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Shorebird migration surveys of Alberta–Saskatchewan border lakes and the north-central lakes of Saskatchewan: 1995–1998

Gerard W. Beyersbergen

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Abstract

A group of 24 lakes along the border of Alberta and Saskatchewan south of Lloydminster were surveyed in the spring and fall of 1995 and the spring of 1996 to determine shorebird use of these wetlands during their annual migration cycle. A further group of 9 lakes were surveyed in central Saskatchewan, east of Saskatoon in the spring and fall of 1997 and spring of 1998. Several aerial surveys were conducted on the border lakes just in the spring of 1995 while ground surveys were generally conducted every three to four on most lakes throughout the survey periods in 1995 through 1998. The border lakes area had an estimated 159,000 shorebirds (spring 1995), 60,000 shorebirds (fall 1995) and 91,000 shorebirds (spring 1996) use the area, which included migrants and local breeding species. Two lakes in Alberta (Baxter and Reflex–West) and two lakes in Saskatchewan (Manitou and Freshwater) were the most heavily used by shorebirds in both years. The most abundant species observed in the region, in order of abundance, included the Red-necked Phalarope, Semipalmated Sandpiper, Sanderling and Stilt Sandpiper. On the central Saskatchewan lakes there were an estimated 51,000 shorebirds (spring 1997), 37,600 shorebirds (fall 1997) and 48,900 shorebirds (fall 1998) observed, including migrants and local breeding birds during the three survey periods, respectively. Buffer Lake was the primary site used and accounted for 45.6%, 88.7% and 76.3% of all shorebirds observed in each of the respective survey periods in 1997 through 1998. The most abundant migrants were the same four species in the same order of abundance as observed in the border lakes survey. Hudsonian Godwits, which are rarely observed during migration through Saskatchewan, were observed on several lakes in central Saskatchewan, with Porter Lake having the highest count at nearly 1000 birds in the fall of 1997. Drier conditions on many of the less semi-permanent wetlands in the border lakes region resulted in the decline in numbers in 1996, and the bulk of the birds were found on the permanent, deep-water wetlands. In the central Saskatchewan lakes, spring was the best period for migrant shorebirds, with more severe drought conditions in 1998 resulting in Buffer Lake drying up at the end of the spring migration period. Given the wide area that shorebirds migrate through the prairies and the ephemeral nature of many of the wetlands, it is imperative that wetlands that host large numbers of shorebirds should receive some form of protection to ensure their long-term conservation. A few of the sites are Migratory Bird Sanctuaries and receive legal protection for conservation. Other key sites are listed as Important Bird Areas for shorebirds, and although there is no legal protection, they do receive recognition for their importance and rely on stewardship actions of local groups to conserve the site for long-term shorebird use.

Résumé

Des relevés ont été effectués au printemps et à l'automne 1995 et au printemps 1996 à 24 lacs situés le long de la frontière entre l'Alberta et la Saskatchewan au sud de Lloydminster, afin de déterminer la fréquentation de ces milieux humides par les oiseaux de rivage au cours de leur cycle migratoire annuel. D'autres relevés ont été effectués à neuf lacs du centre de la Saskatchewan, à l'est de Saskatoon, au printemps et à l'automne 1997 et au printemps 1998. Plusieurs relevés aériens ont été effectués aux lacs de la zone frontalière seulement au printemps 1995, tandis que des relevés au sol ont été effectués généralement tous les trois ou quatre jours à la majorité des lacs pendant toute la période des relevés, de 1995 à 1998. Le nombre d'oiseaux de rivage qui ont fréquenté les lacs proches de la frontière a été estimé à 159 000 (printemps 1995), 60 000 (automne 1995) et 91 000 (printemps 1996), ce qui comprenait les espèces de passage et les espèces nicheuses locales. Au cours de ces deux années, deux lacs de l'Alberta (Baxter et Reflex - bassin ouest) et deux lacs de la Saskatchewan (Manitou et Freshwater) se sont avérés les plus fréquentés par les oiseaux de rivage. Parmi les espèces les plus abondantes observées dans la région, on compte, par ordre décroissant, le Phalarope à bec étroit, le Bécasseau semipalmé, le Bécasseau sanderling et le Bécasseau à échasses. Aux lacs du centre de la Saskatchewan, au cours des trois périodes de relevés, on a estimé à 51 000 (printemps 1997), 37 600 (automne 1997) et 48 900 (automne 1998) le nombre d'oiseaux de rivage observés, qui comprenaient des oiseaux de passage et des nicheurs locaux. Le lac Buffer a été le site le plus fréquenté, avec 45,6 %, 88,7 % et 76,3 % de tous les oiseaux de rivage observés au cours de chacune des périodes respectives de relevés, en 1997 et 1998. Les oiseaux de passage les plus souvent observés ont été les quatre mêmes espèces, dans le même ordre d'abondance, que dans les relevés effectués aux lacs de la zone frontalière. La Barge hudsonienne, que l'on voit rarement pendant la migration dans l'ensemble de la Saskatchewan, a été observée à plusieurs lacs du centre de la Saskatchewan, son plus fort effectif (près de 1 000 individus) ayant été observé au lac Porter à l'automne 1997. Les conditions plus sèches à bon nombre des milieux humides les plus éphémères de la région des lacs de la zone frontalière ont fait diminuer les effectifs en 1996, et la majorité des oiseaux ont été observés dans les milieux humides profonds et permanents. Dans les lacs du centre de la Saskatchewan, le printemps a été la période la plus favorable pour les oiseaux de rivage de passage; les conditions de sécheresse les plus graves survenues en 1998 ont entraîné l'assèchement du lac Buffer à la fin de la période de migration printanière. En raison de l'étendue de la zone de migration des oiseaux de rivage dans les Prairies et de l'intermittence de nombreux milieux humides, il faut absolument que les milieux humides qui accueillent de grands nombres d'oiseaux de rivage bénéficient d'une certaine forme de protection afin d'assurer la conservation à long terme de ces limicoles. Quelques-uns de ces sites sont des refuges d'oiseaux migrateurs qui bénéficient d'une protection juridique aux fins de conservation. D'autres sites importants figurent sur la liste des zones importantes pour la conservation des oiseaux (ZICO) et, bien qu'ils ne fassent pas l'objet d'une protection juridique, on reconnaît leur importance et l'on compte sur des mesures d'intendance mises en œuvre par des groupes locaux pour assurer la conservation des sites en vue de leur fréquentation à long terme par les oiseaux de rivage.

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1.0 Introduction

Each year, North America's shorebirds migrate between the wintering and breeding areas along the Atlantic and Pacific coasts and through the interior of the continent. Many of these shorebirds undertake these long flights of thousands of kilometres by using 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, there are those shorebirds, which require several stopover areas with suitable habitat and food resources to replenish fat reserves in order to continue their migration.

Traditional stopover sites of suitable habitat frequented by large number of shorebirds are well documented along the narrow corridor of the coastal regions of North America. However, in the continental interior, shorebird migration occurs along a much broader front. This enables migrant shorebirds the opportunity to take advantage of available wetland habitat, which varies significantly from year to year. There are a number of key staging or stopover areas for migrant shorebirds throughout the continent's interior that are well documented but the list is not complete.

The network of important shorebird staging sites along the coast and the continent's interior used during the annual shorebird migration cycle are identified in several documents (Harrington and Perry 1995, Morrison et al. 1995). Canada's prairie region shorebird staging sites were initially identified in 1987, and further studies of these sites and new sites have been ongoing since that time.

Prairie wetlands are generally ephemeral with wetland availability and condition varying substantially within and between years depending on seasonal precipitation and regional weather patterns. Shorebirds have been found to adapt readily to these changing water regimes and are opportunistic in their use of available wetland habitat (Colwell 1991, Farmer and Parent 1997, Skagen and Knopf 1994). The prairie region, especially in the spring, provides numerous and variable wetland habitats suitable to migrant northern nesting and prairie breeding shorebirds (Colwell and Oring 1988, Niemuth et al. 2006). Shorebird migration staging areas across the Canadian prairies were first documented through aerial surveys (Dickson and Smith 1988). The 1987 aerial surveys, although limited to a one-day window of observation, identified numerous larger lakes and clusters of lakes on the prairie landscape that were used by large numbers of shorebirds. The survey provided a list of lakes that required ground surveys to further quantify and identify specific shorebird species using these sites. These ground surveys were first initiated at the Quill Lakes (Alexander and Gratto-Trevor 1997), and successively over the ensuing years at a number of additional sites, to identify key shorebird species, monitor shorebird numbers and provide chronological migration data at these sites. Completed reports or published papers on the results of shorebird surveys are available for the 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), Kimiwan and Hay Zama lakes (Beyersbergen 2009) and the Peace-Athabasca Delta (Beyersbergen 2004).

The focus of the study conducted during the period 1995–1998 was to identify the species and numbers of shorebirds using specific lakes or wetlands and to provide an understanding of the importance of these wetlands to migrant as well as local prairie breeding shorebirds. Due to the number of lakes involved, site-specific information will be presented in a separate section for each of the lakes surveyed during this period.

2.0 Study Area

Historical literature and recent surveys have identified a number of lakes in Saskatchewan and Alberta on which substantial numbers of shorebirds have been observed over the years. There is a cluster of lakes, Manitou Lake being the largest, along the Alberta and Saskatchewan border in an area extending south of North Battleford and north of Swift Current, Saskatchewan and from Wainwright, Alberta east to the Saskatchewan border (Figure 1, Appendix 1). A second cluster of lakes located in central Saskatchewan just east of Saskatoon is centred on Buffer and Basin lakes (Figure 2, Appendix 2).

The lakes surveyed were in the prairie ecozone and covers two ecoregions, the Aspen Parkland, the northern most region and the Moist Mixed Grassland, the next region, within the study area (Environment Canada Website).

The Parkland, in its native state, was characterized by trembling aspen, mixed tall shrubs and intermittent fescue grasslands but is now mostly farmland. Open stands of aspen and shrubs occur on most sites with pastureland surrounding many of the lakes. This broad plains region, underlain by Cretaceous shale, is covered by undulating to kettled, calcareous, glacial till with significant areas of level lacustrine and hummocky to ridged fluvio-glacial deposits (Environment Canada website). Features associated with the hummocky glacial till landscapes are numerous tree-ringed, small lakes, ponds, and sloughs that provide a major habitat for many species of water dependant birds including shorebirds.

The Mixed Moist Grassland ecoregion comprises the northern extension of open grasslands found in Prairie Canada and is closely correlated with semi-arid moisture conditions. Native vegetation is relegated to non-arable pasturelands with more production soils cultivated for crop production (Environment Canada website). The region is composed of upper Cretaceous sediments and covered almost entirely by hummocky to kettled glacial till and level to very gently undulating, sandy to clayey lacustrine deposits (Environment Canada website). Intermittent sloughs and ponds scattered across the landscape provide habitat for a variety of shorebirds.

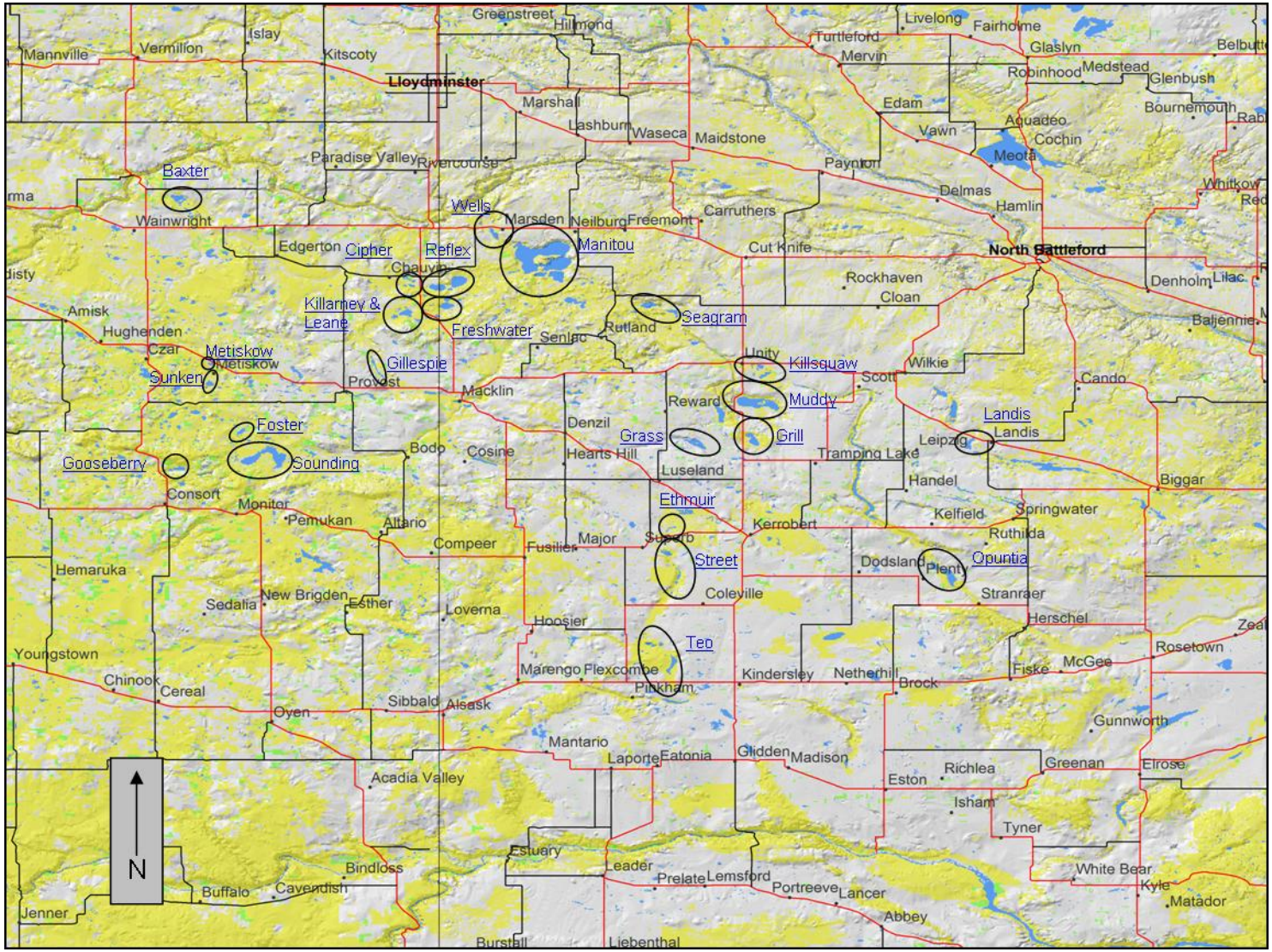

Figure 1. Distribution of lakes surveyed during the annual shorebird migration periods in 1995 and 1996 along the Alberta and Saskatchewan border

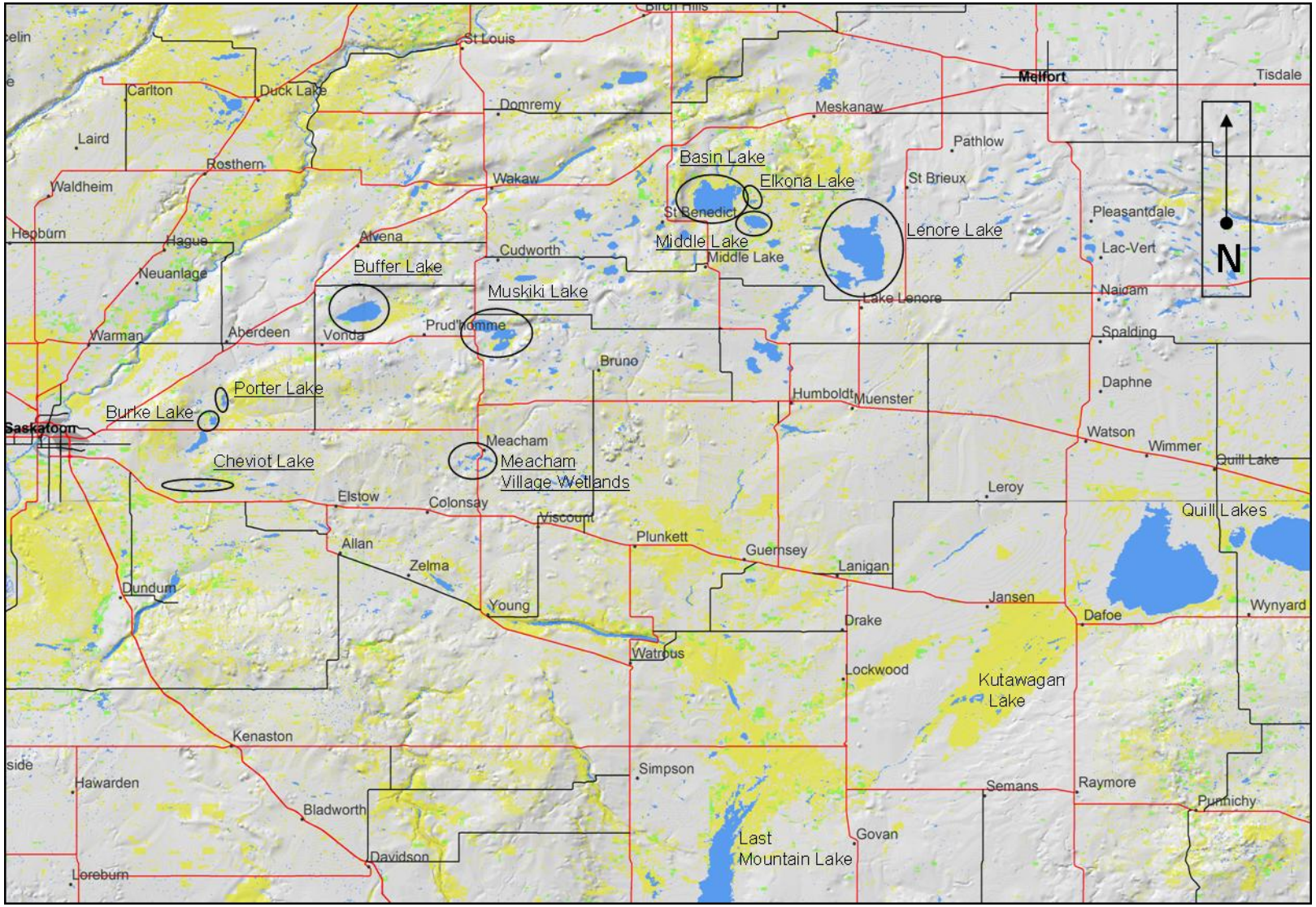

Figure 2. Distribution of lakes surveyed during the annual shorebird migration periods in 1997 and 1998 in central Saskatchewan

3.0 Methods

3.1 Shorebird Habitat

Shoreline habitat was not specifically identified for each of the lakes that were surveyed; however, the fact that shorebirds were observed on the lake indicated it had some suitable habitat. Suitable habitat was characterised as open shoreline that included exposed mudflats (narrow or extensive), short upland vegetation along mudflats, or 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 that deeper, open water areas may provide foraging habitat for phalarope species. Shorebird preference for specific habitats features was likely influenced by several factors including a shorebird's early detectability 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 basins so no indication of upland habitat suitability for shorebird use is addressed in this study.

3.2 Ground Surveys

Regular surveys were generally conducted by one to four observers depending on the size of the lake, using all-terrain vehicles [ATVs] or on foot for those lakes that had nesting Piping Plover (Appendix 3–Scientific names). On some of the larger lakes, the lakeshore was divided into survey sections based on distinct wetland bays/basins or segments of shoreline between prominent headlands.

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 3), number of birds, and location by lake and 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 4). These data were then entered into a computer spreadsheet for later analysis.

3.3 Aerial Surveys

Aerial surveys for shorebirds were only flown in the spring of 1995 using a single engine aircraft and were conducted by a single surveyor with the pilot. A wide range of lakes were checked along the Alberta/Saskatchewan border and repeat surveys were conducted on those lakes where shorebird use warranted it.

The data were recorded using audio-cassette recorders and included the species when feasible or size category (Appendix 3), number of birds, and location by survey basin or shoreline segment. Similar to ground surveys, when birds could not be identified to the species level, they were categorized as small, medium, large or other (mixed/unidentified). After the surveys were completed data was transcribed onto hardcopy forms (Appendix 4). These data were then entered into a computer spreadsheet for later analysis.

4.0 Results and Discussion

4.1 Survey Area – Alberta−Saskatchewan Border Lakes: 1995−1996

4.1.1. Baxter Lake, Alberta

Baxter Lake (Figure 1, Appendix 5) is located in a landscape of aspen woods, pasture lands and extremely sandy soil. Oil/gas extraction is prevalent in the area with several wells positioned along the shoreline of the peninsula in the bottom third of the wetland basin. The water is somewhat saline, and the shorelines are comprised of stretches of sand/silt/rock materials with the width varying from year to year depending on the lake level. In 1995, the beach width ranged from 1−5 m.

Surveys of Baxter Lake in May 1985 resulted in a one-day count of 5278 shorebirds including 350 Long-billed Dowitchers, 700 Semipalmated Sandpipers and 3000 Red-necked Phalaropes (Wershler 1987). Only 36 shorebirds were found on 17 May 1986 and 831 shorebirds observed during ground surveys of the lake in May 1987, which included 100 Long-billed and 100 Short-billed Dowitchers (Wershler 1987). Aerial surveys of the basin on 1 June 1988 located 2026 shorebirds including 230 Red-necked Phalaropes, 21 American Avocets, 100 Sanderling and 13 Black-bellied Plovers (CWS unpubl. data).

Aerial surveys were conducted in the spring of 1995 and Baxter Lake was checked on 23 May (Table 1). Due to the difficulty of shorebird species identification during aerial surveys, half the shorebirds were identified by size class. An estimated count of 3,700 Red-necked Phalaropes was recorded.

In 1995, ground surveys were regularly conducted in the spring (Table 2) and the fall (Table 3). The peak of spring migration occurred on 27 May with the observation of 17,431 shorebirds and peak species counts for Sanderling, Baird's Sandpiper and Semipalmated Sandpiper. A comparison of the two types of surveys conducted on 23 May showed a higher ground count of shorebirds at 9,907 than the aerial survey count at 7756 Red-necked Phalarope was identified as the most abundant shorebird species in both counts.

The fall migration at Baxter Lake was reduced in number by 70% based on peak species totals compared to the spring migration. From the species peak counts in the spring, a total of 18,690 shorebirds were observed on the lake, while in the fall, the peak species count was only 5,235 shorebirds. The fall shorebird migration through Baxter Lake showed two small peaks on 20 July and 15 August, with Red-necked Phalaropes accounting for a good proportion of the shorebirds on both dates. Lesser Yellowlegs were the next most abundant shorebird in the fall survey period.

The Baxter Lake ground surveys for shorebirds were continued in the spring of 1996, with the peak shorebird migration occurring on 22 May (Table 4). Red-necked Phalaropes were the predominant species again, with good numbers of Semipalmated Sandpipers on 18 May and Sanderlings on 30 May. The total for the species peaks counts came to 7,108 shorebirds in the spring of 1996, which is about 40% of what was observed in the spring of 1995.

Table 1. Baxter Lake 1995 spring aerial shorebird survey

Species	May 23
American Avocet	62
Willet	2
Marbled Godwit	1
Red-necked Phalarope	3700
Shorebird–small	1823
Shorebird–medium	128
Shorebird–other	2040
Total shorebirds	7756

Table 2. Shorebirds observed on Baxter Lake, Alberta during the 1995 spring ground surveys

Species	May 23	May 27	May 31	June 4
Black-bellied Plover	**8***	7		
Piping Plover	2	1		**3**
Semipalmated Plover		**1**		
Killdeer		4	4	**8**
American Avocet	74	76	74	**114**
Willet	**1**	1	1	
Marbled Godwit	**3**	2	1	1
Sanderling	307	**1064**	237	527
Dunlin		**1**		
Pectoral Sandpiper		**26**		
White-rumped Sandpiper		**475**	1	12
Baird's Sandpiper	1136	**2952**	3	
Semipalmated Sandpiper	849	**6265**	176	
Least Sandpiper	**101**	10		
Stilt Sandpiper	452	**694**	104	
Dowitcher spp.	**2**			
Red-necked Phalarope	**6972**	5777	2555	
Shorebird–small		75	670	
Total shorebirds	9907	17431	3826	665

***Bold numbers indicate species peak count during migration period**

Drier conditions were experienced on Baxter Lake in the fall of 1995 and through the spring of 1996; however, there was still plenty of suitable habitat available on the basin for migrant shorebirds.

Table 3. Shorebirds observed on Baxter Lake, Alberta during the 1995 fall ground surveys

Species	July 13	July 20	July 27	Aug. 1	Aug. 9	Aug. 15	Aug. 22	Aug. 29
Black-bellied Plover			10	5	23	**68***	19	25
Piping Plover			**1**					
Semipalmated Plover					11	24	33	**40**
Killdeer	2	5	3		3	6	**19**	12
American Avocet	21	**75**	73	69	56	51	14	64
Greater Yellowlegs	**34**	9			4		2	1
Lesser Yellowlegs	1	8	11	38	100	**752**	207	428
Willet		12	16	24	35	**39**	10	3
Marbled Godwit	**20**	7	8	2	1	6	8	
Red Knot					**4**			
Sanderling		**68**	20	1	10		7	45
Pectoral Sandpiper						2	6	**90**
White-rumped Sandpiper								**16**
Baird's Sandpiper	15	134	255	23	99	215	**763**	172
Semipalmated Sandpiper	118	**465**	51	2	184	64	184	38
Least Sandpiper						25		**43**
Stilt Sandpiper	30				6	139	369	**515**
Shorebird− small	6	45	22	34	73	169	254	339
Shorebird− medium		20				20	92	4
Shorebird− other								2
Short-billed Dowitcher								1
Dowitcher spp.						**19**		
Wilson's Phalarope							**80**	14
Red-necked Phalarope	1057	1615		245	694	**2124**	259	100
Total shorebirds	1304	2463	470	443	1303	3723	2326	1952

***Bold numbers indicate species peak count during migration period**

Table 4. Shorebirds observed on Baxter Lake, Alberta in the spring of 1996

Species	May 14	May 18	May 22	May 26	May 30
Black-bellied Plover	5	2		**24**	1
Piping Plover				**1**	1
Semipalmated Plover	**15**	1		2	
Killdeer	**4**	2	1	2	3
American Avocet			7	**37**	32
Lesser Yellowlegs	**1**				
Willet	**7**	1	5		5

Species	May 14	May 18	May 22	May 26	May 30
Marbled Godwit		**2**	2		
Sanderling	55	558	848	992	**1093**
Dunlin			**5**		
Pectoral Sandpiper	**21**				
White-rumped Sandpiper		**72**	8	35	60
Baird's Sandpiper	60	**79**	3		
Semipalmated Sandpiper	345	1831	1716	**1907**	154
Least Sandpiper		3	**86**		
Stilt Sandpiper			**192**	21	4
Shorebird− small	19		20		
Common Snipe				**1**	
Red-necked Phalarope	488	150	**3561**	103	406
Total horebirds	996	2696	6453	3096	1754

***Bold numbers indicate species peak count during migration period**

4.1.2 Cipher Lake, Alberta

Seven adult Piping Plover were observed on Cipher Lake (Figure 1, Appendix 6) on 17May 1985 (Wershler and Wallis 1987). Site visits in the spring of 1985 recorded a peak of 600 shorebirds including 200 Baird's Sandpiper (Wershler 1987). During the regional shorebird surveys conducted across Prairie Canada in 1987, 1,800 unidentified shorebirds were noted on Cipher Lake during the aerial survey component, while ground surveys resulted in the observation of nearly 5,000 shorebirds in the spring (May) and 5,000 shorebirds during the fall (July) survey (Wershler 1987, Smith and Dickson 1989). Noteworthy species peak numbers for the lake on 23 May 1987 included 1,500 Baird's Sandpipers, 500 Stilt Sandpipers and 2,500 Red-necked Phalarope (Wershler 1987). During spring 1989 surveys on Cipher Lake, there were 10,021 shorebirds observed (Morrison et al. 1995).

Cipher Lake was not included in the spring 1995 aerial surveys, but ground surveys were conducted on this relatively small alkaline basin during the spring migration period (Table 5). No surveys were done in the fall migration period because the basin was dry. Despite the small size of the wetland, a large number of shorebirds were found including Baird's Sandpiper and Red-necked Phalarope on 21 May, the peak date of shorebird use of the basin. On 25 May 1995, Cipher Lake was almost dry, accounting for the sharp drop in use on 29 May.

Shorebird surveys were repeated on Cipher Lake in the spring of 1996, with the peak number of shorebirds being observed on 26 May (Table 6). Red-necked Phalarope were the predominant species noted. Fall surveys were not conducted at this wetland due to low numbers and poor water conditions.

Previous observations show high use of the basin when conditions are suitable, and it appears that conditions were poorer during this survey period resulting in lower numbers of shorebirds on the basin as well as in the general area. Comparison of peak species counts in spring of 1995 and 1996, at 2881 and 1312 shorebirds each respectively, also show a decline in basin use.

Part of the Manitou Lake Area Important Bird Area (IBA), Cipher Lake is identified as a site of importance to shorebirds, but conservation of the site is not guaranteed by any legal basis (IBA website).

Table 5. Shorebirds observed on Cipher Lake, Alberta in the spring of 1995

Species	May 13	May 17	May 21	May 25	May 29
Black-bellied Plover				**32**	
Piping Plover		**2**			2
Semipalmated Plover			**30**		
Killdeer		**2**			
American Avocet	3	4		2	**5**
Sanderling			35	**75**	36
Baird's Sandpiper			**1500**	175	
Semipalmated Sandpiper			295	**320**	
Least Sandpiper			**42**		
Stilt Sandpiper			**185**	1	
Shorebird−small		3			
Wilson's Phalarope			**40**		
Red-necked Phalarope			**648**	520	
Total shorebirds	3	11	2775	1125	43

***Bold numbers indicate species peak count during migration period**

Table 6. Shorebirds observed on Cipher Lake, Alberta in the spring of 1996

Species	May 14	May 18	May 22	May 26	May 30
Black-bellied Plover				**12**	
Piping Plover	1	1	**3**	2	1
Killdeer	**1**			1	
American Avocet	6	35	35	**87**	80
Lesser Yellowlegs	**17**				
Willet	**4**	2		1	
Marbled Godwit	**1**	1			1
Sanderling	10	20	20	161	**215**
White-rumped Sandpiper		**4**		1	
Baird's Sandpiper				**3**	
Semipalmated Sandpiper		20		**165**	15
Stilt Sandpiper		**100**	93	72	
Red-necked Phalarope		35	160	**700**	100
Total shorebirds	38	217	308	1190	411

***Bold numbers indicate species peak count during migration period**

4.1.3 Foster Lake, Alberta

A saline wetland locally identified as Foster Lake (Figure 1, Appendix 7) is located about 5 kilometres northwest of Sounding Lake. There was no reference to Foster Lake having been previously surveyed, but Wershler (1987) reports high shorebird use of similar wetlands in the surrounding area. Those small wetlands accounted for large numbers of shorebirds including 14,000 Semipalmated Sandpipers, 11,000 Baird's Sandpipers, and 7,000 Stilt Sandpipers (Wershler 1987). Sounding Lake itself accounted for 11,850 Lesser Yellowlegs in August 1987 as well as 22,000 small unidentified shorebirds (Smith and Dickson 1989).

The 1995 aerial surveys of the region resulted in an observation of 2,009 shorebirds on 23 May (Table 7), while ground surveys on 25 May resulted in 4,362 shorebird observations, with Semipalmated Sandpipers topping the list with 2550 individuals (Table 8). Substantial numbers of Baird's and Stilt Sandpipers were also observed on the wetland. The peak species count for the two surveys was 4378 shorebirds.

Foster Lake ground shorebird surveys were not conducted during the fall migration period due to logistical limitations and priorities on other wetlands.

Five ground shorebird surveys were conducted on Foster Lake in spring 1996 and the peak count occurred on 19 May (Table 9). Stilt Sandpipers were the most abundant species on that date while Sanderling, a late migrant, was the most abundant species on 27 May. Peak species counts for this migration period was 2015 shorebirds. A decline of over 50% shorebird observations occurred from the spring of 1995 to 1996.

Table 7. Foster Lake 1995 spring aerial shorebird survey

Species	May 23
Killdeer	1
American Avocet	38
Willet	1
Marbled Godwit	2
Shorebird–medium	34
Shorebird–other	1933
Total shorebirds	2009

Table 8. Shorebirds observed on Foster Lake, Alberta in the spring of 1995

Species	May 25	June 2
Black-bellied Plover		16
American Avocet	186	24
Marbled Godwit	6	
Baird's Sandpiper	900	
Semipalmated Sandpiper	2550	
Stilt Sandpiper	720	
Total shorebirds	4362	40

Table 9. Shorebirds observed on Foster Lake, Alberta in the spring of 1996

Species	May 15	May 19	May 23	May 27	May 31
Black-bellied Plover			**3**		
Piping Plover				**4**	1
Killdeer	**2**			1	
American Avocet		23	**32**	16	4
Willet	**4**	4	4		1
Marbled Godwit	2	**5**	4	4	1
Sanderling		41	69	**223**	
Pectoral Sandpiper		**2**			
Baird's Sandpiper		**10**			
Semipalmated Sandpiper		**186**	5	140	
Least Sandpiper	**1**		1		
Stilt Sandpiper		**1469**	405		
Shorebird−small	19	50	30		
Dowitcher spp.	**15**				
Wilson's Snipe	**2**				
Red-necked Phalarope	24	**57**	28		
Total shorebirds	69	1847	581	388	7

***Bold numbers indicate species peak count during migration period**

4.1.4 Gillespie Lake, Alberta

A pair of Piping Plover was observed on Gillespie Lake (Figure 1, Appendix 8) on 16 May 1984, as well as 2500 Semipalmated Sandpipers of a total of 2834 shorebirds (Wershler and Wallis 1987, Wershler 1987). Additional surveys on 16 May 1986 noted the presence of 2,750 Semipalmated Sandpipers (Wershler 1987). Ground surveys were conducted on Gillespie Lake and a peak of 2025 shorebirds including 225 Baird's Sandpipers was noted in September of 1987 (Wershler 1987). Ground surveys conducted on 21 May 1988 provided a count of 10,000 Stilt Sandpipers among the 16,854 shorebirds observed on the lake (Morrison et al .1995). The water must have been extremely shallow that spring, as Gillespie Lake was reported dry on 1 June 1988 during aerial surveys by Dickson (CWS unpubl. data).

Gillespie Lake was surveyed for shorebirds once during the spring 1995 aerial surveys (Table 10). An initial ground survey of Gillespie Lake on 21 May 1995 found the basin to be mostly dry, so no further ground surveys were conducted on this wetland.

Ground surveys were resumed in the spring 1996 with somewhat improved water conditions from the melt of the accumulated winter snow, but shorebird use was generally poor during the three survey days in May (Table 11).

Gillespie Lake would not be considered a very good shorebird lake and is likely used intermittently when conditions are suitable. The very nature of the lake occurring in a narrow

valley means the shoreline would be narrow during high water periods with limited habitat on the open and broad ends of the valley or during periods of low water throughout the entire basin.

Table 10. Gillespie Lake 1995 spring aerial shorebird survey

Species	May 9
American Avocet	2
Willet	2
Shorebird–small	15
Shorebird–large	17
Total shorebirds	36

Table 11. Shorebirds observed on Gillespie Lake, Alberta in the spring of 1996

Species	May 19	May 23	May 27
Black-bellied Plover	2	61	
Killdeer	3	2	
American Avocet	6	5	1
Willet	3	1	1
Marbled Godwit		3	3
Red Knot		2	
Sanderling	50	2	
Baird's Sandpiper		9	
Semipalmated Sandpiper		15	
Shorebird−small	17	226	5
Total shorebirds	81	326	10

4.1.5 Gooseberry Lake, Alberta

Two pairs of Piping Plovers were located on Gooseberry Lake (Figure 1, Appendix 9) on 14 June 1986 (Wershler and Wallis 1987). During the 1987 spring aerial surveys of Gooseberry Lake, 4310 shorebirds were observed, including 3545 Red-necked Phalaropes and 13 American Avocets (Smith and Dickson 1989). The 1987 ground surveys observed 7500 Red-necked Phalaropes in May and 10,000 Red-necked Phalaropes in August on Gooseberry Lake (Wershler 1987, Smith and Dickson 1989). Aerial surveys on 1 June 1988 recorded 1775 shorebirds on the lake, including 165 Red-necked Phalaropes and 52 American Avocets (CWS unpubl. data). Further ground surveys located 13,503 shorebirds in the spring of 1988 and 14,719 shorebirds, including 2500 Sanderlings, in the spring of 1989 (Morrison et al. 1995).

During this study, the aerial survey on 23 May 1995 (Table 12) was the only survey conducted on Gooseberry Lake. Shorebird numbers were low during the aerial survey, at a time when numbers should have been high, and during a site visit on the ground, habitat conditions did not appear suitable for shorebirds.

The Provincial Park on the northwest corner of the lake provides access to recreational activity on and around the lake and likely influences shorebird use of the basin. The lake had a narrow

band of alkaline sandy shoreline when we visited the lake in the spring of 1995 and minimal shorebird activity was evident on the basin. No further checks were made of the lake during 1995 and it was not visited in the spring of 1996.

Table 12. Gooseberry Lake 1995 spring aerial shorebird survey

Species	May 23
Killdeer	3
American Avocet	1
Willet	4
Marbled Godwit	3
Shorebird–small	2
Shorebird–medium	6
Shorebird–other	65
Total shorebirds	84

4.1.6 Killarney and Leane Lakes, Alberta

During the spring of 1984, there were 17,170 shorebirds observed on Killarney (Figure 1, Appendix 10) and Leane (Figure 1, Appendix 11) lakes combined including 10,000 Semipalmated Sandpipers, 5000 Stilt Sandpipers and 2000 Red-necked Phalaropes on Killarney Lake (Morrison et al. 1995, CWS unpubl. data). Repeat visits to Leane Lake in May from 1984 to 1987 found limited shorebird use of the basin with a peak of 110 birds, which included 108 Stilt Sandpipers on 18 May 1986 (Wershler 1987). Further shorebird observations on these lakes were part of the extensive 1987 surveys, and during the spring aerial surveys, 6121 shorebirds were recorded including 6050 Red-necked Phalaropes on Killarney Lake and 88 shorebirds including 12 American Avocets on Leane Lake (Smith and Dickson 1989). Aerial surveys on 1 June 1988 located 322 shorebirds on Killarney Lake and 273 shorebirds on Leane Lake (CWS unpubl. data). Shorebirds were again surveyed on Killarney Lake in the spring of 1989 and 27,542 birds were observed (Morrison et al. 1995).

Shoreline habitat was abundant and suitable for shorebirds on both lakes during a site visit in April 1995. On 26 May 1995, the west basin of the Killarney Lake group was nearly dry and by 30 May, it had dried up. Leane Lake had extremely low water conditions and was likely to be dry in July.

The only aerial survey effort on these lakes occurred on 9 May (Table 13) and shorebird numbers were extremely low. The low count was likely a result of the early timing of the survey, which is prior to the period when most migrant shorebirds move through the area. This was confirmed by the increase in numbers later in May during the ground surveys.

The 1995 spring ground surveys on both Killarney Lake (Table 14) and Leane Lake (Table 15) resulted in peak one-day counts of 3,292 shorebirds and 2,003 shorebirds respectively, but on different dates. Red-necked Phalaropes and Semipalmated Sandpipers were the most abundant species on Killarney Lake on 22 May, with Red-necked Phalaropes recorded as the most abundant species the next survey date, 26 May on Leane Lake. The peak species count during the spring surveys was 3586 shorebirds on Killarney Lake and 2094 shorebirds on Leane Lake.

Table 13. Leane Lake 1995 spring aerial shorebird survey

Species	May 9
Killdeer	1
American Avocet	1
Shorebird–small	78
Shorebird–medium	7
Total shorebirds	87

Table 14. Shorebirds observed on Killarney Lake, Alberta in the spring of 1995

Species	May 14	May 18	May 22	May 26	May 30	June 3
Black-bellied Plover						**1**
Piping Plover	15	15	14	20	18	**21**
Semipalmated Plover		**11**		2		
Killdeer	4	4	5	**7**	6	3
American Avocet	17	24	34	39	45	**94**
Willet		2	**4**		1	1
Marbled Godwit	**2**		2			
Ruddy Turnstone				**3**		
Red Knot				**6**		
Sanderling		329	**599**	43		8
Pectoral Sandpiper			**1**			
White-rumped Sandpiper			**1**			
Baird's Sandpiper	9	28	**65**	52	12	
Semipalmated Sandpiper		80	**1187**	65		1
Least Sandpiper		**2**				
Stilt Sandpiper		**152**	141			
Shorebird−small	12	97	54	54		
Dowitcher spp.		**230**				
Wilson's Phalarope		**25**	10			
Red-necked Phalarope		413	**1175**	29		
Total shorebirds	59	1412	3292	320	82	129

***Bold numbers indicate species peak count during migration period**

Table 15. Shorebirds observed on Leane Lake, Alberta in the spring of 1995

Species	May 14	May 18	May 22	May 26	May 30	June 3
Black-bellied Plover			2	**7**		2
Piping Plover	**1**					
Killdeer	**4**	2	2			
American Avocet	11	30	**39**	30	3	3
Willet			1		**2**	
Sanderling			**53**	35		
Baird's Sandpiper			**44**	40		

Species	May 14	May 18	May 22	May 26	May 30	June 3
Semipalmated Sandpiper			**145**	92		
Stilt Sandpiper			45	**274**		
Shorebird−small			16			
Red-necked Phalarope			109	**1525**		
Total shorebirds	16	32	456	2003	5	5

***Bold numbers indicate species peak count during migration period**

Fall surveys were conducted on Killarney Lake in 1995 but Leane Lake was dry (Table 16). The daily counts of shorebirds were much lower on Killarney Lake during the 8 surveys and American Avocets were the most abundant species reaching their peak numbers on 16 August. The species peak total during this migration period was 1419 shorebirds.

Water conditions were suitable in the spring of 1996 on both lakes, and surveys were resumed on both lakes. The shorebirds appeared to be moving between these two lakes in their use because peak numbers varied between the lakes from survey to survey (Table 17, Table 18). Three species of shorebirds, including Sanderling, Stilt and Semipalmated Sandpipers, were the most abundant shorebirds observed during the entire survey period. Both these lakes had occurrences of Piping Plovers that were likely nesting on the shores of the lakes. No surveys were conducted on either lake in the 1996 fall migration period In the spring of 1996, the peak count of all species on Killarney Lake was 2209 shorebirds, while the peak on Leane Lake was 1329 shorebirds.

The two basins varied in their use by shorebirds over the two years of surveys, with Killarney Lake being the preferred of the two basins. Killarney Lake had wide bands of open shoreline around the entire perimeter, with several small sandbar islands used by nesting American Avocets, and gravel patches higher up the lake's shoreline for nesting Piping Plovers.

Table 16. Shorebirds observed on Killarney Lake, Alberta in the fall of 1995

Species	July 11	July 18	July 25	August 2	August 11	August 16	August 23	August 30
Black-bellied Plover					5	**40**		
Piping Plover	**24**	22	5					
Semipalmated Plover		**1**						
Killdeer	3	**6**	1	2	2			2
American Avocet	335	538	276	72	471	**820**	35	
Lesser Yellowlegs						**61**		
Willet			1			**7**		
Spotted Sandpiper	**1**							
Marbled Godwit	**2**							
Sanderling		**7**						4
Pectoral Sandpiper		**1**				1		
Baird's Sandpiper		6				50	**58**	
Semipalmated Sandpiper	**266**	40				70	6	
Stilt Sandpiper						**67**		

Species	July 11	July 18	July 25	August 2	August 11	August 16	August 23	August 30
Shorebird−medium						15	25	
Shorebird−small	65	150	12	7	18	69	16	
Red-necked Phalarope	**58**					6		
Total shorebirds	727	742	289	79	489	1166	140	4

***Bold numbers indicate species peak count during migration period**

Table 17. Shorebirds observed on Killarney Lake, Alberta in the spring of 1996

Species	May 14	May 18	May 22	May 26	May 30
Piping Plover	**6**	4	8	3	1
Killdeer	**10**	5		2	
American Avocet	15	17	11	**19**	4
Lesser Yellowlegs	**14**				
Willet	4	**7**	3	2	
Marbled Godwit	2	**3**	3		
Ruddy Turnstone				**4**	
Sanderling	10	**778**	233	47	519
Pectoral Sandpiper		**1**			
Baird's Sandpiper	21	**82**			
Semipalmated Sandpiper	106	350	18	**1093**	103
Stilt Sandpiper		**12**		1	
Shorebird−small	76	40	9	10	1000
Dowitcher spp.	**10**				
White-rumped Sandpiper				**80**	
Red-necked Phalarope	**90**	5	1		
Total shorebirds	348	1295	278	1256	1626

***Bold numbers indicate species peak count during migration period**

Table 18. Shorebirds observed on Leane Lake, Alberta in the spring of 1996

Species	May 14	May 18	May 22	May 26	May 30
Black-bellied Plover			**1**		
Piping Plover		**2**			
Killdeer	**2**		1	2	
American Avocet	**30**	17	14	8	
Lesser Yellowlegs	**13**				
Willet	1	1	**2**		
Marbled Godwit		**1**	1	1	
Sanderling	15		**689**	1	62
Pectoral Sandpiper			**1**		
Baird's Sandpiper		2	**4**		
Semipalmated Sandpiper		16	**86**	4	3

Species	May 14	May 18	May 22	May 26	May 30
Stilt Sandpiper			**406**		
Shorebird−small	125	80	42	24	
Wilson's Snipe		**1**	1		
Wilson's Phalarope	**13**				
Red-necked Phalarope	40	**78**	46		
Total shorebirds	239	198	1294	40	65

***Bold numbers indicate species peak count during migration period**

4.1.7 Metiskow wetland, Alberta

Aerial surveys of Metiskow wetland (Figure 1, Appendix 12) on 1 June 1988 resulted in the observation of 700 shorebirds (CWS unpubl. data). There were 17,703 shorebirds observed during ground surveys of Metiskow wetland in May 1988, including 10,000 Baird's Sandpipers and 5,000 Semipalmated Sandpipers. May 1989 (Morrison et al. 1995) resulted in 13,487 shorebird observations.

The wetland was checked once during the spring aerial survey effort in 1995, and on 23 May there were 800 small shorebirds recorded. The peak ground survey count was recorded on 27 May, with Sanderlings and Semipalmated Sandpipers accounting for most of the birds (Table 19). During the survey of Metiskow wetland on 31 May 1995, water levels were very low and overall conditions were quite poor as was evident with the few shorebirds that were observed on the basin.

Peak species counts indicated a minimum of 3164 shorebirds used the basin in the spring of 1995. Fall 1995 migration surveys were not conducted due to low water conditions, but were resumed in spring 1996. Daily counts were much lower in 1996, but Sanderling and Semipalmated Sandpiper were again the most abundant species (Table 20). The species peak count for the spring was 1333, which is down from 1995 by about 57%. No surveys were conducted in fall 1996.

The Metiskow wetland was a very small, shallow, flat-bottomed ephemeral basin surrounded by aspen bluffs and located in pasture land. Water conditions in the basin were greatly influenced by available precipitation. Shorebird use was mainly restricted to the spring when snow melt provided suitable water conditions in the basin for migrant shorebirds, which was evident from the survey results during the two years.

Table 19. Shorebirds observed on Metiskow wetland, Alberta in the spring of 1995

Species	May 19	May 23	May 27	May 31	June 4
Piping Plover	**1**		1		
Semipalmated Plover	**9**				
Killdeer	1	3	**4**	1	1
American Avocet	2	**3**	3	2	2
Marbled Godwit	**2**		2		

Species	May 19	May 23	May 27	May 31	June 4
Sanderling	9	183	**880**		
White-rumped Sandpiper		**1**			
Baird's Sandpiper	165	**741**	11	12	
Semipalmated Sandpiper	899	1106	**1430**		
Least Sandpiper	**53**				
Stilt Sandpiper		**2**			
Wilson's Snipe	**3**		1	1	
Wilson's Phalarope		**1**			
Red-necked Phalarope	30	**34**	4	3	
Total shorebirds	1174	2074	2336	19	3

***Bold numbers indicate species peak count during migration period**

Table 20. Shorebirds observed on Metiskow wetland, Alberta in the spring of 1996

Species	May 15	May 19	May 23	May 27	May 31
Piping Plover			2	**3**	2
Killdeer	2	**4**	2	3	4
American Avocet	4	5	**27**	16	37
Willet		**1**		1	
Marbled Godwit			**2**		
Sanderling	139	266	423	213	**650**
Pectoral Sandpiper	**2**				
White-rumped Sandpiper				**9**	
Baird's Sandpiper			**8**	8	
Semipalmated Sandpiper		**504**	362	394	55
Stilt Sandpiper			**14**	1	
Shorebird−small	29			42	
Wilson's Snipe	**4**		2	2	1
Red-necked Phalarope	1	20	63		**105**
Total shorebirds	181	800	905	692	854

***Bold numbers indicate species peak count during migration period**

4.1.8 Reflex Lake, Alberta–West Basin (Salt Lake)

In the surveys conducted in 1995 and 1996, the large unnamed basin to the east of Reflex Lake and located entirely in Saskatchewan was labelled as Reflex Lake–East. Reflex Lake–West (Figure 1, Appendix 13) straddles the border with part of the basin in Alberta and part in Saskatchewan. All references in the literature (published and unpublished) refers to the western basin or Salt Lake, as it is locally known. During the 1987 aerial survey effort, it is not clear if both basins were separated or counted as one basin, but it appears that the ground surveys were focused entirely on the west basin. Reflex Lake is part of the Manitou Lake Area IBA (IBA website).

Surveys for Piping Plover on Reflex Lake recorded 15, 26 and 38 adults in May 1984, 1985 and 1986, respectively (Wershler and Wallis 1987). Observations of 2000, 3100 and 1500−2000 Sanderlings were recorded on 17 May 1984, 26 May 1985 and 18 May 1986, respectively (Wershler 1987). Spring aerial surveys on Reflex Lake recorded 3277 shorebird observations in 1987, while ground surveys in May 1987 had records of 1186 shorebirds including 1000 Sanderlings (Wershler 1987, Smith and Dickson 1989). Aerial surveys of the region on 1 June 1988 found 5683 shorebirds on Reflex Lake including 3395 Red-necked Phalaropes and 127 American Avocets (CWS unpubl. data). Surveys were resumed in May 1989 on the lake, and a total of 35,948 shorebirds were observed including 10,000 Red-necked Phalaropes and 20,000 Sanderlings (Morrison et al. 1995).

Aerial surveys of the region in spring 1995 found a minimal number of shorebirds (Table 21) possibly due to the early date of the flight. No further flights over the lake were made that spring, or the following year due to logistical issues.

Ground surveys started in mid-May found numerous shorebirds on the wetland, and Sanderlings accounted for the vast majority with their peak number occurring on 2 June (Table 22). Semipalmated Sandpiper and Red-necked Phalarope numbers reached their peak on 25 May. The sighting of a Snowy Plover on 29 May was unusual for the area. The peak species count for the spring 1995 migration period was 6854 shorebirds.

Surveys during the 1995 fall migration period showed shorebird wetland use to be greatly reduced from the spring migration (Table 23). The Semipalmated Sandpiper, an Arctic migrant, was the most abundant migrant species, numbering less than 200 at its peak. The American Avocet, a local breeding species, was the most abundant shorebird reaching its peak on 10 August. The highest daily count of shorebirds was on 23 August at 670 shorebirds, considerably less compared to over 4000 in the spring. The peak species count during the fall migration was 1154 shorebirds, an 80% drop from the spring surveys.

Surveys resumed in spring 1996, and although the numbers were higher than the previous fall, they were lower than observed in spring 1995 (Table 24). Sanderlings were again the most abundant species, and their peak numbers were reached on 26 May. Red-necked Phalaropes were the next most abundant species, and their numbers peaked on 22 May. The peak count of all species for the spring of 1996 was 2924 shorebirds. Surveys were not conducted in the 1996 fall migration period.

Table 21. Reflex Lake−West 1995 spring aerial shorebird survey

Species	May 9
Black-bellied Plover	2
Killdeer	1
American Avocet	6
Yellowlegs spp.	2
Willet	1
Marbled Godwit	11
Shorebird–small	1

Species	May 9
Shorebird–medium	4
Shorebird–large	3
Total shorebirds	31

Table 22. Shorebirds observed on Reflex Lake−West, Alberta in the spring of 1995

Species	May 13	May 17	May 21	May 25	May 29	June 2	June 5
Black-bellied Plover	6	16	**69**	26	17	28	
American Golden Plover	8	1		1	**38**		
Piping Plover	10	7	11	12	15	**19**	4
Semipalmated Plover		**5**	3	2			
Snowy Plover					**1**		
Killdeer	15	**20**	10	9	19	11	7
American Avocet	16	**29**	24	18	29	25	25
Willet	1	1	1	1	1	**4**	2
Spotted Sandpiper				**1**			
Long-billed Curlew	2			2	3	**4**	3
Marbled Godwit	**32**	22	18	21	18	10	4
Ruddy Turnstone			3	**18**	2		
Red Knot		1	2	15	**25**	5	
Sanderling	21	2879	1334	2991	1481	**3453**	337
Pectoral Sandpiper				**1**			
White-rumped Sandpiper						**3**	
Baird's Sandpiper	3	**502**	22	45		2	
Semipalmated Sandpiper		478	12	**632**	68	18	
Least Sandpiper		**3**		1			
Shorebird−small	200	83		7			
Wilson's Snipe	1	**2**	2		2	2	
Wilson's Phalarope		**5**				2	
Red-necked Phalarope			698	**1988**	21		
Total shorebirds	276	4005	2116	5741	1650	3528	371

***Bold numbers indicate species peak count during migration period**

Table 23. Shorebirds observed on Reflex Lake−West, Alberta in the fall of 1995

Species	July 12	July 19	July 26	August 3	August 10	August 16	August 23	August 30
Black-bellied Plover					43	**67**	37	8
Piping Plover	9	**20**	20	16		1	2	3
Semipalmated Plover			**11**			8	3	2
Killdeer	8	11	13	11	14	**17**	13	8
American Avocet	23	40	18	27	**248**	56	166	57
Greater Yellowlegs		4					**26**	
Lesser Yellowlegs	1	5	25	1	41	130	**166**	51
Solitary Sandpiper					**1**			

Species	July 12	July 19	July 26	August 3	August 10	August 16	August 23	August 30
Willet	28	31	**44**	27	26	22	13	4
Spotted Sandpiper		**2**	1	1				
Marbled Godwit	**22**	4	2	1	7	1		
Sanderling		**10**			5	8	14	15
Pectoral Sandpiper						23	32	**58**
White-rumped Sandpiper						**7**		
Baird's Sandpiper			3	2	10	52	**97**	
Semipalmated Sandpiper	39		3		69	**193**	20	
Least Sandpiper						2	**73**	4
Stilt Sandpiper		1				**24**	23	7
Shorebird−small		7	2		7		29	2
Dowitcher spp.					**2**			
Buff-breasted Sandpiper						1	**2**	
Wilson's Snipe	2	2				**12**		
Wilson's Phalarope			1				**9**	7
Red-necked Phalarope					21	18		**43**
Total shorebirds	115	106	99	59	437	549	670	248

***Bold numbers indicate species peak count during migration period**

The observation of several Long-billed Curlews is unusual and likely represents the northern limits of the breeding range for the species in Alberta (Dugger and Dugger 2002). Comparison of the peak species counts for the two spring migration periods showed a decline of about 57% in shorebird numbers from 1995 to 1996.

Table 24. Shorebirds observed on Reflex Lake−West, Alberta in the spring of 1996

Species	May 14	May 18	May 22	May 26	May 30
Black-bellied Plover		**17**	11	1	
Piping Plover	20	15	**24**	13	24
Semipalmated Plover	**17**				
Killdeer	6	4	6	**9**	2
American Avocet	**32**	10	2	12	22
Willet	2	**7**	1		
Spotted Sandpiper		**1**			
Long-billed Curlew	**3**	2			1
Marbled Godwit	**28**	20	7	8	9
Red Knot	4	**9**		1	
Sanderling	575	1472	1279	**1872**	580
Dunlin			**2**		

Species	May 14	May 18	May 22	May 26	May 30
White-rumped Sandpiper			1	**5**	1
Baird's Sandpiper	**22**				
Semipalmated Sandpiper		176	57	**286**	120
Least Sandpiper		**29**	6		
Stilt Sandpiper		**3**			
Shorebird−small	542		38	10	31
Dowitcher spp.	**2**				
Wilson's Snipe			**1**		1
Red-necked Phalarope		33	**555**	353	40
Total shorebirds	1210	1762	1949	2547	805

***Bold numbers indicate species peak count during migration period**

4.1.9 Sunken Lake, Alberta

Piping Plovers were observed on Sunken Lake (Figure 1, Appendix 14) during surveys in May 1983, 1985 and June 1986 (Wershler and Wallis 1987). A visit to the basin on 26 May 1983 resulted in the observation of 4000–5000 shorebirds including 2000−3000 Sanderlings, hundreds of Baird's Sandpipers and 100+ White-rumped Sandpipers (Wershler 1987). There were 4750 Sanderlings observed on the basin on 26 May 1985 (Wershler 1987). Ground survey observers on Sunken Lake recorded 4000 shorebirds in September 1987 (Wershler 1987). During aerial surveys on 1 June 1988, the lake was recorded as dry (CWS unpubl. data).

During the 1995 spring aerial surveys of the region, one large shorebird was observed on 9 May. No shorebirds were observed during the aerial survey on 23 May, but ground surveys the same day located 25 shorebirds including 7 Piping Plovers (Table 25). On 31 May, the basin was almost dry but had a few shorebirds. Fall surveys were not conducted due to drought conditions.

Shorebird surveys resumed in spring 1996. Winter snow melt improved water levels and shorebird numbers were up from the previous spring (Table 26). Stilt and Semipalmated Sandpipers and Red-necked Phalaropes were the most abundant species of shorebirds using the wetland, but their peak numbers occurred on different survey days. Piping Plover were again observed using the wetland and likely nested on the adjacent shoreline. The peak species count during the spring 1996 migration period was 1331 shorebirds, and although not a large number, it was substantially larger than that observed in 1995. Fall 1996 shorebird migration surveys were not conducted.

The use or suitability of Sunken Lake by local nesting species is limited due to the dynamic nature of water levels. It may only be beneficial to spring migrants when snow melt provides suitable wetland conditions.

Table 25. Shorebirds observed on Sunken Lake, Alberta in the spring of 1995

Species	May 23	May 31	June 4
Black-bellied Plover	1		
Piping Plover	7	3	
Killdeer	1	1	
Willet		1	2
Marbled Godwit	1		
Sanderling	14		
Semipalmated Sandpiper	1	3	
Total shorebirds	25	8	2

Table 26. Shorebirds observed on Sunken Lake, Alberta in the spring of 1996

Species	May 15	May 19	May 23	May 27	May 31
Black-bellied Plover			**4**		
Piping Plover	**4**	1	1	1	2
Killdeer	2	**3**	2	2	1
American Avocet	4	2	2	**21**	5
Willet			**3**	1	
Marbled Godwit	**15**	2	11	5	5
Sanderling		33	94	**165**	1
Baird's Sandpiper		**16**			
Semipalmated Sandpiper	12	**463**	18	127	
Stilt Sandpiper		5	**400**		
Shorebird− small	53	63	45	4	
Wilson's Snipe	**1**				
Red-necked Phalarope	150	4	**236**	1	
Total shorebirds	235	588	809	324	11

***Bold numbers indicate species peak count during migration period**

4.1.10 Ethmuir Lake, Saskatchewan

An aerial survey of Ethmuir Lake (Figure 1, Appendix 15) in May 1987 recorded 199 shorebirds on the wetland, including 3 American Avocets (Smith and Dickson 1989). During aerial surveys of Ethmuir Lake on 1 June 1988, no shorebirds were observed (CWS data).

Few shorebirds were observed during the aerial survey in early May 1995, but numbers increased on the subsequent survey (Table 27). During ground surveys later in May, shorebird numbers had again increased (Table 28). Red-necked Phalaropes were again the highest recorded species on the wetland followed by Stilt and Semipalmated Sandpipers on the first ground survey on 27 May. Shorebird numbers declined rapidly as the migrants departed the area; however, the peak species count for the spring of 1995 was 2118 shorebirds. Fall 1995 surveys were not conducted due to drought.

Surveys were not conducted the following spring because conditions did not improve.

Ethmuir Lake is an ephemeral wetland, and poor precipitation in the region during the past couple of years limited its use over the survey period. The fact that a large number of shorebirds were observed on 27 May 1995 indicates that the basin is used by shorebirds when conditions are suitable, especially in the spring migration period.

Table 27. Ethmuir Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22
Killdeer	2	
American Avocet	20	9
Yellowlegs spp.		2
Willet	4	
Shorebird–small		3
Shorebird–medium		8
Shorebird–other		829
Total shorebirds	26	851

Table 28. Shorebirds observed on Ethmuir Lake, Saskatchewan in the spring of 1995

Species	May 27	May 31	June 4
Killdeer	3	**4**	2
American Avocet	11	35	**38**
Willet		1	**2**
Marbled Godwit		1	**4**
Sanderling		**25**	
Baird's Sandpiper	**11**		
Semipalmated Sandpiper	**315**	72	
Stilt Sandpiper	**490**		
Dowitcher spp.	**1**		
Wilson's Snipe			**1**
Wilson's Phalarope		**27**	27
Red-necked Phalarope	**1200**	7	
Total shorebirds	2031	172	74

***Bold numbers indicate species peak count during migration period**

4.1.11 Freshwater Lake, Saskatchewan

During the 1987 spring aerial surveys of Freshwater Lake (Figure 1, Appendix 16), observers recorded 190 shorebirds on the basin (Smith and Dickson 1989). Aerial surveys on 1 June 1988 located 675 shorebirds on Freshwater Lake, including 62 American Avocets (CWS unpubl. data).

Freshwater Lake is a large body of water divided into two basins and is located in a large community pasture with rolling terrain, aspen bluffs and extremely sandy soil. It is part of the

Manitou Lake Area IBA site and is somewhat protected because entry to the community pasture is limited and permission required; vehicle access was poor and confined to a few narrow, sandy trails. Freshwater Lake was not surveyed during the regional aerial survey of spring 1995. A preliminary ground visit was conducted in April 1995 to check access and condition of the wetland. Freshwater Lake had large expanses of exposed mudflats or bare sand/alkaline shoreline, suitable for shorebirds, around the north basin, but the south basin was not viewed at that time so conditions were unknown.

Ground surveys commenced in early May, and shorebird numbers increased with each successive survey until the peak was reached on 29 May (Table 29).

Table 29. Shorebirds observed on Freshwater Lake, Saskatchewan in the spring of 1995

Species	May 13	May 17	May 21	May 25	May 29	June 2	June 5
Black-bellied Plover	2	4	5	4	**9**	5	2
Piping Plover	6	1	4	5	3	10	**15**
Semipalmated Plover	**7**	4			2		
Killdeer	3	**11**	10	7	2	9	8
American Avocet	78	101	**162**	151	86	68	76
Lesser Yellowlegs					**1**		
Willet	**6**	6	4	4	1	8	8
Spotted Sandpiper				**2**			
Long-billed Curlew	5	**6**	4	2	1		1
Marbled Godwit	**14**	7	7	5	3	5	4
Ruddy Turnstone				**1**			
Red Knot				1	**2**		
Sanderling	3		442	445	**2650**	1898	1015
Pectoral Sandpiper				**3**			
White-rumped Sandpiper					**17**		
Baird's Sandpiper	**365**	148	86	230	101		
Semipalmated Sandpiper	46	334	445	1146	**1505**	150	22
Stilt Sandpiper		221	111	**243**	98		
Shorebird− small	380	33	36	15	155		6
Wilson's Phalarope			1	1		2	**5**
Red-necked Phalarope		21	865	**1307**	1172	225	35
Total shorebirds	915	897	2182	3572	5808	2380	1197

***Bold numbers indicate species peak count during migration period**

Baird's Sandpiper, an early migrant, peaked on 13 May while American Avocet peaked on 21 May. Stilt Sandpipers and Red-necked Phalarope reached their highest on 25 May, while Sanderling and Semipalmated Sandpipers were the most abundant species on the peak shorebird daily count on 29 May. The observation of Long-billed Curlew was fortunate as this is likely the northern limit of their breeding range in Saskatchewan. The species peak count during the spring migration period was 6331 shorebirds.

Fall surveys were initiated in mid-July and shorebird numbers peaked in mid-August

(Table 30). American Avocet numbers fluctuated with peaks on 27 July and 24 August and likely represent birds staging on the wetland from the surrounding areas for a short period before commencing migration. It was noteworthy that Sanderlings, which were abundant in the spring, did not use the lake in the fall in any large numbers. The Semipalmated Sandpiper was the most abundant migrant shorebird during the complete survey schedule and reached a peak of 1113 birds on 12 August. The total for the species counts was 2589 shorebirds, which was a drop of almost 60% from the spring period.

Table 30. Shorebirds observed on Freshwater Lake, Saskatchewan in the fall of 1995

Species	July 13	July 20	July 27	August 3	August 12	August 24
Black-bellied Plover		3	1	**24**	11	3
American Golden Plover			**1**			
Piping Plover					**3**	
Semipalmated Plover		60	11	73	71	**92**
Killdeer	2	15	2	1	**16**	9
American Avocet	419	719	835	303	320	**875**
Greater Yellowlegs			**5**			4
Lesser Yellowlegs	7	23	**116**	106	45	92
Willet		**13**	5	3	1	
Spotted Sandpiper		2		**3**		1
Marbled Godwit		**1**		1		
Sanderling				1	**24**	2
Pectoral Sandpiper				**16**	13	
Baird's Sandpiper	6	38	90	53	**114**	30
Semipalmated Sandpiper	2	251	117	394	**1113**	518
Least Sandpiper					**6**	
Stilt Sandpiper			27	**38**		
Shorebird−small			40	35	45	37
Wilson's Snipe					**1**	
Wilson's Phalarope		2		2	**3**	
Red-necked Phalarope	**125**	15		4	10	
Total shorebirds	434	1049	1235	955	1685	1559

***Bold numbers indicate species peak count during migration period**

Table 31. Shorebirds observed on Freshwater Lake, Saskatchewan in the spring of 1996

Species	May 14	May 18	May 22	May 26	May 30
Black-bellied Plover		1		**4**	1
Piping Plover		5		**12**	12
Semipalmated Plover	**10**			1	
Killdeer	4	2	4	2	**5**
American Avocet	38	105	78	161	**177**
Yellowlegs species	**2**				
Willet	4	3	**10**	4	3
Marbled Godwit	1	**4**	3	3	4
Ruddy Turnstone			**1**		

Species	May 14	May 18	May 22	May 26	May 30
Sanderling		408	1088	1571	**2877**
Dunlin			**1**		
Pectoral Sandpiper	**1**				
White-rumped Sandpiper					**1**
Baird's Sandpiper	2	13	**82**	36	
Semipalmated Sandpiper	391	965	1051	**1143**	118
Stilt Sandpiper		60	33	**165**	88
Shorebird−small	110	10	293	105	16
Dowitcher spp.	**14**				
Wilson's Snipe	1	**2**			2
Wilson's Phalarope			**1**		
Red-necked Phalarope	25	753	300	**2511**	712
Total shorebirds	589	2323	2941	5699	3998

***Bold numbers indicate species peak count during migration period**

Shorebird ground surveys resumed in spring 1996 and the highest daily count was reached on 26 May. Semipalmated Sandpiper and Red-necked Phalarope numbers peaked on this date as well (Table 31). Sanderling numbers continued to rise through the spring and peaked on 30 May at 2877 birds. The presence of Piping Plover during both spring surveys indicated that the species traditionally used the wetland as a breeding lake when conditions were favourable. The spring 1996 species peak count total was 7023 shorebirds, about 10% higher than in 1995. The presence of large numbers of local breeding and northern migrant shorebirds during the spring and fall survey periods indicated that Freshwater Lake had suitable habitat as well as non-disturbance features that were favourable conditions for shorebirds. No fall surveys were conducted in 1996 on Freshwater Lake.

4.1.12 Grass Lake, Saskatchewan

Grass Lake (Figure 1, Appendix 17) was visited in April 1995, and most of the shoreline appeared to be flooded with water well into the vegetated area. However, there was a large expanse of shallow water/mudflat zone along the north and northeast shore of the basin that appeared to be suitable for shorebird use.

Historical records of shorebird observations were not located for Grass Lake. During the 1995 spring aerial surveys, shorebird numbers increased with each successive survey (Table 32). Red-necked Phalarope was the most abundant shorebird identified on the wetland basin.

Spring 1995 ground surveys were initiated on Grass Lake late in the migration period, and numbers peaked on 26 May (Table 33). Semipalmated Sandpipers and Red-necked Phalaropes represented the two largest cohorts of shorebirds on that peak day count. Sanderling peaked at the end of May, which is typical of this late migrant shorebird. Stilt Sandpiper numbers were their highest on the same day as Sanderlings. The banks of the shoreline are fairly steep, and few prairie breeding shorebirds were recorded on this wetland, implying unsuitable conditions for local breeding species. The peak species count for the spring migration period was 4753 shorebirds. Fall surveys were not conducted in 1995 on Grass Lake because the basin was nearly dry.

Spring surveys in 1996 were started earlier on 18 May, but shorebird numbers failed to increase much over the four survey dates (Table 34). There was not much runoff from snow melt in the area, water levels were extremely low and habitat conditions appeared poor in the basin. No surveys were conducted in the fall of 1996.

The reduction in shorebird numbers between the two spring surveys and the minimal number of local prairie breeding species indicates that the wetland is used opportunistically by migrant species when conditions are favourable. Shorebird use appeared limited to the spring migration period because of the lack of water in the basin during the fall migration.

Table 32. Grass Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22	May 31
American Avocet	26	25	12
Yellowlegs spp.		4	
Willet	3		
Red-necked Phalarope		1000	650
Shorebird–small		290	
Shorebird–medium		15	107
Shorebird–large		1	1
Shorebird–other		1495	2351
Total shorebirds	29	2830	3121

Table 33. Shorebirds observed on Grass Lake, Saskatchewan in the spring of 1995

Species	**May 22**	**May 26**	**May 30**	**June 3**
Black-bellied Plover	48	**86**	23	
American Golden Plover			**1**	
American Avocet	45	56	20	**79**
Lesser Yellowlegs	**2**			
Willet	2	1	4	**13**
Marbled Godwit		**1**		
Red Knot	**1**	1		
Sanderling	260	121	**1647**	346
White-rumped Sandpiper		**60**		
Baird's Sandpiper	11	**220**	74	
Semipalmated Sandpiper	605	**1150**	227	
Stilt Sandpiper	2	220	**445**	
Shorebird−medium	150	77		
Shorebird−small	650	745		3
Wilson's Phalarope				**15**
Red-necked Phalarope	47	**1033**	431	
Total shorebirds	1823	3771	2872	456

***Bold numbers indicate species peak count during migration period**

Table 34. Shorebirds observed on Grass Lake, Saskatchewan in the spring of 1996

Species	May 18	May 22	May 26	May 30
Black-bellied Plover		13	30	21
Killdeer		6	2	
American Avocet	29	16	13	34
Willet		6	3	4
Marbled Godwit	2	8		1
Sanderling	5			8
Stilt Sandpiper		6		
Shorebird−small	12	80	31	153
Common Snipe			1	
Wilson's Phalarope	2	2	2	6
Total shorebirds	50	118	50	206

4.1.13 Grill Lake, Saskatchewan

The 1987 spring aerial surveys of the region resulted in the observation of 2934 shorebirds on Grill Lake (Figure 1, Appendix 18) including 100 Red-necked Phalaropes and 17 American Avocets (Smith and Dickson 1989). The lake bed was recorded as dry during aerial surveys on 1 June 1988 and ground surveys 22 May 1989 (CWS unpubl. data).

A dike constructed by Ducks Unlimited Canada separates the basin in two unequal parts with the northern basin being a deep-water marsh with emergent vegetation (bulrush species), and the southern basin a shallow, alkaline basin. The north basin appeared to be flooded into the shoreline vegetation with no mudflats visible during the site visit in April 1995. The southern portion of the lake was completely dry and grassed over in October 1996.

The 1995 spring aerial surveys documented the peak shorebird numbers on 22 May (Table 35), but species identification was not possible for the smaller species. Ground surveys documented the peak daily count on Grill Lake on 26 May, and Stilt Sandpipers comprised over 65% of the total (Table 36). Semipalmated and Baird's Sandpiper as well as Black-bellied Plover numbers added to the peak count on 26 May. Peak species counts during the spring period totalled 7251 shorebirds. No fall surveys were conducted on Grill Lake because of poor water conditions on the basin.

Despite winter snow melt, there was insufficient runoff to improve water conditions on the basin from the previous fall. The result was a reduced use of the basin by migrant and local shorebirds in the spring of 1996 (Table 37). Total shorebird numbers were low during the entire migration period, with no species appearing in any substantial numbers. No fall surveys were conducted for shorebirds in 1996. Grill Lake appears to be another basin that is used opportunistically by shorebirds when conditions are favourable.

Table 35. Grill Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22	May 31
Killdeer	4		6
American Avocet	67	20	40
Yellowlegs spp.	4	2	2
Willet	29	3	15
Marbled Godwit	7	1	
Red-necked Phalarope		250	
Shorebird–small	89		3
Shorebird–medium	49	330	7
Shorebird–large		1	5
Shorebird–other		2492	93
Total shorebirds	249	3099	171

Table 36. Shorebirds observed on Grill Lake, Saskatchewan in the spring of 1995

Species	May 18	May 26	May 30	June 3
Black-bellied Plover	29	**675**	56	26
American Golden Plover	**5**			
Semipalmated Plover		**1**		
Killdeer	**3**			1
American Avocet	**129**	12	89	24
Lesser Yellowlegs	**1**			
Willet	10	2	**16**	7
Marbled Godwit	**12**		6	3
Red Knot	**3**	1	2	
White-rumped Sandpiper		**25**		
Baird's Sandpiper	10	**460**		
Semipalmated Sandpiper	4	**1050**		
Stilt Sandpiper	2	**4750**		2
Shorebird–medium	3			
Shorebird−small	453			
Dowitcher spp.	**14**			
Wilson's Phalarope	**7**			
Red-necked Phalarope		**100**		
Total shorebirds	685	7076	169	63

***Bold numbers indicate species peak count during migration period**

Table 37. Shorebirds observed on Grill Lake, Saskatchewan in the spring of 1996

Species	May 14	May 18	May 22	May 26	May 30
Black-bellied Plover	1	28		31	
Killdeer	1		1	1	
American Avocet	2				
Willet	2	11	2	2	13
Spotted Sandpiper				2	1
Marbled Godwit	2	4	3	1	6
Sanderling			2	2	
Pectoral Sandpiper			5		
White-rumped Sandpiper				1	
Baird's Sandpiper			1		
Semipalmated Sandpiper			8	18	
Stilt Sandpiper			18	3	
Shorebird−medium	16			5	
Shorebird−small	12	25	18		
Wilson's Phalarope				14	16
Red-necked Phalarope			2		155
Total shorebirds	34	40	59	48	191

4.1.14 Killsquaw Lake, Saskatchewan

A site visit to Killsquaw Lake (Figure 1, Appendix 19) during a Piping Plover survey on 26 June 1984 resulted in the observation of 327 shorebirds including 15 Hudsonian Godwits (Harris et al. 1985). Aerial shorebird surveys of Killsquaw Lake in spring 1987 detected 7259 birds on a one-day count (Smith and Dickson 1989). Aerial surveys on 1 June 1988 resulted in the observation of 7259 shorebirds on Killsquaw Lake including 109 American Avocets (CWS unpubl. data). Further ground surveys located a peak one-day count of 5198 shorebirds including 432 Black-bellied Plovers on the lake in the spring of 1989 and 417 Red Knots, 271 Lesser Yellowlegs and 18 Greater Yellowlegs of a total of 785 shorebirds on 14 September 1989 (Canadian Wildlife Service, unpubl. data).

Killsquaw Lake has a salt extraction/mining plant ("Sifto Salt") on the north side of the main lake. A site visit in April 1995 found snow and ice right into the shoreline vegetation of the main lake body, but it did not appear to affect shorebird habitat during the spring migration period. The main lake was dry in October 1996, and the only remaining water was in the deep water basin next to the salt mine plant.

The aerial surveys of Killsquaw Lake in the spring of 1995 identified use of the complex of basins by shorebirds, but there was no indication of which basin was used (Table 38). Shorebird numbers increased over the spring period, and peak numbers were reached on 31 May. Spring ground surveys were initiated on Killsquaw Lake in mid-May (Table 39). The dominant species were Semipalmated and Baird's Sandpiper in the first survey. The survey peak occurred on 31 May, with Sanderling being the most abundant species. The total for the

peak species count in the spring of 1995 was 2371 shorebirds. No fall survey was conducted in 1995 on Killsquaw Lake.

Surveys resumed in the spring of 1996, but limited runoff from the snow melt created poor water conditions and shorebird numbers were much reduced from the previous spring surveys (Table 40). Peak species counts in the spring of 1996 only totalled 143 shorebirds.

Table 38. Killsquaw Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22	May 31
Black-bellied Plover		15	
American Avocet	2	2	32
Willet	2		1
Marbled Godwit	8		
Shorebird–small	50	43	10
Shorebird–medium		36	44
Shorebird–large	4	2	
Shorebird–other	10	377	1032
Total shorebirds	76	475	1119

Table 39. Shorebirds observed on Killsquaw Lake, Saskatchewan in the spring of 1995

Species	May 18	May 23	May 27	May 31	June 3
Black-bellied Plover	4	**39**			
American Avocet	**2**				
Willet			**2**		
Marbled Godwit		**6**	2		2
Sanderling	123			**755**	28
Dunlin	**1**				
Baird's Sandpiper	**408**		185		
Semipalmated Sandpiper	**626**	185	377	185	
Stilt Sandpiper				**188**	
Shorebird−small	78	935	100		
Red-necked Phalarope				**344**	
Total shorebirds	1242	1165	666	1472	30

***Bold numbers indicate species peak count during migration period**

Table 40. Shorebirds observed on Killsquaw Lake, Saskatchewan in the spring of 1996

Species	May 23	May 27	May 31
Black-bellied Plover	**57**	21	
American Golden Plover	**13**		
Piping Plover	**3**	3	
Killdeer		1	**2**
American Avocet	**4**		

Species	May 23	May 27	May 31
Willet	**1**		
Marbled Godwit		**1**	
Red Knot	**9**		
Sanderling		**40**	
Semipalmated Sandpiper		**8**	
Stilt Sandpiper	**5**		
Shorebird−small	59		
Total shorebirds	94	53	2

***Bold numbers indicate species peak count during migration period**

Killsquaw Lake is another basin that is ephemeral in nature and does not have a consistent water base and is likely to grow dry in a number of years. Shorebirds using this basin are likely opportunistic and will stop on the lake when conditions are suitable during the migration period as is evident by the reduced counts. The presence of limited numbers of local breeding shorebirds indicates that the lake is used intermittently for breeding as well.

4.1.15 Landis Lake, Saskatchewan

The earliest record of shorebird use of Landis Lake (Figure 1, Appendix 20) was a single Piping Plover observed on 8 June 1979 (Renaud et al. 2008). Aerial survey personnel on 1 June 1988 located 41 shorebirds on Landis Lake (CWS unpubl. data). Ground surveys for shorebirds on Landis Lake in May 1989 identified a peak of 24,790 shorebirds using the wetland, which included 11,890 Red-necked Phalaropes and 5560 Stilt Sandpipers (Morrison et al. 1995, CWS unpubl. data).

Aerial surveys in the spring of 1995 were initiated early in May, likely before most northern migrants had moved into the area, and the result was a low shorebird count (Table 41). Numbers increased as the spring progressed, and the peak occurred on the last survey day.

Due to the large number of lakes being surveyed, ground surveys were only initiated on Landis Lake after the high count of shorebirds was made on the May 31 aerial survey (Table 42). Sanderlings were the most abundant species observed on the lake during both surveys in the spring of 1995, and the species peak counts totalled 2247 shorebirds.

Shorebird surveys run in the fall of 1995 showed minimal use of the wetland during the first two surveys, with a large proportion of the birds being local prairie breeding species such as the American Avocet and Willet (Table 43). American Avocet numbers continued to increase as the birds staged in preparation for the southward migration. A good number of Pectoral Sandpipers were also observed on the last fall survey. The species peak counts for the fall migration period was 1711 shorebirds.

Landis Lake is a long narrow lake located in a valley or old glacial drainage channel with steep banks and narrow shoreline areas along the sides. The primary shorebird habitat was located on the ends of the lake and was especially prominent when water levels were low, providing extensive mudflats for roosting and feeding shorebirds. The majority of the shorebirds were

observed on the ends of the lake, with the greatest numbers on the north end. The lake is listed as an IBA site, and a portion of the west central shoreline has been designated as critical habitat for the Piping Plover (IBA website).

Table 41. Landis Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22	May 31
Killdeer		1	
American Avocet	8		16
Willet	13	1	1
Shorebird–small	12		1170
Shorebird–medium		20	
Shorebird–other		125	1479
Total shorebirds	33	147	2666

Table 42. Shorebird observations on Landis Lake, Saskatchewan in the spring of 1995

Species	June 3	June 7
Killdeer		**5**
American Avocet	6	**60**
Willet		**14**
Spotted Sandpiper		**2**
Marbled Godwit	**1**	
Sanderling	**1661**	570
White-rumped Sandpiper		**149**
Semipalmated Sandpiper		**282**
Wilson's Phalarope	**3**	
Red-necked Phalarope		**70**
Total shorebirds	1671	1152

***Bold numbers indicate species peak count during migration period**

Table 43. Shorebird observations on Landis Lake, Saskatchewan in the fall of 1995

Species	July 15	July 23	July 30
Black-bellied Plover			**25**
Semipalmated Plover			**3**
Killdeer			**16**
American Avocet	29	130	**336**
Greater Yellowlegs		**20**	
Lesser Yellowlegs		81	**165**
Willet	3	**79**	55
Marbled Godwit		8	**41**
Sanderling		**41**	
Pectoral Sandpiper			**597**

Species	July 15	July 23	July 30
Baird's Sandpiper		20	**113**
Semipalmated Sandpiper		15	**122**
Stilt Sandpiper			**75**
Dowitcher spp.			**3**
Red-necked Phalarope			**75**
Total shorebirds	32	394	1582

***Bold numbers indicate species peak count during migration period**

4.1.16 Manitou Lake, Saskatchewan

Manitou Lake is an important breeding area for Piping Plovers (IBA Canada website), and during surveys on the lake (Figure 1, Appendix 21) there was a count of 27 adults and 166 other shorebirds in June 1984 (Harris et al. 1985) and 111 adults in 1991 (Skeel 1994; Morrison et al. 1995). Spring aerial surveys in 1987 on Manitou Lake recorded 28,702 shorebirds on the basin including 26,530 Red-necked Phalaropes and 15 American Avocets (Smith and Dickson 1989). Aerial survey personnel on 1 June 1988 located 7805 shorebirds, which included 4613 Red-necked Phalaropes and 249 American Avocets (CWS unpubl. data). During ground surveys of Manitou Lake on 20 May 1989, there were 28,806 shorebirds observed, including 26,555 Red-necked Phalaropes, 548 Sanderling and 1202 Semipalmated Sandpipers (CWS unpubl. data, Morrison et al. 1995).

Manitou Lake, part of the Manitou Lake Area IBA site (IBA website), is a large alkaline lake (8000 hectare) surrounded on the west and south sides by large pastures and grazing co-operatives in a rolling, sandy landscape with stunted aspen growth and native grasslands, and cultivated landscape on the north and east sides of the lake. Steep banks along the shoreline reduced disturbance along the east and north sides, while limited and restricted access on the south and west side provided ample protection from disturbance of roosting and feeding shorebirds. The shoreline was quite variable from narrow bands around most of the lake to broad expanses on the large island in the south-central portion of the lake, and the large basins adjoining the main lake on the south and west sides provided excellent roosting and feeding areas for shorebirds.

During the 1995 spring aerial surveys of Manitou Lake, large numbers of Red-necked Phalaropes were observed and the species reached their peak numbers on 22 May (Table 44). All other shorebirds were minimal in counts, which was representative of the habitat conditions for this deep water, saline lake.

Ground surveys of Manitou Lake were initiated in early May to catch the early migrant species of shorebirds, but it was local breeding shorebirds that were mostly detected (Table 45). The first pulse of northern migrants moved onto the lake around the middle of May, with numbers of Red-necked Phalaropes, the most abundant shorebird, increasing to its peak on 28 May. Semipalmated Sandpipers and Sanderlings were the next prominent species, but in minimal numbers compared to the phalaropes. The resident population of American Avocet appeared to be in the range of 130 to 175 individuals. The regular observation of Long-billed Curlew was indicative of probable breeding in the area, which is the northern limit of the breeding range for

the species in Saskatchewan. The total for the species peak counts in the spring of 1995 was 71, 429 shorebirds with Red-necked Phalaropes accounting for 93% of the total count.

Ground surveys for shorebirds were continued in the fall of 1995 in mid-July (Table 46). Red-necked Phalarope were the most abundant shorebird species during the fall migration, with peak numbers occurring on 26 July. Semipalmated and Baird's Sandpipers were the next in abundance with peaks for both species occurring on 23 August. Lesser Yellowlegs were somewhat common along the shores of Manitou Lake, and two peaks were observed in the staging of this species in early to mid-August. A Long-billed Curlew was observed once during the fall migration period. Manitou Lake is an important site for nesting Piping Plovers and was evident with 43 birds observed in late July. Species peak counts totalled 45,380 shorebirds, and Red-necked Phalaropes accounted for 88% of the total fall count.

Ground surveys were resumed on Manitou Lake on 13 May 1996, and Red-necked Phalaropes topped the list followed by Sanderlings (Table 47). Red-necked Phalarope numbers steadily increased to a peak count of 46,845 birds on 25 May. Sanderling numbers peaked at a little over 3100, while Semipalmated Sandpiper numbers reached a high of 2885 individuals. Although not specifically targeted in the survey, Piping Plovers reached a high of 56 birds on 29 May, which is more than double the number of birds observed on 28 May 1995. One unusual sighting was of two Western Sandpipers, which typically migrate along the Pacific coastal areas. The sighting of a single Long-billed Curlew indicated the possibility of nesting in the area. The species peak counts for the spring of 1996 was 54,538 shorebirds, and Red-necked Phalarope accounted for 85% of the total. No fall surveys were conducted on the lake in 1996.

Manitou Lake had the highest shorebird use of all the basins surveyed in the area during the two year period, and the most numerous species was the Red-necked Phalarope. A comparison of the total species counts for each of the two spring periods showed a decline in numbers at Manitou Lake of about 24% from 1995 to 1996. The largest drop in numbers occurred for Red-necked Phalaropes, with a decline of 20,000 birds in 1996 or about 30% of the species peak count in 1995. The remaining species were comparable in numbers over the two spring periods except for Sanderling, which more than doubled in numbers in 1996. There had been a drought in the area during the survey period, and although the deep water basin experience lower water levels each year, it still provided consistent habitat for the variety of shorebirds that depended on it for migration staging and breeding.

Table 44. Manitou Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22	May 31
Black-bellied Plover			4
Killdeer	2	1	17
American Avocet	28	8	67
Willet	3		7
Spotted Sandpiper	1		1
Marbled Godwit	5	2	12
Stilt Sandpiper			8
Red-necked Phalarope		26,400	13,010

Species	May 9	May 22	May 31
Shorebird–small	97	855	770
Shorebird–medium			797
Shorebird–large			3
Shorebird–other		1,662	2,108
Total shorebirds	136	28928	16804

Table 45. Shorebirds observed on Manitou Lake, Saskatchewan in the spring of 1995

Species	May 8	May 12	May 16	May 20	May 24	May 28	June 1	June 5
Black-bellied Plover			9	11	**60**	16	13	1
American Golden Plover				13		**17**	1	
Piping Plover	12	16	12	12	13	**23**	16	18
Semipalmated Plover				**27**	5	1	2	
Killdeer	32	32	25	**35**	28	30	18	31
American Avocet	139	165	**174**	153	165	137	131	151
Greater Yellowlegs	**1**							
Lesser Yellowlegs	**7**		2					
Solitary Sandpiper			1	**4**	1			
Willet	**27**	13	11	7	8	8	4	7
Spotted Sandpiper	2	9	15	**73**	23	19	39	16
Whimbrel						**1**		
Long-billed Curlew	5	1	1	3	**7**	2		
Marbled Godwit	**69**	41	47	46	35	43	46	49
Ruddy Turnstone						**2**		1
Red Knot					**7**			
Sanderling	76	86	34	75	1176	1186	**1264**	1010
Dunlin					**1**			
Pectoral Sandpiper	**2**	2					1	
White-rumped Sandpiper			1		**57**	21	2	
Baird's Sandpiper	6	118	112	81	**558**	270	18	
Semipalmated Sandpiper		1	140	52	**2046**	721	263	
Least Sandpiper		1	**8**	7	3			
Stilt Sandpiper					**31**			
Shorebird−small	6	78	110	287	217	35	6	
Dowitcher spp.		**2**			1			
Wilson's Phalarope		6	**66**	7			4	7
Red-necked Phalarope		385	2598	35648	56577	**66860**	17934	19
Total shorebirds	384	956	3366	36541	61019	69392	19762	1310

***Bold numbers indicate species peak count during migration period**

Table 46. Shorebird observations on Manitou Lake, Saskatchewan in the fall of 1995

Species	July 12	July 19	July 26	August 2	August 10	August 16	August 23	August 30
Black-bellied Plover	1		14	12	20	**145**	19	7
American Golden Plover		**3**	1					
Piping Plover	34	**43**	43	19	13	9	7	
Semipalmated Plover	4	5	**115**	58	12	26	61	62
Killdeer	**68**	48	49	82	25	58	24	26
American Avocet	**92**	67	52	24	5	17	4	2
Greater Yellowlegs	1	5	**10**	4	1	3		1
Lesser Yellowlegs	119	127	505	931	581	**1019**	588	356
Willet	65	28	39	**83**	35	59	13	1
Spotted Sandpiper	55	77	110	**159**	76	101	72	31
Whimbrel					**1**			
Long-billed Curlew			**1**					
Marbled Godwit	33	16	**19**	4		4	2	
Ruddy Turnstone			3	1				**4**
Red Knot	**3**							
Sanderling	10	27	30	64	75	16	**92**	16
Pectoral Sandpiper	2	47	68	60	45	98	**208**	52
Baird's Sandpiper	259	86	254	39	12	412	**1419**	75
Semipalmated Sandpiper	172	31	94	171	302	824	**1757**	151
Least Sandpiper	5	3	13	5		18	**33**	1
Stilt Sandpiper	**8**			2		2		
Shorebird−small	268	35		74	68	70	39	18
Dowitcher spp.		14	12	3	6	**25**	23	
Wilson's Phalarope			**6**	1	4	4	4	
Red-necked Phalarope	21472	20575	**40067**	20510	8888	11702	5168	2131
Total shorebirds	22564	21138	41283	22135	10099	14374	9422	2839

***Bold numbers indicate species peak count during migration period**

Table 47. Shorebirds observed on Manitou Lake, Saskatchewan in the spring of 1996

Species	May 13	May 17	May 21	May 25	May 29	June 2
Black-bellied Plover	1	9	9	**21**	11	3
American Golden Plover		**9**				
Piping Plover	11	53	42	49	**56**	26
Semipalmated Plover	26	**29**	8	1		
Killdeer	20	22	27	**27**	21	21
American Avocet	56	**150**	105	111	146	133
Willet	15	**32**	10	12	2	6
Spotted Sandpiper	16	34	**69**	14	14	24
Long-billed Curlew				**1**		
Marbled Godwit	65	**83**	36	28	29	45
Ruddy Turnstone		**65**	40	14	2	
Red Knot	7	**11**				
Sanderling	207	3104	1816	2652	2453	**2903**
Dunlin		8	8	**10**	2	
Pectoral Sandpiper		**5**				
White-rumped Sandpiper	1	63	25	**331**	68	66
Baird's Sandpiper	34	**172**	48	50	17	2
Western Sandpiper		**2**				
Semipalmated Sandpiper	108	2242	512	**2885**	1264	534
Least Sandpiper	1	26	**52**	3	4	
Stilt Sandpiper		318	37	**771**	41	
Shorebird−small	180	299	455	342	183	15
Dowitcher spp.		**8**	5			
Wilson's Phalarope		**1**				
Red-necked Phalarope	819	17076	32097	**46845**	16977	4914
Total shorebirds	1567	23825	35403	54167	21290	8692

***Bold numbers indicate species peak count during migration period**

4.1.17 Muddy Lake, Saskatchewan

Muddy Lake (Figure 1, Appendix 22) is a very shallow, flat-bottomed basin that is quite susceptible to drying when not regularly recharged with precipitation runoff from the surrounding landscape. There were large tracts of dry, dusty alkaline flats viewed from the hilltop along Highway 21 in April 1995. The basin was completely dry in October 1996, and the majority covered with a variety of grass species.

During the 1987 spring aerial surveys, personnel recorded 10,654 shorebirds on Muddy Lake, including 124 American Avocets and 275 Stilt Sandpipers (Smith and Dickson 1989). When aerial surveys of the region were conducted on 1 June 1988, Muddy Lake was dry, and the basin was still dry during ground surveys of the region on 22 May 1989 (CWS unpubl. data).

Aerial survey during the spring of 1995 resulted in the recording of large numbers of shorebirds utilizing the basin, with peak numbers occurring at the end of May (Table 48). The only reliably identified species in high numbers was the American Avocet, which likely nested along the lake shore.

Spring surveys were initiated on the ground at Muddy Lake on 14 May (Table 49). Muddy Lake, large in size and flat in relief, had a bottom substrate that is a fine silt material that limited access around the shoreline when wet. A number of shorebirds, feeding far off in the centre of the basin, were difficult to identify and classed by size category (Appendix 4). Of those species that could be identified, the Red-necked Phalarope was the most abundant on the basin followed by the Semipalmated Sandpiper and Sanderling.

The migration peak for these species occurred between 22 May and 30 May. A good population of American Avocets appeared to be nesting around the shoreline area, with peak numbers reaching 169 adults. The species peak counts totalled 11,067 shorebirds in the spring of 1995 on Muddy Lake, which is lower than the highest daily count of 11,546.

No ground surveys were conducted on Muddy Lake in the fall of 1995 because of poor water conditions, but surveys were resumed in the spring of 1996 (Table 50). Low water levels, distance to the area where the birds were located and topography of the lake again influenced our ability to identify a large number of shorebirds as was evident by the number in the "Shorebird−small" category. Shorebird counts were lower in 1996 than in 1995, with the highest daily count in 1996 at about 50% of the highest in 1995. Red-necked Phalarope numbers dropped to negligible levels, but Stilt Sandpiper numbers increased four-fold over those that were observed in 1995, with a peak count of 2322 birds on 27 May. The observation of four Hudsonian Godwits was unusual, as they are early migrants and tend to be missed. Local breeding shorebirds were still using the lake based on the number and variety of species observed during the spring surveys. The peak species count was not calculated because of the high number of unidentified shorebirds on the basin. No ground surveys were conducted on Muddy Lake in the fall migration period of 1996.

Table 48. Muddy Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22	May 31
American Avocet	161	239	85
Willet	14	3	
Long-billed Curlew			1
Marbled Godwit	7	6	
Red-necked Phalarope			325
Shorebird–small		3225	
Shorebird–medium		387	93
Shorebird–large	1	4	30
Shorebird–other	30	1355	4832
Total shorebirds	213	5219	5366

Table 49. Shorebirds observed on Muddy Lake, Saskatchewan in the spring of 1995

Species	May 14	May 18	May 22	May 26	May 30	June 3
Black-bellied Plover		25	154	**552**	404	64
American Golden Plover		**1**				
Killdeer	5	**6**	3	1	6	3
American Avocet	116	105	**169**	55	151	97
Lesser Yellowlegs	1		**10**			
Willet	10	**24**	15	13	15	10
Spotted Sandpiper		**2**				
Marbled Godwit	16	14	14	15	**24**	17
Ruddy Turnstone				**4**		
Red Knot				**2**		
Sanderling	19	290	465	1164	**1399**	705
Dunlin		**1**		1		
Pectoral Sandpiper				**7**		
Baird's Sandpiper	76	**653**	45	141	194	
Semipalmated Sandpiper		567	1921	971	**2775**	97
Stilt Sandpiper		600	267	**636**	164	
Shorebird−large		2				
Shorebird−medium		3	2000			
Shorebird−other			90			
Shorebird−small	260	785	1734	179	145	1
Dowitcher spp.		**13**				
Wilson's Snipe			**1**			
Wilson's Phalarope	6	**136**	6	3	3	1
Red-necked Phalarope		1015	**4652**	3384	1479	5
Total shorebirds	509	4242	11546	7128	6759	1000

***Bold numbers indicate species peak count during migration period**

Table 50. Shorebirds observed on Muddy Lake, Saskatchewan in the spring of 1996

Species	May 15	May 23	May 27	May 31
Black-bellied Plover		8	1	**197**
American Golden Plover		**120**		
Killdeer	1	**2**	2	1
American Avocet	14	**69**	40	37
Yellowlegs species	**2**			
Willet	13	**26**	2	9
Long-billed Curlew	**3**			1
Hudsonian Godwit		**4**		
Marbled Godwit	14	14	12	**31**
Sanderling	**9**			
Pectoral Sandpiper			**399**	
White-rumped Sandpiper		**10**		
Baird's Sandpiper	**70**	45		

Species	May 15	May 23	May 27	May 31
Semipalmated Sandpiper		**653**	65	
Least Sandpiper		**12**		
Stilt Sandpiper	50	1993	**2322**	19
Shorebird−medium		10		
Shorebird−small	184	1023	2943	53
Dowitcher spp.	**278**	1		
Wilson's Phalarope		**2**		1
Red-necked Phalarope		71	**270**	
Total shorebirds	638	4055	6055	152

***Bold numbers indicate species peak count during migration period**

Muddy Lake, because of its shallow, flat-bottom topography, is very susceptible to drying when annual or seasonal precipitation is low. Furthermore, the nature of the soil in the basin likely prevents it from being cultivated and as such remains a dry basin until it receives its next recharge of water. Therefore, the lake tends to be used opportunistically by shorebirds when water conditions on the basin are favourable.

4.1.18 Opuntia Lake, Saskatchewan

Observations of a variety of shorebirds including Piping Plovers on Opuntia Lake (Figure 1, Appendix 23) occurred as early as July 1972 (Renaud 1974, Renaud et al. 2008) and sporadically up to the region wide survey in 1987. Observations of sizeable numbers of shorebirds included American Avocet–330 birds in July 1975 and 430 birds in July 2000; American Golden Plover–468 in May 1975; Hudsonian Godwit–950 birds in August 1979; Sanderling–400 birds in July 1974; and Baird's Sandpiper–228 in July 2000 (Renaud et al. 2008). A visit to the lake on 15 May 1984 resulted in the observation of 6 Piping Plovers (Wiercinski 1984). In 1987, during spring aerial surveys of Opuntia Lake, 715 shorebirds were observed including 184 American Avocets (Smith and Dickson 1989). Aerial surveys were conducted over the lake on 1 June 1988, and 6,118 shorebirds were observed (CWS unpubl. data) and during 28 May 1989 ground surveys, there were 450 shorebirds counted on the lake including 2087 Red-necked Phalaropes and 832 Stilt Sandpipers (CWS unpubl. data).

Water levels were high on the lake in April 1995, with water up to the high-water mark or bank edge on the shoreline. This may have influenced shorebird use, because during the aerial shorebirds of the basin in May of 1995, few shorebirds were observed on Opuntia Lake (Table 51).

The high water levels, lack of suitable shoreline habitat and the low count of shorebirds on Opuntia Lake resulted in the decision not to survey the lake in 1995. Because of its remoteness from the main survey area, it was only surveyed once in the spring of 1996. On 30 May 1996, over 3000 shorebirds were seen on the lake, with Red-necked Phalaropes composing the bulk of the birds recorded (Table 52).

Historical observations of the shorebirds indicate that shorebirds will use the basin when conditions are favourable. As well, given that Opuntia Lake is a federal Migratory Bird Sanctuary, the lake will remain for shorebirds to use opportunistically during the migration and as a breeding area for prairie nesting species.

Table 51. Opuntia Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22
Killdeer	4	15
American Avocet	62	35
Yellowlegs spp.	2	5
Willet	30	31
Spotted Sandpiper		2
Marbled Godwit	14	6
Red-necked Phalarope		75
Shorebird–small	13	68
Shorebird–medium	73	31
Shorebird–large	3	7
Shorebird–other		135
Total shorebirds	201	410

Table 52. Shorebirds observed on Opuntia Lake, Saskatchewan in the spring of 1996

Species	May 30
Killdeer	1
American Avocet	22
Willet	2
Marbled Godwit	9
Red-necked Phalarope	3000
Total shorebirds	3034

4.1.19 Reflex Lake, Saskatchewan–East Basin

As noted earlier (Section 4.1.1.h), this basin was not specifically identified in previous surveys, and as such, no shorebird observations were noted for this lake in the literature. The results of the survey effort of 1995−96 represent the only known shorebird information for this basin. This basin is part of the Manitou Lake Area IBA site (IBA website).

The aerial survey of Reflex Lake–East (Figure 1, Appendix 24) was conducted early in the season, and due to low counts and logistical problems, no further surveys were conducted in the spring of 1995 (Table 53).

The shoreline of Reflex Lake–East is quite sandy and similar to Reflex Lake–West in this sandy-soil based region. Sanderlings, which appear to prefer this type of habitat, were the most abundant shorebird species on the basin (Table 54). As is the case for this late migrant, Sanderling peak numbers occurred in late May to early June. The number of local breeding

species of shorebirds remained fairly constant throughout the survey period and likely represented resident nesting birds on Reflex Lake–East. The total species peak count was 2197 shorebirds in the spring of 1995.

Ground surveys of Reflex Lake–East resumed in mid-July, but numbers of shorebirds using the basin remained quite low until mid-August (Table 55). It is likely a small flock of Semipalmated and Baird's Sandpipers stopped on 17 August for a short rest before continuing on their southward migration. The total of all the species peak counts was only 717 shorebirds in the fall, which is about a third of the total shorebirds observed in the spring.

Shorebird surveys continued on the ground at Reflex Lake–East in the spring of 1996 (Table 56). Sanderlings were again the most of abundant species, reaching peak numbers of 1728 birds in late May at the same time as Semipalmated Sandpipers reached their peak of 795 birds. The total for the species peak counts was 3099 shorebirds in the spring of 1996, which represents an increase of about 41% in occurrence of shorebirds from 1995 spring.

Reflex Lake–East had similar habitat to that of Reflex Lake–West and it was likely that the shorebirds moved around the area and opportunistically used both basins for feeding and resting during migration.

Table 53. Reflex Lake−East 1995 spring aerial shorebird surveys

Species	May 9
Black-bellied Plover	2
Killdeer	3
Yellowlegs spp.	8
Willet	13
Marbled Godwit	9
Shorebird–medium	5
Shorebird–large	3
Shorebird–other	12
Total shorebirds	55

Table 54. Shorebirds observed on Reflex Lake−East, Saskatchewan in the spring of 1995

Species	May 13	May 17	May 21	May 25	May 29	June 2
Black-bellied Plover		8		**11**	5	2
Piping Plover					**1**	
Semipalmated Plover	**12**		12	5		
Killdeer	12	8	**23**	19	17	20
American Avocet	9	**20**	10	20	17	20

Species	May 13	May 17	May 21	May 25	May 29	June 2
Lesser Yellowlegs	**37**	2	1	10		
Willet	23	18	**26**	17	14	15
Spotted Sandpiper	1		3	**7**	1	
Whimbrel				**1**		
Long-billed Curlew	**2**					1
Marbled Godwit	**32**	13	21	26	12	10
Red Knot						**5**
Sanderling	6		182	1022	1832	**1894**
Pectoral Sandpiper		**6**		4	2	1
White-rumped Sandpiper	**1**					
Baird's Sandpiper	**25**		6			12
Semipalmated Sandpiper	1		**81**	23		10
Least Sandpiper	1	**2**				
Shorebird−large			1			
Shorebird−small	39	30	102	140	60	9
Wilson's Snipe	**2**	1	1	2	2	2
Wilson's Phalarope			**4**			1
Red-necked Phalarope			4	**7**	3	
Total shorebirds	179	92	442	1279	1943	1980

***Bold numbers indicate species peak count during migration period**

Table 55. Shorebirds observed on Reflex Lake−East, Saskatchewan in the fall of 1995

Species	July 13	July 20	July 27	August 3	August 11	August 17	August 24
Black-bellied Plover		4	11	6	7	22	**38**
American Golden Plover			**3**				
Piping Plover	**2**	2	1				1
Semipalmated Plover	10					9	**39**
Killdeer	30	38	50	**54**	30	60	53
American Avocet		2		2			**55**
Greater Yellowlegs	**1**						
Lesser Yellowlegs	7	5	2	15	15	**36**	13
Willet	5	5	5	**10**	8		
Spotted Sandpiper	10	16	14	**31**	12	11	
Marbled Godwit	9	12	**17**	12	7	4	3
Sanderling	**4**	2			4	1	
Pectoral Sandpiper	15	13	5	6	19	3	**93**
Baird's Sandpiper	2				3	**152**	54
Semipalmated Sandpiper	10			17	11	**142**	123
Least Sandpiper	2		1			**15**	13
Shorebird−small		7					

Species	July 13	July 20	July 27	August 3	August 11	August 17	August 24
Dowitcher spp.		**1**	1				
Wilson's Snipe	**2**						
Red-necked Phalarope	20	**22**					
Total shorebirds	87	85	45	93	79	364	354

***Bold numbers indicate species peak count during migration period**

Table 56. Shorebirds observed on Reflex Lake−East, Saskatchewan in the spring of 1996

Species	May 14	May 18	May 22	May 26	May 30
Black-bellied Plover	2		13	**16**	5
American Golden Plover			**23**		
Piping Plover				**2**	
Killdeer	4	9	**11**	8	5
American Avocet	2	**17**	7	7	5
Lesser Yellowlegs	**11**				
Yellowlegs species	**1**				
Willet	7	**13**	5	8	5
Spotted Sandpiper	1	**3**	1		
Long-billed Curlew			**1**	1	
Marbled Godwit	13	**22**	16	14	5
Ruddy Turnstone			7	**15**	4
Red Knot				6	**11**
Sanderling		412	1577	**1728**	1678
Dunlin			**3**		
White-rumped Sandpiper		4	6	**37**	16
Baird's Sandpiper		5	**13**	7	
Semipalmated Sandpiper		317	677	**795**	89
Least Sandpiper		**23**	16	16	
Shorebird−large		20	2		
Shorebird−medium			21		
Shorebird−small	65	42	45	30	
Dowitcher spp.	**1**				
Common Snipe	2	5	**6**	2	
Red-necked Phalarope			94	**347**	37
Total shorebirds	107	892	2531	3023	1855

***Bold numbers indicate species peak count during migration period**

4.1.20 Seagram Lakes, Saskatchewan

Spring aerial surveys in this region included several lakes clustered together, "Seagram, Altair and Orion lakes," which were surveyed, and a total of 284 shorebirds were recorded on the three basins, including 4 American Avocets and 50 Stilt Sandpipers in May 1987 (Smith and Dickson 1989). An aerial survey on 1 June 1988 of Seagram Lakes resulted in the observation of 1318

shorebirds, including 145 American Avocet and 864 Red-necked Phalaropes (CWS unpubl. data).

The Seagram Lakes (Figure 1, Appendix 25) was surveyed from the air during the spring of 1995. Despite the low counts in the first survey, shorebird numbers increased later in May (Table 57). Red-necked Phalarope was the most abundant species observed on the lakes. The consistent count of American Avocets indicated they were nesting in the area.

Shorebird ground surveys were conducted three times in the spring of 1995 on the Seagram Lakes, but the number of birds recorded was never very large (Table 58). A large flock of Red-necked Phalaropes was observed during one survey that accounted for the majority of birds recorded that day. The total for the species peak counts was only 670 shorebirds, of which75% were Red-necked Phalarope. Most of the remaining species seen were local prairie-breeding shorebirds.

Table 57. Seagram Lakes 1995 spring aerial shorebird surveys

Species	May 9	May 22	May 31
Killdeer	3	2	9
American Avocet	22	34	17
Yellowlegs spp.		5	
Willet	12	5	13
Spotted Sandpiper	3	1	
Marbled Godwit	5	9	7
Stilt Sandpiper			150
Red-necked Phalarope		2150	800
Shorebird–small	10	113	32
Shorebird–medium	2	131	83
Shorebird–large	5		2
Shorebird–other		10	158
Total shorebirds	62	2460	1271

Table 58. Shorebirds observed on Seagram Lakes, Saskatchewan in the spring of 1995

Species	May 14	May 19	June 4
Killdeer	3	5	**9**
American Avocet	3	**40**	24
Lesser Yellowlegs		**20**	
Willet		**16**	11
Spotted Sandpiper		**5**	1
Marbled Godwit		2	**6**
Sanderling			**28**
Pectoral Sandpiper			**6**
White-rumped Sandpiper		**2**	
Baird's Sandpiper		**1**	
Semipalmated Sandpiper		**11**	

Species	May 14	May 19	June 4
Shorebird−small		12	20
Dowitcher spp.		**5**	
Wilson's Snipe			**1**
Wilson's Phalarope			**19**
Red-necked Phalarope		**501**	
Total shorebirds	6	620	125

***Bold numbers indicate species peak count during migration period**

Ground surveys during the 1995 fall migration period on the Seagram Lakes showed an increased use of the basin (Table 59). Semipalmated Sandpipers were the most abundant species and peaked in numbers later in August. Lesser Yellowlegs frequented the basin throughout the fall migration period along with well over a hundred Marbled Godwits through July and early August. The species peak counts totalled 2083 shorebirds, which is nearly triple the spring total. Surveys were not conducted on the Seagram Lakes in 1996.

Table 59. Shorebirds observed on Seagram Lakes, Saskatchewan in the fall of 1995

Species	July 14	July 20	July 28	August 3	August 14	August 17	August 25
Black-bellied Plover				**30**	13		
Piping Plover	2	2	**7**	4			
Semipalmated Plover	3	16	6	**65**	25	53	74
Killdeer	2	**31**	9	1		3	
American Avocet	27	31	20	13	**44**	3	1
Lesser Yellowlegs	22	161	139	31	**169**	41	18
Willet	1	**20**					
Spotted Sandpiper		**4**				4	
Hudsonian Godwit		**3**					
Marbled Godwit	108	**187**	110	133		7	
Sanderling		50		12	75	**95**	
Pectoral Sandpiper		1	13	**122**	72	5	35
Baird's Sandpiper			141			**215**	186
Semipalmated Sandpiper		970	121	75	271	**1035**	537
Least Sandpiper						**3**	
Shorebird−small						25	
Dowitcher spp.		**2**					
Wilson's Phalarope	1	**6**					
Red-necked Phalarope		2	**45**		18		13
Total shorebirds	159	1437	589	386	649	1433	790

***Bold numbers indicate species peak count during migration period**

4.1.21 Street Lake, Saskatchewan

During the spring 1987 aerial surveys of Street Lake (Figure 1), there were 918 shorebirds observed (Smith and Dickson 1989), but no shorebirds were seen during the aerial surveys on 1 June 1988 (CWS unpubl. data). No further historical shorebird information was located for Street Lake.

Aerial surveys of Street Lake in May 1995 (Table 60) showed that the Red-necked Phalarope was the most abundant of the identified shorebird species on the lake.

Ground surveys on 23 May 1995 (Table 61) confirmed the abundance of Red-necked Phalaropes with Semipalmated Sandpipers second in numbers on Street Lake. The species peak counts totalled 2233 shorebirds in the spring of 1995, which is low because of the high number of unidentified shorebirds in the first survey.

No surveys were conducted on the basin in the fall of 1995 or the spring of 1996.

Table 60. Street Lake 1995 spring aerial shorebird surveys

Species	May 9	May 22
American Avocet	7	35
Yellowlegs spp.	2	102
Willet	10	5
Shorebird–small	10	
Shorebird–medium	20	217
Shorebird–large	8	4
Shorebird–other	50	2062
Red-necked Phalarope		1050
Total shorebirds	107	3475

Table 61. Shorebirds observed on Street Lake, Saskatchewan in the spring of 1995

Species	May 23	May 27	May 31	June 4
Killdeer	**1**			
American Avocet	14	**20**	19	15
Willet	2		1	**6**
Marbled Godwit	**7**	2	1	2
White-rumped Sandpiper		**12**		
Baird's Sandpiper		**37**		
Semipalmated Sandpiper	**860**	10		
Stilt Sandpiper		**16**		
Shorebird−medium	1750			
Shorebird−small		100		
Dowitcher spp.		**5**		

Species	May 23	May 27	May 31	June 4
Wilson's Snipe	**2**	2		
Wilson's Phalarope		**4**		4
Red-necked Phalarope	**1270**			
Total shorebirds	3905	208	21	27

***Bold numbers indicate species peak count during migration period**

4.1.22 Teo Lakes, Saskatchewan

There were 1152 shorebirds including 173 American Avocets observed during spring aerial surveys of Teo Lakes (Figure 1, Appendix 26) in 1987 (Smith and Dickson 1989). However, during the aerial survey of Teo Lakes on 1 June 1988, only 125 shorebirds were found (CWS unpubl. data).

The 1995 spring aerial surveys of Teo Lakes resulted in the observation of over 6000 shorebirds on the second of two surveys (Table 62). Most shorebirds were not identified to species, but for those that were, the Red-necked Phalarope was the most abundant at 500 birds.

Ground surveys of Teo Lakes initiated on 23 May (Table 63) and represented the highest daily count of all the ground surveys. The number of shorebirds decreased in each of the following three surveys. The most abundant species was the Stilt Sandpiper, followed by the Semi-palmated Sandpiper, which peaked in numbers on 27 May at over 2200 birds. Baird's Sandpiper also had its highest count on 27 May at just under 1000 individuals. American Avocet numbers remained fairly constant throughout the survey period, which likely represented the local breeding population on the lake. The species peak count totalled 5539 shorebirds in the spring of 1995, but was much lower than the highest daily count due to the high number of unidentified shorebirds on 23 May.

The 1995 fall ground surveys were resumed on Teo Lakes in mid-July (Table 64). The Red-necked Phalarope was the most abundant shorebird recorded on Teo Lakes, with the peak in number for the species recorded on 24 July at over 1600 individuals. Over 160 Wilson's Phalaropes were recorded on the basin at the start of the survey period on 13 July, while Lesser Yellowlegs numbers peaked at 322 individuals on 14 August. A variety of other migrant and local breeding species were recorded using the basin in small numbers throughout the fall migration period. The total for the peak species counts was 3376 shorebirds, which are about a 55% decline from the highest daily count in the spring. No surveys were conducted on Teo Lakes in 1996.

Table 62. Teo Lakes 1995 spring aerial shorebird surveys

Species	May 9	May 22
Killdeer	1	2
American Avocet	105	22
Yellowlegs spp.	18	19
Willet	21	18
Marbled Godwit	6	9

Red-necked Phalarope		500
Shorebird -small	15	604
Shorebird–medium	2	24
Shorebird–large	7	2
Shorebird–other	722	4840
Total shorebirds	897	6040

Table 63. Shorebirds observed on Teo Lakes, Saskatchewan in the spring of 1995

Species	May 23	May 27	May 30	June 3
Black-bellied Plover		**9**		
Semipalmated Plover	**3**			
Killdeer	4	**8**	5	8
American Avocet	56	57	**147**	64
Willet	9	5	**20**	17
Marbled Godwit	8	12	**16**	14
Ruddy Turnstone	**1**			
Sanderling	76	168	**365**	10
White-rumped Sandpiper	**1**		1	
Baird's Sandpiper	17	**993**	26	
Semipalmated Sandpiper	1045	**2235**	813	
Stilt Sandpiper	**1157**	490	27	
Shorebird−small	4619			
Wilson's Phalarope	42	35	53	**68**
Red-necked Phalarope	435	**516**	122	
Total shorebirds	7466	4511	1590	173

***Bold numbers indicate species peak count during migration period**

Table 64. Shorebirds observed on Teo Lakes, Saskatchewan in the fall of 1995

Species	July 13	July 24	July 31	August 6	August 14	August 20	August 31
Black-bellied Plover	2		24	54	55	**138**	24
Semipalmated Plover		12	**58**			5	
Killdeer	**8**		4	5			
American Avocet	34	94	63	**111**	31	13	4
Greater Yellowlegs	11	**33**					
Lesser Yellowlegs	113	203	123	269	**322**	106	
Willet	15	8	14	**33**	16	1	
Spotted Sandpiper	4	4	4	**10**	1		
Hudsonian Godwit		**1**					
Marbled Godwit	**26**	13	5	5	8	2	
Sanderling		2	**3**				
Pectoral Sandpiper	4	25	74	**80**	21	9	
Baird's Sandpiper	36	60	49	19	6	**94**	
Semipalmated Sandpiper	89	73	**209**	188	164	148	2

Species	July 13	July 24	July 31	August 6	August 14	August 20	August 31
Least Sandpiper			**3**		1		
Stilt Sandpiper	116	**165**	12	4	12		
Shorebird−small		30		16		8	
Long-billed Dowitcher	93						
Dowitcher spp.	2	**248**	155	178	65	20	17
Wilson's Phalarope	**162**	103	36	2	2		
Red-necked Phalarope	461	**1672**	1357	1220	393	654	245
Total shorebirds	1166	2734	2107	2135	1042	1055	268

***Bold numbers indicate species peak count during migration period**

4.1.23 Wells Lake, Saskatchewan

A survey of Wells Lake (Figure 1, Appendix 27) was conducted in the spring/summer of 1985 and 40 shorebirds were observed, but the focal species of the survey, the Piping Plover, was not seen on the lake (Harris et al. 1985). The next survey of the basin was the 1987 spring aerial survey of the region, and the count for Wells Lake was 4649 shorebirds (Smith and Dickson 1989). Aerial surveys were conducted on 1 June 1988, and 358 shorebirds including 99 American Avocet were observed on the lake (CWS unpubl. data). On 20 May 1989, there were 8168 shorebirds observed on Wells Lake. and the majority of the birds were Red-necked Phalaropes (7690) as well as 133 American Avocets (CWS unpubl. data).

Ground surveys of Wells Lake in 1995 were regularly conducted from May through early June, and shorebird use of the basin would be described as generally quite limited with a few exceptions (Table 65). American Avocet numbers peaked on Wells Lake during the first survey and declined steadily over the ensuring surveys. A surge of migrants on 24 May boosted shorebird numbers on the lake, with a peak count of 1141 Semipalmated Sandpipers. The total for the species peak counts was 2955 shorebirds for the spring migration period.

Table 65. Shorebirds observed on Wells Lake, Saskatchewan in the spring of 1995

Species	May 12	May 16	May 20	May 24	May 28	June 1	June 5
Black-bellied Plover	4	1		11	20	**23**	
American Golden Plover					**147**		
Semipalmated Plover	**1**						
Piping Plover				**2**	1		
Killdeer	**5**	3	1	2	1		1
American Avocet	**221**	127	123	77	75	26	72
Lesser Yellowlegs		**4**					
Willet	**18**	9	8	6	6	18	16
Whimbrel							**1**
Long-billed Curlew			**1**	1			
Marbled Godwit	26	34	33	40	**44**	13	30
Sanderling				89	75	**425**	
Baird's Sandpiper		10	2	**145**	9	25	

Species	May 12	May 16	May 20	May 24	May 28	June 1	June 5
Semipalmated Sandpiper	2	12	6	**1141**	108	32	
Least Sandpiper			**2**				
Stilt Sandpiper				**433**	15	1	
Shorebird−small			65			30	
Wilson's Phalarope	1				2	1	**4**
Red-necked Phalarope			17	**338**	310		
Total shorebirds	278	200	258	2285	813	594	124

***Bold numbers indicate species peak count during migration period**

The number of shorebirds observed during each of the 1995 fall migration surveys generally varied from 1800 to 3600 birds for daily totals (Table 66). American Avocet appeared to use Wells Lake as a staging area, with numbers peaking on various dates as birds continued their migration. Lesser Yellowlegs also appeared to stage for a short period on the basin before recommencing their southward migration. Semipalmated Sandpiper numbers varied through August with two peaks in mid- to late August. Stilt Sandpipers moved through the area earlier and peaked at 1258 individuals on 19 July. Given the proximity of Wells Lake to Manitou Lake, it appeared that most Red-necked Phalaropes were using Manitou Lake. The total for each species peak count was 7123 shorebirds, which was a 60% increase from the total shorebirds observed on Wells Lake in the spring migration period.

Table 66. Shorebirds observed on Wells Lake, Saskatchewan in the fall of 1995

Species	July 12	July 19	July 28	August 3	August 12	August 17	August 24	August 31
Black-bellied Plover			11	69	22	**170**	48	3
Semipalmated Plover			1	9		11	**68**	
American Avocet	372	205	**398**	102	62	103	128	25
Lesser Yellowlegs	190	276	**1188**	432	1167	358	158	76
Greater Yellowlegs		**21**				5		1
Willet	60	**67**	13	20	11			
Marbled Godwit	**45**	26	6					
Red Knot	**8**							
Sanderling		**13**	4			2		
Pectoral Sandpiper	8	1			**182**		4	2
Baird's Sandpiper	22	133	13	**838**	75	63	680	10
Semipalmated Sandpiper		205	125	410	1850	1070	**1956**	17
Least Sandpiper							**7**	
Stilt Sandpiper	544	**1258**	428	180	131		96	
Shorebird–small			39			4	200	
Dowitcher spp.		5	**8**		1			
Wilson's Phalarope		**39**		2	1		3	
Red-necked Phalarope	**857**	845	253	269	140			4
Total shorebirds	2106	3094	2487	2331	3642	1786	3348	138

***Bold numbers indicate peak count during migration period**

In the spring of 1996, ground surveys resumed on Wells Lake on 13 May with the observation of fewer than 200 shorebirds (Table 67). Numbers tripled the next survey, with the peak count of 552 Sanderlings. Shorebird numbers declined the following surveys until they peaked on 29 May at over 1500 birds, composed mostly of Semipalmated Sandpipers, Sanderlings and Red-necked Phalaropes. Numbers were greatly reduced on the final survey day, composed mostly of local breeding shorebird species. The continued observation of a Piping Plover during the entire spring survey period indicated the possibility that the species was nesting in the area, although no nest was found. The total for each species peak count was 1686 shorebirds during the 1996 spring survey period. The total number of shorebirds observed on Wells Lake in 1996 was down about 43% from the spring of 1995. As well, the spring migration totals are much lower than those observed in the fall of 1995, which indicates that the basin may be more preferred in the fall by migrant shorebirds. No surveys were conducted in the fall migration period in 1996 on Wells Lake. Although Wells Lake is part of the Manitou Lake Area IBA site (IBA website), it has no conservation status that protects it from development.

Table 67. Shorebird observations on Wells Lake, Saskatchewan in the spring of 1996

Species	May 13	May 17	May 21	May 25	May 29	June 2
Black-bellied Plover			2	**39**		
Piping Plover		**4**	1	1		1
Killdeer			**1**			
American Avocet		12	1	7	**26**	17
Willet	7	15	14	15	9	**20**
Marbled Godwit	8	11	10	17	8	**32**
Ruddy Turnstone				**1**		
Red Knot		**3**				
Dunlin					**1**	
Sanderling	9	**552**	85	110	498	9
White-rumped Sandpiper			3		**15**	
Baird's Sandpiper	**24**	7	13		1	8
Semipalmated Sandpiper	96	16	29	42	**720**	
Least Sandpiper			**15**			
Stilt Sandpiper					**2**	1
Shorebird–small	8	12		20	17	
Wilson's Phalarope		**2**				
Red-necked Phalarope	44				**230**	
Total shorebirds	196	634	174	252	1527	88

***Bold numbers indicate species peak count during migration period**

4.2 Survey Area − East Central Saskatchewan Lakes: 1997−1998

4.2.1 Basin and Middle Lakes

A lone Piping Plover adult was observed on Basin Lake (Figure 2, Appendix 28) on 5 June 1984, and 2 adult Piping Plovers on Middle Lake (Figure 2, Appendix 29) on 10 July 1984 (Wiercinski 1984). Neither Basin or Middle Lake were part of the aerial survey effort in 1987. However, aerial surveys on 30 May 1988 of Basin lake resulted in the observation of 2398 shorebirds, including 120 American Avocets, while Middle Lake had 10,282 shorebirds including 3945 unidentified phalaropes and 40 American Avocets (CWS unpubl. data). Ground surveys of Middle and Basin lakes combined had a total of 5830 on 25 May 1988 and 12,623 shorebirds in the spring of 1989 (Morrison et al. 1995).

Basin and Middle Lakes were first surveyed on 15 May 1997, and overall the number of shorebirds was extremely low (Tables 68, Table 69). Basin Lake never had very much shorebird use during the spring of 1997, while Middle Lake had over 1400 Red-necked Phalaropes on 27 May. The spring 1997 species peak count totals were low for both lakes at 511 shorebirds for Basin Lake and 1649 shorebirds for Middle Lake.

Table 68. Shorebirds observed on Basin Lake, Saskatchewan in the spring of 1997

Species	May 15	May 19	May 27	May 31	June 4
Black-bellied Plover		**3**	2		1
Piping Plover			**1**		
Semipalmated Plover			**2**		
Killdeer	3	5	**9**	9	4
American Avocet	21	15	**29**	14	25
Willet	**7**	7	4	5	6
Marbled Godwit	**6**	5	4	4	4
Ruddy Turnstone		8	6	**9**	1
Sanderling	2	4	**122**	36	98
Dunlin	**1**				
Pectoral Sandpiper			1	**2**	
White-rumped Sandpiper			**6**	1	
Baird's Sandpiper			**12**		1
Semipalmated Sandpiper		3	**188**	110	77
Stilt Sandpiper			**84**	60	10
Shorebird–small			9		25
Dowitcher spp.	**1**				
Wilson's Snipe			**2**		1
Red-necked Phalarope			**27**	3	
Total shorebirds	38	42	494	244	248

***Bold numbers indicate species peak count during migration period**

Table 69. Shorebirds observed on Middle Lake, Saskatchewan in the spring of 1997

Species	May 15	May 27	May 31
Semipalmated Plover	**5**		
Piping Plover	**1**		
Killdeer		1	**2**
American Avocet	11	**31**	10
Willet		**1**	
Marbled Godwit	**2**	1	
Sanderling		**58**	
White-rumped Sandpiper		**2**	
Baird's Sandpiper		**25**	
Semipalmated Sandpiper	4	**66**	8
Least Sandpiper	**1**		
Stilt Sandpiper		**9**	
Dowitcher spp.		**1**	
Red-necked Phalarope		**1445**	610
Total shorebirds	24	1640	630

***Bold numbers indicate species peak count during migration period**

Surveys resumed on these two wetlands on 24 July 1997, but overall use was extremely limited with a peak one-day count of just under 150 shorebirds on Basin Lake and 26 birds on Middle Lake (Table 70, Table 71). The total for the species peak count was 215 shorebirds for Middle Lake and 65 shorebirds for Basin Lake for the fall of 1997.

The 1998 spring shorebird surveys resumed on Basin and Middle Lakes on 13 May, but shorebird numbers, although better than the previous spring, were still low throughout the entire survey period, with the highest daily count on Basin Lake at 559 shorebirds and 251 shorebirds on Middle Lake. American Avocets, which nested in the area, were the most abundant species on either lake (Table 72, Table 73). Piping Plover were regularly observed and likely nested in the area. The total for the species peak counts were 971 and 371 shorebirds for Basin and Middle Lakes, respectively. The count of Middle Lake was much lower as a result of reduced numbers of Red-necked Phalaropes.

Basin and Middle Lakes, both federal Migratory Bird Sanctuaries, provide secure habitat for nesting and migrating birds, and because of the history of high shorebird numbers are also listed as an Important Bird Area for shorebirds (IBA website). However, the total number of shorebirds using the two lakes, being quite low, indicated that other than providing nesting habitat for local breeding species, it opportunistically attracted migrant shorebirds rather than being a site that these birds targeted during migration.

Table 70. Shorebirds observed on Basin Lake, Saskatchewan in the fall of 1997

Species	July 24	July 27	August 8	August 21	August 24
Semipalmated Plover				**3**	
Killdeer	16	**17**	14		
American Avocet	2	**4**	1	1	2
Greater Yellowlegs	2	**3**		3	1
Lesser Yellowlegs	5			**7**	4
Solitary Sandpiper		**1**			
Willet	27	**31**	13	17	1
Spotted Sandpiper	**20**	12	2		
Hudsonian Godwit		**2**			
Marbled Godwit	9	**11**	2	5	
Ruddy Turnstone				**2**	
Sanderling			**11**		
Baird's Sandpiper	4	15		**27**	26
Semipalmated Sandpiper		14		**23**	14
Least Sandpiper				**12**	1
Stilt Sandpiper				**30**	5
Wilson's Phalarope	1			**9**	8
Red-necked Phalarope				**2**	
Total shorebirds	86	110	43	141	62

***Bold numbers indicate species peak count during migration period**

Table 71. Shorebirds observed on Middle Lake, Saskatchewan in the fall of 1997

Species	July 21	July 24	July 27	August 20
Semipalmated Plover				**1**
Killdeer	**4**	2	1	
American Avocet	**10**			
Greater Yellowlegs		**2**		
Willet	3	1	**9**	
Marbled Godwit	**3**			
Sanderling			**3**	
Pectoral Sandpiper			**2**	
Baird's Sandpiper				**25**
Red-necked Phalarope		**6**		
Total shorebirds	20	11	15	26

***Bold numbers indicate species peak count during migration period**

Table 72. Shorebirds observed on Basin Lake, Saskatchewan in the spring of 1998

Species	May 13	May 17	May 20	May 24	May 27	May 30	June 2
Black-bellied Plover		19	2	10	**47**	36	13
American Golden Plover		5	**19**				
Piping Plover				1	**2**	2	
Killdeer	10	**32**	24	27	18	14	4
Plover Species	**5**						
American Avocet	105	96	88	**144**	101	103	64
Greater Yellowlegs	**3**		3				
Lesser Yellowlegs	8	**51**					
Solitary Sandpiper		**3**					
Willet	11	**20**	16	9	10	6	4
Spotted Sandpiper		**2**					
Hudsonian Godwit		**1**					
Marbled Godwit	**17**	11	5	8	9	6	4
Ruddy Turnstone		18	19	**109**	70	90	79
Red Knot		1		1		1	**2**
Sanderling		5	4	6	27	17	**44**
Pectoral Sandpiper			**2**				
White-rumped Sandpiper		8	**18**	12	12	2	3
Baird's Sandpiper		31	**64**	16	11	4	1
Semipalmated Sandpiper		3	34	40	**191**	12	10
Least Sandpiper		21	**33**		2		
Stilt Sandpiper	4	14	**49**	16			
Shorebird–small		6	10		16		
Dowitcher spp.	1	2	**11**				
Wilson Phalarope		**12**	7	6		2	
Red-necked Phalarope				51	**90**	5	
Total shorebirds	164	342	406	446	559	264	215

***Bold numbers indicate species peak count during migration period**

Table 73. Shorebirds observed on Middle Lake, Saskatchewan in the spring of 1998

Species	May 13	May 17	May 20	May 27	May 30	June 2
Black-bellied Plover				6	**9**	
American Golden Plover				**8**		
Piping Plover		1	4	2	6	**9**
Semipalmated Plover			**6**			
Killdeer	2	**8**	8	2		
American Avocet	13	23	**46**	33	32	6
Willet	4	**5**	2	3		
Marbled Godwit			2	**3**		
Ruddy Turnstone					**1**	

Species	May 13	May 17	May 20	May 27	May 30	June 2
Sanderling		20	2	**45**	2	
White-rumped Sandpiper		**14**				
Baird's Sandpiper	2	**126**	67			
Semipalmated Sandpiper		**34**	7	4		7
Least Sandpiper		**9**				
Wilson's Phalarope		**11**	8			
Red-necked Phalarope				**37**	2	8
Total shorebirds	21	251	152	143	52	30

***Bold numbers indicate species peak count during migration period**

4.2.2 Elkona Lake

Elkona Lake, a small alkaline wetland (Figure 2, Appendix 28), was not included in any previous shorebird surveys or observations that we were able to identify, except the International Piping Plover surveys. A survey of the lake on 4 June 1991 resulted in the observation of 5 adult Piping Plovers on the basin (Flemming 1994). A site visit on 10 June 1993 found 3 adults and on 20 June 1994, there were 16 adults or 8 pairs scattered along the shoreline (Skeel et al. 1996). There were no Piping Plover on the basin in 1996 because all suitable habitats were flooded (Skeel et al. 1996).

The lake was added to the survey schedule for the spring of 1998 because of the high number of Piping Plover that use the basin for nesting (Table 74). Local breeding shorebirds, such as the American Avocet, were the more abundant species, but a few migrant species of shorebirds were also observed on the wetland. Overall, the number of shorebirds was not high during the spring migration period.

The total for the species peak counts was 419 shorebirds that used the wetland in the spring of 1998. The importance of the basin is more for local breeding species such as the Piping Plover than for migrant shorebirds.

Table 74. Shorebirds observed on Elkona Lake, Saskatchewan in the spring of 1998

Species	May 13	May 17	May 20	May 24	May 27	May 30	June 2
Black-bellied Plover	3	**16**	15	9			5
Piping Plover	10	**12**	5	7	5	5	5
Semipalmated Plover				**3**			
Killdeer	4	5	**9**	6	4	3	4
American Avocet	**96**	28	33	30	28	25	15
Willet	1		**2**		1		1
Spotted Sandpiper			1	1	1		**4**
Marbled Godwit					**1**		
Ruddy Turnstone						**10**	
Sanderling				**48**			

Species	May 13	May 17	May 20	May 24	May 27	May 30	June 2
Dunlin				**3**			
White-rumped Sandpiper		3	5	**37**			
Baird's Sandpiper	14	96	**107**	17			
Semipalmated Sandpiper	**47**	17	50	3			
Least Sandpiper		**3**		1			
Stilt Sandpiper	**18**		4				
Shorebird–small			**3**				
Total shorebirds	137	210	201	212	43	43	34

***Bold numbers indicate species peak count during migration period**

4.2.3 Buffer Lake

A single Piping Plover was observed on Buffer Lake (Figure 2, Appendix 30) on 14 May 1966 (Hatch 1966). A visit to the lake by Saskatoon bird watchers noted 47 American Avocet and 84 Black-bellied Plover using Buffer Lake on 25 May 1972 (Renaud and Shadick 1972). Five adult Piping Plover were also located on the basin that same day (Renaud 1974). Aerial surveys of Buffer Lake in May 1987 resulted in the observation of 10,672 shorebirds on the lake (Smith and Dickson 1989). The lake was dry on 30 May 1988 (CWS unpubl. data).

In the spring of 1997, Buffer Lake had ideal water and shoreline habitat conditions that included mudflats, open shoreline habitat and shallow water zones, and the result was extensive use of the basin by a large number and variety of shorebird species (Table 75). American Avocets nested on the lake in large numbers. Several species of northern migrants were present in good numbers with Red-necked Phalaropes reaching their peak count on 25 May, while Sanderlings, Semipalmated Sandpipers and Stilt Sandpipers peaked in numbers on 2 June. Daily counts were high throughout the spring surveys with a peak daily count of 17,825 shorebirds on 25 May. The total of species peak counts was 23,253 shorebirds for the spring of 1997.

Wetland conditions continued to be optimal throughout the season with high daily counts of shorebirds throughout the 1997 fall migration period on Buffer Lake (Table 76). Peak migration counts were reached on Buffer Lake on 23 July, with counts of 8765 Stilt Sandpipers, 2780 Baird's Sandpipers and 11,170 Red-necked Phalaropes. It was three days later when American Avocets reached their highest numbers along with Semipalmated Sandpipers. The observation of 15 Buff-breasted Sandpipers on 7 August was quite unusual and noteworthy as the only previous observation, by the author, occurred during the surveys of the Quill Lakes in 1989–1993. Hudsonian Godwits were observed on Buffer Lake, although only 58 birds, indicated the suitability of the habitat for fall migration staging for the species. The species peak count during the fall surveys on Buffer Lake was 33,346 shorebirds, which was a 43% increase over the numbers recorded in the spring of 1997.

Spring surveys were resumed on Buffer Lake on 12 May, which was early for the majority of the shorebird migrants as was evident from the survey results (Table 77), except for American Avocet, a local breeding species that peaked on that date. Baird's Sandpipers, an early migrant, peaked on the next survey, and a large pulse of migrants arrived on 23 May, with three species

reaching their peak numbers, including Sanderling, Semipalmated Sandpiper and White-rumped Sandpiper. The migration corridor for White-rumped Sandpipers in Saskatchewan is typically through the eastern half of the province.

Water levels dropped throughout May, and the shoreline edge retreated to the centre of this large wetland, where species identification became extremely difficult. On 1 June, most of the shorebirds were classified as "Small" shorebirds. The species peak count prior to the drying of the wetland totalled 37,330 shorebirds, which was higher than the previous spring or fall counts.

Table 75. Shorebirds observed on Buffer Lake, Saskatchewan in the spring of 1997

Species	May 13	May 17	May 25	May 29	June 2
Black-bellied Plover			20	**31**	10
American Golden Plover		**15**			
Piping Plover	**9**		2		2
Killdeer	1		**2**	1	1
American Avocet	188	201	**203**	171	86
Lesser Yellowlegs	**104**	2			
Willet	**13**	3	8	10	9
Marbled Godwit	**24**	5	8	12	3
Ruddy Turnstone		**2**			
Red Knot			1		**5**
Sanderling		109	11	54	**1540**
Dunlin					**4**
Pectoral Sandpiper					**50**
White-rumped Sandpiper		1	1		**28**
Baird's Sandpiper	16	10		71	**985**
Semipalmated Sandpiper		365	186	429	**2045**
Least Sandpiper		1	3	**5**	
Stilt Sandpiper		232	543	607	**1388**
Shorebird–small	15	100	55	85	1700
Dowitcher spp.		**18**	2		
Wilson's Phalarope	**2**				2
Red-necked Phalarope	130	3852	**16780**	5642	3545
Total shorebirds	502	4916	17825	7118	11403

***Bold numbers indicate species peak count during migration period**

Table 76. Shorebirds observed on Buffer Lake, Saskatchewan in the fall of 1997

Species	July 17	July 20	July 23	July 26	Aug. 7	Aug. 10	Aug. 13	Aug. 19	Aug. 22	Aug. 25
Black-bellied Plover	3	6	4	10	6	**32**		18	5	4
American Golden Plover	**1**	1		1						
Piping Plover	**13**			1	1					
Semipalmated	9	12	131	120	**192**	70	181	21	54	8

Species	July 17	July 20	July 23	July 26	Aug. 7	Aug. 10	Aug. 13	Aug. 19	Aug. 22	Aug. 25
Plover										
Killdeer	1	5	**8**	7	2				4	
American Avocet	1395	1502	1444	**1842**	926	1149	1051	1058	1194	1356
Greater Yellowlegs			2		**52**					
Lesser Yellowlegs	529	564	509	**991**	384	247	259	89	42	36
Solitary Sandpiper	**1**									
Willet	35	53	**68**	23	3	1	2	2	4	
Spotted Sandpiper				**1**						
Hudsonian Godwit	3	39	**58**	58						
Marbled Godwit	50	53	**61**	36						
Ruddy Turnstone		**2**		1						
Red Knot	1							**3**		
Sanderling	86	6	69	284	401	173	980	**1678**	41	24
Dunlin										**1**
Pectoral Sandpiper	26	24	**72**	8		4	4		1	2
White-rumped Sandpiper	3		**2**					1		1
Baird's Sandpiper	136	891	**2780**	1368	568	741	167	335	884	750
Semipalmated Sandpiper	1182	1166	2524	**4973**	2696	1571	1589	1247	1421	1949
Least Sandpiper	5		7		4	16	3	1	1	**64**
Stilt Sandpiper	4845	5981	**8765**	7972	3083	766	334	274	165	20
Shorebirds− small	17	15	417	50	195	260	250	305	1600	830
Dowitcher spp.	153	86	**160**	19	2					
Buff-breasted Sandpiper					**15**				1	3
Wilson's Phalarope	181	189	267	**340**						
Red-necked Phalarope	3216	7604	**11170**	8887	1654	1708	1494	29	1423	83
Total shorebirds	11864	18175	28375	26853	9983	6636	6133	5022	6777	5119

***Bold numbers indicate species peak count during migration period**

Table 77. Shorebirds observed on Buffer Lake, Saskatchewan in the spring of 1998

Species	May 12	May 16	May 19	May 23	May 26	June 1	June 4
Black-bellied Plover	12	5	**58**	13	12		
American Golden Plover			**24**		6		
Piping Plover	**9**	1	2	3	2		1
Semipalmated Plover				**26**			
Killdeer	1	**5**	3	4			
American Avocet	**303**	239	166	262	59	62	12
Greater Yellowlegs					**1**		
Lesser Yellowlegs	**1**						
Willet	**34**	2	7	2			
Whimbrel					**2**		
Marbled Godwit	4	3	4	7	**12**		8
Ruddy Turnstone				13	31	**145**	
Red Knot			40	19	8	**290**	
Sanderling	15	416	48	**3931**	1807	1740	395
Dunlin		3		5		**8**	
White-rumped Sandpiper		825	141	**4667**	214	60	
Baird's Sandpiper	74	**5703**	735	338			
Semipalmated Sandpiper	3	1248	298	**16407**	4756	581	
Least Sandpiper			**520**				
Stilt Sandpiper		**2507**	2123	704	15		
Shorebird–small	4351	123	16365	126	103	21000	217
Wilson's Phalarope		**7**			8	2	
Red-necked Phalarope	2	643	**2670**	2187	875	145	
Total shorebirds	4797	11725	23146	28701	7899	24033	633

***Bold numbers indicate species peak count during migration period**

The poor water conditions on Buffer Lake were evident, with the final surveys conducted on the basin on 9 July when only 1582 shorebirds were observed in the centre of the wetland (Table 78). The only unusual sighting was the occurrence of 559 Marbled Godwits and 51 Hudsonian Godwits on the lake. The number of Hudsonian Godwits observed during both fall migration periods, although not large, was somewhat similar. Hudsonian Godwits are not regularly observed during migration, and the repetitive use over time indicated that the wetland had ideal conditions for the species. Few wetlands in Saskatchewan have been noted with migrant staging Hudsonian Godwits and include the Quill Lakes, Luck Lake and Proctor Lake just east of Buffer Lake. The historical record of shorebird use of the basin has resulted in Buffer Lake being classified as a Nationally Significant Important Bird Area (IBA website) for shorebird concentrations.

Table 78. Shorebirds observed on Buffer Lake, Saskatchewan in the fall of 1998

Species	July 9
American Avocet	275
Greater Yellowlegs	1
Lesser Yellowlegs	88
Willet	2
Hudsonian Godwit	51
Marbled Godwit	559
Baird's Sandpiper	2
Semipalmated Sandpiper	24
Stilt Sandpiper	445
Shorebirds small	52
Wilson's Phalarope	8
Red-necked Phalarope	75
Total shorebirds	1582

4.2.4 Burke Lake

There were 3 Dunlin observed on Burke Lake (Figure 2, Appendix 31) on 20 May 1960 (Roy 1960). On 23 May 1964, local birders reported 8500 shorebirds were present on the lake (Gollop 1965). Spring aerial surveys resulted in the observation of 1403 shorebirds on Burke Lake (Smith and Dickson 1989). Burke Lake was recorded as dry on 30 May 1988 (CWS unpubl. data) and mostly dry on 1 August 1995.

The results of the surveys (Tables 79 and 80) conducted on Burke Lake in the spring and fall period of 1997 showed that conditions were not suitable for most shorebirds. There was limited use by migrant as well as local breeding species in both seasons of that year, and overall, the lake would not be listed as highly important to shorebirds.

Table 79. Shorebirds observed on Burke Lake, Saskatchewan in the spring of 1997

Species	May 14	May 26	May 30
Piping Plover	1		
Killdeer	3		1
American Avocet	2	4	3
Yellowlegs species	2		
Willet	2	2	
Marbled Godwit	1	2	
Sanderling		1	
Least Sandpiper	7		
Shorebird–small		21	
Total shorebirds	18	30	4

Table 80. Shorebirds observed on Burke Lake, Saskatchewan in the fall of 1997

Species	July 16	July 19	July 22	July 25	August 23
Killdeer			2		
American Avocet	24	37	28	55	2
Lesser Yellowlegs				8	
Sanderling				1	
Baird's Sandpiper	34	35		32	
Semipalmated Sandpiper	28	15		121	
Shorebird–small		24	67	34	
Red-necked Phalarope	6			71	
Total	92	111	97	322	2

4.2.5 Cheviot Lake

Cheviot Lake (Figure 2, Appendix 32) is a small ephemeral wetland that holds some water during most years, but in drier years has fairly wide alkaline mudflat shorelines. It appears rather obscure as no historical shorebird records were located for the lake. Surveys were initiated on the lake 14 May (Table 81), but only a local nesting pair of American Avocets was observed. The influx of a large flock of Red-necked Phalaropes along with Stilt Sandpipers bolstered the numbers for the next two surveys, but numbers of shorebirds rapidly dropped as the northern migrants moved through the area. Local nesting species were limited to American Avocet and Willet, and regular observations of these shorebirds were made throughout the spring. The species peak count was only 2376 shorebirds during the entire spring migration period.

Surveys were conducted in the fall on Cheviot Lake (Table 82), but numbers were much reduced from the spring migration. A highlight for the basin was the observation of 37 Hudsonian Godwits on 19 July, but generally was not a highly used basin by either migrants or local nesting species during the fall period. The species peak count for the fall migration was a meagre 292 shorebirds, which amounts to about 12% of the total observed in the spring.

Cheviot Lake would not be considered a high priority shorebird lake, but when conditions are suitable, it would be used opportunistically by migrant and some local breeding shorebirds.

Table 81. Shorebirds observed on Cheviot Lake, Saskatchewan in the spring of 1997

Species	May 14	May 22	May 26	May 30	June 3
Black-bellied Plover			**4**		
American Golden Plover			**6**		
American Avocet	2	67	**83**	12	10
Willet		**6**	3	2	1
Marbled Godwit				**2**	
Sanderling			**70**		32
Baird's Sandpiper					**40**

Semipalmated Sandpiper			10		**89**
Stilt Sandpiper		**225**	71	4	20
Shorebird–small		60		15	
Wilson's Phalarope					**1**
Red-necked Phalarope		1725	**1850**	50	
Total shorebirds	2	2083	2097	85	193

***Bold numbers indicate species peak count during migration period**

Table 82. Shorebirds observed on Cheviot Lake, Saskatchewan in the fall of 1997

Species	July 19	July 22	July 25	August 6	August 9	August 12	August 20	August 26
Piping Plover					**1**	1		
Semipalmated Plover				**30**		17	3	3
American Avocet				**2**				
Lesser Yellowlegs				**4**	3			
Willet	1		**3**					
Hudsonian Godwit	**37**			5				
Marbled Godwit	**1**							
Sanderling				15	**20**	20		
Pectoral Sandpiper					**2**			
Semipalmated Sandpiper				35	**185**		39	25
Least Sandpiper				**7**				
Shorebird–small		4	4					
Total shorebirds	39	4	7	98	211	38	42	28

***Bold numbers indicate species peak count during migration period**

4.2.6 Meacham wetlands

The group of wetlands referred to as the Meacham wetlands (Figure 2, Appendix 33) are clustered near the hamlet of Meacham situated along Highway 2. The surrounding landscape is comprised entirely of cultivated croplands, and the alkalinity of the basin soils appears to the only protection from being cultivated during dry years. No historical shorebird records were located for these four small saline/alkaline wetlands.

The wetlands were first detected as being used by shorebirds in the fall of 1997 at which time surveys were implemented. Three species of migrant shorebirds dominated the counts, that included Red-necked Phalarope, Baird's Sandpiper and Semipalmated Sandpiper (Table 83). American Avocets likely used the wetlands as breeding sites and were also readily used throughout the fall survey period. Hudsonian Godwits were also observed on these wetlands during the fall. The species peak count for the fall came to 2607 shorebirds.

Surveys were initiated later in spring migration of 1998, but resulted in a high count of 5758 shorebirds on 21 May. However, there was a substantial drop in numbers on the next survey. Baird's and Stilt Sandpiper were the most abundant shorebird species on the wetland complex, and it appeared that most shorebirds used the site opportunistically given the drop in numbers from one survey to the next. The species peak count totalled 5221 shorebirds for the spring period.

Table 83. Shorebirds observed on the Meacham wetlands, Saskatchewan in the fall of 1997

Species	July 19	July 22	August 9	August 12	August 23	August 26
Killdeer			**1**		1	
American Avocet	46	52	**116**	28	46	38
Greater Yellowlegs						**4**
Lesser Yellowlegs			8	**55**	13	14
Willet			**26**	9	7	11
Hudsonian Godwit					**54**	
Marbled Godwit			1		**2**	
Sanderling					**6**	1
Pectoral Sandpiper						**1**
Baird's Sandpiper			291	205	547	**667**
Semipalmated Sandpiper			17	**309**	238	387
Least Sandpiper			**1**			
Stilt Sandpiper			180	2	81	**186**
Shorebird–small			15		202	
Red-necked Phalarope	50	240	**1179**	281	27	9
Total shorebirds	96	292	1835	889	1224	1318

***Bold numbers indicate species peak count during migration period**

Table 84. Shorebird observations on the Meacham wetlands, Saskatchewan in the spring of 1998

Species	May 21	May 26
Black-bellied Plover		**2**
Killdeer	**1**	
American Avocet	**13**	13
Willet	**1**	
Sanderling	30	**37**
White-rumped Sandpiper	**181**	3
Baird's Sandpiper	**2758**	
Semipalmated Sandpiper	**386**	46
Least Sandpiper	**64**	
Stilt Sandpiper	**1665**	

Shorebird–small	633	
Wilson's Phalarope	**2**	
Red-necked Phalarope	24	**111**
Total shorebirds	5758	212

***Bold numbers indicate species peak count during migration period**

4.2.7 Muskiki Lake

Muskiki Lake (Figure 2, Appendix 34) is a highly saline basin located along Highway 2 in a primarily cultivated cropland landscape. During years with low water conditions, the shoreline does not appear suitable to shorebirds, especially along the northwest basin near the highway. It likely does not attract much bird watching activity, as no historical records of shorebird use of Muskiki Lake were found.

The surveys on Muskiki Lake were restricted to the spring migration period because low water levels in the fall rendered much of the basin unsuitable for shorebird use. The open water areas were actively used by migrant Red-necked Phalaropes (Table 85) in the spring of 1997.

Spring melt runoff in 1998 improved conditions on the wetland complex, and a greater variety of shorebirds were observed using the basin shorelines (Table 86). The most abundant migrant on 21 May was the Stilt Sandpiper followed by the Semipalmated Sandpiper. The American Avocet, although abundant during the first survey, was not observed on the next survey, so appeared to be using the site as a migration stopover point.

The lack of repeated observations of local breeding species indicated that the wetland was not readily used for nesting, possibly because of its highly saline nature later in the summer. It also appeared that the arctic migrants were using the wetland opportunistically, as there did not appear to be continued use by these species. Muskiki Lake would not be classified as a wetland of high importance to local breeding or migrant shorebirds.

Table 85. Shorebirds observed on Muskiki Lake, Saskatchewan in the spring of 1997

Species	May 17	May 22	May 26	June 3
American Avocet			6	0
Red-necked Phalarope	100	21750	23325	0
Total shorebirds	100	21750	23331	0

Table 86. Shorebirds observed on Muskiki Lake, Saskatchewan in the spring of 1998

Species	May 21	May 25
Black-bellied Plover	219	46
Killdeer	5	1
American Avocet	159	
Willet	23	
Marbled Godwit	38	

Species	May 21	May 25
Ruddy Turnstone	5	1
Red Knot	26	
Sanderling	331	52
Dunlin	4	
White-rumped Sandpiper	250	
Baird's Sandpiper		20
Semipalmated Sandpiper	641	56
Stilt Sandpiper	2524	
Shorebird–small	55	
Dowitcher spp.	3	
Wilson's Phalarope	40	
Red-necked Phalarope	3	55
Total shorebirds	4099	231

4.2.8 Porter Lake

Records of shorebirds using Porter Lake (Figure 2, Appendix 35) were noted for 29 May 1960, when 135 American Avocets were observed (Roy 1960). On 20 May 1965, there were 12 Red Knots observed on Porter Lake (Gollop et al. 1966). Saskatoon area birders observed 46 American Avocets on the lake on 23 May 1972 (Renaud and Shadick 1972). On 12 August 1970, a peak count of 260 Marbled Godwits were observed roosting on the basin (Gollop 1971), and 200 Marbled Godwits were observed on 6 July 1973 (Harris 1974). Porter Lake attained notoriety as an important fall staging lake with the observation of 847 Hudsonian Godwits on 21 July 1971 (Gollop 1971), a peak of 1150 birds in 1973 on 9 July (Harris 1974, Houston 1974), and a high of 1978 Hudsonian Godwits on Porter Lake in 1979 (O'Neil 1979). Porter Lake was again noted in the literature with the observation of 207 American Avocet on 11 August 1983 (Harris 1984). During the regional aerial surveys in 1987, Porter Lake only had 811 shorebirds in the spring count and was dry during the aerial surveys in May 1988 (Smith and Dickson 1989, CWS unpubl. data). There was a site visit made on 1 August 1995, and although there was some water on the north end, the basin appeared to be mostly dry.

Surveys were initiated on Porter Lake in the spring of 1997, and all observations were made from the gravel road running along the east side of the basin. Shorebird use of the basin was not very high, with a peak daily count of only 259 shorebirds during the spring of 1997, and most observations were of local breeding shorebirds such as the American Avocet (Table 87). The species peak count total for the spring was only 345 shorebirds.

Surveys were continued on Porter Lake during the fall migration period beginning on 16 July (Table 88). The most striking feature of the fall surveys was the high number of Hudsonian Godwits observed on the basin for almost a month from 16 July to 12 August, peaking on

Table 87. Shorebirds observed on Porter Lake, Saskatchewan in the spring of 1997

Species	May 14	May 18	May 22	May 26	May 30	June 3
Black-bellied Plover				18	**22**	
Killdeer						**2**
American Avocet	95	**163**	77	91	107	56
Lesser Yellowlegs		**11**				
Willet	**2**	2	2	2	2	2
Sanderling			**7**	2		
Semipalmated Sandpiper		7		**30**	16	
Stilt Sandpiper				**6**	3	
Small shorebird		25	20	65	15	
Wilson's Snipe				**1**		1
Wilson's Phalarope		**13**	2	4	6	3
Red-necked Phalarope		9	33	20	**88**	
Total shorebirds	97	230	141	239	259	64

***Bold numbers indicate species peak count during migration period**

Table 88. Shorebird observations on Porter Lake, Saskatchewan in the fall of 1997

Species	July 16	July 19	July 22	July 25	July 28	Aug 6	Aug 9	Aug 12	Aug 20	Aug 23	Aug 26
Black-bellied Plover			1		**5**						
American Golden Plover							**1**				
Semipalmated Plover							2	**6**			2
Killdeer	3	2			1	**7**					
American Avocet	52	28	**45**	37	28	6		1			
Greater Yellowlegs			**1**								
Lesser Yellowlegs	7	7	3	7	**19**	8	2				8
Willet	2		2	1	**5**	4	5	1			
Hudsonian Godwit	120	148	255	420	706	**997**	748	188		5	
Marbled Godwit	6	11	17	39	11	6	**49**	29	4	3	3
Pectoral Sandpiper			**5**			1					
Baird's Sandpiper	3		10			7		21		**22**	22
Semipalmated Sandpiper	16						**57**	28	22	49	53

Species	July 16	July 19	July 22	July 25	July 28	Aug 6	Aug 9	Aug 12	Aug 20	Aug 23	Aug 26
Least Sandpiper								**3**		1	
Stilt Sandpiper	12	24	20					**29**			4
Shorebird–small		5	25				10	10			20
Wilson's Phalarope	**7**	1	6	1							
Red-necked Phalarope	**328**	31	14	9	130	43		10	7		4
Total shorebirds	556	257	404	514	905	1079	874	326	33	80	116

***Bold numbers indicate species peak count during migration period**

6 August at 997 individuals, along with a number of Marbled Godwits. The basin is quite small, susceptible to drying conditions in the summer, especially when seasonal precipitation is limited. It is also prone to disturbance because of its proximity to a busy gravel road. The number of shorebirds that use the site is quite amazing, indicating there are features about the basin that are extremely attractive, if not to all, at least to a number of shorebird species. The species peak count for the fall of 1997 was a total of 1586 shorebirds. The basin has been listed as a Globally Significant Important Bird Area for shorebirds based on the high number of Hudsonian Godwits (IBA website).

4.3 Surveys of other Saskatchewan Lakes: 1995−1998

During the course of the four-year survey, numerous lakes were checked either from the air or on the ground, as a follow-up to the Canadian Wildlife Service aerial surveys of 1987−1988 (Smith and Dickson 1989, CWS unpubl. data). The bulk of those lakes were covered in the main text of the report, while others are noted in the sections below or listed in the appendices. Some lakes, such as Pelican and Blaine lakes, were located too far from the general area of focus for the surveys, so they were checked irregularly or when convenient. Others with limited or no shorebird use were dropped after the initial visit (Appendix 36). The notation of these lakes is important, to identify that they had been checked and found either lacking in shorebird numbers or were not used at the time of observation, and to provide a baseline for future survey effort.

4.3.1 Blaine Lake

Several ground surveys of Blaine Lake in May 1988 recorded a single-day count of 10,301 shorebirds, including a peak count of 3529 Red-necked Phalaropes, 6117 Semipalmated Sandpipers, 551 Stilt Sandpipers and 153 American Avocets (CWS unpubl. data). An aerial survey of the basin on 2 June 1988 resulted in the sighting of 6329 shorebirds (CWS unpubl. data). During 1989 spring ground surveys of the area, 29,861 shorebirds were recorded on Blaine Lake (Morrison et al. 1995). A single visit to the area on 17 August 1989 found 205 shorebirds using the wetland basins (CWS unpubl. data).

Blaine Lake was visited on 25 May 1995, and there were 4828 shorebirds observed on the middle basin, which had the best water and habitat conditions for shorebird use (Table 90). Northern migrants composed the bulk of the shorebirds observed on the basin. The southern basin was dry while the north basin was nearly dry with some stagnant water. A visit to the site on 9 July 1998 found water conditions improved from the spring, but no shorebird count was conducted.

Bird watchers, Gustave and Aileen Yaki (pers. comm., Calgary, Alberta) observed 11,018 shorebirds on the west end of Blaine Lake (southern basin), which included 6000 Semipalmated Sandpiper, 4000 Stilt Sandpiper and 1000 Red-necked Phalarope on 31 May 1997. The complex of three basins was briefly visited on 28 July 1997, with 20 small shorebirds observed on a limited view of the north shore of the south basin, 500 Red-necked Phalaropes on the middle basin, and no shorebirds on the north basin (CWS unpubl. data).

Table 89. Shorebirds observed on Blaine Lake, Saskatchewan in the spring of 1995

Species	May 25
Black-bellied Plover	2
American Golden Plover	56
Killdeer	1
American Avocet	45
Willet	1
Marbled Godwit	1
Sanderling	31
Dunlin	2
White-rumped Sandpiper	352
Baird's Sandpiper	48
Semipalmated Sandpiper	1200
Stilt Sandpiper	1470
Dowitcher spp.	5
Red-necked Phalarope	1613
Total shorebirds	4828

4.3.2 Cosine/Cactus Lakes

On a visit to Cactus Lake on 15 August 1981, there were 900 American Avocet seen on the lake (Wedgwood 1982). Aerial surveys of the area in the spring of 1987 resulted in the observation of 4467 shorebirds on Cactus and Cosine lakes combined (Smith and Dickson 1989). Additional aerial surveys on 1 June 1988 resulted in the observation of 45 shorebirds on Cosine Lake and a dry lake bed on Cactus Lake (CWS unpubl. data). Ground surveys on 23 May 1989 found 3704 shorebirds using the lake, including 481 Stilt Sandpipers and 1014 Semipalmated Sandpipers (CWS unpubl. data).

In April 1995, Cosine Lake had small pockets of water flooded into the grass and bulrush shoreline and was considered unsuitable shorebird habitat. Cactus Lake had water well into the shoreline vegetation and was considered unsuitable habitat for shorebird use and not visited again for ground surveys in 1995 or 1996. Cactus Lake was checked during the aerial survey

on 23 May 1995, and there were 4 shorebirds on the wetland including 2 American Avocets and 2 Willets. Cosine Lake was also checked that day from the air, and it had 7 shorebirds: 4 Willets, 1 Marbled Godwit and 2 Yellowlegs. The low numbers observed on both lakes during the aerial survey in May reconfirmed the decision not to conduct any further ground surveys.

4.3.3 Flat Lake

Flat Lake is a large shallow wetland on the southeast corner of the Town of Wilkie. Aerial surveys conducted on 1 June 1988 resulted in the observation of 2898 shorebirds including 183 American Avocets (CWS unpubl. data). Ground surveys were conducted 28 May 1989, and there were 9960 shorebirds observed, including 3654 Stilt Sandpipers, 1062 Least Sandpipers, 1355 Semipalmated Sandpipers and 119 Red Knots (CWS unpubl. data).

When the site was visited in April 1995, the lake was dry, completely grassed over and had become a grazing pasture for livestock (CWS unpubl. data).

4.3.4 Lac Lenore/Lenore Lake

Shorebird records were noted for Lac Lenore with the observation of 312 Ruddy Turnstones on 24 May 1972 (Houston 1972). Aerial surveys on 30 May 1988 of Lac Lenore provided a site record of 512 shorebirds (CWS unpubl. data). Ground surveys of Lac Lenore in the spring of 1989 resulted in the observation of 25,000 shorebirds including 5000 White-rumped Sandpipers (P. Taylor, Canadian Wildlife Service, pers. comm. 1989 in Morrison et al. 1995). A visit was made to the south shore of the lake on 17 August 1989 and resulted in a count of 226 shorebirds including 9 Hudsonian Godwits, 67 Killdeer and 78 Lesser Yellowlegs (CWS unpubl. data). During a visit to the lake on 11 May 1998, high-water conditions were prevalent throughout the southern part of the lake, with no suitable habitat for shorebird use. Lenore Lake is listed as a federal Migratory Bird Sanctuary and receives some protection on the water area. It is listed as Globally Significant for shorebird concentrations as an Important Bird Area (IBA website).

4.3.5 Neutral Hills

The Neutral Hills wetlands were observed from the air on 23 May 1995 and had a total of 2595 shorebirds (Table 91). During a ground visit to the four small wetlands after the aerial surveys, few shorebirds were found on site. One basin was nearly dry with two Marbled Godwits present, while one basin had no birds and the remaining two had 20 and 50 small unidentified shorebirds respectively, for each basin (CWS unpubl. data.). No further visits were made to the wetlands. It appears that migrant shorebirds had opportunistically used the site as a short stopover site.

Table 90. Neutral Hills wetlands 1995 spring aerial shorebird survey.

Species	May 23
Black-bellied Plover	55
Killdeer	2
American Avocet	52
Willet	8
Marbled Godwit	2
Stilt Sandpiper	50

Species	May 23
Shorebird–small	2337
Shorebird–medium	24
Shorebird–other	65
Total shorebirds	2595

4.3.6 Pelican Lake

In the spring of 1978, an estimated 75,000 shorebirds were observed on Pelican Lake by E. Kern (Serr 1978). On 7 August 1978, an estimated 1000 Marbled Godwits and 1000 Wilson's Phalaropes were recorded on Pelican Lake by a local naturalist (Serr 1979). Aerial surveys of the area resulted in the observation of 1003 and 362 shorebirds on Pelican Lake in the spring and fall of 1987, respectively (Smith and Dickson 1989). The majority of the birds were unidentified, but 58 Black-bellied Plovers were seen in the spring and 35 Yellowlegs species were observed in the fall.

Aerial surveys were conducted on Pelican Lake in the spring of 1993, and only 305 shorebirds were observed on the lake (Table 92). The long narrow shoreline and surrounding grassland at Pelican Lake likely provided ample nesting habitat for the prairie nesting species such as the American Avocet, Willet and Marbled Godwit.

Shorebird surveys were conducted twice on Pelican Lake in the spring of 1994 (Table 93), with large numbers of shorebirds being observed during each survey. The vast majority were Stilt Sandpipers including an adult male Curlew Sandpiper (Beyersbergen, unpubl. data, Roy 1996). Most of the observations were made on the southern portion of Pelican Lake in the vicinity of the gravel quarry.

An aerial survey was conducted on Pelican Lake in the spring of 1995, but the majority of shorebirds were not identifiable from the air (Table 94).

While in the vicinity of Pelican Lake in August of 1995, a quick ground check of select sites in the southern portion of the lake resulted in the observation of over 10,500 shorebirds (Table 95). Dowitcher spp. was the most abundant shorebird observed on the basin, followed by Stilt Sandpiper. There were also 700 Semipalmated Plovers observed on that date; it is unusual for this species to be observed in such large numbers in the prairies.

The Curlew Sandpiper, observed in the spring of 1994, was located on a small wetland just east of Pelican Lake among a group of Stilt Sandpipers. The bird was again observed on the south end of Pelican Lake several days later, again in a flock of Stilt Sandpipers. This was the first recorded observation of a Curlew Sandpiper in Saskatchewan and was noted by F.J. Roy in *The Birds of the Elbow* (Roy 1996).

Pelican Lake provided good shoreline habitat for migrant shorebirds as well as nesting habitat for local breeding species until the late 1990s, when extensive precipitation events in the area rapidly raised water levels and flooded most of the basin, taking out the three roads that compartmentalized the lake. During a visit to the lake in June 2008, there was a narrow band of mud/gravel shoreline

around the perimeter of the lake, and on the south end, relatively large tracts of mudflats and shallow water were visible. The lake may be returning to a state where shorebird use becomes more regular.

Table 91. Pelican Lake 1993 spring aerial shorebird survey.

Species	May 26
Black-bellied Plover	17
Killdeer	13
American Avocet	23
Willet	28
Yellowlegs spp.	4
Marbled Godwit	8
Shorebird–small	75
Shorebird–medium	35
Shorebird–large	3
Shorebird–other	99
Total shorebirds	305

Table 92. Shorebirds observed on Pelican Lake in the spring and fall of 1994.

Species	May 19	May 24	July 28
Black-bellied Plover		35	62
Killdeer		1	6
American Avocet		5	5
Lesser Yellowlegs			370
Willet		1	1
Hudsonian Godwit			40
Marbled Godwit		8	262
Red Knot		7	
Sanderling	55	90	
Dunlin	1	4	
Curlew Sandpiper*	1	1	
Pectoral Sandpiper	80	55	
White-rumped Sandpiper	90	20	
Semipalmated Sandpiper	705	235	4
Stilt Sandpiper	3875	5082	60
Shorebird–small			200
Dowitcher spp.			730
Wilson's Phalarope		3	230
Red-necked Phalarope	200	198	
Total shorebirds	4902	5745	2023

* First recorded observation of a Curlew Sandpiper, an adult male in breeding plumage, in Saskatchewan was by the author and B. Hepworth, L. Saigon and G. Brewster of DUC. A second observation of the bird was made several days later by the author and B. Leuterbach and T. Herriot of Regina, Sk.

Table 93. Pelican Lake 1995 spring aerial shorebird survey.

Species	May 26
Killdeer	3
American Avocet	70
Willet	18
Marbled Godwit	16
Stilt Sandpiper	434
Shorebird–small	1518
Shorebird–medium	1374
Shorebird–large	16
Shorebird–other	6141
Total shorebirds	9590

Table 94. Shorebirds observed on Pelican Lake in the fall of 1995

Species	August 3
American Avocet	21
Baird's Sandpiper	30
Black-bellied Plover	16
Dowitcher spp.	6850
Greater Yellowlegs	7
Hudsonian Godwit	216
Killdeer	2
Lesser Yellowlegs	287
Marbled Godwit	87
Pectoral Sandpiper	22
Piping Plover	1
Semipalmated Plover	700
Semipalmated Sandpiper	730
Stilt Sandpiper	1320
Willet	2
Wilson's Phalarope	180
White-rumped Sandpiper	50
Total shorebirds	10521

5.0 Conclusions

The lakes surveyed during the four-year study on the prairies comprised a mix of permanent and semi-permanent wetlands that typically experience a great deal of variability from one year to the next. This was evident in the range of conditions observed on all the wetlands with the exception of a few deep water permanent lakes.

In the border lakes or western survey area, there were 10 lakes in Alberta and 14 lakes in Saskatchewan checked during the two survey years of 1995 and 1996. In the spring of 1995, an estimated 38,000 and 121,000 shorebirds, respectively per province, were observed in the area. The fall 1995 surveys were only conducted on a few wetlands because of low numbers in the area, and about 6000 shorebirds were recorded on three lakes in Alberta, while on six lakes in Saskatchewan, there were an estimated 54,000 shorebirds (84.5% on Manitou Lake).

In the spring of 1996, the number of shorebirds observed was only 17,000 in Alberta and 74,000 in Saskatchewan. Two lakes in Alberta (Baxter and Reflex−West) and two lakes in Saskatchewan (Manitou and Freshwater), all deep water lakes, were noteworthy in the persistence of suitable habitat conditions throughout the two years and the numbers of shorebirds observed using these sites. Key species observed in the area included Stilt Sandpiper–10,000 (1995) and 5,900 (1996); Sanderling–20,000 (1995) and 14,500 (1996); Semipalmated Sandpiper–25,000 (1995) and 10,750 (1996); and Red-necked Phalarope–85,000 (1995) and 55,500 (1996). Red-necked Phalarope was the most prominent species of shorebird on Manitou Lake and accounted for a large percentage of all shorebirds recorded in the survey area. The other lakes provided suitable habitat for a wider variety of migrant and local breeding species.

In the eastern survey area, there were 9 lakes checked in central Saskatchewan during the two years of surveys in 1997 and 1998. In the spring of 1997, there were an estimated 51,000 shorebirds observed on these lakes, while the 1997 fall surveys produced an estimated count of 37,600 shorebirds. The 1998 spring surveys resulted in an estimated count of 48,900 shorebirds on the lakes. The primary site in the region was Buffer Lake, which accounted for 45.6%, 88.7% and 76.3% of all the shorebirds observed in each of the three respective surveys periods. Key species observed in the area in the spring included the Sanderling−1800 (1997) and 4300 (1998); Semipalmated Sandpiper−2400 (1997) and 17,600 (1998); Stilt Sandpiper−1700 (1997) and 6800 (1998); and Red-necked Phalarope−43,400 (1997) and 3000 (1998). During the fall 1997 period, there were 1800 Sanderling, 6200 Semipalmated Sandpiper, 9000 Stilt Sandpiper and 14,000 Red-necked Phalaropes observed in the area.

The wetlands surveyed that have been identified of high importance to shorebirds have received recognition for their importance through their designation as an Important Bird Area for shorebirds. These sites include the complex called the Manitou Lake Area, Buffer Lake and Porter Lake, to name a few, while other sites less important, but still used by shorebirds, are protected under the status of a Migratory Bird Sanctuary. The listing of a site as an IBA does not infer any legal protection, but rather, it will be up to local groups and landholders with a vested interest in the lakes to develop stewardship activities to conserve these sites to the mutual benefit of wildlife and their own needs. A lot of the wetlands are subject to extremes of drought and floods because of the general nature of most prairie wetlands, but if the wetland is maintained as a viable basin, then when water conditions improve habitat should be available for shorebirds when they need it during their annual life cycle when they are present in the Canadian prairies.

It has been over a decade since these wetlands have been surveyed for shorebird use, and it is important that a more current status assessment be made of these lakes including their habitat conditions, environmental impacts or changes, and whether or not shorebirds are even using them, in what numbers, which species and what season of the year. A baseline of information on

shorebird use has been established for these lakes and it would be beneficial for shorebird conservation to continue building on this knowledge.

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7.0 Bibliography

Alexander, S. A. and C. L., Gratto-Trevor. 1997. Shorebird migration and staging at a large prairie lake and wetland complex: the Quill Lakes, Saskatchewan. Occasional Paper Number 97, Canadian Wildlife Service, Prairie and Northern Region. Ottawa, Ontario. 47 pp.

Beyersbergen, G.W. 2004. An investigation of migrant shorebird use of the Peace-Athabasca Delta, Alberta in 1999. In: Environment Canada, *Northern Rivers Ecosystem Initiative: Collective Findings* (CD-ROM). Compiled by F.M. Conly, Saskatoon, SK, 2004. (With Alberta Environment). 38 pp

Beyersbergen, G. W. and M. R. Norton. 2005. Shorebird Migration Staging on the "Kutawagan Lake wetland complex" in the Mount Hope-Prairie Rose (PFRA) Community Pasture, Saskatchewan. Canadian Wildlife Service Technical Report Series No. 424. Prairie and Northern Region. Edmonton, Alberta. v + 27 pp.

Beyersbergen, G. W. and D. C. Duncan. 2007. Shorebird Abundance and Migration Chronology at Chaplin Lake, Old Wives Lake and Reed Lake, Saskatchewan: 1993 and 1994. Canadian Wildlife Service Technical Report Series No. 484. Prairie and Northern Region. Edmonton, Alberta. vi + 46 pp.

Beyersbergen, G.W. 2009. Observations of shorebird migration at Hay-Zama Lakes and Kimiwan Lake, Alberta: 2001–2003. Unpublished report: Environment Canada, Canadian Wildlife Service, Prairie and Northern Region. Edmonton, Alberta.

Beyersbergen, G.W. 2009. Shorebird observations and surveys at Luck Lake, Saskatchewan: 1993–2002. Unpublished report: Environment Canada, Canadian Wildlife Service, Prairie and Northern Region. Edmonton, Alberta

Castro, G. and J. P. Myers. 1989. Flight range estimates for Shorebirds. Auk 106: 474-476.

Colwell, M. A. and L. W. Oring. 1988. Habitat use by breeding and migrating shorebirds in south-central Saskatchewan. Wilson Bulletin 100: 554-566.

Colwell, M. A. 1991. Effects of fluctuating wetland conditions on prairie shorebirds. Proceedings of the Second Endangered Species and Prairie Conservation Workshop in Regina, SK. Provincial Museum of Alberta Natural History Occasional Paper No. 15, Pages 173-180.

Dickson, H. L. and A. R. Smith. 1988. Canadian Prairie Shorebird Program: an update. Wader Study Group Bulletin 52: 23-27.

Dugger, Bruce D. and Katie M. Dugger. 2002. Long-billed Curlew (Numenius americanus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/628

Environment Canada Website: http://ec.gc.ca/nature/Default.asp?lang=En&n=C5EDD32E-1

Farmer, A.H. and A. H. Parent. 1997. Effects of the landscape on shorebird movements at spring migration stopovers. The Condor 99: 698-707

Fleming, S. P. 1994. The 1991 International Piping Plover Census in Canada. Canadian Wildlife Service Occasional Paper Number 82. Ottawa, Ontario. 59 pp.

Gollop, J.B. 1965. Some 1964 birds records for the Saskatoon district. Blue Jay 23 (1): 13-14.

Gollop, J.B., J.A. Slimmon and R.V. Folker. 1966. Some 1965 bird records for the Saskatoon district. Blue Jay 24 (2): 76-78.

Gollop, J.B. 1971. Summer records of Hudsonian Godwits near Saskatoon, Saskatchewan. Blue Jay 29 (3): 132-134.

Gudmundsson, G. A., A. Lindstrom and T. Alerstam. 1991. Optimal fat loads and long-distance flights by migrating Knots *Calidris canutus*, Sanderlings *C. alba* and Turnstones *Arenaria interpres.* IBIS 133: 140-152.

Harrington, B. A., F. J. Leeuwenberg, S. L. Resende, R. McNeil, B.T. Thomas, J. S. Grear, and E. F. Martinez. 1991. Migration and mass change of White-rumped Sandpipers in North and South America. Wilson Bulletin 103 (4): 621-636.

Harrington, B. and E. Perry. 1995. Important Shorebird Staging Sites Meeting Western Hemisphere Shorebird Network Criteria in the United States. United States Department of the Interior, Fish & Wildlife Service Publication, October 1995, 121 pp.

Harris, W.C. 1974. More Hudsonian Godwits in Saskatchewan. Blue Jay 32 (2): 101-104.

Harris, W.C. 1984. Fall Migration. August 1, 1983 to November 30, 1983. Prairie Provinces Region. American Birds 38 (2): 214-215.

Harris, W.C., G. Wapple, R. Wapple, K. DeSmet and S. Lamont. 1985. Saskatchewan Piping Plovers - 1984. Unpublished report for the Saskatchewan Natural History Society, Saskatoon, Saskatchewan and Saskatchewan Parks and Renewable Resources, Wildlife Branch, Regina, Saskatchewan. 107 pp.

Hatch, D.R. M. 1966. Spring Migration. April 1, 1966 to May 31, 1966. Northern Great Plains Region. Audubon Field Notes 20 (4): 519-522.

Houston, C.S. 1972. Spring Migration. April 1, 1972 to May 31, 1972. Northern Great Plains Region. American Birds 26 (4): 774-777.

Houston, C.S. 1974. Fall Migration. August 16, 1973 to November 30, 1973. Northern Great Plains Region. American Birds 28 (1): 67-70.

IBA Canada Website. 2008. Manitou and area lakes, Saskatchewan. http://www.bsc-eoc.org/iba/IBAsites.html

McNeil, R. and R. Cadieux. 1972. Fat content and flight-range capabilities of some adult spring and fall migrant North American shorebirds in relation to migration routes on the Atlantic coast. Le Naturalisté Canadien 99: 589-606.

Morrison, R.I.G., R.W. Butler, G.W. Beyersbergen, H.L. Dickson, A. Bourget, P.W. Hicklin, J.P. Goossen, R.K. Ross, and C.L. Gratto-Trevor. 1995. Potential Western Hemisphere Shorebird Reserve Network Sites for Shorebirds in Canada: Second Edition 1995. Canadian Wildlife Service Technical Report Series Number 227, Canadian Wildlife Service, Ottawa, Ontario. 104 pp.

Niemuth, N.D., M.E. Estey, R.E. Reynolds, C.R. Loesch, and W.A. Meeks. 2006. Use of wetlands by spring-migrant shorebirds in agricultural landscapes of North Dakota's drift prairie. Wetlands 26(1): 30-39.

Norton, M. R. and G. W. Beyersbergen. 2002. Shorebird Migration at Luck Lake, Sk.. Blue Jay 60 (4): 199-206.

O'Neil, P. 1979. Annotated List: 30 July - November 28, 1979. Saskatoon Field Notes (mimeo) 8(3):1-17 in Dickson and Smith, 1989.

Renaud, W.E. and S. J. Shadick (eds.). 1972. Saskatoon Field Notes. Spring Migration. (March 16-May 31, 1972). Saskatoon Natural History Society. 26 pp.

Renaud, W.E. 1974. Nesting Piping Plover in Saskatchewan. Blue Jay 32 (3): 158-162.

Roy, F. 1960. Birds of special interest in the Saskatoon area, spring 1960. Blue Jay 18(3): 117-118.

Roy, J. F. 1996. Birds of the Elbow. Special Publication No. 21, Natural History Society of Saskatchewan, Regina, Saskatchewan. 325 pp.

Serr, E.M. 1978. The spring migration, April 1-May 31, 1978. Northern Great Plains Region. American Birds 32: 1021-1024.

Serr, E M. 1979. The fall migration, Aug. 1-Nov. 30, 1978. Northern Great Plains Region. American Birds 33(2): 188-190.

Skagen, S. K. and F. L. Knopf. 1994. Migrating shorebirds and habitat dynamics at a prairie wetland complex. Wilson Bulletin 106 (1): 91-105.

Skeel, M. A., D. C. Duncan, and E. R. Wiltse. 1996. The 1996 International Piping Plover Breeding Census – Saskatchewan. Saskatchewan Wetland Conservation Corporation, Regina, Saskatchewan. 70 pp.

Smith, A. R. and H. L. Dickson. 1989. Prairie Shorebird Survey 1987. Unpublished Report, Canadian Wildlife Service, Edmonton, Alberta. 60 pp.

Tsipoura, N and J. Burger. 1999. Shorebird diet during spring migration stopover on Delaware Bay. The Condor 101: 635-644.

Wapple, R.D. and W.E. Renaud. 2008. Birds of the Rosetown-Biggar District. Nature Saskatchewan publication, Callin Series No. 7. Regina, Saskatchewan.

Wedgwood, J.A. 1982. Fall migration. August 1, 1981 to November 30, 1981. Prairie Provinces Region. American Birds 36 (2): 188-190.

Wershler, C. 1987. Census and Habitat Evaluation for migrating shorebirds in East-central Alberta. Unpublished report prepared by Sweetgrass Consultants Ltd, Calgary, Alberta. 43 pp.

Wershler, C. and C. Wallis. 1987. Status of the Piping Plover in Alberta 1986. Unpublished report prepared by Sweetgrass Consultants Ltd. For World Wildlife Fund Canada – Wild West Program. 53 pp.

Wiercinski, M. 1984. Baseline monitoring of selected migratory bird sanctuaries and national wildlife areas, Saskatchewan, May-August 1984. Canadian Wildlife Service unpublished Technical report, Saskatoon. 90 pp.

8.0 Appendices

Appendix 1. List of lakes surveyed for shorebirds in eastern Alberta and western Saskatchewan during the period 1995–1996 in the spring and fall migration seasons

Lake	Latitude	Longitude	Easting	Northing	Zone	Size	General Location
Alberta							
Baxter	52° 55.7'N	110° 44.0'W	518200	5864000	12U		12 km NE Wainwright, north of Hwy 14.
Cipher	52° 40.9'N	110° 04.3'W	562760	5837080	12U		5 km E Chauvin, west of Hwy 17.
Foster	52° 13.8'N	110° 33.3'W	530535	5786460	12U		28 km NE Consort, 5 km NW of Sounding Lake.
Gillespie	52° 25.2'N	110° 10.6'W	555890	5807780	12U		9 km NE Provost, north of Hwy 13.
Gooseberry	52° 07.0'N	110° 44.1'W	518070	5773850	12U		12 km N Consort, east of Hwy 41.
Killarney	52° 35.1'N	110° 05.6'W	561340	5826300	12U		11 km SSE Chauvin, west of Hwy 17.
Leane	52° 33.7'N	110° 03.4'W	563900	5823820	12U		15 km SSE Chauvin, west of Hwy 17.
Metiskow	52° 26.0'N	110° 38.6'W	524370	5808990	12U		2.5 km N Metiskow hamlet
Reflex West	52° 39.8'N	110° 00.7'W	566910	5835040	12U		8 km E Chauvin, east of Hwy 17.
Sunken	52° 22.5'N	110° 38.8'W	524100	5802500	12U		3 km S of hamlet of Metiskow.
Saskatchewan							
Ethmuir	51° 56.4'N	109° 20.8'W	613660	5755370	12U		14 km W Kerrobert, north of Hwy 51.
Freshwater	52° 36.7'N	109° 58.8'W	569120	5830030	12U		3.0 km south of Reflex Lake, east of Chauvin.
Grass	52° 11.9'N	109° 17.0'W	617300	5784240	12U		28 km SW Unity, west of Hwy 21.
Grill	52° 12.1'N	109° 07.1'W	628800	5784930	12U		25 km S Unity, east of Hwy 21.
Killsquaw	52° 24.0'N	109° 05.2'W	630170	5806740	12U		5 km SE Unity, south of Hwy 14.
Landis	52° 11.5'N	108° 30.7'W	670180	5785070	12U		3.5 km W hamlet of Landis, south of Hwy 14.
Manitou	52° 45.2'N	109° 42.7'W	586950	5845340	12U		4.5 km S Neilburg, south of Hwy 40.
Muddy	52° 18.9'N	109° 07.1'W	628200	5797480	12U		12.5 km S Unity, east of Hwy 21.
Opuntia	51° 48.5'N	108° 34.6'W	667080	5742500	12U		40.0 km E Kerrobert, south of Hwy 51.
Reflex East	52° 40.9'N	109° 56.9'W	571340	5837060	12U		10 km E Chauvin, east of Hwy 17.
Seagram	52° 36.5'N	109° 24.5'W	607880	5829750	12U		29.0 km SE Neilburg, south of Hwy 40/21.
Street	51° 52.0'N	109° 21.9'W	612740	5747100	12U		16 km SW Kerrobert, south of Hwy 51.
Teo	51° 31.8'N	109° 20.5'W	615040	5709810	12U		14 km NW Kindersley, north of Hwy 7.
Wells	52° 49.5'N	109° 50.6'W	577620	5853260	12U		14 km W Neilburg, south of Hwy 40.

Coordinates and distances are from the centre of the lake or wetland basin. UTM in WGS 1984 format

Appendix 2. List of lakes surveyed for shorebirds east central Saskatchewan during the period 1997–1998 in the spring and fall migration seasons

Lake	Latitude	Longitude	Easting	Northing	Zone	Size	General Location
Basin	52° 36.9'N	105° 16.7'W	481200	5828980	13U		47 km SW Melfort
Buffer	52° 22.7'N	106° 00.1'W	431620	5803430	13U		44 km NE Saskatoon, north of Hwy 27.
Burke	52° 09.6'N	106° 18.6'W	410470	5779470	13U		18 km E Saskatoon, north of Hwy 5.
Cheviot	52° 01.8'N	106° 19.8'W	408660	5765020	13U		18 km SE Saskatoon, north of Hwy 14.
Elkona	52° 36.2'N	105° 12.1'W	486640	5828070	13U		1 km E of Basin Lake.
Lenore	52° 30.1'N	104° 58.1'W	502060	5816460	13U		44 km SW Melfort.
Meacham	52° 04.9'N	105° 45.9'W	447810	5770270	13U		Hwy 2 at hamlet of Meacham.
Middle	52° 33.5'N	105° 11.6'W	486730	5823230	13U		50 km SW Melfort.
Muskiki	52° 20.1'N	105° 42.9'W	451140	5798500	13U		14.5 km S Cudworth, east of Hwy. 2.
Porter	52° 11.9'N	106° 17.1'W	412100	5783960	13U		20.0 km NE Saskatoon, north of Hwy 5.

Coordinates and distances are from the centre of the lake or wetland basin. UTM in WGS 1984 format

Appendix 3. Scientific names, species, AOU alpha-codes and size categories for shorebirds observed during surveys in Alberta and Saskatchewan: 1995−1998

Common Name	Scientific Name	Alpha-code	Size Category
Black-bellied Plover	*Pluvialis squatarola*	BBPL	Medium
American Golden Plover	*Pluvialis dominica*	AGPL	Medium
Snowy Plover	*Charadrius alexandrinus*	SNPL	Small
Semipalmated Plover	*Charadrius semipalmatus*	SEPL	Small
Piping Plover	*Charadrius melodus*	PIPL	Small
Killdeer	*Charadrius vociferus*	KILL	Medium
American Avocet	*Recurvirostra americana*	AMAV	Large
Black-necked Stilt	*Himantopus mexicanus*	BNST	Large
Greater Yellowlegs	*Tringa melanoleuca*	GRYE	Large
Lesser Yellowlegs	*Tringa flavipes*	LEYE	Medium
Solitary Sandpiper	*Tringa solitaria*	SOSA	Small
Willet	*Catoptrophorus semipalmatus*	WILL	Large
Spotted Sandpiper	*Actitis macularia*	SPSA	Small
Upland Sandpiper	*Bartramia longicauda*	UPSA	Large
Whimbrel	*Numenius phaeopus*	WHIM	Large
Long-billed Curlew	*Numenius americanus*	LBCU	Large
Hudsonian Godwit	*Limosa haemastica*	HUGO	Large
Marbled Godwit	*Limosa fedoa*	MAGO	Large
Ruddy Turnstone	*Arenaria interpres*	RUTU	Medium
Red Knot	*Calidris canutus*	REKN	Medium
Sanderling	*Calidris alba*	SAND	Small
Semipalmated Sandpiper	*Calidris pusilla*	SESA	Small
Western Sandpiper	*Calidris mauri*	WESA	Small
Least Sandpiper	*Calidris minutilla*	LESA	Small
White-rumped Sandpiper	*Calidris fuscicollis*	WRSA	Small
Baird's Sandpiper	*Calidris bairdii*	BASA	Small
Pectoral Sandpiper	*Calidris melanotos*	PESA	Medium
Dunlin	*Calidris alpina*	DUNL	Small
Stilt Sandpiper	*Calidris himantopus*	STSA	Medium
Buff-breasted Sandpiper	*Tryngites subruficollis*	BBSA	Medium
Wilson's Snipe	*Gallinago delicata*	WISN	Medium
Wilson's Phalarope	*Phalaropus tricolor*	WIPH	Medium
Red-necked Phalarope	*Phalaropus lobatus*	RNPH	Small
Dowitcher spp.	*Limnodromus* spp.	DOWI	Medium
Yellowlegs spp.	*Tringa* spp.	YELL	Medium
Phalarope spp.	*Phalaropus* spp.	PHAL	Small
Shorebird−large		SHLA	Large
Shorebird−medium		SHME	Medium
Shorebird–other		SHOT	
Shorebird−small		SHSM	Small

Appendix 4. Field data form for audio cassette tape recordings of shorebird observations

________________. LAKE SHOREBIRD CENSUS Page ____ of _____.

Observer: ________________. Survey Date: ____/____/______. Wind : _____/______. Cloud :____.
m d y
dir. speed

SEG. NO.	TIME 2400	SPECIES	NUMBER OF BIRDS		SEG. NO.	TIME 2400	SPECIES	NUMBER OF BIRDS

Appendix 5. Baxter Lake landscape features, roadways and access points

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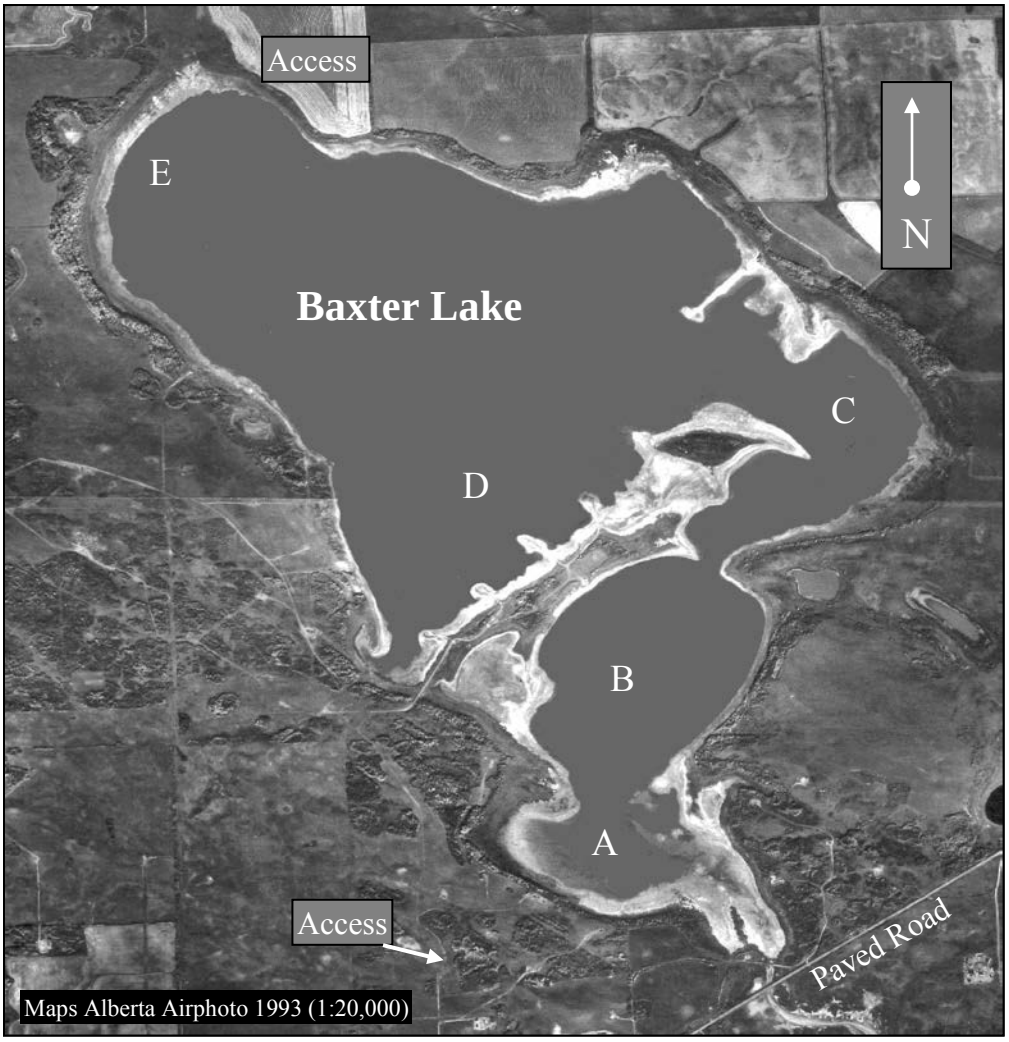
Baxter Lake, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: Wainwright, 1.6 km east on Highway 14, then 6.4 km north on Highway 41, then approximately 7 km east to the south shore of Baxter Lake.
Location: Latitude 52° 53′, Longitude 110°43′
UTM 5859330N; 519065E
Surface Area: 5.61 km² **Length of shoreline**: 18.93 km



Appendix 6. Cipher Lake landscape features, roadways and access points

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Cipher Lake, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: Chauvin, 5 km east along gravel road. Located 1.6 km west of Highway 17.
Location: Latitude 52° 41′, Longitude 110° 06′
UTM 5837424N; 560839E
Surface area: 0.69 km² **Length of shoreline**: 3.27 km

Appendix 7. Foster Lake landscape features, roadways and access points

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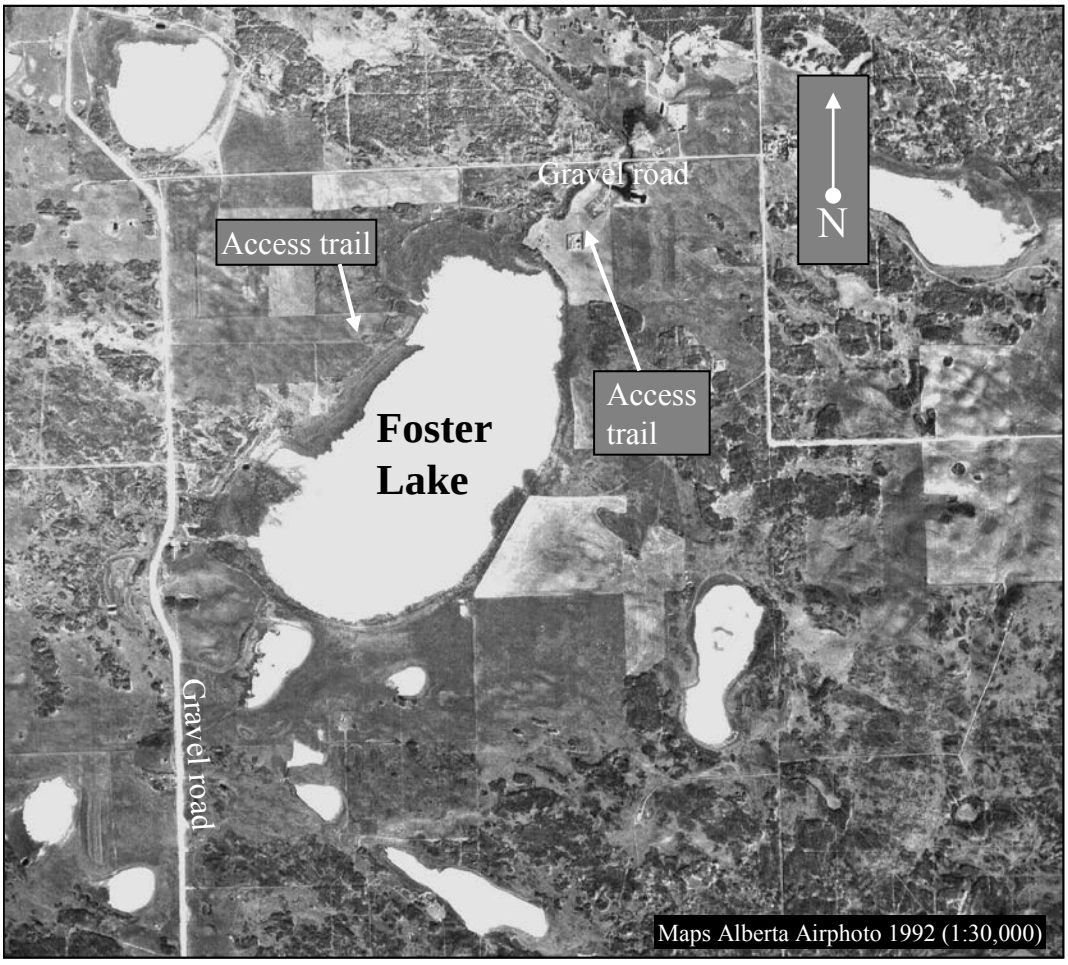
Foster Lake, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: Consort, 28 km northeast or approximately 3 km northwest of north end of Sounding Lake.
Location: Latitude 55° 47′, Longitude 115° 58′
UTM 6182448N; 564805E
Surface area: 2.28 km² **Length of shoreline**: 6.41 km



Appendix 8. Gillespie Lake landscape features, roadways and access points

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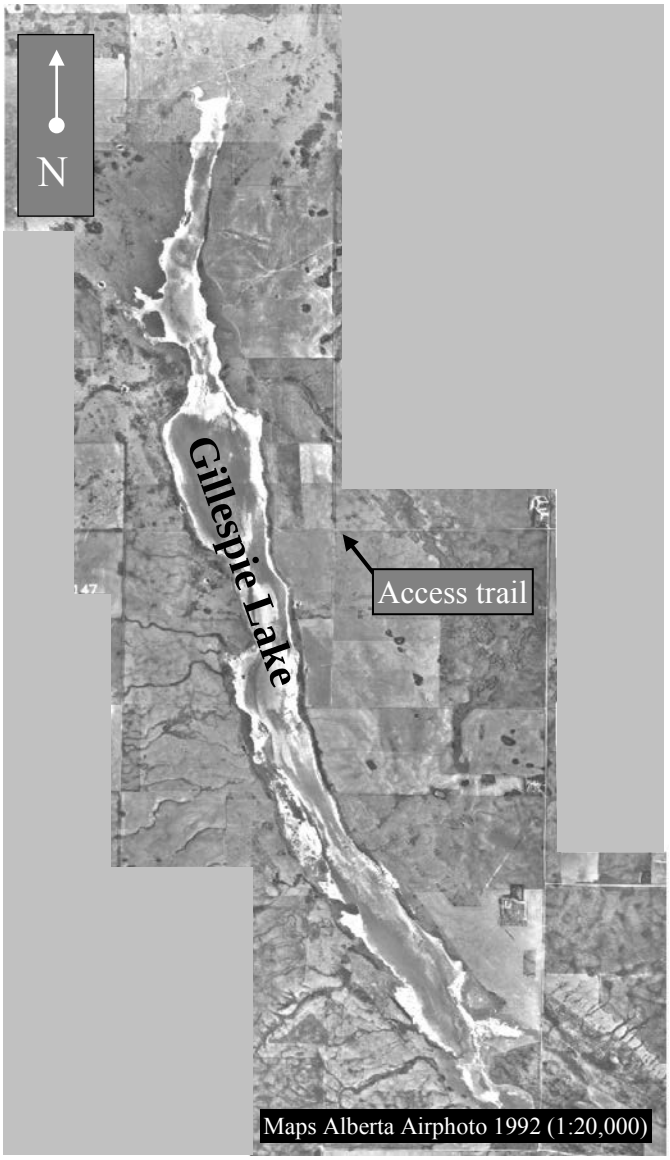
Gillespie Lake, Alberta

Topographic Mapsheet: North Battleford 73C
General Location: Provost, then 6.4 km east on Highway 13 and 2.4 km north on gravel roads to south end of lake.
Location: Latitude 52° 25′, Longitude 110° 11′
UTM 5807696N; 555542E
Surface area: 4.45 km² **Length of shoreline**: 24.32 km



Appendix 9. Gooseberry Lake landscape features, roadways and access points

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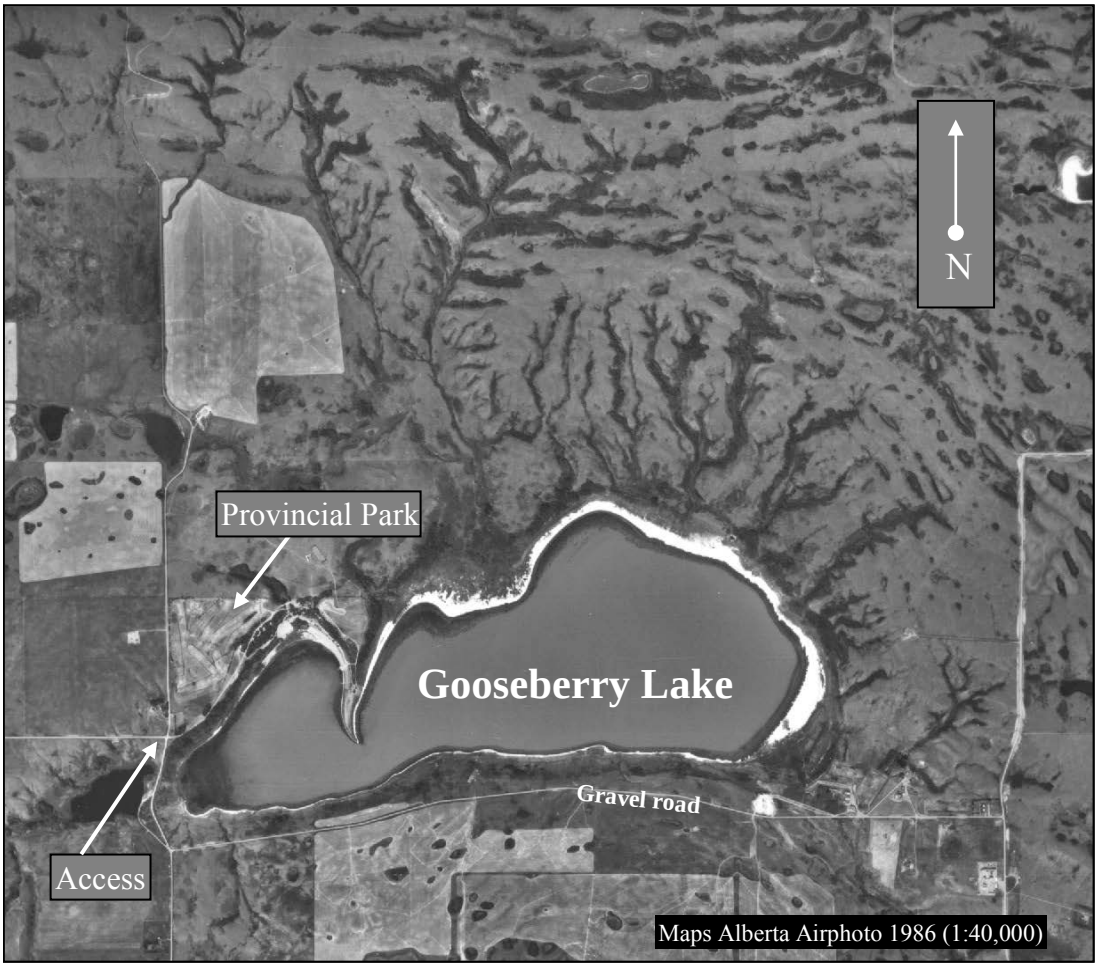
Gooseberry Lake, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: North of Consort on Highway 41 about 11 km, then 1.6 km east. Northwest corner of lake is Gooseberry Provincial Park. The Neutral Hills extends to the north edge of the lake.
Location: Latitude 52° 07′, Longitude 110° 44′
UTM 5774047N; 518259E
Surface Area: 4.03 km² **Length of shoreline**: 10.47 km



Appendix 10. Killarney Lake landscape features, roadways and access points

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Killarney Lake, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: South of Chauvin 11 km, also 1.6 km west of Highway 17. Extensive oil patch operations in the area near the lake.
Location: Latitude 52° 35′, Longitude 110° 06′
UTM 5826301N; 560978E
Surface area: 5.54 km² **Length of shoreline**: 10.85 km

Appendix 11. Leane Lake landscape features, roadways and access points

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Leane Lake, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: South of Chauvin about 13 km on gravel roads and 4.8 km east. Located about 1.6 km east of Highway 17. Dillberry Provincial Park is located just east of the lake.
Location: Latitude 52° 33′, Longitude 110° 04′
UTM 5822622N; 563284E
Surface area: 2.67 km² **Length of shoreline**: 7.84 km

Appendix 12. Metiskow wetland landscape features, roadways and access points

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Metiskow wetland, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: North of hamlet of Metiskow approx. 2.5 km. Adjacent to Highway 13 on south side. Approx. 13 km west and 2.5 km south of Czar. Unnamed wetland on map sheet.
Location: Latitude 52° 24′, Longitude 110° 38′
UTM 5805592N; 524946E
Surface area: 0.59 km² **Length of shoreline**: 3.52 km

Appendix 13. Reflex Lake−West landscape features, roadways and access points

---

Reflex Lake−West, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: Chauvin, 6.4 km east and 3 km south on Highway 17, then east 1.6 km to west shore of lake. Locally referred to as 'salt' Lake.
Location: Latitude 52° 40′, Longitude 110° 01′
UTM 566498N; 5835664E
Surface area: 5.56 km² **Length of shoreline**: 9.58 km

Appendix 14. Sunken Lake landscape features, roadways and access points

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Sunken Lake, Alberta

Topographic Mapsheet: Wainwright 73D
General Location: South of hamlet of Metiskow approximately 3 km. An estimated 8 km south and 12 km east of Czar.
Location: Latitude 52° 23′, Longitude 110° 39′
UTM 5820417N; 523741E
Surface area: 2.51 km² **Length of shoreline**: 7.59 km

Appendix 15. Ethmuir Lake landscape features, roadways and access points

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Ethmuir Lake, Saskatchewan

Topographic Mapsheet: Kindersley 72N
General Location: Kerrobert, 10 km west on Highway 51, then 4 km west on gravel road to south end of lake.
Location: Latitude 51° 56′, Longitude 109° 21′
UTM 5754909N; 613140E
Surface area: 1.19 km² **Length of shoreline**: 7.84 km

Appendix 16. Freshwater Lake landscape features, roadways and access points

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Freshwater Lake, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: East of Highway 17 approximately 2.5 km, but access is via Salt or West Reflex Lake road to the cabin/recreation area.
Location: Latitude 52° 37′, Longitude 109° 59′
UTM 5830114N; 568830E
Surface area: 5.76 km² **Length of shoreline**: 13.47 km

Appendix 17. Grass Lake landscape features, roadways and access points

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Grass Lake, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: South of Unity on Highway 21, 28 km then 8 km west on gravel road to east side of lake.
Location: Latitude 52° 11′, Longitude 109° 17′
UTM 5782818N; 617363E
Surface area: 9.68 km² **Length of shoreline**: 20.64 km

Appendix 18. Grill Lake landscape features, roadways and access points

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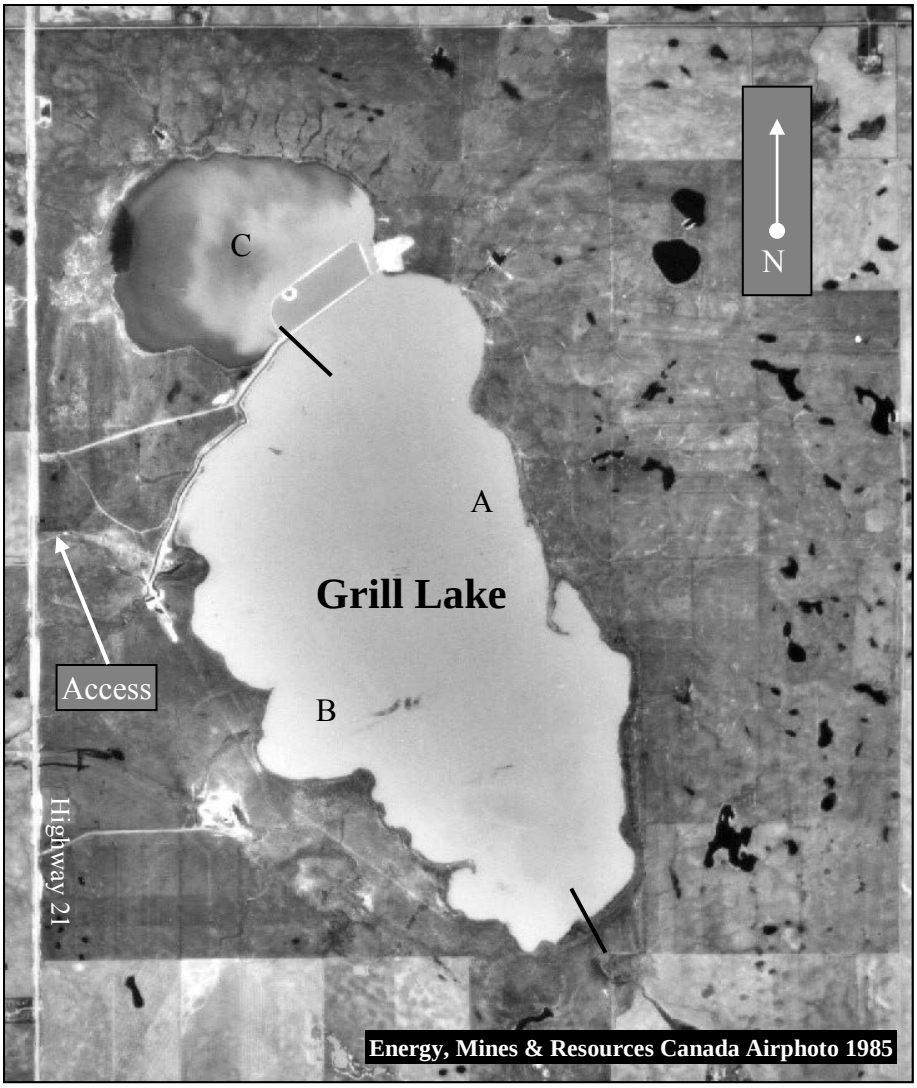
Grill Lake, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: South of Unity on Highway 21 about 25 km, directly off east side of highway.
Location: Latitude 52° 12′, Longitude 109° 07′
UTM 5784954N; 628709E
Surface area: 7.84 km² **Length of shoreline**: 16.48 km



Appendix 19. Killsquaw Lake landscape features, roadways and access points

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Killsquaw Lake, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: South of Unity 3.2 km on Highway 21 and 1.6 km east on gravel road to northwest corner of lake.
Location: Latitude 52° 24′, Longitude 109° 06′
UTM 5807227N; 629264E
Surface area: 7.85 km² **Length of shoreline**: 33.87 km

Appendix 20. Landis Lake landscape features, roadways and access points

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Landis Lake, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: West of village of Landis about 1.6 km on Highway 14, then 1.6 km on dirt trail to northeast corner of the lake.
Location: Latitude 52° 11′, Longitude 108° 31′
UTM 5784336N; 669771E
Surface area: 3.35 km² **Length of shoreline**: 10.18 km

Appendix 21. Manitou Lake landscape features, roadways and access points

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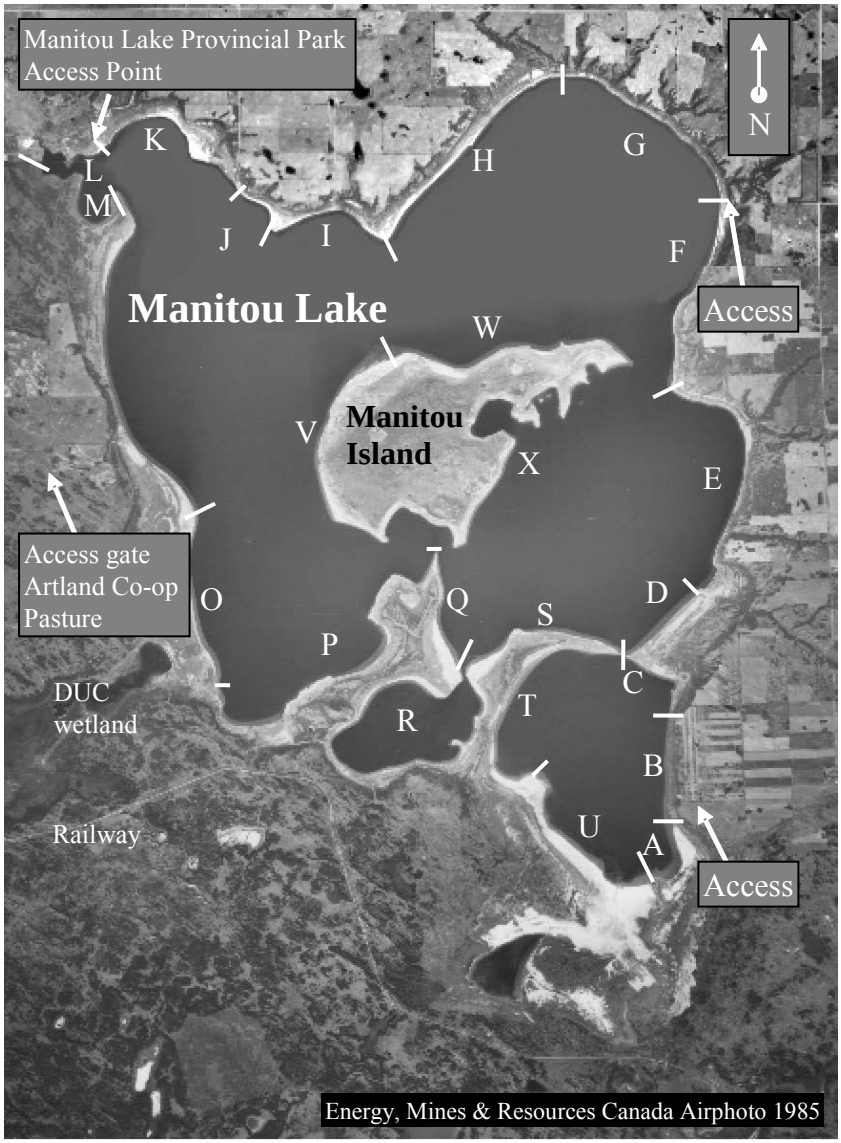
Manitou Lake, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: Town of Neilburg, travel 4.5 km south on paved road called Winter Road on east edge of town to the northeast corner of the lake.
Location: Latitude 52° 43′, Longitude 109° 43′
UTM 5841525N; 586685E
Surface area: 38.29 km² **Length of shoreline**: 96.58 km



Appendix 22. Muddy Lake landscape features, roadways and access points

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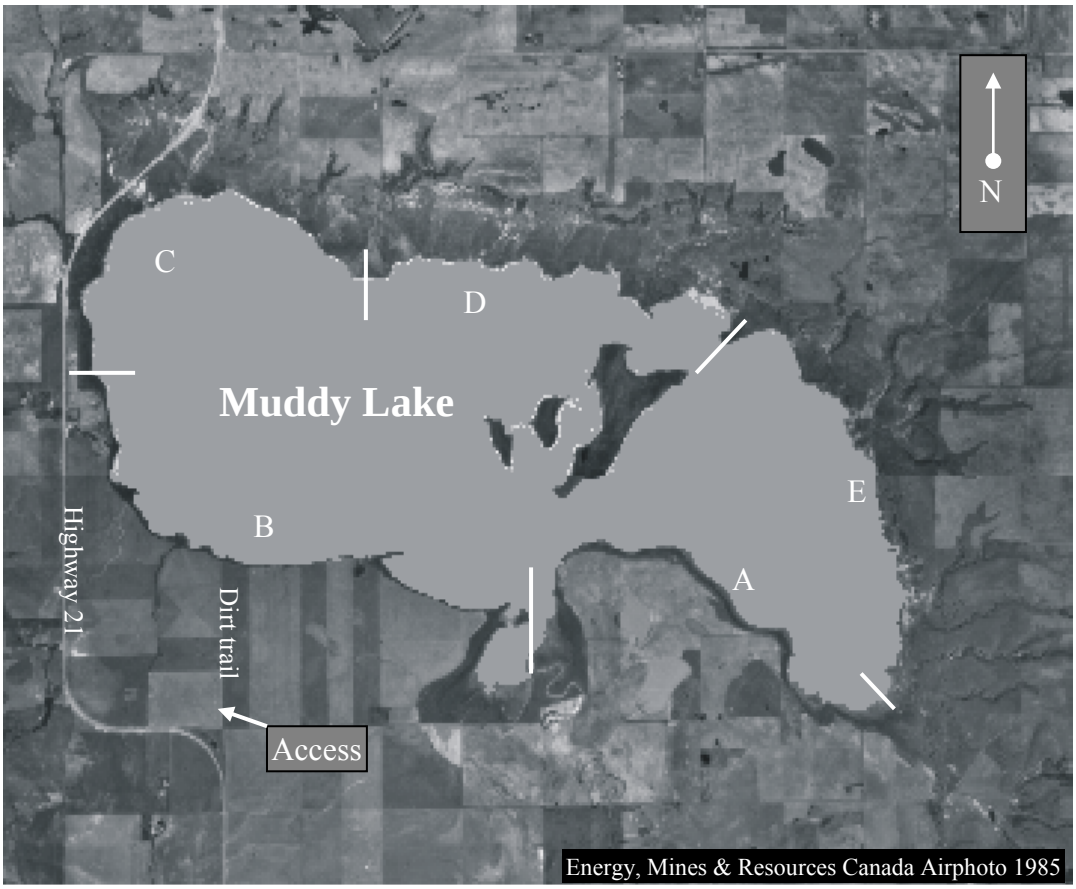
Muddy Lake, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: South of Unity approximately 12 km on Highway 21 to northwest corner of the lake.
Location: Latitude 52° 19′, Longitude 109° 06′
UTM 5797959N; 629507E
Surface area: 18.32 km² **Length of shoreline**: 23.93 km



Appendix 23. Opuntia Lake landscape features, roadways and access points

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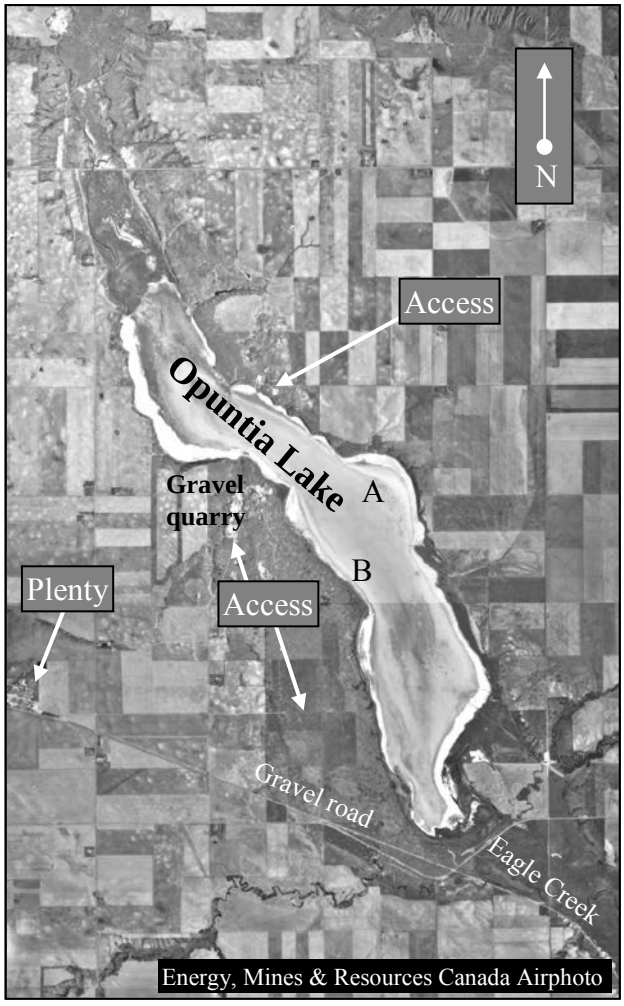
Opuntia Lake, Saskatchewan

Topographic Mapsheet: Kindersley 72N
General Location: East of the town of Plenty about 5 km to the west side of the lake. Approximately 40 km east and south of Kerrobert.
Location: Latitude 51° 49′, Longitude 108° 35′
UTM 5743409N; 666570E
Surface area: 13.74 km² **Length of shoreline**: 30.6 km



Appendix 24. Reflex Lake−East landscape features, roadways and access points

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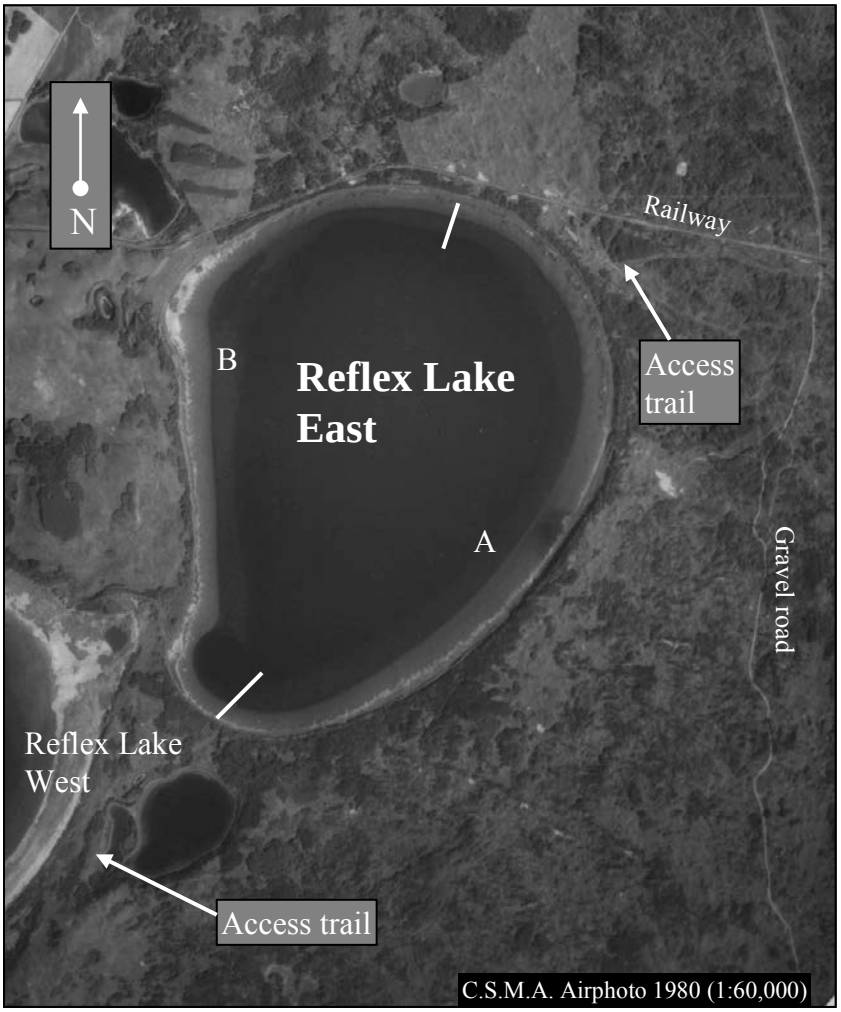
Reflex Lake−East, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: Marsden, 4.8 km west on Highway. 40, south on gravel road 16 km to Artland, west 1.6 km through pasture to east shore of lake. Easiest access via Salt Lake or West Reflex road off Highway 17.
Location: Latitude 52° 40′, Longitude 109° 59′
UTM 568752N; 5835676E
Surface area: 9.69 km² **Length of shoreline**: 11.69 km



Appendix 25. Seagram Lakes landscape features, roadways and access points

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Seagram Lakes, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: North of Unity 12.9 km along Highway 21, then 12.9 km west along gravel road and 3.2 km north to the southern end of the eastern lake basin.
Location: Latitude 52° 36′, Longitude 109° 23′
UTM 5829002N; 609491E
Surface area: West 4.4 km² **Length of shoreline**: West 9.75 km
East 3.26 km² East 9.88 km

Appendix 26. Teo Lakes landscape features, roadways and access points

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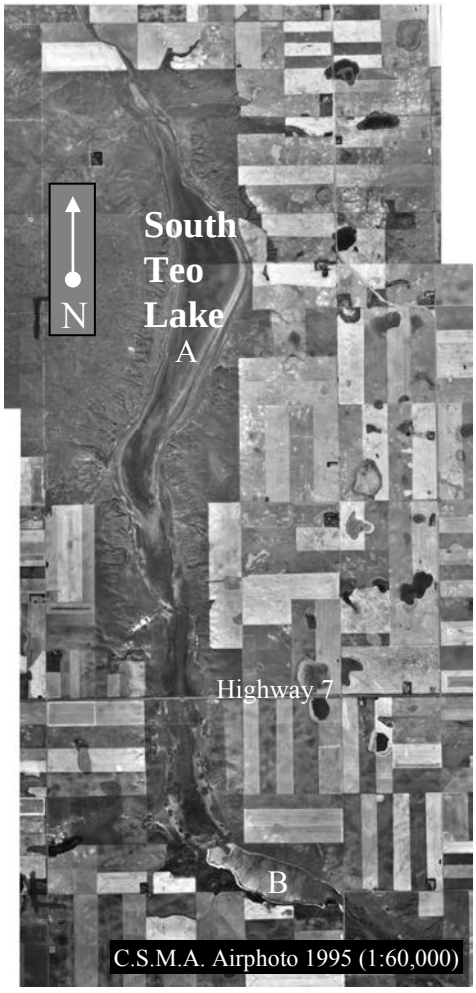
Teo Lakes, Saskatchewan

Topographic Mapsheet: Kindersley 72N
General Location: West of Kindersley 12 km on Highway 7 to south Teo.
Location: Latitude 51° 30′, Longitude 109° 21′
UTM 5706719N; 614527E
Surface area: North 3.72 km² **Length of shoreline**: North 17.15 km
South 9.54 km² South 35.60 km



Note: North Teo Lake is not included in this photo but is located about two kilometres northwest of South Teo Lake along the drainage channel.

Appendix 27. Wells Lake landscape features, roadways and access points

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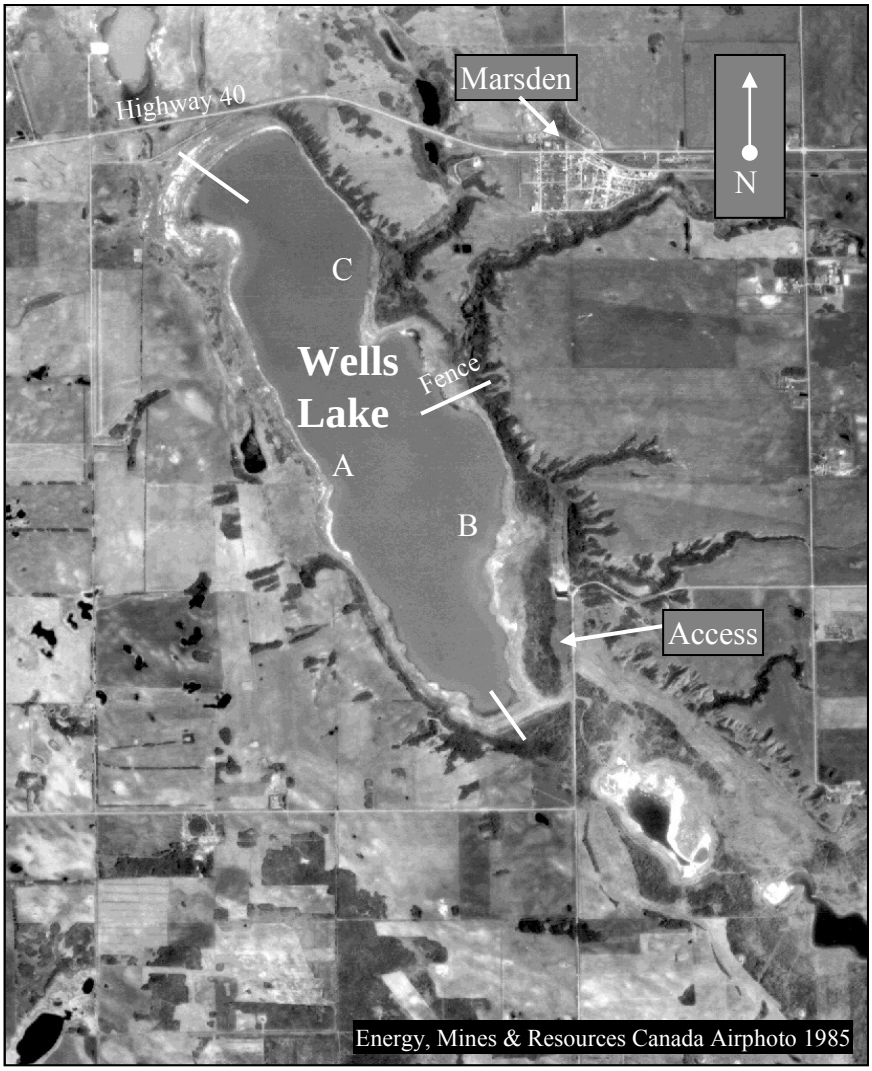
Wells Lake, Saskatchewan

Topographic Mapsheet: North Battleford 73C
General Location: West of town of Marsden about 1.6 km along Highway 40 to the north end of the lake.
Location: Latitude 52° 50′, Longitude 109° 51′
UTM 5854350N; 577472E
Surface area: 4.83 km² **Length of shoreline**: 11.93 km



Appendix 28. Basin and Elkona lakes landscape features, roadways and access points

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Basin and Elkona Lake, Saskatchewan

Topographic Mapsheet: Melfort 73A
General Location: Town of Middle Lake, 8 km north on Highway 20 to south end of lake.
Location: Latitude 52° 38′, Longitude 105°17′
UTM 5831520N; 480824E
Surface Area: 49.81 km² **Length of shoreline**: 31.92 km

Appendix 29. Middle Lake landscape features, roadways and access points

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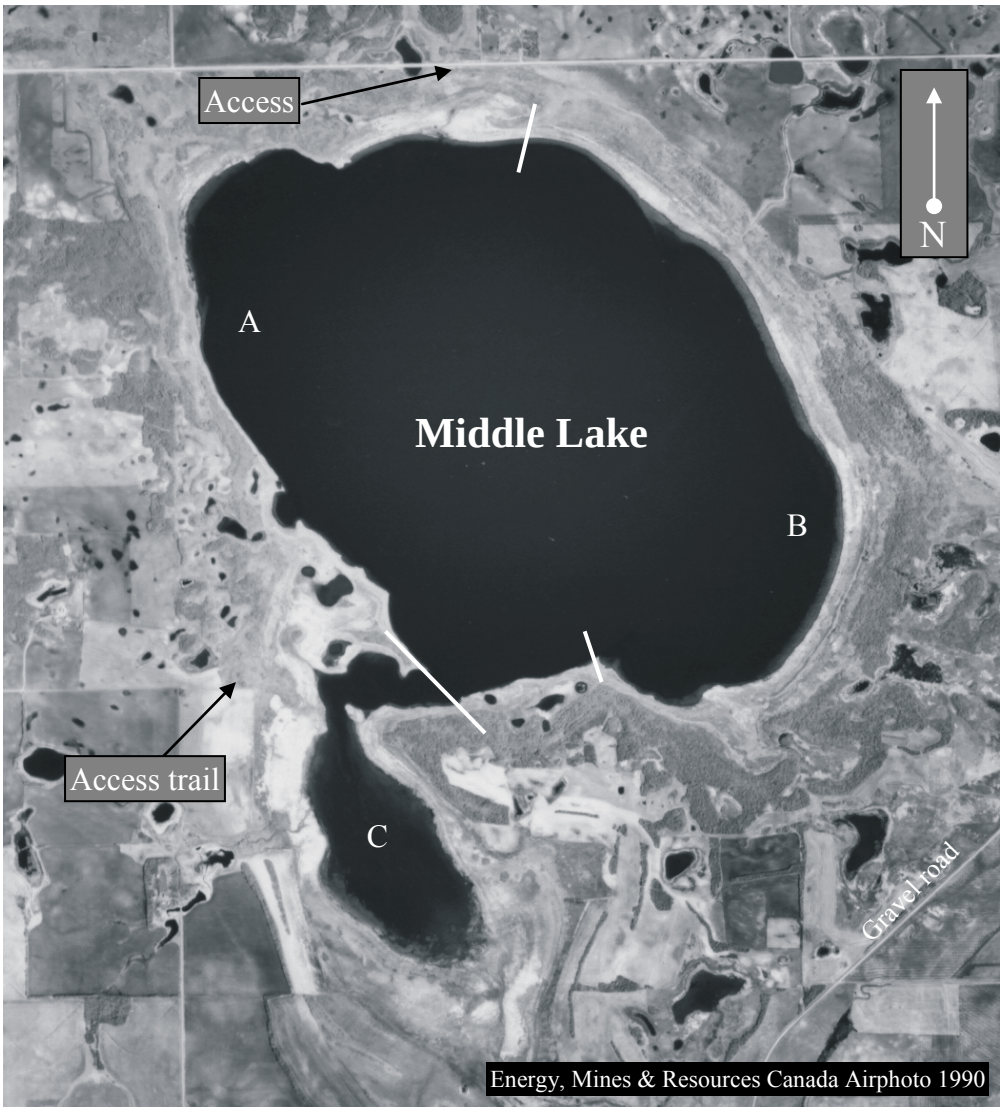
Middle Lake, Saskatchewan

Topographic Mapsheet: Melfort 73A
General Location: North end of lake is about 9.5 km north of the town of Middle Lake and 6.5 km east.
Location: Latitude 52° 34′, Longitude 105° 10′
UTM 5824080N; 488703E
Surface area: 10.83 km² **Length of shoreline**: 19.09 km



Appendix 30. Buffer Lake landscape features, roadways and access points

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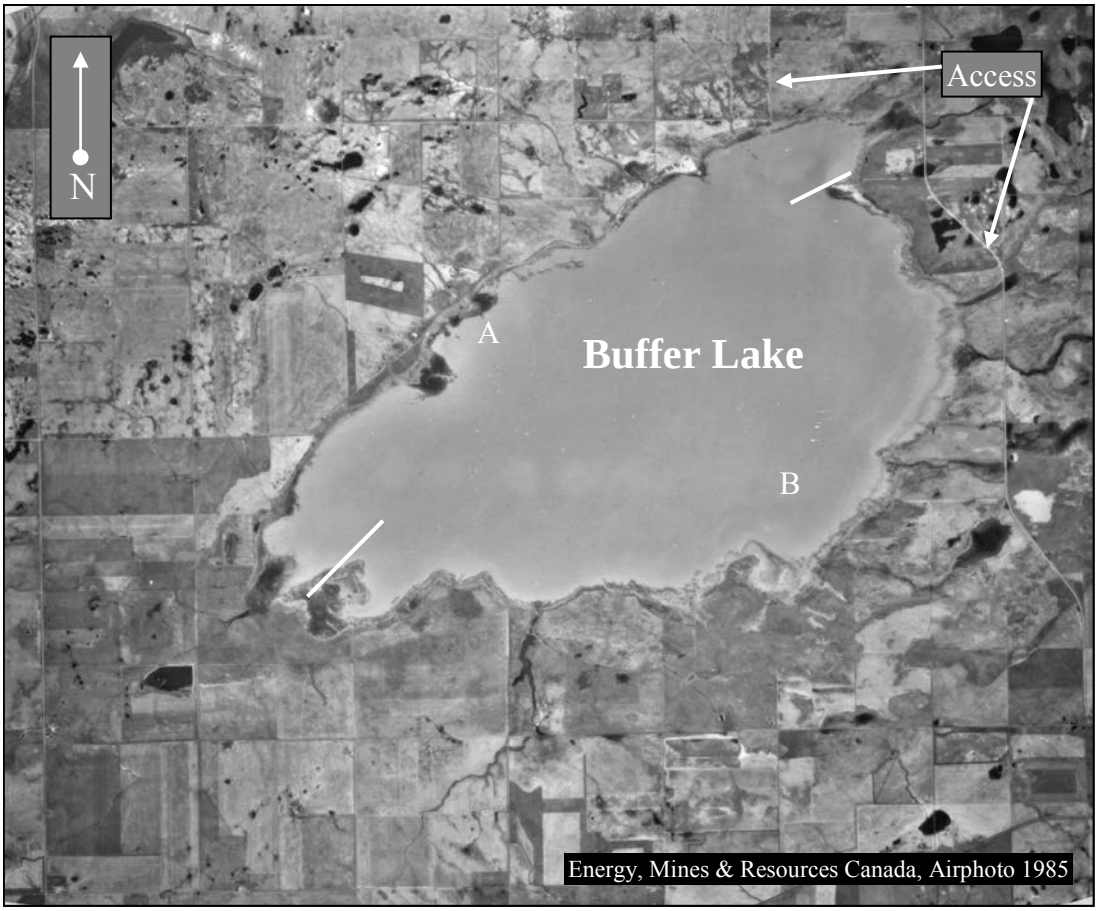
Buffer Lake, Saskatchewan

Topographic Mapsheet: Saskatoon 73B
General Location: Vonda situated on Highway 27; from townsite on gravel road, travel due north 6.5 km then 3.2 km east to the west shore of the lake.
Location: Latitude 52° 23′, Longitude 106° 00′
UTM 5804145N; 431938E
Surface area: 26.22 km² **Length of shoreline**: 29.56 km



Appendix 31. Burke Lake landscape features, roadways and access points

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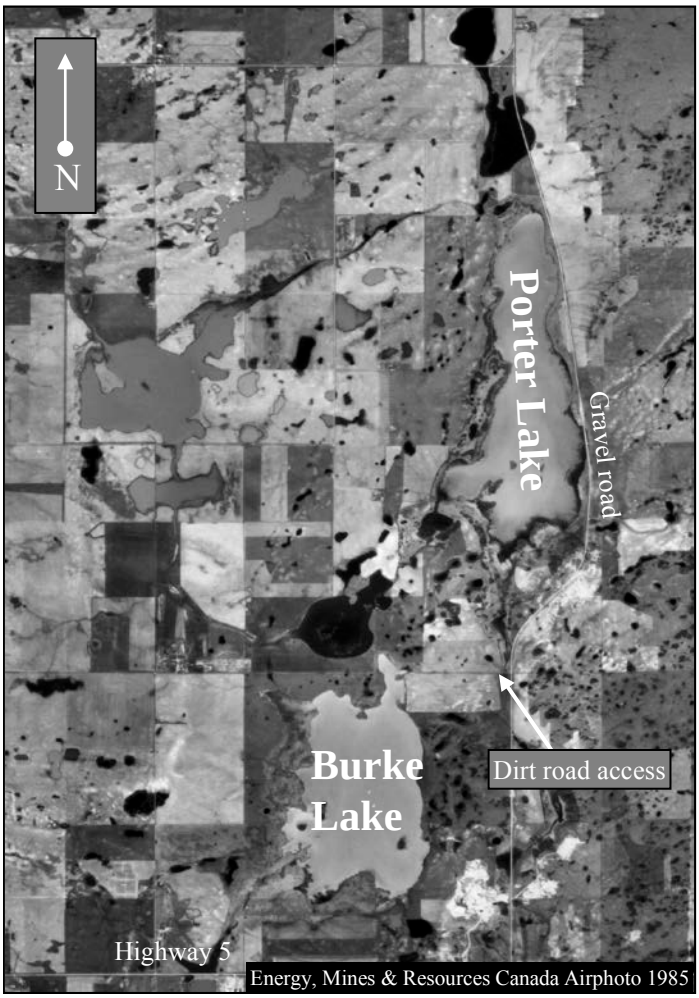
Burke Lake, Saskatchewan

Topographic Mapsheet: Saskatoon 73B
General Location: East of Saskatoon 19 km on Highway 5 then north 3.2 km on gravel road and west 1.6 km on dirt road, impassable when wet.
Location: Latitude 52° 10′, Longitude 106° 18′
UTM 5780372N; 411088E
Surface area: 2.06 km ² **Length of shoreline**: 9.25 km



Appendix 32. Cheviot Lake landscape features, roadways and access points

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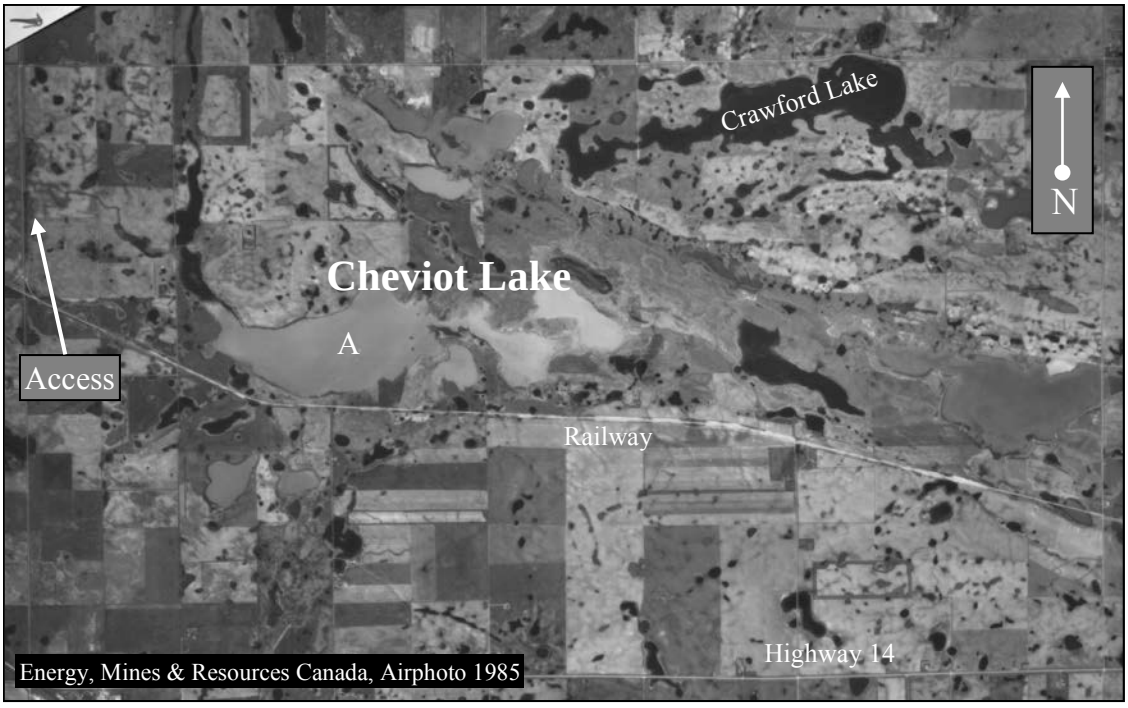
Cheviot Lake, Saskatchewan

Topographic Mapsheet: Saskatoon 73B
General Location: Saskatoon, 9.7 km southeast on Highway 14, then 4.8 km east of highway turnoff.
Location: Latitude 52° 02′, Longitude 106° 20′
UTM 5765584N; 408535E
Surface area: 2.77 km² **Length of shoreline**: 13.84 km



Appendix 33. Meacham wetlands landscape features, roadways and access points

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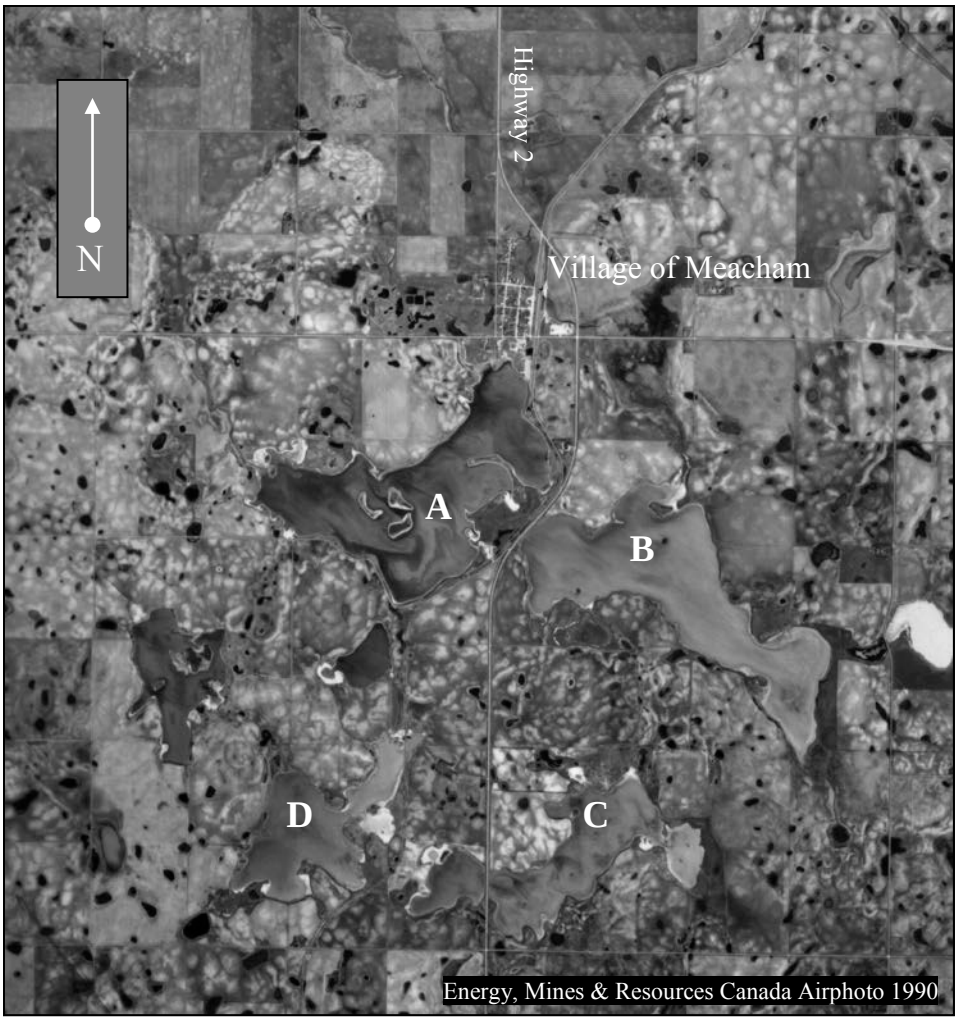
Meacham Village Wetlands, Saskatchewan

Topographic Mapsheet: Melfort 73A
General Location: Village of Meacham on Highway 2. Site located almost 10 km south and 42 km west of Humboldt.
Location: Latitude 52° 06′, Longitude 105° 45′
UTM 5772425N; 448627E
Surface area: 1.98 km² **Length of shoreline**: 10.97 km



Appendix 34. Muskiki Lake landscape features, roadways and access points

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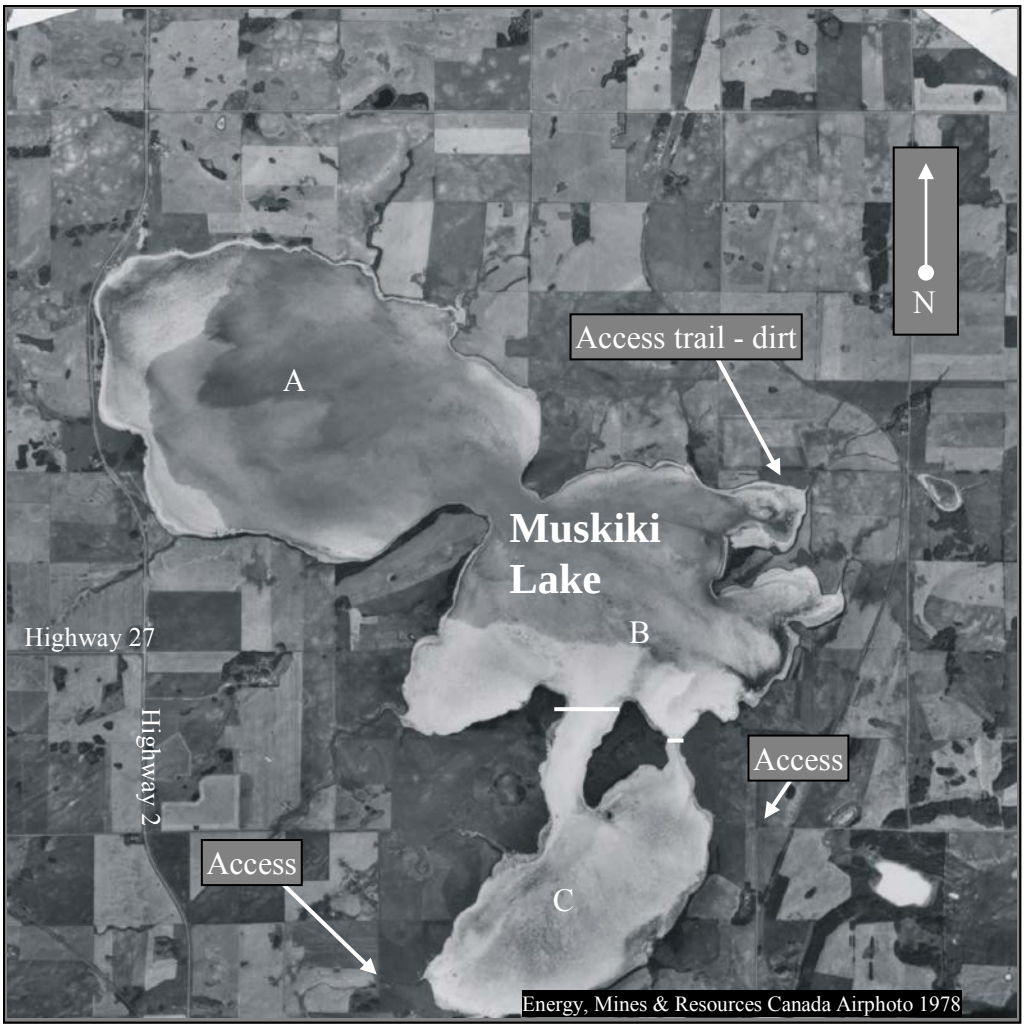
Muskiki Lake, Saskatchewan

Topographic Mapsheet: Melfort 73A
General Location: South of Cudworth, 14.5 km on Highway 2.
Location: Latitude 52° 20′, Longitude 105° 45′
UTM 5798378N; 448895E
Surface area: 18.54 km² **Length of shoreline**: 36.04 km



Appendix 35. Porter Lake landscape features, roadways and access points

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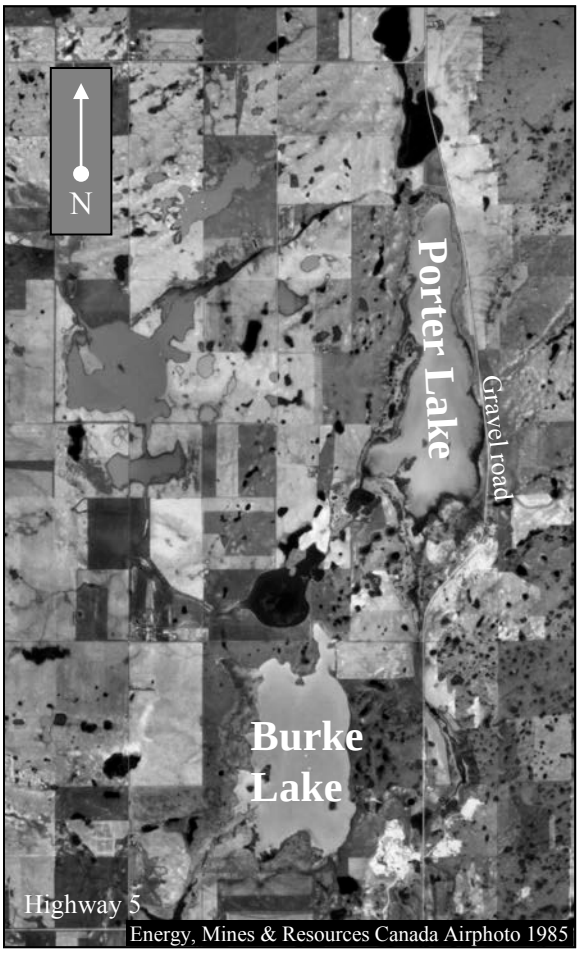
Porter Lake, Saskatchewan

Topographic Mapsheet: Saskatoon 73B
General Location: East of Saskatoon 19.3 km on Highway 5 and north on gravel road 4.8 km.
Location: Latitude 52° 12′, Longitude 106° 17′
UTM 5784059N; 412239E
Surface area: 2.94 km ² **Length of shoreline**: 11.51 km



Appendix 36. Other lakes checked for shorebird presence during aerial surveys in spring 1995

Lake	Province	Date	Number	Comments
Aroma	SK	May 9	7	Killdeer 2; American Avocets 2; unidentified shorebirds.
Tramping	SK	May 9	16	Killdeer 5; Willet 4; American Avocet 3; unidentified shorebirds.
Akerlund	SK	May 22	0	
Aubrey	SK	May 22	50	Unidentified shorebirds.
Balloon	SK	May 22	105	Killdeer 2; American Avocets 2; unidentified shorebirds.
Cutbank	SK	May 22	1389	Unidentified shorebirds.
Fairmount	SK	May 22	149	American Avocet 6; Unidentified shorebirds
Gravel	SK	May 22	0	
Herrick Low	SK	May 22	225	American Avocet 21; Willet 24; Yellowlegs 9; Killdeer 6; unidentified shorebirds.
Inglenook	SK	May 22	405	American Avocet; unidentified shorebirds.
Little Manitou	SK	May 23	613	Red-necked Phalarope 400, American Avocet 6; Killdeer 5; unidentified shorebirds.
Long	SK	May 22	111	Black-bellied Plover 10; American Avocet 21; Killdeer 4; unidentified shorebirds.
Pentland	SK	May 22	0	
Senlac	SK	May 22	3	American Avocet 1; Marbled Godwit 2
Shallow	SK	May 22	0	
Druid - Unnamed	SK	May 22	0	
White Heron	SK	May 22	0	
Whiteshore	SK	May 22	919	American Avocet 18; Killdeer 1; Willet 2; unidentified shorebirds.
Verendrye marsh	SK	May 22	1183	American Avocet 3; Willet 2; unidentified shorebirds.
Zella	SK	May 22	0	
Capt. Eyre	AB	May 23	28	American Avocet 2; Willet 2; Killdeer,1; unidentified shorebirds
Grassy Island	AB	May 23	253	Black-bellied Plover 79; American Avocet 45; Willet 14; unidentified shorebirds.
Greenlees	AB	May 23	555	American Avocet 1; Killdeer 1; unidentified shorebirds
Horseshore	AB	May 23	6	Unidentified shorebirds
Houcher	AB	May 23	76	Unidentified shorebirds
Piper	AB	May 23	81	American Avocet 18; unidentified shorebirds.
Ribstone	AB	May 23	0	
Sounding	AB	May 23	357	American Avocet 130; Marbled Godwit 8; Willet 3; unidentified shorebirds.

www.**ec.gc.ca**

Additional information can be obtained at:

Environment Canada
Inquiry Centre
10 Wellington Street, 23rd Floor
Gatineau QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-997-2800
Fax: 819-994-1412
TTY: 819-994-0736
Email: enviroinfo@ec.gc.ca