



Bird Monitoring Report, 2019—Mattawoman Creek IBA

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Mattawoman Creek Important Bird Area (IBA) is a site of statewide importance for bird conservation. It was designated as an IBA in 2009 using Data from the 2nd Breeding Bird Atlas of Maryland and DC (Ellison 2010) and Bird Blitz surveys conducted by Audubon in 2009. These surveys demonstrated that the site qualifies for IBA designation based on both the bird species at risk criterion and the species assemblage criterion¹. Along with containing significant numbers of at-risk species—including Prothonotary Warbler, Wood Thrush, and Kentucky Warbler—the site supports one of the most diverse assemblages of Forest Interior Dwelling Species (FIDS; CAC 2001) in Maryland’s Coastal Plain, with 20 out of 24 potentially occurring species breeding regularly². The site mostly consists of deciduous woodland, though it also includes some areas of forested wetland, which support at-risk floodplain specialists including Prothonotary Warbler and Louisiana Waterthrush.

In 2017, Audubon Maryland-DC (Audubon) and Maryland Bird Conservation Partnership (MBCP) implemented a program of bird monitoring at several IBAs across Maryland. The goal of the monitoring is to provide managers with data on bird abundance and location and to provide a current baseline against which to measure population trends in the future. In 2018, IBA monitoring at Mattawoman Creek IBA began, conducted along two survey routes chosen to be representative of the two dominant habitat types at the site. Those same points were surveyed again in 2019.

¹ Population thresholds for IBA site selection and the bird species assemblages characteristic of Maryland’s major habitat types are provided in the IBA Criteria for Site Selection, available online at <http://md.audubon.org/conservation/important-bird-areas>.

² A 2016 site account of Mattawoman Creek IBA detailing its ornithological significance and conservation management is online at <http://md.audubon.org/conservation/southern-maryland-important-bird-areas-inform-land-use-planning>

Methods

Surveys were conducted along two routes in the Mattawoman Creek IBA (see Map 1). Seven survey points were in the Mattawoman State Natural Environmental Area (NEA), in a wetland and forested floodplain habitat, and eight survey points were along the Upper Mattawoman Creek (Upper Creek) in an oak-hickory forest between US-301 and Acton Road. In order to reduce the probability that individual birds were counted more than once (from two different points) survey locations were selected using ArcGIS so that a minimum of 300 meters separated points.

Birds were monitored using point count surveys conducted during the height of the bird breeding season between 25 May and 30 June. A volunteer observer was assigned to each route and conducted two surveys of each location at least one week apart (Table 1). Volunteer observers were trained on survey methodology, data recording, and data entry. Observers navigated to survey locations using a georeferenced PDF map with the Avenza app on a smartphone. This eliminated the need to mark survey points with flagging.

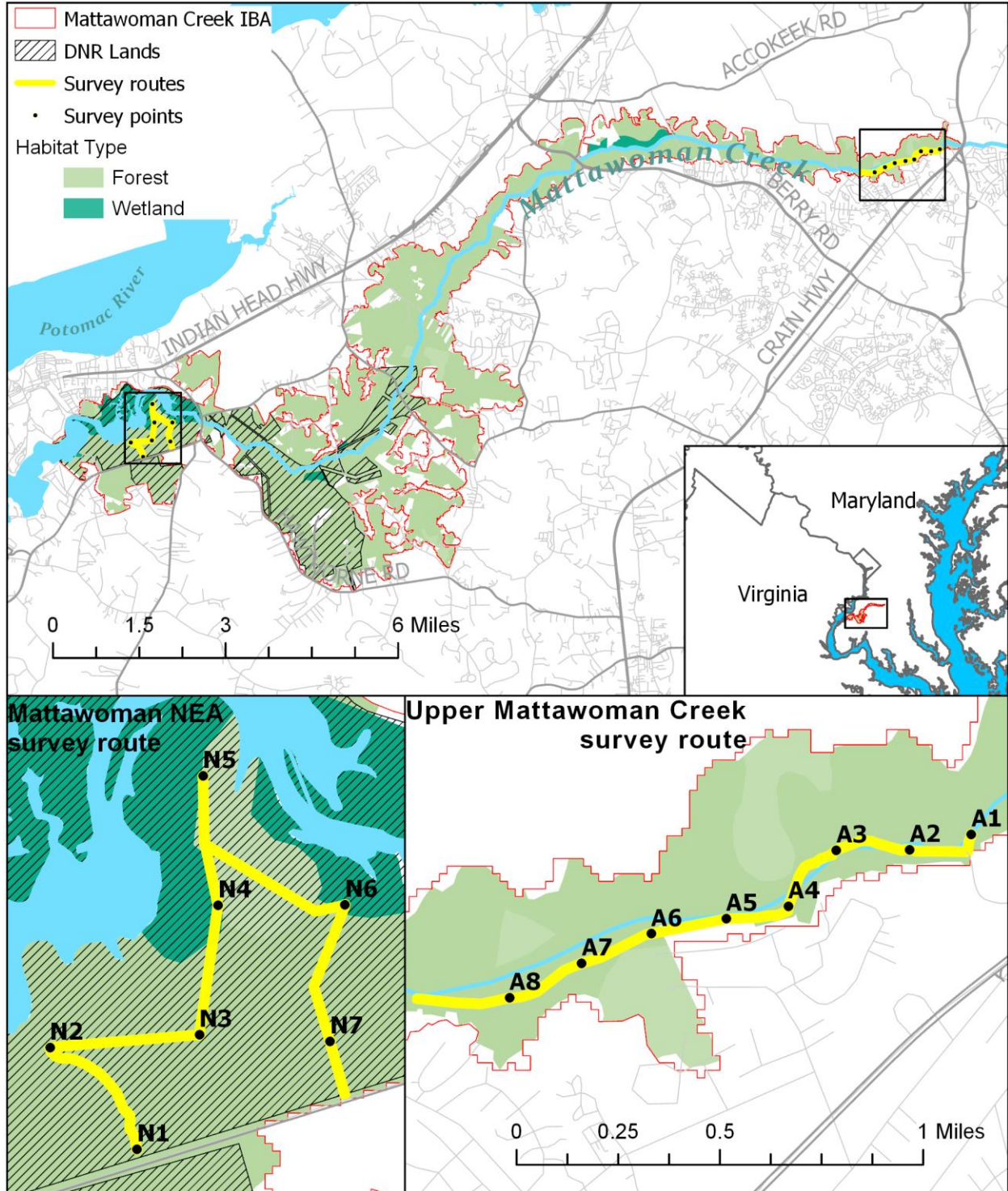
Surveys were completed during the first four hours after sunrise generally between 0600 and 1000 EST. Weather and wind conditions were recorded during each count following the Beaufort scale (for wind) and standard weather codes. Surveys were not conducted during high wind conditions (> 12 mph) or during dense fog, steady drizzle, or prolonged rain. Counts at each survey location were five minutes in duration, with counts split between an initial 3-minute period and the following 2-minute period. The division into two time periods can provide a measure of how detectable each species is within a given timeframe. All birds seen or heard up to an unlimited distance were counted – we did not ask observers to estimate distance to birds because observers generally vary greatly in their ability to do this accurately. Observers also recorded any birds from a short list of priority species which they heard or saw between points or outside of a survey period.

Observers recorded birds during surveys on field datasheets designed by Audubon and MBCP, and, after surveys were completed, entered data into the computer on Excel spreadsheet templates also provided by Audubon and MBCP. MBCP staff and Audubon staff and volunteers combined and summarized the individual datasets submitted by observers.

Table 1. 2019 bird survey routes at Mattawoman Creek IBA.

Route name	Habitat type	# survey points	Observer	Date of visit 1	Date of visit 2
Upper Mattawoman Creek	Deciduous forest	8	Oliver Griffin	06/04/19	06/16/19
Mattawoman NEA	Forested wetland	7	Tom Seaton	05/26/19	06/15/19

Map 1. Mattawoman Creek IBA monitoring. Overview map with inset maps of routes and points surveyed in spring 2019. Scales of the two lower maps are equal. Habitat type derived from Maryland Integrated Map (2016).



2019 Results

A total of 495 detections were made of 47 species at Mattawoman Creek IBA in 2019 (Table 2). Of these detections, 318 (64%) occurred along the Upper Mattawoman Creek survey route (Table 5) and the remaining 177 (36%) occurred on the Mattawoman NEA route (Table 6). Among the 47 species detected, 23 were present on both survey routes, 16 were detected only at the Upper Mattawoman Creek route, and eight were detected only at the Mattawoman NEA route (Table 4). A total of 13 FIDS were detected during the 5-minute counts at the IBA (seven on both routes, two at Upper Mattawoman Creek only, and four at Mattawoman NEA only).

Along the Upper Mattawoman Creek route, FIDS comprised 26.7% of all detections, and at Mattawoman NEA, FIDS comprised 42.9% of all detections.

Among the 13 FIDS detected at Mattawoman Creek IBA, nine are listed as Species of Greatest Conservation Need (SGCN) in Maryland's State Wildlife Action Plan (Table 4). Nine FIDS were detected in the Upper Mattawoman Creek and 10 in the NEA. Two additional SGCNs which are not FIDS were also detected: Chimney Swift and Great Blue Heron. At the Mattawoman NEA route, of the five most common species (Wood Thrush, Acadian Flycatcher, Red-bellied Woodpecker, Eastern Wood-Pewee, Carolina Wren/Tufted Titmouse), two are FIDS (Wood Thrush and Acadian Flycatcher). Of the five most common species at the Upper Mattawoman Creek Route (Northern Cardinal, Carolina Wren, Blue-gray Gnatcatcher, Red-eyed Vireo, Acadian Flycatcher), two (Red-Eyed Vireo and Acadian Flycatcher) are FIDS.

Table 2. Total detections at Mattawoman Creek IBA survey locations for 2019. Data for Upper Creek (16 total counts) and Mattawoman NEA (14 total counts). **FIDS** are in bold, and Species of Greatest Conservation Need are indicated by *. The **Mean** represents a species' relative abundance for each 5-minute count (Total detections / total counts). Mean of P indicates that the species was only detected between survey points or outside the survey period. Population trend shown for species that are FIDS or SGCN (PIF 2019).

Species	Habitat Specialist	Upper Creek		NEA		IBA (Both Sites)	
		Total	Mean	Total	Mean	Total	Mean
Acadian Flycatcher*	FIDS	23	1.44	17	1.21	40	1.33
American Crow		22	1.38			22	0.73
American Goldfinch		6	0.38			6	0.20
Belted Kingfisher		2	0.13			2	0.07
Black-and-white Warbler*	FIDS			2	0.14	2	0.07
Blue Jay				5	0.36	5	0.17
Blue-gray Gnatcatcher		24	1.50	10	0.71	34	1.13
Brown-headed Cowbird		1	0.06	2	0.14	3	0.10
Canada Goose		1	0.06	2	0.14	3	0.10
Carolina Chickadee		13	0.81	2	0.14	15	0.50
Carolina Wren		27	1.69	11	0.79	38	1.27
Chimney Swift*		4	0.25			4	0.13

Species	Habitat Specialist	Upper Creek		NEA		IBA (Both Sites)	
		Total	Mean	Total	Mean	Total	Mean
Common Grackle		3	0.19	2	0.14	5	0.17
Common Yellowthroat		8	0.50			8	0.27
Downy Woodpecker		9	0.56	2	0.14	11	0.37
Eastern Bluebird		7	0.44			7	0.23
Eastern Phoebe		1	0.06			1	0.03
Eastern Wood-Pewee		6	0.38	12	0.86	18	0.60
European Starling		1	0.06			1	0.03
Fish Crow		4	0.25			4	0.13
Gray Catbird		3	0.19			3	0.10
Great Blue Heron*		1	0.06			1	0.03
Great Crested Flycatcher		3	0.19	4	0.29	7	0.23
Green Heron		3	0.19			3	0.10
Hairy Woodpecker	FIDS	1	0.06			2	0.07
Indigo Bunting		4	0.25	1	0.07	7	0.23
Louisiana Waterthrush*	FIDS			3	0.21	3	0.10
Mallard		2	0.13	3	0.21	2	0.07
Mourning Dove				3	0.21	3	0.10
Northern Cardinal		33	2.06	5	0.36	38	1.27
Northern Parula*	FIDS	14	0.88	8	0.57	22	0.73
Ovenbird*	FIDS			4	0.29	4	0.13
Pileated Woodpecker	FIDS	3	0.19	6	0.43	9	0.30
Pine Warbler				1	0.07	1	0.03
Prothonotary Warbler*	FIDS	5	0.31			5	0.17
Red-bellied Woodpecker		14	0.88	14	1.00	28	0.93
Red-eyed Vireo	FIDS	24	1.50	9	0.64	33	1.10
Red-shouldered Hawk	FIDS	10	0.63			10	0.33
Red-winged Blackbird		1	0.06	3	0.21	4	0.13
Scarlet Tanager*	FIDS	3	0.19	4	0.29	7	0.23
Tufted Titmouse		17	1.06	11	0.79	28	0.93
White-breasted Nuthatch		1	0.06	6	0.43	7	0.23
White-eyed Vireo	SHRUB	5	0.31			5	0.17
Wood Duck				1	0.07	1	0.03
Wood Thrush*	FIDS	2	0.13	20	1.43	22	0.73
Yellow-billed Cuckoo		7	0.44	2	0.14	9	0.30
Yellow-throated Vireo*	FIDS			2	0.14	2	0.07
TOTALS		318	19.88	177	12.64	495	16.50
<i># Species</i>		39		31		47	
FIDS TOTALS		85	5.3125	75	5.3571	85	5.31
<i># FIDS Species</i>		9		10		9	

Table 3. Number of Species, FIDS, and Species of Greatest Conservation Need (SGCN) detected at Mattawoman Creek IBA survey locations for 2019.

# Species	ALL SPECIES	FIDS	SGCN	FIDS & SGCN
Total	47	13	11	9
Upper Creek ONLY	16	2	3	1
NEA ONLY	8	4	4	4
BOTH SITES	23	7	4	4

Table 4. Number of FIDS detected at Mattawoman Creek IBA survey locations for 2019. Species of Greatest Conservation Need (SGCN) are shown with “*”.

Species		Upper Creek		NEA		IBA (Both Sites)	
		Total	Mean	Total	Mean	Total	Mean
Acadian Flycatcher*	FIDS	23	1.44	17	1.21	40	1.33
Black-and-white Warbler*	FIDS			2	0.14	2	0.07
Hairy Woodpecker	FIDS	1	0.06			1	0.03
Louisiana Waterthrush*	FIDS			3	0.21	3	0.10
Northern Parula*	FIDS	14	0.88	8	0.57	22	0.73
Ovenbird*	FIDS			4	0.29	4	0.13
Pileated Woodpecker	FIDS	3	0.19	6	0.43	9	0.30
Prothonotary Warbler*	FIDS	5	0.31			5	0.17
Red-eyed Vireo	FIDS	24	1.50	9	0.64	33	1.10
Red-shouldered Hawk	FIDS	10	0.63			10	0.33
Scarlet Tanager*	FIDS	3	0.19	4	0.29	7	0.23
Wood Thrush*	FIDS	2	0.13	20	1.43	22	0.73
Yellow-throated Vireo*	FIDS			2	0.14	2	0.07
FIDS TOTALS		85	5.31	75	5.36	160	5.33
<i># FIDS Species</i>		9		10		13	
SGCN TOTALS		47	2.94	60	4.29	107	3.62
<i># SGCN Species</i>		5		8		9	

Discussion

The monitoring data collected during 2019 highlights the value of the Mattawoman Creek IBA to forest birds and can inform the conservation management of the IBA with respect to forest birds in several ways:

1. The data provide a baseline against which future bird survey data can be compared to examine population trends.
2. The data from this and future surveys can be compared to the 2018 survey to gain insights into recent trends in the species composition of the bird assemblage at the site.
3. The data provide an indicator of habitat quality at this site relative to other sites in the region (Coastal Plain).
4. Examination of the spatial distribution of the occurrence of certain species across the site may provide information useful for making habitat management decisions.

Overall, the two survey routes (Upper Creek and NEA) had a similar number of FIDS detections per survey point. Seven FIDS were detected at both survey routes (Table 3) and only one species classified as a habitat specialist other than forest interior (Shrub) was detected (White-eyed Vireo). FIDS made up a higher proportion of detections at the Mattawoman NEA (43%) than the Upper Mattawoman Creek route (27%). More than half of Maryland's forest interior dwelling birds (FIDS) were detected in 2019 (13 of 20), and four of the top 10 most numerous species FIDS.

The total number of detections increased from 438 to 495 (13%) from 2018 to 2019. The species assemblages detected on the two survey routes had some differences, and the number of species detected increased from 46 to 47. Thirteen FIDS species were detected each year. The mean of FIDS detected at each survey point at each site was similar was lower in 2019 (27.7%) than 2018 (32.6%), but the mean detections of FIDS per survey point was higher in 2019 (5.4) than 2018 (4.3). A Spearman Rank correlation test showed that the assemblage of FIDS species in 2018 and 2019 were strongly ($\rho=0.897$) and significantly ($p=0.00001$) correlated, indicating no major change in the FIDS community.

The Upper Creek site abuts a rapidly growing area to the immediate south (Charles County), with the distance to housing subdivisions anywhere from 50 to 150 meters away (Map 3). The Prince George's County portion to the north has contiguous forest for 200 to 600 meters from every survey point. Wood Thrush were detected at only two points (one at each point) along the Upper Creek, and both were on the north side (Oliver Griffin, personal communication). There were 16 species detected only at Upper Creek, but only two of those were FIDS and three were SGCN (one species was both; Table 4). The NEA site is within a forested block of at least 1,500 acres (Map 3). The closest development is approximately 300 meters and across Mattawoman Creek from point 5. Of the eight species detected only at NEA, four were both FIDS and SGCN (Table 4). At NEA, a total of 20 Wood Thrush were detected at six of the seven points (average of 3.3 detected per point).

The North American avifauna population has declined by 2.9 billion birds since 1970 (Rosenberg et al. 2019). Included in these declines are birds breeding in Eastern Forests (-17%),

aerial insectivores (-32%), and long-distance migrants (-28%). A total of 11 species detected during 2018 and/or 2019 are both FIDS and Species of Greatest Conservation Need (SGCN). Of these, seven have experienced population declines of 7% to 60% (Table 8). Maryland has > 1% of the world's population of three of these (plus two other FIDS). The NEA is especially valuable for Wood Thrush, with a mean of 1.2 detections per survey point. Acadian Flycatcher was found at 13 of the 15 total IBA survey points both years, and at the other two one of the years. It has declined 10% since 1970 and the Coastal Plain has an estimated 2.3% of the world's population.

Finally, the data collected in 2019 at Mattawoman Creek will be a useful baseline to compare to future monitoring efforts by Audubon Maryland-DC and the Maryland Bird Conservation Partnership. More reliable estimates of trends in abundance and richness may be made possible by replicating surveys at the same routes and points in future breeding seasons at this and other Maryland IBAs. The Upper Creek site will be evaluated for the benefits of continued monitoring and other potential locations will be investigated.

Acknowledgements

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Table x. Total detections and mean relative abundances at Mattawoman Creek IBA 2018 and 2019.

Species	Habitat Specialist	2018		2019		Both	
		Total	Mean	Total	Mean	Total	Mean
Acadian Flycatcher*	FIDS	27	0.90	40	1.33	67	2.23
American Crow		18	0.60	22	0.73	40	1.33
American Goldfinch		14	0.47	6	0.20	20	0.67
American Redstart*	FIDS	1	0.03			1	0.03
Barred Owl	FIDS	1	0.03			1	0.03
Belted Kingfisher				2	0.07	2	0.07
Black-and-white Warbler*	FIDS	1	0.03	2	0.07	3	0.10
Blue Jay		5	0.17	5	0.17	10	0.33
Blue-gray Gnatcatcher		22	0.73	34	1.13	56	1.87
Brown-headed Cowbird		6	0.20	3	0.10	9	0.30
Canada Goose		1	0.03	3	0.10	4	0.13
Carolina Chickadee		12	0.40	15	0.50	27	0.90
Carolina Wren		35	1.17	38	1.27	73	2.43
Chimney Swift*		1	0.03	4	0.13	5	0.17
Common Grackle		4	0.13	5	0.17	9	0.30
Common Yellowthroat		2	0.07	8	0.27	10	0.33
Downy Woodpecker		10	0.33	11	0.37	21	0.70
Eastern Bluebird				7	0.23	7	0.23
Eastern Phoebe				1	0.03	1	0.03
Eastern Towhee	SHRUB	1	0.03			1	0.03
Eastern Wood-Pewee		17	0.57	18	0.60	35	1.17
European Starling				1	0.03	1	0.03
Fish Crow				4	0.13	4	0.13
Gray Catbird		1	0.03	3	0.10	4	0.13
Great Blue Heron*		1	0.03	1	0.03	2	0.07
Great Crested Flycatcher		10	0.33	7	0.23	17	0.57
Green Heron				3	0.10	3	0.10
Hairy Woodpecker	FIDS			2	0.07	2	0.07
Indigo Bunting		4	0.13	7	0.23	11	0.37
Kentucky Warbler*	FIDS	2	0.07			2	0.07
Louisiana Waterthrush*	FIDS	1	0.03	3	0.10	4	0.13
Mallard				2	0.07	2	0.07
Mourning Dove		7	0.23	3	0.10	10	0.33
Northern Cardinal		37	1.23	38	1.27	75	2.50
northern flicker		1	0.03			1	0.03
Northern Mockingbird		1	0.03			1	0.03
Northern Parula*	FIDS	17	0.57	22	0.73	39	1.30
Ovenbird*	FIDS	9	0.30	4	0.13	13	0.43
Pileated Woodpecker	FIDS	9	0.30	9	0.30	18	0.60
Pine Warbler		2	0.07	1	0.03	3	0.10

Species	Habitat Specialist	2018		2019		Both	
		Total	Mean	Total	Mean	Total	Mean
Prothonotary Warbler*	FIDS	2	0.07	5	0.17	7	0.23
Red-bellied Woodpecker		23	0.77	28	0.93	51	1.70
Red-eyed Vireo	FIDS	34	1.13	33	1.10	67	2.23
Red-shouldered Hawk	FIDS	2	0.07	10	0.33	12	0.40
Red-winged Blackbird		5	0.17	4	0.13	9	0.30
Scarlet Tanager*	FIDS	8	0.27	7	0.23	15	0.50
Summer Tanager		3	0.10			3	0.10
Tufted Titmouse		36	1.20	28	0.93	64	2.13
White-breasted Nuthatch		8	0.27	7	0.23	15	0.50
White-eyed Vireo	SHRUB	14	0.47	5	0.17	19	0.63
Wood Duck				1	0.03	1	0.03
Wood Thrush*	FIDS	14	0.47	22	0.73	36	1.20
Yellow-billed Cuckoo		6	0.20	9	0.30	15	0.50
Yellow-throated Vireo*	FIDS	1	0.03	2	0.07	3	0.10
Yellow-throated Warbler		2	0.07			2	0.07
TOTALS		438	14.60	495	16.50	933	31.10
<i># Species</i>		<i>46</i>		<i>47</i>		<i>55</i>	
FIDS TOTALS		129	4.30	161	5.37	290	9.67
<i># FIDS Species</i>		<i>15</i>		<i>13</i>		<i>16</i>	
SGCN TOTALS		85	2.83	112	3.73	197	6.57
<i># SGCN Species</i>		<i>13</i>		<i>11</i>		<i>13</i>	

Table 5. Total detections and mean relative abundances at Upper Creek survey locations for 2018 and 2019. Eight points were each surveyed twice in May-June in both 2018 and 2019, (16 counts each year; 32 total counts). FIDS species are shown in bold, and Species of Greatest Conservation Need are indicated by *. The **Mean** represents a species' relative abundance. A mean detection of P indicates that the species was only detected between survey points or outside the survey period.

Species	Habitat Specialist	2018		2019		2-year Totals	
		Total	Mean	Total	Mean	Total	Mean
Acadian Flycatcher*	FIDS	18	1.13	23	1.44	41	1.28
American Crow		17	1.06	22	1.38	39	1.22
American Goldfinch		14	0.88	6	0.38	20	0.63
Barred Owl	FIDS	1	0.06			1	0.03
Belted Kingfisher				2	0.13	2	0.06
Black-and-white Warbler*	FIDS	1	0.06			1	0.03
Blue Jay		2	0.13			2	0.06
Blue-gray Gnatcatcher		18	1.13	24	1.50	42	1.31
Brown-headed Cowbird		6	0.38	1	0.06	7	0.22
Canada Goose				1	0.06	1	0.03
Carolina Chickadee		12	0.75	13	0.81	25	0.78
Carolina Wren		29	1.81	27	1.69	56	1.75
Chimney Swift*		1	0.06	4	0.25	5	0.16
Common Grackle		3	0.19	3	0.19	6	0.19
Common Yellowthroat		2	0.13	8	0.50	10	0.31
Downy Woodpecker		10	0.63	9	0.56	19	0.59
Eastern Bluebird				7	0.44	7	0.22
Eastern Phoebe				1	0.06	1	0.03
Eastern Towhee	SHRUB	1	0.06			1	0.03
Eastern Wood-Pewee		2	0.13	6	0.38	8	0.25
European Starling				1	0.06	1	0.03
Fish Crow				4	0.25	4	0.13
Gray Catbird		1	0.06	3	0.19	4	0.13
Great Blue Heron*				1	0.06	1	0.03
Great Crested Flycatcher		7	0.44	3	0.19	10	0.31
Green Heron				3	0.19	3	0.09
Hairy Woodpecker	FIDS			1	0.06	1	0.03
Hooded Warbler*	FIDS		P				
Indigo Bunting		4	0.25	4	0.25	8	0.25
Kentucky Warbler*	FIDS	2	0.13			2	0.06
Louisiana Waterthrush*	FIDS	1	0.06			1	0.03
Mallard				2	0.13	2	0.06
Northern Cardinal		29	1.81	33	2.06	62	1.94
Northern Mockingbird		1	0.06			1	0.03
Northern Parula*	FIDS	10	0.63	14	0.88	24	0.75
Pileated Woodpecker	FIDS	4	0.25	3	0.19	7	0.22
Prothonotary Warbler*	FIDS	1	0.06	5	0.31	6	0.19

Species	Habitat Specialist	2018		2019		2-year Totals	
		Total	Mean	Total	Mean	Total	Mean
Red-bellied Woodpecker		14	0.88	14	0.88	28	0.88
Red-eyed Vireo	FIDS	22	1.38	24	1.50	46	1.44
Red-shouldered Hawk	FIDS	2	0.13	10	0.63	12	0.38
Red-winged Blackbird		3	0.19	1	0.06	4	0.13
Scarlet Tanager*	FIDS	1	0.06	3	0.19	4	0.13
Summer Tanager		2	0.13			2	0.06
Tufted Titmouse		25	1.56	17	1.06	42	1.31
White-breasted Nuthatch		1	0.06	1	0.06	2	0.06
White-eyed Vireo	SHRUB	14	0.88	5	0.31	19	0.59
Wood Thrush*	FIDS		P	2	0.13	2	0.06
Yellow-billed Cuckoo		4	0.25	7	0.44	11	0.34
TOTALS		285	17.81	318	19.88	603	18.81
<i># Species</i>		<i>36</i>		<i>39</i>		<i>47</i>	
FIDS TOTALS		63	3.94	85	5.31	148	4.63
<i># Species</i>		<i>11</i>		<i>9</i>		<i>13</i>	
Proportion FIDS		22.1%		26.7%		24.5%	
<i>Proportion FIDS Species</i>		<i>30.6%</i>		<i>23.1%</i>		<i>27.7%</i>	

Table 6. Total detections and mean relative abundances at NEA survey locations for 2018 and 2019. Seven points were each surveyed twice in May-June in both 2018 and 2019 (14 counts each year; 28 total counts). FIDS species are shown in bold, and Species of Greatest Conservation Need are indicated by *. The **Mean** represents a species' relative abundance. A mean detection of P indicates that the species was only detected between survey points or outside the survey period.

SPECIES	Habitat Specialist	2018		2019		2-year Totals	
		Total	Mean	Total	Mean	Total	Mean
Acadian Flycatcher*	FIDS	9	0.64	17	1.21	26	0.93
American Crow		1	0.07			1	0.04
American Redstart*	FIDS	1	0.07			1	0.04
Black-and-white Warbler*	FIDS			2	0.14	2	0.07
Blue Jay		3	0.21	5	0.36	8	0.29
Blue-gray Gnatcatcher		4	0.29	10	0.71	14	0.50
Brown-headed Cowbird				2	0.14	2	0.07
Canada Goose		1	0.07	2	0.14	3	0.11
Carolina Chickadee				2	0.14	2	0.07
Carolina Wren		6	0.43	11	0.79	17	0.61
Common Grackle		1	0.07	2	0.14	3	0.11
Downy Woodpecker				2	0.14	2	0.07
Eastern Wood-Pewee		15	1.07	12	0.86	27	0.96
Great Blue Heron*		1	0.07			1	0.04
Great Crested Flycatcher		3	0.21	4	0.29	7	0.25
Hairy Woodpecker	FIDS			1	0.07	1	0.04
Hooded Warbler*	FIDS		P				P
Indigo Bunting				3	0.21	3	0.11
Kentucky Warbler*	FIDS		P				P
Louisiana Waterthrush*	FIDS		P	3	0.21	3	0.11
Mourning Dove		7	0.50	3	0.21	10	0.36
Northern Cardinal		8	0.57	5	0.36	13	0.46
Northern Flicker		1	0.07			1	0.04
Northern Parula*	FIDS	7	0.50	8	0.57	15	0.54
Ovenbird*	FIDS	9	0.64	4	0.29	13	0.46
Pileated Woodpecker	FIDS	5	0.36	6	0.43	11	0.39
Pine Warbler		2	0.14	1	0.07	3	0.11
Prothonotary Warbler*	FIDS	1	0.07		P	1	0.04
Red-bellied Woodpecker		9	0.64	14	1.00	23	0.82
Red-eyed Vireo	FIDS	12	0.86	9	0.64	21	0.75
Red-headed Woodpecker*			P				P
Red-winged Blackbird		2	0.14	3	0.21	5	0.18
Scarlet Tanager*	FIDS	7	0.50	4	0.29	11	0.39
Summer Tanager		1	0.07		P	1	0.04
Tufted Titmouse		11	0.79	11	0.79	22	0.79
White-breasted Nuthatch		7	0.50	6	0.43	13	0.46
Wood Duck				1	0.07	1	0.04

SPECIES	Habitat Specialist	2018		2019		2-year Totals	
		Total	Mean	Total	Mean	Total	Mean
Wood Thrush*	FIDS	14	1.00	20	1.43	34	1.21
Worm-eating Warbler*	FIDS		P				P
Yellow-billed Cuckoo		2	0.14	2	0.14	4	0.14
Yellow-throated Vireo*	FIDS	1	0.07	2	0.14	3	0.11
Yellow-throated Warbler		2	0.14			2	0.07
TOTALS		153	10.93	177	12.64	330	11.79
<i># Species</i>		30		31		38	
FIDS TOTALS		66	5.43	76	5.43	142	5.07
<i># FIDS Species</i>		10		11		13	
Proportion FIDS Totals		43.1%		42.9%		43.0%	
<i>Proportion FIDS Species</i>		33.3%		35.5%		34.2%	
<i>FIDS between points only</i>		4		1		3	

Table 7. Abundance ranks for FIDS at Mattawoman Creek IBA.

Species	Abundance rank 2018	Abundance rank 2019	Mean of 2018 and 2019	Rank Change 2018-2019
Red-eyed Vireo	1	2	1.5	-1
Acadian Flycatcher	2	1	1.5	+1
Northern Parula	3	3.5	3.25	-0.5
Wood Thrush	4	3.5	3.75	+0.5
Pileated Woodpecker	5.5	6	5.75	-0.5
Ovenbird	5.5	9	7.25	-3.5
Scarlet Tanager	7	7	7	--
Red-shouldered Hawk	9	5	7	+4
Prothonotary Warbler	9	8	8.5	+1
Kentucky Warbler	9	15	12	-6
Louisiana Waterthrush	13	10	11.5	+3
Black-and-white Warbler	13	12	12.5	+1
Yellow-throated Vireo	13	12	12.5	+1
American Redstart	13	15	14	-2
Barred Owl	13	15	14	-2
Hairy Woodpecker	16	12	14	+4

Table 8. Total detections at Mattawoman Creek IBA survey locations for 2018 and 2019 combined. FIDS species are shown in bold, and Species of Greatest Conservation Need are indicated by *. **Mean** is a species' relative abundance. FIDS species are shown in bold, and Species of Greatest Conservation Need are indicated by *. A mean detection of P indicates that the species was only detected between survey points or outside the survey period.

Species	Habitat Specialist	Upper Creek		NEA		Both Sites		Pop Trend
		Total	Mean	Total	Mean	Total	Mean	
Acadian Flycatcher*	FIDS	41	1.28	26	0.93	67	1.12	-10%
American Crow		39	1.22	1	0.04	40	0.67	
American Goldfinch		20	0.63			20	0.33	
American Redstart*	FIDS			1	0.04	1	0.02	-12%
Barred Owl	FIDS	1	0.03			1	0.02	99%
Belted Kingfisher		2	0.06			2	0.03	
Black-and-white Warbler*	FIDS	1	0.03	2	0.07	3	0.05	-27%
Blue Jay		2	0.06	8	0.29	10	0.17	
Blue-gray Gnatcatcher		42	1.31	14	0.50	56	0.93	
Brown-headed Cowbird		7	0.22	2	0.07	9	0.15	
Canada Goose		1	0.03	3	0.11	4	0.07	
Carolina Chickadee		25	0.78	2	0.07	27	0.45	
Carolina Wren		56	1.75	17	0.61	73	1.22	
Chimney Swift*		5	0.16			5	0.08	-67%
Common Grackle		6	0.19	3	0.11	9	0.15	
Common Yellowthroat		10	0.31			10	0.17	
Downy Woodpecker		19	0.59	2	0.07	21	0.35	
Eastern Bluebird		7	0.22			7	0.12	
Eastern Phoebe		1	0.03			1	0.02	
Eastern Towhee	SHRUB	1	0.03			1	0.02	
Eastern Wood-Pewee		8	0.25	27	0.96	35	0.58	
European Starling		1	0.03			1	0.02	
Fish Crow		4	0.13			4	0.07	
Gray Catbird		4	0.13			4	0.07	
Great Blue Heron*		1	0.03	1	0.04	2	0.03	?
Great Crested Flycatcher		10	0.31	7	0.25	17	0.28	
Green Heron		3	0.09			3	0.05	
Hairy Woodpecker	FIDS	1	0.03	1	0.04	2	0.03	54%
Hooded Warbler*	FIDS		P		P		P	103%
Indigo Bunting		8	0.25	3	0.11	11	0.18	
Kentucky Warbler*	FIDS	2	0.06		P	2	0.03	-29%
Louisiana Waterthrush*	FIDS	1	0.03	3	0.11	4	0.07	34%
Mallard		2	0.06			2	0.03	
Mourning Dove				10	0.36	10	0.17	
Northern Cardinal		62	1.94	13	0.46	75	1.25	
Northern Flicker				1	0.04	1	0.02	

Species	Habitat Specialist	Upper Creek		NEA		Both Sites		Pop Trend
		Total	Mean	Total	Mean	Total	Mean	
Northern Mockingbird		1	0.03			1	0.02	
Northern Parula*	FIDS	24	0.75	15	0.54	39	0.65	62%
Ovenbird*	FIDS			13	0.46	13	0.22	0%
Pileated Woodpecker	FIDS	7	0.22	11	0.39	18	0.30	87%
Pine Warbler				3	0.11	3	0.05	
Prothonotary Warbler*	FIDS	6	0.19	1	0.04	7	0.12	-38%
Red-bellied Woodpecker		28	0.88	23	0.82	51	0.85	
Red-eyed Vireo	FIDS	46	1.44	21	0.75	67	1.12	43%
<i>Red-headed Woodpecker</i>			<i>P</i>				<i>P</i>	
Red-shouldered Hawk	FIDS	12	0.38			12	0.20	>200%
Red-winged Blackbird		4	0.13	5	0.18	9	0.15	
Scarlet Tanager*	FIDS	4	0.13	11	0.39	15	0.25	-7%
Summer Tanager		2	0.06	1	0.04	3	0.05	
Tufted Titmouse		42	1.31	22	0.79	64	1.07	
White-breasted Nuthatch		2	0.06	13	0.46	15	0.25	
White-eyed Vireo	SHRUB	19	0.59			19	0.32	
Wood Duck				1	0.04	1	0.02	
Wood Thrush*	FIDS	2	0.06	34	1.21	36	0.60	-60%
<i>Worm-eating Warbler*</i>	<i>FIDS</i>		<i>P</i>				<i>P</i>	26%
Yellow-billed Cuckoo		11	0.34	4	0.14	15	0.25	
Yellow-throated Vireo*	FIDS			3	0.11	3	0.05	62%
Yellow-throated Warbler				2	0.07	2	0.03	
TOTALS		603	10.93	330	12.64	933	15.55	Pop Trend <0
<i># Species</i>		47		38		55		
FIDS TOTALS		148	4.63	142	5.07	290	4.83	7
<i># FIDS Species</i>		13		13		16		
Proportion FIDS		24.5%		43.0%		31.1%		
<i>Proportion FIDS Species</i>		27.7%		34.2%		29.1%		
SGCN TOTALS		87	2.72	110	3.93	197	3.28	8
<i># SGCN Species</i>		10		11		13		
Proportion SGCN		14.4%		33.3%		21.1%		
<i>Proportion SGCN Species</i>		21.3%		28.9%		23.6%		
<i># FIDS and SGCN</i>		8		10		11		7
<i>FIDS between points only</i>		2		2		2		

Table 9. Number of Species and FIDS detected at Mattawoman Creek IBA survey locations for 2018 and 2019. “Incidental” means species that were ONLY detected between survey points or outside the survey period.

# Species	During Survey		Incidental	
	<u>ALL</u>	<u>FIDS</u>	<u>ALL</u>	<u>FIDS</u>
Total	55	16	3	2
Upper Creek ONLY	8	3	--	--
NEA ONLY	9	1	2	1
BOTH SITES	38	12	1	1

Table 10. Top 10 most detected species for the Mattawoman Creek IBA. The combined scores for Upper Creek and NEA sites are shown in "IBA". **FIDS** are shown in bold. "*" designates a Species of Greatest Conservation Need.

Upper Creek 2018	#
Carolina Wren	29
Northern Cardinal	29
Tufted Titmouse	25
Red-eyed Vireo	22
Acadian Flycatcher*	18
Blue-gray Gnatcatcher	18
American Crow	17
American Goldfinch	14
Red-bellied Woodpecker	14
White-eyed Vireo	14

Upper Creek 2019	#
Northern Cardinal	33
Carolina Wren	27
Blue-gray Gnatcatcher	24
Red-eyed Vireo	24
Acadian Flycatcher*	23
American Crow	22
Tufted Titmouse	17
Northern Parula*	14
Red-bellied Woodpecker	14
Carolina Chickadee	13

Upper Ck 2018 & 2019	#
Northern Cardinal	62
Carolina Wren	56
Red-eyed Vireo	46
Blue-gray Gnatcatcher	42
Tufted Titmouse	42
Acadian Flycatcher*	41
American Crow	39
Red-bellied Woodpecker	28
Carolina Chickadee	25
Northern Parula*	24

NEA 2018	#
Eastern Wood-Pewee	15
Wood Thrush*	14
Red-eyed Vireo	12
Tufted Titmouse	11
Acadian Flycatcher*	9
Ovenbird*	9
Red-bellied Woodpecker	9
Northern Cardinal	8
Mourning Dove	7
Northern Parula*	7

NEA 2019	#
Wood Thrush*	20
Acadian Flycatcher*	17
Red-bellied Woodpecker	14
Eastern Wood-Pewee	12
Carolina Wren	11
Tufted Titmouse	11
Blue-gray Gnatcatcher	10
Red-eyed Vireo	9
Northern Parula*	8
Pileated Woodpecker	6

NEA 2018 & 2019	#
Wood Thrush*	34
Eastern Wood-Pewee	27
Acadian Flycatcher*	26
Red-bellied Woodpecker	23
Tufted Titmouse	22
Red-eyed Vireo	21
Carolina Wren	17
Northern Parula*	15
Blue-gray Gnatcatcher	14
Northern Cardinal	13

IBA 2018	#
Northern Cardinal	37
Tufted Titmouse	36
Carolina Wren	35
Red-eyed Vireo	34
Acadian Flycatcher*	27
Red-bellied Woodpecker	23
Blue-gray Gnatcatcher	22
American Crow	18
Eastern Wood-Pewee	17
Northern Parula*	17

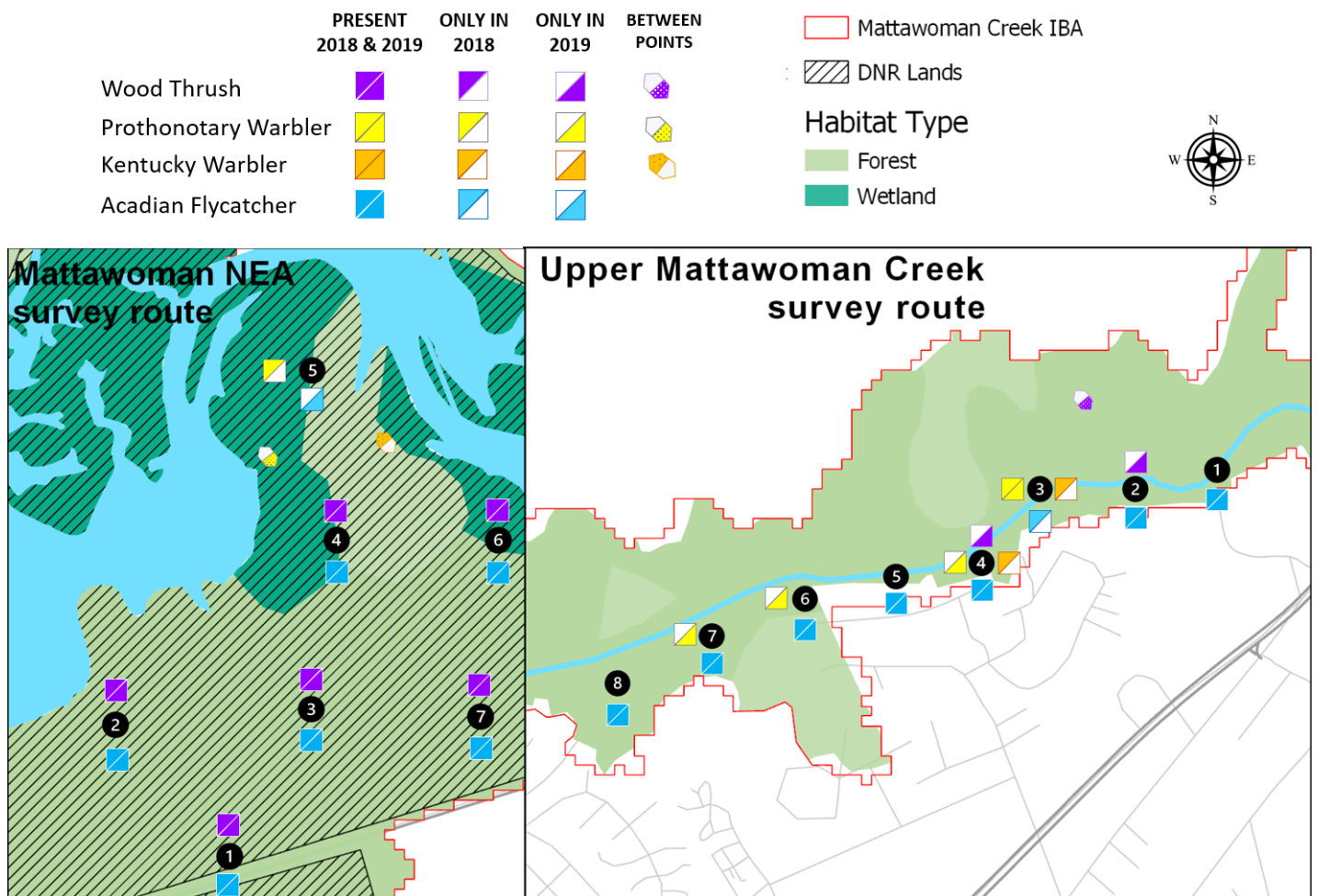
IBA 2019	#
Acadian Flycatcher*	40
Carolina Wren	38
Northern Cardinal	38
Blue-gray Gnatcatcher	34
Red-eyed Vireo	33
Red-bellied Woodpecker	28
Tufted Titmouse	28
American Crow	22
Northern Parula*	22
Wood Thrush*	22

IBA 2018 & 2019	#
Northern Cardinal	75
Carolina Wren	73
Acadian Flycatcher*	67
Red-eyed Vireo	67
Tufted Titmouse	64
Blue-gray Gnatcatcher	56
Red-bellied Woodpecker	51
American Crow	40
Northern Parula*	39
Wood Thrush*	36

Table 11. List of Priority Species. FIDS are shown in bold. Species of Greatest Conservation Need are designated with “*”.

American Redstart*	Cerulean Warbler*	Northern Parula*
Barred Owl	Chuck-will's-widow*	Prairie Warbler*
Black-and-white Warbler*	Common Nighthawk*	Prothonotary Warbler*
Black-billed Cuckoo	Eastern Whip-poor-will*	Red-headed Woodpecker*
Blue-winged Warbler*	Hooded Warbler*	Summer Tanager
Broad-winged Hawk*	Kentucky Warbler*	Wood Thrush*
Brown Creeper*	Louisiana Waterthrush*	Worm-eating Warbler*

Map 2. Location of detections of selected priority species. At least one priority species was detected at every survey location in both years. The three selected priority species (plus Acadian Flycatcher) that are FIDS, SGCN, and have population declines of at least 10%. See Map 1 for spatial extents of maps.



Map 3. Google Maps view of Mattawoman Upper Creek (top) and NEA (bottom) survey areas. The yellow line approximates the survey routes. See Map 1 for spatial extents of maps.

