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Spatial and Temporal Distribution and Abundance of the Franklin's Gull in the Canadian Prairie Provinces: 2005–2007

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ABSTRACT

The Northern Prairie and Parkland Waterbird Conservation Plan ranked the Franklin's Gull as a species of High Concern for conservation. More than 80% of their breeding range occurs in the Canadian Prairie provinces and previous knowledge on the distribution of colonies and population abundance was extremely limited. A review of historical literature and conservation data bases and contacts with naturalist groups provided us with an initial list of lakes that might be suitable for Franklin's Gull colonies. Beginning in 2005, we searched for Franklin's Gull colonies in the three Prairie provinces. We refined our survey methodology and then expanded the survey effort in the final year, 2007, to provide a comprehensive survey across the region. On accessible lakes, colony boundaries in the emergent vegetation were delineated in May-June. Nest density transects were conducted through the colonies in July during the post-fledging period. Over the course of the 3-year study, 49 lakes were found with colonies, but of the 167 lakes visited in 2007, only 36 lakes had colonies, while Franklin's Gulls were found on an additional 49 lakes but were not breeding. In 2007, colony boundaries were delineated on 25 lakes. The colony areas ranged from 5.3 to 364 hectares. Nest density transects were completed on 18 lakes and nest density ranged from 1.1 nests /100 m² (Eyebrow and Glenboro lakes) to 18.4 nests/100 m² (Moose Lake). The smallest colonies were on Taber and Stirling lakes in Alberta, at 100 breeding adults, while the largest population was on Whitewater Lake in Manitoba with over 184,000 breeding adults. In 2007 in Canada, the adult population of Franklin's Gull was calculated at 1.176 million. In that year, there were five lakes with more than 100,000 breeding adults each, which together represent >55% of the Canadian population. An additional 11 lakes had 20,000 or more breeding adults each. Together these 16 lakes of the 36 identified in 2007, represent more than 95% of the Canadian population. The Canadian Prairie provinces contain a high percentage of the breeding range and global population of Franklin's Gull. It is our stewardship responsibility that adequate and suitable wetland habitat is conserved to ensure the survival of the species while it is resident in Canada.

RÉSUMÉ

Le *Northern Prairie and Parkland Waterbird Conservation Plan* (plan de conservation des oiseaux aquatiques des prairies et prairies-parcs du Nord) a désigné la Mouette de Franklin comme espèce très préoccupante à des fins de conservation. Plus de 80 % de l'aire de reproduction de cette espèce se situe dans les provinces canadiennes des Prairies, et les données sur la répartition des colonies et l'abondance de la population sont extrêmement limitées. L'étude de documents historiques et de bases de données de conservation ainsi que des discussions avec des groupes de naturalistes nous ont permis de dresser une liste initiale de lacs pouvant convenir aux colonies de Mouettes de Franklin. En 2005, nous avons commencé à chercher des colonies de Mouettes de Franklin dans les provinces des Prairies. Nous avons amélioré notre méthode d'enquête et intensifié nos relevés au cours de la dernière année (2007) afin d'obtenir des données exhaustives pour toute la région. Aux lacs accessibles, les zones occupées par les colonies ont été délimitées dans la végétation émergente, aux mois de mai et juin. Des transects sur la densité des nids ont été effectués dans les colonies en juillet, durant la période suivant l'envol des jeunes. Au cours de l'étude, qui a duré trois ans, 49 lacs abritant des colonies ont été repérés. Cependant, des 167 lacs visités en 2007, seulement 36 étaient peuplés par des colonies, tandis que des Mouettes de Franklin ont été aperçues à 49 autres lacs, mais elles ne s'accouplaient pas. En 2007, les zones occupées par les colonies de 25 lacs ont été délimitées. L'espace qu'elles occupaient variait entre 5,3 et 364 hectares. Des transects sur la densité des nids ont été effectués à 18 lacs, et la densité variait entre 1,1 nid/100 m² (lacs Eyebrow et Glenboro) et 18,4 nids/100 m² (Moose Lake). Les plus petites colonies se trouvaient aux lacs Taber et Stirling (Alberta) et comptaient une centaine d'adultes reproducteurs, tandis que la plus grande population, au lac Whitewater (Manitoba), comptait 184 000 adultes reproducteurs. En 2007 au Canada, la population d'adultes reproducteurs chez la Mouette de Franklin, était estimée à 1,176 million. Cette année-là, cinq lacs comptaient plus de 100 000 adultes reproducteurs chacun, ce qui représente, en tout, plus de 55 % de la population canadienne de Mouettes de Franklin. Onze autres lacs comptaient 20 000 adultes reproducteurs ou plus chacun. Ainsi, 16 des 36 lacs repérés en 2007 regroupaient plus de 95 % de la population canadienne de Mouettes de Franklin. Un très grand pourcentage de l'aire de reproduction et de la population totale de l'espèce se trouve dans les provinces des Prairies. Nous avons la responsabilité d'assurer la conservation des milieux humides nécessaires à la survie de cette espèce pendant qu'elle réside au Canada.

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1.0 INTRODUCTION

The Northern Prairie and Parkland Waterbird Conservation Plan (NPPWCP) identifies a lack of abundance and distribution information for most waterbird species within the Canadian Prairie provinces, including the Franklin's Gull (Scientific Names–Appendix 1), (Beyersbergen et al. 2004). Currently no regional annual surveys occur specifically for waterbirds in Alberta, Saskatchewan or Manitoba, unlike the Breeding Bird Surveys for landbird species instituted in 1966 or the Waterfowl Breeding Population Surveys first established in 1955. Previous waterbird studies have been short-term and localized, utilizing a variety of methods that make comparisons among years and locations difficult.

The North American Waterbird Conservation Plan (Kushlan et al. 2002) and Canada's Waterbird Conservation Plan "Wings over Water" (Milko et al. 2003) list the Franklin's Gull as "Moderate Concern" under their conservation priority listings. Regionally within the NPPWCP it was elevated to the next level, as a species of "High Concern" because of "Area Importance." This factor assesses the importance of a region to the species and the proportion of the species' North American breeding range found within a region. Approximately 67% of the Franklin's Gull global breeding range is thought to occur in the NPPWCP region. When the colonies in the more northern Boreal Plain and Taiga Plain are added to the prairie and parkland region, then greater than 80% of the global breeding range likely occurs in the Canadian Prairie provinces (range map: Burger and Gochfeld 1994). Yet, very little is known about historic or current population sizes, trends, nesting colony sites, or habitat requirements within this area.

Wetlands are highly important to the Franklin's Gull, with habitat loss and degradation believed to be serious threats to the species (Burger and Gochfeld 1994). Franklin's Gulls are colonial breeders that construct floating nests in marshes that have extensive emergent vegetation and water that is stable and of suitable depth (Burger and Gochfeld 1994). The floating nature of these nests puts the eggs and newly hatched chicks at risk from flooding or draw-down caused by human-induced and natural fluctuations in water depths. Extreme changes in water depths or deterioration of emergent habitat conditions will cause entire colonies to shift from year to year. The dynamic nature of prairie wetlands and the species' low site tenacity make tracking population numbers difficult.

Due to their concentrated nesting habits, colonial waterbirds are susceptible to large-scale die-offs from disease outbreaks (e.g. botulism) or human-induced events (e.g. the effect of the Wabamun Lake oil spill on nesting Western Grebes in 2005 (M. Watmough, Canadian Wildlife Service, pers. comm.). The large numbers of breeding birds in some colonies and the potential for complete devastation could have a large impact on regional population abundance.

The paucity of data on distribution, abundance and habitat requirements of this species in the Canadian Prairie provinces form the primary goal for this study. The three-year study focuses on identifying the distribution and composition of priority breeding habitat and developing breeding population estimates of Franklin's Gulls in the Canadian Prairie provinces. Additionally, breeding sites and habitats used by associated waterbird species are identified.

The Franklin's Gull is susceptible to human disturbance early in its breeding cycle and will readily desert colonies (Burger and Gochfeld 1994). A non-detrimental survey methodology had not been developed for nesting Franklin's Gulls until recently (Steinkamp et al. 2003.). Soos (2004) developed field procedures for monitoring a Franklin's Gull colony at Eyebrow Lake, Saskatchewan and for calculating breeding population estimates without causing colony collapse or desertion. The study colony was located in sparse bulrush habitat and had a low nest density.

The primary focus in the first year of our study was therefore to refine and further develop the field methodologies developed by Soos (2004) for use on colonies with variable habitat types and nest densities. The following two years focused on expanding our area of coverage across the three Prairie provinces with the goal of identifying and surveying as many colonies as possible in cooperation with other wildlife agencies. The information collected from this study will be used to define current breeding population estimates in Canada, identify target areas for future conservation and management efforts, and highlight any overlap between priority waterbird areas and current conservation lands to determine possible benefits for waterbirds.

2.0 METHODS

2.1 Field Surveys

2.1.1 FRANKLIN'S GULL COLONY DISTRIBUTION AND ABUNDANCE

A review of the historical literature and correspondence with conservation data centres, wildlife agency personnel, and natural history groups resulted in a list of sites with references to the possible presence of breeding or non-breeding Franklin's Gulls across the three Canadian Prairie provinces. Efforts were initially focused in Alberta, with 66 lakes visited in 2005 (Beyersbergen and Gingras 2006). The study was expanded in 2006 across the prairies, with a total of 173 wetlands visited in Alberta (86), Saskatchewan (59) and Manitoba (28). In 2007, a total of 167 wetlands were visited in Alberta (87), Saskatchewan (67) and Manitoba (13). Other wildlife agencies also provided colony locations and breeding adult abundance estimates for wetlands we were not able to visit during the three-year study.

We observed and recorded the presence or absence of breeding and non-breeding Franklin's Gulls and other waterbirds from vantage points on the shore or from a canoe or airboat positioned near the colony. In consecutive years of the study, wetlands with no potential for breeding or non-breeding activity were dropped in favour of other accessible and suitable wetlands in the immediate vicinity. If a Franklin's Gull colony was discovered in a wetland, survey effort was focused on the area of the colony such that the entire lake may not have been searched. Counts of other waterbirds observed on these wetlands should therefore be considered minimum estimates.

All colonies were visited in May and early June. Colonies that were either inaccessible for mapping or had relatively small numbers of birds were recorded with only a visual estimate of total breeding adults. The perimeter of most other nesting colonies was delineated by canoeing, or in a few cases walking, around the colony edge and recording a track log with GPS (Garmin Global Positioning System 12XL) receivers in UTM coordinates (datum WGS 84). The track

logs were then mapped for each colony using GIS software (MapViewer Version 6), and overlaid with 50-m or 100-m geo-reference grid lines, depending on the size of the colony. The map produced for each colony use was then used to select survey transects for nest counts when the colony was revisited in July.

Nest counts can be very laborious, depending on the size of and access to the colony. Nonetheless, nest counts with sufficient sampling effort are much more accurate than aerial survey or ground count estimates of breeding adults (Morris 2006). Vegetation type and density as well as water depth influence how the nest counts are performed.

Active Franklin's Gull nests are maintained until fledging but quickly degrade when the young leave the nest (Burger and Gochfeld 1994). Nest count surveys were conducted after the majority of Franklin's Gull chicks had fledged, to minimize disturbance to the colony during incubation or after hatch. There was only a narrow window of time available for nest counts, from the earliest stage when most Franklin's Gull chicks had abandoned their nest, to the time when many nests had sunk and were no longer visible. On some lakes, extensive growth of Common Duckweed obscured the partially sunken nests and extra effort was required to confirm the nest site. Only active nests were counted in the colony because nesting adults quickly strip materials from failed nests for their own use (Burger and Gochfeld 1994). The rate of nest degradation and disappearance has never been measured, but is most likely dependent on the type of vegetation used in nest building, nest location in the emergent vegetation, and depth of water under the nest. A number of active nests were likely missed, especially during the later surveys.

Nests were counted by walking (one observer) or canoeing (two observers) along predefined transects, using the colony grid maps noted above, which usually traversed the colony perpendicular to the water-edge of the vegetation. Transects were generally 100 m apart and parallel. The number of nests observed within 2 m on either side of the transect was recorded, as measured by a 2 m length of wood doweling from the centre of the observer's body. Observers tallied their nest counts every 50 m along the transect using a GPS receiver to measure the distance traversed. Observers also recorded the vegetation type and density for each 50-m segment. For transects completed by canoe, the observer in the bow counted nests, while the observer at the stern maintained the heading and managed the GPS. In shallow water and dense vegetation, the observer in the stern would exit the canoe (square stern was preferable) and push it from behind. This low stance also helped in detecting nests in dense vegetation and physically searching for submerged nests or nests covered by Duckweed.

2.1.2 HABITAT CHARACTERISTICS AT COLONY AND LAKE LEVEL

Wetland and colony habitat characteristics that were recorded (Appendix 2) included features such as emergent vegetation type, density and proportion, and water depth. While delineating the perimeter of each colony, we recorded water depth at various locations around the colony (five locations minimum on most colonies). As mentioned previously, during nest counts we recorded vegetation type and density for each 50-m transect segment. Habitat characteristics recorded at every lake surveyed, regardless of the presence of Franklin's Gulls, included wetland type, water depth stage, and vegetation cover type. Shoreline and riparian habitat were described as percent area vegetated and the dominant vegetation species present.

Wetland type identifies the water permanency or duration of flooding of a wetland (Evans and Black 1956, CWS 1989): Type 1 (temporary) wetlands have less than 15 cm of standing water and are usually dry in the first 3 weeks of spring (Appendix 3); Type 3 (seasonal) wetlands have more than 15 cm of standing water and persist longer than 3 weeks, but may be dry by the end of the summer; Type 4 (semi-permanent) wetlands retain water into fall in most years; and Type 5 (permanent) wetlands usually retain water year-round except during cases of extreme drought. Reservoir refers to man-made wetlands that are usually part of irrigation or other water retention systems and have controlled water depths.

The water level stage of a wetland was ranked from 1 to 7, with a dry wetland at Stage 1 and an overflowing wetland at Stage 7 (CWS 1989). Wetland cover type refers to the differences in the spatial relation of emergent vegetation to open water or exposed soil (Stewart and Kantrud 1971; Appendix 3). A wetland with cover type 1 has less than 5% of the area as open water or bare soil. A wetland with cover type 2 has 5−95% open water or bare soil and scattered patches or open stands of emergent vegetation, whereas a wetland with cover type 3 has 5−95% open water or bare soil surrounded by peripheral bands of emergent vegetation averaging two metres or more in width. Wetlands with cover type 4 have open water or bare soil that covers more than 95% of the wetland.

2.1.3 LANDSCAPE LEVEL USE AND CHARACTERIZATION

In 2006 only, an additional component was added to monitor the landscape level habitat use by Franklin's Gulls. Franklin's Gulls are known to forage up to 50 km away from nesting colonies during the breeding season (Burger and Gochfeld 1994). We used intensive surveying at Frank and Manawan lakes, Alberta, and incidental observations throughout Saskatchewan to characterize the extent of landscape use surrounding breeding colonies. Study results for this component are presented in Beyersbergen and Gingras (2006), and excerpts of the procedures and results are contained in Appendix 4.

2.2 Data Analysis

2.2.1 ADULT POPULATION ESTIMATES

We used a bootstrapping procedure (Manly 1997) to calculate population estimates, variances and confidence intervals. From the complete set of 50-m transect segments, we randomly resampled, with replacement, an equivalent number of survey segments. We then calculated the total number of nests and area of these resampled segments. Nest density was calculated by dividing the total number of nests by the total area of the resampled segments. We estimated the total number of nests in the colony by multiplying nest density and colony area. We repeated this resampling procedure 100,000 times, generating an estimate of the number of nests in the colony each time. Our bootstrap estimate of the total number of nests in the colony was the median of these 100,000 resampled estimates. The variance of the 100,000 resamplings is the bootstrap variance of our estimate of the number of nests in the colony. Our bootstrap 95% confidence interval is the 2.5th percentile and 97.5th percentile of the 100,000 resampled estimates.

We multiplied the bootstrap nest estimate by two to calculate adult abundance at each colony. The bootstrap adult population variance is four times the bootstrap variance of nests, and the bootstrap adult population confidence limits are double the bootstrap confidence intervals of nests.

2.2.2 COLONY HABITAT CHARACTERISTICS

For each colony, we calculated the range, mean, and standard deviation of water depths recorded during the delineation of the colony boundary. To quantify the type and density of emergent vegetation for each colony, we calculated the percentage of 50-m transect segments containing cattail, bulrush or sedge. We also calculated overall, regardless of vegetation type, the percentage of segments with Sparse, Moderate, or High vegetation density.

For each lake, the status category was based on the use of the lake by Franklin's Gulls (not used, foraging/resting only, or breeding).

3.0 RESULTS

3.1 Distribution of Franklin's Gull and Associated Waterbird Colonies

3.1.1 ALBERTA SURVEY LAKES

3.1.1.a Franklin's Gull Colonies

Of the 66 wetlands surveyed in Alberta in 2005, Franklin's Gulls were observed to be breeding on 15, present but non-breeding on 18, and absent on 33 (Figure 1, Table 1, and Appendix 5). In 2006, they were observed to be breeding on 16, present but non-breeding on 33, and absent from 37 of the 86 wetlands surveyed. Nine lakes with colonies in 2005 were again active in 2006. Colonies observed in 2005 on Big Hay, Hay-Zama, Lac La Biche, Stirling, Taber and Upper Therien lakes were not active in 2006. Surveyed in 2006 but not in 2005, colonies were confirmed on Lesser Slave, Murray–south basin, Stobart, Third and Utikuma lakes. Non-breeding Franklin's Gulls were observed on Jessie Lake in 2005 and a small breeding colony was confirmed in 2006. In 2007, Franklin's Gulls were observed breeding on 20, present but not breeding on 27, and absent on 40 of 87 wetlands surveyed in Alberta. Seven lakes had active colonies throughout the three-year study. Egg Lake (near Eaglesham) and Winagami lakes were flooded in 2007 and the colony sites deserted. New colonies were located on Big, Buffalo, Isle, and Mamawi lakes while colonies were re-established on Hay-Zama, Stirling and Taber lakes. The Jessie Lake colony was not active in 2007; however, a new colony was established on Charlotte Lake, five kilometres to the east.

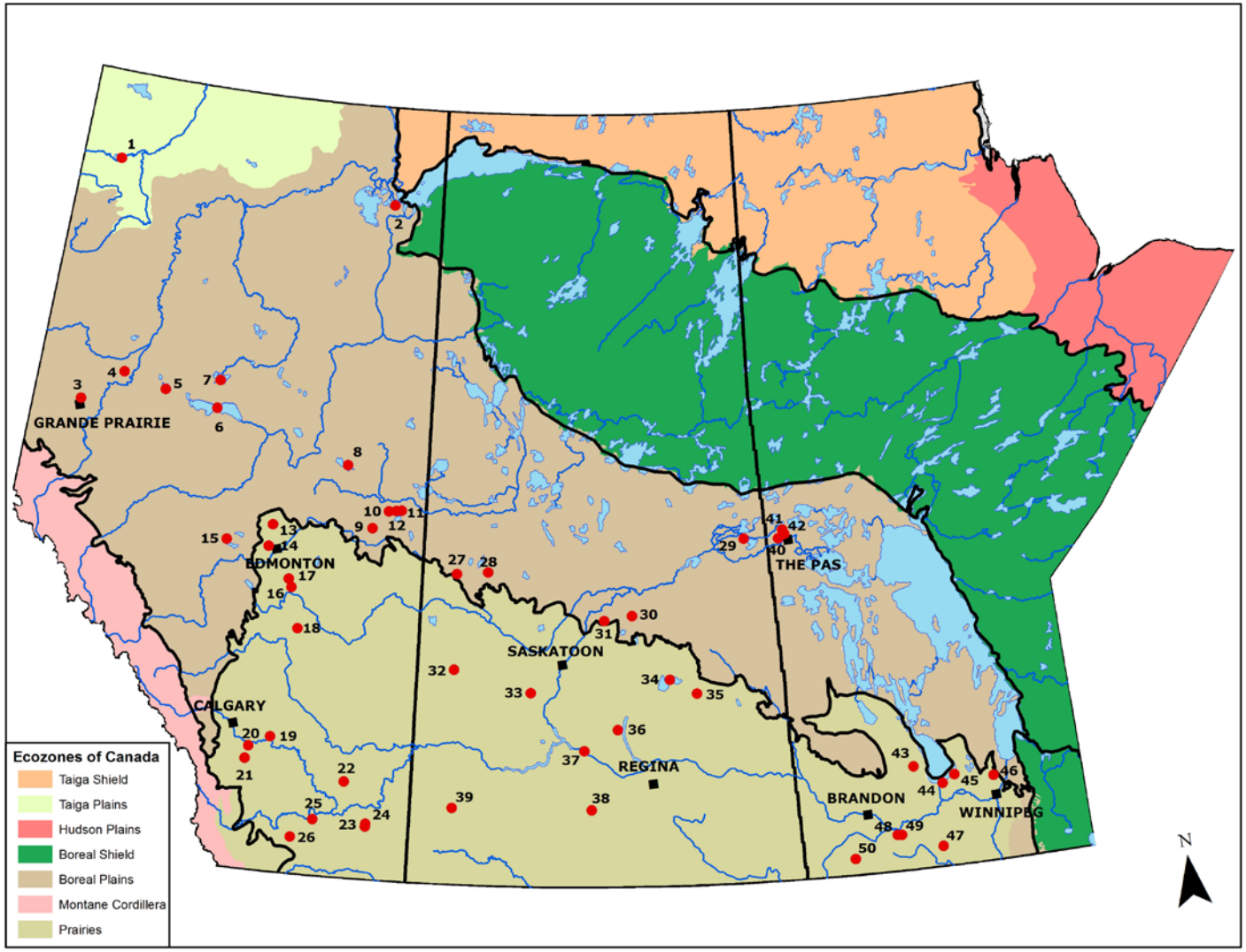

Figure 1. Distribution of lakes where Franklin's Gull colonies were observed during surveys in 2005–2007 [See adjoining page for corresponding numerical code and lake name identifiers]

Figure 1 (continued). Index of lake reference numbers for Franklin's Gull colonies mapped in Figure 1

Reference Number	Lake Name	Reference Number	Lake Name
	Alberta		**Saskatchewan**
1	Duck Lake	27	Englishman Lake
2	Mamawi Lake	28	Maiden Lake
3	Ferguson Lake	29	Egg Lake
4	Egg (Eaglesham) Lake	30	Waterhen Marsh
5	Winagami Lake	31	Pelican Lake (North)
6	Lesser Slave Lake	32	Volk wetland–N of Kerrobert
7	Utikuma Lake	33	Goose Lake
8	Lac La Biche	34	Middle (Mud) Quill Lake
9	Upper Therien Lake	35	Foam Lake Marsh
10	Charlotte Lake	36	Stalwart Marsh
11	Jessie Lake	37	Eyebrow Lake
12	Moose Lake	38	Old Wives Lake
13	Manawan Lake	39	Crane Lake
14	Big Lake		
15	Isle Lake*		**Manitoba**
16	Big Hay Lake	40	North Reader Lake
17	Bittern Lake	41	Saskeram Lake
18	Buffalo Lake	42	South Reader Lake
19	Stobart Lake	43	Big Grass Marsh
20	Third Lake	44	Delta Marsh
21	Frank Lake	45	Lake Francis
22	Minor Lake	46	Oak Hammock Marsh
23	Murray Lake–North Basin	47	Lizard Lake
24	Murray Lake–South Basin	48	Glenboro Marsh (West)
25	Taber Lake	49	Glenboro Marsh (East)
26	Stirling Lake	50	Whitewater Lake

Table 1. Observations of active breeding by Franklin's Gull on lakes visited in Alberta in May and June (See Appendix 3e for lake locations)

Lake	2005	2006	2007
Big*	Foraging/resting (10)	Foraging/resting (16)	**Breeding Colony** (500)
Big Hay	**Breeding Colony** (>3,000)	Foraging/resting (20)	Foraging/resting (70)
Bittern	**Breeding Colony** (~1,000)	**Breeding Colony** (~10,000)	**Breeding Colony**
Buffalo	Foraging/resting (-)[1]	Not visited	**Breeding Colonies** (1200)*
Charlotte	Foraging/resting (805)	Foraging/resting (100)	**Breeding Colony** (2,000)
Duck (in the Hay-Zama lakes complex)*	**Breeding Colony** (~2,000)	Foraging/resting (>2,000)	**Breeding Colony** (350)*
Egg	**Breeding Colony** (>3,000)	**Breeding Colony** (15,000)	Foraging/resting (19)
Ferguson	**Breeding Colony** (-)[1]	**Breeding Colony**	**Breeding Colony**
Frank	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**
Isle*	Absent	Present (-)[1]	**Breeding Colony** (150)
Jessie	Foraging/resting (-)[1]	**Breeding Colony** (1,000)	Foraging/resting (15)
Lac La Biche*	**Breeding Colony** (<100)	**Breeding** (2 birds; 1nest)	Foraging/resting (1)
Lesser Slave*	Not visited	**Breeding Colony** (>1,000)	Non-breeders (-)[1]
Mamawi*	Not visited	Not visited	**Breeding Colony** (200)
Manawan	**Breeding Colony** (-)[1]	**Breeding Colony**	**Breeding Colony**
Minor	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**
Moose	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**
Murray–North Basin	**Breeding Colony** (-)[1]	**Breeding Colony**	**Breeding Colony**
Murray–South Basin	Not visited	**Breeding Colony**	**Breeding Colony**
Stirling	**Breeding Colony** (>500)	Foraging/resting (2)	**Breeding Colony** (100)
Stobart	Not visited	**Breeding Colony** (15,000)	**Breeding Colony**
Taber	**Breeding Colony** (100)	Foraging/resting (3)	**Breeding Colony** (100)
Third	Not visited	**Breeding Colony** (1,000)	**Breeding Colony**
Upper Therien	**Breeding Colony** (~250)	Absent	**Breeding Colony** (230)
Utikuma*	Not visited	**Breeding Colonies** (40,000)	**Breeding Colonies**
Winagami	**Breeding Colony** (-)[1]	**Breeding Colony**	Foraging/resting (200)
Number of lakes with colonies	15	16	20

* As reported by staff from Alberta Fish and Wildlife, Alberta Conservation Association or Parks Canada Agency
[1] Dashes (-) represent species that were present on a lake but no count or estimate of number is available.

3.1.1.b Other Colonial Waterbirds

Time spent searching for other waterbirds nesting in association with the Franklin's Gull colonies in 2005 was minimal and data are lacking. On Frank Lake, 25 Black-crowned Night-Herons were recorded and one was observed on Minor Lake. Eared Grebe colonies were observed within Franklin's Gull colonies on Ferguson, Frank, Stirling, Moose, and Winagami lakes, with no estimates of numbers. Eighteen White-faced Ibis were observed within the Franklin's Gull colony on Frank Lake. Both Western Grebe and Forster's Tern were observed nesting within the Moose Lake colony, again with no estimate of numbers. Two pairs of Common Loon used the Moose Lake colony bulrush bed for nesting.

Nine waterbird species were observed nesting in association with the Franklin's Gull colonies surveyed in Alberta in 2006 (Table 2). The numbers listed in the table are minimal counts as these birds were not the target species of the study, and the focus was the area of the Franklin's Gull colony. Eared Grebes were observed nesting among Franklin's Gulls at every colony we visited. Black-crowned Night-Herons and White-faced Ibis were found nesting in all of the Franklin's Gull colonies in southern and central Alberta. The greatest diversity of waterbird species was observed on two lakes: Murray in the south and Moose in the boreal fringe, both with considerable recreational boating.

Eleven waterbird species were observed nesting in association with Franklin's Gull colonies surveyed in 2007 (Table 3). Eared Grebes were nesting in 9 of 10 colonies we surveyed in Alberta, with Third Lake being the exception. Black-crowned Night-Herons were again wide-spread, nesting in 6 of 10 colonies. Utikuma Lake, with several islands around which the Franklin's Gull colonies were clustered, had the greatest species diversity with 7 other waterbird species observed including the American White Pelican and the Double-crested Cormorant.

The colonies discovered on Hay-Zama Lakes in the Taiga Plains Ecozone and on Mamawi Lake in the Peace Athabasca Delta in the Boreal Plains Ecozone were the two most northern Franklin's Gull colonies found at the border of the Boreal Shield during our study. The northern limit of the species' range may be this latitude. The northern record of a breeding colony in Alberta was at Loutit Lake at 59° 00′, about 32 km northeast of Fort Chipewyan (Semenchuk 1992). The remaining colonies found in Alberta were in the Boreal Plains and Prairie Ecozones.

Table 2. Type and number of other waterbirds observed nesting in association with Franklin's Gull colonies on lakes surveyed in Alberta in 2006

Species	Lake						
	N & S Murray	Frank	Minor	Manawan	Moose	Winagami	Ferguson
Common Loon					2		
Red-necked Grebe	3				10		
Eared Grebe	1240	5000	88	414	56	101	280
Pied-billed Grebe	2	2	1			11	
Western Grebe	20				41		
White-faced Ibis	15	51	3	1			
Black-crowned Night-Heron	25	24	3	3			
Forster's Tern		5			16		
Black Tern	154				5		8

Table 3. Type and number of other waterbirds observed nesting in association with the Franklin's Gull colonies on lakes surveyed in Alberta in 2007

	Lake									
Species	Bittern	Ferguson	Frank	Manawan	Minor	Moose	Murray	Stobart	Third	Utikuma
Red-necked Grebe						1				4
Eared Grebe	500	150	910	90	54	152	618	70		30
Pied-billed Grebe				2						
Western Grebe			7			11	13	12		9
Black-crowned Night-Heron	17		53	16	36		6	116		
White-faced Ibis			97	"?"					19	
Forster's Tern	4			14		5				20
Black Tern										100
White-headed Gull spp.*		(-)[1]								(-)[1]
American White Pelican*										723
Double-crested Cormorant*										818

* Nesting on islands within the perimeter or on the edge of the Franklin's Gull colony.
[1] Dashes (-) represent species that were present on a lake but no count or estimate of number is available.
"?" Nest with two blue eggs but no adults in attendance; unconfirmed identity of nest.

3.1.2 SASKATCHEWAN SURVEY LAKES

3.1.2.a Franklin's Gull Colonies

Initial reconnaissance surveys were conducted on several lakes in southern Saskatchewan in June 2005. Franklin's Gull colonies were observed on Old Wives and Eyebrow lakes, and on Stalwart Marsh (P. S. Taylor, pers. comm.). Chaplin Lake Marsh, the site of an historical Franklin's Gull colony in the early 1990s, did not have any birds present in 2005 nor in any of the following survey years.

In 2006, the first year of intense survey effort in Saskatchewan, 62 wetlands were visited. Franklin's Gull breeding colonies were confirmed on 12, non-breeding individuals were present on 25, and no individuals were observed on 25 (Figure 1, Table 4, and Appendix 6). The three wetlands with colonies in 2005 were again active in 2006; however, flooding destroyed most of the emergent vegetation on Stalwart Marsh, resulting in a colony much reduced both in area and number of nesting adults. Franklin's Gull breeding colonies were confirmed on 10 wetlands, non-breeding adults were observed on 19, and absent on 38 of the 67 wetlands visited in 2007. Nine breeding colonies active in 2006 were again active in 2007. Low water depths on Old Wives Lake terminated any colony prospects in 2007 and flooding at Stalwart Marsh eliminated the remaining emergent vegetation and thus any nesting potential for that marsh. The colony at Egg Lake in the Cumberland Delta, reported by Ducks Unlimited Canada (DUC) staff in 2006, was not present in 2007. A new colony was discovered on a small wetland north of Kerrobert in western Saskatchewan in 2007.

3.1.2.b Other Colonial Waterbirds

In Saskatchewan, where 8 colonies were extensively surveyed, 13 other waterbird species were observed nesting in association with the Franklin's Gull colonies in 2006 (Table 5). Eared Grebes were observed nesting among Franklin's Gulls at all 8 colonies, while Black-crowned Night-Herons were present on all except Englishman Lake. White-faced Ibis were observed at 2 colonies (Beyersbergen 2008a) and Cattle Egret at 1 colony (Beyersbergen 2008b). The greatest diversity of waterbird species occurred at Middle Quill Lake, which has several islands at the edge of the colony that are used by nesting American White Pelican, Double-crested Cormorant, and white-headed gull species.

In 2007, 13 species of waterbirds were observed nesting with, or in proximity to, Franklin's Gulls in the 8 colonies surveyed (Table 6). Eared Grebes and Black-crowned Night-Herons were observed in all colonies. White-faced Ibis were noted nesting in 3 colonies and Cattle Egret in 2 colonies. Forster's Terns nested in 5 colonies. Middle Quill Lake again had the greatest diversity of nesting waterbird species.

Table 4. Franklin's Gull observations on active breeding lakes visited in Saskatchewan in May and June (See Appendix 6 for lake locations)

Lake	2005	2006	2007
Crane	Not visited	Breeding Colony (5,000)	Breeding Colony
Egg (in the Cumberland Delta complex)	Not visited	Breeding Colony (1000−1500)	Absent
Englishman	Not visited	Breeding Colony	Breeding Colony
Eyebrow	Breeding Colony	Breeding Colony	Breeding Colony
Foam	Not visited	Breeding Colony (10,000)	Breeding Colony
Goose	Not visited	Breeding Colony	Breeding Colony
Maiden	Not visited	Breeding Colony (10,000)	Breeding Colony
Mud (also known as Middle Quill Lake)	Not visited	Breeding Colony	Breeding Colony (500)
Old Wives	Breeding Colony	Breeding Colony (1,000)	Absent
Pelican (North)	Not visited	Breeding Colony (1,500)	Breeding Colony (1,000)
Stalwart	Breeding Colony	Breeding Colony (3,000)	Absent
Volk (small wetland north of Kerrobert–name of landowner)	Not visited	Not visited	Breeding Colony (1,500)
Waterhen	Not visited	Breeding Colony	Breeding Colony
Lakes with colonies	3	12	10

(N*) Number of breeding adults observed on the wetland during the visit.

The Saskatchewan Franklin's Gull colonies observed during the study were located in the Prairie and Boreal Plains Ecozones. The colonies on Englishman Lake and Maiden Lake were the most northerly colonies found during the course of this study in Saskatchewan. However, we believe there are more northerly colonies in the Meadow Lake, Tobin Lake, and Hudson Bay areas within the Boreal Plains Ecozone. There are few roads, and lack of logistical support for aerial surveys restricted our access to the remote lakes of this ecozone.

Table 5. Type and number of other waterbirds observed nesting in association with the Franklin's Gull colonies on lakes surveyed in Saskatchewan in 2006

	Lake							
Species	Englishman	Eyebrow	Foam	Goose	Middle Quill	Old Wives	Stalwart	Waterhen
Red-necked Grebe			2					
Eared Grebe	460	100	450	1000	258	54	200	850
Pied-billed Grebe	1	2	3		2			
Western Grebe					15	100		
Cattle Egret					50			
Black-crowned Night-Heron		142	89	26	20	12	34	6
White-faced Ibis				2	2			
Common Tern*								6
Forster's Tern	10	2	20	10	8			
Black Tern	20			100		27		2
American White Pelican*					1000			27
Double-crested Cormorant*					10			
White-headed Gull spp.*					(-)[1]			(-)[1]

*Nesting on islands within the perimeter or on the edge of the Franklin's Gull colony.
[1] Dashes (-) represent species that were observed on a lake but no count or estimate of number is available.

Table 6. Type and number of other waterbirds observed nesting in association with the Franklin's Gull colonies on lakes surveyed in Saskatchewan in 2007

Species	Lake								
	Crane	Englishman	Eyebrow	Foam	Goose	Maiden	Middle Quill	Old Wives	Waterhen
Red-necked Grebe				2					
Horned Grebe							4		
Eared Grebe	42	670	576	126	210		632	1410	2290
Pied-billed Grebe		1	5	4			1		
Western Grebe								65	
Cattle Egret					3			6	
Black-crowned Night-Heron	29	10	148	239	42	1	166	NS	10
White-faced Ibis	7		4		2				
Forster's Tern	5	10	10	2				7	
Black Tern		17							
American White Pelican*	530							(-)[1]	(-)[1]
Double-crested Cormorant*	40							(-)[1]	
White-headed Gull spp.*								(-)[1]	(-)[1]

* Nesting on islands within the perimeter or on the edge of the Franklin's Gull colony.
[1] Dashes (-) represent species that were observed on a lake but no count or estimate of number is available.

3.1.3 MANITOBA SURVEY LAKES

3.1.3.a Franklin's Gull Colonies

A brief reconnaissance of wetlands was undertaken in southern Manitoba in 2005. Four colonies of Franklin's Gulls were found (Figure 1, Table 7, and Appendix 7). Nine of the 28 lakes visited in Manitoba in 2006 had 1 or more Franklin's Gull colonies, while non-breeding adults were observed at two lakes. Three of the 4 colonies observed in 2005 were still active in 2006. Only 6 of the 13 lakes surveyed in 2007 had Franklin's Gull colonies, while 3 lakes had only non-breeders present. The 6 breeding colonies observed in 2007 had all been active in 2006, but only 1 of the wetlands with active colonies 2005 (Whitewater Lake) still had active colonies in 2007. The inconsistency of wetland site visits across Manitoba during this study precluded our ability to track colony presence over time for several lakes.

Table 7. Franklin's Gull observations on active breeding lakes visited in Manitoba in May and June See Appendix 7 for lake locations

Lake	2005	2006	2007
Big Grass Marsh	Not visited	Breeding Colonies	Breeding Colonies
Delta Marsh	Absent	Breeding Colony	Absent
Glenboro Marsh	Not visited	Breeding Colony	Breeding Colonies
Lake Francis	Breeding Colony	Breeding Colony	Foraging/resting (3)
Lizard Lake	Not visited	Breeding Colony	Breeding Colony
North Reader Lake*	Not visited	Breeding Colony	Breeding Colony
Oak Hammock Marsh	Breeding Colony	Breeding Colony	Foraging/resting (<200)
Saskeram Lake*	Not visited	Breeding Colony	Breeding Colony
South Reader Lake*	Breeding Colony	Absent	Absent
Whitewater Lake	Breeding Colony	Breeding Colonies	Breeding Colonies
Active colonies	4	9	6

* Information provided by or acquired with the assistance of Ducks Unlimited Canada staff at The Pas, Manitoba.

3.1.3.b Other Colonial Waterbirds

Surveys of four lakes in 2007 identified eight waterbird species nesting near or in association with the Franklin's Gull colonies (Table 8). Eared Grebes and Black-crowned Night-Herons were found on all four lakes while Black Terns were observed on three of the four lakes. Whitewater Lake, the largest lake surveyed, had the greatest waterbird diversity with seven other species observed, including Cattle Egrets and White-faced Ibis. Whitewater Lake provides some of the best habitat for these two species, which nest within the Franklin's Gull colonies and are rare in Manitoba (Bazin and Artuso 2006, Bazin 2006, Bazin 2008).

The Manitoba colonies observed during the study were located in the Prairie and Boreal Plains Ecozones. The three colonies at North and South Reader and Saskeram lakes, near The Pas, were the most northerly Manitoba colonies.

Table 8. Type and number of other waterbirds observed nesting in association with the Franklin's Gull colonies on lakes surveyed in Manitoba in 2007

Species	Lake			
	Big Grass	Glenboro Marsh (West)	Lizard	Whitewater
Eared Grebe	454	276	140	2739
Pied-billed Grebe		6	4	
Western Grebe				63
Cattle Egret				130
Black-crowned Night-Heron	27	6	14	259
White-faced Ibis				35
Forster's Tern				42
Black Tern	323	32		117

3.2 Nest Density and Adult Population Estimates

Nest counts were conducted on 3 wetlands in 2005 from July 19−28, on 8 colonies in 2006 from July 11–27, and on 15 colonies in 2007 from July 4–25, to determine nest density and colony habitat characteristics.

3.2.1 ALBERTA SURVEY LAKES

Nest count survey results from each of the three years of the study showed that nest densities and estimated numbers of breeding adult Franklin's Gulls varied among colonies and between years in Alberta (Table 9). The numbers can vary substantially. The number of breeding adults increased on Minor Lake by 60% and 220% over each successive year of the study. The Manawan Lake colony increased over 90% from 2006 to 2007 while the Moose Lake colony declined steadily. Frank Lake, the largest colony in Alberta in 2005, declined by 30% and 60% during the next two years of the study due to flooding and a reduction in the area of emergent vegetation. Third Lake, about 20 km north, provided suitable alternative nesting habitat in 2006 and 2007, and the number of adults breeding there increased from ~1,000 to ~130,000 between 2006 and 2007 (Table 9). Although breeding adult numbers appear to have increased on Stobart Lake from 2006 to 2007, they are likely closer than they appear because visual estimates are generally lower on large colonies than the calculated estimates.

Nest density, although changing annually, was the highest on Moose Lake in comparison with all other colonies surveyed in each year (Table 9). Minor Lake saw the greatest fluctuation in nest density with close to a five-fold increase from 2006 to 2007. In 2007, nest counts were not conducted on Ferguson or the two Murray lakes. All three lakes were mapped and during the mapping phase the density of nesting adults appeared similar to the previous year, so the corresponding mean nest density estimates for 2006 were applied to the 2007 colony areas to

Table 9. Mean nest density, adult population estimates, and 95% confidence intervals (CI) for Franklin's Gull colonies surveyed in Alberta in 2005−2007

Lake	Mean Nest Density (per 100 m^2)			Population Estimate			Lower 95% CI			Upper 95% CI		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
Big*						[500]						
Big Hay				[>3,000]								
Bittern			6.1	[~1,000]	[~10,000]	57,823			41,960			78,727
Buffalo*						[1,200]						
Charlotte						[2,000]						
Duck*				[~2,000]	[>2,000]	[350]						
Egg				[>3,000]	[15,000]							
Ferguson**		3.8	**{3.8}**		51,037	**{27,451}**		42,484			60,416	
Frank	3.8	3.5	4.3	111,414	77,973	29,637	98,238	62,485	22,836	125,766	94,507	37,338
Isle*						[150]						
Jessie					[1,000]							
Lac La Biche*				[<100]	[2]							
Lesser Slave*					[>1,000]							
Mamawi*						[200]						
Manawan		2.9	4.8		68,600	131,682		57,873	118,601		79,790	145,729
Minor	4.1	3.5	16.9	21,202	33,860	109,498	14,958	24,453	90,864	28,554	44,236	128,935
Moose	25.0	29.2	18.4	60,968	54,740	32,155	50,532	47,965	29,019	70,568	61,631	35,420
Murray–North**		5.5	**{5.5}**		3,777	**{3,168}**		2,045			5,625	

Table 9 continued

Lake	Mean Nest Density (per 100 m^2)			Population Estimate			Lower 95% CI			Upper 95% CI		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
Murray–South**		9.5	**{9.5}**		13,491	**{11,989}**		9,441			17,686	
Stirling				[>500]		[100]						
Stobart			6.2		[15,000]	35,001			30,152			39,932
Taber				[100]		[100]						
Third			8.4		[1,000]	129,549			115,654			144,191
Upper Therien				[~250]		[230]						
Utikuma†			6.0		[40,000]	69,012						
Winagami		2.1			13,045			9,266			17,363	
Total–nest count estimates				193,584	265,486	636,965						
Total–visual estimates				[>9,950]	[>85,000]	[4,630]						
Grand total for each year				>203,534	>401,523	641,595						

[N] Value is based on a visual estimate of adults present.
* Data provided by personnel from other agencies.
**{Bold numbers}. No nest counts were conducted in 2007. Mean nest density estimate from 2006 used for each of the lakes.
† Used mean nest density estimate from surveyed lakes with visually estimated similar nest densities.

develop adult abundance estimates for that year. The Utikuma Lake colonies' areas were mapped in 2007, but no nest counts were done. Nest density estimates were established using measured nest densities from lakes in Alberta subjectively judged by an experienced observer to have the same density, to provide an estimated number of breeding adults on Utikuma Lake.

In 2005, nest count survey results completed at three colonies in Alberta (Table 9) showed an estimated total of 193,584 Franklin's Gulls nesting. Nesting was observed that year at other colonies where breeding adult estimates were not calculated but were sometimes visually estimated. It is likely the minimum number of breeding adults observed at all the colonies found in 2005 would have been over 200,000. Nest count results from eight colonies in 2006 combined with visual estimates of the remaining eight colonies place the number of Franklin's Gulls at a minimum estimate of 401,500 breeding adults in Alberta. The underestimation of visual estimates is especially relevant in 2006 as 20% of the population estimate was derived from this methodology.

In 2007, Alberta had 20 known Franklin's Gull colonies spread across the entire province, with the smallest at 100 breeding adults and the largest at over 131,000 breeding adults (Table 9). Efforts to broaden the survey coverage across Alberta in 2007 resulted in observations of nearly 641,795 adult Franklin's Gulls based on nest survey results and only a limited number of visually estimated counts. The three colonies at Manawan, Minor and Third lakes are each over 100,000 birds, with adult numbers on Bittern Lake at nearly 58,000 and Utikuma Lake at nearly 70,000. These five colonies represent 77% of the provincial and 42.3% of the Canadian total. The Alberta provincial estimate of 642,000 represents 55% of the known Canadian Franklin's Gull breeding population of over 1.176 million.

3.2.2 SASKATCHEWAN SURVEY LAKES

During the two years of the study in Saskatchewan, nest densities and numbers of breeding adult Franklin's Gulls also varied among colonies and between years (Table 10). Goose Lake was the colony with the largest number of breeding adults in both years, increasing by nearly 60% from 2006 to 2007. Increased water depths in 2007 dramatically influenced breeding adult numbers on Englishman Lake (25% decline), Waterhen Marsh (62% decline) and Middle Quill Lake (99% decline, probably because of decreased availability of emergent vegetation.

Conversely, Foam Lake water depths, which were at flood stage in the spring of 2006, were lower in 2007, and although fewer adults were observed in the area, more were actually nesting on that lake. Eyebrow Lake, although an active colony in 2006, was visited too late in July. Most nests had already sunk, and a nest count survey was not possible that year. The density of adult birds on Eyebrow Lake in 2006 and 2007 was judged by an experienced observer (GWB) to be identical, thus the 2007 measured density was applied to the 2006 map.

Nest density estimates were quite variable from 2006 to 2007, with Englishman Lake showing a drop of nearly 50% while Goose Lake densities more than doubled (Table 10). Nest density estimates at Eyebrow Lake in 2007 were slightly lower than the 1999−2001 estimates of 1.2 to 2.4 nests/100 m^2 that Soos (2004) found. The Waterhen Marsh colony, active when mapped in early June 2007, was destroyed by flooding when visited in July and no nest count could be conducted. The density of nesting adults in this small colony appeared similar to 2006, so the

Table 10. Mean nest density, adult population estimates and 95% confidence intervals (CI) for Franklin's Gull colonies surveyed in Saskatchewan in 2006−2007

	Mean Nest Density (per 100 m²)		Population Estimate		Lower 95% CI		Upper 95% CI	
Lake	2006	2007	2006	2007	2006	2007	2006	2007
Crane*		**3.0**	[5,000]	51,090				
Englishman	8.4	3.8	26,694	21,580	22,890	17,773	30,511	25,812
Eyebrow**	**1.1**	1.1	15,443	25,182		19,415		31,763
Foam		1.4	[10,000]	5,132		4,025		6,290
Goose	1.2	2.8	66,215	104,590	58,756	92,976	74,091	116,866
Maiden		6.3	[10,000]	73,390		66,106		81,665
Middle Quill	11.7		45,027	[500]	37,687		52,718	
Old Wives			[1,000]					
Pelican North			[1,500]	[1,000]				
Stalwart Marsh			[3,000]					
Volk Wetland (Kerrobert)				[1,500]				
Waterhen Marsh***	5.1	**5.1**	25,114	9,404	20,091		30,938	
Total−nest count estimates			178,493	290,368				
Total−visual estimates			[30,500]	[3,000]				
Grand total for each year			208,993	293,000				

* Used mean nest density estimate from surveyed lakes with visually similar nest densities.
** Nests had sunk below water surface at time of nest count in 2006; therefore assume nest density similar to 2007 density.
*** Nest count was not conducted in 2007, so the 2006 mean nest density estimate was used to calculate number of breeding adults.

2006 nest density estimate was applied to the 2007 colony area to obtain an estimate of the number of breeding adults.

Breeding adult estimates based on nest count surveys and visual estimates (Table 10) indicate a provincial Franklin's Gull breeding population of 228,993 birds in 2006 and 293,368 in 2007. As previously noted, visual estimates are generally lower on large colonies as the calculated estimates and the difference can vary substantially. The underestimation of visual estimates is especially relevant in 2006, as more than 25% of the population estimate was derived by this means. The 2007 Saskatchewan population was estimated from 10 colonies spread across the prairie parkland landscape. Multiple observations of large numbers (several thousand) of adult Franklin's Gulls in areas beyond the territorial range of known colonies indicate the presence of

several unconfirmed colonies in the non-accessible boreal ecozone areas. The colonies located on Goose Lake (104,590), Maiden Lake (73,390), and Crane Lake (51,090) in 2007 together represent 78% of the provincial and 19.5% of the Canadian total. The 2007 Saskatchewan estimate represents approximately 25% of the known Canadian Franklin's Gull breeding population estimate of 1.176 million.

3.2.3 MANITOBA SURVEY LAKES

Nest count surveys were conducted in Manitoba only in 2007; nest densities and number of breeding adult Franklin's Gulls varied among colonies (Table 11). Whitewater Lake, with its numerous colonies, had the largest population of breeding adults in all the Canadian Prairie provinces. The colonies on Big Grass Marsh represent the second-largest population in Manitoba. The estimated number of breeding adults on Lizard Lake was derived using similar breeding adult and nest density estimates from Big Grass Marsh.

The Manitoba Franklin's Gull breeding adult population, based on nest count surveys and visual counts (Table 11), is about 241,000 birds in 2007. The largest concentration of Franklin's Gulls was on Whitewater Lake, which had 19 satellite colonies dispersed across the lake. The largest of these 19 colonies was located in the larger of the two "Ducks Unlimited Canada cells" on the east end of the lake and had an estimated 155,000 breeding birds. The total Franklin's Gull breeding population on the lake, estimated at over 184,000, represents 76% of the provincial and 15.7% of the Canadian Franklin's Gull breeding population. The Manitoba Franklin's Gull breeding population estimate represents about 20.5% of the Canadian total of 1.176 million.

Interestingly, in 2004, the colony on Whitewater Lake was located primarily within the central portion of the lake because water depths were suitable for the development of vast areas of bulrush emergent vegetation (R. Bazin, pers. comm.). The boundary of the colony was mapped in 2004, and a number of nest transects were conducted through the bulrush beds by airboat, using methods similar to those employed for this study. The colony area was estimated at 596.3 hectares. Nest density was estimated at 1.74 nests/100 m^2. The adult estimate was 207,079 with an upper CI of 253,348 and a lower CI of 148,683 (CWS unpubl. data). The emergent vegetation was flooded out in June 2005, destroying most of the nests and young on the lake. The following year, the large central colony had dispersed into smaller colonies around the perimeter of the lake and a large colony on the east end. Despite the changes in habitat availability and colony locations, the total number of adults on Whitewater Lake does not appear to have changed very much since 2004.

3.2.4 SUMMARY: ADULT POPULATION ESTIMATES

There were 36 Franklin's Gull breeding colonies (Tables 1, 4, and 7) identified across the Canadian Prairie provinces during the summer of 2007. The smallest colonies were on Taber and Stirling lakes in Alberta, each with about 100 breeding adults, while the largest population was on Whitewater Lake in Manitoba with over 184,000 birds. There were five colonies in Prairie Canada with over 100,000 birds each. Collectively, at 659,390 breeding adults, these colonies represent 56% of the Canadian population of Franklin's Gulls. Additionally, there were four colonies with over 50,000 breeding adults each, three colonies of over 30,000 adults each and four colonies with over 20,000 adults each. The total count of these 16 colonies, or 44% of

total identified colonies, represents 95% of the Canadian breeding Franklin's Gull population of 1.176 million.

Table 11. Mean nest density, adult population estimates, and 95% confidence intervals (CI) for Franklin's Gull colonies surveyed in Manitoba in 2007

Lake	Mean Nest Density (per 100 m2)	Population Estimate	Lower 95% CI	Upper 95% CI
Big Grass Marsh	2.5	35,846	30,406	41,674
Glenboro East		[1,000]		
Glenboro West	1.1	8,714	6,084	11,623
Lizard*	**2.5**	5,390		
North Reader**	**1.1**	1,157		
Saskeram**	**3.3**	4,798		
Whitewater	2.3	184,071	167,096	202,279
Total		240,976		

[N] Visual estimate of birds from the marsh edge, no nest count.
* Used mean nest density estimate from Big Grass Marsh with visually similar adult densities.
**Mean nest density estimate used from Glenboro with visually similar adult density; Saskeram nest density visually appeared to be three times that of North Reader.

3.3 Nesting Colony Habitat Characteristics

3.3.1 ALBERTA LAKES

Of the three Alberta colonies that were mapped in 2005, Frank Lake had the largest colony area, followed by Minor Lake and Moose Lake (Table 12). For those colonies in 2006 where boundaries were mapped and areas calculated, the Manawan and Frank lake colonies were the largest while both Murray Lake colonies (north and south) were the smallest (Table 13). More colonies were mapped in 2007, with the Manawan Lake colony even larger in than in 2006, followed by Third Lake. The two colonies on Murray Lake again were the smallest area of those that were mapped (Table 14).

Table 12. Colony area and dominant emergent vegetation in Franklin's Gull colonies surveyed in Alberta in 2005

Lake	Colony Area (ha)	Emergent Vegetation
Frank	146.24	Schoenoplectus/Typha
Minor	26.09	Typha
Moose	12.15	Schoenoplectus

Table 13. Colony area, water depth, and type and density of emergent vegetation nesting cover (as represented by the 100 m^2 units derived from nest transects) in Franklin's Gull colonies in Alberta in 2006

Lake	Colony Area (ha)	Water Depth (cm)		Emergent Vegetation (% of total) Density (% of species total)
		Mean (± 1 SD)	Min.–Max.	
Ferguson	67.00	78 (10)	67–90	Schoenoplectus (32), Typha (1), Grass (67) (No density estimates)
Frank	111.86	81 (20)	55–100	Schoenoplectus (96.2), Typha (3.8) Sparse (30.0), Sparse (1.5) Medium (34.6), Medium (0) High (31.6), High (2.3)
Manawan	117.19	80 (7)	72–100	Schoenoplectus (3.6), Typha (96.4) (No density estimates)
Minor	48.85	68 (5)	60–75	Typha (100) Sparse (7.0) Medium (41.0) High (52.0)
Moose	9.37	71 (17)	53–100	Schoenoplectus (100) Medium (85.0) High (15.0)
Murray–North	3.46	73 (11)	65–80	Schoenoplectus, Typha (No density estimates)
Murray–South	7.09	62 (12)	42–78	Schoenoplectus, Typha (No density estimates)
Winagami	30.55	75 (22)	44–100	Schoenoplectus, Typha, Grass sp. (No density estimates)

"No density estimates" = inconsistent data for various parts of survey to allow calculation of density estimates or in some cases, proportions of vegetation type within the colony.

The colony areas were quite variable between years. Frank Lake showed dramatic changes over the three years because of increased water depths in the summer of 2005 and 2006. Extensive areas of emergent vegetation were flooded out and destroyed, resulting in the colony area decreasing from 146.24 ha in 2005 to 34.95 ha in 2007. The 68% reduction in area of the Ferguson Lake colony from 2006 to 2007 was the result of flooding and disappearance of the grass portion of the colony. Bulrush was the only available emergent cover suitable on Ferguson Lake for nesting habitat in 2007.

Years of low water in Manawan Lake resulted in extensive beds of dense cattail developing around the perimeter of the lake. When we visited the site in 2005, access to these beds from the central area of open water proved to be impractical because of the water depth and density of the vegetation. Higher water levels in 2006 opened up the area between the shore edge and the main cattail beds, allowing navigation around the shore edge of the colony. The previous year of high water and increase in water depths in the spring further thinned the cattail beds on Manawan

Table 14. Colony area, water depth, and type and density of emergent vegetation nesting cover (as represented by the 100 m^2 units derived from transects n Franklin's Gull colonies in Alberta in 2007

Lake	Colony Area (ha)	Water Depth (cm)		Emergent Vegetation (% of total) Density (% of species total)	
		Mean (± 1 SD)	Min.–Max.		
Bittern	47.87	85 (6)	74–94	Schoenoplectus	
				Sparse (12.7)	
				Medium (87.3)	
Ferguson	36.12	78 (22)	55–117	Schoenoplectus,	Typha
				(No density estimates)	
Frank	34.95	66 (18)	37–100	Schoenoplectus (97.9)	Typha (2.1)
				Sparse (15.0)	Sparse (0)
				Medium (47.4)	Medium (2.1)
				High (35.5)	High (0)
Manawan	136.49	89 (3)	85–93	Typha	
				Sparse (11.0)	
				Medium (71.8)	
				High (17.2)	
Minor	32.45	50 (3)	45–57	Typha	
				High (100.0)	
Moose	8.75	66 (18)	45–83	Schoenoplectus	Typha
				Medium (95.4)	Medium (4.6)
Murray–North	2.88	50 (9)	43–62	Schoenoplectus, Typha	
				(No density estimates)	
Murray–South	6.31	38 (11)	21–59		
Stobart	28.37	54 (10)	37–69	Schoenoplectus	
				Sparse (13.1)	
				Medium (53.3)	
				High (33.6)	
Third	77.37	60 (4)	53–66	Schoenoplectus (99.4)	Grass (0.6)
				Sparse (24.5)	Sparse (0.6)
				Medium (30.5)	Medium (0)
				High (44.4),	High (0)
Utikuma	57.51			Schoenoplectus	
				(No density estimates)	

Lake and created more usable nesting habitat for Franklin's Gulls and a 16% increase in the colony area.

Water levels on Moose Lake's secluded southwest bay were higher in each successive year of the study, resulting in a diminished colony area each year. Winagami Lake, although active in 2006, was flooded out in the spring of 2007. Minor Lake's colony area increased by 87% in 2006 from 2005 (26.10 ha). The area of the cattail bed on the wetland remained the same over both years, but the colony area within the cattail bed varied with changes in water depths. The higher water levels in 2006 thinned the dense cattail bed, providing more emergent vegetation suitable for nesting. A drop in water depths in 2007 constricted the area within the cattail bed that was suitable for Franklin's Gull nesting. The Murray Lake (south) colony increased in 2007 by expanding to a new bulrush bed west of the main colony.

Mean water depths at the Franklin's Gull colonies in 2006 ranged from 62 cm at Murray Lake south to 81 cm at Frank Lake, while mean water depths in 2007 ranged from 38 cm on Murray Lake south to 89 cm on Manawan Lake (Tables 13 and 14). Water depths were taken during the mapping period in the spring. On Frank and Manawan lakes, water depths increased dramatically later in the summer as a result of local storms. This altered the emergent habitat areas primarily in the deep water zones next to the open water areas, where large islands of cattails floated around the open water areas or jammed up against the rooted vegetation on these two lakes. Subsequent changes in the total area of the emergent vegetation were observed in the following years of mapping, primarily at Frank Lake. These local rainstorms not only flooded out existing wetlands but helped recharge drought-stricken wetlands such as Third Lake. This basin was dry in 2005 (pers. comm. Greg Tory, landowner), had some water in 2006 with a small Franklin's Gull colony established in bulrush and grass, and had a mean water depth of 60 cm in 2007 and a very large colony.

Six of the 8 colonies in 2006 were in mixed beds of bulrush, cattail, and/or grass (Table 13) while only 5 of 11 colonies were in mixed habitat in 2007 (Table 14). Analysis of densities of variable habitat types was not possible on some lakes because of inconsistencies in data collection by various field personnel over the years of the study. The colonies on Bittern, Moose, Stobart, and Utikuma lakes were located in bulrush beds of variable density, while the colonies on Manawan and Minor were in almost exclusively cattail habitat of variable density depending on the year and water depth. In 2006, the Ferguson Lake colony was unique with the majority of nesting habitat believed to be aquatic wild rice that flooded out in 2007, such that nesting was only possible in a mix of cattail and bulrush habitat.

3.3.2 SASKATCHEWAN LAKES

Although several lakes were visited in 2005, mapping of colonies was not initiated in Saskatchewan until 2006. Four lakes were mapped, with Goose Lake being the largest in colony area at nearly four times the size of the next largest colony on Eyebrow Lake (Table 15). The smallest colony was on Englishman Lake, 1/17 the size of the Goose Lake colony. Increased survey efforts in 2007 resulted in eight colonies being mapped in Saskatchewan (Table 16). Goose Lake was again the largest colony in area, and the colony on Middle Quill Lake was the smallest of the wetlands that were mapped in Saskatchewan in 2007.

Table 15. The colony area (ha), mean (± 1 SD), minimum and maximum (cm) water depth, and type and density of emergent nesting cover (as represented by the 100 m^2 units derived from nest transects) in Franklin's Gull colonies in Saskatchewan in 2006

Lake	Colony Area	Water Depth (cm)		Emergent Vegetation (% of total) Density (% of total)	
		Mean (± 1 SD)	Min.–Max.		
Englishman	15.96	92 (10)	75–108	Schoenoplectus (39.2)	Typha (60.8)
				Medium (27.2)	Medium (26.9)
				High (12.0)	High (33.9)
Eyebrow	70.20	79 (7)	69–90	Schoenoplectus (100) (No density estimates)	
Foam*	-	119 (19)	78–140	Schoenoplectus (100) (No density estimates)	
Goose	276.02	80 (15)	55–100	Schoenoplectus (100) (No density estimates)	
Middle Quill	19.29	57 (9)	43–72	Schoenoplectus (93.3), Typha (6.7) (No density estimates)	
Old Wives*	-	27 (10)	13–38	Schoenoplectus, Typha (No density estimates)	
Stalwart*	-	59 (6)	53–64	Schoenoplectus, Phragmites (No density estimates)	
Waterhen	24.64	87 (7)	78–95	Schoenoplectus, Grass sp. (No density estimates)	

* Colony partially mapped but no definitive boundary; scattered emergent vegetation clumps with some nesting Franklin's Gulls.
(No density estimates) = inconsistent data for various parts of survey to allow calculation of density estimates or in some cases, proportions of vegetation type within the colony.

Colony area on most wetlands varied significantly between the two years of the study in Saskatchewan. Goose Lake saw a drop of 33% in area from 2006 to 2007 (Tables 15 and 16). The outer perimeter of Goose Lake was larger in 2007, but high water levels created large areas of open water within the colony. This opened up the bulrush beds, creating more edge effect and better nesting habitat for Franklin's Gulls. These large patches of open water were removed from the total colony area during the mapping phase, reducing the overall area of the colony in 2007, but increasing the density.

Crane Lake, although active in 2006, was not accessible until 2007 due to access restrictions and flooding around the dike area. The wetland is surrounded by an earthen dike, and water levels are managed with a control structure on the north end. Low water depths in previous years (local ranchers, pers. comm.) resulted in a dense growth of bulrush, especially in the shallower shoreline areas of the wetland. The colony was located in the centre of the wetland where deeper water had opened up the area or restricted the encroachment of bulrush, creating ideal habitat for nesting Franklin's Gulls.

Table 16. Colony area, mean (± 1 standard deviation), minimum and maximum (cm) water depth, and type and density of emergent nesting cover (as represented by the 100 m^2 units derived from nest transects) in Franklin's Gull colonies in Saskatchewan in 2007

Lake	Colony Area (ha)	Water Depth (cm)		Emergent Vegetation (% of total) Density (% of species total)	
		Mean	Min.–Max.		
Crane	85.15	103 (3)	97–105	Schoenoplectus (No density estimates)	
Englishman	28.4	98 (8)	88–115	Schoenoplectus (56)	Typha (44)
				Sparse (40.1)	Sparse (1.4)
				Medium (15.9)	Medium (31.2)
				High (0)	High (11.4)
Eyebrow	112.07	69 (7)	56–80	Schoenoplectus Sparse (81.2) Medium (18.8)	
Foam	18.64	76 (3)	71–79	Schoenoplectus Sparse (51.7) Medium (48.3)	
Goose	184.8	89 (16)	62–105	Schoenoplectus (99.8), Sparse (12.9), Medium (84.7), High (1.2),	Typha (0.2) Sparse (0.1) Medium (0.1) High (0)
Maiden	58.53	78 (5)	73–92	Schoenoplectus Sparse (16.1) Medium (80.2) High (3.7)	
Middle Quill	2.51	75 (13)	65–84	Schoenoplectus, Typha (No density estimates)	
Waterhen	9.22	75*	-	Scirpus, Grass (No density estimates)	

* Single water depth reading on lake during boundary delineation survey.
(No density estimates) = inconsistent data for various parts of survey to allow calculation of density estimates or in some cases, proportions of vegetation type within the colony.

The original Englishman Lake colony area in 2006 decreased because of flooding. However, in 2007 the total area increased due to the movement or expansion of the colony from the south to emergent vegetation on the north end of the lake. Although smaller in area, the colony persisted on the south end of the lake. Habitat conditions may have changed on the north end because of higher water depths, but this could not be verified, as the northern site had not been visited in 2006.

The Eyebrow Lake colony had an increase in area of about 60% from 2006 to 2007. Dense bulrush beds were located in shallow water along the shoreline in 2006. Increased water depths in 2007 thinned and opened up these shoreline stands and increased the area of available habitat suitable for nesting Franklin's Gulls. The colony area also expanded northwards throughout the available bulrush in the basin.

The 2007 Waterhen Marsh colony was reduced by over 60% compared to the 2006 area due to flooding, while the site on the west side of Middle Quill Lake where that colony was situated in 2006 was completely flooded out in the spring of 2007 from the snow melt runoff. The only emergent habitat available in the spring of 2007 on Middle Quill Lake was in the northeast corner, and the new colony site was established in this location. The 2007 colony was about 10% in area of the 2006 colony.

Clusters of nests were scattered in small clumps of emergent vegetation in the high waters of Stalwart Marsh and Foam Lake, but no distinct colony areas could be defined in 2006. Large numbers of adult Franklin's Gulls were observed feeding in fields around Foam Lake, but little nesting activity was recorded in the spring of 2006. High water persisted in 2007 on Stalwart Marsh and no nesting was observed on the wetland. Water depths were dramatically reduced on Foam Lake in 2007, and a distinct colony area was discovered in a large bulrush bed. Mats of floating bulrush suggested extensive flooding the previous year.

A large colony was observed, but not mapped on Old Wives Lake in 2005 (P. S. Taylor, pers. comm.). In 2006, a few active nests were observed on Old Wives Lake, but could not be mapped because the water depth was too shallow for canoeing and the muddy bottom made it too difficult to walk. Further reduction in water depths in 2007 resulted in abandonment of the site by Franklin's Gulls, and no birds were present when visited in the spring of 2007.

Water conditions appeared suitable in 2006 on Maiden Lake, where a small colony was evident from the road, but not mapped due to inaccessibility. Higher water levels and access permission from the landowner resulted in Maiden Lake being mapped and surveyed in 2007.

Mean water depths in 2006 (Table 15) ranged from 27 to 119 cm, but at both of these extremes, Old Wives and Foam lakes respectively, colony nesting activity was minimal. The greatest activity occurred on wetlands with mean water depths of 57−92 cm. In 2007, the range of mean water depths was closer at 75 cm to 103 cm (Table 16). Water depths were measured in the spring on the Saskatchewan lakes, with water depths typically dropping over the course of the summer. The only exception was on Waterhen Marsh, when heavy rainfall (37–92 mm) in the drainage basin area, and runoff from the surrounding landscape during a storm on June 17, 2007 (Environment Canada–National Climate Data and Information Archive), resulted in flooding and 100% destruction of the colony nests and emergent vegetation.

Three of eight colonies in 2006 were located in emergent vegetation dominated by bulrush (Table 15). The remaining colonies were in a mix of bulrush, cattail, reed grass or other grass species. The Waterhen Marsh colony was pre-dominantly in flooded grass habitat with bulrush present in deeper water zones. Inconsistencies in the habitat data precluded calculations of species proportions on the lake. Eight colonies were visited in 2007, including two new lakes, Crane and Maiden, with four of these colonies in bulrush habitat only (Table 16). Goose Lake was identified as bulrush only in 2006 and was essentially similar in 2007, with a small fraction of the colony habitat identified as cattail. The shifting of part of the colony on Englishman Lake between 2006 and 2007 resulted in a proportional change in the bulrush and cattail components and inclusion of reed grass habitat. Waterhen Marsh was completely destroyed by floods in

2007 before the nest count survey. As a result, no habitat data could be collected, although during the spring mapping, the colony was primarily in grass habitat. The proportion of bulrush and cattail habitat could not be calculated on Middle Quill Lake because no nest transects were surveyed.

3.3.3 MANITOBA LAKES

Whitewater Lake was visited in 2004 prior to the start of the study, and a large colony occupied the emergent bulrush vegetation in the central portion of the lake. In 2005, when the site was revisited in July, high water depths had flooded out the emergent vegetation in the centre of the lake, effectively destroying the colony. Colony mapping activity did not resume on any lake in Manitoba until 2007, when six wetlands were mapped. Whitewater Lake was the largest in area, with one large colony within the emergent vegetation in the Ducks Unlimited Canada cell at the east end of the lake and approximately 18 smaller colonies scattered along the shoreline of the lake (Table 17). Big Grass Marsh was the second largest in area, with several colonies scattered around the perimeter of the lake, while the North Reader Lake colony near The Pas, Manitoba, was the smallest.

Table 17. The colony area (ha), mean (± 1 standard deviation), minimum and maximum (cm) water depth, and type and density of emergent nesting cover (as represented by the 100 m^2 units derived from nest survey segments) in Franklin's Gull colonies surveyed in Manitoba in 2007

Lake	Colony Area	Water Depth		Emergent Vegetation (% of total) Density (% of total)	
		Mean	Min.–Max.		
Big Grass	71.86	83 (16)	64–125	Typha Sparse (1.6) Medium (19.2) High (79.2)	
Glenboro	39.16	45 (7)	37–60	Schoenoplectus (2), Medium (2.0), High (0),	Typha (98) Medium (15.2) High (82.8)
Lizard	10.78	75 (2)	72–78	Typha (100) (No density estimates)	
North Reader*	5.26	-	-	Typha, Grass sp. (No density estimates)	
Saskeram*	7.27	-	-	Typha (No density estimates)	
Whitewater	364.31	75 (13)	40–100	Schoenoplectus(30.4), Sparse (24.7), Medium (5.3), High (0.4),	Typha (69.6) Sparse (15.9) Medium (30.0) High (23.7)

*Nesting colony boundary mapped (airboat with DUC staff); no water depths taken or nest counts conducted.
(No density estimates) = inconsistent data for various parts of survey to allow calculation of density estimates or in some cases, proportions of vegetation type within the colony.

Water depths were collected on only four colonies during the study. The mean water depth ranged from 45 to 83 cm, with Big Grass Marsh being the deepest and Glenboro (west) the shallowest of the four lakes. Whitewater Lake and Big Grass Marsh (main waterbody referred to

as Jackfish Lake) have quite large open water areas, and depths can readily change in the colonies under stormy conditions, but they are less likely to drop over the summer due to evaporation.

Cattail is the dominant emergent habitat in all colonies in Manitoba (Table 17). Whitewater Lake had the highest proportion of bulrush habitat in all the colonies visited. The only other colony with bulrush was on Glenboro Marsh (west), which had a minimal amount. No nest counts were conducted on North Reader or Saskeram Lakes near The Pas, but cattail was again the dominant species identified in the colonies during the mapping survey. A minimal amount of unidentified grass habitat was evident in the colony on North Reader Lake.

In summary, bulrush was the dominant emergent vegetation within Franklin's Gull colonies on 81% of the Alberta lakes (exceptions Minor and Manawan lakes) and 88% of the Saskatchewan lakes (exception Englishman). Cattail was the dominant emergent vegetation on 100% of the colonies within Manitoba.

3.4 Lake/Wetland Characteristics

Almost all (98%) of the wetlands surveyed in Alberta, Saskatchewan, and Manitoba in 2005−2007 were semi-permanent to permanent wetlands (including reservoirs) (Table 18). In general, water levels were high, with surface water present to the outer edge of the wet meadow zone (Stage 5) for 77% of the wetlands surveyed. For 11% of the lakes, the water was beyond the wet meadow zone and covering the adjacent upland (Stage 6).

The cover type of the wetlands surveyed ranged from wetlands with closed stands of emergent vegetation (Cover Type 1) and wetlands with peripheral bands of emergent vegetation averaging two metres or more in width (Cover Type 3: 37% of wetlands), to wetlands with very little emergent vegetation (Cover Type 4; 50% of wetlands). Breeding gulls (81.6%) were most often found on lakes that were Cover Types 2 or 3 (Table 18).

Table 18. Franklin's Gull use of waterbodies surveyed in Alberta, Saskatchewan, and Manitoba in 2005–2007 in relation to their habitat characteristics The percentage of lakes with Franklin's Gulls breeding, present (foraging/resting only), or absent on various waterbody types (n = 171), with water level stages, cover types, and with extensive emergent vegetation beds present.

Habitat Characteristic		% Franklin's Gull Use		
		Breeding	Present	Absent
Waterbody Type	Reservoir	8	20	12
	5	79	72	83
	4	11	6	4
	3	0	2	1
	2	3	0	0
Stage	1	0	2	0
	3	5	2	3
	4	11	11	3
	5	71	73	84

Habitat Characteristic		% Franklin's Gull Use		
	6	13	13	10
Cover	1	5	2	1
	2	42	2	1
	3	39	34	38
	4	13	63	59

4.0 DISCUSSION

Forty-nine lakes with Franklin's Gull colonies were located among the 237 lakes visited across the Canadian prairies during the period 2005–2007 (26 lakes in Alberta, 13 in Saskatchewan, and 10 in Manitoba). However, only 36 of those 49 lakes had active Franklin's Gull colonies in 2007. The lack of annual or periodic province-wide surveys in the past limits our ability to identify whether the total number of lakes with Franklin's Gull colonies has increased, decreased, or remained stable. There are lakes that were traditionally used by Franklin's Gulls for nesting colonies, as shown in the historic records (Appendix 8), that are still active today, and others where no colony was found during the entire study period. Bird and egg collector records showed that Crane Lake, Saskatchewan, was an active colony back in 1905. Some ornithological records from the 1930s show active Franklin's Gull colonies on Big Hay Lake, Alberta as well as Waterhen Marsh, Saskatchewan, and Delta Marsh, Manitoba. A search of egg collection notes from museums and discussions with local landowners resulted in records for the 1950s (Englishman, Manawan and Foam lakes) and the 1960s (Ferguson, Frank and Stobart lakes). Colonization at some lakes (e.g. Bittern, Minor and Eyebrow lakes) may be a result of habitat creation initiatives by conservation groups (Appendix 8). Expansion northwards into the boreal ecozone (e.g. Utikuma Lake, Hay-Zama Lakes, Cumberland Marsh and The Pas) may be a result of drought conditions and habitat degradation or loss on the prairies and aspen parkland, forcing Franklin's Gulls to extend beyond their normal breeding range. This has been evident in prairie nesting species such as the American Avocet that were observed nesting in the Peace Athabasca Delta (Beyersbergen 2004) and Hay-Zama Lakes (K. Morton, Alberta Sustainable Resource Development, pers. comm.), well beyond their traditional breeding range.

There were a number of lakes identified as having important Franklin's Gull nesting colonies by Poston et al. (1990) that were not active during this study. Of the 22 lakes identified as Locally (11), Regionally (8) or Nationally (3) important (Poston et al. 1990), only 9 had colonies during this study. Several lakes were dry or nearly dry (e.g. Pakowki and Whitford/Rush lakes, Alberta), had been drained (Reed Lake, Alberta), or no suitable emergent habitat was available (Namaka and Forsyth lakes, Alberta, and Rice Lake, Saskatchewan). The colony on Namaka Lake probably shifted over to Stobart Lake 1 km to the south. Although Rice Lake no longer had suitable emergent habitat, a large colony was established on Goose Lake approximately 20 km to the southwest. Big Lake (identified by Poston et al. 1990) had only a small colony in 2007, but 33 km to the north on Manawan Lake, a large colony was active for all three years of the study. The Big Hay Lake colony likely shifted south a few kilometres to Bittern Lake. The habitat conditions on Forsyth Lake were poor during our study, but an active colony was found on Moose Lake, about 14 km south.

Locations of colonies can vary from year-to-year depending on habitat suitability (Burger and Gochfeld, 1994). This was evident during the course of our study on numerous lakes across the region (Appendix 8). Satellite colonies developed when conditions on the main lake deteriorated or the available habitat had reached its carrying capacity. The Third Lake colony was initiated in 2006 when torrential rains improved the water depths of the lake. However, these same rains flooded out the habitat on Frank Lake, 10 km to the south (Appendix 8). The habitat conditions continued to decline on Frank Lake in 2007, presumably resulting in the majority of breeding adult Franklin's Gulls taking up residence on Third Lake. All suitable habitats were utilized on Moose Lake in 2006, and two small colonies developed on Jessie (2006) and Charlotte (2007) lakes to the east. Changing habitat conditions on Stirling and Taber lakes saw active but small colonies in 2005, then no activity in 2006 followed by the return of the colonies in 2007. Old Wives Lake showed a steady decline in habitat conditions over the three years with a decline in numbers of Franklin's Gulls on the colony until 2007, when it was no longer active. An active Franklin's Gull colony on Cardinal Lake, Alberta, in 2001 (Hanneman and Heckbert 2001) and 2002 (Beyersbergen, unpubl. data) was deserted in 2005 when all emergent cover was eliminated because of high water levels. Our limited work in Manitoba precluded our ability to track changes on the lakes with colonies in that province.

Lake habitat characteristics may influence the distribution of Franklin's Gulls. In terms of lake characteristics, Franklin's Gull colonies across the Canadian prairies were found only on semi-permanent to permanent natural wetlands and on reservoirs with high water levels and suitable emergent vegetation. Furthermore, we found that lake use was related to the amount and configuration of suitable emergent vegetation cover.

Water depth plays a key role in the colonization by Franklin's Gulls of prospective lakes. During the course of the study across the entire region, Franklin's Gulls generally did not nest in water less than 37 cm or greater than 125 cm deep, which is consistent with water depths reported elsewhere (Burger and Gochfeld 1994) and which coincidentally is likely the optimal water depth for emergent vegetation growth (Wetzel 1983). Those lakes with emergent vegetation outside the optimal range of water depths tended not to fare very well when it came to breeding success. Old Wives Lake in 2006 had a mean water depth of 27 cm, and the numbers of nesting Franklin's Gulls were at a minimum just prior to the abandonment of the colony. Foam Lake in 2006 had a mean depth of 119 cm, but again the colony was limited to small patches within suitable emergent vegetation in a flooded landscape. The colony on Foam Lake prospered the following year when mean water depth was 76 cm. Fluctuations in water depths during the breeding season can result in the flooding and destruction of nests, eggs and chicks (Guay 1968, Burger 1974). In 2005, the Franklin's Gull colony on Whitewater Lake in Manitoba was nearly destroyed after heavy rainfalls, and rising water levels flooded nests and uprooted emergent vegetation supporting nests (R. Bazin, Canadian Wildlife Service, pers. comm.). This was also the case on Waterhen Marsh when a single storm event in late June 2007 completely destroyed the nesting colony with no evidence of any emergent cover where the colony had been earlier in June.

Periodic fluctuations in water levels are needed in order to maintain the habitat diversity and productivity of wetlands (van der Valk 2005). Increased precipitation in southern Alberta during

the summer of 2005 resulted in a needed reduction in the density of the emergent vegetation beds in Minor and Frank lakes. Another high-water event in 2006 further reduced the emergent vegetation beds at Frank Lake and also created better habitat conditions on Third and Stobart lakes. Increased water depths on Manawan Lake opened up the emergent cover around the shoreline and within the interior of the colony to the point where it was a large and productive colony in 2007. Higher water levels on Goose Lake in 2007 opened up the interior of the emergent bed where the colony was located and resulted in increased nesting density around the edge of these large bodies of open water in the colony. Foam Lake, in 2006, had water levels so high that only the tips of the bulrush were visible. Drainage of excess water during the 2006 summer months and minimal influx of spring melt water in 2007 resulted in an extensive stand of emergent vegetation in summer 2007 used by nesting Franklin's Gulls and Black-crowned Night-Herons. Higher water levels will be needed on some lakes that have dense stands of emergent vegetation unsuitable for nesting Franklin's Gulls (e.g. Oak Hammock Marsh, Lizard Lake, Lake Francis). The consequences of artificial stabilization of water depths are evident on large marshes such as Delta Marsh and Netley Marsh in Manitoba where there is overgrowth of dense emergent vegetation and loss of emergent vegetation diversity (e.g. loss of bulrush "islands").

Colony level characteristics, (i.e. the type and density of the emergent vegetation) appear to influence the location and density of nests found within the colonies. We found that the majority of Franklin's Gull colonies were in extensive beds of bulrush or cattail, although two colonies (Ferguson Lake in Alberta and Waterhen Marsh in Saskatchewan) were dominated by short grasses. In colonies dominated by dense cattail, such as Minor Lake and Manawan Lake in Alberta and Big Grass Marsh and Lizard Lake in Manitoba, nests were clumped around the edges of the cattail beds near areas of open water. Burger (1974) reported similar observations at Agassiz National Wildlife Refuge in Minnesota. Franklin's Gulls likely nest at these edges because access to the nests is easier where birds are not hampered by dense vegetation.

There was an unusual occurrence on Minor Lake in 2007: numerous dead young were found on their nests in extremely dense cattail. The new growth of cattail may have reached a point where the adults were unable to return to the nest to feed the young and they therefore abandoned the nests and young. The cattail stalks were over 2 metres high in very dense continuous stands with no open water, making it difficult for the surveyors to move through on foot.

Nest density appeared more homogenous within bulrush beds than within cattail beds. Bulrush beds were generally less dense than cattail beds and did not appear to hamper access to and from nests. This was especially evident on lakes with moderate density bulrush (e.g. Moose, Stobart, Maiden and Goose lakes).

Habitat at the landscape level may also influence the distribution of Franklin's Gulls across the region. Most of the colonies visited were on lakes within landscapes dominated by agriculture. In 2006, we found that Franklin's Gulls extensively use upland habitats within 30 km for foraging and resting. During our three-year study, Franklin's Gulls were often observed in dry or flooded crop fields foraging for invertebrates (e.g. earthworms, cutworms, and grasshoppers). Large flocks of gulls were often observed foraging on freshly tilled soils behind a cultivator in

stubble fields. Franklin's Gulls were also observed foraging over wetlands near the breeding colony, most likely for swarming insects.

There are limitations in the size of lakes that are able to provide sufficient resources for a colony to exist and flourish, given the enormous nutritional requirements of large numbers of Franklin's Gulls. Many of the lakes with colonies are too small (e.g. Manawan Lake ~750 ha, Maiden Lake ~200 ha) to contain enough food within the lake itself to support up to 130,000 adults with young. Therefore, the surrounding landscape must be able to provide most of the food resources required during the breeding season in these situations. Little is known about foraging behaviour by Franklin's Gulls in boreal landscapes. If it is assumed that feeding occurs exclusively within the wetland, then it is likely that only a specific size of wetland or wetland complex would be capable of supporting a successful Franklin's Gull colony. This was the case for the colonies on Hay-Zama Lake and Utikuma Lake in 2007. Utikuma Lake is a large (28,800 ha) but shallow (mean depth of 1.7 m) wetland in a landscape dominated by muskeg and forest, with very little agricultural activity (Mitchell and Prepas 1990). We suspect that the 69,000 adult Franklin's Gulls nesting on Utikuma Lake are foraging primarily within the lake basin, although we did not survey upland habitats. The Hay-Zama Lake colony is currently quite small, but the wetland complex encompasses 50,000 hectares of open water, wet meadows and floodplain woodlots that likely can support a large population (Wright 2001).

Numerous authors have noted the benefits of Franklin's Gulls to the agriculture industry in their ability to control grasshopper numbers and other crop-damaging insects (Gardner 1927, Bradhaw 1934, DuMont 1941, Nice 1962). Bradshaw (1933) refers to an incident where an estimated 1 million Franklin's Gulls were observed devouring grasshoppers during an outbreak west of Last Mountain Lake near Liberty, Saskatchewan. Many landowners near Franklin's Gull colonies also mentioned the importance of these birds in controlling invertebrate pests. They have also been quoted as "The Farmers Friend." One local landowner near Goose Lake commented on the lack of Franklin's Gulls in his fields, but he also noted that he was practicing the new method of zero tillage (W. Calvert, pers. comm.). This "no cultivation" method may be influencing feeding activity of the species in some areas because it limits access to invertebrates under the soil surface. The benefit to agriculture in insect control could be evaluated with some simple calculations from assumed diets of Franklin's Gulls. Based on samples of stomach contents of Franklin's Gulls (Burger and Gochfeld), if we assume a daily consumption of 30−40 grams of invertebrates a day, then a colony of 20,000 birds would consume 600−800 kg/day or 4200−5600 kg/week. Increase that amount for larger colonies such as Goose Lake, Saskatchewan, which has 100,000 adults that are feeding an even larger number of young, then the benefit in insect control is enormous.

Foraging Franklin's Gulls may be an important predator of crop-damaging insects, but they may also be an important prey item for owls and raptors (Burger and Gochfeld 1994) including the endangered Peregrine Falcon. Enderson (1965) found Franklin's Gulls to be a common item in Peregrine Falcon nests in Alberta. He found one nest that contained only Franklin's Gull remains. Franklin's Gulls accounted for 80% of prey items found in the Peregrine Falcon nest on the Health Sciences Building at the University of Alberta in Edmonton during the summer of 2006 (G.L. Holroyd, Canadian Wildlife Service, pers. comm.). Most of the gulls taken were yearlings. The Peregrine Falcons in Edmonton consume about three Franklin's Gulls per day per

breeding pair for up to eight weeks so the large Franklin's Gull colony on Manawan Lake near Edmonton would be beneficial to peregrine recovery in the area (G.L. Holroyd, Canadian Wildlife Service, pers. comm.).

Franklin's Gulls were often found nesting in multi-species colonies across the Canadian range. Some of the species observed are considered species of Moderate to High concern within the northern prairie and parkland region (e.g. Eared Grebe, Western Grebe, Black-crowned Night-Heron; Beyersbergen et al. 2004). Some of the species are quite secretive when nesting (e.g. Black-crowned Night-Herons, White-faced Ibis, and Cattle Egrets). These species might simply prefer the same nesting habitat as Franklin's Gulls or they might be actively choosing to nest within Franklin's Gulls colonies to some benefit. Black-crowned Night-Herons, nesting in close proximity to a Franklin's Gull colony, were reported to be feeding gull chicks to their young (Wolford and Boag 1971). Franklin's Gulls are also extremely sensitive to disturbance and are quick to respond to predators by swooping, soaring, mobbing, and attacking (Burger and Gochfeld 1994). Thus, other nesting waterbird species may also benefit from the early warning and anti-predator behaviour of the Franklin's Gulls.

Over the course of the three-year study, we had the opportunity to compare visual estimates of the number of adults on a colony to nest count survey data that provided a more accurate estimate of the number of breeding adults. In nearly all cases, the visual estimate underestimated the number of birds in a colony. There are several inherent problems with estimating numbers of breeding adult Franklin's Gulls in a colony of more than 1000 birds when one is viewing them from a distance. Depending on the time of day, a large portion of the breeding adults is likely to be off feeding in the surrounding landscape, and thus only a few of the adults may be flying or hovering above their nest site. Estimating density of nests along the edge of a colony and extrapolating across the entire colony is not possible as density of nesting birds varies greatly with the type and density of habitat and location within the colony in relation to open-water areas. As an example, Maiden Lake in Saskatchewan was viewed from the roadside and an observer experienced with counting Franklin's Gull colonies estimated 10,000 birds. When the nest count was later conducted and extrapolated over the mapped area of the colony, a more accurate estimate of 7 times the visual estimate, more than 70,000 birds, was developed. Therefore, we need to be cautious when relying on population estimates of large Franklin's Gull colonies based solely on visual counts.

Franklin's Gull colonies faced potential threats on all the lakes visited: mortality due to disease and collision with power lines, changes in water quality or depth, and destruction of nests and nesting habitats due to shoreline development and recreational activity. In Alberta, there are 8 lakes with active water management and 5 under protection by government and non-government conservation agencies as parks or sanctuaries. However, there are 11 lakes where there is no form of conservation or management action. Saskatchewan lakes include 6 under some form of water management by conservation groups and 2 listed as either a Migratory Bird Sanctuary or National Wildlife Area. Only 4 lakes have no formal protection of the wetland or wetland habitat. Manitoba has the highest proportion of lakes under some form of water management or conservation status as a refuge, heritage marsh or wildlife management area. Of the 6 lakes in Manitoba, only Glenboro Marsh lacks any form of protection. Of the 5 lakes identified in 2007 with over 100,000 adult breeding Franklin's Gulls, 3 were protected by some form of land or

water management program (Whitewater, Manawan and Minor lakes) while the other 2 had no protective status (Goose and Third lakes).

During other field programs in 2008, we were able to check on a number of the Franklin's Gull colony lakes that had been surveyed or were active at some time during the study (Appendix 9). Two new colonies were located in Alberta with one confirmed and one potential new one in Saskatchewan.

5.0 CONCLUSIONS

Franklin's Gulls have been identified as a species of high conservation concern in the Canadian Prairie provinces. The majority of the breeding range and possibly of the global population of this species, based on 2007 survey results, reside in the Canadian Prairie provinces. Survey results indicate that we have a very large and healthy population of 1.176 million breeding Franklin's Gulls scattered in distinct colonies across the Prairie provinces. Although there were 49 colonies identified during the course of the three-year survey, it is most important to note that Franklin's Gulls were present in high concentrations at only a few select sites. In 2007, there were 5 colonies with more than 100,000 breeding adults, which together represent >55% of the Canadian population. An additional 11 colonies have 20,000 or more breeding adults. Together these 16 colonies, out of 36 identified in 2007, represent more than 95% of the Canadian population. A catastrophic event at one of these colonies could have a detrimental effect on the regional and potentially global population. Thus, it is the responsibility of all government and non-government conservation organizations to ensure the continued survival of Franklin's Gulls by safeguarding those lakes with prime nesting habitat for the species.

The Franklin's Gull is an ideal species on which to focus conservation activities. They are the quintessential prairie waterbird: they nest in typical prairie wetlands and forage in grasslands. However, they will also colonize suitable habitat in the boreal plains ecozone of the Prairie provinces. They will readily colonize wetlands that have been restored or created, as long as the wetland has suitable emergent vegetation. They forage within agricultural landscapes and act as a natural control for crop-damaging invertebrates. They are an essential prey species for owls and raptors such as the Peregrine Falcon, and serve as sentinels for a host of other waterbird species that nest in the same habitat.

Franklin's Gulls should be considered an indicator species of the overall productivity of semi-permanent and permanent shallow wetlands in agriculturally dominated landscapes. The presence of breeding Franklin's Gulls on a wetland indicates that the wetland is healthy and will probably support many other wetland-dependent species. The presence of Franklin's Gull colonies on NAWMP-supported projects and other conservation lands across the Canadian prairies is an indication of conservation success.

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8.0 APPENDICES

Appendix 1. Scientific names of birds and plants encountered during the Franklin's Gull surveys 2005–2007

Common Name	Scientific Name
Common Loon	*Gavia immer*
Pied-billed Grebe	*Podilymbus podiceps*
Red-necked Grebe	*Podiceps grisegena*
Eared Grebe	*Podiceps nigricollis*
Western Grebe	*Aechmophorus occidentalis*
American White Pelican	*Pelecanus erythrorhynchos*
Double-crested Cormorant	*Phalacrocorax auritus*
Cattle Egret	*Bubulcus ibis*
Black-crowned Night-Herons	*Nycticorax nycticorax*
White-faced Ibis	*Plegadis chihi*
Peregrine Falcon	*Falco peregrinus*
American Avocet	*Recurvirostra americana*
White-headed Gull spp	
Franklin's Gull	*Leucophaeus pipixcan*
Common Tern	*Sterna hirundo*
Forster's Tern	*Sterna forsteri*
Black Terns	*Chlidonias niger*
Cattail	*Typha* spp.
Bulrush	*Schoenoplectus* spp.
Common Duckweed	*Lemna minor*
Sedge	*Carex* spp.
Wild Rice	*Zizania* spp.
Giant Reed grass	*Phragmites* spp.

Appendix 2. Data collection form for wetland inventory of Franklin's Gulls and other waterbird species

Franklin's Gull Waterbody Inventory Information

Date: _____\ __________ Observers: _____Photo #'s: _____

Lake: _____ **Province: _____**

Location of survey:

_____

Threats (high, medium, low, n/a):

Threat	Rating		Threat	Rating
Presence of Industry			Evidence of Predators	
Recreational Activities			Powerlines	
Agricultural: Grazing			Pollution	
Agricultural: Crop			Cottage/Urbanization	
Vehicle Traffic			History of Botulism	
Public Access			Other:	

Industry type:

_____

Waterbody: **Upland Habitat:**

Type	Stage	Cover	Size	% Survey		% Agric.	% Resid /Comm	% Natural

Shoreline Habitat: **Riparian Vegetation**

% Veg.	Dominant Emerg. Species		% Veg	Dominant Species

Colony Information:

Delineated? Y/N	Dominant Vegetation	Depth at Nests (cm)

Habitat Comments:

_____

_____

_____

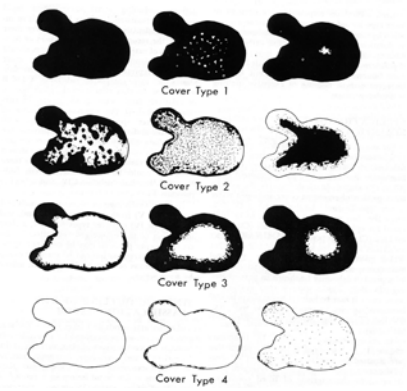
_____

Appendix 3. Field key for waterbody inventory information during Franklin's Gull surveys in the Prairie provinces: 2005–2007

Wetland Type–Natural		Artificial/Streams	
Type	**Description**	**Type**	**Code**
Type 1	Temporary: less than 15 cm of standing water, persists <3 weeks in spring	Dugouts	DO
		Gravel Pit	PT
Type 3	Seasonal: more than 15 cm of standing water, persists >3 weeks but usually dry by July	Borrow Pit	BT
		Irrigation Canal	IC
Type 4	Semi-permanent: persists into fall most years	Reservoir	Res
Type 5	Permanent: usually retains water all year round except in periods of extreme drought	Stream	ST

Water Level Stages	
Type	**Description**
Stage 1	Dry: No water
Stage 2	Vestigial: small ponds or puddles, will disappear in a few days
Stage 3	Recessional: levels have receded within the central zone, but still cover an extensive area, mudflat present
Stage 4	Intermediate: lack of water in the wet meadow zone
Stage 5	Full: water to the outer edge of the wet meadow zone
Stage 6	Flooded: water beyond wet meadow zone and covers adjacent upland
Stage 7	Overflowing: Surface water exceeds the full supply level

Cover Type	
Type	**Description**
Type 1	Closed stands of emergents with open water or bare soil covering less than 5% of the wetland area
Type 2	Open water or bare soil covering 5 to 95% of the wetland area, with scattered dense patches or diffuse open stands of emergents
Type 3	Central expanses of open water or bare soil (comprising more than 5% of wetland area surrounded by peripheral bands of emergent cover averaging 2 metres or more in width
Type 4	Open water or bare soil covers more than 95% of the wetland area.



Appendix 4. Text excerpts from Beyersbergen and Gingras (2006) on the landscape-level use and characterization by Franklin's Gulls around breeding colonies in Alberta and Saskatchewan

Methods
Field Methods

Page 4:
Franklin's Gulls are known to forage up to 50 km away from nesting colonies during the breeding season (Burger and Gochfeld 1994). We used incidental observation and intensive surveying to characterize and determine the extent of use of the landscape surrounding breeding colonies. While traveling to/from colonies we recorded the location and habitat type of any individuals or groups of Franklin's Gulls incidentally observed. We also intensively surveyed along roads for foraging, resting, and flying Franklin's Gulls near the breeding colony at Manawan Lake, 45 km north of Edmonton, and at Frank Lake, 11 km east of High River. In June 8–June 29, 2006 we surveyed along 1,485 km of roadways in an approximate 50 km radius around Manawan Lake and along 420 km of roadways around Frank Lake.

The following information was recorded during each observation: time of day; UTM coordinates and a written description of location using road names and the Alberta Township System; number of Franklin's Gulls observed; gull activity (foraging/resting/flying), flight direction (where applicable); a description of habitat including habitat type (dominant vegetation/crop), land use, and any other notable habitat characteristics. Habitat type was roughly classified as one of the following: crop (identified where possible), pasture or hayfields, wetlands (including temporary wetlands on flooded fields) or other (along roadways and highways, over farm and urban buildings or unidentified).

Results

Page 7:
We recorded a total of 223 upland Franklin's Gull observations at Frank Lake and 219 observations at Manawan Lake. Most observations (93%) were within 30 km of the colonies (see Fig. 2 and 3). We also incidentally recorded a total of 139 observations collected across Alberta. Observations ranged from 1 individual to groups of 2000, but most (~80%) of the observations were groups of 30 or less Franklin's Gulls. Most observations recorded near Manawan (70.3%) and Frank (55.6%) lakes were of Franklin's Gulls flying. The number of total foraging (Manawan = 27.4%, Frank = 31.8%) and resting (Manawan = 0.03%, Frank = 12.6%) observations were similar among both lakes.

Near Frank Lake, foraging and resting Franklin's Gulls were observed more frequently on wetlands/flooded crop fields (Fig. 4a) than any other upland habitat In contrast, near Manawan Lake, foraging and resting Franklin's Gulls were more frequently observed on dry crop fields than any other upland habitat (Fig 4b). It was often difficult to classify the habitat used by flying individuals, but generally near both lakes, Franklin's Gulls were seen flying over dry cropland more frequently than over pasture/hay fields, or wetlands/flooded fields (Fig 4a & b).

Appendix 4 continued

The proportion of total observations (all activities combined) was significantly different among upland habitats at Frank Lake (/2 = 56.193, df = 3, p < 0.001) and at Manawan Lake (/2 = 76.909, df = 3, p < 0.001). At Frank Lake, Franklin's Gulls were observed more frequently using wetlands/flooded fields than other upland habitat (Fig 4a) whereas at Manawan Lake, Franklin's Gulls were observed more frequently using dry crop fields (Fig 4b).

The proportion of total observations in Alberta in 2006 (all activities at all locations, including incidental, combined) was significantly different (/2 = 68.914, df = 3, p < 0.001) among upland habitats. Franklin's Gulls were less likely to be observed using pasture/hayfields (11% of observations) and more likely to be observed using dry crop lands (36%) than wetlands/flooded fields (26%) or any other upland habitat (26%). However, because we have yet to measure the proportion these habitats encompass on the landscape as a whole, we do not know if proportion of Franklin's Gulls using these wetlands is simply a function of the availability of these habitats within the larger landscape and not the result of habitat preference.

Appendix 5. The location (latitude and longitude), wetland type, water level stage, wetland vegetation cover type, and other waterbird species observed on wetlands visited during surveys for Franklin's Gull colonies in Alberta 2005–2007

Alberta Lake	Latitude	Longitude	Wetland type[a] (2006)	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Antoine Lake	54.76388	-112.07979	5	5	4	Absent	Not visited	Not visited	American White Pelican, White-headed Gull spp., Double-crested Cormorant
Badger Reservoir	50.38194	-112.46148	Reservoir	5	4	Absent	Absent	Non-breeders (1)	American White Pelican, Double-crested Cormorant, White-headed Gull spp.
Barbara Lake	54.52953	-110.86414	4	5	3	Foraging/resting (10)	Absent	Absent	Eared Grebe
Big Hay Lake	53.16220	-113.16157				**Breeding Colony**	Foraging/resting (20)	Foraging/resting (70)	
Big Lake	53.59369	-113.72317	5	4	3	Foraging/resting (10)	Foraging/resting (16)	**Breeding Colony** (500)	American White Pelican
Birch Lake	53.76640	-114.49852	5			Not visited	Absent	Not visited	Black Tern, Sora
Bittern Lake	53.05000	-113.08000	5	5	4	**Breeding Colony** (est. 1000)	**Breeding Colony**	**Breeding Colony**	
Boag Lake	53.51909	-113.21824	5	5	4	Not visited	Foraging/resting (4)	Foraging/resting (9)	White-headed Gull spp.
Brant Slough	50.54310	-113.51900	3	2	Unknown	Absent (Dry)	Not visited	Not visited	
Bridge Lakes (West)	54.18887	-113.47831	5	4	3	Not visited	Absent	Absent	Black Tern, Common Loon, Great Blue Heron
Buffalo Lake	52.47363	-112.84193	5	5	4	Foraging/resting (no count)	Not visited	**Breeding Colonies** (1200)*****	
Bunder Lake	54.28093	-111.67451	5	5	3	Not visited	Absent	Absent	Great Blue Heron
Cache Lake	54.10040	-111.78387	5	5	4	Absent	Absent	Absent	
Cardinal Lake	56.24000	-117.75000	5	5	4	Foraging/resting (750)	Foraging/resting (2)	Absent	Red-necked Grebe
Cavan Lake	49.93398	-110.40667	5	3	4	Not visited	Not visited	Absent	

Apprendix 5 continued

Alberta Lake	Latitude	Longitude	Wetland type[a] (2006)	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Charlotte Lake	54.25973	-110.60514	2	4	2	Foraging/resting (805)	Foraging/resting (100)	**Breeding Colony** (Small)	
Chip Lake	53.67000	-115.38000	5	5	3	Absent	Absent	Not visited	Pied-billed Grebe
Clairmont Lake	55.27313	-118.77363	5	4	4	Not visited	Foraging/resting (1000)	Foraging/resting (500)	Eared Grebe, Pied-billed Grebe, Red-necked Grebe
Clear Lake	50.15056	-113.41605	5	5	5	Foraging/resting (250)	Not visited	Foraging/resting (5)	
Cold Lake	54.54606	-110.07185	5	5	4	Absent	Not visited	Not visited	
Cooking Lake	53.42000	-113.04000	5	5	3	Foraging/resting (no count)	Foraging/resting (100s)	Absent	
Cow Lake	52.27220	-115.01110	5	5	4	Absent	Not visited	Not visited	Red-necked Grebe, Common Loon, Western Grebe, Common Tern
Cowoki Lake	50.58907	-111.68962	Reservoir	5	4	Not visited	Foraging/resting (43)	Foraging/resting (1)	Common Loon, Eared Grebe, Great Blue Heron, Red-necked Grebe
Crane Lake	54.51780	-110.52150	5	5	4	Absent	Absent	Not visited	
Crow Indian Lake	49.36929	-111.78495	5	5	4	Absent	Absent	Absent	American White Pelican, Black-crowned Night Heron, Forster's Tern, Sora
Cutbank Lake	55.26101	-119.12004	5	5	3	Absent	Not visited	Not visited	
Dalemead Lake (Langdon Reservoir)	50.91203	-113.62523	Reservoir	5	3	Absent	Absent	Foraging/resting (4)	Double-crested Cormorant, White-headed Gull spp.
Deadhorse Lake	51.05219	-112.65572	5	3	2	Not visited	Not visited	Absent	
Dechaine Lake	53.83050	-114.10257	5	5	4	Not visited	Foraging/resting (14)	Absent (Flooded)	Black Tern. Pied-billed Grebe, Red-necked Grebe
Duck Lake (Athabasca)	54.65143	-113.94294	5	5	Unknown	Absent	Not visited	Not visited	
Duggans Lake	54.21675	-113.44798	5	5	3	Not visited	Absent	Absent	
Eagle Lake	51.00001	-113.32000	Reservoir	4	4	Foraging/resting (2200+)	Foraging/resting (650+)	Absent	American White Pelican, Black-crowned Night Heron, Eared Grebe, Forster's Tern, Horned Grebe, Sora, Western Grebe

Apprendix 5 continued

Alberta Lake	Latitude	Longitude	Wetland type[a] (2006)	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Edward Lake	54.44509	-110.57504	3	5	3	Not visited	Absent	Absent	
Egg (Eaglesham) Lake	55.75369	-117.85604	4	4	2	**Breeding Colony** (>3000)	**Breeding Colony**	Foraging/resting (19)	Eared Grebe, Pied-billed Grebe
Ethel Lake	54.52909	-110.35131	5	5	4	Absent	Absent	Absent	Black Tern
Ferguson Lake	55.27100	-118.81400	4	4	2	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**	Black Tern, California Gull, Double-crested Cormorant, Eared Grebe, White Tern spp.
Fincastle Lake	49.82629	-111.97897	Reservoir	3	4	Absent	Foraging/resting (6)	Absent	American White Pelican, Common Tern, Double-crested Cormorant, Great Blue Heron, Red-necked Grebe, White-headed Gull spp.
Forsyth Lake	54.33367	-110.88933	4	3	3	Absent	Absent	Absent	Eared Grebe
Frank Lake	50.57000	-113.72000	5	5	3	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**	Black-crowned Night Heron, Eared Grebe, Forster's Tern, Pied-billed Grebe, White-faced Ibis, White-headed Gull spp.
George Lake	53.95749	-114.08117	5	5	3	Not visited	Foraging/resting (25)	Foraging/resting (20)	Black Tern
Gladu Lake	53.64286	-113.91008	5	5	4	Not visited	Foraging/resting (3)	Absent	
Haley Lake	54.11366	-113.69393	5	5		Not visited	Foraging/resting (25)	Absent	Sora
Hay Zama (Duck Lake–local named basin)	58.74979	-118.96731	5	6	2	**Breeding Colony** (~2000)	Foraging/resting (no count)	**Breeding Colony** (350)*	
Helliwell Lake	54.23912	-113.65046	5	5	3	Not visited	Foraging/resting (220)	Absent	Black Tern, Eared Grebe, Sora
Horsefly Lake Reservoir	49.72000	-112.07000	Reservoir	5	3	Not visited	Absent	Absent	American White Pelican
Hummock Lake	52.05691	-113.18429				Absent	Not visited	Not visited	

Apprendix 5 continued

Alberta Lake	Latitude	Longitude	Wetland type[a] (2006)	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Intermittent Lake (Unnamed on map)	55.34628	-118.93205	5	5	3	Absent	Not visited	Not visited	
Isle Lake	53.62326	-114.74509	5	5	3	Absent	present (no count)	**Breeding Colony** (150)	
Jessie Lake	54.25000	-110.73300	5	5	3	Foraging/resting (no count)	**Breeding Colony**	Foraging/resting (no count)	Black Tern, Eared Grebe
Kakina Lake	53.85616	-114.16150	5	5		Absent	Absent	Absent	Black Tern
Kimiwan Lake	55.71621	-116.91176	5	5	4	Absent	Foraging/resting (2000)	Foraging/resting (no count)	Sora, Yellow Rail
Kimura Lake	53.95202	-113.24814	5	5		Not visited	Absent	Foraging/resting (38)	Black Tern
Kleskun Lake	55.33500	-118.56400	5	5	3	Not visited	Absent	Not visited	
Lac Bellevue	53.81144	-111.33809				Absent	Not visited	Not visited	
Lac La Biche	54.85000	-112.00010	5	5	4	**Breeding Colony** (< 100)	**Breeding** (2 birds/ 1nest)	Foraging/resting (1)	American White Pelican, Double-crested Cormorants, White-headed Gulls
Lac La Nonne	53.93968	-114.32388	4	5	3	Not visited	Foraging/resting (5)	Absent	Black Tern
Lac Magloire	55.88679	-117.18333	5	5	3	Foraging/resting (20)	Foraging/resting (9)	Absent	Sora, White-headed Gull spp.
Lac Sante	53.83879	-111.58926	5	5	4	Foraging/resting (180)	Absent	Absent	
Lac Sante Cyr	53.89513	-111.19514				Absent	Not visited	Not visited	
Lake Eliza	53.80856	-111.18774				Absent	Not visited	Not visited	
Landry Lake	54.21403	-110.62859	5	5	3	Not visited	Absent	Not visited	White-headed Gull spp.
Lanes Lake	52.20280	-112.01063				Not visited	Not visited	Absent	
Leddy Lake	56.39353	-117.45129	5	5	4	Not visited	Foraging/resting (4)	Absent	Red-necked Grebe
Lesser Slave Lake	55.45000	-115.40000	5	5	3	Not visited	**Breeding Colony**	Non-breeders (no count)	Western Grebe, American White Pelican, Double-crested Cormorants

Apprendix 5 continued

Alberta Lake	Latitude	Longitude	Wetland type[a] (2006)	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Lily Lake	53.94913	-113.37219	4	4		Not visited	Absent	Foraging/resting (50)	Black Tern
Lost Lake	50.14289	-112.30552	5	5	3	Foraging/resting (150)	Absent	Absent	
Lost Point Lake	53.89087	-113.27527	Reservoir	5		Not visited	Absent	Foraging/resting (175)	Black Tern
Louisiana Lakes North	50.57207	-111.66639	5	5	4	Not visited	Absent	Absent	American White Pelican, Common Loon, Common Tern, Double-crested Cormorant, Red-necked Grebe, White-headed Gull spp.
Louisiana Lakes SW	50.51736	-111.40133	Reservoir	5	3	Not visited	Not visited	Foraging/resting (500)	Western Grebe, White-headed Gull
Lowe Lake	55.32729	-119.17846	5	5	3	Absent	Not visited	Not visited	
Lower Therien Lake	53.94376	-111.33347	5	5	4	Not visited	Absent	Absent	American White Pelican, Black Tern, Common Loon, Double-crested Cormorant
Majeau Lake	53.92233	-114.41681	5	5		Not visited	Foraging/resting (4)	Foraging/resting (37)	
Mamawi Lake (Peace Athabasca Delta)	58.60380	-111.33570	5	5	3	Not visited	Not visited	**Breeding Colony** (200)	
Manatokan Lake	54.46442	-110.95270	5	5	4	Foraging/resting (250)	Foraging/resting (14)	Foraging/resting (3)	Black Tern, California Gull, Double-crested Cormorant, Horned Grebe, Pied-billed Grebe, Red-necked Grebe
Manawan Lake	53.90820	-113.68185	5	5	3	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**	Eared Grebe, Black-crowned Night Heron, White-faced Ibis, White Tern spp.
Matchayaw Lake	53.71560	-114.09408	Reservoir	4	3	Not visited	Absent	Absent	Red-necked Grebe, White Tern spp.
Milk River Ridge Reservoir	49.36424	-112.52725	4	5	4	Not visited	Absent	Not visited	American White Pelican, Double-crested Cormorant, White-headed Gull spp.

Apprendix 5 continued

Alberta Lake	Latitude	Longitude	Wetland type[a] (2006)	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Minor (Kininvie) Lake	50.37233	-111.48615	5	5	2	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**	Black-crowned Night Heron, Eared Grebe, Pied-billed Grebe, White-faced Ibis
Missiwawi Lake	54.72643	-112.19307				Absent	Not visited	Not visited	
Moose Lake	54.24000	-110.91000	5	5	2	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**	American White Pelican, Black Tern, Common Loon, Double-crested Cormorant, Eared Grebe, Forster's Tern, Great Blue Heron Red-necked Grebe, Western Grebe.
Mulligan Lake	55.37175	-119.12459	5	5	3	Absent	Not visited	Not visited	
Muir Lake	53.62802	-113.95719	5	5	4	Not visited	Absent	Absent	Great Blue Heron
Muriel Lake	54.14000	-110.68000	5	5	3	Foraging/resting (30)	Absent	Foraging/resting (24)	American White Pelican, Black Tern, Common Tern, Double-crested Cormorant, Red-necked Grebe, White-headed Gull spp.
Murray Lake–North Basin	49.80161	-110.94416	Reservoir	5	2	**Breeding Colony**	**Breeding Colony**	**Breeding Colony**	Black-crowned Night Heron, Black Tern, Common Tern, Double-crested Cormorant, Eared Grebe, Pied-billed Grebe, Red-necked Grebe, Sora, Western Grebe, White-faced Ibis
Murray Lake–South Basin	49.76149	-110.95006	5	5	2	Not visited	**Breeding Colony**	**Breeding Colony**	Eared Grebe
Namaka Lake	50.94834	-113.23475	Reservoir	4	4	Foraging/resting (100+)	Foraging/resting (56)	Absent	Eared Grebe, Forster's Tern, Pied-billed Grebe, Western Grebe,
Nakamun Lake	53.88452	-114.21403	5	5	3	Absent	Foraging/resting (16)	Absent	American White Pelican, Black Tern, Red-necked Grebe,
Oldman Lake	53.87533	-114.53589	5	5	3	Not visited	Absent	Absent (Flooded)	Black Tern
Pakowki Lake	49.33000	-110.92000	3	4	2	Foraging/resting (5)	Absent	Absent	California Gull
Poplar Lake	53.50301	-113.21609	5	5	3	Not visited	Foraging/resting (1)	Not visited	

Apprendix 5 continued

Alberta Lake	Latitude	Longitude	Wetland type[a] (2006)	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Portage Lake						Foraging/resting (6)	Not visited	Not visited	
Reed Lake	54.23821	-111.75098	5	5		Absent (Drained-pasture)	Absent	Absent	
Rush Lake Marsh	53.81897	-112.20292	4	2	2	Not visited	Absent	Not visited	
Samson Lake	52.73848	-113.21549	5	5	3	Not visited	Not visited	Foraging/resting (170)	
Sandy Lake	53.80085	-114.03460	5	5		Not visited	Foraging/resting (1000−1500)	Foraging/resting (1000−1500)	Black Tern, Great Blue Heron, Sora, Western Grebe, White-headed Gull spp.
San Francisco Lake	50.59314	-112.13148	5	5	2	Absent	Not visited	Foraging/resting (50)	
Saskatoon Lake	55.20935	-119.09585	5	5	4	Absent	Not visited	Not visited	
Scope (Hays) Reservoir	50.05941	-111.80438	Reservoir	5	4	Absent	Foraging/resting (10)	Foraging/resting (6)	American White Pelican, California Gull. Common Tern, Great Blue Heron, Western Grebe
Shoal Lake	54.25545	-114.44618	5	5		Not visited	Absent	Absent	Black Tern, Sora
Stirling Lake (Michelson's marsh)	49.53529	-112.55642	5	4	3	**Breeding Colony** (500+)	Foraging/resting (2)	**Breeding Colony** (100)	American White Pelican, Double-crested Cormorant, White-headed Gull spp.
Stobart Lake	50.91152	-113.20655	Reservoir	5	2	Not visited	**Breeding Colony**	**Breeding Colony**	American White Pelican, Forster's Tern
Stoney Lake	53.86278	-111.08879				Absent	Not visited	Not visited	
Taber Lake	49.80533	-112.10537	Reservoir	5	3	**Breeding Colony** (small)	Foraging/resting (3)	**Breeding Colony** (100)	American White Pelican, Double-crested Cormorant, White-headed Gull spp.
Third Lake	50.75111	-113.67511	4	5	2	Not visited	**Breeding Colony**	**Breeding Colony**	Black Tern, Sora
Tucker Lake	54.53200	-110.60157				Absent	Not visited	Not visited	
Thunder Lake	54.12980	-114.76080	5	5	4	Not visited	Not visited	Foraging/resting (1000)	Common Loon

Apprendix 5 continued

Alberta Lake	Latitude	Longitude	Wetland type[a] (2006)	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Tyrrell Lake	49.37545	-112.24689	Reservoir	5	4	Not visited	Foraging/resting (4)	Foraging/resting (2)	American White Pelican, Common Tern, Double-crested Cormorant, Herring Gull, Eared Grebe, Western Grebe, White-headed Gull spp.
Unnamed (2 mile N La Corey)	54.47471	-110.76735				Foraging/resting (450)	Not visited	Not visited	
Unnamed (4 miles NE Westlock)	54.18618	-113.72552	4	5		Not visited	Absent	Absent	Black Tern, Sora
Unnamed (4 miles SW Redwater)	53.89664	-113.19886	4	5		Not visited	Foraging/resting (1)	Not visited	Black Tern, Sora
Unnamed (4 miles E Taawatinaw)	54.03582	-113.37864	4	5	3	Not visited	Foraging/resting (30)	Not visited	American Bittern, Black Tern, Pied-billed Grebe, Sora
Upper Mann Lake	54.14517	-111.53922	5	5		Not visited	Absent	Absent	
Upper Therien Lake	53.98425	-111.27935	5	5	3	**Breeding Colony** (~250)	Absent	**Breeding Colony** (230)	
Utikuma Lake	55.85000	-115.41000	5	5	3	Not visited	**Breeding Colonies**	**Breeding Colonies**	
Wakomao Lake	54.16484	-113.55644	5	5	3	Absent	Foraging/resting (13)	Absent	Black Tern, Sora, White Tern spp.
Whitford Lake	53.85486	-112.25382	5	3	2	Absent (Low water)	Not visited	Not visited	
Winagami Lake	55.60393	-116.75068	5	5	3	**Breeding Colony**	**Breeding Colony**	Foraging/resting (200)	Eared Grebe, Pied-billed Grebe

a. See Appendix 3.
b. See Appendix 3.
c. See Appendix 3.

Appendix 6. The location (latitude and longitude), wetland type, water level stage, wetland vegetation cover type, and a listing of waterbird species observed on wetlands visited during surveys for Franklin's Gull colonies in Saskatchewan 2006−2007

Saskatchewan Lake	Year(s)	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	Other Waterbirds Observed
Antelope Lake	2006	50.27210	-108.39320	5	5	4	Eared Grebe
Barber Lake	2006–2007	51.37290	-107.66140	5	5	4	Eared Grebe, Black-crowned Night-Heron.
Basin Lake	2006	52.61560	-105.28060	5	5	4	American White Pelican, Double-crested Cormorant.
Beaufield Lake	2007	51.78480	-109.09630	5	5	4	
Bigstick Lake	2006	50.25960	-109.33150	Dry	1	Nil (Dry)	
Bjork Lake	2006–2007	52.72400	-103.50840	5	5	3 (4)	Double-crested Cormorant, Sora.
Blackstrap Reservoir	2006	51.78330	-106.45000	Reservoir	5	4	Black Tern
Blackwater Marsh	2006	51.43330	-106.13330	5	5	3	Eared Grebe, American Coot
Bloodsucker Lake (Cumberland Delta)*	2007	53.86180	-102.55370	5	5	2	Forster's Tern, Black Tern, American Bittern, Red-necked Grebe, Eared Grebe.
Bradwell Reservoir	2006	51.92960	-106.19140	Reservoir	5	3	Red-necked Grebe, American White Pelican, Common Loon, Black-crowned Night-Heron, Double Crested Cormorant, Common Tern.
Brightwater Reservoir	2006	51.60050	-106.53010	Reservoir	4	4	Black Tern
Broderick Reservoir	2006	51.47120	-106.90650	Reservoir	5	4	Black Tern
Buffalo Pound Lake	2006–2007	50.65000	-105.50000	Reservoir	5	4	Western Grebe, American White Pelican, White Tern spp., Double-crested Cormorant, Common Tern.
Chaplin Lake Marshes	2006–2007	50.24080	-106.44350	5	4 (5)	3	Forster's Tern, Eared Grebe, Horned Grebe, Western Grebe, Black-crowned Night-heron, White-headed Gull, Sora, American White Pelican, Double-crested Cormorant, White-faced Ibis.
Charron Lake	2007	52.40120	-104.31390	5	5	4	Red-necked Grebe.
Clearwater Lake (Kyle)	2006	50.87410	-107.92950	5	5	4	Great Blue Heron
Crane Lake	2006–2007	50.09490	-109.07610	5	5	1	American White Pelican, White-faced Ibis, Black-crowned Night-heron, American Bittern, Forster's Tern, Eared Grebe, Pied-billed Grebe, Sora, Western Grebe, Ring-billed Gull, California Gull.
Crescent Lake	2006–2007	51.01800	-102.48250	5	5	4 (3)	Red-necked Grebe, Western Grebe, Black Tern, Double-crested Cormorant, White Tern spp., Pied-billed Grebe, American White Pelican, Great Blue Heron, Forster's Tern.
Crooked Lake	2006	50.60490	-102.73720	5	5	4	Common Tern, Western Grebe.
Cutbank Lake	2007	51.26880	-109.12420	5	5	4	

Appendix 6 continued

Saskatchewan Lake	Year(s)	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	Other Waterbirds Observed
Cypress Lake	2007	49.46870	-109.47800	Reservoir	5	4	
Duck Lake	2006–2007	52.80330	-106.26450	5	6 (5)	4 (3)	Black Tern, Eared Grebe, White Tern spp.
Ear Lake	2007	52.28300	-109.20640	5	5	4	
Egg Lake(Cumberland Delta)*	2007	53.88600	-102.32410	5	6	2	
Englishman Lake	2006–2007	53.40350	-109.19450	5	6	3	Black Tern, Forster's Tern, Eared Grebe, Black-crowned Night-Heron, Pied-billed Grebe, American Bittern, Sora.
Eyebrow Lake	2006–2007	50.93499	-106.16530	5	5	2	Black-crowned Night-heron, Forster's Tern, Sora, Pied-billed Grebe, Eared Grebe, American White Pelican, White-faced Ibis, Black Tern.
Fishing Lake	2006–2007	51.83170	-103.52220	5	6	4	American White Pelican, Common Loon, Red-necked Grebe, Western Grebe, Common Tern, Ring-billed Gull, Pied-billed Grebe, Eared Grebe.
Foam Lake	2006–2007	51.72080	103.59050	5	5 (6)	2 (3)	Black Tern, Red-necked Grebe, Black-crowned Night-Heron, Pied-billed Grebe, Forster's Tern, Eared Grebe.
Good Spirit Lake	2006–2007	51.54970	-102.66490	5	5 (6)	4	Forster's Tern, Western Grebe, Common Tern, Eared Grebe, Great Blue Heron.
Goose Lake	2006–2007	51.75000	-107.38330	5	6	2	Black-crowned Night Heron, Eared Grebe, White-faced Ibis, Cattle Egret, Black Tern, Forster's Tern, Sora.
Gooseberry Lake	2006	49.94120	-103.19950	5	5	4	American Bittern, Sora, Red-necked Grebe.
Gordon Lake	2007	52.89080	-107.36650	5	6	4	
Highfield Reservoir	2007	50.29260	-107.37880	Reservoir	5	4	White Tern spp., Double-crested Cormorant, White-headed Gull, Eared Grebe.
Horseshoe Lake (Heritage Marsh)	2006–2007	51.48160	-102.60750	5	5	3	Eared Grebe, Horned Grebe, White headed Gull, White Tern spp. Red-necked Grebe, Pied-billed Grebe.
Houghton Lake	2007	52.37490	-105.13750	5	6	4	Eared Grebe, Horned Grebe.
Indi Marsh	2006	51.70820	-106.50270	5	5	3	Black Tern, Eared Grebe
Jumping Lake	2007	52.85560	-105.44890	5	5	4	
Junction Reservoir	2006	49.94520	-109.50160	Reservoir	5	4	Common Tern, Black Tern, American White Pelican, Double-crested Cormorant, White headed Gull.
Kettlehut Lake	2006–2007	50.65000	-106.50000	5	5	3	Black Tern, Forster's Tern, Western Grebe, American White Pelican, Double-crested Cormorant, Eared Grebe, Common Tern.
Kitako Lake	2007	52.45580	104.21310	5	5	4	Red-necked Grebe, Pied-billed Grebe.

Appendix 6 continued

Saskatchewan Lake	Year(s)	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	Other Waterbirds Observed
Last Mountain Lake (Big Arm Bay)	2007	51.16790	-105.34710	5	5	4	Western Grebe, Black Tern, Double-crested Cormorant, White-headed Gull, Common Tern, Eared Grebe.
Lenore Lake	2006	52.49350	-104.96750	5	5	4	American White Pelican, Double-crested Cormorant, Black Tern, Common Loon, Red-necked Grebe, White headed Gull.
Little Nut Lake	2006–2007	52.31930	-103.50570	5	6	4	Western Grebe, Red-necked Grebe, Black Tern, White Tern spp.
Little Quill Lake (Milligan Creek Project)	2006–2007	51.89770	-103.89150	5	6	3	Black-crowned Night-Heron, Great Blue Heron, Forster's Tern, American Bittern, Red-necked Grebe, Pied-billed Grebe, Sora.
Luck Lake	2006–2007	51.08330	-107.08330	5	5	4	Black-crowned Night-heron, Eared Grebe, White-headed Gull.
Maiden Lake	2006–2007	53.44670	-108.44930	5	5	2	Sandhill Crane, Black Tern, Horned Grebe, Black-crowned Night-Heron, Eared Grebe, Pied-billed Grebe.
Makwa Lake (near Town of Loon Lake)	2006	54.02590	-109.15710				
Manitou (DUC) Marsh	2006–2007	52.70750	-109.78880	5 (Reservoir)	5	3	Eared Grebe, White Tern spp., White headed Gull.
McLean Lake (near Seagram Lakes)	2006	52.61310	-109.36830	5	5	4	
Meadow Lake	2006	54.09490	108.40100	5	5	4	Forster's Tern, Great Blue Heron.
Middle (Mud) Quill Lake	2006–2007	51.92830	-104.20240	5	6 (5)	3	Western Grebe, Black-crowned Night-Heron, Forster's Tern, Eared Grebe, Great Egret, Cattle Egret, American White Pelican, Double-crested Cormorant, California Gull, Ring-billed Gull, American Bittern, Pied-billed Grebe, Sora, White-faced Ibis, Great Blue Heron.
Milden Lake	2007	51.38020	-107.41980	5	5	4	Black Tern
Mistawasis Lake	2007	53.08900	-107.24100	5	5	4	American White Pelican, Double-crested Cormorant, Red-necked Grebe, Black Tern, Common Loon, White headed Gull.
Moore Lake	2006–2007	52.96800	-108.20840	5	5	3	Black Tern, Eared Grebe, White Tern spp., Sora.
Murray Lake	2006–2007	53.04350	-108.29730	5	5	4	Western Grebe, Forster's Tern, Black Tern, Red-necked Grebe, American White Pelican, Common Tern, Sora, Double-crested Cormorant.
Nut Lake	2006–2007	52.35540	-103.70320	5	6	4	American White Pelican.

Appendix 6 continued

Saskatchewan Lake	Year(s)	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	Other Waterbirds Observed
Okemasis Lake	2007	52.89770	-106.27580	5	5	4	Eared Grebe, White Tern spp.
Old Wives Lake	2006–2007	50.10000	-106.00000	5	3 (5)	4	Western Grebe, Black-crowned Night-Heron, Common Tern, Forster's Tern, Eared Grebe, Black Tern, Ring-billed Gull.
Paddling Lake	2006–2007	52.95630	-106.93070	5	6	4 (3)	Western Grebe, White headed Gull.
Pasqua Lake	2006	50.78290	-103.96620	5	5	4	
Paysen-Horfield Lake	2006–2007	50.71670	-106.75000	Reservoir	5	4	American White Pelican, Forster's Tern.
Pelican Lake (North)	2006–2007	52.77680	-105.70000	5	5	2	Black Tern, Eared Grebe, White headed Gull, Forster's Tern, Sora.
Pelican Lake (South)	2006–2007	50.53330	-106.00000	5	5	4	Western Grebe, Eared Grebe, White Tern, Double-crested Cormorant, Forster's Tern, American White Pelican, Common Tern, White-headed Gull, Black Tern.
Ponass Lake	2006	52.27490	-104.01600	5	6	3	Black Tern, Eared Grebe, Pied-billed Grebe.
Ranch Lake (Range Slough)	2006–2007	52.47950	-104.77590	5	6 (5)	3 (2)	Black Tern, White headed Gull, Common Tern, Eared Grebe.
Reed Lake	2006–2007	50.39880	-107.07580	5	5	4	White-headed Gull, American White Pelican, Double-crested Cormorant.
Rice Lake	2006–2007	52.06450	-107.11350	5	6	4	Double-crested Cormorant, Eared Grebe, Sandhill Crane, Black Tern, Red-necked Grebe.
Round Lake	2006	50.53790	-102.36310	5	5	4	American White Pelican.
Rousay Lake (Upper and Lower)	2006–2007	51.16540	-102.55690	5	5	3 (2)	White Tern spp.
Royal Lake	2007	53.08250	-106.88430	5	5	3	
Scentgrass Lake	2006–2007	52.96000	-108.15410	5	5	3	Bonaparte's Gull, Western Grebe, Great Blue Heron, Common Tern, Black Tern, Eared Grebe, California Gull, Forster's Tern, Sora.
Seagram Lake (East)	2006	52.58740	-109.33590	5	5	3	Black Tern
Silver Lake (Bladworth)	2006–2007	51.67570	-103.23040	5	5 (6)	4	Black Tern
Snipe Lake	2007	51.23140	-108.85640	5	5	3	
Spring Lake	2007	50.96700	-107.32110	5	5	3	American Coots
Stalwart Marsh	2006–2007	51.23320	-105.40870	5	5 (6)	4 (3)	Black Tern, Eared Grebe, Red-necked Grebe, American Coot, Black-crowned Night-Heron, Common Tern, Cattle Egret, Sora.
Strehlow Pond	2006	51.89420	-106.49290	5	6	4	
Sylvander Lake	2006–2007	53.45840	-107.66870	5	5 (6)	3	Black-crowned Night-Heron, Sora, Black Tern, Pied-

Appendix 6 continued

Saskatchewan Lake	Year(s)	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	Other Waterbirds Observed
							billed Grebe, American Bittern, Great Blue Heron.
Tobin Lake (below dam/power station)	2007	53.64230	-103.41460	River	5	4	American White Pelican, Double-crested Cormorant.
Thompson Lake	2007	49.76330	-106.58280	Reservoir	5	4	
Turtle Lake (Horseshoe Bay)	2006	53.61740	-108.61540				
Unnamed–Hamlet of Richard	2007	52.69090	-107.77000	5	6	4	Eared Grebe, White Tern spp.
Unnamed–Kettlehut and Paysen	2006–2007	50.64820	-106.68070	5	5	3 (2)	White Tern spp., Black Tern, American White Pelican.
Unnamed–N of Crescent Lake	2007	51.05230	-102.44370	5	5	3	Red-necked Grebe, White-headed Gull, Black-crowned Night-Heron, Pied-billed Grebe.
Unnamed–Volk–N of Kerrobert	2007	52.04740	-109.16030	5	5	2	Eared Grebe
Verendrye Marsh	2007	51.38910	-109.20200	5	5	4	
Virgin Lake	2007	52.85840	-105.60030	5	5	4	Eared Grebe, Pied-billed Grebe.
Waterhen Marsh	2006–2007	52.84250	-105.04320	5	5	2	American White Pelican, Double-crested Cormorant, Eared Grebe, Black-crowned Night-heron, Black Tern, Ring-billed Gull, Common Tern, Forster's Tern, Sora.
Whitehill Lake	2007	52.96030	-107.92090	5	5	4	
Whitesand Lake	2006	51.76720	103.34710	5	5	4	Western Grebe, Red-necked Grebe.
Witchekan Lake	2006–2007	53.40770	-107.53040	5	6	4	American Bittern, Black Tern, Eared Grebe, Red-necked Grebe, Horned Grebe.
Zelma Reservoir	2006	51.83080	-105.83260	Reservoir	5	4	American White Pelican

a. See Appendix 3..
b. See Appendix 3..
c. See Appendix 3..
.

Appendix 7. Location, wetland type, water level stage, wetland vegetation cover type, and waterbird species observed on wetlands visited during surveys for Franklin's Gull colonies in Manitoba 2005–2007

Manitoba Lake	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Big Grass Marsh (Jackfish Lake)	50.45870	-98.86150	5	5	3	Not visited	**Breeding Colonies**	**Breeding Colonies**	Black-crowned Night-Heron, Black Tern, Eared Grebe, American White Pelican, Great Blue Heron, White-headed Gull.
Bone Lake	49.43020	-99.67470	5	5	4	Not visited	Absent	Foraging/ resting (5)	Red-necked Grebe, Eared Grebe, Western Grebe, Sora.
Buffalo Lake	50.81834	-97.68678	5	5	2	Not visited	Absent	Not visited	American Coot, Black Tern, Common Loon, Red-necked Grebe, Sandhill Crane, American Bittern, Least Bittern, Sora, Pied-billed Grebe
Burnt Lake	50.80486	-97.78916				Not visited	Absent	Not visited	
Delta Marsh	50.18170	-98.26200	5	5	2 and 3	Absent	**Breeding Colony**	Absent	Western Grebe, Franklin's Gull, Forster's Tern, Black Tern, American Bittern, Great Blue Heron, Black-crowned Night-Heron, Sora, American White Pelican, Double-crested Cormorant
Fish Lake	50.74432	-97.37974	5	5	2	Not visited	Absent	Not visited	American Coot, Black Tern, Common Loon, Sandhill Crane, American White Pelican, Red-necked Grebe, American Bittern, Least Bittern, Pied-billed Grebe, Sora, Virginia Rail
Glenboro Marsh (East and West)	49.52560	-99.35860	5	5	2 (west) 1 (east)	Not visited	**Breeding Colony**	**Breeding Colonies**	Sora, Eared Grebe, Black-crowned Night-Heron, Pied-billed Grebe, Black Tern.
Goulet Lakes	50.62875	-97.88389	5	5	3	Not visited	Absent	Not visited	

Appendix 7 continued

Manitoba Lake	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Grassy Marsh	49.33280	-98.78850	4	4	2	Not visited	Foraging/resting (40 Juveniles)	Not visited	
Grass Lake	49.41120	-99.62530	5	5	3	Not visited	Not visited	Absent	Sora, Eared Grebe, Black-crowned Night-Heron, Western Grebe, Black Tern, American White Pelican.
Lake Francis	50.28570	-97.98480	5	5	2	**Breeding Colony**	**Breeding Colony**	Foraging/ resting (3)	Black-crowned Night-Heron, American Bittern, Double-crested Cormorant, Forster's Tern, Western Grebe, Black Tern, American White Pelican, White-headed Gull.
Lindals Lake	50.58940	-97.69557	5	5	4	Not visited	Absent	Not visited	
Little Birch Lake	51.15085	-98.03963	5	5	3	Not visited	Absent	Not visited	American Coot, American White Pelican, Black Tern, Common Loon, Ring-billed Gull, Red-necked Grebe, Sandhill Crane, American Bittern, Least Bittern, Pied-billed Grebe, Sora, Virginia Rail, Forster's Tern
Lizard Lake	49.29780	-98.40270	5	5	2	Not visited	**Breeding Colony**	**Breeding Colony**	Eared Grebe, Black-crowned Night-Heron, Sora, Black Tern, American Bittern, Pied-billed Grebe.
Lorne/Louise Lake	49.23090	-99.41510	5	5	4	Not visited	Absent	Not visited	
Marshy Point	50.54040	-98.10290	5	5	3	Not visited	Absent	Not visited	American Bittern, Red-necked Grebe, American White Pelican, Western Grebe, Eared Grebe, Great Blue Heron, Herring Gull, Black Tern, American Coot, Caspian Tern, Common Loon, Forster's Tern, Ring-billed Gull, Sandhill Crane, Pied-billed Grebe, Sora, Virginia Rail, Yellow Rail

Appendix 7 continued

Manitoba Lake	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
Netley Marsh	50.36500	-96.78600	5	5	2 and 3	Not visited	Absent	Not visited	Forster's Tern, Western Grebe, Black Tern, American White Pelican, Double-crested Cormorant
North Reader Lake*	53.97570	-101.37750				Not visited	**Breeding Colony**	**Breeding Colony**	Eared Grebes
Oak Hammock Marsh	50.20300	-97.13040	5	4	1 and 2	**Breeding Colony**	**Breeding Colony**	Foraging/ resting (<200)	Black Tern, Pied-billed Grebe, Red-necked Grebe.
Oak Lake	49.67330	-100.75210	5	5	4	Not visited	Absent	Not visited	American White Pelican
Pelican Lake	49.36960	-99.59330	5	5	4	Not visited	Absent	Absent	Great Blue Heron, Black Tern, Western Grebe, Eared Grebe, American White Pelican, Red-necked Grebe, Common Tern, Double-crested Cormorant, White-headed Gull.
Plum Lakes Marsh	49.64770	-100.70360	5	5	2 and 3	Absent	Absent	Not visited	American Coot, American Bittern, Cattle Egrets, Black-crowned Night-Heron
Proven Lake	50.54420	-99.99220	5	5	2	Not visited	Absent	Not visited	American White Pelican, Black Tern, Forster's Tern, Ring-billed Gull
Rock Lake	49.21100	-99.17850	5	5	4	Not visited	Absent	Not visited	American White Pelican
Saskeram Lake*	53.85440	-101.49150				Not visited	**Breeding Colony**	**Breeding Colony**	
South Reader Lake*	53.91370	-101.33820				**Breeding Colony**	Absent	Absent	
Swan Lake	49.36040	-98.93760	5	5	4	Not visited	Foraging/resting (40)	Not visited	Black Tern
Vestfold Lake	50.58605	-97.71978	5	5	3	Not visited	Absent	Not visited	American Coot, Black Tern, Double-crested Cormorant, Forster's Tern, Red-necked Grebe, Ring-billed Gull, Sandhill Crane, Caspian Tern, Common Loon, American Bittern,

Appendix 7 continued

Manitoba Lake	Latitude	Longitude	Wetland type[a]	Water level stage[b]	Vegetation cover type[c]	2005	2006	2007	Other Waterbirds Observed
									Least Bittern, Pied-billed Grebe, Sora, Virginia Rail
Whitewater Lake	49.24590	-100.31370	5	5	3	**Breeding Colony**	**Breeding Colonies**	**Breeding Colonies**	Eared Grebe, White-faced Ibis, Western Grebe, Black-crowned Night-Heron, Forster's Tern, Black Tern.

* Site information provided by Ducks Unlimited staff in The Pas.
a. See Appendix 3.
b. See Appendix 3.
c. See Appendix 3.

Appendix 8. History of Franklin's Gull colonies in Alberta, Saskatchewan, and Manitoba

1.0 INTRODUCTION

Franklin's Gulls (*Leucophaeus pipixcan*) shift colony sites from year to year depending on the habitat suitability of potential breeding lakes (Burger and Gochfeld 1994). Annual or periodic surveys for Franklin's Gull colonies have not previously occurred in the Canadian Prairie provinces, so it is difficult to determine the relative importance, in terms of colony size and consistency of use, of breeding lakes. Evidence from surveys done from 2005 through 2007 suggests that patterns of lake use by Franklin's Gull changed from year-to-year especially due to variations in water levels. During the course of our study, only 9 of the 22 historical lakes (Alberta–14, Saskatchewan–4, Manitoba–4) considered priority breeding areas for Franklin's Gulls were found to be still active (Poston *et al*. 1990, Important Bird Areas Canada 2004). Many colonies were initiated on new lakes and colonies shifted within the subset of lakes checked during the three-year study.

2.0 METHODS

In order to examine the historic use of breeding lakes by Franklin's Gulls, we focused on data collected during Breeding Bird Surveys (BBS). The United States Geological Survey in the United States initiated the BBS in 1966, and in Canada, the Canadian Wildlife Service in 1968. The purpose of these surveys was to track the status and trends of North American Birds (Canadian Wildlife Service 2006). It is a roadside survey with routes chosen using a stratified random design. Each survey route is approximately 39.2 km long and consists of 50 stops spaced at 0.8 km intervals. Routes are run in late May to early July and at each stop in the route, a single observer completes a 3-minute, 400-m radius point count. Although Burger and Gochfeld (1994) suggested that the BBS may not be appropriate for monitoring Franklin's Gull trends, we are using the survey data to provide an indication of Franklin's Gull presence/absence and their year-to-year relative abundance.

We downloaded, from the BBS website (USGS Patuxent Wildlife Research Center 2007), the location coordinates of all the BBS routes in Alberta, Saskatchewan, and Manitoba surveyed at least once since 1968. Using ArcGIS, we plotted these routes in relation to locations of Franklin's Gull colonies observed in 2005, 2006, and 2007. We found that in Alberta, 19 of the lakes with Franklin's Gull colonies are located within 30 km of 1–5 BBS routes, while in Saskatchewan and Manitoba, 11 lakes and 7 lakes, respectively, with colonies were located within 30 km of 1-3 BBS routes. We then downloaded, from the BBS website (USGS Patuxent Wildlife Research Center 2006), the Franklin's Gull data collected during BBS surveys from 1968–2005 on the routes nearest to the colonies.

The total number of Franklin's Gulls observed for each year that a BBS route was completed is presented as an index of Franklin's Gulls presence and abundance at each lake. Because the number of Franklin's Gulls observed is most likely related to the distance the route is from the colony, we could not compare yearly totals between lakes. We supplemented the BBS results with other historical survey or anecdotal published or unpublished data collated from a variety of sources including personal communications.

In addition to examining the history of Franklin's Gull presence on each lake, where possible we also describe the current and historical lake characteristics including water levels, habitat modifications, and conservation actions that have occurred at each lake. The following is a summary of these findings with the focus on individual lakes with Franklin's Gulls colonies present only in 2005, 2006 and 2007.

3.0 RESULTS

3.1 Alberta Lakes

3.1.1 BIG LAKE

Big Lake is on the west edge of the Town of St. Albert and is fed by Atim Creek to the west and the Sturgeon River from the north. The lake is regionally important (Poston et al. 1990) and a globally significant Important Bird Area (2140 hectares) for Franklin's Gulls. Agricultural lands, recreational areas (e.g. golf course), housing developments and some unoccupied provincial crown land surround the lake. It is a shallow lake with extensive bulrush beds along the north and west shores of the lake and two open water basins with a maximum depth of 4 m in their centres.

Historically, a large colony of nesting Franklin's Gulls was located on the west bay of the lake at the mouth of Atim Creek. In the 1980s, there were estimated 500–3,000 nests (IBA website). In 1982, a nesting colony with an estimated 2,000-3,000 adult Franklin's Gulls was observed on the west end of the lake, and in 1991, in the same area near the mouth of Atim Creek, a colony of approximately 1700 adults (J. Folinsbee, pers. comm.). In 1999, no Franklin's Gulls were observed on the breeding colony, and the colony site again was not active in 2003 as the water level in the bulrush bed of the colony was low or dry in some areas (Lane 2000, Elliot et al. 2004). Visits in 2005−2006 found no evidence of breeding (J. Folinsbee, pers. comm.). Approximately 250 pairs of birds, with young being actively fed by adults, were observed on the Atim Creek colony site in July 2007 (H. Wollis, Alberta Sustainable Resource Development, pers. comm.).

The Calahoo and Pickardville routes come within 12 and 15 km respectively of Manawan Lake. The Calahoo route is also within 12 km of Big Lake. Because of the close proximity of the lakes, it is impossible to determine the origin of the gulls observed on BBS transects. Figure 1 shows the observations from all three BBS routes. It shows that Franklin's Gulls have been present near the two lakes almost every year since 1971. The number of birds observed varied yearly with a peak in the early 1990s followed by a virtual disappearance of the birds from 1993–2001. The Calmar route is well south of Big Lake, barely within its 30-km radius, and the birds reported on it may well be flying toward Bittern Lake.

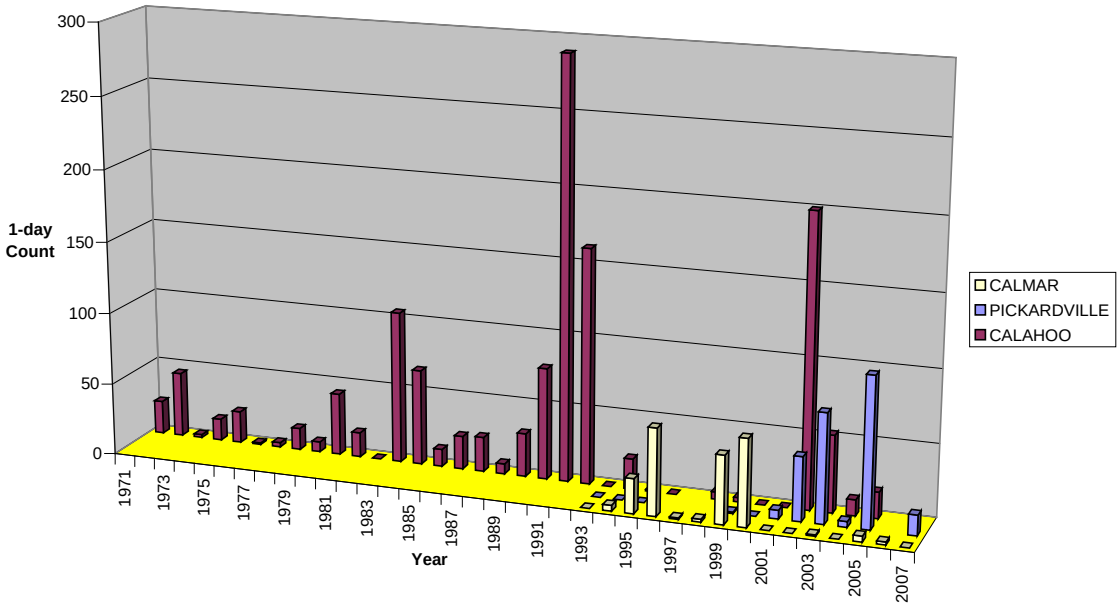


Figure 1. The number of Franklin's Gulls observed from 1971–2007 on the BBS routes run near Big and Manawan lakes

Big Lake Environment Support Society is very active in conservation and education activities on the lake. There has been a conservation plan developed for the Big Lake Important Bird Area (Lane 2000). However, regulations are limited concerning conservation and protection of the lake. The lake proper including part of the marsh habitat is designated as the Big Lake Natural Area under the Alberta Special Places program while the majority of the surrounding landscape is under private ownership.

3.1.2 Big Hay Lake and Bittern Lake

Bittern Lake is approximately 12 km west, and Big Hay Lake 25 km north-west, of the City of Camrose. The lakes are approximately 10 km apart in a north south gradient. Both lakes are situated in a primarily agricultural landscape including pasture and croplands with some small stands of trembling aspen (*Populus tremuloides*). In 2005, we observed several thousand adult Franklin's Gulls in the central portion of Big Hay Lake, which we believed to be a colony, but did not check the site by boat. A few foraging birds were observed in the main basin in 2006 and 2007, and we concluded the colony did not exist in those years. The habitat where the birds and potential colony were observed in 2005 consisted of open patches of water with a mixture of dense cattail and bulrush.

During a visit to Bittern Lake in 2006, we noted cattle/bison grazing to the shoreline along the east side. The north bay of Bittern Lake is separated from the main basin by a dyke with a fixed-crest weir constructed by Ducks Unlimited Canada (DUC) (M. Barr, DUC, pers. comm.). Within this bay are extensive beds of bulrush where we observed a colony of ~10,000 (visual estimate) adult Franklin's Gulls in 2005 and 2006. In 2007, we mapped the colony perimeter and ran several transects through the colony to get a more accurate estimate of the number of breeding adults.

There are five BBS routes (Lindbrook, Hay Lakes, Clover Lawn, Bashaw, and Kingman) starting within 3–26 km of either Bittern or Big Hay lakes. At least one BBS route was surveyed every year since 1968. Because of the close proximity of the lakes, it is impossible to determine exactly where the gulls observed on the BBS transects were nesting. The Bashaw route, which starts near Buffalo Lake, runs north towards Bittern and the northern tip of the route is within the 30 km radius of Bittern Lake, so some of the birds observed on it may be using Bittern Lake. Figure 2 shows the observations on the other four routes, including years from the late 1970s to the late 1980s when few or no Franklin's Gulls were observed. Then they were present near the lakes almost every year from 1990 through 2007.

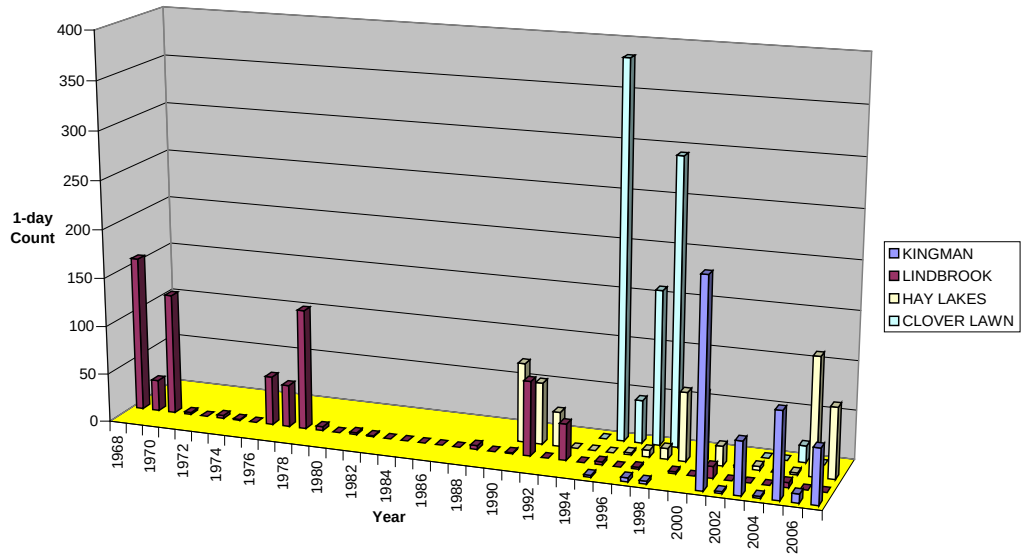


Figure 2. The number of Franklin's Gulls observed from 1968–2007 on BBS routes near Bittern and Big Hay lakes

Franklin's Gulls were observed on Big Hay Lake prior to 1990. A colony of ~5,000 pairs was seen on the lake in 1931 (Farley 1932). Soper (1939a) reported Franklin's Gulls as common on the lake in August 1939. In 1947, a Franklin's Gull egg was collected at the lake (Royal Alberta Museum 2006), and one colony was recorded on the lake in 1958 (Guay 1968). In 1964–66, Guay (1968) studied the breeding biology of Franklin's Gulls on a colony of approximately 2,000 pairs.

Past water levels on both lakes have fluctuated. Soper (1939a) reported that Big Hay Lake was entirely dry in August of 1935 and had been for some years. He mentioned that the entire lake area was used for hay or grazing. Conditions had not improved much in 1939 when he found that most of the lake was dry except for a small section in the south east part of the lake that had low water levels and a dense stand of bulrush. Water levels must have improved by 1957 as a drainage ditch was built to drain Hay Lakes into Bittern Lake (Guay 1968). Guay (1968) reported that water levels dropped two feet after the ditch was opened and that the Franklin's Gulls responded by moving from the south part of the lake to the north part. Guay (1968) also reported that water levels were stable during his study in 1964–66. Currently, water levels are managed in Big Hay Lake by a fixed-crest weir built by DUC (M. Barr, DUC, pers. comm.).

Completed in 1993, the dam affects outflows for the entire basin. The dam permits water levels to return closer to historic upper levels and causes the wetland to experience fluctuations and frequencies more like those prior to drainage.

We were unable to find any observations of Franklin's Gulls on Bittern Lake in the literature, but due to the paucity of information on the lake as a whole, it is difficult to determine if the colony on Bittern Lake is a relatively new development or if the colony has existed, but gone unreported. Emergent vegetation is lacking in most of the Bittern Lake, most likely due to the alkalinity of the lake. Soper (1939b) noticed this lack of growth and mentioned that there "was never any account for marsh-nesting birds as this type of habitat, in useful amount, is absent from Bittern Lake". Soper (1939b) also reported that water level was down 4–5 feet in 1935 and had subsided further in 1939. In 1994, DUC constructed a dyke with a fixed-crest weir in the north bay of Bittern Lake (M. Barr, DUC, pers. comm.). The dam did not change the historic upper water level experienced in the bay, but did alter the historic high/low water fluctuations and frequencies thus causing water levels to be higher more often. Disappearance of Franklin's Gulls in the area in 1993 and 1994 (Fig. 1) most likely reflects the disturbance caused by construction of the weirs. The return of Franklin's Gulls in the late 1990s to numbers higher than were seen in the early 1990s (Fig. 1) is probably the result of the water control structures put in place by DUC. Drought experienced across the area in 2002–2004 likely caused the decline in Franklin's Gull observations during that time (Fig. 2).

3.1.3 BUFFALO LAKE

Buffalo Lake is one of the largest (93.5 km^2) lakes in central Alberta (Mitchell and Prepas 1990). It is surrounded by agricultural, industrial (primarily petrochemical extraction and processing), residential and recreational developments. A project designed to stabilize lake levels, provide agricultural flood control, water for nearby municipalities, and enhancement of fish and wildlife by pumping water from the Red Deer River into the lake was completed in 1995. The lake stabilization and thriving local economy then led to acceleration of development on shorelines and adjacent areas in recent years (Prescott and Stevens 2007).

There are two BBS routes near Buffalo Lake, but neither has been run frequently. The Tees route, 27 km to the west, began in 1995, and has been run 5 times. The maximum number of Franklin's Gulls observed was 272 in 2006 (Fig. 3). The Bashaw route, starting 5 km to the north and running north, was only run in 2006 and 2007, with the peak number observed less than 100 birds. Some of these birds, if they came from the north end of the route, may have been Bittern Lake birds.

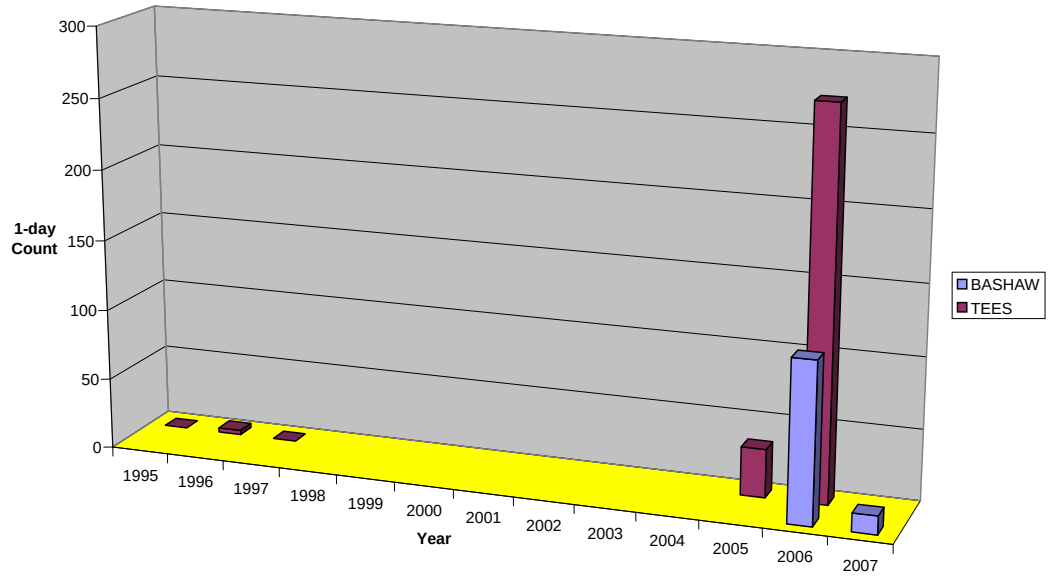


Figure 3. The number of Franklin's Gulls observed on BBS routes run near Buffalo Lake

Poston et al. (1990) reported that Buffalo Lake was locally important for Franklin's Gulls. Bjorge (1992) does not mention any breeding of Franklin's Gulls during an investigation of the lake for colonial nesting waterbirds in 1992. There has been a Franklin's Gull colony reported in Buffalo Lake offshore of Scenic Sands (Potter et al. 2003 in Prescott and Stevens 2007). However, the 2007 water levels were reported to be the highest since stabilization (D. Neis, pers. comm.. in Prescott and Stevens 2007), causing a shift of the colony (~1,200 adults) to near the outlet of Tail Creek, and to the northwest side of Secondary Bay (Prescott and Stevens 2007).

3.1.4 Duck Lake (basin within Hay-Zama Lakes Wetland Complex)

The Hay-Zama Lakes Wetland Complex is a series of lakes, flood plains, and river deltas located in a remote area of northwest Alberta about 100 km west of High Level. The complex was designated a Ramsar site in 1982, and 48,600 ha of the wetland complex was recognized as a Wildland Provincial Park in 1999. The complex is recognized as an Important Bird Area (IBA Canada 2004).

No BBS routes are run near the Hay-Zama Lake wetland complex. The first observations of Franklin's Gulls on Hay-Zama Lakes were reported in 1974 (Pinel *et al*. 1991). Approximately 1800 Franklin's Gulls were observed within the complex in 1993 (CWS, unpubl. data). In 2005, ~2,000 Franklin's Gulls were observed, during aerial surveys of the complex, in the bulrush beds on Duck Lake and thought to be nesting (K. Wright, Alberta Conservation Association, pers. comm.). It is unknown if this colony was active in 2006 although several hundred birds were observed in the area in late May, but a small colony of Franklin's Gulls were observed nesting in the bulrush beds on Duck Lake in the complex in 2007 (K. Wright, ACA, pers. comm.). We were unable to find any other published or unpublished information regarding Franklin's Gulls in the Hay-Zama Lakes Wetland Complex.

3.1.5 EGG LAKE (NEAR THE HAMLET OF EAGLESHAM)

Egg Lake is the local name for a small (533 ha), unnamed lake in northwest Alberta approximately 3 km southeast of the Town of Eaglesham. The lake is situated in landscape currently dominated by agriculture lands and by mixed stands of spruce and aspen. Most of the riparian area surrounding the lake is forested with little to no agricultural activities except for a small golf course along the southwest shore. Observations from the road at the golf course showed an active breeding colony in 2005 of several thousand Franklin's Gulls. A dense labyrinth of cattail beds interspersed with open water is found throughout most of the lake, and in 2006 we observed ~15,000 Franklin's Gulls nesting on the northwest part of the lake. Water levels were high in 2007 and no colony was observed on the lake.

Franklin's Gulls have been observed in the area during every BBS survey done on the Watino route from 1972–1985 (Fig. 4). The route starts approximately 4 km northeast of the lake and heads west and south. The route was surveyed 9 times from 1972–1985 and has not been surveyed since. Yearly counts varied with peaks in 1974 and 1980−1981.

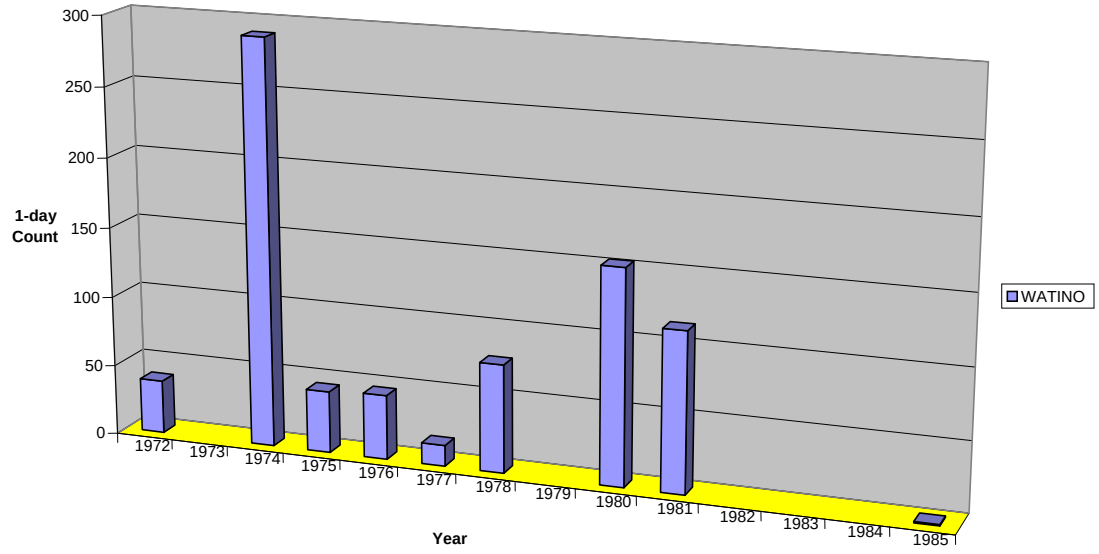


Figure 4. The number of Franklin's Gulls observed from 1972–1985 on the BBS route run near "Egg Lake"4

We were unable to find any other published or unpublished information regarding any marsh nesting waterbirds on "Egg Lake." In terms of conservation, DUC has a water control structure on crown land at "Egg Lake" that maintains the water level in the lake and a number of Conservation Easements on privately owned land around the shore of the lake (D. Matheson, DUC, pers. comm.).

3.1.6 FERGUSON LAKE

Ferguson Lake is a regionally important breeding lake for Franklin's Gulls in Poston *et al.* (1990). It is a relatively small (265 ha) wetland located approximately 1 km west of the Town of Clairmont and 9 km northeast of the City of Grande Prairie. It is located in a landscape dominated by agriculture. Most of the riparian area around the lake is vegetated with willow, but

grazing to the shoreline does occur in the northwest part of the lake, and the County of Grande Prairie has a landfill site on the west side of the lake. Bulrush and cattail beds are interspersed with open water in ratio of 50:50. In 2006, we observed ~51, 000 Franklin's Gulls nesting within the bulrush and cattail beds, but also nesting in grassy vegetation that we suspect is aquatic wild rice (*Zizania aquatica*).

Franklin's Gulls have been observed in the area during each of the seven years a BBS survey was done on the Bear Lake route (Fig. 5). The route starts approximately 25 km northwest of Ferguson Lake and ends approximately 22 km southwest. The closest stop on the route to the lake is 16 km west. Yearly counts varied with peaks in 1998 and 1999. A second BBS route, Wembley, is 29 km to the southwest, and has been run off and on since 1974 and annually since 1996 (Fig. 5). Because it is further from the lake, fewer gulls are observed, but 70 were seen in 1985 and 96 in 2003.

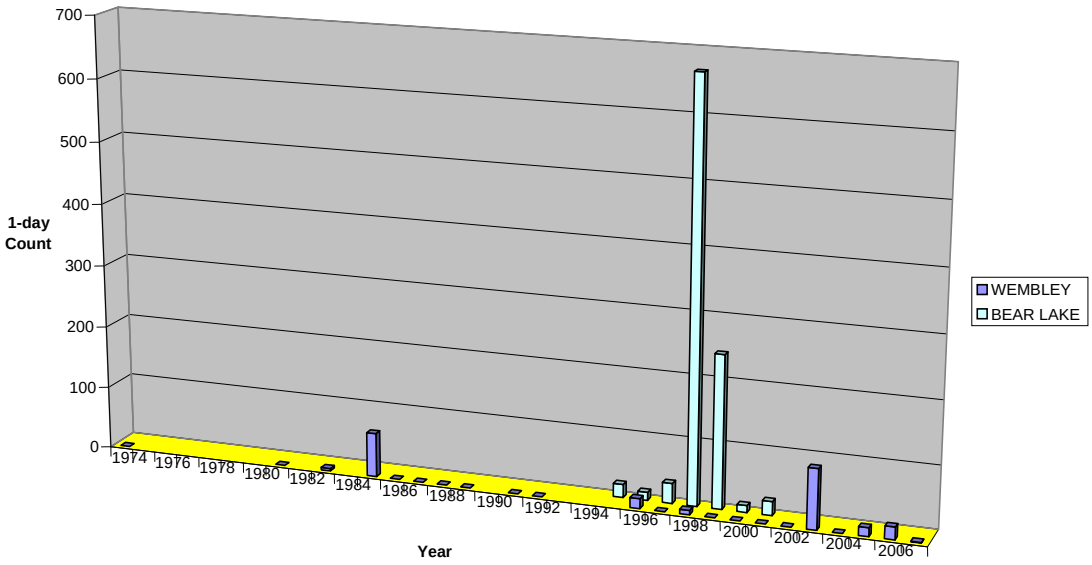


Figure 5. The number of Franklin's Gulls observed from 1974–2007 on the BBS routes run near Ferguson Lake

We found few other references to Franklin's Gulls on or near Ferguson Lake. Eggs were collected from the lake in 1962, and adults and sub-adults were collected in 1979 (Royal Alberta Museum 2006). Local landowner (W. Jackson) reported to us that Franklin's Gulls have been nesting on the lake since at least the 1950s. He recalls seeing the gulls on the lake every year except for two separate occasions when the lake was drained.

Little conservation action has occurred at this lake in the past. All land surrounding the lake is privately owned. DUC has water control structures on the east and west side of the lake to help maintain water levels (D. Matheson, DUC, pers. comm.). The water quality of Ferguson Lake and therefore the Franklin's Gull colony is threatened by the presence of the active landfill.

3.1.7 FRANK LAKE

Frank Lake, approximately 6 km east of the Town of High River in southern Alberta, is located in a landscape dominated by agriculture and small wetlands. The riparian areas surrounding the lake include native and non-native grasses. The lake is composed of four basins. The Franklin's Gull colony was found in the extensive emergent vegetation beds in the north and northeast portions of the most northerly and largest basin (Basin 1) all three years. The Franklin's Gull colony on Frank Lake, estimated to be the largest in Alberta in the first year, has declined each year because of periods of flooding and the resultant decline in emergent vegetation used by the nesting Franklin's Gulls.

The Mazeppa BBS route starts approximately 17 km southwest of Frank Lake and ends approximately 17 km north of Frank Lake. The closest stop on the route to the lake is 3 km west. Franklin's Gulls have been observed each of the 12 times the Mazeppa route has been surveyed 1989–2007 (Fig. 6). The BBS data show that the gulls colonized relatively quickly after the lake was recharged in 1989, peaking in abundance sometime in the late 1990s. After a dip in abundance, likely due to drought conditions throughout most of southern Alberta, numbers appeared to hit another high in 2005. The Okotoks route is further west, with its closest stop 21 km from Third Lake. The Longview, Chain Lakes, and Ensign BBS routes have only recently been run. They range from 11–27 km from the Frank Lake colony.

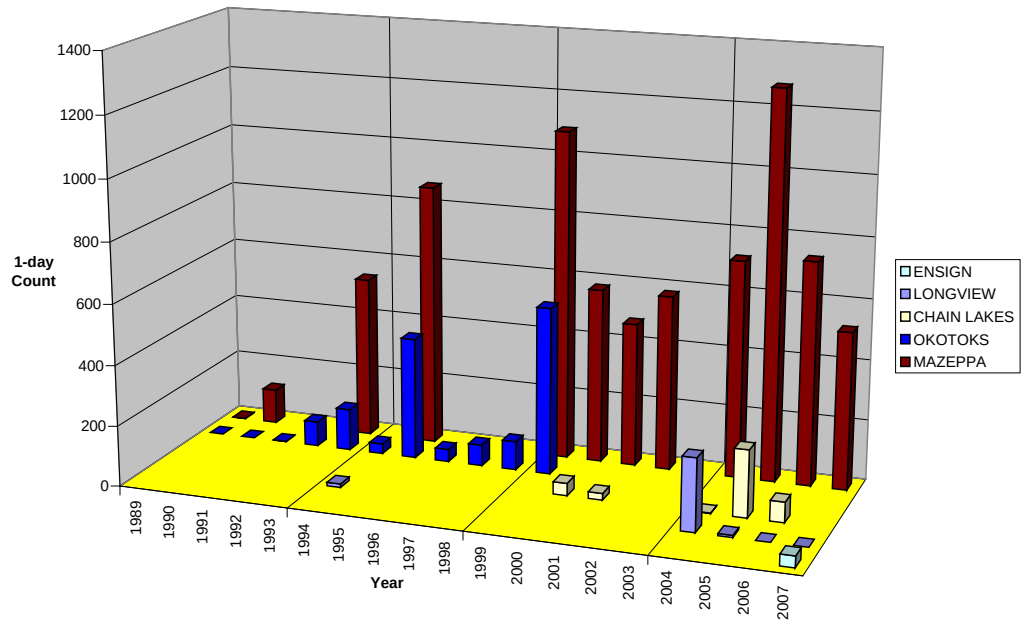


Figure 6. The number of Franklin's Gulls observed from 1989–2007 on the BBS routes near Frank and Third Lake

Frank Lake is listed as a locally important Franklin's Gull breeding lake in Poston *et al*. 1990 and as an Important Bird Area (IBA Canada 2004). Prior to the 1980s, a large colony was observed on the lake in 1968 (Sadler and Myer 1976) and in 1971 (Pinel *et al*. 1991). However, the lake was dry from 1983–1987. Franklin's Gulls were likely not present on the lake in the

mid-1970s or the 1950s as the lake was flooded at the time or in the 1940s or 1930s when the lake was completely dry (Sadler *et al.* 1995).

In 1989, DUC collaborated with Cargill Ltd. and the Town of High River to build a pipeline that would carry a water supply of tertiary wastewater to Frank Lake (Sadler et al. 1995). This secure water supply in combination with the weir constructed in 1975 and additional diking done by DUC in 1989 resulted in the recharging of water levels and the restoration of the wetland (Sadler et al. 1995). DUC currently manages water levels on the lake and manages some of the flood-prone uplands adjacent to the lake.

There is a large power-line intersecting the colony on Frank Lake. While performing nest counts on the lake, we noticed a number of dead gulls directly under the power line. No mortality counts from the power line were conducted, so we do not know how many birds die each year due to collision with the line and towers. There has also been a history of botulism on the lake during years when conditions were right for the outbreak to occur.

3.1.8 ISLE LAKE

Isle Lake is located approximately 65 km west of Edmonton in the boreal transition zone dominated by spruce and aspen. Agriculture is limited in the area to grazing. The area lakes are mainly surrounded by recreational properties, and Isle Lake is a typical example. Thus, the major threat to a colony on the lake would be activities of recreational boaters.

There are four BBS routes near Isle Lake. The Tomahawk and Moon Lake routes begin 9 and 15 km south and continue south of the lake, and the Chip Lake route begins 19 km west and runs west. The best data are from the Isle Lake route, which runs along the north shore within 1 km of the lake and has been surveyed annually from 1992 through 2007 (Fig. 7).

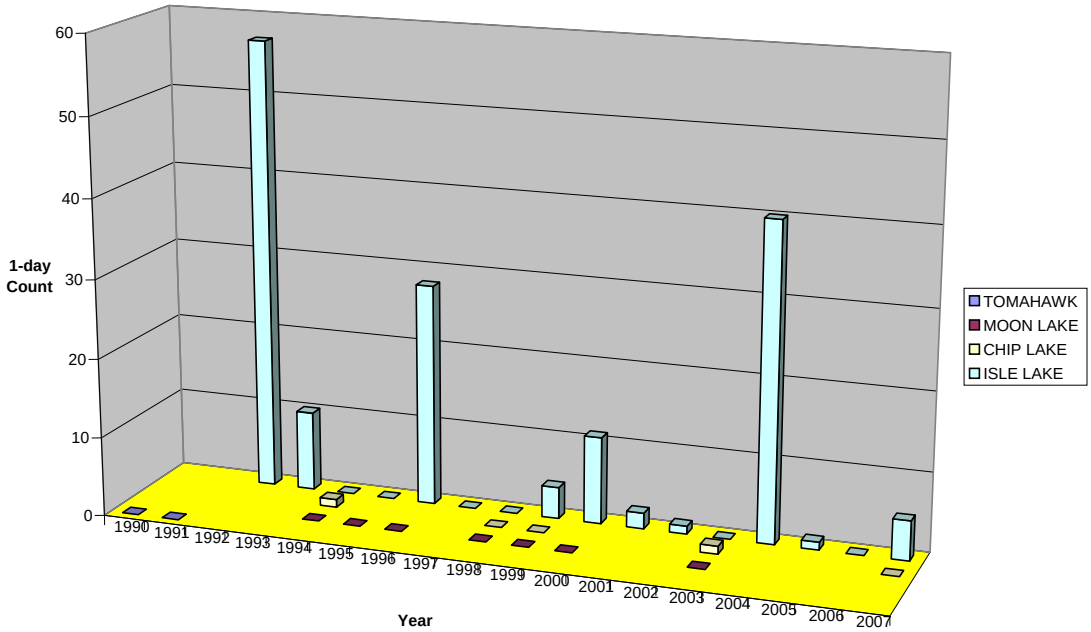


Figure 7. Numbers of gulls observed on the BBS routes run near Isle Lake

We do not have any historical information on the use of the lake by nesting Franklin's Gulls, but given the peaks observed on the Isle Lake BBS route, there may have been a colony on the lake earlier than we detected in our surveys. However, Franklin's Gulls were observed on the lake in 2006, and a small colony (~150 adults) was observed nesting in a stand of bulrush in 2007.

3.1.9 LAC LA BICHE

Lac La Biche, a large lake (234 km²) with a mean depth of 8.4 m, is located approximately 220 km northeast of Edmonton in the boreal transition zone landscape (Mitchell and Prepas 1990). The surrounding landscape is primarily wooded (mix of spruce and aspen), some agricultural lands, recreational properties, and the Town of Lac La Biche on the southeast shore. The numerous islands in the lake are protected as provincial bird sanctuaries, and there is a provincial park on the largest island joined to the mainland by a causeway (Mitchell and Prepas 1990).

The lake is susceptible to heavy wave action in certain areas of the lake basin, so emergent habitat would be limited to less-exposed regions of the lake (Mitchell and Prepas 1990). Water levels in the lake have been variable as a result of long-term drought and excessive runoff periods. The lake has been identified as providing important nesting habitat for Western Grebes, and it is in association with these grebe colonies that nesting Franklin's Gulls have been observed (C. Found, Alberta Sustainable Resource Development, pers. comm.). The greatest threat to nesting waterbirds would be extreme wave action, either natural or caused by recreational vehicles.

There are three BBS routes near Lac la Biche (Fig. 8). Skukum Lake begins the closest, at 8 km, but it has only been run from 2004 to 2007, and Franklin's Gulls were reported only the first year. The Lac la Biche route comes within 12 km and was run annually from 1992 to 2001, then stopped in 2003, but no more than 18 gulls were sighted in any year. The Noral route is 28 km from the lake and has never reported any Franklin's Gulls.

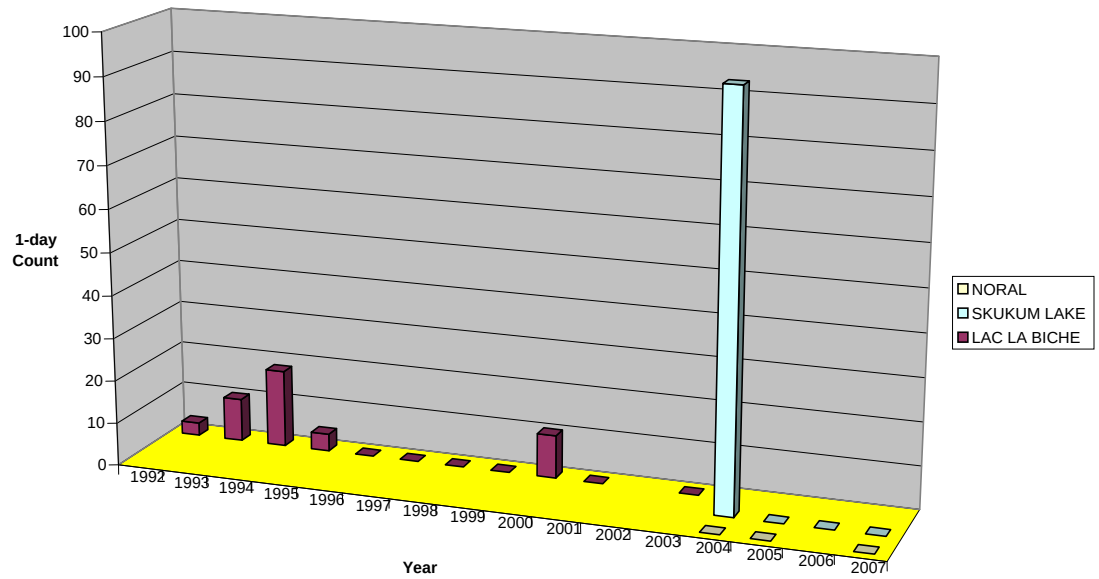


Figure 8. Numbers of Franklin's Gulls observed on the BBS routes run near Lac La Biche

3.1.10 LESSER SLAVE LAKE

Lesser Slave Lake, one of Alberta's largest waterbodies, is ~300 km north of Edmonton. There is a Provincial Park on the southeast side of the lake that is considered an Important Bird Area (IBA Canada 2004). Franklin's Gulls were reported on the lake in the early 1990s (Semenchuk 1992). The Franklin's Gull colony is located on the southwest portion of Lesser Slave Lake near the Town of Joussard. The colony is located in a mixed bed of bulrush and cattail (Gendron *et al*. 2003). The riparian area near the colony consists of shrubs and pasture land (Gendron *et al*. 2003). The colony site was not visited in 2005, but was active in 2006. High water levels in 2007 flooded out the emergent vegetation, and no Franklin's Gulls were observed nesting at the colony site that year.

There are three BBS routes within 30 km of the Franklin's Gull colony on Lesser Slave Lake. The Kinuso and Little Smoky routes have never reported Franklin's Gulls and are not currently active. The Swan River route begins 8 km southeast of the lake and runs south. It was first surveyed in 1988, when 30 Franklin's Gulls were seen. The highest count was 300 in 1995 (Fig. 9).

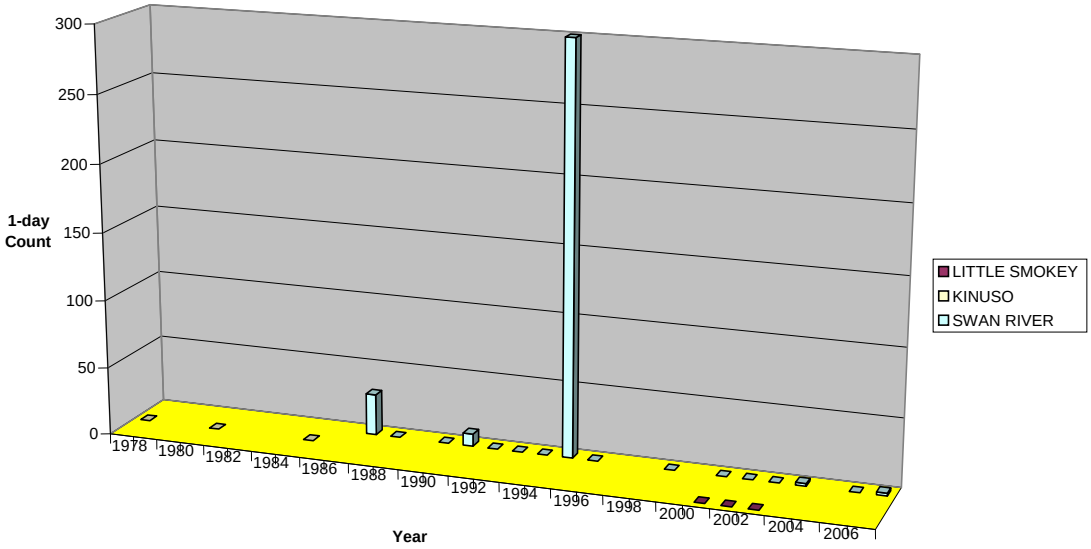


Figure 9. Numbers of Franklin's Gulls observed on BBS routes run near Lesser Slave Lake

Franklin's Gulls were reported as "very common in the Lesser Slave Lake" region in 1964 (Sadler and Myers 1976). A number of Franklin's Gull colonies were observed on Lesser Slave Lake in 1978 and 1979 (Alberta Environment 1979). Eadie (2002) reported seeing "hundreds" of Franklin's Gulls flying over the colony and nesting on floating mats of bulrush in 2002. In 2003, thousands of nesting Franklin's Gulls were reported at the colony (Gendron *et al*. 2003).

Grazing of emergent vegetation near the colony and the disturbance, wave action, and destruction of emergent vegetation by boats have been identified as potential threats to the Franklin's Gull colony on Lesser Slave Lake (Gendron *et al*. 2003). To alleviate some of the grazing issues, a portion of the grazing lease near the colony has been fenced to keep cattle out of the riparian areas, but it is not a complete exclusion at this time (R. Arbuckle, Alberta Parks and Protected Areas, pers. comm.).

3.1.11 MAMAWI LAKE (BASIN WITHIN THE PEACE ATHABASCA DELTA)

Mamawi Lake is a large shallow lake in the Peace Athabasca Delta (PAD) in northeast Alberta and located about 10 km southwest of Fort Chipewyan. Water levels in the lake are dependent on the flow of the Peace and Athabasca Rivers and local precipitation and runoff, so they can be quite variable between years. Emergent vegetation beds and willow clumps dot the shoreline of the lake.

No BBS routes are run near the lake, and few reports are available on nesting of this gull in the entire PAD let alone this specific lake. There was a report of a colony on Loutit Lake, approximately 35 km northeast of Fort Chipewyan in 1975. In 1977, Rick Beaver (Canadian Wildlife Service, Edmonton) observed two breeding colonies of Franklin's Gulls, of 135 to 140 pairs, in the Peace Athabasca Delta, but no indication of which lake(s) were occupied (Francis and Lumbis 1979). L. Carbyn (CWS, pers. comm.) noted many Franklin's Gulls flying around the PAD area during his work in the 1990s, but with no indication of specific location or of any nesting of the species. In 2007, Stephen Anderson (Parks Canada Agency, pers. comm.) observed a nesting colony of 200 adults on Mamawi Lake in a bulrush bed bordered by reed grass and reported small flocks of adults in other areas of the delta.

The majority of the lakes in the area are located within the boundary of Wood Buffalo National Park and thus receive protection from development. However, the greatest threat to the area is low water levels caused by reduced flows of the Peace and Athabasca rivers. Drought conditions in the local area will also have a negative effect on water levels in the area lakes.

3.1.12 MANAWAN LAKE

Manawan Lake, a small (~750 ha) shallow lake, is located 45 km north of Edmonton and situated in a landscape dominated by agricultural activities. Riparian vegetation surrounding the lake is comprised of grasses, shrubs and trees. J.D. Soper visited the area in 1937 and 1939 and reported Manawan Lake as "one of the finest little bodies of water for aquatic birds on the Canadian prairies" (Kemper and Doberstein 1977). In 1976, the lake had a narrow band of emergent vegetation along the shoreline with a large area of open water in the central portion of the basin (Kemper and Doberstein 1977). In 2005, much of the lake basin was covered with emergent vegetation, primarily cattail, with comparatively little open water. However, increased water levels during the following two years opened up or thinned the emergent vegetation and created open areas of shallow water around the shoreline edge.

The Calahoo and Pickardville routes come within 12 and 15 km respectively of Manawan Lake. The Calahoo route is also within 12 km of Big Lake, where a Franklin's Gull colony has been in the past and was again observed in 2007. Because of the close proximity of the lakes, it is impossible to determine the origin of the gulls observed on BBS transects. Figure 10 shows the observations from all three BBS routes. It shows that Franklin's Gulls have been present near the lakes almost every year since 1971. The number of birds observed varied yearly with a peak in the early 1990s followed by a virtual disappearance of the birds from 1993–2001. The Calmar route is well south of Big Lake and barely within its 30-km radius; the birds reported on it may well be flying toward Bittern Lake.

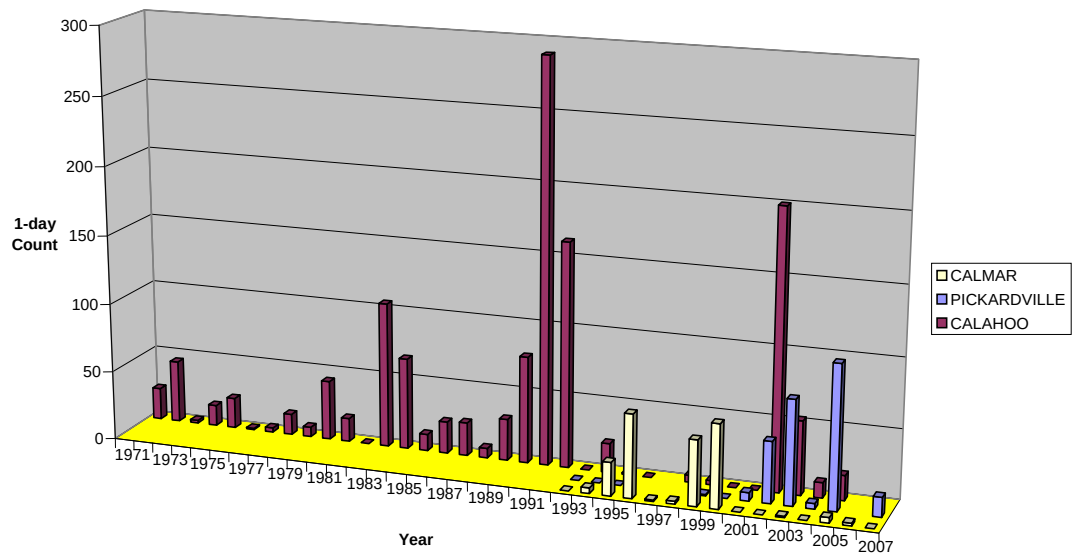


Figure 10. The number of Franklin's Gulls observed from 1971–2007 on the BBS routes run near Manawan and Big Lakes

Franklin's Gulls were observed nesting at Manawan Lake prior to 1971. Franklin's Gull eggs were collected from the lake in 1953 and 1963 (Royal Alberta Museum 2006). Guay (1968) observed a colony on the south-western edge of Manawan Lake in 1963, but not in 1964 when the lake was completely dry. Several species of gulls were observed during fall aerial surveys of the lake in 1976 (Kemper and Doberstein 1977). The surveys had occurred well past the nesting period so it is unknown if they actually nested on the lake in that year. Although not estimated in 2005, the Franklin's Gull colony area appeared as large as that occupied in 2006 and further increased in size and number in 2007.

Prior to the 1980s, Manawan Lake had a history of drought and flooding conditions. To address flooding concerns, in 1949 a weir was constructed on the lake though a joint DUC and Alberta Environment project (Alberta Sustainable Resource Development 2005). During the 1970s and 1980s, the Province of Alberta purchased the majority of the flood-prone lands surrounding the lake and established Conservation Lands, and the lands were then leased back to former landowners. Water levels began to recede to below normal during the late 1980s, and some of the lake basin was grazed or cultivated during this time (Alberta Sustainable Resource Development 2005). By 2000, the lake was completely dry. The low numbers of Franklin's Gulls observed in the mid-late 1990s likely reflect low water levels in the lake at that time. In 2003, a new fixed-crest weir was installed at Manawan Lake and water levels, and Franklin's Gull numbers have since increased. Higher water levels in 2006 and 2007 that thinned and opened up access into the thick emergent vegetation (cattail) beds improved conditions for nesting Franklin's Gulls.

During our visits through the three-year study, we observed some potential threats to the Franklin's Gull colony. In July 2006, much of the open water was covered with very thick mats of filamentous green algae. Young Franklin's Gulls had a very difficult time moving through these thick mats, and we noticed carcasses of many young Franklin's Gulls stuck in the algal

mats. High water levels had also uprooted clumps of cattail which were floating or jamming along the leeward areas of the open water basin.

3.1.13 Minor Lake (also referred to as Kininvie)

Minor Lake, also known as Kininvie Marsh, is a small wetland located ~33 km from the Town of Brooks. The lake is in a landscape composed of grazing lands and other shallow wetlands. The riparian area around the lake is composed of grassland. Water conditions were quite variable on this prairie wetland, and in the 1950s, as part of the Louisiana Lakes project, DUC constructed a dyke across part of the marsh dividing it into two parts (T. Sadler, Strathmore, Alberta, pers. comm.). The western section has more permanent water conditions while the eastern section has water levels that are more variable. They are both fed by natural run-off and irrigation water in August from the Eastern Irrigation District (EID) and are managed by DUC as permanent cattail-hemi-marshes (B. Speers, DUC, pers. comm.). Periodically, the wetland is drawn-down in an effort to control expanding cattail growth. The Eastern Irrigation District controls access to the wetland with cattle grazing the main land use in the area.

The number of Franklin's Gulls nesting within the thick cattail beds that encompassed most of the east section of Minor Lake increased each year of our surveys with the most dramatic increase in 2007 of over three times the number from 2006. Higher water levels in 2006 thinned the emergent vegetation and provided more suitable nesting habitat within the cattail bed, which was similar in size to that in 2005, while nesting density increased dramatically in 2007. This colony was also observed in 2004, but not counted. No BBS routes are run near Minor Lake. However, we do know that the colony was active in the early 1980s over a four-year period (D. Duncan, CWS, pers. comm.).

3.1.14 Moose, Jessie, and Charlotte lakes

Located 240 km northeast of Edmonton and 3.5 km west of the Town of Bonnyville, Moose Lake is one of the most popular and intensely used lakes in Alberta (Mitchell and Prepas 1990). Almost half of the lake's drainage basin has been cleared for agriculture and urban development; the remaining half is composed of mixed-wood forests (Mitchell and Prepas 1990). Much of the shoreline has been developed for recreational properties, but a large portion of the shoreline is Crown land, including a Provincial Park on the north shore.

In 2002, a large (>10,000) Franklin's Gull breeding colony was observed in Island Bay, the southwest portion of the lake (CWS, unpubl. data). This area of the lake is shallow (<3 m of water) with dense areas of submergent and emergent vegetation, and the Franklin's Gulls were found to build their nests on a thick floating mat of dead vegetation within a moderately dense bulrush bed. The colony occupied the same location each year from 2005–2007.

Jessie Lake is a small wetland bordered to the north by the Town of Bonnyville and agricultural lands to the south, while Charlotte Lake is a small wetland about 5 km east of the Town of Bonnyville with agricultural lands surrounding the lake. In 2002, a small breeding colony was observed on Jessie Lake (CWS, unpubl. data). Franklin's Gulls were observed foraging, but not nesting on Jessie and Charlotte lakes in 2005, but ~1000 adults were observed nesting in a bulrush bed in the south side of Jessie Lake in 2006. In 2006, the nesting colony on Jessie Lake appeared to have shifted to Charlotte Lake as about 2000 adults were observed nesting in the

bulrush on this lake. The close proximity of the colonies on Moose and the two smaller lakes, and the fluctuating use of these lakes may indicate that the gulls nesting on Jessie and Charlotte lakes are likely those that failed to establish nesting territories on the larger Moose Lake colony.

There are four BBS routes within the 30-km limit identified for the colonies. The Kehiwin Lake route is closest and most frequently surveyed. It starts ~19 km south of Moose Lake and ends ~14 km northeast of the lake. The route comes between Moose and Jessie Lakes and within 3 km of Jessie Lake. Franklin's Gulls have been observed each time the Kehiwin Lake route has been surveyed from 1972–2007 (Fig. 11), but only 16 surveys have been done in those 36 years. The number of birds observed varied, with peak observations in 1994. The Therien route is 23 km to the west at its nearest point and runs west and south. The numbers of gulls observed on the other two routes are minimal.

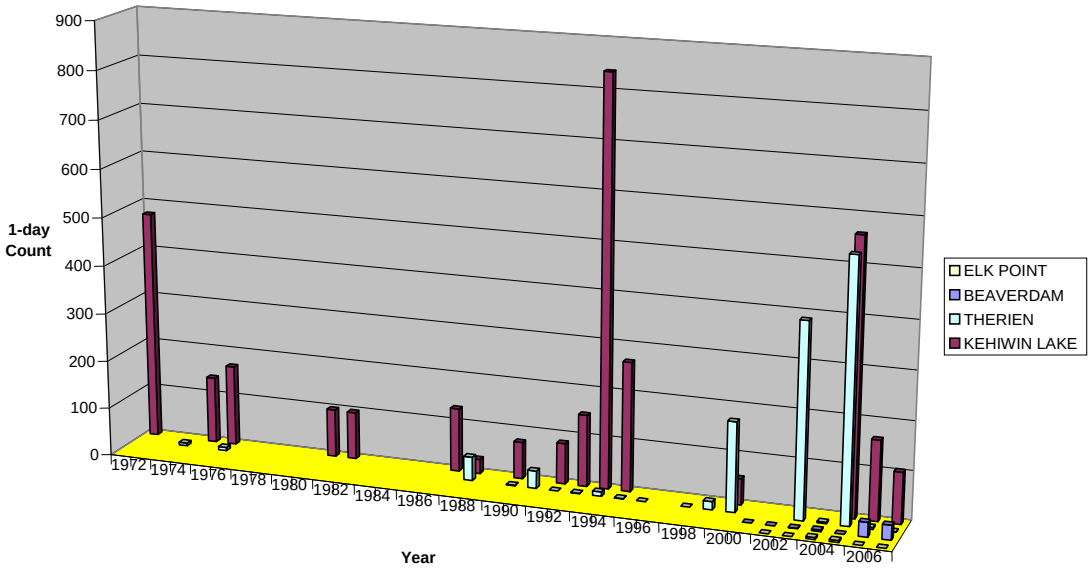


Figure 11. The number of Franklin's Gulls observed from 1972–2007 on the BBS routes run near Moose Lake

Moose Lake water levels dropped in 1966 after the failure of a weir and remained relatively constant until the early 1990s, when water levels dropped to a record low in October 1993 (Alberta Lake Management Society 2005). Water levels increased in the late 1990s but decreased in 2005 to 1994 levels (Alberta Lake Management Society 2005). Low water levels likely result in the creation of more emergent habitat for Franklin's Gulls on the lake, hence the peaks in Franklin's Gull observations in 1994 and 2005 (Fig. 11).

As mentioned, Moose Lake is a very popular recreational lake. Franklin's Gulls nesting in Island Bay are currently only protected from human disturbance by the shallow nature of the bay. Larger recreational boats are not likely to venture into the bay. However, people with personal watercraft are able to access the bay and could disturb nesting birds as well as destroy nesting habitat. There is currently no active conservation on the Moose Lake colony site, but it has been identified in the recent Moose Lake Watershed Management Plan (White et al. 2006), and

Alberta Sustainable Resource Development has indicated a possibility of a Protective Notation for the site (C. Found, Alberta Sustainable Resource Development, pers. comm.).

3.1.15 NORTH AND SOUTH MURRAY LAKES

Murray Lake, located 30 km southeast of Medicine Hat, is a reservoir created in 1954 to hold water used to irrigate surrounding agriculture lands. Unlike other reservoirs, the two basins, which we designated as North and South Murray, do not have steep rocky shores. Much of the shoreline is vegetated with cattail and bulrush. The riparian area surrounding the lakes is primarily native and non-native grassland with some shrubs. In 2005 through 2007, we observed a Franklin's Gull colony in the northwest section of the north basin and another in the southeast section of the south basin from 2006–2007. Both colonies are in beds dominated by cattail. Grazing to the shoreline does occur near the colony located at the south basin. The north basin of the lake has access points for launching recreational/fishing boats so the north colony likely receives some disturbance from their activity.

The Seven Person BBS route starts ~15 km northeast of Murray Lake and ends ~20 km southeast of the lake. The closest stop to the lake is 5 km east. Although observations were begun in 1972, Franklin's Gulls were not observed on the route until 1975. The route was not run from 1982 to 1990, prior to when the first large numbers were reported (Fig. 12). The number of birds observed varied yearly with a peak in observations in 1993. Another BBS route, Rush Lake, is further east. Its closest stop is 17 km. It has been run only five times since 1998, and no Franklin's Gulls have been reported.

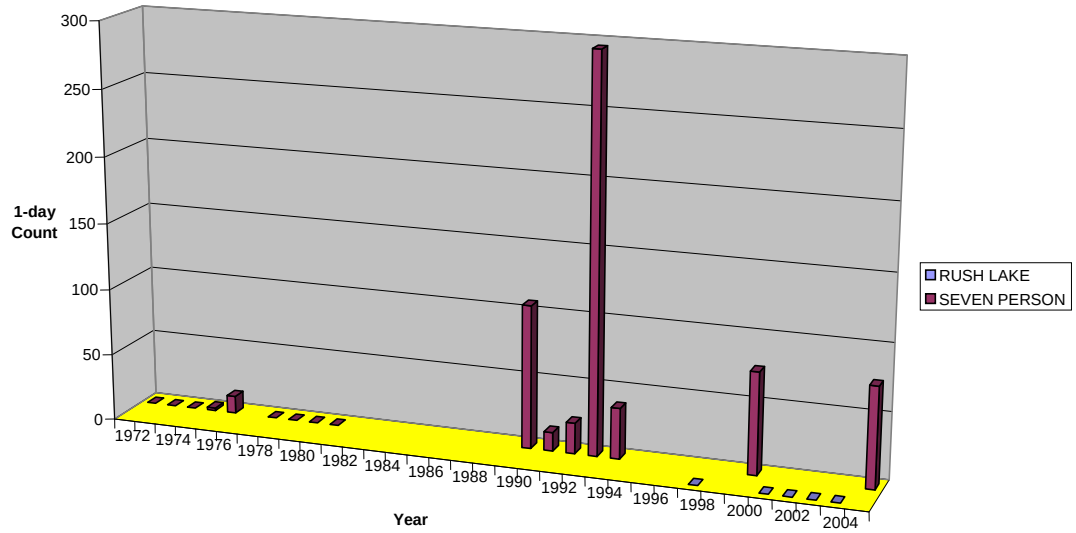


Figure 12. The number of Franklin's Gulls observed from 1972–2007 on BBS routes run near North and South Murray Lakes

3.1.16 STIRLING LAKE

Stirling Lake, also known as Michelson's Marsh, is a small wetland 23 km southeast of Lethbridge. It has some emergent beds of cattail that may support a small colony of Franklin's Gulls depending on yearly water levels in the lake. In 1998, the water level of the lake was low and only 20 adults were seen (Cottonwood Consultants Ltd. 2000). Over 200 adults were noted

on the lake in 2004 with no indication of nesting (CWS, unpubl. data). We found a colony on the south side of the lake in 2005 and 2007. Water levels appeared low in 2006 and we did not see any nesting Franklin's Gulls. However, Stirling Lake is listed as a locally important Franklin's Gull breeding lake in Poston *et al*. (1990). The greatest threat to the colony would be low water levels caused by periods of drought or low precipitation during the year.

Stirling and Taber lakes are within 50 km of each other, and the 30 km range of foraging Franklin's Gulls would overlap between the two colonies, so we combined the BBS routes for both lakes on one graph. One BBS route starts ~18 km southwest of Stirling Lake and ends ~33 km southeast of the lake. The closest stop on the route is 13 km to the lake. Franklin's Gulls have been observed on the Kipp Coulee BBS route run from 1992–2003 (Fig. 13), but never in great abundance and not in every year. The remaining two routes are linked to the Taber colony, although the southern end of the Horsefly route is just within 30 km of the colony of Stirling Lake.

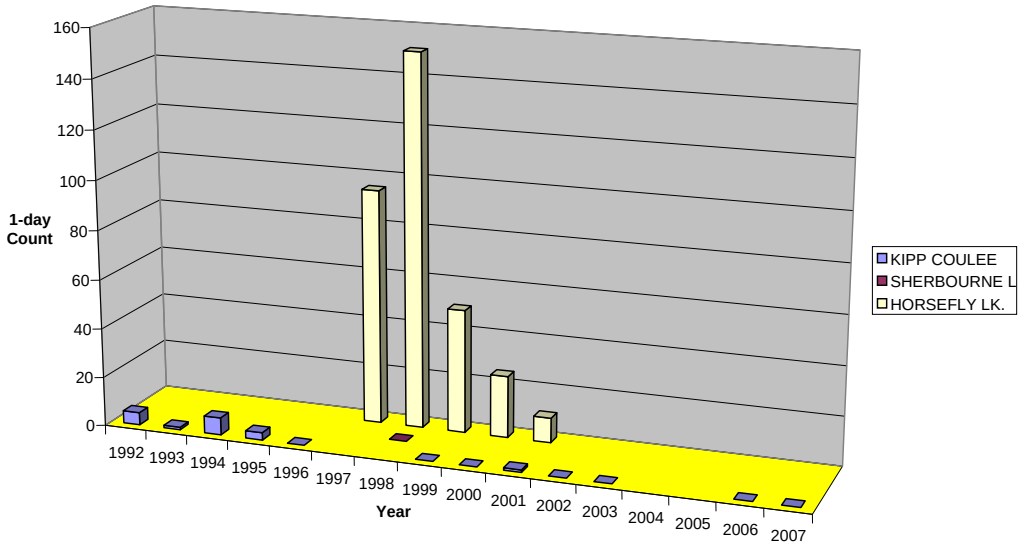


Figure 13. The number of Franklin's Gulls observed from 1992–2007 on the BBS routes run near Stirling Lake

3.1.17 STOBART LAKE

Stobart Lake is a moderate-sized wetland (546 ha), approximately 15 km southeast of the Town of Strathmore, that is entirely contained within the Siksika First Nations Reserve. Agriculture lands dominate the surrounding area with Namaka Lake ~1 km north, a historic Franklin's Gull breeding colony lake of local significance (Poston et al. 1990), and the Bow River ~3 km south of the lake. Grasses with a few shrubs make up most of the riparian vegetation surrounding the lake and much of the shoreline appears buffered from grazing and crops. Most of the shoreline is surrounded with emergent vegetation.

There are no BBS routes in the vicinity of Stobart Lake, but evidence suggests that Franklin's Gulls have repeatedly nested at the lake in the past. Franklin's Gull eggs were collected at Stobart Lake in 1964, 1965, 1966, 1968, 1970, and 1971 (Royal Alberta Museum 2006). In addition, Sadler and Myers (1976) report a colony of ~5000 in 1965 and several thousand nesting

on Stobart Lake in 1967. In 2006 and 2007, a Franklin's Gull colony of 15,000 adults (visual estimate) and 35,000 adults (nest count), respectively, was observed in two extensive emergent vegetation beds dominated by bulrush on the southeast and the northeast side of the lake.

DUC have been working with the Siksika Nation to keep Stobart Lake an important wetland for birds. In 1957, DUC constructed a flume that provided a water source to Stobart Lake (Montgomery 2001). Since then DUC has constructed a number of dams and channels to regulate and supply water to the lake. In 2000, changes were made to the outlet control structure and channel to improve water circulation and quality. In addition, to address marsh-management goals, a water management agreement was formed between DUC and the Siksika First Nation (Montgomery 2001).

3.1.18 TABER LAKE

Situated east of the Town of Taber, Taber Lake is a reservoir on which Franklin's Gulls occasionally appear to nest. Extensive beds of cattail and bulrush are found in the lake. In 1998, 50 adults (Cottonwood Consultants Ltd. 2000) were observed on Taber Lake, and in 2004, 250 adults (CWS, unpubl. data) were observed on the lake, but no indication of nesting was recorded. In 2005 and 2007 (100 adults), a colony was observed on the southwest side of the lake while Franklin's Gulls only appeared to be foraging on the lake in 2006.

The closest BBS route (Horsefly) starts ~21 km south of Taber Lake and ends ~10 km northeast of the lake. The closest stop on the route to the lake is 3 km. The Horsefly Lake route was run from 1997–2001 and Franklin's Gulls were observed near Taber Lake every year of the survey (Fig. 14). The Sherbourne Lake route, further east, was run only in 1998 and no gulls were seen. The Kipp Coulee route is beyond the 30 km range of the Taber colony.

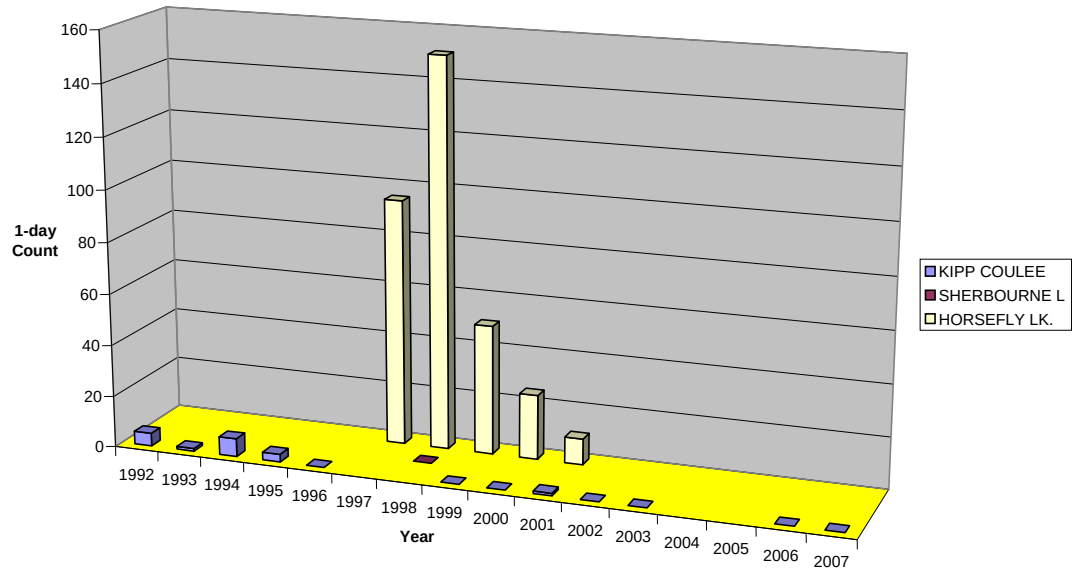


Figure 14. The number of Franklin's Gulls observed from 1992–2007 on the BBS routes run near Taber Lake

3.1.19 THIRD LAKE

In 2006, we observed a small colony (< 1000 adults) of Franklin's Gulls on Third Lake, which is located about 21 km north of Frank Lake. The wetland, located within the confines of approximately a quarter section of land, is surrounded by private agricultural landholdings. Two years earlier, it was completely dry except for two small dugouts on opposite corners of the periphery of the basin (G. & S. Tory, landowners, pers. comm.). Because of its close proximity to Frank Lake, we believe that Franklin's Gulls that were unable to find nesting habitat in the reduced emergent vegetation beds on Frank Lake moved to this wetland. We were unable to find any previous reports of Franklin's Gulls at Third Lake. In 2007, with the continued demise of habitat at Frank Lake and increased water depth and expanse of suitable habitat on Third Lake, the adult population increased to nearly 130,000 breeding birds.

Third Lake and Frank Lake are located within 21 km of each other. Two of the routes that are within the 30 km radius of Frank Lake are also located within the radius of Third Lake. They include the Mazeppa and Okotoks BBS routes. Birds observed on these two BBS routes could be associated with either lake, given the close proximity to each other, but the Okotoks route was not run after 1999, before water conditions improved on Third Lake. Franklin's Gulls have been observed on the Mazeppa route during every BBS survey done from 1989–2007 (Fig. 15). The BBS data show a four-year dip in abundance, likely due to drought conditions throughout most of southern Alberta, with numbers hitting another high in 2005.

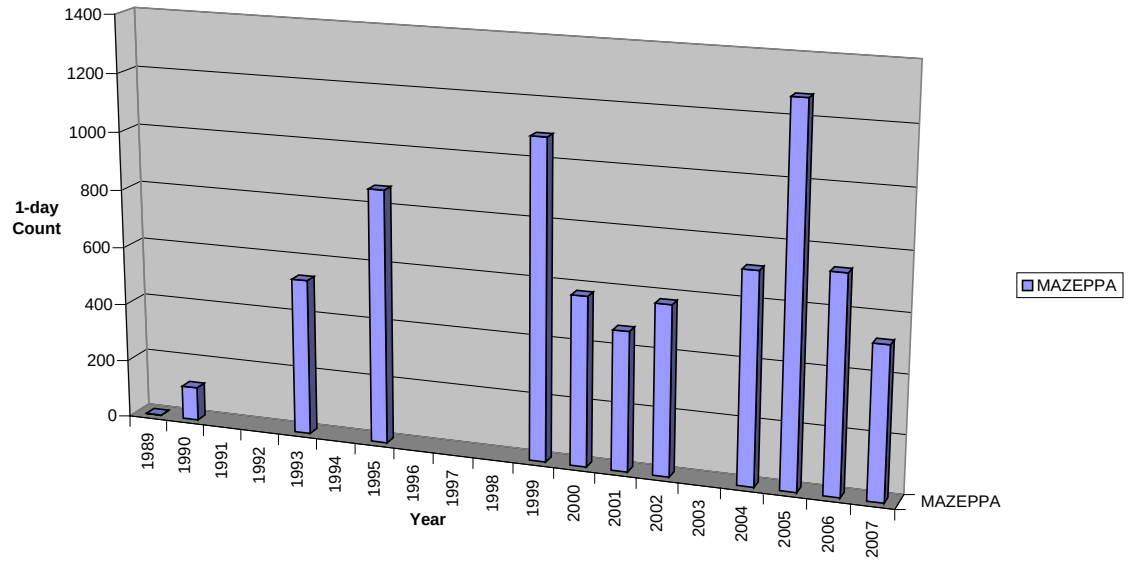


Figure 15. The number of Franklin's Gulls observed from 1989–2007 on the BBS route run near Third Lake Birds observed on the route might have been from Third Lake in the years 2006 and 2007

3.1.20 UPPER THERIEN LAKE

This lake is located in the aspen parkland region of northeast Alberta and is adjacent to the Town of St. Paul. It is in a landscape dominated by agriculture as well as areas of industrial/residential development along the north shore. Emergent vegetation cover is limited on the lake, and the colony was located in a small stand of bulrush in the northwest sector. In May of 2005 and again in 2007, we observed a small Franklin's Gull colony (range: 200–300 adults) on Upper Therien

Lake, but no nesting activity was observed on this lake in 2006. There are no BBS routes near Upper Therien Lake (near St. Paul), and we were unable to find any other published or unpublished information regarding Franklin's Gulls on this lake.

3.1.21 UTIKUMA LAKE

Recognized as an Important Bird Area (IBA Canada 2004), Utikuma Lake is a large (28,000 ha), shallow (mean depth of 1.7 m), eutrophic lake located approximately 80 km northwest of the Town of Slave Lake (Mitchell and Prepas 1991). It is situated in a landscape dominated by muskeg and mixed-wood forest with very little agricultural activity (Mitchell and Prepas 1991). The shoreline and islands within the lake are covered with bulrush (Mitchell and Prepas 1991). Water levels have been managed by DUC since 1948, when DUC and the Government of Alberta installed a timber weir at the outlet. In 1973, the structure was upgraded to a sheet-pile weir (Mitchell and Prepas 1991).

No BBS routes are run near Utikuma Lake. The first observations of Franklin's Gulls on the lake were reported in 2000 (Hanneman and Heckbert 2001). Hanneman and Heckbert (2001) counted 360 Franklin's Gull nests at South Island, 1543 nests at North Island and 2000 nests at East Island. In 2006, ~40,000 Franklin's Gulls were estimated in the nesting colonies found on the lake (M. Heckbert, Alberta Sustainable Resource Development, pers. comm.). All the sites occupied in 2006 were again active in 2007 along with an additional two new sites. Adult numbers were much higher, with an increase from 40,000 adults in 2006 (visual estimate) to over 69,000 (visual estimate) in 2007. We were unable to find any other published or unpublished information regarding Franklin's Gulls on Utikuma Lake.

3.1.22 WINAGAMI LAKE

Winagami Lake is a large (4670 ha), shallow (mean depth of 1.7 m) and eutrophic lake located in northwest Alberta ~6 km from the Town of McLennan (Mitchell and Prepas 1991). The lake is situated in primarily forested landscape with some agricultural lands to the west, and with Kimiwan Lake to the northwest and the South Heart River to the northeast. Over 80% of the shoreline is protected within the Winagami Lake Provincial Park and the Winagami Wildland Park. In 2005 and 2006 we observed Franklin's Gulls nesting in mixed cattail and bulrush beds in the extreme northwest corner of the lake. In 2006, there were ~13,000 Franklin's Gulls in the colony on Winagami Lake. Water levels were higher in 2007, and no nesting activity was found although adults were observed flying around the old colony site.

There are three BBS routes that have been run in the vicinity of Winagami Lake. Minimum distances to the lake from the routes range from 5–25 km and maximum distances range from 15–40 km. The High Prairie route was run only in 1978, the Winagami route was run periodically from 1981–2000 and the Prairie Echo route was only run in 2005. The combined data from all the routes indicate that Franklin's Gulls have been observed in the area around Winagami Lake since at least 1978 (Fig. 16), with peaks in observations in 1978 and 1993.

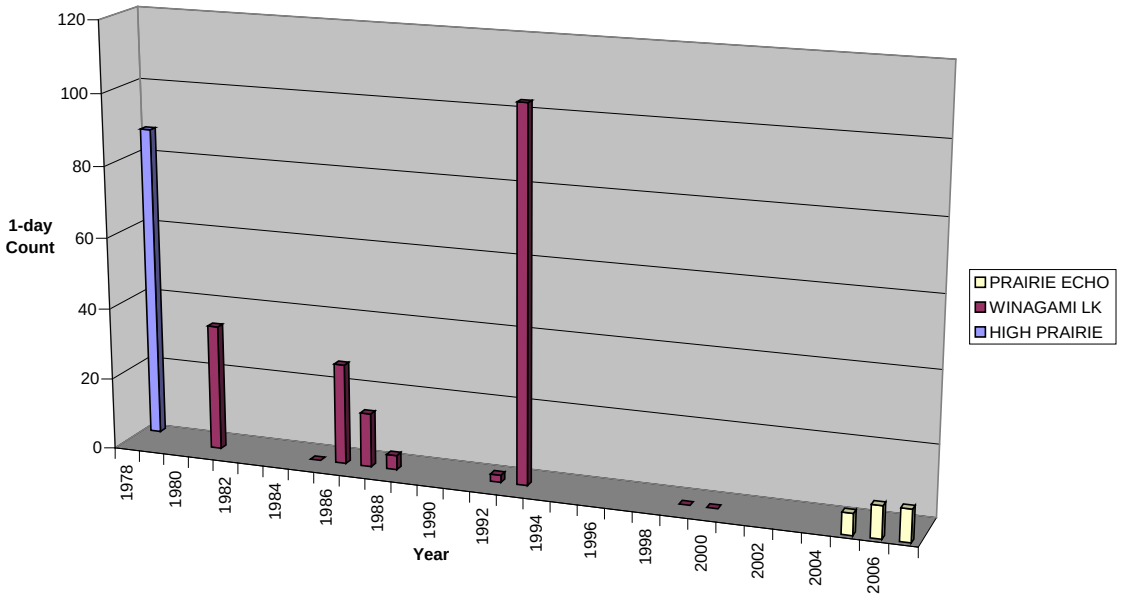


Figure 16. The number of Franklin's Gulls observed from 1978–2007 on BBS routes run near Winagami Lake

Winagami Lake is listed as a locally important Franklin's Gull breeding lake in Poston *et al*. (1990), but we were unable to find any other published or unpublished information regarding Franklin's Gulls on Winagami Lake. However, prior to 1950, lake water levels were not regulated and water levels would drop low enough to expose large areas of mudflats (Mitchell and Prepas 1991), thus Franklin's Gulls were likely not regularly nesting on the lake. In 1950, a dam was built on the South Heart River to channel water into Winagami Lake. A canal also runs from the northwest corner of Winagami Lake to Kimiwan Lake (Mitchell and Prepas 1991).

Winagami Lake, a very popular recreational lake, designated as a Provincial Park and segments of it as a Wildland Park, receives some protection from the provincial government. Franklin's Gulls nesting in the extreme northwest part of the lake are currently only protected from human disturbance by the shallow nature of the bay (maximum depth of 1 m). Larger recreational boats are not likely to venture into the bay. However, people with personal watercraft are able to access the bay and could disturb nesting birds as well as destroy nesting habitat.

3.2 Saskatchewan Lakes

3.2.1 Bloodsucker and Egg lakes (basins in the Cumberland Delta)

The Cumberland Marsh is a complex of marshes, bogs, levees and lakes that includes Bloodsucker and Egg lakes (Hart and Davis 1975). Water levels are controlled on individual lakes and wetlands, to some degree depending on annual precipitation and flooding of the Saskatchewan River, by a series of dykes, channels and water control structures. Construction of these first structures was by the Hudson's Bay Company in 1938, with later upgrades and expansion by Ducks Unlimited Canada, starting in 1961.

One BBS route runs along the road north of the Cumberland marsh leading east into Cumberland House. It was run only three years, but the counts of >100 birds in the early 2000s tie into the period (Fig. 17) when colonies of nesting Franklin's Gulls were reported to be occupying a couple of lakes within the marsh complex.

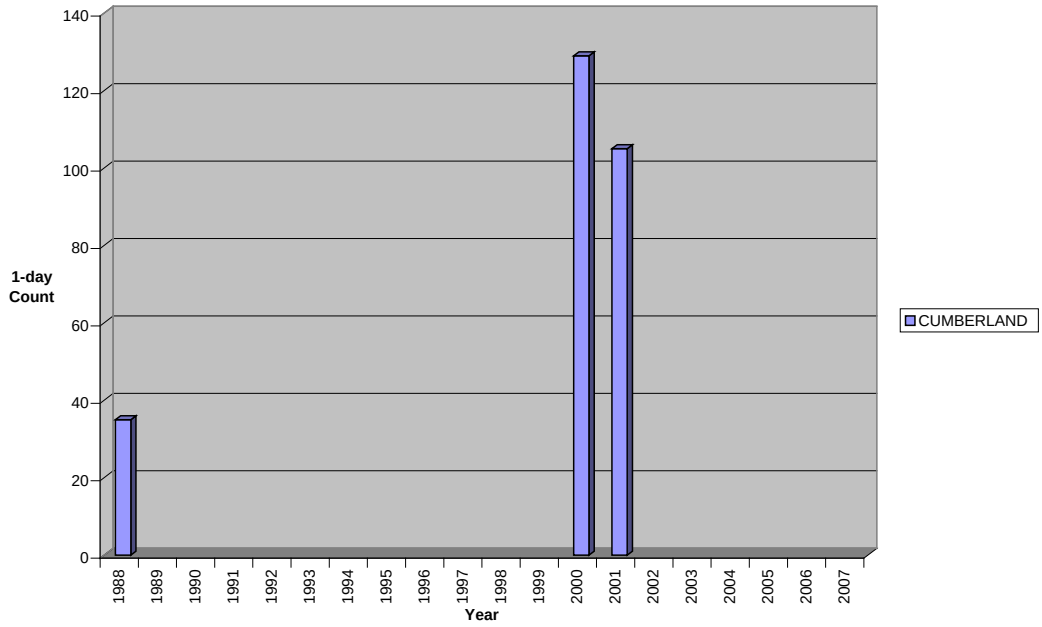


Figure 17. Number of Franklin's Gulls observed on the BBS route run along the Cumberland marsh complex

We were unable to locate any historic information on the occurrence of Franklin's Gulls within the marsh, and recent observations are limited to local residents working on the marsh complex. A breeding colony (1000−1500 adults) was located on Egg Lake in 2006, but higher water levels in 2007 made the emergent vegetation beds unsuitable for nesting and the site was not used that year (Gilbert Crane, DUC, pers. comm.). Gilbert Crane observed a large colony (1,000s) of Franklin's Gulls nesting on Bloodsucker Lake in 2003 and 2004, but flooding of the entire Cumberland marsh complex by the Saskatchewan River in 2005 eliminated any potential nesting habitat that year. No nesting birds were observed in 2006, and during our 2007 visit, we only observed 20 non-breeding adults in the area of the old Bloodsucker Lake colony site.

3.2.2 CRANE LAKE

Crane Lake, located north of the TransCanada Highway between Tompkins and Maple Creek in southwest Saskatchewan, is now a small part of what was once a 4,450-hectare lake on the prairie landscape. The first naturalist to visit the lake was J. Macoun in 1880, who noted the lake was characterized as liquid mud with scarcely an inch of water on the surface (Houston 1983). He collected five species of gulls at what is believed to be Crane Lake, but no indication if one was a Franklin's Gull. In 1905, Bent visited the marsh observing "a number of Eared Grebe nests and a fair-sized colony of Franklin's Gulls". That year, Bent also observed a colony estimated at 20,000 nests in the bulrush of a wetland called Lake of the Narrows, about 8 km

southeast of Crane Lake near Sidewood. Water levels were high in 1929, suitable for operation of a large motor launch on the lake, but by 1933 water levels were low and stagnant and in 1935 only pools of water remained. The lake was recharged in 1951 when a couple of dams on adjoining creeks broke and flooded the basin (Houston 1983). The ephemeral nature of the prairies was evident with the ever-changing water conditions on Crane Lake.

There is one BBS route near Crane Lake. It runs north-south on the east side of the lake and comes within 10 km at its closest point. Although it was first run in 1990, Franklin's Gulls were not observed until the fifth survey in 1994 (Fig. 18). No surveys were run from 1996 to 2005,, but when they were resumed, the highest count recorded to date was in 2006.

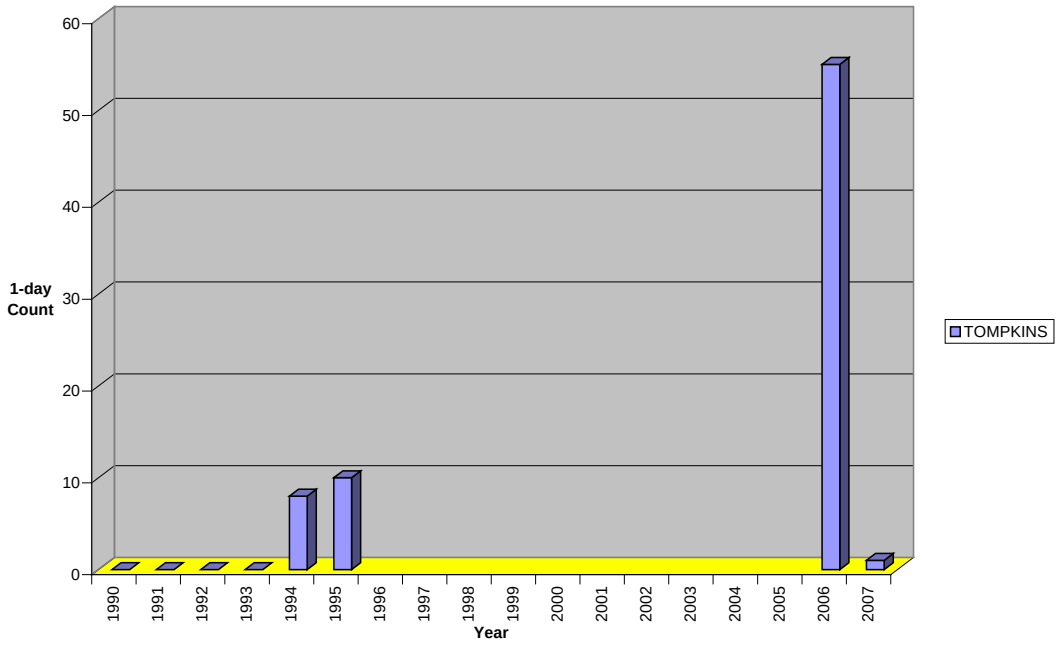


Figure 18. Number of Franklin's Gulls observed on the BBS route run near Crane Lake

Ducks Unlimited Canada initiated a project on Crane Lake in 1981 that confined the remaining water to smaller, but deeper basins by means of a large series of dykes surrounding the basin. Water conditions were still quite variable depending on the annual precipitation and the resultant runoff. Prior to the construction of the dyke network, an environmental impact statement was completed that mentions the presence of Franklin's Gulls on the site, but no indication of breeding or numbers of birds (B. Neufeldt, DUC, pers. comm.). In a visit to the site in 2006, we observed and visually estimated a large colony of nesting Franklin's Gulls (~5,000 adults), but the landscape surrounding the outside perimeter of the dyke was flooded, which prohibited our accessing the dyke. Drier conditions in 2007 allowed access on the dyke, and we were able to map and survey the colony, which was much larger than estimated the previous year. Water levels in the early 2000s on Crane Lake were apparently low (local landowners, pers. comm.), which resulted in extensive growth of emergent vegetation and a dense band of bulrush ringed the outer boundary of the basin confined within the dyke network. After traversing the dense

stand of bulrush, we found the central portion of the basin to consist of moderate density bulrush beds with patchy open water areas where the Franklin's Gulls were nesting.

The main threat to the area would be long-term drought and loss of the wetland habitat. There is some petrochemical extraction in the area, but the threat would be minimal to the wetland.

3.2.3 ENGLISHMAN LAKE

This small lake, located in the aspen parkland region of western Saskatchewan, is situated in an old glacial river channel. The area is primarily private grazing lands with extensive heavy-oil extraction involving pumping stations and large storage tanks. Numerous storage tanks are located along the east and west shorelines of the lake. The oil from these tanks is pumped into truck on a regular basis, resulting in extensive heavy traffic within close proximity to the colony.

The construction of a control structure of sheet-pile design with four stoplog bays, by Ducks Unlimited Canada in 1991 on the north end helps regulate the water levels in the basin (B. Chappell, DUC, pers. comm.). Observations during our field study show that water levels are still dependent on sufficient runoff and annual precipitation to maintain adequate water in the lake. The lake has extensive beds of bulrush and cattail used by the nesting gulls. The colony occupied the emergent beds on the south end of the lake in 2006, but with higher water levels in 2007 most of the southern area emergent beds were flooded out. The colony, in 2007, was comprised of two areas including birds nesting in the remaining emergents in the south and previously unoccupied emergent vegetation beds in the north end of the lake.

The Turtleford BBS route comes within 2 km of the lake, and runs northwest. It was surveyed annually 1976−1985, with the highest number of Franklin's Gulls sighted in 1976 (Fig. 19). The Frenchman Butte route starts 14 km to the west and continues west. It was run four times from 1994−1998. The St. Walburg route is 25 km to the north and was first run in 2004.

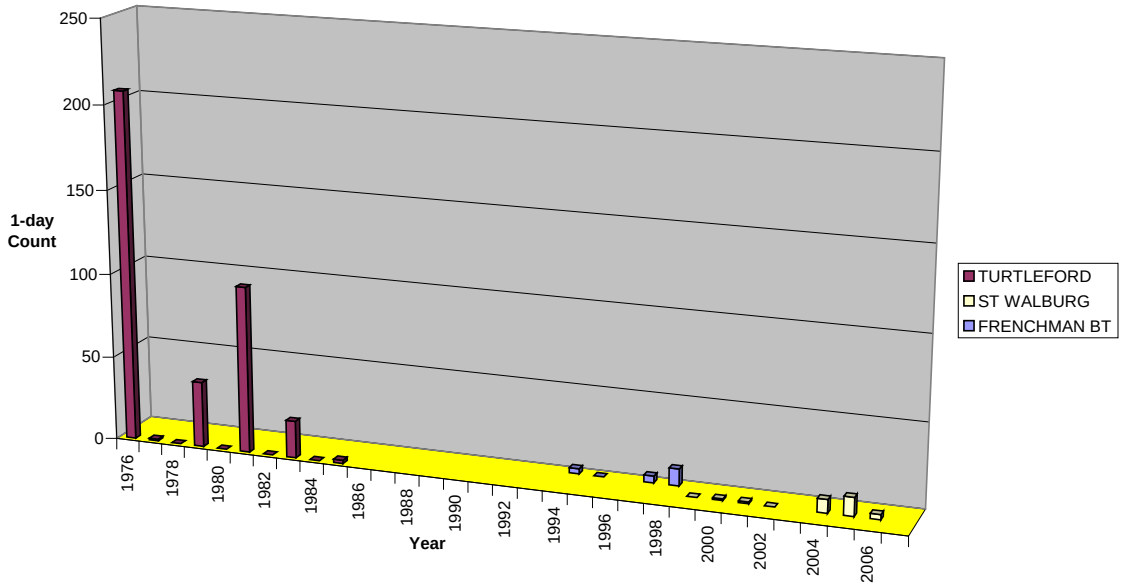


Figure 19. Number of Franklin's Gulls observed on BBS routes run near Englishman Lake

We were unable to locate any references to Franklin's Gulls. However, B. MacFarlane (DUC) noted the presence of Franklin's Gulls on the lake during a survey of the area in 1976 (B. Chappell, pers. comm.). In 2006, we had discussions with a local landholder who indicated that Franklin's Gulls have been nesting on the lake at least since the 1950s. He also indicated there were some years when water conditions were poor and no birds were using the lake.

3.2.4 EYEBROW LAKE

Eyebrow Lake, which is 9 km long and 1 km wide or approximately 900 ha in area, is located in the mid-grass prairie region of south-central Saskatchewan in the upper Qu'Appelle valley just below the southeast dam site on Lake Diefenbaker. The lake, running parallel to the Qu'Appelle River, comprises three separate basins or impoundments created by a series of dykes in 1968 with control structures to manage water levels. Eyebrow Lake represents one of the region's most significant permanent marshes (IBA website). The lake has abundant emergent growth including bulrush and cattail as well as extensive areas of open water.

There are two BBS routes coming within 13 and 16 km of the lake, but heading away north and south respectively. The Bladworth route has been run annually for all but three years from 1969 to 2007, with few observations of Franklin's Gulls. The Parkbeg route, run only five times has had numerous gulls observed since 1975 (Fig. 20). It is interesting to note that these routes did not pick up the high numbers of birds using the colony in the early 2000s.

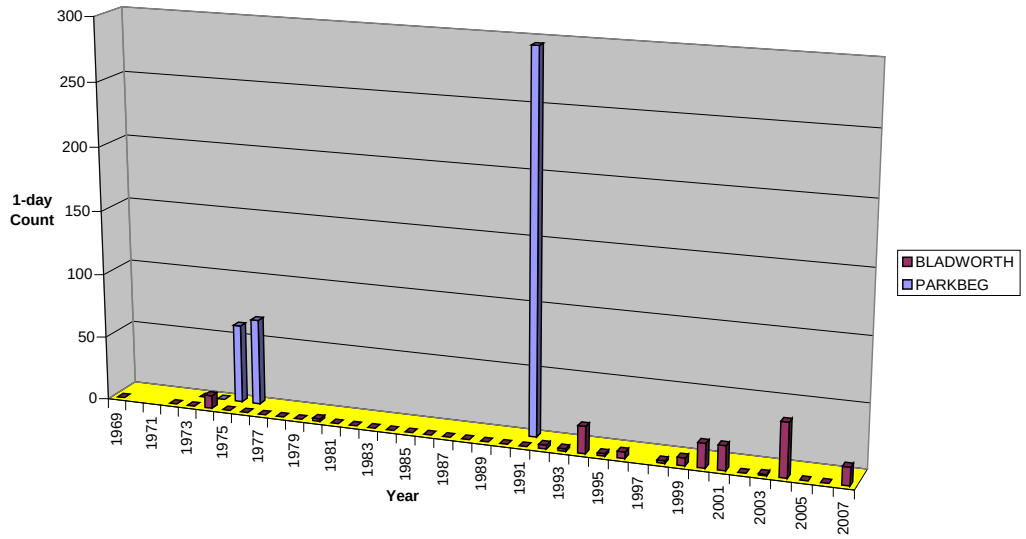


Figure 20. The number of Franklin's Gulls observed on BBS routes run near Eyebrow Lake

An estimated 2000 pairs of breeding Franklin's Gulls were observed on Eyebrow Lake in 1992 (Roy 1996). Soos (2004), during a three-year study on the breeding colony on the lake, estimated the adult breeding population at 20,000 pairs (1999), 34,000 pairs (2000) and 26,500 pairs (2001). Nest density was quite variable during the three years (1.17 nests/100 m² [1999], 2.43 nests/100 m² [2000] and 1.70 nests/100 m² [2001]). In 2007, during our study, nest density was estimated at 1.1 nests/100 m² and the adult population estimated at about 12,600 pairs.

Saigeon and Hepworth (DUC biologists) documented the Black-crowned Night-Heron as a breeding species on the lake in 1993 and 1994, when nesting colonies were located totalling 30 and 50 nests for each respective year (Roy 1996). Greater numbers of breeding Black-crowned Night-Herons were observed on extensive nesting colonies during the lake surveys in 2006–2007.

Ducks Unlimited Canada currently manages water levels in the lake through use of the control structures, and the resultant stability of the wetland is evident in its long-term use by nesting waterbirds. However, the wetland has a history of avian botulism outbreaks with the IBA website recording a period of outbreaks on the lake from 1988−1992. Eyebrow Lake is recognized as an Important Bird Area for Congregatory Species (IBA website).

3.2.5 FOAM LAKE

Foam Lake Marsh, located in the aspen parkland region of east-central Saskatchewan and northwest of the Town of Foam Lake, is an intermittent saline wetland. Water levels in the wetland are managed by a series of dykes and water control structures, developed by Ducks Unlimited Canada in 1985, that encompass approximately 1600 ha when the wetland is at full supply of water. The entire marsh complex including uplands and wetland totals 2630 ha in area (Quill Lakes region website). The marsh is located in an agricultural landscape dotted with aspen bluffs. Prior to the establishment of the control structure, water levels varied dramatically, with periods when the area was completely flooded to times when the lake bottom was dry and cut for hay (A. Goodman, CWS retired, pers. comm.).

Foam Lake is 51 km from Mud Lake, but no BBS routes have been established near it. In the 1960s, a Franklin's Gull nesting colony was observed by a pilot flying over the lake (Houston and Anaka 2003). A. Goodman (CWS retired, pers. comm.) grew up on a farm adjacent to Foam Lake and talked about nesting Franklin's Gulls on the lake in the 1950s and 1960s when water conditions were suitable. A wildlife study of the marsh in 1974 noted four species of gulls were observed in the area with probable breeding but no indication of which gull species. Three nesting colonies of Black-crowned Night-Herons were also observed that year. C. Deschamps (DUC, pers. comm.) notes the presence of a breeding colony of Franklin's Gulls on the northeast basin of Foam Lake in the 1990s but no indication of numbers. Limited nesting took place in 2006, but an estimated 10,000 adults were on the lake during our visit. A nesting colony was present in 2007 in the bulrush bed that had been flooded the previous year.

The Foam Lake marsh is the third wetland identified and protected under the Saskatchewan Heritage Marsh Agreement. It is identified as an Important Bird Area, classified as Nationally Significant for Waterfowl and Wading Birds. An observation tower is located on the northwest corner of the marsh complex with educational signage indicating an active conservation and education program for the wetland. The main conservation issue in the area is drought due to lack of spring runoff from the snow pack or low precipitation during the summer months. The extreme has been excessive runoff flooding the emergent vegetation for a period of time until the outflow is capable of removing the excess water. Such was the case in 2006 during our visit to the wetland when the majority of the emergent vegetation and island in the marsh were under water.

3.2.6 GOOSE LAKE

Goose Lake is located in the mixed-grass prairie ecodistrict about 43 km northeast of Rosetown in a agricultural landscape composed of cultivated fields and pasture/hay lands. The east side of Goose Lake is part of a provincial grazing cooperative while the west side is primarily cultivated fields. The lake is approximately 9.5 km long by 4.5 km wide. The emergent vegetation is primarily bulrush with some small stands of cattail. Local residents talk about the lake experiencing extreme water level fluctuations depending on snow melt and annual precipitation. They also mention increased numbers of birds in the area during grasshopper outbreaks in the past. During the two years of our study, the water level rose in the second year, flooding areas of low-lying pasture and opening up an area within the extensive bulrush beds along the east side of the lake.

There are two BBS routes near Goose Lake. The Delisle route comes within 16 km of the lake on the east side. It was run regularly from 1974–1994, but only once since then (Fig. 21). There were peaks in observations in the mid-1970s, the mid-1980s, and the mid-1990s. The Bounty route is more than 25 km away at its nearest point and runs south of the lake, then east, but in 2003 and 2005 it also had high numbers of Franklin's Gulls.

We were unable to locate any references to nesting Franklin's Gulls on Goose Lake, but there are references to a colony on Rice Lake about 30 km northeast of Goose Lake. The Rice Lake nesting colony (325 nests) was reported as early as 1966 by R.T. Stirling (Leighton et al. 2002) and contained at least 3,000 adults in 1990 (W. Renaud, pers. comm.). Visits to Rice Lake during our two-year study showed that high water levels on the lake removed all the emergent vegetation and removed all potential nesting cover for Franklin's Gulls. We are not aware of when the shift occurred from Rice Lake to Goose Lake. In his research for an update on the book *Birds of the Biggar/Rosetown Area*, W. Renaud (pers. comm.) did not come across any historical records or make any observations of nesting activity on Goose Lake; and M. Houston (Leighton et al. 2002) does not mention Franklin's Gull nesting activity at Goose Lake. The close proximity of the two lakes and the two BBS routes near Goose and Rice lakes make it difficult to be sure which lake was used by Franklin's Gulls observed on the routes. The colony on Goose Lake in 2006 and 2007 was the largest colony in Saskatchewan at 66,000 and 104,000 adults, respectively. The bulrush beds on the lake are extensive and provide ideal nesting cover for a variety of other waterbird species as well as Franklin's Gulls.

The main threat to the lake would be the effects of long-term drought on water levels on the lake. There may be some potential for agricultural chemical runoff from cultivated lands to the west. The landscape to the east is primarily grazing land contained within the regulation of a provincial grazing pasture, but the remainder of the landscape is under private ownership. Environment Canada has a quarter section of land (NW 5, Tp32, R10, W3) on the southeast part of the lake that is identified as Prairie National Wildlife Area Unit 8, which provides some level of protection (Jurick, 1983).

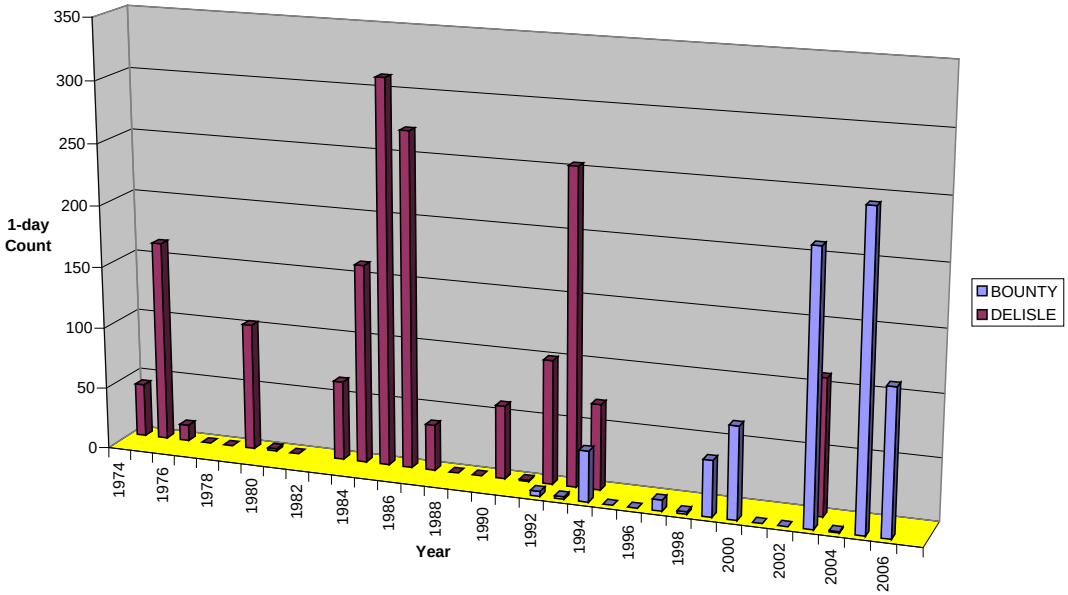


Figure 21. Numbers of Franklin's Gulls observed on BBS routes run near Goose Lake

3.2.7 MAIDEN LAKE

It is located in the aspen parkland region of northwest Saskatchewan about 11 km northwest of the Town of Glaslyn. Pastures with aspen bluffs surround the lake and land ownership is completely private. The lake is susceptible to drought conditions, as is evident by the presence of a large dugout on the southwest corner of the wetland. Water conditions were good in 2007 and extensive areas of the pasture were flooded.

We were unable to find any references to Franklin's Gulls on the lake in any literature. However, D. Hooey (Ducks Unlimited Canada) reported a colony with 1800 nests in 1976 (A. Smith, CWS retired, pers. comm.). When we first checked the wetland in 2006, we observed a large colony of nesting Franklin's Gulls (~10,000 adults). We did not get on the lake because of logistical and access permission problems. Because of the higher water levels in 2007, access to the lake was feasible and the landowner granted us permission to cross his land to the lake. The increased water levels in 2007 expanded the area of suitable habitat in the bulrush bed, which enabled a very large colony to establish on the site (~73,000 adults).

Maiden is less than 50 km from Englishman Lake, so some of the Franklin's Gulls observed on BBS routes near one lake could have been from the colony of the other lake. The Brightsand route begins 14 km to the northwest and continues northwest. It has been run almost every year 1979–2006, with peaks in Franklin's Gulls in 1981, 1992–1994, and 2004 (Fig. 22). The Edam route begins 22 km southwest of the lake and runs southwest then south. It has been surveyed annually 1991–2007, with peak observations in 1991 and 1998 (Fig. 22).

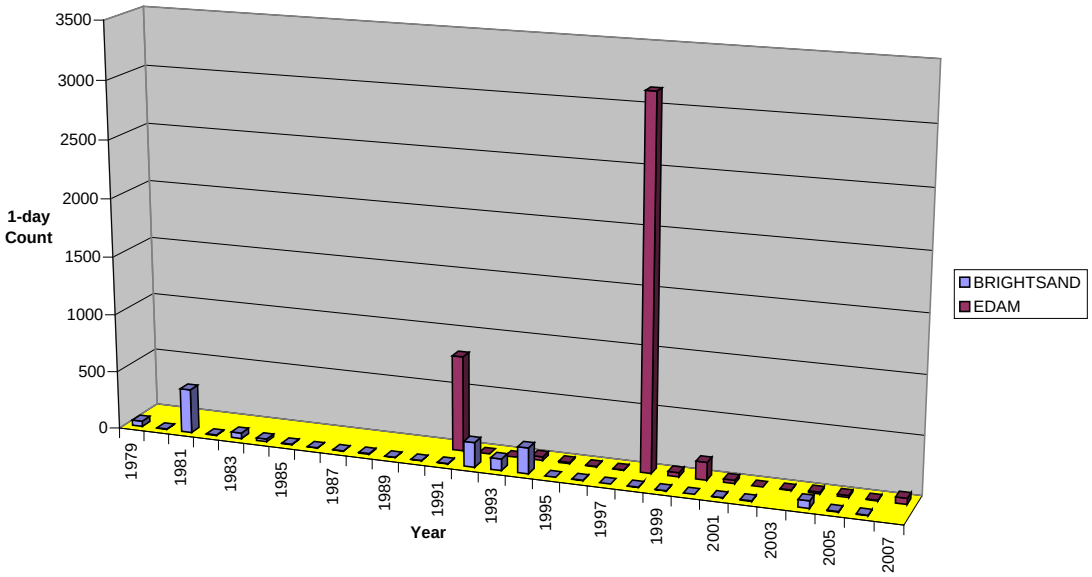


Figure 22. Number of Franklin's Gulls observed on BBS routes run near Maiden Lake

3.2.8 MIDDLE QUILL LAKE

Middle Quill Lake, referred to locally as Mud Lake (1,289 ha), is located 16 km due north of Wynyard in east-central Saskatchewan between Little and Big Quill lakes. Big Quill, the largest and furthest west of the three, is the largest saline lake in Canada (IBA website). All three are extremely shallow and do not have an outlet. The shoreline is gravely or muddy, and surrounded by grasslands, aspen parkland, and numerous freshwater marshes.

There is one BBS route, coming within 24 km of the lake on the west side. The route was only run between 1972 and 1983, and few Franklin's Gulls were observed (Fig. 23). No reference to nesting by Franklin's Gulls was found in published or unpublished literature for Middle Quill Lake. Todd (1947) noted many immature Franklin's Gulls on the Quill Lakes (no reference to specific location) during a bird specimen-collecting trip in late June. Houston (1962) visited Middle Quill Lake during the period from 1956 to 1961 to check the nesting islands for colonial waterbirds. He gives no mention of any occurrence of Franklin's Gulls during this period. However, he does mention that water levels were dropping in the basin in 1958–1959 and that the basin was dry in 1960. C. Deschamps (DUC, pers. comm.) noted the existence of a colony on the northwest corner of "Mud" Lake since the 1990s, but with only about 300 pairs. A colony of about 45,000 adults was observed nesting in the northwest corner of the basin in 2006. Excessively high water levels in 2007 destroyed that emergent vegetation bed, and the small colony (several hundred birds) relocated to the only suitable habitat on the northeast corner of the basin.

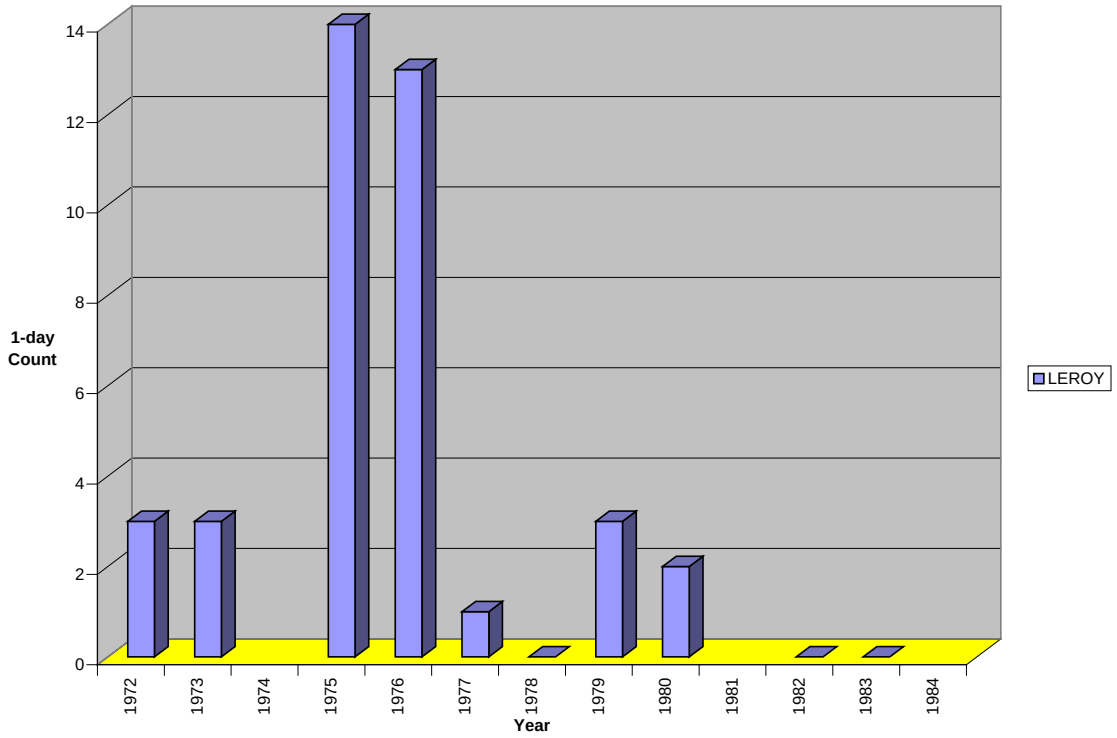


Figure 23. Number of Franklin's Gulls observed on the BBS route run near Middle Quill Lake

Little and Big Quill lakes, with their extensive mud flats and shallow water areas along the shoreline, are important for shorebird staging and breeding as well as waterfowl breeding. The islands used by nesting gulls, American White Pelicans (*Pelecanus erythrorhynchos*) and Double-crested Cormorants (*Phalacrocorax auritus*) are provincial wildlife refuges. In 1987, the lakes were used as the first implementation site for the North American Waterfowl Management Plan in Canada. The site has also been included in the Saskatchewan Heritage Marsh Program. The two larger lakes tend to have a higher salinity and lack any significant areas of emergent vegetation. Middle Quill is the only one of the three with extensive beds of bulrush along the shoreline suitable for nesting by over-water nesting waterbirds.

Threats to the site include agricultural pollution and water-level fluctuations as well as disease outbreaks, including botulism. Botulism outbreaks have been sporadic with a small die-off of ducks in 2007 and a large one in the mid-1990s of 5,000 waterfowl (C. Deschamps, pers. comm.).

3.2.9 Old Wives Lake

Old Wives Lake is a relatively shallow, intermittent saline lake of approximately 33,020 hectares located southwest of Moose Jaw in southern Saskatchewan. Most of the shoreline is rocky with a sand/silt base. A dam on the Wood River as it enters Old Wives Lake, constructed by Ducks Unlimited Canada, created a large marsh upstream and a variable-size and very diverse marsh downstream. The Wood River delta on the west end, which is heavily vegetated with bulrush and cattail, constitutes the main emergent vegetation growth in the lake except for small scattered patches around the shore. The minimal topographic relief throughout the basin results in large expanses of mudflats and shallow water areas occurring during the summer months

when water levels drawdown through evaporation (Jurick 1985). Typical of a prairie lake, there are years when the lake is nearly or completely dry, as was the case in the late 1980s, but exceptional spring runoff in 1997 filled the lake to near capacity. Water levels were receding lately, and in 2007, the colony on the Wood River delta was abandoned because water was too shallow in the emergent vegetation.

There are three BBS routes near Old Wives Lake. The Courval and Wood River routes begin about 15 km from the lake and run north and west respectively. The Mitchellton route is 29 km to the southeast at its closest point. The peak number of Franklin's Gull observations (Fig. 24) coincides with the observation of activity on the colony at the Wood River delta in the 2000s, and it is possible that there may have been some nesting activity in the mid-1970s.

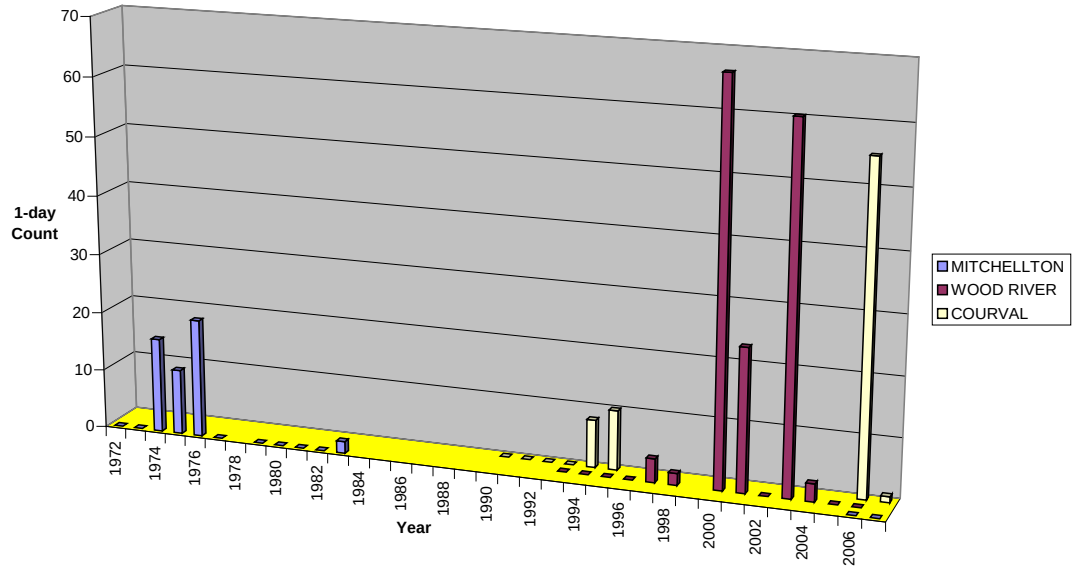


Figure 24. Number of Franklin's Gulls observed on BBS routes run near Old Wives Lake

We were unable to locate any references to Franklin's Gull nesting on Old Wives Lake. Harrold (1933) mentions large evening flights of Franklin's Gulls along the east shore of Lake Johnston (Old Wives Lake) during the period of May 10–21, but no indication of any record of nesting. A large colony of Western Grebes and Franklin's Gulls (1000s) were observed on the west end of Old Wives Lake during an airboat survey of the lake by Environment Canada biologists in the early 2000s (P. Taylor, pers. comm.). During a visit to Old Wives Lake in June 2005, we observed a large colony of nesting Franklin's Gulls (several thousand) in the emergent vegetation on the west end of the lake. Water levels were lower in 2006, and approximately 1000 adult Franklin's Gulls were observed nesting in scattered locations across the delta. In 2007, no nesting colony was active in the delta area and exposed mud flats were evident along the emergent vegetation.

The lakebed is provincial Crown land and the surrounding land is under lease to local landowners for cattle grazing. Old Wives Lake was established as a Migratory Bird Sanctuary on March 9, 1925, and as such, the lake is protected under the federal Migratory Bird Sanctuary regulations (Environment Canada website). The Isle of Bays, an island in the northeast part of the lake, is also protected by Provincial Wildlife Refuge Regulations under the Saskatchewan

Wildlife Act because of the presence of colonial nesting birds on the island (Jurick, 1985). The lake has also been identified as a Important Bird Area under various categories (IBA website).

3.2.10 PELICAN LAKE (NORTH)/WATERHEN MARSH

Pelican Lake (north) is a small wetland in a predominantly agricultural landscape surrounded by private land in central Saskatchewan. It is located approximately 1 km east of Domremy or 45 km south of Prince Albert. It is approximately 2.5 km² in size and has a scattering of bulrush bed throughout the wetland, with the largest patch in the central portion of the basin. A viewpoint on a high hill on the north side of the lake along the roadway provides a good visual of the entire basin.

Waterhen Marsh, 43 km east of Pelican Lake, is located in a wholly agricultural landscape and situated about 8 km south of the Town of Kinistino or 27 km west of the City of Melfort. Ducks Unlimited Canada (DUC) began their conservation efforts in Saskatchewan with the Waterhen Marsh project in 1938. A dam, approximately 1.5 km in width, was constructed on the north end of the marsh, and water levels are regulated by means of a stoplog control structure in the dam. Lake levels are still dependant on the annual snow melt and annual precipitation in the area.

The Wakaw BBS route starts about 6 km south of the lake then goes south. It has been run annually 1970–2006. Franklin's Gulls were numerous in the mid-1970s, but rare or absent in the 1990s and later (Fig. 25). The Birch Hills route starts 11 km north of the lake, goes north, then east. It was first run in 1989 and has been run annually to 2006. It had peaks of observations of Franklin's Gulls in 1989 and 1997, then none till 2005 (Fig. 25). Waterhen Marsh, east of Pelican Lake, includes the Birch Hills route within its 30-km radius. The close proximity of the lakes and BBS routes makes it difficult to differentiate which lake the birds on the Birch Hills route are using.

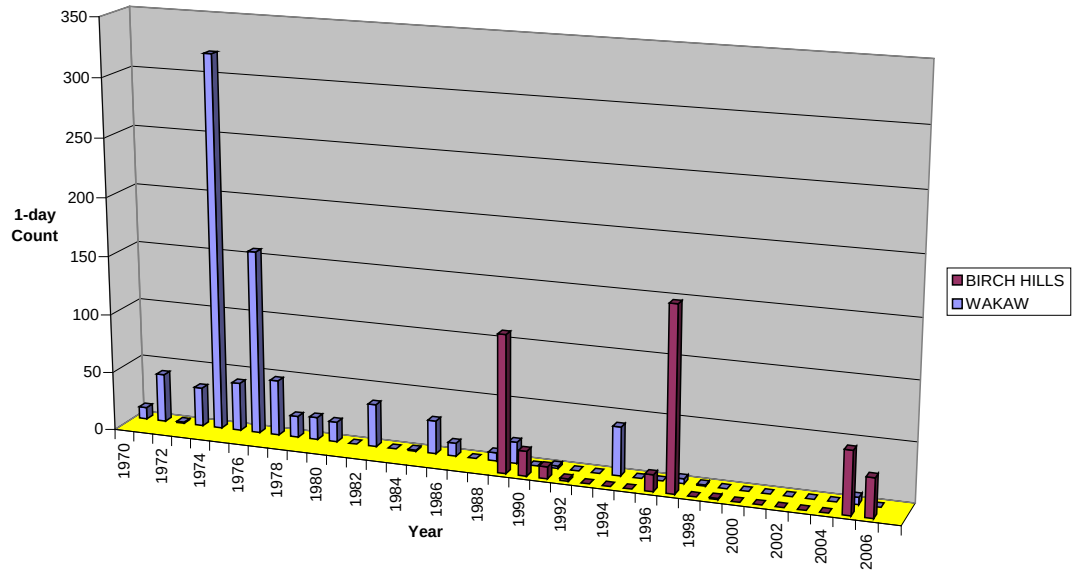


Figure 25. Number of Franklin's Gulls observed on BBS routes run near Pelican Lake (north) and Waterhen Marsh

We did not find references to Franklin's Gull use of the Pelican Lake wetland in any literature. The Franklin's Gull nesting colony was observed in the bulrush bed in the centre of the basin in 2006 and 2007. The colony site on the water was not accessed, but we estimated 1,500 and 1,000 adults respectively in each of the consecutive years.

Furniss observed a large nesting colony on Waterhen Lake near Kinistino in early June 1934 (Houston and Street 1959). Houston and Street (1959) cite another reference to Waterhen Marsh having an active breeding colony, but give no date. The most recent observation of nesting Franklin's Gulls was during our study, in which a colony was observed in 2006 (~25,000 adults) and again in 2007 (~9,000 adults).

In 2004, Waterhen Marsh was dry, and landowners seeded the lake bottom to nearly 800 acres of barley (local landowner, pers. comm.). Drought has serious implications for this wetland, as well as high water levels that destroy the emergent vegetation nesting cover, as was the case in 2007. Conservation of the Pelican Lake basin would be in the hands of the local landholders, and threats to the site are likely to include drought and possible contamination by agricultural chemical runoff.

3.2.11 STALWART MARSH

Stalwart Marsh is located along the west side of Last Mountain Lake near the north end adjacent to the Town of Stalwart. It is surrounded by gently rolling grasslands and cultivated farmlands. Water levels are largely dependent upon small streams leading into the marsh and local precipitation events. A dam on the outlet of the south unit of the wetland, and a stream diversion and dam leading to the centre unit provide additional spring runoff to the marsh and make it a more permanent marsh. Extensive beds of bulrush, cattail, phragmites and whitetop dominate the large wetlands.

Girvin is the only BBS route within the 30 km radius of Stalwart Marsh, but it has never been run. Fred Bard banded a Franklin's Gull, unknown age, on 4 July 1936 on Stalwart Marsh, but there is no notation if it was on a nesting colony (R. Dickson, pers. comm.). Dewey Soper visited Big Arm Bay on Last Mountain Lake in 1942, 1943, and 1946 and noted "every evening a stream of straggling flocks of Franklin's Gulls followed each other from the direction of Stalwart Marsh…" (R. Dickson, pers. comm.). The evening flight would indicate they were travelling to a roost site or colony, so nesting likely was not occurring on Stalwart Marsh at that time. J.R. Caldwell (1984) in an annotated list of birds of Stalwart noted Franklin's Gull as a summer visitor and possible resident, but has no record of breeding on the site. There was a nesting colony in 1982 at the mouth of Lanigan creek on Last Mountain Lake about 22 km northeast of Stalwart (P. Taylor, pers. comm.). Franklin's Gulls were nesting on Stalwart Marsh in 2005, when a large colony was observed in the emergent vegetation (P. Taylor, pers. comm.). High water levels in the spring of 2006 flooded out the majority of the emergent vegetation in the central basin, and a small colony of Franklin's Gulls was observed nesting along with the Eared Grebes. We estimated approximately 3,000 adults in the area, while fewer than 100 birds were actually nesting. A survey of the main basin Stalwart Marsh in January 2007 resulted in observations of 45 muskrat houses (125 houses on the entire marsh) and numerous "muskrat push-ups." The May visit in 2007 found the site unchanged except for higher water levels, no

emergent vegetation, and no nesting Franklin's Gulls. The muskrat activity could account for the lack of emergent vegetation although no houses were visible during the May survey.

This is a National Wildlife Area and is important for spring and fall staging for waterfowl, shorebirds, and songbirds. Intensive cropping and grazing have been the major threats to the wildlife habitat of the area. The Canadian Wildlife Service acquired the marsh and adjacent uplands in 1969 to protect them from encroachment. Ducks Unlimited Canada began marsh development on the wetland in 1938, the third project in Saskatchewan.

3.2.12 VOLK WETLAND (BASIN WE NAMED AFTER THE LANDOWNER)

A small wetland approximately 15 km north of Kerrobert along the west side of Highway 21 had a small colony of nesting Franklin's Gulls (~1,500 adults) in the bulrush habitat. The wetland is in an agricultural landscape with a mix of cultivated fields and pastureland and hayfields. Only one BBS route has been run near the Volk Wetland, and only for four years. Franklin's Gulls were seen in two of those years (Fig. 26). The first indication of a colony in the area in 2007 was the presence of feeding birds 15–20 km north of the wetland. We are not aware of any historical nesting records for Franklin's gulls for this wetland. The wetland was first located in 2007 and only visited the one time during our surveys.

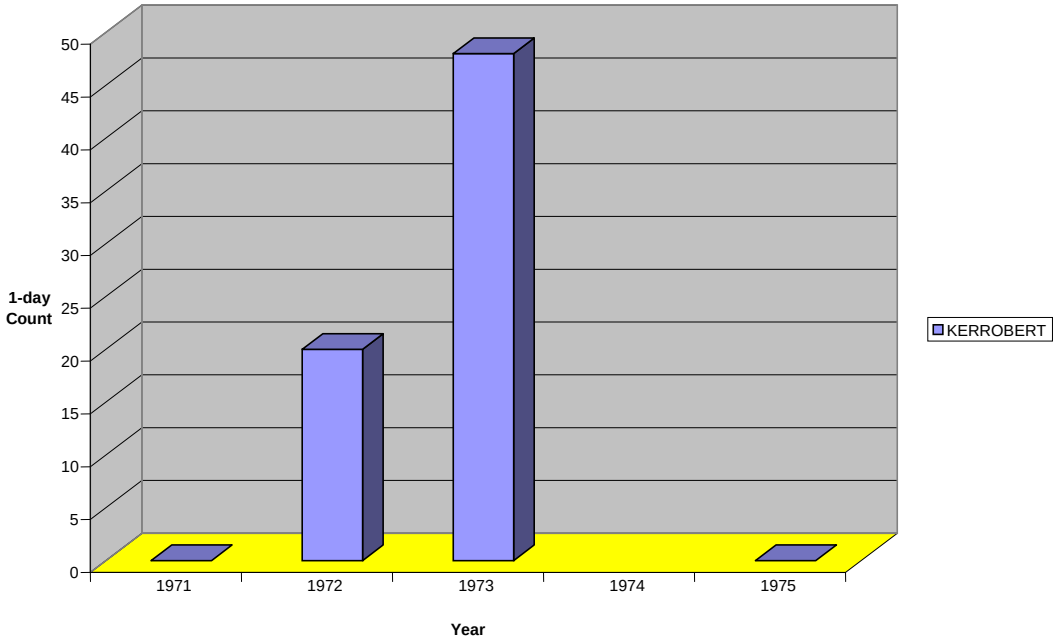


Figure 26. Number of Franklin's Gulls observed on the BBS route run near the "Volk" wetland.

The greatest conservation threat to the wetland would be drought, drainage and potential conversion of the site to agricultural cropland. Agricultural chemical runoff could be a concern for this wetland.

3.3 Manitoba Lakes

3.3.1 BIG GRASS MARSH

Large, dense stands of *Phragmites communis* (cane grass) made it unattractive for agriculture, but pressure for agricultural land and flooding of the Big Grass River led to a dredge channel that was completed in 1916. Further demands for development led to Big Grass Marsh becoming the first Ducks Unlimited project to restore wetland habitat in Canada, initiated in 1938. The Big Grass Marsh complex comprises Jackfish Lake to the north and Chandler Lake to the south. In subsequent year, the channel was enhanced, and dams with water control structures were constructed or enhanced to manage water levels in the complex. Aside from runoff from the surrounding landscape, which is dominated by agriculture (cultivation, pasture and hay lands), water flows into the marsh from the south through a channel connected to the Whitemud River. The primary emergent vegetation used by Franklin's Gulls is cattail and some hard-stem bulrush. Big Grass Marsh is a game bird or wildlife refuge and a Wildlife Management Area. It is currently a candidate Heritage Marsh. As such, it receives some protection from the provincial government. The complex is 5,000 ha in size with half of the area under control as Crown lands.

On August 2, 1943, 5,000 Franklin's Gulls were observed on Jackfish Lake (Boothroyd et al. 1977). A nesting colony was observed on the north side of Jackfish Lake in May 1963 (Boothroyd et al. 1977). In 1977, approximately 250 pairs of Franklin's Gulls established a colony in a bed of hard-stem Bulrush on the south edge of Jackfish Lake. The colony was flooded out in July. (Boothroyd et al. 1977). In 2007, Jackfish Lake had several nesting colonies scattered along the north end in the cattail beds, and we estimated the adult population at nearly 36,000 individuals. No BBS routes are run within a 30 km radius of Big Grass Marsh, but the Westbourne route near Delta Marsh runs south of the marsh, and some of the birds nesting on Big Grass may be observed on this route (see Fig. 27).

The marsh has a history of botulism outbreaks and unusually high precipitation events can flood out the emergent vegetation and nesting gulls.

3.3.2 DELTA MARSH/LAKE FRANCIS

Delta Marsh, 16,000 ha in size, is a large wetland composed of wide shallow bays, sloughs and meadows (IBA website) located on the south end of Lake Manitoba. The majority of the wetland is provincial Crown land administered by the Wildlife Branch of the Manitoba Department of Natural Resources. It is also designated as a Heritage Marsh (16,600 ha).

Lake Francis, a Wildlife Management Area, is part of the Delta Heritage Marsh and is located on the southeast end of Lake Manitoba (Manitoba Conservation–website). The lake and adjacent hay lands are protected under provincial regulations governing wildlife management areas. The lake is a maze of cattail beds interspersed with open water areas. The northeast corner is a large open water area with cottage development along the north shore, a beach ridge that separates Lake Francis from Lake Manitoba. With the cottage development along the north shore, recreational activities may potentially be a threat to the colony.

C. Broley estimated over 5,000 nests at a Delta colony in June 1933 (Taylor 2003). Franklin's Gulls were reported as abundant nesters in the Delta marsh, but no numbers were identified, and

they subsisted largely on grasshoppers in the summers when this type of prey was abundant (Nice 1962). A nesting colony was observed on the marsh during a visit in 2006, but no estimates of size were made.

Surveys conducted on Lake Francis by regional biological staff as part of a natural resources inventory in 1995 noted the Franklin's Gull as a common species, but found no evidence of nesting on the lake. Rather, it was suspected that the birds observed were likely nesting on the nearby Lake Manitoba marshes (Nash 1995). A small but active nesting colony was found in 2006 along the edge of a large cattail bed near the large open water area in the northeast, but no Franklin's Gulls were found nesting on the lake during our 2007 visit.

The Delta Beach BBS route begins about 5 km from the marsh and runs southwest. It has been run 1989–2007 with only two years missed, but Franklin's Gulls are not often observed (Fig. 27). The most observations were in 1992. The Westbourne route has been surveyed 1995–2007. It is 26 km west of Delta Marsh and more than 30 km south of Big Grass Marsh, yet more Franklin's Gulls have been observed along it in most years (Fig. 27), with peaks in 1996 and 2005.

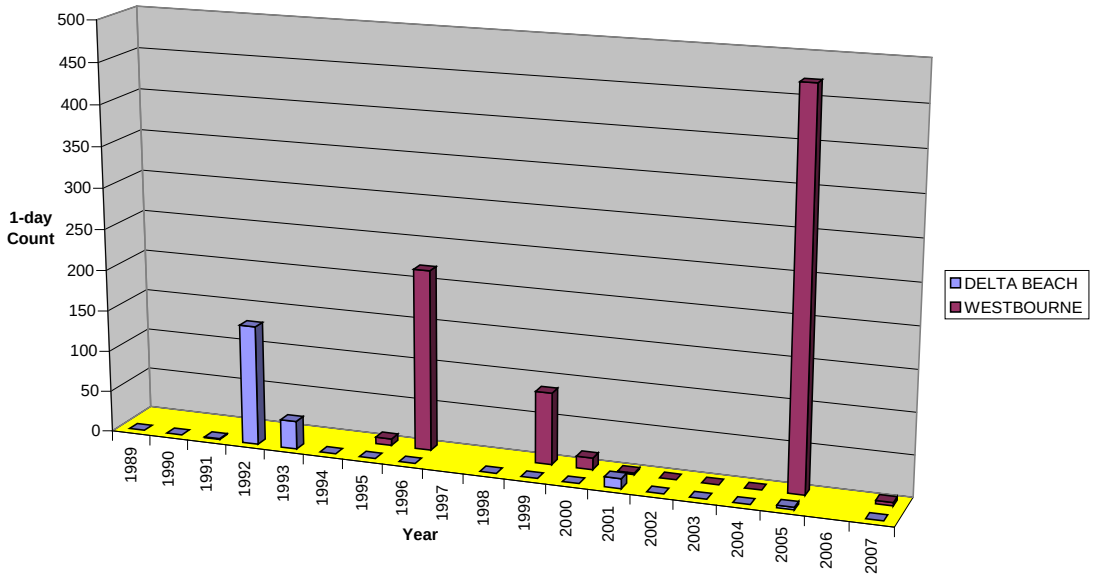


Figure 27. Number of Franklin's Gulls observed on the BBS routes run near Delta Marsh, Lake Francis, and Big Grass Marsh

Threats include development for recreation along the fringe areas, diversion of water and drainage water-level fluctuations (IBA website). Water-level regulation on Lake Manitoba has degraded the marsh habitat over the past numbers of years.

3.3.3 GLENBORO MARSH

Glenboro Marsh, about 4 km south of the Town of Glenboro, is divided into two components, with the east being larger and more heavily vegetated while the west is less vegetated with more standing open water. The east basin has extensive beds of cattail that cover most of the basin and is not well suited for nesting Franklin's Gulls or other waterbird species. The west basin has emergent beds of cattail that are broken up by areas of open water, creating an edge effect that is

well suited to and used by nesting Franklin's Gulls. The surrounding landscape, completely under private ownership, is agricultural with a mix of cultivated fields and hay/pasture lands.

No BBS routes were found within the 30 km radius of Glenboro Marsh although the Croll BBS route on Lizard Lake does come near the eastern boundary limit. Franklin's Gulls were observed in a nesting colony of about 2,000 pairs on Glenboro marsh in 1983 (Kopachena 1987). A visit to the site in 2006 and 2007 resulted in further documentation of nesting on the wetland complex. In 2007, the east colony (~1,000 adults) was limited to a few open water areas with nesting Franklin's Gulls located on the edge in the new growth cattail. The west colony habitat was more suitable with a mix of cattail and bulrush, and colony size was much larger (~8,700 adults).

The potential for agricultural chemical runoff could affect the colony, but drought is likely the greatest threat to the existence of the colonies on the east and west basins. The continued growth of the dense cattail beds on the east basin may eventually eliminate any suitable nesting habitat for Franklin's Gulls.

3.3.4 LIZARD LAKE

Lizard Lake is an isolated wetland varying in size from 500–1,000 ha, depending on water conditions in a landscape that is totally dominated by agriculture. Water levels are regulated by construction of a weir with a water control structure on the east side of the wetland and under Ducks Unlimited Canada management. It is also a candidate Heritage Marsh.

The Jordan BBS route is 29 km east of the lake, running north. It has been surveyed nearly every year 1967–2007, with inconsistent observations of Franklin's Gulls in the 1970s, none in the early 1980s, and a peak in 1988. The Holland route is 24 km to the northwest, and comes within 30 km of Glenboro Marsh. It has been surveyed 1989–2007, with a peak in Franklin's Gulls observations in 1996. The Graysville route runs east-west 26 km north of the lake. Few Franklin's Gulls were observed after it was begun in 1995, until more than 200 were observed in 2006 (Fig. 28).

Franklin's Gull nesting colonies have been identified in the past, but there is no reference as to when they were active (Manitoba Conservation–website). There was an active Franklin's Gull colony (~5,300 adults) in 2007, and it was located in the new cattail growth found between the edge of the dense, old growth cattail and areas of open water.

Threats to the area include drought and continued growth of the dense cattail beds that are unsuitable for nesting Franklin's Gulls. Agricultural chemical runoff could be an issue from the surrounding landscape.

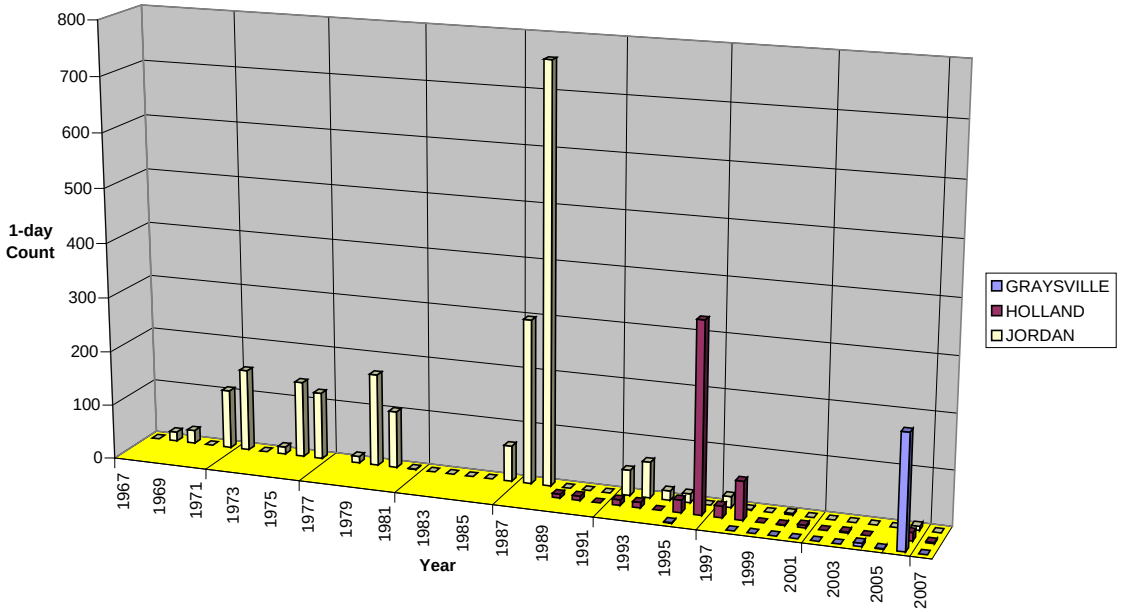


Figure 28. Number of Franklin's Gulls observed on the BBS routes run near Lizard Lake

3.3.5 OAK HAMMOCK MARSH

The Oak Hammock Marsh Wildlife Management Area is a 3600-ha restored wetland. The marsh is a remnant of the once vast St. Andrews Bog set between the Stonewall ridge to the west and the lower Selkirk ridge to the east. Early attempts at drainage all but eliminated the marsh, but it was restored through the construction of dykes and water control structures and comprises six wetland cells or impoundments. The marsh is surrounded by remnants of tall-grass prairie and formerly cultivated areas that have been seeded to nesting cover (Manitoba Conservation– website). Water levels are manipulated to manage open water areas and the amount and density of emergent vegetation growth within the various cells. An interpretation centre is located on the southwest corner of the complex run by Ducks Unlimited Canada and the Government of Manitoba. It has been identified as an Important Bird Area for a number of species including the Franklin's Gull.

The Riverside BBS route is located within 14 km of the marsh. It was run 1967–2005, with peaks in observations of Franklin's Gulls in the early 1990s and the mid-2000s (Fig. 29). The Tyndall route has been run almost as frequently, 1968–2007, and although closer to the marsh, starting 8 km to the east, tended to record fewer Franklin's Gulls in more recent years, though more in the 1970s. The Stonewall route runs southwest of the marsh, about 14 km away. It was first surveyed in 2006 (Fig. 29).

Surveys of colonial nesting waterbirds were conducted across southern Manitoba in 1979, and a colony of 2000 nests was reported on Oak Hammock Marsh (Koonz and Rakowski 1985) and estimated at 5,500 breeding pairs in 1995 (IBA website, Taylor 2003). An active colony was located in one of the cells in 2005 and 2006. During our visit in 2007, no nesting colony was located but about 200 Franklin's Gulls were observed foraging above one of the cells.

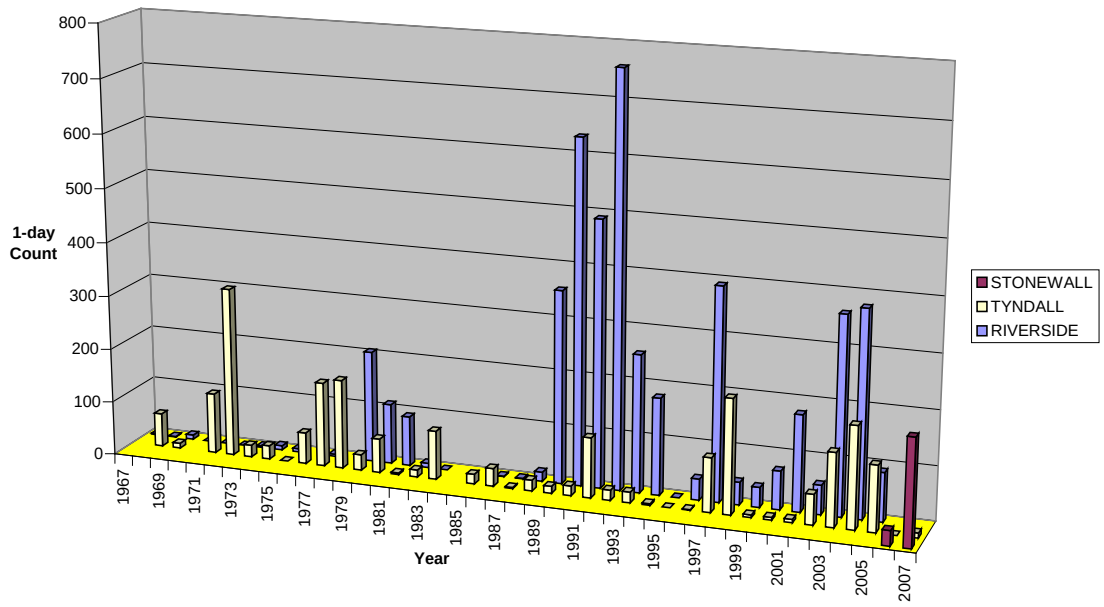


Figure 29. Number of Franklin's Gulls observed on the BBS routes run near Oak Hammock Marsh

The area is surrounded by privately owned agricultural lands and urban/industrial development is a concern (IBA website). This wetland is a Manitoba Heritage Marsh site and receives some protection under provincial regulations.

3.3.6 READER AND SASKERAM LAKES (BASINS LOCATED WEST OF THE PAS)

Reader Lake is found north of Saskeram and about 20 km northwest of The Pas in a boreal landscape. The Saskatchewan River, which runs near the west boundary of Reader Lake, influences water levels during flood years. The lake is divided into two parts, North and South, separated by a weir and control structure that regulates the water level in the north basin with excess flow into the south basin. In 2007, the North Reader basin had central area consisting of mainly open water with a wide peripheral emergent zone, with two large shallow bays along the west portion of the basin (DUC Project Biological Inspection Report 2007). A peninsula of emergents (cattail and bulrush) in the southern portion of the basin is the focal nesting area for Franklin's Gulls.

Saskeram Lake is located in a boreal landscape about 15 km west of The Pas in west central Manitoba within the Saskeram Wildlife Management Area, which includes the Reader lakes and was designated in 1963 (958 km^2) (IBA website). The water level in this basin is regulated by channels, dikes and water control structures (bracken dam with stop logs) on several inflow and outflow creeks. In 2007, 35–40% of the basin was open water with the remainder covered by emergent vegetation. The basin, a wildlife management area, is on Crown land surrounded by Crown-leased land for pasture and hay lands. Water levels were high in 2005 because of a 1-in-35-year flood event on the Saskatchewan River delta, and higher levels occurred in 2006 as a result of high snow pack and abundant precipitation in the region (DUC, Project Biological Inspection Report 2007).

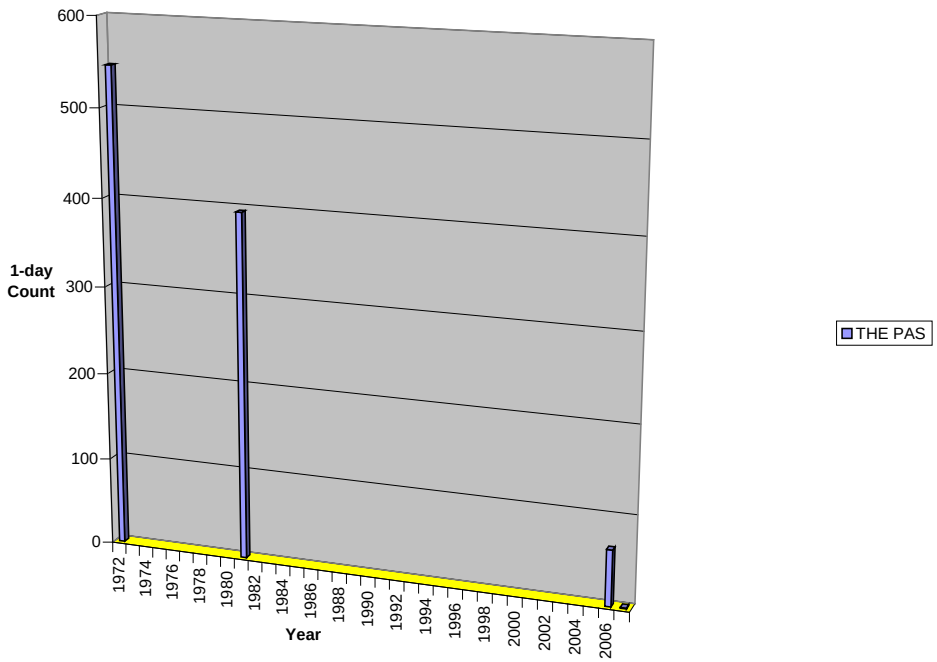


Figure 30. Number of Franklin's Gulls observed on the BBS route run near Reader and Saskeram lakes

The only BBS route near the Saskeram and Reader lakes colonies is The Pas. It has been run only four times between 1972 and 2007, and at least one Franklin's Gull was seen each time (Fig. 30). There is no historic record that we could find of possible nesting by Franklin's Gulls on the Reader wetland. D. Clayton (DUC The Pas) observed a small colony of nesting Franklin's Gulls on the north basin during surveys of the area in 2006. During a visit in 2007, a colony of about 1,100 adults was nesting in the emergents similar in location to the previous year. During the survey in 2007, a large colony was observed on Saskeram in the cattail emergent vegetation that is thinning because of high water levels. D. Clayton (DUC The Pas) visited the area in 1990 and observed a large nesting colony that appeared to be larger that year, which would indicate he was aware there had been a colony present in the area prior to that year.

The one major threat to the wetland is flooding by the adjoining river such as the Saskatchewan River. The Saskeram wetland is a Manitoba Heritage Marsh site and receives some protection under provincial regulations. Conservation action is limited to the management activities of agencies such as Ducks Unlimited Canada at The Pas.

3.3.7 WHITEWATER LAKE

Whitewater Lake is a catchment basin in the southwest corner of Manitoba just north of Turtle Mountain Provincial Park (IBA website). Whitewater is an alkaline lake that can be dry during severe drought periods but can range in size from 6,070 to 10,320 ha, depending on runoff and local precipitation. At the east end of the lake, Ducks Unlimited Canada (DUC) has constructed a series of dykes with water control structures to create basins with stabilized water levels for nesting birds.

The Croll BBS route begins 17 km northeast of the lake and continues mostly north. It has been run fairly regularly since 1967, but Franklin's Gulls were not observed in great numbers until the late 1990s, and the highest numbers occurred in the 2007 survey (Fig. 31). The Lena route begins 26 km southeast of the lake and continues southeast. It has been surveyed 1989–2007. Franklin's Gulls were not seen until 1993, with a peak in 1999. The Grand Clairi route is 21 km west of the lake, running north. It has been surveyed annually 1995–2007 with peaks in 1997 and 2004–2005 (Fig. 31).

The large size, limited access and remote nature of Whitewater Lake make it difficult to view all potential areas on the lake for nesting Franklin's Gulls. In 1995, 3,000 pairs of Franklin's Gulls were recorded in a nesting colony of the lake, and it is identified as an Important Bird Area (IBA website). R. Bazin visited the site in 2004 by airboat and located an extensive colony in the bulrush beds in the central portion of the basin. An estimated 207,000 adults were located within the confines of this colony (CWS, unpubl. data). High water levels in 2005 flooded out the bulrush vegetation in the central portion of the lake and destroyed the colony with the loss of young and eggs. Colonies were evident in 2006 around the perimeter of the lake, but no counts were conducted. In 2007, the colonies were again distributed around the perimeter of the lake with clusters in the northeast and southwest areas of the lake. The largest colony was located within the confines of the DUC cell on the east end of the lake.

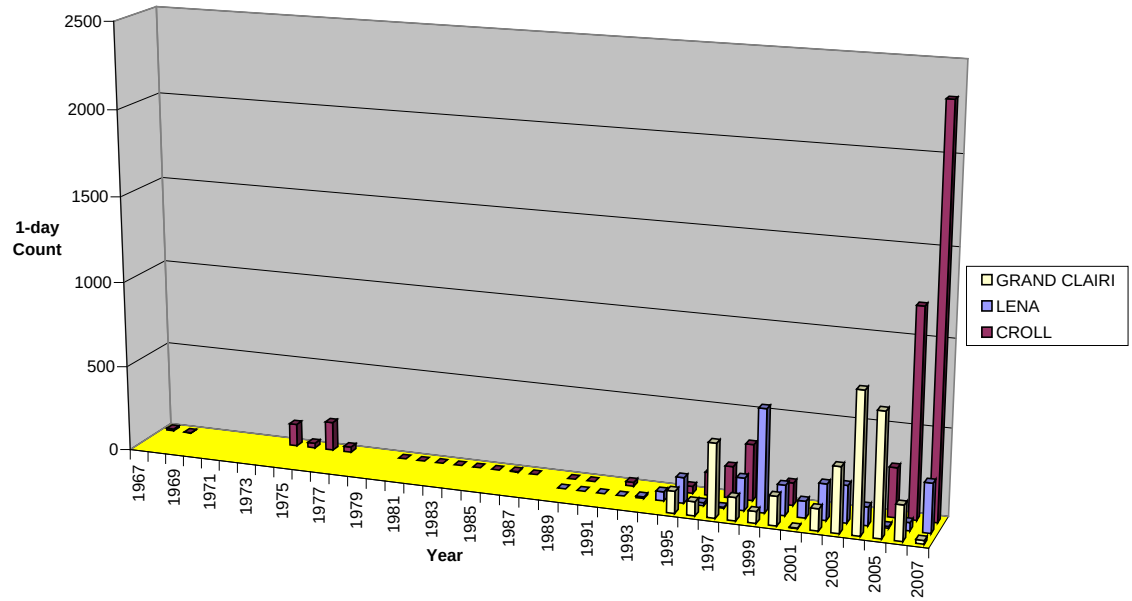


Figure 31. Number of Franklin's Gulls observed on the BBS routes near Whitewater Lake

The entire lake is designated a Wildlife Management Area under provincial regulations, so it is afforded some protection. It is also designated a Ramsar site or wetland of international importance and is currently a candidate Heritage Marsh. Viewing sites are established around the area to promote education and conservation of wildlife resources on the lake. Drought can affect the main lake basin, but the basin on the east end may offset some of the effects with regulation of water levels in a smaller area. The lake has a history of botulism, which can be highly detrimental to dense concentrations of nesting waterbirds.

4.0 CONCLUSIONS

Franklin's Gulls appear to have a long history of nesting on many of the lakes found with active colonies during our study on the Canadian prairies. Relatively stable water and emergent vegetation conditions as well as minimal disturbance are likely the main reasons for the continued use of these lakes by nesting gulls. Water management on these lakes plays an important role in the stability of these colonies as is evident with the number of lakes managed by conservation agencies. The satellite lakes, primarily in Alberta, that are occasionally used for colonies (e.g. Jessie Lake, Forsyth Lake, Third Lake) may be important habitat for nesting Franklin's Gulls when conditions at the main lake (e.g. Frank and Moose lakes) are not conducive to nesting or capacity of the lake has been reached. Lakes where Franklin's Gulls no longer nest are those that are dry, flooded, have little emergent vegetation left, vegetation is too dense and/or there is too much disturbance for nesting gulls. Franklin's Gulls may recolonize some of these lakes if water and emergent vegetation conditions again reach appropriate levels and no development occurs on the lake that could deter use by the nesting gulls.

Franklin's Gull colonies face potential threats on all the lakes visited. Mortality due to power line collisions, changes in water quality (pollution from agricultural runoff; chemical pesticides) or depth, destruction of nests and nesting habitats due to shoreline development, recreation, and disturbance by humans were identified as potential threats during our surveys. Conservation steps need to be taken to ensure that the threats on the core Franklin's Gull colonies identified in this report are minimized. The major portion of the Franklin's Gull global population resides in Prairie Canada during the breeding season, and it is important for the conservation of this species that these colonies and wetlands be protected.

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Appendix 9. Franklin's gull colonies newly found or revisited in 2008 to confirm status

Alberta Lakes				
Reed	May 23	>2,000 adults	Bulrush	New colony, north of Shanks Lake on Hwy 62, southern Alberta. Wetland in not very large, next of active farmstead.
Frank	May 25	Breeding; 1,000s	Bulrush	Area of colony reduced to that of the nest area survey in 2007, fewer birds were observed.
Third	May 25	Breeding; 10,000s	Bulrush	Colony area and numbers similar to 2007 observations and water conditions appear similar.
Stobart	May 26	Breeding	Bulrush	Colony area and numbers appear similar to the 2007 observations from east access.
Gull	May 27	2,500–5,000	Cattail/ Bulrush	New colony north of Gull lake about 1 kilometer in small wetland. Occupied nesting habitat around the wetland perimeter.
Bittern	May 29	Breeding	Bulrush	Colony active and appears to be similar in area and numbers to 2007 observations.
Big Hay	May 29	Not active		No birds observed on the lake.
Saskatchewan Lakes				
Pasqua	June 10	Present– several hundred		Birds roosting on shoreline of the north end of the lake, no breeding activity observed on the lake.
Eyebrow	June 10	1,000s	Bulrush	Colony active but numbers of birds and area of occupancy lower (possibly < 50% of area and numbers?)
Foam	June 12	50,000–70,000	Bulrush	Nesting colony covers entire basin of the complex and birds are using all emergent habitat.
Middle Quill	June 18	20,000	Bulrush	Colony active, area and location of colony similar to 2006, but numbers and density appear lower.
Waterhen Marsh	June 19	Not active		No emergent habitat is visible on the lake and no gulls were observed.
Turtle	June 24	500–1,000	Bulrush	New colony on north end of lake. Bulrush bed also occupied by nesting Western Grebe and about 50 pairs of Forster's Terns.
Meadow Lake P.P.	June 27	Active colony– location unknown.		South of Meadow Lake Provincial Park and east of the Hamlet of Dorintosh there is a lake with a Franklin's gull colony, but no access.

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