New water degree program addresses complex interdisciplinary issues

Competition for clean water around the world intensifies year after year. Stressors such as climate change, land use, and changing demands on water resources call for a scientific understanding of the water cycle. Sustainable urban expansion requires an understanding of the interactions among water availability, water quality, culture, and society. Increasingly, solutions to sharing water in a sustainable manner require a mix of skills involving water science, law, economics, management, and related social sciences.

In response, the college has led the charge to create a new undergraduate degree in water. The bachelor of science program — titled Water: Resources, Policy, and Management — will provide students with a background in water science as well as law, economics, management, and the social sciences in one of the most innovative, interdisciplinary offerings in the country. In addition, it will position graduates for a wide spectrum of careers in private industry, federal and state agencies, and nongovernmental organizations.

“The timing of this new program could not be better, nor more urgent,” said Brian Richter, director of global freshwater strategies for The Nature Conservancy. “Job opportunities will await students upon graduation. Many corporations are now awakening to the water risks in their business operations and supply chains, and they are looking for help.”

Coursework for the water degree includes many opportunities for field study, helping to prepare students for future careers.

The degree’s academic home will be in the college’s Department of Forest Resources and Environmental Conservation. Four other Virginia Tech colleges — Agriculture and Life Sciences, Architecture and Urban Studies, Engineering, and Science — are partners, reflecting the program’s interdisciplinary nature. The degree will be initiated in the fall 2015 semester, building its curriculum from existing courses in 13 departments across campus.

In addition, seven new faculty members were hired specifically for their expertise related to water. They add to the university’s existing capabilities by exploring such subjects as the effects of climate change on agriculture, management of water and natural resources, transport of chemicals to surface water and groundwater, and development of decision-support tools to mitigate the negative impacts of human activities.

“In order to sustainably manage the resource, understanding the human side of water is as important as understanding the science,” said Stephen Schoenholtz, professor of forest hydrology and soils and director of the Virginia Water Resources Research Center, which is housed in the college.

Students in the water major will select one area of focused study from four water science specializations: aquatic ecosystems, hydrology, water quality, or water treatment and public health. They will choose another area of focused study from four water policy specializations: water, climate, energy, and global issues; watershed management; international water management; or water policy, planning, and economics.

Schoenholtz, who will coordinate the program with an advisory committee representing faculty from 10 departments, found strong, widespread support for the new degree program and interest in its future graduates. The program addresses an expected 18 percent job growth in positions requiring a comprehensive understanding of water issues. “It’s exciting to look at the jobs opening up in corporate sustainability in an array of companies such as MillerCoors, Coca-Cola, North Face, and Estee Lauder,” Schoenholtz said. “There is a strong outlook for jobs to meet the growing needs for sustainably managing water.”

The new water degree program, coordinated by Stephen Schoenholtz (second from right), is one of the most innovative, interdisciplinary offerings in the nation.

“The new degree is exactly the kind of curriculum innovation we need to address global challenges,” Dean Paul Winistorfer added. “We’ve brought together the many facets of water expertise on our campus to form what will surely be a leading national educational effort. The Winston-Salem Foundation was the first external partner to support the degree program with a donor-directed gift, and we are thankful for the growing financial support of this innovative program.”

The new water degree is already garnering philanthropic support from the alumni community. Alumnus Jeff Rudd (’83) is funding two endowments specifically for the interdisciplinary program. The Sustainable Water Scholarship is for juniors or seniors pursuing a water degree; recipients will be known as Sustainable Water Scholars. The Sustainable Water Undergraduate Research Fund will support undergraduate research projects, internships, and professional development opportunities.

Rudd recognizes the importance of preparing students to enter the rapidly growing field of water security. “The scientific and policy analysis of water resources, quality, and conservation are essential for the development of sustainability plans in both the public and private sectors,” he said. “The scholarship recipients will have a genuine opportunity to ‘Invent the Future’ during their careers and to reflect on the critical role of the College of Natural Resources and Environment in providing an early foundation for their success.”

Rudd earned bachelor’s degrees in biological sciences and philosophy from Virginia Tech and holds a doctorate in environment and resources. He currently runs a family investment business.

For more information visit waterdegree.fres.vt.edu or email waterdegree@vt.edu

Alumnus creates water endowments

For more information visit waterdegree.fres.vt.edu or email waterdegree@vt.edu

The Sustainable Water Undergraduate Research Fund will support undergraduate water-related research projects, internships, and professional development opportunities.

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Our most important work

There is little we do at the university more important than curriculum development. Formally, curricula are the prescribed courses that must be completed successfully to earn a diploma. Our curricula are the foundation of the university experience for our students. Students also engage in extracurricular activities (recreational sports, clubs) and co-curricular activities (activities that synergize, augment the curriculum, but typically are outside the classroom and not for credit, such as professional clubs, specialized training, or our college’s new Sustainability Institute, for which recruitment will begin this fall). To those outside the university, the nomenclature we use to describe our curricula leading to a diploma is often confusing. I want to clarify some of that language as we have brought much focus to this curriculum work in the college over the past five years.

Our cover story highlights the new bachelor of science degree titled Water: Resources, Policy, and Management. All degree programs are approved by the State Council of Higher Education for Virginia (SCHEV). Much planning, course development, and passage through many steps of university governance take place before a degree proposal is even sent to SCHEV for consideration. Any significant changes to an approved degree program must be reconsidered by SCHEV.

The degree name may not necessarily be the same as a student’s major. For example, students can earn a degree in fish and wildlife conservation, with a major in either fish conservation or wildlife conservation. Additionally, students can sometimes choose a concentration area — called an option or track — within a major, such as the marine fisheries conservation option in the fish conservation major. Not all majors are named differently from the degree, and not all majors have options or tracks available.

The student’s diploma includes the degree and major.

On the right, you can see the hierarchy of our current undergraduate offerings in the college. Why am I taking time to explain this? It can be confusing for students (and parents), future employers, and even for college alumni who are interested in our evolution. But the hierarchy and nomenclature are important to us as we focus on student learning, learning outcomes, and doing the very best job we can at offering contemporary, challenging, and rewarding degree programs. As we hire new faculty, our knowledge base changes and evolves. As the world around us changes, so must individual courses, options, majors, degrees, and, ultimately, the curricula. We have been vigilant these past few years in modernizing our curricula to offer our students the very best educational experience we can. We balance the evolution of our course content with respect for the strong foundational principles across our disciplines. It is hard work, it takes considerable time, and it sometimes moves slowly through the semester. We rarely talk of these details. I want you to know that at our foundation are our curricula, built from a composite of great courses in the college and across the university. We are very proud of our degree programs and equally proud of our faculty who deliver on our most important job: student education.

Paul M. Winistorfer
Dean
paulwestern@vt.edu

(Left to right): Forestry alumni Mike Mincher (’88), board member, and Easton Loving (’89), chair of the forest resources and environmental conservation department’s Advisory Board, recently met with Dean Paul Winistorfer, University Distinguished Professor Harold Burkart, and interim Department Head Jay Sullivan to begin the visioning process for an educational center at the college’s Fishburn Forest property near campus to enhance on-site learning and research.

New approach to student projects promotes passion, learning for its own sake

For two years, Assistant Professor Tim Baird has instructed his students to “skip class, do anything you want, and give yourself a grade.” It turns out the strategy promotes passion, learning for its own sake and self-regulated learning, which ultimately kills passion and undermines learning,” said Baird.

Taking a lesson from “Drive,” Daniel Pink’s book about motivation, Baird told students in his second-semester sustainability course to go learn about something that fired them up, present it to the class, and then tell him how well they thought they learned about their chosen topic. He called the exercise, which took place three times during the semester, “Pink Time.”

“Students pursued an incredible diversity of activities,” Baird said. “They brought their passions into the classroom and imbued them with lessons from the course. They are thinking more critically about assessment and recognize that learning takes place all the time.”

Examples of Pink Time projects included interviewing a professor about life in Appalachia, making cross-country skis from wood, mapping the social networks for “The Walking Dead” television show, developing a mobile phone app to reduce waiting times for forest harvest operations, and accounting for the energy consumed by the university’s building systems.

“Before beginning their Pink Time assignments, we took a draft assessment tool to the students and incorporated their feedback into the final tool. In this way, the tool was co-designed with students,” said Baird. The projects were assessed based on choice, complexity, effort, persistence, and curiosity in the three categories of students’ learning; developing, competent, and exemplary.

By the third exercise, 84 percent of students reported that they were doing complex projects and 79 percent reported exhibiting exemplary curiosity. “Students pursued their interests by spending more time on them and learning about them in increasingly diverse and integrative ways,” Baird said. “There was an increased sense among the students that they were responsible for their learning and that learning occurs everywhere.”

“Self-regulated learning is an effective way to harness students’ interests and sense of themselves, and to place them within the purview of a course in a way that promotes engagement, critical thinking, and a more tightly held and personal value for education,” he concluded.

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Tim Baird (center) found that students’ projects increased in complexity and creativity over the course of the semester. Photo by Christine O’Connor.

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VIRGINIA TECH CNRE NEWS 2
MWV gift continues support for natural resources assessments

International packaging leader MWV (formerly MeadWestvaco), a long-time college partner, continued its support with a $100,000 gift to the Center for Natural Resources Assessment and Decision Support. “This gift represents the third year of MWV’s support for the center, which enables us to continue efforts to improve our assessments of the natural resources upon which so many in our state depend for recreation and livelihood,” said Stephen Prisley, center director. MWV is one of a number of industry partners providing leadership support to the newly formed center, which provides stakeholders in Virginia agencies and industries with improved data models, and analytical techniques to assess the status and trends of natural resources such as wood fiber, water, and biodiversity.

“The work the center is doing is exactly what the southeastern U.S. needs during this time of substantial demand increase on small-diameter pine,” said Kirby Funderburke, director of wood supply strategy for MWV. “Our focus is to support the center in working with colleges throughout the South to provide scientifically sound resource modeling and assessments.”

MWV’s support of the college spans several decades. MWV has been a member of the Forest Productivity Cooperative since the cooperative’s inception in 1988, and has funded numerous research projects on sustainable forestry and land management. Dozens of graduate students have been housed at MWV facilities while conducting site work, and MWV employs many graduates in land management and procurement positions. Most importantly, MWV has provided the land base and silvicultural treatments for several large-scale and long-term projects — some involving thousands of acres as long as 15 years!

“MWV’s philanthropy is as vital as ever to business and society, and we look forward to building our relationship in a strategic and collaborative way,” said Emily Hutchins, the college’s development director. “Support from MWV and other center partners such as RockTenn, which has since merged with MWV to form RockRock, allows our faculty and students to directly engage with industry to find pro-active solutions and make smarter decisions for our natural resources, which in turn makes their businesses more sustainable.”

Growth in Virginia’s forests exceeds harvest but demand for younger trees grows

Growth in Virginia’s forests exceeds harvests, which is good for carbon sequestration and forest sustainability, according to the college’s Center for Natural Resources Assessment and Decision Support. However, the center’s assessment of the commercial wood supply in Virginia revealed significant pressure on smaller-diameter trees commonly used for manufacturing paper, wood pellets, and some wood composites. The center focused its research on the privately owned forest resource, which provides over 85 percent of the state’s commercial wood supply. “Virginia’s private forests annually grow 86 percent more wood than is harvested, leading to increasing inventories and ongoing removal of carbon from the atmosphere in excess of what is used for products and energy,” said Stephen Prisley, center director.

In addition, however, harvest of smaller trees, termed pulpwood, exceeded growth by 2.4 million tons in 2011. Demand for pulpwood is increasing owing to its use as a renewable energy source, such as feedstock for electricity production both in Virginia and overseas. “If demand for one portion of the forest resource continues to exceed growth, supply shortfalls will lead to higher costs for buyers and impacts on other related resources,” Prisley explained. “For example, increased competition for pulpwood means that buyers may have to seek out higher priced trees that are suitable for lumber, impacting those markets as well.”

The assessment report points to opportunities that exist for active forest management, accelerated reforestation, and increased outreach and support for private forest landowners to mitigate the long-term impacts of this situation. Research in the college has shown that more intensive management will dramatically increase forest productivity, “but such efforts are time critical, since there is a lag between implementation and harvest,” Prisley said. View the report at cnre.vt.edu.

Outstanding recent alumni

Matthew Brinkman (‘08 B.S., ‘10 M.S. forestry) received this year’s Outstanding Recent Alumnus Award. As the Forest Productivity Cooperative’s youngest alumnus, Brinkman is currently the mid-Atlantic regional science coordinator for the American Chestnut Foundation.

Since graduating, Brinkman has made remarkable strides worthy of recognition. He first joined the Department of Forest Resources and Environmental Conservation as an Extension project associate. Among his many accomplishments, he carried out a statewide project focused on reducing the barriers to participation in forest certification among private forest landowners. His leadership in the formative stages of the project led to an additional $50,000 in funding to build on his achievements.

Brinkman joined the American Chestnut Foundation in 2012 and has been blazing a trail of success ever since. He is a leader in the organization, having taken several projects under his wing, and is critical to the success of efforts to repopulate eastern forests with healthy and viable chestnut trees.

Outstanding graduates

Graduating senior: Ashley Lohr
Hometown: Purcellville, Virginia
 Majors: Wildlife conservation (entomology minor)
 Main accomplishment: Getting involved with various research projects was one of the best things I did at Virginia Tech. I participated in two Summer Undergraduate Research Fellowships in entomology and served as a mentor in the program during my second year. I worked on several projects with Dr. Marcella Kelly, such as camera trapping and black bear research, and traveled to Belize for her project analyzing jaguar dens. I am so grateful for the experience I have gained so far, and I know it will serve as a solid foundation for future jobs and graduate school.

Master’s Student: Ashley Athey
Hometown: Danville, Virginia
 Major: Geography (meteorology)
 Research focus: My thesis research was born from my experience as a weather analyst with a private weather company, Meteorological Connections LLC. For my research I have assessed the accuracy of satellite-derived precipitation estimates across the country using the NEXRAD data. This research will work towards improving the accuracy of satellite-derived precipitation products for remote mountainous regions.

Doctoral Student: Wei Zhang
Hometown: Wenzhou, China
 Major: Sustainable biomaterials (macromolecular science and engineering)
 Research focus: I worked on the isolation, purification, and structural characterization of wood polymers after processing the wood on polymer extrusion equipment. The purpose is to understand how the thermal energy combined with a ‘protectant’ solvent changes molecular connections while preserving the backbone structure of bio-macromolecules. The isolated biopolymers with specific functionality have potential applications as synthetic polymer replacements. Results of my additional research on biomass conversion to liquid fuel like ethanol indicated that biomass can be efficiently transformed into sustainable feedstock for biofuel production, as well as used to isolate high-quality fiber.

Awards and Honors

The college honored some of its most accomplished students, prominent alumni, respected faculty, and cherished friends at this year’s Annual Awards Recognition Celebration. View the complete list of 2014-15 awards and recipients at cnre.vt.edu/events/awards-recognition-celebration/2015-awards-recognition-celebration-program.pdf. Among the many honors presented are those highlighted here.

Outstanding recent alumni

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Sullivan named interim department head

Sullivan intends to continue to build on the strong foundation established by his predecessor, Janaki Alavalapati, who is now dean of the School of Forestry and Wildlife Science at Auburn University. “During this interim period, I hope to guide us in continuing to serve our students, the commonwealth, and clientele through our strong leadership role in matters of forestry and the environment,” he said.

The college will launch an international search for its next department head in early fall. “The department is considered one of the leading academic forestry programs in the world, and identifying talent to lead us into the future is very important,” Winistorfer said.

Sue Snow retires

Congressman Morgan Griffith tours the college’s Freshwater Mollusk Conservation Center this spring to see firsthand the research going on and to learn about the long-term project of cultivating endangered mussels and planting them in their native rivers to revitalize those habitats. Griffith was briefed on the success of the conservation efforts, the life cycle of mussels, and how the project is restoring habitats in the coalfields.

In attendance were Restoration Biologist Jess Jones, who co-directs the center, and his U.S. Fish and Wildlife Service partners Supervisory Biologist Susan Lingenfelser and Field Supervisor Cindy Schulz, as well as Dean Paul Winistorfer and Professor Eric Hallerman. Several other faculty and graduate students provided background on the restoration programs and how they are conserving the Upper Tennessee River Basin biodiversity, especially in the Clinch and Powell rivers of southwestern Virginia.

DGIF winter meeting held at Virginia Tech

Congressman Morgan Griffith visited the college’s Freshwater Mollusk Conservation Center last week for his first time in March. Board Chairman Ben Davenport, a former Virginia Tech rector, wanted to give the college an opportunity to showcase its programs for the board members and DGIF staff. The college hosted a reception that featured posters highlighting research in its Department of Fish and Wildlife Conservation.

“IT is good for us to get out in the field where a lot of our fishermen and hunters reside,” said Dave Whitehurst, director of DGIF’s Bureau of Wildlife Resources. “It also makes it a little easier for them to attend if they want to make comments.”

Research uncovers virtual treasure trove

Research led by Associate Professor Phil Radtke has “rediscovered” a virtual treasure trove of historical measurements of standing and felled trees, including volume, biomass, carbon contents, and component measurements, as well as root dimensions, weights, and chemical contents. Records from over 140,000 trees have been recovered from files that had been largely forgotten on old computer tapes or paper files tucked away in storage facilities, research labs, libraries, offices, and field stations around the United States.

Measurements recorded back to 1898 have been located and preserved, with efforts underway to compile them into a nationally consistent database for use in improving assessments of the nation’s forest resources. A cadre of students is working closely with Research Associate David Walker, with financial support from the U.S. Forest Service and forest industry, to recover legacy data using document scanning, optical character recognition, and old-fashioned keyboard data entry to find and recover as many of these valuable records as possible before they disappear altogether.
Student chapter hosts Southeastern Wildlife Conclave
Members of The Virginia Tech Wildlife Society hosted teams from 22 regional colleges and universities for the Southeastern Wildlife Conclave March 12-15 at the W.E. Stovall 4-H Education Center at Smith Mountain Lake. The event was packed with presentations, speakers, workshops, field trips, and competitions of physical, intellectual, and artistic prowess, including identifying and keying out botanical and biological specimens, demonstrating proficiency with rifle and bow, maneuvering an obstacle course, navigating an orienteering course, and fielding questions in the marathon-session Quiz Bowl. It also featured 15 workshops run by graduate students and faculty as well as professionals from partner agencies and organizations.

The host chapter cannot participate in the competitions, but the Virginia Tech students, who spent months planning and organizing every detail, maintained an active presence as they worked together to staff, judge, and facilitate the event. "Staging an event of this size requires dedication, passion, and a desire to satisfy the more than 400 students, faculty, guest professionals, and volunteers who attended," said Ashley Lohr, president of Virginia Tech’s student chapter. "The days were very busy, and at the same time, incredibly fulfilling."

"There is quite a bit of competition at the conclave, but it’s all in good fun," said Emily Ronis, conclave chair. The University of Tennessee team took first place overall, followed by the University of Georgia and Frostburg State University.

Howey takes first place for poster
Geography master’s student Catherine Howey of Roanoke, Virginia, an intern for Blacksburg Transit and the New River Valley Metropolitan Planning Organization (NRV-MPO), earned the first place poster award at the annual Virginia GIS Conference last fall. Her poster showcased the MPO-funded Regional GIS Transit Portal, a website dedicated to transit mapping information, including regional bus routes and stops.

"Ms. Howey’s poster explained the development and impact a transit GIS portal can have on providing accurate public transportation data within the New River Valley area," said Erik Olsen, transportation planner for Blacksburg Transit and NRV-MPO.

Two geography majors earn NOAA scholarships
Two sophomores have been awarded prestigious Ernest F. Hollings Scholarships by the National Oceanographic and Atmospheric Administration. Christopher Gerlach of Alexandria, Virginia, a double major in meteorology and geography, and Gina Li of Herndon, Virginia, a double major in geography and computer science, each received a two-year scholarship and a 10-week summer internship position at a NOAA facility in summer 2016.

"I would like to pursue an opportunity in the study of severe convective weather," Gerlach said of his internship, "particularly one focused on the application of terrestrial and satellite remote sensing or sounding observation to weather prediction." His future plans include graduate school followed by work at a research facility such as the National Severe Storms Laboratory or the Center for Severe Weather Research.

For her internship, Li said, "I would love to study urban areas using GIS and remote sensing and build models to provide city planners with useful tools, as part of my computer science major, so I can use my geography major, and build useful tools, as part of my computer science major, so that people may access and share information alike." Li also plans on attending graduate school, in a technical field such as GIS or computer science.

Reed takes command of Corps of Cadets
Junior meteorology major Samantha Reed of Manassas, Virginia, accepted command of the Virginia Tech Corps of Cadets at the Pass in Review on the Drillfield in May. Reed, who is also pursuing minors in leadership studies and statistics, is a member of Air Force ROTC and is a recipient of the Nicholas D. Street ’53 Emerging Leader Scholarship.

Reed will serve as regimental commander, in charge of every cadet in the corps, for the fall 2015 semester. She and other top corps leaders are chosen through a rigorous interview and selection process that examines each leader’s entire cadet career.

"Assuming command of the regiment at the change of command ceremony was just the start of this huge responsibility I’ve been given," she said. "I’m really excited to get to experience this amount of leadership and to grow as a leader."

Wildlife students win Steger Poetry Prizes
Sophomore wildlife conservation major Gretchtn Gookee Doe of Manassas, Virginia, took first place in Virginia Tech’s 10th annual Steger Poetry Prize. Michelle Wright of Norfolk, Virginia, a freshman wildlife conservation major, earned third place in the competition, established in 2005 by Charles W. Steger, Virginia Tech’s president at the time. Nikki Giovanni, world-renowned poet and University Distinguished Professor of English, presented the awards.

"Whole," Gookee Doe’s winning entry, "is a poem about me accidentally slicing my palm open and getting five stitches while in a state of weary, existential sleep deprivation," she explained. Although Wright said her entry, “Spoken Word: To Be Woman,” means different things to her at different times, “I think the overall theme of it is strength in the face of weakness, allowing yourself room to just exist, and be okay with, letting yourself know it’s okay to take up space as a woman.”

Steger, now president emeritus, funds the prizes and participates in the event where the top 10 poems are read. This year, he increased the top cash prize to $1,100, making the purse the most generous in the world for undergraduate poetry competitions.

Nelson captures writing award
Freshman wildlife conservation major Christina Nelson of Purcellville, Virginia, won first place in the annual VOWA (Virginia Outdoor Writers Association)/Dominion Collegiate Undergraduate Writing Contest. Nelson wrote about a hunting trip that changed the way she thought about nature in her essay “Into the ‘Real’ World.” She also submitted a hand-drawn sketch of a deer to complement her writing. “Writing this essay about my experience really helped me think through quite a few personal questions that I have had about my future in wildlife studies,” Nelson explained. “Only after reflecting on it through writing my essay did I realize that those types of questions can only be understood through experience.”

“This experience broadened and deepened my understanding of the natural world, and I look forward to seeing where it takes me,” she continued. “I have always wanted to incorporate creativity into my love of the outdoors, and it was very encouraging to be able to participate in a contest that allowed me to combine the two!”

Three Virginia Tech students win Steger Poetry Prizes
Michelle Wright (left) with President Emeritus Charles W. Steger.

First-place winner Gretchtn Gookee Doe (right) with Nikki Giovanni.
Popular wilderness area requires intensive management to remain natural

Approximately 265,000 annual visitors to Minnesota’s Boundary Waters have a significant impact on the campsites along the area’s 1,000 lakes in America’s most visited wilderness area. In 1982, Jeff Marion, now an adjunct professor and recreation ecologist, surveyed 96 of the wilderness area’s 2,200 campites for his doctoral research. He returned with a team in July 2014 to document the impact of continued use on these sites and to measure recovery on sites that had been closed.

“In addition to documenting over three decades of camping impacts, this study is focused on helping managers make recreational visitation more sustainable,” said Marion. An important finding is that the impact of site use levels off. “It’s better to have a small number of well-used campites than to disperse use and impact across a large number of sites.”

Vacuum-steam treatment for pests more efficient, less costly

Current treatment methods to kill invasive pests in wood and wood products use either chemicals or extreme heat. Research Scientist Zhenhui Chen and Professor Emeritus Marshall White have developed a vacuum-contained steam method that is just as effective. In a test with firewood from ash infested with the invasive emerald ash borer, their method proved successful at killing all of the insect’s life stages and took less than half the time and 25 percent less energy than the heat treatment currently required by the U.S. Department of Agriculture. The portable treatment system, which can fit in a pickup truck bed, can be used to treat firewood, pallets, and other wood products on site. A larger, rigid unit that fits in a truck trailer to treat logs and large amounts of firewood is under development.

Researchers have applied the same technology to eradicate invasive snails from sites. The snails crawl onto pallets stored outside Mediterranean tile facilities and then burrow into the packaging materials once the pallets are loaded. After shipment to the U.S., the snails, which eat a number of plant species and can carry parasites, escape at ports and other locations along the distribution chain. The researchers are working with the USDA Animal and Plant Health Inspection Service to determine the right combination of vacuum and steam to kill the snails while preserving the integrity of the product, the packaging, and the pallets. The technology is also being tested for its effectiveness on diseases that affect trees, such as oak wilt and thousand canker disease.

Patches of groundwater responsible for nitrogen loss from forests

Researchers found that even during summer dry spells, isolated patches of soil in forested watersheds remain waterlogged at depth and act as hot spots of microbial activity that remove nitrogen from groundwater and return it to the atmosphere. Most nitrogen is deposited by rain. Temperate forests receive much larger inputs of nitrogen from the atmosphere than they export to streams. Once nitrogen leaves the forest in streams, it can become a water pollutant.

The process of denitrification — a gaseous loss of nitrogen to the atmosphere — is difficult to measure. Since it removes nitrogen from water, it can improve water quality in downstream lakes and streams. However, nitrogen is also an important nutrient for plant growth in the forest, so removals of nitrogen by natural processes can reduce the forest productivity.

The researchers, from Virginia Tech, Cornell University, and the Cary Institute of Ecosystem Studies, measured the presence of nitrate, a form of nitrogen that is highly mobile and reactive in the environment. They then determined whether the nitrate is a result of atmospheric deposition or microbial conversion, and discovered that there is nitrogen loss to the atmosphere by looking at nitrate at the atomic level.

“Some work remains to be done, but the aim is to be able to develop a better sense of where and how nitrogen is processed in the environment and to be in a position to predict how changes in climate affect nitrogen cycling and water quality in forested ecosystems,” said Kevin McGuire, associate director of the Virginia Water Resources Research Center. The team’s findings were reported in the Proceedings of the National Academy of Sciences.

Are cellulose nanocrystals harmful to human health?

Are cellulose nanocrystals harmful to human health? The answer might depend on the route of exposure, according to a review of the literature by Associate Professor Maren Roman. But there have been few studies and many questions remain.

Writing in the journal Industrial Biotechnology, Roman pointed out discrepancies in studies of whether cellulose nanocrystals are toxic when inhaled or to particular cells in the body. She said that more studies are needed to support scant research results that the nanocrystals are nontoxic to the skin or when swallowed.

Cellulose nanocrystals are produced from renewable materials, such as wood pulp. Biocompatible and biodegradable, the low-cost, high-value material is being studied for use in high-performance composites and optical films, as a thickening agent, and to deliver medicine in pills or by injection. But before a material can be commercialized, its impact on the environment and human health must be determined.

Roman reviewed published studies about the effects of cellulose nanocrystals on the respiratory system, gastrointestinal system, skin, and cells, and found conflicting results. “The discrepancies in the results are not surprising,” she said, “considering that the studies all used different cell lines, cellulose sources, preparation procedures, and post-processing or sample preparation methods.”

She was also critical of much of the research for overlooking chemicals that may be present in cellulose nanocrystals from prior processing. “Only by careful particle characterization and exclusion of interfering factors will we be able to develop a detailed understanding of the potential adverse health effects of cellulose nanocrystals,” Roman concluded.

Vacuum treatment system for firewood fits in the bed of a pickup truck.
Jason Henderson head chef for Captain D’s

Jason Henderson (’96 B.S. fisheries science) creates recipes, supervises a test kitchen, and travels around the country demonstrating fish cookery for the media — all part of his job as vice president of product innovation and head chef for Captain D’s, a regional seafood restaurant chain.

How did he land this fine job? By following his interests. “I didn’t have a master plan,” said Henderson, who grew up in Blackburg. “I got my first job as a teen because I liked the Hobby Shop’s comic books. The owner put me downstairs, with the aquariums. I got to know recirculating water systems pretty well.”

Henderson was lured into Virginia Tech’s fisheries program after visiting its aquaculture lab, where he recognized familiar recirculating systems. After graduation, while pondering his next move, he worked at Gillie’s Restaurant downtown. In fact, he created a smoked salmon pasta entrée, “Smoked Henderson,” that still appears on the menu.

Henderson realized he liked cooking fish as much as raising them, so he studied at the Culinary Institute of America in New York. For the next several years he traveled — he cooked in Germany, prepared French food at Disney’s Epcot Center, worked as a seafood broker, and helped the U.S. military establish restaurants at bases around the globe.

He then worked as a research and development chef for Applebee’s and AMC Theaters before joining the management team at Captain D’s three years ago. The chain, based in Nashville, has 520 restaurants, mostly in the Southeast. He also served as president of the International Corporate Chefs Association.

Henderson is glad to be concentrating on fish. Although many Americans may not yet recognize all the health benefits of seafood, he sees a big potential for growth in fish consumption. “Eating a seafood twice a week reduces your risk of dying from heart disease by 36 percent,” he said, citing statistics from the Seafood Nutrition Partnership.

Captain D’s serves a mix of wild-caught and farm-raised fish, and Henderson vouches for the quality of all the fish, much of it Alaskan pollock. The restaurants also use regionally farmed catfish, tilapia, white fish, and shrimp. “We’re known for our battered fish,” Henderson said. “People in the Southeast also like things braised in comimue and fried, with a bit of Cajun spice.”

But Captain D’s customers also like variety, and this keeps Henderson and his staff busy experimenting with the likes of parmesan encrusted tilapia, lobster bites, and grilled fish with rosemary sugarcane dressing or Bourbon glaze. The company’s new “9-Dish Meals” feature five meals under 500 calories, sparking a 25 percent increase in grilled menu items.

And when something new appears on the menu, it’s often promoted on table-tent cards bearing Henderson’s picture. With his media appearances, cooking demos, and his family-friendly foods like Crab Bites and Funnel Cake Stix, Henderson has become an integral part of the friendly face of Captain D’s.

Greene named dean of Georgia’s forestry school

W. Dale Greene (’83 M.S. forestry) has been named dean of the University of Georgia’s Warnell School of Forestry and Natural Resources. A faculty member at the school since 1986, Greene previously served as Warnell’s associate dean for academic affairs and had been interim dean since January.

Greene’s research focuses on enhancing the productivity and sustainability of the wood supply system. He has been active in the Council on Forest Engineering, Forest Resources Association, Forest Products Society, and Society of American Foresters and served as chairman of the Georgia State Board of Registration for Foresters. He has received all three teaching awards given by the Warnell School and has been honored by the Georgia Forestry Association for his service.

Greene has helped to develop some of the school’s most popular courses, including an off-campus forest field practicum where undergraduate students gain hands-on experience with forest harvesting, processing, and manufacturing operations. His research has been funded by nearly 50 grants from industry and agencies, including the U.S. Forest Service.

A native of the piney woods region of southern Arkansas and northern Louisiana, Greene earned his bachelor’s degree from Louisiana State University and his doctorate from Auburn University. His wife, Jeanna Wilson, a University of Georgia poultry science professor, earned her bachelor’s and master’s at Virginia Tech.

“Receiving the Cross Leadership Award is especially meaningful to me,” Warren said. “I was very fortunate to attend graduate school at Virginia Tech because it provided the foundation for my successful career in academia and the wildlife profession. Not only did I receive an exceptional education in wildlife science, but the faculty and my fellow graduate students served as role models and mentors who inspired me to achieve my fullest potential as a wildlife biologist.”

Warren’s research interests include the ecology and management of wildlife populations, especially in parks and urban/suburban areas; predator ecology; and management; wildlife damage management; and wildlife physiology, nutrition, and genetics.

Professor Emeritus Gerald H. Cross, head of what was then called the Department of Fisheries and Wildlife Sciences from 1976 to 1989, created a continuing education program focusing on leadership development for Forest Service professionals. Approximately 1,000 natural resource professionals have participated in the program since 1988. The leadership that Cross demonstrated inspired the creation of his namesake award, whose recipients are recognized for their dedication and outstanding achievements in leading others.

Warren receives Cross Alumni Leadership Award

Robert J. “Bob” Warren (’76 M.S., ’79 Ph.D. fisheries and wildlife sciences) received the Gerald H. Cross Alumni Leadership Award from the Department of Fish and Wildlife Conservation and the college’s Leadership Institute. Warren, a career-long educator, has served on the faculty of the University of Georgia’s Warnell School of Forestry and Natural Resources since 1983 and was named a Josiah Meigs Distinguished Teaching Professor in 1999.

Recent posts

Richard Bullard (’76 B.S., ’77 M.S.)
Steven Bullard (’83 Ph.D.)
Brian Carey (’00 B.S.)
W. Lee Daniels (’78 B.S.)
Paul Johansen (’81 M.S.)
Edwin Jones (’79 B.S., ’83 Ph.D.)
Bettina Ring (’86 B.S.)

In memoriam:
Edward Dixon Lott (’51 B.S.)
Sidney G. Oaksmith (’78 B.S.)
Charles Walker (’75 B.S.)

Alumni events

Alumni Events Calendar

September 12, 2015
NCRE Homecoming and Tailgate
Virginia Tech vs. Furman
Cheatham Hall, Blacksburg, Virginia
alumni.vt.edu/reunion/cnre

October 5-9, 2015
National States Geographic Information Council
Annual Conference
Kansas City, Missouri
nugis.org

October 15-18, 2015
North American Association for Environmental Education
44th Annual Conference
San Diego, California
naeee.net

October 17-21, 2015
The Wildlife Society 22nd Annual Conference
Winnipeg, Manitoba
twesconference.org

November 1-4, 2015
Southeastern Association of Fish and Wildlife Agencies
Annual Conference
Auburn, Georgia
seaafa.org

November 3-5, 2015
North American Association 42nd Annual Conference
Little Rock, Arkansas
naturalareas.org

We love hearing about the great things going on with our alumni, but we don’t have enough space in the newsmagazine to print them all. Catch up with former classmates and fellow Hokies online; scan the QR code or visit cnre.vt.edu/tags/aluminnl.html.

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Habitat degradation and deforestation, recognized as principal threats to wildlife globally, have especially destructive implications on the island nation of Madagascar — four out of five of its plant and animal species are found nowhere else in the world. But a graduate student’s camera-trap project reveals that unsustainable hunting practices and human-associated predators, including dogs and cats, are responsible for range contractions and possible population declines of native species — even if the forest is intact and protected — leaving behind a phenomena biologists call an “empty forest.”

Wildlife conservation master’s student Asia Murphy worked in Madagascar’s Masoala-Makira protected area complex, the largest tract of intact rainforest remaining on the island. Her work elaborated on a five-year-study coordinated by her co-advisors, associate professors Marcella Kelly and Sarah Karpany. The larger project, which logged 16,000 trap nights — the equivalent of one camera station running for nearly 45 years, is one of only a few efforts to study lemurs for longer than five years in northeastern Madagascar. Murphy’s work was the first to study the effect of habitat degradation, principally caused by deforestation for rice production, on lemurs and birds.

Collecting camera-trap data in both intact and degraded forests, Murphy determined how habitat degradation and the presence of exotic predators affected 23 species of lemurs, tenrecs (small mammals native to Madagascar), and ground-dwelling forest birds. Of those species, seven are listed as either endangered or critically endangered. Murphy said, “If you want to get some food, you don’t go to a store that barely has anything on the shelf. You go to a store with stocked shelves so you can choose what you want, and you can get as much as you want.”

Farris also found that invasive carnivores — including domestic dogs, feral cats, and the introduced small Indian civet — were often found in high numbers in intact forests, increasing the chances of negative interactions between native and invasive carnivores. In particular, Farris determined that the threatened Malagasy civet, a native carnivore, was less common in areas with high rates of feral cat activity.

Murphy’s work elaborated on the negative influence of feral cats, discovering that when feral cats were present, the likelihood of finding native bird species was reduced. She describes her findings as providing a more 3-D view of the loss of wildlife occurring in the protected Masoala-Makira forests. “Although there is plenty of forest out there, wild populations still seem to be declining, including in intact forests,” she explained. “We’re seeing that it’s not only the carnivores and lemurs, which are very charismatic and relatively well-studied, that are being threatened by habitat degradation, hunting, and non-native species; it’s the birds and tenrecs, too.”

To slow declines in native wild populations, Murphy recommends integrated socioeconomic measures such as improving food security, increasing access to birth control, and emphasizing the inclusion of locals at every level of wildlife management, including the encouragement of locally led conservation and research initiatives. Exotic predators such as feral cats also need to be removed from the forests, and village cats should be spayed or neutered.

Dedicated to communicating complex science to a broad audience, Murphy launched a website (www.anatiala.com) and is also on Twitter @anatiala. “Anatiala” means “in the forest” in Malagasy, the language of Madagascar. “I hope to take nonscientists inside the forest and show them the realities of wildlife conservation and research in an international setting,” she said.