

Migrational Survey and Habitat Usage of Shorebirds in the Lake Erie Marsh Region,2014

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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 (10 March 2014) through fall (28 November 2014). 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 2014) where a complete count was made with adequate location information. Data were compiled by region and marsh unit.

RESULTS AND DISCUSSION

The 2014 field season was the 23rd full year of data collection for shorebird migration. Twenty-six marshes were sampled at least once in the spring and 29 in the fall. The main areas sampled were Ottawa NWR, flooded fields in Ottawa County, Lucas County flooded fields, East Harbor State Park, 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 33,690 birds of 30 species were counted during 208 trips (Table 2). Lucas County flooded fields, Ottawa NWR, East Harbor State Park, 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, Magee Marsh WA, and Metzger Marsh WA. Peak activity on these major areas is shown in Table 3. The most abundant species counted and their peak movements were Killdeer (March 1-10), Lesser Yellowlegs (May 1-10), Short-billed Dowitcher (May 11-20), Pectoral Sandpiper (April 11-20), Greater Yellowlegs (May 1-20), Black-bellied Plover (May 11-20), Least Sandpiper (May 1-20), Dunlin (May 11-20), American Golden Plover (May 1-20), and Semipalmated Sandpiper (June 1-10) (Table 4). Data suggest a later than normal migration in 2014 than normal. Bird numbers also suggest stopover was of shorter duration as might be expected with a late movement.

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, East Harbor State Park, 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 2014, 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 the wetland restoration site at East Harbor State Park.

Overall, 2014 was a below average spring migration for shorebirds in the marsh region. Migration appeared to peak for most species 10 days later than 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 29,379 birds were recorded on 215 trips (Table 2). Consistently productive areas were Ottawa NWR, McClure Marsh, Willow Point Wildlife Area (WA), East Harbor State Park, Ottawa County agriculture fields, and Pt. Moulliee SGA. Shorebird habitat management is very challenging during the fall period. Early fall was extremely wet which reflooded drawdown units rapidly. August and September resulted in little shorebird habitat as wetlands had dried to quickly or management held water on 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 (July 1-10 and August 21-31), Stilt Sandpiper (July 21-31), Lesser Yellowlegs (July 21-31), Killdeer (July 1-10), Sanderling (September 11-20), Greater Yellowlegs (September 1-10), Semipalmated Sandpiper (August 1-31), Pectoral Sandpiper (Aug. 21-31 and September 1-10), Least Sandpiper (Aug. 11-31), Semipalmated Plover (August 21-31), Spotted Sandpiper (July 1-10 and July 21-31), and Dunlin (October 21-31) (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. 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 low availability of natural mud flats, especially at Ottawa NWR for migrating shorebirds in 2014. 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 2012 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 (500 hrs @ \$16.00/hr for services=\$8,000).

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Table 1. Sampling intensity of surveyed marshes and shorebird numbers, 2014.

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	13	2,148	165	3	56	19	16	2,204	138
Maumee Bay State Park	4	129	32	13	338	26	17	467	27
Lucas Co. Flooded fields	17	933	55	18	415	23	35	1,348	39
Cedar Pt NWR	2	53	27	1	56	56	3	109	36
Mallard Club WA	1	53	53				1	53	53
Ottawa Co.Flooded fields	13	1,178	91	10	1,655	166	23	2,833	123
Winous Point Marsh	6	551	92	8	411	51	14	962	69
Magee Marsh W/A	24	2,615	109	6	86	14	30	2,701	90
Moxley Marsh	2	18	9	3	207	69	5	225	45
Ottawa NWR	37	7,853	212	38	2,747	72	75	10,600	141
East Harbor State Park	14	1,541	110	26	5,063	195	40	6,604	165
Meadowbrook Marsh	3	13	4	4	29	7	7	42	6
Turtle Creek	1	44	44				1	44	44
Darby Unit ONWR				1	60	60	1	60	60
Camp Perry Beach				2	23	12	2	23	12
Navarre Marsh	1	7	7				1	7	7
Little Portage WA	1	31	31				1	31	31
Great Egret Marsh	2	25	13				2	25	13
Pickeral Creek WA	7	1,695	242	7	344	49	14	2,039	146
Sandusky River				1	23	23	1	23	23
Green Creek	2	20	10	9	599	67	11	619	56
Willow Point WA	8	1,782	223	9	1,058	118	17	2,840	167
McClure Marsh				8	4,484	561	8	4,484	561
Resthaven WA				1	6	6	1	6	6
Pipe Creek WA	5	334	67	9	621	69	14	955	68
Sheldon's Marsh	8	113	14	2	20	10	10	133	13
Old Woman's WA				1	12	12	1	12	12
Huron Pier	3	14	5	3	8	3	6	22	4
Pt. Mouillee	17	10,666	627	18	7,584	421	35	18,250	521
Erie Marsh, MI	9	1,739	193	2	122	61	11	1,861	169
Sterling SP	3	29	10	19	3,174	167	22	3,203	146
Monroe Power Plant				1	38	38	1	38	38
Erie County Fields	4	106	27	6	140	23	10	246	25
Total	75	33,690	449	107	29,379	275	182	63,069	347

Table 2. Shorebird numbers observed during spring and fall migration in the Lake Erie marshes, 2014.

Species	Spring	Fall	Total	Species	Spring	Fall	Total
Piping Plover	0	0	0	Short-billed Dowitcher	444	1,794	2,238
Semipalmated Plover	432	655	1,087	Long-billed Dowitcher	1	62	63
Killdeer	1,995	3,976	5,971	Greater Yellowlegs	695	1,049	1,744
American Golden Plover	876	41	917	Lesser Yellowlegs	1,334	6,590	7,924
Black-bellied Plover	620	200	820	Red Knot	15	36	51
Spotted Sandpiper	452	387	839	Wilson Phalarope	14	62	76
Solitary Sandpiper	256	167	423	Red-necked Phalarope	16	20	36
Pectoral Sandpiper	870	1,376	2,246	Upland Sandpiper	26	1	27
White-rumped Sandpiper	38	40	78	Ruddy Turnstone	403	23	426
Baird's Sandpiper	3	66	69	Willet	158	24	182
Least Sandpiper	735	4,314	5,049	American Avocet	152	57	209
Stilt Sandpiper	6	402	408	American Woodcock	98	4	102
Semipalmated Sandpiper	755	4,652	5,407	Wilson's Snipe	178	160	338
Western Sandpiper	0	7	7	Sanderling	70	232	302
Marbled Godwit	4	30	34	Whimbrel	372	2	374
Buff-breasted Sandpiper	0	9	9	Unidentified Dowitcher	42	75	117
Dunlin	22,518	738	23,256	Unidentified Peep	102	920	1,022
Hudsonian Godwit	0	17	17	Ruff	0	0	0
Black.-necked Stilt	10	0	10	Red Phalarope	0	2	2
TOTAL birds	33,690	29,379	63,069	# Trips	208	215	423

Table 3. Mean shorebird numbers observed by ten day periods for selected marshes during spring migration in the Lake Erie marshes, 2014.

10-day Periods	Principle Marshes Surveyed					
	Magee Marsh	Ottawa NWR	Metzger Marsh	Erie Marsh	Willow Pt	Pt Moullie
March 1-10		5				
March 11-20	20			21	6	
March 21-31	6	4	24	34		5
April 1-10		56		62	32	55
April 11-20		36	19		223	248
April 21-30	<u>138</u>	67	35	<u>443</u>	<u>420</u>	230
May 1-10	73	<u>387</u>	<u>219</u>	59	<u>255</u>	498
May 11-20	<u>167</u>	<u>331</u>	<u>179</u>	91	<u>580</u>	<u>2,174</u>
May 21-31	88	20		<u>968</u>		<u>1,717</u>
June 1-10		11				393
June 11-20				27		74
June 21-30					11	85

Table 4. Timing of spring migrating shorebirds (avg. #/day) in the Lake Erie marsh region, 2014.*

Time Period	Gold Plov	Spot. Sand.	Killdeer	SB Dow	Pect. Sand	Semi-Sand	Dunlin	Greater Yleg	Lesser Yleg	Least Sand.	BB Plover
Mar 1-10			55								
11-20			21						<1		
21-31			18		7			3	2		
Apr 1-10	<1	<1	17		10		8	3	8	<1	
11-20	<1	<1	13	<1	<u>45</u>		48	17	14	<1	
21-30	2	3	14	<1	24	<1	153	11	14	5	
May 1-10	<u>50</u>	<u>15</u>	<u>56</u>	5	7	5	596	<u>32</u>	<u>71</u>	<u>28</u>	15
11-20	<u>35</u>	<u>16</u>	34	<u>38</u>	2	7	<u>1,039</u>	<u>28</u>	28	<u>28</u>	<u>36</u>
21-31		9	18	2	<1	21	517	<1	<1	17	12
Jun 1-10	<1	3	26		2	<u>141</u>	79		<1	<1	3
11-20	1	7	26		<1	10	8		<1		1
21-30		4	53		<1	<1	1	<1	<1	<1	<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, 2014.

10-day periods	Marshes						
	Pt Moullie SGA	Ottawa NWR	McClure Marsh	East Harbor SP	Willow Pt WA	Pipe Creek WA	Ottawa Co. Fields
July 1-10	513	34		18		17	
July 11-20	<u>678</u>	46		151	125	36	
July 21-31	556	130		<u>344</u>	64	22	
Aug. 1-10	598	95		<u>266</u>		77	
Aug. 11-20	267	23	<u>606</u>	112	124	<u>200</u>	<u>374</u>
Aug. 21-31	253	34	<u>661</u>	33	<u>275</u>	<u>175</u>	<u>115</u>
Sept. 1-10		<u>142</u>		141	87	70	
Sept. 11-20	7	67		23			25
Sept. 21-30		92	24	15		14	24
Oct. 1-10		15			30		24
Oct. 11-20		7			62		
Oct. 21-31		119					
Nov. 1-10		15				4	

Table 6. Timing of fall migrating shorebirds (avg. #/day) in the Lake Erie marsh region, 2014.*

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	2	<u>106</u>	3	66	4	4	81	51		1	<1	<u>13</u>
11-20	<1	62	4	41	41	12	101	33		6		8
21-31	11	66	8	88	94	15	<u>139</u>	<u>44</u>	2	<u>9</u>		<u>11</u>
Aug 1-10	13	42	14	49	<u>140</u>	15	<u>107</u>	9	1	<u>7</u>		<u>8</u>
11-20	8	39	28	<u>106</u>	<u>180</u>	10	<u>103</u>	25	1	<u>7</u>	<1	5
21-31	<u>14</u>	62	<u>36</u>	<u>112</u>	<u>157</u>	12	92	<u>43</u>	3	4	<1	4
Sep. 1-10	<u>12</u>	45	<u>37</u>	22	29	<u>20</u>	96	24	4	5	<1	2
11-20	4	20	2	5	7	8	13	<1	<u>7</u>	<1		<1
21-30	10	25	10	6	2	9	38	2	3	<1		<1
Oct 1-10	2	13	3	5	<1	7	19		2		2	
11-20	<1	9	2	5	1	6	14	<1	<1	5	<u>22</u>	
21-31	<1	21	3	5		8	6		4	2	<u>51</u>	
Nov 1-10		8	<1	<1		3	<1				<u>21</u>	
11-20		14									<1	
21-30		6									12	

*numbers underlined are peaks for each species