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### CHARADRIIFORM BIRD SURVEYS IN NORTH CENTRAL KANSAS

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**Abstract** – Extensive research has been dedicated to documenting charadriiform the use of Cheyenne Bottoms Wildlife Area and Quivira National Wildlife Refuge in central Kansas by migratory shorebirds. In contrast, little effort has been focused on potential stop-over sites for charadriiforms outside this area in Kansas. Here we present some preliminary results of shorebird, gull, and tern surveys conducted in 1996 and 1997 at reservoirs and natural wetlands in the north central region of Kansas. We recorded a total of 33 charadriiform species including 25 species of shorebirds, 5 gulls, and 3 terns. Piping Plover, Snowy Plover, Ruddy Turnstone, Western Sandpiper, Laughing Gull, and Least Tern represent some of the most notable sightings. In both years the peak of migration was in the first two weeks of May. Reservoirs and wetlands in north central Kansas tend to be dynamic systems that can vary greatly between years and even seasons in the quality of habitat they provide. For example at Jamestown Wildlife Area, we recorded over 8,800 individuals of 26 charadriiform species in May 1996 but only about 700 individuals of 5 five species during the same comparable period in 1997.

#### INTRODUCTION

Each year, charadriiform birds (shorebirds, gulls, and terns) migrate between their breeding grounds in North America and their wintering grounds in Central and South America. Critical to successful completion of this journey is the complex network of wetlands dispersed along the migration route. One of the major migration routes in North America lies in the Great Plains (Morrison 1984). Charadriiforms migrating through the Great Plains of North America are more susceptible to changes in habitat quality, as the ephemeral wetlands of this region are scattered and less reliable compared to coastal sites.

Although wetlands occupy only a small portion of Kansas, they are

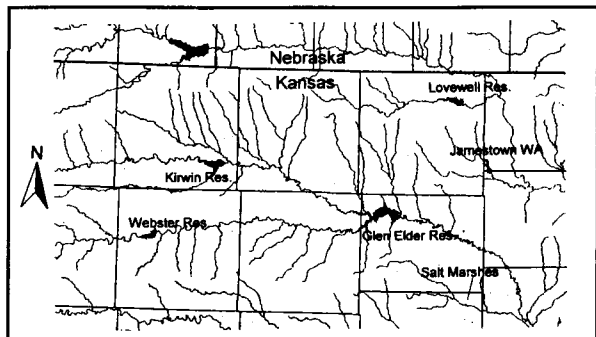


Figure 1. – Map of study area showing specific survey sites.

of great importance to migrating shorebirds (Thompson and Ely 1989). Cheyenne Bottoms Wildlife Area and Quivira National Wildlife Refuge in central Kansas have been identified as nationally significant shorebird stopover sites and Cheyenne Bottoms as the most important charadriiform locality in the central United States (Martinez 1979, Morrison 1984, Parmelee et al. 1969, Senner and Howe 1984). However, in times when the Cheyenne Bottoms/Quivira area does not provide adequate habitat, alternative staging areas are essential for successful completion of spring migration. Little systematic survey work has been done in the state outside of these localities (but see, Davis 1964, Schreiber 1970).

The objective of this project was to identify additional significant charadriiform stopover sites in Kansas. Here we present preliminary data on distribution, abundance, and phenology of migratory shorebirds, gulls, and terns in north central Kansas. We hope that by making these data public we will increase attention to the localities mentioned herein and thereby increase management efforts for charadriiforms in this region.

## METHODS

As part of biological surveys of the Solomon and Republic river drainages for the U. S. Bureau of Reclamation by the Kansas Biological Survey, we surveyed all major reservoirs and naturally occurring wetlands within the Solomon and Republic river drainages (Fig. 1). We surveyed one natural wetland site (referred to as "salt flats" below) and five impoundments varying in size from about 400 to over 5000 ha (Table 1). The larger man-made impoundments were constructed by the U. S. Bureau of Reclamation in the late 1950's and early 1960's for irrigation and flood control and are currently managed by the Kansas Department of Wildlife and Parks and the U. S. Fish and Wildlife Service., Jamestown Wildlife Area is an impounded wetland managed by the Kansas Department of Wildlife and Parks, and the salt flats consist of two natural salt marsh complexes on private land.

**Table 1.** — Location and characteristics of surveyed sites.

Site	County	River System	Surface Area (ha)
Glen Elder	Mitchell	South Fork Solomon River	5063
Kirwin	Phillips	North Fork Solomon River	2025
Jamestown	Republic	Marsh Creek	506
Webster	Rooks	South Fork Solomon River	405
Lovewell	Jewell	White Rock Creek	1215
Salt Flats	Mitchell and Lincoln	Salt and Rattlesnake Creeks	>100

Charadriiform surveys were conducted from 1 March to June 16 May in 1996 and 25 April to 28 May in 1997 (Table 2). Two earliest surveys (1 and 2 March 1996), when only two common wintering gull species were recorded, were excluded from further analysis (Table 3). The surveys consisted of searching for suitable habitats, counting foraging or roosting birds, and collecting voucher specimens. We typically spent four hours at each reservoir, but this varied based on weather conditions and stage of migration. In cases of inclement weather (i.e., rain or high winds) or periods of minimal migration (early spring or summer), we spent less time searching for birds at any given site. In total the 15 surveys amounted to over 100 hours of field observation time.

Specimens were collected to ascertain sex, age, and subspecies (e.g., *Limnodromus*). For all voucher specimens we recorded stomach content, gonad size, and presence of subcutaneous fat and molt. These data were collected to determine physiological condition of migrating individuals and to indirectly evaluate the quality of habitats and food availability. All specimens and associated frozen tissue samples were deposited in the collection of the University of Kansas Natural History Museum (KUNHM).

**Table 2.** – Sites surveyed and survey dates in 1996 and 1997.

1996	1 Mar	2 Mar	17 Apr	18 Apr	25 Apr	1 May	14 May	15 May	16 May
Glen Elder	X	X	X	X	X	X		X	
Jamestown					X	X		X	X
Kirwin	X	X		X		X	X		
Salt Flats								X	
1997	25 Apr	26 Apr	13 May	14 May	27 May	28 May			
Glen Elder		X	X	X	X				
Jamestown	X		X						
Kirwin		X				X			
Lovewell					X				
Salt Flats				X	X				
Webster		X	X						

## RESULTS

Over the two-year sampling period, we recorded 33 charadriiform species including 25 species of shorebirds, 5 gull species, and 3 terns (Tables 2 and 3 and 4). Of the thousands of individuals observed, we collected nearly 60 individuals of 14 species as voucher specimens that are now deposited at KUNHM.

**Table 3.** – Identity and numbers of charadriiforms observed in 1996. Only those sites where a given species was recorded at least once per season are listed (see Table 2 for complete survey schedule); two early March surveys were excluded (see text). Asterisks indicate for which voucher specimens were collected.

Species	18 Apr	19 Apr	26 Apr	2 May	15 May	16 May	17 May
American Avoset							
<i>Recurvirostra americana</i> *							
Glen Elder	0	15	10	2		1	
Jamestown			150	89		0	0
Kirwin		0		0	22		
Salt Flats						4	
Snowy Plover							
<i>Charadrius alexandrinus</i>							
Glen Elder	0	1	0	3		0	
Jamestown			0	0		2	2
Kirwin		0		0	2		
Salt Flats						1	
Piping Plover							
<i>Charadrius melodus</i>							
Glen Elder	0	0	0	2		0	
Jamestown			2	3		0	1
Semipalmated Plover							
<i>Charadrius semipalmatus</i>							
Glen Elder	5	0	0	0		0	
Jamestown			50	50+		1	4
Killdeer							
<i>Charadrius vociferus</i> *							
Glen Elder	4	25	4	0		40	
Jamestown			25	0		0	0
Kirwin		6		0	0		
Black-bellied Plover							
<i>Pluvialis squatarola</i> *							
Glen Elder	0	0	0	8		0	
Jamestown			0	0		0	26
Marbled Godwit							
<i>Limosa fedoa</i> *							
Glen Elder	0	0	0	8		0	
Hudsonian Godwit							
<i>Limosa haemastica</i> *							
Glen Elder	0	0	0	3		0	
Jamestown			150	1		0	0

Species	18 Apr	19 Apr	26 Apr	2 May	15 May	16 May	17 May
<b>Willet</b>							
<i>Catoptrophorus semipalmatus*</i>							
Glen Elder	0	0	10	0		0	
Jamestown			250	15		3	0
Kirwin		0		6	0		
Salt Flats						23	
<b>Greater Yellowlegs</b>							
<i>Tringa melanoleuca</i>							
Glen Elder	0	5	0	0		0	
Jamestown			20	3		0	0
Kirwin		2		0	0		
Salt Flats						1	
<b>Lesser Yellowlegs</b>							
<i>Tringa flavipes*</i>							
Glen Elder	0	25	0	12		0	
Jamestown			50	200+		0	0
Kirwin		6		4	1		
Salt Flats						6	
<b>Spotted Sandpiper</b>							
<i>Actitis macularia</i>							
Glen Elder	0	0	0	3		0	
Jamestown			10	3		0	0
Kirwin		0		3	4		
<b>Wilson's Phalarope</b>							
<i>Phalaropus tricolor*</i>							
Glen Elder	0	20	8	75+		0	
Jamestown			20	250+		0	0
Kirwin		12		50+	80+		
Salt Flats						90	
<b>Long-billed Dowitcher</b>							
<i>Limnodromus scolopaceus*</i>							
Glen Elder	0	15	200+	65		24	
Jamestown			1000	1400		3	3
Kirwin		0		35	125+		
<b>Common Snipe</b>							
<i>Gallinago gallinago</i>							
Glen Elder	0	2	1	0		0	
Jamestown			10	0		0	0
Kirwin		1		0	0		
<b>Stilt Sandpiper</b>							
<i>Calidris himantopus*</i>							
Glen Elder	0	0	0	14		0	
Jamestown			0	75+		350	200
Kirwin		0		8	0		
Salt Flats						110	
<b>Dunlin</b>							
<i>Calidris alpina</i>							
Glen Elder	0	0	0	1		0	
Jamestown			0	0		0	1
<b>Sanderling</b>							
<i>Calidris alba*</i>							
Glen Elder	0	0	0	0		1	
Jamestown			0	4		6	20
<b>Semipalmated Sandpiper</b>							
<i>Calidris pusilla*</i>							
Glen Elder	0	40	6	10	0	0	
Jamestown			50	50	0	12	0
Kirwin		2		0	0		
Salt Flats						0	
<b>Western Sandpiper</b>							
<i>Calidris mauri</i>							
Glen Elder	0	0	2	0		0	
Jamestown			6	0		0	0
<b>Least Sandpiper</b>							
<i>Calidris minutilla</i>							
Glen Elder	0	50	0	10		0	
Jamestown			50	2000		0	0
Kirwin		0		10	3		
Salt Flats						3	

Species	18 Apr	19 Apr	26 Apr	2 May	15 May	16 May	17 May
White-rumped Sandpiper							
<i>Calidris fuscicollis</i>							
Glen Elder	0	0	0	7		20	
Jamestown			0	30+		1400	550
Kirwin		0		0	6		
Salt Flats						190	
Baird's Sandpiper							
<i>Calidris bairdii</i> *							
Glen Elder	0	0	12	60		0	
Jamestown			100+	4000+		0	0
Kirwin		0		30	1		
Salt Flats						3	
Pectoral Sandpiper							
<i>Calidris melanotos</i>							
Glen Elder	5	10	0	2		0	
Jamestown			0	8		0	0
Kirwin		0		2	0		
Franklin's Gull							
<i>Larus pipixcan</i> *							
Glen Elder	150	100	150	50		200	
Jamestown			0	40+		200	150
Kirwin		10		50+	0		
Laughing Gull							
<i>Larus atricilla</i>							
Glen Elder	0	0	0	0		1	
Bonaparte's Gull							
<i>Larus philadelphia</i> *							
Glen Elder	0	10	0	0		10	
Ring-billed Gull							
<i>Larus delawarensis</i> *							
Glen Elder	1	2	0	0		10	
Jamestown			10	6		0	0
Kirwin		1		15	9		
Herring Gull							
<i>Larus argentatus</i>							
Glen Elder	0	0	0	10		0	
Kirwin		0		0	0		
Forster's Tern							
<i>Sterna forsteri</i>							
Jamestown			0	9		0	0
Kirwin		0		4	3		
Salt Flats						3	
Least Tern							
<i>Sterna antillarum</i>							
Jamestown						4	0
Black Tern							
<i>Chlidonias niger</i> *							
Jamestown			0	2		400	400
Kirwin		0		1	0		
Salt Flats						200	

The peak migration period in both years during our study was the first two weeks of May. The highest species diversity (26 species) and number of individuals (over 8,800) were recorded on 2 May 1996 at Jamestown Wildlife Area. In the spring of 1996, the water control device at Jamestown broke causing the northern pool to drain and thus exposing extensive mudflats. This habitat must have been especially useful for migrating shorebirds. In fact, the first two weeks of May 1996, following the drainage of the northern pool, produced our highest counts of shorebird species and individuals.

Several interesting observations of locally rare or uncommon birds were made during the two-year study. In the spring of 1996 several observations of Snowy (*Charadrius alexandrinus*) and Piping Plovers (*C. melodus*) were recorded throughout the study area, and the latter was found once again in 1997 at Jamestown. An uncommon spring migrant in Kansas, the Western Sandpiper (*Calidris mauri*) was observed on 26 April 1996 at Glen Elder Reservoir and at Jamestown.

Another uncommon A rare species, the Laughing Gull (*Larus atricilla*), was recorded twice at Glen Elder Reservoir, on 16 May 1996 and 27 April 1997. Finally, four Least Terns (*Sterna antillarum*) were observed at Jamestown on 16 May 1996.

**Table 4.** – Identity and numbers of charadriiforms observed in 1997 (see Table 3 for explanations).

Species	26 Apr	27 Apr	14 May	15 May	28 May	29 May
American Avoset						
<i>Recurvirostra americana</i> *						
Glen Elder		1	0	0	0	
Piping Plover						
<i>Charadrius melodus</i>						
Kirwin		1				0
Semipalmated Plover						
<i>Charadrius semipalmatus</i>						
Salt Flats				10	0	
Killdeer						
<i>Charadrius vociferus</i> *						
Glen Elder		40	15	10	5	
Jamestown	1		0			
Kirwin		50				0
Salt Flats				10	10	
American Golden Plover						
<i>Pluvialis dominica</i> *						
Salt Flats				7	0	
Willet						
<i>Catoptrophorus semipalmatus</i> *						
Kirwin		11				0
Webster		0	1			
Greater Yellowlegs						
<i>Tringa melanoleuca</i>						
Kirwin		2				0
Salt Flats				15	0	
Lesser Yellowlegs						
<i>Tringa flavipes</i> *						
Glen Elder		0	15	0	0	
Jamestown	25		35			
Salt Flats				75	0	
Webster		0	11			
Solitary Sandpiper						
<i>Tringa solitaria</i>						
Jamestown			5			
Wilson's Phalarope						
<i>Phalaropus tricolor</i> *						
Salt Flats				50	10	
Long-billed Dowitcher						
<i>Limnodromus scolopaceus</i> *						
Glen Elder		24	0	0	0	
Ruddy Turnstone						
<i>Arenaria interpres</i> *						
Glen Elder		0	10	10	0	
Stilt Sandpiper						
<i>Calidris himantopus</i> *						
Salt Flats				15	0	
Sanderling						
<i>Calidris alba</i> *						
Glen Elder		1	10	50	0	
Semipalmated Sandpiper						
<i>Calidris pusilla</i>						
Glen Elder		0	15	40	0	
Salt Flats				0	30	
Least Sandpiper						
<i>Calidris minutilla</i>						
Salt Flats				0	10	
White-rumped Sandpiper						
<i>Calidris fuscicollis</i>						
Glen Elder		20	0	50	0	
Salt Flats				0	150	

Species	26 Apr	27 Apr	14 May	15 May	28 May	29 May
<b>Baird's Sandpiper</b>						
<i>Calidris bairdii</i>						
Glen Elder		0	10	100	0	
Salt Flats				0	50	
<b>Franklin's Gull</b>						
<i>Larus pipixcan*</i>						
Glen Elder		200	3	3	400	
Jamestown	0		250			
Kirwin		100				50
Salt Flats				0	10	
Webster		250	0			
Lovewell					2000	
<b>Laughing Gull</b>						
<i>Larus atricilla</i>						
Glen Elder		1	0	0	0	
<b>Bonaparte's Gull</b>						
<i>Larus philadelphia*</i>						
Glen Elder		10	4	2	0	
<b>Ring-billed Gull</b>						
<i>Larus delawarensis</i>						
Glen Elder		10	0	0	0	
Jamestown	0		12			
Kirwin		20				10
<b>Forster's Tern</b>						
<i>Sterna forsteri</i>						
Kirwin		0				1
Salt Flats				75	50	
Webster		1	0			
Lovewell					3	
<b>Black Tern</b>						
<i>Chlidonias niger*</i>						
Glen Elder		0	100	100's	50	
Jamestown	0		300			
Salt Flats				150	100	
Lovewell					400	

## DISCUSSION

Of the 60 charadriiform species known to occur in Kansas (Thompson and Ely 1989), we recorded 33 during our two-year survey. Most of the species listed by Thompson and Ely (1989) that we failed to record are either extralimital, probably extinct or use non-wetland habitats. Further work will undoubtedly increase the preliminary species list presented herein.

Throughout the world, wetlands are undergoing drastic changes and face continuous encroachment and development by humans (Myers 1983). In spite of these land alterations, charadriiforms continue their annual migration cycles and manage to reproduce in sustainable numbers. The continued successful migration of these birds is dependent on their ability to utilize secondary, perhaps marginal habitats and the continued existence of such habitats. Although the majority of migratory charadriiforms moving through Kansas will continue to use the Cheyenne Bottoms Wildlife Area as the primary stop-over site, the ephemeral nature and unpredictability of wetland habitats makes it critical to preserve alternative areas that could be available for these migrants (Skagen and Knopf 1993). As the survey results presented herein show, the reservoir and wetland areas of north central Kansas can provide just such alternative habitat with appropriate management of water levels. We hope that these data will bring to light the importance of the north central region of Kansas to migratory birds.

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