Winous Point Marsh Conservancy

2020 Research and Activities Report

February 2021

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On the cover: Red-Winged Blackbird perched on Swamp Rose Mallow, spring 2020; Credit: Charlie Simpson

Winous Point Marsh Conservancy

Vision:

The vision of the Winous Point Marsh Conservancy is to protect, restore and enhance wetland habitat and wildlife in the southwest Lake Erie region by serving as advocate, practitioner, and educator.

Mission:

The WPMC's area of focus is the wetlands and tributaries of southwestern Lake Erie in pursuit of the following goals:

1) *To assure the protection and stewardship of the Winous Point Marsh Conservancy wetlands and property.*

2) *To aid and facilitate wetland conservation and restoration efforts in the greater southwest Lake Erie region.*

3) *To support and develop research and educational opportunities in wetland and wildlife ecology.*

Winous Point Marsh Conservancy

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Executive Summary

Staff: John Simpson, Executive Director
Brendan Shirkey, Research Coordinator
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This past year provided a new challenge for the Winous Point Marsh Conservancy research program, with many of our planned partnership projects cancelled and suspended for the year. Whereas in 2019 we housed a record number of students and projects, in 2020 we housed only 4 students and interns and only a handful of student projects. It was a nice change, however, to focus on in-house projects and to also invest additional time into a number of partnership opportunities we might otherwise not have had time to delve into. As you will see in reading through the report, we aided some great new partnership projects on trumpeter swans and heavy-metal accumulation in wetland wildlife. We also invested additional time and resources into our partnership projects with the Ohio Division of Wildlife banding waterfowl and common terns. Our in-house rail projects are now down to one with the completion of Michelle Kane (CMU) and Nicole Hengst's (OSU) theses, leaving Dustin Brewer (CMU) to complete work on king rails. Finally, our in-house wood duck, purple martin, and tree swallow nesting structures received extra attention from staff and family this year who were all looking for projects to fill time during the spring "quarantine" period.

Winous Point Marsh Conservancy staff members worked hard to communicate the results of the Conservancy's research and to bring our wetlands and waterfowl conservation message to target audiences, though much of our normal travel and teaching was cancelled. We were still able to participate in a number of conferences, seminars, meetings, and workshops, virtual or otherwise. Our staff and students also continued to disseminate our research in peer-reviewed journals and professional publications, publishing 4 peer-reviewed articles or theses in 2020 with another 2 manuscripts and one thesis in preparation for 2021. In addition to our own work, WPMC staff also provided peer-review for another 8 manuscripts submitted for publication by other authors in 2020.

Lastly, in 2020, the Trustees of the Winous Point Marsh Conservancy furthered their commitment to its long-term mission by establishing the Legacy Endowment Program. This program provides a financial vehicle for supporters of the Conservancy to make donations and planned gifts into a perpetual endowment. Annual income from this endowment will support the Conservancy's three main objectives – conservation, education, and research – with a regional focus on coastal Lake Erie and the greater Great Lakes/Upper Midwest. The principal of this Endowment continues to grow thanks to generous contributions and pledges from donors.

The Winous Point Marsh Conservancy has been able to consistently grow, evolve, and develop as a result of the generous support and dedication we receive from our trustees, donors, partners, and neighbors. An organization of our size can only have a significant regional impact on wetland research and conservation by forging a multitude of relationships with other conservation-focused organizations. We genuinely value the support that our partners and contributors bring to this organization and look forward to the many challenges and accomplishments next year and beyond.

Regards,

John Simpson
Executive Director

Winous Point and Ohio Division of Wildlife Cooperative Waterfowl Banding

Investigators: Brendan Shirkey, John Simpson and Jessica Schmit, Winous Point Marsh Conservancy; Nathan Stricker, Ohio Division of Wildlife

Collaborators: Black Duck Joint Venture; Tom Kashmer, Sandusky County Park District; Mark Shieldcastle, Black Swamp Bird Observatory; Bob Gates, The Ohio State University

Schedule: Long-term

Introduction: Since 2010 Winous Point Marsh Conservancy staff has banded over 7,000 ducks. Most of this effort in recent years is accomplished as part of the Ohio Division of Wildlife's (ODW) summer banding program targeting wood ducks (*Aix sponsa*) and mallards (*Anas platyrhynchos*) and winter banding program targeting black ducks (*Anas rubripes*). The program operates under a cooperative agreement with the ODW with established goals of Winous Point Marsh Conservancy staff banding 50 black ducks, 400 mallards, and 150 adult male wood ducks annually. This work helps the ODW meet banding quotas for the US Fish and Wildlife Service and Mississippi Flyway Waterfowl Administrative Council. Data from summer banding efforts was also used by WPMC Conservancy staff in the analyses of two 2020 peer-reviewed publications aimed at improving waterfowl conservation practices (see page 44).

Figure 1. Blue-winged teal (Spatula discors) captured during summer 2020 banding efforts in Slade's Marsh.

Summary: Banding efforts in 2020 resulted in the capture and banding of 4 different duck species including our first hooded mergansers (*Lophodytes cucullatus*). We banded a total of 718 individuals (Table 1) and had a successful year banding our target species, capturing 245 wood ducks and 306 mallards during summer banding (Table 2). We were able to exceed our winter black duck banding goal by banding 82 individuals despite an early shutdown of banding activities with the outbreak of COVID-19. Duck banding is an activity the WPMC takes great pride in as we are able to make a signficant contribution to the ODW's state-wide banding efforts that inform flyway harvest management decisons. Furthermore, it is an excellent opportunity for our summer interns and volunteers to gain first-hand experience identifying, banding, and handling wild birds.

Figure 2. WPMC seasonal employees and studnets Laura Wallace (left), Ben Chrestman (middle), and Nicole Hengst (right) banding wood ducks captured in Slade's Marsh in August, 2020.

Table 1. Total number of banded individuals during the winter (February-March 2020) and summer banding programs (July – August, 2020).

Species	Winter totals	Summer Totals
Black Duck	82	4
Mallard	79	306
Wood Duck	0	245
Hooded Merganser	0	2
Seasonal Total	**161**	**557**

Table 2. Total number of waterfowl banded since 2010 (Grand Total = 7011).

Year	Mallard	Wood Duck	Black Duck	Redhead	Gadwall	Canvasback	Scaup	Ring Neck	Shoveler	Pintail	Widgeon	Hooded Merganser
2010	3	0	41	0	0	0	0	0	0	0	0	0
2011	186	39	42	0	0	0	0	0	0	0	0	0
2012	49	143	125	0	0	0	0	0	0	0	0	0
2013	237	140	51	123	0	1	10	0	9	0	0	0
2014	181	164	23	7	341	5	5	2	1	7	6	0
2015	582	232	9	126	0	35	13	32	0	0	0	0
2016	679	307	127	80	10	0	0	2	0	1	0	0
2017	575	266	84	148	0	13	11	0	0	0	0	0
2018	71	150	169	0	0	0	0	0	0	0	0	0
2019	440	67	64	143	0	0	2	0	0	0	0	0
2020	385	245	86	0	0	0	0	0	0	0	0	2
Totals	**3388**	**1753**	**735**	**627**	**351**	**54**	**41**	**36**	**10**	**8**	**6**	**2**

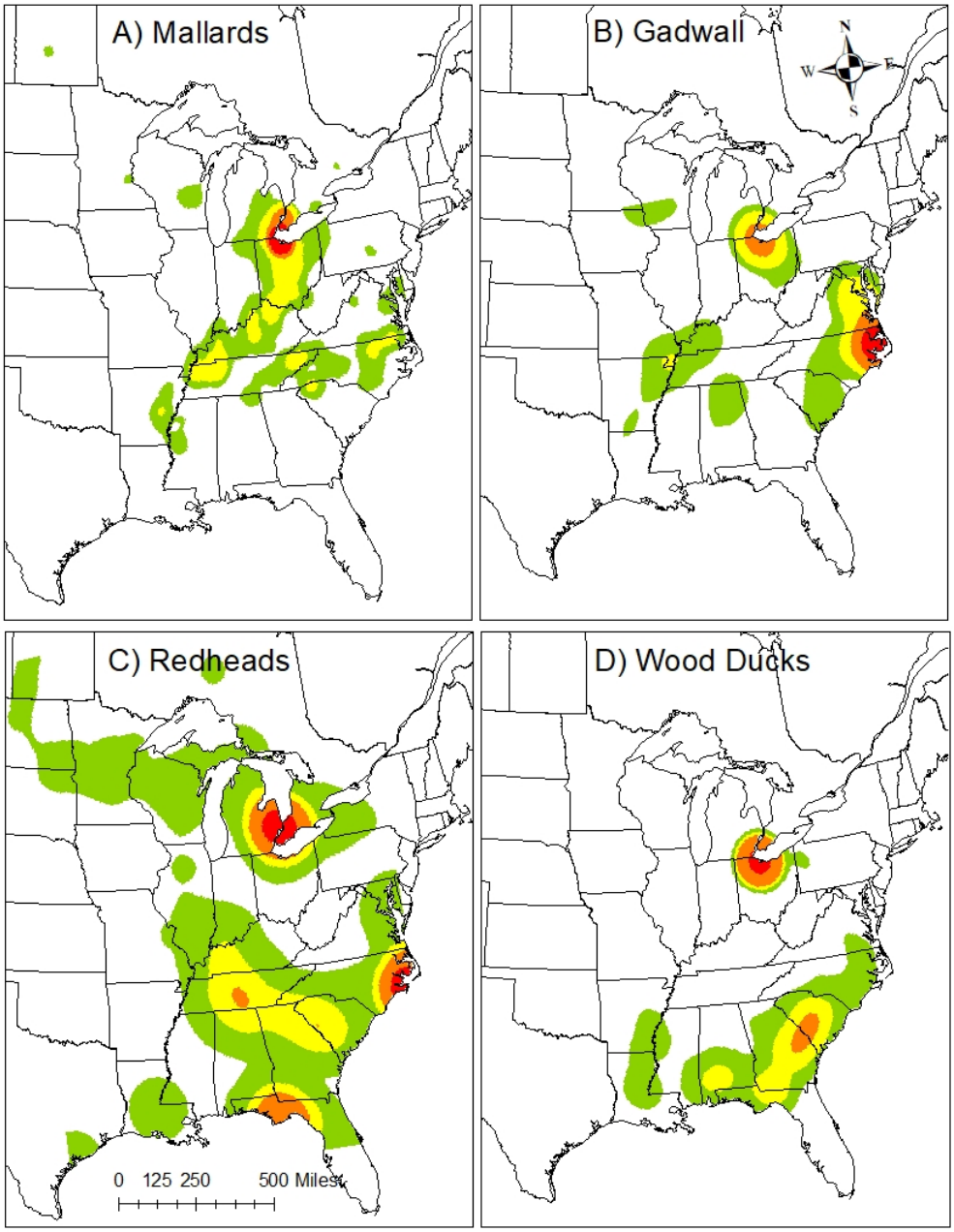

Figure 3. Band recovery distribution for 4 of the most commonly banded species at WPMC from 2013 to 2020. Colors from green to red depict increasingly higher densities of band recoveries. A total of 564 mallard recoveries, 68 gadwall recoveries, 101 redhead recoveries, and 227 wood duck recoveries were used to build these maps.

Winous Point Marsh Conservancy supports this project through a cooperative agreement with the Ohio Division of Wildlife. Funding is also sourced from the Black Duck Joint Venture and Ohio State University. Green Creek Wildlife Society and Black Swamp Bird Observatory provide additional banding staff and resources.

Winous Point Marsh Conservancy Purple Martin Monitoring

Investigators: Lisa Rock and Tom Kashmer, Green Creek Wildlife Society; Mark Shieldcastle, Black Swamp Bird Observatory; Kaylie Simpson, Winous Point Marsh Conservancy

Collaborators: Ohio Division of Wildlife - Wildlife Diversity Program

Schedule: 2017 - 2021

Summary: The purple martin (*Progne subis*) is a colonial cavity nesting swallow that now relies almost solely on artificial nesting cavities. The Winous Point Marsh Conservancy (WPMC) has provided purple martin housing since the 1940's, and there is evidence of colonial farms providing nesting cavities as early as the first half of the 18th century. Purple martin housing traditionally had an ornamental design consisting of a pole with several dozen cavities on the sides. The Conservancy's original houses could not be lowered for cleaning or monitoring and resulted in cavities being overrun by invasive species like European starlings (*Sturnus vulgaris*) and house sparrows (*Passer domesticus*). Many purple martin landlords, including WPMC, have decided to upgrade their nesting structures to improve management practices that discourage invasive species and to contribute to Green Creek Wildlife Society's purple martin research and monitoring program. WPMC used Ohio Wildlife Diversity grant funds in 2018 and 2019 to purchase 8 rigs (144 gourds) to replace our aging structures and start this program.

Figure 1. Adult female purple martin tending to her nest at the Winous Point Marsh in spring of 2020.

Figure 2. Winous Point volunteer Kaylie Simpson lowering nesting gourds for mid-season checks in summer of 2020.

As in years past, the purple martin, tree swallow and bluebird monitoring projects encourage citizen science and are a great way for volunteers to get involved in wildlife conservation. Unfortunately, with the ongoing pandemic volunteer activity was much more limited than in previous years. However, Tom Kashmer and Lisa Rock of the Green Creek Wildlife Society still managed to band 373 purple martins and 100 tree swallows at the Winous Point Marsh. Tom and Lisa banded a total of 4,726 purple martins and 1,832 tree swallows throughout northwest Ohio in 2020, both of which were record highs for the Green Creek Wildlife Society. WPMC is looking forward to continuing support for this project in 2021, and we hope proposed research by

the Green Creek Wildlife Society that was postponed in 2020 will have a chance to get started in 2021.

Figure 3. Volunteers maintaining purple martin nesting rigs at Winous Point Marsh, August 2019.

Winous Point Marsh Conservancy staff continue this research out of self-interest and historical significance. We appreciate the hard work of the graduate students and volunteers who assisted with maintenance and monitoring on this project.

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

Investigators: Brendan Shirkey and Jessica Schmit, Winous Point Marsh Conservancy; Laura Kearns, Ohio Division of Wildlife

Collaborators: USDA Wildlife Services, Pickeral Creek Wildlife Area, Toledo Metroparks

Schedule: Long-term

Introduction: Common terns (*Sterna hirundo)* have been listed as state endangered in Ohio since 1974. Once frequent nesters on the sand and gravel covered islands and shorelines of western Lake Erie, common terns in Ohio are now entirely dependent on artificial nesting platforms for continued reproductive success. The Ohio Division of Wildlife's (ODW) 1990-1995 Strategic Plan established the goal of maintaining common tern populations in Ohio. Artificial nesting platforms consisting of re-purposed pontoon boats covered in gravel were established at several sites in northwest Ohio beginning in 1994.

Figure 1. Newly hatched common tern chick at Howard Marsh in July 2020. Note the rock in the background marking the nest number and location.

Summary: The ODW, Toledo Metroparks, and USDA Wildlife Services staff deployed 7 platforms at Howard Marsh Metropark (Lucas County, OH) and 5 platforms at Willow Point

State Wildlife Area (Sandusky County, OH) in 2020. WPMC research staff monitored the platforms weekly to band chicks and record recapture status beginning in the middle of May and continuing until late August. WPMC banded a total of 360 chicks in the summer of 2020 with an estimated 227 of those surviving to fledging (Table 1). The total number of fledglings was lower than 2018 (340 young) and 2019 (283 young), but still above the long-term average (184 young) goal set forth by the Detroit River – Western Lake Erie Common Tern Management Plan. Despite control efforts by USDA Wildlife Services, great-horned owls continue to be the primary threat to common tern chick survival on the artificial platforms. Further research is needed to fully understand the impacts of a wide variety of factors such as predation, weather, surrounding land cover types, western Lake Erie water quality, human disturbance, and available nesting habitat have on nest success and chick survival at the nesting platforms.

Figure 2. Adult common tern at the Howard Marsh common tern neting platoforms, July 2020.

Table 1. Estimated number of dead or missing chicks, number of surviving chicks, and estimated fledging rates by artifical nesting platform at Willow Point and Howard Marsh during the 2020 season.

Willow Point					
Platform	**# Dead**	**# Missing**	**Est # Fledged**	**Total**	**Fledging Rate**
1	9	2	16	27	59.3%
2	17	0	11	28	39.3%
3	7	0	10	17	58.8%
4	10	3	15	28	53.6%
5	17	0	18	35	51.4%
Total	**60**	**5**	**70**	**135**	**51.9%**
Howard Marsh					
Platform	**# Dead**	**# Missing**	**Est # Fledged**	**Total**	**Fledging Rate**
1	10	0	21	31	67.7%
2	15	0	23	38	60.5%
3	6	1	18	25	72.0%
4	5	0	28	33	84.8%
5	10	0	15	25	60.0%
6	14	1	27	42	64.3%
7	6	0	25	31	80.6%
Total	**66**	**2**	**157**	**225**	**69.8%**

Winous Point supports this project through a cooperative agreement with the Ohio Division of Wildlife whereby WPMC supplies field staff, time, and materials to monitor the tern nests and perform basic upkeep on the artificial nesting platforms.

Population Monitoring, Ecology, and Habitat Relationships of Virginia Rails and Soras in Northwest Ohio

Investigators: Nicole Hengst, Robert J. Gates and Christopher M. Tonra, The Ohio State University; Laura Kearns, Ohio Division of Wildlife; and Brendan Shirkey and John Simpson, Winous Point Marsh Conservancy

Schedule: 2016 - 2020

Introduction: The amount of wetland habitat across North America has declined substantially over the last century and this loss has been associated with declines of many marsh bird species. The goal of this project is to provide empirical data on distribution, abundance, local population densities, and habitat selection of two harvestable marsh bird species, the Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*). Knowledge of population demography, life history phenology, and population-habitat relationships will help address the current population status of these species as well as inform harvest management in Ohio. Knowledge of seasonal movements, home range, and habitat use patterns of Virginia rails and soras will also inform habitat management recommendations for these two species.

Summary: Capture and tracking efforts of Virginia rails and soras occurred at Winous Point Marsh Conservancy (WPMC) during late March through late September in 2016 – 2020. A total of 642 Virginia rails and 216 soras were captured using walk-in funnel traps equipped with audio lures of rail vocalizations that continuously played from dusk to dawn. One Virginia rail captured in 2016 was originally banded in 2014 during previous rail banding at WPMC; however, no other rails were recaptured across years. We deployed frequency-coded VHF radio transmitters (frequency-coded) on 293 Virginia rails and 121 soras and pulse-coded VHF radio transmitters (pulse-coded) on 83 Virginia rails (Figure 1). Rails were tracked in 12 of 21 impounded wetland units across WPMC from the day after capture until the rails departed the area or were found dead.

Figure 1. Virginia rail fitted with a pulse-coded VHF radio transmitter at Winous Point Marsh, Ottawa County, Ohio, USA in 2019.

A phenology of life history events was created for when rails were present in northwest Ohio during 2016 – 2019. We relied primarily on information from movements and behavioral observations of frequency-coded and pulse-coded rails in addition to capture data, field notes, and published literature to delineate the timing and duration of the pre-nesting, nesting, and post-breeding stages. The nesting stage included the entire cycle of nest-building, egg-laying, incubation, hatching, fledging, and fledgling parental care, while the pre-nesting and post-breeding stages were the periods of activity before and after the nesting stage. Nesting data was limited to nine Virginia rail nests found during 2016 – 2019 of which 2 successfully fledged young. Peak activity was observed during early April – late May, mid-May – mid-July, and mid-July – mid-November for pre-nesting, nesting, and post-breeding stages, respectively (Figure 2).

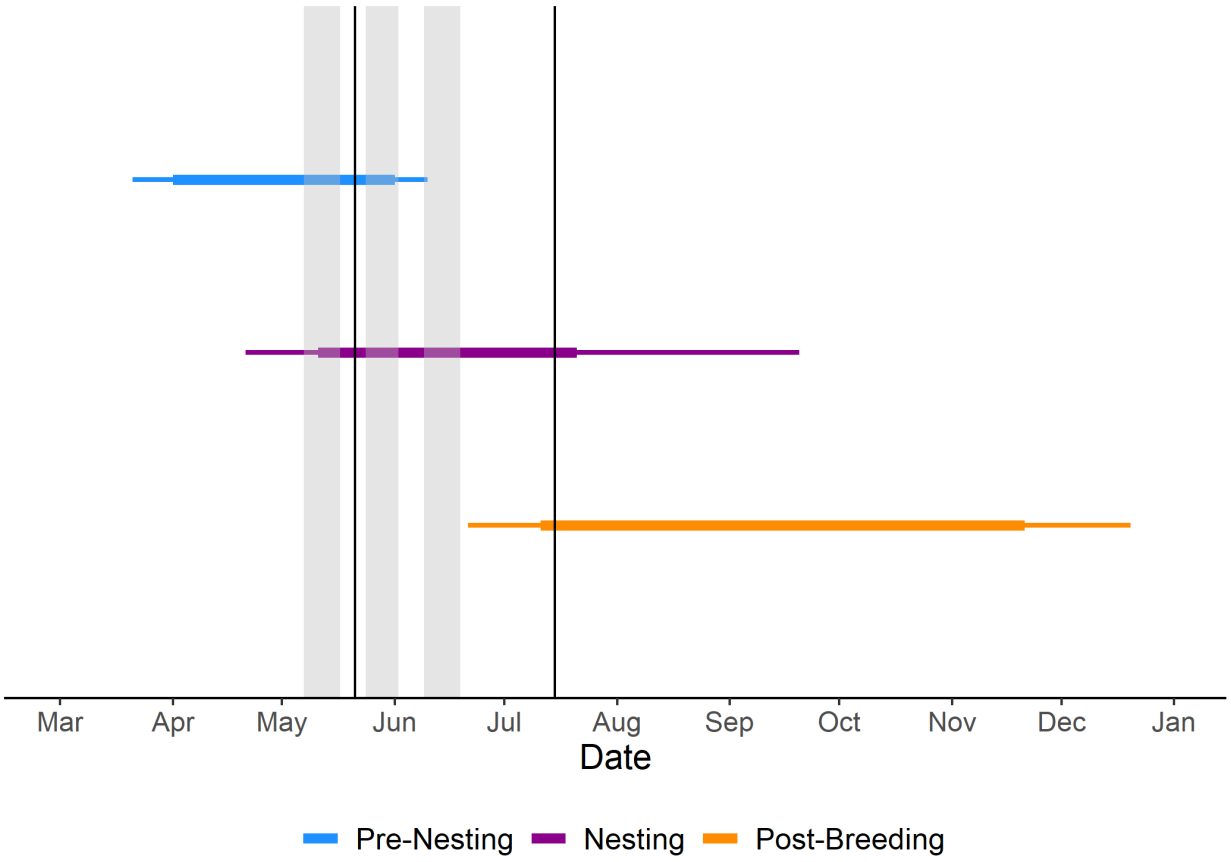

Figure 2. Estimated phenology of Virginia rail and sora pre-nesting, nesting, and post-breeding stages in northwest Ohio, USA during 2016 – 2019. Thick colored lines denote peak activity while thin colored lines are off-peak and stage extremes. Black vertical lines show cut-offs for each stage for analytical purposes, and shaded gray areas represent Ohio Division of Wildlife secretive marsh bird survey windows.

Large numbers of frequency-coded and pulse-coded rails apparently departed WPMC before the post-breeding stage with 74% (n = 282) marked as missing during the pre-nesting stage and 81% (n = 196) during the nesting stage. Ground and aerial searches relocated a limited number of missing frequency-coded and pulse-coded rails in the surrounding area (e.g. Ottawa National Wildlife Refuge and Magee Marsh Wildlife Area). Seventeen of the departed rails were detected again during the pre-nesting and nesting stages with only 5 of those birds remaining at nearby off-site locations through the entire nesting and post-breeding stage. Twenty of the departed rails were only detected again during the post-breeding stage at surrounding wetland complexes (n = 15) or at WPMC (n = 5). The high number of departures from WPMC during the pre-nesting and nesting stages without subsequent detections or with only a brief relocation within the surrounding area imply a majority of rails only used WPMC and the surrounding area as a migratory stopover in spring and summer and not as breeding habitat. Limited anecdotal evidence of nesting rails in the area further supports this idea. The reappearance of frequency-

coded and pulse-coded rails in the post-breeding stage also shows the importance of WPMC in late summer and early fall migration as Virginia rails and soras are known to concentrate in larger wetlands prior to migration due to the continued presence of water and greater food availability in large wetlands.

We deployed pulse-coded VHF radio transmitters during 2018 – 2019 in addition to frequency-coded VHF radio transmitters due to the high number of missing frequency-coded rails during 2016 – 2017. Movements of pulse-coded Virginia rails were tracked using data collected from the Motus Wildlife Tracking System which utilizes automated radio telemetry towers to detect passage of tagged individuals. We monitored an array of existing telemetry towers in the area surrounding WPMC including 11 local towers in northwest Ohio and 2 towers in southeast Michigan and used data collected from towers beyond the western Lake Erie basin for analysis (Figure 3). Rails that were detected by hand-tracking at WPMC were not simultaneously detected by the automated telemetry tower located at WPMC, thus all detections from the array occurred when rails were in flight. Detections of 61 Virginia rails fitted with pulse-coded VHF radio transmitters were observed at automated telemetry towers from lower Ontario to northern Florida (Figure 3). The automated telemetry tower data showed that pulse-coded Virginia rails moved well beyond the western Lake Erie basin during the pre-nesting and nesting stages which confirmed the high departure rates and not a lack of search effort. Additionally, other movement patterns including nocturnal forays and migratory routes and wintering areas within the Atlantic Flyway were detected from the pulse-coded data.

In addition to tracking rail movements, we also conducted habitat assessments with the objective of analyzing movement patterns and habitat selection of Virginia rails and soras in response to changing water levels and vegetation structure and cover. We conducted a total of 512 water surveys and 322 vegetation surveys at known locations of frequency-coded and pulse-coded rails and paired random locations 25 m away weekly during 4 April – 15 August 2018 and 15 April – 28 August 2019. Rails were mostly located in emergent vegetation (78%) while no rail locations were recorded in scrub-shrub or forested areas. The normalized water levels from known Virginia rail locations indicated Virginia rails were largely located at points (i.e. known locations) and surrounding areas (i.e. random locations) that were shallower than the overall range of water depths in the wetland unit in which the rails were found. This seems to suggest Virginia rails are trying to stay at or near shallow water depths. There was no difference between known and random locations of Virginia rails, however, which indicated Virginia rails were not selecting a specific site based on its water depth relative to the surrounding area within a 25 m distance. Water data from known sora locations and paired random locations were sparse; therefore, there was extremely limited data interpretation concerning soras and water levels.

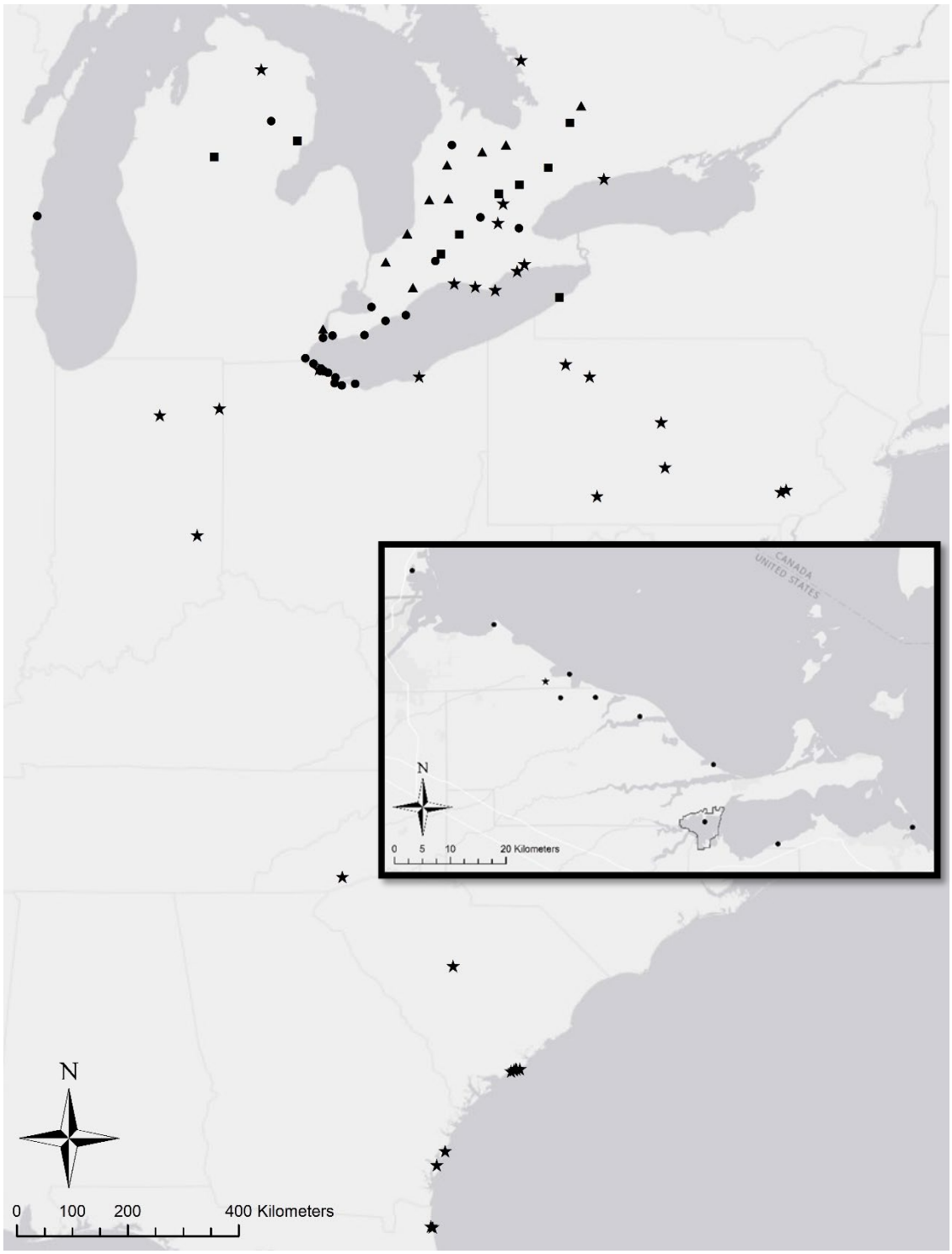

Figure 3. Locations where Virginia rails fitted with pulse-coded VHF radio transmitters at Winous Point Marsh Conservancy (WPMC), Ottawa County, Ohio, USA were detected at Motus Wildlife Tracking System automated telemetry towers during April – December in 2018 and 2019. Towers that detected rails during the pre-nesting stage are shown as triangles, the nesting

stage as squares, the post-breeding stage as stars, and in more than one stage as circles. WPMC is outlined in black in the inset map. The local array is the 11 towers within the inset map.

Figure 4. Sora marked by researchers at Winous Point Marsh Conservancy, Ottawa County, Ohio, USA

Winous Point is a lead investigator on the project, assisting with the proposal development and research implementation. This project is funded by the Ohio Division of Wildlife through the Terrestrial Wildlife Ecology Lab at Ohio State University.

King Rail Habitat Use and Response to Conspecific Playback

Investigators: Dustin Brewer and Thomas Gehring, Central Michigan University; Brendan Shirkey, Winous Point Marsh Conservancy

Project Period: 2019 to 2021

Introduction: King rail (*Rallus elegans*) populations have sharply declined in the midwestern United States during the last century. The most likely cause for this decline is habitat loss. Previous research from birds captured at the Winous Point Marsh Conservancy tracked migration routes of individual king rails using satellite telemetry and helped to refine capture methods. Determining what habitat this species requires in northwest Ohio and southeast Michigan will further aid conservation efforts throughout the Upper Mississippi River/Great Lakes Region.

Like other secretive marsh bird species, estimates of true abundance for king rails are difficult to obtain because individuals are so difficult to detect. Traditional survey techniques, such as distance sampling, assume that all individuals immediately at a survey point are detectable. This is likely untrue of king rails and violates a crucial assumption of distance sampling. Determining response rates to the standard marsh bird survey track will allow an appropriate 'correction factor' to be applied to population models in order to improve king rail population estimates. Identifying what broadcasted king rail call types elicit the most responses from king rails that are present can improve population estimates by informing surveyors which call types to use during playback surveys.

Therefore, the main objectives of the current study are to: 1) determine what habitat types king rails are using and to 2) determine the rate at which king rails respond to different audio playback tracks. These data will inform wildlife managers seeking to create and preserve habitat for king rails and to help researchers effectively generate king rail population estimates.

Methods: Trapping efforts in 2020 occurred at Winous Point Marsh Conservancy, Ottawa National Wildlife Refuge, and Pickerel Creek Wildlife Area. We attempted to catch king rails by using walk-in traps (Figure 1) baited with broadcasted king rail calls. 'Whoosh nets' were also used opportunistically for trapping attempts.

Figure 1. King rail captured and banded at WPMC in spring, 2009.

We recorded homing and random locations of radio-tagged birds at least twice per week. This entailed tracking a radio-tagged bird using radio telemetry, marking the location with a GPS, and then marking two other locations 75 m away in random directions. This will allow us to determine, upon completing vegetation surveys at both the random and homing locations, if king rails are displaying non-random use of habitat within their home range. Some habitat measures that we recorded at each of the locations include percent herbaceous emergent vegetation, percent open water, most dominant plant species, and water depth. At a subset of homing and random points, we also measured the abundance of crayfish (Figure 2), which we hypothesize are an important part of king rails diets in the upper midwest.

Figure 2. A couple crayfish (Faxonius spp.) caught in a king rail territory at Pickeral Creek Wildlife Area in summer of 2020.

We also used radio telemetry techniques to track king rails for the call-response rate objective of the project. Once we approached a radio-marked individual to an estimated distance of less than 30m, we conducted a standardized marsh bird survey and recorded whether the individual vocalized or not. This will allow us to estimate the rate at which king rails respond to the existing survey methodology.

Results: We captured 5 king rails (all in walk-in traps) in 2020 despite logistical challenges associated with COVID-19. One was caught in the Horseshoe unit on 5/14 and another was caught on 5/18 near Elm Island at the Winous Point Marsh. On 5/19, a king rail was caught at Pickerel Creek Wildlife Area and another was caught at that property on 6/6 (Figure 3). The last king rail was caught on 6/11 at Ottawa National Wildlife Refuge.

Figure 3. King rail captured at Pickeral Creek Wildlife Area in spring of 2020.

We conducted on average 21 homing locations and 42 random locations per bird. We have not yet completed analysis of the habitat data to compare homing and random points. Preliminary analysis of a subset of homing locations indicates that Reed Canary Grass (*Phalaris*) was most frequently (33% of the time) the dominant plant. At random locations, preliminary analysis indicates that cattail (*Typha spp.*) was most frequently (27% of the time) the dominant plant. We found that home range size for the 5 marked birds averaged 12.4 hectares (30.6 acres).

On 6/16, we found a king rail nest in the home range of a bird we were tracking at Pickerel Creek Wildlife Area. The eggs hatched on 7/6 and 7/7. Habitat characteristics for the nest site will be reported in the scientific literature and will be some of the first ever rigorous habitat analysis ever conducted at a king rail nest site in Ohio.

We conducted 46 playback surveys within approximately 30 meters of radio-tagged king rails and they responded 19 times. We will further analyze these data to determine when in the season, and to which call types, king rails are most likely to respond to.

Winous Point Marsh Conservancy is a co-lead investigator on the project with Dr. Thomas Gehring of Central Michigan University. The project is funded by Central Michigan University and grant funding from the Upper Mississippi River and Great Lakes Region Joint Venture.

Heavy Metal Accumulation in Wetland-dependent Species

Investigators: Dr. Jessica Heinz, Wildlife and Ecosystem Health Program, The Ohio State University/Columbus Zoo/The Wilds; and Dr. Mark Flint, Program Head of Zoo and Wildlife Conservation Medicine and Ecosystem Health, Veterinary Preventive Medicine Department at OSU

Collaborators: The Wilds, Winous Point Marsh Conservancy

Schedule: 2019 – 2023

Heavy metal toxicity has significant effects on the health of animals and can be found as a pollutant after human disturbance of the land. Wetlands are concentrators of these heavy metals serving to help sequester and clean waters. Differences in niche, diet and potential routes of exposure can lead to variation in the accumulation and effect of heavy metals in wetland species. Consequently, these species serve as bio-indicators of the degree of contamination in multiple niches of these complex ecosystems.

Figure 1. Painted turtle collected from wetland habitat in Ohio in June 2020.

Goal: Evaluate the heavy metal levels of several wetland fauna species in two different wetland habitats in Ohio—the Winous Point Marsh Conservancy (WPMC) and The Wilds, an endangered species conservation facility and strip-mine restoration area in the Cumberland region of Ohio. Species include the North American beaver (*Castor canadensis*), common muskrat (*Ondatra zibethicus*), painted turtle (*Chrysemys picta*), channel catfish (*Ictalurus punctatus*), and bluegill (*Lepomis macrochirus*).

Analytical Methods: During the summer months, 10 catfish, bluegill and painted turtles each were collected from sites across the wetland and tissue samples of liver were collected for metal analysis. In addition, non-terminal samples from turtles were collected to correlate to total tissue levels. These samples help determine whether antemortem sampling is validated in determining true metal accumulation in species. These metal levels will be compared between species to evaluate which are most heavily affected, between locations to evaluate differences in human impact and correlated with physiologic parameters to evaluate health impacts on species.

This project was conducted by Dr. Jessica Heinz, a veterinary resident in the Wildlife and Ecosystem Health program with The Ohio State University/Columbus Zoo/The Wilds, and under the guidance of Dr. Mark Flint, Program Head of Zoo and Wildlife Conservation Medicine and Ecosystem Health program in the Veterinary Preventive Medicine Department at OSU. Winous Point Marsh Conservancy supported Year 1 of this project by assisting in the collection of animals for tissue sampling, including providing housing, technical support, use of laboratory facilities and expert advice on wetland species trapping.

Preliminary results in liver testing show differences in metal accumulation between species as well as between sites (WPMC vs. The Wilds) within the same species. Additional analysis and statistics are pending. Sampling of mammalian species are currently being conducted.

Winous Point Marsh Conservancy supports this project through assistance with collection of various species for sampling.

Figure 2. Dr. Heinz collecting channel catfish (Ictalurus punctatus) and other species from wetland habitats in June 2020.

Figure 3. Dr. Heinz collecting turtle samples from Winous Point Marsh Conservancy wetlands in June 2020.

Trumpeter Swan Movement Ecology in the Upper Midwest

Investigators: David Wolfson and John Fieberg, University of Minnesota; Randy Knapik Michigan DNR; and David Anderson, USGS.

Collaborators: Laura Kearns, Ohio Division of Wildlife; The Winous Point Marsh Conservancy

Schedule: 2020 and 2021

Introduction: Today, over forty percent (27,055) of North America's trumpeter swans are part of the Interior Population. This is truly remarkable considering trumpeter swans were largely gone from the lower forty-eight United States by the late 1800s, due largely to market and subsistence hunting. The Interior Population Trumpeter Swan Migration Ecology and Conservation project was started to research and understand factors affecting the restoration and management of interior (Central, Mississippi, an Atlantic flyway swans. This multi-state, multi-year research project will document annual travels and landscape use of a number of trumpeter swans from midwest restoration programs. In 2019, swans in Minnesota and Michigan received GSM collars. Iowa, Manitoba, Ohio, and Wisconsin joined in the research in the summer 2020. Twelve collars with GPS/GSM transmitters were affixed to adult swans in Ohio during the summer of 2020. Additional collars will be placed on swans in Ohio in summer 2021. The Ohio Division of Wildlife was able to provide funds for 6 collars, USFWS for 5, and funds for additional collars were provided by several Ohio zoos and Ohio chapters of the Association of Zoos and Aquariums (AZA) by fundraising efforts of the Trumpeter Swan Society.

These transmitters record high-resolution, high frequency location and related data and transmit those data to researchers allowing them to:

- Evaluate year-round swan movements, including determining the locations where swans spend the winter, and the timing and duration of their movements.
- Determine whether and where trumpeter swans make molt migrations.
- Evaluate year-round habitat use and selection patterns of trumpeter swans.
- Estimate annual survival rates of trumpeter swans, if sample sizes are adequate and fates (i.e., mortality events) can be determined.

Figure 1. WPMC research technician, Jessica Schmit, holding a collared trumpeter swan captured in July 2020 in South Creek at the Winous Point Marsh.

Summary: Adult trumpeter swans undergoing molt were collared in July and August 2020 at Winous Point Marsh Conservancy (N = 4, Ottawa/Sandusky Co), Ottawa National Wildlife Refuge (N = 4, Ottawa Co), Killdeer Plains Wildlife Area (N = 3, Wyandot Co), and Big Island Wildlife Area (N = 1, Marion Co). Unfortunately, one of the Ottawa NWR birds was killed by a motor vehicle in October 2020 near Howard Marsh Metropark.

As of the end of January 2021, Ohio's swans have remained within at least 15 kilometers of their capture site (Fig. 3). This is in stark contrast with swans in Manitoba, Minnesota, and Wisconsin, many of which have made long-distance migratory flights (Fig. 4). The winter climate is milder and there has been little ice cover this winter in Ohio and Michigan, so there may be fewer advantages for the swans to migrate.

Figure 2. Ohio Division of Wildlife biologist, Laura Kearns, with a trumpeter swan captured in the Beardsley's unit at the Winous Point Marsh.

See the following link for more information and tracking maps regarding this project:

https://trumpeterswan.netlify.app/tabbed_annual_reports.html

Figure 3. July 2020 to January 2021 movements of the 4 trumpeter swans captured at the Winous Point Marsh. Note all swans are still located nearby capture locations. The dot indicates the last known location of the individua, lines their prior movements between locations.

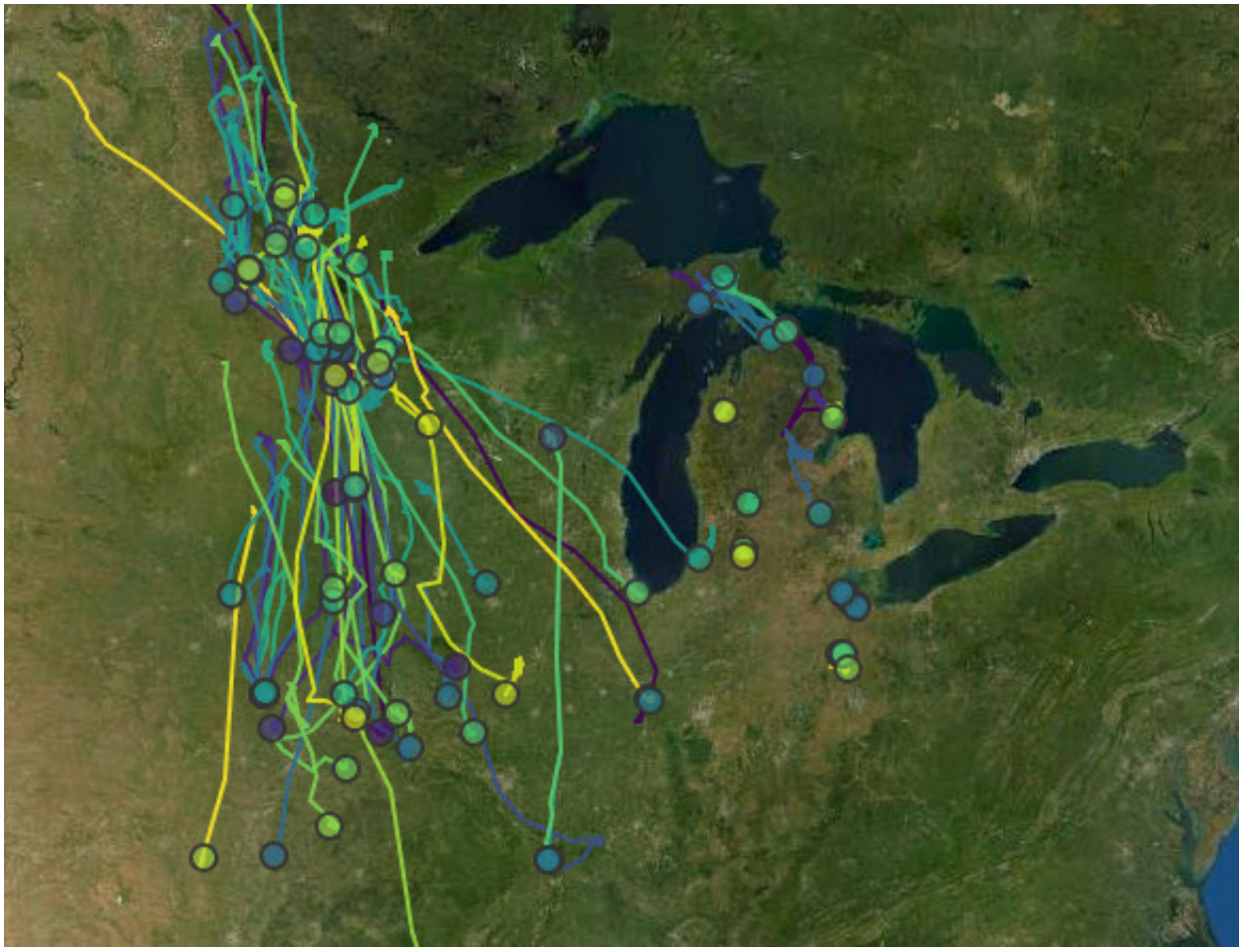

Figure 4. July 2020 to January 2021 movements of all trumpeter swans captured for this project. Note how the Ohio and Michigan trumpeter swans have made few seasonal movements while many of the other interior swans have made large-scale migratory movements. The dot indicates the last known location of the individual and lines represent prior movements.

Winous Point Marsh Conservancy supports this project through assistance with capture and marking of swans in Ohio.

Additional Research and Education Programs Supported by WPMC in 2020

In addition to the projects detailed above, Winous Point Marsh Conservancy (WPMC) annually supports a variety of smaller projects or supplies field housing and logistical support for larger projects not directly initiated by our staff. These projects are important components towards achieving program objectives.

Wood Duck Nesting Box Program

Wood duck (*Aix sponsa*) boxes have been placed around Winous Point Marsh and monitored for decades. Some of our marshes have great habitat for cavity nesting waterfowl like wood ducks and hooded mergansers (*Lophodytes cucullatus*), and WPMC staff want to encourage more nesting of these species. This past year Port Clinton High School student Kaylie Simpson monitoring the wood duck boxes for her Grade 8 Science Fair Project.

Figure 1. Port Clinton High School student Kaylie Simpson checking wood duck nest boxes in spring of 2020.

Port Clinton School Science Fair Project

Question: Does the habitat surrounding a wood duck box affect the success of the eggs?

Previous Known Facts:

- Wood ducks are cavity nesters, and often nest in old trees.
- A clutch of wood duck eggs usually ranges anywhere from 6-18.
- Female wood ducks will line their nest with soft down feathers taken from her breast.
- Wood ducks thrive in bottomland forests, swamps, freshwater marshes, and beaver ponds.
- In the early 20th century, wood ducks were threatened by extinction due to the loss of wetlands. Protection and man-made nest boxes brought the population back to safe numbers again.

Figure 2. A pair of wood ducks investigates a nesting box while another cavity-nesting species, the hooded merganser, looks on in March, 2020.

Purpose: The purpose of this experiment is to learn how, or if, the habitat surrounding a wood duck box affects the eggs. This information is a useful tool when placing wood duck boxes in the future. I am also collecting data such as the distance to the nearest road, to see if that has an effect as well.

Hypotheses and Predictions:

1. If habitat does affect the wood duck eggs, I predict a great amount of vegetative wetland and forests will lead to more successful eggs.
2. If the box is further away from a dike or road, the eggs will be more successful.

Procedure:

1. Gave each of the sample wood duck boxes a number to keep track of them.
2. Conducted habitat surveys on each box when they hatched or failed over a period of 3 weeks.
3. Put all of the information into 2 spreadsheets, one for successful boxes, and one for failed.
4. Analyzed the data by taking averages for each habitat and placing the information into a pie chart.
5. Compared to the 2 and analyzed how, or if, the habitat affected the outcome of the eggs.

Conclusion: My first hypothesis *was not* supported by the data because the habitat did not affect the success of the eggs. The habitat information was nearly the same for both the successful and failed boxes. Now, it is important to note that the habitat probably has a minor effect on the outcome, but because I only had a sample of 12 boxes, those minor effects did not show in the data. Although, I was able to see that the habitat did not have any major changes on the egg success. By examining the pie charts for both outcomes, you can see that they are almost identical (Figures 3 and 4). This means that the habitat around the wood duck boxes did not have any major effects on the success of the eggs.

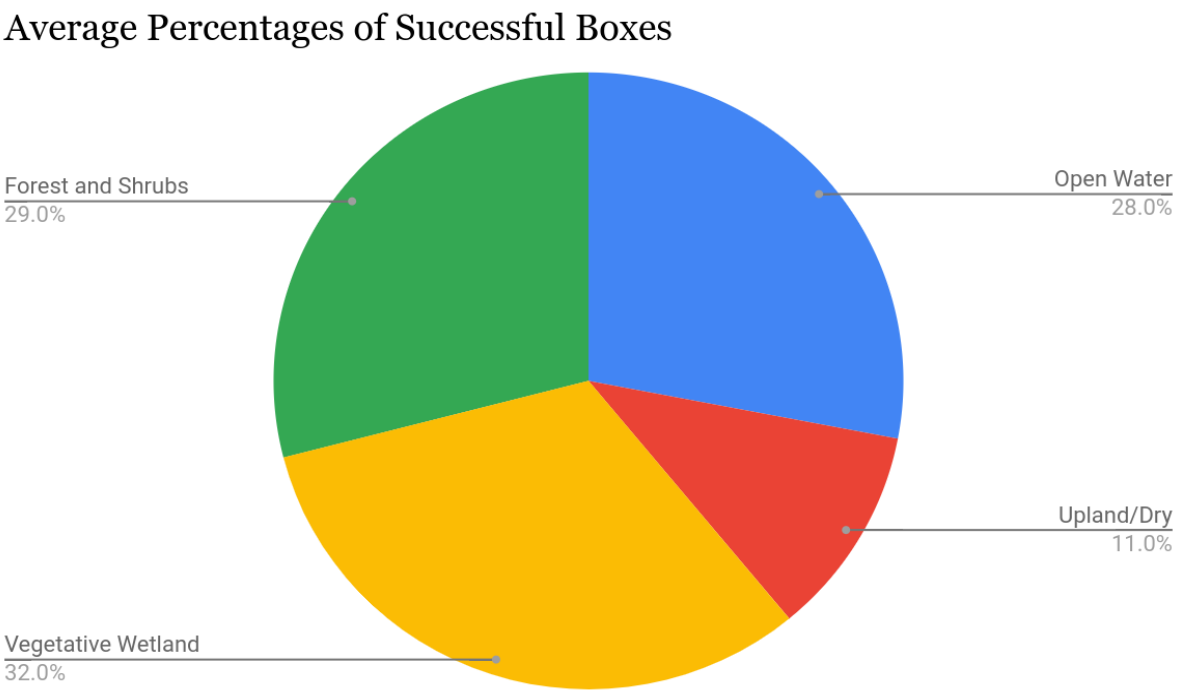

Figure 3. Habitat composition surrounding all successful wood duck boxes in 2020.

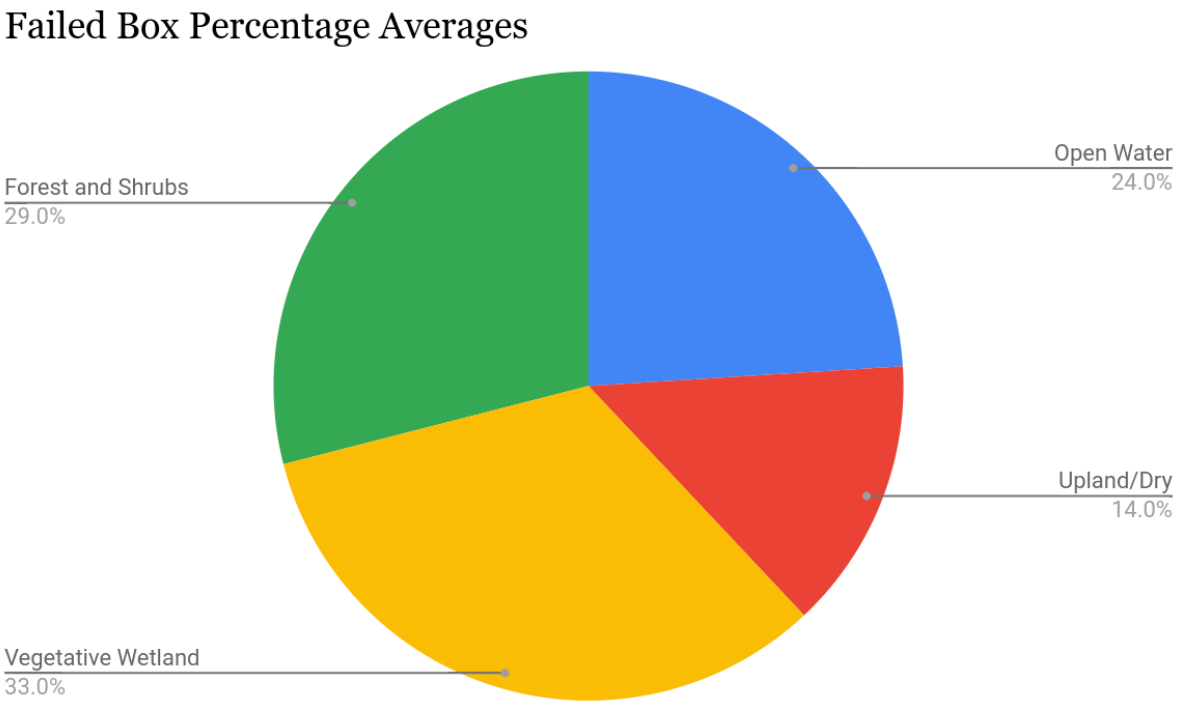

Figure 4. Habitat composition surrounding all unsuccessful wood duck boxes in 2020.

My second hypothesis *was* supported by the data because boxes further away from the dikes or roads were more successful than the closer ones. The successful ones averaged 22 meters from the dike, while the failed ones averaged 8.5 meters from the dike (Figure 4).

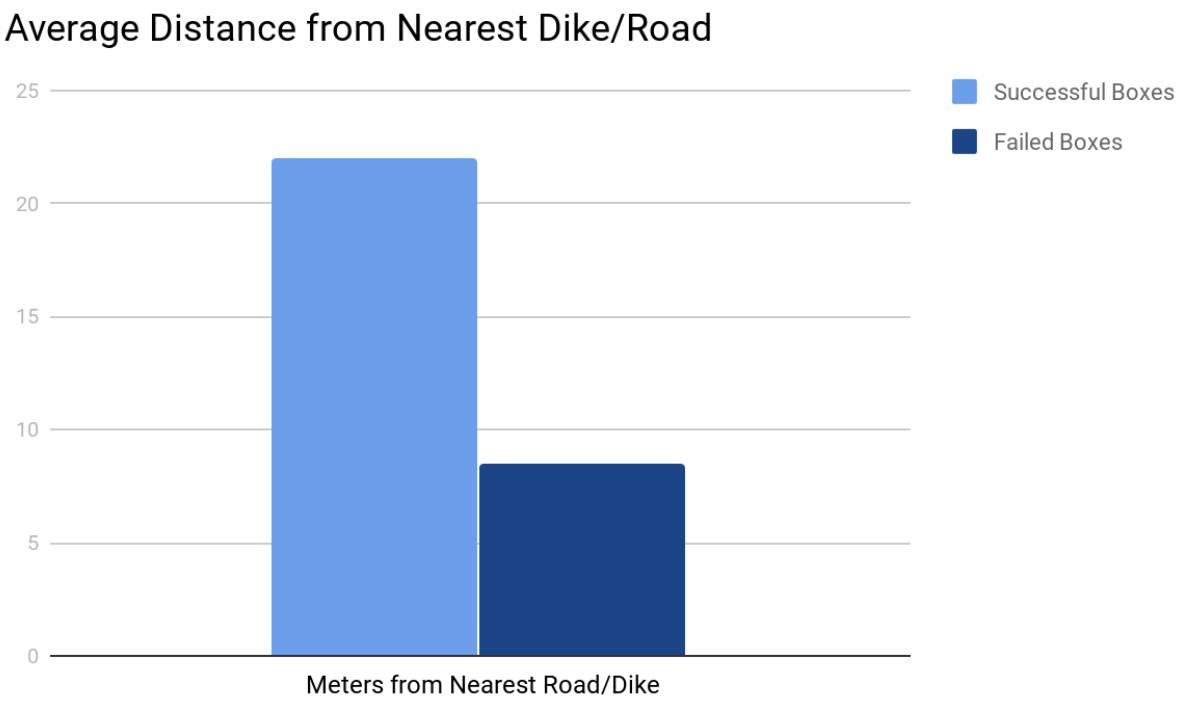

Figure 5. Comparison of the average distances from the nearest dike or road to both successful and unsuccessful wood duck boxes in 2020.

As you can see, the successful boxes were further away from the dike than the failed boxes. I can infer that this is due to the greater amount of predators, such as raccoons and squirrels, along the dikes.

Winous Point Marsh Conservancy continues this long-term project for self-interest and volunteer and educational opportunities.

Eastern Mallard Stable Isotope and Genetics

Dr. Michael Schummer at SUNY ESF and Dr. Philip Lavretsky of the University of Texas El Paso continue to further research into the geographical reach of game-farm mallard genetics in North America. This project partnered with many state/provincial and federal agencies across USA and Canada. Dr. Lavretsky has processed 2,000+ mallards spanning space and time (i.e., pre- versus post-season). Though sampling is on-going, current trends are clear: (1) game-farm mallards are of Eurasian source, and are substantially genetically different from wild North American mallards (i.e., ~10%), (2) the highest rate of hybridization is in the Atlantic flyway which is consistent with where game-farm mallard releases persist, (3) the number of mallards carrying game-farm mallard genes decreases going westward, (4) the majority of hybrids can be categorized as part of a wild × feral mallard hybrid swarm (i.e., hybrid × hybrid crosses), and (5) there are greater numbers of birds carrying game-farm mallard genes in more southern (i.e., USA) versus northern (i.e., Canada) regions (Fig 5). The latter suggests some form of regional partitioning between wild North American and feral/feral × wild mallards. As part of a recently awarded 4-year National Science Foundation grant in 2019, and along with partners at the Smithsonian Institute, Dr. Schummer and Dr. Lavretsky will be taking a deep dive into understanding the genetic consequences of such domestic × wild interactions on the adaptiveness of wild populations. Specifically, they will be using state-of-the-art genomic methods to identify genes that have been under artificial selection for over a century in game-farm mallards, and then associate morphological and ecological traits to these genetic regions to understand how the

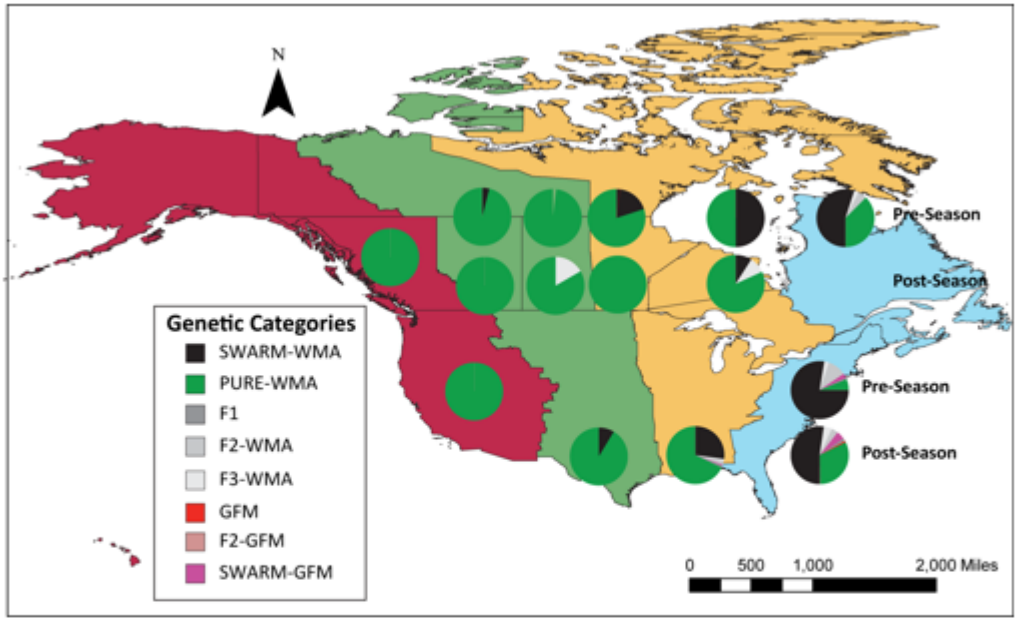

Figure 5. Percentage of pure wild mallard (Pure-WMA), pure game farm mallard (GFM), hybrid swarms mallards (Swarm WMA and Swarm GFM), and filial generations of offspring (F1, F2-WMA, F3-WMA, and F2-GFM) during pre-season and post-season banding in North America.

movement of these genes into wild populations may change survival or fecundity. With genetically vetted pure wild mallard, game-farm mallard sources, and more importantly, different generations of their hybrids, they will be able to track how natural selection acts on these potentially maladaptive genes and their associated traits. Finally, they will be coupling ancient DNA methods with hundreds of museum specimens spanning the entirety of North America and across the last 150 years to track how the interaction of game-farm and wild mallards resulted in today's eastern hybrid swarm. In short, this project aims to understand how these interactions ultimately changed the genetic diversity of North America's wild mallard, and potentially their ability to survive and adapt.

Financial support provided by Ducks Unlimited (IWWR), Ducks Unlimited, Inc., Birds Canada, National Science Foundation, and SUNY ESF. Technical support provided by the USFWS, Environment Canada, and Atlantic Flyway Technical Section. Winous Point Marsh Conservancy is supporting this project by collecting wing-feather samples from hunter-harvested mallards and mallards handled during banding programs.

Mallard Genetics and Origin

Dr. Michael Schummer at SUNY ESF and Dr. Philip Lavretsky of the University of Texas El Paso have amassed 1,000+ paired stable isotopes (origin) and blood samples (genetics) from eastern mallards by the end of 2021. These samples also include a focused case-study of 300 mallards harvested at Winous Point Shooting Club and Ottawa Shooting Club during the 2019 waterfowl season. Stable isotopes enable researchers to determine where the bird grew the feather, and the blood samples provide us with percentage wild and game farm ancestry. As such, researchers can develop a map of origin and genetics to help delineate the extent of game farm ancestry in the Atlantic flyway. Of note, game farm genes appear to be moving west and, because the Winous Point region derives mallards from the "mid-continent" & "eastern" mallard populations, this concentrated sample is ideal to determine the relative origins of wild & game farm genes.

Figure 1. Winous Point Marsh Conservancy employee C.J. White assisting with banding mallards in the winter of 2020.

This project is led by Dr. Michael L. Schummer, Department of Environmental and Forest Biology, State University of NY College of Environmental Science and Forestry (SUNY ESF). Winous Point Marsh Conservancy is supporting this project by collecting wing-feather samples from hunter-harvested mallards and mallards handled during banding programs.

Origins of Northern Pintails Harvested in the Atlantic and Mississippi Flyways

Pintails harvested in eastern North America come from 3 main breeding populations: the prairies, Alaska, and the eastern U.S. and Canada. Apparent increases in the number of pintails observed in the east have researchers suspecting that eastern pintail populations may be increasing relative to pintail breeding populations elsewhere. Prior research on pintails marked with satellite telemetry units on Atlantic Coast wintering areas revealed that 80% of these females (n = 55) used an eastern migration corridor and all but 2 settled in the southern James Bay lowlands of Ontario or farther east. This is further corroborated by counts of ~35,000 pintails during peak migration in the Montezuma Wetlands Complex of central New York alone. On opening week of waterfowl season, harvest of pintail in the Montezuma Wetlands Complex and elsewhere in NY is comprised largely of juveniles, although this percentage does fluctuate annually, presumably because of differences in annual production. However, where these ducks are hatched and breed is difficult to determine using traditional banding data because few pintails are banded in their eastern breeding region. Pintails breeding in eastern North America may contribute substantially to harvest in the Atlantic flyway and may have different productivity than those in the mid-continent and Alaska. Stable isotope analysis of feathers grown on breeding grounds provides a unique opportunity to sample pintails in abundance to determine summer origin and regional productivity.

Figure 1. Northern pintail at Winous Point Marsh Conservancy, spring, 2018.

Dariusz Wojtaszek is leading this project while completing his MSc at Western University. SUNY ESF and the Hobson Isotope Lab at Western University is providing financial, technical, and logistical support. This project is generously support by Birds Canada, SUNY ESF, Winous Point Marsh Conservancy, and the Waterfowl Research Foundation. Winous Point Marsh Conservancy provides financial assistance and through the collection of pintail wing samples.

2020 WPMC Activities and Presentations

January	Attended Midwest Marsh Bird Working Group meetings, Lansing, MI
January	Attended Upper Mississippi River/Great Lakes Joint Venture marsh bird committee meetings, Springfield, IL
January	Attended Ohio Fish and Wildlife Management Association Conference, Columbus, OH
February	Hosted Ottawa County Leadership Class
March	Erie/Ottawa/Sandusky County Pheasants Forever Banquet, Oak Harbor, OH
March	Hosted Northwest Ohio Purple Martin landowner workshop
April	Attended Long Point Waterfowl Science Advisory Committee meeting, Port Rowan, Ontario, Canada, Virtual
April	Participated in USEPA Great Lakes Water Level Webinar, Virtual
April	Attended SUNY ESF graduate student Master's thesis defenses (2; Virtual)
June	Co-hosted Ohio Department of Natural Resources Directors tour of common tern nesting colonies
June	Guest speaker for Ohio University Ornithology class, Virtual
November	Presented on Ducks Unlimited Inc. national Podcast, Virtual

2020 WPMC Publications

Published:

Gross, M.C., S.E. McClain, J.D. Lancaster, C.N. Jacques, J.B. Davis, J.W. Simpson, A.P. Yetter, and H.M. Hagy. 2020. Variation in True Metabolizable Energy Among Aquatic Vegetation and Ducks. Journal of Wildlife Management 84:749-758.

Schummer, M., J.W. Simpson, K. Wallen, B. Davis, and B.T. Shirkey. 2020. Balancing Waterfowl Hunting Opportunity and Quality to Recruit, Retain, and Reactivate: Waterfowl Hunting Opportunity and Quality. Wildlife Society Bulletin 44:1-5.

Shirkey, B.T., M.D. Palumbo, and J.W. Simpson. 2020. Land Cover Switching in Autumn by Female Mallards in Ohio. Journal of Wildlife Management 84:968-978.

Shirkey, B.T. and R.J. Gates. 2020. Survival, Harvest, and Lincoln Estimates of Wood Ducks Banded in Ohio. Journal of Fish and Wildlife Management. 11:185-195.

In Review:

Hengst, N.M. Movement Patterns and Microhabitat Selection of Virginia Rails and Soras within Coastal Impounded Wetlands of Northwest Ohio. Master's Thesis. Ohio State University.

Palumbo, M.D. and B.T. Shirkey. Harvest Mortality of Mallards Banded at Lake St. Clair, Canada and Western Lake Erie, USA. Journal of Great Lakes Research.

WPMC LEGACY ENDOWMENT PROGRAM

WPMC Conservation History and Impact

The Winous Point Marsh Conservancy (WPMC), together with Winous Point Shooting Club, have maintained a leading role in the conservation and research of coastal wetlands and wildlife since 1946, when the Winous Point Research Committee was founded with that goal in mind. This philosophy was further solidified in 1999 with the incorporation of the WPMC and since that time program growth and dedication has led to tremendous accomplishments including:

- Over 100 graduate research projects supported and facilitated.
- Publication of scientific peer reviewed papers and articles contributing to national research in wetlands and wetland wildlife.
- Restoration of over 700 acres of additional coastal wetlands in northwest Ohio.
- Involvement in multiple regional conservation and research planning teams.
- Leader of Great Lakes wetland and waterfowl research.
- Internship program training 80+ seasonal interns for conservation careers.

WHAT IS THE LEGACY PROGRAM?

The legacy program is an opportunity for donors to make a lasting contribution to a Permanent Endowment that will assist WPMC in achieving its goals associated with wetland conservation, research, and education. WPMC is already at the forefront of wetland research and conservation in the Great Lakes region, however, a larger endowment would be a significant step in advancing the mission of WPMC and creating opportunities for the expansion of current research and education programs. Furthermore, a larger endowment would be invaluable in securing dedicated funds for future land acquisition and wetland restoration projects to extend the landholdings of WPMC and ultimately restore once lost wetlands to a landscape in desperate need of the ecological benefits provided by these habitats.

For more information please contact:
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John Simpson (john@winous.org)