

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 other Neotropical migrants by their narrow habitat requirements. Abundant food producing stopover sites 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 allows establishment of management regimes that create the favored habitats will be beneficial for 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 was successful in acquiring Regional Site status under the Western Shorebird Hemispheric Reserve Network in September 2000 and 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.

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 (02 April) through fall (29 November). Bird numbers were censused utilizing the International Shorebird Survey protocol (date, location, time observed, 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 2008 field season was the 14th full year of data collection for shorebird migration. Six

marshes were sampled at least once in the spring and 11 in the fall. The main areas sampled were Ottawa NWR, Magee Marsh Wildlife Area (WA), flooded fields in Ottawa County, Winous Point Marsh Conservancy, Pickerel Creek WA, and Pt. Moulliee State Game Area (SGA). The sampling dates and the total shorebirds counted are shown in Table 1.

Spring Migration

A total of 5,173 birds of 23 species was counted during 33 trips (Table 2). Ottawa County flooded fields, Magee Marsh WA, Ottawa NWR, and Lucas County flooded fields 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: Pectoral Sandpiper (April 01-10), Least Sandpiper (April 01-10), Greater Yellowlegs (April 11-20), American Golden Plover (April 11-20), Common Snipe (April 21-30), Killdeer (May 01-10), Dunlin (May 01-10), Lesser Yellowlegs (May 01-10), Short-billed Dowitcher (May 01-10), Least Sandpiper (May 01-10), Semipalmated Sandpiper (May 11-20), Semipalmated Plover (May 21-31), and Dunlin (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 become the dominant in volume shorebird in May with sub-dominants of 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 in flooded agriculture fields which was well below normal in volume. The habitat normally created by drawdowns in control level marshes was poor as most marsh managers chose to hold water on wetlands because of low water levels in Lake Erie. Spring drawdowns geared for smartweed growth for fall migration food are well timed for species migrating in late April through early May and drawdowns in late May for millet growth coincide with late spring migrants and some of the early fall migrants in early July. Because the drawdowns did not occur this spring, this was one of the poorest seasons for shorebirds since the project began.

Fall Migration

Thirty-six species totaling 53,611 birds were recorded on 90 trips (Table 2). Consistent marshes were Winous Point Marsh Conservancy, Ottawa NWR, Pickerel Creek WA, and Pt. Moulliee SGA. Fair to poor mudflat habitat was available throughout the fall migration. Peak activities of major sampled marshes are shown in Table 5. Dominant species counted and their peak movements were: Least Sandpiper (July 21-31), Killdeer (July 21-31 and Oct. 01-20), Short-billed Dowitcher (July 21-31), Semipalmated Sandpiper (July 21-31), Greater Yellowlegs (July 21-31), Stilt Sandpiper (Aug. 21-31), Pectoral Sandpiper (Sept. 01-10), Lesser Yellowlegs (Sept. 21-30), Semipalmated Plover (Sept. 21-30), Black-bellied Plover (Oct. 01-10), Long-billed Dowitcher (Oct. 11-20), and Dunlin (Nov. 01-10) (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, Greater Yellowlegs, and Least and Semipalmated Sandpipers in July. Stilt Sandpiper peaked in August. September peaks were observed in Lesser Yellowlegs, Pectoral Sandpiper and Semipalmated Plover. Early to mid-October had peak species of Black-bellied Plover and Killdeer. Dunlin peaked in 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

As more yearly data accumulate a better picture of habitat use will be developed. It appears preferred habitat typically is quite transitory. However, Turtle Creek in 1994 showed use can be spread out over an entire migration. Lower lake levels in fall 1999 through 2008 have shown the potential shorebird use of natural habitat creation in the Lake Erie Marsh region. Heaviest use occurred in habitat ranging from several inches of water to recently emerged mudflats. Habitat use varied with species compartmentalizing themselves into guilds. Deeper water was used by the larger shorebirds and phalaropes, very shallow water was used 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.

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 shorebirds (Rundle and Frederickson 1981, Conners et al. 1981). 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.

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. The Observatory 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.

COSTS

Cost of this project was covered by the Black Swamp Bird Observatory through computer support, data analysis, and volunteers for data collection (300 hours at \$12.00 per hour for a total of \$3600 spent on services).

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Table 1. Sampling intensity of surveyed marshes and shorebird numbers, 2008.

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				2	124	62	2	124	62
Magee Marsh W/A	4	597	149	4	149	37	8	746	93
Metzger Marsh W/A				1	3	3	1	3	3
Ottawa NWR	11	2,048	186	47	42,278	900	58	44,326	764
Pickereel Crk. W/A				4	777	194	4	777	194
Sandusky Co. Flooded fields	1	232	232	1	435	435	2	667	334
Ottawa Co. Flooded fields	12	1,732	144	1	59	59	13	1,791	138
Winous Point Marsh				13	4,498	346	13	4,498	346
Lucas Co. Flooded fields	3	230	77	3	254	85	6	484	81
Pt. Mouillee	2	334	167	7	4,227	604	9	4,561	507
Willow Point WA				5	431	86	5	431	86
Navarre Unit O NWR				2	238	119	2	238	119
Total	33	5,173	157	90	53,611	596	123	58,784	478

Table 2. Shorebird numbers observed during spring and fall migration in the Lake Erie marshes, 2008.

Species	Spring	Fall	Total	Species	Spring	Fall	Total
Piping Plover	0	2	2	Short-billed Dowitcher	88	2,688	2,776
Semipalmated Plover	81	1,113	1,194	Long-billed Dowitcher	0	517	517
Killdeer	520	7,575	8,095	Greater Yellowlegs	137	1,480	1,617
American Golden Plover	54	90	144	Lesser Yellowlegs	253	6,264	6,517
Black-bellied Plover	28	507	535	Red Knot	1	8	9
Spotted Sandpiper	82	296	378	Wilson Phalarope	0	17	17
Solitary Sandpiper	21	230	251	Red-necked Phalarope	0	19	19
Pectoral Sandpiper	20	3,441	3,461	Upland sandpiper	0	1	1
White-rumped Sandpiper	6	65	71	Ruddy Turnstone	33	15	48
Baird's Sandpiper	3	81	84	Willet	1	1	2
Least Sandpiper	242	7,003	7,245	American Avocet	1	4	5
Stilt Sandpiper	4	414	418	American Woodcock	0	1	1
Semipalmated Sandpiper	44	7,528	7,572	Common Snipe	40	134	174
Western Sandpiper	0	9	9	Sanderling	2	36	38
Marbled Godwit	0	36	36	Whimbrel	0	2	2
Buff-breasted Sandpiper	0	5	5	Unidentified Dowitcher	0	56	56
Dunlin	3,506	9,998	13,504	Unidentified Peep	2	3,950	3,952
Hudsonian Godwit	0	4	4	Ruff	0	1	1
Black.-necked Stilt	4	18	22	Red Phalarope	0	2	2
TOTAL birds	5,173	53,611	58,784	# Trips	33	90	123
# observer hrs.			297				

Table 3. Mean shorebird numbers observed by ten day periods for selected marshes during spring migration in the Lake Erie marshes, 2008.

10-day Periods	Principle Marshes Surveyed					
	Pt. Mouillee	Ottawa NWR	Magee Marsh	Sandusky Co. Fields	Ottawa Co. Fields	Lucas Co. Fields
March 1-10						
March 11-20						
March 21-31						
April 1-10		46				
April 11-20				232	133	61
April 21-30		67			36	46
May 1-10		133			99	
May 11-20		39	372		57	
May 21-31		196			20	
June 1-10		15	27			
June 11-20	88		3			
June 21-30	246					

Table 4. Timing of spring migrating shorebirds (avg. #/trip) in the Lake Erie marsh region, 2008.*

Time Period	Semi Plov	Snipe	Killdeer	Golden Plover	Spot. Sand	Semi-Sand	Dunlin	Greater Yleg	Lesser Yleg	Least Sand.	S.B. Dow.
Mar 1-10											
11-20											
21-31											
Apr 1-10		1	<u>45</u>								
11-20			3	<u>6</u>			95	<u>10</u>	4		<1
21-30		<u>4</u>	2				27	2	8		<1
May 1-10	3	2	2		<1		66	2	<u>13</u>	<u>13</u>	<u>7</u>
11-20			3	<1	1	2	50	<1	2	5	1
21-31	<u>4</u>		2		<1	2	<u>131</u>	<1	2	6	
Jun 1-10	1		10		<1	<1	8				
11-20	<1		6		1		<1	<1			
21-30		<1	17		5		<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, 2008.

10-day periods	Marshes				
	Pt. Mouillee	Ottawa NWR	Winous Point	Magee Marsh	Willow Pt WA
July 1-10	139				
July 11-20	415		445	56	
July 21-31		2,194	535		
Aug. 1-10	1,335	1,042	162	22	
Aug. 11-20		338	114		
Aug. 21-31	1,060	764	430	3	53
Sept. 1-10	925	708		12	
Sept. 11-20	352	167			
Sept. 21-30		396			
Oct. 1-10		350			
Oct. 11-20		616			
Oct. 21-31		250			
Nov. 1-10		1,795			
Nov. 11-20		35			
Nov. 21-30	1	136			

Table 6. Timing of fall migrating shorebirds (avg. #/trip) in the Lake Erie marsh region, 2008.*

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	B.B. Plover
July 1-10		22		10		<1	18	41	<1		<1	
11-20		30	1	17	6	3	13	15	<1	<1	<1	
21-31	12	<u>194</u>	23	<u>210</u>	<u>125</u>	<u>37</u>	78	<u>93</u>	3			
Aug 1-10	8	49	16	69	57	6	64	16	2	<1	<1	
11-20	8	36	21	66	55	12	51	15	4	<1	<1	1
21-31	9	35	37	59	81	7	42	18	5	3	33	2
Sept. 1-10	13	34	<u>53</u>	42	85	14	47	20	3	2	<1	3
11-20	5	24	8	9	25	8	21	3	2	<1	<1	1
21-30	<u>17</u>	92	32	30	53	28	<u>102</u>	2	3	11	13	6
Oct 1-10	7	<u>174</u>	17	2	2	11	10			10	72	<u>42</u>
11-20	9	171	16	47	4	17	57		2	<u>41</u>	210	36
21-31		88	2			9	13			2	126	4
Nov 1-10	1	42	9	10		11	8			14	<u>1,685</u>	12
11-20											35	
21-30		1									89	

*numbers underlined are peaks for each species