DUCKS UNLIMITED

SCIENCE SPOTLIGHT 2022

WHAT SCIENCE MEANS TO DU

Since its founding, Ducks Unlimited has embraced a scientific approach to inform planning and programs to conserve wetlands and associated uplands that support North America's waterfowl populations. More recently, DU's application of science has expanded to increase understanding of how habitat conservation affects ecosystem services (e.g., water quality, flood mitigation) that directly improve human health and livelihoods. This approach ensures DU's conservation actions continue to sustain waterfowl populations while increasing their relevance and benefits to broader segments of society.

DU'S SCIENCE VISION STATEMENT

To strengthen DU's vital science foundation through a robust internal science team and innovative partnerships that integrate data-based decision making to effectively and efficiently advance the conservation of waterfowl and their habitats in North America, as well as to recruit, retain, and engage a dedicated and diverse group of conservation professionals and conservation supporters.

DU'S SCIENCE PRIORITIES AND APPROACH

Ducks Unlimited has a choice of where and in what we invest our science resources. Activities that address our greatest uncertainties, in our most important geographies, and provide the greatest opportunities to advance our conservation mission invariably receive highest priority. Across our 3 organizations, DU's science activities can be classified into 6 thematic areas: 1) conservation program planning, delivery and adaptation, 2) ecosystem services and human dimensions, 3) sustainable agriculture, 4) implications of climate change for conservation, 5) species of concern, and 6) development and refinement of the International Conservation Plan.

Developed to complement our International Science Report, this Science Spotlight report details a subset of the more than 100 projects in which DU Inc., DU Canada, and DU de Mexico were collectively engaged or supported during FY22. Also highlighted in this report are some of the students and researchers leading these projects, a list of the DU Fellowship recipients in 2022, and other science insights from across the DU organizations. Ducks Unlimited is proud to collaborate with these outstanding students, researchers, and conservation partners, and we look forward to their continued and future leadership for science in support of waterfowl and wetlands conservation.

PROJECTS IN FOCUS

EFFECTIVENESS OF THE COVER CROP AND LIVESTOCK INTEGRATION PROGRAM FOR IMPROVING WETLAND WATER QUALITY

Kyle Kuechle, Emily Schwartz, & Tanner Gue, DU-GPR; Greg Sandness, North Dakota Dept. of Environmental Quality

Regenerative agriculture is playing an increasingly important role in conservation efforts of DU and other conservation partners. Programs that fall under this category include introducing cover crops on conventionally farmed cropland, grazing cover crops to increase soil health, and installing cross-fence on grassland to promote rotational grazing. Many of these programs focus on promoting soil health and protecting the health of wetlands embedded in these landscapes. Here, cover crops refer to multi-species mixes of grasses and forbs grown in the off-season to protect the soil. The combined use of cover crops and livestock can provide a valuable one-two punch for conservation managers, as they introduce diversity in plant species and management actions to mimic historical processes that made these landscapes so productive. Cover crops and livestock can enhance soil structure and function and improve hydrology by increasing its ability to infiltrate and store water. The return of a more natural hydrology has the potential to benefit wetlands by reducing anthropogenically driven run-off and the pollutants carried with it. Pollutants of concern include sediments and nutrients (phosphorus and nitrogen), which can contaminate wetlands to where they are no longer suitable for recreation or as wildlife habitat. Regenerative agriculture provides another means to implement conservation on private lands where traditional practices (e.g., long-term conservation easements) may not be a viable option.

Despite existing studies that examine environmental impacts of regenerative agriculture, data are often region- and management-specific (e.g., field tillage, tile drainage, cover crop species mix). This makes communicating benefits to landowners and other agencies challenging. In partnership with North Dakota Department of Environmental Quality and the Prairie Pothole Joint Venture, Ducks Unlimited began an investigation into the role that regenerative agriculture can play in improving wetland water quality and soil health in the PPR of North Dakota.

Beginning in fall of 2020 and continuing through 2021, researchers undertook a pilot program to monitor wetland water quality on a farm enrolled in DU's regenerative agriculture programs in North Dakota. This effort enabled refinement of water quality sampling methodology but failed to produce robust results due to widespread drought. Soil health measurements were also collected, and these will be repeated at the end of the study. The spring of 2022 brought moisture back to the prairies, allowing expansion of the study to additional agricultural operations. Samples were collected from wetlands embedded in 17 fields representing a variety of management practices, including 7 farmed with regenerative practices (cover crops and livestock integration), 5 conventionally farmed, 3 native or introduced grass prairies, and 2 grass restorations.

Going forward, this study will be expanded to additional field sites and current monitoring will be continued. Changes resulting from these practices are expected to be gradual, so at least four more years of data will be collected. Ducks Unlimited and project partners will use results from this study help guide private land conservation to best benefit wildlife and the environment in North Dakota.

RESEARCHER SPOTLIGHT Kyle Kuechle

Kyle is a wetlands research scientist in DU's Great Plains Region with a strong interest in wetland ecology of working landscapes. Kyle received a BS in Biology from Bemidji State University and a MSc in Natural Resource Sciences from University of Missouri – Columbia where he studied the impacts of agricultural pesticides on wetland aquatic invertebrates. Currently, Kyle works with the Conservation Planning team to provide scientific support for the Great Plains Region. Specifically, his research focuses on wildlife and ecosystem benefits of DU's working lands programs. Kyle is an avid sportsman and enjoys the diverse hunting and fishing opportunities the Great Plains offer.

*SPATIOTEMPORAL PATTERNS OF SANCTUARY USE BY MALLARDS IN THE LMAV: WHITE RIVER NWR

Ethan Dittmer (MSc student), Dr. Doug Osborne, Univ. of Arkansas at Monticello, Dr. Dale James, DU-SR

Many public lands are only partially open to waterfowl hunting, with some portions serving as waterfowl sanctuary where birds can largely escape human disturbance. It is generally understood that sanctuary areas are vital for waterfowl management, but little research has been done to assess to what degree they are utilized by ducks. There are typically two types of waterfowl sanctuary implemented on public lands—spatial and temporal. Spatial sanctuaries are areas closed to all public access or areas closed to waterfowl hunting only, allowing for other forms of human disturbance such as hiking or small game hunting. These areas may be closed year-round or for portions of the year when waterfowl are present. Temporal sanctuaries are areas that are partially closed to waterfowl hunting, typically allowing hunting only during morning or selected days. This study investigated how ducks use spatial and temporal sanctuaries in the interest of informing decisions by areas managers to optimize the benefits of sanctuaries for waterfowl and hunters.

Modern day tracking devices allow researchers to investigate duck movement ecology at fine scales in both space and time. This study deployed GPS-GSM tracking devices on 105 mallards in four closed-access sanctuaries across Dale Bumpers White River National Wildlife Refuge in the Mississippi Alluvial Valley of Arkansas during the winters of 2019–2021. Tracking devices were programed to collect GPS locations hourly and upload data via cellular towers at 12–24-hour intervals. Over the winter periods of study, approximately 144,000 locations were collected within a 50-km buffer around White River NWR. Of the 59,000 GPS locations on White River NWR, 79.1% were within closed-access sanctuaries.

Researchers used integrated step selection analyses to investigate mallards use of sanctuary and land cover types. These analyses compare movements actually made to those that were potentially available for them to make, which allows identification of factors that influence movements (e.g., how much more likely a mallard is to fly to private land versus public land open to hunting). Preliminary results show that selection of areas differs between day and night, such

that during the hunting season mallards generally select for closed-access sanctuaries in the day and private agricultural lands at night. After hunting season closes in February, mallards begin to prefer private lands and areas open to hunting during the day.

This research will provide managers with information that can be applied directly to the design and management of waterfowl sanctuaries and hunting areas. This information will also help conservation planners identify local and regional areas for the development of protected areas to provide shared benefits to waterfowl and hunters.

STUDENT SPOTLIGHT Ethan Dittmer

Ethan is interested in research to improve hunt quality and opportunity for public land waterfowl hunters. He earned his BS degree in Zoology at Southern Illinois University – Carbondale in Illinois where he developed a passion for waterfowl through hunting and undergraduate research opportunities. Ethan's undergraduate experience involved opportunities to work with the Cooperative Wildlife Research Lab, Kansas Department of Wildlife and Parks as a wetland technician, and for the U.S. Fish and Wildlife Service as an avian technician. Ethan recently completed his MSc degree at the University of Arkansas at Monticello where he was advised by Dr. Douglas Osborne. After completing his master's degree, Ethan will begin a PhD program at the University of Nebraska-Lincoln to work on a project investigating mallard ecology in southeastern Kansas.

STUDENT SPOTLIGHT Kayla Harvey

Kayla is a Maryland native and graduated with her BS degree in Animal Science from the University of Maryland, College Park, in 2018. Kayla has been passionate about waterfowl and the outdoors from a young age and grew up hunting, fishing, and bird watching in the Chesapeake Bay region. Kayla gained experience with waterfowl and wildlife for a few years before pursuing a MSc degree at the State University of New York, College of Environmental Science and Forestry. Kayla recently defended her thesis and is now working as a conservation technician for Maryland DNR.

*ORIGINS OF PRE-SEASON BANDED MALLARDS IN THE NORTHERN ATLANTIC AND MISSISSIPPI FLYWAYS

Kayla Harvey (MSc student) & Dr. Michael Schummer, State Univ. of New York, ESF

The eastern population of Mallards has declined by approximately 40% since the late 1990s. However, the cause for the decline is not well understood, nor has the decline been range wide. Mallard breeding pair abundance has been stable in eastern Canada but declining in the northeastern U.S. Mallards were uncommon in the Atlantic flyway until about the 1940s, and two hypotheses are proposed for how mallards became common in eastern North America: 1) expansion of mid-continent mallards eastward and 2) large scale releases of game-farm mallards used to augment wild populations and provide additional hunting opportunity. One suggested mechanism for the decline of eastern mallards is the introgression of game-farm mallards into portions of their breeding range. In fact, the eastern mallard population has been found to comprise wild North American mallards, released game-farm mallards, and varying degrees of wild × game-farm mallard hybrids.

Banding data from the eastern population of mallards suggests that most mallards harvested in the eastern U.S. originate largely from this same region, with a smaller portion from Canada. However, the origins of birds are uncertain unless they are banded while flightless. Furthermore, some areas of Canada where mallards are produced are poorly accessible to researchers, which may geographically bias banding efforts. Survival and harvest estimates derived from banding data have several assumptions, with one being that populations do not move between survey units. This research used stable isotope analysis on flight feathers of sampled birds to determine whether in fact pre-hunting season banded mallards originated from areas near the location where banded. Blood samples were also collected to determine rates of hybridization and compare trends from previous sampling. Isotopic data were coupled with genetic data to identify areas of game-farm mallard introgression.

* DENOTES A STUDENT-LED PROJECT

Samples were collected from states and provinces in the upper Atlantic and Mississippi flyways from 2019 to 2021. Results suggest that just over half of sampled mallards have origins inconsistent with their banding station, and thus that movement occurs during the banding season. Most samples not originating near the banding location appeared to come from the north. Such data would potentially violate assumptions used for population vital rates estimated from banding data, depending on how the population is managed. Currently, eastern mallards are managed as one population, so movements would not likely violate banding assumptions. However, it could become a source of bias if managers sought to manage the surveyed areas separately, given their differing population trajectories. Future research should understand movement patterns of mallards during the post-fledging and post-molting periods.

Genetic ancestry analyses in this study detected rates of hybridization between wild and game-farm mallards in the Atlantic flyway similar to previous studies but increasing rates in the upper Mississippi flyway. The latter finding demonstrates the importance of continued monitoring of hybridization in wild mallards and the need to determine if the movement of game-farm molecular variation is resulting in a poorly adapted mallard population. Additionally, isotopic signatures of wild and hybrid mallards were not significantly different, suggesting that mallards of a certain ancestry are not limited to certain geographic areas.

**LONG-TERM GENETIC EFFECTS OF GAME-FARM MALLARD RELEASES ON WILD MALLARDS IN NORTH AMERICA

Joshua Brown (PhD student) & Dr. Phil Lavretsky, Univ. of Texas El Paso

Prior to the early 1900s, mallards in North America were largely restricted to areas west of the Mississippi River and rare in the Atlantic flyway. Due to changes in habitat and augmented management practices, mallards became the predominant species in this region by the 1950s, as government and private organizations supplemented wild populations with game-farm (i.e., captive-bred) mallard releases. It is estimated that nearly 500,000 game-farm mallards were released per year from the 1920s to the late 1970s, with about 250,000 still released annually. Mallard numbers in the Atlantic flyway peaked in the mid-1990s, and overall population numbers have since steadily declined throughout the region.

Little is known about the possible cause(s) for recent declines of eastern mallards. One hypothesis is that behavioral and physiological differences in game-farm mallards may be playing a role in lowering overall survival for wild populations. This study used molecular sequencing data from a landscape-level sampling of wild mallards to first describe population structure and hybridization rates across North America. Next, landscape modelling techniques were used to understand the relationship between genetic diversity and the environment for wild vs. game-farm hybrid mallards. Finally, relationships were modeled across future projected environmental conditions to better understand the effects of hybridization and potential vulnerabilities of mallard populations under alternative climate scenarios.

Data from this study revealed that hybridization between wild and game-farm mallards is widespread among eastern mallards and has been increasing over the last decade. While the prevalence of game-farm ancestry varies between flyways, ~98% of samples collected in the Atlantic flyway were recent or backcrossed hybrids; the ~2% of Atlantic flyway mallards identified as truly wild is a 4-fold decrease from a decade ago. The presence of recent hybrids confirms that wild and game-farm mallards continue to interbreed readily in a wild setting, and the predictable association of recent hybrids and game-farm release sites illustrates the consequences of continued releases and the introduction of domestic traits.

This study also demonstrated that hybridization between game-farm and wild mallards is reducing the adaptiveness of wild mallards. In general, wild mallards show widespread genetic adaptiveness, which is exemplified by their ability to adjust behavior and feeding patterns to exploit both native and human-created habitats. Alternatively, models for game-farm hybrids suggest the current patterns of genetic variation restrict their breeding range; specifically, that game-farm mallards may lack the traits necessary to thrive in colder northern environments (i.e., Canada). Results also suggest that for game-farm hybrids, climate change may create environmental conditions better suited for their expansion into the Canadian prairies. While warming temperatures may have limited impact on wild mallards, breeding habitat for game-farm hybrids may expand, further facilitating interactions with wild populations.

These findings are analogous to game-farm mallard releases in Europe, which have profoundly augmented population dynamics and lowered the fitness of Eurasian wild mallard populations. Overall, game-farm releases throughout Europe and North America exemplify the potential genetic consequences of supplemental stocking programs, with Europe acting as a forewarning against indefinite supplemental stocking programs, which are now needed to artificially maintain population stability.

** DENOTES A DU FELLOWSHIP PROJECT

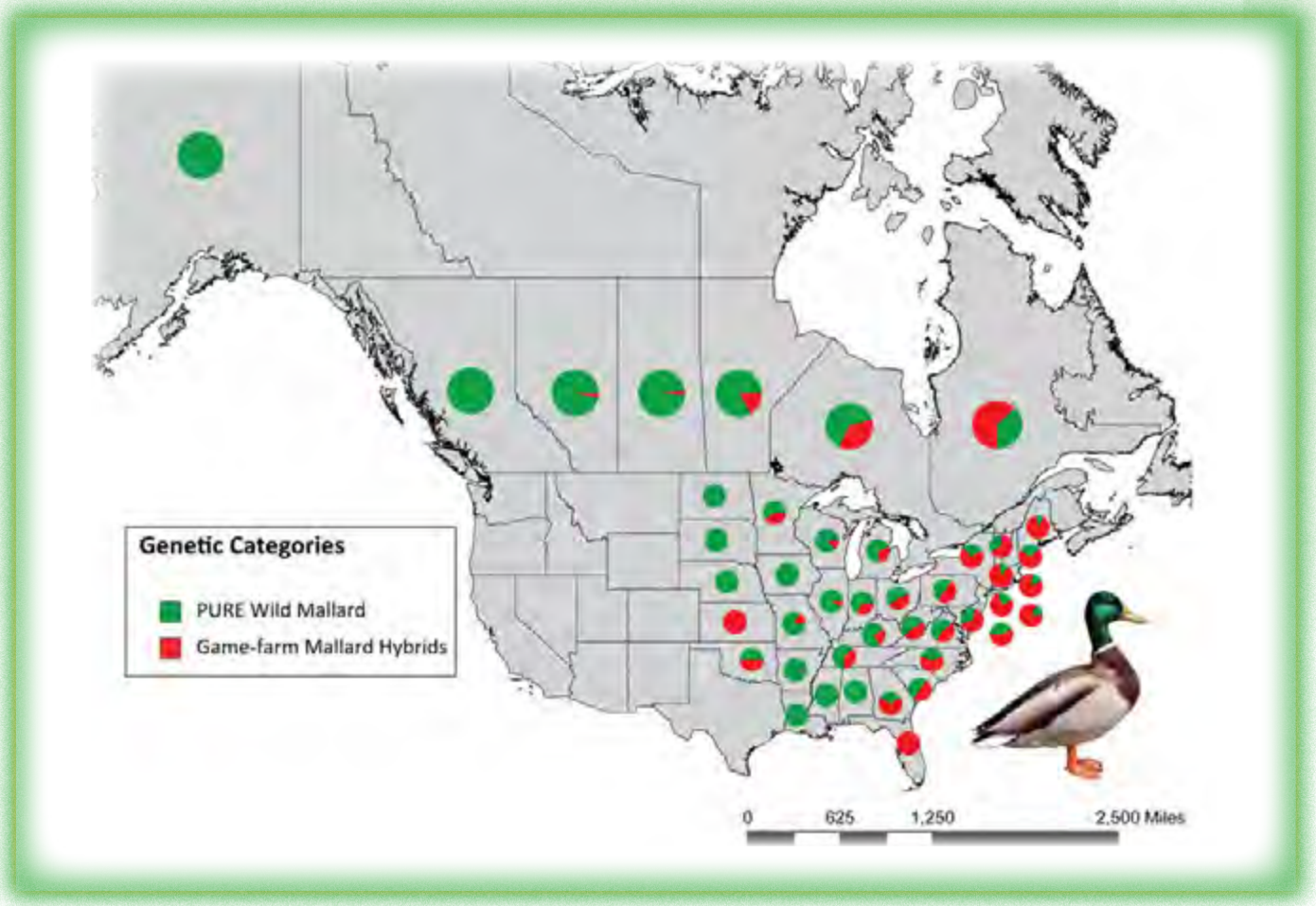

FIGURE 1. Hybridization between released, game-farm mallards and wild mallards is widespread across eastern North America. Prevalence is highest in the Atlantic flyway and declines progressively westward.

STUDENT SPOTLIGHT Joshua Brown

Joshua Brown received his degree in Wildlife and Fisheries Sciences from Texas A&M University in 2016. It was there he formed an interest in applying molecular techniques to conservation issues. Merging this new interest with his lifelong enthusiasm for waterfowl, he began his Ph.D. at the University of Texas at El Paso, where he researched the genetic consequences of hybridization for various mallard-like species. After graduating in 2021, he began as postdoctoral researcher at the Smithsonian Institution, continuing his investigation into the consequences of game-farm mallard releases in eastern North America; specifically, using historical museum specimens to track morphological and genetic changes in North American populations across the last two centuries. Josh was recipient of DU's Waterfowl Research Foundation Fellowship in 2018–2019.

LEVERAGING CITIZEN SCIENCE TO ADDRESS DATA GAPS FOR SEA DUCKS

Sarah Gutowsky (Post-doctoral researcher), & Mark Mallory, Acadia Univ.; Greg Robertson & Scott Gilliland, ECCC; Nic McLellan, DUC-ATL/IWWR

Various sea duck species are in decline compared to most dabblers and divers who have long benefited from traditional DU conservation programs. Understanding relative distributions and trends of waterfowl abundance is necessary to assess population status, evaluate drivers of change, and determine requirements for management efforts. For many sea duck species, long-term monitoring data needed to make these assessments is scarce due to the logistical challenges of conducting surveys. Alternative data sources, including citizen science, are increasingly being considered to provide insights where baseline data is lacking. This study is leveraging Christmas Bird Count (CBC) data to address data gaps for two sea ducks wintering on the Atlantic coasts of Canada and the US—harlequin duck and American common eider.

RESEARCHER SPOTLIGHT Dr. Sarah Gutowsky

Sarah's career in bird conservation and management began in 2007 studying seabirds in British Columbia. In 2010, she found herself working on the remote atolls of the Northwest Hawaiian Islands, which led to her PhD studying the complex ecology of North Pacific albatrosses. From there Sarah began her first postdoctoral fellowship at Acadia University investigating drivers of seabird breeding success in the Canadian high Arctic. Currently, Sarah is a postdoctoral researcher at Acadia University and DUC-ATL under the Mitacs Accelerate program, in partnership with ECCC. Her current research is modelling changes in abundance and distributions of sea ducks on the Atlantic coast to inform marine and coastal conservation.

The eastern population of harlequin duck in Canada has been designated a species of special concern since 2001 and endangered from 1991–2001, largely due to low and declining wintering numbers in the 1980s. The number of birds wintering in eastern Canada has been increasing, yet formal estimates of abundance and distribution need to be updated. This study generated abundance estimates from surveys of major wintering areas in three Atlantic provinces between 2015–2018 and were projected with simulations to 2022 using trends from CBC data during 1988–2021. Overall, results show that numbers have increased and distributions have expanded beyond historically surveyed regions, particularly in Nova Scotia. The findings indicate that the eastern population is in recovery but emphasize that a consistent monitoring program is needed to ensure management actions are effectively evaluated and enable timely responses should regional trends slow or reverse.

The American common eider is an iconic sea duck occurring from the Gulf of St. Lawrence southward to Long Island, New York, with greatest wintering numbers in Maine and Massachusetts. Based on limited data and expert opinion, localized declines have occurred in breeding and wintering numbers in Nova Scotia, New Brunswick, and Maine. A range-wide overview of shifts in local abundance was needed to understand the geographic extent of changes in winter distribution. However, only the Canadian portion of the wintering range had been thoroughly surveyed in the last two decades. This study combined Canadian aerial survey and CBC data to estimate localized changes over a multi-decadal time series across the wintering range. The results show widespread declines in local eider abundance since 2000 throughout the entire Gulf of Maine and surrounding ecosystems, from Nova Scotia to Massachusetts, suggesting a large-scale redistribution away from the centre of the overwinter range. This study confirms suspected trends and further supports the need for inter-jurisdictional coordination of harvest management and habitat conservation for this species.

For DUC and its partners, the American common eider is a high priority species for which much needed science investment is being made across the breeding and wintering range. DUC will continue to protect and enhance eider breeding colonies (e.g. nest shelters) while using research results to develop new tools, opportunities, and partnerships to deliver marine habitat conservation.

NEW PROJECTS IN FY22

A REGIONAL ASSESSMENT OF ECOSYSTEM SERVICES PROVISIONING IN RESTORED COASTAL WETLANDS

Dr. Anna R. Armitage, Texas A&M Univ. at Galveston; Dr. Jessica O'Connell, Univ. of Texas Marine Science Institute; Dr. Ellen Herbert, DU-NHQ; Dr. Dale James, DU-SR

Wetland restoration is a critical component of a multi-faceted coastal management strategy to compensate for impacts from disturbance, development, and climate change. An important restoration goal is to support local economies by reestablishing essential ecosystem services such as erosion protection, fishery support, and carbon sequestration. This study will use field-based and remote sensing assessments to study the provision of ecosystem services in older restoration sites. This information will help us understand the links between coastal restoration design and ecosystem services and lead to more successful and impactful coastal wetland restoration efforts.

DEVELOPMENT OF BIOCONTROL FOR NON-NATIVE PHRAGMITES

Dr. Bernd Blossey & Dr. Angela Burrow, Cornell Univ.

The non-native variety of Phragmites (Phragmites australis), also known as common reed, has become widespread throughout the Great Lakes and Atlantic Coast, threatening the ecological health of wetlands and the Great Lakes and Atlantic coastline. Multiple management techniques are used to control Phragmites but are often ineffective when used singularly, and reinvasion by Phragmites is likely when follow up treatment is not maintained. Biocontrol options using two moths that are specific to Phragmites are showing some promise as a long-term solution. This project will use a social science survey to evaluate opinions toward biocontrol and evaluate its effectiveness and safety by studying larval dispersal of the moths and whether it affects native Phragmites. This information is needed to inform release permits while improving control options and maintaining social support for invasive species management.

APPLICATION OF EBIRD DATA TO ENHANCE INTERREGIONAL PLANNING FOR MIGRATORY WATERFOWL DURING THE NONBREEDING PERIOD

Dr. Kylee Dunham & Dr. Orin Robinson, Cornell Lab of Ornithology; Dr. Kevin Ringelman, Louisiana State Univ.; Dr. Auriel Fournier & Aaron Yetter, Illinois Natural History Survey; Dr. Mike Brasher, DU-NHQ

Avian conservationists have increasingly recognized the importance of cross-regional biological assessments and planning to meet the needs of highly mobile, shared populations of migratory waterfowl. Planning of this nature is likely to be most effective when informed by common or similar models depicting temporal patterns of waterfowl abundance across multiple planning scales. Citizen science data platforms, such as the Cornell Lab or Ornithology's eBird, are revolutionizing the way in which such information is collected and offer a source of data to inform inter-regional planning. This study will rely on a 12–18-month postdoctoral researcher to evaluate the utility of eBird data products for informing inter-regional planning of waterfowl during the non-breeding period. The study will also explore opportunities to integrate multiple datasets to develop superior products for conservation planning.

*EVALUATING UNCREWED AERIAL VEHICLES TO MONITOR WATERFOWL RESPONSE TO WETLAND RESTORATION IN THE MISSISSIPPI ALLUVIAL VALLEY

Zack Loken (MSc student) & Dr. Kevin Ringelman, Louisiana State Univ.; Dr. Dale James, DU-SR; Dr. Anne Mini, Lower Mississippi Valley Joint Venture

Understanding how waterfowl respond to habitat restoration and management is crucial for evaluating and refining conservation delivery programs. However, site-specific monitoring is difficult, especially in heavily forested systems such as the Mississippi Alluvial Valley (MAV). To address this need, this study will develop and evaluate a monitoring protocol using a small, uncrewed aircraft system (UAS) equipped with high-resolution thermal and optical cameras to survey wintering waterfowl on wetland restoration easements in the MAV. Initial results suggest this new technology and the algorithms developed to interpret the data offer a practical solution for enumerating and identifying waterfowl species remotely. By investigating the efficacy of UAS and artificial intelligence technologies for quantifying waterfowl site use, this study will provide managers with the most efficient and cost-effective means to evaluate waterfowl response to restoration efforts.

* DENOTES A STUDENT-LED PROJECT

ASSESSING AND MAPPING THE BIODIVERSITY POTENTIAL OF PRAIRIE LANDSCAPES

Dr. James Devries, Dr. James Paterson, Dr. Lauren Bortolotti, & Paige Kowal, DUC-IWWR

This project will use prairie-wide observations for mammals, birds, amphibians, and reptiles to develop probability of occurrence layers for each species as a function of biogeoclimatic variables at multiple scales. These layers will be used to map biodiversity potential across prairie Canada as a function of land use and habitat characteristics at fine spatial scales. This effort will enhance DU Canada's conservation planning by highlighting areas of potential high biodiversity and allowing prediction of the impact of conservation activity, land use, and habitat change (e.g., wetland and grassland loss) on biodiversity potential.

2022 DUCKS UNLIMITED Fellowship Recipients

Educating the next generation of conservation scientists and managers is critical to the success of DU and waterfowl management across North America. In addition to including graduate students in many staff-led research projects, DU provides dedicated support to graduate students (MSc or PhD). This support is provided in the form of annual graduate fellowships designed to help develop young professionals who are dedicated to conservation, while advancing our scientific understanding of waterfowl and wetlands. To date DU has awarded fellowships to over 60 students from 26 universities. In 2022, DU awarded 4 fellowships to new recipients and renewed fellowships for 4 continuing students.

NEW RECIPIENTS IN 2022

DUC-MBNA CANADA BANK® CONSERVATION FELLOWSHIP

Reyd Smith

Sponsored by a long-time partner of DU Canada, this fellowship helps support tomorrow's conservation leaders while providing new information that can be applied today. The DUC-MBNA Canada Bank® Conservation Fellowship was awarded to Reyd Smith, a PhD student at Carleton University, for her research on effects of oil contamination on seabirds in Nunatsiavut. Reyd's research embodies two of DUC's conservation priorities: 1) determining the sub-lethal effects of oil exposure, and 2) meaningful involvement of Indigenous communities in research to achieve shared conservation objectives.

Ilsa Griebel

MICHAEL F.B. NESBITT FAMILY RESEARCH FELLOWSHIP

This fellowship honors the many contributions by members of the Nesbitt family to science and conservation. This fellowship has been awarded to Ilsa Griebel for her PhD research at the University of Saskatchewan. Ilsa's research seeks to improve our understanding of the annual cycle of black ducks, including addressing key knowledge gaps about breeding season productivity in the boreal forest.

Nick Masto

SPENCER T. AND ANN W. OLIN FOUNDATION WETLANDS AND WATERFOWL RESEARCH FELLOWSHIP

This fellowship reflects the long-term commitment made by a family that has been supporting DU since 1941. Nick Masto, a PhD student at Tennessee Technological University, was the recipient of this fellowship. Nick's research focuses on identifying factors driving mallard movements, habitat selection, and distributions during the non-breeding period. This information will be used to refine regional conservation planning tools and facilitate wetland restoration and management efforts.

Kate Sinnott

DR. BRUCE D.J. BATT FELLOWSHIP IN WATERFOWL CONSERVATION

This fellowship was established in recognition of a retired DU Chief Biologist who was particularly passionate about the role of sound science in guiding conservation. The most recent winner of this award is Kate Sinnott for her work at Utah State University. Kate's MSc project will focus on developing techniques and best practices for the restoration of aquatic vegetation in shallow freshwater wetlands.

CONTINUING RECIPIENTS IN 2022

Alec Schlinder

EDWARD D. AND SALLY M. FUTCH GRADUATE FELLOWSHIP

Thanks to the generous support of one couple with a special interest in DU's scientific work, this fellowship helps to advance our understanding of waterfowl and wetlands in North America. In 2022, Alec Schindler continued as the recipient of this fellowship. His PhD project at the University of Saskatchewan looks at trade-offs in reproduction and survival in the Greenland white-fronted goose by developing a sophisticated life-cycle model from tracking and behavior data. Alec's research will inform conservation of this declining species and provide a scientific framework applicable to other species and systems.

Rob Blenk

THE WATERFOWL RESEARCH FOUNDATION FELLOWSHIP

This fellowship is an investment in young waterfowl professionals with three primary objectives: 1) developing critical scientific information that will contribute to the future conservation of waterfowl and wetland resources, 2) contributing to the training of future professionals in the field of waterfowl and wetlands conservation, and 3) honoring the critical role that waterfowlers have played in supporting waterfowl and wetland conservation throughout North America. This fellowship continued to be awarded to Rob Blenk in 2022, a PhD student at the University of California, Davis for his research on a model of energetics, habitat use, and survival of wintering waterfowl. Rob's research will integrate results from waterfowl foraging behavior experiments into a model that will be applied to California's Suisun Marsh to assess the effect of tidal wetland restoration on the area's ability to sustain target populations of waterfowl.

Brett Leach

BONNYCASTLE FELLOWSHIP FOR WATERFOWL AND WETLAND RESEARCH

This fellowship supports talented young professionals who are dedicated to furthering conservation in North America and advancing our scientific understanding of wetland and waterfowl biology. Brett Leach, a MSc student at the University of Missouri, continued as the recipient of this fellowship in 2022. Blue-winged teal migration timing and distribution in Central and South America have made it challenging to study this species' non-breeding period using traditional approaches. Brett's research used GPS/GSM satellite telemetry methods to fill key knowledge gaps about the annual cycle of this species.

BONNYCASTLE FELLOWSHIP IN WETLAND AND WATERFOWL BIOLOGY

Madeleine Lohman

This fellowship is awarded to graduate students throughout North America for projects focusing on any aspect of wetland or waterfowl ecology that promises to advance conservation. Madeleine Lohman continued in 2022 as our recipient of this award while she completes her PhD at the University of Nevada, Reno, using advanced modelling to understand how climate and land use influence mallard populations in the Prairie Pothole Region.

WELCOME TO OUR NEW SCIENTIST

DR. AARON PIERCE, DIRECTOR OF CONSERVATION SCIENCE AND PLANNING, DU INC., SOUTHERN REGION

DU Inc. welcomes Dr. Aaron Pierce as our new Director of Conservation Science and Planning for the Southern Region. Aaron grew up in a small town in upstate New York where he developed his love of the outdoors while camping, fishing, and hunting with his family. He completed his undergraduate degree in biology at Hartwick College where he developed his interest in avian research while working with his advisor Dr. Michael T. Murphy on several songbird research projects. He received a MS in Ecology from Purdue University and PhD in Natural Resources from the University of Tennessee. Under the direction of Dr. Sammy King, Aaron's PhD research focused on bottomland hardwood wetland systems which developed his passion for wetlands. He was an Associate Professor and Graduate Program Coordinator at Nicholls State University in southeast Louisiana until 2017 when he came to DU as a Regional Biologist in the Lafayette Field Office. His research interests remain focused on wetland ecosystems, wildlife-habitat relationships, and conservation/management implications. He looks forward to his new role with DU and working with DU staff to advance our conservation efforts.

DUCKS UNLIMITED ENDOWED PROFESSORSHIP IN WETLAND AND WATERFOWL CONSERVATION

ESTABLISHED AT UNIVERSITY OF ARKANSAS AT MONTICELLO

University programs dedicated to the study of wetlands and waterfowl ignite the passion of tomorrow's conservation leaders. They stir a curiosity that drives new discoveries. They provide the training needed for managers to ensure the health and viability of waterfowl and their habitats for generations to come.

The future of Ducks Unlimited's science-based conservation depends on trained professionals to deliver North America's next great conservation achievements. For that reason, DU, in cooperation with the University of Arkansas at Monticello (UAM), has established "The Ducks Unlimited Endowed Professorship in Wetlands and Waterfowl Conservation at UAM." The endowment seeks to perpetuate a faculty position in the UAM College of Forestry, Agriculture, and Natural Resources, supporting excellence in teaching, research, and public service in waterfowl ecology, waterfowl habitat management, or wetlands conservation, in cooperation with Ducks Unlimited and other partners.

Persons selected for the endowed professorship must be an associate or full professor in the UAM College of Forestry, Agriculture, and Natural Resources who has demonstrated excellence in teaching, research, and public service in the areas of waterfowl ecology, waterfowl habitat management, or wetlands conservation, preferably in cooperation with DU and other partners. Endowed professorships are awarded for three years and are renewable.

The endowment will be used for salary supplements and support of academic activities of the professorship position, including but not limited to instruction, research, equipment, materials, and professional development. Fund-raising efforts are underway for the Ducks Unlimited Endowment, with a goal of $500,000. Contact a Ducks Unlimited representative to learn how you can contribute and ensure the next generation of managers are trained, knowledgeable and ready to meet the challenges of wetland and waterfowl habitat conservation into the future.

UAM
The University of Arkansas at Monticello
Monticello · Crossett · McGehee

DR. KEVIN RINGELMAN AWARDED H. DALE HALL DUCKS UNLIMITED ENDOWED PROFESSORSHIP IN WETLANDS & WATERFOWL CONSERVATION

Ducks Unlimited (DU) is pleased to name Dr. Kevin Ringelman, associate professor at the Louisiana State University (LSU) School of Renewable Natural Resources, the recipient of this year's H. Dale Hall Ducks Unlimited Endowed Professorship in Wetlands and Waterfowl Conservation.

DU and other partners, in cooperation with the LSU School of Renewable Natural Resources and the LSU AgCenter, established the H. Dale Hall Ducks Unlimited Endowed Professorship in Wetlands and Waterfowl Conservation endowment to perpetuate a faculty position in the school to support excellence in teaching, research, and public service in waterfowl ecology, waterfowl habitat management, or wetlands conservation.

"Ducks Unlimited has been an integral research partner since I started at LSU," said Ringelman. "This professorship helps ensure that waterfowl science remains a priority at LSU, and it's my honor to represent the legacy of Dale Hall and the Ducks Unlimited conservation mission."

Ringelman, who has pursued waterfowl science since 2007 when he attended graduate school at the University of California, Davis, has an impressive background. This includes 30 peer-reviewed papers on the subject and 60 conference abstracts. Since starting at the LSU AgCenter in 2014, his grants in support of waterfowl research exceed $1.6 million, including substantial financial support directly from DU.

LSU
School of Renewable Natural Resources

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DUCKS UNLIMITED

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THREE COMPANIES WITH A SHARED MISSION:

Ducks Unlimited conserves, restores and manages wetlands and associated habitats for North America's waterfowl. These habitats also benefit other wildlife and people.