water Pollution Control System Operators Certification Commission: Marchell Adams David, City of Hamlet; Tim Bannister, owner of TCW Wastewater Management Inc, Indian Trail; Troy Perkins, Greenville Utilities, Greenville, NC; Dr. David L. Lindbo, Department of Soil Science, NC State University.
- Rescinded revisions to the Well Construction Rule (15A NCAC 2C .0100) adopted March 12, 2009, and adopted new proposed revisions. The Rules Review Commission determined that when the rules were originally revised, no notice in a general circulation newspaper had been published. Therefore, the rules had to be withdrawn, a notice published, a new hearing held, and the revised rules represented to the EMC. Some significant changes were made to the original revision.
- Approved the Neuse River Basinwide Water Quality Plan. <http://h2o.enr.state.nc.us/admin/emc/documents/AttachmentAto09-38NRBasinwidePlan.pdf>
- Approved reclassification of a segment of the Haw River in Chatham County as Critical Area for Pittsboro's water supply intake.
- Reclassified Big Laurel Creek and Spring Creek in Madison County (French Broad River Basin) as Outstanding Resource Waters. Studies in the Spring Creek watershed revealed the endemic southern strain of Brook Trout as well as the following listed fish species: Olive Darter (NC and federal species of concern), Mountain Blotched Chub (signifi-

cantly rare and federal species of concern) and Ohio Lamprey (NC significantly rare species). Studies in the Big Laurel Creek watershed revealed the Olive Darter and Ohio Lamprey along with other listed fish species (Smallmouth Buffalo and Logperch) and the rare hellbender salamander.

- In a somewhat strange contested case pitting the U.S. Fish and Wildlife Service (USFWS) against the N.C. Division of Air Quality (DAQ), the EMC first accepted an *Amicus* brief filed by an industry group, then remanded the case to the Administrative Law Judge (ALJ) with instructions to dismiss on point of mootness. (In contested cases, the EMC makes final agency decisions either by upholding or rejecting an ALJ's decision.)

In the contested case the U.S. Department of Interior, Fish and Wildlife Service appealed a decision by DAQ to issue an air permit under the N.C. Prevention of Significant Deterioration regulatory program to PCS Phosphate to construct a new sulfuric acid plant to replace two old ones at its facility in Aurora. The PCS facility is about 20 miles west of the Swanquarter Wilderness Area, a federal class I air quality area.

According to the ALJ's findings, under the Clean Air Act, US-FWL is to be notified whenever an air permit is contemplated that will increase air emissions above a certain level within 100 km of a federal class I air quality area. DAQ held a pre-application meeting, accepted an air quality modeling protocol, and accepted the permit application and additional information without notifying USFWS.

Only when DAQ published notice of preliminary decision and draft permit did it notify USFWS. DAQ provided copies of the permit application and modeling results only after USFWS requested them, and issued the permit without notifying USFWS. Meantime, USFWS had found that the modeling protocol used was not consistent with what it requires for class I air quality areas.

USFWS began negotiations with PCS on the modeling and appealed the permit. After PCS gave USFWS the results of revised modeling, USFWS determined that emissions from the new facility would not cause deterioration of air quality in the Swanquarter Wilderness Area.

In his findings, the ALJ found DAQ at fault for not notifying USFWS as required. In his decision, the ALJ upheld the permit but also held that DAQ must use the modeling protocol demanded by USFWS in future similar cases. It was the last decision that disturbed the EMC. One commissioner called it "rulemaking from the bench," and after much discussion—mostly among the lawyers on the commission—the EMC voted to remand the case with instructions to dismiss.

- Upheld the decision of the ALJ in the contested case Old Mill Forestry, LLC v. DENR, DWQ and Brunswick County.

Environmental legislation passed by the N.C. General Assembly

If no Session Law number is given, it means the law had not been signed by the Governor at the time the list was compiled.

H 239 (SL 2009-216) AN ACT TO PROVIDE FOR IMPROVEMENTS IN THE MANAGEMENT OF THE JORDAN WATERSHED IN ORDER TO RESTORE WATER QUALITY IN THE JORDAN RESERVOIR

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H239v6.pdf>

H 461 (SL 2009-84) AN ACT TO EXTEND THE SUNSET FOR THE PILOT PROGRAM REGARDING ANNUAL INSPECTIONS OF ANIMAL OPERATIONS THAT ARE SUBJECT TO A GENERAL PERMIT FOR AN ANIMAL WASTE MANAGEMENT SYSTEM.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H461v3.pdf>

H 628 (SL 2009-14) AN ACT TO AUTHORIZE THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO EXPEND EXISTING MONEYS FOR CAPITAL IMPROVEMENT PROJECTS AT NORTH CAROLINA AQUARIUM SATELLITE AREAS. Authorizes capital projects related to the construction of the North Carolina Aquarium Pier at Nags Head by the Aquariums Division of DENR. Up to \$25 million. Stimulus funding to be used before other non-general-fund money.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H628v4.pdf>

H 684 (SL 2009-303) AN ACT TO MAKE A CHANGE TO THE MEMBERSHIP OF THE NORTH CAROLINA AGRICULTURAL DEVELOPMENT AND FARMLAND PRESERVATION TRUST FUND ADVISORY COMMITTEE, AND TO MAKE TECHNICAL CHANGES.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H684v4.pdf>

H 749 (SL 2009-243) AN ACT TO AUTHORIZE THE STATE BUILDING CODE TO PERMIT THE USE OF CISTERNS TO PROVIDE WATER FOR FLUSHING TOILETS AND FOR OUTDOOR IRRIGATION IN THE CONSTRUCTION OR RENOVATION OF RESIDENTIAL OR COMMERCIAL BUILDINGS OR STRUCTURES AND TO PROHIBIT ANY STATE, COUNTY, OR LOCAL BUILDING CODE OR REGULATION FROM PROHIBITING THE USE OF CISTERNS FOR THESE USES, AND TO CLARIFY MINORITY BUSINESS PURPOSES FOR PUBLIC CONTRACTS.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H749v4.pdf>

H 1011 (SL 2009-293) AN ACT TO PROVIDE FOR ASSESSMENTS BY THE CITY OF RALEIGH TO OWNERS OF STORMWATER FACILITIES.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H1011v3.pdf>

H 1100 (SL 2009-322) AN ACT TO DIRECT THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO ESTABLISH STORMWATER CONTROL BEST MANAGEMENT PRACTICES AND PROCESS WATER TREATMENT PROCESSES FOR COMPOSTING OPERATIONS FOR THE PURPOSE OF PROTECTING WATER QUALITY.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H1100v5.pdf>

H 1118 (SL 2009-89) AN ACT TO STANDARDIZE WILD BOAR HUNTING SEASON AND THE HARVESTING OF FERAL SWINE AND TO DIRECT THE DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES TO STUDY ISSUES RELATED TO THE IMPORTATION OF FERAL SWINE IN NORTH CAROLINA.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H1118v4.pdf>

H1378 AN ACT TO PROVIDE THAT THE OWNER OR OPERATOR OF CERTAIN MARINAS SHALL INSTALL AND MAINTAIN PUMPOUT FACILITIES BY JULY 1, 2010, TO PROHIBIT THE DISCHARGE OF SEWAGE FROM A VESSEL INTO CERTAIN COASTAL WATERS, TO REQUIRE THE OWNER OR OPERATOR OF ANY MARINA WHO KNOWS THAT A VESSEL DOCKED AT THE MARINA HAS UNLAWFULLY DISCHARGED SEWAGE INTO COASTAL WATERS TO REPORT THE UNLAWFUL DISCHARGE TO THE APPROPRIATE LAW ENFORCEMENT AGENCY, TO REQUIRE VESSEL OWNERS AND OPERATORS TO KEEP A LOG REGARDING THE DATE AND LOCATION OF PUMPOUTS OF SEWAGE FROM MARINE

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Environmental Legislation *continued from page 6*

SANITATION DEVICES, AND TO PROVIDE THAT A PILOT PROGRAM IN NEW HANOVER COUNTY SHALL BE DESIGNED AND IMPLEMENTED BY THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES PHASING IN THE PUMPOUT STATION REQUIREMENTS.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H1378v5.pdf>

H 1399 (SL 2009-134) AN ACT TO PROVIDE THAT CIVIL PENALTIES OF UP TO ONE THOUSAND DOLLARS MAY BE ASSESSED FOR VIOLATION OF CAPACITY USE AREA LAWS.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/House/PDF/H1399v6.pdf>

S 141 (SL 2009-124) AN ACT TO REQUIRE THE COMMISSION FOR PUBLIC HEALTH TO ADOPT RULES CONCERNING WHEN TESTING FOR VOLATILE ORGANIC COMPOUNDS IN NEWLY CONSTRUCTED PRIVATE DRINKING WATER WELLS IS REQUIRED, AND TO LIMIT DRINKING WATER TESTING FOR THE PRESENCE OF VOLATILE ORGANIC COMPOUNDS IN ACCORDANCE WITH THOSE RULES.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/Senate/PDF/S141v5.pdf>

S 304 AN ACT TO INCREASE THE AMOUNT THE STATE MAY FINANCE UNDER GUARANTEED ENERGY SAVINGS CONTRACTS AND TO MODIFY THE REPORTING REQUIREMENTS.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/Senate/PDF/S304v4.pdf>

S 307 AN ACT TO AMEND THE LAW REGULATING THE USE OF CERTAIN REPTILES. Regulates ownership, transport and use of venomous reptiles, constricting snakes and crocodiles.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/Senate/PDF/S307v3.pdf>

S 755 AN ACT TO PROMOTE THE USE OF COMPENSATORY MITIGATION BANKS FOR RIPARIAN BUFFER PROTECTION AND NUTRIENT OFFSET PAYMENTS, TO MAKE CLARIFYING CHANGES TO THE STATUTES GOVERNING COMPENSATORY MITIGATION FOR WETLAND AND STREAM IMPACTS, AND TO DIRECT THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO STUDY CERTAIN IMPACTS THAT THE PROMOTION OF COMPENSATORY MITIGATION BANKS MAY HAVE ON THE ECOSYSTEM ENHANCEMENT PROGRAM.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/Senate/PDF/S755v6.pdf>

S 835 (SL 2009-306) AN ACT TO EXTEND THE LEGISLATIVE COMMISSION ON GLOBAL CLIMATE CHANGE. (Extends to October 2010)

<http://www.ncga.state.nc.us/Sessions/2009/Bills/Senate/PDF/S835v4.pdf>

S 1010 (SL 2009-221) AN ACT TO AUTHORIZE THE WILDLIFE RESOURCES COMMISSION TO ADOPT SEASON STRUCTURES FOR MIGRATORY GAME BIRD SEASONS AND TO ALLOW THE USE OF UNPLUGGED SHOTGUNS AND ELECTRONIC CALLS.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/Senate/PDF/S1010v4.pdf>

S 1018 (SL 2009-163) AN ACT TO REDUCE PLASTIC AND NONRECYCLED PAPER BAG USE ON NORTH CAROLINA'S OUTER BANKS.

<http://www.ncga.state.nc.us/Sessions/2009/Bills/Senate/PDF/S1018v6.pdf>

HJR 1655 (Resolution 2009-23) A JOINT RESOLUTION HONORING THE SEVENTY-FIFTH ANNIVERSARY OF THE BLUE RIDGE PARKWAY.

Natural Fibers Control Runoff Pollution

NCSU News Release

In a recent study, Dr. Rich McLaughlin and NC State colleagues Scott King, extension associate in soil science, and Dr. Greg Jennings, professor and extension specialist in biological and agricultural engineering, found that conventional erosion control BMPs don't hold a candle to natural fiber check dams (FCDs) enhanced with polyacrylamide (PAM). FCDs use natural fibers instead of rocks as a type of dam to slow the flow of water in ditches. PAM causes sediment to clump together.

The researchers found, in a measure of the "muddiness" of road runoff, that the BMPs yielded 3,813 nephelometric turbidity units (NTUs) in testing, equating to some rather muddy water, McLaughlin says. Fiber check dams with PAM yielded averages of 34 NTUs, a veritable drink of Perrier in comparison, McLaughlin adds.

US Geological Survey cooperating with NEON to illuminate environmental trends nationwide

In 2001, the National Research Council released *Grand Challenges in Environmental Sciences 2001*. This report, requested by the National Science Foundation (NSF), identified the most important environmental research challenges of the next generation. One of the areas identified as most likely to yield results of major scientific and practical importance was biological diversity and ecosystem functioning.

To produce data to advance studies of biological diversity and ecosystem functioning, a group of universities and institutions established the National Ecological Observatory Network (NEON). Funded by NSF,

Further, the study showed that after a storm, sites that used standard BMPs lost an average of 944 pounds of sediment compared with only 1.8 pounds of sediment lost at sites utilizing FCDs with PAM.

McLaughlin says that these results are so convincing that North Carolina's Department of Transportation is in the process of making FCDs with PAM the new best management practice around road and construction sites. McLaughlin's group is also training engineers and installers around the state and nationally in the use of this system.

A paper reporting the study results appears in the March/April edition of the *Journal of Soil and Water Conservation*. <http://www.jswnonline.org/content/64/2/144.full.pdf+html>

The article must be purchased.

NEON will create a new national observatory network to collect ecological and climatic observations across the continental United States, including Alaska, Hawaii and Puerto Rico. The observatory network will be the first of its kind designed to detect and enable forecasting of ecological change at continental scales over multiple decades.

The USGS is cooperating with NEON to develop protocols for collecting data on long-term, large-scale environmental changes. Standard field procedures improve the quality of data used to forecast ecosystem responses to such changes. For more information visit NEON: <http://www.neoninc.org/>

In Memoriam: Linda Lambert

Linda Lambert, who was for nearly 30 years the administrative heart of the Water Resources Research Institute, died June 3, 2009. Linda was business and administrative officer for every WRRRI director, beginning with David Howells in 1969 and retiring during Ken Reckhow's tenure in 1998.

During her years at WRRRI, numerous now-distinguished university researchers began their careers with her budgeting and proposal advice. Renowned for attention to detail and her "Eagle Eye," Linda provided "quality control" for the *WRRRI News* and numerous other Institute publications and projects.

In 1998, NCSU's Office of Research, Outreach and Extension recognized Linda's service with the Award for Excellence. She had received a similar honor in 1989.

Events

NCWRA Forums/Luncheons

11:30 am, Friday, September 11, 2009

McKimmon Center, Raleigh, NC

Water-Energy Nexus: Renewable and Sustainable Options for Charlotte Mecklenburg Utilities Wastewater Treatment Plants

Speaker: Jacqueline Jarrell, PE, Environmental Management Division Superintendent, Charlotte-Mecklenburg Utilities

Charlotte-Mecklenburg Utilities Department (CMUD) is taking a serious look at how energy and water play a role in providing renewable and sustainable options at their wastewater treatment plants. CMUD has experimented with the use of methane gas from waste products to be reused to provide power and heat, which decreases the cost of water purification. Other projects include the evaluation of using brown grease ("grease trap" grease) for biodiesel as well as the use of solar power to incorporate energy saving equipment in plant improvements.

December 7, 2009

Recent and Current Projects and Initiatives in Hazard Risk Management for North Carolina Water Resources
McKimmon Center, Raleigh, NC

February 22, 2010

Israeli Water Technology
McKimmon Center, Raleigh, NC

<http://www.ncsu.edu/wri/events/ncwra/>

Resources

New USGS reports:

- *Spatial Analysis of Instream Nitrogen Loads and Factors Controlling Delivery to Streams in the Southeastern United States using Spatially Referenced Regression on Watershed Attributes (SPARROW) and Regional Classification Frameworks.* A regional model by the USGS shows that sources of nitrogen delivered to estuaries and bays, such as Albemarle Sound and Mobile and Apalachicola Bays, include atmospheric deposition (47%), fertilizer applied to agricultural land (21%), manure from livestock operations (12%), municipal wastewater (11%), and urban land (9%).
<http://www.usgs.gov/newsroom/article.asp?ID=2246>

SAVE THE DATE!

March 30-31, 2010
McKimmon Center
Raleigh, NC

**WRI Annual Conference &
NCWRA Symposium:
The State of Water Resources
in North Carolina**

**More information will be
available this fall:**

<http://www.ncsu.edu/wri/conference/>

- *Mercury sources, distribution and bioavailability in the North Pacific Ocean—Insights from data and models and information on other USGS mercury research.* Consumption of ocean fish and shellfish account for over 90 percent of human methylmercury exposure in the United States, and tuna harvested in the Pacific Ocean account for 40 percent of this total exposure. A new USGS study indicates that total mercury levels in the North Pacific Ocean water have risen about 30 percent over the last 20 years. The authors attribute the rise to increases in global mercury atmospheric emission rates, particularly from Asia. They project a 50 percent increase in Pacific Ocean mercury levels by the year 2050.
http://toxics.usgs.gov/highlights/pacific_mercury.html
- *Characterization of groundwater quality based on regional geologic setting in the Piedmont and Blue Ridge Physiographic Provinces, North Carolina.* This report is a compilation of groundwater-quality data collected as part of two studies, and it provides a basis for understanding the ambient geochemistry related to geologic setting in the Piedmont and Blue Ridge Physiographic Provinces of North Carolina. It was produced in part by the Piedmont-Mountains Resource Evaluation Program cooperative study between the USGS and the N.C. Division of Water Quality, Aquifer Protection Section.
<http://pubs.usgs.gov/sir/2009/5149/>