

Results of June and September / October 2021
Bird Surveys at the Crossroads at Big Creek
Preserve in Sturgeon Bay, WI.

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Author:

Michael Grimm

30 North 7th Avenue

Sturgeon Bay,

WI 54235

920-256-1356

epigearepens@gmail.com

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All aerial photos presented in this report are from the [Door County Web Map](#), all on the ground habitat photos were taken by the author.

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INTRODUCTION

In April of 2020 a “Sustain Our Great Lakes Program” proposal was submitted to the National Fish and Wildlife Foundation (NFWF) to fund biological surveys of targeted taxa in support of the “Ecological Restoration Plan for Wetlands and Riparian Corridor” at the Crossroads at Big Creek Preserve (“Crossroads”) in Sturgeon Bay, WI. One of the taxa of interest were birds, and specifically those species present on the Preserve in June and in fall (August through October). Reported presence on the Preserve in this report in June is an assumed indication, but not definitive evidence, of usage by those species of habitat at Crossroads as breeding habitat. Presence of species that do not overwinter in this area during the fall period indicates a potential use of the site by species during migration. To gather information on the June 2021 bird assemblage a standard and repeatable June bird presence and abundance survey was conducted in June of 2021 at the Preserve. A survey of bird presence and abundance was conducted in the fall to identify those species on site at that time.

At a fine grain (e.g., 5-acre patch size) analysis The Crossroads property holds numerous visually distinct habitat types including willow shrub carr, mesic white cedar forest, meadow, mixed conifer / hardwood forest and several others including distinctly anthropogenic examples such as white pine and Norway spruce plantations. This diversity of generally small patch habitats creates a mosaic of vegetative structure across the property characterized by multiple ecotones, sharp to gradual, between the patches. Often very different habitat types abut one another either because of natural topographic or hydrologic conditions, e.g., open water, mud flat, shrub carr transition, the legacy of historic conditions and land use, e.g., pine plantation and old field meadows, or post-settlement land use activities.

METHODS

The approach taken to survey the birds present in June in this habitat mosaic was to use the standardized ‘breeding’ bird survey method of 10-minute point counts at established points repeated multiple times. Records were also kept of any additional species encountered while on the property walking between the points on the survey dates. 4 points were established on the property as the 10-minute count points. Counts were made at these 4 points on 4 separate dates in June 2021 and two counts were made at each point on each survey day totaling eight 10-minute counts at each point and 32 total 10-minute survey counts over the 4 points. New birds or species encountered during the walks between the points were recorded separately but were considered to be using the property during the survey period and would be added to the list of total species present in June 2021. Different established trails or paths were chosen to move between the points on different survey dates in an attempt to visit all areas of the property.

In addition, during the survey period 3 other points were established on the property to test whether the 4 primary points were picking up all or most of the species on the property. It was found that the 4 points and the walks between them were not picking up birds from the far SW corner of the property. Thus, midway through the survey period an additional point was established in the SW corner of the property. 4 counts over 3 different dates were taken at the SW corner point. Other point counts taken in the northern portion of the property did not find any new species but did find additional numbers of species already recorded at nearby primary points, (Figure 1).



Figure 1. Location of 4 primary June survey points (numbered 1, 2, 3, 4) and the two additional points SW (=southwest), NE (=northeast), NB (=north bridge).

In selecting the June survey points an attempt was made to distribute the 4 points across the Preserve far enough apart to minimize double recording of singing species and force the observer to walk through most of the preserve on a survey morning. The distance between the points was generally far enough apart to prevent double recording but some strong singers like great crested flycatchers or strong singers in open, treeless habitats could often be heard from two or more sites. Best judgement of the observer was used in trying to avoid double counting species under these circumstances.

As most points had multiple habitat types within the range in which birds could be heard an attempt was made to assign individual birds heard or seen during a 10-minute count period to a particular habitat present at or near the survey point, (Figure 2). This however proved only partially effective as the vegetation of most sites obscured distant, often different, habitats and only approximations of location and habitat could be made.



Figure 2. Aerial photo of June Survey Point 2 showing survey center point and 100-meter radius circle. This point illustrates the typical habitat variability of most points on the Preserve within a 100 meters of a survey point center. 100 meters is a distance in which most singing birds can be detected although many species can be detected at greater distances.

Data was collected on paper field data sheets (see Appendix 1) and subsequently entered into a spreadsheet for analysis. Points were surveyed between June 3 and June 14, 2021, between 0450 and 0800 in the morning. Days with clear skies and calm or light winds were used for the survey. Temperatures generally ranged from high 50's to mid-60's (F) during the survey periods.

The fall survey made use of the 6 survey points established for the June survey and they were used as locations of a minimum 20 minute 'focused meandering' in the area of the survey point. These focused 20 minutes were followed by a walk to the next point where another minimum of 20 minutes was spent searching for birds in the vicinity of that point. This would be repeated through the morning of each survey date survey resulting in an average of 4 hours being spent each day on the property engaged in searching for birds. This method forced the observer to thoroughly search an area with a minimum of 20 minutes. However, in some cases, especially at survey point 1, the time spent in the area lasted over an hour on several occasions due to the complexity of the habitat and the abundance of bird life.

RESULTS FOR JUNE BIRD SURVEY

Location and description of the survey points

Point 1 (Latitude 44.82426 / Longitude -87.34590)

This point was in the area considered the “Cove Preserve” at the far south end of the property. The June (and fall) survey point lies near the south end of the walking trail which parallels the east side of the mouth of Big Creek where it widens and meets the waters of Sturgeon Bay (Figure 3).



Figure 3. Point 1, showing the mix of habitats including a willow / alder shrub carr, mud flat, open water transition in the immediate vicinity of the survey point and nearby suburban home lots upgradient from the shrub carr.

Description:

This site edges the east side of Big Creek and Sturgeon Bay. Habitats comprise shallow open water, an intermittently inundated mud flat bordering the open water, a sprawling band of emergent vegetation of predominantly narrow leaved cattail that lies between the open water or mud flat and a shrub carr of non-native buckthorn, willow, and alder. (Though more detailed notes on the flora were made throughout the survey periods, thorough inventories were not made, and only structure defining, characteristic or dominant species are noted for each site in this report. Common names of plant species are used in this report). Further inland the shrub carr grades unevenly into a stand of lowland hardwoods and white cedar. This small Great Lakes coastal wetland complex is subject to the variable lake levels and appears to become inundated during high water levels. During the time of the surveys (2021) the lake level had receded from previous record and near record high levels. The board mud flat between the open water and emergent vegetation exposed by the lower water levels provided feeding and loafing area for several wetland associated species.

Figures 4 and 5 show various habitat elements of the site.



Figure 4. Point 1. Looking north along the path showing willow thicket that borders the path with taller dead green ash and live cottonwood in the distance.



Figure 5. Point 1 looking west over exposed mud flat in foreground, open water of Big Creek mouth and emergent wetland and lowland hardwood stand on the opposite shore.

June Survey Results for Point 1. (Consistency measure is the percent of times the species was recorded at the point during the survey, e.g., 1.00 = 100%, .89 = 89% etc.)

June 2021 Survey 34 Species	POINT 1 - Mouth of Big Creek 44.82419; -87.34591									Consist ency
	Dates									
	6/3/2021	6/4/2021	6/8/2021	6/9/2021	6/14/2021					
	Beginning Times for Survey									
Common name	0513	0531	0728	0746	0502	0517	0510	0524	0641	
Red-winged Blackbird	13	8	10	11	8	10	10	13	11	1.00
Mourning Dove	2	1		1	1	1	1	1	1	0.89
Killdeer	2	2		3	2	1	1	1	2	0.89
Warbling Vireo	1	1	1		1	2		1	2	0.78
Cedar Waxwing			1	1	1	7	1	1	1	0.78
Common Yellowthroat	1	2	2		1	1	2	1		0.78
Eastern Kingbird	1		1		1	1		1	1	0.67
Baltimore Oriole	1	1				2	1	1	1	0.67

Common Grackle	2	3	1		1	2	1			0.67
Mallard	1		4	4				1	2	0.56
American Robin					1	1	1	1	1	0.56
Chimney Swift	1	2				3	1			0.44
Spotted Sandpiper			1	1			1	1		0.44
American White Pelican	4		4	4	3					0.44
Tree Swallow					1	1		1	1	0.44
Northern Waterthrush	1	1	1	1						0.44
American Redstart					1	1	1	1		0.44
House Wren					1		1		1	0.33
Yellow Warbler		1			1		1			0.33
Canada Goose	3	1								0.22
Sandhill Crane	2						2			0.22
Herring Gull	2	1								0.22
Green Heron					1	1				0.22
Belted Kingfisher					1					0.14
Caspian Tern								1		0.11
Great Blue Heron	1									0.11
Osprey			1							0.11
Red-bellied Woodpecker						1				0.11
Downy Woodpecker									1	0.11
Red-eyed Vireo	1									0.11
Blue Jay								1		0.11
Black-capped Chickadee					1					0.11
Song Sparrow	2									0.11
Brown-headed Cowbird				1						0.11

Point 2 (Latitude 44.82980 / Longitude -87.34505)

The center point of the survey lies east of the Cedar Crossing Bridge at the juncture of two trails. A wooden trail post marks the point. (Figure 6).



Figure 6. Point 2, looking east across canopy of site. The yellow star indicates the point of the survey.

Description:

Point 2 is centered in a stand of pole size white cedar (*Thuja occidentalis*) with scattered basswood (*Tilia americana*) and green ash of similar diameter but overtopping the cedar. The shrub or small tree understory is sparse below the white cedar and the ground flora comprises thick stands of bulblet fern, jewelweed, horsetail, and tall enchanter's nightshade. Lesser numbers of jack-in-the-pulpit, helleborine orchid, and seedlings of non-native buckthorn, and high bush cranberry, wild grape are scattered in the ferns. Gaps in the canopy have the same mix of ground cover species but also dandelion, burdock, low shrubs and small trees which grade into open fields of old field forbs and grasses. Beyond the central white cedar grove trees give way quickly to open fields of brome grass, open field forbs, scattered fruit trees, small conifers, and sumac patches.

Figures 7, 8, 9, and 10 below illustrate the habitat physiognomy of the site.



*Figure 7. Point 2. Looking NE from point showing irregular forest structure of pole sized white cedar and hardwoods, mixed with understory gaps and thickets of buckthorn (*Frangula* spp).*



Figure 8. Point 2 looking west. Note lack of understory below white cedar stand.



Figure 9. Point 2 looking South into white cedar stand bordering Big Creek. Bulblet fern is dominant ground cover below cedars.



Figure 10. Point 2 looking East into thicket dominated by Frangula.

Catbird					1					0.11
Yellow-rumped warbler								1		0.11

Point 3 (Latitude 44.83278, Longitude -87.34298).

The center of this point is located on “Pike Passage Bridge”; Figure 11.



Figure 11. Aerial photo of Point 3 for June bird survey. Yellow star locates survey point.

Description:

The immediate area surrounding this point comprises small diameter stands of white cedar, white spruce and white pine mixed with young trembling aspen, cottonwood, green ash and basswood. The corridor of Big Creek runs through the site and the creek is bordered by open grass and forb stands and thickets of green ash saplings, red-twig dogwood, willow, and non-native buckthorn. Beyond 50 meters of the point center lie swards of old field grasses and forbs or a continuation of the young stand of mixed conifer and hardwoods.

Figures 12 and 13 illustrate the young fairly early successional nature of this site.



Figure 12. Point 3, looking Northeast above the creek channel. Riparian opening of grasses and sedges is bordered by stands of Norway spruce to the north and mix of young conifers (white pine, white cedar) and hardwoods (green ash, basswood, elm) elsewhere.



Figure 13. Point 3 looking south along corridor of Big Creek, note opening of canopy caused by the death of a number of green ash.

June Survey Results for Point 3.

June 2021 Survey 9 Surveys	POINT 3 - Pike Passage Bridge 44.83278; -87.34298									28 Species
	DATE									
	6/3/2021	6/4/2021	6/8/2021	6/9/2021	6/14/2021					
	Beginning Times for Survey									
Common name	0627	0639	0557	0609	0615	0628	0627	0639	0601	Consistency
Black-capped Chickadee	2	1	2		2	2	2	2	1	0.89
Indigo Bunting	1	1		1	2	1	1	2	3	0.89
Northern cardinal		3	2	3	2	1	1	2	1	0.89
Red-eyed Vireo	2	2	1	1			2	1	1	0.78
Wood thrush			1	1	1	1	1	1	1	0.78
Nashville warbler	2		1	1	1	1		1		0.67
Great crested flycatcher	1	1	1	1	1					0.56
Eastern wood pewee				1	1	1	1	1		0.56
Blue Jay	1		1	1	1				1	0.56
Red-breasted nuthatch			1	1			1	1	1	0.56
American Goldfinch	3		1		1	2		3		0.56
Field Sparrow	2	2		1	2				1	0.56
Yellow-rumped warbler		1	1		1	1	1			0.56
Common Yellowthroat	1	1	1	1						0.44
Black and white warbler	1	1		1		1				0.44
Red-winged blackbird		1		1	1	1				0.44
Ovenbird					1	1	1	1		0.44
Baltimore Oriole	1		1				1			0.33
Common grackle					1		1	2		0.33
Mourning Dove						1			1	0.22
House finch	1	1								0.22
Pileated woodpecker			1	1						0.22
Cedar Waxwing								3		0.11
American Robin			1							0.11
House Wren								1		0.11
Red-bellied Woodpecker						1				0.11

White-throated sparrow	1									0.11
Northern flicker			2							0.11

Point 4 (Latitude 44.83051, Longitude -87.34056).

This point is located on the high ground just east of the Astronomy Center building at the meeting point of four trails, Figure 14.



Figure 14. Aerial photo of location of survey point (yellow star) and surrounding habitat of Point 4 of the June bird survey.

Description:

For the most part this site comprises open field habitat sparsely and irregularly dotted with open growing black cherry and box elder along with small white pine and spruce. Two areas near the point center provide denser tree and shrub dominated habitat. A low dense irregular hedgerow of grey and red-twig dogwood, juneberry, chokecherry, and honeysuckle (*Lonicera* spp.) lies to the west of the point center and a remnant wooded copse of sugar maples, white birch, red oak edged by aspen, box elder and small white pines is present to the north of the point occupying a shallow, sloping bedrock outcrop. The understory of this grove holds irregularly growing shrub honeysuckle (*Lonicera* spp.).

Figures 15, 16, and 17 below depicts the mostly open nature of the habitat which constitutes this site.



Figure 15. Point 4 looking south showing open grass and old field forbs with interspersed with occasional small box elder and black cherry trees.



Figure 16. Point 4 looking north showing the copse of mature sugar maples and smaller diameter white birch, spruce and basswood which occupies a small bedrock scarp.



Figure 17. Point 4 looking east across broad, level meadow of old field grasses with scattered open grown black cherries and small conifers.

June Survey Results for Point 4.

June 2021 Survey 9 Surveys	POINT 4 - Observatory Hill; 44.83051; -87.34056									31 Species Consistency
	DATE									
	6/3/2021		6/4/2021		6/8/2021		6/9/2021		6/14/2021	
	Beginning Times for Survey									
Common name	0657	0716	0646	0700	0647	0700	0554	0608	0641	
Black-capped Chickadee	2	1	1	1	2	1	1	1	1	1.00
Indigo Bunting	1	2	1	1	1	1	2	2	2	1.00
Red-winged blackbird	2	4	1	2	3	2	1	1	1	1.00
Clay colored sparrow	3	1	2	1	4	2	2	2	3	1.00
American Robin	2	3	2	1	1	2	1	1	1	1.00
House Wren	1	2	1	1	1	1	2	2	2	1.00
Northern cardinal	1		2	2	1	2	1	2	1	0.89
Field Sparrow	3	2	1	1		1	3	2	2	0.89
Cedar Waxwing	3	1		1	1	1	2	1	1	0.89

Southwest Point (Latitude 44.82863 / Longitude -87.34700)

This extra survey point is located in the southwest corner of the Preserve with the center of the point lying just north of Utah Street and east of the bike / walking trail; Figure 18.



Figure 18. Oblique aerial photo of Southwest June survey point looking east with yellow star indicating the survey point. Hiking / biking trail crosses the area in the lower 1/3 of the photo.

Description:

A small patch of pole sized cottonwood and unevenly scattered sapling balsam poplar, trembling aspen, white pine, and white spruce emerge above a shrub thicket of varying density comprising willow, grey and red-twig dogwood, honeysuckle (*Lonicera spp.*), non-native viburnum (*V. lantana*). An open field of old field grasses and forbs covers the eastern portion of the site and Highway 42/57 defines the western border.

Figures 19 and 20 illustrate the mixed species and complex physiognomy of the site.



Figure 19. Extra point in SW corner of property, looking south. Typical complex physiognomy of scattered young conifer and hardwood trees above a thicket of willow, dogwood, and Frangula.



Figure 20. Extra Point SW, looking into the thicket of young trees while white-tailed deer monitors the count.

June Survey Results for the 'Southwest Point'.

June 2021 Survey 4 Surveys	Southwest Point 44.82863; -87.34700				28 Species
	DATE				
	6/8/2021	6/9/2021	6/14/2021		
	Beginning Times for Survey				
Common name	0728	0726	0741	0708	Consistency
Red-eyed Vireo	1	1	1	1	1.00
Baltimore Oriole	2	1	2	1	1.00
Song sparrow	3	1	1	1	1.00
Alder flycatcher	1	1	1	1	1.00
Indigo Bunting	2	1		1	0.75
Downy woodpecker	1	1	1		0.75
American redstart		1	1	1	0.75
Northern cardinal		1	3		0.50
Blue Jay			3	1	0.50
American Goldfinch	1	1			0.50
Common Yellowthroat	1		2		0.50
Red-winged blackbird	1		2		0.50
Cedar Waxwing	1	1			0.50
American Robin	2	1			0.50
Brown-headed cowbird	1			1	0.50
Catbird	1	2			0.50
Black and white warbler				1	0.25
Red-bellied Woodpecker		1			0.25
Northern flicker		1			0.25
Kingbird	1				0.25
Yellow-billed cuckoo	1				0.25
Chipping sparrow		1			0.25
Rose-breasted grosbeak			1		0.25
Warbling vireo			1		0.25

North Bridge June Survey Point (Latitude 44.83368 / Longitude -87.34203)

The center of this point lies on the North Bridge of the Preserve; Figure 21.

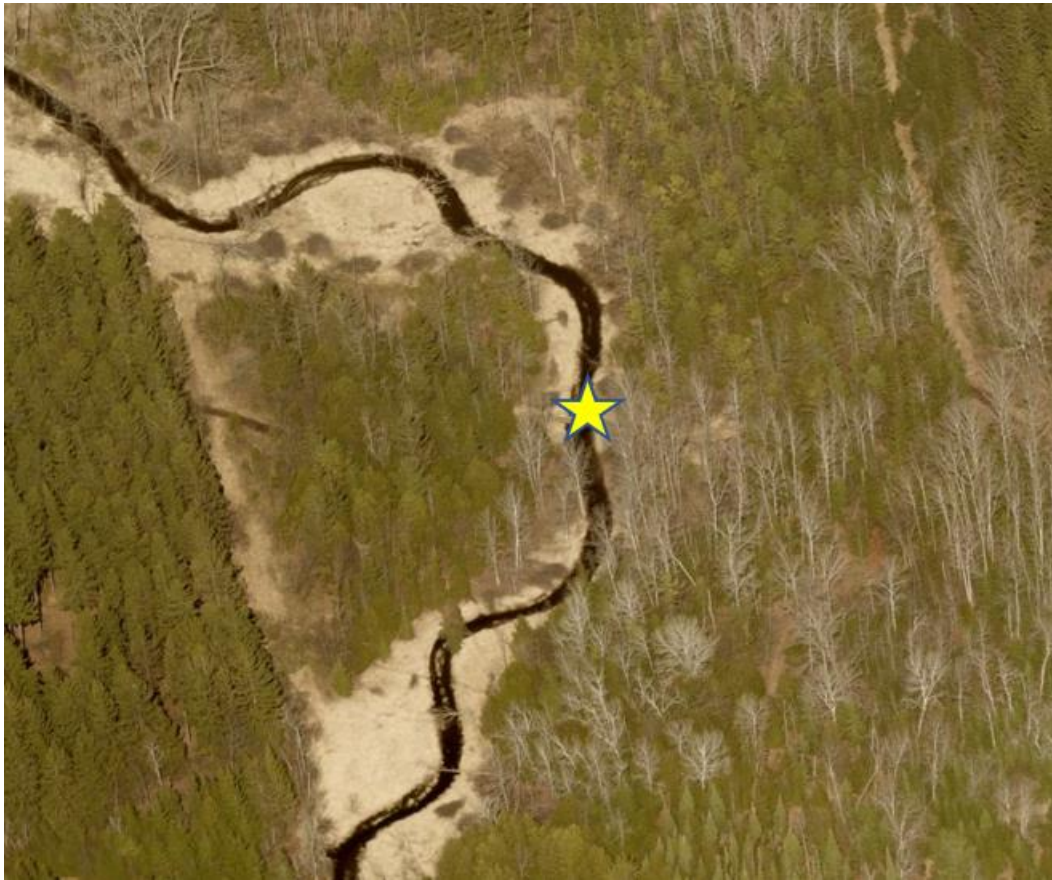


Figure 21 showing the location of the survey point and surrounding habitat of Big Creek corridor.

Description:

Like Survey Point 2 this point includes the corridor of Big Creek with its bordering wet meadows and wet-mesic forest types. The forest comprises a heavy white cedar, trembling aspen cover type with the mature Norway spruce plantation occupying the western portion of the site. Figure 22 below shows habitat of site looking north.



Figure 22. View of wet meadow at extra point at 'North Bridge'.

June Survey Results for the North Bridge Point.

June 2021 Survey 1 Surveys	North Bridge 44.83368; - 87.34203
	DATE
	6/4/2021
	Beginning Time of Survey
Common name	0625
Northern cardinal	2
Red-eyed Vireo	1
Wood thrush	1
Blue Jay	1
American Goldfinch	1
Black-capped Chickadee	1
Great crested flycatcher	1
Common Yellowthroat	1
Baltimore Oriole	1
House wren	1
Mallard (chicks)	10
Song sparrow	1
Nashville warbler	1

Northeast Point (Latitude 44.83404 / -87.33979)

The center of this survey point is located at the northern edge of the open field in the northeast corner of the Preserve, i.e., the boundary between the open field and the pole white pine plantation, Figure 23.



Figure 23. Area surveyed from the NE Point. This point holds a mix of conifer plantations (white pine to the north and Norway spruce to the west) and an open field of forbs, grasses and scattered small planted deciduous and conifer trees.

Description: This point lies at the sharp transition between an open grass / forb field to the south, a pole white pine plantation to the north and a dense semi-mature Norway spruce plantation to the west. Widely scattered 3-foot spruce and sapling sugar maples dot the open field but the impression of an open field of goldenrod, New England asters, common milkweed, Queen Ann’s lace, etc.

June Survey Results for the ‘Northeast Point’.

June 2021 Survey 1 Surveys	Northeast Point 44.83404; - 87.33979
	DATE
	6/14/2021
	Beginning Time of Survey
Common name	0621
Northern cardinal	1
Red-eyed Vireo	1

Wood thrush	2
Blue Jay	2
American Goldfinch	2
Red-breasted nuthatch	1
Ovenbird	2
Mourning Dove	1
American crow	1

Summary of birds recorded during the June bird survey.

Common Name	Number of Points out of 7
Blue Jay	7
Red-eyed Vireo	7
American Goldfinch	6
Baltimore Oriole	6
Black-capped Chickadee	6
Common Yellowthroat	6
House wren	6
Mourning Dove	6
Northern cardinal	6
American Robin	5
Cedar Waxwing	5
Great crested flycatcher	5
Song Sparrow	5
American redstart	4
Common Grackle	4
Field Sparrow	4
Indigo Bunting	4
Nashville warbler	4
Red-bellied Woodpecker	4
Red-breasted nuthatch	4
Red-winged Blackbird	4
Wood thrush	4
Alder flycatcher	3
American crow	3
Brown-headed Cowbird	3
Catbird	3
Downy Woodpecker	3
House finch	3
Northern flicker	3

Ovenbird	3
Yellow warbler	3
Yellow-billed cuckoo	3
Yellow-rumped warbler	3
Black and white warbler	2
Eastern wood pewee	2
Kingbird	2
Mallard	2
Pileated woodpecker	2
Rose-breasted grosbeak	2
Tree Swallow	2
Warbling Vireo	2
White-throated sparrow	2
American White Pelican	1
Belted Kingfisher	1
Black-throated green warbler	1
Blue-winged warbler	1
Canada Goose	1
Caspian Tern	1
Chimney Swift	1
Clay colored sparrow	1
Eastern Kingbird	1
Eastern meadowlark	1
Great Blue Heron	1
Green Heron	1
Herring Gull	1
Killdeer	1
Northern Waterthrush	1
Osprey	1
Sandhill Crane	1
Spotted Sandpiper	1
Towhee	1
61 Species	

Table 1. Species encountered on Preserve during June survey.

The results of this survey will be entered into the eBird database (<https://ebird.org/home>) and be used to generate recommendations for consideration in the restoration plan for the Preserve.

RESULTS FOR SEPTEMBER / OCTOBER SURVEYS

Point 1

The fall survey for this point focused on the area outlined in Figure 24.



Figure 24. Area of the focused meander for Point 1 of the fall survey.

Fall Survey Results for Point 1.

September - October 2021 Bird Survey	POINT 1 - Mouth of Big Creek 44.82419; -87.34591						
	Dates						
	9/17/20 21	9/19/20 21	9/22/20 21	9/25/20 21	10/6/20 21	10/9/20 21	10/15/20 21
	Period of Observation						
Common name	0735 - 0745	0743 - 0840	0750 - 0855	0745 - 0849	0710 - 0810	0736 - 0843	0720 - 0846
Canada Goose		27	4	9	2	154	38
Wood Duck		10	19	8	3	1	15
Mallard	1	4	52	16	27	9	19

Ruddy Duck						2	
Pied-billed Grebe			6	2		4	3
American Coot					31	25	
Sandhill Crane	1			2			
Killdeer					1		
Wilson's Snipe							1
Herring Gull		1					
Cormorant				2			
Great Blue Heron					1		
Green Heron				1			
Turkey Vulture			1				
Bald Eagle					1		1
Sharp-shinned Hawk							1
Cooper's Hawk				1			
Belted Kingfisher	1	1					
Red-bellied Woodpecker		1					
Downy Woodpecker	1	2		1	1	2	
Hairy Woodpecker							1
Blue Jay	4	2	6	6	3	3	2
American Crow	1	1		1	2	1	4
Golden crowned kinglet				4		2	
Ruby crowned kinglet				2			1
Black-capped Chickadee	1	1	2			3	1
Red-breasted Nuthatch		1	1		1		
White-breasted Nuthatch	1			1	2	3	1
House Wren	2						
American Robin	1	1	8	3	3	8	3
Cedar Waxwing		1					1
Purple Finch					1	1	
American Goldfinch	2	6	4	2	4	7	15
Lincoln's sparrow	3	3	4	2	1	2	2
Swamp sparrow			3	8	5	5	8
Fox sparrow		1					
White-throated Sparrow	4	6	4	8	4	4	4
Song Sparrow		3		4	2	6	2

Junco				4			
Eastern Towhee	1						
Red-winged Blackbird					28	3	21
Rusty Blackbird						6	
Northern Waterthrush				1			
Common Yellowthroat		1	1	2			
Palm Warbler					2		
Yellow Warbler	2	4					
Yellow-rumped Warbler			11	1			1
Northern Cardinal							1
Rose-breasted Grosbeak			2				

Southwest Point

Figure 25 shows the location of the focused meander fall xurvey.



Figure 25. Area of Preserve surrounding the “Southwest” survey point for the fall bird survey.

Fall Survey Results for the 'Southwest Point'.

September - October 2021 Bird Survey	SOUTHWEST POINT 44.82863; -87.34700						
	Dates						
	9/17/202	9/19/202	9/22/202	9/25/202	10/6/202	10/9/202	10/15/20
	1	1	1	1	1	1	21
Common name	Period of Observation						
	0811 - 0831	0848 - 0920	0911 - 0931	0852 - 0914	0825 - 0839	0900 - 0930	0850 - 0910
Rock Pigeon		15					
Mourning Dove					1	1	
Turkey Vulture			1				
Downy Woodpecker	1						
Northern Flicker	1						
Eastern Wood Pewee				1			
Blue Jay	1	6		2	1	1	2
American Crow			1			1	3
Golden crowned kinglet						4	
Ruby crowned kinglet						3	
Black-capped Chickadee		2	3			2	2
Red-breasted Nuthatch						1	
Eastern Bluebird							2
American Robin	12	1	1	1	9	4	1
Gray Catbird	3						
Cedar Waxwing	2						1
American Goldfinch					1	1	1
White-throated Sparrow		1		1			
Red-winged Blackbird					1		
Common Grackle						5	

Point 2

Figure 26 shows the area surveyed for the Fall Survey.



Figure 26. Location of survey point 2. Black polygon defines the general area of the survey.

Fall Survey Results for the 'Southwest Point'.

September - October 2021 Bird Survey	POINT 2 - Just east of Cedar Crossing Bridge within white cedar stand; 44.82980; -87.34505						
	Dates						
	9/17/20 21	9/19/20 21	9/22/20 21	9/25/20 21	10/6/20 21	10/9/20 21	10/15/20 21
	Period of Observation						
Common name	0840 - 0900	0927 - 0957	0933 - 0953	0919 - 0939	0841 - 0853	0936 - 0956	0915 - 0938
Downy Woodpecker							1
Northern Flicker					1		
Blue Jay	2	1	3	3	2	1	
American Crow	1	1	1			1	

Golden crowned kinglet				1		1	
Ruby crowned kinglet							1
Black-capped Chickadee	3	4	1	6	2	3	5
Red-breasted Nuthatch	1	1	1				2
Brown Creeper				1			
American Robin	1						
Gray Catbird	1						
American Goldfinch	1			2	1	4	
Chipping Sparrow	1						
White-throated Sparrow		3					
Brown-headed Cowbird		1					
Palm Warbler							
Yellow-rumped Warbler	1	1					3

Point 3.

Figure 27 shows the area surveyed in the Fall Survey.



Figure 27. Area surrounding the fall survey point 3.

Fall Survey Results for Point 3.

September - October 2021 Bird Survey	POINT 3 - Pike Passage Bridge 44.83278; -87.34298						
	Dates						
	9/17/20	9/19/20	9/22/20	9/25/20	10/6/20	10/9/20	10/15/20
	21	21	21	21	21	21	21
Common name	Period of Observation						
	0912 - 0934	1054 - 1114	0956 - 1021	0945 - 1005	0859 - 0916	1002 - 1025	0946 - 1006
Hairy Woodpecker						1	
Pileated Woodpecker			1				
Blue Jay	1	5		3	3	2	2
American Crow			1	2			1

Ruby crowned kinglet				1		2	1
Black-capped Chickadee	3	2	4	2	2	4	2
Red-breasted Nuthatch	3			1	3	2	
Brown Creeper			2	1	1	1	
House Wren	1						
American Robin			1			1	2
Cedar Waxwing	2						
American Goldfinch	1	1		3	3		1
White-throated Sparrow							1
Swamp Sparrow				1			
Yellow-rumped Warbler			1		1		

Point 4.

Figure 28 shows the area of focus for Point 4 in the Fall Survey.



Figure 28. Location of area surveyed from Point 4 during June bird survey.

Fall Survey Results for Point 4.

September - October 2021 Bird Survey	Point 4 - Observatory Hill; 44.83051; -87.34056						
	Dates						
	9/17/20	9/19/20	9/22/20	9/25/20	10/6/20	10/9/20	10/15/20
	21	21	21	21	21	21	21
	Period of Observation						
Common name	1017 - 1050	1000 - 1020	1052 - 1120	1035 - 1005	0951 - 1035	1059 - 1137	1036 - 1109
Canada Goose* note fly overs							
Mourning Dove							1
Turkey Vulture					1		
Red-bellied Woodpecker					1		1
Downy Woodpecker	1						

Northern Flicker	1				1	1	
Blue Jay	1	3		2	2	3	4
American Crow					2		
Black-capped Chickadee					5	1	1
Red-breasted Nuthatch					1		1
White-breasted Nuthatch					1		
House Wren	1						
Eastern Bluebird							1
American Robin						2	
American Goldfinch	1	3		1	6	6	1
Field Sparrow					1		
White-throated Sparrow				3	3	9	
Song Sparrow					1		
Junco				1			5
Palm Warbler	1		2		3		1
Yellow-rumped Warbler					8		
Northern Cardinal				1			

Northeast Point

Figure 29 shows the area of the Fall Survey for the Northeast Point.



Figure 29. Location of area surveyed from Northeast Point during the Fall survey.

Fall Survey Results for the Northeast Point.

September - October 2021 Bird Survey	NORTHEAST POINT 44.83408; -87.33979 (includes conifer hedge along eastern boundary)						
	Dates						
	9/17/2021	9/19/2021	9/22/2021	9/25/2021	10/6/2021	10/9/2021	10/15/2021
	1	1	1	1	1	1	21
Period of Observation							
Common name	0947 - 1007	1038 - 1046	1024 - 1052	1009 - 1035	0920 - 0939	1027 - 1059	1010 - 1036
Mourning Dove					1		
Turkey Vulture			2				
Downy Woodpecker			1				
Blue Jay	1	2	2	2	1	3	2
American Crow		1	5		1		
Golden crowned kinglet						1	
Black-capped Chickadee	2	1	1	4	4	3	4

Red-breasted Nuthatch	2				1	1	1
Brown Creeper			1				
Eastern Bluebird					1		
American Robin			1		1		
American Goldfinch	1		2		1		2
White-throated Sparrow			5	7			2
Junco				3			4
Palm Warbler						6	

Species on property at each point and in total at the points within the 10-minute count

Species recorded on property outside the 10-minute point counts either while on the point but before or after the 10-minute period, or while walking between the points

Species recorded but clearly not on the property, or related to any habitat on the property

BIRD SURVEY RESULTS SUMMARY

Common name	Number of Points out of 7
American Crow	6
American Goldfinch	6
American Robin	6
Black-capped Chickadee	6
Blue Jay	6
Red-breasted Nuthatch	6
White-throated Sparrow	6
Downy Woodpecker	5
Golden crowned kinglet	4
Palm Warbler	4
Ruby crowned kinglet	4
Turkey Vulture	4
Yellow-rumped Warbler	4
Brown Creeper	3
Cedar Waxwing	3
Eastern Bluebird	3
House Wren	3

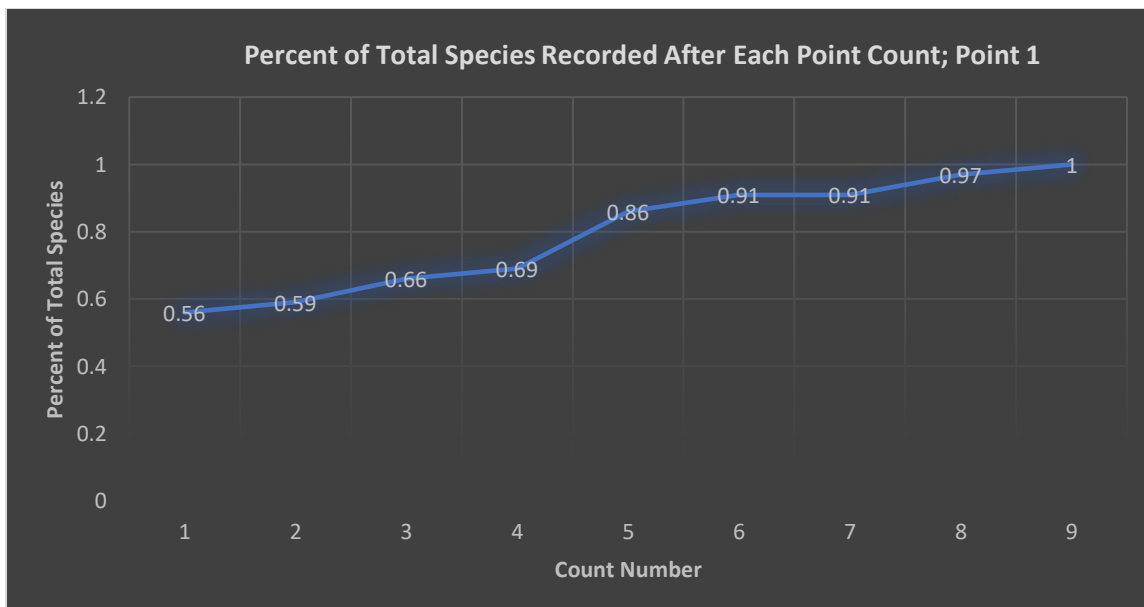
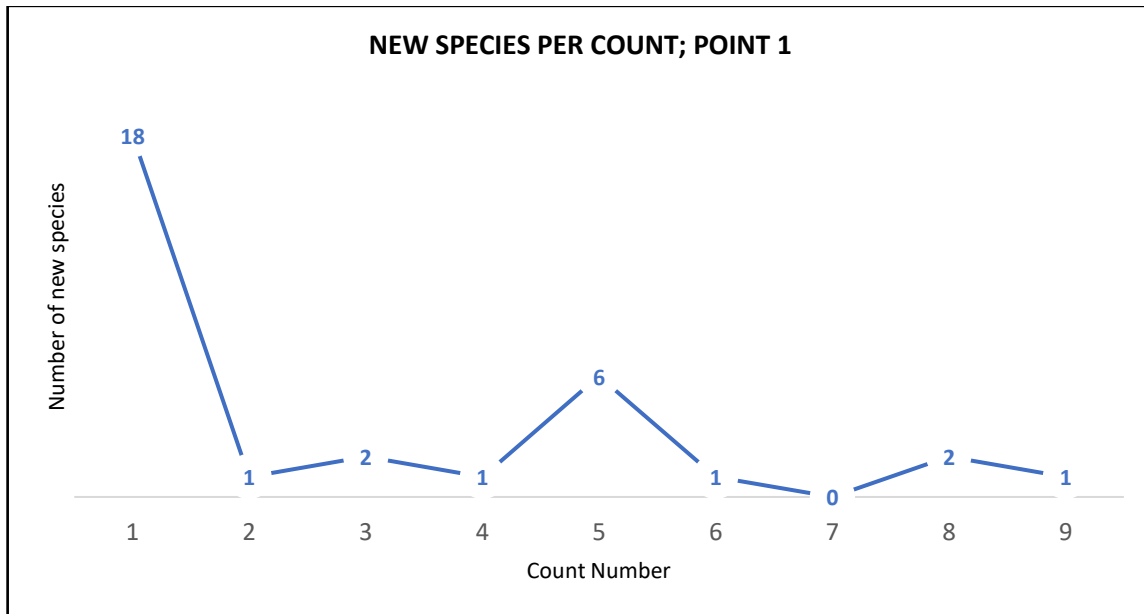
Junco	3
Mourning Dove	3
Northern Flicker	3
Gray Catbird	2
Hairy Woodpecker	2
Northern Cardinal	2
Red-bellied Woodpecker	2
Song Sparrow	2
Swamp sparrow	2
White-breasted Nuthatch	2
American Coot	1
Bald Eagle	1
Belted Kingfisher	1
Brown-headed Cowbird	1
Canada Goose	1
Chipping Sparrow	1
Common Grackle	1
Common Yellowthroat	1
Cooper's Hawk	1
Cormorant	1
Eastern Towhee	1
Eastern Wood Pewee	1
Field Sparrow	1
Fox sparrow	1
Great Blue Heron	1
Green Heron	1
Herring Gull	1
Killdeer	1
Lincoln's sparrow	1
Mallard	1
Northern Waterthrush	1
Pied-billed Grebe	1
Pileated Woodpecker	1
Purple Finch	1
Red-winged Blackbird	1
Rock Pigeon	1
Rose-breasted Grosbeak	1
Ruddy Duck	1
Rusty Blackbird	1
Sandhill Crane	1

Sharp-shinned Hawk	1
Wilson's Snipe	1
Wood Duck	1
Yellow Warbler	1
61 Species	

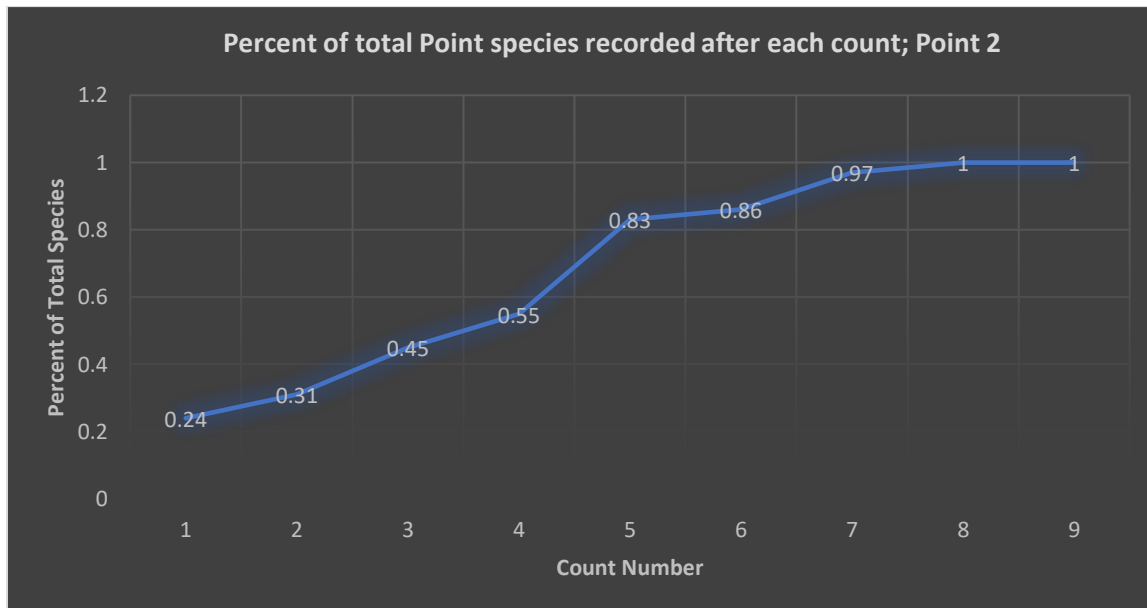
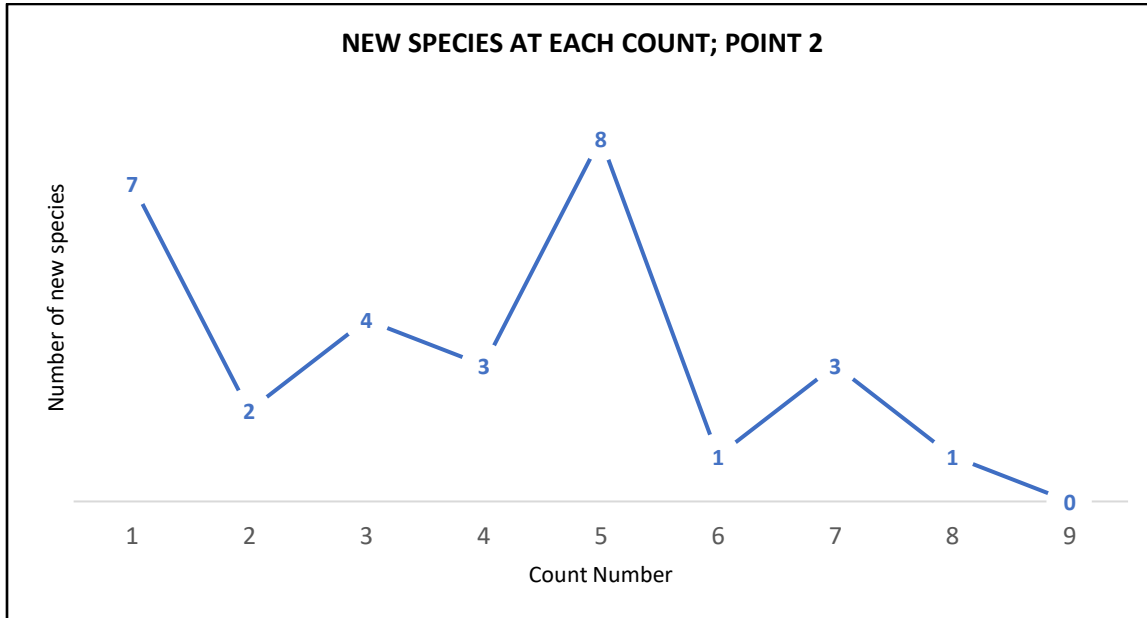
Discussion and Thoughts on Management Actions

Comment on Survey Method:

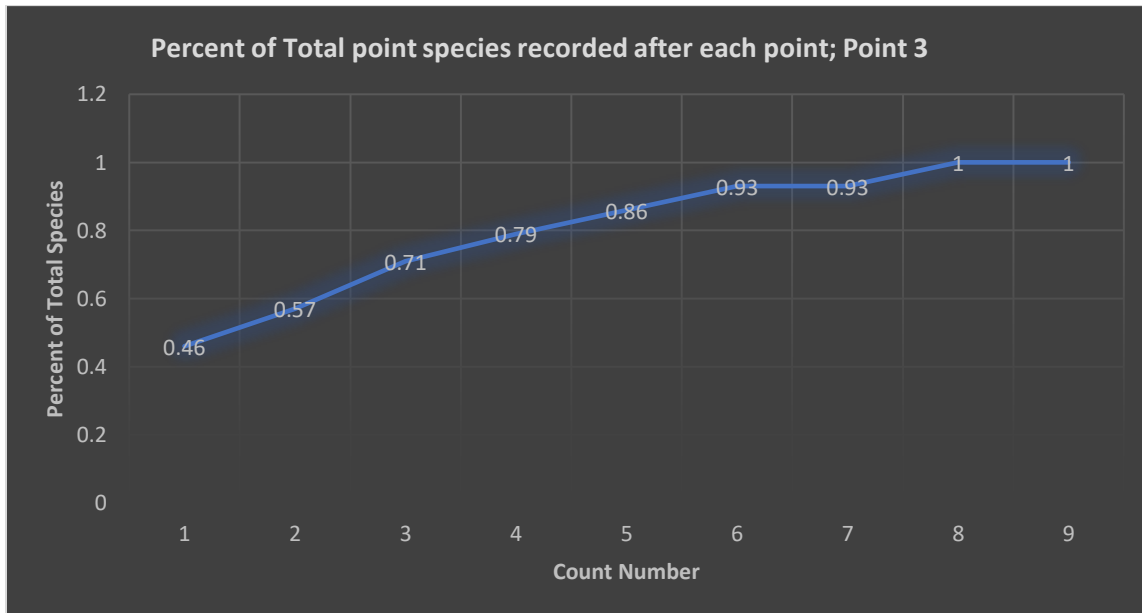
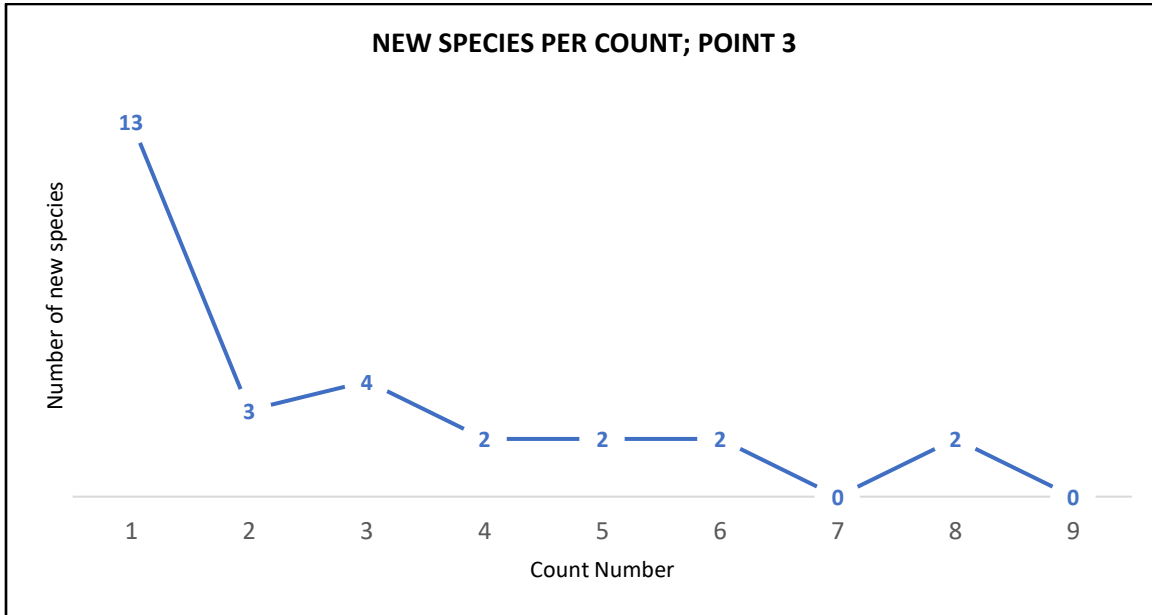
The June survey used 9 replicates for each survey point: 2 each day on 4 separate days and one extra survey on a separate date. The charts below show the efficiency of this method in recording birds from each point. Except for Point 2 all Points captured over 90% of the species recorded at that point at the end of the 6th point survey. About 86% of the species were captured after the 6th survey at Point 2.



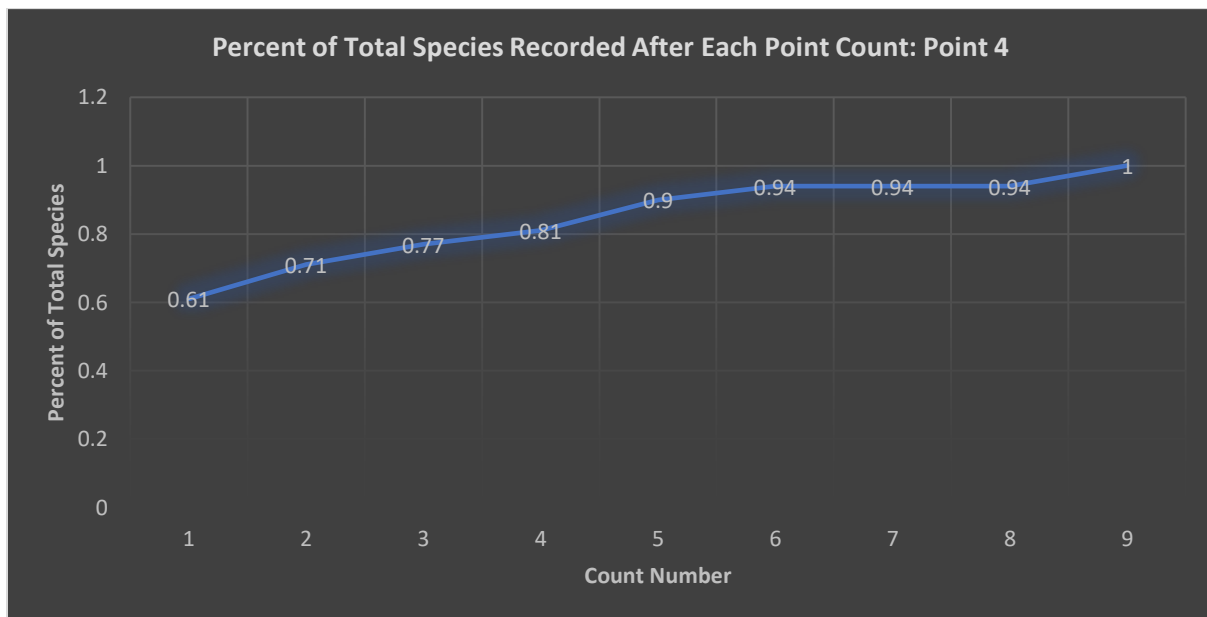
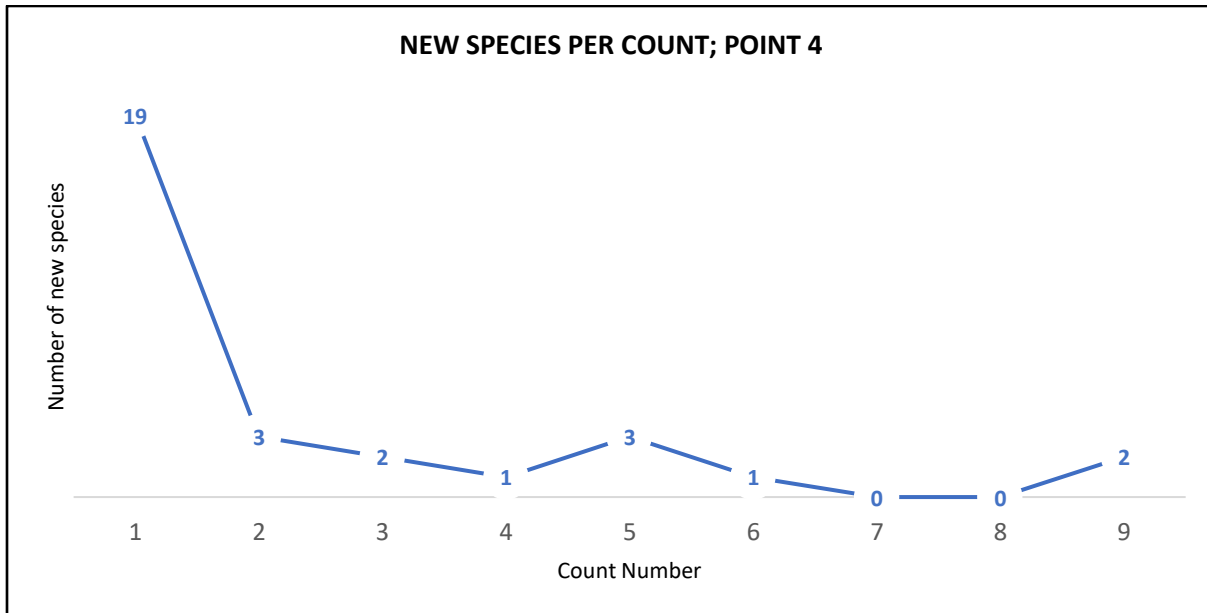
Point 2:



Point 3:



Point 4



Regarding the addition of the ‘Southwest, North and Northeast’ points later in the survey period to explore whether the 4 original points were picking up all the species present on the property only one additional species was detected by adding the 3 points. A chipping sparrow was detected at the Southwest Point and not detected at any other point.

These results indicate the 4 survey points were adequate in picking up the vast majority of species present on the Crossroad property in June. The question of whether it is necessary to conduct 8 surveys at a point to capture an adequate representation of the species present is less clear. Additional surveys beyond the 8 at a point would help determine an adequate number of surveys to conduct at a point.

Management Thoughts:

Birds are some of the most mobile and wide-ranging taxa. Wind dispersed plants and microfauna, bats, some insects, and those species that are aided by birds in dispersal (e.g., fat-head minnows) also cover great distances, but few groups are as completely mobile and wide ranging as birds. This mobility, along with the high diversity of bird species known to frequent Wisconsin (300+ species), creates some challenges in developing specific management guidelines for specific migratory species on small acreages like the Crossroads. Migratory birds as a group contain species that are general or broad in their habitat and food requirements and species that require more specific habitat and food needs. Given this diversity of habitat requirements it might seem prudent to conserve, create or develop a landscape of habitats to accommodate as broad a range of migratory bird needs as possible. However, this is clearly a daunting task given the diversity of migratory species. In addition, such an approach, on a small acreage like the Crossroads, may jeopardize habitat requirements of those summer breeding residents that require large blocks of contiguous, generally homogeneous habitat, particularly the forest interior nesting birds. The approach to balance or decide between habitat management actions that favor migratory species and / or a set of summer resident breeding birds will require a longer discussion than is possible in this report.

However, some generalized management actions can be offered based on the experience and results gained through this survey. It must be emphasized that the management actions included below are bird focused and result from objectives that intend to increase the habitat value for birds. These objectives, if deemed desirable, need to be integrated into objectives developed for other species or natural values or services desired for the property.

Management actions to increase property use by migratory and summer resident species:

Spring Migrants:

- Increase the cover by native conifers (e.g., white cedar, balsam fir, eastern hemlock) near the water in the Cove area of the property. Spring migrants, especially neo-tropical migrant warblers utilize the conifer dominated shoreline forests of the upper Great Lakes in their northern spring migration as they feed on adult midges (Chironomid spp.) which emerge from the shallow nearshore waters of the lakes in mid-May and other small insects. At that time of year conifers provide more surface area than deciduous trees and support higher densities of resting adult midges. The dense foliage of white cedar stands also provide cover for songbirds from predatory hawks. An example of such a conifer planting could be made upgradient or upstream of the shrub carr community along the east side of the mouth of Big Creek. The shoreline on either side of the kayak launch could be explored as a site to establish a stand of white cedar. It should be noted that both northern white cedar and balsam fir, two common species in the conifer dominated coastal forests of Door County are projected to decline under modeled future climate scenarios for Wisconsin's northern forest (Handler, et. al. 2019). The modeled future for eastern hemlock another relatively common species of this coastal forest type is less clear as the models project an increase under low climate change and a decline under high climate change scenarios.
- Similar establishment of native conifer stands adjacent to the small permanent or ephemeral ponds on the property would provide early emergent pond associated insects resting sites and provide foraging habitat and cover for insectivorous spring migrant birds.

- Early (< June) spring flowering shrubs and spring ephemerals attract early nectar and pollen gathering insects. These insect pollinators can be important stop-over food sources for migrating birds. Small trees and shrubs including willows (*Salix spp.*), hawthorns (*Crataegus spp.*), pin cherries (*Prunus pennsylvanica*), wild plum (*P. americana*), elderberry (*Sambucus spp.*) and some species of Juneberry (*Amelanchier spp.*) attract both pollinators and their bird predators in early and mid-Spring. Planting for insect diversity will likely support increased bird abundance and diversity on the property.
- Ephemeral ponds can be important feeding sites for migrating woodland birds. These ponds produce spring emergent aquatic insects which are consumed by fly-catching species including many woodland warblers (e.g., American red-starts), blue-grey gnatcatchers, and several small woodland flycatchers.

Fall Migrants:

- Increasing the number and diversity of fall fruit bearing will support several migratory species including the thrushes, gray catbird, cedar waxwings and yellow-rumped warblers. Shrubs that provide both food (fruit, mast) and cover for birds, migrants or resident species include most of the dogwood species (*Cornus racemose*, *C. rugosa*, *C. stolonifera*), winterberry (*Ilex verticellata*), Virginia creeper (*Parthenocissus quinquefolia*) and the native Viburnums. Native sunflowers (*Helianthus spp.*) will provide food for seed eating birds through the fall.
- Fall or late summer flower herbaceous plants such as the native goldenrods, (*Solidago spp.*) and asters (*Symphyotrichum spp.*) will attract late season pollinators which can provide food for migrating insectivorous birds such as flycatchers, warblers, sparrows, and other species.

Summer resident (i.e., possible breeding) species:

- Retain and increase the number of native trees and shrubs that support large insect populations. As noted above planting trees, shrubs and flowers that support high insect populations will also favor higher bird populations. According to Douglas Tallamy (2007) the following top 10 genera of trees / shrubs for supporting high numbers of Lepidoptera (moths & butterflies) are listed in the table below.

<i>Common name</i>	<i>Genus</i>	<i>Species supported</i>
<i>Oaks</i>	<i>Quercus</i>	<i>534</i>
<i>Willow</i>	<i>Salix</i>	<i>456</i>
<i>Cherry, plum</i>	<i>Prunus</i>	<i>546</i>
<i>Birch</i>	<i>Betula</i>	<i>413</i>
<i>Poplar, aspen, cottonwood</i>	<i>Populus</i>	<i>368</i>
<i>Crabapple</i>	<i>Malus</i>	<i>311</i>
<i>Blueberry, cranberry</i>	<i>Vaccinium</i>	<i>285</i>
<i>Maple, box elder</i>	<i>Acer</i>	<i>285</i>
<i>Elm</i>	<i>Ulmus</i>	<i>213</i>
<i>Pine</i>	<i>Pinus</i>	<i>203</i>

- Improve habitat structure in the dense conifer (*Picea and Pinus*) plantations in the northern portions of the property and the monotypic white cedar stand at Bird survey Site 2 through

judicious thinning of overstory and introduction of shade tolerant native understory shrubs and trees. The objectives of this action would be to increase the vegetative, and hopefully insect, diversity in these stands, increase understory cover for nesting habitat and increase the resilience against invasive species, insect pest damage, and climate shifts. Decreasing the basal area of the overstory conifers in the stand to increase the amount of light reaching the understory and the ground would be one approach to achieve this objective along with supplementing this thinning with understory plantings of shade tolerant trees and shrubs (e.g., hemlock, sugar maple, yellow birch). Protection from deer browsing would be necessary for most of these species.

- Continue removal of non-native buckthorn in targeted areas and attempt replacement with either native tree, (to expand habitat type or make connection with another forest type) or forest edge shrubs / small trees (if this forest edge is to be maintained).

Landscape management actions:

In general, strive to expand habitat patches by consolidation of smaller habitat patches of similar physiognomy, i.e., connect and expand habitat patches across the property. The table below of the birds recorded from the June survey indicates that about 40% of the species recorded at over half the survey points (9 of 22 shaded in orange in the table) are considered “core shrubland” species. Recent research (Schlossberg and King 2007, Roberts and King 2017, and King and Schlossberg 2012) has shown that there is a suite of species which are tightly associated with shrub or early successional forest stage patches. These species are not “edge” species, in fact some of these species actively avoid forest edge conditions (Roberts and King 2017) and hence could be considered “core” shrubland species. The abundance of shrubland associated species on the Crossroads property correlates with the predominant habitat physiognomy of the property, i.e., forest openings occupied by small trees and shrubs, and larger areas with abandoned apple trees, patches of sumac, dogwood, non-native honeysuckle, and small forest trees. The “Southwest” bird survey point embodies many of the attributes of this shrubland habitat. These shrubland associated species have small shrubland area requirements for breeding. Areas as small as .5 to .27 acres appear to be sufficient to support breeding by some species (Roberts and King 2017). As the area requirements for birds utilizing other major habitat types, e.g., grasslands and forests are larger, 20 acres for grassland birds

(https://www2.dnr.state.mi.us/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/Species_Mgmt/Grassland_Birds.htm), and several hundred acres for forest dependent breeding birds

(https://ct.audubon.org/sites/default/files/guide_to_managing_forests_for_trees_birds_in_ct.pdf#:~:text=However%2C%20the%20minimum%20size%20forest%20block%20needed%20to,Thrush%20can%20thrive%20in%20medium-sized%20blocks%20%28~200%20acres%29) utilizing grassland and shrubland birds as a target for habitat management on the Crossroads may prove more successful than striving to provide adequate habitat for forest dependent species in the short-term.

Figure 31 below depicts a conceptualized design for the Crossroads Property that attempts to consolidate similarly structured habitats on the Crossroads along with major habitat creation efforts to fill in blocks of disparate physiognomy. However, even with blocking, connecting, and infilling of habitat to create larger blocks of similar habitat, the forest and grassland habitat blocks would be marginal in size for some of the species that require forest or grassland interior habitat. Given this limitation it may seem more prudent to focus on creating a habitat mosaic and structures that serve migratory and shrubland species.

As mentioned above this is a bird focused design intended to increase the habitat value for birds. need to be integrated into objectives developed for other species or natural values or services desired for the property.

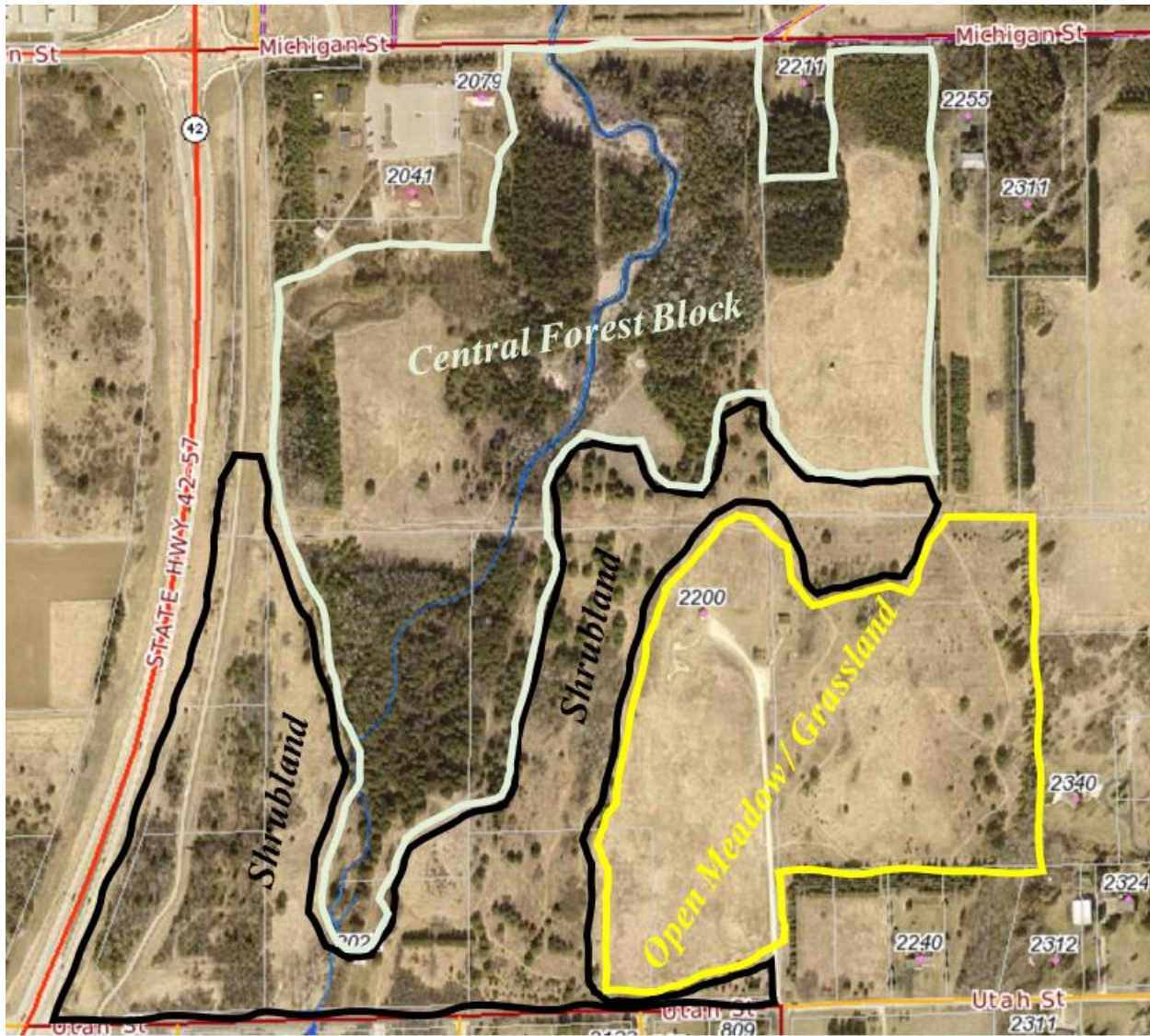


Figure 30. Conceptual long-term configuration of three major habitat types on The Crossroads property north of Utah Street. Configuration is an attempt at a management balance between existing habitat types and area needs for bird species utilizing those habitat types.

JUNE SPECIES

<i>Common Name (Orange shaded species recorded on over half of the survey points)</i>	<i>Number of Points recorded out of 7</i>	<i>Neo- tropical migrant*</i>	<i>NMBCA Species of Concern *****</i>	<i>Cavity Nesters ***</i>	<i>PIF Region 23 Combined Score - Breeding Season > 13**</i>	<i>PIF Region 12 Combined Score - Breeding Season > 13**</i>	<i>Core Shrubland Species ****</i>
<i>Blue Jay</i>	7						
<i>Red-eyed Vireo</i>	7	x					
<i>American Goldfinch</i>	6	x					x
<i>Baltimore Oriole</i>	6	x			14		
<i>Black-capped Chickadee</i>	6			x			
<i>Common Yellowthroat</i>	6	x					x
<i>House wren</i>	6	x		x			x
<i>Mourning Dove</i>	6	x					
<i>Northern cardinal</i>	6						x
<i>American Robin</i>	5	x					
<i>Cedar Waxwing</i>	5	x					x
<i>Great crested flycatcher</i>	5	x		x		14	
<i>Song Sparrow</i>	5	x					x
<i>American redstart</i>	4	x					
<i>Common Grackle</i>	4				14		
<i>Field Sparrow</i>	4	x			16	14	x
<i>Indigo Bunting</i>	4	x					x
<i>Nashville warbler</i>	4	x				14	x
<i>Red-bellied Woodpecker</i>	4			x			
<i>Red-breasted nuthatch</i>	4			x			
<i>Red-winged Blackbird</i>	4	x			14		
<i>Wood thrush</i>	4	x	x			15	
<i>Alder flycatcher</i>	3	x					x
<i>American crow</i>	3						
<i>Brown-headed Cowbird</i>	3	x					
<i>Gray Catbird</i>	3	x					x
<i>Downy Woodpecker</i>	3			x			
<i>House finch</i>	3						
<i>Northern flicker</i>	3	x		x	15	14	
<i>Ovenbird</i>	3	x				14	
<i>Yellow warbler</i>	3	x					x
<i>Yellow-billed cuckoo</i>	3	x	x				x
<i>Yellow-rumped warbler</i>	3	x					
<i>Black and white warbler</i>	2	x				15	x
<i>Eastern wood pewee</i>	2	x					

Kingbird	2	x					
Mallard	2	x					
Pileated woodpecker	2			x			
Rose-breasted grosbeak	2	x			14	17	
Tree Swallow	2	x		x		15	
Warbling Vireo	2	x					
White-throated sparrow	2						x
American White Pelican	1	x			15		
Belted Kingfisher	1	x				16	
Black-throated green warbler	1	x					
Blue-winged warbler	1	x					
Canada Goose	1	x					
Caspian Tern	1	x					
Chimney Swift	1	x		x			
Clay colored sparrow	1	x					
Eastern Kingbird	1	x			15	14	
Eastern meadowlark	1	x			14	14	
Great Blue Heron	1	x			14	14	
Green Heron	1	x					
Herring Gull	1	x					
Killdeer	1						
Northern Waterthrush	1	x					
Osprey	1						
Sandhill Crane	1	x					
Spotted Sandpiper	1						
Eastern towhee	1	x			14	14	x

*Bird Species Considered as Neotropical Migrants under the Neotropical Migratory Bird Conservation Act.
<https://www.fws.gov/migratorybirds/pdf/grants/NMBCASpeciesList.pdf>

**2022 Partners in Flight Databases <https://pif.birdconservancy.org/avian-conservation-assessment-database-scores/>. Figure 31 below shows Bird Conservation Regions 23 and 12. As the region boundary is the Sturgeon Bay ship canal rankings for both BCRs are shown in the table.

*** Ehrlich, et.al. 1988.

**** Schlossberg and King 2007

***** <https://www.fws.gov/migratorybirds/pdf/grants/NMBCASpeciesList.pdf>

June birds recorded on the Crossroads Property with notations of neotropical status, "Partner-in-Flight" conservation scores and habitat associations.

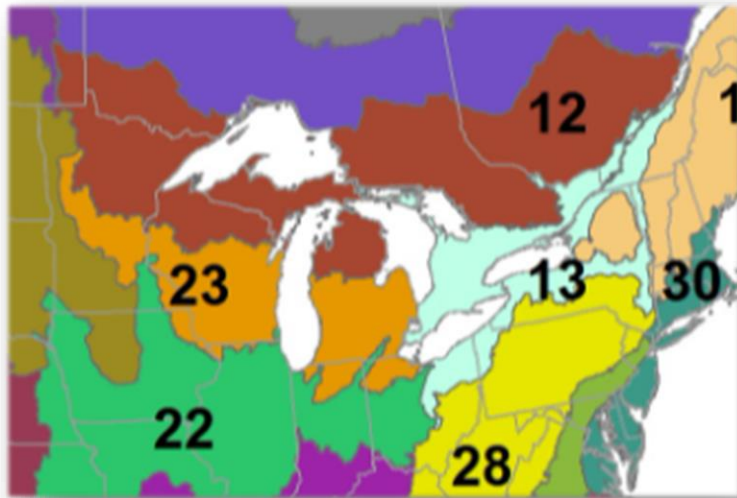


Figure 31. Partner in Flight Bird Conservation Regions (BCRs) for the upper Midwest. The land in Door County north of the ship canal is in BCR 12, the land south of the canal is in BCR 23. <https://pif.birdconservancy.org/avian-conservation-assessment-database-scores/>

APPENDIX II:

Literature Cited.

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APPENDIX III:

POINT SUMMARIES FOR THE JUNE SURVEYS

June 2021 Survey 34 Species	POINT 1 - Mouth of Big Creek 44.82419; -87.34591									Consist ency
	Dates									
	6/3/2021	6/4/2021	6/8/2021	6/9/2021	6/14/2021					
	Beginning Times for Survey									
Common name	0513	0531	0728	0746	0502	0517	0510	0524	0641	
Red-winged Blackbird	13	8	10	11	8	10	10	13	11	1.00
Mourning Dove	2	1		1	1	1	1	1	1	0.89
Killdeer	2	2		3	2	1	1	1	2	0.89
Warbling Vireo	1	1	1		1	2		1	2	0.78
Cedar Waxwing			1	1	1	7	1	1	1	0.78
Common Yellowthroat	1	2	2		1	1	2	1		0.78
Eastern Kingbird	1		1		1	1		1	1	0.67
Baltimore Oriole	1	1				2	1	1	1	0.67
Common Grackle	2	3	1		1	2	1			0.67
Mallard	1		4	4				1	2	0.56
American Robin					1	1	1	1	1	0.56
Chimney Swift	1	2				3	1			0.44
Spotted Sandpiper			1	1			1	1		0.44
American White Pelican	4		4	4	3					0.44
Tree Swallow					1	1		1	1	0.44
Northern Waterthrush	1	1	1	1						0.44
American Redstart					1	1	1	1		0.44
House Wren					1		1		1	0.33
Yellow Warbler		1			1		1			0.33
Canada Goose	3	1								0.22
Sandhill Crane	2						2			0.22
Herring Gull	2	1								0.22
Green Heron					1	1				0.22
Belted Kingfisher					1					0.14
Caspian Tern								1		0.11

Great Blue Heron	1									0.11
Osprey			1							0.11
Red-bellied Woodpecker						1				0.11
Downy Woodpecker									1	0.11
Red-eyed Vireo	1									0.11
Blue Jay								1		0.11
Black-capped Chickadee					1					0.11
Song Sparrow	2									0.11
Brown-headed Cowbird				1						0.11

June 2021 Survey 9 Surveys	POINT 2 - Just east of Cedar Crossing Bridge within white cedar stand; 44.82980; -87.34505									29 Species
	DATE									
	6/3/2021	6/4/2021	6/8/2021	6/9/2021	6/14/2021					
	Beginning Times for Survey									
Common name	0553	0608	0525	0538	0542	0555	0658	0710	0545	Consistency
Red-eyed Vireo	4	3	2	4	1	1	1	1	3	1.00
Great crested flycatcher	1	1	1	1	1	2	2	1	1	1.00
Black-capped Chickadee	2	2		1	1	2	2	1		0.78
Black-throated green warbler	1	1	1	1		1				0.55
Alder Flycatcher					1	1	1	1	1	0.55
Blue Jay		1		1				2	2	0.44
American Crow				1		1	1	2		0.44
Cedar Waxwing			1	1				1	1	0.44
Common Yellowthroat	1		2	1		1				0.44
Brown-headed Cowbird				1			1	1	1	0.44
Indigo Bunting					1		1	1	1	0.44
Red-breasted nuthatch	1	1	1							0.33
Northern cardinal					2	1		2		0.33
Song Sparrow					2	1	1			0.33
Mourning Dove			1	1						0.22
American Robin			1	1						0.22

Rose-breasted Grosbeak							1	1		0.22
American Redstart					1	1				0.22
American Goldfinch					1	1				0.22
Yellow Warbler		1								0.11
Yellow-billed Cuckoo								1		0.11
Baltimore Oriole							1			0.11
Tree Swallow	1									0.11
House Wren					1					0.11
Red-bellied Woodpecker				1						0.11
Downy Woodpecker								1		0.11
Field Sparrow			1							0.11
Catbird					1					0.11
Yellow-rumped warbler									1	0.11

June 2021 Survey 9 Surveys	POINT 3 - Pike Passage Bridge 44.83278; -87.34298									28 Species
	DATE									
	6/3/2021	6/4/2021	6/8/2021	6/9/2021	6/14/2021					
	Beginning Times for Survey									
Common name	0627	0639	0557	0609	0615	0628	0627	0639	0601	Consistency
Black-capped Chickadee	2	1	2		2	2	2	2	1	0.89
Indigo Bunting	1	1		1	2	1	1	2	3	0.89
Northern cardinal		3	2	3	2	1	1	2	1	0.89
Red-eyed Vireo	2	2	1	1			2	1	1	0.78
Wood thrush			1	1	1	1	1	1	1	0.78
Nashville warbler	2		1	1	1	1		1		0.67
Great crested flycatcher	1	1	1	1	1					0.56
Eastern wood pewee				1	1	1	1	1		0.56
Blue Jay	1		1	1	1				1	0.56
Red-breasted nuthatch			1	1			1	1	1	0.56
American Goldfinch	3		1		1	2		3		0.56
Field Sparrow	2	2		1	2				1	0.56
Yellow-rumped warbler		1	1		1	1	1			0.56
Common Yellowthroat	1	1	1	1						0.44

Black and white warbler	1	1		1		1				0.44
Red-winged blackbird		1		1	1	1				0.44
Ovenbird					1	1	1	1		0.44
Baltimore Oriole	1		1				1			0.33
Common grackle					1		1	2		0.33
Mourning Dove						1			1	0.22
House finch	1	1								0.22
Pileated woodpecker			1	1						0.22
Cedar Waxwing								3		0.11
American Robin			1							0.11
House Wren								1		0.11
Red-bellied Woodpecker						1				0.11
White-throated sparrow	1									0.11
Northern flicker				2						0.11

June 2021 Survey 9 Surveys	POINT 4 - Observatory Hill; 44.83051; -87.34056									31 Species
	DATE									
	6/3/2021	6/4/2021	6/8/2021	6/9/2021	6/14/2021					
	Beginning Times for Survey									
Common name	0657	0716	0646	0700	0647	0700	0554	0608	0641	Consistency
Black-capped Chickadee	2	1	1	1	2	1	1	1	1	1.00
Indigo Bunting	1	2	1	1	1	1	2	2	2	1.00
Red-winged blackbird	2	4	1	2	3	2	1	1	1	1.00
Clay colored sparrow	3	1	2	1	4	2	2	2	3	1.00
American Robin	2	3	2	1	1	2	1	1	1	1.00
House Wren	1	2	1	1	1	1	2	2	2	1.00
Northern cardinal	1		2	2	1	2	1	2	1	0.89
Field Sparrow	3	2	1	1		1	3	2	2	0.89
Cedar Waxwing	3	1		1	1	1	2	1	1	0.89
Kingbird	1	1	2	2	1			1	1	0.78
Blue Jay	1	1	1	1		1			1	0.67
Red-eyed Vireo	2		1	1		1			1	0.56

American Goldfinch			1		1		2	2	2	0.56
Baltimore Oriole		1			1	1		1	2	0.56
Mourning Dove	1	1	1	1			1			0.56
Catbird		1				1	1	1	1	0.56
Alder flycatcher	1	1	1	1						0.44
Great crested flycatcher	1	2	1							0.33
Common Yellowthroat					1	1	1			0.33
American crow	1		1			1				0.33
Eastern meadowlark	1	1			1					0.33
Towhee			1	1				1		0.33
Blue-winged warbler				1			1	1		0.33
Nashville warbler	2		1							0.22
Common grackle	1		1							0.22
American redstart					1	1				0.22
Song sparrow					1	1				0.22
House finch									1	0.11
Northern flicker		1								0.11
Yellow warbler						1				0.11
Yellow-billed cuckoo									1	0.11

June 2021 Survey 4 Surveys	Southwest Point 44.82863; -87.34700				28 Species
	DATE				
	6/8/2021	6/9/2021	6/14/2021		
	Beginning Times for Survey				
Common name	0728	0726	0741	0708	Consistency
Red-eyed Vireo	1	1	1	1	1.00
Baltimore Oriole	2	1	2	1	1.00
Song sparrow	3	1	1	1	1.00
Alder flycatcher	1	1	1	1	1.00
Indigo Bunting	2	1		1	0.75
Downy woodpecker	1	1	1		0.75
American redstart		1	1	1	0.75
Northern cardinal		1	3		0.50

Blue Jay			3	1	0.50
American Goldfinch	1	1			0.50
Common Yellowthroat	1		2		0.50
Red-winged blackbird	1		2		0.50
Cedar Waxwing	1	1			0.50
American Robin	2	1			0.50
Brown-headed cowbird	1			1	0.50
Catbird	1	2			0.50
Black and white warbler				1	0.25
Red-bellied Woodpecker		1			0.25
Northern flicker		1			0.25
Kingbird	1				0.25
Yellow-billed cuckoo	1				0.25
Chipping sparrow		1			0.25
Rose-breasted grosbeak			1		0.25
Warbling vireo			1		0.25

June 2021 Survey 1 Surveys	North Bridge 44.83368; - 87.34203
	DATE
	6/4/2021
	Beginning Time of Survey
Common name	0625
Northern cardinal	2
Red-eyed Vireo	1
Wood thrush	1
Blue Jay	1
American Goldfinch	1
Black-capped Chickadee	1
Great crested flycatcher	1
Common Yellowthroat	1
Baltimore Oriole	1
House wren	1
Mallard (chicks)	10
Song sparrow	1
Nashville warbler	1

June 2021 Survey 1 Surveys	Northeast Point 44.83404; - 87.33979
	DATE
	6/14/2021
	Beginning Time of Survey
Common name	0621
Northern cardinal	1
Red-eyed Vireo	1
Wood thrush	2
Blue Jay	2
American Goldfinch	2
Red-breasted nuthatch	1
Ovenbird	2
Mourning Dove	1
American crow	1

Species encountered outside of point counts during the June survey
American crow
American goldfinch
American redstart
Baltimore oriole
Blue jay
Brown-headed cowbird
Canada goose
Eastern towhee
Field sparrow
Great-blue heron
Great-crested flycatcher
House wren
Indigo bunting
Killdeer
Mallard
Mourning dove
Nashville warbler
Northern cardinal
Northern flicker
Red-bellied woodpecker
Red-breasted nuthatch
Red-eyed vireo
Red-tailed hawk
Red-winged blackbird

Sandhill crane
Tree swallow

SEPTEMBER / OCTOBER SURVEYS

September - October 2021 Bird Survey	POINT 1 - Mouth of Big Creek 44.82419; -87.34591						
	Dates						
	9/17/20 21	9/19/20 21	9/22/20 21	9/25/20 21	10/6/20 21	10/9/20 21	10/15/20 21
Common name	Period of Observation						
	0735 - 0745	0743 - 0840	0750 - 0855	0745 - 0849	0710 - 0810	0736 - 0843	0720 - 0846
Canada Goose		27	4	9	2	154	38
Wood Duck		10	19	8	3	1	15
Mallard	1	4	52	16	27	9	19
Ruddy Duck						2	
Pied-billed Grebe			6	2		4	3
American Coot					31	25	
Sandhill Crane	1			2			
Killdeer					1		
Wilson's Snipe							1
Herring Gull		1					
Cormorant				2			
Great Blue Heron					1		
Green Heron				1			
Turkey Vulture			1				
Bald Eagle					1		1
Sharp-shinned Hawk							1
Cooper's Hawk				1			
Belted Kingfisher	1	1					
Red-bellied Woodpecker		1					
Downy Woodpecker	1	2		1	1	2	
Hairy Woodpecker							1
Blue Jay	4	2	6	6	3	3	2
American Crow	1	1		1	2	1	4
Golden crowned kinglet				4		2	
Ruby crowned kinglet				2			1
Black-capped Chickadee	1	1	2			3	1
Red-breasted Nuthatch		1	1		1		

White-breasted Nuthatch	1			1	2	3	1
House Wren	2						
American Robin	1	1	8	3	3	8	3
Cedar Waxwing		1					1
Purple Finch					1	1	
American Goldfinch	2	6	4	2	4	7	15
Lincoln's sparrow	3	3	4	2	1	2	2
Swamp sparrow			3	8	5	5	8
Fox sparrow		1					
White-throated Sparrow	4	6	4	8	4	4	4
Song Sparrow		3		4	2	6	2
Junco				4			
Eastern Towhee	1						
Red-winged Blackbird					28	3	21
Rusty Blackbird						6	
Northern Waterthrush				1			
Common Yellowthroat		1	1	2			
Palm Warbler					2		
Yellow Warbler	2	4					
Yellow-rumped Warbler			11	1			1
Northern Cardinal							1
Rose-breasted Grosbeak			2				

September - October 2021 Bird Survey	SOUTHWEST POINT 44.82863; -87.34700						
	Dates						
	9/17/20 21	9/19/20 21	9/22/20 21	9/25/20 21	10/6/20 21	10/9/20 21	10/15/20 21
Common name	Period of Observation						
	0811 - 0831	0848 - 0920	0911 - 0931	0852 - 0914	0825 - 0839	0900 - 0930	0850 - 0910
Rock Pigeon		15					
Mourning Dove					1	1	
Turkey Vulture			1				

Downy Woodpecker	1						
Northern Flicker	1						
Eastern Wood Pewee				1			
Blue Jay	1	6		2	1	1	2
American Crow			1			1	3
Golden crowned kinglet						4	
Ruby crowned kinglet						3	
Black-capped Chickadee		2	3			2	2
Red-breasted Nuthatch						1	
Eastern Bluebird							2
American Robin	12	1	1	1	9	4	1
Gray Catbird	3						
Cedar Waxwing	2						1
American Goldfinch					1	1	1
White-throated Sparrow		1		1			
Red-winged Blackbird					1		
Common Grackle						5	

September - October 2021 Bird Survey	POINT 2 - Just east of Cedar Crossing Bridge within white cedar stand; 44.82980; -87.34505						
	Dates						
	9/17/20 21	9/19/20 21	9/22/20 21	9/25/20 21	10/6/20 21	10/9/20 21	10/15/20 21
Common name	Period of Observation						
	0840 - 0900	0927 - 0957	0933 - 0953	0919 - 0939	0841 - 0853	0936 - 0956	0915 - 0938
Downy Woodpecker							1
Northern Flicker					1		
Blue Jay	2	1	3	3	2	1	
American Crow	1	1	1			1	
Golden crowned kinglet				1		1	
Ruby crowned kinglet							1
Black-capped Chickadee	3	4	1	6	2	3	5

Red-breasted Nuthatch	1	1	1				2
Brown Creeper				1			
American Robin	1						
Gray Catbird	1						
American Goldfinch	1			2	1	4	
Chipping Sparrow	1						
White-throated Sparrow		3					
Brown-headed Cowbird		1					
Palm Warbler							
Yellow-rumped Warbler	1	1					3

September - October 2021 Bird Survey	POINT 3 - Pike Passage Bridge 44.83278; -87.34298						
	Dates						
	9/17/20	9/19/20	9/22/20	9/25/20	10/6/20	10/9/20	10/15/20
	21	21	21	21	21	21	021
	Period of Observation						
Common name	0912 - 0934	1054 - 1114	0956 - 1021	0945 - 1005	0859 - 0916	1002 - 1025	0946 - 1006
Hairy Woodpecker						1	
Pileated Woodpecker			1				
Blue Jay	1	5		3	3	2	2
American Crow			1	2			1
Ruby crowned kinglet				1		2	1
Black-capped Chickadee	3	2	4	2	2	4	2
Red-breasted Nuthatch	3			1	3	2	
Brown Creeper			2	1	1	1	
House Wren	1						
American Robin			1			1	2
Cedar Waxwing	2						
American Goldfinch	1	1		3	3		1
White-throated Sparrow							1
Swamp Sparrow				1			
Yellow-rumped Warbler			1		1		

September - October 2021 Bird Survey	Point 4 - Observatory Hill; 44.83051; -87.34056						
	Dates						
	9/17/20 21	9/19/20 21	9/22/20 21	9/25/20 21	10/6/20 21	10/9/20 21	10/15/2 021
	Period of Observation						
Common name	1017 - 1050	1000 - 1020	1052 - 1120	1035 - 1005	0951 - 1035	1059 - 1137	1036 - 1109
Canada Goose* note fly overs							
Mourning Dove							1
Turkey Vulture					1		
Red-bellied Woodpecker					1		1
Downy Woodpecker	1						
Northern Flicker	1				1	1	
Blue Jay	1	3		2	2	3	4
American Crow					2		
Black-capped Chickadee					5	1	1
Red-breasted Nuthatch					1		1
White-breasted Nuthatch					1		
House Wren	1						
Eastern Bluebird							1
American Robin						2	
American Goldfinch	1	3		1	6	6	1
Field Sparrow					1		
White-throated Sparrow				3	3	9	
Song Sparrow					1		
Junco				1			5
Palm Warbler	1		2		3		1
Yellow-rumped Warbler					8		
Northern Cardinal				1			

September - October 2021 Bird Survey	NORTHEAST POINT 44.83408; -87.33979 (includes conifer hedge along eastern boundary)						
	Dates						
	9/17/20 21	9/19/20 21	9/22/20 21	9/25/20 21	10/6/20 21	10/9/20 21	10/15/20 21
	Period of Observation						
Common name	0947 - 1007	1038 - 1046	1024 - 1052	1009 - 1035	0920 - 0939	1027 - 1059	1010 - 1036
Mourning Dove					1		
Turkey Vulture			2				

Downy Woodpecker			1				
Blue Jay	1	2	2	2	1	3	2
American Crow		1	5		1		
Golden crowned kinglet						1	
Black-capped Chickadee	2	1	1	4	4	3	4
Red-breasted Nuthatch	2				1	1	1
Brown Creeper			1				
Eastern Bluebird					1		
American Robin			1		1		
American Goldfinch	1		2		1		2
White-throated Sparrow			5	7			2
Junco				3			4
Palm Warbler						6	

Appendix III. Other animal species encountered during bird surveys

Mammals:

Possum
White tailed deer
Porcupine
Red squirrel

Herptiles:

Snapping turtle (egg laying in archeology pit near the kayak launch)
American toad
Grey tree frog

Odonates:

Black mantled glider
Widow skimmer
Common whitetail skimmer
12 spot skimmer