

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

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INTRODUCTION

The importance of studying shorebird migration and stopover habitat needs have greatly increased as wetland habitat acreage dwindles (Helmert 1992). 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 pressures on these long distant 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). Lake Erie marshes make up the largest 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 analysis will provide support of International 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 surrounding wetlands of the Lake Erie marsh region were surveyed by vehicle or on foot from spring migration (03 March

2009) through fall (28 November 2009). Shorebirds were censused utilizing the International Shorebird Survey protocol (date, location, time observer, water depth, and disturbance) plus additional information on individual management units and habitat conditions. Data were compiled by region and marsh unit.

RESULTS AND DISCUSSION

The 2009 field season was the 15th full year of data collection for shorebird migration. Seven marshes were sampled at least once in the spring and ten in the fall. The main areas sampled were Ottawa NWR, flooded fields in Ottawa and Lucas Counties, Winous Point Marsh Conservancy, Pickerel Creek State Wildlife Area (WA), Willow Point WA, and Pt. Mouillee State Game Area (SGA). The sampling dates and the total shorebirds counted are shown in Table 1.

Spring Migration

A total of 75,046 birds of 30 species were counted during 78 trips (Table 2). Ottawa county flooded fields, Ottawa NWR, Lucas County flooded fields, and Pt. Mouillee were the most often surveyed wetlands. Heaviest bird concentrations were observed on Ottawa NWR and Ottawa County flooded fields. Peak activity on major marshes is shown in Table 3. The most abundant species counted and their peak movements were Common Snipe (March 21-31), Pectoral Sandpiper (April 11-20), American Golden Plover (April 11-20), Lesser Yellowlegs (May 1-10), Greater Yellowlegs (May 1-10), Killdeer (May 11-20), Dunlin (May 11-20), Least Sandpiper (May 11-20), Short-billed Dowitcher (May 11-20), Semipalmated Sandpiper (May 21-31), and Semipalmated Plover (May 21-31) (Table 4).

The Pectoral Sandpiper appears to be the most abundant species of early April along with Greater Yellowlegs and Common Snipe. Dunlin becomes the most abundant shorebird in May, followed by Semipalmated Sandpiper, Semipalmated Plover, Lesser Yellowlegs, and Least Sandpiper.

Spring habitat was predominantly composed of mudflats along the various estuaries, such as Turtle Creek and Crane Creek, and flooded agriculture fields. Spring drawdowns of control level marshes, to increase smartweed growth for fall migration food, are well timed for species migrating in late April through early May. Drawdowns in late May for millet growth coincide with late spring migrants and some of the early fall migrants in early July. In 2009, the amount of available mudflat habitat created by drawdowns was below normal, as most marsh managers chose to hold water on wetlands due to the low water levels of Lake Erie. The exceptions were two units of Ottawa NWR that were being specifically managed for spring-migrating shorebirds in 2009.

Fall Migration

Thirty-four species totaling 56,151 birds were recorded on 91 trips (Table 2). Consistent marshes

were Ottawa NWR, Winous Point Marsh Conservancy, Pickerel Creek WA, McClure Marsh, and Pt. Moulliee SGA. Fair amount of mudflat habitat was available throughout the fall migration. Peak activities of major sampled marshes are shown in Table 5. Most abundant species counted and their peak movements were Killdeer (July 11-20 and Aug. 1-10), Short-billed Dowitcher (July 11-31), Least Sandpiper (Aug. 1-10), Solitary Sandpiper (Aug. 1-10), Semipalmated Sandpiper (Aug. 1-10), Lesser Yellowlegs (Aug. 1-10), Greater Yellowlegs (Aug. 1-10 and Sept. 1-10), Stilt Sandpiper (July 11-20 and Sept. 1-10), Semipalmated Plover (Aug. 11-20), Pectoral Sandpiper (Aug. 21-31), Long-billed Dowitcher (Sept. 1-10 and Oct. 21-31), and Dunlin (Oct. 21-Nov. 10) (Table 6).

Fall migration is more protracted than spring, running from early July into November. The earliest species to peak were the Short-billed Dowitcher and adult Stilt Sandpiper in July. Semipalmated Plover, Pectoral Sandpiper, Semipalmated Sandpiper, and Lesser Yellowlegs peaked in August. September peaks were observed in Greater Yellowlegs, hatching year Stilt Sandpiper, and adult Long-billed Dowitcher. Hatching year Long-billed Dowitcher peaked during early to mid-October, and Dunlin peaked in late October and early November.

Lake levels resulted in poor amounts of natural mud flats available for migrating shorebirds. The loss of natural habitats puts more importance on water level management regimes in managed marsh units.

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 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 usage and requirements for shorebird species. As more yearly data accumulate a better picture of habitat use will be developed.

It appears that the habitat preferred by migrating shorebirds is typically quite transitory. However, Turtle Creek in 1994 showed use can be spread out over an entire migration. Lower lake levels in fall 1999 through 2009 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 compartmentalizing themselves into 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. Management rotation also ensure units in deep water condition to develop a food base and provides 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

Cost of this project was covered by the Black Swamp Bird Observatory through computer support, data analysis, and volunteers for data collection (400 hrs @ \$12.00/hr for services=\$4800).

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Table 1. Sampling intensity of surveyed marshes and shorebird numbers, 2009.

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
Pipe Creek W/A				1	28	28	1	28	28
Magee Marsh W/A	3	80	27	2	2	1	5	82	16
Maumee Bay	4	63	16				4	63	16
Ottawa NWR	23	29,195	1,269	51	43,413	851	74	72,608	981
Pickrel Crk. W/A				4	1,006	252	4	1,006	252
Navarre Unit ONWR	1	34	34				1	34	34
Ottawa Co.Flooded fields	31	42,643	1,376				31	42,643	1,376
Winous Point Marsh				13	3,370	259	13	3,370	259
Lucas Co. Flooded fields	9	667	74				9	667	74
Pt. Mouillee	7	2,364	338	6	5,454	909	13	7,818	601
Willow Point WA				5	933	187	5	933	187
Cedar Pt NWR				3	490	163	3	490	163
South Bass Island				4	117	29	4	117	29
McClure Marsh				2	1,317	659	2	1,317	659
Total	78	75,046	962	91	56,151	617	169	131,197	776

Table 2. Shorebird numbers observed during spring and fall migration in the Lake Erie marshes, 2009.

Species	Spring	Fall	Total	Species	Spring	Fall	Total
Piping Plover	0	0	0	Short-billed Dowitcher	129	2,605	2,734
Semipalmated Plover	773	1,418	2,194	Long-billed Dowitcher	3	717	720
Killdeer	1,487	9,147	10,634	Greater Yellowlegs	920	1,578	2,498
American Golden Plover	1,820	69	1,889	Lesser Yellowlegs	2,370	9,163	11,533
Black-bellied Plover	15	132	147	Red Knot	1	26	27
Spotted Sandpiper	111	321	432	Wilson Phalarope	6	29	35
Solitary Sandpiper	103	325	428	Red-necked Phalarope	3	12	15
Pectoral Sandpiper	2,655	2,842	5,497	Upland sandpiper	11	2	13
White-rumped Sandpiper	11	39	50	Ruddy Turnstone	36	15	51
Baird's Sandpiper	0	122	122	Willet	4	10	14
Least Sandpiper	346	8,288	8,634	American Avocet	21	16	37
Stilt Sandpiper	10	757	767	American Woodcock	0	1	1
Semipalmated Sandpiper	141	8,363	8,504	Common Snipe	1,236	146	1,382
Western Sandpiper	0	42	42	Sanderling	4	31	35
Marbled Godwit	1	13	14	Whimbrel	7	6	13
Buff-breasted Sandpiper	0	18	18	Unidentified Dowitcher	0	0	0
Dunlin	62,818	9,808	72,626	Unidentified Peep	0	83	83
Hudsonian Godwit	1	5	6	Ruff	2	1	3
Black.-necked Stilt	1	0	1	Red Phalarope	0	1	1
TOTAL birds	75,046	56,151	131,197	# Trips	78	91	169
# observer hrs.			386				

Table 3. Mean shorebird numbers observed by ten day periods for selected marshes during spring migration in the Lake Erie marshes, 2009.

10-day Periods	Principle Marshes Surveyed			
	Pt. Mouillee	Ottawa NWR	Ottawa Co. Fields	Lucas Co. Fields
March 1-10			25	
March 11-20		25	27	21
March 21-31		239	123	17
April 1-10	20	230	161	
April 11-20	15	108	830	16
April 21-30		251	2,138	121
May 1-10	1,159	530	3,230	217
May 11-20	797	6,403	3,728	70
May 21-31		1,012		
June 1-10		11		
June 11-20	106			
June 21-30	166			

Table 4. Timing of spring migrating shorebirds (avg. #/trip) in the Lake Erie marsh region, 2009.*

Time Period	Semi Plov	Snipe	Killdeer	Golden Plover	Pect. Sand	Semi-Sand	Dunlin	Greater Yleg	Lesser Yleg	Least Sand.	S.B. Dow.
Mar 1-10			35								
11-20		<1	26		<1			<1	1		
21-31		<u>127</u>	33	1	62		<1	17	4		
Apr 1-10		76	33	2	112		16	25	17		
11-20		32	25	<u>151</u>	<u>265</u>		148	<u>42</u>	43		8
21-30		21	24	<u>140</u>	94		1,532	37	<u>129</u>	1	<1
May 1-10	21	2	31	42	1		<u>3,435</u>	<u>48</u>	<u>196</u>	29	2
11-20	93	<1	<u>46</u>			4	<u>10,086</u>	19	101	<u>49</u>	<u>26</u>
21-31	<u>130</u>		11			<u>41</u>	1,608	<1	<1	13	<1
Jun 1-10			11				3				
11-20	<1		81				2			1	
21-30			131				1		1	4	

*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, 2009.

10-day periods	Marshes				
	Pt. Mouillee	Ottawa NWR	Winous Point	Pickereel Creek WA	Willow Pt WA
July 1-10		100			
July 11-20	1,751	438	734		
July 21-31		585	6	217	137
Aug. 1-10	2,017	1,629	182	198	
Aug. 11-20		1,059	366		238
Aug. 21-31	795	817	232	296	288
Sept. 1-10	869	663			32
Sept. 11-20	12	420			
Sept. 21-30		406	97		
Oct. 1-10	10	205	140		
Oct. 11-20		1,961	145		
Oct. 21-31		1,640			
Nov. 1-10		2,530			
Nov. 11-20		31			
Nov. 21-31		356			

Table 6. Timing of fall migrating shorebirds (avg. #/trip) in the Lake Erie marsh region, 2009.*

Time Period	Semi Plov	Kill-deer	Pect Sand	Least Sand	Semi. Sand	Great Yleg	Less Yleg	Sh-bill Dowit	Stilt Sand	Lo-bill Dowit	Dunlin	Solitar Sand
July 1-10	<1	84				1		8				1
11-20	1	<u>337</u>	6	280	30	29	220	<u>132</u>	<u>79</u>			4
21-31	2	102	8	131	67	28	201	<u>124</u>	13	2		7
Aug 1-10	<u>33</u>	<u>321</u>	68	<u>388</u>	<u>395</u>	<u>48</u>	<u>336</u>	78	10	2		<u>20</u>
11-20	<u>34</u>	223	64	125	<u>302</u>	12	138	13	2	<1		6
21-31	<u>33</u>	147	<u>148</u>	78	183	36	205	24	24	5	4	4
Sept. 1-10	23	72	43	95	69	<u>47</u>	111	7	35	<u>47</u>	<1	<1
11-20	17	43	68	59	33	16	52	1	18	17		<1
21-30	19	55	37	54	6	14	65	7	21	21	<1	<1
Oct 1-10	8	30	20	24	<1	13	20	1	8	9	6	
11-20	25	49	3	20		5	20		3	14	910	
21-31	14	62	8	42	3	26	66		2	<u>42</u>	<u>1,039</u>	
Nov 1-10	79	5		5		7	13			30	<u>1,813</u>	
11-20		<1					<1				28	
21-30												356

*numbers underlined are peaks for each species