Winous Point Marsh Conservancy

2024 Research and Activities Report

February 2025

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On the cover: Great egret (Ardea alba), at Winous Point Marsh, October, 2024. Photo credit: Art Weber

Winous Point Marsh Conservancy

Vision:

To act as a leader, facilitator, and innovator in wetland and wetland dependent wildlife conservation, education, and research in the lower Great Lakes region.

Mission:

1) *CONSERVATION: To ensure the protection and sound management of the Winous Point coastal wetlands, the greater southwest Lake Erie region, and the associated waterfowl and wildlife.*

2) *EDUCATION: To provide practical learning opportunities in wetlands and waterfowl ecology with a particular focus on training and career development of young professionals.*

3) *RESEARCH: To be a leader in delivering impactful, applied research programs and projects in wetlands ecology, with a focus on wetlands and wetland dependent plants and animals.*

Winous Point Marsh Conservancy

2024

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The Winous Point Marsh Conservancy's mission is broad, but directed: Research, Conservation, and Education. Annually, we work hard to support sound scientific research, to advance local and regional wetland conservation, and to deliver meaningful education programs.

Our graduate research program is currently supporting four graduate research projects; Andrea Spurck at Ohio State University (OSU; Page 5), Dominic Hockenbury at SUNY-ESF (Page 10), Ilsa Griebel at the University of Saskatchewan (Page 12), and Rachel Mansfield at Wright State University (Page 18). These projects are investigating a variety of waterfowl and waterbird conservation issues, and two continue line of research (marshbird ecology and mallard genetics) that Winous Point Marsh Conservancy (WPMC) has worked with other recent students. We are excited and proud to support these four students, as each project has implications for conservation and management of waterfowl and waterbirds in the Great Lakes and beyond.

In addition to graduate research, we are one year into two large research and monitoring projects. The first is in partnership with OSU College of Veterinary Medicine and is funded by the National Institute of Health (Page 21). This project is designed to improve our understanding of seasonal patterns of West Nile Virus between birds and mosquitos with implications for wildlife and human health. WPMC staff will be conducting sampling across the state for the next 3 years, and we have brought on additional seasonal staff to accomplish this. Similarly, we are also in the first year of a research partnership project with OSU and the Ohio Division of Wildlife to monitor and assess the wildlife benefits of the thousands of acres of wetlands being restored statewide as part of Governor Dewine's H2Ohio Water Quality Initiative (Page 25). This project is led by OSU postdoctoral researcher Dr. Nate Stott, who is based at WPMC, but supported by the *Winous Point Wetlands and Waterfowl Endowed Faculty Support Fund* program at Ohio State University. Again, his project involves employing a team of seasonal technicians to conduct bird and wetland habitat assessments at sites throughout the Lake Erie watershed. Rachael Mansfield's Ph.D. project at Wright State University is a part of this larger H2Ohio monitoring project and our 2024 intern, Tim Maron, is in the process of developing a graduate research proposal evaluating breeding waterfowl use of H2Ohio and other wetlands.

On the conservation front, WPMC staff are involved in a variety of local and regional on-the-ground wetlands conservation projects. We learned this year that our partnership grant with

Ducks Unlimited to the North American Wetlands Conservation Act was funded. DU will administer this grant funding for a variety of conservation projects at various partner sites across northwestern Ohio including the replacement of the primary water control system in our 750-acre Sandusky County marshes. We are also continuing our ongoing conservation award with the Ohio Department of Natural Resources H2Ohio water quality program. This project will enhance nearly 1000 acres of WPMC marshes in Ottawa County with improved water management infrastructure that will allow for greater connectivity to Lake Erie. Regionally, we have aided a suite of community partners to revitalize the Lake Erie Cooperative Weed Management Association. This program was extremely successful in the past at managing regional *Phragmites* issues, and it has been recently revitalized with funding from a variety of sources, including the aforementioned North American Wetlands Conservation Act grant.

We also continue to grow and focus our efforts around conservation education and mentorship of youth, students, and adults. A quick browse of our 2024 calendar (Page 46) and photo log (Page 48) reveals that we remain engaged in our long-term programs and are also adding additional educational and mentorship opportunities. We continued Day on the Wildside, 7th Grade Science Tours, and the Delta Waterfowl University Hunt Program this year, in addition to hosting numerous educational tours, talks, and meetings. New this year is the addition of a "High School Experience Program" that offers summer internships and job-shadow opportunities to local high-school seniors. Finally, as we add additional seasonal staff and technicians we are also investing in their professional development through attendance at national conferences, professional training events, and leadership opportunities.

Thanks to the generosity of supportive donors, support derived from our strong network of partners, and the leadership and dedication of our board and staff, the WPMC continues to make significant contributions to wetlands science, to the careers of young professionals, and to regional management and conservation of wetlands. We look forward to the challenges and opportunities that lie ahead as we continue to further our impact on Great Lakes coastal wetlands, their wildlife, and the people that support them.

Regards,

John Simpson
Executive Director

Modeling Future Winter Waterfowl Distribution in Ohio and the Upper Mississippi River/Great Lakes Region Joint Venture

Investigators: Andrea Spurck and Dr. Robert Gates, The Ohio State University; and Brendan Shirkey, Winous Point Marsh Conservancy

Collaborators: Waterfowl Research Foundation and the Ohio Division of Wildlife

Schedule: 2023 – 2025

Introduction: Warming winter temperatures have affected duck distributions across the United States. Previous studies have reported or predicted delayed autumn migration and northward shifts in wintering ranges. This research has been conducted mostly on a continental scale, with less focus on smaller geographic areas. Ohio and other midwestern states are important to consider in this context because of their proximity to the Great Lakes. Increased abundance of wintering ducks in this area could place greater demand on food and habitat, limiting resources available during spring migration. This research has potential management implications for proactively addressing wetland conservation aimed at providing additional overwintering and spring migratory habitat to support future increases in waterfowl. This research could also help inform future waterfowl hunting regulations and viewing opportunities to match shifting winter distributions.

Figure 1. Andrea Spurck assists with black duck banding, 2025.

Project objectives:

1. Use Integrated Nested Laplace Approximation (INLA) models to model historical changes (1966-2021) in relative abundance of ducks across the Upper Mississippi and Great Lakes Region Joint Venture (UMRGLJV) as a function of winter weather severity.

2. Project future trends in winter duck abundance using Global Circulation Climate Change models and estimated changes in winter weather severity for 2050 and 2100 under different emissions scenarios.

Summary: The Christmas Bird Count (CBC) is a volunteer-based annual survey of birds that has occurred in late December since 1900; however, consistent survey methods were not established until the 1960s. A study of CBC trends in the eastern United States reported that relative abundance of waterfowl increased more at northern latitudes for most species, with the mean winter temperature explaining about half of the variation in trends for 12 of 16 species (Meehan et al. 2021). We used CBC Data (1966-2021) to assess observations of "mallards and American black ducks combined" as well as "wetland obligate dabbling duck species" (gadwall, American wigeon, northern shovelers, northern pintail, and green-winged teal) at a 100 sq. km spatial grid across the entire UMRGLJV. We adjusted counts to correct for varying degrees of survey effort and spatial variation. Then we estimated percent change in relative abundance for mallards/black ducks and wetland obligate dabbling ducks for each grid cell from 1966 to 2021. We also calculated a winter weather severity index (WSI) for each grid cell that combined the inverse of average temperature, consecutive days below freezing, average snowfall, and consecutive days with accumulated snow >2.54 cm. This allowed us to compare how the relative abundance of mallards/black ducks and wetland obligate ducks changed in relation to winter weather severity, which has been demonstrated to be an important predictor of winter duck distributions.

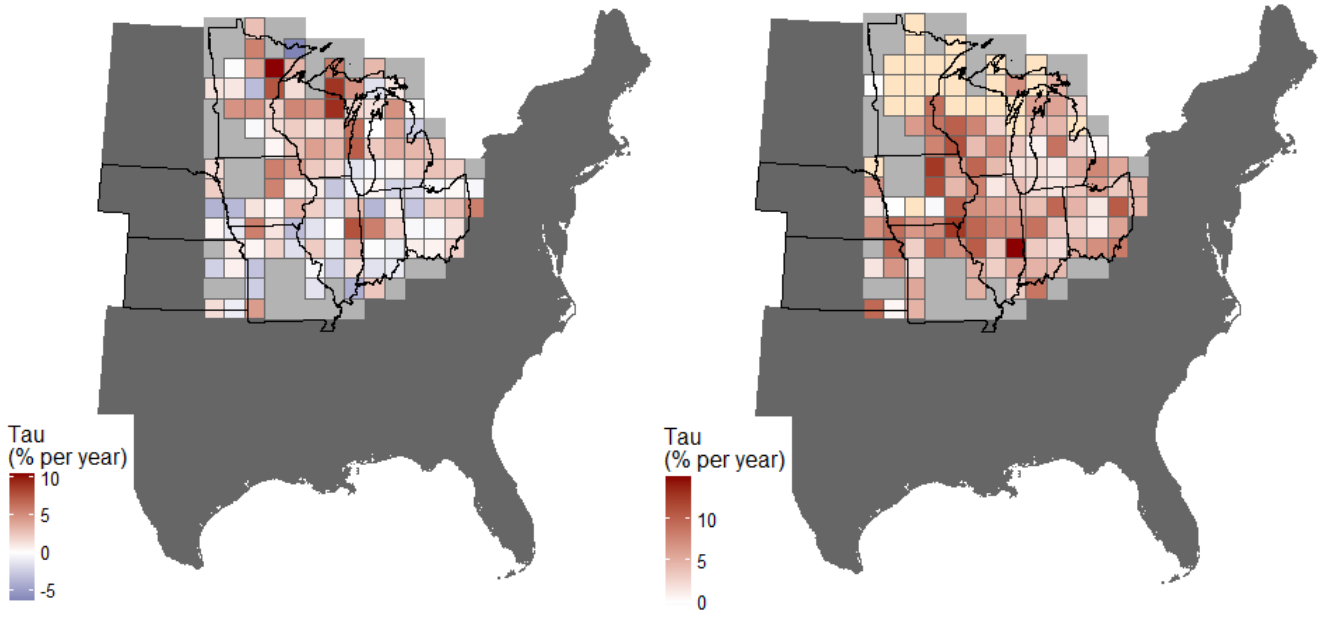

Figure 2. Percent change in relative abundance of mallards and American black ducks (left) and wetland obligate dabbling ducks (right) from 1966 to 2021 across the Upper Mississippi River and Great Lakes Joint Venture. Darker reds indicate areas with greater increases in relative abundance.

Results from my first objective indicate that relative abundance of wintering wetland obligate dabbling ducks is increasing across the entire UMRGLJV, especially along the Mississippi River. Relative abundance of mallards and American black ducks is increasing in some portions of the UMRGLJV and decreasing in other areas but overall increasing more in the northwestern part of the region (Figure 2). In contrast, there were no wetland obligates detected during the CBC surveys in the northwestern region of the UMRGLJV (Minnesota and northern Wisconsin), but these areas had mallards/black ducks present. Our post hoc correlations show wetland obligate dabbling ducks increasing more in areas with historically milder winters within our region (mid-latitude) and unable to occupy areas with historically more severe winter weather. Mallards and black ducks were overall increasing regardless of winter weather conditions but were increasing more in areas with historically severe winters (i.e. far northern sites, Figure 3). These findings are generally consistent with Meehan et al.'s (2021) analyses of CBC data across eastern North America, however there are some interesting findings from this finer scale approach. Wetland obligate dabbling duck species are increasing in abundance throughout the UMRGLJV but are still limited by severe winter weather in the northern portions of our study area. We also found a threshold WSI value where wetland obligates are no longer able to overwinter as these species are more sensitive to cold temperatures that freeze wetlands. Mallards and American black ducks can feed in agricultural fields when wetlands are frozen and also have a larger body mass, allowing them to overwinter at more northernly latitudes compared to wetland obligate ducks.

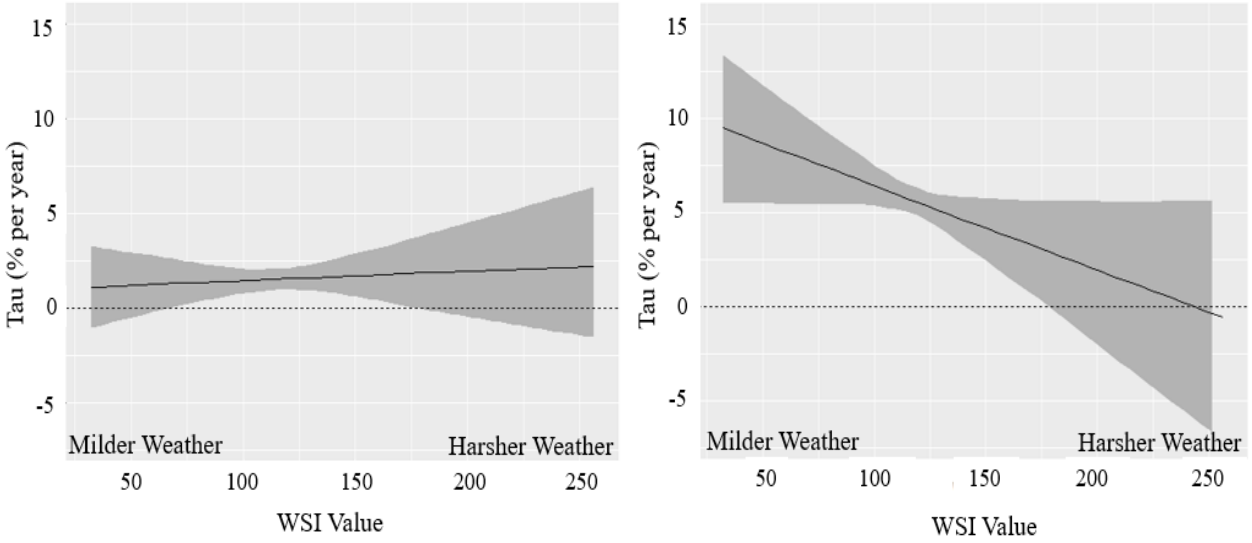

Figure 3. Percent change in relative abundance of wintering mallards and American black ducks (left) and wetland obligate dabbling ducks (right) as function of winter weather severity across the Upper Mississippi River and Great Lakes Region Joint Venture from 1966 to 2021. Higher WSI values represent cells with colder and snowier winters.

Global Climate Models (GCMs) suggest that daily snowfall patterns will become less consistent but more intense across the Upper Midwest and Great Lakes as reduced ice cover promotes lake-effect snow. Studies of future shifts in duck wintering abundance predict that there will be delayed migration for all species based on climate change projections of rising temperatures and reduced snow cover. We used models from the historical CBC data in chapter 1 and GCMs with two different climate change scenarios to evaluate future changes in WSI index. Within the UMRGLJV we calculated future WSI values for 2050 and 2100 using GCMs with emissions scenarios A2, which represents more extreme temperature increases, and B1, which represents less extreme temperature increases.

Preliminary results indicate a continued northward shift in wintering duck distribution in the UMRGLJV. Future projections show an increase across the entire UMRGLJV for mallards and American black ducks and wetland obligate dabbling ducks. Mallards and American black ducks will increase more in the northern latitudes of the UMRGLJV whereas wetland obligate dabbling ducks will increase more in the southern latitudes of the UMRGLJV. Emissions scenarios A2 and B1 provided similar shifts in duck distribution patterns but were more pronounced with scenario A2. Likewise, the increases in duck abundance were more evident in 2100 compared to 2050. By 2050, future temperature increases are projected to shift the WSI threshold for wetland obligate dabbling ducks such that they will be able to overwinter in northern areas where they have historically not overwintered. Projecting increases in overwintering ducks in the Great Lakes region is important for proactively addressing potential limitations on food resources for ducks and other wetland-dependent wildlife.

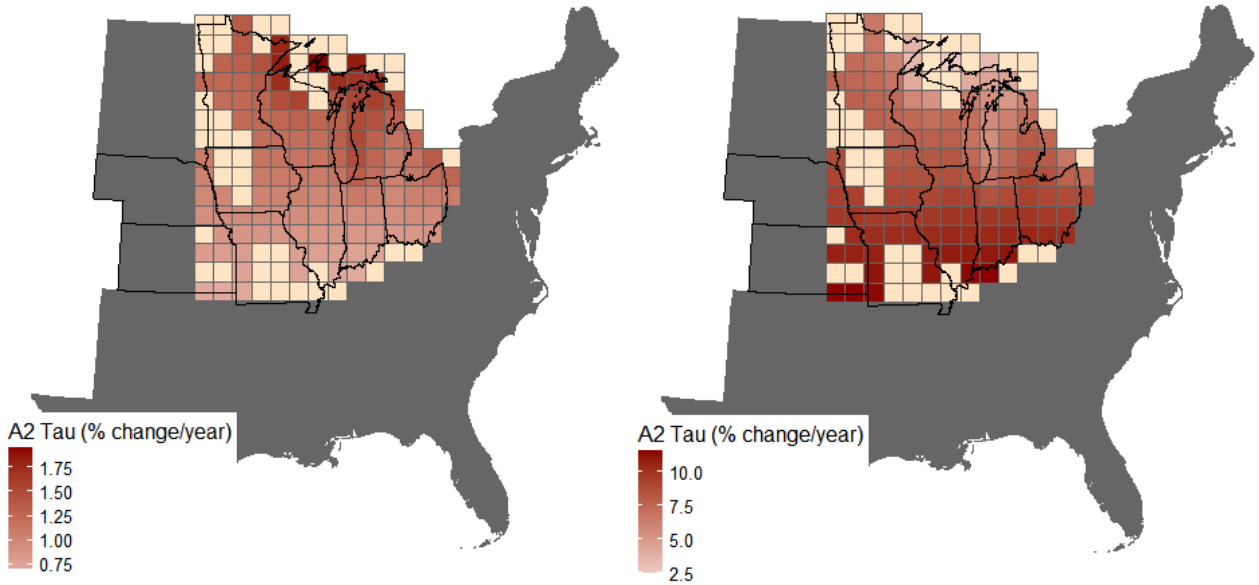

Figure 4. Predicted percent change per year in relative abundance of mallards and American black ducks (left) and predicted percent change per year in relative abundance of wetland obligate dabbling ducks (right) under climate change emissions scenario A2 (more extreme

temperature increases) for 2050 across the Upper Mississippi River and Great Lakes Region Joint Venture. Darker reds indicate areas with greater increases in relative abundance.

The next steps in our research include calculating a spatially explicit model for weather severity index values using the GCMs. Initial modeling was completed with an average WSI value for each grid cell but changing weather patterns vary across the UMRGLJV, especially within the Great Lakes region. A spatially explicit model will allow us to predict changes in relative abundance of wintering ducks across each grid cell for the UMRGLJV.

Figure 5. Overwintering ducks at Winous Point Marsh, 2009.

Winous Point Marsh Conservancy is a co-lead investigator with Andrea and Dr. Bob Gates of Ohio State University. The project is currently funded by Ohio State University, the Waterfowl Research Foundation, and WPMC's Brown Fellowship. We thank Dr. Bill Peterman of The Ohio State University, Dr. Steve Matthews of The Ohio State University, Mike Ervin of the Ohio Division of Wildlife, Tim Meehan of the National Audubon Society, and Dr. Mike Notaro of the University of Wisconsin for their help with project development and data access.

Assessment of Game-Farm Mallard Releases on the North American Wild Mallard Genome

Investigators: Dominic Hockenbury and Dr. Michael Schummer, SUNY College of Environmental Science and Forestry

Collaborators: Winous Point Marsh Conservancy and University of Texas-El Paso

Schedule: 2024 – 2027

Summary: Over the last decade, the eastern mallard duck (*Anas platyrhynchos*) population has declined by approximately 2% yearly. One of the leading theories for this decline is the release of game-farm mallards into the wild mallard population. Previous work by Dr. Phil Lavretsky at University of Texas El-Paso, Dr. Mike Schummer of SUNY-ESF, Dr. Benjamin Luukkonen of Michigan State University, and others has indicated that game-farm mallards, as well as early generational hybrids between game-farm and wild mallards exhibit reduced migratory behavior, decreased nest attendance, decreased feeding rate of natural food sources and increased use of urban environments compared to their wild counterparts.

Figure 1. Ph.D. candidate Dominic Hockenbury banding and sampling mallards for his genetic research project.

In my research, I aim to build on our understanding of the effects of game-farm mallard releases by using genomic approaches to identify genetic regions associated with these previously identified traits in game-farm mallards and early generational hybrids. The first part of my project will focus on identifying genetic regions associated with migratory behavior and nest attendance. Several candidate genes have been identified in passerine bird species associated with migratory behavior and nest attendance, which are also present in the mallard genome. These candidate genes have been identified as regulators of circadian rhythm, a crucial biological process involved in migratory and nesting behavior of all birds. I aim to analyze the genome of game-farm mallards, early generational hybrids, and pure wild

mallards to identify variations in these candidate genes that are associated with migratory behavior and nest attendance or the lack thereof.

In a captive study of game-farm and pure wild mallards, game-farm mallards fed at a 50% reduced rate compared to pure wild mallards on natural food sources presented in a simulated natural substrate. Various species of waterfowl significantly differ in bill-tip receptor composition, density, and size, which are specialized to that species' preferred food source (i.e. a northern pintail has more receptors for feeding on small seeds). In comparison, a common pochard has fewer receptors and specializes in feeding on submerged aquatic vegetation. We suggest there are significant differences in bill-tip receptors between game-farm mallards and early generational hybrids compared to pure wild mallards that result in a decreased feeding rate. To study this, I aim to collect mallard bill samples from game-farm mallards, early generational hybrids, and pure wild mallards and analyze samples using light and scanning electron microscopy to distinguish the receptors' composition, density, and size in each sample category. After morphologically analyzing bill-tip receptors, I aim to associate genetic regions with significant variations discovered in bill-tip receptors between the sample categories.

Lastly, I aim to utilize population modeling simulations to understand how long identified genomic regions associated with migratory behavior, nest attendance, and bill-tip receptor morphology persist generationally in the wild mallard population. In combination with estimates of the extent of game-farm mallard releases, the rate at which game-farm mallards are hybridizing with wild mallards, the average life expectancy of early generational hybrids, and inheritance patterns of identified genomic regions, I will be able to model the extent to which these traits will be present in the mallard population in future generations. In addition, I will also be able to model the presence of these traits in the mallard population and estimate the total population number of mallards based on various management practices, including a complete halt in game-farm mallard releases.

Winous Point Marsh Conservancy supports this project by funding genetic testing and sampling and sharing of mallard location and genetic data collected by previous projects.

Quantifying the Influence of Environmental Conditions and Black Duck Behavior and Movements on Productivity

Investigators: Dr. Mitch D. Weegman and Ilsa Griebel**,** University of Saskatchewan

Collaborators:

Introduction: American **b**lack ducks are a species highly valued by hunters and a flagship species for Atlantic tidal marshes (Ringelman and Williams 2018). The population decreased by 50% between the 1950s and 1980s, and while stable now, has not recovered to its early 1900s level (Ringelman and Williams 2018). Over the past several decades, research on black ducks has focused on two competing hypotheses: 1) population growth in black ducks is limited by conditions on breeding areas, or 2) population growth in black ducks is limited by conditions on wintering areas (Roberts et al. 2020). Although extensive research has been completed addressing the latter of these two hypotheses, an equivalent assessment of the former hypothesis has not been possible due to the financial and logistical challenges of accessing the boreal region where black ducks breed. Devers et al. (2021) found that survival did not fully explain the lack of recovery currently displayed by black duck populations, and therefore, productivity could instead be the proximate mechanism for population declines in black ducks (Robinson et al. 2017, Roberts et al. 2020). Thus, research on black duck productivity in the boreal region is a crucial next step to inform management of the black duck population in Canada and the U.S.A.

To overcome previous challenges of collecting data on breeding black ducks in the boreal region, we are using state-of-the-art GPS-ACC devices to remotely collect spatiotemporal data on black duck movement and behaviour (Figure 1). GPS locations are collected once an hour and ACC fixes (behavioural data) every 10 minutes. We will investigate how habitat use, behaviour, migratory movements and energy expenditure explain variation in productivity.

Figure 1. Ph.D. student, Ilsa Griebel, holding a black duck newly fitted with a GPS transmitter just before release (left; photo credit: Mathieu Tetreault). A black duck hen that received a GPS transmitter as part of this study shortly before release at the Winous Point Marsh Conservancy in February of 2024.

Objectives:

1) Quantify movements and use of wetlands by black ducks during the breeding season.
2) Develop detailed time activity budgets of black duck behaviour (feeding, flight, resting/stationary, preening) throughout the annual cycle for different time periods (late winter before spring migration, spring migration, breeding season, fall migration).
3) Quantify reproductive metrics, such as nesting attempts, full-term incubation and brood-rearing, in black ducks by using daily displacement data and a proxy for energy expenditure from ACC data.
4) Use a hierarchical modelling approach to assess 1) the extent to which migration characteristics (e.g., number of stops, duration of stops), proportion of time feeding, energy expenditure, past mercury exposure and habitat used during wintering, staging and the reproductive period explain variation in reproductive metrics and 2) the extent to which precipitation and temperature explain variation in behaviour and energy expenditure during wintering, staging and breeding periods.

Summary: To date, project partners that include Connecticut, Delaware, Kentucky, Maine, Maryland, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, Tennessee, and Virginia have deployed 748 GSM transmitters on female black ducks since 2021 (Figure 2). Ohio led the way in 2024 deploying 61 transmitters on American black ducks, of which 53 were still transmitting as of May 2024 (Table 1). Overall, 86% of the 243 black ducks marked with transmitters in 2024 were still alive in May, providing substantial new information on breeding productivity. Post-deployment movements of all birds from WPMC are shown in Figure 3.

*Table 1. A summary of how many units have been deployed in 2024 and the current status of each deployment. *OH birds represent all those deployed by WPMC staff.*

Partner Agency	**Alive**	**Dead - recovered**	**Dead - unrecovered**	**Grand Total**
CT	15			15
DE	16			16
EC – Atlantic	16	4		20
EC – Ontario	4	1		5
MA	9	4	2	15
MD	24	3		27
ME	10	1		11
NJ	33	6	1	40
NY	14	3	1	18
OH	53	4	4	61
PA	17	1	1	19
TN	12		2	14
VA	20	2		22
Grand Total	**243**	**28**	**11**	**282**

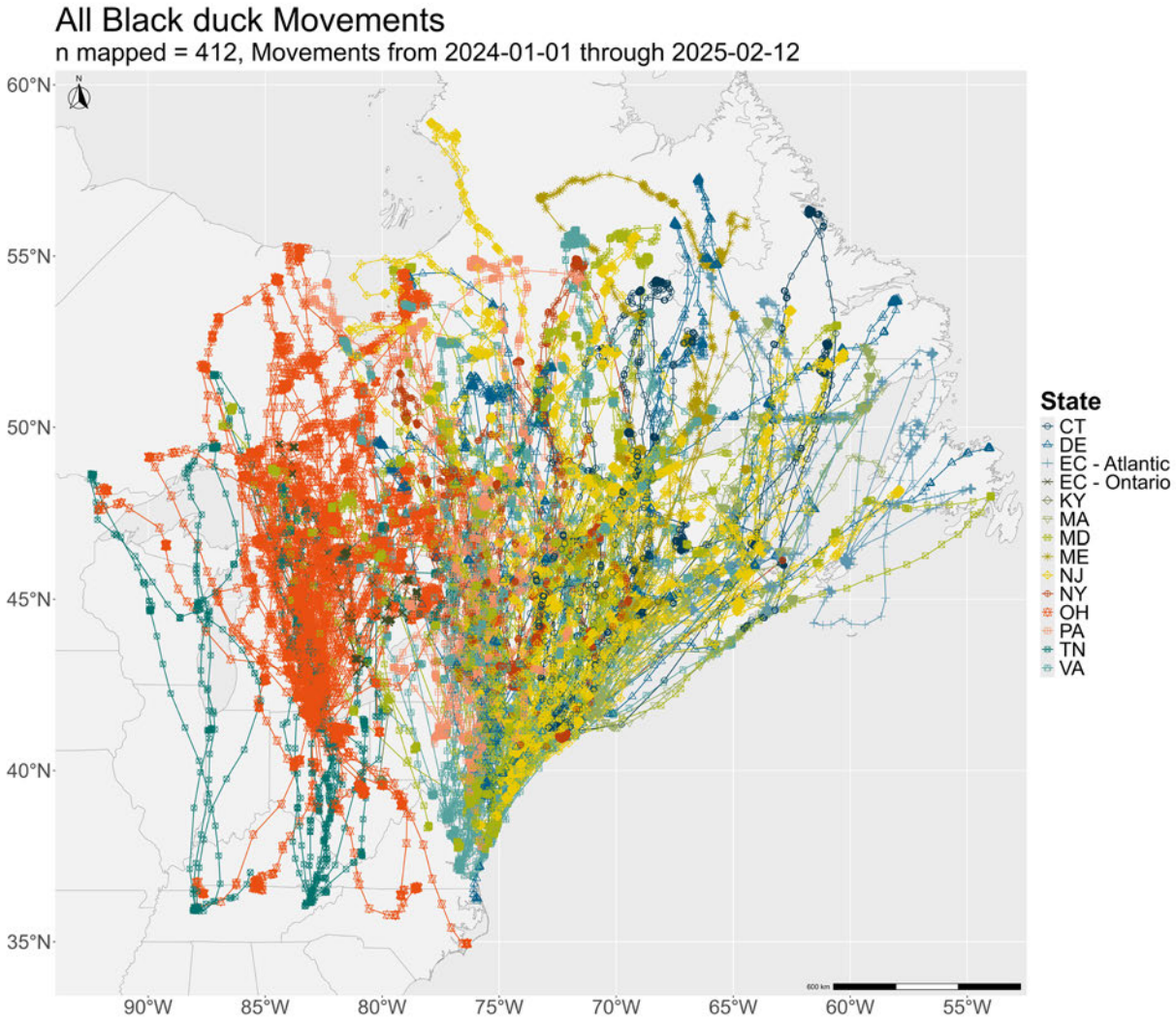

Figure 2. Movements from January, 2024 to February, 2025, for all black ducks marked with GSM transmitters in the winter of 2024. Colour of points indicate the state or province that deployed the device.

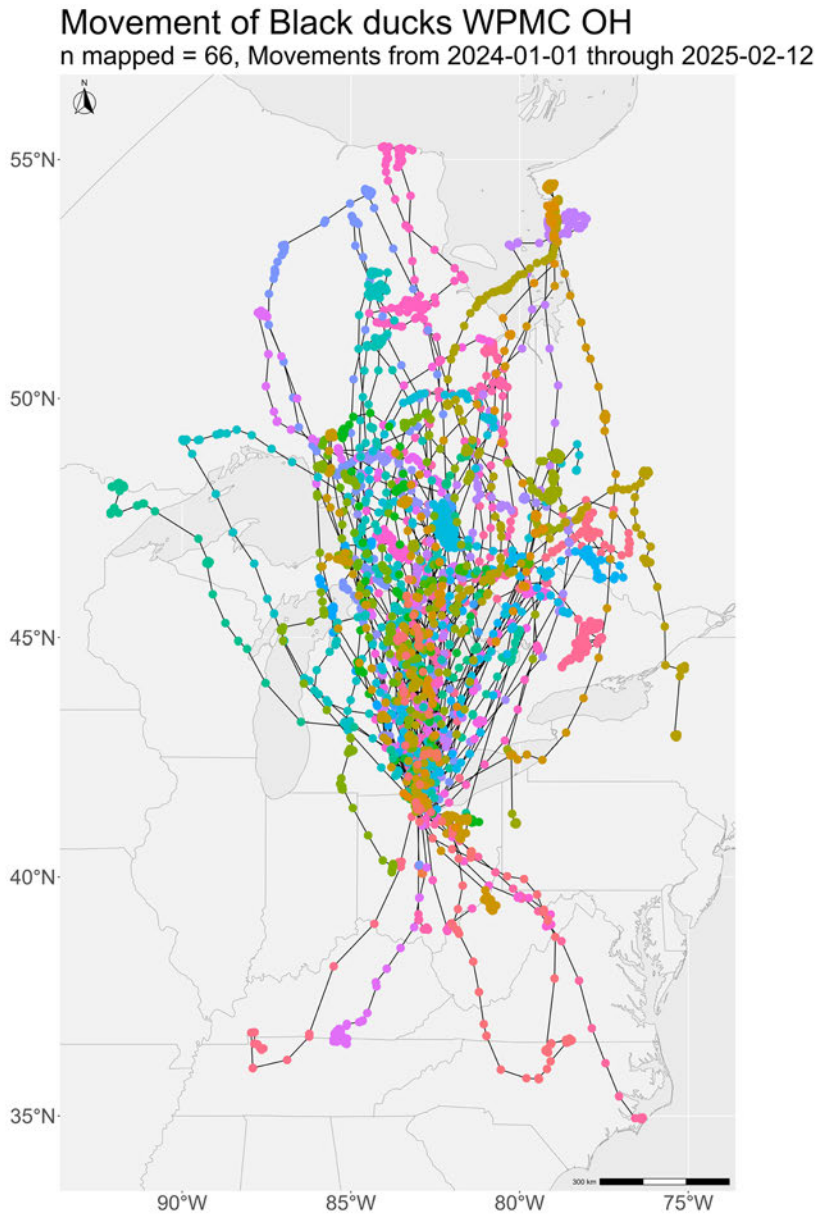

Figure 3. Map of all movements from January, 2024 to February, 2025 for black ducks marked at Winous Point Marsh Conservancy.

We developed a machine learning approach to classify incubation and brood rearing behaviour remotely for black ducks. For this approach, we need known occurrences of the behaviour we are trying to classify to train the machine learning algorithms. With the help of our partners on a sister project on eastern mallards, we have been locating nests of GPS-marked mallards and confirming the fate of the nests for known incubation behaviour and confirming the presence of a brood with marked mallard hens using both human observers and drones for known brood rearing behaviour (Figure 4).

Our most recent attempts using the incubation algorithm have achieved an algorithm accuracy of classifying one day as incubation vs. non-incubation of 96%. After the algorithm classifies each day as either incubating or not, we count consecutive days classified as incubating and apply a ruleset (e.g., > 23 consecutive days = full-term incubation) to determine breeding outcome. Our final accuracy of classifying breeding outcome to full-term incubation vs. failure prior to full-term incubation is 90%. For classifying brood rearing, our algorithm accuracy for classifying one day as brood rearing vs. not brood rearing is at 86%. The training dataset for brood rearing is still small and we're hoping to do a more intense drone survey effort of broods this summer to increase our sample size.

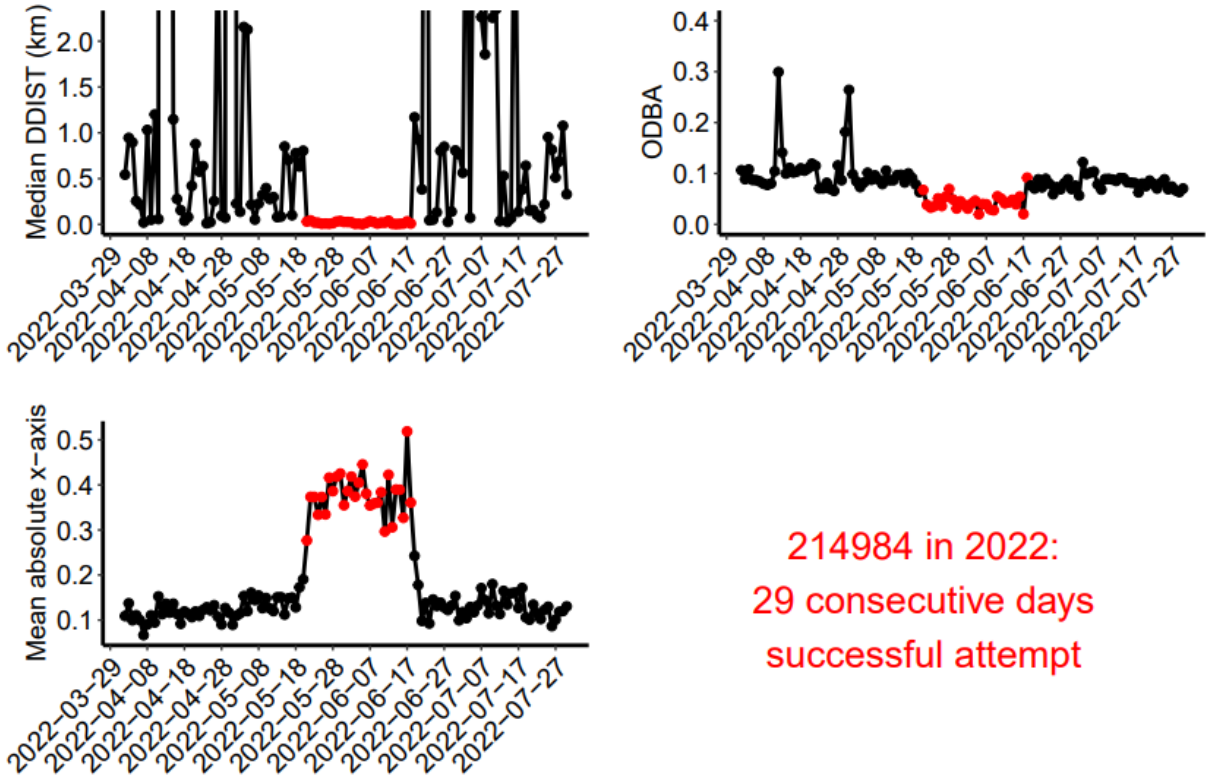

Figure 4. Daily summary metrics from April to August of a marked black duck that had 29 consecutive days classified as incubating (red points) and therefore, was deemed to have a successful nesting attempt. Daily summary metrics include median displacement distance (DDIST), which describes the distance moved between days, overall dynamic body acceleration (ODBA), a proxy for energy expenditure, and mean absolute x-axis, a measure of one axis of the acceleration data.

This project is supported by the Winous Point Marsh Conservancy Legacy Endowment Fund through the purchase of GPS-ACC transmitters. WPMC staff are also important in the trapping and marking of female black ducks for this project.

Acoustic Monitoring for Wetland Birds in the Great Lakes Region

Investigators: Rachel Mansfield, Ph.D. candidate, and Dr. Volker Bahn, Wright State University; Brendan Shirkey, Winous Point Marsh Conservancy; and Nate Stott, Post Doctoral Researcher, Ohio State University

Collaborators: Audubon Great Lakes, Upper Mississippi River/Great Lakes Joint Venture, and the Ohio Division of Wildlife

Schedule: 2024 – 2027

Introduction: North American wetland bird populations have significantly declined due to habitat loss, fragmentation, and degradation. Although Ohio has lost more than 90% of its wetlands, restoration programs have been increasing in recent years aiming to improve water quality, yet wildlife responses remain unmeasured. Secretive marsh birds are an important group of birds that can be an indicator of wetland quality, but they are difficult to sample due to their cryptic habits as they hide within dense vegetation and call infrequently. Autonomous Recording Units (ARUs) are self-contained audio recording devices that can be used to monitor sites remotely for secretive marsh bird vocalizations. They can record over long periods of time, and they can be deployed over many locations simultaneously.

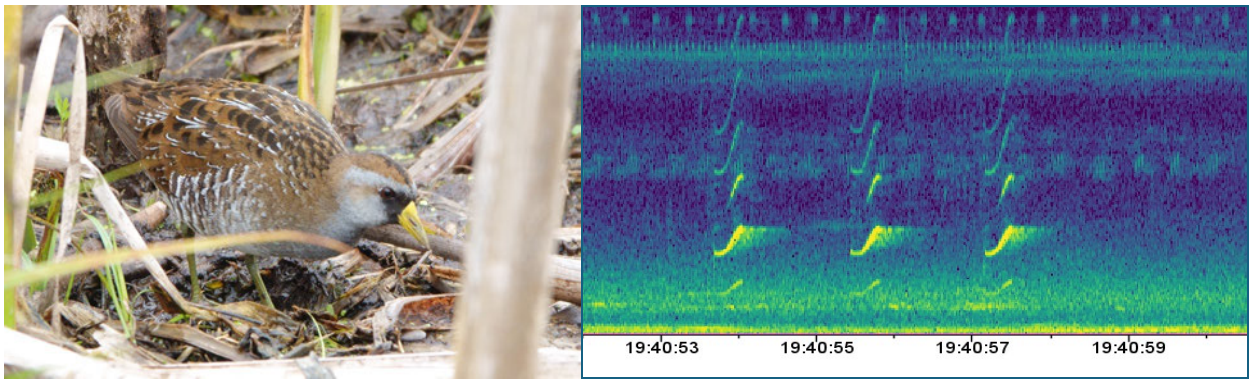

Figure 1. Acoustic Recording Units (ARUs) record sounds which can be processed to produce sonograms (graphical representations of a frequency of sound over time). On the right is a sonogram of a Sora (pictured left) call. The brightness and color indicate amplitude of sound waves.

Establishing the detection and identification range of ARUs for secretive marsh birds will allow us to combine the data from ARU-based and human-conducted surveys, hopefully, giving us a better estimate of bird occupancy at our sites. Additionally, understanding performance trade-offs will guide experimental designs combining ARU deployment with human-conducted point-counts. Leveraging the spatiotemporal advantage of the ARU-collected data with the reliability

of traditional human-conducted point count data, we aim to better estimate the occupancy of secretive marsh birds in Ohio, allowing us to investigate marsh bird habitat associations in detail. These associations will enable the evaluation of wetland habitat characteristics relevant to management and conservation decisions for restoration and enhancement projects across the Great Lakes region. These trends can then be used to identify potential habitat deficits across the region, which can be used to target conservation work that best addresses habitat deficits.

Summary: Our first step is to determine the detection accuracy and effective detection range of ARUs for secretive marsh bird calls by broadcasting calls from a speaker at known distances from ARUs in both open field and marsh environments. The open-field trials were completed during the summer, fall, and winter months of 2024 over a range of environmental conditions. We broadcast 12 vocalization types from 5 species including the American Bittern (AMBI), Least Bittern (LEBI), King Rail (KIRA), Virginia Rail (VIRA), and Sora (SORA). We used this data to construct detection probability curves for each call (Figure 2).

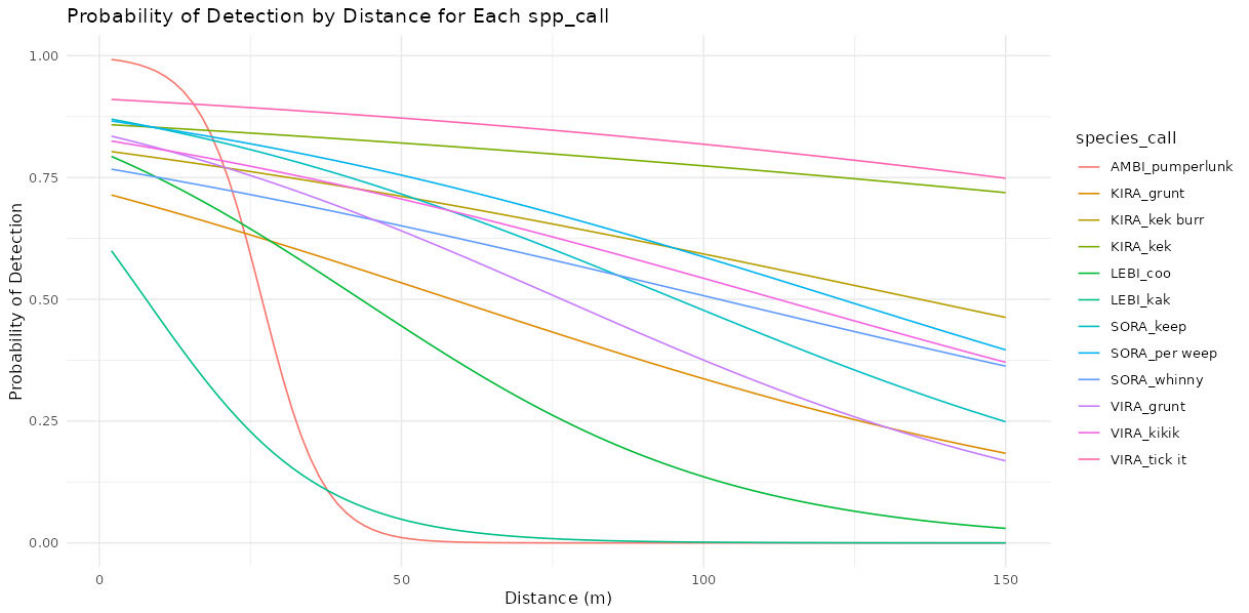

Figure 2. Detection probability of each call type in an open-field environment. The two calls that were detectible at the shortest distances had low-frequencies which occur at similar frequencies to background noise.

During field trials at Winous Point Marsh Conservancy, we broadcast the same vocalizations as in the open-field trials in a random order at marked distances from a speaker within a wetland. A human observer was stationed next to the ARU to listen and identify calls broadcast from the speaker to allow us to compare the detection range of the human observer with the ARU.

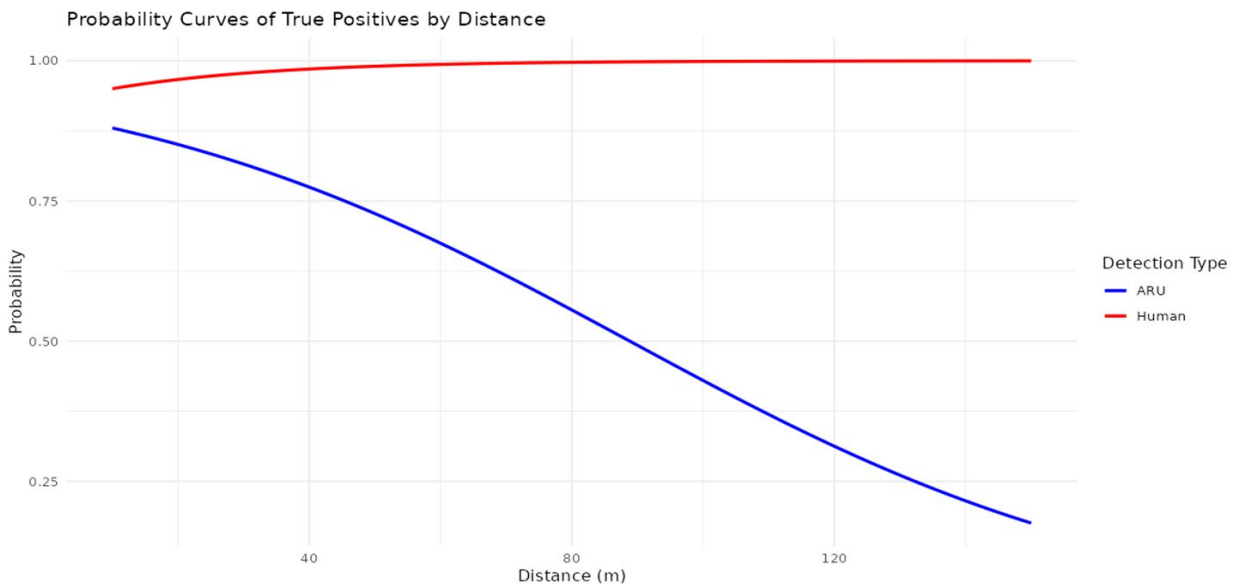

Figure 3. The probability that secretive marsh bird calls will be correctly identified by humans compared to the ARU. Over the range of distances trialed in the marsh, humans far surpassed the ARU, but the ARU can record over a much longer period of time. Knowing the detection range differences will enable us to correct for different detection performance.

Establishing the detection and identification range for ARUs to monitor secretive marsh birds will provide the first step in information needed to guide future monitoring and conservation efforts. The results of these call broadcast trials are informing the next steps of our large-scale ARU survey of 60 Ohio wetlands. We will conduct simultaneous point count surveys and ARU-based surveys in 60 Ohio wetlands. Detections rates will be compared, and we will develop correction factors allowing us to integrate the two types of data. We will use the integrated data to build statistical models to estimate bird density and/or relative abundance. Next, we will associate bird density/relative abundance with wetland habitat characteristics. We will relate bird density to abiotic and biotic characteristics important to wetland restoration project managers. Finally, we will assess the cost-effectiveness of ARUs with the costs of traditional human observer-based point count surveys. We expect our findings to inform the development of comprehensive monitoring methods for secretive marsh birds. These recommendations, if widely adopted, can significantly enhance the ability to detect long-term population trends and provide valuable data for conservation planning. Integrating ARU data with traditional methods could lead to more accurate and robust population estimates, improving our understanding of secretive marsh bird species and also guiding wetland management actions.

This project is supported by the Winous Point Marsh Conservancy Legacy Endowment Fund and Winous Point Marsh staff assist with all field project objectives. This project is also supported by the David R. Luukkonen Waterfowl and Wetlands Graduate Student Fellowship.

Modelling Biotic and Environmental Drivers of Seasonal West Nile Virus Transmission

Investigators: Dr. Megan Meuti, Dr. Laura Pomeroy, Dr. Jacqueline Nolting and Lauren Smith, Ohio State University; and Brendan Shirkey, Gabi Lindsey, and Anne Mauro, Winous Point Marsh Conservancy

Collaborators: Erie County Metroparks, Ohio Department of Natural Resources, Ottawa National Wildlife Refuge, Metroparks Toledo, and Franklin County Metroparks

Schedule: 2024 – 2027

Introduction: West Nile Virus (hereafter WNV) is a mosquito-borne illness that causes a wide variety of symptoms in mammals, reptiles, amphibians and birds. Furthermore, WNV is a human health concern with an estimated 59,000 cases and 3,000 fatalities since 1999. Researchers believe the primary mechanism for spread of WNV is wild birds that once infected with WNV can then transmit the virus to any mosquitoes that feed on them. Those mosquitoes can then spread the virus to other birds and other animals. It is generally believed that most mammal hosts, including humans, are dead end hosts that do not play a large role in spreading the virus. Although hundreds or even thousands of species of wild birds have been known to carry WNV, its effects vary dramatically across species. For example, many corvids, especially American crows, have extremely high mortality rates, whereas other species, such as mourning doves, are mostly asymptomatic.

Figure 1. Bird species captured for West Nile Virus testing thus far in 2024. From left to right: American tree sparrow, eastern towhee, fox sparrow, northern cardinal, red-bellied woodpecker, red-winged blackbird, white-breasted nuthatch, white-throated sparrow. All photos provided by G. Lindsey.

Throughout the U.S. and worldwide, there are patterns in WNV transmission with peaks occurring in mid-to-late summer. WNV seasonality is shaped by three factors: temperature, bird movement, and mosquito feeding preferences. WNV also has a higher prevalence in urban areas

than rural areas because, likely due to the urban heat island effect, mosquitoes can bite both earlier in the spring and later in the fall. However, most of these factors only operate within a single season, and it is unknown how WNV reinitiates each spring. Because mosquitoes enter diapause, a state similar to hibernation in mammals, mosquitoes previously infected with WNV may begin transmission again in the spring when temperatures become warmer. Understanding what is driving seasonal and spatial differences in WNV transmission and how cycles of WNV transmission begin each year is important to predict WNV transmission across space and time and to implement control efforts most effectively.

Summary: Beginning in August 2024, we began testing bird capture methods and blood draws at Winous Point Marsh. In November, trapping efforts began to increase at sites across northern and central Ohio. In March 2025, our goal is to begin trapping at 16 locations on a bi-weekly basis (Table 1). We are targeting songbirds that are common in both rural and urban environments, many of which have been found to carry WNV in previous studies (Figure 1, Table 2). Once captured, birds are banded, weighed and measured, swabbed for Highly Pathogenic Avian Influenza (HPAI), and blood is drawn from the brachial vein under the wing (Figure 2). These blood samples are then transported to the Bowman/Nolting Lab at Ohio State University for both HPAI and WNV PCR and ELISA testing.

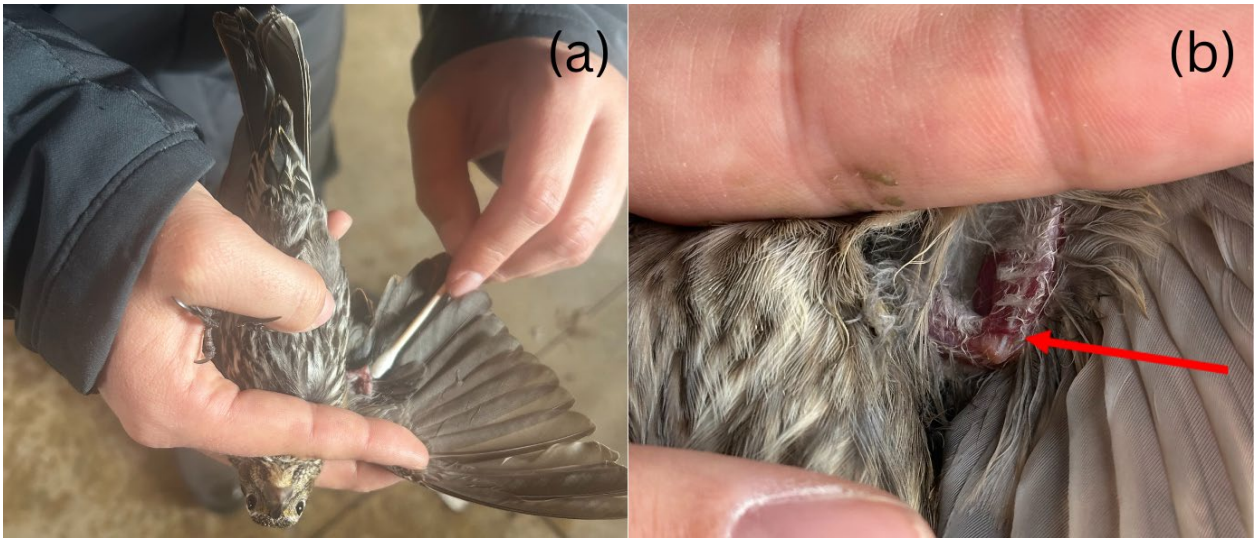

Figure 2. Collecting blood from a female red-winged blackbird (a) from the brachial vein (b) captured at WPMC in January of 2025.

In addition to bird trapping, we are also sampling species of *Culex* mosquitoes (Figure 3) at all 16 sites where we are trapping birds. We are using gravid traps (Figure 4), which attract female mosquitoes by means of an oviposition medium (water fermented with grass clippings) contained in a pan below the trap. The trap operates by creating an upward current of air from a battery-operated fan above the pan, so that the mosquitoes are blown into the mesh bag when coming to the oviposition medium. In addition to the gravid traps, we are scouting large culverts across the

state to aspirate mosquitoes in diapause (Figure 4). Mosquitoes are then transported to the Meuti Lab at Ohio State University where they are identified to species, body condition is recorded (i.e., if in diapause, gravid, or has recently had a blood meal), and they are tested for WNV.

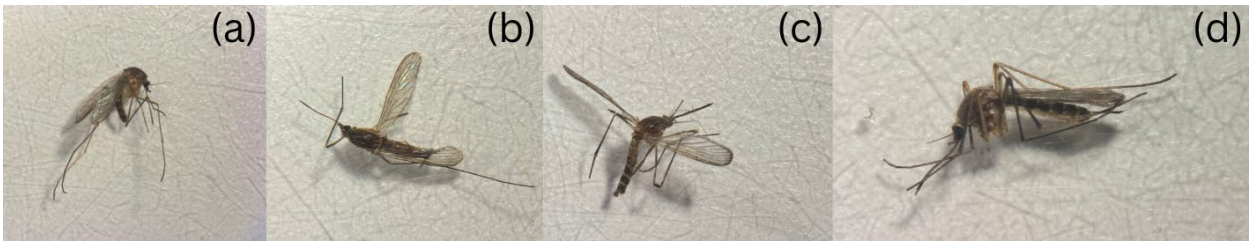

Figure 3. Four species of Culex mosquitoes; C. pipiens (a), C. restuans (b), C. salinarius (c), C. erraticus (d). All mosquitoes were captured in gravid Traps. Identification and photos provided by A. Grimenstein.

Figure 4. A gravid trap (Castalia Quarry in November 2024) for collecting mosquitoes. (left). WPMC technician Holly Erickson manually aspirating mosquitoes in a culvert near Columbus, OH in December 2024. Photos provided by A. Grimenstein.

This project is funded by the National Institute of Health. Winous Point Marsh CoZnservancy staff trap and collect avian blood samples from wild birds and collect mosquitoes for testing.

Table 1. Owner, county, and name of each location where we are trapping birds and mosquitoes.

Site	County	Owner
Winous Point Marsh Conservancy	Ottawa	Winous Point Marsh Conservancy
East Harbor State Park	Ottawa	Ohio Department of Natural Resources
Ottawa National Wildlife Refuge	Ottawa	U.S. Fish and Wildlife Service
Castalia Quarry	Erie	Erie County Metroparks
Eagle Point Metropark	Erie	Erie County Metroparks
Pearson Metropark	Lucas	Metroparks Toledo
Swan Creek Metropark	Lucas	Metroparks Toledo
Fallen Timbers Battlefield	Lucas	Metroparks Toledo/National Park Service
Glacier Ridge Metro Park	Union	Columbus and Franklin County Metro Parks
Batelle-Darby Creek Metro Park	Franklin	Columbus and Franklin County Metro Parks
Blacklick Woods Metro Park	Franklin	Columbus and Franklin County Metro Parks
Prairie Oaks Metro Park	Madison	Columbus and Franklin County Metro Parks
Olentangy River Wetland Research Park	Franklin	Ohio State University
Scioto Audubon Metro Park	Franklin	Columbus and Franklin County Metro Parks
Pickerington Ponds Metro Park	Franklin	Columbus and Franklin County Metro Parks
Jeffrey Park/Wolfe Park	Franklin	City of Bexley/Columbus Recreation and Parks Department

Table 2. Target species and number of individuals sampled from 4 September 2024 to 23 January 2025. Table includes target and non-target species sampled to create a representative collection of species present in the areas we are trapping.

Target Species	Samples	Non-Target Species	Samples
American Robin	0	American Tree Sparrow	1
Brown-headed Cowbird	2	Eastern Towhee	1
Blue Jay	20	Fox Sparrow	2
Common Grackle	2	House Finch	4
European Starling	0	Red-bellied Woodpecker	3
Gray Catbird	0	White-breasted Nuthatch	1
House Sparrow	3	White-throated Sparrow	8
Mourning Dove	10		
Northern Cardinal	20		
Red-winged Blackbird	15		
Song Sparrow	4		
Swainson’s Thrush	0		
Wood Thrush	0		
TOTALS	**76**		**20**

Monitoring Bird Use of Wetlands Restored by Ohio's H2Ohio Statewide Water Quality Initiative

Collaborators: Dr. Nate Stott, Dr. Robert Gates, Ohio State University; Brendan Shirkey, Winous Point Marsh Conservancy; Stephanie Belke, Dr. Sarah Saunders and Dr. Nathan Michael, Audubon Society Great Lakes; Dr. Laura Kearns, Ohio Division of Wildlife; Rachel Mansfield, Dr. Volker Bahn, Wright State University; and Matt Shumar, Ohio Bird Conservation Initiative

Schedule: 2024 – 2028

Introduction: After the Toledo drinking water crisis in 2014, substantial effort and monetary investments have been made to clean Lake Erie and its tributaries. H2Ohio is Ohio Governor Mike DeWine's statewide water quality initiative designed to address complex issues impacting Ohio's waters. Launched in 2019, H2Ohio uses a comprehensive approach guided by science and data to reduce algal blooms, stop pollution, and improve access to clean drinking water by supporting best farming practices, road salt runoff reduction, litter cleanup, dam removal, land conservation, and water infrastructure revitalization. Prior to H2Ohio, most wetland restorations in the state were designed to improve habitat for wildlife with little direct intention to reduce nutrient loadings. Therefore, little is known about the benefits that H2Ohio wetland restorations may serve to wildlife, or what trade-offs might occur between wildlife use and nutrient retention. The aim of this study is to assess wetland bird use of H2Ohio wetlands, compare bird use of H2Ohio wetland restorations to non-H2Ohio wetland restorations, and identify functional differences in bird use and nutrient retention through collaboration with the Lake Erie Aquatic Research Network (LEARN) wetland monitoring program.

Summary: In 2024, we conducted pilot secretive marsh bird call play back and visual marsh bird surveys for a 10-minute survey period. We conducted 248 point counts (137 H2Ohio, 111 non-H2Ohio) across 28 wetland projects (16 H2Ohio, 12 non-H2Ohio) in northwestern Ohio during May-July 2024. Sampling point locations were strategically placed to maximize the number of points in the wetland, while not being within 300m of another sample point to minimize potential of duplicating detections. Survey windows start on May 1, and continue for 20 days for each window, while ensuring at least 10 days has passed since monitoring the same wetland. In the first survey window, 75 surveys were conducted, 81 in the second, and 82 in the third survey window. The number of observers conducting the surveys varied from 1 to 3 to assess the need to use additional staff to more accurately survey the wetland bird communities. Eighty-eight of these surveys were conducted with one observer, 100 were conducted with two, and 52 were conducted with three observers primarily during training with an experienced observer quality checking the surveys.

Similar rates of detection were observed across the H2Ohio and non-H2Ohio projects across multiple different taxa. The only times that non-H2Ohio projects had a large difference between the two groups was for marsh wrens (MAWR) and swamp sparrows (SWSP, Figure 1). These species were the most abundant, overall, as well as a few very patchy instances where numbers were >100 at a single point. There was substantial overlap in bird communities between H2Ohio and non-H2Ohio wetland restoration projects (Figure 2). As expected, more generalist species like mallard, wood duck, and Canada goose were detected in most locations and thus are ordinated centrally in Figure 2, whereas rare species such as black-necked stilt and snowy egrets where detections may have only occurred at one location, are ordinated at the periphery.

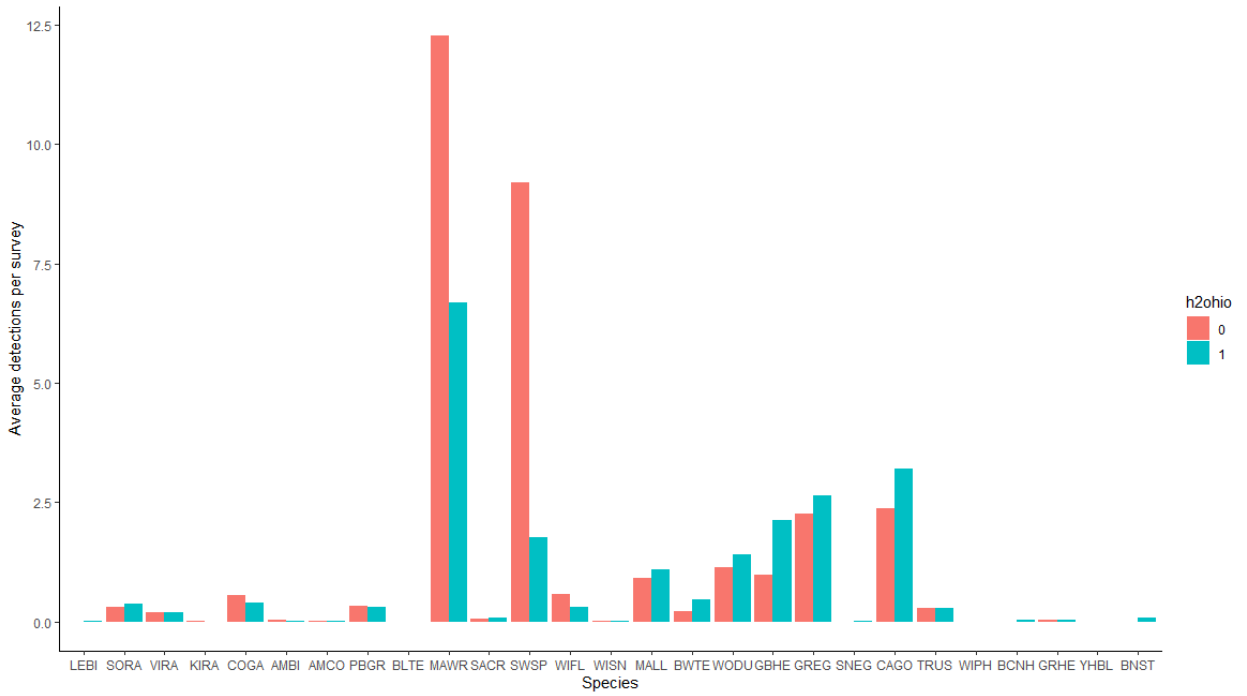

Figure 1. The average number of detections per survey detected during our pilot season. H2Ohio projects are denoted in teal and non-H2Ohio in red.

After the secretive marsh bird survey window (July 2024), we conducted pilot habitat assessment surveys which included measuring rank-ordered vegetation abundances, water depth, water primary productivity, conductivity, and a measure of submergent vegetation density. The vegetation non-metric multidimensional scaling plot demonstrated a more diverse vegetation community among H2Ohio wetland restorations compared to non-H2Ohio wetland restorations (Figure 3). There was still a substantial overlap between the two restoration program wetlands, however. H2Ohio projects range from coastal marshes (positive on axis 1) to inland wetlands that were dominated by wet prairie species (negative axis 1) and thus show a much larger diversity of habitat types as opposed to the wildlife driven restoration programs which tended to be less diverse.

In addition to providing valuable information to guide regional conservation planning efforts, the H2Ohio wetland bird monitoring program provides funding for the Terrestrial Wildlife Ecology Laboratory Post-Doc Dr. Nate Stott who is stationed at Winous Point Marsh Conservancy (WPMC). Four WPMC seasonal staff will be hired each year to educate and provide valuable in field experience to early career and student professionals for the next 3 years (Figure 4) as well as providing personnel to assist with Rachel Mansfield's project, "Acoustic Monitoring for Wetland Birds in the Great Lakes Region" (see page 18).

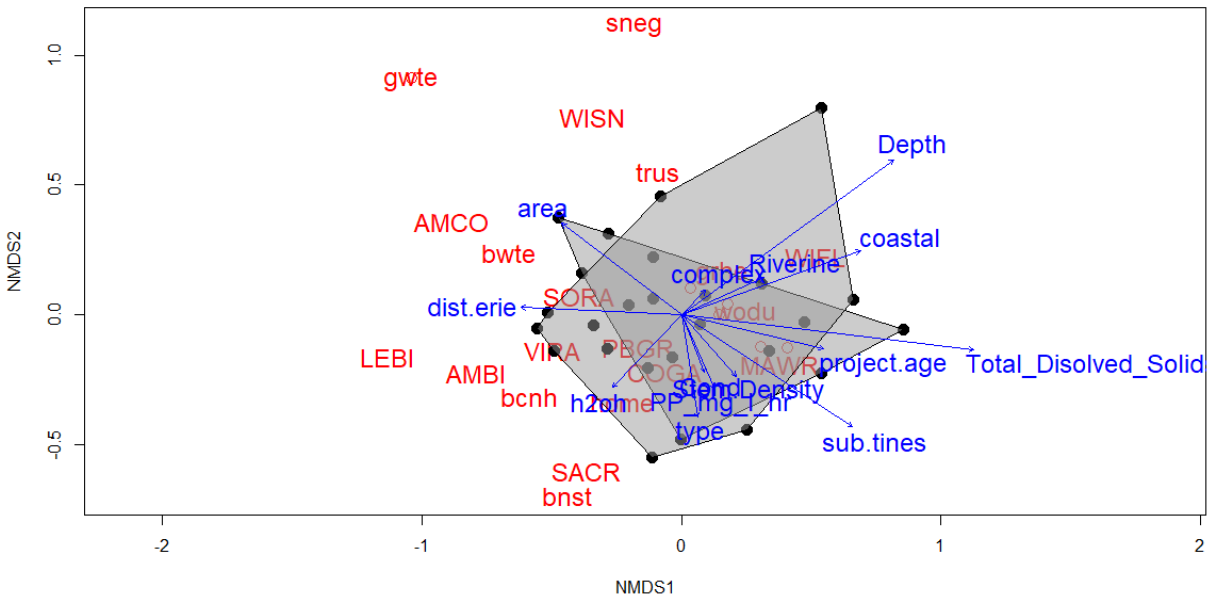

Figure 2. Non-metric multidimensional scales ordination of bird detection across the environmental predictors. Vectors indicate predicting environmental variables, red lettering indicate four letter bird species codes, and hulls indicate H2Ohio vs non-H2Ohio restoration projects. Environmental variables include dist.erie (distance to Lake Erie),complex (binary variable if the wetland is adjacent to a larger complex of wetland), riverine (whether the wetland is connected to a river), coastal (if the wetland can be influenced by Lake Erie water level), Area of wetland, stem density (emergent vegetation density), type (hydrologic connectivity categorical variable), sub tines (measure of submergent vegetation density), PP_mg_l_hr (measure of water primary productivity), and depth (average water depth).

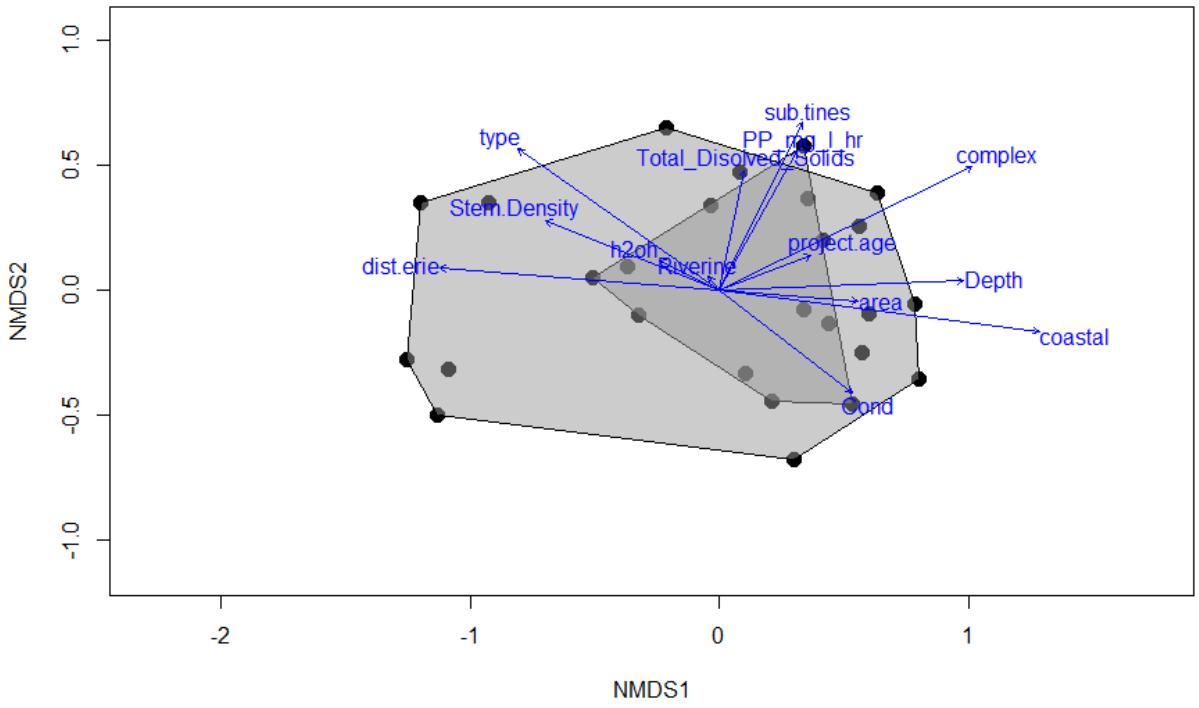

Figure 3. Non-metric multi-dimensional scaling plot comparing vegetation species composition of H2Ohio (larger hull) and non-H2Ohio (smaller hull) restoration projects. Environmental variables include distance to Lake Erie (dist.erie), complex (binary variable if the wetland is adjacent to a larger complex of wetland), riverine (whether the wetland is connected to a river), coastal (if the wetland can be influence by Lake Erie water level), area of wetland, stem density (emergent vegetation density), depth (average water depth), type (hydrologic connectivity categorical variable), measure of submergent vegetation density (sub tines) and water primary productivity (PP_mg_l_hr).

Figure 4. Undergraduate research technicians Mike Penka and Jamie Stopczynski learning to operate a punt boat while conducting habitat surveys during the 2024 field season.

Winous Point Marsh Conservancy, Ohio State University, and the Ohio Division of Wildlife are co-lead investigators on this project.

Winous Point Marsh Conservancy and Ohio Division of Wildlife Cooperative Waterfowl Banding

Investigators: Nate Stott, Ohio State University; Brendan Shirkey and John Simpson, Winous Point Marsh Conservancy; and Michael Ervin, Ohio Division of Wildlife

Collaborators: Black Duck Joint Venture, Mark Shieldcastle, Black Swamp Bird Observatory; and Tim Goetz, Lake Erie Marsh Association

Schedule: Long-term

Introduction: Placing a metal leg band on a bird is one of the oldest and simplest methods of tracking, and this simple technique is invaluable to modern waterfowl management. Waterfowl banding has been at the core of waterfowl science and research for many decades providing researchers with a a wealth of information on the movements and survival of ducks and geese. This information is used to regulate the harvest of waterfowl and contributes to maintaining healthy populations of ducks and geese into the future for the enjoyment of hunters and waterfowl viewing enthusiasts alike.

Figure 1. WPMC and ODW staff assisting with mallard and black duck banding (left), and WPMC staff assisting ODW staff with satellite transmitter attachment on a female black duck at Blendon Woods Metro Park, in Columbus, OH in January 2025.

Winous Point Marsh Conservancy (WPMC) has assisted the Ohio Division of Wildlife (ODW) with winter black duck banding objectives since 2010 and pre-season (summer) banding of mallards and wood ducks since 2011. This partnership has grown into a formal cooperative

agreement in which WPMC staff aims to band at least 50 black ducks each winter and 400 mallards and 150 adult male wood ducks each summer. Furthermore, this cooperative banding effort offers WPMC and ODW staff, especially field technicians, the opportunity to colloborate and network at various wetland management areas across the state, and has supported a number of WPMC sponsored graduate research projects in recent years.

Summary: The Winous Point Marsh Conservancy surpassed 11,000 total banded ducks and added 2 additional species (blue-winged and green-winged teal) to our banding list in 2024. We banded a total of 1,194 ducks this year, our second highest total ever (Table 1). As part of our winter banding program, WPMC was able to take advantage of a third consecutive mild winter and marked 61 hen American black ducks with satellite transmitters for Ilsa Greibel's Ph.D. work investigating breeding productivity and movements of the species (see page 12). These black ducks provided a wealth of information for the project and furthered WPMC's long running support of research on an iconic species of the southwest Lake Erie marsh region.

Banding Note: In 2015 Winous Point Marsh Conservancy banded a total of 35 canvasback ducks (Figure 2). On January 29, 2025, a hunter harvested and reported one of those canvasbacks during a hunt on the Ohio River not far upstream from it's confluence with the Mississippi River. This duck was banded by us on March 6, 2015 meaning it was at least 11 years old at harvest!

Figure 2. Good friend and mentor of WPMC, Tom Kashmer, banding a canvasback, 2015.

Table 1. Total number of waterfowl banded by species and year at WPMC from 2010 to 2024.

Year	Mallard	Wood Duck	Black Duck	Redhead	Gadwall	Canvasback	Ring Neck	Scaup	Shoveler	Pintail	Widgeon	H. Merganser	G.W. Teal	B.W. Teal	Total
2010	3	0	41	0	0	0	0	0	0	0	0	0	0	0	44
2011	186	39	42	0	0	0	0	0	0	0	0	0	0	0	267
2012	49	143	125	0	0	0	0	0	0	0	0	0	0	0	317
2013	237	140	51	123	0	1	0	10	9	0	0	0	0	0	571
2014	181	164	23	7	341	5	2	5	1	7	6	0	0	0	742
2015	582	232	9	126	0	35	32	13	0	0	0	0	0	0	1,029
2016	679	307	127	80	10	0	2	0	0	1	0	0	0	0	1,206
2017	575	266	84	148	0	13	0	11	0	0	0	0	0	0	1,097
2018	71	150	169	0	0	0	0	0	0	0	0	0	0	0	390
2019	440	67	64	143	0	0	0	2	0	0	0	0	0	0	716
2020	306	245	86	0	0	0	0	0	0	0	0	2	0	0	639
2021	304	246	110	0	0	0	7	0	0	0	0	0	0	0	667
2022	784	498	201	8	0	0	0	0	0	0	0	0	0	0	1,491
2023	244	381	194	0	0	0	0	0	0	0	0	0	0	0	819
2024	638	349	203	0	0	0	0	0	0	0	0	0	1	3	1,194
Totals	**5,279**	**3,227**	**1,529**	**635**	**351**	**54**	**43**	**41**	**10**	**8**	**6**	**2**	**1**	**3**	**11,189**

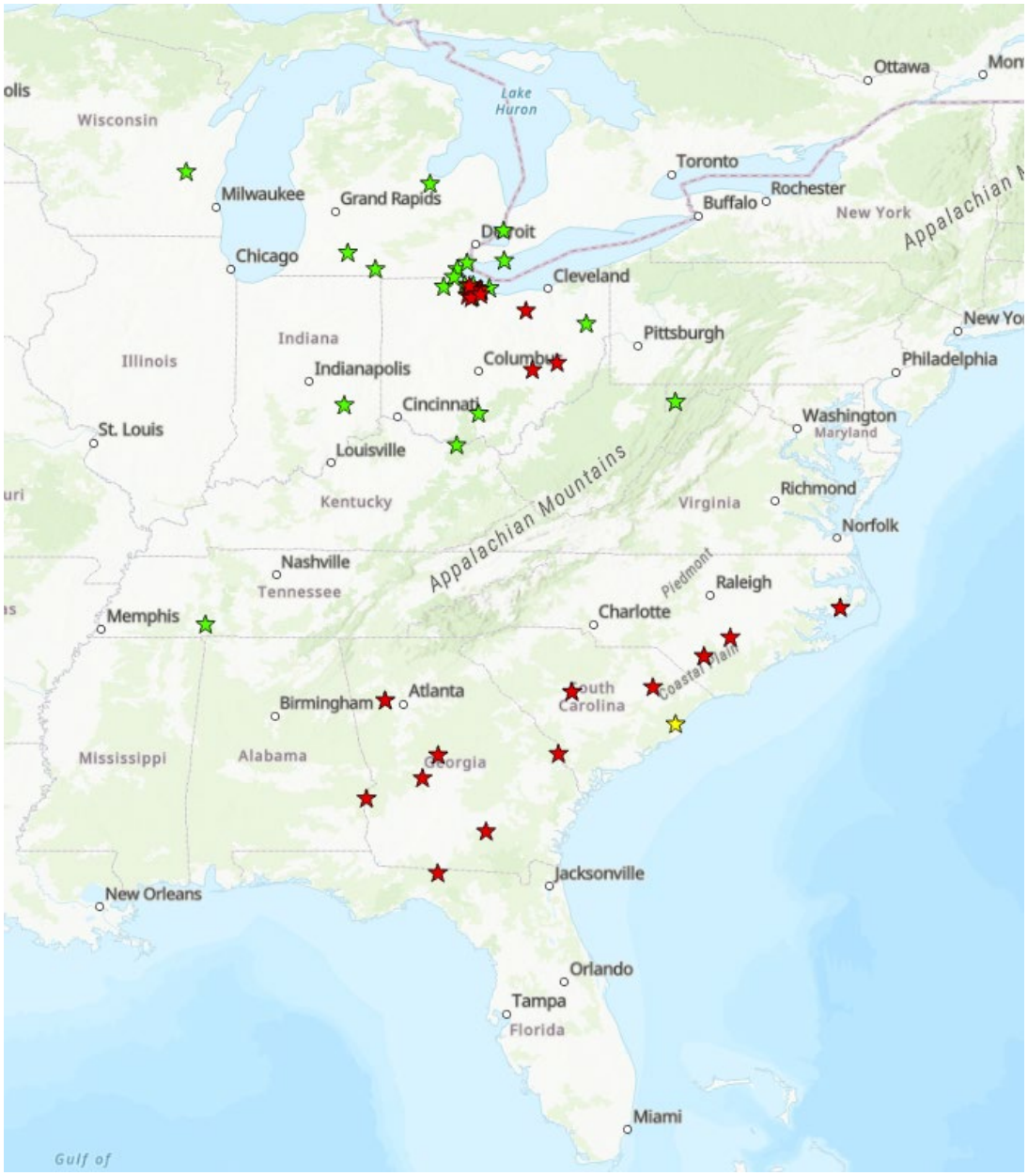

Figure 3. Map showing the recovery locations of ducks banded by WPMC staff in summer of 2024 and recovered during the 2024 hunting season. Mallards are shown in green, wood ducks in red, and green-winged teal in yellow. It is interesting that many summer-banded mallards were recovered northwards, meaning they moved northwards in late summer or fall.

Winous Point Marsh Conservancy supports this project through a cooperative agreement with the Ohio Division of Wildlife whereby WPMC supplies field staff, time, and materials to band waterfowl and analyze data. Project funding is also sourced from the Black Duck Joint Venture. We thank the many volunteers that assist us with our banding operations each year.

Winous Point Marsh Conservancy and Ohio Division of Wildlife Cooperative Common Tern Monitoring

Collaborators: Winous Point Marsh Conservancy, Ohio Division of Wildlife, USDA Wildlife Services, and Toledo Metroparks

Schedule: Long-term

Introduction: Common terns (*Sterna hirundo)* have been listed as state endangered in Ohio since 1974 and are state endangered or threatened in many of the states and provinces surrounding the Great Lakes. Common terns are still at risk of extirpation in Ohio due to loss of their natural beach and island nesting habitat along the shores of Lake Erie and predation. To combat potential extirpation, the Ohio Division of Wildlife started deploying artificial nesting platforms in the 1990s. The project has grown into an excellent example of conservation collaboration as Toledo Metroparks, USDA Wildlife Services, Winous Point Marsh Conservancy (WPMC), and Ohio Division of Wildlife staff all work together to ensure breeding common terns are present in Ohio.

Figure 1. Newly-hatched common tern chick in nest, 2024.

Summary: Ohio's two common tern colonies were once again located at Howard Marsh Metropark (Lucas Co.) and WPMC's Metzger property (Sandusky Co.). In April 2024, Toledo Metroparks staff launched 5 platforms at Howard Marsh and WPMC staff launched 6 platforms at the Metzger property. Similar to 4 of the last 5 years, Howard Marsh had significantly more nesting adults and produced more than three times as many chicks as the WPMC colony (Table 1, Figure 3).

The 2024 breeding season was one of the most productive in the last 5 years for Ohio's terns. WPMC staff banded 390 common tern chicks during the summer with 274 surviving until fledging for a fledgling survival rate of 70%. This survival rate was significantly higher than what we observed during both the 2022 and 2023 breeding seasons.

In addition to supporting this state endangered species, this monitoring program is an excellent way for WPMC staff to train young professionals in the proper banding and handling of wild birds (Figure 1). Furthermore, this project offers a practical example of the basic field and statistical approaches used to monitor wildlife populations and illustrates the need for data organization and management for students interested in wildlife biology. Overall, Ohio's common tern colonies are a fantastic addition to WPMC's research and education programs.

Figure 2. Three common tern nesting platforms with adult terns circling overhead at the Winous Point Marsh Conservancy colony in June of 2024.

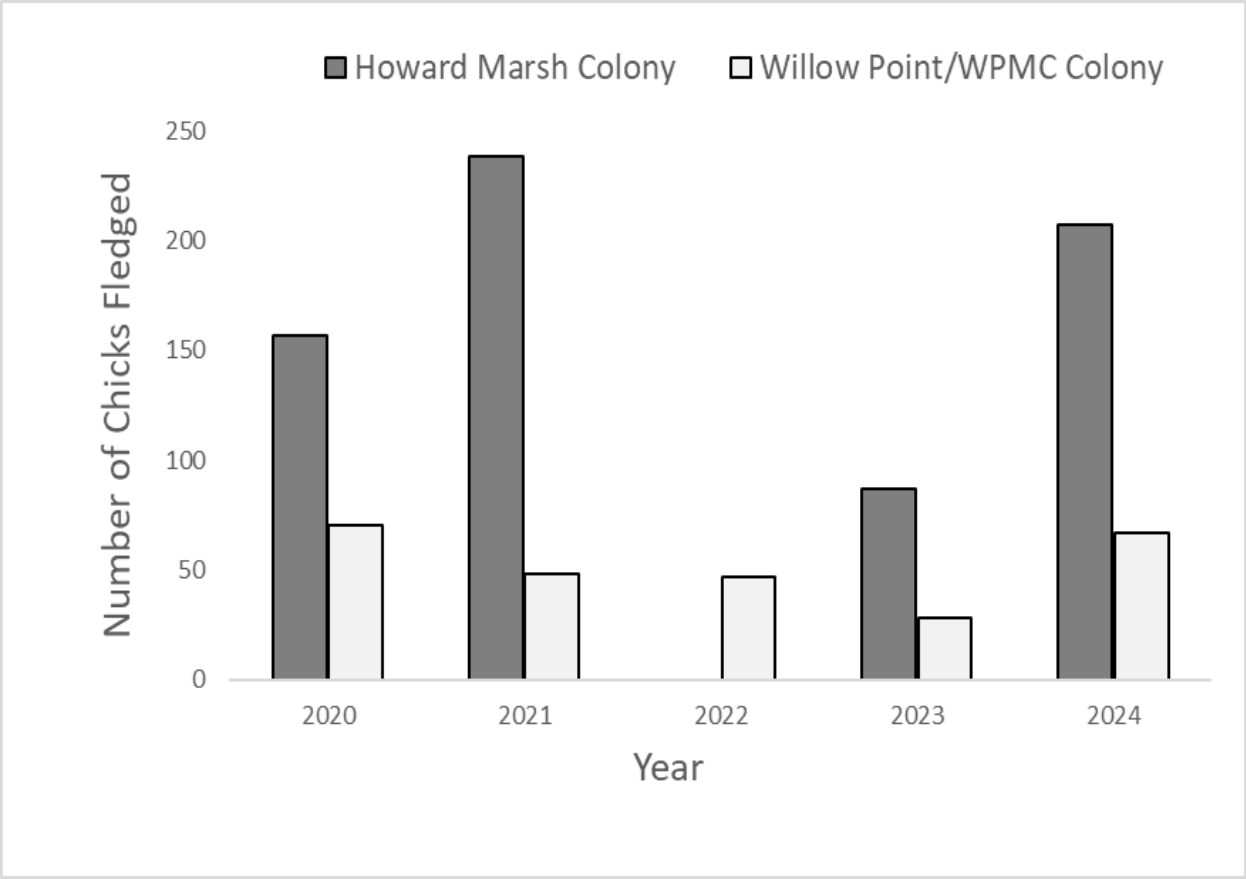

Figure 3. Total number of common tern chicks fledged at Ohio's two common tern colonies from 2020 to 2024.

Table 1. Total number of nests, number of succesful nests, and the success rate by platform at the Howard Marsh and WPMC Metzger colonies during the summer of 2024.

Howard Marsh Nest Success			
Platform ID	Total Nests	Successful Nests	Success Rate
1	37	36	97.30%
2	44	39	88.64%
3	37	37	100.00%
4	37	35	94.59%
5	39	37	94.87%
Total	**194**	**184**	**94.85%**
WPMC Metzger Nest Success			
Platform ID	Total Nests	Successful Nests	Success Rate
1	20	18	90.00%
2	3	2	66.67%
3	13	12	92.31%
4	12	0	0.00%
5	18	16	88.89%
6	27	23	85.19%
Total	**115**	**71**	**61.74%**

Table 2. Number of tern chicks banded, the number of confirmed and presumed mortalities, and the estimated fledging rate of common tern chicks at the Howard Marsh and WPMC Metzger colonies in 2024.

Howard Marsh Fledging Success			
Platform ID	Total Banded	# Fledged	Success Rate
1	45	33	73.33%
2	61	47	77.05%
3	61	40	65.57%
4	61	46	75.41%
5	58	41	70.69%
Total	**286**	**207**	**72.38%**
WPMC Fledging Success			
Platform ID	Total Banded	# Fledged	Success Rate
1	32	23	71.88%
2	4	3	75.00%
3	18	11	61.11%
4	0	0	n/a
5	16	9	56.25%
6	34	21	61.76%
Total	**104**	**67**	**64.42%**

WPMC supports this project through a cooperative agreement with the Ohio Division of Wildlife (ODW) whereby WPMC supplies field staff, time, and materials to monitor chick and nesting success and to host one of the tern colonies. In addition to the ODW, the project is also supported by Toledo Metroparks and USDA Wildlife Services.

Additional Research Supported by WPMC in 2024

Community Purple Martin Monitoring and Citizen Science

The purple martin (*Progne subis*) is a colonial cavity nesting swallow that readily uses artificial nesting cavities during the breeding season. The Winous Point Marsh Conservancy (WPMC) has provided purple martin housing since the 1940s as part of early bird banding programs. In 2018 and 2019, with the help of the Green Creek Wildlife Society and Ohio Division of Wildlife Diversity grant funds, WPMC replaced our unmaintained nesting structures with eight new nesting towers totaling 144 nesting cavities. We use these nesting towers to facilitate volunteerism, support our educational programs, and as a self-sufficient research opportunity for local high school students interested in pursuing wildlife and conservation degrees.

Figure 1. Purple martins at Winous Point Marsh Conservancy nesting structures, 2024.

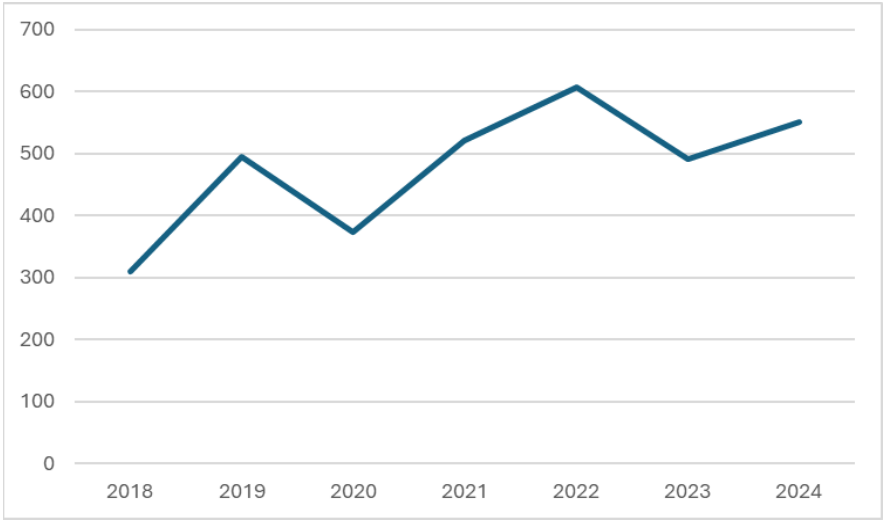

Figure 2. Number of purple martin chicks banded at Winous Point Marsh, 2018 - 2024.

Highly Pathogenic Avian Influenza Surveillance in Wild Birds and Wild Mammals

Investigators: Andrew S. Bowman, Ohio State University; Jacqueline M. Nolting, Ohio State University; and Lauren M. Smith (author), Ohio State University

Summary: The collaboration between the Animal Influenza Ecology and Epidemiology Research Program at the Ohio State University's College of Veterinary Medicine and Winous Point Marsh Conservancy has been ongoing since 1986. Wild ducks have been sampled across the years at Winous Point and can provide up to date data as an influenza A (IAV) reservoir. Low pathogenic avian influenza freely circulates in these populations without the birds appearing sick and is shed in feces. Because influenza A can develop genetic changes quickly, these duck samples have provided valuable data to our society for the genetic characterization of circulating influenza A viruses, which give rise to highly pathogenic avian influenza (HPAI).

Sampling efforts: In 2024, 898 wild birds were sampled by cloacal swab at Winous Point for influenza A surveillance. Of those, 851 samples were ducks, with songbirds being added on as an addition mid-way through the year. PCR screening at Ohio State University resulted in 236 ducks and 1 songbird testing positive for influenza A, which is an estimated 27.7% prevalence of IAV in Winous Point ducks for 2024. These positive samples were then screened for Highly Pathogenic Avian Influenza (HPAI) and returned 6 non-negatives, or 2.5%, which have been submitted to the National Veterinary Service Laboratories for confirmation. With the recent HPAI outbreaks in commercial poultry farms across the U.S. and many in Ohio, these positive samples provide highly valuable viral genome information for the potential spread of the virus to both animals and humans. Since the start of the outbreak on February 8, 2022, 147.25 million birds have been affected. HPAI has been detected in a total of 1,471 flocks in 50 states and Puerto Rico. Of those, 682 flocks have been commercial, and 789 flocks have been backyard. HPAI has also been detected in wild birds in all 50 states and Puerto Rico. Ramifications from the virus can be seen from increased poultry prices to a shortage of eggs at our grocery stores.

An additional project began in 2024 to sample wild mammals at Winous Point Marsh Conservancy (WPMC) to look for HPAI spillover events from birds to mammals. Mammal cases have been documented across the U.S., and we are looking to better define the role that wild mammals sharing habitats with large flocks of wild birds play in the spread of HPAI. Samples collected at WPMC in 2024 were primarily from raccoons (56 blood samples and 107 nasal swabs) that share much of the same habitat as waterfowl at the Winous Point Marshes. Although no nasal swabs tested positive for influenza A, preliminary data on blood samples shows most raccoons have been exposed to HPAI through antibody testing. This new data will further inform and direct research on the spread of HPAI between species.

Figure 1. Katelyn Cook and Sara Patrick, veterinary students at Ohio State University, assist with sampling efforts at Winous Point Marsh Conservancy.

This project is funded through St. Jude Children's Research Hospital's Center of Excellence of Influenza Research and Response and supported through WPMC staff time.

Investigating Duck Antibody Response to Influenza Viruses

Investigators: Nicholas C. Wu, University of Illinois at Urbana-Champaign; Huibin Lv, University of Illinois at Urbana-Champaign; and Jenna J. Guthmiller, University of Colorado Anschutz Medical Campus

Collaborators: Ohio State University, Ohio Division of Wildlife, and Winous Point Marsh Conservancy

Summary: Aquatic birds, including ducks, are the natural reservoir of influenza A viruses, which can jump into humans and cause pandemics. Influenza A viruses are highly variable with multiple types and variants within these types that can cause infection. While influenza A viruses can be incredibly dangerous to humans and other animals, ducks are constantly exposed to different types of influenza A virus without getting sick. The goal of our study is to understand what makes ducks unique by studying how they generate immunity against influenza A viruses. We are focusing our studies on antibodies, which function to recognize and eliminate foreign invaders. Studying antibodies from aquatic birds that control infection can provide valuable insight for developing therapeutics and vaccines against influenza A viruses that pose a pandemic threat. However, our understanding of aquatic bird antibody response to influenza A virus is extremely limited due to both lack of adequate samples and tools to study immunity within ducks.

In 2023 and 2024, Winous Point Marsh Conservancy, University of Illinois at Urbana-Champaign, and University of Colorado Anschutz Medical Campus participated in a collaborative program in collecting blood and colon samples from free-ranging mallard ducks during the hunting season. During November and December 2024, 15 blood samples and 38 colon samples from hunter-harvested mallards were collected. Samples were sent to the University of Colorado Anschutz Medical Campus for processing. In the new year, researchers at the University of Illinois at Urbana-Champaign are analyzing B cells within these samples, with the goal of isolating anti-influenza monoclonal antibodies to study how they are distinct from human antibodies. We expect this collaborative project will lead to discovery of monoclonal duck antibodies with broad virus binding capacity. The results will not only provide important insights into the interplay between influenza virus and the immune system of ducks, but also reveal how duck antibodies provide protection.

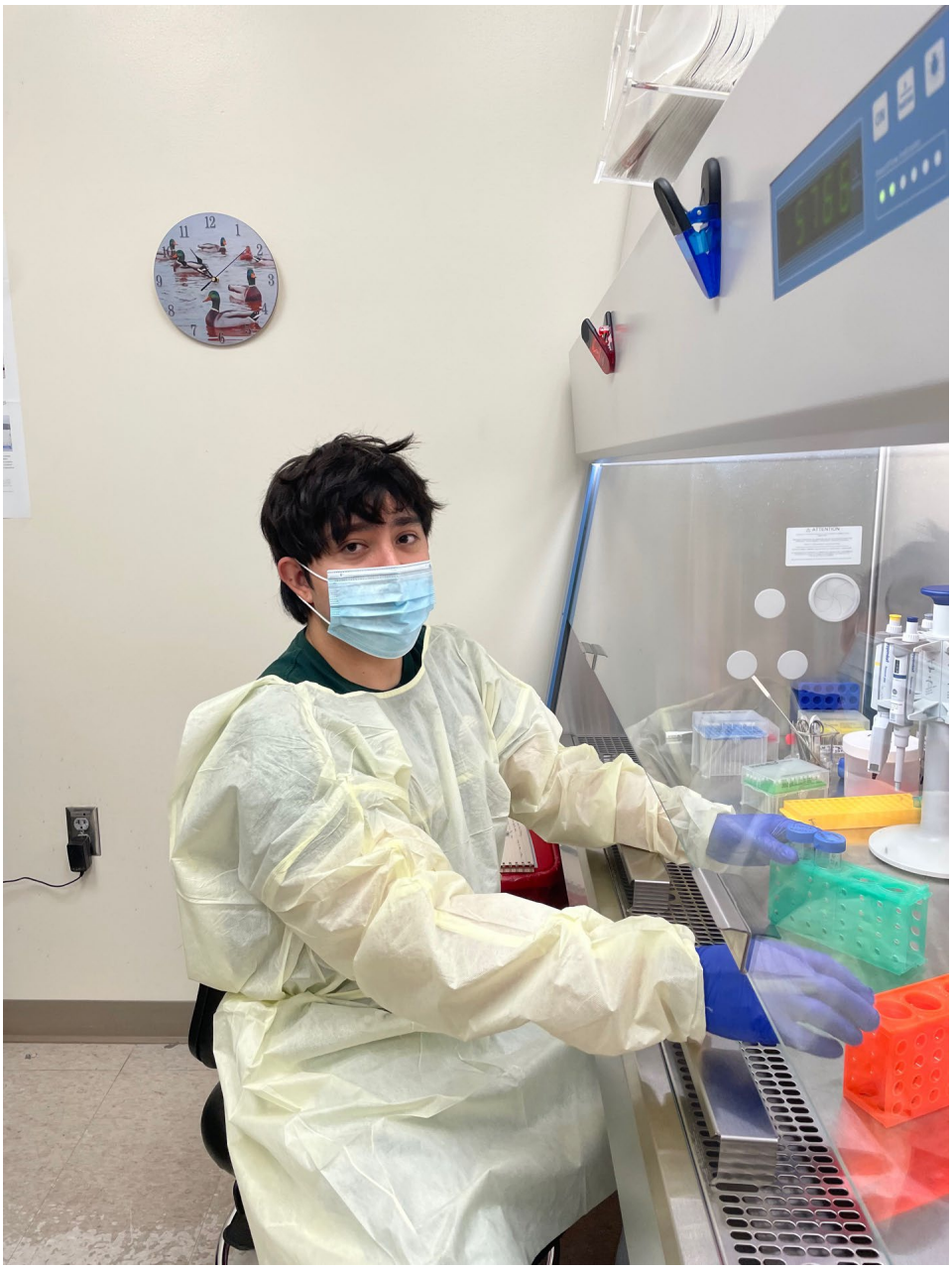

Figure 1. Edgar Ayala processing mallard blood and intestines collected at WPMC during autumn of 2024.

This project is funded by Howard Hughes Medical Institute's Emerging Pathogens Initiative. Winous Point Marsh Conservancy staff collected blood samples from wild ducks.

2024 Internships and Technicians

Tim Maron, Internship 2024: Tim came to us after recently completing his degree in Wildlife Science at SUNY-ESF. Tim gained many experiences here working as our seasonal intern from May through December 2024. Tim has stayed on with WPMC this winter to lead our winter duck banding program. Tim is currently also working on a project proposal to begin an M.Sc. degree at Ohio State University in partnership with WPMC and the Ohio Division of Wildlife.

Jason Spindel, Internship 2024: Jason has volunteered many times for WPMC in the past, so we were excited to see him return this past May through August to work as a summer intern for us. Jason expects to graduate in May 2025 from Allegheny College where he is studying Environmental Science.

Gabi Lindsey, West Nile Project Manager: Gabi comes to us from Ohio University where she studied Environmental Science. Gabi has a wealth of previous bird and lab experience working on various projects in Montana, Michigan, and Ohio as well as previous experience working in conservation education. Gabi will be working full-time for WPMC from 2024 – 2027 and will lead the field operations for our partnership project investigating West Nile Virus in birds and mosquitos (Page 21).

Maddie Weichman and Kaylie Simpson, High School Experience Program: In 2024 we began offering a High School Summer Experience program for graduating seniors moving on to environmental college degrees. Maddie (left) and Kaylie (right) came to us from Port Clinton High School and gained a variety of field experience with our staff and students. Maddie is currently studying Biology at Bowling Green State University and Kaylie is studying Environmental Science at Michigan Tech University.

2024 WPMC Activities and Presentations

January

- Presented at Ohio Wildlife Management Association Conference, Columbus, OH
- Attended US Army Corps Great Lakes Water Levels presentation, Virtual

February

- Presented at Northwest Ohio Natural History and Research Conference, Toledo, OH
- Attended State Wildlife Action Plan Meeting, Toledo, OH
- Attended and Presented at North American Duck Symposium, Portland, OR

March

- Attended Ohio Wildlife Diversity Conference, Columbus, OH
- Attended Master's thesis defense "Migratory Movements of Virginia Rails and Soras in Illinois", virtual
- Attended Ottawa Soil and Water Conservation District Ag Breakfast, Oak Harbor, OH
- Hosted Bowling Green State University ornithology field trip at WPMC
- Hosted Ohio Division of Wildlife Officer Cadets training and tour
- Hosted US Fish and Wildlife Service Partners for Fish and Wildlife training and tour
- Presented at 18th Annual Emiquon Science Symposium, University of Illinois, virtual
- Attended Long Point Waterfowl Annual Science Advisory Committee Meeting, virtual

April

- Attended State Wildlife Action Plan Meeting, Toledo, OH
- Served as Judge for Ohio Academy of Science, State Science Day, virtual
- Participated in statewide Sandhill Crane breeding survey
- Attended Wilderness First Aid training, Huron, OH

May

- Hosted Firelands Audubon Group birdwatching field trip
- Attended Ohio Division of Wildlife Bird Ohio day, Oak Harbor, OH
- Hosted Black Swamp Bird Observatory Biggest Week in Birding Field Trips (3)
- Attended Sandusky Bay Restoration Initiative project update meeting, Sandusky, OH
- Hosted Port Clinton School District 7th Grade Science Field Trips (3)
- Attended Great Lakes Marsh Bird Conservation Network Meetings, virtual
- Hosted Ohio Division of Wildlife "Birding Academy" field training

June

- Attended and presented at Delta Waterfowl Breeding Ecology Course, North Dakota, USA and Manitoba, Canada
- Attended "Great Lakes Mallard Movements, Genetics and Population Dynamics" Ph.D. defense, virtual
- Hosted State Wildlife Action Plan Meeting
- Hosted 15th annual "Day on Wildside" youth education event
- Presented at Ohio Division of Wildlife Council meeting, Columbus, OH
- Interviewed with Channel 11 News, Toledo, OH

August

- Hosted Sandusky River Watershed Coalition annual field day and tour
- Hosted Women in Conservation field trip
- Hosted Green Creek Wildlife Society annual meeting and social

September

- Hosted West Nile Virus Principal Investigators Project Meeting
- Hosted Lake Erie Marsh Association Meeting
- Instructed at Water Career Fair at Heidelberg University, Tiffin, OH
- Instructed at Earth Heart Farms GLOBE day youth education event, Oak Harbor, OH
- Instructed at Ottawa National Wildlife Refuge Youth Waterfowl event, Oak Harbor, OH
- Hosted Cedarville University Wildlife Conservation Class field trip and tour

October

- Presented at The Wildlife Society 31st Annual Conference, Baltimore, MD
- Guest Lecture for Ohio University Ornithology Class, virtual
- Instructed at Earth Heart Farms STEM Field Day, Oak Harbor, OH
- Attended Ohio Wildlife Diversity Partnership Meeting, Toledo, OH
- Presented at Ducks Unlimited Partnership Hunt, Port Clinton, OH
- Hosted and instructed for Delta Waterfowl University Hunt Program

November

- Attended Lake Erie Aquatic Research Network annual meeting, Sandusky, OH
- Attended Master's thesis defense "Comparisons of morphology among mallard genotypes and review of contemporary game-farm mallard release in North America", virtual

December

- Participated in Ottawa Soil and Water Conservation District annual planning meeting

Day on the WildSide: Winous Point Marsh Conservancy and the Ottawa Soil and Water Conservation District have partnered since 2009 to offer this one-day educational camp for middle-school age children. Over 800 kids have participated and been educated by a host of volunteers and partnering organizations.

Figure 1. Participants learning about wetland habitats and wildlife during "Day on the Wildside", 2024.

Figure 2. First-time archers at "Day on the Wildside", 2024.

Figure 3. Participants and group leaders at "Day on the Wildside", 2024.

Figure 4. Investigating frogs, fish, and tadpoles at the "Life in the Marsh" station at "Day on the Wildside", 2024.

Figure 5. Channel catfish caught and released at the "Learn to Fish" station at "Day on the Wildside", 2024.

7th Grade Science Field Trips: Winous Point Marsh Conservancy and the Port Clinton School District began providing science field trips to Winous Point Marsh in 2022. Each year all 7th grade science students spend a morning at the marsh learning about wetland wildlife, wetlands and their role in water quality, and WPMC's student research program.

Figure 6. 7th grade students checking duck boxes during their science field trip, May, 2024.

Figure 7. Classroom exercise on water quality, 7th grade science field trips, May, 2024.

Delta Waterfowl University Hunt Program: Winous Point Marsh Conservancy, Toussaint River Watershed Conservancy, Ohio Division of Wildlife, and Delta Waterfowl have partnered to offer this opportunity since 2022. Each year 10-12 students at Ohio State University participate in classroom instruction, shooting range instruction, and a duck hunt and wild game lunch hosted by WPMC and Toussaint River Watershed Conservancy.

Figure 8. Participants in the Delta Waterfowl University Hunt Program sponsored by WPMC, Toussaint River Watershed Conservancy, Ohio State University, and Ohio Division of Wildlife, October, 2024.

Figure 9. Participants in the Delta Waterfowl University Hunt Program sponsored by WPMC, Toussaint River Watershed Conservancy, Ohio State University, and Ohio Division of Wildlife, October, 2024.

2024 WPMC Publications

Published:

Luukkonen, B. Z., S. R. Winterstein, D. B. Hayes, D. N. Fowler, G. J. Soulliere, J. M. Coluccy, A. A. Shipley, J. Simpson, B. Shirkey, J. M. Winiarski, et al. 2024. Great Lakes mallard population dynamics. *Journal of Wildlife Management* e22702.

Dustin E. Brewer, Thomas M. Gehring, Brendan T. Shirkey, and John W. Simpson. King Rail (*Rallus elegans*) Morphometric, Nesting, Mortality, and Movement Notes from a Northern Study Area. *Northeastern Naturalist* 31(2), 259-270.

Brendan T. Shirkey, John W. Simpson, James M. Hansen, Nicole M. Hengst, Robert J. Gates, and Chris M. Tonra. Vocalization Behavior of Resident and Migrant Virginia Rails (*Rallus limicola*) and Soras (*Porzana carolina*) in Northwestern Ohio, U.S.A. *Waterbirds* 46(2-4), 277-288.

Luukkonen, B.L. 2024. Movement and Population Dynamics of Great Lakes Mallards. *Ph.D. Dissertation*, Michigan State University. East Lansing, MI, USA

Collins, H. 2024. Comparisons of morphology among mallard genotypes and review of contemporary game-farm mallard release in North America. *M.Sc. Thesis*, State University of New York – College of Environmental Science and Forestry. Syracuse, NY, USA

In Review:

Assessing Consequences of Anthropogenic Hybridization: Great Lakes Mallard Movement and Resource Selection. Luukkonen, B. Z. et. al.