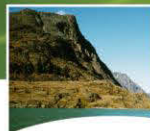




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Observations of shorebird migration at Hay-Zama Lakes and Kimiwan Lake, Alberta: 2001–2003

Gerard W. Beyersbergen

Canadian Wildlife Service, Prairie and Northern Region 2009

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Aussi disponible en français

Abstract

The Hay-Zama Lakes Wetland complex in northwest Alberta and Kimiwan Lake in north-central Alberta were surveyed during the spring and fall migration of 2001–2003 to determine their use by migrating shorebirds. Aerial surveys were the primary survey method at Hay-Zama because ground access was difficult, while mostly ground surveys, on all-terrain vehicle and on foot, were conducted on Kimiwan Lake. Two aerial surveys were conducted in each of the three years at Hay-Zama, while one aerial survey, in May 2001, was conducted on Kimiwan Lake. All ground surveys on Kimiwan Lake were conducted in May, with two partial surveys in 2001, three shoreline surveys in 2002 and four in 2003. Aerial surveys limited our ability to identify the majority of shorebird species on the Hay-Zama wetland complex but 23 species of shorebirds were identified using Kimiwan Lake. The most abundant shorebird species on Kimiwan Lake were Dowitchers (*Limnodromus* spp.), Semipalmated Sandpipers (*Calidris pusilla*) and Stilt Sandpipers (*C. himantopus*). Shorebird use of the Hay-Zama wetland complex was variable, with a low of 1753 birds counted in May 2003 to a high of 13,989 in May 2002. Shorebird numbers were higher on Kimiwan Lake with a one-day high of 24,500 in 2001, peak species count of 32,259 in 2002 and one-day high of 11,993 in 2003. The effects of high water and flooding into the upland influenced shorebird use on Hay-Zama in 2003, but even when conditions were suitable, shorebird use was limited compared to wetlands in the prairies. Kimiwan Lake had much higher levels of use, indicating its importance to migrant shorebirds. When conditions were ideal, as in 2002, it had high use by species such as the American Avocet (*Recurvirostra americana*). Kimiwan Lake, because of its high shorebird numbers, meets the criteria to be designated as a Regional level shorebird reserve under the Western Hemisphere Shorebird Reserve Network. Hay-Zama, although not observed to be an exceptional shorebird site during this study, still provides habitat under suitable conditions for local breeding as well as for northern migrant shorebirds, and historical records indicate that it may be heavily used by shorebirds in some years. Its protection would benefit not only shorebirds but also a host of other water-dependant wildlife.

Résumé

Le complexe de milieux humides des lacs Hay-Zama, dans le nord-ouest de l'Alberta, et le lac Kimiwan, dans le centre-nord de cette même province, ont fait l'objet de relevés durant les migrations printanières ou automnales en 2001, 2002 et 2003 pour déterminer leur utilisation par les oiseaux de rivage en migration. À Hay-Zama, on a effectué seulement des relevés aériens à cause de la difficulté d'accès au sol, tandis qu'au lac Kimiwan, on a effectué surtout des relevés au sol, en véhicule tout-terrain ou à pied. Deux relevés aériens ont été effectués dans chacune des trois années à Hay-Zama, et un seul a été réalisé, en mai 2001, au lac Kimiwan. Tous les relevés au sol à ce dernier lac ont été menés en mai, soit deux relevés partiels en 2001, trois relevés de l'ensemble du rivage en 2002, et quatre en 2003. À Hay-Zama, la majorité des espèces présentes dans le complexe de milieux humides n'ont pu être identifiées du fait que les relevés ont été réalisés du haut des airs, mais on a pu établir que 23 espèces de limicoles ont utilisées le lac Kimiwan. Les espèces les plus abondantes à ce lac ont été les bécassins (*Limnodromus* spp.), le Bécasseau semipalmé (*Calidris pusilla*) et le Bécasseau à échasses (*C. himantopus*). Les effectifs de limicoles au complexe de milieux humides de Hay-Zama étaient variables, avec un minimum de 1753 oiseaux dénombrés le 20 mai 2003 et un maximum de 13 989 le 20 mai 2002. Les effectifs étaient plus élevés au lac Kimiwan; le dénombrement d'un jour le plus élevé en 2001 a été de 24 500 oiseaux, la somme des pics d'abondance des espèces a été en 2002 de 32 259 oiseaux, et le dénombrement d'un jour le plus élevé en 2003 a été de 11 993 oiseaux. Les hautes eaux et l'inondation des terrains élevés a influé sur l'utilisation de Hay-Zama par les oiseaux de rivage en 2003, mais même quand les conditions hydriques y étaient favorables, le complexe accueillait nettement moins de limicoles que les milieux humides des Prairies. Le lac Kimiwan était beaucoup plus fréquenté, ce qui témoigne de son importance pour les oiseaux de rivage en migration. Quand les conditions y étaient idéales, comme en 2002, il était fortement utilisé par des espèces comme l'Avocette d'Amérique (*Recurvirostra americana*). Les effectifs élevés de limicoles fréquentant le lac Kimiwan font que ce dernier satisfait aux critères de désignation comme réserve d'importance régionale pour les oiseaux de rivage au sein du Réseau de réserves pour les oiseaux de rivage dans l'hémisphère occidental. Par ailleurs, bien qu'on n'ait pas observé des effectifs exceptionnels de limicoles à Hay-Zama durant cette étude, quand les conditions y sont favorables, ce site offre tout de même un habitat propice à des limicoles nichant localement ainsi qu'à des limicoles de passage nichant plus au nord, et les données historiques indiquent qu'il peut être fortement fréquenté par les oiseaux de rivage certaines années. La protection de ce complexe profiterait non seulement aux oiseaux de rivage mais aussi à un grand nombre d'espèces sauvages dépendantes des milieux humides.

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1.0 Introduction

The annual migration of shorebirds in North America between breeding and wintering areas occurs along three primary routes: the Atlantic and Pacific coasts and the interior mid-continent. Many of these shorebirds undertake marathon flights of several thousand kilometres utilizing stored fat reserves converted into energy (Castro and Myers 1989, Gudmundsson et al. 1991, Harrington et al. 1991, McNeil and Cadieux 1972, Tsipoura and Burger 1999). However, some shorebirds may require numerous stopover areas of secure and suitable habitat with good food sources in order to replenish fat reserves for their migration.

Traditional stopover sites frequented by large numbers of shorebirds are well documented along the narrow corridor of suitable habitat of the coastal regions of North America. In the interior mid-continent region, shorebird migration occurs along a much broader front. This enables migrant shorebirds the opportunity to take advantage of available wetland habitat that varies significantly from year to year and region to region.

These networks of shorebird staging sites along the coast and in the continent's interior have been identified as being extremely important in the annual shorebird migration cycle (Harrington and Perry 1995, Morrison et al. 1995). The chain of sites located in Canada's Prairie provinces were initially identified in 1987 and are being further studied along with new sites located during the expanding survey effort.

Prairie wetlands are hydrologically dynamic, with wetland availability and condition varying substantially within and between years, depending on seasonal precipitation and regional weather patterns. Shorebirds adapt readily to these changing water regimes and are quite opportunistic in their use of available wetland habitat. The prairie region, especially in the spring, provides numerous and variable wetland habitats important for migrant, northern nesting and prairie breeding shorebirds (Colwell and Oring 1988, Skagen and Knopf 1994, Niemuth et al. 2006). Aerial surveys (Dickson and Smith 1988) were used to first document the shorebird migration staging areas across the Canadian prairies. The 1987 aerial surveys, although limited to a one-day window of observation, identified several lakes on the prairie landscape that hosted high numbers of shorebirds. The survey provided a priority list of lakes that required more intensive ground surveys. These intensive ground surveys were first initiated at the Quill Lakes (Alexander and Gratto-Trevor 1997) and successively at a number of additional sites to identify key shorebird species, monitor shorebird numbers and provide chronological data at these sites. Completed reports or published papers on the results of shorebird surveys are available for Kutawagan Lake wetland complex (Beyersbergen and Norton 2005), Luck Lake (Norton and Beyersbergen 2002, Beyersbergen 2009), Chaplin, Old Wives, and Reed lakes (Beyersbergen and Duncan 2007), and the Peace-Athabasca Delta (Beyersbergen 2004).

The Hay-Zama Lakes Complex lies above extensive oil and gas reserves, and initial exploration and extraction processes began in the 1960s. The Hay-Zama Committee, which includes government and non-government groups, industry and the Dene Tha First

Nation, was established in 1985 to address cultural, economic and environmental concerns related to the oil and gas activities in the wetland complex. Part of their responsibility was to initiate wildlife surveys of the area, primarily those related to the wetland complex. Surveys were initiated for waterfowl in the late 1980s, in which observations of shorebirds were noted, but detailed records were minimal. Flocks of 5,000–10,000 Dowitcher spp. (Appendix 1—scientific names) were observed on the complex in the late 1980s (Pollard et al. 1990), and thousands of shorebirds were seen during aerial surveys in the late 1990s (K. Wright, Alberta Conservation Association, pers. comm.). Large numbers of dead and decaying shorebirds were picked up during a botulism outbreak on the wetland complex in 2000 (K. Morton, Alberta Sustainable Resource Development, pers. comm.). American Avocet was first observed nesting on the complex on 21 June 2001 when several pairs, each with a nest (with eggs and young), were found during an airboat trip on the complex (K. Morton, pers. comm.).

The first recorded observation of shorebird use of Kimiwan Lake was the 1987 aerial shorebird survey conducted across the Canadian Prairie provinces (Smith and Dickson 1989). Spring aerial survey results showed nearly 21,000 shorebirds using the lake, while fall aerial survey numbers were much reduced at 8,500 shorebirds. During several ground surveys in late August 1987, a peak one-day count of 10,000 shorebirds, including 2,000 Lesser Yellowlegs, was observed on the lake. On another day, 5,000 Dowitchers spp. were recorded and a total of 9,000 shorebirds. The Kimiwan Lake Nature Centre, on the south shore of the lake, maintains records of species of shorebirds observed at the lake, but no systematic shorebird surveys to estimate numbers using the lake are conducted.

The focus of this study was to use systematic aerial and ground surveys to quantify migrant northern-nesting and local-breeding shorebird use of Kimiwan Lake and the Hay- Zama lakes in the boreal region of north-western Alberta. The resulting information will be used to evaluate the significance and degree of importance of these lakes in providing staging, resting and feeding areas for shorebirds during their annual cycle.

2.0 Study Area

The Hay-Zama Lakes Complex (Figure 1) is located in the Hay River drainage in the northwest corner of Alberta and is part of the mid-boreal mixed wood eco-region (Poston et al. 1990). The wetland complex, approximately 48,600 hectares in size, is a large lowland region comprising marshes, eutrophic freshwater lakes, willow-ringed wetlands, floodplain woodlands and wet sedge meadows. It is characterized by extreme seasonal and annual water level fluctuations (www.albertawilderness.ca/issues/wildlands/hay-zama). Spring runoff, including timing and amount, and high precipitation events influence the level of inflow of the Hay River and numerous smaller tributaries (e.g. Amber, Omega) that feed into the complex. During high runoff periods, the interaction of several tributaries results in flooding of the larger lakes as well as the closed wetlands within the complex that are not directly fed by any tributary. The larger, flooded basins will eventually be drawn down by the streams flowing out of the complex while the smaller, closed wetlands hold water later into the summer.

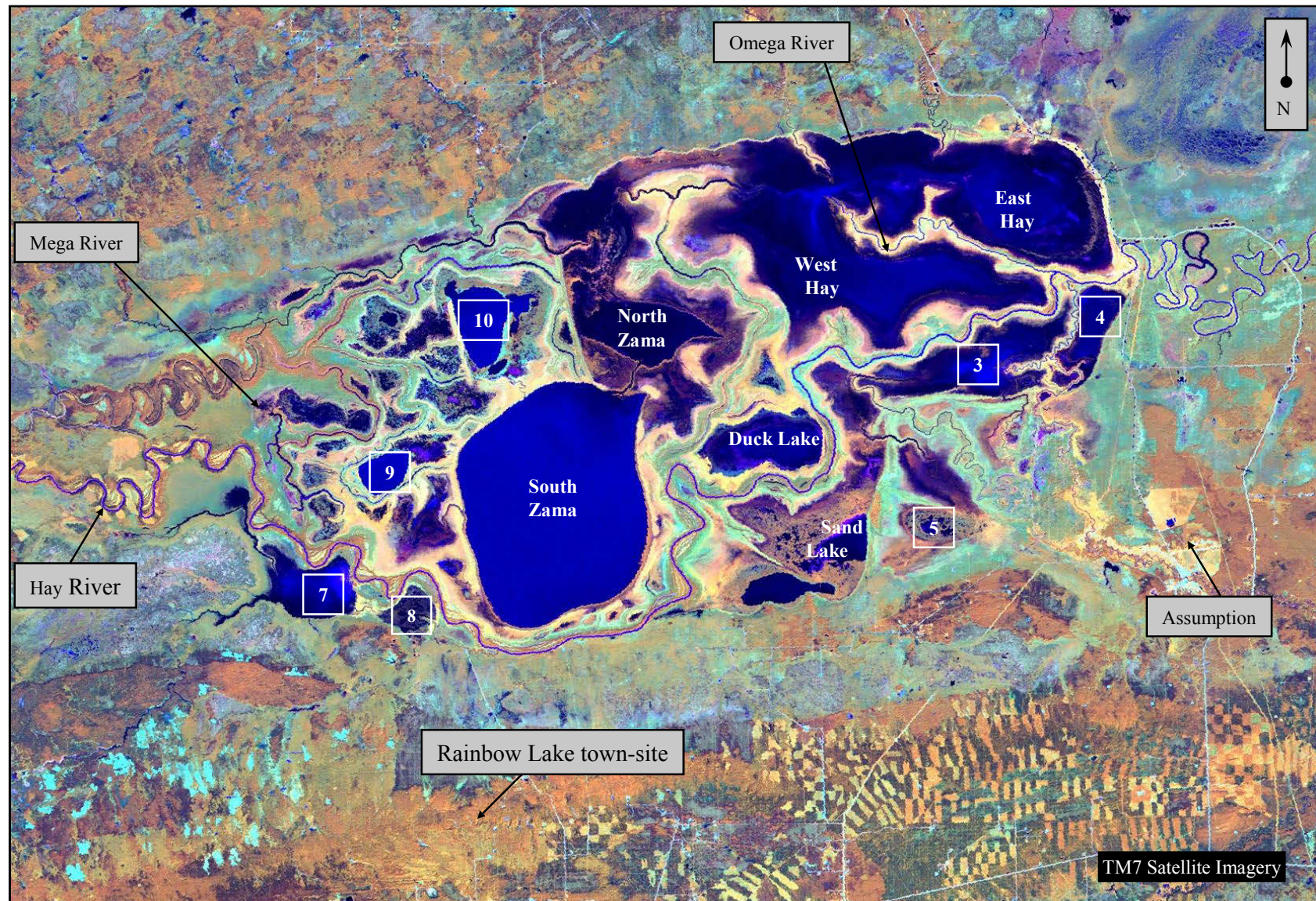


Figure 1. Hay-Zama Lakes wetland complex in northwest Alberta, north of the Town of Rainbow Lake, Alberta

Note: Numbers refer to the sloughs that were surveyed for shorebirds.

Kimiwan Lake (Figure 2) is located in the mid-boreal mixed wood eco-region and is part of the Winagami Lake Plain habitat sub-region (Poston et al. 1990). The eastern boundary of the lake is primarily wooded while the remainder of the lake is bounded by crop and grazing lands, except for the Town of McLennan on the south shore. The Kimiwan Birdwalk and Interpretive Centre, located on the south shore, provides an elevated walkway for access to the lake beyond the wet meadow zone for observation of birds on the water.

3.0 Methods

3.1 Shorebird Habitat

Shoreline habitat was subjectively identified based on its suitability for shorebirds. Suitable habitat was characterized as: (1) open shoreline, which included exposed mudflats (narrow or extensive), (2) short upland vegetation along mudflats, or (3) shallow water zones in the near-shore areas. Deep water shorelines with dense stands of emergent vegetation were not considered suitable for shorebirds, with the exception of deeper, open water areas that may provide foraging habitat for Red-necked Phalarope. Shorebird preference for specific habitat features was likely influenced by several factors including early detection of predators, access to variable types of feeding areas (near-shore upland habitat with short or sparse vegetation, bare ground shorelines, mudflats and shallow water) and disturbance-free resting habitat. Surveys were focused along the shoreline or edge of the lakes and basins. Suitability of upland habitat for shorebird use was not addressed in these surveys.

3.2 Aerial Surveys

Two aerial surveys of the Hay-Zama lakes complex were conducted each year from 2001 to 2003, using a rotary-winged aircraft at an altitude of about 30 m above ground level and air speed ranging between 100 to 130 km/h, depending on bird densities, habitat conditions and shoreline complexity. In the two 2001 surveys and during the spring survey in 2002, one shorebird observer participated in the waterfowl surveys that Alberta Conservation Association regularly flew over the complex (Wright 2000). The August survey in 2002 and both surveys in 2003 were specifically shorebird surveys with two observers. A single aerial survey of Kimiwan Lake, in May 2001, was conducted using a United States Fish and Wildlife Service fixed-wing aircraft present in the area for the spring waterfowl surveys, and one observer estimated shorebird numbers on the lake (D. Duncan, Canadian Wildlife Service, pers. comm.).

The shorebird observer(s) identified and counted all shorebirds and recorded the data on audio cassette recorders. The data recorded on shorebird observations included time, location, number of birds, and identification by species or size category (Appendix 1). Specific species identification was limited to small groups of shorebirds with distinguishable features such as larger size, colouration or flight pattern. The similarity of several species of smaller shorebirds, the mixing of multiple species of shorebirds in large flocks, and the speed of the aircraft resulted in the majority of shorebirds being identified

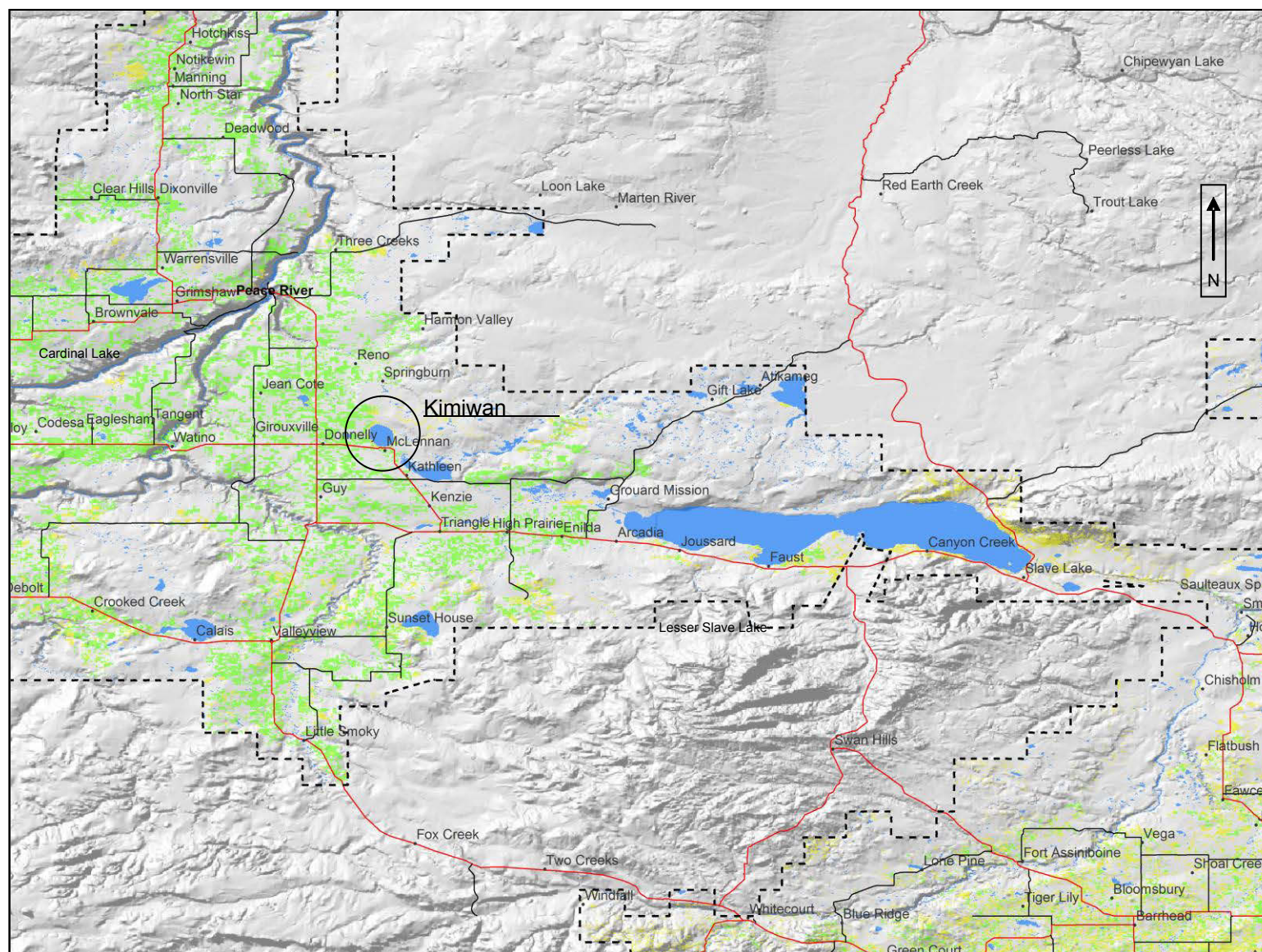


Figure 2. Location of Kimiwan Lake in north-central Alberta near the Town of McLennan, Alberta
The area delineated by the dotted line is beyond the land coverage framework of the map source but is located in the boreal forest eco-region

only by size category. Data were transcribed from tape onto hard copy field data forms at the end of each day. These data were then entered into a computer spreadsheet file.

3.3 Ground Surveys

Ground surveys were not conducted on Hay-Zama lakes because of the lack of ground access to the basins where the shorebirds were observed during aerial surveys. There was limited but poor shorebird habitat on the shoreline parallel to a short stretch of gravel road north of the community of Assumption.

Kimiwan Lake was surveyed on foot from select access locations and by an all-terrain vehicle (ATV) around selected areas of the perimeter of the lake. The lakebed substrate was extremely soft, and travel by the ATV was restricted to the dry, vegetated areas close to the willow border on the lake. The survey was conducted by one or two observers. Surveys were conducted in mid- to late May, with an increased number of surveys in each successive year.

Shorebirds were identified using binoculars and/or a 15-60X spotting scope. The data were recorded using audio-cassette recorders and included the species or size category (Appendix 1), number of birds, and location by survey basin or shoreline segment. When birds could not be identified to the species level, they were categorized as small, medium, large or other (mixed/unidentified). Each day, observation data were transcribed onto hard copy field data forms after the surveys were completed (Appendix 2). These data were then entered into a computer database for later analysis.

4.0 Results and Discussion

4.1 Shorebird Habitat

Shorebird habitat was quite variable on the Hay-Zama complex during the three years of surveys and observations. The flooding of the lakes and large basins (sloughs) and later drawdown of the water levels through drainage or evaporation resulted in the exposure of new mudflats. Similar to the situation observed on the wetlands of the Peace Athabasca Delta (Beyersbergen 2000), exposed mudflats are colonized by sedges and other vegetative growth. Without the annual and seasonal flooding cycle of these areas, most suitable shoreline habitat for roosting and feeding shorebirds would be restricted or eliminated. Habitat conditions were not noted during the initial surveys conducted in 2001. However, the numbers of shorebirds observed in select lakes (north shore of East Hay, entire perimeter of West Hay and southern portion of North Zama) indicated that suitable habitat conditions were present on the complex.

In May 2002, narrow mudflat expanses were evident along the shoreline of East and West Hay and the north shore of North Zama. Sloughs 3 and 7 had suitable habitat conditions along their southern shores. In August 2002, limited habitat was available for shorebirds along the north shore of East and West Hay, the complete perimeter of Duck Lake in the form of floating vegetation mats, and extensive mudflats on Sloughs 9 and 10.

Extremely high water levels in the complex in May 2003 limited shorebird habitat to a few locations, and even that habitat was marginal. Water was well into the surrounding willow and shrubs, and floating mats of vegetation provided some resting locations for groups of shorebirds along the north and eastern shores of East Hay. Shallow water and some mudflats were evident on Sloughs 9 and 10. Water levels appeared to have dropped slightly between the two surveys in 2003, but habitat was still very limited.

Kimiwan Lake had ideal shoreline conditions in May 2001 with extensive, bare mudflats between the willow perimeter and the water edge with widely scattered clumps of Reed Grass (Appendix 1) and areas of extensive Cattail stands. Observations were mostly restricted to foot access with limited ATV use because of the soft terrain. Water levels were lower in May 2002, and the mudflats encroached further into the lake proper. However, these bare mudflats were soon covered with the growth of spring vegetation including a variety of forbs species along the drier upland areas. The use of an ATV for surveys was feasible along a greater portion of the lake perimeter, but travel was still restricted to the willow perimeter, especially on the east side of the lake. Drought conditions persisted, and in May 2003, bare mudflats were minimal with extensive old and new forbs along the shoreline. The height of green growth vegetation along the water edge obscured the view and made observation and identification of shorebirds difficult at times.

4.2 Surveys

4.2.1 Hay-Zama Lakes

The initial survey in 2001 was basically a reconnaissance survey to gain familiarity with the area. The early survey date also resulted in low numbers of shorebirds being observed. The highest use was observed on the West Hay basin with Yellowlegs spp., the dominant identifiable species group (Table 1) along with a few Hudsonian Godwits. More intense coverage of the complex was completed for shorebirds in the second survey, and again, the West Hay basin held the highest number of shorebirds. Most shorebirds were identified by size category except small numbers of a few species including Pectoral Sandpiper, Dowitcher spp. and Wilson's Phalarope (Table 1).

In the single spring survey in 2002, observations reached totals of slightly under 14,000 shorebirds (Table 2). The basins referred to as West Hay, East Hay and Slough 3 had the highest use with shorebirds totalling 3,000–4,000 in each of the basins. Dowitcher spp. and Lesser Yellowlegs were the dominant species with numbers of 3,993 and 1,786 respectively. The American Avocet appears to have established itself as a breeding species in the complex with 14 adults detected during the survey.

Table 1. Shorebird observations recorded during aerial surveys of the Hay-Zama Lakes wetland complex in 2001

Species	Basin										Total
	Duck Lake	East Hay	West Hay	North Zama	South Zama	Sand Lake	Slough 3	Slough 4	Slough 5	Slough 7	
Survey Date: May 7											
Yellowlegs spp.		266	690	200	70	38	142			75	1481
Hudsonian Godwit				10							10
Shorebird–other			160								160
Shorebird–small				160							160
May 17 Total		266	850	370	70	38	142			75	1811
Survey Date: July 24											
Yellowlegs spp.	42	88	33	210	341			240	5		959
Pectoral Sandpiper		3									3
Shorebird–large		10						1			11
Shorebird–medium	93	248	1887	418	120			198			2964
Shorebird–other		150	200								350
Shorebird–small		111	5187	123	441			4			5866
Dowitcher spp.		2									2
Wilson’s Phalarope		2									2
July 24 Total	135	614	7307	751	902			443	5		10157

Table 2. Shorebird observations during an aerial survey of the Hay-Zama Lakes wetland complex on 20 May 2002

Species	Basin									Total
	Duck Lake	East Hay	West Hay	North Zama	South Zama	Sand Lake	Slough 3	Slough 4	Slough 7	
Killdeer				1						1
American Avocet				3		5	6			14
Lesser Yellowlegs	3	536	710	255	2	47	56	25	152	1786
Yellowlegs spp.		15	2			21	282	2		322
Hudsonian Godwit		2								2
Marbled Godwit							1			1
Shorebird–medium		105	205				20	25	35	390
Shorebird–other			300							300
Shorebird–small		2125	2300	346	20	1027	1110		252	7180
Dowitcher spp.		928	440	800	35	15	1735	40		3993
Total shorebirds	3	3711	3957	1405	57	1115	3210	92	439	13989

The survey on 13 August 2002 may have been a little late in the fall migration period, as fewer than 5,000 shorebirds were observed (Table 3). The smaller wetland basins, Sloughs 9 and 10, showed the highest use with 2,013 and 1,160 respectively. Lesser Yellowlegs was once again the dominant identifiable species with American Avocet numbers comparable to the spring survey. Because no differentiation of age category was made for the avocet, evidence of production was not detected during the aerial survey.

Table 3. Shorebird observations recorded during an aerial survey of the Hay-Zama Lakes wetland complex on 13 August 2002

Species	Basin							Total
	Duck Lake	East Hay	West Hay	North Zama	Sand Lake	Slough 9	Slough 10	
Lesser Yellowlegs	128	196	339	1	12	292	555	1523
American Avocet	10		1					11
Spotted Sandpiper					1		4	5
Shorebird–medium	199	121	335	2		1086	195	1938
Shorebird–small	165		180			505	369	1219
Dowitcher spp.						130	37	167
Wilson’s Snipe		1						1
Total shorebirds	502	318	855	3	13	2013	1160	4864

The surveys in 2003 were adversely affected by flooding of the complete wetland complex and the resulting lack of shoreline habitat for shorebirds. The first survey resulted in fewer than 2500 shorebird observations (Table 4). West Hay and Sand Lake had the highest use, and Lesser Yellowlegs and Dowitcher spp. were the most abundant species identified. The second survey resulted in a lower number of birds at 1753, with the same two species being the most abundant, while the greatest number of shorebirds were observed on Slough 10.

Table 4. Shorebird observations recorded during aerial surveys of the Hay-Zama Lakes wetland complex in May 2003

Species	Basin													Total
	Duck Lake	East Hay	West Hay	North Zama	South Zama	Sand Lake	Slough 3	Slough 4	Slough 5	Slough 7	Slough 8	Slough 9	Slough 10	
Survey Date: May 17														
Lesser Yellowlegs	3	90	59	89		30	6	28	67	159		33	64	628
American Avocet												2		2
Hudsonian Godwit	1													1
Shorebird small		75	636	2	25	275	105	64			25	16	141	1364
Dowitcher spp.		27	63			300						25	12	427
May 17 Total	4	192	758	91	25	605	111	92	67	159	25	76	217	2422
Survey Date: May 20														
Lesser Yellowlegs		71	21	1	158				2	4		10	104	371
Yellowlegs spp.		32	15	2	3	30							46	128
Shorebird–medium				52									250	302
Shorebird–other		14		10		40								64
Shorebird–small	15	113	94		72	150			8	25	27	251		755
Dowitcher spp.		10			30					60	10	23		133
May 20 Total	15	240	130	65	263	220			2	12	85	47	674	1753

4.2.2 Kimiwan Lake

An aerial survey was conducted on 20 May 2001 (D. Duncan, Canadian Wildlife Service, pers. comm.) of the entire lake and resulted in the observation of 24,500 shorebirds (Table 5).

Ground observations two days later from several select locations on the south and west shoreline of the lake enabled observers to identify the species of shorebirds using the lake. From these locations a sample of shorebirds (1188) were identified, with Pectoral Sandpiper and Semipalmated Sandpiper being the two dominant species at 458 and 353 birds respectively. A third survey on 30 May was again restricted to several locations on the south and west shoreline, and only a small proportion of the total shorebirds using the lake were counted and identified. Pectoral Sandpiper (504) was the dominant recorded species followed by Red-necked Phalarope (395) and American Avocet (180).

Table 5. Shorebird observations recorded during aerial and ground counts at Kimiwan Lake in 2001

Species	Aerial		Ground	
	May 20	May 22	May 30	
Black-bellied Plover		25	138	
American Golden Plover			18	
Semipalmated Plover		40	14	
Killdeer			6	
American Avocet		62	180	
Lesser Yellowlegs			6	
Solitary Sandpiper		7		
Spotted Sandpiper			11	
Marbled Godwit			12	
Pectoral Sandpiper		458	504	
White-rumped Sandpiper			1	
Baird's Sandpiper		18	14	
Semipalmated Sandpiper		353	89	
Stilt Sandpiper		25	50	
Shorebird-medium	2450			
Shorebird-small	22050		1616	
Dowitcher spp.		200	1	
Wilson's Phalarope			37	
Red-necked Phalarope			395	
Total shorebirds	24500	1188	2916	

In 2002, three spring surveys conducted from 16–22 May covered the entire lake shoreline. Numbers of shorebirds increased each survey day, with numbers from 16,853 to 21,804 (Table 6). During the first survey, the 9,266 Dowitchers spp. observed on the lake accounted for a large proportion of the total shorebirds recorded followed by Semipalmated Sandpiper (2,998) and Lesser Yellowlegs (1,705). In the second survey, Dowitcher numbers declined to 6,327 birds while the number of Semipalmated Sandpiper doubled and American Avocet tripled. The third survey on 22 May showed Semipalmated Sandpiper

numbers continued to rise (9,197) while Stilt Sandpipers increased to 6,970 birds. The Dowitcher migration through the area was near completion and numbers dropped to a few hundred birds. A corresponding increase in the number of Dowitchers was observed on Hay-Zama on 20 May. Numbers of American Avocets, which nest in the area, settled at similar levels to the previous survey. Red-necked phalarope numbers totalled 1,816 for the last survey. Logistic difficulties prevented further surveys on the site, although migrant shorebird numbers continued to climb for some species, so the peak for several species was not determined.

Table 6. Shorebird observations recorded during ground surveys at Kimiwan Lake in 2002

Species	May 16	May 19	May 22	Species peak numbers
Black-bellied Plover		10	3	10
Semipalmated Plover	472	270	60	472
American Avocet	302	1066	1081	1081
Lesser Yellowlegs	1705	433	305	1705
Solitary Sandpiper	1			1
Spotted Sandpiper		1	6	6
Whimbrel			4	4
Hudsonian Godwit	53	2	5	53
Marbled Godwit	8	11	12	12
Red Knot		2	3	3
Sanderling			10	10
Dunlin	1			1
Pectoral Sandpiper	264	13	349	349
White-rumped Sandpiper			1	1
Baird's Sandpiper	21	463	485	485
Semipalmated Sandpiper	2998	6626	9197	9197
Least Sandpiper	530	191	796	796
Stilt Sandpiper	124	1391	6970	6970
Shorebird-small	980	302	457	
Dowitcher spp.	9266	6327	227	9266
Wilson's Snipe		1		1
Wilson's Phalarope	7	20	14	20
Red-necked Phalarope	57	470	1816	1816
Total shorebirds	16853	17603	21804	32259

The change in shoreline conditions at Kimiwan Lake in 2003 resulted in lower use of the site by migrating shorebirds. The first surveys resulted in the highest use at 11,993 birds, but numbers declined dramatically in the following surveys (Table 7). Semipalmated Sandpipers were the dominant species in the first two surveys followed by Dowitcher spp. and Pectoral Sandpiper. Red-necked Phalarope and Stilt Sandpiper accounted for most of the shorebirds observed during the third survey. The total number of shorebirds observed during the final survey was minimal at 184 birds. The poor habitat conditions along the

shore were highlighted by the dramatic reduction in numbers of American Avocet, which normally nest at the lake but peaked at 10 birds.

Table 7. Shorebird observations recorded during ground surveys at Kimiwan Lake in 2003

Species	May 14	May 19	May 24	May 27	Species peak numbers
Black-bellied Plover		7		3	7
Semipalmated Plover	109	71			109
American Avocet	10	9	9		10
Lesser Yellowlegs	113	206	4		206
Yellowlegs spp.	10				
Hudsonian Godwit	21	15			21
Marbled Godwit	20	6	7	14	20
Dunlin	1				1
Pectoral Sandpiper	676	284	3	24	676
Baird's Sandpiper	204	92			204
Semipalmated Sandpiper	5507	3169	323	89	5507
Least Sandpiper	837	78			837
Stilt Sandpiper	5	26	642	4	642
Shorebird–medium			40		
Shorebird–small	3716	77	521	42	
Dowitcher spp.	689	640	87	8	689
Wilson's Phalarope		3			3
Red-necked Phalarope	65	3	680		680
Total shorebirds	11993	4687	2317	184	9,612

5.0 Conclusions

Surveys conducted on Kimiwan Lake and Hay-Zama Lakes in 2001–2003 show that these lakes provide important staging and breeding habitat for shorebirds when conditions are suitable. Water and habitat conditions greatly influence shorebird use of these lakes as was evident over the years of surveys. High-water conditions at Hay-Zama eliminated mudflats along the shoreline of some or all basins and forced shorebirds to concentrate on a few basins or in some cases probably to over-fly the area. Conversely, several years of low water conditions at Kimiwan Lake resulted in extensive growth of vegetation on the exposed mudflats and eliminated much of the area for shorebird use. Therefore, variability in water level and habitat features will result in variable shorebird use.

Conservation actions on the Hay-Zama Lakes wetland complex were bolstered in 1999 when the site was declared a Wildland Provincial Park that encompassed 48,600 ha of upland and wetland habitat (www.albertaparks.ca/pubsandmedia/HayZama_web.pdf Hay-Zama lakes website). The oil and gas reserves under the wetland complex are limited, and when the reserves have been removed, oil and gas production on the wetlands will be terminated (Hay-Zama Lakes website).

The number of shorebirds observed at Kimiwan Lake (>32,000) and Hay-Zama lakes (>20,000) are low in comparison to some of the larger wetlands such as the Quill Lakes and Chaplin/Old Wives/Reed Lakes complexes (>100,000), but they still form part of a network. There are several sites in Saskatchewan that can host substantial numbers during migration when conditions are favourable, such as Luck Lake (>40,000; spring 2001; Norton and Beyersbergen 2002, Beyersbergen 2009) and Manitou Lake (70,000; spring 1995; Beyersbergen in prep.).

The numbers of shorebirds at a site are used to qualify and rank its level for inclusion under specific conservation programs. The Hay-Zama complex was recognized as a Wetland of International Importance under RAMSAR (Wetland of International Significance) on 24 May 1982 (www.albertawilderness.ca/issues/wildlands/hay-zama/management). It is listed in the Important Bird Areas of Canada as Globally Significant for waterfowl. The wetland complex was designated as the Hay Zama Lakes Wildland Park in May 1999 (www.albertawilderness.ca/issues/wildlands/hay-zama).

Shorebird numbers would qualify Kimiwan Lake as a Regional level reserve in the Western Hemisphere Shorebird Reserve Network (WHSRN). The network has several sites listed in Prairie Canada, including Chaplin/Old Wives/Reed Lakes, the Quill Lakes and Last Mountain Lake in Saskatchewan and Beaverhill Lake in Alberta. Other WHSRN sites in Canada include the Bay of Fundy, bordering Nova Scotia and New Brunswick, and the Fraser River Estuary in British Columbia.

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8.0 Appendices

Appendix 1. Scientific names, species AOU alpha-codes and size categories for shorebirds and plants recorded during surveys on Hay-Zama and Kimiwan lakes, Alberta

Common Name	Scientific Name	Alpha-code	Size Category
Black-bellied Plover	<i>Pluvialis squatarola</i>	BBPL	Medium
American Golden Plover	<i>Pluvialis dominica</i>	AGPL	Medium
Semipalmated Plover	<i>Charadrius semipalmatus</i>	SEPL	Small
Killdeer	<i>Charadrius vociferus</i>	KILL	Medium
American Avocet	<i>Recurvirostra americana</i>	AMAV	Large
Lesser Yellowlegs	<i>Tringa flavipes</i>	LEYE	Medium
Solitary Sandpiper		SOSA	Small
Spotted Sandpiper	<i>Actitis macularia</i>	SPSA	Small
Whimbrel	<i>Numenius phaeopus</i>	WHIM	Large
Hudsonian Godwit	<i>Limosa haemastica</i>	HUGO	Large
Marbled Godwit	<i>Limosa fedoa</i>	MAGO	Large
Red Knot	<i>Calidris canutus</i>	REKN	Medium
Sanderling	<i>Calidris alba</i>	SAND	Small
Dunlin	<i>Calidris alpina</i>	DUNL	Small
Pectoral Sandpiper	<i>Calidris melanotos</i>	PESA	Medium
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	WRSA	Small
Baird's Sandpiper	<i>Calidris bairdii</i>	BASA	Small
Semipalmated Sandpiper	<i>Calidris pusilla</i>	SESA	Small
Least Sandpiper	<i>Calidris minutilla</i>	LESA	Small
Stilt Sandpiper	<i>Calidris himantopus</i>	STSA	Medium
Wilson's Snipe	<i>Gallinago delicata</i>	WISN	Medium
Wilson's Phalarope	<i>Phalaropus tricolor</i>	WIPH	Medium
Red-necked Phalarope	<i>Phalaropus lobatus</i>	RNPH	Small
Dowitcher spp.	<i>Limnodromus</i> spp.	DOWI	Medium
Yellowlegs spp.	<i>Tringa</i> spp.	YELL	Medium
Shorebirds–Large		SHLA	Large
Shorebirds–Medium		SHME	Medium
Shorebirds–Other		SHOT	Mixed
Shorebirds–Small		SHSM	Small
Reed Grass	<i>Phragmites</i> spp.		
Cattail spp.	<i>Typha</i> spp.		
Bulrush	<i>Schoenoplectus</i> spp.		

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