

`Migrational Survey and Habitat Usage of Shorebirds in the Lake Erie Marsh Region,2016

PROGRESS REPORT-2016 BSBO-16-2

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INTRODUCTION

The importance of studying shorebird migration and stopover habitat needs has greatly increased as wetland habitat acreage dwindles (Helmert 1992, Brown et al. 2001). The loss and degradation of migration and wintering habitat from agriculture and urban development as well as disturbance at feeding and roosting sites are creating additional pressures on these long distance migrants (Helmert 1993).

Shorebirds differ from many other Neotropical migrants because of their narrow habitat requirements. Stopover sites with abundant food sources are needed to acquire lipid reserves for continued migration and to produce eggs once they reach the breeding grounds (Eldridge and Krapu 1993, Helmert 1992). The Lake Erie marshes are the largest inland stopover habitats in the eastern United States between coastal habitats and northern breeding areas. More than 30 species of shorebirds migrate through the Lake Erie marshes each year, but different species as well as different ages within a species appear at different times of the year and choose different microhabitats. Determining habitat uses will allow establishment of management regimes that create the favored habitats, thereby increasing the value of the marsh systems to shorebirds (Skagen and Knopf 1993). Improved management of spring and fall stopover sites can increase summer reproductive success and survivorship of fledglings (Knauer 1977, Taylor 1977).

The Black Swamp Bird Observatory (BSBO) has been monitoring shorebird migration in the Lake Erie Marsh region since 1992, and was successful in acquiring Regional Site status under the Western Shorebird Hemispheric Reserve Network in September 2000. Additional data collection and analyses are needed to seek International Site status. This designation recognizes the importance of the region to shorebirds and has direct impact in assisting restoration and management projects in highly competitive granting processes. Continued data collection will also help to refine our knowledge of the specific habitat needs of migrating shorebird species and guide management efforts.

MATERIALS AND METHODS

Units of the Ottawa National Wildlife Refuge (NWR) complex and wetlands of the Lake Erie

marsh region from south of Detroit, Michigan to Huron, Ohio were surveyed by vehicle or on foot from spring migration (01 March 2016) through fall (23 November 2016). Shorebirds were censused utilizing the International Shorebird Survey protocol (date, location, time observer, water depth, and disturbance) (Manomet 2010) plus additional information on individual management units and habitat conditions. Additional data was gleaned from the eBird Database (eBird 2016) where a complete count was made with adequate location information. Data were compiled by region and marsh unit.

RESULTS AND DISCUSSION

The 2016 field season was the 25th full year of data collection for shorebird migration. Thirty marshes were sampled at least once in the spring and 25 in the fall. The main areas sampled were Ottawa NWR, flooded fields in Ottawa County, Lucas County flooded fields, Magee Marsh Wildlife Area (WA), and Pointe Mouillee State Game Area (SGA). The sampling dates and the total shorebirds counted are shown in Table 1.

Spring Migration

A total of 61,463 birds of 33 species were counted during (Table 2). Lucas County flooded fields, Ottawa NWR, Magee Marsh Wildlife Area (WA), and Pointe Mouillee SGA were the most frequently surveyed wetlands. Heaviest bird concentrations were observed on Pointe Mouillee SGA, Ottawa NWR, Lucas County flooded fields, Pickerel Creek WA, Winous Point MC, and Moxley Marsh WA. Peak activity on these major areas is shown in Table 3. The most abundant species counted and their peak movements were Killdeer (May 1-20), Lesser Yellowlegs (May 1-10), Short-billed Dowitcher (May 11-20), Pectoral Sandpiper (April 11-20), Semipalmated Plover (May 11-20), Black-bellied Plover (May 1-20), Least Sandpiper (May 11-20), Dunlin (May 11-20), American Golden Plover (April 21-30), Greater Yellowlegs (May 11-31), and Semipalmated Sandpiper (May 21-31) (Table 4). Data suggest migration was greater than 2015 and below normal.

Over the timeframe of the study the Pectoral Sandpiper appeared to be the most abundant species of April along with Greater Yellowlegs, Lesser Yellowlegs, and Wilson's Snipe. Dunlin becomes the most abundant shorebird in May, followed by Semipalmated Sandpiper, Semipalmated Plover, and Least Sandpiper.

Spring habitat was predominantly composed of mudflats in Ottawa NWR, Pointe Mouillee SGA, Pickerel Creek WA, Moxley Marsh WA, Winous Point MC, and flooded agriculture fields. Spring drawdowns of control level marshes, to increase smartweed (*Polygonum spp.*) growth for fall migration food, are well timed for species migrating in late April through early May. Drawdowns in late May for millet growth coincided with late spring migrants and some of the early fall migrants in early July. In 2016, the amount of available mudflat habitat created by drawdowns was below average, as most marsh managers chose to hold water on wetlands due to the low water levels of Lake Erie; the exceptions was Pointe Mouillee SGA and Pickerel Creek

Wildlife Area. Overall, 2016 was an above average spring migration for shorebirds in the marsh region. Migration appeared to peak for most species similar to last year. Weather conditions and quick vegetation maturity resulted in little available habitat and caused a presumed rapid movement north of shorebirds.

Fall Migration

Thirty-three species totaling 22,254 birds were recorded (Table 2). Consistently productive areas were Ottawa NWR, Willow Point WA, Moxley Marsh, and Pt. Moulliee SGA. Shorebird habitat management is very challenging during the fall period. Early fall was extremely wet which reflooded drawdown units rapidly. July through September resulted in little shorebird habitat as heavy rains and storms affected management units. Several prime shorebird units were just reaching desired water levels when rains inundated the region. This reduced habitat to small areas throughout the region. Peak activities of major sampled marshes are shown in Table 5. The most abundant species counted and their peak movements were Short-billed Dowitcher (August 21-31), Stilt Sandpiper (August 21-31), Lesser Yellowlegs (July 11-31), Killdeer (July 21-31), Greater Yellowlegs (August 21-31), Semipalmated Sandpiper (August 11-31), Pectoral Sandpiper (Aug. 21-31 - September 1-10), Least Sandpiper (Aug. 21-31), Semipalmated Plover (August 21-31 - September 1-10), Spotted Sandpiper (July 1-10 and 21-31), and Dunlin (August 11-20) (Table 6).

Fall migration is more protracted than spring, running from early July into November. Generally the earliest species to peak are the Short-billed Dowitcher and Least Sandpiper in July. Semipalmated Plover, Lesser Yellowlegs, and Semipalmated Sandpiper peak in August. September peaks are observed in Stilt Sandpiper (hatching year), Pectoral Sandpiper, Killdeer, and adult Long-billed Dowitcher. Hatching year Long-billed Dowitcher and Greater Yellowlegs peaked during early to mid-October, while Dunlin and Sanderling peak in late October and early November. Dunlin numbers were extremely low this fall. These peaks are affected by age composition of the populations passing through the region as well as well timed habitat availability.

Lake levels resulted in fair availability of natural mud flats, especially at Ottawa NWR and Pointe Moulliee SGA for migrating shorebirds in 2016. The loss of natural habitats puts more importance on water level management regimes in managed marsh units. Rainfall timing also resulted in sub-optimal habitat availability for birds as they arrived in the region.

Habitat Use and Management Implications

This study continues to demonstrate the importance of the Lake Erie Marsh region to migrating shorebirds. In 2000, BSBO led a successful application for Western Shorebird Reserve Network status for the Lake Erie Marsh Region. The area now represents one of only two recognized locations in the entire Great Lakes region. This study has also provided valuable information about the timing of shorebird migration and has begun to document habitat use and requirements for shorebird species. As more yearly data accumulate a better picture of habitat use will be

developed.

The habitat preferred by migrating shorebirds is typically quite transitory throughout the season. However, Turtle Creek in 1994 showed use can be spread out over an entire migration. Lower lake levels in fall 1999 through 2016 have shown the potential shorebird use of natural habitat creation in the Lake Erie Marsh region. Heaviest use appears to occur in habitats ranging from several inches of standing water to recently emerged mudflats. Habitat use varied across shorebird species, with species segregating themselves by guilds. Deeper water was used by the larger shorebirds and phalaropes, very shallow water by larger sandpipers, and wet mud flats were used by the smaller peeps and the plovers. The dry flats were utilized by the larger plovers and Baird's and Buff-breasted Sandpipers.

Information gained from this study will allow managers to make better informed decisions about wetland management as it relates to shorebird use. Shorebirds need quality habitat which can be provided by knowing what prey exists in a particular area, what prey is needed by shorebirds, and the timing of shorebird migration (Rundle and Frederickson 1981, Connors et al. 1981). Shorebird needs in wetland management plans require consideration throughout the year. Rotation of management units is necessary to provide the mudflat conditions needed to forage. Abnormal amounts of precipitation highlight the need for managers to monitor marsh levels closely to adjust unit depths to ensure proper habitat throughout the migration season. Management rotation also ensures some units in deep water condition to develop a food base and provide drawdown units that will produce substrate for invertebrate growth in following years. With the continued monitoring of shorebird numbers, species, migration timing, and habitat usage in the Lake Erie marsh region, information can be used to provide direction to resource managers for including the shorebird group into their management scheme.

COSTS

All costs associated with this project were covered by the Black Swamp Bird Observatory through computer support, data analysis, and volunteers for data collection (400 hrs @ \$16.00/hr for services=\$6,400).

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Table 1. Sampling intensity of surveyed marshes and shorebird numbers, 2016.

Marsh sampled	Spring			Fall			Total		
	# days sampled	Total birds	Birds per day	# days sampled	Total birds	Birds per day	# days sampled	Total birds	Birds per day
Metzger W/A	12	1,569	131	1	12	12	13	1,581	122
Maumee Bay State Park	10	337	34	16	384	24	26	721	28
Lucas Co. Flooded fields	42	4,613	110	15	394	26	57	5,007	88
Cedar Pt NWR	8	281	35	3	92	31	11	323	34
Mallard Club WA	8	756	95				8	756	95
Ottawa Co.Flooded fields	19	441	23	13	417	32	32	858	27
Winous Point Marsh	4	2,678	670	2	643	322	6	3,321	554
Magee Marsh W/A	34	1,058	31	5	91	18	39	1,149	29
Moxley Marsh	11	2,561	233	15	2,095	140	26	4,656	179
Ottawa NWR	55	28,758	523	34	5,658	166	89	34,416	387
East Harbor State Park	1	2	2	2	25	13	3	27	9
Catawba State Park				1	1	1	1	1	1
Camp Perry Beach	1	7	7	4	64	16	5	71	14
Navarre Marsh	2	18	9				2	18	9
Great Egret Marsh	3	191	64	3	165	55	6	356	59
Pickeral Creek WA	19	3,363	177	1	5	5	20	3,368	168
Sandusky River	1	3	3	2	14	7	3	17	6
Green Creek	2	28	14				2	28	14
Willow Point WA	15	542	36	14	3,770	269	29	4,312	149
McClure Marsh	2	7	4				2	7	4
Pipe Creek WA	20	811	41	4	12	3	24	823	34
Sheldon's Marsh	16	76	5	10	20	2	26	96	4
Old Woman's WA	3	4	1	6	12	2	9	16	2
Huron Pier	9	120	13	11	25	2	20	145	7
Pt. Mouillee	28	12,235	437	15	7,954	530	43	20,189	470
Erie Marsh, MI	15	805	54	4	348	87	19	1,153	61
Sterling SP	5	34	7	4	23	6	9	57	6
East Bay	14	100	7	4	9	2	18	109	6
Monroe County Fields	3	37	12				3	37	12
Sandusky County Fields	3	16	5	1	21	21	4	37	9
Erie County Fields	1	2	2				1	2	2
Total	99	61,463	621	100	22,254	223	199	83,717	421

Table 2. Shorebird numbers observed during spring and fall migration in the Lake Erie marshes, 2016.

Species	Spring	Fall	Total	Species	Spring	Fall	Total
Piping Plover	0	2	2	Short-billed Dowitcher	574	1,693	2,267
Semipalmated Plover	1,208	779	1,987	Long-billed Dowitcher	15	139	154
Killdeer	3,323	4,496	7,819	Greater Yellowlegs	2,109	860	2,969
American Golden Plover	4,430	47	4,477	Lesser Yellowlegs	2,472	3,888	6,360
Black-bellied Plover	666	162	828	Red Knot	241	42	283
Spotted Sandpiper	570	604	1,174	Wilson Phalarope	49	80	129
Solitary Sandpiper	275	131	406	Red-necked Phalarope	5	14	19
Pectoral Sandpiper	1,024	1,188	2,212	Upland Sandpiper	6	0	6
White-rumped Sandpiper	84	82	166	Ruddy Turnstone	218	38	256
Baird's Sandpiper	61	48	109	Willet	309	3	312
Least Sandpiper	1,103	3,067	4,170	American Avocet	56	7	63
Stilt Sandpiper	6	563	569	American Woodcock	156	8	164
Semipalmated Sandpiper	1,786	2,972	4,758	Wilson's Snipe	366	58	424
Western Sandpiper	1	13	14	Sanderling	169	273	442
Marbled Godwit	14	14	28	Whimbrel	228	4	232
Buff-breasted Sandpiper	8	30	38	Unidentified Dowitcher	1	4	5
Dunlin	39,711	188	39,899	Unidentified Peep	212	472	954
Hudsonian Godwit	0	8	8	Purple Sandpiper	0	1	1
Curlew Sandpiper	1	0	1	Red Phalarope	7	6	13
TOTAL birds	61,463	22,254	83,717	# Trips			

Table 3. Mean shorebird numbers observed by ten day periods for selected marshes during spring migration in the Lake Erie marshes, 2016.

10-day Periods	Principle Marshes Surveyed					
	Magee Marsh	Ottawa NWR	Moxley Marsh	Pickereel Ck	Lucas Co. Fields	Pt Moullie
March 1-10	<u>47</u>	28	2		3	
March 11-20	1	4		1	8	
March 21-31	1	6		1	6	13
April 1-10	2	23		7	9	20
April 11-20	6	121	73	5	31	73
April 21-30	12	64	<u>124</u>	22	82	86
May 1-10	21	633	37	111	112	134
May 11-20	<u>34</u>	<u>1,846</u>	21	<u>187</u>	<u>201</u>	<u>388</u>
May 21-31	5	164	1	3	5	<u>376</u>
June 1-10		1			3	111
June 11-20	6				5	72
June 21-30					3	97

Table 4. Timing of spring migrating shorebirds (avg. #/day) in the Lake Erie marsh region, 2016.*

Time Period	Gold Plov	Pect. Sand.	Killdeer	SB Dow	Gr. Yello.	Semi-Sand	Dunlin	Semi. Plover	Lesser Yleg	Least Sand.	BB Plover
Mar 1-10			41	1	<1		57		1	2	
11-20	<1	2	20		<1				<1		
21-31	<1	18	25		3		7		3		
Apr 1-10	1	5	21	<1	13		13		11		
11-20	69	<u>51</u>	29	<1	23		167	<1	29	2	
21-30	<u>182</u>	14	23	<1	16	<1	140	<1	22	4	2
May 1-10	<u>186</u>	7	<u>55</u>	6	35	6	814	17	<u>121</u>	36	<u>32</u>
11-20	4	5	<u>55</u>	<u>47</u>	<u>120</u>	33	<u>2,448</u>	<u>68</u>	53	<u>50</u>	<u>22</u>
21-31	<1	2	34	2	<1	<u>86</u>	347	32	1	16	<u>9</u>
Jun 1-10			18			<u>61</u>	9	6		<1	1
11-20			30			38	4	<1	<1	1	<1
21-30			70	5	<1	2	<1	<1	14	3	1

*numbers underlined are peaks for each species

Table 5. Mean shorebird numbers observed by ten-day periods for selected marshes during fall migration in the Lake Erie marshes, 2016.

10-day periods	Marshes						
	Pt Moullie SGA	Ottawa NWR	Moxley Marsh	Willow Point	Maumee Bay SP	Lucas Co. Fields	Ottawa Co. Fields
July 1-10	192	49			4	3	3
July 11-20	<u>317</u>	22			4	9	
July 21-31	<u>248</u>	57	10		4	3	
Aug. 1-10	70	113	2		8	3	
Aug. 11-20	114	<u>131</u>	75	11	5	8	8
Aug. 21-31	25	<u>150</u>	30	<u>249</u>	1	1	<u>24</u>
Sept. 1-10	4	95	<u>89</u>	158	4	2	9
Sept. 11-20	7	12	28	39	<u>7</u>		
Sept. 21-30		4	25	1	<u>9</u>	2	2
Oct. 1-10		46	5			<u>16</u>	3
Oct. 11-20	1	3			8		
Oct. 21-31					2		
Nov. 1-10		7		2			
Nov. 11-20			1				
Nov. 21-30		5					

Table 6. Timing of fall migrating shorebirds (avg. #/day) in the Lake Erie marsh region, 2016.*

Time Period	Semi Plov	Kill-deer	Pect Sand	Least Sand	Semi. Sand	Great Yleg	Less Yleg	Sh-bill Dow	Sande rling	Stilt Sand	Dunlin	Spot Sand
July 1-10	1	80	6	56	2	2	63	23		<1		<u>22</u>
11-20	2	23	4	<u>83</u>	62	4	<u>95</u>	35	3	3	<1	7
21-31	6	<u>125</u>	18	32	53	20	<u>94</u>	36	<1	4	<1	<u>14</u>
Aug 1-10	10	66	12	30	27	8	33	11	<1	2	1	7
11-20	19	51	22	38	<u>74</u>	12	61	23	1	7	<u>9</u>	9
21-31	<u>26</u>	66	<u>34</u>	<u>63</u>	<u>86</u>	<u>22</u>	53	<u>46</u>	<u>11</u>	<u>28</u>	<1	8
Sept. 1-10	<u>24</u>	85	<u>28</u>	<u>60</u>	42	11	33	20	<u>15</u>	18	1	<1
11-20	3	10	17	9	14	10	14	9	2	<1		2
21-30	<1	11	1	2	<1	9	10	2	<1	3	<1	<1
Oct 1-10	3	22	3	4	5	7	17	1	<1	3	3	<1
11-20	<1	2	<1	1	<1	<1	1	<1	<1	<1	1	
21-31		3									<1	<1
Nov 1-10		12		1		1	<1				<u>3</u>	
11-20		2									5	
21-30		1									4	

*numbers underlined are peaks for each species