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RALEIGH — Observed in the wild, tucked away in museum collections, and even exhibited in zoos, is one mysterious creature that has been a victim of mistaken identity for more than 100 years. A team of scientists — including Dr. Roland Kays, of the North Carolina Museum of Natural Sciences and a professor in the FWCB program at North Carolina State University — however, uncovered overlooked museum specimens of this remarkable animal. Their investigation eventually took them on a journey from museum cabinets in Chicago to cloud forests in South America to genetics labs in Washington, D.C. The result: the olinguito (*Bassaricyon neblina*) the first carnivore species to be discovered in the Western Hemisphere in 35 years. The team’s discovery is published in the Aug. 15 issue of the journal ZooKeys.

The olinguito (oh-lin-GHEE-toe) looks like a cross between a house cat and a teddy bear. It is actually the latest scientifically documented member of the family Procyonidae, which it shares with raccoons, coatis, kinakinjous and olings. (Olinguito means “little olingo.”) The 2-pound olinguito, with its large eyes and woolly orange-brown fur, is native to the cloud forests of Colombia and Ecuador, as its scientific name, “neblina” (Spanish for “fog”), hints. In addition to being the latest described member of its family, another distinction the olinguito holds is that it is the newest species in the order Carnivora — an incredibly rare discovery in the 21st century.

“The discovery of the olinguito shows us that the world is not yet completely explored, its most basic secrets not yet revealed,” said Kristofer Helgen, curator of mammals at the Smithsonian’s National Museum of Natural History and leader of the team reporting the new discovery. “If new carnivores can still be found, what other surprises await us? So many of the world’s species are not yet known to science. Documenting them is the first step toward understanding the full richness and diversity of life on Earth.”

Discovering a new species of carnivore, however, does not happen over-
night. This one took a decade, and was not the project’s original goal — completing the first comprehensive study of olingos, several species of tree-living carnivoires in the genus Bassaricyon, was. Helgen’s team wanted to understand how many olingo species should be recognized and how these species are distributed — issues that had long been unclear to scientists. Unexpectedly, the team’s close examination of more than 95 percent of the world’s olingo specimens in museums, along with new DNA testing and the review of historic field data, revealed existence of the olinguito, a previously undescribed species.

The first clue came from the olinguito’s teeth and skull, which were smaller and differently shaped than those of olingos. Examining museum skins revealed that this new species was also smaller overall with a longer and denser coat; field records showed that it occurred in a unique area of the northern Andes Mountains at 5,000 to 9,000 feet above sea level — elevations much higher than the known species of olingo. This information, however, was coming from overlooked olinguito specimens collected in the early 20th century. The question Helgen and his team wanted to answer next was: Does the olinguito still exist in the wild?

To answer that question, Helgen called on Dr. Kays, director of the Biodiversity Lab at the North Carolina Museum of Natural Sciences and professor in the College of Natural Resources at North Carolina State University, to help organize a field expedition.

“The data from the old specimens gave us an idea of where to look, but it still seemed like a shot in the dark,” Kays said. “But these Andean forests are so amazing that even if we didn’t find the animal we were looking for, I knew our team would discover something cool along the way.”

The team had a lucky break that started with a camcorder video. With confirmation of the olinguito’s existence via a few seconds of grainy video shot by their colleague Miguel Pinto, a zoologist in Ecuador, Helgen and Kays set off on a three-week expedition to find the animal themselves. Working with Pinto, they found olinguitos in a forest on the western slopes of the Andes, and spent their days documenting what they could about the animal - its characteristics and its forest home. Because the olinguito was new to science, it was imperative for the scientists to record every aspect of the animal. They learned that the olinguito is mostly active at night, is mainly a fruit eater, rarely comes out of the trees and has one baby at a time.

In addition to body features and behavior, the team made special note of the olinguito’s cloud forest Andean habitat, which is under heavy pressure from human development. Computerized mapping of museum records allowed the team to estimate that 42 percent of olinguito habitat likely has already been converted to agriculture or urban areas.

“The cloud forests of the Andes are a world unto themselves, filled with many species found nowhere else, many of them threatened or endangered,” Helgen said. “We hope that the olinguito can serve as an ambassador species for the cloud forests of Ecuador and Colombia, to bring the world’s attention to these critical habitats.”

While the olinguito is new to science, it is not a stranger to people. People have been living in or near the olinguito’s cloud forest world for thousands of years. And, while misidentified, specimens have been in museums for more than 100 years, and at least one olinguito from Colombia was exhibited in several zoos in the United States during the 1960s and 1970s. There were even several occasions during the past century when the olinguito came close to being discovered but was not. In 1920, a zoologist in New York thought an olinguito museum specimen was so unusual that it might be a new species, but he never followed through in publishing the discovery.

Giving the olinguito its scientific name is just the beginning. “This is the first step,” Helgen said. “Proving that a species exists and giving it a name is where everything starts. This is a beautiful animal, but we know so little about it. How many countries does it live in? What else can we learn about its behavior? What do we need to do to ensure its conservation?”

The team is already planning its next mission into the clouds.

The olinguito (oh-lin-GHEE-toe) looks like a cross between a house cat and a teddy bear.
Dr. John Miller passed away at the age of 73. Dr. Miller spent 35 years with the NCSU Department of Zoology.

**DR. JOHN MILLER**

**SUPERVISED 37 STUDENTS DURING HIS 35-YEAR CAREER AT NCSU**

*By Dr. Steve W. Ross*

Dr. John Miller, emeritus professor of Zoology at NCSU, passed away at the age of 73 on 27 June 2013, after a prolonged illness. John was hired into the NCSU Department of Zoology in 1974 and remained there until he retired in 2010. He was a fisheries biologist and ecologist, and an active member of the Fisheries, Wildlife, and Conservation Biology Program. During his 35 year career at NCSU he supervised 37 M.S. and Ph.D. students, served on numerous other graduate committees, and taught several graduate and undergraduate level courses and seminars, including Limnology, Ecology of Fishes, Estuarine Ecology and Biology of Fishes.

John was born in Indiana in 1940 and spent his childhood and early years in the Nashville, IN area. He earned a Bachelor’s degree in biology at Indiana University in 1961, after which he taught high school science until 1966. John was recruited into a graduate program at the University of Texas (Port Aransas lab) where he completed a M.S. degree in marine science in 1964. His thesis research documented the distributions of marine fishes near Port Aransas. John’s Ph.D. research was conducted at the University of Wisconsin where he studied factors controlling the distribution of young brook trout. He was awarded his Ph.D. in zoology in 1970. John took a position with the University of Hawaii from 1970 until he came to NCSU. While in Hawaii his work involved unraveling the mysteries of larval fish recruitment and dispersal dynamics, which remained one of his research passions throughout his career as a faculty member at NC State.

In the early 1980s, John successful-
Miller
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ly led an effort to enhance the NCSU fisheries program by pursuing a legislative allocation for fisheries research. He then turned the allocation over to the Fisheries and Wildlife Science Program, more than tripling its discretionary budget, and leading to investments in equipment, facilities, and personnel that formed a solid base for the expanding fisheries research program.

In 1997, John was appointed as the first Mote Eminent Scholar and was also appointed as a Mote Marine Laboratory Distinguished Visiting Scientist. He held an appointment as a Visiting Scientist with the Netherlands Institute of Sea Research where he helped promote international research on flatfishes. John was instrumental in starting and maintaining momentum for the International Flatfish Symposia. John’s outreach to the international community for assistance in solving various fishery science problems was mirrored by his involvement with other disciplines.

Later in John’s career he concentrated his resources on singular, but interdisciplinary, research issues. He was a pioneer in trying to meld physical oceanography with biology to address problems of fish recruitment. Another research focal area involved fish ecophysiology, where John and his students attempted to understand fish distributions, abundance, growth and survival in the context of their environment and their physiological needs. I recall John telling me that he expected to finish his career honing in on fish ecophysiology to see if this would yield the answers he sought.

The statistics of John’s career (dates, degrees, publications, etc.) cannot define who he was; they do not really measure what he accomplished or reveal how he approached his work, or signify the mark he left on our profession. He put little faith in GRE scores or journal impact factors, or other metrics by which we traditionally gage intellect or scientific worth. John searched for that spark of logical, independent thinking, which he promoted in his students and colleagues. John was about quality, and he preferred to spend his time on a few projects, papers, or students to make them the best he could, rather than producing volume.

John was one of the most critical and innovative thinkers I have met. He had a skill for finding the crucial part of a research question and formulating a variety of ways to tackle it. He was a master at what we call “thinking outside the box.” John instilled in his students the need for scientific rigor, but beyond that he also taught us how to think more analytically and how to evaluate problems from many angles. I think that for John, teaching the ability to think was of the foremost importance to him. He was dismayed by students who were unwilling to engage intellectual-

Fishing was one of Dr. John Miller’s favorite pastimes.

ly, but would spend huge amounts of time and energy on those who were willing to try. John was a beacon in this regard as he promoted creative, logical thinking, hard work, knowing your animal, and he provided encouragement when times were hard. We learned that there are many pathways to the truth.

John was passionate about outdoor activities, fishing being one of his favorite pastimes. He enjoyed pitting his intellect (not fancy technology) against that of his potential prey. He brought his knowledge of fish (“think like a fish”) to the game of trying to entice the beast onto his hook. To my knowledge John never engaged in half-way measures. If he started a task, he was fully involved whether that was fishing or conducting research.

John left us too soon. His lively wit, quick smile, and creative spark cannot be replaced. But, John’s legacy lives on in his family, friends and students, and through us a part of him will travel through the ages. Memorials can be made in John’s name to the Quay Endowment/Fisheries Scholarship at NCSU.
Growing up in Raleigh I always had an interest in nature and wildlife. My parents encouraged this interest by being outdoor enthusiasts and taking my sister Melissa and I camping and vacationing all over North Carolina. Mom was our Girl Scout leader, Dad was a birder and gardener, and it often felt like we lived outside. When talk turned to what we would do when we grew up, our parents encouraged us to follow our interests and trust that our careers would unfold from there. It turned out to be great advice for both of us. Melissa has taken her own road less traveled and become an archaeologist with her Masters in Maritime Archaeology. We are so lucky to have grown up with parents who wanted us to be ourselves and spend our lives doing what we love.

Each summer when I was a teenager, I attended an environmental education camp in the Virginia mountains called Nature Camp. There, I had the opportunity to participate in field classes in topics such as conservation, mammalogy, botany, and ornithology. This opportunity gave me firsthand experience as a naturalist and lit a fire in me that furthered my interest in pursuing this as a career.

Looking at the universities in the area, I noticed that many of the sciences were focused on biology as it applied toward medicine. NCSU provided the focus I wanted in zoology and conservation, so I chose to attend NCSU.

I entered NCSU in Biology, but midway through my first semester Dr. Roger Powell came to speak in one of my classes about the Fisheries and Wildlife Sciences (FWS) Program and his black bear research in the North Carolina mountains. I knew immediately that Fisheries and Wildlife was where I needed to be, so I headed to Turner House and switched majors.

At the time, it was typical for a FWS student to either attend summer camp or have a field research internship after their Junior year. However, I wanted both experiences. This meant attending summer camp a year early - after my Sophomore year. I struggled a little at summer camp because I didn’t yet have all the courses I needed to be successful. However, it paid off because it freed me up to do an internship in Puerto Rico after my Junior year. I was lucky enough to make a great friend, Dave Davenport, who was my TA for Herpetology that spring. When Dave heard I was looking for a summer internship and would love to go out of the country, he began advocating for me with his friends Dr. Jaime Collazo in the Zoology department and Leopoldo Miranda, PhD student setting up a research project in Ciales, Puerto Rico. Before I knew it I was on a plane headed towards a summer that would change things in a big way for me.

I am so glad I had the opportunity through the FWS Program to obtain valuable hands-on experiences. Summer camp and my wildlife biology courses gave me knowledge as a naturalist that I use in my job at the Museum. The field internship changed the direction of my career. Before my intern-
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ternship I had thought I wanted to be a field researcher, possibly a refuge biologist. However, a summer of being fairly isolated in the field and having incredible experiences far from groups of people I could share them with was difficult for an extrovert like me. All that summer, I kept finding myself having these moments of wonder that I wanted to turn around and share with someone who had not seen what I was seeing, and yet I was alone or with other researchers who saw it all the time. I realized that for me, there was no substitute for witnessing that “sense of wonder” on a person’s face when they first watch a nesting sea turtle heave herself up a beach or a Puerto Rican boa snatch a bat from the air. I realized the isolated nature of field work was not for me and that my passion was in sharing the wonder of the natural world through education.

While working on my Master’s degree in Natural Resources Administration at NCSU, I began working part-time with the NC Museum of Natural Sciences. The spring I was to graduate I saw a posting for the Curator of Youth Programs position at the Museum, and the job seemed to have been written for me. I was thrilled to be offered the job and began working for the Museum full-time. That fall, I married my wonderful husband, David, who I had met my Junior year through a friend I made while at summer camp (another reason I’m glad I attended a year early)!

As part of my job, I was coordinator of the Museum’s summer camps and of the Junior Curator teen volunteer program. I hired summer camp teachers, taught programs for preschool and elementary-aged kids, and led monthly field trips all over North Carolina and beyond for interested, enthusiastic, science-minded teens. Once a year, my colleagues at the Museum and I led a 10 day trip to a destination further away, and our travels led us to Puerto Rico, Trinidad & Tobago, Newfoundland, Big Bend Texas, Florida & the Everglades, Honduras, and Yellowstone. These trips could not have happened if I was leading them alone, but in a place like the Museum there are many educators with experience leading trips to different places. Also, my friend Dave Davenport was on staff at the Museum and we planned and led many of these field trips together. When I look back on those seven years and see what the Junior Curators have gone on to do with their lives, I can see what an impact we had. Some of them have even come through the FWCB program, and I love seeing how many of them grab opportunities with both hands and work hard to make the world a better place.

In the spring of 2006, my husband David and I welcomed our first daughter Isabel into our family. I decided to put my full-time work at the museum on hold while I stayed home with her. Three years later, we welcomed our second daughter Eleanor and our family was complete. Though I have spent the majority of my time in recent years with my girls, I have continued teaching a few programs each month at the Museum. Now that my children are getting a bit older I volunteer teaching nature programs for their preschool and elementary school classes and lead Isabel’s Girl Scout troop. We are a very outdoors family and love hiking, birding, gardening, and even keeping chickens.

At first I was conflicted with my decision to stay home because as all parents know, when home alone with your baby it is hard to do anything but survive the day. When they were small it felt at times like I was giving up a huge part of who I am, but it was wonderful and the baby phase with each of them just flew by. I have never stopped being a naturalist and educator. It is more than just a job for me, it is a way of life, something I do every day whether through the Museum, as a volunteer, or in my most important job, as Mom.

Wildlife stickers
Show your support for the N.C. State Leopold Wildlife Club by purchasing a sticker for all of your vehicles. Stickers are $7.

If interested contact Dr. Chris DePerno (chris_deperno@ncsu.edu)
Scavenger Hunt was organized by the Biodiversity Lab of the North Carolina Museum of Natural Sciences and NC State University.

The Science Communication Scavenger Hunt was held at the North Carolina Museum of Natural Sciences Prairie Ridge Ecostation. Six teams competed in five stations, including a Herbivory (climb a tree and find the most bug-eaten leaves you can) and Insect Diversity (Catch a diversity of insects and make a Vine Video).

http://storify.com/RolandKays/scihunt

Team Tyson: Laura Nichols, Chris Moorman, Tara Malow, Greg Rice, and Brian Malow.

SCAVENGER HUNT

Herbivory station.

Photo courtesy of Lauren Nichols
Team Tyson documents herbivory in the trees.

Photo courtesy of Rebecca Owens
Herbivory station.
Teaching Assistant Professor of Fisheries, Wildlife, and Conservation Biology

I am a new Teaching Assistant Professor and undergraduate coordinator in Fisheries, Wildlife, and Conservation Biology. My education and work experiences are a hodgepodge of wildlife biology and teaching. I never quite realized what I wanted to do “when I grew up” until I started this position and realized this was it.

I went to the State University of New York College of Environmental Science and Forestry at Syracuse for my undergraduate degree in Environmental and Forest Biology. I decided to go there because I liked being outdoors and with in-state tuition, the price was right. In the summer between my junior and senior years, I went to summer camp and had an internship both in the Adirondack Mountains. I spent the summer hiking, canoeing, identifying plants and animals, live trapping small mammals and deer, checking wood duck boxes, and performing loon nest surveys. It was awesome. From then on, I knew that wildlife biology was for me.

I went on to complete a Master’s degree at Auburn University with NCSU alum Mike Mitchell working on the Pisgah Bear Project, which was started by NCSU Professor Emeritus Roger Powell. During my time at Auburn, I was the TA for several wildlife classes. After teaching for just a semester, I knew that teaching was also for me. The only thing better than experiencing the wonders of the natural world is the opportunity to share those experiences with others.

In the years since I earned my Master’s degree, I accumulated experiences that prepared me to combine my affinities for wildlife and teaching – I taught high school biology, environmental science, and wildlife ecology; I advised Envirothon and Science Olympiad teams; I earned my doctorate in Science Education from the University of Georgia; I studied students doing undergraduate research in science; I taught university courses in biology and biology education; and I supervised aspiring science teachers. I enjoyed each one of these experiences but longed for a way to fully integrate my interests in wildlife and teaching.

I am so honored to now be in this position that allows me to teach, mentor students, and build the community in the Fisheries, Wildlife, and Conservation Biology Program. It allows me to draw from all my past experiences and fully enjoy both wildlife and teaching every day.

My husband is an NCSU Wildlife alum and currently works in the Department of Applied Ecology. We are grateful to be back in Raleigh and to raise our 2-year old son, Samson, in the Wolfpack Nation.
Beginning in the late 1970s, a strain of rabies associated with raccoons (*Procyon lotor*) rapidly spread along the East coast of the United States, with many states reporting over 500 cases a year. Raccoon-strain rabies can infect companion animals, livestock, other wildlife and even humans, and raccoons are the major vector of this disease in Eastern North America. Urban areas provide ideal environments for the spread of zoonotic diseases such as rabies from wildlife to human and domestic animal species. At the end of 2007, Guilford County, NC, had the highest number of rabies positive wildlife cases per county in the state. Pet vaccination, wildlife vector management and public health education may well be the most efficient ways to prevent a rabies epidemic in an urban environment.

Human behaviors play a fundamental role in the epidemiology of urban wildlife diseases, and those behaviors are shaped by knowledge and ethnicity. Guilford County, and in particular the city of Greensboro, has a total population of 237,423, of which 15,412 are Hispanic/Latino and 88,587 are African American. Ethnic minorities, particularly Latinos, are growing in numbers throughout the U.S. and are becoming critically important for wildlife management and public health outreach programs. We evaluated knowledge of rabies, transmission routes, vector species, and response to rabies exposure with a bilingual (English/Spanish) in person survey in Greensboro, North Carolina. Ethnicity, gender and education level were predictors of rabies knowledge. Latinos and African Americans had less rabies knowledge than non-Latino Whites.

Non-Latino Whites and men had less rabies knowledge than women. Only 41% of African American respondents identified animal bites as a route of rabies transmission to humans, and less than half of all respondents knew that washing a bite wound with soap and water was useful prevention. Our knowledge scale was internally consistent (Cronbach’s alpha = 0.73) and could be valuable for future studies of zoonotic disease knowledge. Future rabies educational campaigns should focus on developing culturally sensitive, language appropriate educational materials geared to minorities.

Guilford County also needed to assess the pet vaccination status and awareness of rabies vaccination clinics offered by the County. Furthermore, they needed to understand how the public would respond to rabid animals and how to deliver information about rabies and rabies clinics to them in the future. To address this need, we asked several outreach questions in addition to the knowledge questions as part of developing culturally sensitive, language appropriate educational materials geared to minorities.

Guilford County also needed to assess the pet vaccination status and awareness of rabies vaccination clinics offered by the County. Furthermore, they needed to understand how the public would respond to rabid animals and how to deliver information about rabies and rabies clinics to them in the future. To address this need, we asked several outreach questions in addition to the knowledge questions as part of
the initial bilingual (English/Spanish) survey of people residing in Greensboro, NC. Our results indicated that most pet owners report vaccinating their pet. Most Latinos were not aware of rabies vaccination clinics offered by the county and they preferred to obtain future rabies information through the radio and TV, as do African Americans. Most non-Latino whites were aware of the rabies clinics offered by the county and preferred to obtain future information through the internet.

The final aspect of controlling and eventually eradicating raccoon rabies from urban environments was to implement wildlife management measures that reduce the risk of rabies. Because raccoons are the most important rabies vector in eastern US, we developed a program for the control of raccoons associated with raccoons in Greensboro, NC.

The U.S. Department of Agriculture - Wildlife Services has established the National Oral Rabies Vaccination (ORV) Program with the goal of limiting the westward expansion of raccoon rabies. In the ORV program, baits inoculated with rabies vaccination are distributed aerially. However, aerial vaccines are distributed primarily in rural areas where raccoon density is reported to be lower than in urban environments, aerial baiting limited effectiveness in urban/suburban environments. ORV baiting devices and the associated cost have not been extensively evaluated in urban environments. Additionally raccoon pre-vaccination serology is necessary to determine the prevalence of rabies virus neutralizing antibodies in raccoons before administering a rabies vaccine, and to accurately evaluate the effects of the oral vaccination in a specific population.

To determine efficacy and cost of baiting devices; the species attracted to the bait; and raccoon rabies titers pre ORV delivery, we established bait stations and trapping with trail cameras at 28 different locations within the city limits of Greensboro. We had 4 baiting and trapping periods to evaluate the effectiveness of the oral bait delivery stations and to obtain tissue samples from resident raccoons. Raccoons were captured in 83% of photographs and we observed raccoon activity in 27 out of 28 baiting stations. We sampled 80 unique raccoons and 3.6% of the samples were positive for rabies. Additionally we calculated that it would cost the city of Greensboro $3,665 per year to build, install, bait and remove the required amount of bait stations for the amount of green space that they currently have.
Prescribed fire traditionally has been applied during the dormant season in southeastern pine forests, partly out of concern for destruction of nests of ground nesting birds such as the wild turkey (*Meleagris gallopavo*). However, burning during late spring and early summer promotes grasses and forbs in the forest stand understory which may benefit forage quantity and quality, nesting cover and survival, and recruitment for wild turkeys. The effects of frequent, long-term application of growing-season fire on wild turkey prenesting resource selection, nesting cover availability, and nest destruction have not been determined. We used GPS and VHF-telemetry to assess female prenesting resource selection and locate and monitor wild turkey nests. Additionally, we calculated the risk of nest destruction by prescribed fire as the proportion of nests active times the proportion of the study area burned each week of the nesting season. Growing-season fire history did not influence female resource selection prior to nesting. Rather, females selected locations burned the preceding dormant season, drop zone (managed opening) edges, and riparian areas. Females selected the upland-lowland transitional vegetation community (ecotone) for nesting and avoided upland pine forest. Ecotones had greater cover than upland pine, attributable to abundant ericaceous shrubs. Likewise, estimated nest survival was greater in lowland vegetation types (60%) than uplands (10%). Although approximately 20% of the study area was burned annually during the nesting season, only 1 of 30 wild turkey nests we monitored was destroyed by fire. We estimated that no more than 6% of nests annually were active in a fire management unit when a burn was applied to the same unit. We suggest that prescribed burning forest stands during the wild turkey prenesting and nesting seasons does not negatively influence prenesting resource selection or considerably reduce nest survival. However, dormant-season burns may increase green forage availability for prenesting females and woody cover for nesting in uplands. Including dormant-season burns in fire prescriptions may improve wild turkey spring forage, nesting cover availability, and nest survival. Because females used forest stands managed with growing-season fire as available for prenesting and nesting activities, and because the probability of direct nest failure from fire was low, growing-season burning does not conflict with wild turkey habitat management.

**ABSTRACT:** **ERIC KILBURG**

Wild turkey nesting ecology and nest survival in the presence of frequent growing-season fire

(*UNDER THE DIRECTION OF DRSES. CHRISTOPHER E. MOORMAN AND CHRISTOPHER S. DEPERNO*)
Concurrently, several small mammal and bird species associated with native early successional plant communities have declined. Establishment of native warm-season grass (nwsg) fields has been proposed as a strategy to provide wildlife habitat and diversify forage production, yet monocultures of nwsg may offer poor-quality habitat for birds and small mammals. Changes in small mammal and avian populations associated with changes in forage production systems could alter the ecological services they provide (e.g., seed dispersal and prey).

We measured territory density and reproductive effort for eastern meadowlark (*Sturnella magna*), grasshopper sparrow (*Ammodramus savannarum*), field sparrow (*Spizella pusilla*), and indigo bunting (*Passerina cyanea*) in 7 nwsg forage fields (4 hayed and 3 grazed), 7 non-native cool-season (csg) forage fields (4 hayed and 3 grazed), and 3 nwsg-forb fields managed for wildlife (“wildlife” fields) during May-August 2009 and 2010. We developed a hierarchical spatially-explicit capture-recapture (HSCR) model to compare abundance of hispid cotton rats (*Sigmodon hispidus*), white-footed mice (*Peromyscus leucopus*), and house mice (*Mus musculus*) among 4 hayed csg fields, 4 hayed nwsg fields, and 4 nwsg-forb fields managed for wildlife during 2 summer trapping periods in 2009 and 2010.

Eastern meadowlark territory density was at least 2 times greater in csg grazed fields than other field types and increased with field size. Grasshopper sparrow territory density did not differ among field types but increased with field size. Field sparrow territory density was at least 2.5 times greater in wildlife fields than in all other field types, and indigo bunting territory density was greater in nwsg hayed and wildlife fields than in other field types and increased with field size. Cotton rat abundance estimates were greater in wildlife fields than in nwsg hayed and csg hayed fields. Abundance of white-footed mouse and house mouse did not differ among field types. Also, we radio-collared 12 cotton rats, of which 1 was killed by haying equipment and 2 died of predation following dispersal out of recently hayed fields. Visual obstruction near ground (<0.5 m) generally was greater in wildlife fields and nwsg fields than in csg fields. Forb coverage was greater in csg grazed and wildlife fields than in nwsg and csg hayed fields and leaf litter and thatch coverage were greater in csg hayed and wildlife fields than in nwsg fields.

Our results suggest monocultures of tall nwsg provide low quality habitat for several grassland/shrubland songbirds and small mammals. Using moderate grazing strategies instead of high-intensity grazing and haying may increase suitability of nwsg forage fields for grassland birds while maintaining forage quality. Furthermore, a lack of cover following haying likely is the key factor limiting small mammal abundance in forage fields.

Ryan Law Klimstra studied wildlife use of native warm-season grass and non-native cool-season grass forage fields.
Q&A: L. SCOTT MILLS

Dr. Mills has deep roots in North Carolina

L. Scott Mills, a 1983 alumnus, reunited with North Carolina State University this July as a faculty member. Scott is part of the Chancellor’s Faculty Excellence Program in Global Environmental Change and Human Well-Being. The Chancellor’s Faculty Excellence Program is bringing the best and brightest to join NC State to promote interdisciplinary scholarship and innovation for solving the globe’s most pressing problems.

Scott Mills is a Professor in the Department of Forestry and Environmental Resources in the College of Natural Resources, and a member of the Fisheries, Wildlife, and Conservation Biology Program, and looks forward to collaborating with the College of Agriculture and Life Sciences, the College of Sciences, the NC Museum of Natural Sciences, and the USGS Southeast Climate Science Center.

Dr. Lara Pacifici, also new to NC State as Assistant Teaching Professor and Undergraduate Coordinator of the Fisheries, Wildlife, and Conservation Biology Program, had the recent opportunity to ask Dr. Scott Mills some questions about his past and future:

Pacifi ci: After 18 years at the University of Montana, what influenced you to come to North Carolina State University?

Mills: I have deep roots in North Carolina; I grew up here in Raleigh, and my family history here goes way back (my great-great grandfather was a mathematics professor at Wake Forest College in 1866, when it was a single building in the town of Wake Forest). So in some ways I’m responding to the tidal pull to come back to this part of the world. As an NCSU alum, I have always admired this university, especially in the Natural Resources fields; really, NCSU is one of the few universities with a program strong enough that I’d consider leaving Montana for! I am elated to be back at NCSU as a professor, to give back a bit for all I gained here as a student and citizen.

Pacifi ci: What are your research and teaching interests?

Mills: I am a wildlife population ecologist, meaning that I combine field data, population models, and genetic tools (including non-invasive genetic sampling in the wild) to understand population and community-level effects of human stressors on wildlife. I am also active in developing more efficient and rigorous approaches to population assessment, monitoring, and conservation decision-making.

My teaching has included graduate and undergraduate classes – and short courses for agency biologists – in applied population ecology, conservation genetics, population viability analysis, general ecology, and field techniques.

As for research, for many years I have focused on projects in mountainous landscapes. I am heavily involved in helping to build local capacity for wildlife biology research in the Hima-
Mills
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layan Kingdom of Bhutan, where two of my graduate students are currently using non-invasive genetic sampling and remote cameras to study snow leopards and tigers. We have a book coming out that provides practical, ‘how-to’ overviews of wildlife research techniques in mountainous Asian landscapes.

My students and I have also used field studies, genetic analyses and population models to guide conservation and management of other species ranging from marmots in Olympic National Park confronting invasive coyotes, to endangered Sierra Nevada bighorn sheep, to flying foxes in the Philippines, to small mammals along forest edges, to declining amphibian species. I am also continuing my research on snowshoe hares that has been going for 15 years (more on that in the next question).

While I will keep much of this research going, I’m also excited about going some totally new directions with local species and questions. Not sure what those new research questions will be, but I’m looking forward to getting ideas from folks here!

Pacifici: You’ve done a great deal of work on snowshoe hare predatory prey dynamics. Will you continue that work? See https://vimeo.com/67839982.

Mills: Yes. Having spent 15 years working to understand hare population dynamics and response to logging (and the powerful role of predation), I am now focusing on whether hare camouflage can adapt to climate change. Like many species across the globe, hares change from brown to white seasonally to match their background. Because the change is based on daylength, they turn white whether or not snow is present. As duration of snow during winters decreases due to climate change, what does that mean for these white hares on a snowless background? The question is key because it will help us understand the ability of animals to locally adapt to climate change, thereby improving the decisions we make in managing wildlife in the face of climate change and other global stressors. To study how animals might adapt to climate change requires a multi-disciplinary approach, so we are combining radio-telemetry and field studies with global climate prediction models, as well as gene expression and hormone assays. We are even building here, at the Vet School, one of the world’s first facilities to house animals that undergo seasonal coat color molts.

I will continue the work with snowshoe hares, whose southern range in the east coast extends down to Virginia, and I will also extend the studies to other species that undergo coat color molts, such as weasels. While it might seem a little strange to have, here on NCSU campus, a big research program on animals that turn white (and including a sub-freezing animal facility), it makes sense if you consider that this project is very high profile, addresses critical questions for understanding climate change effects on wildlife, and is poised to prosper in the rich collaborative environment of the NCSU campus community. For example, the sub-zero hare facility we’re building at the Vet School (which has been nicknamed the ‘Bunny Chiller’ by some) couldn’t be built in most places because of the varied expertise required in animal husbandry, engineering, and construction; the team helping me here at NCSU is second to none. In short, the expertise of my new colleagues at NCSU will help us answer aspects of adaptation to climate change that are critical to society and that are not being addressed anywhere else.

Pacifici: What experiences stand out most in your memories of your time as an undergraduate at NCSU?

Mills: I worked hard and played hard. Many a night I studied up in the stacks of D.H. Hill, but weekends I would head out for bass fishing nearby or rock climbing in the mountains (one night, to test out a new rope, we rappelled out of a Tucker Dorm window; the police officer standing at the bottom was shaking his head and gave us a big lecture). I was a features writer for the Technician, and had memorable interviews about milking contests, spider webs, and making beer. I remember talking with Dr. Roger Powell (Mammalogy prof) as one of his pet weasels ran loose in his office. A powerful class moment was a field trip to Lake Matumuskeet, where Dr. Phil Doerr showed us a swan dying of lead poisoning, a visceral symbol of the importance of banning lead shot from waterfowl hunting (this finally happened a few years later). Another memorable night was the student chapter of the Wildlife Society banquet at my grandparent’s pond in Wake Forest. And finally, my senior year was 1983, so I was a participant in the celebrations on the brickyard when the Cardiac Pack won the NCAA championship!

READ MORE ONLINE: HTTP://CNR.NCSU.EDU/BLOGS/NEWS/2013/08/25/MEET-DR-L-SCOTT-MILLS/
Research Publications


**Book Chapter**


**Research Presentations**


**Workshops:**

POLLOCK IS HONOUR SPEAKER AT EURING 2013 CONFERENCE

Ken Pollock was the Honour Speaker, International EURING 2013 Conference on Mark-Recapture Methods. April 28- May 4, 2013, University of Georgia, Athens Georgia. The primary focus of The EURING Meetings is the advancement of statistical methods used to estimate population parameters for populations where animals are marked.

Extension Presentations


Student Awards: Best poster

Stevenson, K., M. N. Peterson, R. Strnad, H. Bondell, S. Moore, and L. Malone. 2013. Identifying influences on environmental literacy in middle school students. FER & MEAS Graduate Student Research Symposium, NCSU.

Extension Article


ENHANCE WILDLIFE HABITAT

Bat boxes and wood duck boxes $50

You can help enhance wildlife habitat in your backyard. All proceeds benefit the Leopold Wildlife Club

If interested contact Dr. Chris DePerno (chris_deperno@ncsu.edu)
ORGANIZATIONS AND OPPORTUNITIES

North Carolina State University Fisheries, Wildlife, and Conservation Biology students and faculty are active in a number of peer and industry organizations devoted to aspects of Fisheries, Wildlife, and Conservation Biology.

The Leopold Wildlife Club offers students the opportunity to network and learn from professionals in wildlife science and management. Meetings are held twice a month and typically feature speakers on a variety of topics. Past speakers have included falconers, fishing guides, taxidermists, decoy carvers and more.

The Student Fisheries Society is a sub-unit of the North Carolina Chapter of the American Fisheries Society. It encourages the exchange of fisheries and aquatic science information among students, faculty and regional professionals while also providing career guidance to students. The American Fisheries Society is the oldest and largest not-for-profit professional society for government, academic and industry scientists associated with conservation, development and management of fishery resources in North America.

The NC Chapter of The Wildlife Society provides a forum for wildlife professionals and others to interact to improve wildlife conservation and management while fostering high professional standards and ethics within all related fields. It is an acknowledged source of current scientific information and expertise and acts as a collective voice on matters relating to wildlife biology, management, education and policy.

SUMMER CAMP STUDENT ENDOWMENTS

Please consider giving to our two Summer Camp student endowments. These endowments help undergraduate students attend the Fisheries and Wildlife Summer Camp. For more information on how to contribute, contact Dr. Chris Moorman at 919-515-5578 or chris_moorman@ncsu.edu

PHIL DOERR ENDOWMENT FUND

Also, you may consider giving to the Phil Doerr Endowment Fund. The endowment, established with the North Carolina Natural Resources Foundation, will be used to fund an annual award to assist undergraduate or graduate student(s) in gaining valuable field experience. For more information on how to contribute, contact Dr. Chris Moorman at 919-515-5578 or chris_moorman@ncsu.edu

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Got a story idea or a great photo?
Send your article submissions or pictures of North Carolina’s native wildlife to stevecallen1@gmail.com.