Winous Point Marsh Conservancy

2016 Research and Activities Report

February 2016

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On the cover: Migrating waterfowl congregate in a managed moist-soil wetland at the Winous Point Marsh Conservancy, March 2016.

Winous Point Marsh Conservancy

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Executive Summary

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Another incredibly busy, successful, and rewarding year drew to a close at the end of 2016. Although not covered within the contents of this research report, the WPMC achieved a substantial milestone this year with the enrollment of just over 1,000 additional acres of its land into the federal Wetlands Reserve Easement program. This brings the total WPMC landholdings under permanent easement to 2,000 acres. These wetlands represent approximately 6% of the remaining coastal wetlands in Ohio and will be permanently protected as such under these easements.

Winous Point staff-members were busy again disseminating research and knowledge to academic and management audiences in 2016. Collectively we attended more than ten conferences and professional meetings, gave ten or more presentations on waterbird research and wetlands management, and attended several professional training opportunities. Some of the highlights included presenting secretive marshbird research at the American Ornithological Association conference in Washington, D.C.; hosting the Upper Mississippi River Great Lakes Joint Venture Management Board meetings; and receiving the Ohio Ornithological Societies Award for Dedication to Scientific Research.

Our research program continues to grow and diversify. Secretive marshbird research that we started in 2006, and in earnest in 2014, has expanded to include ongoing pilot projects for king rails (Page 39), a new graduate student, Jim Hansen, working on Virginia rails and soras (Page 32), and several new project ideas currently under grant submission. In addition to rail research, we continued an ongoing collaborative project with PhD candidate Matt Palumbo and Long Point Waterfowl, deploying another 25 satellite-marked mallards in Muddy Creek Bay (Page 6) and expanded our ongoing cooperative agreement with the Ohio Division of Wildlife (ODOW) to continue cooperative duck banding (Page 14) and ongoing king rail and Virginia and sora rail projects. In 2017 we hope to wrap up a three-year project examining Submerged Aquatic Vegetation within midwestern wetlands in partnership with the Upper Mississippi Great Lakes Region Joint Venture and Illinois Natural History Survey (Page 27). Lastly, we continue to welcome and support regional graduate research when possible, in 2016 and 2017 we housed students Kristie Stein researching black-crowned night herons (Page 23) and Jay Wright researching rusty blackbirds (Page 44).

The coming year will again be filled with projects and research. In addition to the ongoing protection and management of our own marshes in 2017, we are working on expanding and strengthening our cooperative agreement with the ODOW, seeking additional funding for continued secretive marshbird survey work, hosting the "Partners Forum" regional wetlands student symposium, hosting a Sea Duck Joint Venture Great Lakes information retreat, and working with TNC and University of Toledo to evaluate alternative wetland restoration techniques for open waters of Muddy Creek Bay and Sandusky Bay. We continue to be excited about ongoing research and conservation opportunities here in northwest Ohio.

The Winous Point Marsh Conservancy has been able to continually grow, evolve, and develop as a result of the generous support and dedication we receive from our trustees, donors, partners, and neighbors. We genuinely value the support that our partners and contributors bring Winous Point and look forward to many challenges and accomplishments next year and beyond.

Regards,

John Simpson

Influenza A virus surveillance in wild, free-ranging waterfowl at Winous Point Marsh, Port Clinton, OH: 1986-2016

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

Collaborators: USDA National Research Initiative, The Ohio State University, Ohio Division of Wildlife, Winous Point Marsh Conservancy, other private landowners.

Schedule: 1986 - Present

Summary: For more than twenty years the Winous Point Marsh Conservancy (WPMC), the Ohio Department 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, free-ranging ducks (Figure 1). 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 the duck population 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 PhD projects through this long-standing collaboration. In 2016, the Winous Point Marsh Conservancy also hosted NIH Center of Excellence for Influenza Research and Surveillance investigators to demonstrate how wild bird surveillance is collected in this unique setting.

Publications:

1. Nolting JM, Fries AC, Gates RJ, Bowman AS, Slemons RD. "Influenza A viruses from over-wintering and spring-migrating waterfowl in the Lake Erie Basin, United States." Avian Dis. 2016 May;60 (1 Suppl):241-4. doi: 10.1637/11138-050815-ResNoteR

2. Urig HE, Nolting JM, Mathys DA, Mathys BA, S Bowman A. "Influenza A Virus Surveillance in Underrepresented Avian Species in Ohio in 2015."
   J Wildl Dis. 2017 Jan 4. doi: 10.7589/2016-05-106. [Epub ahead of print]

3. Krauss S, Stallknecht DE, Slemons RD, Bowman AS, Poulson RL, Nolting JM, Knowles JP, Webster RG "The enigma of the apparent disappearance of Eurasian highly pathogenic H5 clade 2.3.4.4 influenza A viruses in North American waterfowl."
   Proc Natl Acad Sci U S A. 2016 Aug 9;113(32):9033-8. doi: 10.1073/pnas.1608853113.

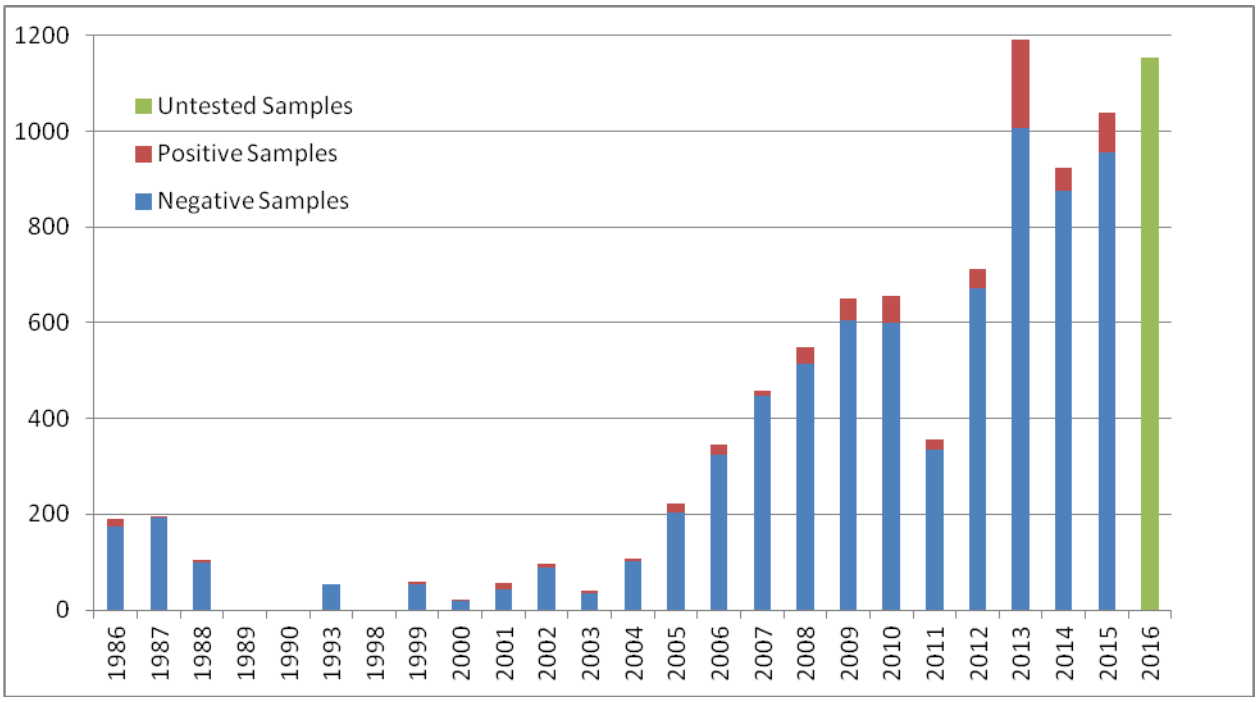

Figure 1. Total number of samples collected at WPMC by year since 1986 and number of type A influenza viruses recovered from these samples (Positive).

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.

Habitat selection and survival of mallards in the Lake St. Clair and Sandusky Bay region during autumn and winter

Investigators: Matthew Palumbo Ph.D. student, Long Point Waterfowl, Western University; Dr. Chris G. Guglielmo, Western University; Dr. Michael Schummer, Long Point Waterfowl Scientist; John Simpson and Brendan Shirkey, Winous Point Marsh Conservancy, Port Clinton, OH; Canadian Wildlife Service; and Ohio Division of Wildlife

Schedule: 2014 - 2017

Summary: The Lake St. Clair region of southern Ontario and the wetlands of western Lake Erie provide important staging habitat for millions of waterfowl from the Atlantic and Mississippi Flyways. Unfortunately, this region has experienced significant habitat loss and degradation. The habitat that remains is threatened by additional loss in addition to stress from invasive species, industrial development, and population growth. Additionally, these wetlands may continue to experience increased demands by waterfowl as a result of warmer winters leading to significant increases in overwintering population size.

Despite the threats to waterfowl habitat and the potential for increased future use, little is known about how waterfowl use the remaining habitat and how this use impacts their survival during autumn and winter. This project will estimate waterfowl use of different habitat types (e.g. flooded agriculture, dry agriculture, open water, emergent marsh) and how this use is influenced by land management practices. The project will also examine how daytime (diurnal) and nighttime (nocturnal) habitat use varies and how that variability impacts fall and winter survival.

2016 Project Update: Winous Point staff deployed an additional 25 satellite transmitters in 2016 at the Muddy Creek Bay study area. Previous to this, Winous Point had deployed transmitters in 2015 (22) and Long Point Waterfowl deployed transmitters in 2014 (20) and 2015 (40), respectively (Figure 1). Each of these transmitters provides up to six daily GPS locations on a duck and will download data via cellular towers. In addition, each point is tagged with date, time, and a host of other information that can be interpreted for habitat selection analyses.

Figure 1. Female mallard equipped with a solar-powered GPS transmitter.

Of the 25 transmitters deployed, three were predated prior to duck season and six left the study area, leaving 16 active transmitters in the Muddy Creek Bay study area at the beginning of the fall waterfowl hunting season. In contrast to 2015 when eight of our marked birds were harvested by hunters, only two were harvested in 2016 and both of those late in the season outside of Muddy Creek bay. All birds departed the study area in early December with the onset of a sudden deep freeze and as typical of all mallards we band and mark at Winous Point, migration routes were short and ended within Ohio or neighboring states (Figure 2).

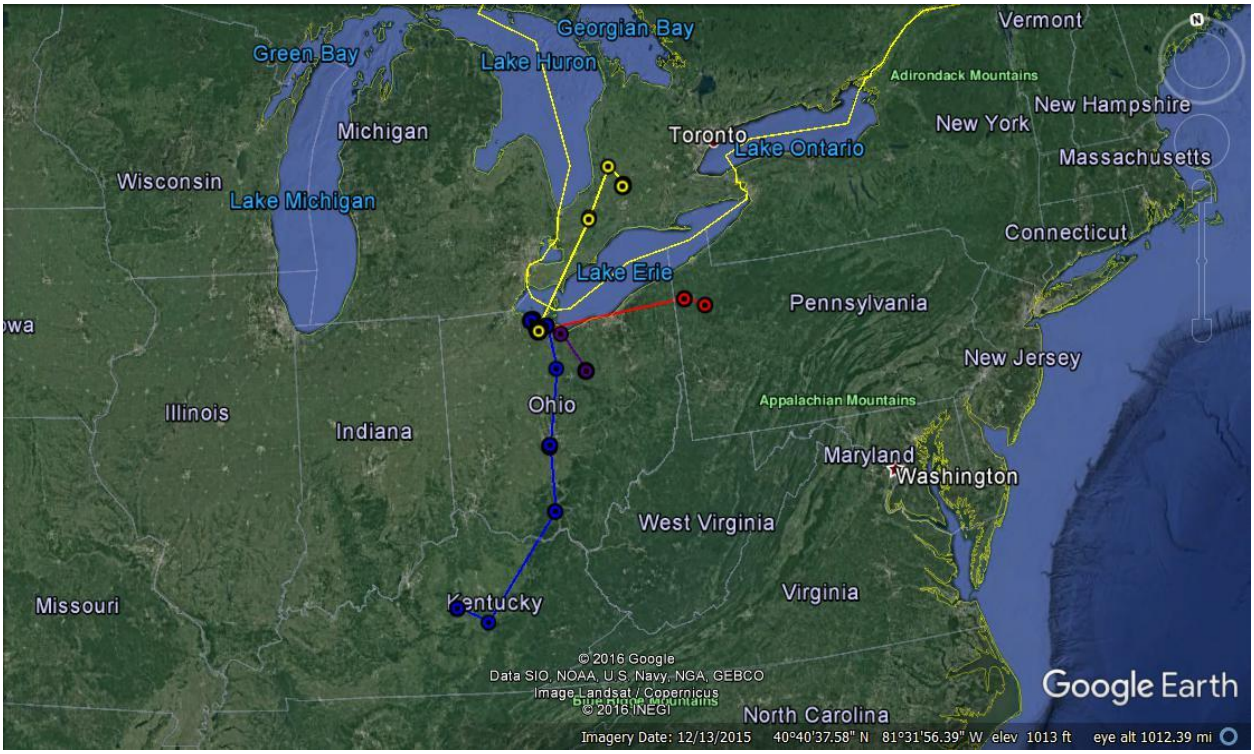

Figure 2. Migration routes for selected marked mallards in December, 2016.

We received close to 10,000 habitat use points from the 47 marked mallards over 2 years (Figure 3). As expected, these points are concentrated within key feeding, loafing, and sanctuary habitats and are consistent with observed mallard behaviors and distribution in the study area. We have yet to conduct a habitat selection analysis that examines use of key habitats in relation to availability but summary statistics indicate some patterns of habitat use among mallards.

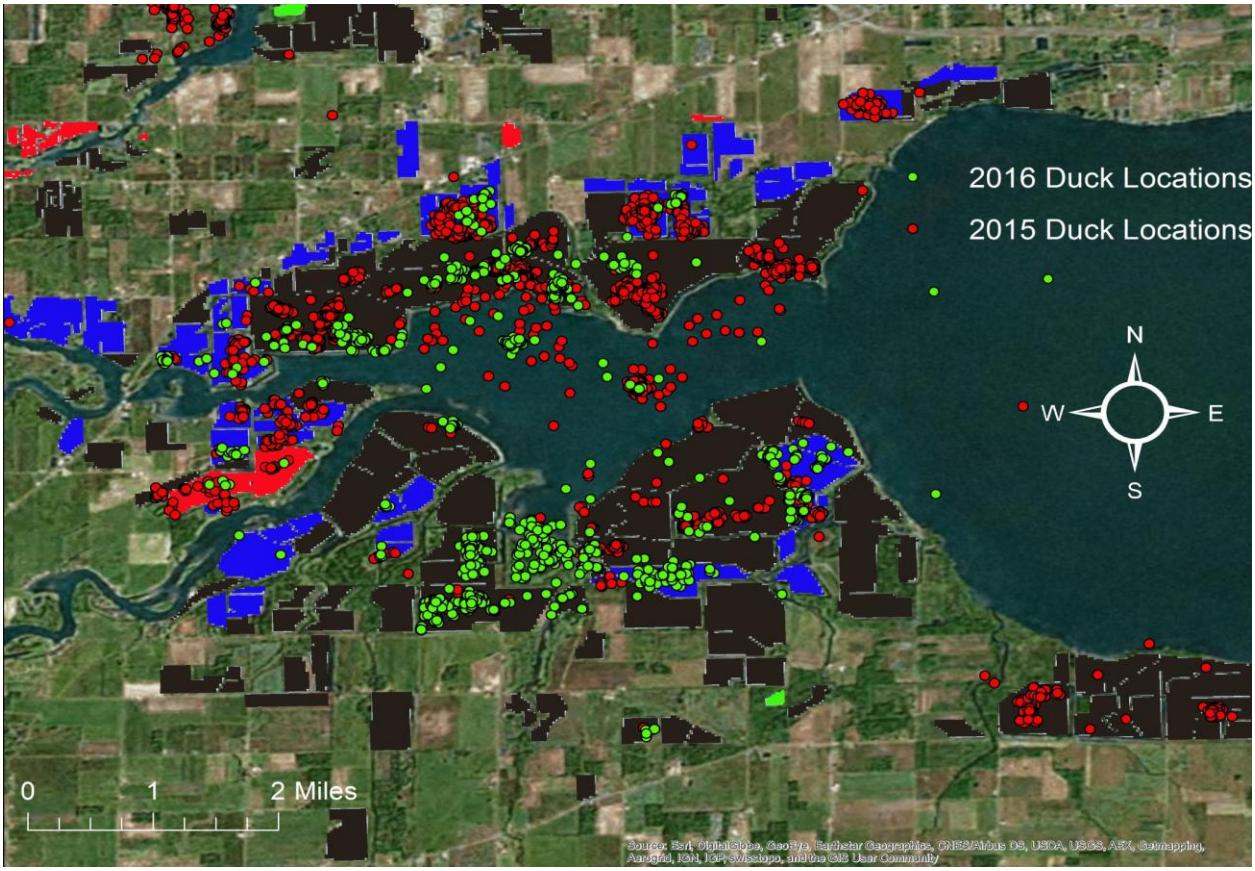

Figure 3. Satellite-marked duck locations in relation to habitat type for 30 marked hen mallards in the Muddy Creek Bay region during the 60 days of fall waterfowl hunting season, Fall of 2015 and 2016. Emergent marsh mapped in dark brown and red, flooded agricultural crops in blue.

As expected, use of key habitat types during open hunting season was highly skewed between daytime and nighttime. During diurnal periods when hunting was open we received very few locations from marked mallards within crops flooded specifically for duck hunting, suggesting strong avoidance (Figure 4). In contrast, marked mallards appear to have exhibited a much stronger selection for flooded crop during nocturnal periods when hunting is closed. This pattern was consistent with our predictions and observations, but perhaps stronger than expected.

Consistent with our hypotheses, open-water refuge areas that are closed to hunting were used preferentially in the daytime, hunted, periods (Figure 4). Overall, refuge areas were underutilized relative to predictions, anecdotal observations, and availability. Intuitively, marked

birds fed within high-risk hunted areas at night and used un-hunted refuge during the day, but it appears that some birds used hunted emergent marshes during the daytime as an alternative to refuge.

Emergent marsh received equal use both diurnally and nocturnally (Figure 4). This was unexpected, as emergent marshes within the study area are generally open to hunting and we hypothesized diurnal exclusion as a result. Upon examination of the data it appears that several marked mallards used emergent marshes (open to hunting) as an alternate daytime survival strategy. In some cases the emergent marshes selected were lightly-hunted or un-hunted marshes that were clearly perceived as "refuge" locations. However, in many cases marked mallards made considerable daytime use of relatively heavily-hunted emergent marshes suggesting they may be using dense emergent cover to avoid harvest.

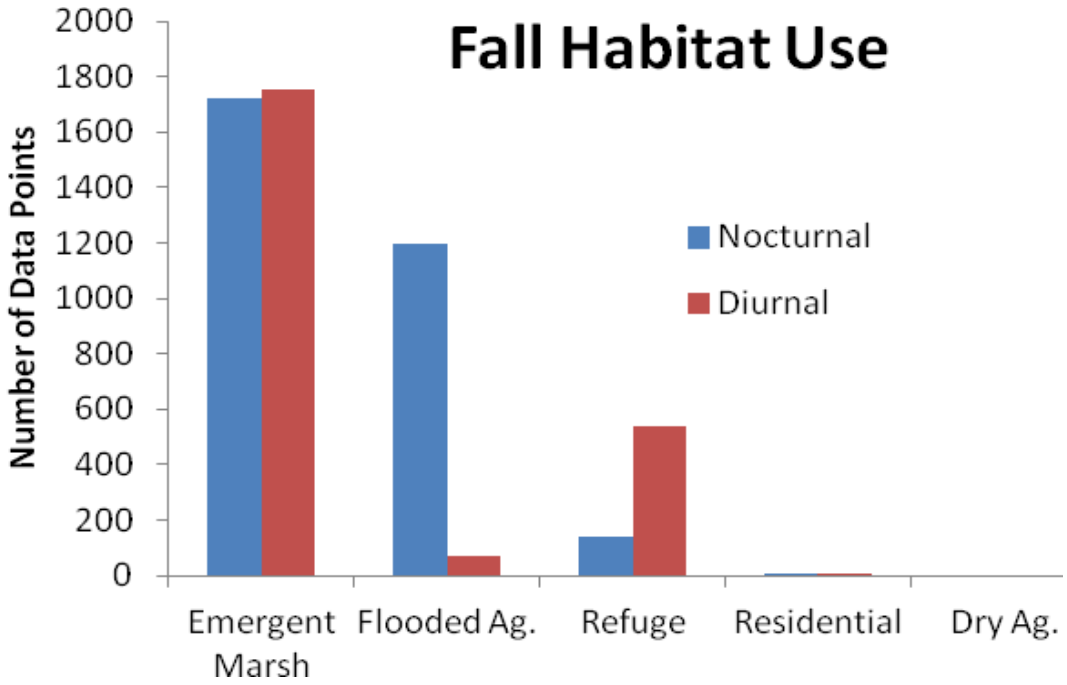

Figure 4. Percentage of total locations by time period (nighttime vs. daytime) for each habitat type within periods open to waterfowl hunting for satellite-marked female mallards in Muddy Creek Bay, OH; Fall of 2015 and 2016.

Survival rates varied greatly between 2015 and 2016. In 2015 eleven birds were lost to predators or harvest over the summer and fall period, while in 2016 only five were predated or harvested. Thus, 2015 probability of survival was about 0.41 while the 2016 probability of survival for the same time period was about 0.83 (Figure 5). A full analysis of habitat use and survival interactions has yet to be conducted, but we hypothesize that the differences in survival rates between the two years may be related to the reduced use of high-risk (hunted) habitat types observed in 2016. Data analysis forthcoming in the next year will include a better examination

of habitat selection in relation to availability and a discrete choice analysis that will tease apart relationships among habitat use choices and survival rates. Ultimately, a more rigorous analysis of habitat selection and its interaction with survival of mallards in the Great Lakes region will help influence harvest and habitat management decisions in the region.

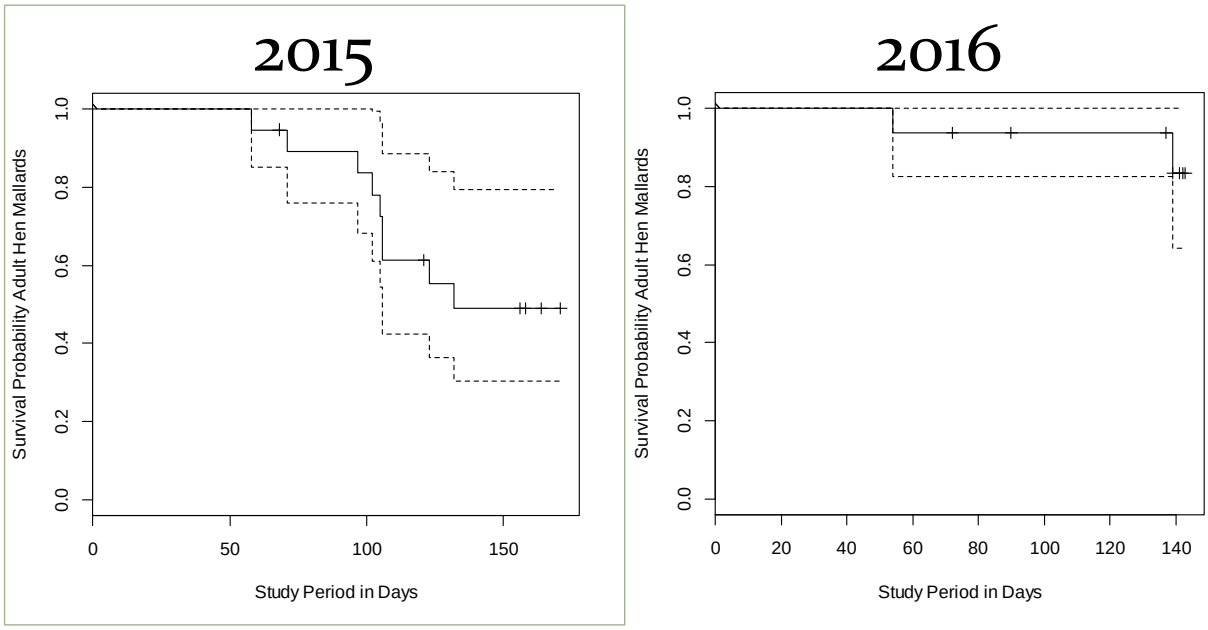

Figure 5. Survival probability to a given day for satellite-marked female mallards in Muddy Creek Bay, Ohio for the entire fall study period in 2015 and 2016.

Winous Point is a key partner is this project through fundraising, deploying satellite transmitters, and completing harvest surveys, and taking morphometric measurements of mallards.

Control of Invasive Plant Species in Northwest Ohio

Investigators: John W. Simpson, Winous Point Marsh Conservancy; Jeff Finn, U.S. Fish and Wildlife Service; Matthew Kovach, The Nature Conservancy; Oliver Cornet, Lake Erie Cooperative Weed Management Mike Libben, Ottawa Soil and Water Conservation District; and Mark Witt, Ohio Division of Wildlife.

Schedule: Initiated in 2009, long-term

Summary: Aquatic invasive plants threaten the ecological integrity of wetlands across North America. Here in the Western Lake Erie basin invasive plants are especially prevalent and add an extra stressor to the already degraded coastal wetlands. Invasive plants damage coastal wetland by excluding native vegetation and thus reducing plant species diversity and eliminating animal food resources. In addition, invasive plants often reduce recreational opportunity and limit wetland functions related to water quality and flood storage.

In northwest Ohio the most widespread and damaging invasive plant is *Phragmites australis*, a large perennial rhizomatous grass. *Phragmites* is widespread in the United States and typically grows in wetlands usually inhabiting the marsh-upland interface. *Phragmites* is capable of vigorous vegetative reproduction and often forms dense monospecific stands.

In addition to *Phragmites*, coastal wetlands in western Lake Erie are threatened by flowering rush (*Butomus umbellatus*), a newcomer under close watch, and purple loosestrife (*Lythrum salicaria*), an established species thought to be under control. Several other non-native invasive plant species such as narrow-leaf cattail (*Typha angustifolia*) and reed canary grass (*Phalaris arundinacea*) are prevalent in this region but are not considered as damaging.

In 2009 a partnership including the Winous Point Marsh Conservancy, U.S. Fish and Wildlife Service, Nature Conservancy, and the Ottawa Soil and Water Conservation District joined forces to create the Lake Erie Cooperative Weed Management Area (CWMA). Today the CWMA has a full-time Program Coordinator and seasonal interns directed by a steering committee. Due to the popularity of the program, it has now expanded by combatting other top invasives in the area as well as transitioning the program over to a landowner-led initiative. By transitioning to a landowner-led program, the CWMA will ensure private stakeholders in the region have the tools and information they need to tackle the invasives problem themselves not only now but well into

the future. A selection of tools and implements will be available to landowners free of charge through a rental program as well as a manual detailing tactics to manage specific invasives. While the CWMA will continue to offer the late-summer spraying campaign, we hope to transition towards supplying the landowner all the information and tools they need to effectively manage invasives themselves. Since 2009 the CWMA has been successful and through spraying programs, prescribed burning, and landowner outreach initiatives substantial acreages of invasive species have been managed (Table 1).

Table 1. Phragmites and other invasive species management acreage accomplishments under cooperative program since 2009.

Regional Phragmites Program				
Year	**Aerial Application Acres**	**Ground Application Acres**	**Prescribed Burn Acres**	**Mechanical Treatment Acres (Smash/Mow)**
2009	550	0	0	0
2010	625	175	0	0
2011	1120	325	0	0
2012	1100	429	318	306
2013	1140	292	113	32
2014	700	50	87	0
2015	1188	80	0	0
2016	618	40	0	0
Totals:	**7041**	**1391**	**518**	**338**

Beginning in 2011 experimental sampling plots were established within various treatment stands to monitor the effectiveness of treatment combinations in a) controlling the coverage and density of live *Phragmites* stems, and b) reestablishing a diverse wetland plant community. In total, 78 vegetation plots were monitored across 11 different ownerships. Each treatment type showed a significant reduction in percent cover of live *Phragmites* between 2011 and 2013 (Figure 1).

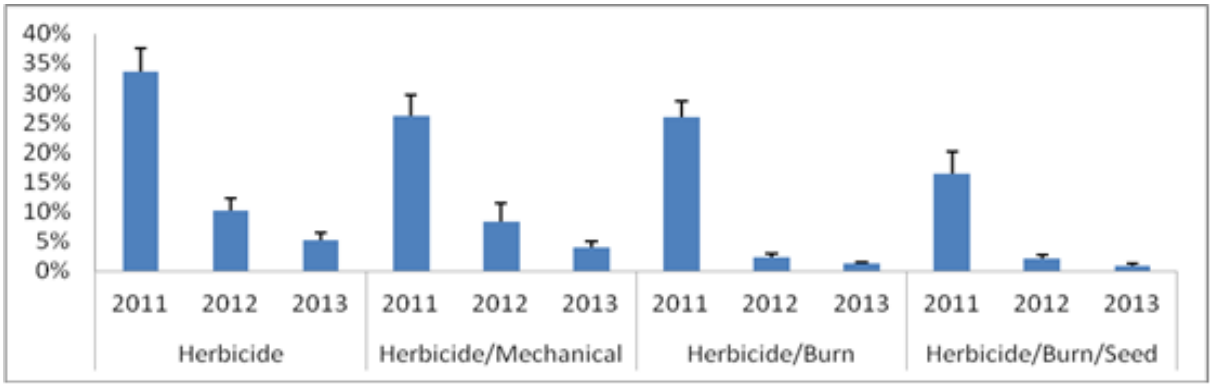

Figure 1. Percent cover of phragmites vegetation within treatment plots under three years of continuous management.

Each treatment type increased species richness by at least 36%. The treatment types incorporating prescribed fire averaged at least a two-fold increase in the number of species observed at each plot (Table 2). The Herbicide/Burn treatment showed a significantly greater increase in species richness than Herbicide only. Notably, all treatments with fire resulted in significantly greater increases in species richness (Figure 4).

Table 2. Change in Species Richness between 2011 and 2013 by treatment type.

Treatment Type	**2011 Species Richness (*avg*)**	**2013 Species Richness (*avg*)**	**% Increase (*avg*)**	**p**
Herbicide	2.25	3.08	36%	0.01
Herbicide/Mechanical	2.07	3.07	48%	0.02
Herbicide/Burn	1.86	4.97	167%	<0.01
Herbicide/Burn/Seed	2.2	4.87	121%	<0.01
Overall	2.03	4.29	111%	<0.01

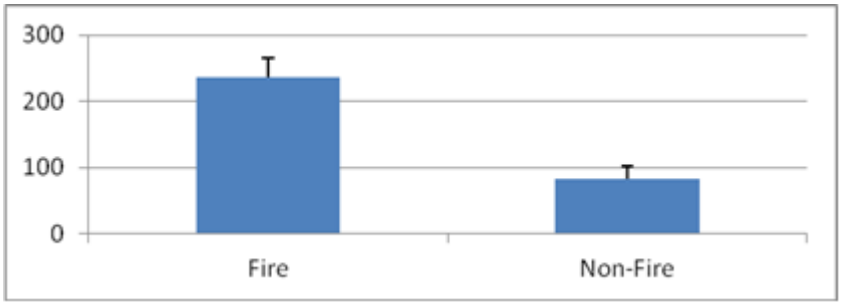

Figure 4. Percent increase in number of species (+/- SE) on plots with "fire" and "non-fire" treatments after 3 years of treatment.

Winous Point supports this project as a steering committee member, by acquiring and holding grant funding, by providing research locations, and by hiring and housing project staff. Current program funding is supplied through GLRI grants from the Environmental Protection Agency.

Winous Point and Ohio Division of Wildlife Cooperative Waterfowl Banding

Investigators: Brendan Shirkey and John Simpson, Winous Point Marsh Conservancy; Michael Ervin and Dave Sherman, Ohio Division of Wildlife; and Bob Gates, The Ohio State University

Collaborators: Pat Devers, Black Duck Joint Venture; Tom Kashmer, Sandusky County Park District; Mark Shieldcastle, Black Swamp Bird Observatory

Schedule: Long-term

Introduction: Since 2011 Winous Point has been heavily involved in the Ohio Division of Wildlife's (ODOW) summer banding program targeting wood ducks (*Aix sponsa*) and mallards (*Anas platyrhynchos*) as well as 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 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. We have usccessfully met ODOW established quotas in large part due to hard work of our summer interns over the past two years. This success has in-part led to proposed expanded banding efforts for the ODOW both increasing our summer mallard quota and experimenting with spring lesser scaup (*Aytha affinis*) banding. The banding program is also a tremendous learning opportunity for our summer interns. Many of these students have little or no background sexing, aging, identifying waterfowl species. This banding program offers students the opportunity to develop a valuable skill set for a pursuing a professional career in wetland or waterfowl management (Figure 1).

Figure 1. WPMC interns Brendan Woodall and Steve Bycznski banding a captured wood duck, July 2016.

Summary: Banding efforts in 2016 involving Winous Point staff resulted in the capture and banding of 11 different duck species totalling over 4000 banded individuals (Table 1).

Table 1. Total number of banded individuals during the winter banding program (January - March, 2016) and summer banding program (July – August, 2016).

Species	Winter totals	Summer Totals
Black Duck	127	0
Mallard	193	486
Gadwall	10	0
Wood Duck	0	307
Redhead	80	0
Ringneck	2	0
Pintail	1	0
Seasonal Total	**413**	**731**

This program builds on waterfowl banding that has been occurring at Winous as part of various programs and projects since 2010 and is well over 4100 total banded ducks (Table 2).

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
Totals	**418**	**1917**	**336**	**351**	**1025**	**8**	**6**	**41**	**28**	**36**	**10**

Band recovery data is used to inform population management estimates for habitat and harvest goals and to calculate important waterfowl vital rates (e.g. survival and harvest rates). In addition, band recovery data can provide visual representation of harvest derivation and migratory routes. Waterfowl banded at Winous Point are recovered throughout the Atlantic and Mississippi flyways, with gadwall (*Anas strepera*) concentrating on the eastern seaboard,

redheads (*Aythya americana*) along the Atlantic and gulf coasts, wood ducks being recovered throughout the southeast, and mallards regionally important to harvest within the Great Lakes states (Figures 2 and 3).

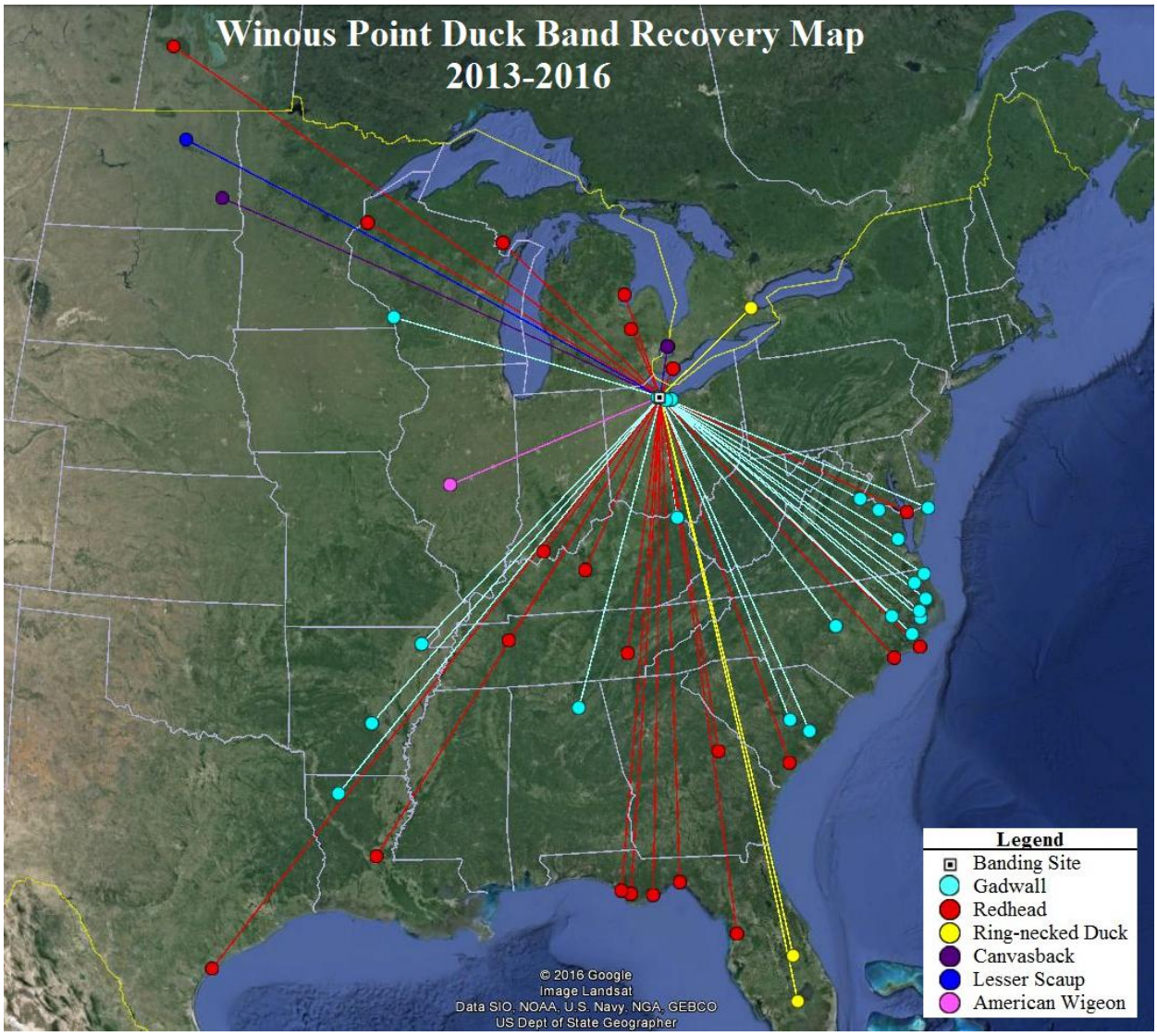

Figure 2. Band recovery locations for gadwall, redhead, ring-necked duck, canvasback, lesser scaup, and American widgeon banded at Winous Point from 2013 – 2016.

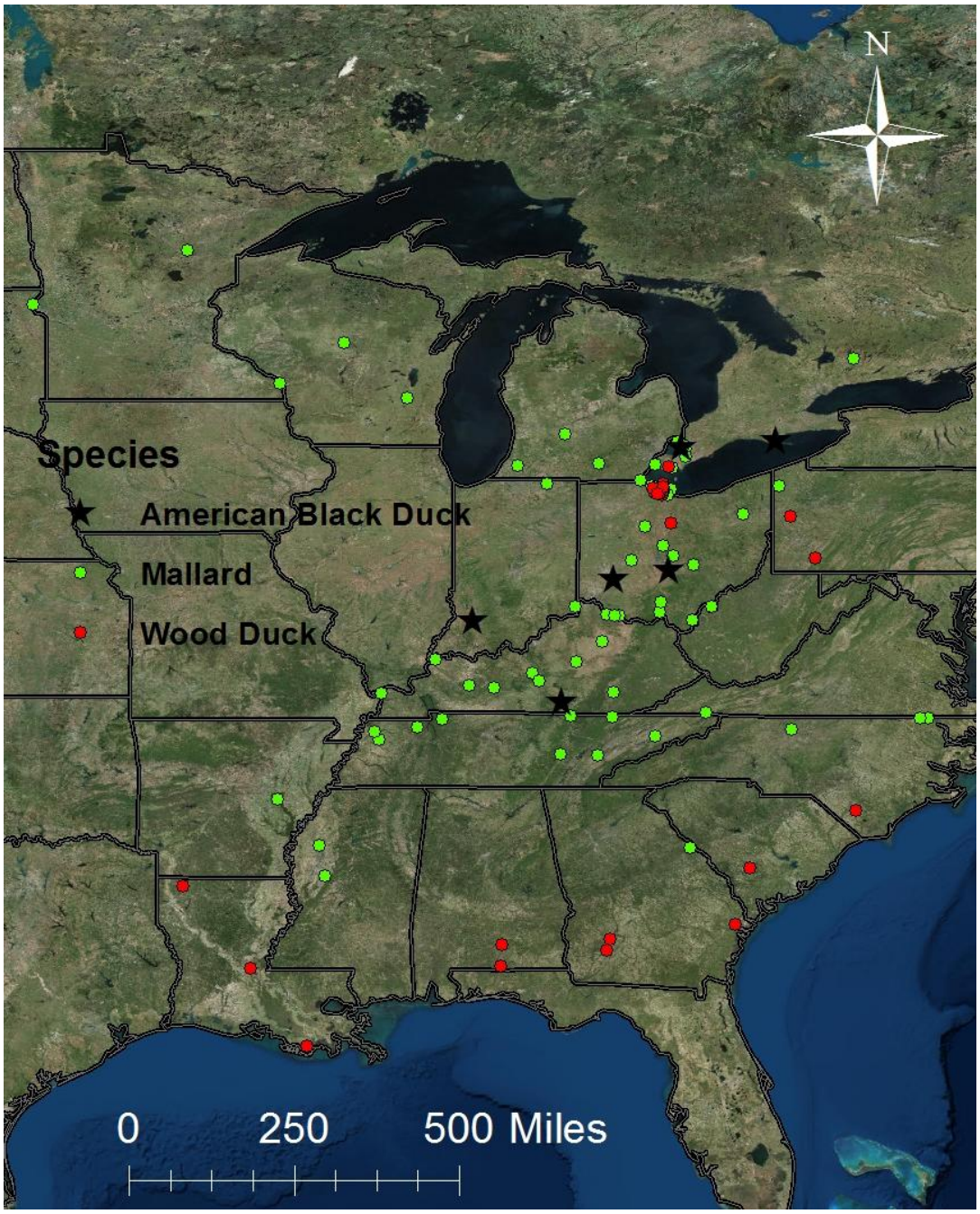

Figure 3. Band recovery locations for mallards, wood ducks, and black ducks banded at Winous Point from 2012 – 2016 and recovered in the fall 2016 hunting season.

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. Sandusky County Park District and Black Swamp Bird Observatory provide additional banding staff and resources.

Survival and Harvest Rates of Ohio-banded Canada Geese (*Branta canadensis*)

Investigators: Brendan Shirkey, Research Coordinator Winous Point Marsh Conservancy; Robert J. Gates, Associate Professor, The Ohio State University; and Michael Ervin, Ohio Division of Wildlife

Introduction: The Ohio Division of Wildlife (ODOW) has banded in excess of 140,000 temperate-breeding Canada geese (*Branta canadensis*) from 1990 to 2013. Neither the banding nor the band recovery data has been used to inform decisions specific to Canada goose management in Ohio. Growing numbers of Canada geese present some unique problems for natural resources managers, and a better understanding of survival rates, harvest rates, and the strategies (e.g., hunting) used to impact those rates could be beneficial. The goals of this project were to identify models best predicting Ohio's Canada goose survival and recovery rates and to evaluate the impacts of changing harvest regulations and winter weather severity on Canada goose survival and harvest.

Methods: We obtained all banding data from *Gamebirds*. We used a total of 141,016 bandings and 44,875 recoveries from 1990 to 2013 to generate survival models in program *Mark* (White and Burnham 1999). We designated all Canada Geese used in the analyses as either urban or rural by overlaying banding locations on U.S. Census bureau maps. We designated four *a priori* cohorts of Canada geese, including rural after hatch year (AHY), rural hatch year (HY), urban AHY, & urban HY.

We incorporated varying harvest regulations packages as a variable in our survival models. We used the parameter index matrix in *Mark* to allow survival rates to vary under three categorical harvest regulation packages (i.e., liberal, moderate, and restrictive). We also included a winter weather severity index as a variable in our models. The cumulative days below freezing and accumulation of snowfall both appear to be important drivers influencing large-scale migratory movements of some waterfowl species, especially those adept at foraging in dry agricultural fields (e.g., Mallards [*Anas platyrhnchos*], Tundra swans [*Cygnus columbianus*], and Canada geese). As a result, we calculated an index of winter weather severity based on average December and January temperatures and snowfall for a given hunting season. We allowed survival to vary under three different winter weather regimes (severe, moderate, and mild) using the parameter index matrix in *Mark*. We downloaded all weather data from the Midwest Regional Climate Center.

We calculated harvest rates by dividing direct recovery rates by published band reporting rates (BRR) for Canada geese (BRR=0.75). We also calculated harvest rates separately for AHY rural,

HY rural, AHY urban, and HY urban geese. We believe that differences in harvest rate among these four groups might be significant and be of major interest to managers.

Results: The top-ranked model for survival (*S*) and recovery rates (*F*) of temperate-breeding Canada geese in Ohio was the most complex model tested. The model included an age and urban-rural cohort effect with time interactions for survival and recovery parameters. When ignoring time effects and just analyzing survival as a function of age and urban-rural status, we found that the AHY urban cohort had the highest survival rates ($\hat{s}$ = 0.69, 95% CI = 0.686-0.696), followed by HY urban geese ($\hat{s}$ = 0.69, 95% CI = 0.668-0.712), AHY rural geese ($\hat{s}$ = 0.67, 95% CI = 0.672-0.679), and finally HY rural geese ($\hat{s}$ = 0.64, 95% CI = 0.633-0.657).

None of the models containing either the hunting regulations or the winter weather severity variables were highly supported. Despite this, the results from both of these models may contain practical management implications, especially when comparing rural geese to urban geese. For these reasons, we reported survival rates by urban-rural status for both survival as a function of hunting regulations and survival as a function of winter weather severity. Counterintuitively, survival rates increased under liberalized harvest regulations packages for both urban and rural geese, although the increase was much more pronounced for urban geese (Figure 1). Furthermore, survival rates of urban geese decreased dramatically during moderate and severe winters from mild winters, but survival rates of rural geese remained relatively unchanged among all three winter weather categories (Figure 2).

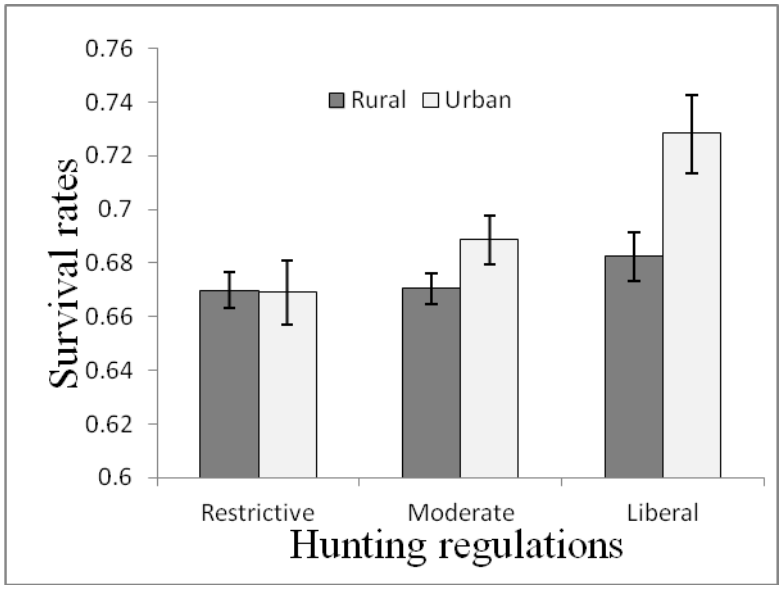

Figure 1. Survival rates of urban and rural Canada geese as they vary among three different hunting regulations packages from 1990-2013.

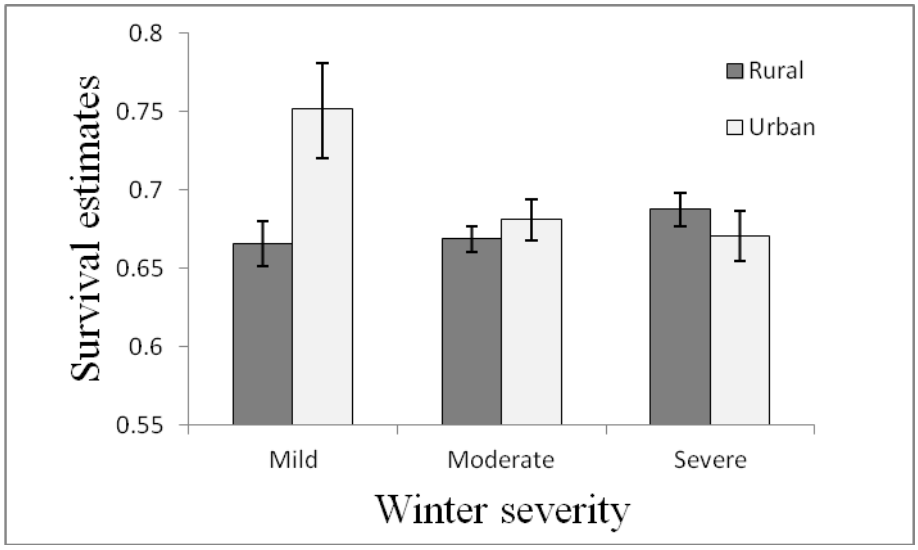

Figure 2. Survival rates of Canada geese as they vary among three winter weather severity groupings from 1990-2013.

Harvest rates of Ohio-banded Canada geese have generally declined from the early 1990's through 2013. Harvest rates were highest in HY rural geese with a peak rate occurring in 1990 (harvest rate = 0.28) and a low in 1994 (harvest rate = 0.10; Fig. 3). AHY rural geese had slightly lower survival rates than HY rural geese with harvest rate peaking in 1995 (harvest rate = 0.18; Figure 3). Harvest rate calculations for urban geese were somewhat limited due to small sample sizes early in the study period (e.g., n = 5 AHY band recoveries, n = 7 HY band recoveries in 1990). Excluding 1990, harvest rates of HY urban geese peaked in 1995 (harvest rate = 0.18) and declined to a low of 0.07 in 2012 (Figure 3). AHY urban geese had a peak harvest rate of 0.18 in 2000 and a low of 0.07 in 2010 (Figure 3).

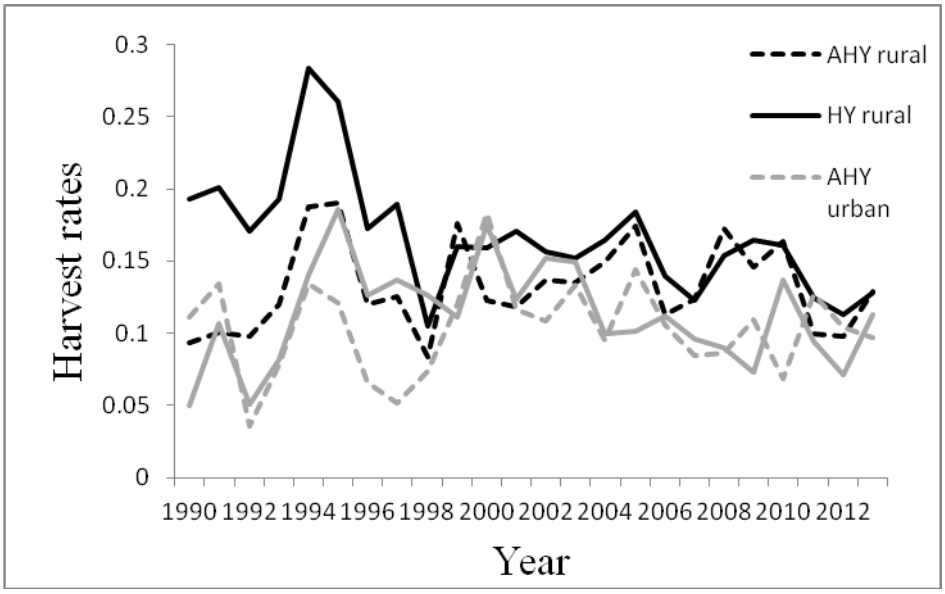

Figure 3. Harvest rates of adult (AHY) rural, juvenile (HY) rural, AHY urban, and HY urban geese in Ohio from 1990-2013.

Discussion: We found survival of Ohio-banded Canada geese was best explained by the model containing time, age, and urban-rural status as explanatory variables. We believe the strong support for this model was supported by the extremely large sample size in this dataset (i.e., as many as 11,397 bandings in a single year). Although the time model that allowed survival to vary from one year to the next was strongly supported, it was not overly informative from a practical management perspective. It does suggest that there is a great deal of annual variation in Canada goose survival that we were unable to explain with the variables we included such as winter weather severity and hunting regulation packages.

Winter-weather severity did not appear to be a significant driver of Canada goose survival in Ohio. Urban geese did appear to be somewhat impacted with survival rates dropping significantly during years with more severe winters, but rural goose survival rates remained relatively unchanged regardless of winter severity. We hypothesize that urban geese might be forced to forage greater distances from roosting areas during more severe winters (Legagneux et al. 2009). This may result in birds being forced to leave urban areas to forage in areas where they are actually exposed to hunting pressure. Conversely, rural geese may already be accustomed to navigating landscapes with extensive hunting pressure, thus their survival rates remained relatively unchanged regardless of weather conditions. Liberalized hunting regulations also appeared to have little impact on Canada goose survival rates in Ohio. Canada goose survival rates were actually higher in years with liberal hunting regulations than they were in years with restrictive hunting regulations. These findings are unsurprising given that Canada goose population estimates have continued to increase in recent years despite liberalized regulations. The increase in survival was also much more pronounced in urban geese than their rural counterparts.

We hypothesize that regulations targeted at temperate-breeding Canada geese are likely not liberal enough to impact survival and harvest rates in Ohio (Rexstad 1992, Ankney 1996). Also, the number of goose hunters in Ohio simply may not be high enough to impact Canada goose vital rates despite liberalized regulations (Ankney 1996, Beston et al. 2014).

Winous Point undertook this project in cooperation with The Ohio State University, Terrestrial Wildlife Ecology Lab in partnership with the Ohio Division of Wildlife.

Responses of Colonial Wading Bird Populations within the Lake Erie Marsh Focus Area to Cormorant Control and Wetland Management

Investigators: Kristie Stein and Christopher Tonra, Ohio State University; and Laura Kerns, Ohio Division of Wildlife

Schedule: 2015 - 2016

Summary: This research is conducted on two breeding colonies of Black-crowned Night-Herons (*Nycticorax nycticorax*) located within Lake Erie. The colonies are located on West Sister Island National Wildlife Refuge (WSI) in Lucas County and Turning Point Island (TPI) in Erie County (Figure 1). These sites were chosen because they provide critical nesting habitat for Black-crowned Night-Herons as well as other species of colonial wading birds such as Great Egrets, Great Blue Herons, Cattle Egrets, Snowy Egrets, and Double-crested Cormorants. Objectives of the study include quantifying the effect of foraging distance on chick development and survival and identifying important local foraging areas and migratory routes.

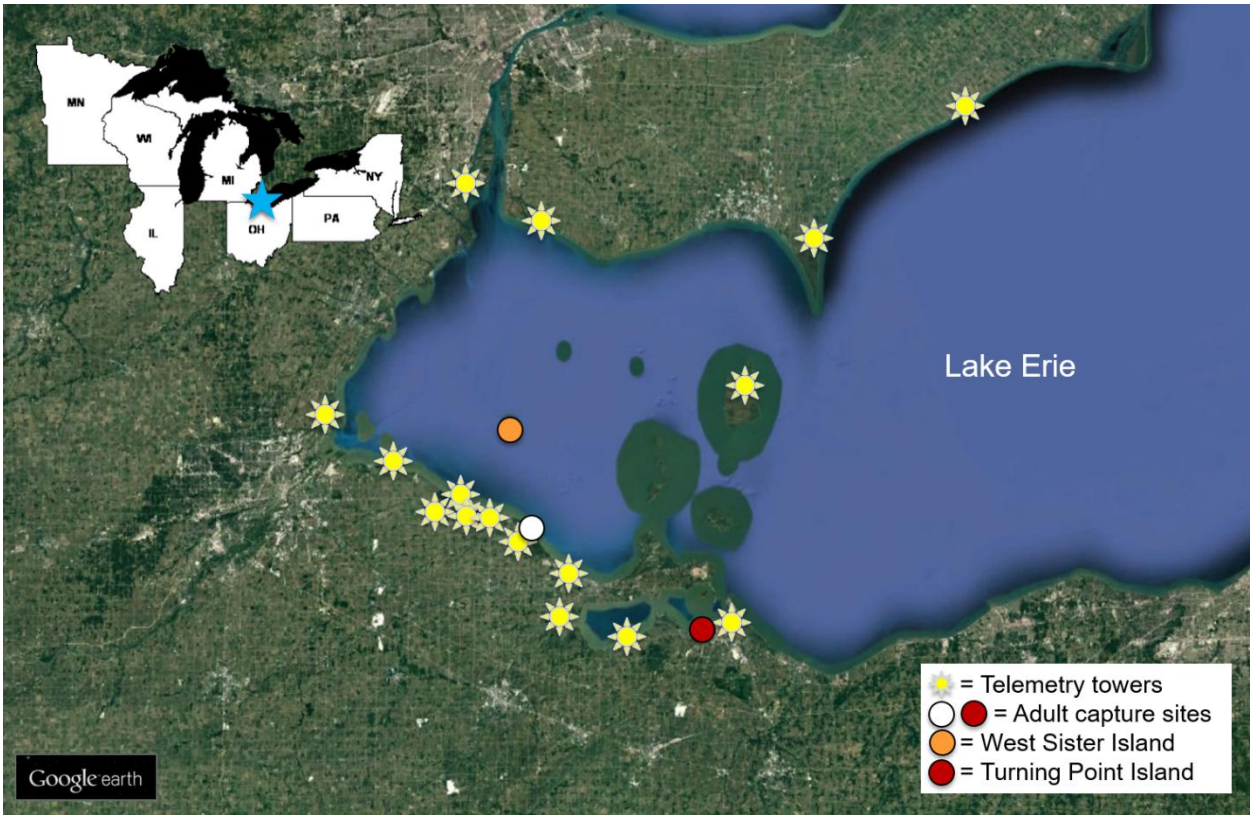

Figure 1. Map of Black-crowned Night-Heron study site

Upon the first visit to a breeding colony, we affixed motion sensitive cameras facing 20 nests at each colony. Cameras are used to record adult visitation rates and predation events at each nest. Juveniles were captured by hand and measured twice at the nest before fledging, and one nestling from each nest was fitted with a nanotag attached to a figure-8 harness. Sixty nestlings were marked with nanotags this season (Figure 2). Growth rates and survival during the early nesting period were analyzed and compared between islands. When considering all brood members, growth rates and survival were lower for TPI than WSI. Fledging rates of nanotagged birds were 80% and 75% at West Sister Island and Turning Point Island, respectively. Individuals were located once every 13 days using a combination of hand tracking, aerial telemetry, and the Motus (www.motus.org) automated telemetry array to determine survivorship rates and examine movements during the post-fledging period. Night-herons were detected on all 11 of our local towers as well as 8 towers outside of the study site. Furthest detections of tagged juveniles were at Cape Romain NWR in South Carolina (n=3), Parker River NWR in Massachusetts (n=1), and Pea Island NWR in North Carolina (n=1).

Figure 2. Nestling black-crowned night heron affixed with a federal bird band, color-coded leg band, and nanotag.

Adults were captured using a baited whoosh net technique at both local marinas and Turning Point Island. Upon capture, adults were measured and fitted with a backpack-style satellite transmitter. This season, we captured 10 adult night-herons. As of January 2017, all tagged night-herons have reached a wintering location. The breakdown of locations is as follows: Cuba – 2, Florida – 4, SC – 2, NC – 1 (Figure 3). Migration departure dates were spread out over a period of 11 weeks with three birds departing in September, four in October, and two in November. One of the more interesting findings has been the different migratory strategies evident, with some individuals migrating directly to wintering sites from Ohio in a short time span (few days), other individuals making short stopovers, and still others making long (several week) stopovers. Tags should last through the 2017 breeding season, thus it will be important to determine if the same patterns occur during spring migration.

Figure 3. Graduate student Kristie Stein holds an adult black-crowned night heron marked with a federal bird band, color-coded leg band, and backpack-style satellite transmitter.

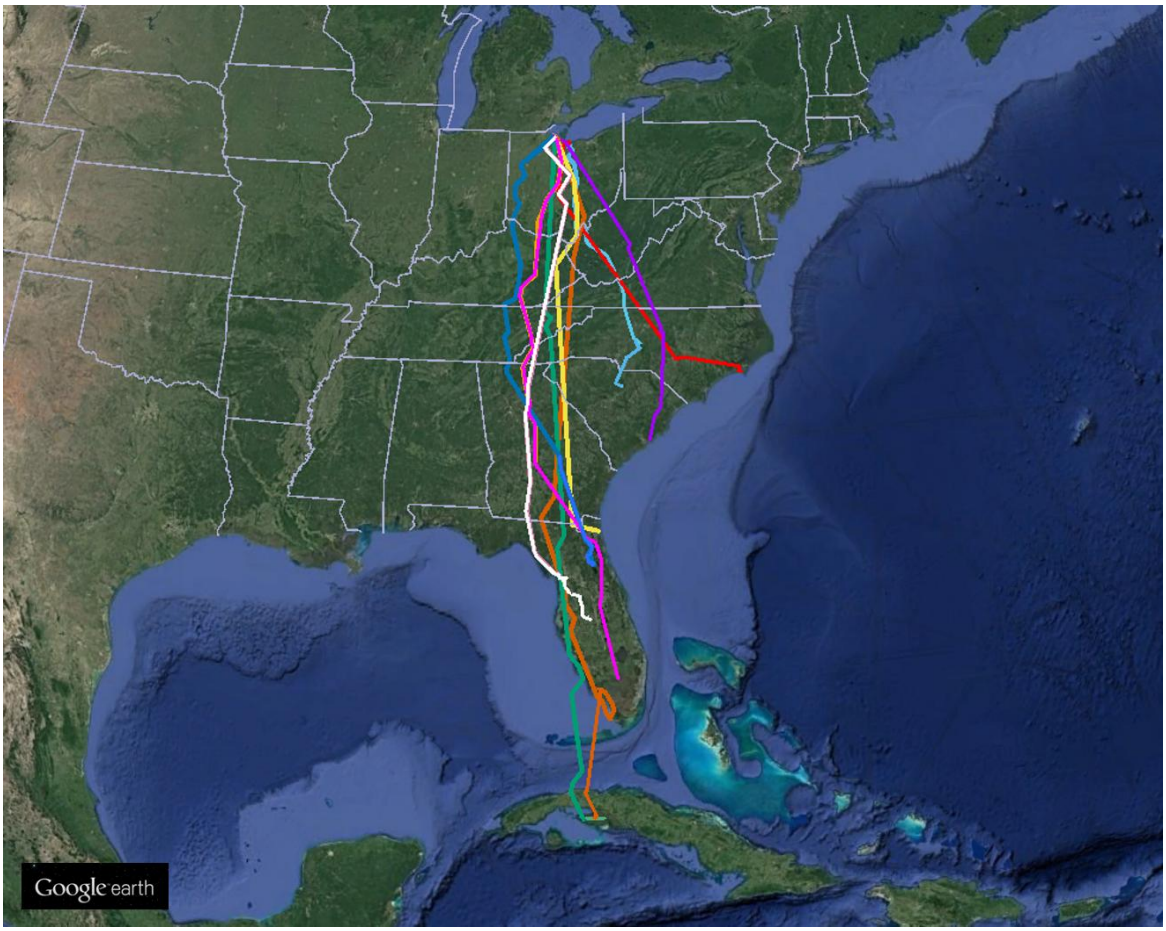

Figure 4. Fall migration movements of nine adult Black-crowned Night-Herons in 2016.

Winous Point supports this project by supplying technician housing, tower placement, and other logistical support.

Energetic Carrying Capacity of Submerged Aquatic Vegetation in Semi-permanent Marshes for Dabbling Ducks in the Upper Mississippi River and Great Lakes Region Joint Venture

Principal Investigators: John Simpson, Brendan Shirkey, and Michael Picciuto *Winous Point Marsh Conservancy, Port Clinton, OH*

Co-Investigator: Heath M. Hagy, *Illinois Natural History Survey, Forbes Biological Station–Bellrose Waterfowl Research Center, Prairie Research Institute, University of Illinois at Urbana–Champaign*

Schedule: 2015 – 2017

Summary: Wetlands within the Upper Mississippi River and Great Lakes Region (UMRGLR) Joint Venture (hereafter, Joint Venture) have been intensively impacted by anthropogenic influences. Many wetland areas have been lost altogether and those large wetland complexes that remain are thus increasingly important to waterfowl. Understanding the distribution and availably of waterfowl food resources, especially the carrying capacity of those food resources, is important for waterfowl conservation planning and resource management.

The lower Great Lakes coastal marshes are valuable resources for breeding, migratory, and wintering waterfowl within the Joint Venture. These marshes have long been recognized for their importance in providing habitat for a wide variety of flora and fauna, and in particular for migratory birds. For example, the coastal wetlands of northwest Ohio alone support an estimated 500,000 itinerant waterfowl during fall migration (Ohio Division of Wildlife, unpublished). These marshes are also subject to a variety of anthropogenic stressors, including dredging, nutrient/pollutant loading, and altered hydrological regimes, all of which have led to significant losses and degradation in aquatic plant communities. Today, a majority of the region's coastal marshes and wetlands have been drained or replaced by shoreline development or have been further degraded by altered hydrology and sediment deposition patterns. Furthermore, a large proportion of remaining coastal marshes are now impounded and actively managed for submerged aquatic vegetation (SAV), but no information is available about the density or nutritional value of SAV communities within either managed or unmanaged marshes.

Information is needed on the density and forage value of SAV semi-permanent marshes throughout UMRGLR before carrying capacity models can be updated and wetland restoration practices can be evaluated relative to their value for dabbling ducks.

Study Area: We have proposed to sample wetland sites within the lower portion of the UMGLJV annually. Over the 3 years in which sampling will occur, 5 of the 10 sampling sites

will remain constant to account for temporal variation in SAV abundance and distribution. The remaining 5 sites will be rotated each year to improve the spatial distribution of the samples. Each rotation is designed to focus on a spatially unique region. Northern Ohio was the focus of in 2015, rotating to Eastern Michigan in 2016, and then to the IRV/Mississippi River in 2017 (Table 1). Data on SAV availability during spring will be assembled from recently completed waterfowl research projects where data was collected from across the Joint Venture Region and from other sources as available (e.g., Smith 2007, Straub et al. 2012).

Table 1. Submerged Aquatic Vegetation sampling sites in 2015, 2016, and 2017.

2015	2016	2017
Winous Point, OH	Winous Point, OH	Winous Point, OH
Bay View, OH	Bay View, OH	Bay View, OH
Big Island WA, OH	Big Island WA, OH	Big Island WA, OH
Ottawa NWR, OH	Ottawa NWR, OH	Ottawa NWR, OH
Pickeral Creek WA, OH	Pickeral Creek WA, OH	Pickeral Creek WA, OH
Mosquito Creek WA, OH	Pte. Moullie SGA, MI	Goosepond WA, IN
Cedar Point/Little Darby NWR, OH	Harsens Island	Horicon Marsh, WI
Ottawa Shooting Club, OH	Nyanquing Point, MI	Hennepin/Hopper/Senachwine, IL
East Harbor State Park, OH	Erie Shooting Club, MI	Pool 13 Mississippi River
Magee Marsh WA	Shiawassee NWR, MI	Pool 19 Mississippi River

Methods: To assess energetic carrying capacity, we will build a database during summer each year of SAV samples where semi-permanent marsh habitat and fall waterfowl concentrations exist (i.e., areas containing SAV and emergent vegetation and ≥10 ha). This will be done using anecdotal observations of waterfowl professionals, historic records, National Wetland Inventory data, and other available data (e.g., U.S. Geological Survey Long Term Resource Monitoring Data). At each of the ten sites we will collect samples at 10 points for a total of 100 samples annually. We will use a multi-stage sampling design where ~33% of sites within our sampling frame are selected annually and 10 points are randomly sampled within each site for SAV, seeds, tubers, and aquatic invertebrates that may be present (Stafford et al. 2011). We will sample deep-water areas (>45 cm) with a modified Gerking box sampler (Synchra and Adamek 2010) and convert measures to biomass and energy density (kg[dry]/ha, duck energy days [DED]/ha). This measurement will reflect foods "available" for waterfowl consumption. In cooperation with an ongoing INHS study, we will develop a visual rapid assessment method similar to Naylor et al. (2005) and document species richness, diversity, density, and quality at each sample location during autumn to determine if rapid visual assessment can serve as an index of foraging habitat quality in shallow and deep-water marshes.

Results: During the 2016 SAV processing 29 different species of submerged aquatic vegetation from 15 different genera were identified (Figure 1). Below average precipitation coupled with waterfowl management drawdown strategies in the Ohio study area likely contributed to the observered 21% decrease in overall SAV biomass sampled. New noteworthy species accounted for in this year of the study would include fineleaf pondweed (*Stuckenia filiformis*), swaying bulrush (S*cirpus subterminalis*), water primrose (*Ludwiga palustris*), flatleaf bladderwort (*Utricularia Intermedia*), whitestem pondweed (*Potamogeton praelongus*), water stargrass (*Heteranthera dubia*), Hill's pondweed (*Potamogeton hillii*), and twoleaf waterweed (*Elodea bifoliata*).

Similar to 2015, coontail (*Ceratophyllum demersum*) proved to be the most dominant species in the region representing 23.94% of the biomass sampled (Table 2). At 15.55%, Eurasian watermilfoil (*Myriophyllum spicatum*) surpassed Canada waterweed (*Elodea canadensis*) at 10.73% as the second most dominant species. Other significant changes to biomass composition would be the roughly 10% increase in both sago pondweed (*Stuckenia pectinata*) and common stonewort (*Chara* sp.) which were sampled mostly in the new northerly study sites.

Table 2. Five most dominant (total dry mass collected) species collected in 2016 sampling, including difference from 2015 sampling.

Common Name	2015 Dry Mass (g)	Sample Size	Percent	2016 Dry Mass (g)	Sample Size	Percent	% Change
Coontail	129.2877	51	45.74%	53.354	39	23.94%	-21.80%
Eurasian watermilfoil	39.5914	21	14.01%	34.657	24	15.55%	1.55%
Canada waterweed	44.7515	19	15.83%	23.904	15	10.73%	-5.11%
Sago pondweed	1.0309	9	0.36%	22.377	24	10.04%	9.68%
Stonewort Chara spp.	0.5131	5	0.18%	22.332	13	10.02%	9.84%

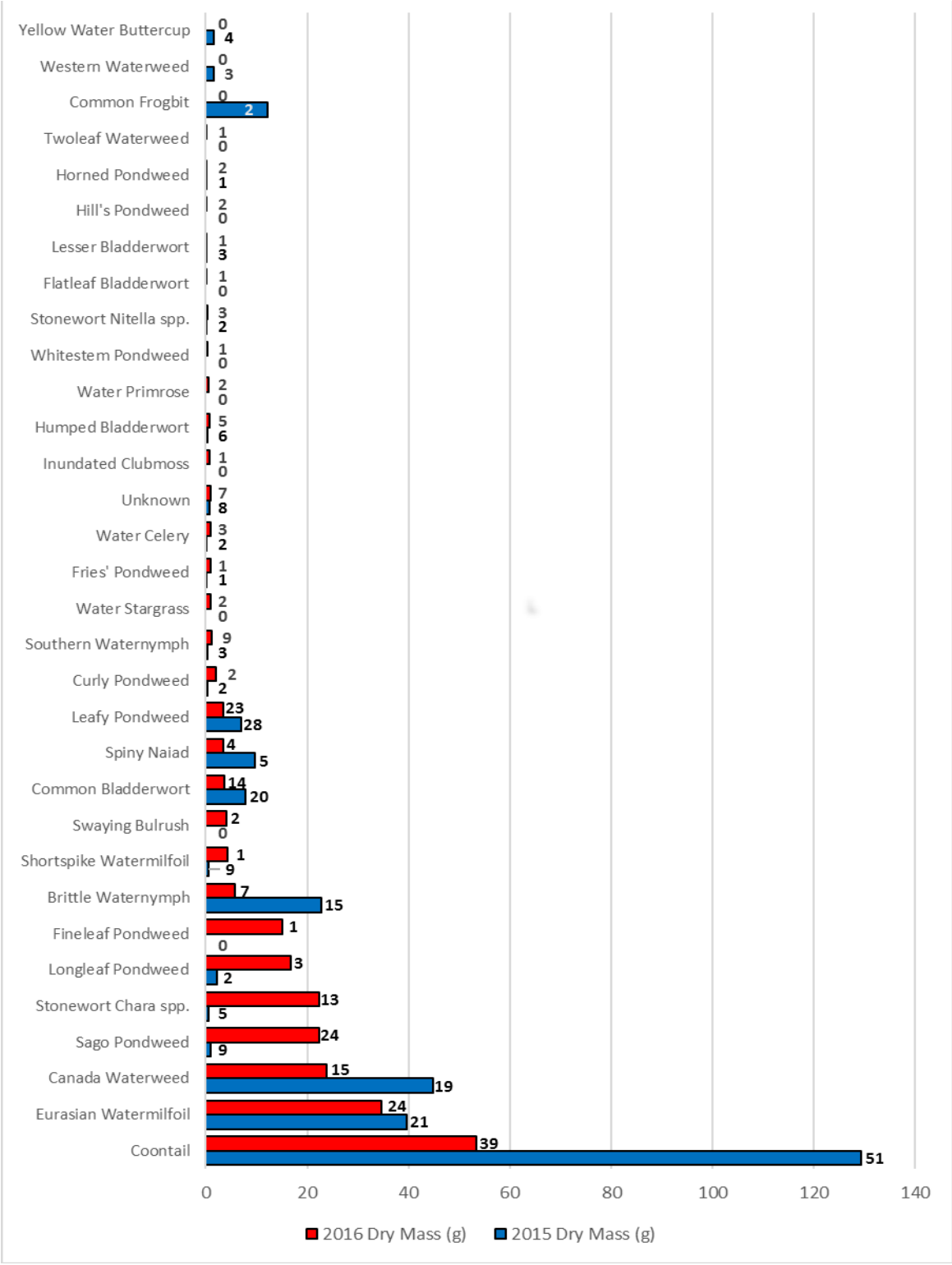

Figure 1. Histogram of total biomass of submerged aquatic vegetation sampled in 2016 compared to the total biomass sampled in 2015. The bar label (number placed at the end of each bar indicates the number of samples in which that species was present).

Winous Point has undertaken this project in cooperation with the Illinois Natural History survey which is conducting a related study designed to inform habitat objectives developed by the Upper Mississippi Great Lakes Joint Venture. Funding for this project comes from the Upper Mississippi Great Lakes Joint Venture.

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

Investigators: James Hansen, Bob Gates and Chris Tonra, Ohio State University; Laura Kerns, 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 Krementz and Auriel Van der Laar Fournier, University of Arkansas

Schedule: 2016 - 2019

Project Overview: The amount of wetland habitat across North America has declined heavily over the last century, and it is thought that this loss has resulted in a decline in populations of many marshbird species. The goal of this project is to provide empirical data on the distribution, abundance, and local population densities of two harvestable marsh bird species, the Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*). Currently, little basic life history information is available for these species. Basic population demography, life history phenology, and population-habitat relationships will help address the need for knowledge on the current population status, as well as inform harvest management in Ohio. Knowledge and understanding of seasonal movements, home range, and habitat use patterns of Virginia rails and sora will also inform habitat management recommendations of these two species. We aim to gain better understanding of intra-seasonal movements, habitat use, vital rates of breeding soras and Virginia Rails, and the biases of the National Marshbird Monitoring Protocol that is currently used to monitor secretive marshbirds throughout the midwestern US states. These goals will be met by the following objectives.

Objectives:

1. Determine distribution, occupancy, and relative abundance of sora and Virginia Rails using the National Marshbird 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 marshbird 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: The pilot field season for this study commenced with trapping on 5 April 2016. Trapping continued throughout the summer with VHF transmitters being deployed on rails beginning 5 May. A total of 321 rails were captured from 5 April to 5 August, with peaks in capture rates in early April, mid-May, and late August (Figure 1 and Figure 2). A higher proportion of the captured rails were Virginia rails (*n*=235), with a large majority of both species being adults (Table 1). There were 10 juvenile rails captured (3 sora and 7 Virginia rail) and a Virginia rail nest with young was discovered, verifying that breeding of both species occurs at Winous Point. Of the 321 rails captured, 98 transmitters were deployed on Virginia rail (*n*=64) and sora (*n*=34). These birds were tracked from the date of capture to when their signal was lost. Signals were lost on 73 of the 98 radio-marked birds during the breeding season, and were thought to have left the area (Figure 3). The number of days that rails spent at Winous Point from the date of capture to the date of apparent departure ranged from 1 to 143 ($\bar{x}$ = 23.07) (Figure 4). An aerial search was conducted by the Ohio Department of Natural Resources to look for missing birds, and five missing Virginia rails were found inhabiting some of the nearby National and State wildlife areas, as well as two local hunting clubs (Figure 5). Radio-triangulated locations were gathered on rails to determine their home range size and distribution. Kernel density and minimum convex polygon (MCP) home range sizes were estimated for 15 Virginia rails and two soras. Mean 95% kernel home range size was 5.02 ha (range = 3.38-6.67) for soras and 5.16 ha (range = 1.62-8.70) for Virginia rails. Mean MCP home range size was 3.45 ha (range = 1.16-7.32) for Virginia rails. There was a distinct spatial overlap in home ranges, both within and between species, indicating a possible lack of territoriality (Figure 6). Radio-marked birds continued to be tracked until they departed the area for fall migration, with the last rails departing Winous point on 14 October.

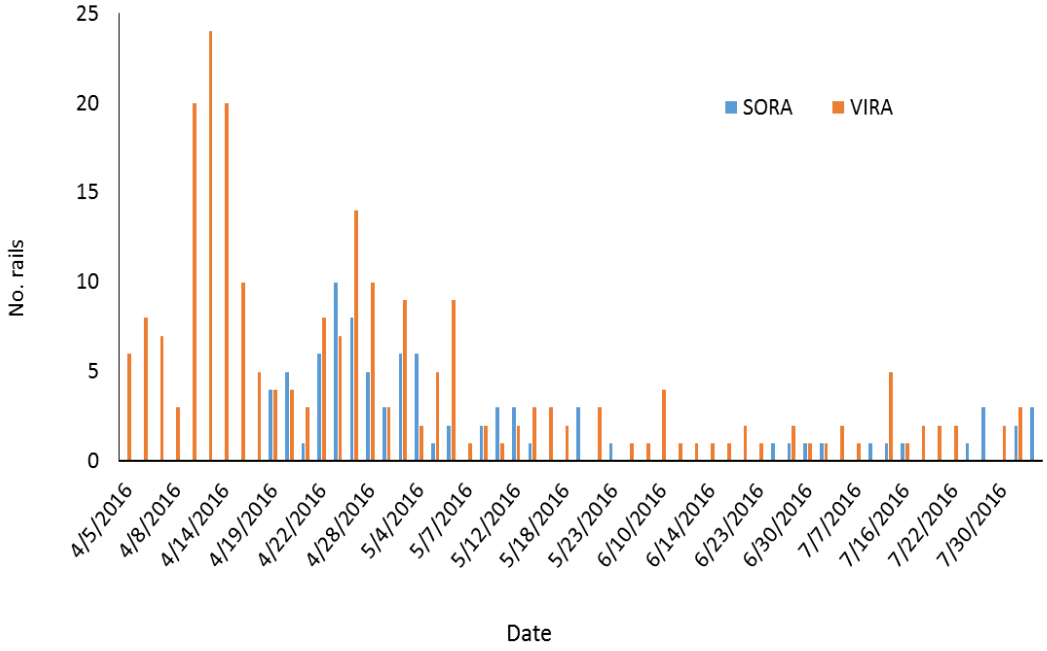

Figure 1. Number of Virginia rails (VIRA) and Soras (SORA) captured during 5 May – 5 Aug 2016 at Winous Point Marsh Conservancy in Ottawa County, OH.

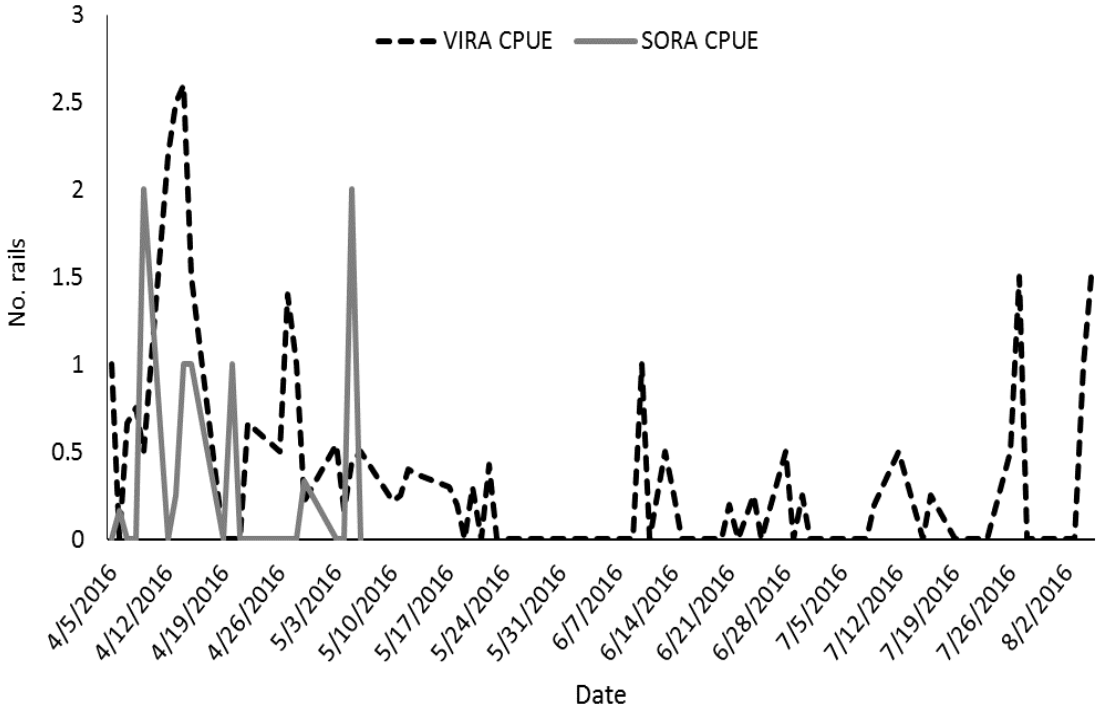

Figure 2. Catch per unit effort for Virginia Rails (VIRA) and soras (SORA) during 5 May – 5 Aug 2016 at Winous Point Marsh Conservancy in Ottawa County, OH.

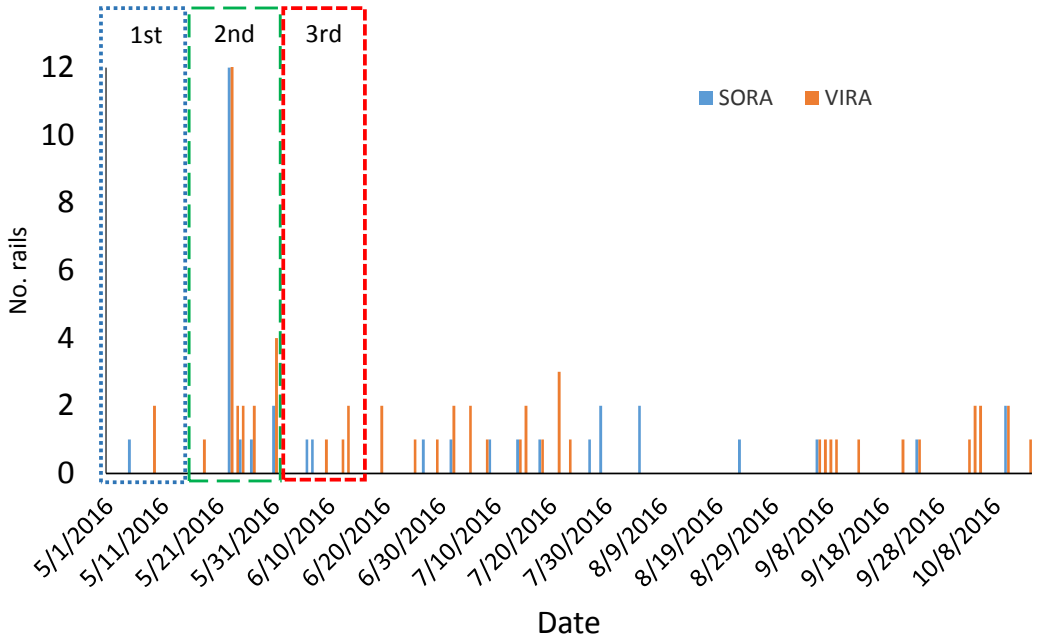

Figure 3. Number of radio-marked Soras (SORA) and Virginia Rails (VIRA) that departed Winous Point Marsh Conservancy during 5 May – 14 Oct 2016. Boxes depict National Marsh Bird Monitoring survey windows for northwest Ohio.

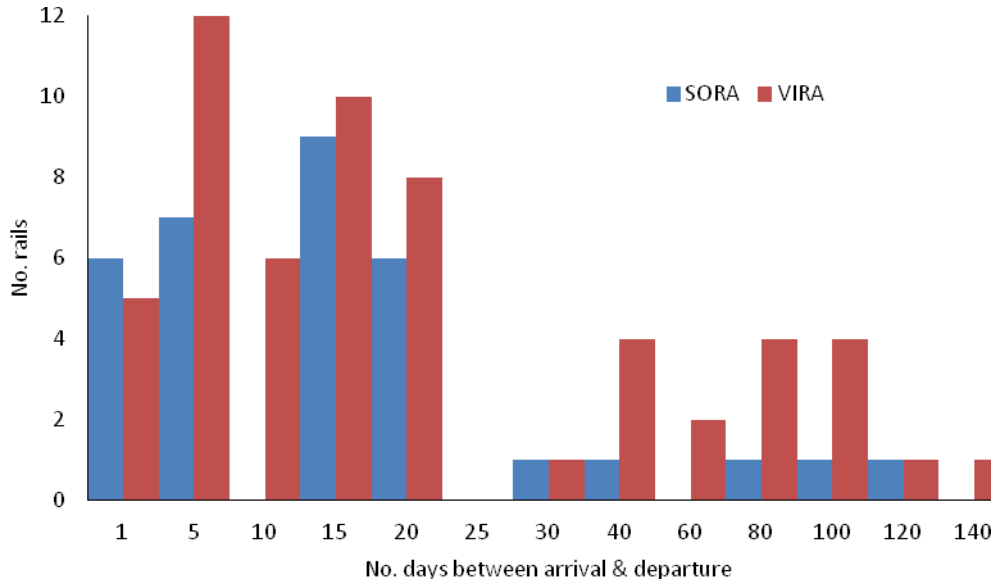

Figure 4. Average number of days between initial capture and departure dates for Soras (SORA) and Virginia rails (VIRA) during 5 May – 14 Oct 2016 at Winous Point Marsh Conservancy in Ottawa County, OH.

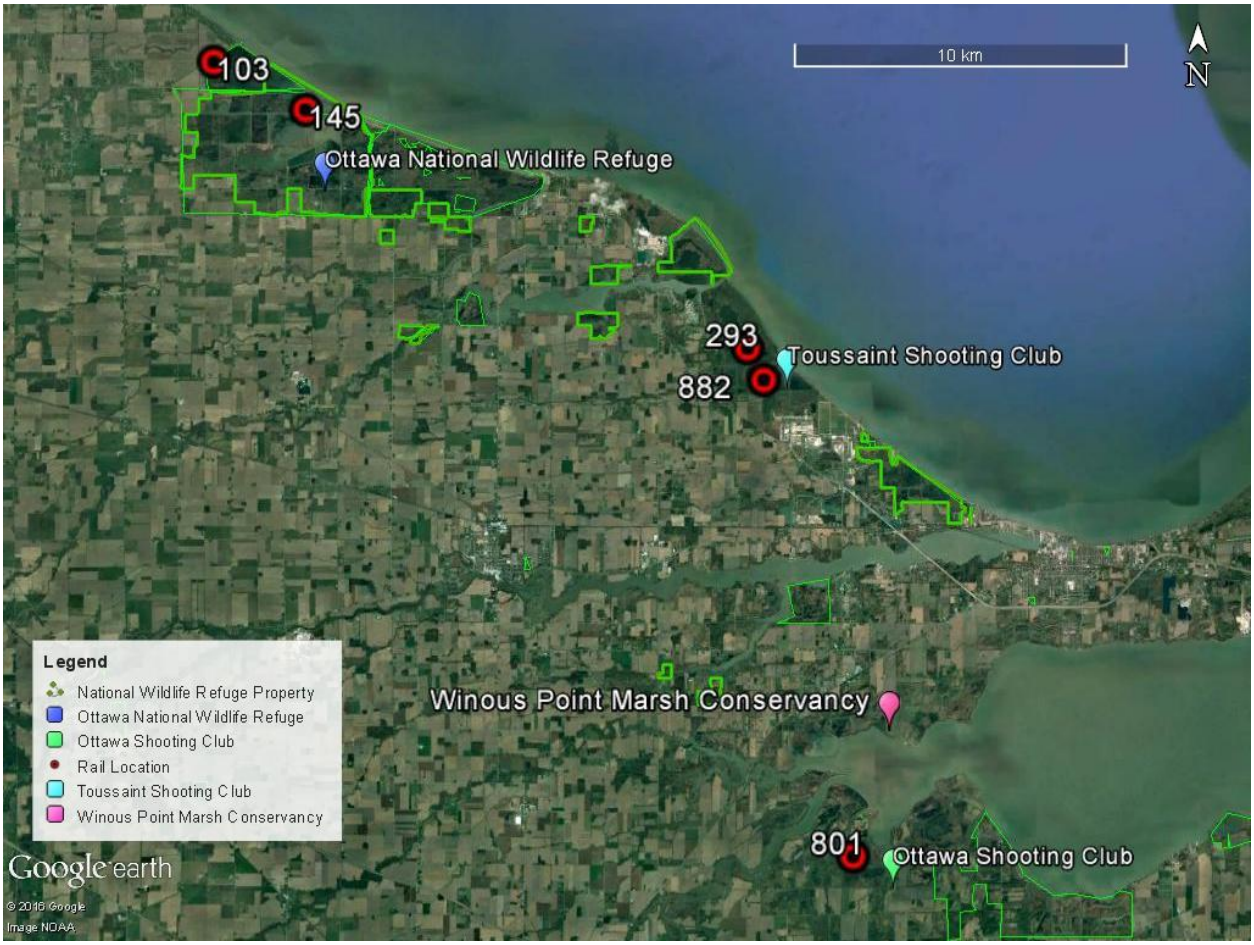

Figure 5. Locations where radio-marked Virginia rails and soras were found with aircraft on 2 August 2016 after leaving Winous Point Marsh Conservancy in Ottawa County, OH.

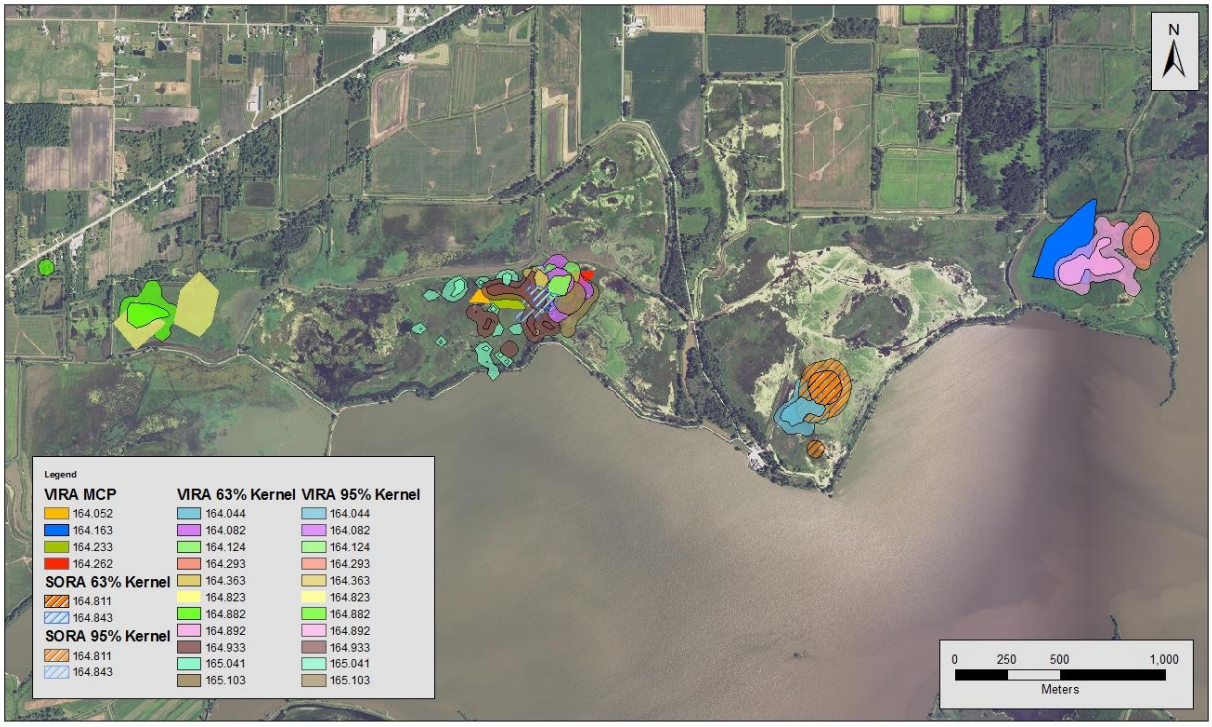

Figure 6. Kernel density and minimum convex polygon (MCP) estimates of home ranges for Virginia rails (VIRA) and soras (SORA) at Winous Point Marsh Conservancy in Ottawa County, OH, during 5 May - 2 December 2016.

Table 1. Summary of sora (SORA) and Virginia rail (VIRA) captures at Winous Point Marsh Conservancy in Ottawa County, OH during 5 April – 5 August 2016.

				Age			Sex		
Species	Captured	Banded	Transmitter Deployed	Adult	Juvenile	Unknown	Male	Female	Unknown
SORA	86	80	34	76	7	3	26	6	54
VIRA	235	218	64	222	3	10			235
Total	321	298	98	298	10	13	26	6	289

Approach/Planned Activities: We will emphasize testing the National Secretive Marsh Bird Monitoring Protocol's ability to meet assumptions of occupancy modeling. Capture and radio-marking of rails will continue, and we shall test the assumptions of occupancy modeling by conducting the national survey in marsh management units with known radio-marked birds versus units without radio-marked birds to determine if there is a difference in call response rates and detectability. Trail cameras will also be distributed in marshes near survey points to verify presence/absence of rails, especially in units with a lack of call response. As part of a modified survey design, distance sampling techniques and other detection covariates will be incorporated to estimate detection probability and factors affecting detection probability. We plan to use estimates of rail response rates to generate a correction factor of birds available for detection. This, coupled with density estimates derived from distance sampling, may yield an abundance estimate that could be applied to wetlands to inform managers of the abundance of these species. Survey data will be collected in conjunction with home range, movement, and habitat use data. The surveys will be primarily conducted from the beginning of May to mid-June during the sampling windows for the National Marsh Bird Survey. Field data collection for the other aspects of the project will be initiated at the same time and extend into late summer.

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.

Evaluation of King Rail Trapping Techniques in Midwestern United States

Investigators: Brendan T. Shirkey, John Simpson, and Michael Picciuto, Winous Point Marsh Conservancy

Collaborators: Bob Gates, The Ohio State University; Tom Kashmer, Sandusky County Park District; Mark Shieldcastle, Black Swamp Bird Observatory; Dave Sherman, Ohio Division of Wildlife; Dr. David Krementz and Auriel Van der Laar Fournier, University of Arkansas

Schedule: 2016 - 2020

Introduction: Contrary to the more resident populations of king rails (*Rallus elegans*) in the gulf coast region (U.S.A), the more northerly, migratory population of king rails that breed in the upper Midwest (U.S.A.) are believed to be quite rare. Due to their limited detectability and secretive nature very little is known about these birds. The little evidence that has been collected suggests that these birds have experienced significant population decline in the past 50 years, and consequently they have been identified as endangered and species of conservation interest by multiple state and federal agencies (ODNR 2015 and UMRGLJV 2007). Assumed population declines are unsurprising given that these birds are a wetland dependent species and wetland habitat has experienced some of the most substantial loss and severe degradation of any habitat type in the country.

Local king rail populations are undoubtedly low in the Midwest although some uncertainty exists about just how low due to the difficulty associated with detecting king rails even when present. The Ohio Division of Wildlife and Winous Point have participated in the Standardized Secretive Marshbird Survey since 2011. This survey is conducted by multiple agencies across the Midwest to generate indices of secretive marshbird (i.e., rails and bitterns) population trends. However, king rail detections have been rare (only one at Winous Point in six years) during these standardized surveys.

We developed a pilot king rail research project in the spring of 2014 at Winous Point to evaluate the efficiency of two different trapping techniques, further evaluate the presence or absence of king rails on the property, and to collect habitat use and migratory data with satellite marked birds. The trapping techniques and detection probability phase of this project has been completed and is scheduled to be published in the March edition of the scientific journal, *Waterbirds*. However, we are still heavily engaged in the satellite telemetry data collection and analysis aspect of the project.

Methods: We established between five and thirteen trapping locations annually (2014-2016) within habitat we hypothesized was suitable rail habitat (e.g., dense emergent vegetation with shallow or no standing water). We placed a rail trap, predator trap, trail camera, and an automated rail-call broadcaster at each site (Shirkey et al. *in press*). Rail calls were broadcast from sunset to sunrise because we hypothesized most king rail activity occurred during this period. Captured king rails were equipped with federal aluminum leg bands and a subset received 9.5 gram solar-powered satellite transmitters from Microwave Technology. Transmitters are attached using a simple leg-loop harness. These transmitters store and record data via satellites and that data can then be accessed and queried by Winous Point researchers at any time.

Figure 1. Captured king rail before release. Notice the long antennae used to improve satellite communication.

Results: We captured two king rails during 2014, six king rails in 2015 and four in 2016 at seven different locations at Winous Point (Table 1). Interestingly, five of the captures have occurred at the newly restored Metzger's property in Sandusky County. This is an excellent example of the potential benefits of wetland restoration for a state endangered species.

Table 1. Summary of trapping dates, locations, and results for twelve King Rails captured and banded at Winous Point, 2014 - 2016.

Date	Location	Trap Type	Satellite Transmitter
7-May-15	North Boalt's	Walk-in	Yes
11-May-14	Weaver's	Walk-in	No
12-May-15	Elm Island	Walk-in	Yes
15-May-15	Weaver's	Walk-in	Yes
24-May-14	Weaver's	Walk-in	Yes
4-Jun-15	Metzger's	Whoosh net	No
8-Jun-15	Metzger's	Walk-in	No
18-Jun-15	Hickory Island	Whoosh net	No
5-May-16	Metzger's	Walk-in	Yes
10-May-16	Metzger's	Walk-in	Yes
26-May-16	Metzger's	Whoosh net	Yes
27-May-16	McRitchie	Walk-in	No

All twelve king rails were banded with a federal leg band and seven of the birds were equipped with a 9.5 satellite transmitter. Of the seven satellite marked birds, we have sufficient data to investigate summer home-range and habitat preference for six and wintering home-range and habitat preferences and fall migratory pathways for three individuals. Although this sample size is small this is the first satellite data ever collected on king rails breeding in the Midwest. Several interesting facts from these birds include the speedy nature of their migration (all 3 birds made it from northwest Ohio to the Gulf Coast in <7 days) and the consistency of wintering location (all 3 birds eventually settled in extreme southern Louisiana).

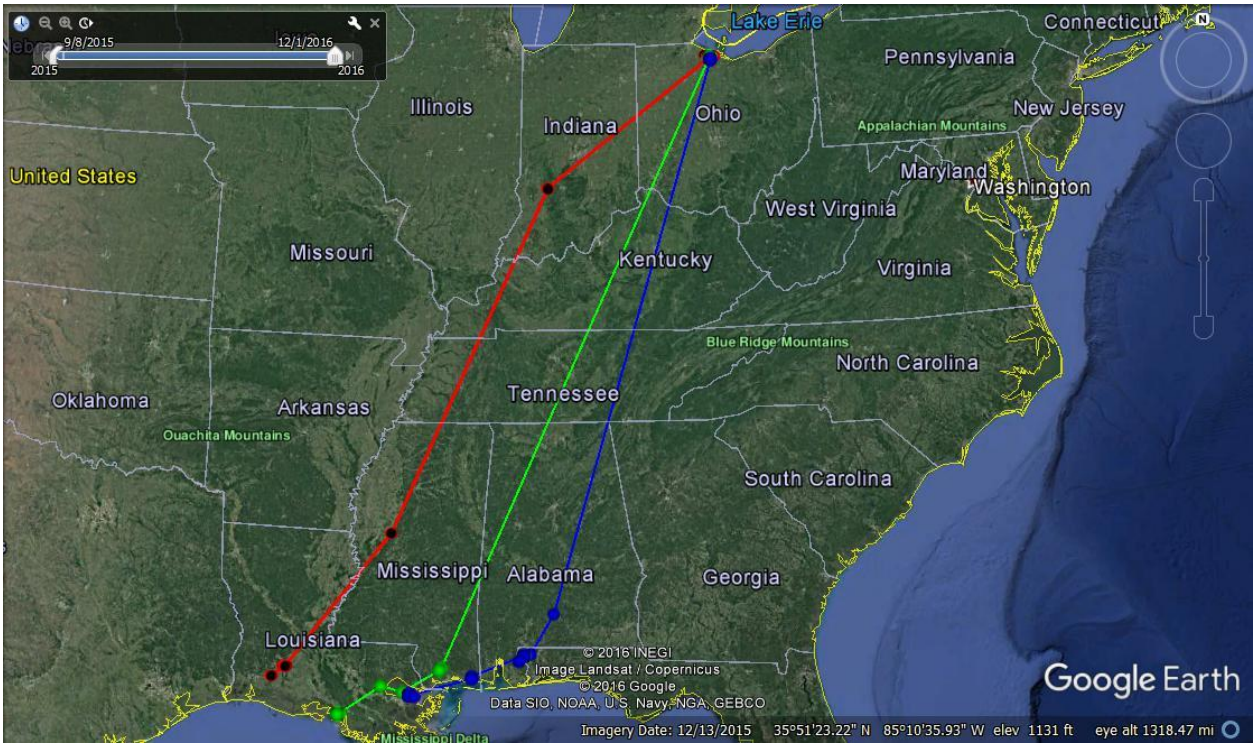

Figure 2. Migratory route of three satellite-marked King Rails from Winous Point to wintering grounds in coastal Louisiana. Red line is a 2014 bird, 2015 in green, and 2016 in blue.

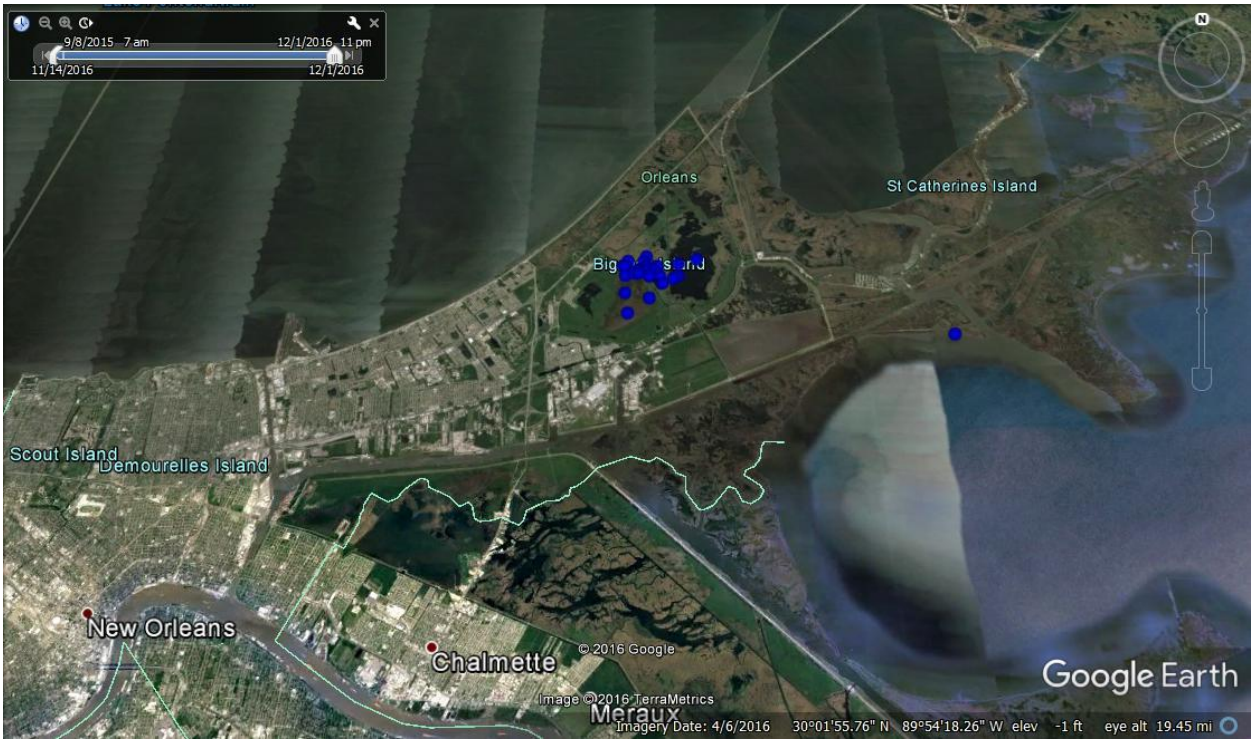

Figure 3. Example of wintering home-range data collected just outside New Orleans, LA from a King Rail marked at WPMC in 2016.

Discussion: The ultimate goal of the satellite telemetry data is to confirm hypothesized migratory routes and wintering locations for the Upper Mississippi River and Great Lakes Region Joint Venture and to investigate habitat preferences of king rails both on their summer breeding grounds and wintering grounds. The habitat use aspect of the project is somewhat limited by the accuracy of the GPS units; however, we are obtaining excellent home-range data and we hope to initiate a graduate student project in the coming years comparing habitat composition within home-ranges to habitat composition at different landscape-level scales.

Winous Point is a lead investigator on this project, seeking grant funding from a variety of sources, including the Webless Migratory Bird Fund, Ohio Division of Wildlife, and the Upper Mississippi/Great Lakes Joint Venture to fund transmitters and technicians needed for the project.

Additional Research and Education Programs Supported by WPMC in 2016

In addition to the projects detailed above, Winous Point annually supports a variety of projects in partnership with partners who initiate the project and 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.

- Winous Point is working with Dr. Chris Tonra (Ohio State University) to support graduate student Jay Wright's research into rusty blackbird ecology (*Euphagus carolinus*). From his proposal: *Based on long term citizen science data rusty blackbirds are believed to be the fastest declining songbird in North America. While much research has focused on elucidating the cause of decline on the breeding and wintering grounds, as of yet no study has examined the basic migratory stopover ecology of this species. Based on the work of the Rusty Blackbird Working Group and citizen scientists that participated in the Rusty Blackbird Spring Migration Blitz, western Lake Erie is clearly one of the most heavily used stopover site in the U.S. Thus we have begun conducting research at Ottawa National Wildlife Refuge, Detroit River International Wildlife Refuge, and on state lands in both Michigan and Ohio to better understand the habitat needs of this species during migration. We are using nanotags (VHF transmitters that carry an individual identifier), an array of automated telemetry towers (one of which is located at Winous Point), and hand tracking to quantify foraging and roosting habitat selection as well as broad scale movements in the region. We are also collecting tissue and fecal samples to determine the origin of birds passing through the region and to describe migration diet.*

- For the sixth 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 (*Emydoidea blandingii*) and spotted (*Clemmys guttata*) turtles. WPMC acts as a study area and logistic hub for housing and storage for this Great Lakes Restoration Initiative funded project.

- Winous Point and the Black Swamp Bird Observatory work together each year to support their respective research and conservation programs. BSBO is directly or indirectly involved with many of the bird banding projects conducted annually at Winous Point. Winous Point supplies housing for BSBO seasonal banding staff and conducts three private lands birding tours each year in support of BSBO programs.

- Sandusky County Park District (SCPD) and Green Creek Wildlife Society continue to work cooperatively with the WPMC to achieve mutually beneficial program goals. The SCPD is an essential partner in our waterfowl banding operations and WPMC youth education programs. WPMC assists the SCPD by providing a research site for shorebirds, Christmas bird count, and shorebird conservation tours.

- Tom Bartlett, Cleveland Museum of Natural History, and Tom Kashmer, Sandusky County Park District, continue to use Winous Point as one of their primary shorebird banding locations. Since 2006 this program has banded 11,673 shorebirds representing 28 different species. Their work has highlighted the importance of this region to these migratory birds that travel annually between south and central America and the high arctic.

- We were also a host site or participant in a number of educational programs this past year. For the sixth 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. Activities include shooting and fishing, wetlands education, and bird research. We also hosted the "Land Stewardship Workshop" this past summer. This program is targeted at high-school seniors interested in conservation careers. The theme was forestry this summer and students spent a full day at Winous in the classroom and within our wetland woodlots. We hosted one of the six sessions of the "Women in Conservation" workshop, aimed at encouraging adult women to participate in outdoor activities. Lastly, our staff assisted with instructing at the "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.

2016 WPMC Activities and Presentations

January	Hosted The Nature Conservancy Lands Protection Meeting
January	Hosted the Sandusky Bay Collaborative Conservation Meeting
January	Upper Mississippi Great Lakes Joint Venture science meetings, Grand Rapids, MI
February	Ohio Fish and Wildlife Management Association Conference, Columbus, OH
March	Hosted and presented Lake Erie Marsh Owners Annual Winter Meeting
March	Supported the Ottawa County Pheasants Forever Banquet
April	Hosted Old Woman Creek Management Planning Meeting
April	Presented for the Firelands Audubon Society; Huron, OH
May	Hosted WPMC Annual Meeting
May	Black Swamp Bird Observatory birdwatching tours (3)
May	Hosted Upper Mississippi Great Lakes Joint Venture waterfowl planning retreat
May	Presented at Wood County Teacher Association Meeting, Bowling Green, OH
June	Hosted Ohio Division of Wildlife Banding training session
June	Hosted the "Land Stewardship Workshop" for high schoolers
June	Attended National Oceanic and Atmospheric Agency training "Effective Project Planning", Huron, OH
July	Hosted "Day on the Wild Side" youth outdoor education event
July/August	Sandusky County Park District shorebird tours (4)
August	Hosted Upper Mississippi Great Lakes Joint Venture Board Meetings in cooperation with the ODOW
August	Attended and presented at the 6th North American Ornithological Conference, Washington, D.C.
August	Presented at OSU Extension Wetlands Management Landowner Workshop; Mansfield, OH
September	Hosted Ohio State University Wildlife Management Class for 25 students
September	Hosted Healing Our Waters Coalition Great Lakes Regional conference tour

September	Hosted Ohio Division of Wildlife officer cadets tour and waterfowl workshop
September	Presented at the Ohio Chapter of the Wildlife Society wetlands workshop; Columbus, OH
September	Presented and hosted tour for the Ohio Ornithological Association Conference, Sandusky, OH
October	Presented at Ottawa National Wildlife Refuge "Youth Waterfowlers of Tomorrow"; Oak Harbor, OH
November	Hosted NIH Center of Excellence for Influenza Research and Surveillance investigators field session