



RESEARCH

RNR Scientists Investigate Factors to Guide Nesting Island Restoration

Each spring the Louisiana coastline is home to hundreds of colonies of nesting waterbirds. For these species, island habitats are very important due to limited human and predator disturbance the islands provide. Unfortunately, coastal islands are shrinking and even disappearing altogether due in large part to sea level rise. As these islands lose elevation they become increasingly susceptible to flooding and overwash events that can destroy whole colonies. The Louisiana Department of Wildlife and Fisheries is invested in restoring and creating island habitat to conserve these species, many of which are listed within the state as species of concern. However, the restoration process is very costly. Islands are primarily restored by dredging the Gulf or a nearby ship channel and depositing the dredged material on top of an existing island, or, in some cases, creating a new island out of the dredged material. Because this process is expensive and time-consuming, managers and contractors would like to build the islands up as high as possible so that wave action, subsidence and sea level rise do not undo millions of dollars of effort in just a few years.

On the other hand, many of the benefits conferred by island habitats — including a general lack of predators, fire ants (which are known to attack and injure or kill young chicks) and invasive or woody vegetation — may be eliminated by increasing the elevation too much. With no periodic saltwater flooding or overwash, dense and woody vegetation can overtake elevated dredge-spoil islands, making it difficult for colonial species to nest, especially primarily ground-nesting birds. A lack of inundation can allow invasive fire ants to gain a stronger foothold on the island, while woody vegetation provides habitat and cover for potential nest predators, such as rats, raccoons and foxes.

Although low-elevation islands can experience overwash events that wipe out whole colonies of ground-nesting birds, these same overwash events may make them a better habitat over time for these long-lived species. Most waterbird species live well over a decade and reproduce almost every year. Losing the occasional nest is a small price to pay for a safe nesting site to return to every year. However, too frequent overwash events could impede population stability if adult birds return to this land and attempt to breed every year, only to have every nest flooded before the chicks are fledged.



RNR researchers are evaluating nest success of Forster's Terns (above) and Brown Pelicans (left) at Rabbit Island near Cameron, Louisiana.

The Louisiana Department of Wildlife and Fisheries is funding one master's degree student, Karis Ritenour, under the direction of Dr. Sammy King of the USGS Louisiana Cooperative Fish and Wildlife Research Unit to investigate the factors affecting nesting success of several species of colonial nesting waterbirds on Rabbit Island within Lake Calcasieu in Cameron Parish, Louisiana, as well as a pair of small previously restored islands within Bayou Platte at Marsh Island Wildlife Refuge. Work began in spring 2017 to monitor nest success in Brown Pelicans, Roseate Spoonbills, Forster's Terns and Tricolored Herons on these islands. In addition to tracking nest success, they are also recording the elevation, vegetation type, soil composition and height of each nest as well as tracking these factors for areas of the islands not utilized by nesting birds. They are monitoring the island sites for mammalian nest predators and fire ants in comparison with the nearest high-elevation dredge spoil island. They intend to model the best elevation and other habitat qualities for both the successful restoration of Rabbit Island and for future island restoration or building projects.



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RNR

School of Renewable Natural Resources



Allen Rutherford

Welcome to the LSU School of Renewable Natural Resources, where we continue to train the next generation of natural resource leaders. We have a long history of research, teaching and outreach in forestry and wood science, wildlife and conservation biology, fisheries, aquaculture and wetland science. As the world's population increases, natural resource issues will become ever more important.

Our current undergraduate enrollment is composed of a diversity of student interests with 189 wildlife students, 45 forestry students, 37 fisheries and aquaculture students, and more than 20 undecideds. Our undergraduate student body has an ACT average of 26 and is composed of 62 percent female students. How times have changed!

Our graduate students are the heart of the School of Renewable Natural Resources' research program, and our 60 masters and Ph.D. students represent us well. We have a diverse graduate student body that has undertaken, with the mentoring of faculty advisors, innovative research studies that will advance our understanding of current research-related issues.

In the past year we have been fortunate to fill two faculty positions and are currently interviewing for a third position. Dr. Ashley Long joined us in January as our new wildlife extension specialist. In addition to her outreach efforts, she will develop a research program and teach a wildlife management course. Also coming on board in January was Dr. Chris Reid, who is renowned for his knowledge of southeastern U.S. plants. Chris will teach dendrology, aquatic plants and an introductory-level botany course. We are currently interviewing four excellent candidates for our open forest ecophysiology and global climate change position. We plan to have this new position filled and in place by next fall.

We were saddened when Melinda Hughes decided to retire this year. Ms. Hughes made countless contributions to the school over the years, including overseeing the production of this newsletter. So, you will understand if this year's Research Matters is not up to normal standards!

As we've become all too accustomed, we are again facing state-based economic challenges, but there are many reasons to be positive about the future of RNR programs. Our faculty are some of the very best in the country and the new faculty additions can only enhance our standing. We continue to solicit your help in making potential students aware of the unique career opportunities we offer. We appreciate your continued support of the School of Renewable Natural Resources.

If you have any questions, comments or would like to come by to visit, please feel free to contact me at drutherford@agcenter.lsu.edu; 225-578-4187; or 225-954-0995.

RNR Welcomes New Wildlife Extension Specialist

The LSU School of Renewable Natural Resources welcomes Dr. Ashley M. Long to our faculty as an assistant professor and extension specialist of wildlife ecology. Dr. Long completed her undergraduate education at Northland College in Ashland, Wisconsin, where she received her B.S. in biology. She then started an academic trek down the center of the U.S., earning her M.S. in biological sciences from Emporia State University (Emporia, Kansas) and her Ph.D. in wildlife and fisheries sciences from Texas A&M University (College Station, Texas). Prior to joining RNR, Dr. Long was a research scientist at the Texas A&M Natural Resources Institute, where she studied how vegetation management, human activity and infrastructure development influence species' distributions and wildlife population dynamics. Dr. Long's current research collaborations with the Department of Defense and U.S. Fish and Wildlife Service employ emerging technologies, such as miniaturized light-level geolocators and Doppler radar data, to examine migratory patterns for endangered species and develop management recommendations that reduce risk of collisions between birds and military aircraft. In her new position at LSU, Dr. Long is developing research projects to study wildlife use of working lands in Louisiana. She will be teaching wildlife habitat management and will be sharing information



Dr. Long bands rails at the Yellow Rails and Rice Festival in Jennings.

about wildlife conservation and management with the public through extension programming. Outside of work, Ashley and her husband, C.J., love trying out new recipes and spending time outdoors with their dog, Pip.

Reid Welcomed As Instructor

The School of RNR welcomes Dr. Christopher Reid as an instructor. He comes to RNR after a 15-year tenure with the Louisiana Department of Wildlife and Fisheries, where he worked as a botanist in the Natural Heritage Program. Reid's path to becoming a botanist started in Dr. Robert E. Nobles' dendrology class here at LSU over 20 years ago. Reid completed a B.S.F. degree in forest management at LSU in 1997, then went on to the University of Louisiana at Monroe for his M.S. training. About midway through his time at LDWF, Reid entered a Ph.D. program in the LSU Department of Biological Sciences, graduating in 2016. His dissertation focused on several aspects of the genus *Cyperus* (flat sedges). Reid's recent professional focus has been on coastal prairie conservation. This work has involved collaborating with members of the cattle ranching community to accomplish stewardship actions such as prescribed burning and chemical and mechanical control of encroaching brush. Reid plans to continue his research into coastal prairie flora and vegetation and to keep contributing to prairie conservation.

Reid will be teaching plant identification courses, including Trees and Woody Plants of the Southeast and Taxonomy and Ecology of Wetland Plants. He taught the latter course several times during his Ph.D. program and discovered a passion for teaching. These courses are critical to natural resource professionals. Even many professional biologists are not fully aware of the botanical and ecological diversity of the coastal plain landscape. Reid's goal is to make RNR graduates stand out by having strong botanical skills and awareness.



Dr. Christopher Reid

School of Renewable Natural Resources Research Matters - Spring 2018

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Researchers, Former Student Assist in Sustainable Oyster Management

Development of a sustainable harvest approach for management of the public

eastern oyster grounds continued with the sixth annual Louisiana oyster stock assessment workshop held in December. The stock assessment workshop is held annually to evaluate the status of the oyster stock in public oyster areas of Louisiana, estimate sustainable harvests for the upcoming oyster seasons in the public areas and propose and review management and research recommendations. RNR faculty member Dr. Megan La Peyre, along with recent postdoctoral researcher Dr. Michael Lowe and recent RNR graduate Troy Sehlinger (currently a Louisiana Department of Wildlife and Fisheries employee), contributed to the development of these models through the analysis of 40 years of monitoring data from Louisiana's public oyster reefs. These analyses demonstrated that the optimal combination of temperature and salinity where Louisiana oysters experience maximum net growth is skewed toward lower salinities and higher water temperatures. Outside of that optimal range, oysters are commonly exposed to combinations of temperature and salinity that are correlated with high mortality and reduced growth. These data help refine the growth and mortality models used to ensure sustainable reefs for long-term harvest and ecological function, benefiting not only the oyster and its associated ecological role, but also the oyster industry.



Light penetrates a natural gap in a bottomland hardwood stand at Grassy Lake Wildlife Management Area.

Dean Researches Hardwood Tree Seedling Needs

Dr. Thomas J. Dean is working with the Louisiana Department of Wildlife and Fisheries to determine what size opening needs to be created in a typical bottomland hardwood stand to release seedlings to grow and eventually replace the overstory trees. Seedlings of various species were planted under an existing canopy to ensure a source of living seedlings when the canopy openings are created. After the openings are created, seedling height growth and survival will be tracked. Researchers expect to be able to make a preliminary decision on the ideal opening size after five years. At this age, regeneration success should be related to the number of young trees that have their crowns above the competing vegetation.

Opening sizes will range from one-quarter acre to 3 acres. Three acres is the recommended opening size to regenerate Nutall oak, but observations in the lower part of the Mississippi Alluvial Valley suggest that smaller openings would work just as well. Being able to open smaller openings in the canopy would provide greater flexibility to resource managers who must meet a variety of objectives simultaneously.

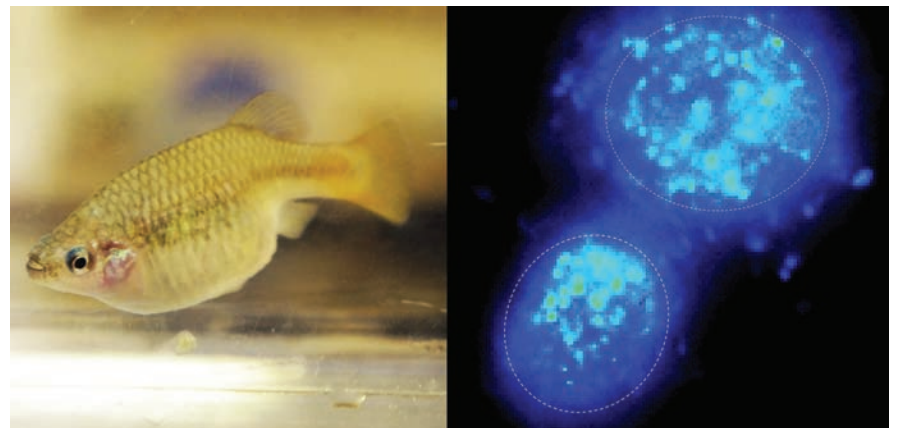
Lively Active in Louisiana Blue Crab Developments

Dr. Julie Lively, Sea Grant and Louisiana Cooperative Extension Service extension biologist, has been intimately involved in recent developments with the Louisiana blue crab fishery. There have been a lot of regulation changes in the fishery over the last few years, mostly due to abundance changes in the stock. Blue crabs have always had cyclical rises and falls in landings, and right now landings are low. Hard blue crab landings (not peelers or soft shell) were 39.9 million pounds in 2016, which was an 11 percent decline over the 10-year average of 44.9 million pounds (excluding 2010 because of the oil spill). Although there may be many reasons why the harvest is down, including



Louisiana blue crabs.

increases in predatory mortality, changes in precipitation or other factors, stock assessments indicate overfishing occurred in 2012 and 2014. Fishing mortality is the factor managers can try to regulate to help rebuild the stock. Several new regulations have been implemented over the last few years to improve blue crab stock abundance, including a training program for new commercial blue crab fishermen to get a gear license. Traps are now required to have three (instead of two) escape rings (2 3/8 inches), and a new three-year rule implemented in 2017 closed trap fishing for 30 days and banned harvest of immature females. In 2018 and 2019, the 30-day closure is changing to a 60-day, no-female harvest. Researchers hope current stock assessment efforts will show the benefits of these actions to the Louisiana blue crab stock and will ultimately result in increased landings in the future.



Left: A pregnant female of the endangered redtail splitfin (family Goodeidae). Right: Fluorescent imaging of two sperm bundles (ovals) allowing changes in intracellular calcium to be monitored by ratiometric dyes within individual sperm cells during activation of motility.

Collaboration in Fish Cell Biology

RNR doctoral student Yue Liu (Aquatic Germplasm and Genetic Resources Center) won first place for his oral presentation at the Annual Retreat of the Department of Comparative Biomedical Sciences (CBS) at the LSU School of Veterinary Medicine. Yue presented research findings on cell imaging of fish sperm done in collaboration with Dr. Henrique Cheng (CBS) and Dr. Terrence Tiersch (RNR). This work focuses on an endangered livebearing fish (redtail splitfin) that has internal fertilization. During insemination, males transfer specialized sperm bundles rather than individual sperm into the female reproductive tract. This research collaboration has allowed, for the first time, study of the molecular mechanisms of sperm motility activation for these unusual fish. Internal fertilization has evolved independently in multiple groups of fishes and perhaps explains why a novel signaling mechanism for sperm activation was found. Yue's work provides an important foundation for further study of the molecular mechanisms of reproductive evolution of fishes, and will assist development of germplasm repositories that can be integrated into comprehensive conservation programs for imperiled livebearers such as goodeid fishes.



Researcher Studies Louisiana Eucalyptus Plantations

Forest plantations are established for the production of timber or other wood products, but other attributes, such as wildlife habitat and soil and water conservation, are also important objectives for plantations. In 2007, a forest products company began a large-scale experiment to explore the potential for eucalyptus plantations for overcoming short-term hardwood fiber shortages that were recurrent in southwestern Louisiana.

Eucalyptus (in this case, *Eucalyptus benthamii*) growth and survival suffers from competition; consequently, early culture requires several applications of herbicides in the first year after seedling planting to keep plantations as free of competing vegetation as possible. The forest industry was curious about the long-term effects of understory composition from such intensive weed control during the initial establishment period in eucalyptus plantations. Their interest led to a collaborative study between the LSU AgCenter and Stephen F. Austin State University funded by the National Council of Air and Stream Improvement. Andrea De Stefano, a Ph.D. student working with Dr. Michael Blazier and Dr. Thomas Dean, is studying understory vegetation richness and structure for this project.

The eucalyptus plantations in southwestern Louisiana were planted on sites formerly managed as slash pine plantations. For three years (2014, 2015 and 2016) Andrea conducted floristic surveys to quantify the richness of understory species in eucalyptus and slash pine plantations. Vegetation under the eucalyptus plantations was compared with the vegetation under slash pine plantations of the same age (established in 2013) and of the same height (established in 2008) to compensate for the fast growth rate of eucalyptus.

While differences in species richness were detected between the plantations during the first year of measurement, by the third year there was no significant difference in the number of species between the eucalyptus and same-age slash pine plantations. More understory species were counted in the eucalyptus plantation when compared to the species richness under the slash pine plantation of the same height. By 2016, no differences in understory species richness were observed between the eucalyptus and same-height slash pine plantations, and the eucalyptus plantation had significantly lower species richness than the same-age slash pine plantation.

These results suggest that the decrease of understory vegetation richness is strongly correlated with the degree of canopy closure. Fast-growing eucalyptus plantations seemed to reach a canopy closure more quickly than slash pine plantations, altering the understory species composition pattern in a very short time.



Three-year-old *Eucalyptus benthamii* plantation.

Melinda Hughes Retires

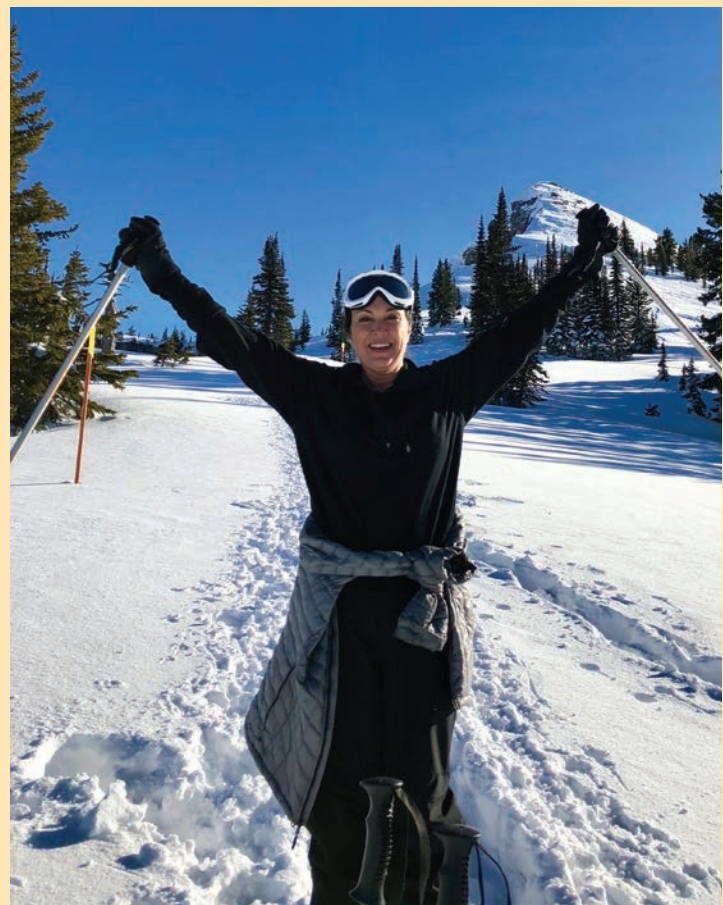
Our many thanks and a very happy retirement to Melinda S. Hughes — friend, teacher and colleague!

Melinda retired from the LSU AgCenter and School of RNR in January 2018 with a nearly 30-year career in forestry and renewable natural resources. As she says and we believe, it was “much too early to retire.” Before working at RNR, she was employed in research for several entities in Louisiana. She worked for the LSU AgCenter Hill Farm Experiment Station as a research associate in the mid- to late 1980s. Then she was a soil scientist with the USDA Forest Service, beginning in 1989 and through the early 90s. She worked for the Louisiana Department of Environmental Quality as an environmental specialist in water quality. In spite of her loyalty to Louisiana Tech, she finally got smart and decided to join RNR.

She obviously came to the school with considerable research experience. Her initial work centered on organizing forestry best management practices (BMPs) workshops on private lands, working on BMP publications and analyzing data on these practices for the state. She initially worked with Drs. Stanley Carpenter, Allen Rutherford and Bill Kelso. Her role with RNR began to change as she assisted Dr. Jim Chambers and other faculty with forestry research projects aimed at understanding forest responses to forest practices and environmental stresses. As a senior research associate, she assisted faculty and graduate students with the organization, startup and execution of numerous research projects. Over the years, Melinda worked on field research projects in pine, bottomland hardwood, baldcypress and tupelo forest settings.

Among her many professional roles within RNR, she became a member of the Governor’s Coastal Wetland Forest Conservation and Use Science Working Group (SWG). While on the SWG Melinda worked with scientists from all over the South — state and federal personnel, private landowners and industry professionals. She was important in the development of the SWG report, which has led to changes in use and conservation and has led to additional studies. Other southern states have also made use of this study in assessing the conditions and actions involving their own coastal forest situations.

During the last several years Melinda has taught many sections of the Trees and Woody Plants of the Southeast class (“Dendro” to students and faculty). Dendrology is a foundation course for most areas of concentration in RNR curricula. It was obvious that Melinda loved teaching dendrology, and she loved the interactions with her students. As an avid hiker she really enjoyed the walks in the woods and still claims that her research and teaching were more of a hobby than a job. Melinda, the faculty, staff and students of RNR hope you will be able to spend many more happy years walking in the woods and calling every tree and wild animal by name.



Melinda Hughes enjoying retirement. We wish her the best!



Ph.D. students Bo Wang, Yuyan Zhou and Shuwei Zheng use the terrestrial LiDAR Scanner next to the Amite River at the U. S. Highway 190 bridge near Denham Springs, Louisiana.

RNR Faculty Study Flood Risk and Amite River Channel Morphodynamics

The 2016 flood in south Louisiana submerged an estimated 146,000 homes, forced over 40,000 people to relocate and damaged thousands of businesses, severely affecting the state's economy and regional development. The lower Amite River Basin, which includes Livingston and East Baton Rouge parishes, was the hardest hit area. The Amite River at Denham Springs crested nearly 6 feet above the 1983 record, resulting in compounding effects of multiple local floods in the river's tributary areas. There is currently a debate about which factors, in addition to the intense precipitation that occurred during the time, may have caused the rapid rise in backwater flooding.

RNR hydrologist Jun Xu is conducting a study on river channel morphodynamics at the confluence of the Amite and Comite rivers. The main purpose of the study is to determine how transport of sediment and wood logs affect riverbed and channel morphology, which can strongly alter river flow. The study employs a state-of-the-art, 3-D terrestrial laser scanner to acquire high-resolution digital elevation data (scanning error < 3 mm). During 2017 Xu's group conducted field scanning before and after 12 minor flash floods and one moderate event. The high-resolution data obtained are being analyzed together with hourly river discharge and stage records, allowing determination of detailed morphological changes of the confluence front bars and the tributary channels. Preliminary results show that the 13 floods extended the confluence front bar downstream for over 22 feet and widened one tributary bank by nearly 10 feet. The rapid morphologic changes indicate the highly dynamic nature of a slow-moving river, highlighting the relevance of studying coastal river morphology for flood protection.

Implications of Risk Tolerance on Forest Management

Fan Zhang, a Ph.D. student, and Dr. Sun Joseph Chang have been investigating the implication of risk tolerance on the financial performance of forest management decisions. In this study, a heuristic harvest decision approach incorporating varying levels of risk tolerance was constructed and evaluated. The results indicate that given a specific level of stumpage price fluctuation, management results improve with increasing levels of risk tolerance but only up to a specific level. As the interest rate increases, the optimal level of risk tolerance declines. As stumpage prices vary significantly, much is to be gained. Conversely, if there is little price variation, then higher levels of risk tolerance produce small gains. As the level of risk tolerance increases, the optimal harvest age increases. A properly selected level of risk preference must consider the above factors to realize improved management performance when compared to methods assuming risk neutrality.

RNR Instructor Contributes to 'Guide to the Plants of Louisiana'

In fall of 2017 the U.S. Geological Survey released a new web-based plant identification resource applicable to the flora of Louisiana and adjacent areas. "Guide to the Plants of Louisiana," which can be found at <https://warccapps.usgs.gov/PlantID/>, features images of over 1,700 vascular plants that grow outside of cultivation in the state and enables the user to search the database by selecting plant characters (traits). Dr. Chris Reid, a new RNR instructor, coauthored the content featured in this product while he was with the Louisiana Department of Wildlife and Fisheries. He will continue working on the guide while here at RNR.

The searchable database includes 14 characteristics that are mostly morphological, such as growth form (tree, shrub, forb, etc.), leaf arrangement, leaf complexity and flower color. Each plant species treatment includes a parish distribution map and habitat information. Many species have information on field identification, wildlife uses and ethnobotanical uses. Information in the guide is continually being updated. Additional species will become accessible as images for them are acquired.

Vlosky and Partners Conducting New Market Research on Cross-Laminated Timber Manufactured From Southern Yellow Pine in the U.S. South

As the United States looks for ways to reduce its carbon footprint, the commercial construction industry and architects are searching for more sustainable products that are cost-effective, energy efficient, structurally sound and environmentally friendly. Dr. Richard Vlosky is partnering with industry, government and university entities across the southern United States to conduct market research on investment potential for wood-based construction materials to replace steel and concrete in multi-story applications in the U.S. South using southern yellow pine (SYP). The most promising of these new engineered wood products is cross-laminated timber (CLT).

The potential market for CLT in the U.S. is enormous if architects, builders, contractors and building owners accept CLT as a substitute for steel and concrete construction. Currently there are only three CLT producers in the United States, and they are located in Montana, Washington and Oregon. U.S. research and development to date has focused on using Douglas fir and other species from the Pacific Northwest region of the U.S.

This study is being conducted to better understand the dynamics of CLT production in the nation's southern wood supply. The southern U.S. has ample southern yellow pine resources to meet some of the potential market for CLT as there are several sawmills in the region that are idle due to a post-recession reduction in demand or a lack of freight-logical markets.

The study is focusing on awareness, perceptions, potential demand and opportunities for forest landowners, builders, architects, lumber and plywood manufacturers, and policymakers/stakeholders. In addition, performance testing and building codes for these products will be examined.

Medicinal Plant Program Focuses on Use of Botanical Ingredients As Solubilizers

The medicinal plant program headed by Dr. Zhijun Liu is focusing on the use of botanical ingredients as solubilizers for pharmaceutical, nutraceutical and agrochemical formulations. Recently some botanical solubilizers were used in dispersing essential oils, such as tea tree, cinnamon and rosemary, in water. This capability allowed Dr. William Owens at the Hill Farm Research Station to test the efficacy of tea tree oil in treating mastitis in dairy cows by administering the oil in an aqueous solution. Tea tree oil has antibacterial properties. So far the solubilized tea tree oil has achieved the bioequivalency of iodine. It opens the door to alternative treatments of mastitis in dairy farms that often use iodine to prevent mastitis.

Linking Growth and Yield Models of Different Resolutions

Dr. Quang Cao has been working on growth and yield models that provide information on which forest management decisions are based. These models range from relatively simple, whole-stand models (low resolution) to diameter-distribution models that give detailed volume for each tree size class (medium resolution), to complicated individual-tree simulation models (very high resolution). There are advantages and disadvantages to each type of model. Stand-level outputs from individual-tree models and size-class models typically suffer from accumulation of errors and subsequently poor accuracy and precision. On the other hand, outputs from whole-stand models are often more accurate but lack detailed information on forest stand structures. Dr. Cao has been working to link, or constrain, different types of models in an on-going effort to provide a compromise between accuracy and resolution.

Growth and yield models with different resolutions used to be treated as independent entities. Only recently people began to realize that they were indeed related and should be connected. Dr. Cao's efforts to link different types of growth models yielded new breeds of models that made sense and produced better results.

RNR Faculty Push for Arborist Continuing Education in Louisiana

Louisiana is one of only a few states in which licensed tree care professionals — arborists — must participate in continuing education classes to maintain their credentials. In Louisiana, licensed arborists must participate in a minimum of one approved one-day continuing education event each year for annual license renewal. During 2017, over 500 Louisiana licensed arborists participated in one or more of 10 educational events offered across Louisiana. This number is slightly down from 2016.

Early in 2017, a two-year push to certify all licensees in first aid/CPR/AED was concluded. By the beginning of 2017, 74 percent of the license holders in first aid/CPR/AED had been trained. Given that most tree care companies are too small to provide in-house training, and given that tree care is ranked as one of the most hazardous occupations, this is an important accomplishment for Louisiana arborists. First aid/CPR/AED training will be an annual event, so anyone who wishes to renew and maintain this credential may do so.

In the first half of 2017, the Louisiana Arborist Continuing Education Program focused on spreading the unfortunate news that emerald ash borer has reached Louisiana. Bossier, Claiborne, Webster, Bienville, Jackson, Morehouse, Lincoln, Ouachita and Union parishes are currently quarantined for emerald ash borer. Among other things, the quarantine restricts movement of woody debris across parish lines from a quarantined parish to a unquarantined parish. This restriction has potentially severe effect on arborists who routinely move woody debris from work sites to disposal sites across parish lines.

Many of our cities and communities in Louisiana have trees that are 100- to 200-years old. As trees grow older and larger, they provide huge benefits to humans and wildlife in terms of social, economic and

environmental benefits. At the same time, because of their size and age, they have the potential to pose unique problems in the landscape. So, during the second half of 2017 techniques for maintaining these older, larger trees were taught so they may continue to provide benefits without posing danger to their owners and the public.

The Louisiana Arborist License CEU Program is effective in bringing new technical and safety learning opportunities to professionals who serve Louisiana clients statewide.

Preparing Prescribed Burners for Certification

Many of Louisiana's ecosystems are fire dependent, but using fire to manage and improve those ecosystems can be risky. That's why Louisiana has a certification system for prescribed burners. The educational component ensures that burners know how to minimize risks, while the certification reduces liability exposure to the burners. By law (RS 3:17), the LSU AgCenter is charged with the educational component, and the Louisiana Department of Agriculture and Forestry (LDAF) certifies the burners.

There are three types of prescribed burner certifications — forestland, marshland and agricultural. Each has a half-day educational component, except that the forestland certification has both a half-day version and a three-day version. The half-day version is for foresters and others who have had a college-level course in forest fire or similar training through a forestry agency. The three-day version is for all other burners. The marshland and agricultural workshops are half-day only.

Dr. Niels de Hoop of RNR is the primary teacher in the forestland and marshland workshops. Local LDAF and LSU AgCenter personnel assist. Dr. Andy Nyman of RNR usually teaches a marsh ecology component in the marshland workshops. Attendees may also hear knowledgeable guest speakers from The Nature Conservancy, U.S. Fish and Wildlife Service or Louisiana Department of Wildlife and Fisheries, many of whom are alumni of the School of RNR. For the three-day workshop, workshop participants prepare a burn plan and go burn the woods for a field exercise, weather permitting.

The actual certification aspect is conducted by LDAF personnel. Burners must pass a test at the end of their respective workshops. RNR alumnus Bret Lane of the LDAF conducts the certification for forestland, while Joey Breaux of the Office of Conservation conducts the marshland and ag land certifications. Ag land certification includes sugarcane and range.

The largest components in each workshop concern understanding weather and controlling smoke. Most of the complaints fielded by LDAF personnel are about smoke. There are also concerns about air pollution. Workshop participants learn how to control the timing of their burns so that smoke plumes rise high into the atmosphere and disperse readily, maximizing safety and air quality.

The next prescribed burner program for forestland will be May 8 to 10 near Woodworth. For details, contact Dr. de Hoop at cdehoop@lsu.edu or RNR alumnus Keith Hawkins at KHawkins@agcenter.lsu.edu.



In May 2017, LSU AgCenter Forestry Extension Agent Keith Hawkins (back row, third from right) and Dr. Niels de Hoop (back row, far left) organized a prescribed burner-forestland workshop held at Hodges Gardens State Park. Local LDAF personnel assisted with the field exercise on the second day. Attendees included agency personnel, industry foresters and landowners.



RNR Faculty Study Effect of Oil Spills on Birds

The 2010 Deepwater Horizon oil spill may seem like old news to most of the world, but to researchers and the wildlife they study, the spill's effects are an ongoing concern. Long after the news cameras have gone and the oil slicks have dissipated, oil persists in the environment in the form of chemical compounds in the soil. This is especially true in oxygen-poor soils like those found in Louisiana coastal marshes, the terrestrial ecosystem that bore most of the spill's damage.

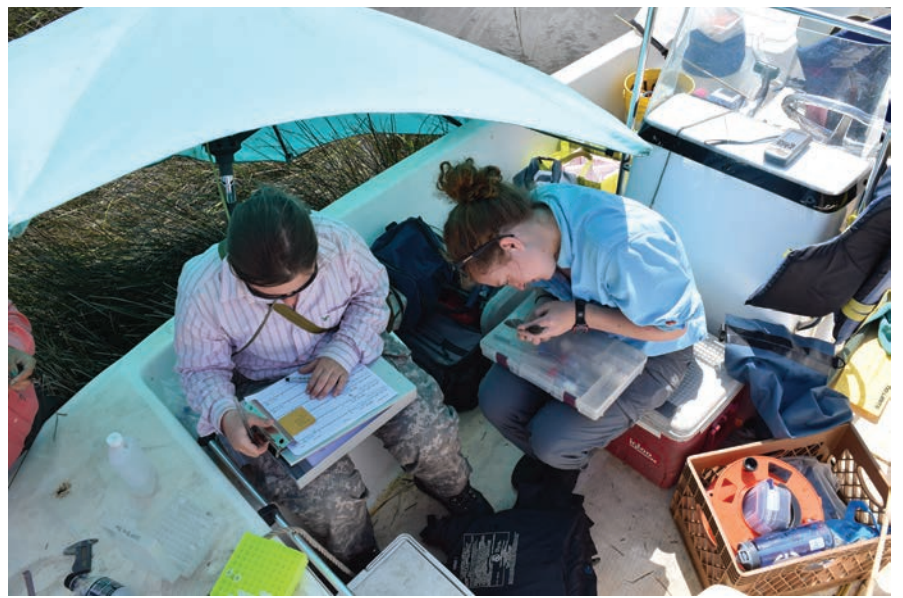
While much of an oil spill's impact on wildlife is documented in the early days after a spill, chronic exposure can continue for years, even decades. For example, sea otters in Prince William Sound, Alaska, took 19 years to recover after the 1989 Exxon Valdez spill. Species that frequent marsh or intertidal areas are especially likely to encounter oil in the years following a spill due to coastal erosion and strong storm systems, such as hurricanes, which can redistribute and resuspend oil into the environment.

In Louisiana, the Seaside Sparrow (*Ammodramus maritimus*) is a very common, non-migratory songbird that lives and nests in marsh grasses. Because Seaside Sparrows forage on the ground for invertebrates like snails, crabs and insect larvae, they are a good candidate to assess contamination in the environment. One goal of RNR researchers was to determine how much oil Seaside Sparrows were exposed to in the years after the spill and whether this exposure correlated with the amount of oil still present in the environment. To answer this question, they needed two things: Seaside Sparrow genetic data and soil samples.

Drs. Sabrina Taylor and Phil Stouffer led the project, which was a collaborative effort by field technicians, postdoctoral researchers, graduate students and other LSU departments and universities. From 2011 to 2014, every March through July a team of researchers based out of Port Sulphur, Louisiana, boated to sites in Barataria Bay and caught the birds in fine-mesh nets.

Although most birds were released after banding, a subset was collected for tissue samples, including the liver. The liver is often used to assess the exposure of wildlife to polycyclic aromatic hydrocarbons (PAHs), a toxic compound in oil, by measuring the activity of genes that work to detoxify contaminants. The RNR team measured the CYP1A gene, which becomes more active when an organism encounters PAHs. Sediment samples were also taken at the same sites to serve as an environmental comparison to the seaside sparrow data. Those samples were analyzed at LSU's College of the Coast and Environment by Drs. Buffy Meyer and Edward Overton for PAH concentrations. After the team measured CYP1A gene activity in the livers of the birds, they compared those values with PAH levels in sediment samples taken from the same location.

The team found a similar pattern between CYP1A activity and PAH levels. Both measures were highest at oiled sites in 2011, one year after the spill, and then declined the following year. However, something surprising occurred in 2013. Both CYP1A activity and PAH levels increased, not only at oiled sites but at unoiled ones as well. The team realized that oil buried in the marsh may have been resuspended and redistributed across a larger area by Hurricane Isaac, a Category 1 storm that made landfall in the study area between the 2012 and 2013 field seasons. When they compared pre- and



RNR Ph.D. student Anna Perez-Umphrey (right) and Austin Peay M.S. student Megan Hart collect data from a Seaside Sparrow at an oiled site in Barataria Bay.



RNR M.S. student Tyler Williams holds a banded Seaside Sparrow.

poststorm samples, the data supported their hunch. CYP1A and PAH levels went down again in 2014 but were still present. These findings demonstrate that oil exposure in a terrestrial bird species continued for several years after the Deepwater Horizon oil spill. Furthermore, the results highlight the importance of including periodic weather events into assessments of long-term species recovery and oil persistence. For more details about this study, keep an eye out for "Polycyclic aromatic hydrocarbon exposure in Seaside Sparrows (*Ammodramus maritimus*) following the 2010 Deepwater Horizon oil spill," by RNR Ph.D. student Anna Perez-Umphrey and others, to be published in *Science of the Total Environment* later this year.

Effects of Oil and Gas Development on Waterfowl Nesting Ecology in the Bakken Region of North Dakota

The Prairie Pothole Region (PPR) is the most important waterfowl breeding area in North America, responsible for producing more than half of the continent's dabbling ducks. The northwestern portion of the PPR in North Dakota coincides with the Bakken shale formation, which contains substantial quantities of recoverable petroleum. Currently, there are more than 8,000 wells in the Bakken region of North Dakota, and that number is expected grow to 38,000 wells by the year 2034. This rapid energy development has the potential to affect more than 1 million duck pairs, which is more than 25 percent of the waterfowl pairs that breed in the PPR. For example, petroleum extraction is associated with habitat loss (from well pads and equipment lots),



Cassie Skaggs and her technician Jacqueline Satter (LSU-NREM B.S. 2016) examining a duck nest in the Bakken region of North Dakota.

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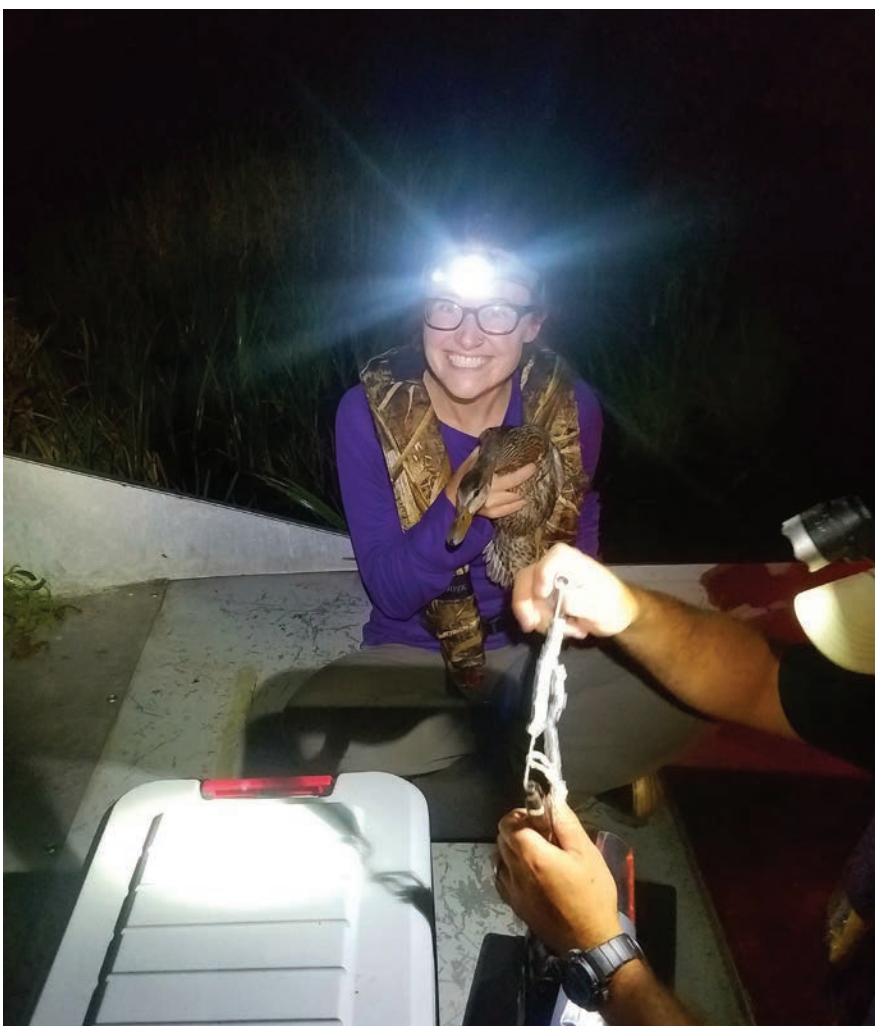
habitat fragmentation (from new and improved roads) and high levels of disturbance (from traffic, flaring, pump noise, etc.), all of which can impact waterfowl production. Cassie Skaggs is undertaking M.S. research with Dr. Kevin Ringelman to evaluate the effect of energy development in the Bakken on waterfowl nest density and success.

Over the past three years, Cassie's team has searched more than 21,000 acres of prairie uplands and located 4,707 duck nests. Her study sites were stratified by the intensity of oil and gas activity, as measured by the number of wells within 4 square miles of each plot. Preliminary results indicate that duck nest survival may actually be higher at more intensively developed sites, possibly because nest predators have been driven from the area or killed by the near-constant truck traffic on rural roads. Cassie is continuing to refine her analyses to better diagnose which aspects of oil and gas activity have the largest effect on nest survival, and at what spatial scale and intensity those become relevant.

Mottled Duck Breeding Ecology in Southwest Louisiana

Mottled Ducks (*Anas fulvigula*) are endemic to the Gulf Coast of the southern United States, and are not migratory throughout their range. As such, they rely on imperiled coastal marsh to fulfill their needs throughout their annual cycle and serve as a flagship species for conserving these habitats. The western Gulf Coast population of Mottled Ducks has been declining over the past 40 years, and this decline is likely linked to breeding season demography. However, there are no estimates of adult survival or nesting productivity in the coastal marshes of southwest Louisiana, the core of the Mottled Duck range. Furthermore, nest-site selection remains understudied at fine spatial scales, but such knowledge is critical for targeting conservation actions. Lizzi Bonczek's Ph. D. research with Dr. Ringelman will employ high-resolution satellite telemetry to track the movements of female Mottled Ducks and monitor their nesting activity during the spring.

In the late summer of 2017, Lizzi placed 65 solar-powered GPS-GSM transmitters on Mottled Ducks at the Rockefeller Wildlife Refuge. These transmitters are programmed to log GPS locations every two hours and then automatically transmit those locations via cellular networks to an online data set. Since deployment, the team has gained new insight into Mottled Duck movements in response to tropical storms and disturbance from hunting as well as important information on sources of Mottled Duck mortality during winter. Lizzi is closely monitoring the movements of her remaining ducks as they are anticipated to begin nesting in early March. When telemetry data indicate that a hen is nesting (several days of locations in the same spot), Lizzi will attempt to locate the nest and will monitor its success or failure in relation to habitat measurements. Her project will continue for two additional field seasons.



Lizzi Bonczek capturing Mottled Ducks at night on the Rockefeller Wildlife Refuge.

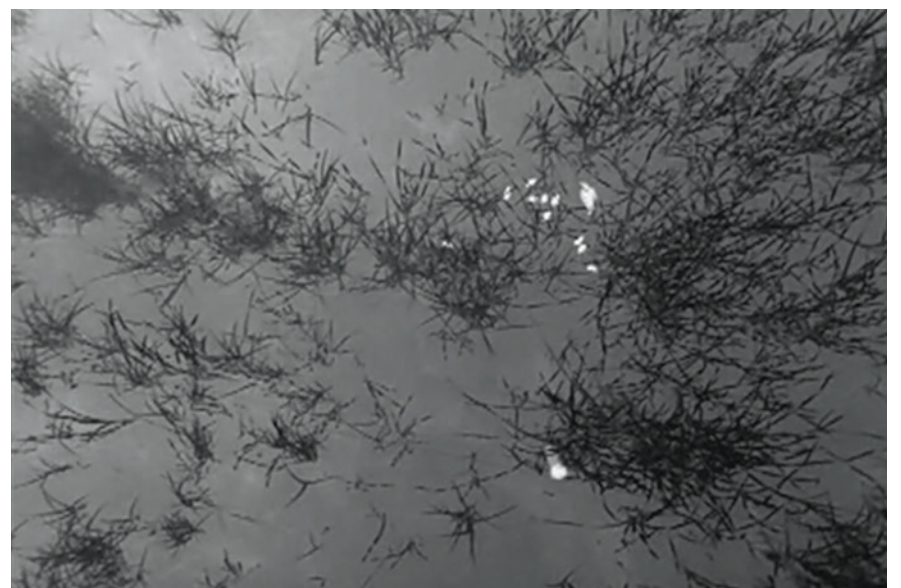
Applications of Drones for Studying Breeding Waterfowl in Minnedosa, Manitoba, Canada

North American waterfowl are widely recognized as a premier example of a successful, science-based conservation program. Key to this success has been habitat and population monitoring, especially metrics of waterfowl density and productivity. For example, pair counts are often used by waterfowl biologists to estimate the breeding population of waterfowl on the landscape, but even experienced observers have been estimated to miss up to 15 percent of breeding pairs. Nesting surveys are used to determine clutch size, hatchability and nest success, but many nests are never found (11 to 25 percent). Brood monitoring is even more difficult, with up to 67 percent of broods going undetected.

New technological advances in unmanned aerial vehicles (UAVs or drones) and thermal imaging cameras may provide a solution to these problems. UAVs have been used to survey a variety of wildlife species, ranging from canopy-nesting birds to elephants. Drones have proven particularly useful for studying breeding birds and appear to cause minimal disturbance. Jacob Bushaw's M.S. research with Dr. Ringelman began last year with a pilot study that demonstrated that drones are capable of surveying wetlands for pairs, nests and broods with potentially unprecedented accuracy and efficiency. The goal of Jacob's project is to evaluate the relative detection probability for waterfowl pairs, nests and broods using a drone versus traditional observer methods. Furthermore, a subset of nests will be monitored remotely (using the drone only) because there is growing concern that the trails left by researchers are used by predators to more easily find duck nests.



Jacob Bushaw prepares for a drone survey in the pre-dawn hours.



A female duck and her brood as viewed with a drone-mounted thermal camera. The hotspot at the bottom of the photo is a blackbird nest.



Student Research off the Mozambique Coast

Imagine waking up with the sun over the Indian Ocean, then heading out to swim with the largest fish in world. Nine students traveled to Praia do Tofo, Mozambique, this past May to do just that as part of a monthlong coastal studies and techniques course taught by Dr. Reagan Errera. The students received open-water scuba certification and were trained on fish identification, reef and benthic habitats and underwater data collection techniques. As part of the course, students designed research projects around five main research themes — fish or sea urchin diversity and abundance, ocean plastics, human and marine megafauna interactions (dolphins and whale sharks), cleaning station fish diversity and coral reef health. At the completion of the course, the students presented their findings to the local community at Praia do Tofo. Students encountered several large megafauna species, including a whale shark that the students lovingly nicknamed Rodney, and numerous giant manta rays. As an extra treat before returning, the students spent three days on safari in Kruger National Park, where they encountered an enormous variety of native savannah species, including elephants, rhinos, and lions.



*The RNR3018 class with Dr. Kevin Ringelman helps band rails in the southwestern part of the state. Under the direction of Justin Lehman (right) from Louisiana Audubon Society, undergraduate student Sydney Cottingham (left) documents the molt pattern on the wing of the enigmatic Yellow Rail (*Coturnicops noveboracensis*).*

Drs. Nyman and King and their graduate wetlands class visited the globally rare floating pitcher plant bogs on Eglin Air Force Base in fall 2017.





GRADUATE STUDENTS



Ashley Booth is a Ph.D. student studying coastal wetland ecology under Drs. King and Nyman.



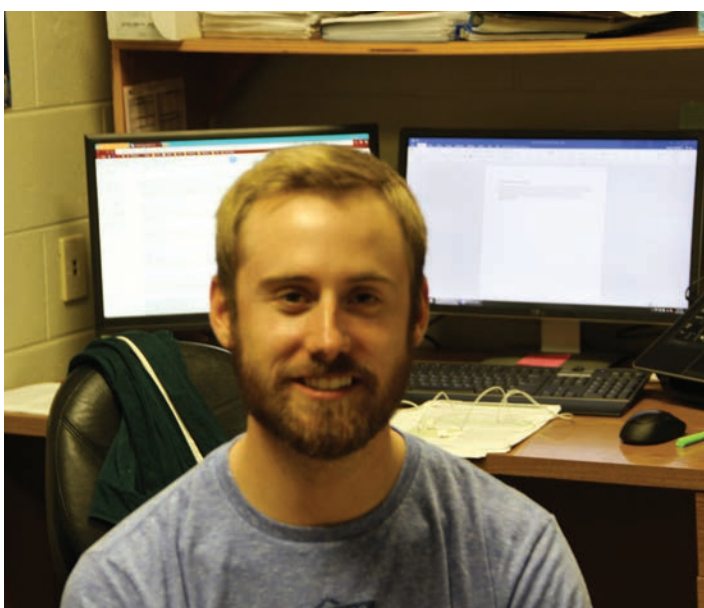
Charles Pell is a Ph.D. student working with Dr. King on the effects of drought and flooding on bottomland hardwood regeneration in east Texas.



Savannah Morales is an M.S. student in watershed science working with Dr. Keim on the hydrology of floodplain forest soils.



Tyler Williams is an M.S. student working with Dr. Taylor on immune gene variation in reticulated flatwoods salamanders.



Caleb Taylor is an M.S. student working with Dr. La Peyre on blue crab ecology and coastal restoration in southeast Louisiana.



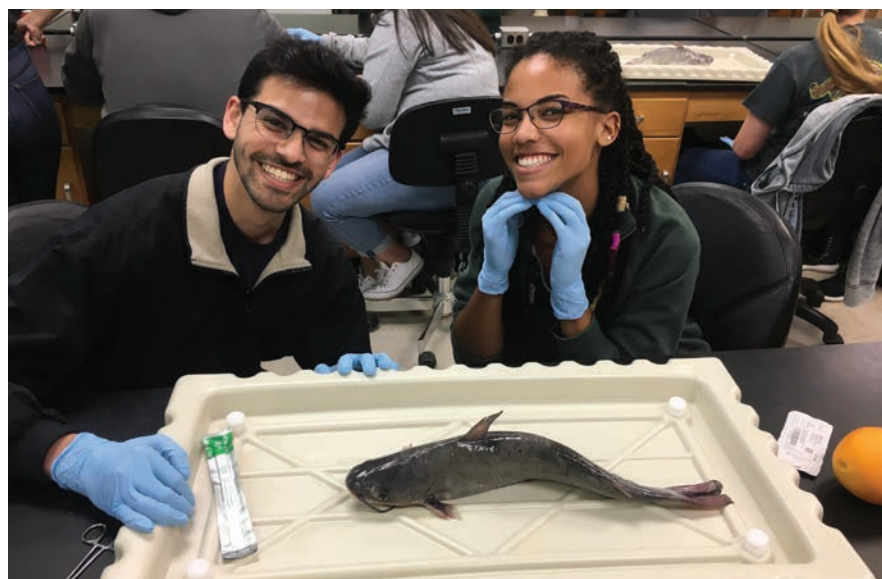
Tiger Chapter Ducks Unlimited Raises \$100,000

In 2017, the student chapter of Ducks Unlimited (DU) at LSU — the Tiger Chapter — raised over \$100,000 for wetlands conservation, winning DU's Sweet Sixteen sweepstakes as the No. 1 university chapter in the country. During the year, members of the chapter heard from guest speakers on leadership, fundraising and waterfowl conservation and visited a Ducks Unlimited wetland restoration hosted by Don Chachere, president of Tony Chachere's. The chapter hosted a spring crawfish boil and fall general membership banquet. Chapter members represented LSU at the Louisiana DU State Leadership meeting in Alexandria, the Louisiana DU State Convention in Lafayette, the DU National Convention in San Antonio and the DU Third Term Collegiate Leadership Conclave in Memphis. Tiger Chapter also received the President's Elite award from DU National President Paul Bonderson.

The Tiger Chapter of Ducks Unlimited raised more than \$100,000 for wetlands conservation. The chapter president, Clint Pace, kneels on the left side of the front row. The chapter's advisers, Drs. Luke Laborde and Kevin Ringelman, kneel at bottom right.

Aquaculture and Fisheries Club Helps Students Learn

The Aquaculture and Fisheries Club (AFC) at LSU provides interested students with opportunities to learn and build technical skills through hands-on learning activities from guest speakers at monthly general meetings. Past guest speakers have included professionals from the National Oceanic and Atmospheric Administration, the Louisiana Department of Wildlife and Fisheries (LDWF) and the United States Fish and Wildlife Service (USFWS). In fall 2017, Kayla Kimmel from the USFWS taught AFC members how to perform surgical sutures, which she uses to insert acoustic transmitter tags in sturgeon and alligator gar. AFC members also participated in several volunteer events during the year, including Louisiana Sea Grant's Ocean Commotion in fall 2017 and Louisiana Sea Grant and LDWF's annual derelict crab trap rodeo in spring 2018. Upcoming events include a behind-the-scenes tour of the Audubon Aquarium in New Orleans, the annual fishing trip to Grand Isle, the spring crawfish boil, and the Louisiana Chapter of the American Fisheries Society (AFS) meeting. The silent auction and raffle held each year at the Louisiana AFS meeting serves as the club's main fundraising event, which enables the club to put on programs for members. Every semester, the club looks forward to increasing the amount of student involvement in the Aquaculture and Fisheries Club both from within RNR and across LSU.



Gourav Divan and Greer Darden (right) learning physiological assessment techniques for channel catfish.



Guest speaker Kayla Kimmel from the USFWS teaches AFC members how to perform sutures on fish.



AFC volunteers assisted the Tulane University Biodiversity Research Institute with integrating the ULM fish collection into their holdings.



LSU to Host 62nd Annual Southern Forestry Conclave

Every spring, LSU meets with students from 14 other forestry schools to compete in events such as crosscut sawing, log chopping, log rolling, archery, dendrology, wood tech and wildlife identification. From March 14 to 16, 2019, LSU will host about 250 forestry students and their faculty advisors at the Parker Coliseum. The actual cost per student is about \$300 each, but if adequate financial help can be secured from generous donors and sponsors, the School of Renewable Natural Resources would like to reduce that to \$100 per student. We ask that you budget a donation for early 2019. Watch www.rnr.lsu.edu for details and opportunities to sponsor specific events. This will also be an opportunity to set up a booth for recruiting graduates and summer interns. If you wish to contribute now, please contact Dr. de Hoop at cdehoop@lsu.edu.



Kevin Kohl and Nicole Stagg compete in Jack and Jill crosscut sawing at the 60th Southern Forestry Conclave in March 2017. LSU will host the Southern Forestry Conclave March 14 to 16, 2019, at the Parker Coliseum. Watch www.rnr.lsu.edu for developments and sponsorship opportunities.

Society of American Foresters Student Chapter Competes in Quiz Bowl

Five representatives of the Society of American Foresters LSU Student Chapter attended the national convention in Albuquerque, New Mexico, in November 2017. LSU fielded a team in the Quiz Bowl for the first time. In the first round LSU was pitted against Michigan Tech — winner of the last two years — so the team decided to just relax, get beaten, leave and go have some fun. Well, LSU won that round, and the Michigan Tech team was eliminated. Then the team won the second round and found themselves in the semi-finals. In the semi-finals, Mississippi State won, but they ended up winning the whole thing. The team never had time to go seek fun that evening (everyone had to be fresh for job interviews the next morning), but it was really heartening that they did so well. “This is not really something you can study for,” said LSU forest management student Brennon Ibert. “We credit our professors for teaching us well.”

In other news, the chapter held its annual Christmas tree sale and had its annual combined meeting with the Southeast Louisiana Chapter and the new Southern University Student Chapter. During the meeting, RNR alumni Daniel Bollich and Marcus Rutherford talked about the nuts and bolts of wetland mitigation. The chapter also competed in a conclave hosted by Stephen F. Austin University. In 2018, Chapter members will compete in a conclave hosted by Abraham Baldwin Agricultural University in Tifton, Georgia.



LSU displayed an impressive performance in the Quiz Bowl at the national convention of the Society of American Foresters held in Albuquerque, New Mexico. Attending were, left to right, Brennon Ibert, Nathan Apetrei, Mason LeBlanc, Cheyenne Fouts and Samantha Pioli. Dr. Niels de Hoop (behind camera) accompanied as faculty advisor.



Members of the LSU chapter of TWS enjoy the annual hiking trip to Tunica Hills.

Student Chapter of The Wildlife Society Volunteers and Learns

The LSU Student Chapter of The Wildlife Society provides members with hands-on opportunities with wildlife as well as volunteer opportunities. As part of our volunteer work, members participate in U.S. Fish and Wildlife bayou cleanup events. These events provide members a chance to improve natural aquatic habitat in Louisiana by removing trash and pollutants from local waterways. In addition, our club participates in the U.S. Fish and Wildlife Service’s Wild Things festival. This festival provides local community members an opportunity to experience activities involving natural resources within the state, including forests, wildlife and aquatic recreation. Members of our club volunteer their time at these events to help others experience the natural wonders of the world around us.

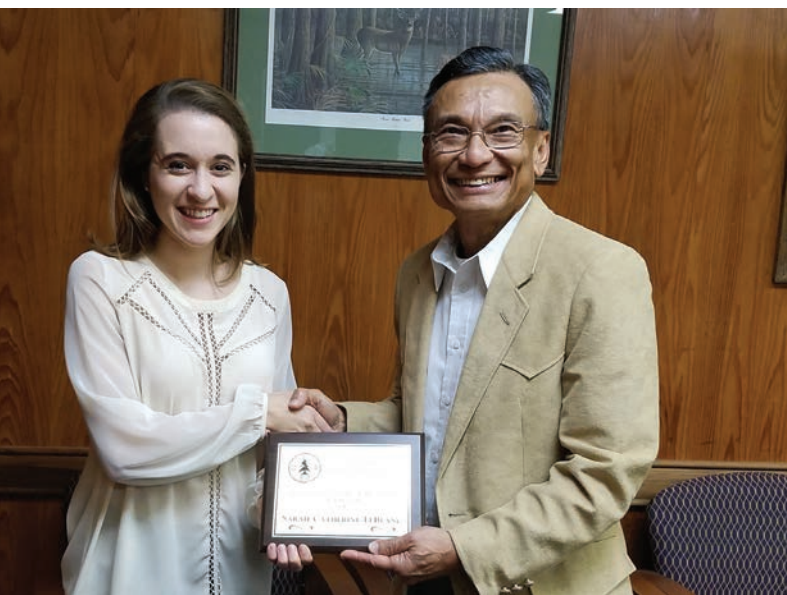
This year, the LSU chapter of The Wildlife Society hosted the annual Southeastern Region Wildlife Conclave. This event attracts over 300 people from more than 20 different schools around the nation. The primary focus of this event is to allow students in the wildlife field the opportunity to practice the skills they have obtained throughout their academic careers. This event also serves as a great networking opportunity with potential graduate schools and employers. Wildlife Society students have spent most of their year preparing for this big event.

During last year’s conclave the club participated in a variety of competitions that focused on both the physical and academic challenges associated with a wildlife career. Events included game calling, team competitions and quiz bowl as well as individual competitions, such as canoeing, orienteering and radio telemetry. In addition, attendees also got to participate in a variety of workshops. These included “Raptor Rehab,” where the attendees learned about the care and handling of different raptor species, and “Invasive Species Ecology,” where students learned about invasive species management and how an invasion can occur.

Throughout the semester we also had different guests speak to our members about issues in the wildlife field as well as possible career paths. Graduate students Nick Bakner and Landon Schofield were the speakers at one event, and they discussed their thesis projects and provided information on the rigors and culture of graduate school and how to prepare for it.



Nathan Apetrei and Benjamin Walters



Sarah LeBlanc

Xi Sigma Pi Forestry Honor Society Adds New Members, Names Outstanding Sophomore

Xi Sigma Pi, a national forestry honor society, added three new members in 2017: Nathan Apetrei and Benjamin Walters, both undergraduate students (spring 2017), and Savannah Morales, graduate student (fall 2017). Sarah Leblanc was named the 2017 Xi Sigma Pi Outstanding Sophomore. All RNR students with an interest in forestry and a minimum 3.0 GPA are eligible for membership.

Xi Sigma Pi also hosted two well-attended Apple Pie seminars. Suna Adams, president of Gulf South Research Corporation was the featured speaker in spring 2017 and Mark Milligan, president of 4Tech Consulting Company, was the featured speaker in fall 2017.

The current officers of Chapter Nu of Xi Sigma Pi are Mason Leblanc (forester), Nathan Apetrei (ranger) and Alicia McAlhane (fiscal agent). Dr. Quang Cao is the faculty advisor.



Savannah Morales

2017-18 RNR Scholarships

A special thanks to those individuals and families that make these scholarships available. The number of scholarships is a tribute to our alumni and friends of the School of Renewable Natural Resources.

Undergraduate Student Scholarships

- | | |
|--|-------------------|
| F. O. Bateman Memorial Scholarship | Kaiser Franck |
| Pauline Bateman Stanley Scholarship | Meghan Roberts |
| Paul Y. Burns Scholarship | Sarah Thomas |
| Hunter Barrilleaux Memorial Scholarship | Madelyn Smith |
| Eric Fabre Memorial Scholarship | Emily Hartdegan |
| Mark Dupuy Jr. Wildlife Conservation Scholarship | Bailey Jones |
| Harold Werner Oleson Scholarship | Kathryn Davis |
| Thomas Plein Scholarship | Catherine Barry |
| Billy W. Weaver Scholarship | Andrew Corrado |
| Lehmann – FWF Alumni Association | Bryce Loschen |
| Forestry, Wildlife, and Fisheries Alumni Association | Anna West |
| | Lindsey Newton |
| | Micah Rodrigue |
| William A. Knight Forestry Scholarship | Anna Omojola |
| | Matthew Shockey |
| | Elaine Arendt |
| | Claire Bullock |
| | Seth Chapman |
| | John Howell |
| | Christian Mann |
| | William Carroll |
| | Mary Conner |
| | Brianna Dannehl |
| | Stephanie Foreman |
| | Charles Hughes |
| | Julianna Johnson |
| | Tori Beaudoin |
| | Jessica Francisco |
| | Brennan Hamilton |
| | Patrick Jolly |
| | Danielle Bussiere |
| | Abigail McCrory |
| | Kristen St. Cyr |
| | Chase Stuckey |
| | Csanyi Matusicky |
| | Keaton Strigley |
| | Alexandra Freeman |
| | Tyler Marcel |

Louisiana Forestry Association Scholarships

- | | |
|----------------------------------|------------------|
| Robert H. Crosby Jr. Scholarship | Nathan Apetrei |
| Roy O. Martin Sr. Scholarship | Andrew Ferachi |
| Dr. Tom Hansbrough Scholarship | Mason LeBlanc |
| Juliet E. Hardtner Scholarship | Sarah LeBlanc |
| Weaver Brothers Scholarship | Beau Navarre |
| Dr. Norwin Linnartz Scholarship | Clint Pace |
| Jim and Doris Curtis Scholarship | Cameron Toerner |
| Joe D. Burns Scholarship | Benjamin Walters |

Graduate Student Scholarships

- | | |
|---|-----------------|
| Barbara M. Edison Scholarship | Alicia McAlhane |
| Ben and Pauline Stanley Excellence Award for Outstanding M.S. Student | Allison Snider |
| Clark M. Hoffpauer Scholarship for RNR Graduate Students | Vitek Jirinec |

Les Voyageurs

- | | |
|---|-----------------|
| Les Voyageurs is a select group of students from the College of Agriculture who represent the college and LSU in recruitment and alumni and development activities. | Brad Frazier |
| | McKaila Darden |
| | Marisa Saladino |
| | Madison Sharp |
| | Chelsea Romph |



Skylar Bueche Wins Undergraduate Research Grant

Skylar Bueche won the fiscal year 2018 Millard Perkins undergraduate research grant from the LSU College of Agriculture. Skylar is a sophomore majoring in Renewable Natural Resource Ecology and Management. With the funding support, she will conduct a one-year study under the guidance of RNR hydrologist Dr. Jun Xu to investigate dynamics of dissolved oxygen in backwaters of the Atchafalaya River Basin. The study aims to answer a crucial question about hydrological and biogeochemical connectivity between the river's mainstem and its floodplain.



Skylar Bueche samples water quality downstream from the Mississippi River Bridge.

Expanding Research Horizons With a Pathfinder Fellowship

Mary Grace Lemon, a Ph.D. student working with Dr. Richard Keim, won a competitive Pathfinder Fellowship from the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) to expand her field research to include new field sites and to collaborate with another lab working on complementary research. CUAHSI is a non-profit consortium of universities — of which LSU is one — funded by the National Science Foundation to support interinstitutional research in the hydrological sciences. Lemon visited the ecohydrology lab of Georgianne Moore at Texas A&M University, where ongoing research on floodplain ecosystems in Texas is closely related to Lemon's work to identify water sources that support floodplain trees. The fellowship also provided support for Lemon to do field work at a field site in the upper Sabine River in Texas as a comparison to her research funded by the Louisiana Department of Wildlife and Fisheries to investigate floodplain forests in Louisiana.



Vitek Jirinec

Jirinec Receives Prestigious Award

Vitek Jirinec, whose advisor is Dr. Phil Stouffer, received the Lewis and Clark Fund for Exploration and Field Research grant from the American Philosophical Society. The \$5,000 grant helps fund his research on the microclimate requirements of Brazilian birds. Vitek is also the recipient of the 2017 to 2018 Clark M. Hoffpauer award from the School of RNR.

Students Win University Research Grants

Bo Wang and Jeremy Reiman were awarded the Louisiana Environmental Education Commission's (LEEC) University Research Grant for the 2017 to 2018 fiscal year. Bo and Jeremy are working in Dr. Jun Xu's hydrology research group. These are competitive awards that will help Bo and Jeremy support their dissertation research on Mississippi River sediment transport-morphodynamics and biogeochemistry.



Jeremy Reiman collects water quality data on the banks of the Mississippi River.

Jeremy Reiman Wins Competitive Fellowship

M.S. graduate student Jeremy Reiman from Dr. Jun Xu's research group recently won a Pathfinder Fellowship from The Consortium of Universities for the Advancement of Hydrologic Science. The fellowship program provides travel funds to graduate students in hydrology to enhance their research by adding a field site to conduct comparative research, collaborating with a research group or working with researchers to add an interdisciplinary dimension to a project. With the competitive funding received, Jeremy will travel to Shanghai, China, in summer 2018 to conduct field measurements and collect water samples from the Yangtze River. He will work on collaborative research to investigate diurnal carbon dioxide outgassing and riverine dissolved carbon dynamics in the Mississippi River and Yangtze River, two of the world's largest alluvial rivers.



Nyman Studies Wetlands From Rhode Island to Maine

Dr. John Nyman has worked with and studied coastal wetland restoration in Louisiana since the 1990s. He has visited with landowners and managers who want to slow wetland loss or build new wetlands across almost 300 miles of coastal Louisiana, from Sabine Lake to Slidell. Nyman also has studied coastal wetland management and restoration outside Louisiana by reading journal articles and attending professional conferences. Until this summer, he had visited only a few of the sites outside Louisiana that he had read about, and he had visited with only a few of the landowners and managers who know those sites intimately. He was very excited to participate this past August in a workshop offered by the Eagle Hill Institute in Stueben, Maine, titled “Tidal Marsh Restoration: A Traveling Course from Rhode Island to Maine.” The workshop was led by two researchers who were already familiar to Dr. Nyman — Dr. Susan Adamowicz, who works for the U.S. Fish and Wildlife Service and is stationed at the Rachel Carson National Wildlife Refuge, and Dr. David Burdick, who works in the Department of Natural Resources at the University of New Hampshire.

The workshop participants visited 12 tidal marsh restoration sites spread across 300 miles through Rhode Island, Massachusetts, New Hampshire, and Maine. At most sites they met with restoration managers, researchers or landowners who knew the site history. As in much of Louisiana, the marshes they visited in New England naturally receive some freshwater and some marine water. Also, as in much of Louisiana, the marshes they visited in New England were dominated by *Spartina alterniflora*, or *Spartina patens* or *Phragmites australis*, but it was a different world than the one that Dr. Nyman knew. In southeast Louisiana, human activity that reduces natural river inflow to the coastal marshes is a common problem. In southwest Louisiana, human activity that increases tidal inflow into low-salinity marshes is a common problem. Thus, in Louisiana restoration often takes the form of increasing river inputs or decreasing tidal inputs. Neither of these were restoration tools at the marshes he visited in New England because the problems in New England were different from those in Louisiana. In New England, human activity that reduces tidal inflow into high-salinity marshes is a common problem. Restoration there generally involved restoring tidal action to such marshes. A difference that Dr. Nyman had read about but not fully appreciated is that increasing tidal action in the New England marshes generally increases drainage as well as salinity. However, in Louisiana increasing tidal action generally seems to increase salinity without increasing drainage. The greater tidal range in the New England marshes (5 to 15 feet) compared to Louisiana (6 inches) is the reason for this apparent difference between the two coasts.



Water drains at low tide through a tidal restriction on the West Branch of the Pleasant River at Addison, Maine.



Water is held during low tide upstream of a tidal restriction on the West Branch of the Pleasant River at Addison, Maine.

Another difference was the greater abundance of the European variety of *Phragmites australis* in New England marshes. In New England, *Phragmites* generally is viewed as a problem but not on the Gulf Coast. Differences in *Phragmites* between coastal Louisiana and much of the Atlantic Coast probably will complicate communication regarding the newly recognized dieback of *Phragmites* in Louisiana.

Nyman and Other AgCenter Scientists Investigate Dieback of Roseau Cane (*Phragmites australis*) in Coastal Louisiana

Roseau cane (*Phragmites australis*) is a large bamboo-like grass common in wetlands worldwide. It is both a loved and hated plant depending upon where you are. In Asia, Roseau cane is cultivated for fiber. In Europe, Roseau cane is protected and restored because it provides nesting habitat for migratory, secretive marsh birds, such as bitterns. On the Atlantic Coast of the U.S., a rare native Roseau cane occurs, but the European variety of Roseau cane is far more common and generally indicates degraded coastal wetlands. Human activity has restricted tidal flow and allowed the invasive Roseau cane to replace many acres of native vegetation, degrading habitat for migratory water birds. Similarly, on the Great Lakes stable water levels have allowed the European variety of Roseau cane to fill shallow ponds and degrade habitat for water birds. Along both the Atlantic Coast and Great Lakes, wetlands can be restored through hydrologic restoration and/or by applying herbicides and fire, but restoration is costly.

On most of the Gulf Coast, Roseau cane has attracted little attention from wildlife managers except at the mouth of the Mississippi River where Roseau cane is an important buffer between quality water bird habitat and waves and salinity in the Gulf of Mexico. At the Pass-a-Loutre Wildlife Management Area and Delta National Wildlife Refuge, Roseau cane forms extensive stands covering thousands of acres in water too deep for other species. Roseau cane produces dense mats of roots, which can reduce erosion of the marsh, particularly during storms, and also facilitate the building of marsh through the buildup of organic matter from the roots.

In the fall of 2016, at Pass-a-Loutre Wildlife Management Area, which lies at the very end of the Mississippi River, wetland managers noticed that some of the Roseau cane was dying and the density of Roseau cane patches was decreasing. This sparked tremendous concern because of Roseau's role in protecting the marsh and the risks associated with the upcoming hurricane season. Dr. John Andrew Nyman began working with Dr. Rodrigo Diaz (entomology) and Dr. Jim Cronin (biology) to investigate the potential cause and spread of the dieback. They observed that dieback generally coincided with a scale bug (*Nipponaclerda biwakoensis*) native to Asia that has not been previously reported in North America. The bugs are common but can only be seen after removing the leaf sheaths from the stems of Roseau cane. However, three parasitoids were also identified that attack the scale bug, which suggests that either the scale bug has a long history in North America or the scale bug and its parasitoids were introduced to North America at similar times. If future generations of scale bug become less fatal, Roseau cane may survive without human intervention. Otherwise, restoration may be needed to prevent increases in storm damage from Roseau cane dieback.



Numerous scale bugs are evident on stems of Roseau cane if the leaf sheath is removed. When scale bugs become numerous, they kill the stems by sucking the sap.



Nyman and King Secure Grants to Evaluate Effects of Waterfowl Management on Marsh Sustainability

Creating and managing coastal impoundments is a common waterfowl management practice along the Gulf and Atlantic coasts in the U.S., including Louisiana. Impoundments are typically drained during the growing season, allowing annual plants to establish and produce abundant food resources for wintering waterfowl. After a few years, perennial vegetation, such as cattail and bulrush, may outcompete the annuals. Influxes of salt water, fire or disking are used to set back the perennial vegetation. These same activities, however, can result in a loss of elevation because of the oxidation and loss of soil organic matter. Several impoundments in Texas and Louisiana have lost 2 to 4 feet of elevation. However, the exact mechanisms behind the losses are poorly understood. Furthermore, many of the management processes used (e.g., fire and flooding) could also be used to increase root production and build up soil organic matter and elevation.

Drs. Andy Nyman and Sammy King have recently been funded by the Louisiana Department of Wildlife and Fisheries and the Texas Parks and Wildlife Department to evaluate the effects of marsh management on long-term sustainability of the marshes. Specifically, Nyman and King and their students will evaluate the effects of current management practices on marsh decomposition and accretion (i.e., build up) processes and will explore management alternatives that can be used to build marshes up while also providing wildlife benefits.

Researchers Working to Conserve the Louisiana Pearlshell Mussel

School of Renewable Natural Resources faculty Drs. Sammy King, Richard Keim, Bill Kelso and Mike Kaller are beginning a project to support U.S. Fish and Wildlife Service conservation efforts for the threatened Louisiana Pearlshell Mussel (*Margaritifera hembli*). King is also the leader of the USGS Louisiana Cooperative Fish and Wildlife Unit.

The mussel has been federally listed since 1988 and is now limited to a few streams in forests in central Louisiana within the Kisatchie National Forest. The project will support future recovery efforts by investigating whether the mussel may be limited by a lack of appropriate habitats or by unsuccessful reproduction efforts. Faculty expertise in hydrological connectivity (e.g., stable isotope conservative tracers), genetics (DNA and eDNA methods) and fish and habitat sampling will be integrated to support conservation and recovery plans. The project is expected to continue until July 2019 and will provide information to better manage existing mussel hosting streams and to develop protocols that maintain and identify suitable habitat in other streams that do not currently support the mussel and may potentially offer opportunities for restoration.



Stouffer Joins Research Effort in Equatorial Guinea

As he was completing his Ph.D. based on fieldwork in Brazil with RNR Professor Phil Stouffer, Luke Powell became interested in African rainforest birds. He identified Equatorial Guinea as a wide-open research opportunity. This tiny country contains the relatively undisturbed Congolese rainforest, but it has seen almost no scientific research except on the island of Bioko. Powell raised enough funding for a scouting trip, and was able to establish a research program (www.biodiversityinitiative.org) that grew to include RNR Ph.D.s Jared Wolfe and Kristin Brzeski. In January 2018, Stouffer joined the



The expedition documented 70 species of birds, including the Yellow-bellied Wattle-eye. Wattle-eyes are part of a small family of birds restricted to sub-Saharan Africa.

team for research in the rainforest near Oyala. This site includes forest that has experienced almost no human disturbance but has recently become more accessible due to new roads. The team also worked in forest that had been selectively logged. In addition to their work with birds, the research effort included sampling bats, large mammals and arthropods. It was quite an international group and included participants from Great Britain, Spain, Portugal and Germany as well as an intern from Equatorial Guinea. The project will integrate Equatorial Guinea with the larger body of ecological research in neighboring Cameroon, where Powell is also working. The researchers hope the Biodiversity Initiative can enhance conservation in this biodiversity hotspot.

Stable Isotope Hydrology

Dr. Richard Keim presented research in October 2017 at the European Geosciences Union special-topic Leonardo Conference, "Water Stable Isotopes in the Hydrological Cycle." The conference brought together experts from around the world to share progress on research using naturally occurring isotopes of water molecules to trace how water moves through the environment. Measurements of variation in isotopic composition of water in space and time are being used to reveal details of numerous hydrologic processes, including ocean currents, groundwater flows and formation of precipitation. Recent advances in laboratory techniques have made analysis of isotopic composition much simpler and cheaper than in the past, so this research field is expanding rapidly. In the water stable isotope lab in RNR, Keim and his students are using this tool to identify water sources to trees in floodplains, flowpaths (i.e., the path of underground water flows) and residence times of water in wetlands and how forests affect rainfall as it enters the soil. Identifying how hydrologic processes interact with forests allows for more detailed and effective management of both resources.

Dr. Scott Allen (RNR Ph.D., 2016) also attended the conference and presented results of research from his new position as a postdoctoral researcher at ETH in Zurich, Switzerland. There he is working as part of a large collaboration to learn about how trees use soil water using samples of water isotopes collected from across Switzerland.



The team is banding and recording molt and morphology as well as collecting fecal samples, feathers and blood. Pictured: Luke Powell (front); Andrew Wiegardt, of Humboldt State University (left); and Crinan Jarrett, University of Edinburgh (back).



King Conducts Wetland Workshops for Nature Reserve Managers in China

In July Dr. Sammy King joined former student Drew Fowler (M.S., King 2013; Ph.D. candidate University of Missouri) and U.S. Fish and Wildlife Service biologist John Vradenburg in northeast China to conduct a wetland workshop for reserve managers. The workshop was part of ongoing efforts with the International Crane Foundation and the China Academy of Sciences to build wetland management technical capacity, particularly for the benefit of the endangered Siberian crane. The workshop was attended by about 50 people, including staff from seven Chinese nature reserves, graduate students, faculty and government officials. The workshop was well-received and, as you can imagine, it was quite the cultural experience!

This region of China, the Songnen Plain, is semi-arid and is a critical agricultural region. Unlike refuges in the United States, locals could graze sheep, cattle, horses and establish gardens on the national wildlife reserves until 2016. Some even established homes for the growing season. It is definitely a heavily utilized landscape, but in spite of this there is still substantial acreage of wetlands, many of which have maintained a high degree of their natural processes. As in the United States, river diversions and widespread and rapidly expanding irrigation infrastructure are disrupting natural hydrological regimes. One of the reserves, Momoge National Nature Reserve, hosts over 90 percent of the world's Siberian crane population during migration. The goal has been to help minimize the impacts of land development on the wetlands and to educate reserve staff on key wetland management principles.

Cranes are of special cultural significance in China, and they are economically important for tourism at several nature reserves. As a result, irrigation district managers have attended the synthesis meetings at each reserve and have worked with reserve staff to minimize their impacts. The reserves still have a daunting task as irrigation canals are supposed to increase by threefold in the next decade or less, but they have an engaged community, and there are viable options to minimize the effects.



Drew Fowler (M.S., King 2013), John Vradenburg (U.S. Fish and Wildlife Service) and Dr. Sammy King (far right) pose with a local sheep herder in northeastern China. King and his colleagues conducted wetland workshops for reserve staff, graduate students and faculty in summer 2017.

Xu Member of International Research Team Studying Deltaic Processes

Dr. Jun Xu, a hydrology professor at the School of Renewable Natural Resources, is on two international research teams that have recently received grants to investigate wetland dynamics and river delta processes under future climate change conditions. The wetland research project is funded by the Natural Science Foundation of China — the NSFC, which is equivalent to the U.S. National Science Foundation — with a budget of 3.88 million Chinese yuan (approximately U.S. \$616,000) for 2018 to 2021. The project will assess potential climate change effects on permafrost wetlands in China's far northeast. The study wetlands are located in the Amur River Basin close to Russia, and they are highly sensitive to climate change. One of the key questions that the project addresses is how increasing thawing in a warmer climate would affect hydrology and the wetland processes in permafrost regions. The interdisciplinary research team includes vegetation, soil, hydrology, wetland and ecosystem ecology researchers from the Chinese Academy of Sciences, LSU and U.S. Geological Survey's Wetlands and Aquatic Research Center. The research team includes three faculty from LSU and four faculty from the East China Normal University – Shanghai, with expertise in river hydrology, sedimentology, marine geology, coastal geomorphology, spatial modeling and socioeconomics. The international team will carry out a comparative study on the Mississippi River and Yangtze River deltas to address two key questions affecting all of the world's densely populated river deltas in the future: (1) How to quantitatively predict the decadal-scale delta evolution trend for future climate and (2) What criteria are needed to develop sustainable strategies for deltaic regions that are highly coupled natural and human systems.



Jun Xu stands at the Xiaolangdi dam that regulates water and sediment flow in the Yellow River.



What's in a Name?

At the April 1 annual business meeting, members of the School of Renewable Natural Resources Alumni Association voted to change the name of the group to the School of Renewable Natural Resources/Forestry, Wildlife, and Fisheries Alumni Association. The goal of the change was to make the association inclusive to both past and recent graduates of the school. Additionally, membership is now open to former students and friends that did not graduate from the school.

Alumni Officers

Officers of the SRNR/FWF Alumni Association elected last April to two-year terms were:

Will deGravelles	President
Craig Gothreaux	President-elect
Luke Laborde	Secretary-treasurer
Rachel Villani	At-large board member

Will can be contacted at 225-931-7373 or william.degravelles@tnc.org.

Hall of Fame Inductees

At the 2017 annual meeting, two alumni were inducted into the School of Renewable Natural Resources Hall of Fame: Mr. Allen U. Bedell, who earned a Bachelor of Science in Forestry in 1960, and Mr. Thomas J. Hess, who earned a Master of Science in Wildlife Management in 1975, and was inducted posthumously.

SRNR Alumni Association Affiliates With University Association

The SRNR/FWF Alumni Association is now the newest chapter of the LSU Alumni Association! Through this affiliation, dual members are now eligible for trips, hotel and rental car discounts, gift shop discounts and all other benefits and communications available to members of the LSU Alumni Association. This alliance streamlines federal filings and ensures appropriate tax and giving credit for members. Visit <https://geaux.lsu.edu/alumni/rnr> for more information.



Alumni and friends gather for the February meeting of Science Thursday.

Supporting Scholarship

Gifts from alumni have allowed the Alumni Association to endow a scholarship to support undergraduate academic achievement in the School of Renewable Natural Resources. Receiving \$1,000 awards were:

Lindsey Newton	Sophomore	Wildlife Ecology
Micah Johnson	Freshman	Forest Resource Management
Anna West	Junior	Conservation biology

Thanks to all of our alumni for their generous support!

Supporting the Director's Excellence Fund

Donations from alumni also allowed the Alumni Association to contribute \$1,035 to the Director's Excellence Fund administered by the LSU Foundation. The Director's Excellence Fund makes discretionary money available to SRNR Director Allen Rutherford to support travel and equipment needs for students engaged in undergraduate research and sponsored student organizations.

Science Thursday

President Will deGravelles initiated Science Thursday, where alumni of the school are briefed on current events and research conducted by faculty and graduates. Alumni gather at the RNR Building the first Thursday of the month during the spring and fall semester for a social time at 5:45 p.m. followed by a topical presentation at 6:15 p.m. Speakers to date have included:

- Mr. Craig Gothreaux, "Restoration Following the Historic Deepwater Horizon Oil Spill: An Explanation of the Process"
- Dr. Kevin Ringelman, "Eye in the Sky: Applications for Drones and Thermal Cameras in Duck Nesting Research"
- Dr. Qinglin Wu, "Wood Fibers – A New Horizon"
- Dr. Sammy King, "Louisiana's Whooping Crane Re-Introduction Program: Where Are We Now?"
- Mr. Bren Haase, "2017 Coastal Master Plan — Committed to Our Coast"

Join Us

Our next Annual Meeting is scheduled for Saturday, April 14 at noon at the LSU School of Renewable Natural Resources. A crawfish boil will follow at La House across from Alex Box Stadium. Tickets are available later that evening to watch LSU host Tennessee in baseball. Watch for upcoming announcements.

Basic memberships to the SRNR/FWF Alumni Association are \$10 annually, but combined memberships for the LSU Alumni Association and the SRNR/FWF Alumni Association are available online for \$50. For \$75 you can join the SRNR/FWF Alumni Association, the LSU College of Agriculture Alumni Association and the LSU Alumni Association — a bargain benefiting our students and our university!

We Want To Hear From You!

The alumni news is compiled and written by Luke Laborde. We are continuously working to update and manage our alumni files and database. We welcome information on promotions, career changes, passings and other important life events from all alumni. If you have any news items or address changes that you would like to share, please e-mail Luke at llabor2@lsu.edu

Billy Carson Bond (B.S.F. '57)

Billy Carson Bond died on Saturday, August 5, 2017, at the age of 84. He was a native of Columbia, Mississippi, and a resident of Monroeville. Following graduation from LSU in 1957, he and his wife, Evelyn, resided in Sylacauga until 1965. During this time, he was employed by the Coosa River Newsprint Company. He and Evelyn enjoyed fond memories of the Sylacauga community and their many friends there. He was a veteran of the United States Air Force and the Mississippi National Guard and served during the Korean conflict. He was a graduate of LSU in forestry and a registered forester in Alabama. He graduated from Jones Law School in Montgomery with a juris doctor degree in law and was a member of the Alabama Bar Association. He spent his career in the forest products industry. During his distinguished career he held the notable positions of corporate vice president of Hammermill Paper Co. Inc.; president of Allegheny Railroad Inc.; and president of Harrigan Lumber Co. Inc. He retired as president of Alabama River Woodlands Inc. in 2000.

Orville Hervey "Doogie" Darling (B.S.F. '50)

Orville Hervey (Doogie) Darling of Crossett, Arkansas, was born June 28, 1928 in Fordyce, Arkansas and died September 23, 2017 in Little Rock, Arkansas. He was a graduate of Fordyce High School, the University of Arkansas at Monticello and LSU and held a master's degree in forestry from Yale University. He retired in April 1994 as forest resource regional manager for Georgia Pacific Corporation after 44 years of service with Georgia Pacific and a predecessor company, Fordyce Lumber Company. He was presented Georgia Pacific's Distinguished Service Award in 1983 in Atlanta, Georgia, and UAM's Achievement and Merit Award for Alumni in 1993. He served many years on the Arkansas Forestry Association Executive Committee and served as president in 1988 and 1989. He was appointed to the Arkansas State Forestry Commission in 1994 and served as chairman from 2002 to 2003. He served as a member of the board of directors for Deltic Timber Corporation of El Dorado, Arkansas, from 1996 to 2008.

In 2005, he was inducted into the Arkansas Foresters Hall of Fame. In 2006, after several years of research, he wrote a book, "A History of the Mills, Logging Camps and Early Forestry Operations of Crossett Lumber Company." It was put in the Yale Forestry Library, University of Arkansas at Monticello Library and the Crossett Public Library. In 2008, he wrote "Fordyce, Arkansas: A History of the Town, and its Forests, Timber and Mills."

Dr. Robert Rodney Foil (B.S.F. '56; M.S. '60)

Dr. Rodney Foil died in his Starkville, Mississippi, home on February 4, 2018, at the age of 83. Rodney was born on August 12, 1934, in Bogalusa, Louisiana to Rosa Green Foil and Odell Foil. He graduated from LSU with a B.S. in forestry in 1956 and an M.S. in forestry in 1960 before earning a doctorate in forestry from Duke University in 1964.

Rodney's career accomplishments in forestry and agriculture at LSU and Mississippi State earned him a reputation that has endured far beyond his retirement in 1999. At Mississippi State he rose from head of the Department of Forestry, to dean of the School of Forest Resources, to experiment station director, to vice president of the School of Agriculture, Forestry, and Veterinary Medicine. After retiring from MSU, Rodney served with the U.S. Department of Agriculture for two years, earning recognition in the department's hall of fame. He is also memorialized at Mississippi State by the Rodney Foil Plant Science Research Center and with the Rosalind and Rodney Foil Teamwork Award.

Purvis R. Huff (B.S.F. '52)

Purvis R. Huff was born on October 23, 1926, in Amite County, Mississippi. He attended Crosby High School and later graduated from Louisiana State University with a degree in forestry. He joined the U.S. Air Force in 1944 and served until the end of World War II. Mr. Huff enjoyed a lifetime career as consulting forester, managing timberland throughout the Southeast and cultivating lifelong loyal relationships with many a landowner. He was the owner of Forestry Consultants Inc. and was a pioneer in the business of forest management and conservation practices.

Jefferson Davis Hughes Jr. (B.S.F. '49)

Former Crown Zellerbach executive Jefferson Davis Hughes Jr., also known as "Jeff" or "J.D.," died on Thursday, June 29. He died peacefully at home in the arms of Betty, his loving wife of 67 years. He was born on April 10, 1924. He was a native of Hammond, Louisiana, and he was the great-great-grandson of Peter Hammond, founder of the city. He was a longtime resident of Bogalusa and resided previously

in Hammond; Poplarville, Mississippi; DeRidder; and Denham Springs. He served in the U.S. Navy during World War II aboard the U.S.S. LCI 442(G), participating in the invasion of Okinawa and the liberation of the Philippines. A graduate of Hammond High School, he attended Southeastern Louisiana University before the war and received a degree in forestry after the war from LSU. Hughes worked for 51 years for Gaylord Container Corporation and its successor companies Crown Zellerbach, Cavenham, Hanson and Weyerhaeuser. He retired in 1986 from Crown Zellerbach as manager of environmental services and association affairs, served as a consultant for Cavenham and Hanson and retired again in 2000 as manager of government affairs for Weyerhaeuser. While employed by Crown Zellerbach, he was chosen to travel to Brazil to evaluate the possibility of starting an operation in that country. He was also chosen by the secretary of the Army to serve on a three-member blue-ribbon panel to advise the Army on management of its national resources at military and civilian installations. He was called as an expert witness in many civil cases and testified before Congress many times on forestry matters. He was frequently called on by the forestry community for his vast knowledge and experience, as comfortable talking to loggers and tree farmers as he was to executives and members of Congress. In 1967 Hughes was named "Outstanding Alumnus of the Year" by the LSU School of Forestry. He was a former president of the Louisiana Forestry Association and a charter member and first president of the Tangipahoa Forestry Association. He was a member of the Washington Parish Forestry Association and the Mississippi Forestry Association. He was a fellow of the Society of American Foresters and served on its national council, serving also as chairman of its Gulf States section, receiving its Distinguished Service Award. In 1977, he received the President's Award from the Southern Forest Institute. In 2010, Hughes was the first non-academic elected to the LSU School of Renewable Natural Resources Hall of Fame. In 2016, he was named Outstanding Alumnus of the Year by the LSU College of Agriculture.

Dr. Wu-Hsiung "Ernest" Hsu (M.S.F. '72)

Dr. Wu-Hsiung "Ernest" Hsu, known to many as "Ernie," passed away unexpectedly, but peacefully, on Christmas Day 2017 in his daughter and son-in-law's home in Seattle, Washington. He was 75. Ernie was born in Keelung, Taiwan, on November 3, 1942 and graduated in 1967 from the National Taiwan University with a B.S. in forestry, which he followed with an M.S. in forestry. He received a hard-earned scholarship to LSU, where he earned an M.S. degree, then went on to earn an M.S. degree from University of Illinois and a Ph.D. in materials science and engineering from Washington State University. Ernie was a dedicated and brilliant scientist, building a career in engineered wood products and specializing in oriented strand board (OSB). Ernie was awarded over 15 original process, equipment and product patents related to wood composites in the U.S., Canada and European Union for his innovations and advancements in engineered wood products that will continue to improve lives through better and more affordable building construction. Ernie was a fellow of the International Academy of Wood Science. We are so fortunate that Ernie was able to leave his legacy and share his deep technical knowledge by publishing two books that have been read and studied worldwide. Ernie loved his work and persisted as a dedicated and unrelenting scientist. He continued to provide technical advising to OSB manufacturers right up until his passing, having just returned from a business trip providing consulting services in Malaysia and China two days before his passing.

F.N. "Nick" Margrave Jr. (B.S.F. '48)

Fred Nicholas "Nick" Margrave, Jr. was born on August 22, 1926, to Fred and Wilhelmina Hart Margrave. Growing up in Little Rock, Arkansas, Nick was a proud graduate of Catholic High School, where he excelled in sports and was named an all-state football player. Blessed with an inquisitive mind and a great appreciation for education, he attended Little Rock Junior College (now University of Arkansas Little Rock), where he met the love of his life, Martha Elizabeth Smith. He graduated from LSU, where he was a forestry major and a member of Theta Xi fraternity. He later received a master's degree in institutional management from Southern Arkansas University. He worked for the woodlands division of the International Paper Company as a forester and in safety management for his entire career.

Ernest George Miller Jr. (B.S.F. '58)

A resident of Lafayette, George Miller passed away on September 27, 2017, at Magnolia Estates Nursing Home. He was born in Soengei Gerong, Sumatra, on July 6, 1935. After graduating from Baton Rouge High

School and LSU, he was employed by the Louisiana Department of Forestry. In Lafayette, he aided in the planting of trees for the development of the Acadian Village through Civitan International. He served on the vestry at St. Barnabas Episcopal Church in Lafayette. His hobbies included fishing and hunting, and he took great pride in his vegetable gardens. Though the last three years took its toll on his health, he always kept a great sense of humor, which will be sorely missed. Survived by his wife of 62 years, Betty Jane (Robinson) Miller; three sons, Kenneth A. (wife, Judy) of St. Francisville, Wendell N. (wife, Jacqueline) of Lafayette, and Eugene R. (wife, Mina) of Kentwood; one granddaughter, Whitney J. Miller of St. Francisville; and sister, Mrs. Richard Stone (Kathleen) of Baton Rouge. He was preceded in death by his parents, Ernest G. Miller Sr., and Leola Denny Miller.

Arnold B. Smith (B.S.F. '60)

Arnold B. Smith of Poplarville, Mississippi, passed away on Monday, January 22, 2018, at the age of 80 after a brave battle with Alzheimer's Disease. He was born January 25, 1937, in the Magnolia community to Olson and Lillie (Brown) Smith. He grew up in Stone County and attended the Magnolia School and graduated from Stone County High School and Perkinson Junior College. He graduated from LSU in 1960 with a degree from the School of Forestry. After LSU, he was called up by the National Guard and served during the Berlin Crisis. Arnold owned and operated his own business, Arnold B. Smith Timber Company in Poplarville, Mississippi, until his retirement. During his career as a forester, he served as a member and as chairperson of the Mississippi Forestry Commission.

Salvo Verucchi (B.S.F. '59)

Salvo J. "Tony" Verucchi, of Hot Springs, Arkansas, died at age 82 on March 2, 2017. He was born December 29, 1934, in Natchez, Mississippi. Tony enlisted in the United States Marine Corps on June 3, 1952, when he was 17 years old, just after graduating from high school. Tony was elected captain of the boxing team, where he was runner up as a middleweight in the Nevada State Golden Gloves in Las Vegas in 1955. While attending Hinds Junior College in Raymond, Mississippi, in 1956, Tony won the Mississippi Golden Gloves Tournament. Tony graduated from Hinds Junior College in 1957 and received his Bachelor of Science degree in forest management from LSU in 1959. His first job was an area forester with the Mississippi Forestry Commission, but he moved to the U.S. Forest Service a year later. He worked 40 years with the Forest Service in different positions. At the Schenck Job Corps Civilian Conservation Center in North Carolina, he served as District Ranger on three National Forests and a land appraiser until his retirement in 1999.

John Milton Webb (B.S.F. '43)

John Milton Webb passed away at his home in Daphne, Alabama, on July 24, 2017. He was born in Atmore, Alabama, on October 21, 1919, and was a member of the Escambia County High School class of 1938 and LSU College of Agriculture class of 1943. At LSU he was a member of the Kappa Alpha Fraternity. He was a U.S. Merchant Marine cadet at Pass Christian, Mississippi in 1944 and was on ships during World War II in the Atlantic war zone and in the Mediterranean-Middle East war zone. Following the war, he was employed by the woodlands department of the International Paper Company for 38 years and lived in Louisiana, Texas and Arkansas. He was secretary-treasurer of the Gulf States section of the Society of American Foresters and of the Texas chapter. While living in Nacogdoches, Texas, he was chairman of the Texas Tree Farm Committee, and in 1964 he received an award for personally enrolling over 100 timberland owners in that program to promote good timberland practices. In his retirement years, he moved back home to Alabama, where he lived in Daphne. His life was spent walking in the pine forests of the south, and as he grew older he walked the hills of Lake Forest and could climb the bleachers at Daphne High School into his 90s.

Charles "Sidney" Winters (B.S.F. '60)

Charles Sidney Winters passed away November 5, 2017 in West Monroe, Louisiana. Sidney was a 1960 forestry graduate. He was a retired forester with Kitchens Brothers Manufacturing and May Timber LLC.

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School of Renewable Natural Resources
Louisiana State University Agricultural Center
128 Knapp Hall
Baton Rouge, LA 70803

LSU

College of Agriculture

School of Renewable Natural Resources

With student enrollment over 300, the School of Renewable Natural Resources is now the 2nd largest department in the LSU College of Agriculture! We need alumni and donors more than ever to help maintain high academic and professional standards, and to prepare our graduates with real work experiences.

You can help. We need guest speakers, field trip and research sites, internship opportunities, and jobs for our students. We also need your financial support, large or small, to support scholarships for our students. This support is particularly important in light of tuition increases resulting from dramatic cuts in state funding for higher education. Endowed chairs and fellowships help us recruit and retain faculty to accommodate increased enrollment and expand our course and research offerings.

Join: The SRNR/FWF Alumni Association and the College of Agriculture Alumni Association. Information on both organizations is available on our website, www.rnr.lsu.edu.

Prospective students: The LSU School of Renewable Natural Resources offers bachelor's degree in natural resource ecology and management with nine areas of concentration:

- Conservation Biology
- Fisheries and Aquaculture
- Wildlife Habitat Conservation and Management
- Wetland Science
- Wildlife Ecology
- Pre-Vet Wildlife/Wildlife and Fisheries
- Ecological Restoration
- Forest Management
- Forest Enterprise

Interested in being part of the School of Renewable Natural Resources?
Your future starts here: www.rnr.lsu.edu/academics/welcome.htm

