



Winous Point Marsh Conservancy



2018 Research and Activities Report

February 2019

Table of Contents

<i>Page</i>	<i>Title</i>
1	Trustees and Officers
2	Executive Summary
4	Influenza A virus surveillance in wild, free-ranging waterfowl at Winous Point Marsh, Port Clinton, OH: 1986-2018
7	Winous Point and Ohio Division of Wildlife Cooperative Waterfowl Banding
12	Winous Point Purple Martin Colony Monitoring Project
15	Winous Point and Ohio Division of Wildlife Cooperative Common Tern Monitoring
18	Variables affecting Rail Response Rates to Call-Playback Surveys and Their Applications for Estimating Abundance
22	Population Monitoring, Ecology, and Habitat Relationships of Sora and Virginia Rails in Northwestern Ohio – Part I
26	Population Monitoring, Ecology, and Habitat Relationships of Sora and Virginia Rails in Northwestern Ohio – Part II
30	King Rail Habitat and Occupancy Modeling Use in Lake Erie Coastal Wetlands
33	Additional Research Supported by WPMC in 2018
35	2018 WPMC Activities and Presentations

On the cover: Mallards over the North Marsh, spring of 2018.



Winous Point Marsh Conservancy

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Executive Summary

Staff: John Simpson, Executive Director
Opie Rohrer, Assistant Manager
Brendan Shirkey, Research Coordinator
Mike Picciuto, Research Technician

This year will mark the 20th anniversary of the Winous Point Marsh Conservancy and the 20th year that the Winous Point Research Program has operated under that umbrella. Incepted in the late 1940's as the Winous Point Research Committee, the research program has since been at the forefront of wetlands and waterfowl research in the lower Great Lakes and former students are now scattered across the country in a variety of professional positions. We are excited to continue this legacy and to grow and develop the role of WPMC. This year was no exception to the recent program development, with the graduation of several students, the addition of new students, and the dissemination of our research.

Our research interests in secretive marsh birds, particularly rails, has continued to grow this year. OSU student Jim Hansen finishes his thesis this spring on Virginia rail and sora population demographics. We will welcome back Nicole Hengst (OSU) to work on Virginia rail and sora as well as Michelle Kane (Central Michigan University) who is researching occupancy rates of state-endangered king rails in coastal Lake Erie marshes. We recently received news a new Ph.D. candidate position in collaboration with Central Michigan University will be funded continuing research on this unique bird group. Lastly, Brendan and Mike will continue our participation in the Midwest Coordinated Marshbird Monitoring project and their research into improving estimates derived from that data.

Three WPMC-supported graduate students successfully defended their master's theses in 2018. Kristi Stein (Ohio State University) conducted research entitled "Responses of Colonial Wading Bird Populations within the Lake Erie Marsh Focus Area to Cormorant Control and Wetland Management". Her research documented important juvenile survival and fledging rates and migratory routes for black-crowned night herons. Maggie Gross's (Western Illinois University) research "True Metabolizable Energy and Energetic Carrying Capacity of Submersed Aquatic Vegetation in Semi-Permanent Marshes of the Upper Midwest" documented food energy, abundance, and availability of wetland foods across the upper Midwest. Finally, Jay Wright (Ohio State University) defended his thesis "Migration Ecology of a Declining Songbird, the Rusty Blackbird (*Euphagus carolinus*)" that documented migration chronology for this rapidly-declining songbird species.

Winous Point 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.

Combined, our staff attended 14 conferences and meetings, gave eight professional seminars or presentations, and hosted 13 different “Tour and Talks” at Winous Point for conservation groups and agencies. Our staff and students also continued to disseminate our research in peer-reviewed journals and white paper reports, publishing six peer-reviewed articles or professional reports with another four in preparation for review over the next year or two.

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 Winous Point and look forward to the many challenges and accomplishments next year and beyond.

Regards,

A handwritten signature in blue ink, appearing to read "John Simpson", with a long, sweeping horizontal line extending to the right.

John Simpson
Executive Director

Influenza A virus surveillance in wild, free-ranging waterfowl at Winous Point Marsh, Port Clinton, OH: 1986-2018

Investigators: Andrew S. Bowman, Richard D. Slemons, Jacqueline M. Nolting, and Sarah E. Lauterbach, Animal Influenza Ecology and Epidemiology Research Program, Department of Veterinary Preventive Medicine, The Ohio State University

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

Schedule: 1986 - Present

Summary: For more than 20 years the Winous Point Marsh Conservancy (WPMC), the Ohio Division of Wildlife, and the Department of Veterinary Preventive Medicine at The Ohio State University have participated in a proactive, collaborative influenza A virus (IAV) surveillance program in wild ducks. The objective of this ongoing effort is to better define the natural history of influenza A virus in wild birds by identifying how genetic and antigenic diversity of these viruses are maintained in wild bird populations over time. Since highly pathogenic H5N8 and H5N2 was identified in avian species in the United States in December 2014, increased IAV surveillance has been initiated to monitor transmission and spread of these viruses of concern. This collaborative project has provided valuable insight into the relationship between host and viral ecology and the environment.

In addition to the valuable data collected at the Winous Point Marsh, many students have completed honors, masters, and Ph.D. projects through this long-standing collaboration. In 2018, graduate student Sarah Lauterbach began her Master's thesis entitled "Filling a gap in influenza A virus surveillance in wild migratory mallard ducks" at WPMC. Previously, IAV surveillance has occurred primarily during summer banding and hunting seasons, thus limiting the understanding of IAV ecology throughout an entire year. Sarah's expanded project aims to conduct surveillance during winter and spring over the course of two years to understand transmission dynamics among mallards (*Anas platyrhynchos*); a species known to play a role in IAV transmission during summer and autumn. Understanding IAV over a two-year period in mallards may help fill gaps in knowledge for this individual species, as well as direct future surveillance efforts to address specific hypotheses.

In 2018, cloacal swabs were collected from 1,213 mallards at WPMC through live trapping and hunter-harvest sample collection. To date, 805 samples have been tested for IAV; 12.5% tested positive for IAV genetic material (indicating presence of IAV but not necessarily active infection) while viable virus was recovered from 0.01% (indicating active infection). After a grueling but enjoyable field season in 2018, sample collection and testing will continue once

again in 2019. IAV positive samples will be further evaluated for their genetic information while assessing ecological data to identify any potential risk factors for IAV infection in the birds.

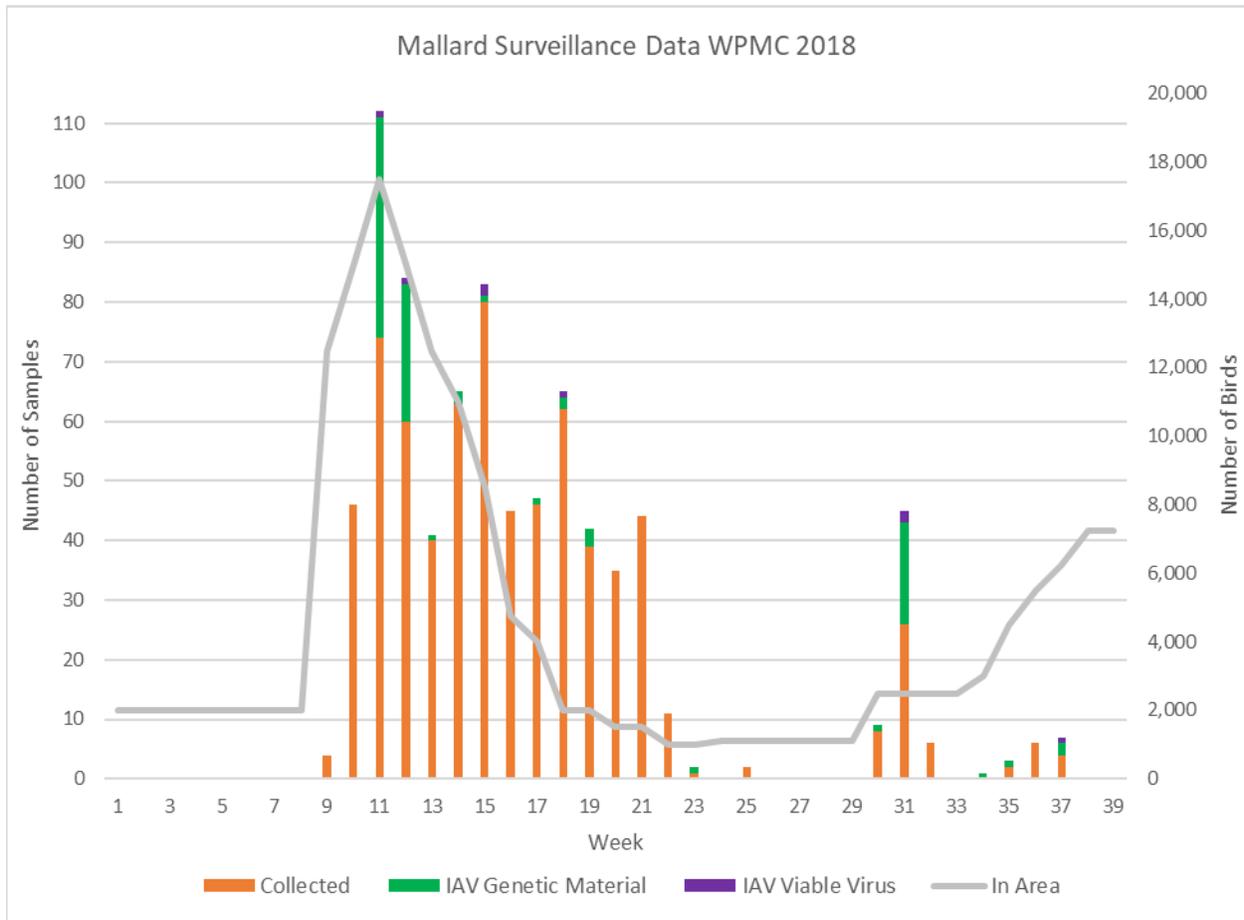


Figure 1. Influenza A surveillance data for mallards during the first 39 weeks of 2018. The bars represent the total number of samples collected, the number of samples that tested positive for IAV genetic material and the number of samples from which viable virus was recovered by week. The line represents the number of birds estimated to be in the area each week.

Publications:

Li, L., Bowman, A.S., DeLiberto, T.J., Killian, M.L., Krauss, S., Nolting, J.M., Torchetti, M.K., Ramey, A.M., Reeves, A.B., Stallknecht, D.E., Webby, R.J., Wan, X.F., 2018. Genetic Evidence Supports Sporadic and Independent Introductions of Subtype H5 Low-Pathogenic Avian Influenza A Viruses from Wild Birds to Domestic Poultry in North America. *J Virol* 92.

Xiao, Y., Nolting, J.M., Sheng, Z.M., Bristol, T., Qi, L., Bowman, A.S., Taubenberger, J.K., 2018. Design and validation of a universal influenza virus enrichment probe set and its utility in deep sequence analysis of primary cloacal swab surveillance samples of wild birds. *Virology* 524, 182-191.

Jacqueline Nolting, Sarah E Lauterbach, Richard D. Slemons, and Andrew S. Bowman, 2018. Identifying gaps in wild waterfowl influenza A surveillance in Ohio, USA. *Avian Diseases* In-Press.

Table 1. Type A Influenza samples collected and tested at Winous Point Marsh, Port Clinton, OH since 1986.

Year	# Collected	# Flu Positive	% Positive
1986	191	18	9.42
1987	196	3	1.53
1988	104	4	3.85
1989	0	0	0
1990	0	0	0
1993	54	0	0
1998	0	0	0
1999	58	4	6.9
2000	22	3	13.64
2001	56	12	21.43
2002	96	7	7.29
2003	39	4	10.26
2004	106	5	4.72
2005	222	18	8.11
2006	346	21	6.07
2007	458	11	2.4
2008	549	36	6.56
2009	652	48	7.36
2010	657	57	8.68
2011	356	20	5.62
2012	712	39	5.48
2013	1192	185	15.52
2014	925	50	5.41
2015	1039	84	8.07
2016	950	52	5.47
2017	1233	134	10.9
2018	1594	15*	1.7*
Total	11807	830**	7.46**

*909 samples have been tested for 2018

**11,122 samples have been tested total

Winous Point supports this project through shorebird and waterfowl sample collections, assistance with trapping waterfowl and shorebirds, and housing interns and staff as needed.

This work was funded Centers of Excellence for Influenza Research and Surveillance, National Institute of Allergy and Infectious Diseases, National Institutes of Health (NIH), Department of Health and Human Services contract HHSN272201400006C.

Winous Point and Ohio Division of Wildlife Cooperative Waterfowl Banding

Investigators: Brendan Shirkey, John Simpson and Mike Picciuto, Winous Point Marsh Conservancy; Doug McClain, Ohio Division of Wildlife

Collaborators: Pat Devers, Black Duck Joint Venture; Tom Kashmer, Green Creek Wildlife Society; Mark Shieldcastle, Black Swamp Bird Observatory; Bob Gates, The Ohio State University

Schedule: Long-term

Introduction: Since 2011 Winous Point has been spearheading the Ohio Division of Wildlife's (ODOW) summer banding program targeting wood ducks (*Aix sponsa*) and mallards (*Anas platyrhynchos*) and the winter banding program targeting black ducks (*Anas rubripes*). The program operates under a cooperative agreement with the ODOW with established goals of having Winous Point band, at minimum, 50 black ducks, 400 mallards, and 150 adult male wood ducks annually, helping the ODOW meet their banding quotas for the US Fish and Wildlife Service and Mississippi Flyway Waterfowl Administrative Council. Winous has been an especially strong contributor to statewide mallard and black duck banding efforts wherein many years since 2011 Winous has accounted for greater than 25% of all mallards banded statewide and over 90% of all black ducks banded statewide.



Figure 1. Mallards and black ducks captured during winter banding efforts.

Summary: Banding efforts in 2018 coordinated by Winous Point staff resulted in the capture and banding of three different duck species totalling 390 banded individuals (Table 1). We have now eclipsed 5,000 banded individuals consisting of 11 different waterfowl species since 2010 (Table 2). Banding totals were down from past years primarily because of extremely slow summer banding.

*Table 1. Total number of banded individuals during the winter banding program (January - March, 2018) and summer banding program (July – August, 2018). *Several hundred mallards, black duck, and wood ducks were released without bands due to a shortage of bands supplied by ODOW and U.S. Fish and Wildlife Service.*

Species	Winter totals	Summer Totals
Black Duck	169*	0
Mallard	11*	60
Wood Duck	0	150*
Seasonal Total	180	210

Table 2. Total number of waterfowl banded at Winous Point since 2010, by species.

Year	Black Duck	Mallard	Redhead	Gadwall	Wood Duck	Pintail	Widgeon	Canvasback	Scaup	Ring Neck	Shoveler
2010	41	3	0	0	0	0	0	0	0	0	0
2011	42	186	0	0	39	0	0	0	0	0	0
2012	125	49	0	0	143	0	0	0	0	0	0
2013	51	237	123	0	140	0	0	1	10	0	9
2014	23	181	7	341	164	7	6	5	5	2	1
2015	9	582	126	0	232	0	0	35	13	32	0
2016	127	679	80	10	307	1	0	0	0	2	0
2017	84	575	148	0	266	0	0	13	11	0	0
2018	169	71	0	0	150	0	0	0	0	0	0
Totals	671	2563	484	351	1441	8	6	54	39	36	10

We are beginning to see a substantial number of band recoveries specific to ducks banded here at Winous Point (Table 3, Figures 2 and 3). The band recovery data is of general interest to those of us who study and hunt waterfowl, but the data also provides valuable information for those responsible for managing the resource. Band recovery data is valuable tool for waterfowl

managers to estimate harvest rates, harvest derivations, and survival rates, all of which ultimately help inform harvest regulation frameworks. In addition to the scientific value, duck banding offers a fantastic opportunity to get kids, and people of all ages, excited about waterfowl, and at the very least our efforts might result in some very excited duck hunters who end up harvesting a banded duck.

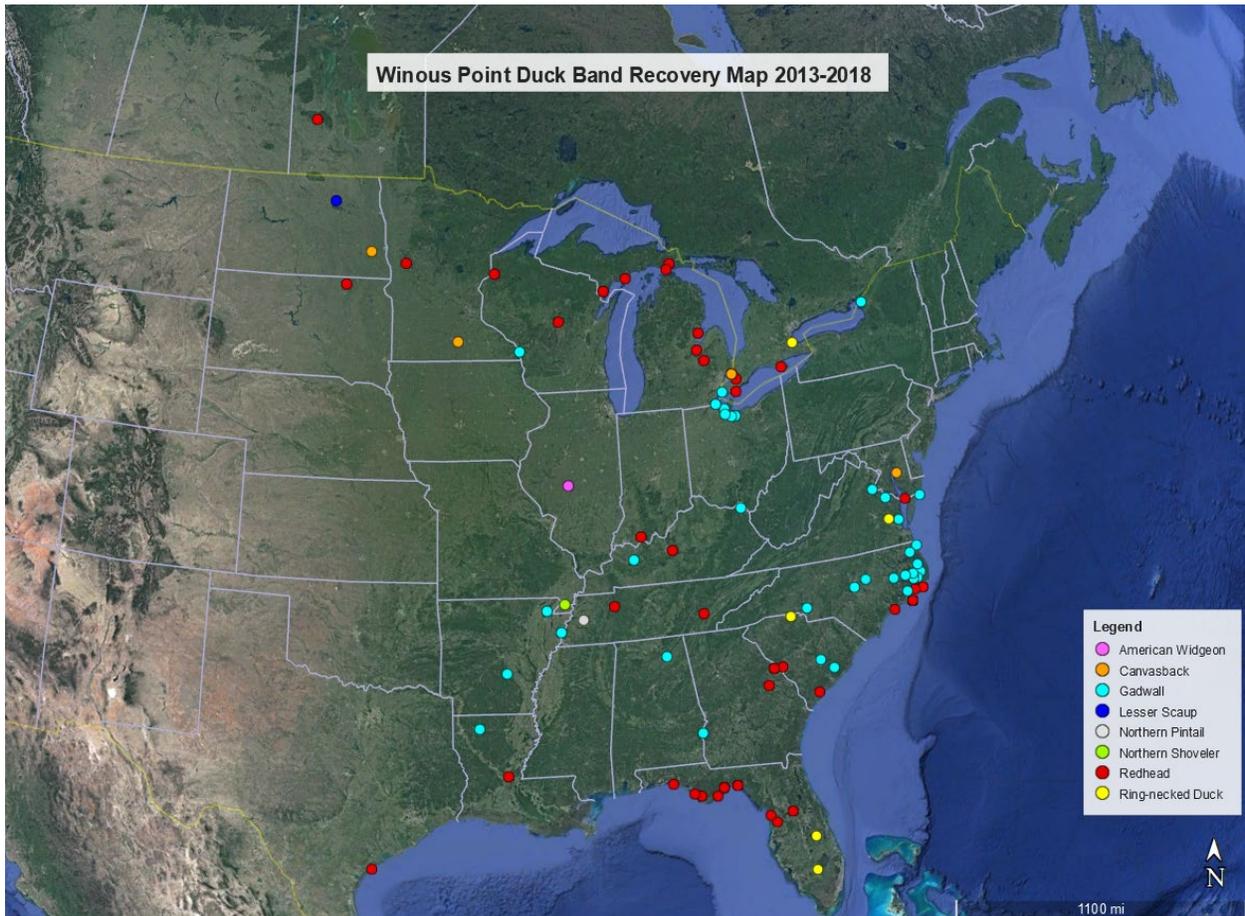


Figure 2. Band recoveries for American widgeon, canvasback, gadwall, lesser scaup, northern pintail, northern shoveler, redhead, and ring-necked ducks banded at Winous Point from 2013 – 2018.

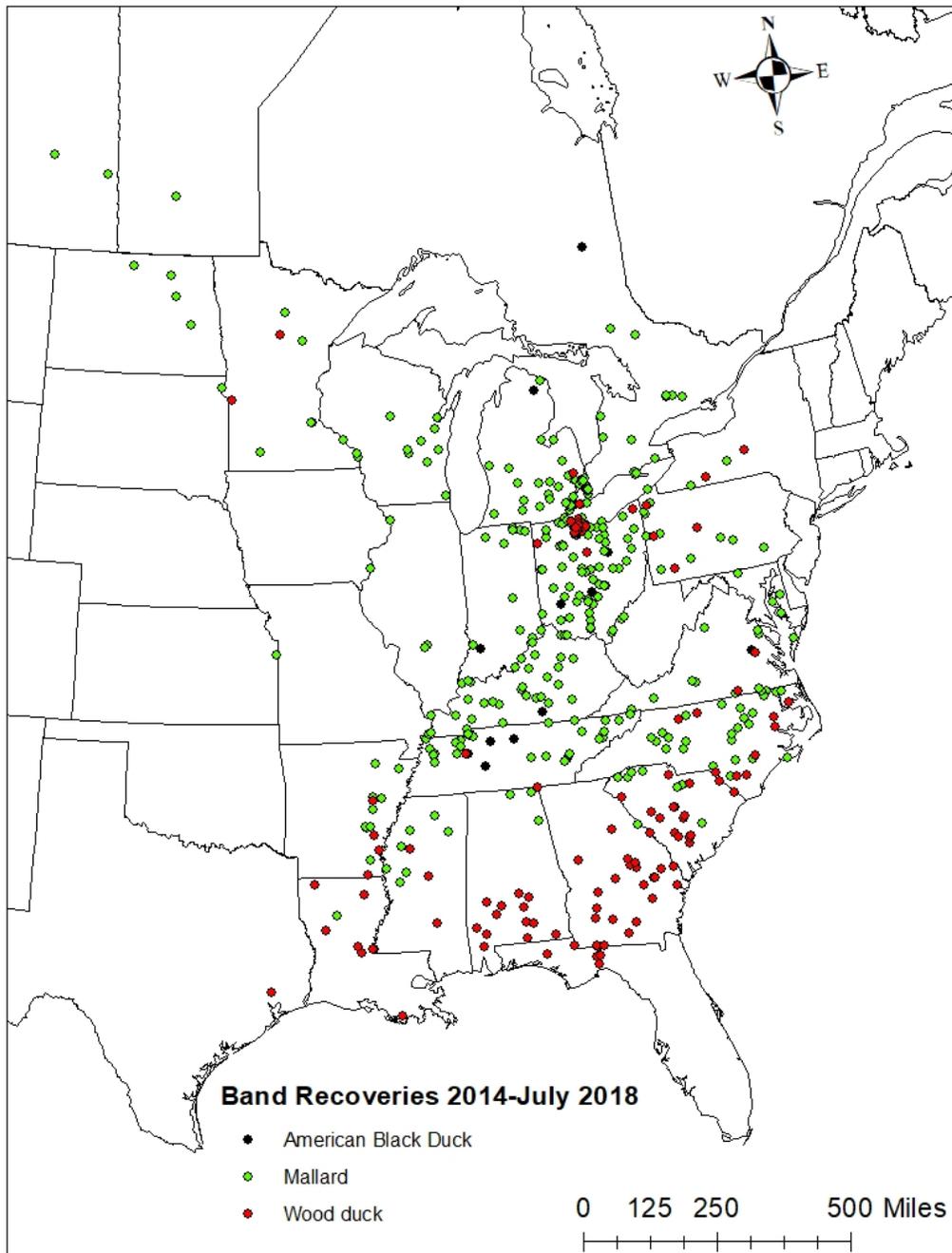


Figure 3. Band recoveries from 2014 - 2018 for mallards, wood ducks, and black ducks banded at Winous Point.

Table 3. Band recovery totals from birds banded specifically at Winous Point for the three species identified in the ODOW's cooperative agreement (2014 - July 2018).

Band Recoveries by Year			
Year	Mallards	American Black Ducks	Wood Ducks
2014	20	1	11
2015	65	1	27
2016	97	5	46
2017	173	10	61
2018	57	4	20
	412	21	165

Winous Point 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. In addition to ODOW, project funding is also sourced from the Black Duck Joint Venture and Ohio State University. A special thanks to all the volunteers over the past 8 years who have helped make our duck banding program such a success.

Winous Point Purple Martin Colony Monitoring Project

Investigators: Lisa Rock and Tom Kashmer, Green Creek Wildlife Society; Mark Shieldcastle, Black Swamp Bird Observatory; Mike Picciuto, 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 cavities for nesting. Winous Point has provided purple martin housing historically 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 historically had an ornamental design focus and looked like an extravagant small-scale house on a pole often with several dozen cavities on the sides. These houses couldn't be lowered for cleaning or monitoring which is undesirable from a research standpoint, but this also results in the cavities being overrun by invasive bird species like European starlings and house sparrows. Many purple martin landlords, including the Winous Point Marsh Conservancy (WPMC), have decided to upgrade their nesting structures to allow for better management practices that do not propagate invasive species and also contribute to Green Creek Wildlife Society's (GCWS) purple martin research goals.



Figure 1. A typical Winous Point Marsh Conservancy purple martin colony.

From April 2017 through June 2018 the WPMC utilized \$5,000 in Wildlife Diversity Funding provided by our existing cooperative agreement with the Ohio Division of Wildlife (ODOW) to upgrade the housing (i.e. rigs/gourds) for its resident Purple Martin colony. The funds were also used to monitor the success of resident purple martin colonies and to aid the GCWS in developing and expanding their ongoing community volunteer purple martin monitoring program. We have used our colony for workshops, Women in Conservation meetings, and to expose young volunteers to the basics of wildlife research.



Figure 2. Volunteers helping on a purple martin nestling banding session.

In 2017 WPMC removed four aged wooden martin houses and replaced them with five modern housing units purchased from Troyer Birds Paradise of Conneautville, PA. The initial housing units, totaling 54 gourds, were purchased and installed by Winous Point staff and GCWS volunteers in late spring 2017. The final two housing units comprising an additional 36 gourds were purchased and installed pre-nesting season in March, 2018 by WPMC staff, allowing for expansion of the nesting colony as new breeding birds arrived. This past season 75 out of the 90 units were utilized, an 83% occupancy rate, and 310 young banded. Based on other regional colonies, this is a terrific rate of occupancy and activity for this first full year.

Moving forward, we have been approved for additional funding through the ODOW and plan to use that to put up three more housing units in 2019 for a total of eight with 144 gourds. 2019 will also be the first of a three-year research project. Winous Point will be one of 6-9 study sites selected by GCWS for research on purple martin dispersal in Northwest Ohio. GCWS will be working with federally licensed bird bander, Mark Shieldcastle to design and implement project goals and protocols.

Winous Point staff continued, 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 and Ohio Division of Wildlife Cooperative Common Tern Monitoring

Investigators: Brendan Shirkey and Mike Picciuto, Winous Point Marsh Conservancy, Laura Kearns, Ohio Division of Wildlife

Collaborators: Jim Schott and Patrick Baranowski, Ohio Division of Wildlife

Schedule: Long-term

Introduction: The Ohio Division of Wildlife's (ODOW) 1990-1995 Strategic Plan established the goal of maintaining common tern (*Sterna hirundo*) populations in Ohio and initiated several research activities aimed at achieving that goal. Common terns were once frequent nesters on the gravel and sand covered islands and shorelines of western Lake Erie, but through a combination of factors (e.g., high lake levels, competition with gulls, and human disturbance) their population has been in steep decline since the 1970's. Common terns are now state endangered and almost entirely dependent on artificial nesting platforms for continued reproductive success (Figure 1). Beginning in April 2018, Winous research staff took over field operations of the project to assist the ODOW with banding chicks and nest and monitoring fledgling at the state's two nesting colonies.



Figure 1. Common tern chick less than a week old (left) and artificial nesting platform at Willow Point (right).

Summary: We banded 386 common tern chicks at Willow Point (Pickeral Creek State Wildlife Area) and Cedar Point National Wildlife Refuge in the summer of 2018. In past years, chick depredation, likely caused by great-horned owls, lowered survival of chicks specifically at the Cedar Point colony. We observed very little chick depredation this summer and fledging rates were actually higher at the Cedar Point colony (Table 1) compared to Willow Point. The total number of chicks fledged was still higher at Willow Point (152) relative to Cedar Point (100), which is consistent with past years and is a result of much higher nesting densities at the Willow Point colony (Table 1). In addition to placing a traditional, federal aluminum leg on each chick, we also deployed colored leg bands specific to each colony on many of the chicks. Re-sighting data is still limited, but the ultimate goal is that this aspect of the project would help illuminate regional movements of common terns among colonies in the Great Lakes.

Table 1. Estimated number of dead or missing chicks and estimated fledging rates and nest success rates by artificial nesting platform at Willow Point and Cedar Point during the 2018 breeding season.

Willow Point							
Platform	Number Dead	Number Missing	Est. Number Fledged	Total	Fledging Rate	Total nests	Estimated Nest Success
1	16	1	19	36	52.8%	19	78.9%
2	10	2	34	46	73.9%	28	82.1%
3	12	2	43	57	75.4%	29	93.1%
4	8	1	30	39	76.9%	21	85.7%
5	12	2	21	35	60.0%	17	64.7%
6	9	1	31	41	75.6%	25	73.1%
Total	67	9	178	254	70.1%	139	81.9%

Cedar Point							
Platform	Number Dead	Number Missing	Est. Number Fledged	Total	Fledging Rate	Total nests	Estimated Nest Success
1	0	1	24	25	96.0%	15	80.0%
2	1	0	30	31	96.8%	12	91.7%
3	2	2	16	20	80.0%	15	60.0%
4	1	2	30	33	90.9%	14	77.8%
5	3	2	38	43	88.4%	21	90.5%
6	1	0	24	25	96.0%	17	76.5%
Total	8	7	162	177	91.5%	94	83.0%

Future Work: The ODOW and Winous Point have also begun preliminary discussions with Floating Island International (Shepherd, Montana) to develop an improved artificial nesting platform design. We are still uncertain on the timeline for deployment of the new structure, but we are hopeful to have something in place for the upcoming breeding season. Furthermore, recent discussions regarding offshore structures aimed at reducing wave energy and theoretically improving water quality in Sandusky Bay may offer an additional opportunity to establish common tern breeding habitat in western Lake Erie.

Winous Point works cooperatively with the ODOW on this project by banding tern chicks and monitoring tern nesting, hatching, and fledging. ODOW staff maintain and seasonally remove and install the floating platforms.

Variables affecting Rail Response Rates to Call-Playback Surveys and Their Applications for Estimating Abundance

Investigators: Brendan Shirkey, Mike Picciuto, and John Simpson, Winous Point Marsh Conservancy

Funding: Upper Mississippi River and Great Lakes Region Joint Venture

Introduction: The first research objective identified in the Upper Mississippi River and Great Lakes Joint Venture Water Bird Implementation Plan is the assessment of distribution, abundance, and population trend data to improve secretive marsh bird population estimates. Abundance data for most secretive marsh birds is highly limited or non-existent, thus any improvement could greatly assist the Joint Venture in improving realistic population estimates needed to calculate habitat objective goals.

The standardized secretive marsh bird survey protocol adopted across the Midwest (USA) proposed using distance sampling techniques to estimate abundance. However, for many secretive marsh birds the survey represents a unique application of distance sampling techniques because most observations are auditory and not visual. This has the potential to introduce a major source of bias if every bird in the population is not vocally responding to the traditionally call-playback based surveys. One of the fundamental assumptions of distance sampling is that detection at or very near the survey point or line is 1.0. If this assumption is violated a separate study is often needed to determine what proportion of the population is available to be sampled and then a correction factor can be applied to the distance data. Furthermore, it is currently unknown what variables may influence rail response rates to call-playback surveys and what the implications might be from an abundance estimation standpoint. Hence our objectives are as follows: 1) test the assumption that detection immediately at the survey point = 1.0, 2) investigate variables potentially affecting rail response rates, 3) if detection at the survey point does not equal 1.0, investigate the use of a “correction factor” to estimate abundance.

Methods: We conducted 60 correction factor surveys in 2017 and 70 correction factor surveys in 2018. We completed correction factor surveys by approaching radio-marked rails to less than 30 meters (Figure 1). One fundamental assumption of this research is that detection probability during the correction factor survey is 1.0 (i.e., if a rail calls, the observer will hear it every time). Through investigation of historical distance sampling data and observer experience, we assumed 30 meters to be a conservative cut-off for the distance at which all calling rails can be heard regardless of observer ability or environmental conditions. We approached rails as close as possible without risking disturbing the birds and then stopped to conduct a standardized secretive marsh bird survey. After completing the survey, the exact distance from the observer to the radio-marked bird was determined either by the location of the bird’s vocalization or by

approaching the radio signal until the bird was flushed from its initial location. This ensured that birds were within the 30 m distance cut-off and that the bird was both alive and had not simply lost its transmitter. We collected a host of environmental and other variables as outlined by the standardized secretive marsh bird protocol to examine their potential impact on rail response rates including date, time, precipitation, cloud cover, temperature, wind, background noise, and observer. Finally, we recorded whether the radio-marked individual or any non-marked rails responded.



Figure 1. Captured Virginia Rail equipped with a vhf radio transmitter.

Results: We found that 46.9% of Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*) responded during a standard secretive marsh bird survey. The top-ranked predictive model for rail response rates estimated rail response rate directly at the survey point to be 60%. We generated an *a priori* list of candidate logistic regression models consisting of variables potentially influencing rail response rates to the standardized secretive marsh bird survey. The top ranked included the categorical variable “conspecific” (i.e., whether another rail of the same species also responded during the survey). The second most competitive model included both “conspecific” and “distance” (measurement of distance in meters between the observer and the bird). We found rail response rate increased significantly if other conspecifics also called (0.60 compared to 0.40 if conspecifics did not call) and that rail response rate decreased as distance between the observer and the radio-marked individual increased (Figure 2).

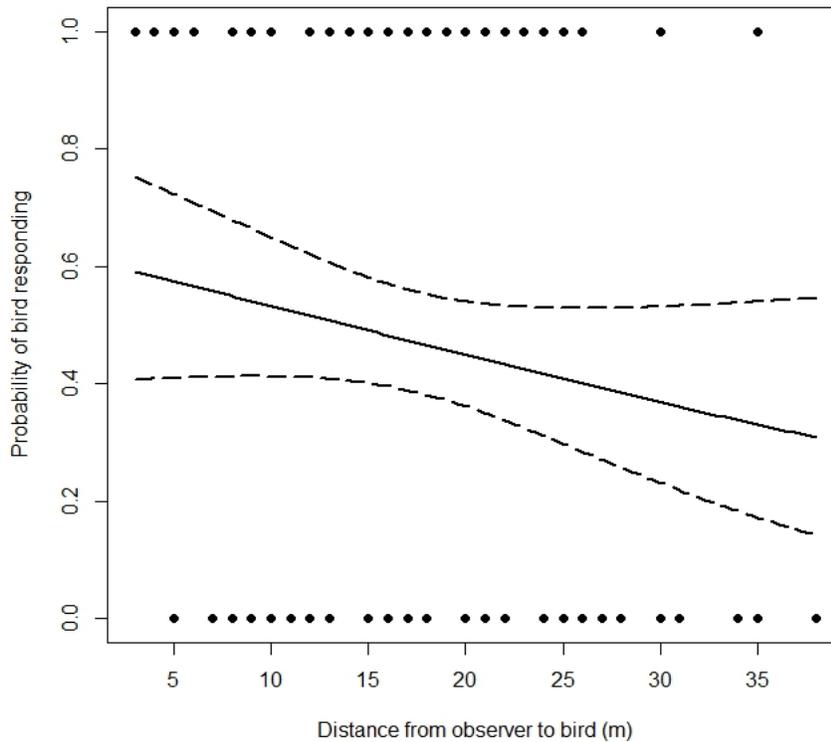


Figure 2. Probability of a radio-marked rail responding during a secretive marsh bird survey dependent on distance between the bird and the observer.

We completed three marsh bird survey routes ($n = 27$ survey points) on Winous Point Marsh Conservancy (WPMC) property during each of the three secretive marsh bird survey windows (Ohio's 1st window = May 7-17; 2nd window May 24-June 2; 3rd window = June 9-19). Detections for Virginia rail and sora were limited with 16 detections during the 1st window, nine during the 2nd, and only one during the 3rd window. We were able to generate abundance estimates using our correction factor and distance sampling protocol for the first two survey windows, however we had to combine Virginia and sora rail detections to do so. The abundance estimate for Virginia rail and sora combined on WPMC property during the 1st survey window was 1,228 individuals (95% CI = 449-3,358) and abundance during the 2nd window was an estimated 207 individuals (95% CI = 62-689).

Discussion: Approaching and conducting secretive marsh bird surveys to radio-marked individuals proved to be an effective, although labor intensive, technique for disproving the assumption that detection probability is 1.0 directly at and adjacent to survey points. Sample size is still limited but for Virginia rail and sora only 60% of individuals respond to the secretive marshbird survey even when the observer is located within several meters of the individual. We did not find a significant difference in Virginia rail and sora response rates between years or

through time. This suggests that distance sampling could be used to track abundance between years and between surveys and is at least a reliable index of rail populations. Further information regarding rail response rates across space and time is needed before reliable abundance estimates can be made.

We documented a significant decline in Virginia rail and sora abundance between the 1st and 2nd secretive marsh bird survey windows. This finding supports concurrent research conducted by Ohio State University that has found a significant number of radio-marked rails leave WPMC property during Ohio's secretive marsh bird survey windows (see the following article). This finding suggests many migrant rails are likely present during the 1st and maybe even 2nd survey window and the 3rd survey window may be most representative of the breeding population. Consequently, our region of the Joint Venture appears to be more important to Virginia rail and sora as migratory stopover habitat relative to breeding habitat.

Winous Point has undertaken this project to inform population objectives developed by the Upper Mississippi Great Lakes Joint Venture. Funding for this project comes from the Upper Mississippi Great Lakes Joint Venture and will continue through 2019.

Population Monitoring, Ecology, and Habitat Relationships of Sora and Virginia Rails in Northwestern Ohio – Part I

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

Schedule: 2016 - 2019

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 sora will also inform habitat management recommendations for these two species. Specific project objectives include:

1. Determine distribution, occupancy, and relative abundance of sora and Virginia rails using the National Marsh-bird Monitoring Protocol and an automated call-playback /trail camera system.
2. Identify local landscape, habitat, and microhabitat factors associated with occupancy rates and seasonal home range and movement patterns of radio-marked sora and Virginia rails
3. Assess and compare the efficacy of survey protocols (National Protocol and automated system) with regard to meeting fundamental assumptions of distance sampling and occupancy modeling and recommend improvements to statewide marsh-bird survey design, methodology, and analyses.
4. Estimate demographic vital rates including breeding and post-breeding season survival, nesting success, and phenology of life history events including migration arrival and departure, nesting, and post-nesting.
5. Evaluate or model viability and resilience of sora and Virginia rail populations to sustain harvest levels under the current regulatory framework using data collected by the Harvest Information Program and results from this study.

Results: Our third field season at the Winous Point Marsh Conservancy (WPMC) commenced with trapping on 29 March 2018. We captured 48 soras and 145 Virginia rails through 5 July

2018. We deployed VHF radio-transmitters on 120 rails (31 soras and 89 Virginia rails) and VHF coded radio-transmitters (hereafter nanotags) on 41 Virginia rails. No rails were recaptured from banding efforts conducted in previous years. Rails equipped with radio-transmitters were tracked from date of capture to when their signal was lost or the rail was found dead. Only six Virginia rails remained at WPMC from date of capture through the onset of fall migration, approximately 1 September. Daily ground searches and monthly aerial searches were made to locate missing radio-marked rails during March – October 2018. Search efforts found rails at nine state, federal, and privately-owned wetland complexes in the area after disappearing from WPMC. Rails stayed at these off-site locations for 1 – 126 days. The last radio-marked rails departed WPMC and the surrounding area by 25 October 2018.

Radio-triangulated and homing locations were gathered on rails to determine their home range size and distribution. We recorded 1 – 60 locations ($\bar{x} = 7.71$) for 104 radio-marked rails during 30 March – 28 August 2018. Using Minimum Convex Polygon (MCP) and Fixed Kernel Density (KDE) methods, 23 home ranges were estimated for radio-marked Virginia rails (Figure 1). The MCP method was used when a rail had 10 – 19 locations, and the KDE method was used for rails with ≥ 20 locations. Mean home range size was 3.17 ha for Virginia rails. None of the radio-marked soras had enough locations to generate home ranges.



Figure 1. MCP and KDE home ranges of radio-marked Virginia rails at WPMC during 30 March – 28 August 2018.

Nanotags were registered with the Motus Wildlife Tracking System that uses automated radio-telemetry towers to detect tagged individuals. Since April 2018 we have been maintaining 14 towers along the western basin of Lake Erie; however, the Motus network extends worldwide, and we have access to all uploaded data connected to our tagged rails. Thirty of 41 tagged rails were detected at least once in the Motus network during 23 April – 10 December 2018. We are currently developing a standardized protocol for filtering Motus tower detections to refine the preliminary analysis of detections to date.

In addition to capturing and tracking rails, we also conducted habitat assessments with the objective of analyzing movement patterns and habitat selection of Virginia rails and soras in response to changing marsh management regimes. We conducted a total of 358 water surveys and 244 vegetation surveys at known locations of radio-marked rails and paired random locations on a weekly basis during 4 April – 15 August 2018. Each location was categorized into a habitat class based on the Integrated Waterbird Management and Monitoring approach developed by the U.S. Fish and Wildlife Service and then further separated into a habitat type based on land cover and vegetation species. Rails were located in areas characterized by emergent vegetation 78% of the time while no rail locations were in scrub-shrub or forested areas (Table 1). Survey measurements included water depth, distance to open water, distance to edge, visual obstruction, percent cover, and interspersions within a 10-m radius plot. Preliminary analysis of these measurements has shown the differences between rail locations and random locations are not statistically significant; therefore, more detailed analysis of the habitat assessments in connection with movement patterns and habitat selection are in progress. Habitat assessments will continue in the upcoming 2019 field season.

Table 1. Categorization and summary of habitat assessments into habitat classes and if applicable habitat types for radio-marked rail locations and random locations.

Habitat Class – Habitat Type	Rail Locations	Random Locations	Total
Water – Open Water	14	22	36
Water – Submergent Aquatic Vegetation	2	3	5
Water – Floating-Leaved Vegetation	10	9	19
Bare Ground	0	2	2
Emergent – Cattail/Bur-reed	54	41	95
Emergent – Rose mallow/Reed canary	28	35	63
Emergent – Loosestrife	2	2	4
Emergent – Phragmites	9	4	13
Emergent – Broadleaf	1	2	3
Emergent – Moist Soil	2	1	3
Scrub-Shrub	0	0	0
Forest	0	1	1
Total	122	122	244

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.

Population Monitoring, Ecology, and Habitat Relationships of Sora and Virginia Rails in Northwestern Ohio – Part II

Investigators: James Hansen, Nicole Hengst, Bob Gates and Chris Tonra, Ohio State University; Laura Kearns, Ohio Division of Wildlife; and Brendan Shirkey and John Simpson, Winous Point Marsh Conservancy

Collaborators: Tom Kashmer, Sandusky County Park District; Mark Shieldcastle, Black Swamp Bird Observatory; Dr. David Kremetz and Auriel Van der Laar Fournier, University of Arkansas

Schedule: 2016 - 2020

Introduction: Secretive marsh birds (i.e. rails, bitterns, and gallinules) have been monitored using the standardized North American marsh bird monitoring protocol (NAMBMP) across much of the upper Midwest over the past decade by federal, state, and non-governmental organizations to investigate changes in their abundance and distribution. The NAMBMP was developed as a tool to monitor marsh birds in a standardized fashion across multiple bird conservation regions and relies on volunteers and natural resource personnel to visit marshland habitat 3 times during the breeding season to survey for marsh birds and assess their overall abundance (Conway et al. 2011). Recent research has indicated that a large proportion of two secretive marsh bird species, Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*), may be migrating from monitored areas along the coastal marshes of Western Lake Erie during the secretive marsh bird monitoring period, thus incorporating bias into estimates of breeding abundance for these species (Hansen, unpublished thesis). This project aims to investigate the intra-seasonal movements of Virginia rail and sora during the breeding season and how changes in the sampling frequency and timing of NAMBMP surveys may affect estimates of abundance for these species in northern Ohio.

Methods: Virginia rails and sora were captured at the Winous Point Marsh Conservancy (WPMC) during 26 March – 05 July 2018 using 12 walk-in funnel traps equipped with audio-lures (see Hengst 2018 Winous Point Annual Report for additional capture and radio-marking descriptions). Radio-marked birds were tracked from the first day after capture until they were found dead or no longer could be found on the study area. We repeatedly searched the north and south marshes of WPMC and surrounding managed marsh areas to locate missing birds from aircraft and on the ground. Aerial telemetry flights to locate missing birds were flown 6 times over the Lake Erie coastal marsh region in northern Ohio during 11 May – 25 October 2018. Locations for secretive marsh bird monitoring surveys (38) were selected from the north marshes of WPMC (18), Ottawa National Wildlife Refuge (ONWR, 10), and Pickerel Creek Wildlife Management Area (PWMA, 10) in early April 2018. Secretive marsh bird surveys were

conducted within four 2-week survey windows during 7 May – 29 June 2018. We recorded visual and aural detections to estimate detection probability and abundance of sora, Virginia rail), king rail (*Rallus elegans*), American bittern (*Botaurus lentiginosus*), least bittern (*Ixobrychus exilis*), and common gallinule (*Gallinula chloropus*).

Results: A total of 193 sora (48) and Virginia rails (145) were captured through 05 July 2018 (see Hengst 2018 Winous Point Annual Report for additional capture results). One hundred twenty-six of 139 (90.6%) rails marked with VHF and pulse-coded nanotag transmitters (excluding 22 rails found dead) apparently emigrated from WPMC within 1-63 days post-capture (median = 6 days for sora, 8 days for Virginia rail). The largest number of departures (52) occurred during the first survey window (Figure 1). Sixty-one percent of radio-marked rails (77 of 126 total apparent emigrants) apparently left the study area during the three Standardized National Marsh Bird Monitoring Survey windows (07 May – 19 June 2018). Twenty-two Virginia rails that departed from WPMC were detected from the ground or air at ONWR (7), Cedar Point NWR (2), Magee Marsh WMA (2), Metzger Marsh WMA (1), PWMA (1), Bayview Marshes (1), Ottawa Shooting Club (1), Toussaint Hunt Club (2), and the WPMC south-side property (5). No other radio-marked individuals were located on subsequent flights and ground

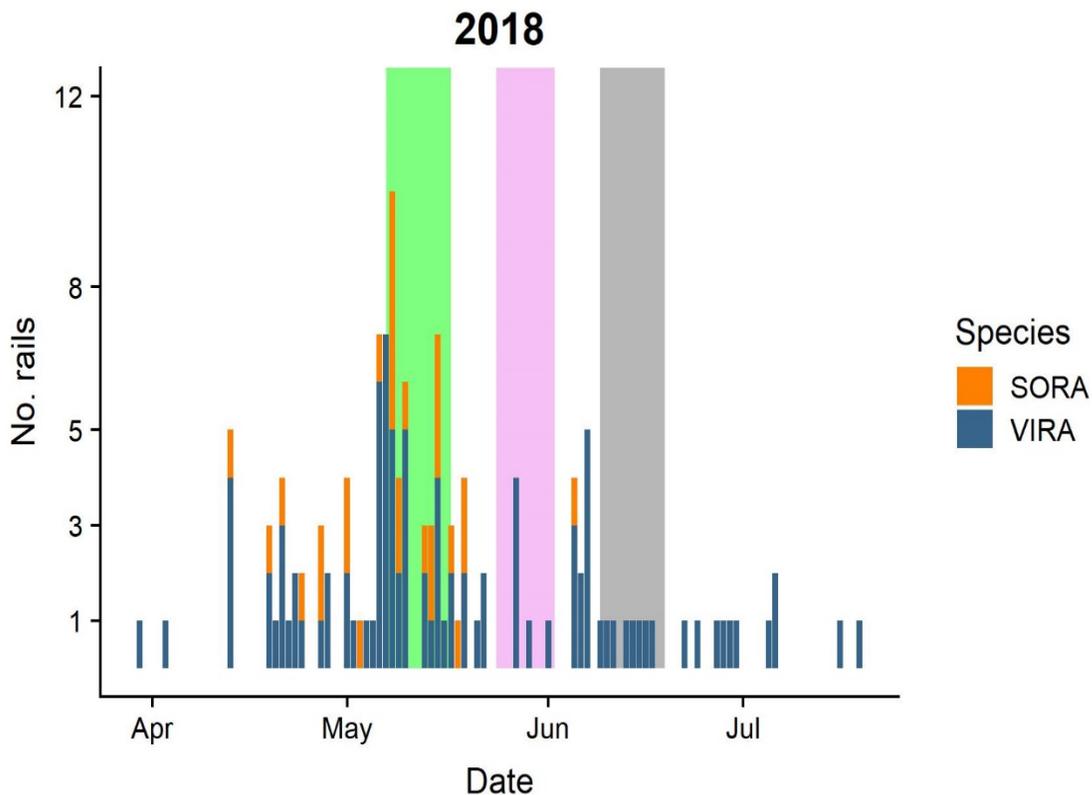
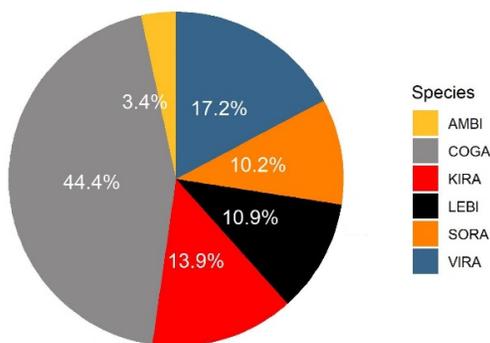


Figure 1. Numbers of Virginia rails and sora that apparently emigrated from Winous Point Marsh Conservancy in Ottawa and Sandusky Counties, OH during 26 March – 01 August 2018. Green, pink, and gray shaded boxes correspond to the start and end dates of the first, second, and third survey windows for Ohio under the North American marsh bird monitoring protocol.

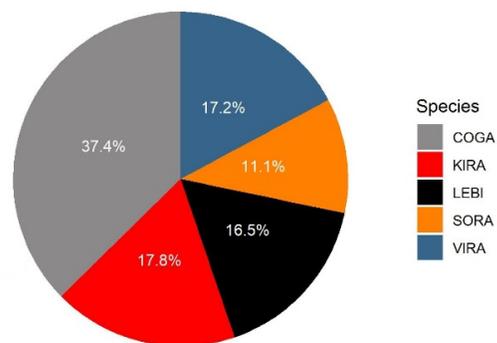
tracking, so we presumed that most if not all birds whose signals we lost had left the area.

A total of 830 detections were recorded for least bittern (LEBI, 75), sora (SORA, 70), Virginia rail (VIRA, 118), king rail (KIRA, 95), American bittern (AMBI, 23), and common gallinule (COGA, 304). We recorded two and a half times more common gallinule detections than any of the other five species (Figure 2). Species richness was highest at ONWR, and the relative proportion of species detections varied among all three sites (Figure 2). Detections of sora peaked in early-May and declined sharply after mid-May (Figure 3). Detections of king rails and Virginia rails peaked in late-May to early-June and remained relatively constant throughout the survey season. American and least bittern detections remained low compared to Virginia rail and sora but were consistently detected during early May to late June (Figure 3). Common gallinule detections varied widely throughout all three survey periods. Analysis of abundance estimates for Virginia rail and sora are currently in progress.

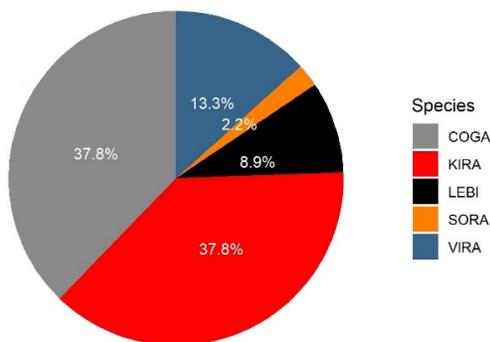
All Sites Combined - 2018



Winous Point Marsh Conservancy



Pickrel Creek WMA



Ottawa Nat'l. Wildlife Refuge

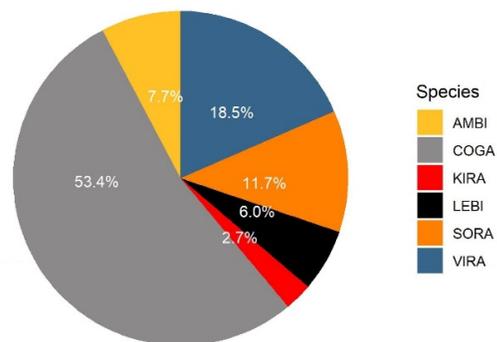


Figure 2. Proportions of total detections for six focal marsh bird species across and within all marsh bird surveys sites in Ottawa and Sandusky Counties, OH during 07 May – 29 June 2018.

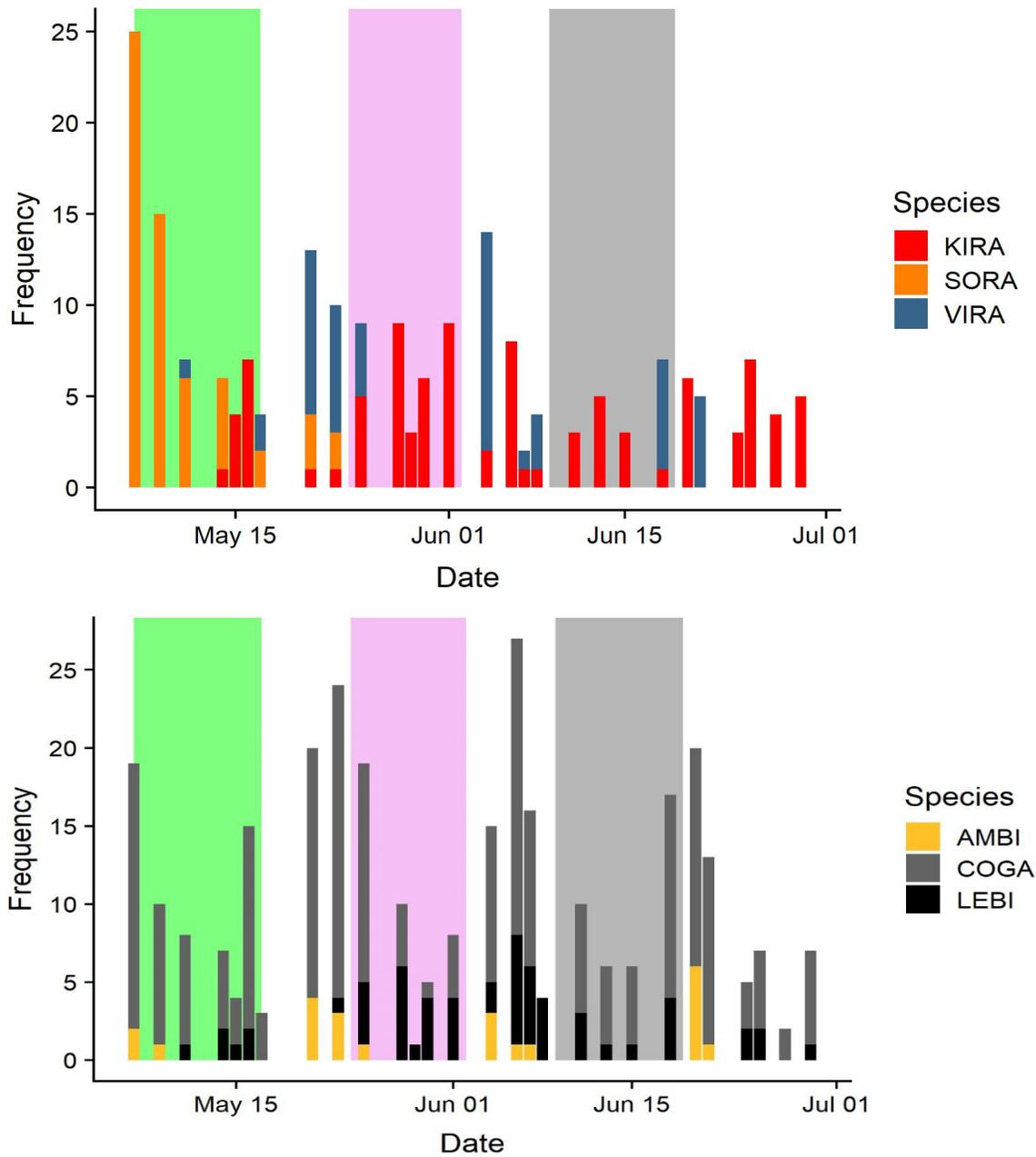


Figure 3. Numbers of sora, Virginia rails, and king rails (Top), and American bittern, common gallinule, and least bittern (Bottom) detected during surveys conducted in Ottawa and Sandusky Counties, OH during 7 May – 29 June 2018. Green, pink, and gray shaded boxes correspond to the start and end dates of the first, second, and third survey windows for Ohio under the North American marsh bird monitoring protocol.

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 and Occupancy Modeling Use in Lake Erie Coastal Wetlands

Investigators: Michelle Kane and Thomas Gehring, Central Michigan University; Brendan Shirkey, Michael Picciuto, and John Simpson, Winous Point Marsh Conservancy

Schedule: 2018 – 2019

Introduction: The Second Atlas of Breeding Birds in Ohio estimates fewer than 140 king rails (*Rallus elegans*) remain in Ohio, where they were once the most abundant breeding rail species. Due to their decline, king rails are listed as threatened or endangered in 12 states. Although their secretive nature makes them difficult to study, king rail decline has been linked to habitat loss. One of the problems that has plagued studies of king rails in the Midwest is low detection rates. During two years of research at the Winous Point Marsh Conservancy, standardized callback surveys for marsh birds failed to detect any king rails, but trail cameras baited with recorded king rail calls detected at least 13 individuals. The presence-absence data gained from trail cameras allows the estimation of site occupancy with occupancy modeling techniques. Occupancy modeling can be used to describe a species' habitat by determining which habitat variables best discriminate between locations where the species is present and where the species is absent.

Gaining a further understanding of the migrant Midwest population of king rails and their habitat is critical for conservation. One of the objectives of this research is to analyze previously collected satellite transmitter data to determine king rail autumn and spring migration routes and chronology, wintering locations, potential to be harvested, and summer and winter home ranges. This will provide an improved understanding of when and where king rails migrate and winter, allowing for effective management recommendations. The other objective of this project is to use data collected from trail cameras deployed at Winous Point and other Lake Erie coastal wetlands to create an occupancy model. This model will inform researchers and managers of king rail habitat needs and their relationship with other secretive marsh birds. This information will be useful to direct where more intensive surveys for king rails should be done, to highlight areas with habitat that may be suitable for king rails, and to better understand the relationship between king rails and local-scale habitat variables.

Methods: King rails were captured at the Winous Point Marsh Conservancy from 2015 – 2017 using whoosh nets and walk-in traps. King rails larger than 300 grams were outfitted with 9.5-g solar PTT satellite transmitters. Four satellite transmitters remained active through autumn migration and two satellite transmitters remained active during spring migration. Migration distances were calculated by creating a line between transmission locations on days of migration and measuring Euclidean distance. Information on hunting seasons was gathered from state agency websites and compared with the days a transmitting king rail spent time in the state.

Home ranges were calculated using the autocorrelated kernel density method available in package `ctmm` in R.

Sampling for the occupancy modeling portion of this project began in the summer of 2018 and will continue in summer 2019. To gather presence-absence data, Moultrie M40 trail cameras were set up in the wetland. From May 2nd to August 22nd, 2018, equipment was deployed at the Metzger and South units of Winous Point Marsh Conservancy and the Darby, Navarre, and Main units of Ottawa National Wildlife Refuge. During the summer of 2019, additional data will be gathered by placing equipment at these and other wetland sites around Lake Erie. Habitat information will be collected from GIS data and information on other marshbird species will be obtained by conducting callback surveys near each camera point, following the protocols outlined in the Great Lakes Coastal Wetland Monitoring Plan. Once all data has been collected, occupancy models will be created with the program PRESENCE.

Results: Departure dates from the breeding range varied from August 30th to October 20th. Autumn migration for all birds was completed in ≤ 5 days, and the average speed was 431 (± 50) km/day. During autumn migration, three individuals migrated from Ohio to the Gulf Coast, and one individual migrated from western Pennsylvania to the southern Atlantic coast (Figure 1). Spring migration lasted longer and had more apparent stopovers than autumn migration. During spring migration, both tracked individuals had prolonged stopover events (10 and 23 days). One individual migrated from Louisiana to Indiana, returning to the upper Midwest on April 20th. The other individual migrated from Georgia to Louisiana, indicating likely immigration and emigration between resident and migratory king rail populations. All king rails studied were exposed to potential harvest, and the number of days an individual was potentially exposed to harvest ranged from 34 to 70 days. During summer, home range size varied from 2.12 – 11.02 km², with an average size of 4.96 km². During winter, home range size varied from 2.04 – 8.58 km², with an average size of 4.82 km². A paired *t*-test showed no difference between home range sizes during the breeding season and winter for birds with data available for both ($p=0.77$). Habitat correlates with home ranges are currently being analyzed.

During 2018, presence-absence data for occupancy modeling was collected from 28 sites. Callback surveys found no detections of king rails. Trail cameras detected four individual king rails at three sites. Three individuals were located in the Metzger unit of Winous Point Marsh Conservancy and one in the Darby unit of Ottawa National Wildlife Refuge (Figure 2). All detections of a king rail occurred before June 1st, 2018. During the summer of 2019, the sampling timeframe will shift to mid-April through the end of June to better target when king rails are responsive. After data collection ends in 2019, presence-absence data will be analyzed, and an occupancy model will be created.

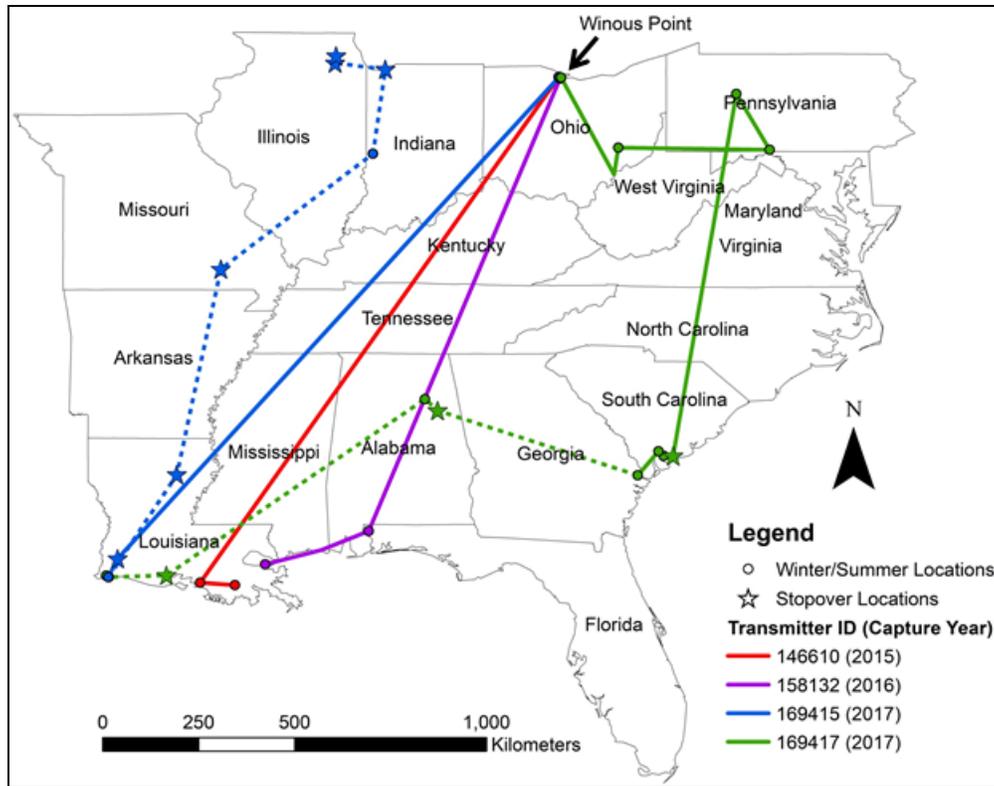


Figure 1. Migration routes of four king rails captured at Winous Point Marsh in Port Clinton, OH from 2015 - 2017. Autumn migration routes are shown as solid lines, and spring migration routes are shown as dashed lines. The centers of winter/summer locations are displayed as points. The centers of groups of stopover locations are displayed as stars.



Figure 2. An image of two king rails captured in the Metzger Unit of Winous Point Marsh Conservancy.

Additional Research and Education Programs Supported by WPMC in 2018

In addition to the projects detailed above, Winous Point annually supports a variety of projects with partners who utilize Winous Point as a study area or for logistical support. While these projects are not directly initiated by WPMC, they are nonetheless important to conservation in northwest Ohio and help WPMC attain program objectives.

- Waterfowl managers currently assume that black ducks harvested in the United States and Canadian provinces originate from the same breeding population, however significant differences exist in the age ratios (i.e., number of adults compared to juveniles in the annual harvest) between black ducks harvested in Canada as compared to those harvested in the US. This distinction in regional age ratio may indicate the presence of two different breeding populations with two different rates of breeding success. Doug Tozer (Director Long Point Waterfowl), and Keith Hobson (Professor at Western University, Ontario CA), plan to perform stable isotope analyses on black duck wings collected from throughout Eastern US and Canada to learn more about the origins of harvested American black ducks. A stable isotope analysis investigates the fraction of isotopes of Hydrogen ($\delta^2\text{H}$), Carbon ($\delta^{13}\text{C}$), and Nitrogen ($\delta^{15}\text{N}$) within feather tissue and uses them as biological markers. Different geological regions will have unique isotopic signatures depending on the vegetative community, precipitation, and other geochemical processes. This concept can be used to estimate where birds grew their feathers and therefore where their breeding population exists. Winous Point Marsh Conservancy has contributed by coordinating the collection of black duck wings from private duck clubs in northwest Ohio. After collection, the Ohio Division of Wildlife will be sending wings to the Environment and Climate Change Canada's National Hydrology Research Centre to be analyzed.
- For the eighth consecutive year USDA Ohio Wildlife Services conducted trapping efforts as part of an integrated approach to managing meso-predator populations, mainly raccoons (*Procyon lotor*), in northwest Ohio. The focus of the project is on increasing the nesting success and enhancing the survival rate of the state-listed threatened Blanding's turtles (*Emydoidea blandingii*) and spotted turtles (*Clemmys guttata*). WPMC acts as a study area and logistic hub for housing and storage for this Great Lakes Restoration Initiative funded project.
- Winous Point Marsh Conservancy collected mallard hearts throughout the 2018 hunting season as part of an OSU study investigating the use of alfaxalone as an avian sedative. We collected over 400 mallard hearts for examination as previous work suggested a specific heart defect may have been linked to complications with alfaxalone. Since its limited approval in 2014, alfaxalone has been commonly used in both induction and

maintenance of anesthesia in dogs and cats in the United States and is widely used for veterinary purposes in Australia. OSU veterinarians and veterinary professors (Tamara Kruze, Josh N. Lorbach, Andrew S. Bowman, Mark S. Flint) organized and conducted trials on 18 captive mallards and some wild mallards. In these trials, captive and wild-trapped mallards were administered alfaxalone and monitored to determine the pharmacokinetic and pharmacodynamic effects of the drug. Pharmacokinetics involves evaluating how quickly the drug takes effect, the peak concentration of the drug, and how quickly the drug is eliminated from the blood stream. Pharmacodynamics measures the physiological effect the drug has on the mallard (ie. heart rate, respiration rate, level and duration of sedation). The choice to collect hearts was predicated on the discovery that a few ducks went into cardiac arrest after being administered various dosages of alfaxalone. This was likely caused by a congenital cardiac atrial septal defect, which is a hole in the wall between the left and right atrium chambers of the heart. This study will continue into 2019 and WPMC we will continue to trap mallards for trials.

- We also participated in a number of educational programs this past year. For the seventh year in a row we hosted “A Day on the Wild Side” which is a youth outdoor education program targeted at middle-school age students and organized by the Ottawa Soil and Water Conservation District. Activities include shooting and fishing, wetlands education, and bird research. We also assisted at with instructing at the 5th annual “Waterfowlers of Tomorrow” event held at Ottawa National Wildlife Refuge each fall. This event focuses on waterfowl hunting and includes a mentored hunt after the day-long sessions. Winous Point Marsh Conservancy also annual administers Conservation Club Grant funding from the Ohio Division of Wildlife and U.S. Sport Fish and Wildlife Restoration Fund that helps fund these events.

2018 WPMC Activities and Presentations

January	Attended Midwest Fish and Wildlife Conference, Milwaukee, WI
January	Attended Upper Mississippi Great Lakes Joint Venture science meetings, Milwaukee, WI
January	Attended Ohio Fish and Wildlife Management Association Conference, Columbus, OH
March	Erie/Ottawa/Sandusky County Pheasants Forever Banquet
March	Presented at Ohio State University Extension “Woodland, Wildlife, and Water” Seminars, Mansfield, OH
March	Presented Northwest Ohio County Association Invasive Species Management Workshop, Toledo, OH
March	Presented at Ashland University’s Conservation Seminar Series, Ashland, OH
March	Attended Long Point Waterfowl Science Advisory Committee meeting, Port Rowan, Ontario, Canada
March	Hosted Northwest Ohio Purple Martin landowner workshop
April	Hosted conservation group meeting with State Representative Steve Arndt
April	Hosted and presented Lake Erie Marsh Owners Annual Winter meeting
April	Upper Mississippi Great Lakes Joint Venture Bird Conservation Workshop, Columbus, OH
April	Hosted Ottawa County Business Leaders meeting and tour
April	Hosted Terra Community College Birdwatching class meeting
May	Hosted WPMC annual meeting
May	Black Swamp Bird Observatory birdwatching tours (3)
May	Hosted Project Wild leadership team meeting and tour
June	Hosted Midwest Wetlands Graduate Student Symposium
June	Hosted Ohio Division of Wildlife Banding training session

July UMGL Joint Venture Waterfowl Science Team meetings

July Attended graduate student Kristi Stein's thesis defense, Columbus, OH

July Attended Lake Erie Marsh Association summer meeting, Fremont, OH

July Hosted "A Day on the Wildside" youth conservation camp

July/August Sandusky County Park District shorebird tours (4)

September Hosted Ohio Youth Birders Club workshop and field trip

August Hosted Green Creek Wildlife Society landowner workshop

October Attended and presented at the Wildlife Society National Conference, Cleveland, OH

October Lake Erie Water Quality Collaborative Learning Group Meeting, Toledo, OH

October Hosted US Fish and Wildlife Service National Refuge System Chiefs tour

October Participated in graduate student Maggie Kenna's thesis defense, Macomb, IL