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The 2012 WRRI Annual Conference and NCWRA Symposium:

Challenging assumptions,debunking myths, and bringing the dogma to heel

by Jeri Gray

The 2012 WRRI Annual Conference brought together university, agency and private scientists ready to speak their minds. From the opening keynote on nutrients to the symposium on mitigation to the closing regulatory reality check seminar, speakers challenged current thinking and offered opposing views.

Heeling the dogma on nutrient limitation

In his keynote address, Dr. Hans Paerl, UNC-Chapel Hill Kenan Professor of Marine and Environmental Sciences, took issue with scientific dogma that says phosphorus is the only limiting nutrient in freshwater and that nitrogen is limiting in estuarine/coastal waters. Paerl particularly focused on the work of University of Alberta limnologist David Schindler, who claims that his 37-year experiment on a small lake in Canada proves that nitrogen limitation is relieved by the ability of blue-green algae to fix nitrogen from the air, and that, therefore, controlling phosphorus alone will control algae growth. [Schindler, co-author of the 2004 book *The Algal Bowl*, specifically opposed the proposal in 2010 to remove nitrogen from Winnipeg's wastewater in an effort to control eutrophication in Lake Winnipeg. According to a report by the *Winnipeg Free Press*, Schindler compared scientists who disagreed with his conclusions on nutrient limitation to climate-change deniers.]

Paerl said that research in the 1970s had established current nutrient limitation dogma, but, recently, the scientific basis for those somewhat simplistic conclusions has come into question, and a picture of much more complexity has emerged. Paerl reviewed studies from Lake Tiahu in China, Gippsland Lakes catchment in Australia, Himmerfjärden coastal river in Sweden, the Baltic Sea, and—in the United States—the Chesapeake Bay, St. John's River, the Mississippi River and Gulf of Mexico, and the Neuse River. In each case, studies of nutrient limitation dynamics demonstrated dual limitation by phosphorus and nitrogen.

Paerl also pointed to a 1986 study funded by WRRI in which Edward Kuenzler, Alan Belensz and Joseph Rudek investigated nutrient cycling and productivity in Jordan Lake and concluded that neither nitrogen nor phosphorus alone controlled phytoplankton growth. Paerl also referenced his own decades-long study of nutrient dynamics in the Neuse River and traced the history of nutrient-control efforts and system response in the

Dr. Hans Paerl, UNC-Chapel Hill Kenan Professor of Marine and Environmental Sciences, challenged the scientific dogma on nutrient limitation in his keynote address.

Neuse. His presentation showed a steady build-up of nitrogen and phosphorus concentrations in the Neuse until the mid 1980s when a phosphate detergent ban and better phosphorus removal by wastewater treatment plans led to a decrease in phosphorus. In response, chlorophyll a concentrations in the upper river fell, but,

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downstream, the opposite occurred.

Said Paerl, "Algal blooms upstream were scavenging nutrients, but when the 'filter' was removed, the problem moved to the estuary. Managing only one nutrient solved only part of the problem."

In fact, Schindler's own work on "Lake 227" demonstrates co-limitation, said Paerl. The lake was fertilized with both phosphorus and nitrogen from 1968-1989, producing phytoplankton blooms. From 1989 on, the lake was fertilized with only phosphorus, and phytoplankton biomass dropped, illustrating that nitrogen fixation could not keep up with phytoplankton demand.

"And it's not because of a lack of nitrogen fixers," Paerl said. "Even where nitrogen fixation is high, only 30 percent of nitrogen requirement is supplied by fixation."

Paerl said that Schindler's hypothesis is just not operative in the real world and particularly in streams and rivers and along the freshwater-saline water continuum.

"Freshwater nutrient management impacts downstream estuarine nutrient limitation dynamics," he said. "Nitrogen reductions are needed to control estuarine eutrophication, but regulations should focus on bioavailable nitrogen (nitrate/nitrite, ammonium, and some dissolved organic nitrogen sources), and probably not total nitrogen. Regulation of total nitrogen requires unrealistically high standards and is unnecessarily costly."

Paerl is co-author with William Lewis and Wayne Wurtsbaugh of "Rationale for Control of Anthropogenic Nitrogen and Phosphorus to Reduce Eutrophication of Inland Waters" published ASAP by *Environmental Science & Technology* in November 2011 (http://pubs.acs.org/doi/abs/10.1021/es202401p).

NCWRA symposium on mitigation policy in North Carolina

A retired N.C. regulator who was frequently a lighting rod for criticism from developers unhappy with wetland and stream mitigation requirements, a private mitigation banker and outspoken critic of NC's fee-based mitigation program (the Ecosystem Enhancement Program —EEP), and a contrarian Duke University professor of river science and policy, along with a large cast of somewhat less provocative speakers, discussed the state and direction of stream and wetland compensatory mitigation in North Carolina.

John Dorney, who for more than a decade led the N.C. Division of Water Quality's 401water quality certification/wetlands unit, opened the symposium on mitigation policy with a luncheon presentation on the successes and challenges of stream and wetland mitigation. Dorney said that his analysis of reports on wetlands regulatory success rates across the country indicates that success rates are not improving, with 48% being the average and North Carolina's 70% being the highest. NC's success rate is higher, he said, because EEP (formerly the Wetlands Restoration Program) curtailed small, on-site applicant-provided mitigation, which studies elsewhere have shown to be poor. In spite of low regulatory success rates reported across the country, Dorney said he does not think that mitigation has been a scientific failure but that restoration/enhancement projects need time to develop ecological function and that people need to be patient.

For stream mitigation, Dorney said much more monitoring is needed to evaluate success and that more fee-based staff positions are needed at both the federal and state levels to adequately monitor projects. "Without oversight, there's no assurance that anything works," he said.

In addition, he said, more flexibility for stream and buffer mitigation alterna-

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WRRI
NC State University, Box 7912,
Raleigh, NC 27695-7912
water_resources@ncsu.edu
http://www.ncsu.edu/wrri/

Panel on "Mitigation Policy in North Carolina: Is the Train on the Right Track?" Left to right: Will Harman, principal, Stream Mechanics; Eric Kulz, N.C. Division of Water Quality; John Dorney, Atkins Global; George Howard, Resotration Systems, Inc. and Michael Ellison, N.C. Ecosystem Enhancement Program.

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tives is needed. He called on the N.C. Environmental Management Commission's Water Quality Committee—which has been batting proposed rules for buffer mitigation flexibility back to DWQ for three years—to "Let those rules go to public hearing!" [On May 9, the committee voted to forward the rules—with additional changes that necessitate a revised fiscal note—to the full commission for consideration in July.] But Dorney cautioned mitigation providers that flexible does not mean cheaper and often means more expensive.

Dorney also criticized EPA's position discouraging in-line ponds for water quality improvement, reviewing projects where stormwater treatment in stream channels associated with urban stream restoration projects accomplished marked improvement in water quality.

Finally, Dorney said that the future of mitigation may lie in the concept of functional uplift, which focuses on no net loss of ecological function rather than acres alone. Using the N.C. Wetland Assessment Method (http://portal.ncdenr.org/c/document_library/get_file?uuid=76f3c58b-dab8-4960-ba43-45b7faf06f4c&groupId=38364), mitigation providers can calculate functional uplift provided by projects and receive additional mitigation credit. The method was developed by an interagency team to be used for project planning, alternatives analysis, compliance and enforcement, mitigation planning, and tracking functional replacement. [Training on N.C. WAM will be held Oct 2-5, 2012, at Haw River State Park in Browns Summit. Contact amanda.mueller@ncdenr.gov]

George Howard of Restoration Systems LLC, a private mitigation provider, set out to debunk myths about private mitigation banks. Howard said it is a myth that mitigation banks are tilted toward preservation. "Restoration is more valuable to bankers because there's more work to do," he said.

It is also a myth that banks put all their acreage in one place. "There is more opportunity for competition if banks are in many watersheds. One big bank would just give one banker all the business."

Howard said that North Carolina is the "Romanian gymnast of the mitigation industry," but that the state has not been good for private banks because of the existence of EEP. "Fee programs are a blatant conflict of interest," he said, "because the same agency that is writing permits is getting checks. Government needs to regulate, and we all need to get in our right places."

Howard was active in promoting recent N.C. legislation favoring mitigation through private banks.

Martin Doyle, Professor of River Science and Policy in Duke's Nicholas School, put the practice of stream restoration in social and economic context. Doyle traced the history of stream restoration from its origin in the late 19th century on private land with private funding to today when most stream restoration is done under regulatory mitigation programs largely on public lands or dedicated banks.

According to Doyle, the first stream restoration efforts were undertaken by a fishing club in the Catskill Mountains (the forerunner of The Nature Conservancy) to restore trout fisheries destroyed by logging. During the Great Depression, with Keynesian inspiration, the federal government put people to work on stream restoration, and the science of stream restoration began to develop, though not in a straight upward-sloping line. Under the assumption that stream restoration practices improve hydrology, reduce sediment loads and improve water quality, restoration became accepted as compensation for stream impacts under the Clean Water Act. As a result, stream restoration is the justification for a growing compensatory stream mitigation industry [both private and public].

However, Doyle said, his research reveals little evidence for the assumption that current stream restoration practices

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Panel on "Reality Check: Water Quality Management Perspectives from Scientists, Regulators and the Regulated:" Michael Lane, City of Burlington; Amy Pickle, Duke University Nicholas Institute for Environmental Policy Solutions; Kacy Cook, N. C. Wildlife Resources Commission; Christy Perrin, NCSU Watershed Education for Communities and Officials; Martin Doyle, Duke University; Alan Clark, N.C. Division of Water Quality; Peter Raabe, American Rivers; John Cox, City of Durham Stormwater Services;

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are effective, and, because the concept of mitigation allows widespread stream impacts, he said, " the mitigation program CAUSES net loss of stream function, and small tweaks won't make it better."

Furthermore, Doyle said, "There is no functioning healthy market for restored streams in North Carolina. There's little on private land for private purposes. Mitigation undermines the market for restoring streams. If the government has to force it, there is no market. We're just boosters of the industry."

Because the stream compensatory mitigation program is currently doing more harm than good, Doyle argues, both the science and policy should be re-examined. His research conclusions and suggestions for changes to the program are explained in a paper he co-authored with F. Douglas Shields to be published in the June issue of the *Journal of the American Water Resources Association* "Compensatory Mitigation for Streams under the Clean Water Act: Reassessing Science and Redirecting Policy." (Early view now online at: http://onlinelibrary.wiley.com.prox.lib.ncsu.edu/journal/10.1111/(ISSN)1752-1688/earlyview)

Progress Energy Seminar "Reality Check: Water Quality Management Perspectives from Scientists, Regulators and the Regulated"

Perhaps it was the lateness of the day or the title of the session, but the panelists for the regulatory reality check on Wednesday afternoon had little very uplifting to say.

Peter Raabe of American Rivers said the nation's water infrastructure is crumbling, climate change is upon us, and we have no national policies or plans in place to deal with either. "How do you redesign, rebuild, and refuel an aircraft full of passengers that is 30,000 feet in the air?" he asked. Raabe did speak with some optimism about the benefits of green infrastructure in creating more resilient water management systems and the triple-bottom-line analysis that led to significant incorporation of green infrastructure in Philadelphia and New York.

Alan Clark of DWQ's Planning Section—speaking on nonpoint source pollution—said that being a regulator today is like wearing a target on your back. At the same time that state environmental regulators are being portrayed as heavy-handed enforcers of job-killing rules, Clark said, regulators see in the near future a confluence of circumstances that threaten the state's quality of life. First, he said, population is growing, but land is being developed at a rate faster than population growth, which has big implications for increases in impervious surfaces. Second, while nonpoint source pollution is regulated, there are regulatory gaps, some sources are under-regulated, and available funding "only scratches the surface" of what is needed to restore impaired waters. He said regulators need the help of conservationists in providing education and outreach to the public, of scientists for better science to base decisions on, and of the regulated community in identifying common interests and working toward adaptive management goals. "One last thing you need to know about regulators," said Clark, "we hear the ticking."

Martin Doyle of Duke University, speaking from the viewpoint of academics asked to provide policy-relevant science, said it's an area with few rewards. "Translating science into policy is time consuming," he said. "Just meeting with regulators is time-consuming." Further, he said, competition in academia is high, with increased pressure to "publish or perish" and money to support a research program drying up. "If you're policy-relevant, you're not viewed as scientific," said Doyle, "and if you're funded from non-government sources your work is suspect." Besides, he said, "regulators today are implementing the ideas of previous academic scribblers, so the point of academic research should be to question

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the status quo."

John Cox, Water Quality Manager for the City of Durham's Stormwater Services, said that he often felt his group had been "sent into a gunfight with a knife." After 15 years working to improve stormwater water for a city setting on impermeable Triassic soils and subject to strict nutrient reduction rules implemented to restore Falls and Jordan lakes, Cox said he concluded that "there are limits to what we can do with the approaches we have now." New approaches to stormwater management must eliminate blind spots, he said. As a response to experience, monitoring is now a more significant part of Durham's stormwater program and has unearthed a "gold mine" of illicit connections in the notorious Ellerbe Creek watershed. Acknowledging and controlling a long-ignored source of nutrients—gross solids in the form of leaves—can eliminate the most significant source of nutrients in some areas, he said. Requiring stormwater retrofits as part of redevelopment and street projects, urban reforestation and rooftop disconnection can also pay big dividends.

Shale Gas Update

Perhaps the most heavily attended sessions at the 2012 Annual Conference were two that provided an overview of the N.C. Department of Environment and Natural Resources' draft Shale Gas Study. Evan Kane of the Division of Water Quality reviewed the evidence for shale gas deposits in the state, the gas production method known as hydraulic fracturing, and the associated water quality and quantity issues. DENR Assistant Secretary for Environment Robin Smith reviewed highlights of the draft report.

Background. Following reports of potential economically recoverable deposits of shale gas in North Carolina's Triassic Basins, the N.C. General Assembly in 2011 mandated a study of shale gas potential and potential impacts. DENR, the Department of Commerce, and the Department of Justice were directed to study environmental, health, infrastructure, and economic impacts as well as legal, consumer protection, and administrative, regulatory, and funding issues.

Limitations of the study. The agencies were given less than a year to hold public hearings and complete the study, and both the draft report and Smith's presentation at the annual conference made clear the limitations imposed by the timeframe. Because the study had to be based on existing data and information, limited evidence is available about:

- The extent and richness of the shale gas resource in North Carolina. Estimates have been extrapolated from two wells in the Sanford sub-basin—the only two data points available—and it is unclear how well the average of those two points represents the resource in that sub-basin, which encompasses only a fraction of the acres in the Triassic Basins. Limited information about the extent of the resource makes projections of environmental and economic impacts highly uncertain.
- The depth to which freshwater extends in NC's Triassic Basins. In the Sanford sub-basin the separation between groundwater used for drinking and gas-producing layers appears to be much less than in other gas-producing states . Without more knowledge of groundwater resources in potential drilling areas, it is not possible to set standards certain to protect drinking water.
- Impacts on groundwater and drinking water in other gas-producing states. The U.S. Environmental Protection Agency is conducting studies of potential groundwater impacts in Pavillion, WY, and Dimock, PA, as well as a broad study of various impacts of

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N.C. Water Resources Association Student Poster Competition Winners

(left to right)

First place winner Gina Lee, N.C. State University Department of Soil Science for her poster "Effects of Mulch Type and Polyacrylamide on Runoff and Vegetation Growth on Steep Slopes" The poster was co-authored by Professor Rich McLaughlin. (Poster #19)

Second place winner Brittany White, Department of Biology, Elon University for her poster "Physiological Responses in the Coastal Marsh Plant, Spartina patens, Following Sudden Increases in Soil Salinities." The poster was co-authored by Kara Salpeter, Daniel Millemann, Michael Caputo, and Brant Touchette (Poster # 35)

Third place winner Leigh-Ann Dudley, North Carolina State University Department of Civil, Construction, and Environmental Engineering, for her poster "Removal of Perfluorinated Compounds by Powdered Activated Carbon and Anion Exchange Resins." The poster was co-authored by Professor Detlef Knappe, and Mark Strynar, Andrew Lindstrom and Larry McMillan of the U.S. Environmental Protection Agency. (Poster #9)

Not pictured:

Honorable mention winner Hannah Postma, undergraduate in Environmental Health, East Carolina University, for her poster "Evaluating the Effects of Watershed Impervious Surfaces on Stream Biochemistry." The poster was co-authored by A.J. Finley, Guy Iverson, Charles Humphrey and. Michael O'Driscoll (Poster # 26)

Honorable mention winner Matthew Smith, graduate student in the Department of Geological Sciences, East Carolina University, for his poster "4-D Geophysical and Water Quality Characterization of On-site Wastewater Treatment." The poster was co-authored by Michael O'Driscoll, David Mallinson, and Charles Humphrey. (Poster #30)

Read the poster abstracts at: http://www.ncsu.edu/wrri/pdfs/pastevents/ac2012/2012%20Compiled%20Poster%20Abstracts.pdf

Voiland to retire as director of WRRI and N.C. Sea Grant

In 2009, amid budget and personnel cuts that challenged the UNC Water Resources Research Institute's ability to continue its leadership in addressing water issues in North Carolina, Dr. Michael P. Voiland stepped up and added to his already full-time position as director of N.C. Sea Grant, the responsibility for steadying and guiding WRRI. Over the last three years, he has merged financial duties for both organizations to address the loss of staff positions, expanded WRRI's training efforts and focused them on state priority issues such as water loss auditing (see article page 7), and strengthened partnerships with state agencies and water resources organizations to identify needs that the Institute can meet.

During his tenure at WRRI, Voiland also initiated a joint Sea Grant-WRRI mini-grant program focused on the interface between NC coastal waters and the fresh water inputs they receive with the objective of providing a proof of concept for larger research. In addition, in recognition for excellence in research and outreach related to watershed science, NC State University, as managing entity of WRRI, was designated by the EPA as a Center of Excellence for Watershed Management. Under a Memorandum of Understanding between the EPA, NCSU, WRRI, and the NC Department of Environment and Natural Resources, an interagency team is currently engaged in designing a Watershed Stewardship Network to provide community watershed stakeholders access to experts and training resources.

At the same time Voiland was immersing himself in new issues and new partnerships as WRRI director, he continued to guide N.C. Sea Grant in innovations that led to its evaluation in 2011 by its parent National Oceanic and Atmospheric Agency "as an exemplary state program with national and regional leadership in several topical areas."

After three years leading two organizations recognized as national leaders in strong research and applied results—and a 36-year career focused on natural resources management,

In appreciation of his leadership, the staffs of WRRI and Sea Grant have nominated Dr. Michael P. Voiland for the N.C. State University 2012 Award for Excellence. He was honored as the EPA recipient of the Award for Excellence for the Office of Research, Innovation and Economic Development in March. University awards will be announced in June.

Voiland has announced his intention to retire in December 2012. A national search for his replacement as director of Sea Grant and WRRI has been launched.

In retirement, Voiland will turn his energies to his musical career as keyboardist with the local band MikeMickXer, his classic car hobby, and his volunteer activities with a number of nonprofit organizations.

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hydraulic fracturing on drinking water, but these studies are still underway so the results could not be considered.

Highlights of recommendations. The DENR study concludes that hydraulic fracturing can be done safely in North Carolina as long as the appropriate protections are in place before any permits to drill are issued. Specific recommendations include:

- Collect baseline data on environmental conditions prior to drilling, including groundwater, surface water and air, and conduct additional research on economic impacts and impacts to local governments and local infrastructure.
- Develop a regulatory program that will address oil and gas well-construction standards and fracturing pressures, setbacks and areas where no drilling can take place, stormwater regulations specific to the activity, and management of wastes.
- Require operators to have a water management plan that limits surface water withdrawals to 20 percent of 7Q10 streamflow, to disclose constituents of hydraulic fracturing fluids, and to avoid the use of diesel fuel in hydraulic fracturing fluids.
- Address issues of industry liability for contamination, clarify local government authority over oil and gas production activities, ensure state and local emergency blowout and spill preparedness, and identify funding sources to address local infrastructure impacts.
- Keep regulatory and permitting in DENR and address the distribution of oil and gas revenues for support of the regulatory and permitting programs.

[Additional public comments on the draft report were taken until April 2, 2012, and comments received were given consideration before publication of the final report on May 1. The report is available at: http://portal.ncdenr.org/web/guest/denr-study]

WRRI helps preach the new gospel of water loss control

In partnership with the State Water Infrastructure Commission (SWIC), Cavanaugh & Associates, Duke University's Nicholas Institute for Environmental Policy Solutions, the N.C. League of Municipalities and American Rivers, WRRI is helping to bringing the new message of water loss auditing and control to operators of public water systems in North Carolina.

New thinking on water-use accounting

According to the American Water Works Association (AWWA), "Every day in the United States over six billion gallons of water withdrawn from rivers, lakes and wells never reaches a billed customer." Water systems can make more efficient use of a scarce resource without reducing revenue by taking a new approach to controlling water losses, says AWWA.

Until about 10 years ago, the term "unaccounted for" was used within the water utility industry to designate water leaks from pipes, fire hydrant use, faulty meters, un-metered connections, water main breaks, and street cleaning. Water loss was tracked as the percentage of unaccounted-for water over total water supplied, and ten to fifteen percent loss was considered acceptable. Systems with higher losses were encouraged to focus efforts to control water loss on leak detection and repair.

However, in 2003, AWWA published *Applying Worldwide Best Management Practices in Water Loss Control*, which revealed shortcomings in the "unaccounted-for" approach and recommended a new approach developed over several years by the International Water Association. The IWA/AWWA Water Audit Method accounts for all water supplied to a distribution system and uses the term "non-revenue" to refer to all the different types of losses plus authorized unbilled consumption (water for firefighting, flushing, etc.) that typically occurs in water utilities. The report recommends using distinct performance indicators of apparent losses (customer meter inaccuracies, unauthorized consumption and systematic data handling errors), and real losses (system leakage) to assess a system's water loss standing. This method helps systems root out water theft, metering problems, and billing inaccuracies (which often represent a larger percentage of water loss and are cheaper problems to address), and target their water-loss efforts more strategically than simply focusing on leaks (which often represent only a small percentage of water loss and can be prohibitively expensive to address).

Water use accounting requirements in North Carolina

Currently, water systems in North Carolina must include in their Local Water Supply Plans information on unaccounted for water (basically, water supplied to the system minus water billed). However, as water becomes scarcer due to population growth and demand, the need to use water more efficiently will grow, as will the need for more sophisticated water-use accounting by utilities.

In 2011, the N.C. General Assembly passed House Bill 609 (SL2011-374) mandating (among other things) that Local Water Supply Plans include a plan for reducing the long-term per capita demand for potable water, and that the N.C. Department of Environment and Natural Resources provide statewide outreach and technical assistance regarding water conservation and efficiency, including development of best management practices. Among the best management practices to be addressed are regular water audits to identify revenue and nonrevenue water and water losses, and water loss abatement programs.

Efforts to introduce water auditing to N.C. utilities

For several years, N.C. SWIC's Water Audits Task Force, under the volunteer leadership of Steve Cavanaugh, has been searching for support to introduce the IWA/AWWA Water Audit Method and AWWA's free audit software to water systems in North Carolina. Last fall, with financial support from WRRI and planning support provided by WRRI's Nicole Wilkinson, Bill Holman of Duke University's Nicholas Institute for Environmental Policy Solutions, and Steve Cavanaugh and Will Jernigan of Cavanaugh & Associates, the state's first Water System Auditing and Loss Control Workshop was presented. Some 100 water system personnel from across the state attended, at a nominal fee. The workshop featured speakers from Philadelphia, the first system in the United States to apply the IWA/AWWA audit method; Georgia, where water auditing is now being required of medium and large systems; and North Carolina systems that have forged ahead with water audits on their own. The workshop also featured a demonstration of the IWA/AWWA water audit software by Will Jernigan.

Following up in January and March 2012, WRRI, the Duke Nicholas Institute for Environmental Policy Solutions, and the UNC Environmental Finance Center co-sponsored water auditing software training sessions in Raleigh and Chapel Hill. WRRI also helped the South Carolina Water Resources Center plan a Water Audit and Loss Control Workshop held May 7 in Columbia.

N.C. Division of Water Resources' simplified water audit software forthcoming

In response to SL 2011-374, The N.C. Division of Water Resources (DWR) has been working on a water efficiency Best

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Represented by Duke law clinic, Yadkin Riverkeeper presses State to assert ownership of Yadkin riverbed

Fast on the heels of a U.S. Supreme Court 9-0 decision affecting determination of ownership of riverbeds, the director of the Duke University Environmental Law and Policy Clinic (ELPC), on behalf of the Yadkin Riverkeeper, has asked the N.C. State Auditor to investigate the N.C. Department of Administration's (DOA) approach to inventorying state-owned submerged lands.

According to the request, the DOA has a statutory duty to inventory state property and "[w]ithout an inventory of the Yadkin River's state-owned submerged lands, the State cannot carry out its duties to defend the Public Trust resources of the River." The request, submitted to the State Auditor in February 2012, is the latest effort to support North Carolina's opposition to relicensing by the Federal Energy Regulatory Commission (FERC) of Alcoa Power Generating Inc's (APGI) operation of four dams on the Yadkin River.

Yadkin Hydroelectric Project

Until the late 1980s, APGI's hydroelectric operation on the Yadkin produced power exclusively for its Badin aluminum smelter, which was the largest employer in Badin and the nearby area. The State of North Carolina had supported the original FERC license issued in 1958 because the Badin smelter provided many jobs and economic benefit to the area. However, beginning in the late 1980s, smelter operations declined, and in a series of layoffs, most jobs disappeared. When Alcoa idled the Badin operation in 2007, its workforce had shrunk to fewer than 50.

In 2002, while operations at the Badin works were in steep decline, APGI began efforts to win renewal of its FERC license to operate the Yadkin Hydroelectric Project. Strong local opposition arose to the company's continued use of Yadkin waterpower to produce electricity that it now sells on the wholesale market for profit. In 2007, the N.C. Department of Environment and Natural Resources intervened in the nearly-complete FERC relicensing process, citing water quality issues, and in April 2008, APGI's FERC license expired. The company was then issued a one-year temporary license. In 2009, Governor Beverly Purdue filed a motion with FERC asking that the commission recommend recapture of the license. At this writing, FERC had not yet responded to the motion.

Relevant Supreme Court decision

Alcoa owns nearly 36,000 acres along the Yadkin River and asserts, that as a riparian owner, it also owns submerged lands under the river and lakes. Except for the fact that APGI is not a regulated utility, the situation is similar to the situation recently considered by the U.S. Supreme Court in *PPL Montana, LLC v. Montana*. In that case, the State of Montana asserted ownership of riverbeds on three rivers and wanted PPL Montana, a regulated utility, to pay rent. The utility also asserted ownership of riverbeds.

The question of ownership of riverbeds turns on the question of navigability at the time of statehood. If a river was not navigable "in fact" when a state became part of the United States, then private riparian landowners on either side of a river own the beds to the center of the river. In its recent ruling, the Supreme Court made it clear that to be considered navigable in fact, rivers must be—in their natural and ordinary condition at the time of statehood—"used or susceptible of being used . . . as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water." According to this ruling, fishermen in canoes don't count as evidence of commercial navigation.

Request to DOA for Declaratory Ruling

Anticipating the *PPL Montana v. Montana* ruling, Duke's ELPC Director Ryke Longest, as Counsel for the Yadkin Riverkeeper, had submitted in December 2011, a Request for a Declaratory Ruling to the N.C. Secretary of Administration asking that the secretary declare (among other things) that the State of North Carolina owns

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Management Practices (BMP) manual and will release a draft for public review this summer. Because a DWR survey indicated that some water systems found the IWA/AWWA water audit software too difficult to use, the agency has developed an alternate audit spreadsheet that will also be available for use by utilities in NC.

According to Nicole Wilkinson, plans are in the works for additional water audit software trainings in fall 2012 or spring of 2013 at which both the IWA/AWWA and DWR software versions will be demonstrated. Beyond these, WRRI will continue to partner with DWR, Cavanaugh & Associates, and SWIC to offer other trainings and forums as needed for teaching the software, sharing lessons learned among systems who have conducted or are thinking of conducting audits, and for advancing the practices of water auditing and loss control in our state.

2012 WRRI awards

The following research projects have been selected for funding for fiscal year 2012-2013 through WRRI's competitive proposal and review process.

- *Geophysical and water quality characterization of on-site wastewater plumes*
  Charles Humphrey, Department of Health Education and Promotion, East Carolina University

- *Optimizing soil-polyacrylamide interactions for erosion control at construction sites*
  Richard McLaughlin, Department of Soil Science, N. C. State University

- *Establishing a pre-drilling baseline of water-quality measurements in North Carolina before shale-gas extraction*
  Robert B. Jackson, Duke University Center on Global Change

- *Bioavailability and fate of organic nitrogen loading to Neuse River Estuary phytoplankton*
  Hans W. Pearl, UNC-Chapel Hill Institute of Marine Sciences

- *Nutrient retention and floodplain connectivity in restored Piedmont streams*
  Sara McMillan, UNC-Charlotte Civil Engineering Technology

- *Evaluation of the P balance of a restored, previously farmed wetland*
  Michael Vepraskas, Department of Soil Science, N.C. State University

- *An integrated framework for assessing the dynamics of population growth, land use and climate change for urban water resources management*
  Emily M. Zechman, Department of Civil, Construction and Environmental Engineering, N.C. State University

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the bed of the Yadkin River in trust for the people of North Carolina under the Public Trust Doctrine. Based on extensive research by students at the law clinic, the request traces evidence of navigability of the Yadkin from 1879. The request also traces a State title to the bed of the Yadkin from its origin in 1895 to its transfer in 1899 to the Yadkin River Power Company, with no evidence of further transfer of the title. The title included an obligation to pay rent for the riverbeds, although none was actually collected. In addition to providing evidence to support state ownership of Yadkin riverbeds, the request notes that the N.C. Constitution prohibits the State from granting monopolies or exclusive privileges except in consideration of public service, such as that provided by regulated public utilities.

In January 2012, Secretary of Administration Moses Carey, Jr. responded to the Request for Declaratory Ruling from the Yadkin Riverkeeper denying all requests on the basis that they do not ask for a ruling "as to the validity of a rule or as to the applicability to a given state of facts of a statute administered by the agency or of a rule or order of the agency."

Protecting State interests in riverbeds

In response to the denial of the Request for a Declaratory Ruling, Longest, on behalf of the Yadkin Riverkeeper, requested the audit of DOA. "It does not appear that [DOA has] a program for protecting the state's interests in these lands by maintaining an inventory of what the state actually owns. These are extremely valuable properties and their ownership is a matter of critical importance."

Longest warns that the Supreme Court ruling in *PPL Montana v. Montana* added to the law of navigability, suggesting that evidence that a state has not charged rent for land it thought it owned can be considered evidence that the state did not own the land and that the rivers were, therefore, not navigable. Says Longest, "North Carolina can no longer wait to be sued over ownership of our rivers; we must enforce those rights affirmatively, or lose them."

Duke's Amy Pickle appointed to N.C. Environmental Management Commission

Governor Beverly Purdue has appointed Amy Pickle, senior attorney for state policy at Duke University's Nicholas Institute for Environmental Policy Solutions, to the N.C. Environmental Management Commission (EMC) for a five-year term. Pickle replaces Dr. David H. Moreau whose term expired in June. Moreau, former WRRI director and retired UNC-Chapel Hill professor, served on the EMC for 19 years, 15 of those years as chairman.

Governor Purdue also reappointed Dickson Phillips to the commission and reappointed Stephen Smith as EMC chairman.

Upcoming Events

Save-the-Date for

The 15th WRRI Annual Conference
&
10th NCWRA Symposium

March 20-21, 2013
Jane S. McKimmon Center, Raleigh

NCWRA
North Carolina Water Resources Association

Upcoming luncheon forums:
September 10, 2012, Hydrofracking
December 3, 2012, Water Reuse

Download a brochure for registration by mail at:
http://ncsu.edu/wrri/code/events.htm

Register online at http://www.ncwra.org/

North Carolina-South Carolina-Georgia regional water conference

CONFLUENCE CONFERENCE

September 13-14, 2012
Greenville, SC

Sign up for email updates or check for details at:
http://www.confluence.cc/

North Carolina Forum on Nutrient Over-Enrichment

The Science, Economics, and Options for Proactive Public Policy

May 29-30, 2012
Sheraton Imperial Hotel & Convention Center
4700 Emperor Boulevard
Durham, NC 27703

The NC Division of Water Quality and the N.C. Environmental Management Commission are hosting this forum to provide a well-balanced review of the science, regulatory issues, economic considerations, and other policy issues related to nutrient over-enrichment and options for avoiding impairment to our surface waters.
The forum is organized by the N.C. State University McKimmon Center for Extension and Continuing Education:

http://www.ncsu.edu/mckimmon/cpe/opd/NCFONOE/index.html