JAMES C. KENNEDY 2016 annual report



FOREST AND WILDLIFE RESEARCH CENTER

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GREETINGS *Friends & Colleagues*

This year marks my first prologue as coordinator of the James C. Kennedy Chair of Waterfowl and Wetlands Conservation Program at Mississippi State University. Dr. Rick Kaminski served as the waterfowl ecologist at MSU since 1983, and helped establish and expertly led the Chair for seven years prior to his retirement in 2015. After departing MSU, Rick assumed a similar role at Clemson University's Belle W. Baruch Institute of Coastal Ecology and Forest Science. I am indebted to Dr. Kaminski for supervising my graduate student program, and believing in me to spearhead the next phase of MSU's waterfowl conservation program. I am also so very grateful to Mr. Jim Kennedy for his philanthropy and investment in waterfowl conservation at Mississippi State, and other North American universities.

Since 1985, I have had the great pleasure of working for several agencies on behalf of waterfowl and wetland conservation across the country including the Missouri Department of Conservation, California Waterfowl Association, US Fish and Wildlife Service, and Ducks Unlimited Inc. I thoroughly enjoyed cooperative research and managementrelated projects with state natural resource agencies in my home state of Missouri as well as Arkansas, California, Louisiana, and Mississippi. Working with these different agencies on waterfowl conservation have provided me with a diversity of experiences that I now practice in my current role at MSU and as coordinator of the Kennedy Chair. Once in academia, you quickly realize your potential impact on the young lives of the students before you and whom you are responsible for helping to build their professional career. Professors play a critical role in helping to shape the student's skills, knowledge and attitudes regarding wildlife management before heading out to build their own careers and partnerships. Every day, I seize the opportunity to share with students' aspects of the wildlife profession and what new discoveries they might uncover while working for federal, state, or private agencies. My goal is to always stimulate a sense of adventure in my students, to go experience life to

its fullest and follow their professional aspirations wherever it may take them.

This past year was a productive one here in our program. One significant highlight was that the students and I were very active in the 6th North American Duck Symposium, held in Annapolis, Maryland,



February 2016. Seven of our current or former graduate students gave oral and poster presentations, and I coauthored a talk with a graduate student from the University of Georgia-Athens. The following pages highlight some of our students and their projects presented at this symposium. Furthermore, we recruited three more outstanding graduate students in fall 2016, and their profiles appear later in this report. Our research is designed around several themes, such as studying waterfowl habitat use and generating a demographic outcome (winter survival) associated with the habitat, helping private landowners solve problems such as with depredation of fish by ducks and water birds at aquaculture facilities, or accumulating baseline information on pollinator use of wetland plant communities in the Mississippi Delta. Future research may investigate the relevance of sanctuaries to wintering waterfowl, and evaluate novel new technologies to further explore the linkage between important breeding origins of some waterfowl wintering here in the southern United States.

In closing, I truly appreciate our diverse partners, colleagues and Mr. Kennedy's philanthropy that support our research, teaching, and service activities here in the waterfowl program at MSU.

J. Brian Davis ASSOCIATE PROFESSOR

Habitat Use of Sandpipers in the Mississippi Alluvial Valley and Gulf of Mexico

By Justyn Foth, Ph.D.

Dr. Foth completed his master's in 2011 and his Ph.D. in 2016 in Wildlife, Fisheries and Aquaculture. He is currently waterfowl and other gamebird biologist for the state of Delaware.

Nhorebird conservation requires identifying and protecting vital wetland habitats along the birds' migration routes. Shorebird use of inland regions in the southeastern United States is primarily confined to fall and spring migration, with few species breeding and overwintering there. Wetland habitats used by shorebirds in the Mississippi Alluvial Valley (MAV) are primarily found on public lands, near major waterways, and on aquaculture facilities. To increase wetland habitat and invertebrate food resources for fall migrant shorebirds, the Lower Mississippi Valley Joint Venture and their partners encourage private landowners through incentive-based programs, such as the Migratory Bird Habitat Initiative (MBHI) and Wetlands Reserve Program, to provide shallow water habitats (≤ 30 cm) on their properties. However, reliable information on shorebird use of the MAV is limited, which constrains management decisions of the Joint Venture.

Several methods can be used to study migratory pathways of neotropical shorebirds, including stable isotopes that may reveal information on linked food webs and identify sites of conservation concern for migrants. Stable isotopes are atoms with nuclei containing the same number of protons but varying numbers of neutrons, which changes their atomic mass. Isotopic elements of importance in biological processes include hydrogen (H), carbon (C), nitrogen (N), oxygen (O), and sulphur (S). Stable isotope differences can be used to trace locations of origin for breeding, migration, and wintering areas of migratory animals.

Use of stable isotope analysis techniques on migrating shorebirds in the MAV and coastlines of the northern Gulf of Mexico (NGoM) may help explain complex trophic interactions or linkages among wetland sites. Wetlands in the MAV and NGoM differ; sites in the MAV are freshwater, while NGoM sites represent a gradient of freshwater, brackish, and saline habitats. Further, invertebrate foods consumed by shorebirds on marine sediments are often isotopically different than foods derived from terrestrial and freshwater sources. The distinction between fresh and marine environments is important for stable isotope analysis because these habitat types differ isotopically, allowing researchers to discriminate between animals using different habitats by examining C and N. As shorebird species migrate from breeding grounds to stopover sites in the MAV and NGoM to wintering grounds in South America, they encounter both fresh and marine environments.

Bird feathers and blood are often collected for stable isotope analysis. Extracting these tissues are minimally invasive to birds because feathers regrow and low volume of blood is collected from birds already in hand after capture. By diligently selecting tissues prior to capture, an animal's diet or habitat over a range of different temporal and spatial scales may become apparent, leading to identification of distinct migration pathways between breeding and wintering sites, as well as linking stopover sites.

Because little is known about shorebird migration ecology in the Mississippi Basin and in some Gulf Coastal wetlands, Kennedy Ph.D. student, Justyn Foth, collected shorebird tissues (i.e., feathers and blood) to use stable isotope analysis to assess potential migratory connectivity among MAV and NGoM habitats. These stable isotope analysis provide data on use of freshwater and estuarine wetlands by fall migrating shorebirds. Shorebird tissues from capture sites were used to estimate potential hydrocarbon absorption. Differences in isotopic signatures were noted for future studies.

Shorebird feathers, blood, and tissue were collected at three state managed conservation areas in southeast Missouri (the Bootheel), and at St. Catherine Creek National Wildlife Refuge (NWR) in Louisiana of the southern MAV. Samples were also collected at two coastal sites: Dauphin Island, Alabama and Elmer's Island Wildlife Refuge. To capture shorebirds, mist nets were erected in close proximity of



observed greatest bird concentrations. These sites were continually monitored for captured birds. Once captured, birds were processed quickly, which included attaching a numbered aluminum band on the right tarsus, and sexing and aging each bird. The ninth primary feather was collected because shorebirds initiate flight feather molt closer to the body and move outward. Blood samples from each bird was collected in addition to a soil core sample at each bird location to generate a site specific value for stable isotope analysis.

In 2012 and 2013, 236 shorebirds were captured and banded. Eighty-three percent of captures were least sandpipers. Semipalmated sandpipers represented 9.5 percent of captured shorebirds and 24 Western Sandpipers represented 21 percent of captured shorebirds.

Over 81 percent of the individual birds captured did not match the mixing space relative to collected invertebrates at capture sites. Therefore, migratory connectivity amongst MAV and NGoM sites was not definitively confirmed. This may be because the birds' blood likely represents foraging at other locations along their migratory route or they were foraging on food items which were not located. Half of the western sandpipers were associated with MAV invertebrate C and N values. This may indicate this species uses coastal wetlands of the NGoM longer prior to migrating across the Gulf of Mexico or the NGoM represents the northern wintering range for this species. A more detailed study of western sandpipers tissues and invertebrate resource C and N values at southerly MAV sites and along the NGoM may provide evidence of greater migratory connectivity between the two regions.

Differences in foraging niche separation at the species level were distinguishable, with longer-billed Western Sandpipers foraging on isotopically different invertebrates, compared to shorter-billed Least Sandpiper or Semipalmated Sandpiper. Only a few semipalmated sandpipers were captured because of differences in migration strategies among the three species. During southbound migration, semipalmated sandpipers make a nearly 2,500 mile nonstop flight of 60–70 hours to wintering grounds in southern South America. Western and least sandpipers make a series of shorter migrational flights to reach their more northerly overwintering latitudes from Mexico to northern South America. Future research needs to identify if species with diverse migrational strategies (i.e., one long flight versus many short stops) differentially use coastal ecosystems of the NGoM during migration. Despite differential use of diverse wetlands in interior MAV and along Gulf coastal

habitats, collectively it is the combination of resources that are vital to migrant shorebirds.



Student ACCOMPLISHMENTS

The abstracts below, modified for this report, were presented at the North American Duck Symposium 7 (NADS7) in Annapolis, Maryland February 1-5, 2016. The first two papers, led by former MS students, Molly Kneece and Clay Shipes, were presented at a NADS7 Special Session entitled, **Evolution, Ecology, and Conservation of Monotypic Ducks.** Current and former students are highlighted in bold.



Nesting Ecology of Mottled Ducks in Coastal South Carolina

by Molly R. Kneece, J. Clay Shipes, J. Brian Davis, Ernie P. Wiggers, Richard M. Kaminski, Michael E. Colvin

ottled ducks are endemic to Western Gulf Coastal (WGC) United States and Mexico, with a separate, genetically distinct subspecies occurring in peninsular Florida. Birds from Texas, Louisiana, and Florida were released in coastal South Carolina from 1975-1983, and banding data suggest an expanding population in the state. Because little is known about autecology of mottled ducks in South Carolina, studies of the species were initiated by capturing and radio-marking 189 females during remigial molt in August 2010-2012 in the Ashepoo, Combahee, and Edisto (ACE) Rivers Basin. The primary objective was to study nesting ecology using radio-marked females, but significant transmitter failure in 2010 and low nesting propensity by radio-marked individuals caused us to search for and locate nests of unmarked females. A search for nests in unmanaged and managed wetlands and upland habitats using traditional beat-out techniques in spring 2011-2014 was employed. Results indicated that nest survival varied by year and vegetation height negatively influenced nest success. Daily nest survival rates varied among years, and ranged from 88 to 96 percent. Interval nest success, or that extending across the nesting season, was only about 12 percent across years, but it was representative of nest success for the species elsewhere in its range. Depredation was the primary cause of nest failure (<15%) and was typified by intact nest bowls void of eggs or shell fragments, indicative of



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avian predators. Tall, robust vegetation may serve as perches for avian predators to locate and depredate mottled duck nests. Until breeding season survival of females, duckling and brood survival are estimated, population status of mottled ducks in South Carolina remains unclear. Research results indicate that managed tidal impoundments were highly used by nesting mottled ducks throughout their annual cycle. We recomment that habitats for this and other waterbird species in coastal South Carolina be continuously managed.

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Mallard Use of Public, Private and Incentive-Funded Wetlands in Mississippi's Alluvial Valley

by Joseph D. Lancaster

allards in the Mississippi Alluvial Valley (MAV) and elsewhere require diverse wetlands to meet daily and seasonal energetic and social needs. Supporting a target 3.9 million dabbling ducks in the MAV each year requires extensive wetlands on public, private, and naturally flooded lands. Wetlands on private land are managed through an incentivized program (MIP), like the Natural Resource Conservation Service's Wetlands Reserve Program (WRP), or managed outside of an incentivized program (MOP). Importantly, MIP wetlands are protected through an easement with contracts lasting from approximately five to 10 years to perpetual, whereas, MOP wetlands are vulnerable to annual change. Repeated man-induced disturbance can interrupt daily routines of mallards and other waterfowl which impacts their use of and time spent among various wetlands. Evaluating mallard use of these habitats during and after waterfowl hunting season will clarify the importance of the habitats for the non-breeding birds. Ph.D. student, Joe Lancaster, examined proportional use of these wetland sources (MIP, MOP, and Public) in winters 2010-2015 using 9,229 (daytime, 7,441; nighttime, 1,788) locations from 241 radio-marked females obtained via radiotelemetry. Patterns of wetland use revealed sensitivities to anthropogenic disturbance during waterfowl hunting season. Generally during hunting season, mallards made greatest daytime use of wetlands on public lands which included inviolate sanctuaries, but increased their use of MOP and MIP wetlands at night and post-hunting season. Sanctuary habitats on public wetlands provide important resources to wintering waterfowl, including forage and a safe space from hunting and other disturbances. It is important to note



that sanctuaries also occur and provide similar benefits on private wetlands, but identifying those specific wetlands is difficult. Trends in MIP wetland use were similar to MOP wetlands but MIP wetlands may be especially important prior to spring migration when agricultural MOP wetlands are drained to prepare for spring planting. Public and MIP wetlands provide a relative constancy of important wetland resources to non-breeding mallard in the MAV.

Index of Spent Shot in Louisiana and Texas Gulf Coast Prairie Ricelands

by Joseph R. Marty, J. Brian Davis, Richard M. Kaminski, Michael G. Brasher, Erin Brinkman

n estimated 2-3 percent of North American waterfowl die annually from lead poisoning despite the longterm ban on lead shotgun shells for waterfowl hunting. Lead also is deposited in waterfowl habitats when hunters use lead shot to pursue other game birds. The Chenier Plain (CP) of Louisiana and Texas and the Texas Mid Coast (TMC) are popular hunting areas that winter millions of waterfowl and other birds annually. Production and idled ricelands in the CP and TMC provide high energy foods for waterfowl, such as waste rice, natural seeds, tubers, and aquatic invertebrates. Consequently, waterfowl may ingest residual lead or non-toxic shot while foraging. A study was conducted to estimate density of lead and non-toxic shot in ricelands in the CP and TMC. Ph.D. student, Joe Marty, randomly collected and x-rayed 1,000 soil cores (10-cm diameter and depth) from production and idled ricelands in the CP and TMC (n = 760 and n = 240, respectively) in November 2013. Soil cores were washed through a series of graduated sieves ($4.75 \text{ mm} - 300 \mu \text{m}$) to recover shot pellets. Using x-ray images, one lead shot pellet was detected from a production rice field in the CP of Louisiana and zero nontoxic pellets. Density of lead shot was 1,273 pellets/hectare. X-ray images were effective in detecting lead and non-toxic shot. It is speculated that regular soil tillage incorporates spent shot into the soil, likely rendering it unavailable to foraging waterfowl. Given that spent shot likely exhibits a clumped spatial distribution, the line-transect sampling may have been an imperfect design for estimating shot availability. Nevertheless, results indicate that lead shot is not a widespread concern for waterfowl foraging in Gulf Coast ricelands.



CFR | FWRC

Waste Rice & Natural Seed Abundance in Rice Fields in the Gulf Coast Prairies of Louisiana and Texas

by Joseph R. Marty, J. Brian Davis, Richard M. Kaminski, Michael G. Brasher, Guiming Wang

ommercial rice production and idled ricelands provide important habitats for waterfowl and waterbirds in the Chenier Plain (CP) of Louisiana and Texas and the Texas Mid Coast (TMC) region. Spatiotemporal dynamics of waste rice and natural seeds have not been previously estimated in CP and TMC regions as in other rice growing regions of North America. Nonetheless, contemporary evidence posits that abundance of waste rice is variable and influenced by region, month, and post-harvest treatments. Ricelands in the CP and TMC are assumed to provide approximately 42 percent of the estimated carrying capacity for wintering waterfowl in this region; thus, precise estimates of waste rice and natural seed densities are necessary for habitat conservation planning by the Gulf Coast Joint Venture. A spatially large sampling survey was conducted to estimate waste rice and natural seed densities in production and idled rice fields in the CP and TMC. Ph.D. student, Joe Marty, collected 8,750 soil cores from production and idled rice fields during August, October, and November 2010-2013. Cores were washed through a series of graduated sieves to recover rice and natural seeds.

Overall, seasonal trends of waste rice in fields with a harvested second crop decreased in the CP and increased in the TMC, and natural seed abundance was greatest in idled fields with standing vegetation as anticipated. Growing and harvesting a second crop of rice in November likely mitigates rice loss due to decomposition, germination, or granivory that may occur between the first and second harvests. These results will be critical metrics for daily ration models used to estimate foraging carrying capacity of ricelands in these regions.



Waterbird Use of Wetlands and Aquaculture Ponds in the Mississippi Alluvial Valley and Gulf Coast Regions

by Justyn Foth, F. Vilella, and R. Kaminski

In the Mississippi Alluvial Valley (MAV) landscapes were dominated by extensive forested wetlands. During the last century, most of the MAV was converted to agricultural, aquaculture, and other anthropogenic uses. However, these land use changes created previously unavailable stop-over habitats for migrating shorebirds, waterfowl, and other waterbirds. Prior to modification, some species of waterbirds, such as shorebirds, likely migrated past or sparingly used the MAV before settling in wetlands along the Gulf Coast (GC). Shorebirds exhibit some of the longest annual migrations of any animal. During migration, they rely heavily on interior and coastal wetlands in the Atlantic and Mississippi Flyways for stopover sites.

In 2010, the Deepwater Horizon Oil Spill impacted coastal marshes of the northern Gulf of Mexico. In response, the Natural Resources Conservation Service (NRCS) implemented the Migratory Bird Habitat Initiative (MBHI) to provide migratory waterbirds with interior wetland habitats to mitigate coastal wetland degradation. The objective of this study was to estimate species composition and relative abundance of migrating waterbirds on MBHI and associated wetlands in the MAV and GC regions during fall migration. Waterbird use of aquaculture farms, national wildlife refuges, and conservation areas throughout the MAV and GC were surveyed during August-October 2011-2013.

Preliminary results indicate that year and month, wetland type, and study site were all important in explaining bird abundances. Scientists found the number of birds per hectare on MBHI wetlands were more than eight times greater in 2011, more than four times greater in 2012, and more than seven times greater in 2013, than wetlands not enrolled in MBHI during peak migration.



Waterbird Use of Catfish Ponds and Migratory Bird Habitat Initiative Wetlands in Mississippi

by James S. Feaga, Francisco J. Vilella, Richard M. Kaminski, and J. Brian Davis

quaculture impoundments provide surrogate habitats for waterfowl and other waterbirds. In response to the 2010 Deep Water Horizon Oil Spill in the Gulf of Mexico, the National Resource Conservation Service implemented the Migratory Bird Habitat Initiative (MBHI) that incentivized landowners to provide wetland habitats for migrating waterfowl and other waterbirds inland from potential oil impacted Gulf coastal wetlands. Diversity and abundance of waterfowl and waterbirds were estimated and compared in six production and four MBHI idled aquaculture sites in Mississippi in the winters of 2011–2013. The MBHI ponds were flooded shallowly (mudflat - <30 cm) and some received vegetation or soil manipulations. The influence of surrounding land cover types on waterbird use of production ponds was also examined. Wintering waterbirds exhibited similar densities on production (~22 birds/ha) and idled (~20 birds/ha) sites. Forty-two species were observed using both types of wetlands combined, but there was considerable departure in bird guilds occupying the two wetland types. Production ponds were primarily used by wading birds and diving and dabbling ducks, whereas idled ponds, with varying water depths and emergent vegetationwater interspersion, attracted nearly 40 species of waterbirds. Waders and diving species observed on production ponds were associated with adjoining aquatic landscapes (e.g., other aquaculture, permanent water bodies, rice fields, flooded fallow fields, and forested wetlands), whereas surface feeders were associated with contiguous croplands (e.g., milo and soybeans). Results suggest production and idled aquaculture impoundments produced suitable conditions for different



waterbird guilds but, without MBHI management, idled ponds would support little or no avian use, suggesting the importance and value of MBHI management and active management of idled ponds.

New Student Profiles

rerrel Christie is a M. S. student working on, "Predation risk and economic impact of piscivorous waterbirds on commercial catfish production." Terrel hails from Pineville, Louisiana and completed his bachelor's degree from Louisiana State University in Wildlife Ecology. Terrel already has accrued diverse professional experience from working on several waterfowl or waterbird projects in Louisiana, Florida, and most recently Illinois, and an alligator project in Louisiana. Terrel also was a member of LSU's Golden Band from Tigerland.

Project

Commercial aquaculture producers in Mississippi are concerned with apparent increasing numbers of waterbirds and depredation of their commercially grown fish. Waterbirds may be especially problematic if their use of available commercial fish ponds increases as the number of ponds decreases with declining catfish (Ictalurus punctatus) industry production. Double-crested cormorants (Phalacrocorax auritus) are known to depredate catfish and create serious economic concerns among producers. Risks of fish loss to waterbirds are feared to rise as commercial aquaculture acreage continues to decline and birds congregate on fewer remaining ponds. Terrel's research will provide contemporary information on cormorant roost locations, numbers of birds per roost, roost distance from active and inactive catfish ponds in Mississippi, and how cormorants may modify their use of roost sites as commercial aquaculture decreases. Ultimately, this study will estimate economic losses of fish caused by these birds, and to generate management recommendations for producers to ameliorate depredation of fish by waterbirds.



These students joined "Team Duck" in summer-fall 2016. We look forward to working with them during their MSU tenure. Each student is engaged in diverse research topics including double-crested cormorants, scaup, and wetland pollinators.

S tephen Clements is a master's student working on, "Predation risk and economic impact of lesser scaup on commercial baitfish production."

Stephen graduated with a bachelor's degree in Environmental and Natural Resources, Clemson University. Stephen has diverse practical field experience working in wetland habitats of coastal South Carolina and at Mr. Kennedy's York Woods property in summer 2016.

Project

Commercial aquaculture producers in Arkansas are concerned with apparent increasing numbers of waterbirds and depredation of their commercially grown fish. It is thought that scaup (Aythya spp.) have increased their use of available commercial fish ponds in recent years, especially as the number of ponds has decreased with declining catfish (Ictalurus punctatus) industry production. Scaup are perceived to consume large quantities of baitfish and sportfish, especially golden shiner (Notemigonus crysoleucas), fathead minnow (*Pimephales promelas*), and goldfish (*Carassius auratus*) on baitfish farms, and redear sunfish (Lepomis microlophus) and other centrarchid species on sportfish farms. Risks of fish loss to waterbirds are feared to rise as commercial aquaculture acreage continues to decline and birds congregate on fewer remaining ponds. Research is needed to better understand use of baitfish ponds by scaup, species and sizes of fish consumed, and ultimately to generate an economic analysis of baitfish losses. Stephen's study will culminate in an estimate of economic losses of fish caused by these birds, and to generate management recommendations for producers to ameliorate depredation of fish by waterbirds.



New Student Profiles

harilyn Taylor is a master's student working on, "Pollinator species abundance and richness in wetlands and associated resources of the Mississippi Delta." Sharilyn graduated cum laude with a bachelor's degree in Biology and a minor in Environmental Studies from the University North Florida. Sharilyn has diverse practical field experience including coastal wetland vegetation monitoring, an undergraduate research project on honeybees, and experiences with tortoises, snakes, and other critters.

Project

Insects provide vital ecological services worldwide, including an estimated \$57 billion annually in natural services in the United States. Diverse communities of insects are invaluable for pollination of agricultural crops and flowering plants, but knowledge of pollinator services in wetland and associated non-agricultural habitats of southeastern United States is basically unknown. The Mississippi Alluvial Valley (MAV) extends from southeastern Missouri to southern Louisiana, and it once contained nearly 24 million acres of bottomland hardwood forest and associated habitats. Despite great modification of the MAV, management of seasonal wetland and associated riparian or bottomland hardwood forests is a traditional practice among private landowners. Wetland management is largely driven by waterfowl hunting, a nearly \$150M annual economic enterprise in Mississippi. Many colorful flowering species desired by wetland conservationists, including smartweeds (Polygonum spp.), beggarticks (Bidens spp.), water primroses (Ludwigia spp.), rushes (Juncus spp.), and woody species such as buttonbush (Cephalanthus occidentalis) and willow (Salix spp.), directly or indirectly provide food sources and other

habitat needs (e.g., cover) to waterfowl and other wetland birds. An understanding of relations between pollinators and wetland management practices is needed, as diverse lowland habitats likely provide vital habitats for myriad pollinators.



Undergraduate Research Projects, Summer 2016

Sam D. Hamilton Noxubee National Wildlife Refuge Wood Duck Banding Project

n spring-summer 2016, two College of Forest Resources (CFR) wildlife, fisheries and aquaculture students were provided a Kennedy undergraduate research scholarship opportunity to conduct research on waterfowl ecology. Mr. Taylor Gibson and Ms. Katie Depperschmidt helped monitor wood duck nest boxes and mark incubating females and hatching ducklings at the Sam D. Hamilton Noxubee National Wildlife Refuge (Noxubee).

Their primary responsibilities were to learn how to monitor wood duck nest boxes, capture and band nesting female wood ducks, and capture post-breeding and locally hatched wood ducks with rocket nest and swim-in traps. The pair conducted fieldwork and wood duck banding from April through September 2016 at Noxubee Refuge, about 16 miles south of campus.

The students captured and banded 42 nesting female wood ducks in nest boxes on the refuge. When discovering active nests, they candled eggs to determine incubation stage and predict hatch date. They captured and web-tagged 36 ducklings before they exited nest boxes.

As the nesting season waned, Taylor and Katie constructed wire swim-in traps and placed them at different locations on the refuge. They also used herbicide to clear vegetated areas that would then be used for the rocket net trap site. A combination of wheat and cracked corn was used to bait each trap site and camera traps were installed to determine the number of ducks, as well as the frequency of use, at each trap site. This information helped the students develop a schedule for setting each swim-in trap and whether to conduct an early morning or late evening rocket net shot. By the end of the summer nesting and banding period, or about July 31, they banded and recorded data for 96 wood



ducks, four of which were captured in the swim-in trap. These banding efforts resulted in the first wood ducks to be captured and banded on Noxubee since 2010.

Besides these great activities, the students also gained other valuable experience with: completing a rocket net training and certification program through the refuge; attending a two-day wood duck banding workshop sponsored by the USFWS; completing ATV/UTV training and certification, and a CPR training and certification course; and assisting with nest cavity checks and banding of red-cockaded woodpecker nests and chicks.

Professional Experience

In addition to the Kennedy internships, Dr. Davis helped other undergraduate students secure wetlands and waterfowl related jobs with state agencies and private landowners.



Ryan Mann

Biological technician at the Marais des Cygnes Wildlife Area, Kansas, summer 2016.

Undergraduate students at MSU interested in waterfowl and wetlands conservation have enjoyed a fruitful relationship the past several years with the Kansas Department of Wildlife, Parks and Tourism, specifically working for Mr. Karl Karrow, Area Manager of Marais des Cygnes Wildlife Area near Kansas City, Missouri. Wildlife, Fisheries and Aquaculture senior Ryan Mann worked at the 7,600 acre area in summer 2016, maintaining the tradition set by a handful of former MSU students. We are quite appreciative of having this relationship with Mr. Karrow, as our students have gained valuable experiences with wetland management, agricultural production, use of a myriad of heavy machinery, levees and water control structures, and many other details required to intensively manage these valuable wetland habitats.



Jessie Critcher and Tyler Turner Biological technicians, W. R. Russell Farms, Bells, Tennessee, summer 2016.

In early spring 2016, Mr. Robbie Russell of Tennessee contacted Dr. Davis to inquire about MSU students and summer jobs. After some inquiries by Dr. Davis with students, both Jessie and Tyler jumped at the opportunity to work for Mr. Russell on his 2,000 acre property near Bells, Tennessee. Jessie and Tyler obtained first-hand experience with bottomland hardwood forests and cypress brakes, and intensively managed moist-soil wetland habitats and upland food plots. They used a diversity of heavy equipment to repair duck blinds, manage habitat, and install underground irrigation pipes, among other activities. The students also constructed and installed wood duck nest boxes, and experienced a diversity of reptiles and amphibians, deer, and other wildlife.



Guests of Team Duck



Dr. Gary Hepp, Professor Emeritus, Auburn University, spoke to CFR on incubation ecology of wood ducks and other animals on March 31, 2016. Dr. Hepp gave an excellent presentation on how just slight differences in incubation temperatures can influence duckling physiology and survival. Dr. Hepp graciously accepted an MSU cowbell from WFA graduate students, including Joe Lancaster, doctoral student of "Team Duck."



Mr. Phillip Stephenson, Master of Science student, University of Arkansas-Fayetteville, spoke to WFA about pollinator abundance and species richness in seasonal wetlands of Arkansas. This work has received little attention nationwide, and will be part of Davis' overall research effort beginning in 2017.





ublic Aquarium

FIELD TRIPS

blending academics with professional experience

Wetlands Ecology & Management, Fall 2016

Grand Bay, Dauphin Island, Sandhill Crane Refuge, and the Pascagoula River (October 20-23, 2016)

esides the classroom, relevant academic experience is gained by students afield experiencing wetlands and waterfowl firsthand. In one of two primary field trips in fall 2016, Dr. Davis led his Wetlands Ecology and Management class to two different coastal ecosystems, associated riverine wetlands of the Pascagoula River in south Mississippi, and wetlands of the northern Gulf of Mexico in Alabama and Mississippi. We were in great hands with our primary host, Dr. Mark Woodrey, research ecologist in the Mississippi Agricultural and Forestry Experiment Station and the Grand Bay National Estuarine Research Reserve. We also toured the historic Mississippi Sandhill Crane National Wildlife Refuge near Gautier, MS. Approximately 12 undergraduate students attended, and Dr. Woodrey's master's student Jared Fuera, who is studying clapper rails, a secretive marsh bird along Gulf coastal wetlands, met us in Grand Bay to introduce us to this awesome bird of the coastal marshes.

Our first stop was the Dauphin Island Estuarium where we were hosted by the witty and intellectual Dr. Just ('Joost') Cebrian, a wetlands ecologist at Dauphin Island. Dr. Cebrian gave a presentation to the students on coastal wetland and plant ecology, and contemporary research being conducted by the resident scientists. Dr. Cebrian led us to the estuarium, an awesome exhibit of the region's coastal wetland and river ecology. We then boarded a large pontoon-style boat with Mr. Benny McCoy of McCoy River Tours. Benny is a local who has spent decades in the marshes of Grand Bay and along the Pascagoula River. Benny and Mark led us on a fantastic tour of Grand Bay, where not only was the boat ride itself a blast, but we visited several wetlands to inspect plant communities and listened to Dr. Woodrey lecture on local marsh ecology.

Saturday morning began the next level of entertainment and learning when we again boarded "Mr. Benny's" boat to tour the Pascagoula River. Benny once provided a similar trip up the river for legendary ecologist, Dr. E.O. Wilson, who inspected ants amid this amazing riverine wetland community. We enjoyed Benny reminiscing about the legendary E.O. Wilson and their field exploits to study ants. We headed to Sandhill Crane NWR where we met Mr. Scott Saucier who introduced us to the refuge and management practices necessary for managing these beloved cranes. After an inside presentation from Scott, we toured the refuge specifically to observe savanna habitats, part of which is comprised by the exquisite pitcher plants that flourish in the wet-grass community. Toward evening, we finally spied some cranes peacefully foraging in a large open field in the distance.





York Woods Charleston, MS (November 3, 2016)

n the second of two primary fall field trips, Dr. Davis' wetlands class visited York Woods. York Woods is about 9,000 acres of prime wetland, forested, and agricultural lands, owned by Mr. Jim Kennedy. The property is the epitome of intensively managed lands for waterfowl and other wildlife, and agricultural production. Former wildlife, fisheries and aquaculture alumni Cody Pugh and Andy Wright are full-time wildlife biologists at York Woods and hosted the trip. Compared to other years, fall 2016 was incredibly dry, with burn bans in many Mississippi counties. Students got a full view of York and diverse management for waterfowl, deer, and other species. The York Woods tour greatly complemented the coastal trip given the profound differences in geographies and natural resources between them. We are grateful to Mr. Kennedy and his excellent staff for enabling this great trip, making York Woods available to us as a premiere outdoor learning environment.



Students at Grand Bay National Estuarine Research Reserve.

Publications

Davis, J. B. 2016. A book review of The Teal by Matthieu Guillemain and Johan Elmberg. Condor 118:682-683.

Davis, J. B. 2016. Mississippi Alluvial Valley. Springer Encyclopedia of Wetlands.

Davis, J. B. 2016. Wood Duck Box Management. Ducks Unlimited magazine, March/April 2016.

Davis, J. B., F. J. Vilella, J. D. Lancaster, M. Lopez-Flores, R. M. Kaminski, J. A. Cruz-Burgos. *In Press.* Survival of White-cheeked Pintail ducklings and broods in Puerto Rico. The Condor.

Davis, J. B., M. Schummer, M. Guillemain, J. Elmberg. *In press.* Fall migration and winter. In: Migrating and Wintering Waterfowl, Texas A&M Press.

Marty. J. R., J. B. Davis, R. M. Kaminski, M. G. Brasher, E. L. Brinkman. *In Press.* Density of lead and non-toxic shotshell pellets in Gulf Coast Prairie Ricelands. Journal of Fish and Wildlife Management.

Newcomb, K. C., J. B. Davis, R. M. Kaminski, M. J. Gray. 2016. Winter survival of female American Black Ducks (*Anas rubripes*) in Tennessee. The Condor 118:33-45.

Osborn, J. M., H. M. Hagy, M. D. McClanahan, J. B. Davis, and M. J. Gray. *In Press.* Habitat selection and available foods for American black ducks in Tennessee. Journal of Wildlife Management.

Tapp, J. L., M. W. Weegman, E. B. Webb, R. M. Kaminski, J. B. Davis. *In Press.* Waterbird communities and seed biomass in managed and non-managed restored wetlands in the Mississippi Alluvial Valley. Restoration Ecology. Refereed (peer-reviewed) Manuscripts (In Preparation):

Davis, J. B., and R. M. Kaminski. 2016. In Preparation. James C. Kennedy Waterfowl and Wetlands Program Annual Report, Forest and Wildlife Research Center, Mississippi State University.

Foth, J. R., R. M. Kaminski, J. B. Davis, J. N. Straub, and T. D. Leininger. *In Preparation*. Aquatic invertebrate community composition, diversity, and biomass in non-impounded bottomland hardwood forests and impounded greentree reservoirs. Wildlife Society Bulletin or other depending on WSB Editor decision.

McClanahan, M. D., H. M. Hagy, J. M. Osborn, J. B. Davis, D. A. Buehler, and M. J. Gray. *In Preparation*. Diurnal habitat selection and activities of non-breeding dabbling ducks in Tennessee. Journal of Wildlife Management.

Newcomb, K. C., J. B. Davis, R. M. Kaminski, D. L. Evans, A. Monroe, and M. J. Gray. *In Preparation*. Diel Habitat Selection by American Black Ducks in Tennessee. Journal of Wildlife Management.

Osborn, J. M., H. M. Hagy, M. D. McClanahan, J. B. Davis, C. Ferrel, and M. J. Gray. *In Preparation*. Response of vegetation and waterfowl to invasive species management techniques in moist-soil wetlands. Journal of Wildlife Management.

Presentations

Scientific or Professional Papers/Presentations. *Invited Presentations (Oral)*

Davis, J. B. 2016. An introduction to basic waterfowl biology and wetland management in the Mississippi Alluvial Valley. Delta Wildlife, Deer and Duck Management Workshop, Natural Resource Enterprises, March 1, 2016, Rolling Fork, MS.

Davis, J. B. 2016. An introduction to basic waterfowl biology and wetland management in the Mississippi Alluvial Valley. Invited seminar presented to the Mississippi Land Realtors Land Institute group, October 13, 2016, Starkville, MS.

Davis, J. B. 2016 Evaluations of NRCS's Migratory Bird Habitat Initiative (MBHI). Invited guest speaker, School of Renewable Natural Resources, Louisiana State University, November 2, 2016, Baton Rouge, LA.

Davis, J. B. 2016. Wetland management and associated plant communities. Invited lecture, Wildlife Plant Identification class (WFA 4223/6223), November 7, 2016, MS State, MS.

Refereed Presentations (Oral)

Davis, J. B. 2016. Evaluations of NRCS's Migratory Bird Habitat Initiative (MBHI). American Society of Agricultural and Biological Engineers, July 17-20, 2016, Orlando, FL.

Lancaster, J. D., J. B. Davis, R. M. Kaminski, E. J. Penny, A. D. Afton. 2016. Linking habitat use and survival to identify habitat complexes that promote female mallard survival in Mississippi. 7th North American Duck Symposium, February 2016, Annapolis, MD.

Lancaster, J. D., J. B. Davis, R. M. Kaminski, K. D. Nelms. 2016. Diurnal use of private, public, and incentivized conservation wetlands by female mallards in Mississippi. 7th North American Duck Symposium, February 2016, Annapolis, MD.

Kneece, M. R., J. D. Lancaster, J. B. Davis, J. C. Shipes, D. E. Harrigal. 2016. Survival and recovery of mottled ducks in coastal South Carolina 2008-2014. 7th North American Duck Symposium, February 2016, Annapolis, MD.

Tapp, J. L., M. W. Weegman, R. M. Kaminski, J. B. Davis, E. B. Webb, K. D. Nelms. 2016. Evaluating the Migratory Bird Habitat Initiative after the Deepwater Horizon Oil Spill: Waterbird and seed abundances. 7th North American Duck Symposium, February 2016, Annapolis, MD.

Marty, J. R., J. B. Davis, R. M. Kaminski, M. G. Brasher, S. Rush, G. Wang. 2016. Waste rice and natural seed abundances in rice fields in the Gulf Coast Prairies of Louisiana and Texas. 7th North American Duck Symposium, February 2016, Annapolis, MD.

Marty, J. R., J. B. Davis, R. M. Kaminski, M. G. Brasher, S. Rush, G. Wang. Waste rice and natural seed abundances in rice fields in the Gulf Coast Prairies of Louisiana and Texas. 52nd Annual Meeting of the Texas Chapter of the Wildlife Society, San Antonio, TX.

Robichaux-Davis, R. R., M. Pope, J. B. Davis. 2016. Duck, duck, goose: Do the math. National Science Teachers Association National Conference on Science Education, March 31-April 3, 2016, Nashville, TN.

Presentations

Volunteered Presentations (Oral)

Kneece, M. R., R. M. Kaminski, E.P. Wiggers, J. B. Davis. 2016. Evaluation of nest structure use by mottled ducks in the Ashepoo, Combahee, and Edisto Rivers Basin, South Carolina. South Carolina Department of Natural Resources Migratory Bird Committee Meeting, Garnett, SC.

Marty, J. R., R. R. Robichaux, J. B. Davis. 2016. Mississippi waterfowl and wetlands. Introduction to basic waterfowl anatomy and habitats. K-4th graders of Louisville Municipal School District, for the Dillard's Reading, Enrichment, Arts, Mathematics and Science (DREAMS) summer program, June 24, 2016, Louisville, MS.

Foth, J. R., R. R. Robichaux-Davis, J. B. Davis. 2016. The wise use of water. A field demonstration presented to K-4th graders of Louisville Municipal School District, for the Dillard's Reading, Enrichment, Arts, Mathematics and Science (DREAMS) summer program, June 17, 2016. Louisville, MS.

Davis, J. B. 2016. Waterfowl and wetlands program. Department of Wildlife, Fisheries and Aquaculture Advisory Board members, November 16, 2016, MS State, MS.

Refereed Presentations (Poster)

Marty, J. R., J. B. Davis, R. M. Kaminski, M. G. Brasher, E. Brinkman, S. Rush. 2016. Density of lead and non-toxic shot in Gulf Coast Prairie ricelands. 52nd Annual Meeting of the Texas Chapter of the Wildlife Society, San Antonio, TX.

Davis, J. B., T. W. Arnold, R. M. Kaminski, R. R. Cox Jr., J. D. Lancaster, B. D. Leopold. 2016. Is there an optimal brood size in wood ducks? 7th North American Duck Symposium, February 2016, Annapolis, MD.

Awards-Accolades

J. B. Davis awarded Level I Graduate Faculty, promoted to Associate Professor, and tenured in the Department of Wildlife, Fisheries, and Aquaculture.

J. B. Davis nominated for annual College of Forest Resources Research Faculty Award.

J. R. Marty awarded Second Place Doctoral Poster Award, Density of lead and non-toxic shot in Gulf Coast Prairie ricelands, 7th North American Duck Symposium.

J. R. Marty awarded the Helm Student Travel Award, 7th North American Duck Symposium.



Waterfowl & Wetland Expenditures				
July 1, 2016 - June 30, 2016				
	Kennedy Funds	Mississippi State University	Contracts & Grants	Totals
Kennedy Coordinator	3,099	99,169		102,268
Research Coordinator	3,772		70,623	74,395
Administrative Support		20,000		20,000
Contractual & Commodities	21,461		12,550	34,011
Travel			7,586	7,586
GrandTotal	28,332	119,169	90,759	238,260





FOREST AND WILDLIFE RESEARCH CENTER

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JAMES C. KENNEDY ENDOWED CHAIR IN WATERFOWL & WETLANDS