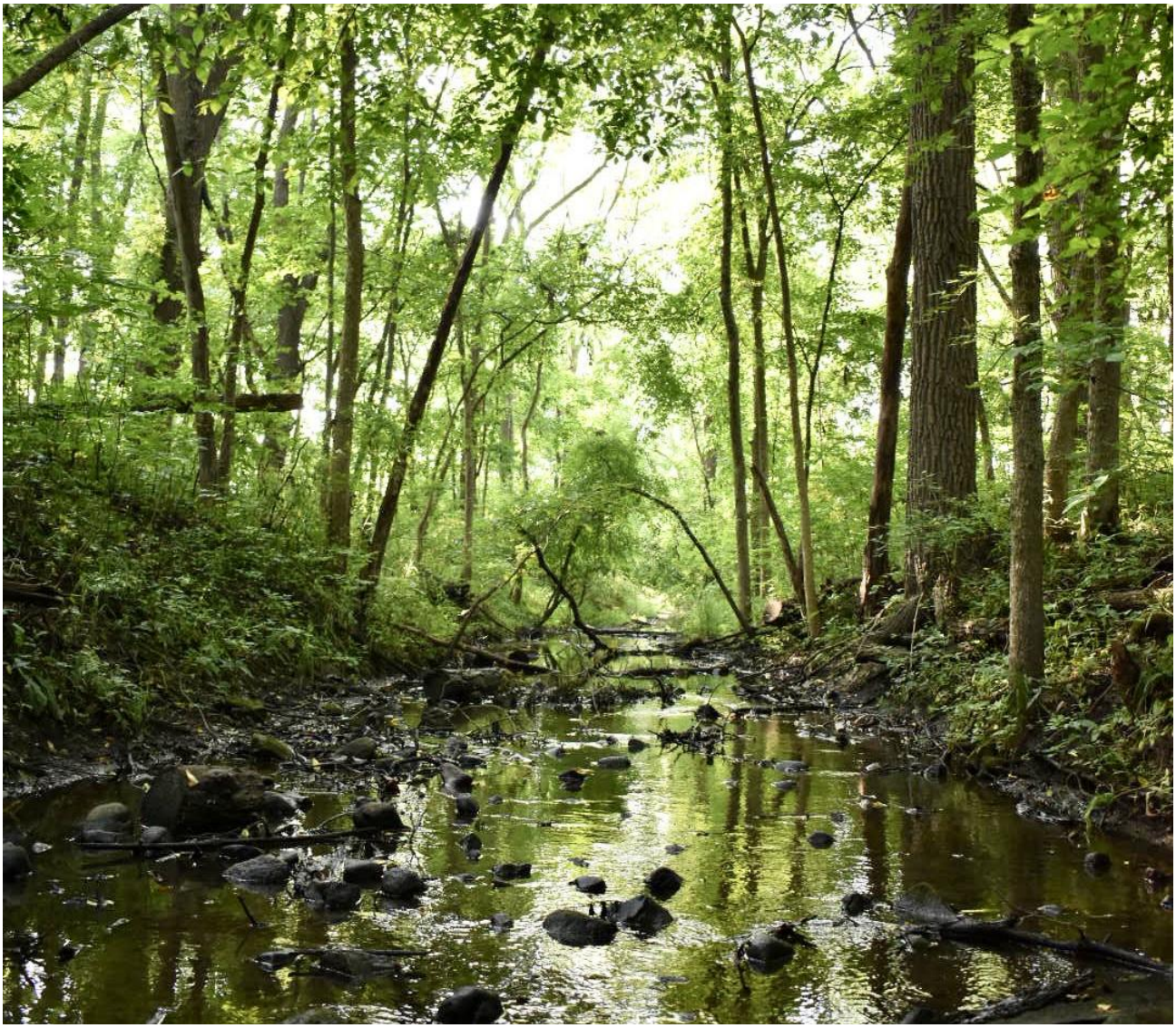
Breeding Bird and Invasive Plant Research Report

August 2023



Scio Township Parks Preserves & Pathways

Scio Township
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Scio Township Parks, Preserves and Pathways

Scio Township Natural Features Report

Scio Township, Ann Arbor, Michigan

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August, 2023

Abstract

This document contains breeding bird survey and invasive plant survey methods and findings, recommendations for management and future research.

Acknowledgements

Thank you to the Scio Township Parks, Preserves and Pathways Committee for supporting this research. Thank you to Hob Calhoun, Norm Roller, and Juliet Berger for their help in the creation of bird survey methods, Greg Norwood for sharing his professional knowledge on bird species, and Shikha Singh for taking time to teach about invasive plants. Thank you to Chris Bailey for setting up ArcGIS. Thank you to Anna Cone, Walker Whitehouse, and Sam Bandstra for their support throughout this project, and the volunteers who assisted in the bird survey.

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Executive Summary

West Scio Preserve, accessed from the south end of Dino Drive, south of Jackson Road in Scio Township, is one of seven parks and preserves owned by Scio Township. West Scio Preserve is 217 acres and made up of southern hardwood swamp, dry-mesic southern forest, wet prairie, and old agricultural fields. There are two vernal pools located within the property as well. In the summer of 2021, the preserve was 124 acres in size. The additional 93 acres were added later in the year 2021, which is located east of the original property, just south of Scio Farms community and includes the wet prairie, dry-mesic southern forest, old fields, and one of the vernal pools. In this report, the addition to West Scio since 2021 will be referred to as the eastern addition.

In 2021, a land history report, breeding bird survey, and vegetative survey were completed in the 124-acre West Scio by Anna Cone and James Johnson. That report will be referred to as the 2021 report. In 2023, summer interns completed a breeding bird survey that builds upon the one completed in 2021, and a vegetative survey that focuses on invasive plants. An invasive species specific management plan created for the Scio Parks, Preserves, and Pathways department is referenced in the report and is a separate document titled West Scio Natural Resource Stewardship Plan.

Breeding bird surveys conducted at West Scio in 2023 resulted in the identification of 64 species present, with 18 confirmed breeding and 15 probable. There were indicator species present in West Scio, as well as some indicator species found in 2021 that were not present in 2023. There were 17 new species identified in 2023, 8 of them being primarily in the eastern addition of West Scio.

The invasive plant survey covered all of West Scio Preserve except the old fields, because the fields are dominated by non-native and invasive plants. It would not serve any major benefit to survey the fields, since they do not have a native plant community in need of protection from invasive plants. Three priority species were identified for the survey: garlic mustard, multiflora rose, and common buckthorn. Two watch list species, Japanese knotweed and Japanese stiltgrass, were also prioritized during the survey. Additional invasive plants can be surveyed in future years. Maps of the invasive plants and their locations were created using ArcGIS Fieldmaps, which can be used to draw conclusions and plan management of the invasive plants present.

It is recommended that management at West Scio Preserve be focused on protecting outstanding natural features through management of invasive species. Bird species of greatest conservation need should be protected by making mandatory land preservation stipulations.

Invasive Plant Survey

INTRODUCTION

Background Information

Invasive plants are those that are not native to the area and cause harm to humans, the environment, or the economy (Michigan DNR). While most non-native plants are harmless, invasive plants compete directly with native plants for water, sunlight, and nutrients and can harm native plants and ecosystems. The vegetative survey conducted in 2021 showed that West Scio has a total Floristic Quality Index (FQI) of 30, which indicates high floristic quality with many native plants and few invasive plants. According to the survey, native plants at West Scio make up 88.5% of the total vegetation. There were three major invasive plants found, which are garlic mustard, common buckthorn, and multiflora rose. The 2021 report recommended conducting a survey of invasive plants at West Scio, which was completed in August 2023. This invasive plant survey is the first to be completed in the parks and preserves of Scio Township and will serve as a guide for future surveys and management.

Research Statement

The purpose of the survey is to conduct an invasive species survey at West Scio Preserve, to be used as a baseline for future monitoring and management of the invasive plants present. The objective of the survey is to locate, map, and collect data on all priority invasive plant populations in West Scio Preserve.

Significance of the Study

Invasive species compete directly with native plants for water, sunlight, and nutrients. They are able to outcompete native plants easily because invasive plants often thrive on disturbed soil, produce large amounts of seed, spread easily, and can grow very densely. Some invasives even release chemicals that prevent other plants from growing near them. An invasion of invasive plants causes a decline in biodiversity and alters ecosystem dynamics, and if left unchecked and unmanaged, invasives can collapse a healthy ecosystem.

Invasive plant surveys are completed by groups and organizations such as the Michigan Department of Natural Resources (MDNR), Ann Arbor Natural Area Preservation (NAP), and Cooperative Invasive Species Management Areas (CISMA) around Michigan. These surveys are often used to inform management decisions for reasons such as protecting natural resources and recreational opportunities. Additionally, invasive plant surveys contribute to public awareness. Sharing survey results with local communities helps raise awareness about the impacts of invasive plants, and can begin to involve volunteers in control efforts.

METHODS

Survey Design

The methods used for the invasive plant survey are transects and swaths. These methods require walking through the landscape on a defined path while scanning for target plants. While transects are straight lines of travel, swaths can be curved and often follow the landscape. Both methods were used in the survey to increase efficiency and accuracy. The transect method was used for the majority of the survey because it is very straightforward, while swaths were used only when necessary for efficiency, such as surveying along a trail.

In the field using these methods, observers walk side by side spaced just far enough apart to identify plants halfway between one observer to the next, so the full space between each observer is covered. While walking, both observers scan the foliage for invasive plants. When a plant is spotted, its location is marked and data is collected. This sometimes involves walking off the set path of travel to identify the edges of a patch and determine population size, then returning to continue on the transect line. Transect lines were mapped using ArcGIS Fieldmaps, which was used in the field as a guide to maintain direction and keep track of the areas of completion.

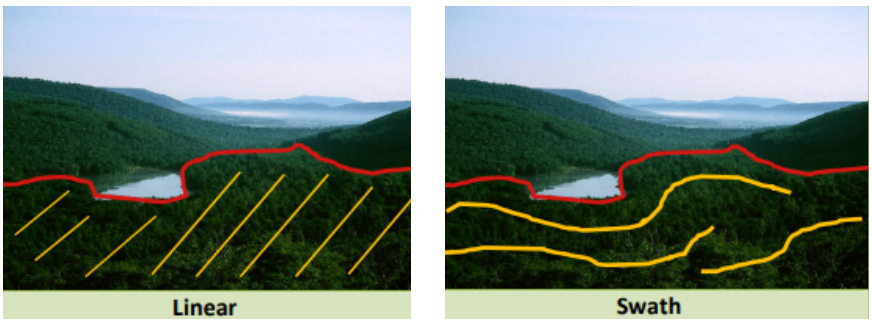

Figure 1A**:** Images from the Food and Agriculture Organization showing transect (linear) and swath survey methods.

Priorities

When completing an invasive plant survey, it is unreasonable to survey every single species that exists in an area. When too many plant species are surveyed at once, it becomes difficult for the observer to accurately spot and identify every plant and will result in missed populations and less accurate data. To minimize that effect, a few priority plant species were chosen for this survey. Remaining plant species can be surveyed in future years.

In addition, some areas within West Scio are of higher priority than others. High quality areas with many native plants are considered higher priority, while lower quality areas already degraded or dominated by invasive plants are considered lower priority. All areas of West Scio were surveyed except the old agricultural fields, because the old fields were already known to be dominated by invasive plants. Doing a survey of the fields would not be beneficial because there are not any highly sensitive areas within the field. The wet prairie was also of lower priority, because it is already dominated by reed canary grass and does not have any areas of wet prairie remnants in their natural state.

The three main invasive plants surveyed were garlic mustard, multiflora rose, and common buckthorn. These are the plants that appear most likely to cause ecological damage most quickly, and be more difficult to manage if left unchecked. Factors that contributed to this decision include West Scio habitat types, sunlight, and soil moisture, as well as invasive plant seed production. There are a couple invasive plants considered watch list species in Washtenaw County, according to the Midwest Invasive Species Information Network (MISIN) that were also surveyed. These plants are Japanese Knotweed and Japanese Stiltgrass. If either species is found in a new location in West Scio, it is important to document and control them quickly. In making these decisions, an expert from the Jackson, Lenawee, and Washtenaw county CISMA was consulted to further understand invasive plant species and their effects throughout the area.

Data Collection

The tool used for mapping and data collection is ArcGIS Fieldmaps, a computer program and iPhone app designed for use in the field. Fieldmaps allows users to view their current location, place points, lines, or polygons, and input data.

The data collected for each invasive plant population are species, location, population size, population density, and last observed date. This information will be useful for control and monitoring efforts.

Both points and polygons were used to map plant populations in the field. Points were used when a population was small, under a half acre, and were depicted as different shapes based on

population size. If an invasive plant population was equal to or greater than a half acre in size, a polygon was used. In the field, this meant walking the perimeter of a patch while placing points periodically in fieldmaps, and closing the area to create the polygon. Polygons allow a better picture of how the population is changing over time.

Addressing Limitations and Potential Sources of Error

Any plant survey requires the observer to be proficient in plant identification, so human error is a potential source of error and should be mitigated when completing a survey. Steps were taken to ensure that observers were familiar with the invasive plants being surveyed, and practice surveys were run to understand how each plant species appears while surveying. However, even those who are proficient in plant identification can miss a plant, so it is worth noting that a few small populations may have been missed, but the overall goal is still achieved. Nearly every invasive plant population was identified, and conclusions can be made using the data collected.

RESULTS

At West Scio, invasive plants were found to be scattered throughout the preserve in varying population sizes and densities. By examining maps created during the survey, trends can be discussed and conclusions can be made about each invasive plant species. Figures 2A-5A on pages 10-13 display findings from the invasive plant survey.

Interpretation of Results

All three priority invasive plants were identified in various locations and quantities in West Scio Preserve. There was one location of Japanese Knotweed located at Dino Drive parking lot, and no populations of Japanese Stiltgrass.

Figure 2A begins to show general trends for all invasive plants. First, these plants are often found along areas of spread such as trails or roads. Note that the trail south of Scio Farms is new this summer and has not yet contributed to spread, but likely will in the future. Larger plant populations are found in areas of soil disturbance, such as along agricultural field edges. The direct sunlight at forest-field edges contributes to these larger areas of invasive plants as well.

Figure 3A shows garlic mustard populations. Garlic mustard appears to be the least common at West Scio out of the three invasive plants surveyed. However, it is found in large, sometimes

dense populations in the eastern addition forest near Honey Creek. The creek likely contributed to its spread. Garlic mustard from the large populations near the creek will also likely spread west along the new trail if not managed, and could establish quickly because of open conditions in that area.

Figure 4A depicts common buckthorn. Buckthorn was found in the largest populations of the plants surveyed, and often the most dense. It was found primarily in the wet prairie, near the swamp and vernal pool. Of the three main invasive plants surveyed, common buckthorn has the greatest potential to cause harm to these more wet areas of West Scio Preserve.

Multiflora rose, shown in figure 5A, appears to be found in the most number of individual point locations throughout the preserve. Currently, large multiflora rose populations are only found at forest-field edges. The remaining populations are scattered and sparse overall.

TABLES AND FIGURES

West Scio All Invasive Plants

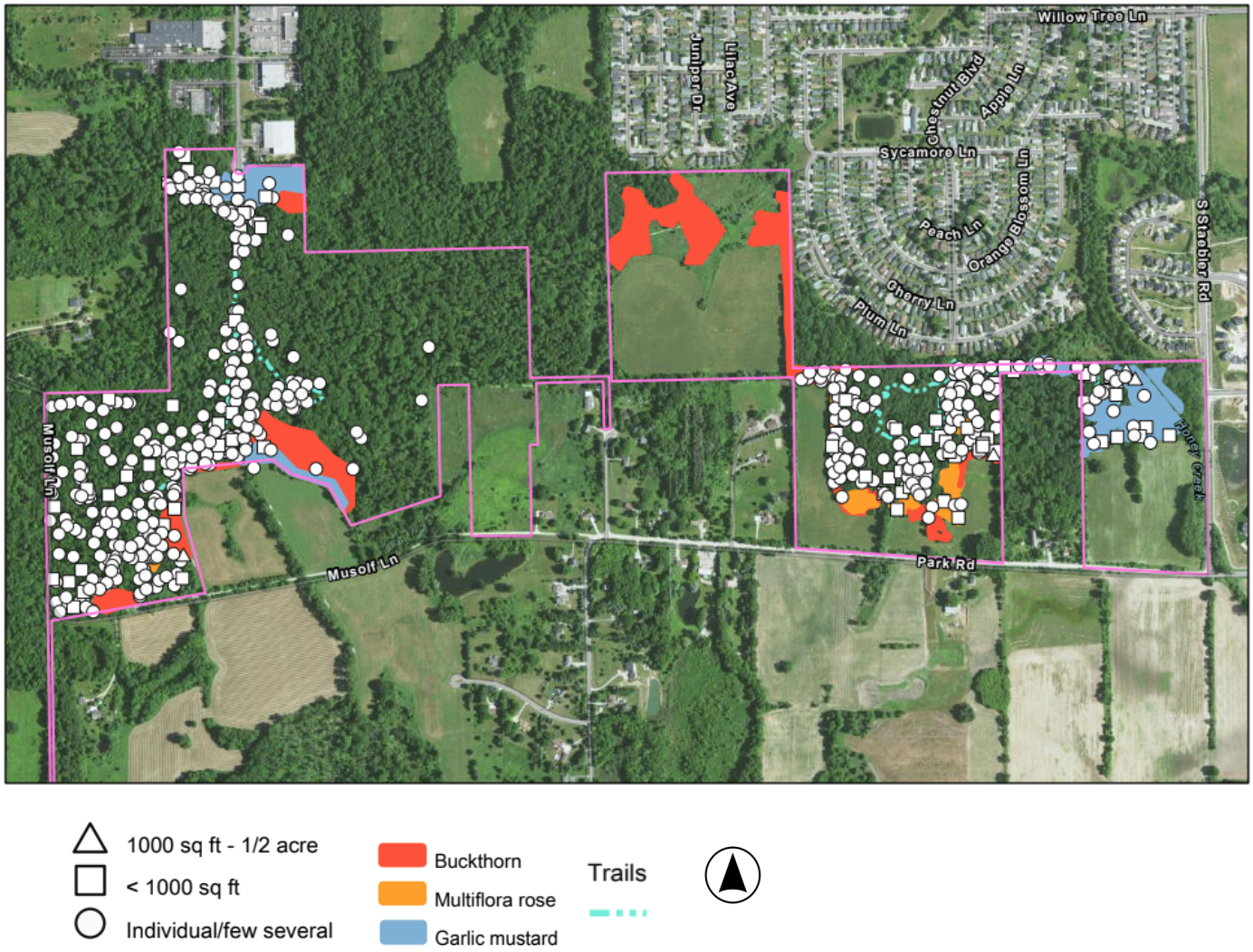

Figure 2A: Map of all invasive plants in West Scio Preserve. In large populations, species are differentiable by polygon color. For smaller populations mapped as points, species are only differentiated when a point is tapped in the ArcGIS map viewer or when individual layers are turned on.. Further maps are created for each species.

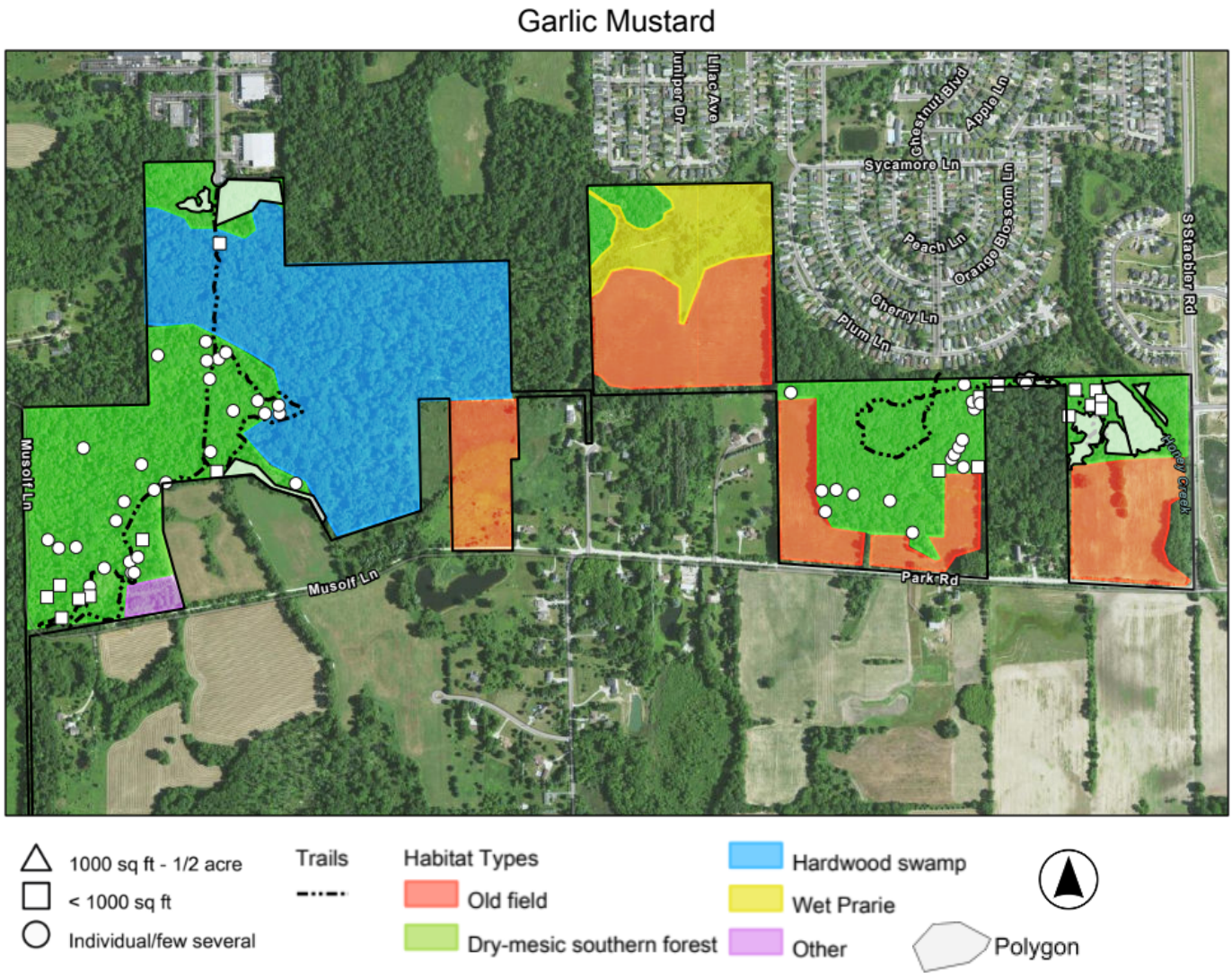

Figure 3A: Map showing all garlic mustard locations and population sizes.

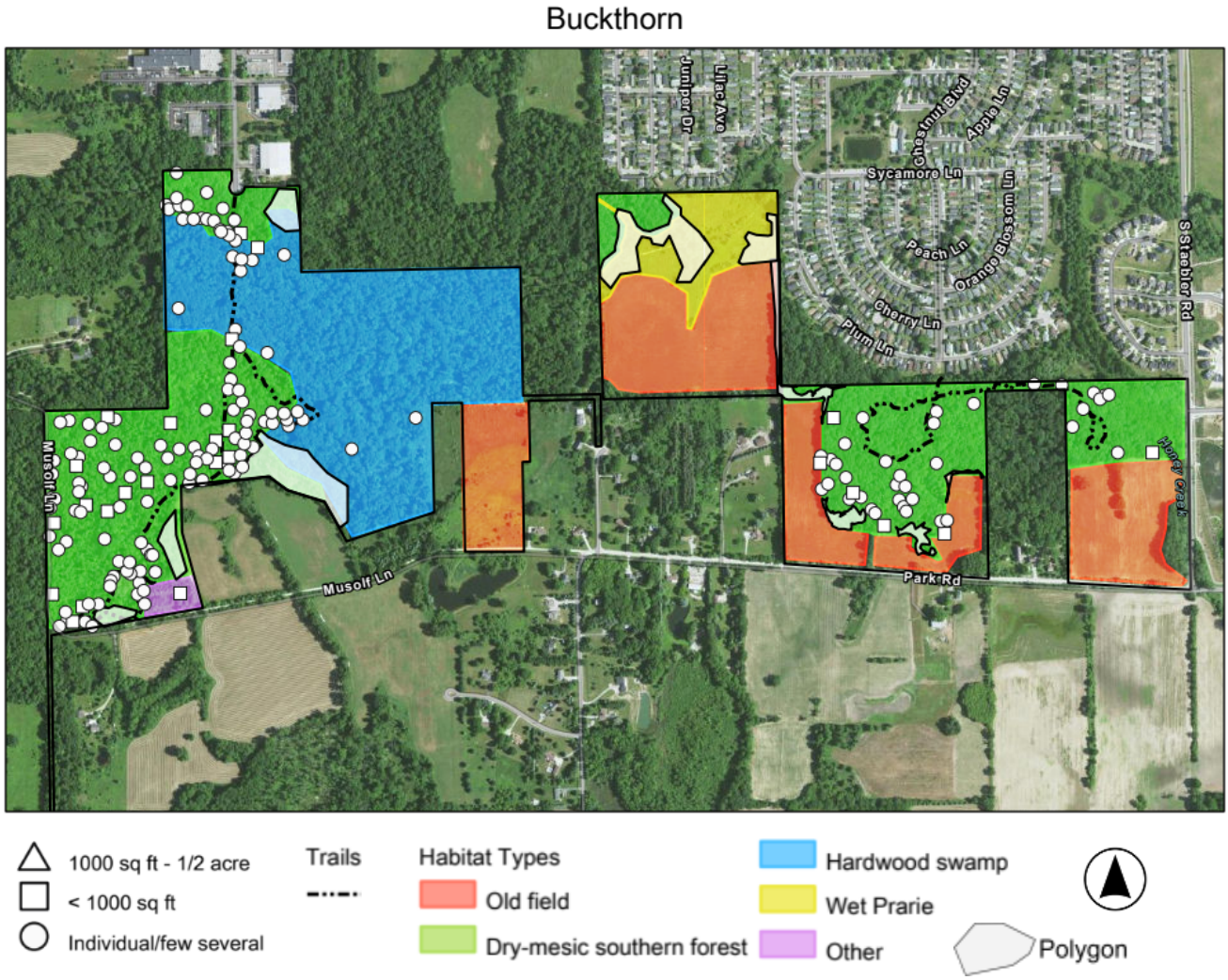

Figure 4A: Map showing all common buckthorn locations and population sizes.

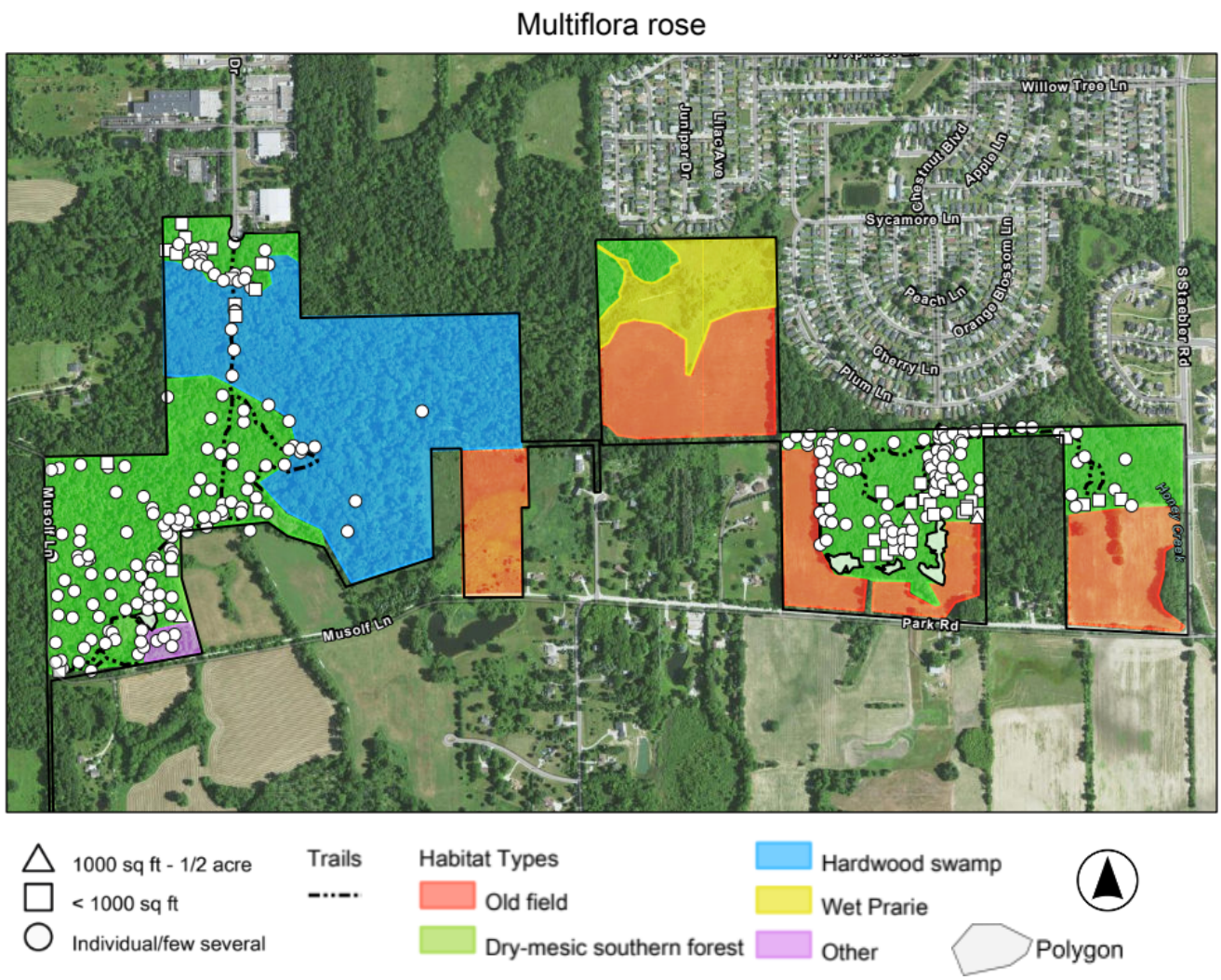

Figure 5A: Map showing all multiflora rose locations and population size.

DISCUSSION

Application of Findings

The maps created by the survey will allow effective management of invasive plant populations. By understanding where invasive plants occur and in what quantities, time and resources can be used efficiently to manage and protect the areas of West Scio that are of high quality.

The maps and data are accessible on ArcGIS fieldmaps by Scio Township Parks, Preserves, and Pathways Department, so the points and polygons created for each invasive plant population can be edited as control and monitoring occurs. This allows land managers to see how a population is changing in response to control efforts, and determine whether the management practice is effective.

Management Discussion and Recommendations

In order to effectively manage invasive plants, it is important to understand where they are found and in what quantities. When managing invasive plants, it is commonly accepted that the most efficient and effective order of controlling populations starts with small satellite populations in high quality areas, working towards larger populations. Then, small populations elsewhere and especially newly detected invasive species with few locations in the preserve. Next, control larger populations with the greatest potential to harm high quality areas, starting with outlier plants and working inward. The last priority for management are populations in lower quality areas. In addition, management should be done on populations in the areas of greatest potential for spread, such as trails and parking lots.

Each invasive species has a unique biology that requires certain control methods. Some require cutting, while for others spraying foliage with herbicide is more effective. These methods are further outlined in the management plan, and are described in detail on websites such as the MDNR invasive species page.

Future Research

The survey completed in August 2023 sets a baseline for future research. The plants surveyed do not require a full survey again, only monitoring and updating data. Everyone should continue to watch for watch list species, which would likely be found along the areas of spread: trails, parking lots, creeks, or roads. The community using the trails can be educated on watch list species as well, through signage or events.

Monitoring of invasive plant populations should take place after management occurs, to assess whether the control method is effective. When control is done on a population, the population area and density data should be updated the following year. For example, if garlic mustard is sprayed with herbicide and dies, changing the population area to non-existent on the map does not accurately represent the population that existed there that year. Instead, immediately following management the “last observed” date and “active management: yes/no” options should be updated in Fieldmaps, along with a note of the control method used. The following year, the location should be checked again to determine if the population was eradicated and whether any has come back. There could be an established seed bank, or missed plants from the previous year that require further treatment. This method of monitoring allows someone to determine whether management is actually causing the invasive plant population to diminish over time, which is the desired outcome.

It is recommended that a survey of West Scio be conducted for the remaining invasive plants that were not a priority in this survey, which include autumn olive, oriental bittersweet, Japanese barberry, amur honeysuckle, and phragmites. It would be beneficial to have a full picture of all invasive species and locations, in order to most effectively manage and protect the preserve. Future surveys can be done using the same methods as this survey.

Additionally, surveys of invasive plants in other preserves could be completed. Other preserves in Scio Township will have different invasive plants and priorities than West Scio, but the same methods as this survey can be used and adjusted to suit the landscape.

If time and resources allow, future research can be conducted on the invasive plants surveyed in 2023. Additional data can be collected on the invasive plants and locations mapped in this survey, such as soil, land use, water, or effects on surrounding native vegetation. This research could allow managers to gain a deeper understanding of how invasive plants are affecting the preserve, how they are spread and how to best protect sensitive areas.

CONCLUSION

In completing this survey, it was found that the invasive plants present in West Scio Preserve are found primarily along trails, roads, disturbed soil, or locations with more sunlight such as forest-field edges. Common buckthorn is found in the largest and most dense populations, primarily in wet areas and areas with more sunlight. Multiflora rose is found scattered

throughout the preserve. Garlic mustard is the least common, but is found in large populations in the east side of the preserve.

While there were many invasive plants found in West Scio, this preserve is a high quality ecosystem that supports diverse native plants and wildlife. Native plant species are more prevalent than invasive species, and the invasive plants found should be managed to protect the ecological integrity of the preserve. By creating and following a management plan, monitoring populations, and conducting future research, West Scio and other preserves can be protected and preserved for years to come.

Breeding Bird Survey

INTRODUCTION

Background Information

The 2023 breeding bird survey builds upon the survey done by Anna Cone and James Johnson in 2021, refining survey methods into something that can be repeated year after year. An important consideration during the development of the 2023 bird survey methods was the potential use of volunteers, which can be included in varying capacities based on volunteers' experience and the survey method used. Breeding bird surveys are an important part of land management, since they enable conservation and population monitoring, ecological assessments, and public engagement.

Research Statement

The purpose of the survey is to gain knowledge of the birds present or absent in West Scio Preserve in order to understand the health of the preserve and inform management decisions. A secondary objective is to create a survey method that can be replicated each year, and for which volunteers can be incorporated in the future.

Significance of the Study

Bird surveys are a tool used all over the world. The state of Michigan runs a Breeding Bird Atlas each year that incorporates volunteers around the state. Locally in Washtenaw county, breeding bird surveys are used by Washtenaw Natural Area Preservation (NAP) and Kalamazoo Nature Center. These surveys are used to determine which birds are breeding in the area. Many of the birds in Michigan during summer months are neotropical migrants; they spend the winter in Mexico, Central and South America and migrate north in the spring to breed. That means that these birds' breeding areas must provide everything they need to thrive and successfully raise young. Their breeding habitats are therefore essential to the perpetuation of each bird species.

METHODS

Survey Design

There were three main methods used in the breeding bird survey: point-count survey, general survey, and night survey. The night survey data was incorporated with point-count data when doing analysis, but general survey data was kept separate because of the difference in methods. Certain data was combined between methods where appropriate.

Habitat Types

West Scio Preserve was divided into 4 main habitat types, shown in Figure 1B, that were used when creating bird survey methods, as well as in data analysis and management planning. Habitat types were partially taken from the 2021 survey and revised, and habitat types in the eastern addition were created in 2023. These habitats are dry-mesic southern forest, southern hardwood swamp, wet prairie, and old agriculture fields. There is also an area of planted pines near the vernal pool, labeled as "other."

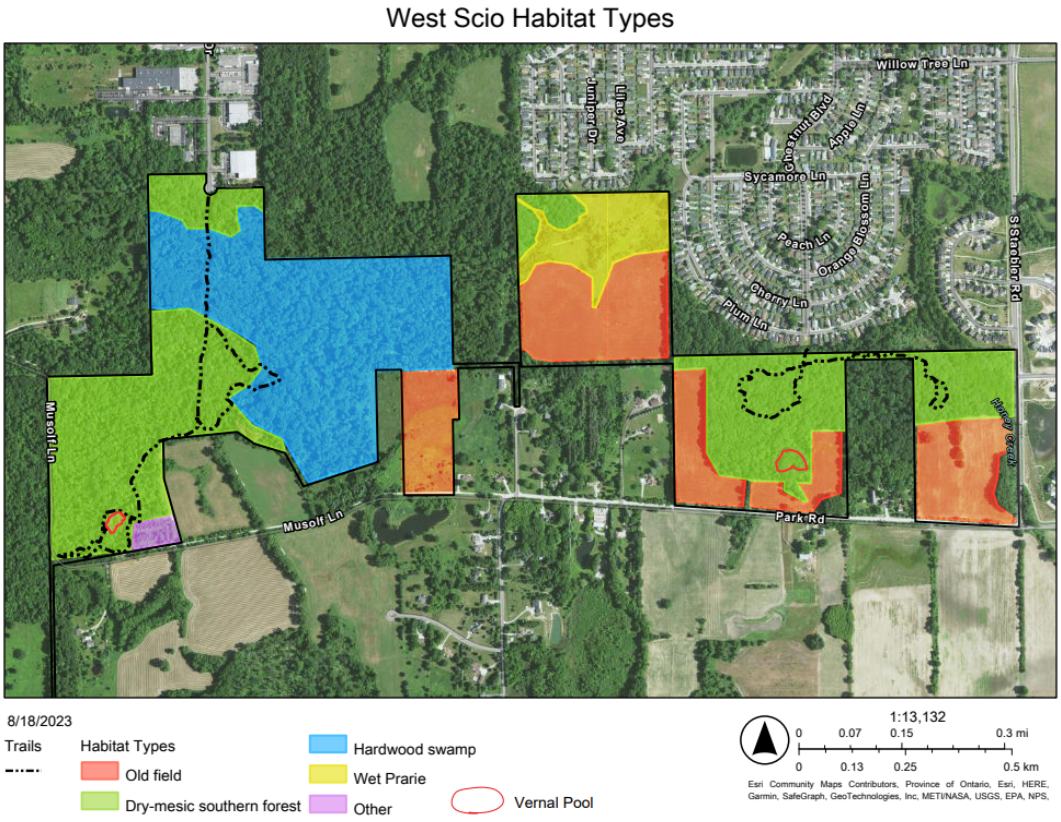

Figure 1B: Habitat types used in data analysis and management planning.

Breeding Codes

Breeding codes are a key feature of breeding bird surveys. These codes, described in Figure 5B on pages 25-26, are taken from the Michigan Breeding Bird Atlas II (MBBA II) and are used when describing bird behavior to determine breeding status. Breeding codes are broken up into four categories: observed, possible, probable, and confirmed. Observed is only used when a bird was seen, but was present outside of its appropriate habitat or typical breeding season. Possible is used when a bird is heard singing or seen in suitable habitat during its breeding season but no other breeding evidence is observed. Probable is used when a bird is seen in suitable habitat and is showing some indication of breeding, such as territorial behavior, mating displays, or visiting probable nesting sites. Lastly, confirmed is used when there is direct evidence of breeding. This includes a bird carrying food, feeding young, or nest building. Only the highest code observed during each bird sighting was used. Confirmed is the highest code, then in descending order probable, possible, and observed.

Point-Count Survey Methods

The purpose of the point-count survey is to collect bird population data, as well as breeding evidence if possible. The point-count method is time efficient and can be repeated easily and accurately in the future, which makes it an easy possibility for future volunteer involvement.

Bird survey points were placed throughout the preserve in strategic locations that represented each habitat type, a total of 18 individual points. Points were placed at least 250 meters apart in order to avoid hearing birds detected at a previous point during a survey. Each point location was surveyed two times, at least two weeks apart to allow for variation in species and breeding behavior, and use of the S7 breeding code. Surveys were conducted from the end of May to the middle of June. Morning point-count surveys took place between 6am-10am, and days of high wind or persistent precipitation were avoided because of decreased bird behavior and detectability in those conditions.

During a survey, each point was surveyed for 10 minutes. During the 10 minutes at a point, the observer recorded all bird species detected by sight or sound, as well as the number of individuals of each species and the corresponding breeding code if it was observed. More than one individual of a species was recorded only when there was visibly more than one at the same time, or vocal calls were detected close to the same time in different locations. If an individual was detected in one location, and was detected in another location more than a minute later during the 10 minutes at a point, it was counted as one individual.

There is no true way to avoid double-counting between points, however, since birds move around their habitat. It is impossible to place survey points that sufficiently cover the 217 acre

preserve while being spaced far enough apart to say with complete certainty that some individuals were not counted twice.

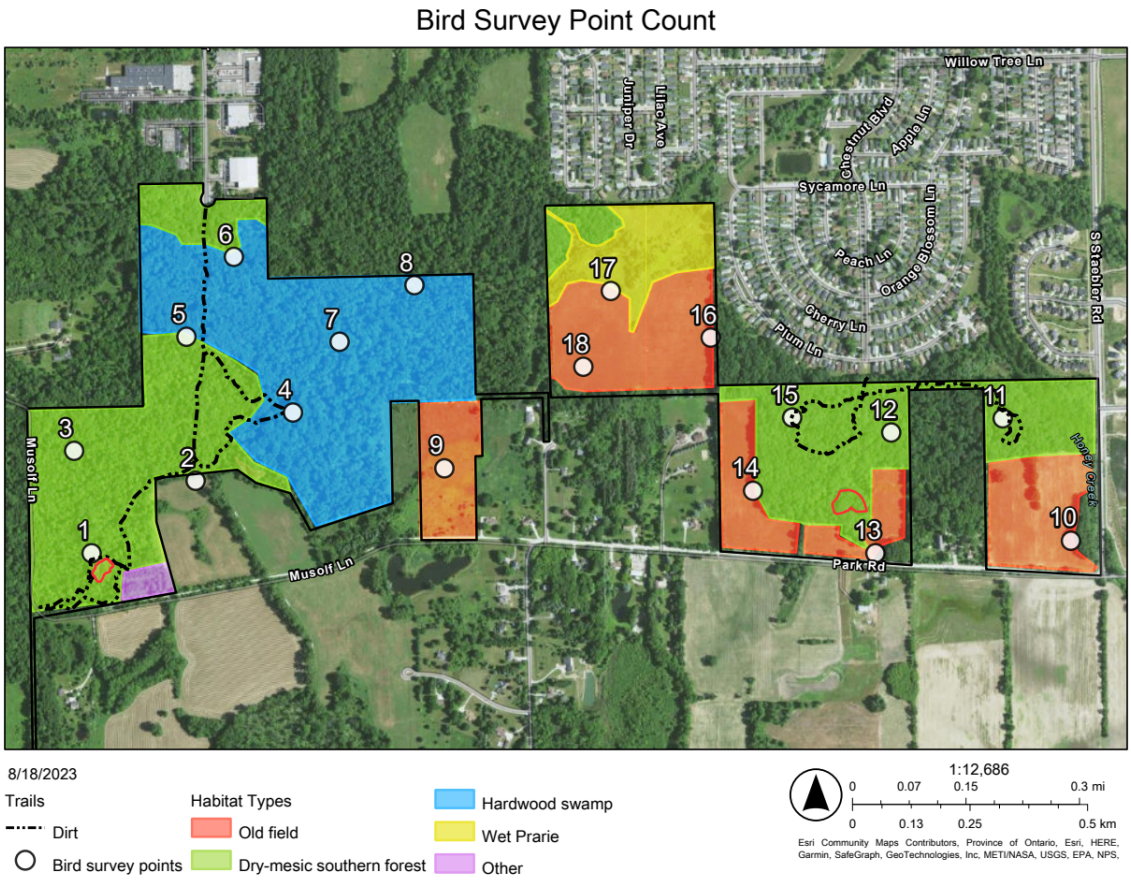

Figure 2B: Map of survey point locations used in the point-count survey method.

General Survey Methods

The purpose of the general survey was to collect stronger breeding evidence and detect birds that are more quiet and elusive, or less common. The general survey is also more flexible in terms of time of day and location. This method is time consuming and requires more walking, but could be suitable for volunteers who enjoy birding in their free time and want to help on a survey when it works for them.

General surveys are surveys in which the observer travels through the area at a slow pace without specific direction, often referred to as meandering. The observer has the flexibility to find birds, spend as much time as needed to identify them, and observe for breeding behavior. The observer records all birds identified by sight or sound, as well as the corresponding number of individuals and breeding code. Similarly to the point-count, more than one individual of a species was recorded only when certain. The general survey method made possible the observation of less

common and less detectable species, which allowed for a more complete species and breeding evidence list.

General surveys took place from the end of May to the beginning of June, once in each area of West Scio. They were typically conducted between 6am-11am, as well as later in the day. It was found that while most breeding evidence was observed in the morning for most species, evidence such as feeding young, carrying food, and agitated behavior could also be observed during the later hours of the day. Based on this, general surveys could be conducted any time of day, making it a great opportunity to involve volunteers.

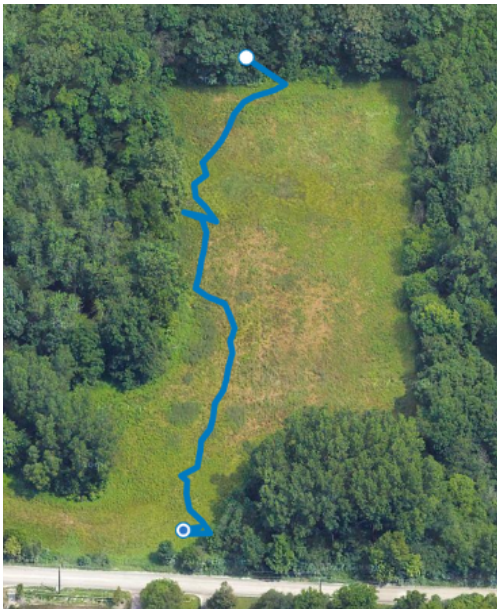

Figure 3B: Screenshot from an eBird location track during a general survey.

Night Survey Methods

The purpose of the night survey is to detect evening and night bird species, as part of an effort to obtain a complete species list. Volunteers also participated in the night survey.

Methods for the night survey differed slightly from the point-count and general survey methods. Bird survey points specifically for night surveying were placed throughout the preserve in accessible, safe locations such as along trails, and were spread out to cover each habitat type.

Two night surveys took place in June, and each point was surveyed once. Night surveys began at 9:00pm, 15 minutes before sunset, and continued until 10:30pm, so both crepuscular and nocturnal species could be observed.

During the survey, observers were placed at each survey point in groups of two or three, and stayed at their point for the duration of the survey while recording all birds identified.

A bird sound played from a device, referred to as playback, was used during the night survey in an attempt to detect certain species. Species habitat, active time, predatory status, and proven response to playback was considered when choosing which species to use playback. It was used only if the target species had not been detected for a certain amount of time at the beginning of the survey, and in order to avoid disturbing breeding birds present, a playback protocol was determined:

1. Begin by playing the bird species song for no more than 30 seconds from a phone app such as Audubon field guide or Merlin bird ID.
2. Quietly listen for a response for 5 minutes.
3. If a response is heard, record the observation in eBird and stop use of playback.
4. If no response is heard after 5 minutes, play another round of vocalizations, no more than 30 seconds.
5. Listen quietly again for at least 10 minutes, record observation if a response is heard.
6. Discontinue use of playback after the second round of 30 seconds.

During the night survey, playback was used for the Eastern Screech Owl, which was also identified in West Scio in 2021.

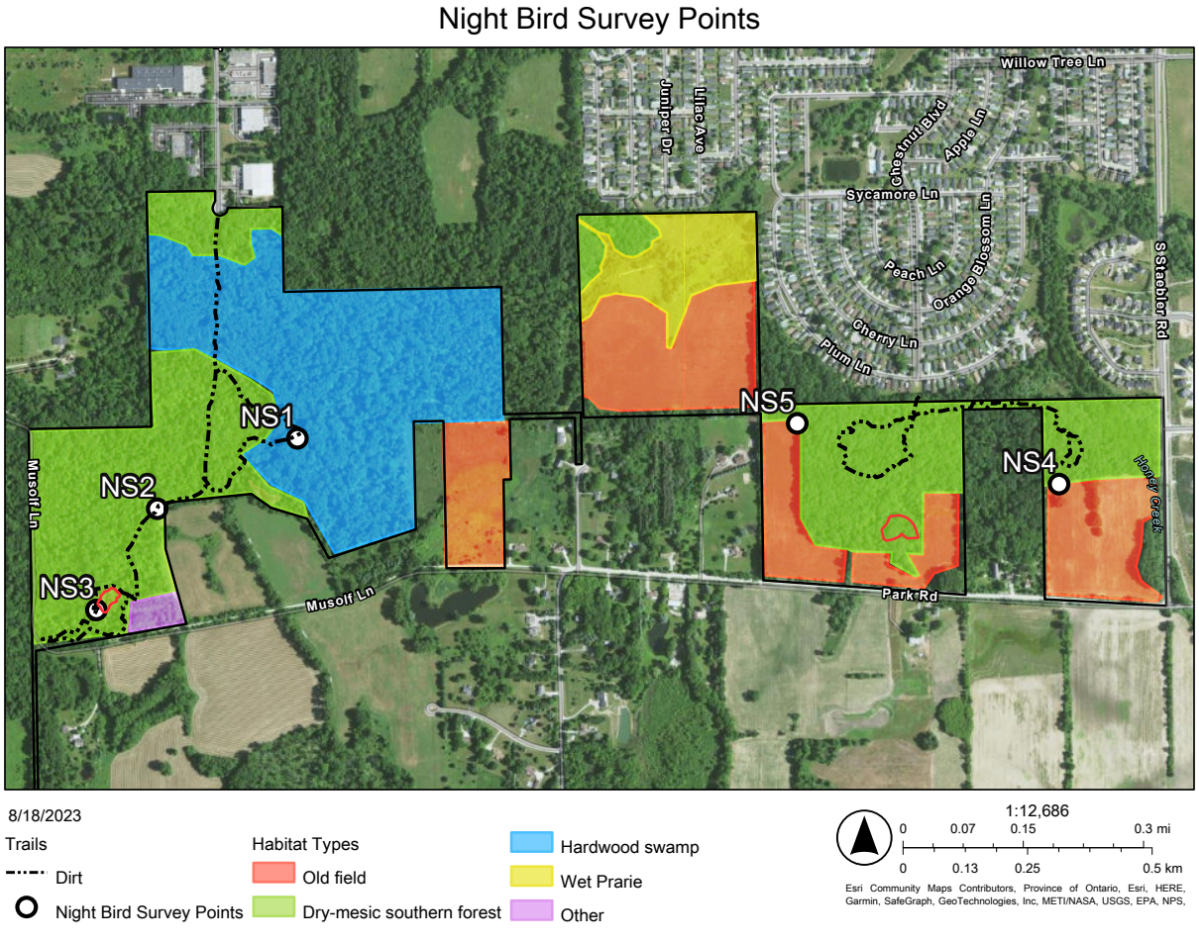

Figure 4B: Map of point survey locations used during the night survey.

Data Collection

The method of data collection used during bird surveys is the eBird app. eBird allows users to input bird sightings and breeding evidence, and is used by bird enthusiasts and researchers around the world. Since eBird is already set up for birding and includes additional features such as location tracking and breeding code options, it was a simple option that offered ease of use in the field.

During each survey, every bird that was identified by sight or sound was recorded in eBird. The highest breeding code observed for each sighting was recorded, and updated for a species if stronger breeding evidence was observed during a single point of a point-count survey, or area of a general survey.

An additional tool used in the field is the Merlin Bird ID app, which has a feature that can identify birds by sound recording. The user begins a recording, and bird species show up on the screen as they are identified. This was helpful in identifying birds and catching species that may have otherwise been missed.

Control Measures

Control measures were taken to ensure accurate data and consistency. Time of day and number of surveys in each location stayed consistent between the 2021 and 2023 surveys.

Within the point-count method, surveys took place between sunrise and 10am. They were conducted on days with no precipitation or high wind, as both factors will affect bird behavior and detectability. Temperature may also play a role, as birds become less active in hot temperatures. Since surveys took place in the morning during the most active time for birds, temperature did not play a major role. It was observed, however, that on days where temperatures rose to 70-80 degrees before completion of a morning survey, birds became less active and stopped singing sooner in the day. Point locations were also kept consistent.

General surveys are more flexible, with the purpose being detection of more elusive birds and observation of breeding evidence. It was found that while breeding evidence is most observable in the morning, certain evidence occurred all day. While some breeding behavior such as singing and territorial defense occur primarily in the morning hours, breeding behavior such as feeding young, carrying food, and agitated behavior occur throughout the day and are most likely to be observed during a general meandering survey because of the area covered and ability to follow birds to observe them.

Night surveys were conducted once at each point, throughout two nights of surveying. Time of day, weather, duration at survey points, and playback protocol were kept consistent.

Addressing Limitations and Potential Sources of Error

While steps were taken to ensure the most accurate data collection possible, it is inevitable that some mistakes occurred. These include possible double counting of bird individuals, missing birds or incorrectly identifying them, and time of day that affected the bird species detected.

Since birds are very active and move about their environment quickly, often unnoticed, there is the chance of double counting. For example, during a point-count three song sparrows may be identified at point A, and two identified later at point B. There is a chance that the two song sparrows at point B could be the same ones seen at point A. This results in an overestimate when

totaling the number of individuals, and is something to be acknowledged and considered when making conclusions about the data collected. When analyzing data, it is important to look for overall trends instead of focusing on exact numbers of bird individuals; the count of individuals is only an estimate. In future surveys, however, certain points used in the point-count method could be adjusted slightly to minimize the possibility of double counting.

The observer's experience and skills can also impact data. People have varying levels of bird identification skills and knowledge, which can impact the number of birds, species, or behavior observed. It is important when conducting a breeding bird survey that at least one observer in a group is proficient at bird identification by sight and sound, and can interpret the behavior that birds are displaying. That may mean training volunteers or staff before conducting the survey.

The time of day also makes a difference on the bird species that are active, and the amount of breeding evidence observed. It was discovered that different bird species are active or singing at different times of day, and that impacts which birds are detectable through the duration of each survey. For example, some birds sing throughout the morning, while others may only sing just before sunrise, and still others are active only at night. It is important, therefore, to survey each point or area at a couple different times in order to capture all the birds that are living there. In this survey, point-counts were completed within the first few hours of sunrise, general surveys were done in the morning but continued until later morning on a couple occasions, and a night survey was conducted past sunset. These steps allowed the observation of a variety of birds and activity at different times of day.

Lastly, it was decided that Merlin should be used only as a tool and not in place of the observer. The Merlin app, while very useful, is not always accurate and should always be double checked by the observer if used to identify a bird. For example, on one occasion Merlin identified a singing song sparrow as a black-throated green warbler. The observer listened to the recording taken in the field and compared it to known recordings of each species, and came to the conclusion that the bird was a song sparrow, not a warbler. When a bird is recorded and identified by Merlin, the recording can be played and listened to by the observer to determine whether the identification is correct.

In future surveys, these limitations and sources of error should be considered and further steps should be taken to minimize them, in order to collect the most accurate data possible.

Breeding Codes

— OBSERVED —

F – Flyover: Birds flying high overhead or in direct flight. This is a behavior code that doesn't indicate breeding, therefore it is in the 'Observed' category. Tree Swallows foraging for insects are not considered a flyover because they are not in direct flight.

— POSSIBLE —

H – In Appropriate Habitat: Adult in suitable nesting habitat during its breeding season. Note that this code has both a habitat and breeding season component, which can be very different for residents vs migrants.

S – Singing Bird: Singing bird present in suitable nesting habitat. This code is also used for non-songbirds giving their primary vocalization, such as woodpecker drumming, owl calls, rail vocalizations, and woodcock peenting. If in doubt, refer to the Acceptable Codes Chart. In some species, both males and females sing (e.g., Northern Cardinal, Bicknell's Thrush). If a bird is heard singing at the same place on a second trip during the breeding season, it may qualify as S7.

— PROBABLE —

S7 – Singing Male Present 7+ Days: Singing male present at same location on at least two occasions 7 or more days apart. Do not use if you observed the species singing a week earlier in a different location. This behavior presumes a permanent territory. This code should only be used if the initial observation was made after migration
ceased. Observations must be made within the same breeding season; observations from different years do not apply.

M – Multiple (7+) Singing Males: Multiple (7 or more) singing or territorial birds of a species detected in a location within a single breeding season.

P – Pair in Suitable Habitat: Pair observed in suitable nesting habitat. Only use this code when you are fairly certain that a mated pair of birds has been observed. Look for behavioral cues to determine if you have a male female pair, particularly in species where males and females look the same.

T – Territorial Defense: Permanent territory presumed through defense of breeding territory by fighting or chasing. While this is generally used for individuals of the same species, an interaction between members of different species may fall under this code when it appears to be territorial defense. Also see "A – Agitated Behavior." Because territoriality involves the defense of a fixed area, it may be useful to map locations of individuals to determine if they are defending the same general area when surveying the block on future visits.

C – Courtship, Display, or Copulation: Courtship behavior or copulation between a male and female. Courtship behavior includes transfer of food, displays, and grooming between a pair of birds.

N – Visiting Probable Nest Site: Repeated visits to a probable nest site. This is especially useful for cavity nesters or for a shrub-nesting species that flies into the same thicket and disappears on several occasions.

A – Agitated Behavior: Agitated behavior or anxiety calls from adults indicating a nest site or young in the vicinity. This code refers to a stronger reaction to intruders than those exhibited by "T – Territorial Defense," usually against brood parasites, nest predators, and humans. Do not use this code for agitation induced by "phishing" or playing recordings. This code also excludes mobbing behavior that species engage in year-round (e.g., mobbing an owl).

B – Woodpecker/Wren Nest Building: Nest-building by wrens or excavation of cavities by

woodpeckers. Wrens may build "dummy" nests before the female selects a nest. Woodpeckers often drill holes for roosting.

— CONFIRMED —

PE – Physiological Evidence: Physiological evidence of breeding based on a bird in the hand. This code is used primarily by bird banders and includes evidence such as a highly vascularized swollen incubation (brood) patch, cloacal protuberance, or an egg in the oviduct.
CN – Carrying Nesting Material: Adult carrying nesting material to an unseen nest, such as sticks, grass, mud, and cobwebs. For raptors, be sure the material is not simply incidental to prey capture/transport. For wrens, use B code.
NB – Nest Building (not wrens or woodpeckers): Nest-building observed at the actual nest site, excluding wrens and woodpeckers.
DD – Distraction Display: Distraction displays and injury feigning in an attempt to draw intruder away from nest or young.
UN – Used Nest: Used nest found, but no adult birds seen nearby. Use *only if* you are *certain* of the species. Add comments detailing how you identified the nest. Do not collect the nest. Enter '0' if no individuals of that species are observed during your visit.
ON – Occupied Nest: Occupied nest indicated by adult sitting in nest in incubating position, adult entering nest site and remaining, or exchange of incubation duties by the pair. This code is useful for nests high in trees, on cliffs, and in chimneys where the contents of the nest and incubating or brooding adult cannot be seen.
FL – Recently Fledged & Precocial Young: Recently fledged or downy young still dependent upon adults and presumed incapable of extended flights from nest site. Look for retained downy feathers, a yellow gape, a short tail (shorter than the wings), clumsy flight and landings, and a bird incapable of feeding itself. Beware of family groups late in the breeding season which may still be interacting but are far from the breeding location. Young cowbirds begging for food confirm both the cowbird and the host species. If you find a dead fledgling and don't see an adult of the same species, use a count of '0' and enter the FL code.
CF – Carrying Food: Adult carrying food for young or incubating partner. This code should not be used for corvids, raptors, terns, and other species that regularly carry food for courtship, caching, or other purposes. One of the best signs to look for is the repeated carrying of food in the same direction.
FY – Feeding Young: Adult bird feeding young that have left the nest. This code should not be used for species that may move many miles from the nest site, such as raptors and terns. Use the NY code for nestlings being fed by an adult.
FS – Carrying Fecal Sac: Adult carrying fecal sac or egg shell fragments. Many passerine adults keep their nests clean by carrying membranous, white fecal sacs and broken eggshells away from the nest. Note that only songbirds and woodpeckers produce fecal sacs and this code should only be applied to these groups of species.
NE – Nest with Eggs: Nest with eggs. Be careful not to disturb the vicinity of the nest. Confirm the species by waiting at a distance until adult returns. If no birds are seen, use the UN code. If a cowbird egg is found in the nest, use code NE for both the cowbird and the host species; if no individual cowbirds were seen that day, then enter a "0" in the Brown-headed Cowbird number field during data entry.
NY – Nest with Young: Nest with young seen or heard. Keep your distance so nestlings are not prematurely flushed from the nest. Include the nestlings in your species count. Presence of cowbird young confirms both the cowbird and the host species.

Figure 5B: Breeding codes and definitions taken from the Michigan Breeding Bird Atlas II.

RESULTS

At West Scio, there were 64 species of birds identified. Of those species, 17 are new in 2023 when compared to the 2021 survey data. Of the 64 species identified, 19 were confirmed as breeding, and 17 were identified with a breeding code of probable.

Discussion of Significant Findings

The indicator species found in West Scio in 2023 indicate that West Scio is a high quality, diverse, and healthy ecosystem. The yellow-throated vireo, scarlet tanager, and wood thrush indicate that West Scio has a large heathy forest. The yellow-throated vireo requires younger, open forest while the scarlet tanager requires older forest with unbroken canopy, and the wood thrush nests in brushy understory. The fact that these indicator species are found in West Scio shows that the preserve can support a wide variety of birds, which also indicates overall ecosystem health and biodiversity. All three of these species require large areas of forest and are often parasitized by cowbirds. Brown-headed cowbirds are native to Michigan, and thrive in open areas and forest-field edges. Cowbirds typically do not penetrate deeper into unbroken forest, which means that large forests provide protection for the species mentioned. However, when a forest becomes fragmented, cowbirds can enter and lay their eggs in other birds' nests. The unsuspecting target then raises cowbirds as their own; cowbirds often grow faster and larger than the host species, which harms the host's own young because cowbirds outcompete them for food.

Woodpeckers and cavity nesters also indicate large, healthy forest. The pileated woodpecker requires large forest and old trees. Pileated woodpeckers are important because they indicate healthy forest and the diversity of other woodpeckers and cavity nesters. Pileated woodpeckers also excavate holes in dead trees that can also be used for nesting by other species. If there are pileated woodpeckers in the area, then likely the forest can support many other species as well.

Many of the species found in the survey appear to reside primarily in field or edge habitat. The species identified in field habitat appear to have stable populations in Michigan, likely because of the abundance of habitat created by farmland and the clearing of forests. While many species were found in the field, the species with greatest conservation need were found in the forest. These include the indicator species mentioned. As forests become smaller and more fragmented because of development, clearing for farmland, or roads, the species that rely on forest are decreasing. Therefore, it is important to conserve and even grow forested land to protect these species.

Two indicator species found in the 2021 survey, the ovenbird and red-headed woodpecker, were not found in 2023. This could be for a variety of reasons. First, it could be that they are less common in West Scio and it was simply chance that they were not detected in 2023. Second, something in West Scio may have changed that caused these birds to disappear from the property. This could be habitat loss or the changing of habitat such as second growth or canopy cover. Details are outlined further in Figure 12B on page 40. There are additional species that were identified in 2021, but not 2023, but were not cause for concern. Either populations are stable in the area, or the species was outside of its breeding range when identified in 2021.

The great blue heron rookery in West Scio is one of the largest in Washtenaw county, with over 50 nests according to the 2021 survey. While a rookery-specific survey was not completed in 2023, it was monitored and found to be active. This means that the Woodview Commons development occurring near the rookery respected the 300m buffer zone and did not cause major disturbance to the herons.

Comparison to 2021 Survey

There were 16 new bird species found in 2023, compared to the 2021 survey. Ten of those species were found primarily in the 93 acres added to West Scio since 2021. Those 10 species indicate that there is something unique about the eastern addition of West Scio, which could be habitat. The eastern addition consists of more fields and smaller, more broken forest than the original 124 acres. This habitat could be suitable for different species, notably the warbling vireo, great-horned owl, field sparrow, and spotted sandpiper.

The 2021 survey methods were similar to that of the 2023 general survey methods, while in 2023 additional methods were implemented. Because of changes in survey methods, certain conclusions cannot be made, such as comparing exact counts of birds. However, it is noted that the 2021 survey identified more species as confirmed breeding, 21 compared to 19 confirmed breeding in 2023. This is likely because the 2021 survey used only general survey methods, and observers spent more time following birds and observing for breeding evidence. This illustrates the importance of both point-count and general survey methods. Breeding bird surveys are new to Scio Township, and are a work in progress. Likely it will take a few years to refine methods and data collection procedures, in order to make the survey most efficient and replicable.

DISCUSSION

Application of Findings

By examining the bird species present in West Scio, which habitats they rely on, and their conservation status, we can make management decisions that best benefit birds and their habitats.

Management Discussion and Recommendations

Scio Township should continue purchasing land to protect birds and provide recreational opportunities. There were 10 new species found primarily in the eastern addition of West Scio, which highlights the importance of land acquisition. When more land is acquired, new species of birds are protected, and managers have the opportunity to manage the land to best benefit species of greatest conservation need. It may be beneficial to assess the ecological importance of a parcel to determine whether it will contribute to conservation. Additionally, acquiring land that supports birds provides recreation opportunities for birders, hikers, and the general public.

The indicator species present in West Scio are threatened by both habitat loss and parasitism by brown-headed cowbirds. The yellow-throated vireo, scarlet tanager, and wood thrush all require large forest for breeding and are parasitized by cowbirds near forest edges or when the forest becomes fragmented. Woodpeckers require forest and appropriate nesting cavities for breeding, and are also threatened by habitat loss and snag removal. To protect these species, it is recommended that the forest in West Scio continue to be preserved. Avoid cutting dead trees when possible during bird breeding season, May-July, unless necessary for safety. This will help protect the bird species that may be using cavities within the tree for nesting.

The buffer zone around the heron rookery, detailed in the 2021 report on page 17, should continue to be supported and monitored. To protect the herons and rookery, it is essential that disturbance to the rookery is minimized as much as possible.

One major management question revolves around the old fields in West Scio. Currently, these fields are dominated by non-native plants. There are unique bird species found in the fields, but their populations appear to be stable. There are three main options regarding how to manage the old fields in West Scio: allow farming or a community garden, restore the old fields to native prairie plants, or allow fields to turn to forest.

Farming or a garden could benefit the community if done organically and with low impact, but does not serve conservation needs. If this option were chosen, crops such as hay would need to

be cut after July 15 to avoid mowing bird nests that may be present. It would also be advised to avoid cutting into the forest, in order to protect vulnerable forest species.

The second option, prairie restoration, would create educational opportunities and provide habitat for native plants and insects while continuing to provide for field and edge bird species. This option, however, is expensive, labor intensive, and time-consuming.

The third option is to allow the field to turn to forest. This would best benefit bird species that require large forests to thrive, and are losing habitat elsewhere in their breeding range which is causing their decline. It takes many years for a forest to grow, but a larger forest would provide long-term protection for forest bird species.

It is recommended, of these three options, that the field be allowed to turn to forest. While this process takes time, it would happen naturally and requires little time and resources. It would also provide long-term conservation for forest bird species, and some species such as the ovenbird could return to the property. Larger forests would also protect those species vulnerable to cowbird parasitism. While field bird species in the preserve may diminish with this option, their populations are stable in the area and there is an abundance of open habitat available.

Future Research

This report is the second breeding bird survey to be completed in West Scio Preserve. The methods used are a work in progress and should be built upon and refined in the future for a more streamlined process, and could be adjusted if volunteers are to be used in the point-count or general survey methods.

The main method of data collection used in this survey was eBird. While eBird worked well, it did not have a system built in to organize and analyze data in ways best suited to our needs. Another option for future bird surveys is Survey123, which is an application from ArcGIS designed for community data collection. Survey123 would require some time for setup, but could provide a more efficient means to organize and analyze data while also utilizing volunteers.

Future surveys can replicate the survey used in 2023, and could be done every year or every other year. Surveys should continue at West Scio Preserve, and can be expanded to other parks and preserves. Research in West Scio can also focus on a few species to be surveyed in greater depth. Surveys could focus on indicator species, their habitat, and whether they are breeding successfully, in order to gain a stronger understanding of their health and conservation needs. This type of research would likely require unique survey methods.

The great blue heron rookery present in West Scio should continue to be monitored. At a minimum, the rookery should be checked every year to ensure that the herons have not abandoned the site and are actively breeding. This could be done during the breeding season when herons are nesting and raising young, but care should be taken to avoid disturbance to the herons. A more in-depth survey could also be completed that would include a nest count and monitoring of breeding success. The protocol by Ross Venessland and Don Norman can be used as a guide in this type of heron rookery survey. Another option, if a thorough survey of the rookery is desired, is hiring a contractor to complete the survey.

CONCLUSION

The breeding bird survey completed in 2023 showed that West Scio Preserve is a healthy, dynamic ecosystem that supports a great variety of bird species. There are some important indicator species present in West Scio, and new species were identified in 2023, including some primarily in the eastern addition of West Scio. There were also two indicator bird species that were not found in 2023. By examining the bird species present, their conservation status and habitat, we can understand the ecological health of an area and learn to best manage it.

Focus should be placed on the bird species of greatest conservation need, which includes the indicator species and the great blue herons. These species should be of concern when making decisions about West Scio and the land around it, and can be monitored to understand the health of West Scio Preserve.

TABLES AND FIGURES

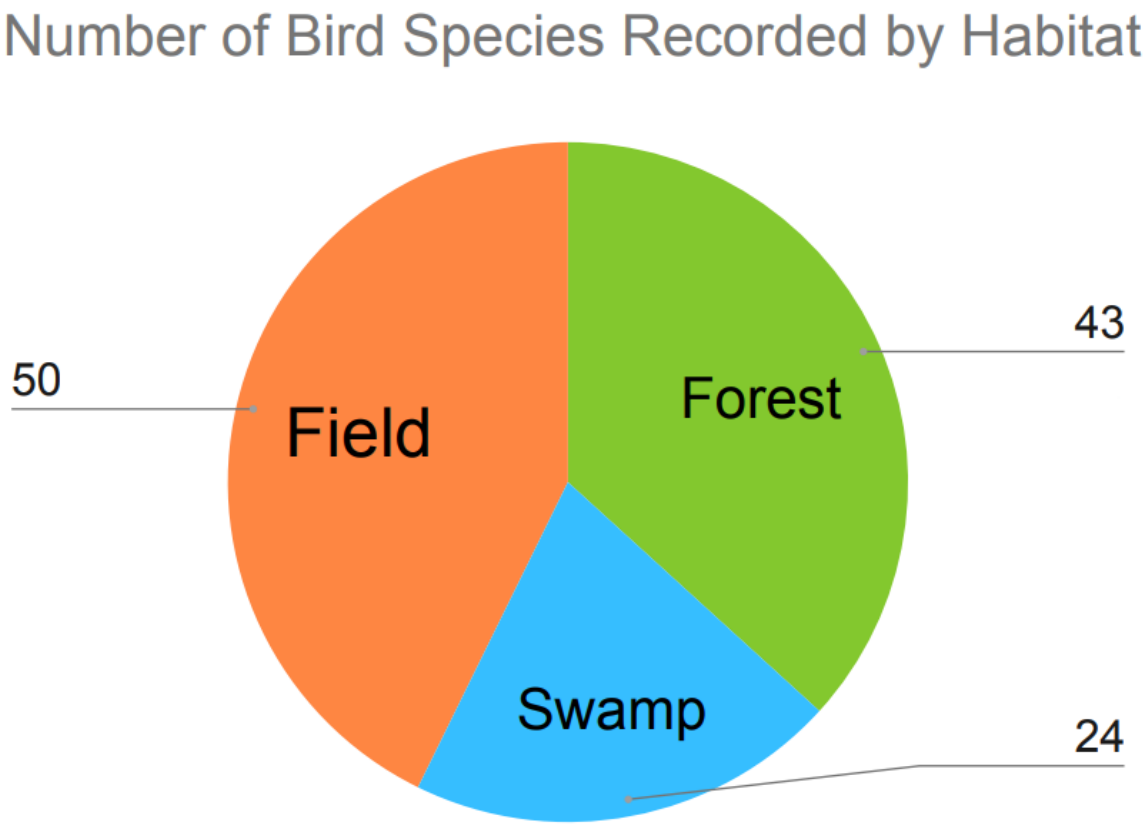

Figure 6B: Shows the number of bird species found in each habitat. Note that any given species can be found in more than one habitat type, and the field habitat includes forest-field edges because the fields are relatively small and detection of forest and edge species occurred while surveying the field. Number of species were created using combined data from all survey methods used, which allowed a full picture of species found in each habitat.

Number of Individuals by Habitat Type

Species	Forest	Swamp	Field
American Crow	6	2	15
American Goldfinch	4	1	18
American Redstart	1		
American Robin	12		9
Baltimore Oriole	1		1
Barn Swallow			16
Barred Owl	1		
Black-capped Chickadee	13		3
Blue Jay	14	1	13
Blue-gray Gnatcatcher	1		
Brown Creeper	1	1	
Brown-headed Cowbird			7
Carolina Wren	3	3	
Chimney Swift			1
Chipping Sparrow			1
Common Grackle			1
Common Yellowthroat	2	3	12
Cooper's Hawk	1		1
Downy Woodpecker	7	2	4
Eastern Bluebird	1		1
Eastern Kingbird			3
Eastern Phoebe			1
Eastern Screech-Owl	1	2	
Eastern Towhee	1		
Eastern Wood-Pewee	19	6	7
European Starling			11
Field Sparrow	2		10
Gray Catbird	1		6
Great Blue Heron	1	5	11
Great Crested Flycatcher	11	2	1
Great Horned Owl			2
Green Heron		1	1

Species	Forest	Swamp	Field
Hairy Woodpecker			1
House Finch	1		2
House Sparrow			1
House Wren	4		5
Indigo Bunting	8	5	6
Killdeer	1		2
Mourning Dove	1		3
Northern Cardinal	14	4	11
Northern Flicker	1	2	4
Northern Rough-winged Swallow	1		6
Pileated Woodpecker	1		
Red-bellied Woodpecker	8	2	2
Red-eyed Vireo	6		
Red-tailed Hawk			1
Red-winged Blackbird	6		17
Rose-breasted Grosbeak	1		
Ruby-throated Hummingbird		1	
Sandhill Crane	1		
Scarlet Tanager	1		
Song Sparrow	9	5	17
Spotted Sandpiper			3
Swamp Sparrow			2
Tree Swallow	1		
Tufted Titmouse	8	3	7
Turkey Vulture			2
Warbling Vireo			2
White-breasted Nuthatch	8	1	3
Wild Turkey	1	1	11
Willow Flycatcher			2
Wood Duck	1		
Wood Thrush	6		1
Yellow-throated Vireo		1	

Figure 7B: Number of bird individuals seen by species and habitat type. Numbers in this chart were taken primarily from point survey methods, but numbers are included for species that were found using only general survey methods. These birds are chimney swift, cooper's hawk, green heron, pileated woodpecker, turkey vulture, wild turkey, and yellow-throated vireo.

Great Blue Heron Rookery Buffer Zone Map

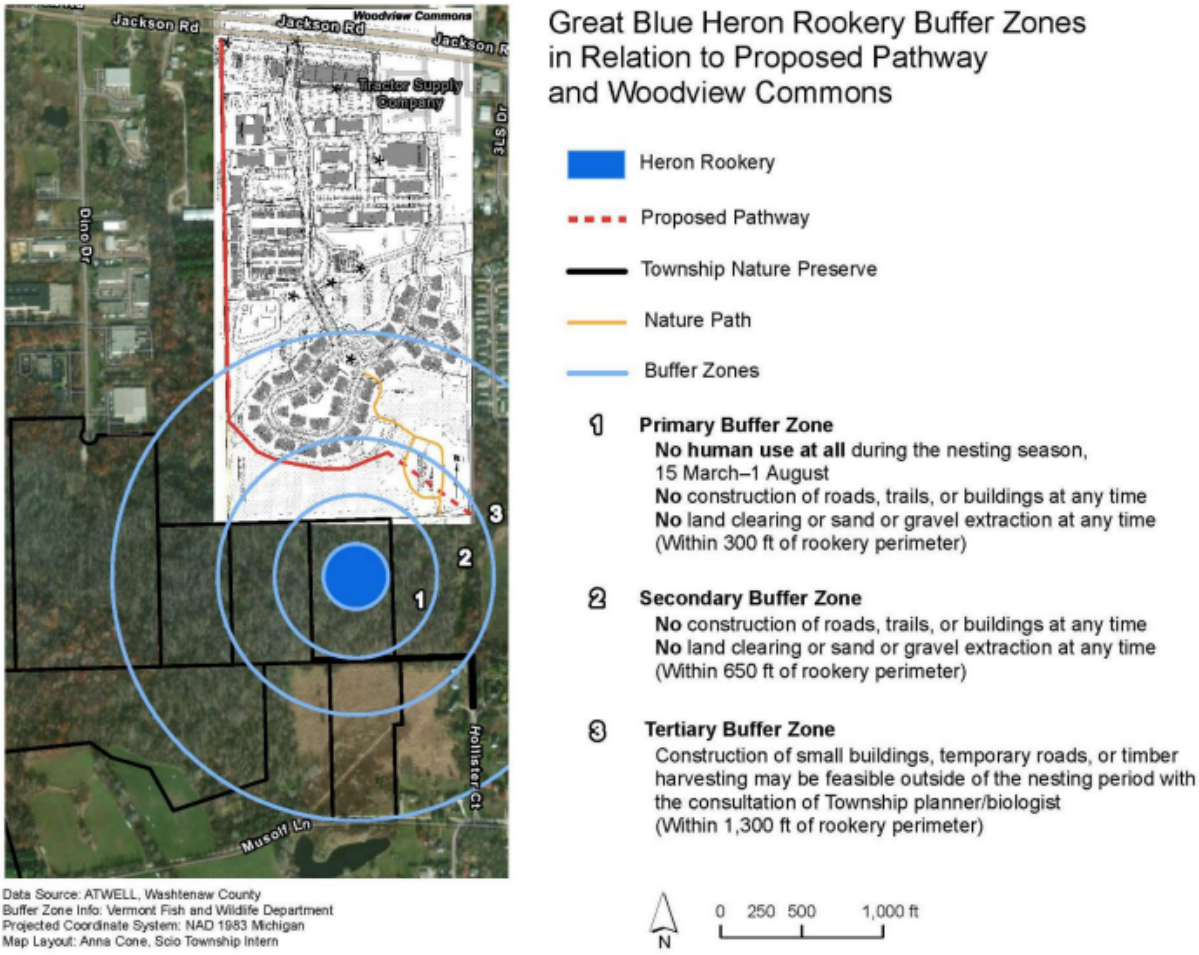

Figure 8B: Heron rookery buffer zone map from the 2021 report. Buffer zones are detailed by the Vermont Fish and Wildlife Agency.

Bird Species and Highest Breeding Code by Year

Species	2021	2023
American Crow	Prob	Poss
American Goldfinch	Poss	Poss
American Redstart	Poss	X
American Robin	Conf	Conf
American Tree Sparrow	Poss	X
Baltimore Oriole	Prob	Prob
Barn Swallow	X	Conf
Barred Owl	Poss	Poss
Black-Billed Cuckoo	Conf	X
Black-capped Chickadee	Conf	Conf
Blue Jay	Conf	Conf
Blue-gray Gnatcatcher	Conf	Poss
Brown Creeper	Poss	Poss
Brown-headed Cowbird	Prob	Conf
Carolina Wren	X	Poss
Cedar Waxwing	Conf	X
Chimney Swift	X	Poss
Chipping Sparrow	X	Poss
Common Grackle	Conf	Poss
Common Yellowthroat	Prob	Prob
Cooper's Hawk	Prob	Conf
Downy Woodpecker	Conf	Conf
Eastern Bluebird	Poss	Prob
Eastern Kingbird	Poss	Prob
Eastern Phoebe	Poss	Poss
Eastern Screech-Owl	Poss	Poss
Eastern Towhee	X	Poss
Eastern Wood-Pewee	Conf	Conf
European Starling	Poss	Prob
Field Sparrow	X	Prob
Gray Catbird	Conf	Poss
Great Blue Heron	Conf	Conf
Great Crested Flycatcher	Conf	Conf
Great Horned Owl	X	Poss
Green Heron	Prob	Poss
Hairy Woodpecker	Conf	Poss

Species	2021	2023
House Finch	X	Prob
House Sparrow	X	Poss
House Wren	Poss	Prob
Indigo Bunting	Conf	Prob
Killdeer	Poss	Prob
Mallard	Prob	X
Mourning Dove	Prob	Prob
Northern Cardinal	Conf	Conf
Northern Flicker	Poss	Conf
Northern Rough-winged Swallow	X	Poss
Ovenbird	Poss	X
Pileated Woodpecker	Poss	Poss
Red-bellied Woodpecker	Conf	Conf
Red-eyed Vireo	Prob	Prob
Red-Headed Woodpecker	Poss	X
Red-tailed Hawk	Poss	Poss
Red-winged Blackbird	Conf	Conf
Rose-breasted Grosbeak	Prob	Poss
Ruby-throated Hummingbird	Conf	Prob
Sandhill Crane	Obs	Poss
Scarlet Tanager	Prob	Conf
Sedge Wren	Poss	X
Song Sparrow	Conf	Conf
Spotted Sandpiper	X	Poss
Swamp Sparrow	X	Prob
Tree Swallow	Poss	Poss
Tufted Titmouse	Prob	Conf
Turkey Vulture	Poss	Obs
Warbling Vireo	X	Poss
White-breasted Nuthatch	Conf	Prob
Wild Turkey	Conf	Conf
Willow Flycatcher	X	Poss
Wood Duck	X	Poss
Wood Thrush	Prob	Conf
Yellow-Billed Cuckoo	Poss	X
Yellow-throated Vireo	X	Poss

KEY	
Conf	Confirmed
Prob	Probable
Poss	Possible
Obs	Observed
X	None

Figure 9B: Compare highest breeding codes in 2023 and 2021 surveys, and view the species that were found each year.

Highest Breeding Code by Survey Type

Species	Point-Count	General	Night
American Crow	Poss	Poss	Poss
American Goldfinch	Prob	Prob	Poss
American Redstart			Poss
American Robin	Prob	Conf	Prob
Baltimore Oriole	Prob		
Barn Swallow	Poss	Prob	Conf
Barred Owl			Poss
Black-capped Chickadee	Prob	Conf	
Blue Jay	Poss	Conf	
Blue-gray Gnatcatcher	Poss	Poss	
Brown Creeper	Poss	Poss	
Brown-headed Cowbird	Conf	Poss	
Carolina Wren	Poss	Poss	
Chimney Swift		Poss	
Chipping Sparrow	Poss		
Common Grackle	Poss		
Common Yellowthroat	Prob	Poss	Poss
Cooper's Hawk		Conf	
Downy Woodpecker	Conf	Conf	Conf
Eastern Bluebird	Poss	Prob	
Eastern Kingbird	Prob	Prob	
Eastern Phoebe	Poss		
Eastern Screech-Owl			Poss
Eastern Towhee	Poss		
Eastern Wood-Pewee	Conf	Prob	Poss
European Starling	Poss	Prob	
Field Sparrow	Prob	Poss	Poss
Gray Catbird	Poss	Poss	Poss
Great Blue Heron	Conf	Conf	Poss
Great Crested Flycatcher	Conf	Poss	Poss
Great Horned Owl			Poss
Green Heron		Poss	

Species	Point-Count	General	Night
Hairy Woodpecker	Poss		
House Finch	Poss	Prob	
House Sparrow	Poss	Poss	
House Wren	Prob	Poss	Poss
Indigo Bunting	Prob	Poss	Poss
Killdeer	Poss	Prob	
Mourning Dove	Poss	Prob	
Northern Cardinal	Conf	Poss	Prob
Northern Flicker	Poss	Conf	
Northern Rough-winged Swallow	Poss	Poss	
Pileated Woodpecker		Poss	
Red-bellied Woodpecker	Poss	Conf	
Red-eyed Vireo	Prob	Poss	
Red-tailed Hawk	Poss	Poss	
Red-winged Blackbird	Conf	Conf	Prob
Rose-breasted Grosbeak	Poss	Poss	
Ruby-throated Hummingbird	Prob	Poss	
Sandhill Crane	Obs	Poss	
Scarlet Tanager	Poss	Conf	
Song Sparrow	Prob	Conf	Prob
Spotted Sandpiper			Poss
Swamp Sparrow	Prob	Poss	Prob
Tree Swallow	Poss		
Tufted Titmouse	Prob	Conf	
Turkey Vulture		Obs	
Warbling Vireo	Poss	Poss	
White-breasted Nuthatch	Prob	Poss	
Wild Turkey		Conf	
Willow Flycatcher	Poss		Poss
Wood Duck	Poss		
Wood Thrush	Poss	Conf	Poss
Yellow-throated Vireo		Poss	

Figure 10B: Highest breeding code viewed for each species and survey method. Allows the comparison of breeding evidence and species found in each survey method. Blank boxes indicate that the species was not found in the corresponding survey method.

Indicator Species in West Scio 2023

Species	Presence Indicates:	Habitat	Conservation & Management
Yellow-Throated Vireo	Valuable, large forest. Often younger forest	Tall trees, deciduous woods with open understory	Maintain forest with open understory
Scarlet Tanager	Large, unbroken, healthy forest, older canopy trees. Often the first to go if the forest shrinks	Large forests and shade trees, mainly where oaks are common	Does poorly in smaller forests, often parasitized by cowbirds. Maintain large forest
Wood Thrush	Large healthy forest, but can hang on longer than yellow-throated vireo or scarlet tanager if the forest shrinks	Areas with tall deciduous trees, breeds in the understory, common in damp forest	Parasitization by cowbirds is causing decline.
Pileated Woodpecker	Large area of forest with large trees. Overall healthy ecosystem	Variety of unbroken mature forest. Requires a large territory for breeding.	Maintain a large forested area with old trees.
Brown Creeper	Oak-hickory forest continuity requires unbroken forest.	Nests in mature forest, not young second growth	Maintain unbroken oak-hickory forest
Hairy Woodpecker	Not found in suburban areas like the downy woodpecker	Mature forests, open woodlands	Removal of snags is contributing to decline

Figure 11B: Indicator species found in West Scio Preserve in 2023, detailing what their presence indicates, their habitat, and conservation concerns and management options. The information is supported by the Cornell Lab of Ornithology.

Indicator Species 2021 Only

Species	Presence Indicates	Habitat	Conservation & Management
Ovenbird	Large tracts of forest	Deciduous or mixed woods; requires closed canopy and large trees	Decreasing in many areas. Subject to parasitism by cowbirds
Red-Headed Woodpecker **State Status: Special Concern**	Open woodlands with large diameter trees	Historically found in oak barrens or open floodplain forest. Areas historically maintained by fire	Prescribed burning could be beneficial

Figure 12B: Indicator species found in West Scio in 2021, but not 2023, seen when compared to the 2021 survey. The information provided is supported by the Cornell Lab of Ornithology.

				Point-Count																		Night Survey				
Species		Totals	# Points Observed	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18	NS2	NS3	NS4	NS5	NS6
	Code	Poss	12	Poss	Poss		Poss			Poss		Poss			Poss	Poss	Poss	Poss	Poss	Obsv	Poss					Poss
American Crow	Count	22		1	1		1			1		1			1	1	1	3	3	3	5					1
	Code	Prob	11	Poss				Poss		Poss		Poss	Prob	Poss			Prob	Obs	Poss	Poss	Prob					Poss
American Goldfinch	Count	22		1				1		1		1	3	1			2	1	1	4	6					1
	Code	Prob	10					Prob	Prob			Prob		Prob	Prob	Prob	Poss	Poss	Obs		Prob					Prob
American Robin	Count	22						3	3			1		4	3	2	2	1	1		2					1
	Code	Prob	2												Poss	Prob										
Baltimore Oriole	Count	2													1	1										
	Code	Poss	5										Poss			Poss	Poss		Poss	Obs						Conf
Barn Swallow	Count	15											4			4	4		1	2						1
	Code		0																					Poss		
Barred Owl	Count	0																						1		
	Code	Prob	8	Poss	Poss	Poss			Poss					Poss			Prob	Poss	Poss							
Black-capped Chickadee	Count	16		3	4	1			2					2			2	1	1							
	Code	Poss	14	Poss	Poss	Poss			Poss		Poss		Poss	Poss	Poss	Poss	Poss	Poss	Poss	Poss	Poss					
Blue Jay	Count	28		1	1	1			1		1		2	5	3	2	1	2	3	3	2					
	Code	Poss	1															Poss								
Blue-gray Gnatcatcher	Count	1																1								
	Code	Poss	2				Poss	Poss																		
Brown Creeper	Count	2					1	1																		
	Code	Conf	4										Poss			Conf				Poss	Poss					
Brown-headed Cowbird	Count	7											1			3				2	1					
	Code	Poss	6				Poss	Poss	Poss	Poss	Poss				Poss											
Carolina Wren	Count	6					1	1	1	1	1				1											
	Code																									
Chimney Swift	Count	0																								
	Code	Poss	1													Poss										
Chipping Sparrow	Count	1														1										
	Code	Poss	1													Poss										
Common Grackle	Count	1														1										
	Code	Prob	9		Poss					Prob	Poss	Prob	Poss				Poss		Prob	Poss	Poss				Poss	Poss
Common Yellowthroat	Count	14			2					2	1	3	1				1		2	1	1				1	2
	Code																									
Cooper's Hawk	Count	0																								
	Code	Conf	10	Poss	Poss	Poss		Poss		Poss	Poss	Confr	Poss		Poss	Poss										Conf
Downy Woodpecker	Count	12		2	2	1		1		1	1	1	1		1	1										1
	Code	Poss	2		Poss											Poss										
Eastern Bluebird	Count	2			1											1										
	Code	Prob	1														Prob									
Eastern Kingbird	Count	3															3									
	Code	Poss	1																	Poss						
Eastern Phoebe	Count	1																		1						
	Code																					Poss		Poss		
Eastern Screech-Owl	Count	0																				2		1		

Figure 13B: Spreadsheet detailing point-count data. This was used when collecting numbers and analyzing habitat type.

	Code	Poss	1						Poss																			
Eastern Towhee	Count	1							1																			
	Code	Conf	14	Prob	Prob	Prob	Poss	Prob	Conf	Prob	Prob		Poss	Prob			Poss		Poss	Poss	Poss				Poss	Poss		
Eastern Wood-Pewee	Count	27		2	2	3	1	3	2	2	3		1	3			1		2	1	1				4	1		
	Code	Poss	2													Obs				Poss								
European Starling	Count	11														1				10								
	Code	Prob	9		Poss							Poss	Prob	Poss		Poss	Poss		Prob	Poss	Poss					Poss		
Field Sparrow	Count	11			1							1	2	1		1	1		2	1	1					1		
	Code	Poss	5	Poss								Poss				Poss				Poss	Poss						Poss	
Gray Catbird	Count	6		1								1				1				1	2						1	
	Code	Poss	9		Obs					Obs	Poss		Obs			Obs	Obs		Obs	Obs	Obs		Obs				Poss	
Great Blue Heron	Count	15			1					2	2		1			1	3		2	1	2		1				1	
	Code	Conf	5	Prob	Poss		Conf	Poss				Poss													Poss			
Great Crested Flycatcher	Count	11		5	1		2	2				1													3			
	Code																									Poss		
Great Horned Owl	Count	0																								2		
	Code																											
Green Heron	Count	0																										
	Code	Poss	1													Poss												
Hairy Woodpecker	Count	1														1												
	Code	Poss	3												Poss	Poss					Poss							
House Finch	Count	3													1	1					1							
	Code	Poss	1													Poss												
House Sparrow	Count	1														1												
	Code	Prob	8			Prob						Poss		Poss	Poss	Poss	Prob	Prob			Poss							Poss	
House Wren	Count	8				1						1		1	1	1	1	1			1							1	
	Code	Prob	13		Prob		Poss	Poss	Poss	Poss	Poss	Prob	Prob	Poss			Prob	Prob		Prob	Prob		Poss	Poss				Poss	
Indigo Bunting	Count	16			2		1	1	2	1	2	1	1	1			1	1		1	1		1	1				1	
	Code	Poss	2												Poss	Poss												
Killdeer	Count	3													1	2												
	Code	Poss	4										Poss			Poss		Poss	Obs									
Mourning Dove	Count	4											1			1		1	1									
	Code	Conf	15	Conf	Prob	Prob	Conf	Poss	Poss		Prob	Poss	Poss			Poss	Prob	Poss	Prob	Poss	Prob		Poss	Poss	Prob	Poss	Poss	
Northern Cardinal	Count	22		4	1	2	2	1	1		1	1	1			1	1	2	2	1	1		1	1	2	1	2	
	Code	Poss	6							Poss	Poss	Poss	Poss	Poss			Poss											
Northern Flicker	Count	7								1	1	1	2	1			1											
	Code	Poss	3		Poss								Poss						Poss									
Northern Rough-winged Swallow	Count	7			1								3						3									
	Code																											
Pileated Woodpecker	Count	0																										
	Code	Poss	11	Poss		Poss	Poss	Poss	Poss	Poss				Poss	Poss	Poss	Poss	Poss										
Red-bellied Woodpecker	Count	12		1		1	1	1	2	1				1	1	1	1	1										
	Code	Prob	5	Prob	Poss	Prob		Prob	Poss																			
Red-eyed Vireo	Count	6		1	1	1		2	1																			
	Code	Poss	1										Poss															
Red-tailed Hawk	Count	1											1															

	Code	Conf	7		Prob							Prob	Conf	Poss			Conf		Poss	Prob							Poss	Prob
Red-winged Blackbird	Count	20			5							4	4	1			2		1	3							1	2
	Code	Poss	1			Poss																								
Rose-breasted Grosbeak	Count	1				1																								
	Code	Prob	1				Prob																							
Ruby-throated Hummingbird	Count	1					1																							
	Code	Obs	1		Obs																									
Sandhill Crane	Count	1			1																									
	Code	Poss	1			Poss																								
Scarlet Tanager	Count	1				1																								
	Code	Prob	14		Prob		Prob	Prob	Prob	Conf	Poss	Prob	Prob	Poss	Prob	Prob		Poss	Prob	Prob			Poss			Poss	Prob
Song Sparrow	Count	25			1		1	2	2	2	1	5	1	1	2	2		1	2	2			1			1	4
	Code																									Poss	Poss
Spotted Sandpiper	Count	0																								1	2
	Code	Prob	1									Prob															Prob
Swamp Sparrow	Count	1										1															1
	Code	Poss	1		Poss																									
Tree Swallow	Count	1			1																									
	Code	Prob	15	Poss	Prob	Prob	Poss	Poss	Poss	Prob	Poss	Prob	Poss		Poss		Poss	Prob	Prob	Prob									
Tufted Titmouse	Count	18		1	1	1	1	1	1	1	1	1	2		1		1	2	1	2									
	Code																													
Turkey Vulture	Count	0																												
	Code	Poss	2										Poss				Poss													
Warbling Vireo	Count	2											1				1													
	Code	Prob	10	Prob	Poss			Poss	Poss		Poss		Poss	Poss	Prob	Poss	Poss													
White-breasted Nuthatch	Count	12		1	2			2	1		1		1	1	1	1	1													
	Code																													
Wild Turkey	Count	0																												
	Code	Poss	1									Poss															Poss			
Willow Flycatcher	Count	1										1															1			
	Code	Poss	1	Poss																										
Wood Duck	Count	1		1																										
	Code	Poss	2			Poss			Poss																		Poss	Poss		
Wood Thrush	Count	2				1			1																		4	1		
	Code																													
Yellow-throated Vireo	Count	0																												

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