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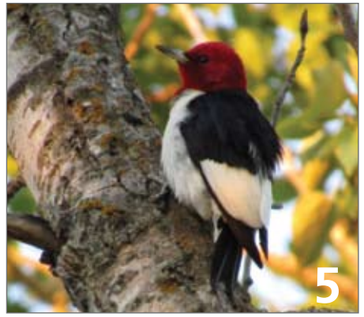
BLUE JAY



Donna Gamache shares her observations of Red-headed Woodpeckers near her home in south-central Manitoba.

The spring of 2009 was a record year for breeding Great Gray Owls in and around Riding Mountain National Park, with evidence of breeding within a relatively small area. In addition, spring 2009 provided the first breeding record for Northern Hawk Owls in Riding Mountain National Park.

J. Paul Goossen and Ken Porteous review the recent status of Piping Plovers in Manitoba and the Special Conservation Areas designated to protect the species, as well as the efforts undertaken to protect and restore habitat on SCAs and the value of SCAs for protecting endangered species habitat when the species no longer uses them.

Upon examining shrews found dead on a road at Delta Marsh, Manitoba, Spencer Sealy discovered that each had been bitten and apparently discarded by a mammalian predator, probably a weasel.

In 2016, one new species was added to the all-time list for the Saskatchewan Christmas Bird Count (CBC), bringing the historical total to 191 species. See the full results of the 75th Annual Saskatchewan CBC on page 32.

In this issue's edition of Human Nature, Rob Warnock shares why the Last Mountain Bird Observatory (LMBO) is one of his favourite places to birdwatch during spring and fall migrations.

WHAT'S INSIDE

FROM THE PRESIDENT

Dr. Branimir Gjetvaj
President, Nature Saskatchewan

The mission of Nature Saskatchewan is to engage and inspire people to appreciate, learn about and conserve Saskatchewan's natural environment. Our Society strives to encourage a better understanding of nature, and human relation to nature. We participate in, and contribute to research that increases knowledge of the natural world. To further support research that complements our goals, we provide graduate student scholarships to those attending post-secondary institutions in Saskatchewan.

ON THE FRONT COVER

An Upland Sandpiper photographed south of Rush Lake, Saskatchewan in the middle of a grassland prairie, far from any notable water source.
Photo credit: Randy McCulloch

ON THE BACK COVER

"Berries on Orange" taken October 11, 2014 in Wascana Park in Regina. These berries belong to the Red Osier Dogwood plant (*Cornus stolonifera*).
Photo credit: Paule Hjertaas

Charlie Bailey, who received one of two scholarships that were awarded this year, is studying the importance of wild insect pollinators for fruit crop production in Saskatchewan. Part of her research is to see if there is a link between the level of intensity of agricultural production and the diversity of wild insects that pollinate sour cherry orchards. Charlie is hoping that the results of her research will lead to a better understanding of how much wild insect pollinators contribute to fruit crop production, and ultimately result in agricultural practices that reduce harm to wild pollinators.

Why is this research important? More than 70 per cent of global food crops depend, at least in part, on pollination by animals. The majority of animal pollinators are insects (e.g. various bees, flies, wasps, moths, and butterflies). They play a crucial role in nature by transferring pollen between the male and female parts of flowers to enable fertilization and formation of seeds and fruit.

Bees are the most important group of pollinators, with more than 20,000 species described worldwide. About 12 bee species — such as the honey bee, some bumblebees and solitary bees — are commonly managed and used for crop pollination, a crucial step in securing sufficient food supply for human consumption[1]. Non-bee wild pollinators also play an important role in the production of our food by pollinating more than 40 major crops grown worldwide. They improve pollination efficiency and the level of fruit set twice the rate of what is achieved by domesticated honey bees[2].

A group of research scientists, including Dr. Cory Sheffield, Curator of Invertebrate Zoology at the Royal Saskatchewan Museum in Regina, conducted a survey of field studies of non-bee pollinators from around the world and concluded that the role of these alternative pollinators has likely

Dr. Branimir Gjetvaj

been underestimated[3]. In some crops, non-bee insects may provide up to half the pollination services of honey bees. These alternative pollinators might also be able to provide more robust ecosystem services in the uncertain and rapidly changing world.

Human-induced land-use change and intensification are considered to be among the main forces behind the pollinator declines. The underlying mechanism of this decline is thought to be the loss of habitat that supports host plants and provides nesting sites[4]. In spite of their importance, there are a limited number of studies that have investigated the contribution of wild pollinators to Canadian agriculture, and the impact that agricultural intensification has on their populations.

At Nature Saskatchewan, we are proud to be able to support young scientists who conduct research that will lead to better understanding of natural processes impacting biodiversity, food security and human well-being.

1. Potts, S.G., *et al*. (2016): Safeguarding pollinators and their values to human well-being. *Nature* 540:220-229.

2. Garibaldi, L.A., *et al*. (2013): Wild pollinators enhance fruit set of crops regardless of honey bee abundance. *Science* 339:1608-1611.

3. Rader, R., *et al*. (2016): Non-bee insects are important contributors to global crop pollination. *Proc. Natl. Acad. Sci. USA* 113: 146-151.

4. Potts, S.G., *et al*. (2010): Global pollinator declines: trends, impacts and drivers. *Trends Ecol. Evol*. 25:345-353.

BLUE JAY

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Blue Jay welcomes all submissions, preferably by e-mail (although hand-written or typed manuscripts will be considered to accommodate those who do not have access to computer equipment), polished or in need of some editorial assistance. All items for publication should be sent to the editor electronically (in a Microsoft Word document) by e-mail or on CD. Hard copies and CDs can be mailed to the editor at the address above.

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January 1 for the Spring issue,
April 1 for the Summer issue,
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'FLYING CHECKERBOARD'
A DELIGHT TO WATCH

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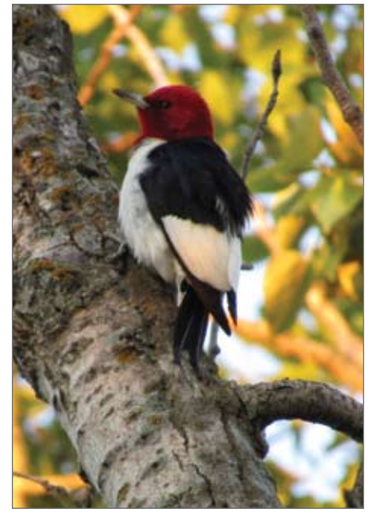
Have you seen a 'flying checkerboard' recently? That is one of the names for the Red-headed Woodpecker (*Melanerpes erythrocephalus*). With its crimson head, snow-white body, and black and white wings, I can see why it is called this, especially when it is flying.

Although the Red-headed Woodpecker is classed as 'threatened,' in our section of south-central Manitoba — in pastured areas a few kilometres from the town of MacGregor — this species seems to be doing well. Over the last few years, my husband and I have seen Red-headed Woodpeckers frequently (although prior to the last five years or so, I had only ever seen one).

My husband runs several bluebird lines (through Manitoba's 'Friends of the Bluebirds,' based in Brandon). Most of his boxes are in cattle pastures and in monitoring these boxes, we often see Red-headed Woodpeckers as well. We have located their nests twice, both times high up in a dead or dying tree. So far this summer we have seen red-heads in about six different locations.

This spring on one afternoon walk, we saw six woodpeckers in an hour. Three of them were in the same spot; the others were in three separate locations, so I am pretty sure there were six in total that day.

The three that were together appeared to be having a spat over one dead tree. They took turns landing on it, swooping away and then coming again. Perhaps they all wanted it as a nesting site, or perhaps it was two males both trying to impress a female.



Adult Red-headed Woodpecker.
Photo credit: Donna Gamache

This particular tree stands very near a different dead tree where a pair nested two years ago. At that time, we watched them several times as the adults flew back and forth feeding young birds into a cavity near the top of the tree. Unlike many woodpeckers, red-heads often reuse a nest cavity for several years and I suspect that they were also re-using that tree last year, but unfortunately a bad windstorm blew the tree down, so any nest would have been destroyed.

In the late summer, each of the last two years, we have been fortunate to also see young red-heads flying around. Juveniles do not have a red head; instead it is a dark gray/brown. However, the bold white wing patches, contrasting with the black back, and the fact that adults were nearby, made them easily identifiable as red-heads.

A Red-headed Woodpecker visits the tree in which it is nesting. Photo credit: Donna Gamache

If you're looking for Red-headed Woodpeckers, late July or August is a good time. Incubation often occurs during early July and takes about two weeks, after which the adults will be flying back and forth feeding the young in their nest for up to four weeks. Then for another while, the young may be flying in the same area. The flying checkerboard appearance always excites me and makes a hike worthwhile.

RECORD NESTING YEAR FOR GREAT GRAY AND NOTHERN HAWK OWLS

IN RIDING MOUNTAIN NATIONAL PARK REGION DURING THE SPRING OF 2009

Northern Hawk Owl chick, June 2009. Photo credit: Ken Kingdon

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The spring of 2009 proved to be a record year for breeding Great Gray Owls (GGOW) (*Strix nebulosi*) and Northern Hawk Owls (NHOW) (*Surnia ulula*) in and around Riding Mountain National Park (Table 1).

Riding Mountain National Park has been a known breeding area for GGOWs for decades, with the author recording at least one nest every two-to-three years since 1991 in or near the Park. However, the spring of 2009 proved to be a record year, with evidence of breeding, including active nests and/or fledged young found within a relatively small area (Figure 1).

The spring of 2009 also provided the first breeding record for NHOWs in Riding Mountain National Park (RMNP unpublished data). Another NHOW breeding record was located east of the park and just west of Lake Manitoba (Figure 1). These records appear to be the most southerly for NHOW in southwestern Manitoba. The closest breeding records for NHOW are about 30 km to the north of these 2009 records.[1]

The lack of breeding records in southwestern Manitoba is possibly due to either a lack of appropriate habitat or search effort. Eastern Manitoba has records of NHOW breeding as far south as the 49° N parallel and there are breeding records extending into boreal forest habitats of adjacent Minnesota.[1,2] More recently, Manitoba's Breeding Bird Atlas, conducted between 2010 and 2014, had no confirmed records of Northern Hawk Owls breeding in the southwest portion of Manitoba, although there were two records, both rated as "possible nests," with one located to the south of the Park and one to the northeast.[3] No details were available for these two records from the online data provided by the Manitoba breeding bird atlas website.[3]

As both GGOW and NHOW are among the most diurnal of Manitoba's owl species (along with Snowy and Short-eared Owls), and with their habit of sitting in conspicuous locations (year-round for NHOW, in winter only for GGOW), these two species are relatively easy

Nesting site of Northern Hawk Owl, June 2009.
Photo credit: Ken Kingdon

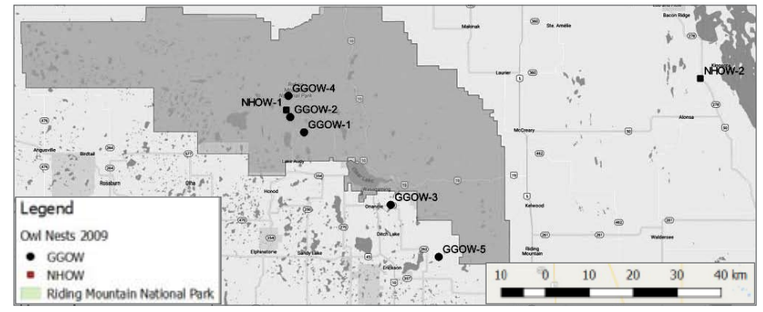

FIGURE 1. Map of owl observations centred in the Riding Mountain National Park region of Manitoba, Spring 2009

TABLE 1: Owl breeding observations for Riding Mountain National Park region, spring of 2009.

SPECIES	DATES OBSERVED (2009)	LOCATION (UTM 14U)	ADULTS	YOUNG OF YEAR (YOY)	NEST	COMMENTS	OBSERVER
NHOW (Pair 1)	May 29 & 31, June 9	0411905 5630050	2	5	yes		KK
NHOW (Pair 2)	May	0504785 5636356	1	suspected	no	Territorial calls heard	CH
GGOW (Pair 1)	June30	0415800 5625000	2	3	no	Fledged young	CD/JI
GGOW (Pair 2)	May 31	0412740 5628450	2	begging calls heard but unable to find nest	no	May be same breeding pair as GGOW Pair 1	KK
GGOW (Pair 3)	April 26, June 19	0435045 5608630	2	1 + 1 non-viable egg in nest	yes	YOY observed several times	KK/KM
GGOW (Pair 4)	July 18	0412400 5633190	1	3	no	Fledged young	KK
GGOW (Pair 5)	May/June	0445755 5596814	2	unknown	yes	At least one fledged young observed	KM

Key to initials of observers: CD/JI: Celes Davar/Jim Irwin CH: Christopher Higgs KK: Ken Kingdon KM: Kurt Mazur

to observe when present, especially in winter and early spring. Two of the GGOW breeding locations and one of the NHOW suspected breeding sites were discovered following several repeated sightings of adult owls in the immediate nesting area during the spring. At the same time, during the winter and spring season of 2009, a NHOW was observed several times approximately 14 km (straight line distance) south of where the nest of NHOW Pair 1 was subsequently discovered. While it is unknown whether this bird was one of the breeding adults, it does appear likely given the close proximity of the winter sightings to the breeding site.

Of interest, the two adult GGOWs indicated as GGOW Pair 2 were observed by the author in an open meadow two times over the spring months. These adults, when observed in flight, always appeared to arrive from the east or southeast. These adults were 4.7 to 4.9 km straight line distance northwest of the adults and fledged young observed on June 30 by Jim Irwin and Celes Davar, designated as GGOW Pair 1. Given the dates of the sighting of the adults by the author and the sighting of fledged young by Irwin and Davar, these two records represented different breeding pairs as young owls do not disperse that far in June. While male GGOWs may fly up to 3.2 km from the nest while hunting for young, the timing of the observed behaviour at GGOW Pair 2 indicates that the nest was nearby and far enough from GGOW Pair 1 to be separate breeding records. The proximity of the GGOW breeding records suggests a plentiful local food supply as GGOW nesting densities in Manitoba have been recorded as high 1.88 pairs/km^2 during periods of high small mammal populations.[4]

A review of winter 2008/2009 Christmas Bird Count (CBC)[5] data suggests it was a poor predictor of the increase in observed owl breeding activity during the spring 2009. One GGOW was seen during the count period, but this is well within the average sighting of one GGOW every two years (n=19 birds over 41 counts) (RMNP unpublished data). Thus the local CBC area (centred in the area of Wasagaming, Riding Mountain National Park) showed no increase in the presence of owls, with no NHOW observed. This is not surprising since both species are able to migrate great distances in winter and settle to breed in areas with high prey availability within weeks of nesting.

Nor did the spring 2009 annual nocturnal owl survey[6] hint at the subsequent breeding documented herein, with no GGOW nor NHOW counted on the five routes surveyed and centred in the central portion of Riding Mountain National Park (RMNP unpublished data). It should be noted, however, that all of the breeding sites were more than one kilometre in distance from the survey routes, and therefore calling GGOW and NHOW would not have been detected during the surveys.

Both GGOW and NHOW are known to prey on voles year-round, and GGOW are particularly well adapted for hunting them under snow.[2,4] A lack of local small mammal population trend data suggests such surveys could be useful to understand owl and other predator trends over time. It is likely that the observed increase in breeding owls correlated to an increase in small mammals during this period.

Spring and summer 2009 provided unprecedented opportunities to view both GGOW and NHOW in the Riding Mountain National Park region. Due to the unpredictable nature of these events, it is hoped that when another breeding event like this occurs, more data will be gathered on these predators and their prey to better understand these icons of the boreal forest.

A final footnote. In April 2017, an active GGOW nest was observed within 0.5 km of the 2009 nesting site of GGOW Pair 2. Additionally, on June 7, 2017, three fledged NHOW young of year were observed within 50 metres of the 2009 nest location of NHOW Pair 1. These observations demonstrate that the ecological requirements for nesting success for both NHOW and GGOW remain within the area. It is hoped that these same conditions continue to persist for another eight years, and more.

I'd like to thank the following for providing details on owl observations: Kurt Mazur, Chris Higgs, Celes Davar, and Jim Irwin. I would also like to thank the anonymous editor who greatly improved the article.

1. Duncan, J. R. and Duncan, P. A. (2003) Northern Hawk Owl. In: Taylor, P. (Ed.) Birds Of Manitoba. Manitoba Naturalists Society, Winnipeg. p. 229-230.

2. Duncan, J. R. and Duncan, P. A. (2014). Northern Hawk Owl. The Birds of North America (Poole, A., Ed.) Ithaca: Cornell Laboratory of Ornithology; Retrieved March 17, 2017, from: https://birdsna.org/Species-Account/bna/species/nohowl/

3. Manitoba Breeding Bird Atlas (2015). Breeding evidence map for northern hawk owl. Retrieved from www.birdatlas.mb.ca on March 17, 2017.

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6. Bird Studies Canada. Guidelines for Nocturnal Owl Monitoring in North America. Retrieved May 24, 2017, from: http://www.birdscanada.org/volunteer/natowls/

Piping Plover Chicks on Grand Beach. Photo credit: Alexandra Froese

MANITOBA'S DECLINING PIPING PLOVER POPULATION AND THE IMPORTANCE OF SPECIAL CONSERVATION AREAS

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Herbert K. Job wrote of the Piping Plover in the seminal work, Birds of America "Somehow the sea-beach hardly seems fully genuine without it. None the less many of our beaches have lost this little gem of a resident".[1] That was 100 years ago. Alas, now on our trip to Gull Bay on Lake Winnipeg, it had come to pass. We did not hear the plaintive 'peep-lo' call, which normally alerts the visitor of its presence before one actually sees it.

Many endangered species have a spotty distribution where local and even entire provincial populations can blink in and out depending on varying habitat and climatic conditions. A challenge for wildlife managers is to decide how long to continue protecting an area for a species at risk when it no longer uses the area. Such could be the case in Manitoba for habitat no longer used by the beach-nesting Piping Plover (*Charadrius melodus*), listed as endangered both provincially and nationally.[2,3,4,5] Conservation concerns in Manitoba were first raised by Susan Haig who conducted a doctoral study on this migratory shorebird at Lake Manitoba, West Shoal Lake and Lake Winnipeg

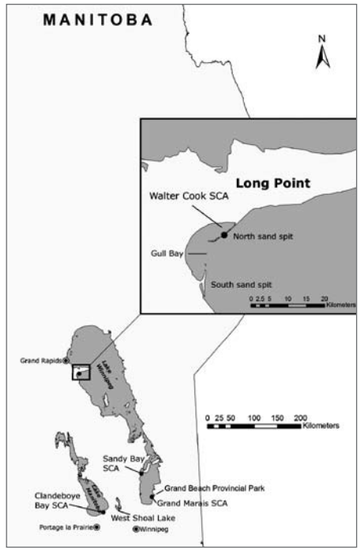

FIGURE 1. Map of Manitoba showing Special Conservation Areas for Piping Plovers.

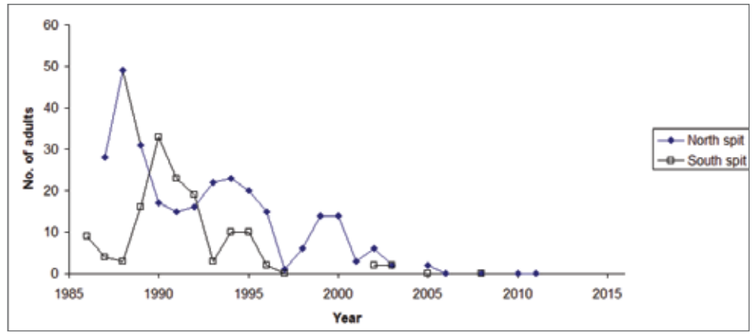

FIGURE 2. Number of Piping Plovers counted at the Gull Bay north and south spits, Lake Winnipeg (1986 -2011). [11,12,14,16,25]

(Fig. 1) from 1981-1986.[6] Her concern for the plover's future led her to identify important breeding sites for Piping Plovers in Manitoba and encouraged their protection.[7] To facilitate species at risk conservation, the Manitoba government initiated a Special Conservation Area (SCA) program to protect the habitat of endangered species. Of the five SCAs established in Manitoba, that are related to species at risk, four were designated to protect Piping Plovers and their nesting habitat: Clandeboye Bay SCA (1983) (N. Firlotte, pers. comm.) in the southeast corner of Lake Manitoba, Walter Cook SCA (WCSCA) (1991) located on Lake Winnipeg's Gull Bay in central Manitoba, Grand Marais SCA (2014) and Sandy Bar SCA (2014) on Lake Winnipeg (G. Suggett, pers. comm.).[7,8,9] Piping Plovers no longer nest at these SCAs and have disappeared from nearly all nesting sites in Manitoba. In this paper we review the recent status of Piping Plovers in Manitoba and the SCAs designated to protect the species. We also discuss efforts undertaken to protect and restore habitat on SCAs, the potential for — and possible origins of — Piping Plovers to re-colonize former breeding sites in Manitoba and the value of SCAs for protecting endangered species habitat when the species no longer uses it.

Long Point is a relatively uninhabited forested peninsula located southeast of Grand Rapids that is up to 19 km wide and extends about 40 km east into Lake Winnipeg (Fig. 1). Immediately south of Long Point, at its base, is Gull Bay. This water body has two spits that extend into the bay, one in a northerly direction and the other southwesterly. These spits have no official names and have been referred to as bars, spits or points.[10,11,12,13,14] The north spit stretches approximately 5.6 km into the bay while the south spit extends only 2.0 km. The spits are separated by about 3.4 km of water. The spits are dynamic and affected by lake currents and water levels. In 1998, a breach near the base of the north spit resulted in the spit becoming an island.[15]

Recognition of the north spit in Lake Winnipeg's Gull Bay (52°54'00"; 98°51'35") is credited to Walter Cook, a fisher, trapper, naturalist and hunter from nearby Grand Rapids who initially reported the site as an important Piping Plover nesting area.[15] This spit was identified as being not only important as Piping Plover habitat but also as a base for the Grand Rapids Fishermen's Co-operative's fishing operations. Thus the joint efforts of the Co-operative and the Manitoba government resulted in the establishment of the WCSCA, located on the north spit about three-quarters of the way to its tip.[12]

Annual Piping Plover surveys were carried out at the north spit from 1987 to 2003 but only five visits (2005, 2006, 2008, 2010, 2011) occurred from 2004 to 2016.[13,14,16,17] Piping Plovers were surveyed yearly at the south spit from 1986 to 1997, however, from 1998 to 2016, only five surveys (2000, 2002, 2003, 2005 and 2008) were carried out.[13,14,16,17] Counts from regular surveys carried out at both Gull Bay spits from 1987-1997 indicated Piping Plover numbers peaked at 52 adults on July 13 and 14, 1988.[16,18] During that year, 49 adults and 11 young were counted on the north spit on July 13 and three adults and three young were seen on the south spit on July 14.[18] By the time the WCSCA was established in 1991, only 15 adults were observed on the north spit.[11] Thereafter, plover numbers increased to 23 adults in 1994 but declined thereafter (Fig. 2).[16,19] The last sighting of Piping Plovers on the north spit was in 2005 when two adults were found but no nest was located.[13]

FIGURE 3. Deserted cabins at Gull Bay north spit can be havens for predators. Photo credit: Ken Porteous.

FIGURE 4. Ken Porteous reads informational sign about the Piping Plover at the Walter Cook Special Conservation Area, Gull Bay, Lake Winnipeg. Photo credit: J. Paul Goossen

FIGURE 5. Piping Plover habitat at the Walter Cook Special Conservation Area, Lake Winnipeg. Photo credit: J. Paul Goossen

The south spit had its highest number (33) of adult plovers in 1990.[16] Piping Plovers (2) were last seen on the south spit in 2003.[16,20] Nesting at Gull Bay was last recorded in 2003 when one nest was found on each spit.[16,20]

In 2010, we organized a field trip to check the WCSCA during the Piping Plover's nesting season, to look for evidence of Piping Plovers and to assess habitat conditions. At the time, it had been five years since the last survey for that area.[13] On June 16, we accessed the north spit by wading through about 1 m deep water. In total, we spent about 6.75 h walking both sides of the spit assessing habitat suitability, looking for Piping Plovers and recording numbers of other avian species present. We did not visit the south spit.

The widest and least vegetated beaches were located on the lake side of the spit. For the most part, the bay side beach was very narrow with extensive vegetation often within 1-2 m from the water's edge. Much of the central portions of the spit had vegetation, including shrubs (e.g., willows) and a few small trees (aspen). At least 18 fisher cabins/buildings were located on the spit; these were all northeast of the SCA, generally on the bay side of the spit. No human activity was noted on that date and some buildings were obviously abandoned (Fig. 3). We saw no evidence of All Terrain Vehicle (ATV) activity which has been noted during previous surveys and recognized for its potential impact on Piping Plovers.[14,18,21]

The original fencing and signage for the WCSCA (Fig. 4) was still mostly in place but weathered from 19 years of exposure. Fencing still

extended to the bay side shore of the spit, however, not onto the lake side shore. Fairly extensive Piping Plover breeding habitat was still present on the lake side of the spit including within the WCSCA (Fig. 5). On this date, this habitat was essentially vegetation-free and appeared wide enough and sufficiently elevated from the water to be suitable for use by plovers. However, a storm event could result in this beach being washed over. Unfortunately, no Piping Plovers were located in the WCSCA nor other parts of the spit during our visit.

Factors related to abandonment

Several factors have been suggested to account for the rather precipitous decline of Piping Plovers at Gull Bay. These include the long-term effects of stabilized water levels on Lake Winnipeg and the presence of humans and nesting larids.[14]

The management of water levels on reservoirs, lakes and rivers in the Northern Great Plains poses significant challenges to protecting and maintaining Piping Plover habitat.[3,5] Prior to establishment of dams and water management strategies, beaches, islands and spits were subjected to the impact of highly variable water levels. In low water years, beaches and spits became wider providing greater habitat availability for nesting plovers. In high water years, nesting and brood habitats were reduced or were unavailable and nesting plovers may have had to relocate to alternate nesting areas in those years. One positive result of the high water was the scouring effect it had on vegetation that encroached on plover habitat. Reducing or eliminating this vegetation in high water years resulted in restoration or even expansion of habitat in years

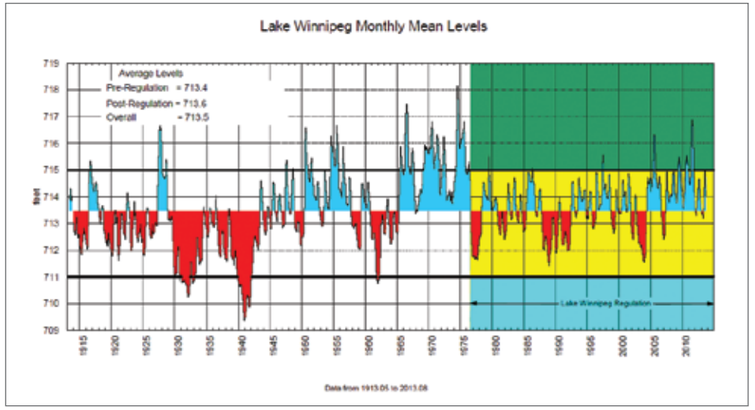

FIGURE 6. Lake Winnipeg average water levels during unregulated and regulated periods.[24]

when water levels were lower.[22] Also, suitable material (e.g., sand or gravel) deposited on nesting beaches during high water events helped improve the quality of these nesting beaches for Piping Plovers.

Lake Winnipeg's water levels have been regulated since 1976.[23,24] Even though average water levels of Lake Winnipeg differ by only 0.2 m when comparing pre- and post- regulation, the amplitude and frequency of low and high water levels have been greatly reduced (Fig. 6).[23] As a result of this long-term stabilization, vegetation has established on former nesting beaches and spits narrowing beach widths and reducing the potential habitat for Piping Plovers. Similarly, vegetation encroachment on Lake Manitoba beaches used by Piping Plovers is considered to be related to water level stabilization.[11]

Displacement is another possible factor contributing to the decline of Piping Plovers at Gull Bay as gull and tern colony expansion appears to have encroached on former plover nesting habitat.[25] Gulls are known or suspected predators of Piping Plover eggs and chicks.[26] Herring Gulls (*Larus argentatus*) had previously been reported nesting on the north spit in 1979 and 1999 but in relatively low numbers (50-60+).[15,27] In 1999, more than 2,000 breeding pairs of Ring-billed Gulls (*Larus delawarensis*) were also observed on the spit and in 2000, 3,750 nests (7,500 adults) were recorded (W. Koonz, unpubl. data).[15]

During our 2010 survey of the spit, we counted an estimated 5,400 Ring-billed Gulls in 10 locations along the spit ranging in numbers from 100 to 2,000 adults (Fig. 7). At most of these locations we found gull nests with eggs. The majority of gull nests observed contained three eggs (range = 1-4), however, some had one or two downy chicks. The majority of gulls nested away from the WCSCA itself and also more toward the bay half of the spit. We also estimated that about 1,200 Common Terns (*Sterna hirundo*) were present, fewer than the 2,000 pairs reported in 1999.[15] Most tern nests had three eggs (range = 1-4 eggs). Although a few Caspian Terns (*Hydroprogne caspia*) were also observed (~55), we saw no evidence of breeding. A family of Common Ravens (*Corvus corax*) (two adults and two fledged young) and a domestic dog were also observed on the spit. At one location just offshore of the SCA we located an abandoned fishing net with dead fish, an attraction for scavengers and

FIGURE 7. Ring-billed Gull colony near the Walter Cook Special Conservation Area, Lake Winnipeg. Photo credit: J. Paul Goossen

predators. Although no raccoons (*Procyon lotor*) were seen, the abandoned cabins may well provide shelter for these and other potential mammalian predators.

Population decline

Manitoba's Piping Plover population is precariously close to extirpation. The population has declined from a high of 137 adults in 1990 to three in 2016.[16,28] From 2013-2015, no Piping Plovers were found in Manitoba although it is possible that some may have nested in more remote areas or at beaches that were not surveyed. The number of breeding locations with Piping Plovers has also greatly declined in Manitoba over the past 30 years. During this period, Piping Plovers nested at 21 sites but by 2016 Piping Plover nesting locations were down to one site (K. Porteous, pers. observ.).[29]

Beginning in 1995, higher than usual precipitation levels in much of southern Manitoba have reduced Piping Plover nesting habitat at many of the best former nesting sites in Manitoba.[12,25] For example, prime breeding habitat at West Shoal Lake, about 55 km northeast of Portage la Prairie, has been flooded and is now under several metres of water.[15,25] Once harbouring the largest nesting population in the province with a count of 67 adults in 1994, Piping Plovers last successfully nested at West Shoal Lake in 1997, and since 2000, plovers have not been recorded at this site.[16,25] Should more normal precipitation result in drawdown of water levels at West Shoal Lake, Piping Plovers may again select this site for nesting. Higher than normal water levels may also have contributed to declines at

other major nesting areas on Lake Manitoba (Clandeboye Bay) and Lake Winnipeg (Grand Beach, Grand Marais and Gull Bay), although long-term effects of water level stabilization on these lakes may be even more damaging. Piping Plover numbers have also decreased at the Gull Bay spits.

Some but not all Piping Plovers breed in their first year and return, although in small numbers, to or near their natal sites.[6,30] Haig and Oring found breeding site fidelity for adult Piping Plovers returning to Manitoba to be relatively high at 67.7%.[6] Natal philopatry, or chicks returning to hatch sites in Manitoba, was much lower at 5.5%. The return rate climbed to 12.2% if chicks returning to the local area were included.[6] These low return rates of chicks to Manitoba may explain why only two of 12 chicks banded at Grand Beach and Gimli during 2009-2011 have been sighted again in the province.[31]

Piping Plovers that nest or are raised in Manitoba may disperse elsewhere in North America rather than returning to their natal or breeding sites. A chick originally hatched in 1985 at West Shoal Lake, Manitoba, was re-sighted at Long Point, Lake Erie, Ontario in August 1986.[6] This bird may have been a migrant (S. Haig, pers. comm.), as its summering location and breeding status was unknown. More concrete evidence of such long-distance movements, however, was provided by a chick banded in 2009 at Grand Beach, Manitoba that was seen at Lake Superior near Grand Marais, Michigan in 2010 and was later documented breeding at Lake Michigan, near Port Inland, Michigan from 2011-2015 (A. Van Zoeren and S. Saunders, pers. comm.).

Piping Plovers can repopulate breeding locations which have been abandoned for many years as evidenced by the return of Piping Plovers to the Great Lakes region.[32] However, the question arises as to where might Piping Plovers come from to repopulate Manitoba breeding sites? Piping Plovers from the Atlantic coast subspecies (*C. m. melodus*) have never been observed in the Great Lakes (F. Cuthbert, pers. comm. but see Miller et al.33) and Northern Great Plains (D. Catlin, pers. comm.) regions although the two subspecies (*C. m. circumcinctus*) occasionally winter along the same coasts.[6,33] Piping Plovers from the Great Lakes are not known to breed in the central Northern Great Plains (F. Cuthbert, pers. comm.) and so are another doubtful source.

Piping Plovers from Lake of the Woods, Minnesota that were seen in Manitoba during 1984-1987 suggest Lake of the Woods as a potential source.[6] Three breeding adults from Lake of the Woods were seen in Manitoba (Clandeboye Bay, Long Point (Gull Bay) and West Shoal Lake). This scenario is somewhat restrictive as the Lake of the Woods population is nearly extirpated. Only four adults were counted at Lake of the Woods during the 2011 international census and none during the 2016 international census although a pair was observed prior to the census (E. Elliott-Smith, pers. comm.).[32,34]

Recruitment of Piping Plovers from parts of the Northern Great Plains as they overfly nesting areas or pass through Manitoba on their spring migration is another possible option. However, evidence for this occurring is minimal as only two Piping Plovers banded outside of Manitoba but within the central Northern Great Plains has ever been observed at any of the Manitoba sites surveyed. In 1991, a banded Piping Plover with a green flag was observed on Gull Bay's north spit.[35] The green flag indicates that the bird was banded in the US Northern Great Plains (either North Dakota or Lake of the Woods).[36] On June 24, 2016, a Piping Plover, possibly banded in North Dakota (M. Ring, pers. comm.), was observed at Whitewater Lake in southwestern Manitoba (P. Taylor, pers. comm.). Long distance movements of Piping Plovers from the Northern Great Plains, within and outside their regional population ranges, lends further credence to the potential for repopulating Manitoba sites. A chick from South Dakota was documented breeding at Lake of the Woods in its second year (D. Catlin, pers. comm.) and a Great Lakes plover was located breeding in South Carolina, along the U.S. Atlantic coast.[37]

Habitat Restoration and Creation

The challenge to protect and restore habitat for Piping Plovers in Manitoba is ongoing and may be delayed or set back by current climatic conditions. SCAs that were designed to protect Piping Plovers in Manitoba continue to serve a purpose, despite a prolonged absence of the species that the SCAs were originally created for. They are a reminder that even significant conservation efforts to protect important habitat may not be enough to ensure recovery for species at risk. In some instances, wildlife managers need to wait until climatic conditions are suitable to allow a species to return. In others, habitat restoration or creation through direct human intervention may be needed to modify or provide additional nesting habitat for Piping Plovers. These efforts, even when successful, may be temporary and sometimes are unsustainable in the long-term especially when unsuitable climatic conditions intervene.

Several attempts have been made to create or restore Piping Plover habitat in Manitoba. Initial attempts involved creating artificial habitat on a Lake Manitoba beach near Delta in 1983 and 1984. Tree saplings along the beach ridge were extricated. Gravel was put down at 20 m intervals on a 25 m by 2 km stretch of sand beach after the strip was ploughed. Unfortunately, a storm destroyed the newly created habitat and the nesting efforts of a Piping Plover pair attracted to this habitat.[7] The creation of offshore nesting islands at West Shoal Lake in 1992, 1993 and 1995 offered plover pairs an alternative to shoreline beaches which were occasionally impacted by cattle, horses and wind tides.[12,38] In total, 14 Piping Plover nests were found on two of the three islands from 1994-1996.[12] Rising water levels after 1996, however, flooded out all shoreline habitat as well as the artificial islands.[15,16,21,25]

Vegetation removal at nesting beaches has been employed at locations on lakes Manitoba (near Delta, "Stony Beach") and Winnipeg to keep nesting areas free of extensive plant growth.[7,10,14,39,40,41] At Grand Beach, for example, several upper beach areas that had patches of willows and various forbs were cleared with the aid of a small bulldozer as it was felt that vegetation encroachment was impacting not only existing territories but also limiting the opportunities for additional pairs to establish territories. Although this endeavour succeeded in rehabilitating a couple of former nesting sites that were eventually used by nesting plovers, efforts to create new nesting areas were less successful as the deep roots of the willows could not be completely removed and new willow growth was evident in these areas the following spring. These efforts pointed out that without annual removal of these roots and any new vegetation growth, sites tended to become re-vegetated in a year or two. Likewise, application of the herbicide (Garlon 3A) and subsequent removal of affected vegetation on a formerly occupied spit at Grand Marais in 2009 failed as the area rapidly re-vegetated.[39,40]

Conclusion

One of the most important values of SCAs is that they provide a measure of habitat protection for species at risk in the interim when populations are small or absent. Providing that the habitat is maintained naturally or through management efforts, these areas provide available habitat when and if the species returns to breed. When applied to Piping Plovers, the approach to managing plover habitat on SCAs needs to be viewed as a long-term endeavour. Not only does it require that nesting plovers return to and find suitable habitat at these former breeding sites, but it requires growth of these small populations to rebuild themselves to sustainable levels. The successful return of nesting pairs after a long absence in the Great Lakes show that nesting areas can eventually be recolonized.[32] Since banding data has also revealed a population link between Lake of the Woods and Manitoba, this suggests the recovery of the Lake of the Woods population could eventually spill over and lead to recolonization of sites in Manitoba. The successful nesting of a single pair of Piping Plovers in Manitoba in 2016 (C. Artuso, pers. observ.) provides conservationists with a measure of hope that this endangered shorebird may in time re-establish itself in the province, including SCAs that were established for its protection.

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BOREAL FOREST EXPERIENCE AT SPRING MEET

Northern Saw-whet Owl chicks after banding.

Jordan Ignatiuk
Executive Director, Nature Saskatchewan

Nature Saskatchewan members met for the annual Spring Meet from June 2 to 4, 2017 at the semi-rustic Hannin Creek Education and Research Facility. The facility, which is located at the north end of Candle Lake, is operated by the Saskatchewan Wildlife Federation and Saskatchewan Polytechnic.

Upon arrival, a hearty chili supper was served in the dining hall and Hamilton Greenwood, Nature Saskatchewan board member and instructor at Saskatchewan Polytechnic, kicked off the program with a welcome to Hannin Creek and a rundown of the facility and details for Saturday's activities. The evening continued with guest speaker Jim Bahr, an instructor at Saskatchewan Polytechnic, who presented on bat vocalizations.

With the rain beginning to pour, a demonstration of the equipment used to record and identify bat species outdoors was curtailed, but fortunately there were two rehabilitated bats in attendance with one of our members. With the live bat — "Batrick" — being present, Jim was able to complete his presentation with the equipment using vocalizations from Batrick. Interested participants were able to see Batrick up close and even hold the bat.

Saturday gave meet-goers three options for tours — remaining at camp to canoe the creek and go on bird and plant walks; go on a geology tour led by Dave Halstead and Lorne Renouf; or accompany Harold Fisher to band saw-whet owls. Feedback was positive for all choices despite some getting wetter than others, some being hungrier than others and there not being as many owls to band as hoped. Highlights of the trips were sightings of bear, otter, deer and a nesting loon.

After an exciting day, everyone met back at the camp for a social hour and banquet. The after-banquet speaker was Harold Fisher, who explained his interest in boreal owls and detailed the various species present in Saskatchewan. He entertained us with stories of his banding exploits through a heartwarming presentation filled with video, several photos and data on the numbers of owls of each species that he has banded in Saskatchewan.

The final day concluded with the Annual General Meeting, which was held in the Curling Rink in Candle Lake and led by President of the Board, Branimir Gjetvaj. Members were presented highlights from the annual report and elected a new slate of directors for the Nature Saskatchewan board. A thank-you to board members stepping down, Robert Wilson and Hamilton Greenwood (Vice-President), was presented. Joining the Board as Directors at large are Fraser Hunter, Morley Maier and Cheryl Loadman. The Meet was a success with many compliments to the planning committee, particularly Hamilton Greenwood for allowing access to the Hannin Creek Education and Research Facility.

Joanne Marchand leads a plant walk, focusing on mosses, for members at the Spring Meet.

Becky Quist, Branimir Gjetvaj and Rebecca Magnus at the Nature Saskatchewan Spring Meet.

DEAD SHREWS ON THE ROAD:
DISCARDED BY MAMMALIAN PREDATORS?

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Many early naturalists suggested that weasels (*Mustela* spp.) discard shrews after they are captured.[1,2] This behaviour has been mentioned in many treatises on shrews and other mammals.[3-6] Contrary observations abound[5,7-9], however, and shrews have been recorded among the prey remains of some raptorial birds[10], and also canid[11,12] and other mustelid mammals.[5,13] The idea that weasels in particular do not eat shrews has focused on glands that produce an odiferous substance that apparently renders shrews distasteful. The following observation in 1921 by Kirk (p. 111)[14] of the Northern Short-tailed Shrew (*Blarina brevicauda*) in Vermont is enlightening:

In December the writer had a trap set for weasels under a brushy fence. The place was infested with blarinas and they were attracted to the rabbit bait and caught regularly. A weasel will take almost any kind of bait in the form of flesh, but tracks in the snow showed if a Bonaparte weasel approached the trap when it held a shrew, it kept at a distance of four inches and refused to touch the bait. The Blarina was removed and the next morning the trap held a weasel. The snow indicated that blarinas had run back and forth under the brush several times but the weasel was untouched.

Speculation regarding the unpalatability of shrews, originating from shrews found dead on roadways in New Brunswick, had been published in 1910: "Upon examination, … always found them to have been killed by some preying mammal, probably the work of a weasel. The skulls have all been more or less broken, and at times, the skin about the fore parts punctured or badly mutilated. Cats will kill shrews, probably in mistake for mice, but they do not eat them as the shrews have a pungent musky odor obnoxious to carnivorous mammals."[2]

During ecological studies of passerine birds and interactions between hosts and the brood-parasitic Brown-headed Cowbird (*Molothrus ater*) in a riparian forest at Delta Marsh[15], Manitoba, I occasionally discovered dead shrews on the road that traversed the northern edge of the marsh.[16] Examination of the carcasses revealed that each had been bitten by a mammal, most more than once, which suggested they had been discarded after being killed. I present evidence for this conclusion based on a sample collected between late May and early July 2000-2001.

Dead shrew on the road. Photo credit: N.L. Sealy

Study Area

I opportunistically collected all but one of the shrews from ~9 km of road that runs from Cram Creek to the hamlet of Delta, east of the Delta Marsh Field Station (University of Manitoba) and Assiniboine River Diversion (Figure 1), through the forested dune ridge that separates Delta Marsh from Lake Manitoba (50°11' N, 98°19' W), in the Aspen-Oak biotic zone. The south edge of the road was bordered by vegetation of Delta Marsh, whereas the northern edge abutted the upland vegetation of the dune-ridge forest (Figure 2).[15,16] An exception was a 1.2-km portion of the road that passed through the marsh. The shrews were collected between late May and early July, usually hundreds of metres apart. An additional specimen of North American Water Shrew (*Sorex palustris*) was collected from a road that transected a stand of White Cedar (*Thuja occidentalis*) at Birch Point (49°10'4" N, 95°14'4" W), Lake of the Woods, Manitoba[17,18], on July 1, 2001.[16] Common and scientific names of mammals follow Naughton.[6]

Methods and results

Shrews were generally fresh when discovered, usually with no external signs of trauma, although blood flowed from the nostrils or wounds in some. Fly eggs were recorded amid the hairs of one male Cinereus Shrew (*S.cinereus*) salvaged on June 26, 2001, which suggests I did not detect it the previous day. All shrews had been bitten (Table 1), but no part of the body was eaten. One Cinereus Shrew was run over by a vehicle, possibly after it had been killed, but I did not include it in the sample. No dead shrews were discovered on the floor of the ridge forest or in vegetation of the marsh where I spent hundreds of hours searching for bird nests. I have no direct observations of capture and subsequent discarding of shrews by predators.

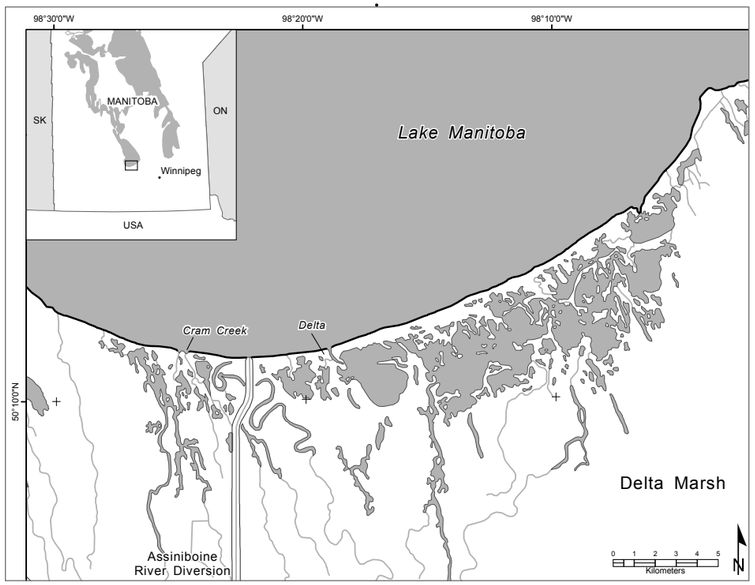

FIGURE 1. Location of study area (inset) and map of Delta Marsh, Manitoba, showing in bold the dune-ridge forest that separates Lake Manitoba and Delta Marsh, Manitoba. Map prepared by Mapmonsters GIS Ltd., Victoria, British Columbia.

FIGURE 2. The road along the southern edge of the dune-ridge forest, Delta Marsh, on which dead shrews were found. To the north of the road (on the left) are Manitoba Maple (*Acer negundo*), Green Ash (*Fraxinus pennsylvanica*), Peach-leaved Willow (*Salix amygdaloides*), with Sandbar Willow (*S. interior*) along the edge, whereas along the south edge of the road are predominantly sedges (*Carex* spp.), Common Reed (*Phragmites communis*), and Sandbar Willow.

Each shrew was weighed to the nearest 0.1 g, bagged, and frozen for later necropsy. I prepared some individuals as voucher specimens (Appendix 1). After thawing but before removing the skin, the maxillary teeth were exposed by pushing up the lips and gently opening the mouth.[9] The identity of the morphologically similar Cinereus Shrew and possible specimens of North American Pygmy Shrew (*S. hoyi*) are based on microscopic examination of the number and relative size of the unicuspid teeth. Northern Short-tailed Shrew, Arctic Shrew and North American Water Shrew were initially identified on the basis of body size and characteristics of the pelage, but their identification was confirmed by examining teeth, in consultation with keys to the identification of shrews of the Canadian Prairie Provinces.[5,19] Except for the voucher specimens, the skin and dissected bodies were re-frozen, but most were subsequently destroyed when the contents of the freezer thawed following a fire in March 2009.[16]

A total of 68 individuals of four species of shrew was collected: Northern Short-tailed Shrew (n = 9), Arctic Shrew (*S. arcticus*, n = 9), Cinereus Shrew (n = 47), and North American Water Shrew (n = 3). Three to five voucher specimens of each species (Appendix I) were

TABLE 1. Number of sets of bite marks (%) recorded on 68 shrews found dead on roads at Delta Marsh and Birch Point, Manitoba, 2000-2001.

SPECIES	ROSTRUM	OCCIPUT	THORAX	ABDOMEN	PELVIC REGION
Blarina brevicauda (n = 9)	0	4 (44.4)	5 (55.6)	3 (33.3)	0[1]
Sorex arcticus (n = 9)	1 (11.1)	4 (44.4)	5 (55.6)	1 (11.1)	1 (11.1)
Sorex cinereus (n = 47)	2 (4.3)	29 (61.7)	42 (89.4)	7 (21.2)	0
Sorex palustris (n = 3)[2]	0	2 (66.7)	3 (100)	0	0

[1] Sample sizes for each category are greater than the number of individuals of each species examined, due to multiple bite marks inflicted on many individuals.

[2] One specimen was salvaged from a road at Birch Point, Lake of the Woods, Manitoba.

deposited in the mammal collection of The Manitoba Museum (MM). In addition, one adult male North American Pygmy Shrew was collected on June 20, 2000, but it was among the necropsied specimens lost in the fire before a voucher specimen could be prepared. This individual had been bitten on the skull/nape, thorax and abdomen; nevertheless, it was not included in the sample.

The entire skin was removed from each individual, except from the feet and tail. The position of each puncture wound on the body was recorded, identified by one or a pair of needle-like bite marks, *i.e.*, single or pairs of canine teeth, which penetrated the skin and body on the dorsum and frequently the undersides of the shrews. The wounds were surrounded by bruises and subcutaneous hematomas on the inner, dermal surface (Figure 3) of all but nine shrews. Dermal bruising corresponded to the location of trauma of the underlying musculature. Of the 68 individuals collected, 109 sets of wounds were recorded from the following regions of the body, indicating most individuals were bitten more than once (Table 1): (1) rostrum (3/3 [100%] crushed), (2) occiput of skull/nape of neck (hereafter, nape; 13/39 [33.3%] crushed), (3) thoracic region (3/55 [5.5%] torn), (4) abdominal region (0/11 [0%] torn), and (5) pelvic region (0/1 [0%] torn). Most shrews were bitten on both the occipital region of the skull/nape and thoracic region with similar frequency, rather than one bite either to one region or the other (Table 1). Thus, 94 sets of puncture marks (86.2%) were recorded on the skull/nape and/or thorax, of which 16 (17%) involved only the thorax. Eleven (11.7%) shrews were punctured on neither the skull nor thorax. One front leg and one hind leg were bitten, in addition to the skull/nape, in one Northern Short-tailed Shrew and Arctic Shrew collected on June 20, 2000 and June 21, 2001, respectively. One adult male Northern Short-tailed Shrew (June 19, 2001) and one lactating Cinereus Shrew (June 13, 2001) were bitten once, both in the abdomen.

Shrews were sexed by dissection: Northern Short-tailed Shrew (5 adult ♂♂ [55.6%]: 4 ♀♀), Arctic Shrew (7 adult ♂♂ [77.8%]: 2 ♀♀), Cinereus Shrew (25 adult ♂♂ [73.5%]: 9 ♀♀; 6 juvenile ♂♂ [46.2%]: 7 ♀♀), and North American Water Shrew (0 ♂♂ [0%]: 1 ♀♀; 2 juvenile ♀♀). Four individuals (all Cinereus Shrews) were not aged, but of the remaining 64 individuals, 37 (57.8%) were adult males, 16 (25%) adult females, and 11 juveniles (17.2%).

The width of the space between puncture wounds on the shrews' skin, likely made by upper canines (Figure 3), was measured (one wound per individual) with calipers

FIGURE 3. Bite marks on the underside of the skin in the thoracic region of a Cinereus Shrew (*Sorex cinereus*). The arrow points to the mid-point between the punctures apparently inflicted by upper canines of a weasel, 5.4 mm apart. The shrew also was bitten on the rostrum.

to the nearest 0.1 mm: Northern Short-tailed Shrew (5.8-6.5 mm; n = 2), Cinereus Shrew (5.4-6.2 mm; n = 3), Arctic Shrew (6.1 mm, n = 1), and North American Water Shrew (6.3 mm; n = 1). Assuming the predator was a weasel, the widths between the upper canines of four species of mustelid were measured to the nearest 0.1 mm: Ermine (*Mustela ermine*, 5.1-6.9 mm, n = 9), Long-tailed Weasel (*M. frenata*, 8.1-9.1 mm, n = 5), Least Weasel (*M. nivalis*, 3.2-4.4 mm, n = 8), and American Mink (*Neovison vision*, 8.4-8.9 mm, n = 5) for individuals in the mammal collection of The Manitoba Museum.

In addition to the shrews, five freshly dead Meadow Jumping Mice (*Zapus hudsonicus*) were collected from the same road between May 25 and June 27, 2000. The four adult males and one lactating female were examined as described above for the shrews and were preserved as voucher specimens (Appendix I). The cause of death was not determined for any of these individuals but, in contrast to the shrews, there were no puncture marks or hematomas on the under surface of the skin. No jumping mice were found dead in a previous or subsequent year, although individuals were flushed occasionally from tall grass.

Each species of shrew and the Meadow Jumping Mouse have been recorded previously at Delta Marsh.[18,20-24] Northern Short-tailed Shrew, Arctic Shrew and Cinereus Shrew were described as the most abundant shrews at Delta Marsh, whereas North American Water Shrew and North American Pygmy Shrew were much less common. No studies of the population dynamics of these species have been conducted at Delta Marsh. All of the shrews except North American Water Shrew were recorded as prey of the Long-tailed Weasel at Delta Marsh.[13] An unidentified weasel with a Meadow Jumping Mouse in its mouth was observed at Delta Marsh[25] and this species was among prey taken by a nesting pair of Northern Saw-whet Owls (*Aegolius acadicus*) in 2000[24], the year the dead jumping mice were collected from the road (Appendix 1).

Discussion

The evidence I present is consistent with the idea that the shrews discarded on a road were killed by a mammalian predator, probably a weasel. The data derived from dissections revealed that each shrew had been bitten and apparently killed and discarded by a mammal, possibly the Ermine, which was the most frequently observed species of weasel. In support of this was the width between bite marks on the skin most closely matched the width between the upper canines of the Ermine. Although the Long-tailed Weasel was abundant and frequently observed at Delta Marsh in the early years of the study[13], I did not observe it after the mid-1990s. Least Weasels are present but uncommon at Delta Marsh[22] and the width between bite marks on the skin was less than what would have been inflicted by the larger American Mink.

Questions remain. I would not have recorded shrews that may have been eaten; therefore, were the dead shrews examples of surplus killing[26], perhaps when other prey was not in short supply? Would male and female shrews, whose scent glands are most developed during the breeding season[27,28], be discarded with the same frequency during the nonbreeding season? Had the shrews died of other causes on or off the road, before being bitten and discarded? If at least some shrews had died of other causes, presumably I would have discovered individuals, unbitten, as in the case of the Meadow Jumping Mice. Despite spending most of my time in habitats off the road, I never found dead shrews, although they would have been easily overlooked amid the dense vegetation.

The preponderance of bites to the neck or thorax of the shrews (Table 1) is consistent with the most commonly reported prey-killing technique of mustelids, particularly the mustelines[29-30]; that is, "biting the back of the neck or base of the skull, thus severing the spinal cord or crushing the occipital region."[29] Multiple bites on most individuals are also consistent with observations of weasels subduing prey in captivity.[31-33]

My observations are tantalizing, but the answer to the question of why weasels sometimes kill and discard shrews, whether because of their distasteful flavour or bad odor, or for some other reason, requires controlled experiments – standard behavioural choice tests that would involve captive weasels and shrews, or their scent, as the smallest shrews, with their rapid metabolism, soon die in captivity.[3,6] Further research is also required to determine the function of the secretion of the flank glands of shrews and the odour produced. The glands and, hence, odour are most developed during the breeding season, which suggests the odour plays a reproductive role, possibly to aid shrews in finding receptive mates.[4]

Acknowledgements

I am indebted to the personnel of the former Delta Marsh Field Station (University of Manitoba) for accommodation and in-kind support, and to many students and other co-workers for support with field work. The board of the Portage Country Club granted permission to conduct some of the field work on their property. C. Piper and A. Andries helped compile the data. Randall Mooi permitted me to measure weasel teeth in the mammal collection of The Manitoba Museum. Craig Willis, University of Winnipeg, offered thought-provoking comments on the manuscript. The map was prepared by Mapmonsters GIS Ltd, Victoria, British Columbia, with assistance from Nikola Zukanovic. Research at Delta Marsh was funded chiefly by the Natural Sciences and Engineering Research Council of Canada.

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Appendix 1

Voucher specimens of Northern Short-tailed Shrew (*Blarina brevicauda*), Arctic Shrew (*Sorex arcticus*), Cinereus Shrew (*S. cinereus*), North American Water Shrew (*S. palustris*), and Meadow Jumping Mouse (*Zapus hudsonicus*) found dead on roads at Delta Marsh and Birch Point, Lake of the Woods, Manitoba. The specimens, with measurements, were deposited in The Manitoba Museum (MM).

Blarina brevicauda: (1) adult male (MM 24137), 30.3 g, 22 May 2000; (2) lactating female (MM 24138), 32.1 g, 20 June 2000; (3) pregnant female, 10 fetuses (MM 24139), 35.6 g, 19 June 2001; and (4) adult male (MM 24140), 25.6 g, 19 June 2001.

Sorex arcticus: (1) adult male (MM 24141), 10.7 g, 19 June 2000; (2) juvenile female (MM 24142), 7.6 g, 24 June 2000; (3) adult male (MM 24143), 11.0 g, 27 June 2000; (4) adult male (MM 24144), 11.4 g, 21 May 2001; and (5) adult male (MM 24145), 10.8 g, 13 June 2001.

Sorex cinereus: (1) male (MM 24147), 5.3 g, 24 June 2000; (2) male (MM 24150), 4.9 g, 12 June 2001; (3) lactating female (MM 24148), 6.1 g, 13 June 2001; (4) male (MM 24149), 4.7 g, 21 June 2001; and (5) male (MM 24151), 5.2 g, 21 June 2001.

Sorex palustris: (1) lactating female (MM 24040), 19.1 g, 6 June 2001[16]; (2) juvenile female (MM 24041), 8.4 g, 12 June 2001 (see Sealy 2013); and (3) juvenile female (MM 24146), 11.4 g, 1 July 2001 (Birch Point, Manitoba).

A single specimen of a male ***Sorex hoyi*** was lost following a melt-down of a freezer during a fire in March 2009.[16]

Zapus hudsonicus: (1) adult male (MM 24155), 17.9 g, 25 May 2000; (2) adult male (MM 24153), 15.3 g, 4 June 2000; (3) adult male (MM 24154), 21.1 g, 16 June 2000; (4) (MM 24156), 18.4 g, 16 June 2000; and (5) lactating female (MM 24152), 23.3 g, 27 June 2000.

Nature SASKATCHEWAN

FALL MEET 2017

SEPTEMBER 29 - OCTOBER 1, 2017 ELBOW, SK

Friday, September 29
Dinner on your own

6:00 p.m. Registration & Reception
Elbow Harbor Golf Club & Resort
Light refreshments provided

7:30 p.m. Program
Introductions

Larry Morgotch Photo Presentation Bring your USB flash drive with your nature photos to share

Explanation of details and logistics of Saturday's tours

Saturday, September 30
Breakfast on your own

Itinerary
TOURS
(groups will be travelling via bus):

8:00 a.m. Board bus, depart for Douglas Provincial Park

8:30 a.m. Sand Dunes Hike
Come take in a leisurely hike and explore the active sand dunes at Douglas Provincial Park; led by Nature Saskatchewan

11:30 a.m. Board bus, depart for lunch (bagged lunch)

1:00 p.m. Arrive for tour of Gardiner Dam
Led by Cam Leslie from SaskWater — a tour of Gardiner Dam and its operations to learn about the power of water (please note: there are several stairs as well as metal grating on this tour)

3:00 p.m. Birding opportunities on return trip to Elbow

4:00 p.m. Business meeting

5:30 p.m. Cocktails at Elbow Harbor Golf Club & Resort

6:15 p.m. Dinner/Banquet

7:00 p.m. Awards

7:30 p.m. Presentation by David Weiman: "Humane trapping in today's world – What does it really mean?"

Sunday, October 1
Breakfast on your own

REGISTRATION (including cost) ON BACK SIDE OF PAGE

ACCOMMODATION SUGGESTIONS

Hotels/Motels:
Sarah's Cove
(306) 854-2003
There is a block of rooms set aside at Sarah's Cove for those attending the meet. Please e-mail or call to make a reservation.

Elbow Hotel
(306) 854-2214

Camping:
Elbow Sunset Suites & RV Park
(306) 854-2144

Nature SASKATCHEWAN

FALL MEET 2017

SEPTEMBER 29 - OCTOBER 1, 2017 ELBOW, SK

Name(s): _____
_____
Address: _____
Postal Code: _____
Telephone: _____
Email: _____

Registration includes Friday evening social (light snacks), Saturday's lunch & evening banquet meal

Nature Saskatchewan Member Fees
Registration Fee: **$85.00 x** _____ **= $** _____

Registration after
September 22: $**100.00 x** _____ **= $** _____

Non-Member Fees
Registration Fee: **$100.00 x** _____ **= $** _____

Registration after
September 22: **$120.00 x** _____ **= $** _____

NOTES:

Do you have any dietary needs or allergies (please circle)?
YES or NO
IF YES, what are they?_____
_____
_____
_____
_____

☐ **PLEASE CHECK BOX IF YOU PLAN TO BE PRESENT FRIDAY EVENING**

TOTAL AMOUNT DUE: $ _____

Payment by Visa/Mastercard:
Card #: _____/_____/_____/_____
exp: _____/_____

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Make cheque payable to Nature Saskatchewan

Mail, e-mail or call our office to register:

Nature Saskatchewan
206-1860 Lorne Street
Regina, SK S4P 2L7
info@naturesask.ca
1-800-667-4668

2017 GRADUATE SCHOLARSHIP WINNERS

The Margaret Skeel Graduate Student Scholarship was established by Nature Saskatchewan to stimulate research of all aspects of the natural world and human relation with nature, and to promote conservation and sustainable use of natural resources. Two $2,000 scholarships were awarded this year, to assist graduate students attending a post-secondary institution in Saskatchewan. The recipients are:

Charlie Bailey.

Charlie Bailey is working toward her master's degree in biology at the University of Regina. She is looking into the diversity and effectiveness of wild insects for sour cherry pollination. Recent declines in honey bee populations have spiked interest into the effectiveness of wild insects as pollinators of agricultural crops. Results of Charlie's research project will contribute to protecting biodiversity to enhance food security and human well-being.

Jillian Kusch. Photo credit: Colleen Crill

Jillian Kusch is studying social behaviour and breeding success in Black-tailed Prairie Dogs, a species considered as "threatened" in Canada. She is working toward a master's degree in biology at the University of Saskatchewan in Saskatoon. You can read a summary of her research on page 30 in this issue of Blue Jay.

We congratulate Charlie and Jillian, and wish them success in pursuit of their studies.

POETRY

Look Down

Look down, adventurer, to where a bold
new world awaits you at your feet, a near
land often overlooked, of sticks and stones
and grassblade forests, pungent mosses so
refreshing, streamlets oozing wayward courses,
with beetle boatmen rowing side oars and
slick water striders skimming on the surface.

The fallen leaves of yesteryears provide
a cushioned footing while, with much to see,
each man and woman walker pauses, just
to hear a field-bird chorus, just to smell
the minted odours of dank growth and of
decay. One's steps are minimal before
a miniature be-flowered landscape, wrought
with yellow lady's-slippers, violets,
pink wintergreens, sweet cicelies, and roses.

Adventurer, give heed to autumn leaves
of tan and gold, now crunching underfoot;
to winter's soft blue snow, impressed with tracks
of deeper blue, a story to be read;
to springtime's burgeoning in lustrous green--
a hurried spell for every waxing leaf;
to summer's slower pace, a world fulfilled,
and you, a relaxed reconnoiterer.

Victor C. Friesen
P.O. Box 65
Rosthern, SK S0K 3R0
victorcfriesen@yahoo.com

NATURE SASKATCHEWAN WELCOMES NEW BOARD MEMBERS

The following new board members were elected at the Annual General Meeting in Candle Lake on June 4, 2017. We welcome their expertise and energies to help advance the vision and mission of Nature Saskatchewan.

Fraser Hunter

Fraser's early years were spent on an organic mixed farm in the 'duck factory' area of western Manitoba. After high school, he joined the meteorological service of Transport Canada as a meteorological technician. Later, he obtained a BSC in physics from the University of Manitoba. Following professional certification as a meteorologist with Environment Canada (now Environment and Climate Change Canada), Fraser worked in several locations across Canada and in several different specializations.

During the latter years of his career, Fraser worked extensively on the 'climate change' file and the ramifications that climate change might have on Canadian Prairie ecosystems and the 13 primary socio-economic Prairie industries. These final years of his professional career gave him the opportunity to get better acquainted again with the importance of healthy ecosystems as they relate to food production and human health.

Since retiring, Fraser has had a few part-time jobs, but the bulk of his time has been devoted to grandchildren, travelling, gardening, golfing, curling and volunteer work. Fraser was asked to become a member of the Nature Saskatchewan Board in 2004, and after leaving the Board in 2012, he has participated in the following Nature Saskatchewan programs: IBA steward, Plant Watch and Lands Committee.

Fraser is honoured to be asked again to join the Nature Saskatchewan Board and hopes he can contribute to the Society continuing to meet its vision and mission goals.

Cheryl Loadman

Cheryl Loadman is Executive Director for Saskatoon Services for Seniors leading a staff of 11 who deliver programs and services that enable individuals to age successfully in their own homes. In addition, Cheryl lectures on Business and Public Policy and International Business at the Edwards School of Business. Previously, she spent 18 years with the Saskatchewan Government holding positions that include: Chief of Staff to the Minister of Finance and Manager of International Market and Business Development, Ministry of the Economy.

Over the years, Cheryl has been elected or appointed as a director of more than 30 for-profit and non-profit boards including Affinity Credit Union, Credit Union Central of Saskatchewan, the Canadian Cooperative Association, the Saskatoon Community Clinic, Passion for Action Against Homelessness, and 25th Street Theatre, to name a few. In addition, she is or has been involved in many aspects of her community including as a community association member, a youth sports coach, a tutor and a foster parent for dogs. She has also been active in her faith community through the Grosvenor United Church. As an avid naturalist, she has supported the Saskatoon Nature Society, the Native Plant Society of Saskatchewan, and has been a member of Nature Saskatchewan for more than 20 years. As well, she is a volunteer wildlife rehabilitator with Living Sky Wildlife Rehabilitation and the fox rehab program.

Cheryl is an alumnus of the University of Saskatchewan where she earned a Master (MA) degree along with a Bachelor of Arts (BA) and a Bachelor of Commerce (BComm). She also holds a Certificate in Adult Education & Continuing Education.

Morley Maier

Morley was born and raised on a farm near Yorkton. Morley attended the U of S and completed a B.Ed. degree with a major in Biology. He began his teaching career as a high school biology teacher in Loon Lake, SK. In 1977, Morley and his wife Paula moved home to Yorkton to take over the family farm. Morley would continue his work as a classroom teacher and in-school administrator. Paula would continue her work as a registered nurse.

Morley is an award winning willow basket maker and juried member of the Saskatchewan Craft Council. His baskets have been used by the former Lieutenant Governor of Saskatchewan as gifts for visiting heads of state and other dignitaries. Included on the list of recipients is Her Majesty, Queen Elizabeth II. His other hobbies include making things (mostly bird houses and feeders) using salvaged and repurposed materials. In 2016, the Ellis Bird Farm of Lacombe, Alberta purchased 25 of Morley's bird boxes to be used as fundraising items at the annual North American Bluebird Society conference. Morley is also an amateur photographer and currently has some bird photos on loan and "on tour" with Nature Saskatchewan. He is also currently a Director on the board of the Yellowhead Flyway Birding Trail Association.

Morley and Paula are now retired from their professions. While they still have a small cow herd and remain connected to the farm, much of their time is spent in their yard and garden, watching and photographing birds, studying and growing native plants, canoeing and camping and looking for every excuse and opportunity to be out of doors. They have recently added Saskatchewan Bird "Atlasing" to the list.

Morley and Paula would be quick to tell anyone that everything done outdoors related to nature is even more enjoyable if you have your grandchildren by your side.

The 3rd Annual International Migratory Bird Day celebration at LMBO provided for a great day of bird watching and other fun activities. Photo credit: Marla Anderson

ANOTHER SUCCESSFUL INTERNATIONAL MIGRATORY BIRD DAY

Marla Anderson

Saturday, May 13 was the 3rd Annual International Migratory Bird Day celebration held at Last Mountain Bird Observatory (LMBO). In both 2016 and 2017, Canada celebrates the centenary of the Migratory Birds Convention Act. The agreement was signed on August 16, 1916 between Canada and the United States and enacted in 1917. The Act laid the foundation for bird conservation by protecting birds as they migrate across international borders.

This year's celebration highlighted the many different species of migratory birds found in Saskatchewan through a day of activities for the whole family to enjoy. More than 100 participants off all ages came out to enjoy the activities. The day started off with a "hoot" for our volunteers who arrived just as the bird banders were returning from a net run with a Long-eared Owl. Luckily Shelly Fisher, an experienced owl bander, was there to help out and brought her owl banding equipment. After many photos and 'oohs' and 'aahs,' the Long-eared Owl was banded, recorded and sent on its way. Unfortunately, the weather was not in our favour for the day and the mist nets had to close early due to strong winds and dark clouds threatening rain.

Bird banding, however, was not the only activity available on Migratory Bird Day. This year, Nature Saskatchewan also teamed up with Bird Studies Canada to host the launch of the Saskatchewan Breeding Bird Atlas. This five-year endeavor is a citizen science project that results in mapping the distribution and relative abundance of breeding birds throughout Saskatchewan. LeeAnn Latremouille and Kiel Drake from the Atlas Office set up a booth and spoke with guests about how they can sign up to be part of this amazing project. With the whole of the province divided up into 10 by 10 km squares, and monitoring to be done in as many squares as possible, the more volunteers the better.

Children (and even some adults) enjoyed the many activities going on during the celebration. Shouts abounded as they became birds and jumped over power lines, dodged buildings, avoided cats, and stopped for cars during the migration obstacle course. Patience and ingenuity were needed as the children learned of all the different foods birds can eat and how they are adapted to do so in the feeding adaptation game. The kids also tested their knowledge of Saskatchewan's flora and fauna as they learned of the importance of wetlands at the 'wetland metaphor.' To keep the interest going even at home, participants were invited to make bird feeders out of toilet paper rolls to take back with them. While the kids were playing, the parents could take in the wonderful photo display, donated by Martin Philips, showcasing the many birds of Saskatchewan.

Shelly Fisher banding a Long-eared Owl. Photo credit: Shayna Hamilton

Before a fantastic barbecue lunch provided by SaskEnergy, we had many speakers who had come out to support the launch of the Breeding Bird Atlas and the International Migratory Bird Day celebration. They included: Steve Van Wilgenburg (Environment and Climate Change Canada), Ryan Fisher (Saskatchewan Ministry of Environment), Jennifer McKillip (Nature Conservancy of Canada), and Branimir Gjetvaj (Nature Saskatchewan). After lunch we were joined by Gabriel Foley who was leading birders from Regina up to LMBO for the annual Great Canadian Birdathon. The Birdathon is a 24-hour event to find as many bird species as possible and to raise money for bird conservation. Gabriel, with his group of 15 people from Regina, led bird walks around Last Mountain Regional Park. In total, he saw 84 species and raised about $250.

The day was a great success and Nature Saskatchewan would like to thank SaskEnergy for its continued sponsorship of this event, all the people who volunteered, and of course everyone who came out to participate. We hope to see you at next year's event!

BOOK REVIEW: THE GENIUS OF BIRDS

Jennifer Ackerman, Penguin Press, New York. 2016. 340 pp.

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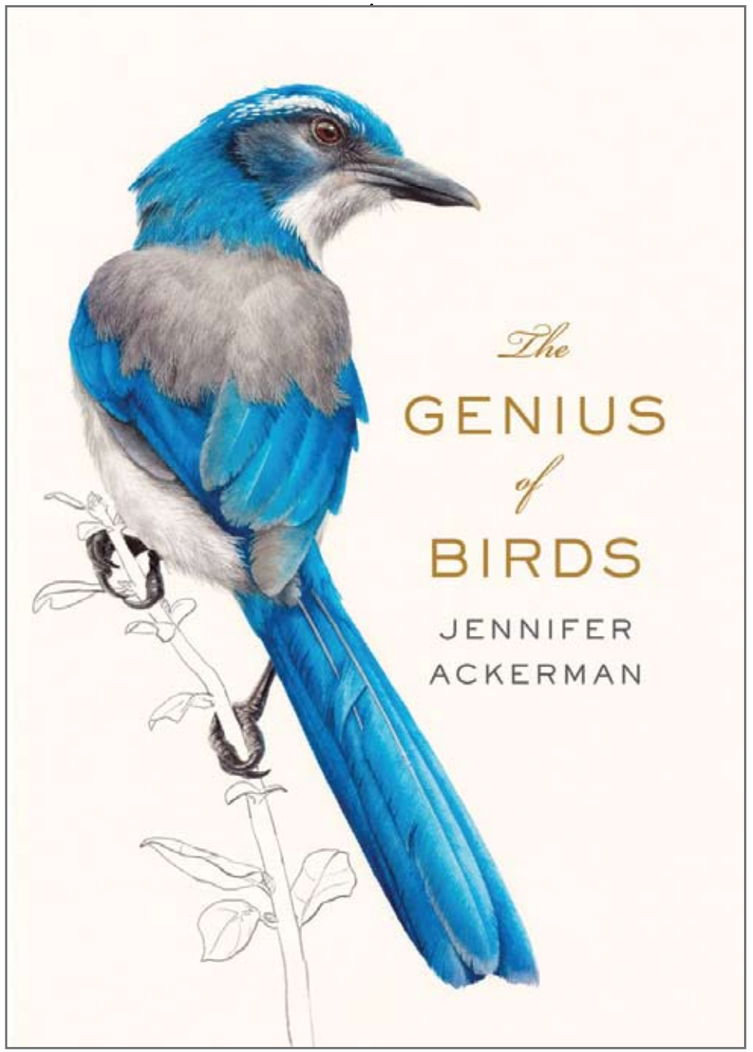
Jennifer Ackerman has been writing about science, nature and human ecology for almost three decades.

The Genius of Birds is a masterly survey of the research on bird cognition. The book is headed by a lengthy introduction, followed by eight chapters. It is a New York Times best seller, and named one of the 10 best nonfiction books of 2016 by the Wall Street Journal and "a best science book of 2016" by Science Friday.

This is a book of knowledge and wonder, and appeals to fans of birds in all their diversity, including professional and amateur ornithologists and the scientific community. The style is formal but easy to read. There are no footnotes nor illustrations, but there are 54 pages of notes, and an index of 11 pages. The author uses primary and secondary sources.

Below are summarised highlights from the introduction and for each of the eight chapters.



Introduction

Birds are often considered stupid, which is reflected by sayings such as "bird brain". However, some birds have intellectual abilities rivalling primates.

1. From Dodo to Crow: Taking Measure of a Bird Mind

One member of the uncommonly intelligent crow family solved an eight-step puzzle to get at food. Intelligence is difficult to measure. Brain size is related to intelligence, and neurons and synapses play a part also.

2. The Bird Way: The Avian Bird Brain Revisited

Chickadees rate highly in their cognitive abilities, such as the use of their calls as a language. The brains of birds are often larger than is expected for their size. The brains of precocious birds at birth, and those of brood parasites, are relatively small. Large numbers of neurons in the cortex-like structures of parrots explain cognitive complexity.

3. Boffins: Technical Wizardry

Many birds make and use tools and apply techniques. New Caledonian crows are on par with primates in their use of tools. Crows and parrots play for fun. A video from Russia showed a crow snowboarding down a roof using a jar lid.

4. Twitter: Social Savvy

The social behaviour of birds ranges from solitary to life in a flock of thousands. A demanding social life might drive the evolution of brain power, and it may involve cooperation with others, respect for each other, grief, empathy and anticipation of the behaviour of flock members. Social life has many advantages such as finding food and seeing predators. Many birds are socially but not sexually monogamous.

5. Four hundred Tongues: Vocal Virtuosity

Birds can learn the songs of other birds and mimic popular songs. There are parallels with the learning of languages by humans. Organs and functions of the brain involved with vocalizations are described in detail. The mockingbird can produce 19 songs per minute and knows 200 songs. Imitation of human speech is rare. Capacity of learning diminishes with age in humans and birds. There is a similarity in brain structures of humans and songbirds. High precision and fidelity, superior amplitude, duration and consistency are attractive to females.

6. The Bird Artist: Aesthetic Aptitude

Innate behaviour, learning and memory are involved in nest building. A bower bird builds a nest structure about 1 foot high and the ground is stippled with colourful objects. When a female visits the nest, the male courts her with song and dance. The artful bower and display can be considered "art" in the human sense. The Golden-collard Manakin is known for its acrobatic courtship displays. Their brains have been shaped by evolution to support male performance and female assessment.

7. A Mapping Mind: Spatial (and Temporal) Ingenuity

We learned much about bird migration from racing pigeons. A White-crowned Sparrow quickly reoriented after a 3,000-mile displacement. The Arctic Tern flies a round-trip of almost 44,000 miles per year. During WWI and even WWII, pigeons were used for conveyance of intelligence. Birds seem to have an internal positioning system, which, like GPS, may be global.

"Electro-smog" may disturb migrating birds. The Clark's Nutcracker collects more than 30,000 pine seeds and stores them in up to 5,000 caches for use in the winter. The size of the hippocampus in humans and birds is reflected by the amount of experience. Birds may use background noise, such as movement of sea surface water, the rumbling of approaching storms and odours, as navigational cues. Cognitive integration is required for navigation, and for this a pattern of connectivity in the brain is required.

8. Sparrowville: Adaptive Genius

The House Sparrow and other synanthropes have special smarts that enable them to adapt to habitats changed by humans. Introduced to North America in 1851, the House Sparrow spread very rapidly. By 1889 it was considered a pest. Successful invaders have larger brains and are more innovative than unsuccessful ones. Sparrows learned to trigger the sensors of automatic doors to a cafeteria and food. In contrast, when a Ruddy Turnstone could not find food under stones, it died. Smart and adaptive bird lineages such as sparrows and blackbirds generate more new species. The range of a bird of paradise has ascended more than 300 feet as a result of global warming by 0.7°F due to climate change.

PRAIRIE DOG FACEBOOK:
RESEARCH ON SOCIAL RODENTS IN GRASSLANDS NATIONAL PARK

Photo credit: Colleen Crill

Jillian Kusch
jillian.kusch@usask.ca

Black-tailed Prairie Dogs are one of five species of prairie dog, and the only species found within Canada. In fact, their distribution is limited to one national park in southern Saskatchewan: Grasslands National Park. Currently, these prairie dogs are being studied by Dr. Jeffrey Lane and two graduate students at the University of Saskatchewan to investigate their hibernation patterns, their social relationships, and their stress response to predation risk in an effort to understand the current population and how it may change in the future.

The Canadian population of prairie dogs is limited to 19 colonies and is listed as threatened by COSEWIC due to isolation from its southern neighbours in Montana and declining population size. Prairie dogs are an important species for grasslands habitat as they are beneficial for more than 100 species including providing habitat for Burrowing Owls and bison, while functioning as prey for badgers, rattlesnakes, Ferruginous Hawks, eagles, Swift Fox, coyotes, as well as the specialist predator, Black-footed Ferrets. Of great note, many of these dependent species are also endangered or threatened.

Black-tailed Prairie Dogs are small, herbivorous ground-dwelling squirrels. They are highly social and live in colonies together. These colonies are separated into coteries of related individuals. A coterie is a polygynous unit typically containing one dominant male, several adult females, as well as yearlings and juveniles of both sexes. Individuals within a coterie often exhibit positive social behaviours including allogrooming and communal nursing to aid in survival of neighbouring individuals. Prairie dogs are considered a charismatic species that draws visitors to the park where social antics like kissing and jump-yips are observed (jump-yips are a contagious communication action where a prairie dog throws its body vertical and lets out a unique call to inform other prairie dogs of their presence and to learn which other animals are currently present as the action is repeated throughout a coterie).

In order to preserve our prairie dog population, I study how social behaviours between prairie dogs influence individual success, and ultimately, population success. An individual's ability to cooperate to gain access to preferential food resources, as well as defend these resources when there is high competition, likely affects their overwinter survival as well as their ability to provide sufficient parental care to offspring. Prairie dogs also use their social behaviour to communicate the presence of potential predators and assist with parasite removal through grooming.

Each prairie dog is live-trapped and given a unique alphanumeric symbol on its back so they can be individually recognized from a distance. I then observe all social

Photo credit: Colleen Crill

encounters and record what type of encounter it is, which prairie dogs were involved, and how often the same individuals interact. I also look at the seasonal variation in this social behaviour, as they may be more important at certain times when accessing or defending vegetation is most impactful to their survival. The collected data can then be used to understand the social landscape of the colony. This social landscape is analogous to social media applications like Facebook that can look at how information moves through friend groups or across global networks.

The data for this project was collected in 2016 and 2017, and will be analyzed in the coming fall to create a social network using graphics software. This research will use social network analysis as a potential conservation tool, which has not been done in the past and could provide a framework for similar studies in the future. These social networks might tell us something about their ability to be successful given their limited dispersal ability and isolation from southern populations. In addition, we may learn important details of maintaining social links for successful reproduction after potential translocations of animals as a management strategy.

Jillian is a MSc student in the Lane Lab at the University of Saskatchewan. She is a recent recipient of the Margaret Skeel Graduate Scholarship through Nature Saskatchewan. She will also be presenting the results of her studies at an upcoming Nature Saskatchewan meeting, so stay tuned!

Photo credit: Evelyn Capelin

POETRY

Autumn's Serenade

Far distances, made dreamlike by a
soft whispering of smoke, are background
to near vermilion-hued rose briars,
to tawny orange leaves of willow
and dogwood filled with tweaking warblers.

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75TH ANNUAL SASKATCHEWAN CHRISTMAS BIRD COUNT - 2016

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The Counts

The number of counts increased slightly from last year's 93 to 95 this year. Effort as measured by hours in the field and at feeders or kilometres walked and driven were about average for this century.

The Weather

Average minimum and maximum count temperatures this past count period (with 2015-16 records in brackets) were -17 to -11 C (-13 to -9 C), wind speeds 8 to 18 km/h (7 to 14 km/h), and snow depths 6 to 14 cm (6 to 13 cm). As can be seen, winter temperatures were lower compared to last year (winds speeds and snowfall were, however, about the same).

The Birds

The total of 119,750 birds counted was much lower than 2015's 177,799, but was about average for this century. The average number of species per count at 18.7 was also on par since 2000.

For the first time in since 1988, Gardiner Dam won the crown for the most species on a count with 44 species; the usual winner, Saskatoon, came in second with 42 species (plus one during the count period).

Population Trends

Waterfowl numbers were down substantially in both numbers and variety. For example, Canada Geese were down from 43,711 in 2015 to 17,219 this past winter, while Mallards were down from 15,488 to 4,629. Species plummeted from 24 to 17.

Raptors fared much better. The Sharp-shinned Hawk has in recent years been catching up to the Merlin as the small diurnal raptor. On the provincial CBC 20 years ago, Merlins outnumbered Sharp-shins 13 to two; this CBC the falcon outnumbered its rival by only 19 to 15.

Another hawk, the Northern Harrier made the strongest showing ever with 11 birds on eight counts. The harriers joined Rough-legged Hawks and Short-eared Owls to feast on large numbers of voles. Vole numbers were up because the wet fall weather had forced many farmers to leave unharvested crops in the field.

Results for two introduced species were mixed. The Eurasian Collared-Dove population continues grow and spread with a record high of 653 birds in 29 localities, seven of them new: Balgonie, Bengough, Denholm, Melfort, Qu'Appelle, Rouleau and Saskatchewan Landing P. P. On the other hand, House Finch numbers have stabilized at around 1,000 to 1,200 birds for the last several years. Only two new localities were added at Duval and Togo; these did not, however, extend the overall range of the species.

Numbers of most other finches were down. An exception was the White-winged Crossbill, whose high numbers and widespread distribution presaged breeding across the southern portion of the province this past spring.

New Species

One new species was added to the all-time list: a Northern Pygmy-Owl was recorded on the Martineau River count by Stan and Jan Shadick. The CBC list now stands at an amazing 191 species.

Other Rarities

A few other rarities of note were recorded; an exception was our seventh Red-bellied Woodpecker at Nipawin.

Count areas and participants

(*Names of compilers are in italics*).

1. ARCHERWILL. Gerald Hiron, Susan Hiron, Audrey Hnetka, Perry Hnetka, *Elaine Hughes*, Dorothy Klettberg, Willie Klettberg, Annette Kozak, Judy Revoy, Stan Revoy.

2. AVONLEA. Randi Edmonds, Terry Miller, *Alan Smith*, Blaine Sudom.

3. BALGONIE. Jared Clarke, Rowan Clarke, Teal Clarke, Ryan Dudragne, Chris Harris, Phil Holloway, Fran Kerbs, Maureen Lee, Jeannette Luther, Kristen Martin, Jim Nordquist, *Brett Quiring*, Chris Selness, Wendy Woodard.

4. BENGOUGH. Randi Edmonds, *Alan Smith*.

5. BIGGAR. Mary-Jo Danychuk, Tammy Danychuk, Blair Slowski, Monica Slowski, Larry Sutherland, *Guy Wapple*, Rob Wapple.

6. BIRCH HILLS. Margaret Mareschal, *Maurice Mareschal.*

7. BORDEN-RADISSSON. Sara Bryson, Kyron Giroux, Mike Heseltine, Ron Jensen, Jennipher Karst, *Stan Shadick*, Phil Taylor.

8. BROADVIEW. Barb Weidl, *Don Weidl*.

9. CATER: Beverly Beland, *Orval Beland*.

10. CHATSWORTH S.D. Herb Cross, Charles Dyck, Donna Dyck, Lisa Herminson, George Maben, Robert Mess, Wionna Mess, *George Murray*, Laurie Murray, Marcel Pelletier, Kerri Rooke, Stewart Rooke, Carol Tangedal, Rudy Tangedal.

11. CHRISTOPHER LAKE. *Jeannie Walker.*

12. CHURCHBRIDGE A. *Ron Johnson*, Elin Johnson.

13. CHURCHBRIDGE B. *Dennis Petracek.*

14. CLARK'S CROSSING. Christine Christensen, Dave Cook, Louise Cook, Phyllis Deason, Lorne Duczek, Joshua Erikson, Shelly Fisher, Bob Godwin, Marilyn Haskins, Ron Jensen, Gwen Klypak, Heney Klypak, Brian McGill, Eileen McGill, Lynn Oliphant, John Patterson, Sylvia Raginski, Nick Saunders, Stan Shadick, Rhonda Shewfelt, Marten Stoffel, Mary Toews, Guy Wapple, Diane Wells, *Michael Williams.*

15. CORONACH. *Ryan Dudragne,* Chris Harris, Bob Luterbach, Dan Sawatzky.

16. CRAVEN. Hiroyuki Aoki, Barbara Barnett, Jessica Beaubier, Stephen Davis, Karen Goldie, Chris Harris, *Trevor Herriot*, Louise Holloway, Phil Holloway, Fran Kerbs, Laurie Koepke, Jeannette Luther, Judy Lynn, Kent Lynn, Barbara Mader, Kim Mann, Val Mann, Amelia McDonald, Jaret McDonald, Barry Mitschke, Rhonda Phillips, Curtis Pollock, Brett Quiring, Dan Sawatzky, Brian Sterenberg, Bernadette Stevenson, Jeanette Taylor, Rob Taylor, Lorna Tyler, Mary Worel.

17. CREIGHTON. Karen Prokopetz, *Brenda Schmidt*, Harvey Schmidt, Terry Smith.

18. CROOKED LAKE. Jaxon Finkas, *Boyd Metzler.*

19. CROOKED RIVER. *Margaret Mehler*, Morley Mehler.

20. CYPRESS HILLS PROVINCIAL PARK (Centre Block). Dwight Dobson, Nancy Dobson, Al Hartley, Joan Hodgins, David Larson, Margarette Larson, Brynne Martin, Mimi Martin, *Melody Nagel-Hisey.*

21. DENHOLM. Beverly Beland, Gerard Beland, Linda Beland, *Orval Beland*, Anna Symynuk, Larry Symynuk.

22. DUVAL. Ryan Dudragne, Merv Hey, Brett Quiring, *Lloyd Saul.*

23. EASTEND. Loraine Armstrong, Roxie Binkley, Duane Bristow, Kevin Bristow, Betty Davis, Cynthia Fehr, *Robert Gebhardt*, Allan Gorrie, Sherry Gorrie, Sandy Hagen, June Higgins, Joan Hodgson, Harvey Johnson, John McIntyre, Heidi Topham, Jack Wilkinson, Jan Wilkinson.

24. EBENEZER B. *Harvey Wegner.*

25. ENDEAVOUR. Ed Harris, *Norman Harris.*

26. ESTEVAN. Barry Dies, Marilyn Dies, Ryan Dudragne, Garry Leslie, Craig Palmer, *Guy Wapple*, Sandra Wapple.

27. ESTUARY NORTH. Barry Cocks, Cathy Cocks, *Dean Francis*, Fran Francis.

28. FENTON. *Carman Dodge.*

29. FLORAL. Jeff Jensen, Ron Jensen, Nick Saunders, *Guy Wapple.*

30. FORT QU'APPELLE. Steve Abbott, Jean Ashcroft, Megan Ashcroft, Peter Ashcroft, Jared Clarke, Ryan Fisher, Kate Hersberger, Alice Isfan, Jack Lowe, Marg Lowe, Tom McDougall, Alan Mlazgar, Paul Paulhus, Wendy Paquin, Florence Pearpoint, *Keith Stephens*, Kim Stephens, Colette Stushnoff.

31. GARDINER DAM. Ryan Dudragne, Krista Ellingson, Greg Fenty, Maxine Forsberg, Jeff Jensen, Ron Jensen, Bob Luterbach, Scott Olshanoski, Nick Saunders, Stan Shadick, Marten Stoffel, *Guy Wapple.*

32. GOOD SPIRIT LAKE. *Joyce Anaka (non-participating compiler)*, Dorothy Riesz, Ray Riesz, Lloyd Wilson, Marg Wilson.

33. GRASSLANDS NATIONAL PARK. Alison Bennet, Anne Bennet, Nick Cairns, Justin Crowe, Ryan Dudragne, *Samantha Fischer*, Laura Gardiner, Kathy Grant, Stefano Liccioli, Davis Shields, Mark Shields, Terry Shields, Nathan Young.

34. GRAYSON. Jack Carrigan, Carina Helm, *Charles Helm*, Daniel Helm, Linda Helm, Jeanette Zimmer, Karl Zimmer.

35. GREENWATER. Bill Gudjonson, *Brian Shuya*, Helen Toovey.

36. HARRIS. Ron Jensen, Nick Saunders, *Guy Wapple.*

37. HAZLET. *Ryan Dudragne.*

38. HUDSON BAY. Judy Block, *John Daisley*, Agnes Lewellin, Dennis Reimer, Gloria Stang, John Zolkavich.

39. INDIAN HEAD. Ethan Archer, Olivia Archer, Anika Blair, Chris Blair, Kay Dixon, *Irvin Escott*, David Gehl, Roberta Gehl, Sharon Hearn, Mavis Jealous, Jim Jinks, Linda Jinks, Dan Loran, Dora Nichols, Jim Rudack, Ruth Rudack, Lorette Schaeffer, Raymond Schaeffer, Chris Skinner, Fred Skinner, Conrad Schreiner, Brian Scott, Glenn Scott, Lorne Scott, Elaine Wiliamson.

40. KENASTON. Tyler Beckie, *P. Lawrence Beckie.*

41. KENOSEE LAKE. Jaxon Finkas, Boyd Metzler, *John Pollock*.

42. KETCHEN NORTH. *Dallas Fairburn.*

43. KILWINNING. *Ed Driver.*

44. KINDERSLEY NORTH. *Jean Harris*, Keith Harris.

45. KINLOCH. Wayne Fletcher, *Don Forbes*, Doreen Forbes, Carter Haroldson, Robert Haroldson, Clifford Logan, Doreen Wickstrom.

46. KUTAWAGAN LAKE. *Valeriana Harris*, Sheila Lamont.

47. KYLE. Arlene Campbell, Glen Pederson, *Dan Zazelenchuk*.

48. LA RONGE. Sid Robinson, *John Schisler*, Jan Shewchuk, Dave Smallwood.

49. LAC LA PLONGE. John Conkin, *Katherine Conkin.*

50. LAST MOUNTAIN LAKE NWA. *Valeriana Harris*, Sheila Lamont.

51. LEADER NORTH. *Daisy Meyers.*

52. LOVE - TORCH RIVER. Isaiah Backlund, Theresa Belliveau, Hal Birkett, Joan Birkett, *Bert Dalziel*, Joan Dalziel, Sara Dalziel, Scott Edwards, Andrea Fisher, Harold Fisher, Shelly Fisher, Taren Fisher, Elaine Inskster, Francis Inskster, Roseanne Kirkpatrick, Eilene L'Heureux, Lynn Matthews, Lillian Nesset, Audrey Schrader, Eric Schrader, Jared Taman, Kari Taman, Micah Taman, Leonard Turtle.

53. LUSELAND. Maxine Butler, Bev Einarson, Don Einarson, Estelle Finley, Graeme Finley, *Kim Finley*, Liam Finley, Valerie Finley, Brent Honeker.

54. MARTINEAU RIVER. Jan Shadick, *Stan Shadick.*

55. MEADOW LAKE. Bill Caldwell, *Bob Wilson*, Ian Wilson.

56. MELFORT. Kirsten Ballantyne, *Bert Dalziel*, Joan Dalziel, Gordon Dodds, Shirley Dodds, Susan Dodds, Graydon Eskowich, Kim Eskowich, Wendy Eskowich, Scott Green, Kurt Luchia, Jared Taman, Kari Taman, Micah Taman.

57. MOOSE JAW. Marla Anderson, Jeff Mander, Ryan Dudragne, Dan Sawatzky, *Alan Smith.*

58. MOOSE MOUNTAIN. Doyle Thomas, *Val Thomas.*

59. MORSE. Larry Bonesky, Noel Enns, Stella Enns, Mike Francis, Roxanne Johnson, Randy McCulloch, Joel Priebe, Ken Priebe, *Myrna Priebe.*

60. NIPAWIN. Carol Blenkin, Nancy Budd, Vi Budd, Joyce Christiansen, Bert Dalziel, Joan Dalziel, *Rick Douslin*, Patti Gaertner, Jennette LeCuyer, George Lidster, Jeri McCleary, Peter McCleary, Fred Olfert, Doug Phillips, Shirley Phillips, Fred Reed, Jared Taman.

61. NISBET FOREST, NORTHWEST. *Sandra Jewell.*

62. NISBET FOREST, WEST. *Kim Clark*, Shamara, Suzanne Clark.

63. ODESSA. *Arden Curts*, Denise Curts, Denny Curts.

64. PIKE LAKE. Denise Bezoplenko, Ron Bezoplenko, Donna Bruce, Dave Cook, Louise Cook, Lorne Duczek, Bob Girvan, Bob Godwin, Greg Hutchings, Jeff Jensen, Ron Jensen, Audrey MacKenzie, Bill MacKenzie, *Murray Morgan*, Keith Paul, Sylvia Raginski, Marc Sabourin, Nick Saunders, Beverley Schmidt, Jan Shadick, Stan Shadick, Joe Stookey, Phil Taylor, Michael Williams, Diane Young.

65. PONTEIX. *Ryan Dudragne.*

66. PRINCE ALBERT. Jim Bahr, Doug Braaten, Marie Braaten, Kim Clark, Shamara Clark, *Carman Dodge*, Ron Jensen, Andrea Fisher, Harold Fisher, Gwen Klebek, John Rye, Vicki St. Germaine, Warren St. Germaine.

67. PRINCE ALBERT N.P. *Jeannie Walker.*

68. QU'APPELLE. Jean Ashcroft, Peter Ashcroft, Melanie Beattie, Cory Bennett, Annika Blair, *Christine Blair*, Lillian Longpre, Paul Paulhus, Colette Strushnoff, Richard Strushnoff, Frank Veresh.

69. QU'APPELLE VALLEY DAM. Muriel Dauvin, Shelly Fisher, Jan Shadick, Stan Shadick, Guy Wapple, *Michael Williams*.

70. RAYMORE. *Valeriana Harris*, Sheila Lamont.

71. REGINA. Ingrid Alesich, Brian Armstrong, Don Bjerkie, Maryanne Bjerkie, Lionel Bonneville, Janet Canwood, Lolamae Crawley, Ron Crawley, Suzy Duckett, Jim Elliot, Ruth Englund, Jackie Fauth, Phil Fauth, Terry Ford, Shirley Friel, Brendan Graham, Chris Harris, Joanne Harrison, Trevor Herriot, Dean Johnson, Fran Kerbs, Laurie Koepke, Luciel Lipka, Mike Lipka, Sarah Ludlow, Bob Luterbach, Jeannette Luther, Lauren Mang, Kim Mann, Val Mann, Kris Mutafov, Carolyn Pepper, Wayne Pepper, Joseph Poissant, *Brett Quiring*, Sylvia Quiring, Chris Ratch, Ed Rodger, Daniel Sawatzky, Nick Selinger, Sheri Selinger, Joanne Shurvin-Martin, Frank Switzer. Mary Switzer, Hanna Walczykowski, George Wang, Bradley Yee.

72. ROKEBY. Clarence Bishop, Lloyd Liebrecht, Edna Lockhart, Morley Maier, Stephanie Newsham, Lorne Niebergal, Fred Phillips, *Martin Phillips*, Kirk Screpnick, Ray Thies, Allan Wheeler.

73. ROSCOMMON S.D. Bernice Althouse, Kate Althouse, Ruby Finnie, Brian Irving, Joan Lillibo, *Dianne Sloan*, Graham Sloan, Marguerite Sloan.

74. ROULEAU. Stuart Anderson, Allen McGratten, Noreen McGratten, *Patricia Sterzuk.*

75. ROUND LAKE (Prince Albert Area) *Crystal Frenette.*

76. ROUND LAKE (Qu'Appelle Valley. *Boyd Metzler,* Mary Ward.

77. SALTCOATS. *Arden Bradford*, Olga Brygider, Len Cameron, Walter Farquharson, Dave Herron, Gloria Herron, Gerri Knudsen, Ron Knudsen, Fern McKay, Randy Torrie, Val Trowell.

78. SASKATCHEWAN LANDING PROVINCIAL PARK. Glen Pederson, Marten Stoffel, *Dan Zazelenchuk*.

79. SASKATCHEWAN RIVER FORKS. Carman Dodge, *Don Weidl.*

80. SASKATOON. Alexander Acton, Joanne Adams, Alison Baudru, Eveline Boudreau, Gerard Boudreau, Jim Beveridge, Janny Bos, Anne Brander, Christina Christensen, Jacquie Christenson, Ewen Coxworth, Yvonne Cuttle, Lorne Duczek, Melanie Elliott, Benjamin Elwood, Joshua Erickson, Lesley Fell, David Forbes, Elisabeth Friesen, Justin Friesen, Nettie Friesen, Daniel Giesbrecht, Kyron Giroux, Mike Gollop, Jeff Jensen, Julie Jensen, Ron Jensen, Marlene Kalanack, Arlene Karpan, Robin Karpan, Richard Kerbes, Dan Kishchuk, Gordon Koshinsky, Margaret Koshinsky, Anna Leighton, Doreen Leighton, Audrey MacKenzie, Bill MacKenzie, Bob McNaughton, Priscilla Mah, Val Martz, Larry Mitchell, Scott Mitchell, Hilda Noton, Ken Nyeste, Farook Oosman, John Patterson, Dorothy Riemer, Bill Robertson, Marella Rosta, Mary Jean Roy, Marc Sabourin, Craig Salisbury, Lorriene Salisbury, Trish Santo, Nick Saunders, Margie Scharf, Maureen Scharf, Murray Scharf, Laurie Slinger, Jan Solem, Barb Sprigings, Stephanie Sydiaha, Phil Taylor, Dave Tyler, Mary Tyler, Guy Wapple, Sandra Wapple, Margaret Watson, Cathy Watts, Hamish Watts, Olive Watts, Trent Watts, Helen Wilkins, *Michael Williams*, Jim Wood, Judy Wood, Sandy Woynarski, Stan Woynarski, Norman Zlotkin.

81. SAWYER LAKE. Maureen Blight, Kathleen Blight, Michael Pitt, *David Weiman.*

82. SHAMROCK. Mike Francis, *Hugh Henry*, Joel Priebe, Myrna Priebe, Lori Wilson.

83. SNOWDEN. Esther Chamberlin, Sonya Fidyk, Diane Friesen, Don Friesen, Ed Hagel, *Irene Hagel*, Lillian Kuzniar, Doreen Long, Linda Patton, Jack Pickett, Edward Priestley, Heather Priestley, Valerie Rein, Tim Thompson, Irene White

84. SPINNEY HILL. *Ed Driver.*

85. SQUAW RAPIDS. Ryan Dudragne, *Valeriana Harris*, Sheila Lamont.

86. SWIFT CURRENT. Anita Anderson, Wade Anderson, Eunice Cammell, Norris Currie, Laurent Dudragne, Mary Ann Dudragne, Ryan Dudragne, *Arnie Ens*, Dave Green, Norma Hain, Leonard Howes, Verna Lynn Knipfel, Sharon Lang, Connie Lendrum, Dot Letkeman, Rita McLaughlin, Janet Payne, Harold Steppuhn, Sue Steppuhn, Irene Stinson, Lloyd Thiessen, Sharlane Toole.

87. THICKWOOD HILLS-SPIRITWOOD. Harold Fast, Margie Fast, Giles Lalonde, Susan Lalonde, Kay Willson, *Philip Wilson.*

88. TOGO. Don Bowes, Amanda Burback, Chad Burback, Donna Dewores, Barb Elsasser, *Doug Elsasser*, Jordan Guenther, Ed King, Louise King, William Koreliuk, Mabel Skinner, Marty Skinner, Zoria Woodworth.

89. TURTLE LAKE. *David Forbes*, Ray Forbes, Fred Hegelton, Jackie Hegelton, Cheryl Robbins.

90. TURTLEFORD. Hank DeGraaf, *Brent Keen*, Leif Johnson, Louise Lundberg, Ron Perkins, Richard Roney, Mark Seabrook, Marg Uhlig.

91. WEYBURN. John Ferrier, Glen Fleming, Millie Fleming, Dale Huff, Sandy Huff, Ken Leblanc, Alex Miles, Eileen Miles, Don Payak, Doyle Thomas, Tanis Thomas, *Val Thomas*, Sid Trepoff, Dorothy Whitell, John Whitell.

92. WHITE BEAR. Martin Gerard, Greg Nelson, Yvonne Nelson, *Dan Zazelenchuk.*

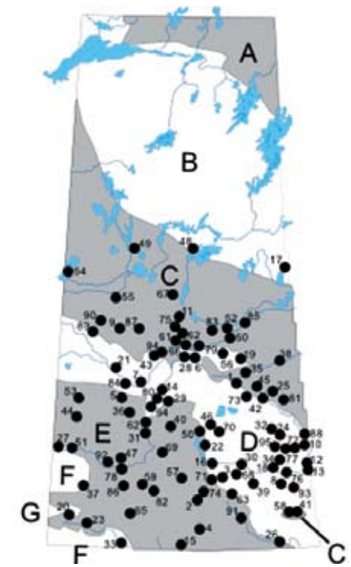
93. WHITEWOOD. Ken Aldous, Carole Armstrong, Cindy Ashfield, Joe Ashfield, Paul Ashfield, Kerri Bachtold, Grant Erickson, Jaxon Finkas, Eileen Hales, Mavis Kay, Joyce Kydd, Florence Luhtala, Sarah Mambourg, *Boyd Metzler*, Harry Mitchell, Marilyn Mitchell, Donna Mohr, Brenda Pollock, John Pollock, Carol Sawatzki, Doug Shepherd, Dawn Vennard, Pat Ward.

94. WINGARD. *Rebecca Beam.*

95. YORKTON. Allan Bailey, Crystal Bailey, Vern Brown, Mae Ann Chilman, Warren Crossman, Bob Graham, George Maben, Matt Montain, Kaarina Rahn, Gloria Rathgeber, Ray Riesz, Bonnie Rushowick, *Geoff Rushowick*, Dorothy Skene, Stan Williams.

One new species was added to the CBC all-time list: a Northern Pygmy-Owl was recorded on the Martineau River count by Stan and Jan Shadick. Photo credit: Nick Saunders

FIGURE 1.
Location of 2016 counts
(numbers correspond to those in text under Count Areas and participants).



Natural Vegetation Zones*
A. Subartic Woodland
B. Northern Boreal forest
C. Southern Boreal Forest
D. Aspen Parkland
E. Mixed Prairie
F. Dry Mixed Prairie
G. Cypress Hills

* Adapted from: Thorpe, J. 1999. Natural Vegetation. P. 133 in Atlas of Saskatchewan (K. Fung, ed). Univ. of Sask., Saskatoon

TABLE 1. Weather and Snow Cover.

LOCALITY	DATE	MIN TEMP (C)	MAX TEMP (OC)	MIN WIND (KM/HR)	MAX WIND (KM/HR)	MIN SMOW (CM)	MAX SNOW (CM)	SKY AM	SKY PM
Archerwill	28 Dec 2016	-11	-4	14	21	12	12	cloudy	mod. snow
Avonlea	21 Dec 2016	-6	-3	5	30	0	20	clear	clear
Balgonie	2 Jan 2017	-24	-21	9	17	5	30	partly cloudy	cloudy
Bengough	2 Jan 2017	-17	-16	2	11	5	20	overcast	overcast
Biggar	27 Dec 2016	-17	-5	8	22	0	5	overcast	overcast
Birch Hills	23 Dec 2016	-5	-4	6	11	7	10	mostly clear	mostly clear
Borden-Radisson	16 Dec 2016	-27	-24	14	28	0	1	mostly clear	clear
Broadview	29 Dec 2016	-7	-6	15	20	20	30	partly cloudy	partly cloudy
Cater	1 Jan 2017	-20	-11	0	20	10	15	overcast	mostly clear
Chatsworth S.D.	5 Jan 2017	-28	-16	5	10	10	25	cloudy	partly cloudy
Christopher Lake	20 Dec 2016	-4	-4	0	0	2	4		clear
Churchbridge A	28 Dec 2016								
Churchbridge B	31 Dec 2016								
Clark's Crossing	17 Dec 2016	-30	-21	4	11	0	4	clear	mostly clear
Coronach	18 Dec 2016	-21	-8	5	40	1	8	clear	clear
Craven	17 Dec 2016	-33	-22	9	17	2	15	mostly clear	mostly clear
Creighton	30 Dec 2016	-18	-11	7	15	10	20	clear	overcast
Crooked Lake	17 Dec 2016	-32	-24	10	15	15	30	clear	clear
Crooked River	19 Dec 2016	-12	-2	2	5	12	15	light snow	light snow
Cypress Hills P.P.	30 Dec 2016	-9	-6	20	35	5	20	light snow	light snow
Denholm	25 Dec 2016	-22	-17	0	8	6	10	overcast	partly cloudy
Duval	28 Dec 2016	-2	-11	10	40	2	20	partly cloudy	overcast
Eastend	29 Dec 2016	-14	-8	6	19	5	10	mostly clear	cloudy
Ebenezer B	21 Dec 2016	-7	-5	5	10	8	10	clear	mostly clear
Endeavour	2 Jan 2017	-34	-24	0	0	10	13	partly cloudy	partly cloudy
Estevan	1 Jan 2017	-17	-13	7	25	30	52	overcast	partly cloudy
Estuary North	2 Jan 2017	-20	-16	0	0	0	8	clear	clear
Fenton	2 Jan 2017	-27	-22	10	20	5	5	overcast	overcast
Floral	22 Dec 2016	-7	-1	15	30	0	5	overcast	partly cloudy
Fort Qu'Appelle	17 Dec 2016	-30	-26	2	2	5	10	clear	clear
Gardiner Dam	19 Dec 2016	-4	1	10	40	0	5	partly cloudy	overcast
Good Spirit Lake	2 Jan 2017	-25	-21	0	7	10	15	clear	clear
Grasslands N.P.	16 Dec 2016	-23	-18	10	15	1	30	light fog	partly cloudy
Grayson	27 Dec 2016	-21	-6	0	35	0	25	clear	light snow
Greenwater	3 Jan 2017	-28	-22	2	5	15	15	clear	clear
Harris	15 Dec 2016	-22	-15	10	25	0	2	partly cloudy	partly cloudy
Hazlet	22 Dec 2016	-5	6	15	30	0	5	partly cloudy	partly cloudy
Hudson Bay	26 Dec 2016	-22	-15	0	0	10	15	clear	mostly clear
Indian Head	28 Dec 2016	-8	-4	10	10	20	25	clear	partly cloudy
Kenaston	20 Dec 2016	-8	-2	10	10	0	1	clear	clear
Kenosee Lake	23 Dec 2016	-7	-5	10	15	5	20	clear	clear
Ketchen North	26 Dec 2016	-17	-15	15	20	8	12	cloudy	partly cloudy
Kilwinning	19 Dec 2016	-7	-5	10	40	5	10	partly cloudy	partly cloudy
Kindersley North	27 Dec 2016	-7	-5	2	11	15	25	partly cloudy	mostly clear
Kinloch	30 Dec 2016	-10	-3	2	5	12	15	light snow	cloudy
Kutawagan Lake	2 Jan 2017	-29	-22	7	15	0	30	mostly clear	mostly clear
Kyle	30 Dec 2016	-8	-7	10	40	0	10	overcast	partly cloudy
La Ronge	26 Dec 2016	-25	-21	5	10	10	10	clear	clear
Lac La Plonge	27 Dec 2016	-14	-14	0	0			mostly clear	mostly clear
LMLNWA	1 Jan 2017	-17	-12	10	14	0	20	mostly clear	partly cloudy
Leader North	30 Dec 2016	-7	-4	28	32	5	10	clear	clear
Love-Torch River	26 Dec 2016	-23	-15	0	0	3	10	clear	clear
Luseland	26 Dec 2016			0	10	2	4	mostly clear	mostly clear
Martineau River	27 Dec 2016	-15	-12	0	8	2	4	cloudy	partly cloudy
Meadow Lake	26 Dec 2016	-17	-14	4	15	2	10	light snow	light snow
Melfort	30 Dec 2016	-14	-10	5	13	3	10	cloudy	cloudy
Moose Jaw	20 Dec 2016	-5	-2	20	30	0	2	mostly clear	mostly clear
Moose Mountain	27 Dec 2016	-8	-7	23	28	15	30	partly cloudy	partly cloudy
Morse	18 Dec 2016	-16	-4	32	48	2	10	mostly clear	partly cloudy
Nipawin	27 Dec 2016	-13	-10	0	10	19	19	clear	clear
Nisbet Forest NW	4 Jan 2017	-18	-17	6	19	5	8	light snow	light snow
Nisbet Forest West	28 Dec 2016	-8	-6	10	12	6	8	partly cloudy	light snow
Odessa	27 Dec 2016	-16	-6	10	25	8	12	partly cloudy	overcast
Pike Lake	2 Jan 2017	-37	-21	2	9	10	15	mostly clear	clear
Ponteix	17 Dec 2016	-26	-19	10	30	2	8	clear	clear
Prince Albert	18 Dec 2016	-21	-15	10	10	10	10	light snow	overcast
Prince Albert N.P.	27 Dec 2016	-15	-12	2	5	2	3		cloudy
Qu'Appelle	28 Dec 2016	-8	-2	30	50	30	35	mostly clear	partly cloudy
Qu'Appelle Dam	18 Dec 2016	-16	-3	13	29	0	5	partly cloudy	mostly clear
Raymore	25 Dec 2016	-17	-15	15	20	0	10	overcast	overcast
Regina	26 Dec 2016	-15	-13	11	37	5	20	cloudy	partly cloudy
Rokeby	21 Dec 2016	-15	-4	12	18	5	10		
Roscommon S.D.	29 Dec 2016	-12	-4	10	15	10	14	overcast	overcast
Rouleau	21 Dec 2016	-13	-1	2	19	1	4	mostly clear	mostly clear
Round Lake (P.A.)	3 Jan 2017	-27	-19	5	19	5	8	overcast	
Round Lake (Q.V.)	19 Dec 2016	-19	-16	10	25	5	30	overcast	overcast
Saltcoats	26 Dec 2016	-14	-12	2	2	4	6	clear	clear
Sask. Landing P.P.	18 Dec 2016	-16	-3	6	40	0	4	overcast	partly cloudy
Sask. River Forks	19 Dec 2016	-13	-8	5	10	4	8	overcast	partly cloudy
Saskatoon	26 Dec 2016	-16	-12	5	16	2	10	partly cloudy	partly cloudy
Sawyer Lake	28 Dec 2016	-8	-6	15	15	6	6	clear	partly cloudy
Shamrock	28 Dec 2016	-7	-2	5	50	3	8	clear	partly cloudy
Snowden	3 Jan 2017	-25	-18	2	5	1	11	clear	clear
Spinney Hill	29 Dec 2016	-9	-8	10	15	5	15	clear	clear
Squaw Rapids	30 Dec 2016	-16	-13	0	15	5	15	cloudy	cloudy
Swift Current	21 Dec 2016	-9	1	20	35	4	8	clear	partly cloudy
Thickwood-Spiritwood	17 Dec 2016	-34	-24	0	5	5	8	mostly clear	clear
Togo	5 Jan 2017	-28	-20	10	20	10	20	overcast	partly cloudy
Turtle Lake	22 Dec 2016	-12	-4	5	5	10	15	clear	clear
Turtleford	29 Dec 2016	-14	-8	2	6	2	5	mostly clear	partly cloudy
Weyburn	17 Dec 2016	-33	-29	2	8	10	18	clear	mostly clear
White Bear	1 Jan 2017	-25	-14	0	5	0	10	partly cloudy	overcast
Whitewood	30 Dec 2016	-8	-6	10	30	30	50	heavy snow	mostly clear
Wingard	26 Dec 2016								
Yorkton	31 Dec 2016	-11	-7	11	24	5	13	overcast	overcast

TABLE 2. Effort and Habitat Coverage. Wild Fruit: p=poor, f=fair, g=good, e=excellent.

LOCALITY	PARTICPANTS	KM ON FOOT	HOURS ON FOOT	KM BY VEHICLE	HOURS BY VEHICLE	HOURS AT FEEDERS	EVERGREEN FOREST	MIXEDWOOD FOREST	DECIDUOUS FOREST	ASPEN GROVE/FARMLAND	ASPEN GROVE/PRAIRIE	NATIVE PRAIRIE	TAME PASTURE	FARMLAND	FARMSTEADS	URBAN	OPEN WATER	RIPARIAN	SHIELD, BOG, SWAMP	WILD FRUIT CROP
Archerwill	10	5.0	1.5	0	0.0	8.0		25						50	25					p
Avonlea	4	12.0	4.0	108	3.0	1.0			15			5	5	40	5	30				f
Balgonie	12	19.0	6.3	319	13.3	2.0				15				30	25	25		5		f
Bengough	2	4.0	1.0	71	3.0	0.0						20	10	40		30				
Biggar	7	6.0	4.5	436	12.5	3.0				15				45	5	35				g
Birch Hills	2	2.0	1.1	97	4.5	2.0		5	5	30			10	35	5	5		5		g
Borden-Radisson	7	4.0	1.5	295	12.5	0.0						10		65	5	15		5		f
Broadview	2	1.0	0.5	129	7.0	1.0			20	35		5		25	5	10				p
Cater	2	0.0	0.0	237	7.3	2.0	5	10	5	15			5	50	5	5				g
Chatsworth S.D.	14	2.0	6.0	98	5.0	4.0				80		10	5		5					p
Christopher Lake	1	17.0	2.5	0	0.0	0.0		60		30						10				p
Churchbridge A	2																			
Churchbridge B	1																			
Clark's Crossing	25	18.2	16.5	560	28.0	13.0			1	20	6	2	1	11	15	37	1	6		f
Coronach	4	7.5	2.4	264	7.8	0.0						15	15	55	<1	10	5			e
Craven	30	11.5	6.0	599	24.5	7.0				30		5	10	20	10	25				f
Creighton	4	5.0	3.0	259	12.0	2.0	10	50								20			20	p
Crooked Lake	2	0.5	0.5	154	4.0	0.0			25	20				20		30	5			g
Crooked River	2	0.0	0.0	30	0.5	6.0		40						40	20					g
Cypress Hills P.P.	9	8.0	5.0	15	1.0	0.0	40	40	8			10			2					g
Denholm	6	0.0	0.0	230	8.0	1.0				10	5		5	65	5	5		5		e
Duval	4	14.5	2.8	307	12.0	1.0				20			5	50	15	10				g
Eastend	17	12.0	7.0	205	6.0	4.0		5		20	50		5	5		15	<1			e
Ebenezer B	1	0.0	0.0	68	4.0	3.0		14		25	25	15	10	10	1					p
Endeavour	1	0.0	0.0	35	2.0	3.0			5		20				75					e
Estevan	7	5.0	4.5	177	5.0	2.0								30	4	29	13	24		f
Estuary North	4	0.0	0.0	50	12.0	0.0		5	5	5	5	20	10	40	10					f
Fenton	1	0.0	0.0	80	2.8	0.5			10			10	10	40	10	15		5		p
Floral	4	7.0	5.0	203	5.5	0.0				19				60	4	17				f
Fort Qu'Appelle	18	0.0	0.0	241	21.0	0.0				25	20		10	20	5	20				e
Gardiner Dam	12	21.0	16.5	544	24.3	1.0				13				45	5	7	27	3		f
Good Spirit Lake	4	0.0	0.0	120	6.0	6.0				30			40		5	25				p
Grasslands N.P.	12	6.0	5.8	226	39.3	0.0						90			5		5			f
Grayson	7	3.0	2.0	120	6.0	3.0			5	35	5			15	15	15	5	5		f
Greenwater	3	0.0	0.0	96	5.0	9.5	5	30	7	15				40	3					e
Harris	3	8.0	6.3	203	6.3	0.0				24				40	8	28				f
Hazlet	1	1.5	0.8	268	6.5	0.0					<1	10	<1	80	5	5				g
Hudson Bay	6	0.0	0.0	0	0.0	20.0									100					g
Indian Head	25	10.0	0.8	346	10.0	22.0	5			9				75	5	5	1			p
Kenaston	2	0.0	0.0	196	5.5	1.0				10				80		10				
Kenosee Lake	3	2.0	2.0	146	3.5	0.5			30	10	5		5			50				p
Ketchen North	1	1.0	1.0	50	2.5	5.5				30			20	20	20	10				
Kilwinning	1	1.0	1.0	145	5.0	0.0														p
Kindersley North	2	0.0	0.0	80	5.0	0.0														p
Kinloch	7	4.0	1.5	64	7.0	20.0	20		30	15				15	20					g
Kinloch	6	3.0	4.0	84	4.0	0.0	10	30	30	10					20					g
Kutawagan Lake	2	1.0	0.5	160	6.5	1.0				10	5	5		60	10	10				f
Kyle	3	4.0	1.5	200	7.5	0.5						15	5	30	20	15		15		f

LOCALITY	PARTICPANTS	KM ON FOOT	HOURS ON FOOT	KM BY VEHICLE	HOURS BY VEHICLE	HOURS AT FEEDERS	EVERGREEN FOREST	MIXEDWOOD FOREST	DECIDUOUS FOREST	ASPEN GROVE/FARMLAND	ASPEN GROVE/PRAIRIE	NATIVE PRAIRIE	TAME PASTURE	FARMLAND	FARMSTEADS	URBAN	OPEN WATER	RIPARIAN	SHIELD, BOG, SWAMP	WILD FRUIT CROP
La Ronge	4	18.0	8.0	52	6.0	1.0	10	40								40	10			f
Lac La Plonge	2	10.0	3.0	40	9.0	2.0	25	35	25							15				g
LMLNWA	2	2.0	1.0	197	7.8	0.5				10		10	5	40	5	25	5			g
Leader North	1	3.0	2.0	25	2.0	3.5						45		50	5					f
Love-Torch River	24	2.0	1.0	312	14.5	20.0	20	10		50					10	10				g
Luseland	9	12.0	5.0	367	4.5	3.0				40	10	5	5	20	10	10				f
Martineau River	2	1.0	0.5	35	6.0	0.0		75	20									5		p
Meadow Lake	3	5.0	1.0	121	3.0	0.0		50						30		20				g
Melfort	14	2.0	1.5	181	8.0	9.0				5				45		50				g
Moose Jaw	5	37.0	12.8	288	9.0	0.0			10			5		50	5	20	5	5		g
Moose Mountain	2	0.0	0.0	96	5.0	0.5		60				2		29	3	6				p
Morse	9	5.5	3.8	457	22.5	6.0							3	90	7					g
Nipawin	17	2.0	1.0	149	9.0	25.0	15	5		15				20	10	30	5			e
Nisbet Forest NW	1	1.0	0.5	0	0.0	3.5		50							50					f
Nisbet Forest West	3	2.0	0.5	70	3.0	2.0	10	20		20			10	40						f
Odessa	3		0.0		3.0	2.0					20	20	30	10	10		10			
Pike Lake	22	17.8	19.8	426	24.1	2.0														g
Ponteix	1	2.8	9.0	232	6.4	0.0				<1		10	20	60	5	5		<1		g
Prince Albert	14	19.3	10.0	387	19.7	3.0	20							10	5	60		5		p
Prince Albert N.P.	1	10.0	3.0	0	0.0	0.0		90								10				p
Qu'Appelle	11	5.0	1.5	250	8.0	7.5				60	5		5	20	5	5				p
Qu'Appelle Dam	7	3.0	5.0	338	11.3	0.0		5		20	7	1	20	10	10	20	2	5		g
Raymore	2	0.5	0.5	134	8.4	1.0				25			5	35	10	25				g
Regina	45	52.0	22.5	381	24.0	10.0				5			5	35	5	50				f
Rokeby	11	0.0	0.0	120	6.0	14.0		2							95	3				
Roscommon S.D.	8	0.5	1.0	69	5.0	31.0				30				60	10					g
Rouleau	4	1.0	0.5	167	6.0	2.0					5			80	5	10				p
Round Lake (P.A.)	1						10	50	10	10								20		
Round Lake (Q.V.)	2	0.5	0.5	198	6.0	2.0			20	40				10		30				g
Saltcoats	11	0.0	0.0	29	6.0	0.0														g
Sask. Landing P.P.	3	10.0	4.0	293	12.0	0.0					5	10		45	5			35		f
Sask. River Forks	2	3.0	1.0	82	5.5	0.5	15	20	20	15			5	15	5		5			p
Saskatoon	80	56.3	44.9	662	43.9	95.0	<1	2	<1	6	1	1	1	5	5	74	4	1		f
Sawyer Lake	4	2.0	6.0	132	10.0	0.0		20		60				10	10					g
Shamrock	5	2.5	2.0	339	11.5	0.0							5	65	25	5				
Snowden	15		3.0		3.0	5.0		10						30	50	10				g
Spinney Hill	1	2.0	2.0	151	4.2	0.0														g
Squaw Rapids	3	8.0	2.5	127	12.3	0.5		65						10	5		20			f
Swift Current	21	35.3	15.3	365	24.5	15.3							20	5	70			5		g
Thickwood-Spiritwood	6	1.5	3.0	154	5.9	3.2	5	10		25			10	30	5	10		5		g
Togo	13							10	20	20		10		40						e
Turtle Lake	5	17.0	10.0	120	3.3	0.5		25		25				20	5			25		f
Turtleford	8	12.0	5.0	350	11.5	3.0				45				50		5				g
Weyburn	15	0.0	0.0	323	11.0	2.0			2		2	5	6	60	10	15				p
White Bear	4	5.0	1.5	228	6.5	0.0						5	5	70	10			10		f
Whitewood	23	5.5	2.0	329	12.5	53.5				10				10	5	75				g
Wingard	1																			
Yorkton	15		4.0	110	7.5	8.0														

TABLE 3. Species found on 6 or more counts; ( ) = seen during count period (CP).

SPECIES	ARCHERWILL 28 DEC 2016	AVONLEA 21 DEC 2016	BALGONIE 2 JAN 2017	BENGOUGH 2 JAN 2017	BIGGAR 27 DEC 2016	BIRCH HILLS 23 DEC 2016	BORDEN-RADISSON 16 DEC 2016	BROADVIEW 29 DEC 2016	CATER 1 JAN 2017	CHATSWORTH S.D. 5 JAN 2017	CHRISTOPHER LAKE 20 DEC 2016	CHURCHBRIDGE A 28 DEC 2016	CHURCHBRIDGE B 31 DEC 2016	CLARK'S CROSSING 17 DEC 2016	CORONACH 18 DEC 2016	CRAVEN 17 DEC 2016	CREIGHTON 30 DEC 2016	CROOKED LAKE 17 DEC 2016	CROOKED RIVER 19 DEC 2016	CYPRESS HILLS P.P. 30 DEC 2016	DENHOLM 25 DEC 2016	DUVAL 28 DEC 2016	EASTEND 29 DEC 2016	EBENEZER B 21 DEC 2016	ENDEAVOUR 2 JAN 2017
Canada Goose							1							544	2299			16							
Mallard					4									10	1810	3		3						5		
Common Goldeneye														1	5			2								
Gray Partridge			5		7		19	9						39	63	9			(10)		7					
Ring-necked Pheasant															42									69		
Ruffed Grouse	(2)					3		1	10	4			(3)			(1)			7	1					3
Sharp-tailed Grouse	(3)		41	2	56		9	7				(1)		36	29	25	15	2				3	51		
Rock Pigeon		59	237	2	109	32	186	30	12	13				182	53	100	73				52	18	13		(15)
Eurasian Collared-Dove		38	14	6	47		5	2							59	1					2		71		
Bald Eagle	(1)						1							3	1	3		1		(1)	(2)		3	2	1
Northern Harrier																				(1)					
Sharp-shinned Hawk		(1)												1											
Northern Goshawk									1								1						1		
Rough-legged Hawk														1		1									
Golden Eagle							1								1	1									
Great Horned Owl	(1)		2		2	(1)		1		1		(1)		5	1	2					3		2		
Snowy Owl						(1)	1		1					1	2	1		1	(1)		3				
Great Gray Owl	1																								
Short-eared Owl															1	2		2							
Downy Woodpecker	4		8		4	7	5	3	1	9	2	1	2	15		17	2	1	2		7	1	8	2	1
Hairy Woodpecker	3	1	7		2		1	2	2	10	3	1	2	14		10	4	2	2	1	3		6		1
Northern Flicker																							2		
Pileated Woodpecker	(1)							(1)																	
Merlin												(1)									1				
Northern Shrike								(1)	2							1						2			
Gray Jay	2																2								2
Blue Jay	16				1	2	2		4	10	(3)		3	9		29		2	4				1	2	4
Black-billed Magpie	6	10	60	2	133	24	81	37	43	58		(1)	5	312	5	124	12	15	1	12	62	51	113	27	1
American Crow														1											
Common Raven	7	2	143		72	38	198	23	50	24	3	(4)		221	1	69	230	6		2	11	44	2	10	29
Horned Lark		10	5	12	8	(2)		26							282	9						15	28		
Black-capped Chickadee	27		173		30	29	29	22	20	62	29	5	20	210		134	23	94	9	43	20	40	57	10	18
Boreal Chickadee	1								(1)		7						2								
Red-breasted Nuthatch	7	2	31	1	21	4	4	3	2		2			32	10	16			3	25	2	10	21	6	
White-breasted Nuthatch	4		3			2	3	3	2	9	3		2		1	9			2			4	5		4
Brown Creeper			2		1									2									(1)		
Golden-crowned Kinglet			2		3										3								1		
American Robin		1														(1)							1		
European Starling		64	85		19		102	25		21				85	6	205					7	6	26		
Bohemian Waxwing			195		21	413	52	1						188		709	2	1			14	53		5	
Cedar Waxwing																33									
Snow Bunting	(30)		3233		680			263	135	198				1	2310	737		2	(15)		245	151	(120)	30	(25)
White-throated Sparrow											1					1									
Harris's Sparrow																1						1	1		
Dark-eyed Junco		1	2		3			1		3	2				6	10						1	2		
Common Grackle																									
Pine Grosbeak	23								25		(6)						7		9						10
Purple Finch																									
House Finch		32	9		12		15	13						117	19	4						1	69		
Red Crossbill			2																	10					
White-winged Crossbill			70		53	14	6	2						34		19				1	17	1	1		
Common Redpoll	6	(1)	31		6	17	12	26	172	27				60			167	19	(3)		(35)	3	4		11
Pine Siskin	1		40		1						17			4								13	1		6
American Goldfinch					17									1		43					(2)				
Evening Grosbeak	27								(3)								(1)								15
House Sparrow		223	210		122	67	306	78	11	185				1059	142	206	4		10	8	101	280	137	42	25
TOTAL BIRDS COUNT DAY	135	443	4610	26	1435	653	1039	579	493	634	69	7	34	3188	7165	2537	545	172	49	103	554	698	708	136	131
TOTAL BIRDS ONLY IN CP	38	4	0	0	0	4	0	2	4	0	9	8	3	0	0	3	1	0	33	2	39	0	121	0	40
TOTAL SPECIES COUNT DAY	15	12	25	7	28	14	22	23	17	15	10	3	6	29	25	34	15	18	10	9	16	20	32	10	15
TOTAL SPECIES ONLY IN CP	6	4	0	0	0	3	0	2	2	0	2	5	1	0	0	3	1	0	5	2	3	0	2	0	2

SPECIES	ESTEVAN 1 JAN 2017	ESTUARY NORTH 2 JAN 2017	FENTON 2 JAN 2017	FLORAL 22 DEC 2016	FORT QU'APPELLE 17 DEC 2016	GARDINER DAM 19 DEC 2016	GOOD SPIRIT LAKE 2 JAN 2017	GRASSLANDS N.P. 16 DEC 2016	GRAYSON 27 DEC 2016	GREENWATER 3 JAN 2017	HARRIS 15 DEC 2016	HAZLET 22 DEC 2016	HUDSON BAY 26 DEC 2016	INDIAN HEAD 28 DEC 2016	KENASTON 20 DEC 2016	KENOSEE LAKE 23 DEC 2016	KETCHEN 26 DEC 2016	KILWINNING 19 DEC 2016	KINDERSLEY NORTH 27 DEC 2016	KINLOCH 30 DEC 2016	KUTAWAGAN LAKE 2 JAN 2017	KYLE 30 DEC 2016	LA RONGE 26 DEC 2016	LAC LA PLONGE 27 DEC 2016	LAST MTN. LAKE 30 DEC 2016 NWA
Canada Goose	3717				4	7058		1	1					1											
Mallard	526					1670			7					80											2
Common Goldeneye	18					283								3											1
Gray Partridge	23	14			2			49			15	33		15	31				38		6	93			
Ring-necked Pheasant	335	24						37																	
Ruffed Grouse					(1)		5		(1)	4			3	5			17	1		7			2	1	
Sharp-tailed Grouse	15	80			8	11		126	(12)		16	5		22	(2)						26	7		1	10
Rock Pigeon	81		36	210	135	57		69	51		56	127		131	37	4		12	70	5	5	126			8
Eurasian Collared-Dove	17				(1)	2		2			9			41								52			
Bald Eagle					2	21			2					7								(1)			
Northern Harrier		2				1					1											1			
Sharp-shinned Hawk	(1)	1									1													2	
Northern Goshawk				1	1	1											(1)			1					
Rough-legged Hawk		2				1		1			1											1			
Golden Eagle	1	1						2																	
Great Horned Owl	(1)	3		4		5		4			3	3		1					1		4	13			3
Snowy Owl	(1)					1		2			1	1	(1)	1	1				3			3			
Great Gray Owl													(1)												
Short-eared Owl		1									1				1				3		2	7			7
Downy Woodpecker	9	2		2	27	2	4		8	4	3		5	22	(2)	4	2	1		1	2	1	5	1	1
Hairy Woodpecker	1	2	2		13	1	5		1	6			12	17	(1)	6	4	2		4			3		1
Northern Flicker	(1)	3		1	(1)																				
Pileated Woodpecker		1					1			1			2											1	
Merlin					(1)			1						1											
Northern Shrike	1		1		1	1			2																
Gray Jay										2			6					6		3			6	3	
Blue Jay			3	3	14	16	8		5	21			27	8		8	6	24		14		4	1	1	
Black-billed Magpie	12	47	17	124	137	117	47	29	56	12	171	37	4	66	24	22	12	58	31	9	53	73		1	18
American Crow					1									1								1			
Common Raven	14	5	17	51	153	16	20		67	12	24	2	170	107	1	16	41	18	4	15	9	8	145	15	7
Horned Lark	3	8			4	1		23				26		14	(8)						1	9			5
Black-capped Chickadee	17	11	16	83	286	43	74		30	29	19	1	65	130	2	100	12	48		34	4	6	34	3	9
Boreal Chickadee										2			2					2					(2)	1	
Red-breasted Nuthatch	3	1		4	12	9	9		2	4	8		13	34	1	5		7	(2)	1	1	7		1	2
White-breasted Nuthatch	3			1	21		4		2	5	2		2	27		4	(1)			3		1			
Brown Creeper						1																			
Golden-crowned Kinglet						2					4														
American Robin	2	4			(1)	3					2														
European Starling	2	300	1	11	75	58			4		4	3		29	(3)		8				1	60			29
Bohemian Waxwing	(3)	400	10	33	109	91								50						(12)			1		
Cedar Waxwing																									
Snow Bunting	654	360	15		1	26	25	60	84	9	7			110	1	30			150	88	541	62			520
White-throated Sparrow													1												
Harris's Sparrow					1									1						1					
Dark-eyed Junco	4	1			8	3		1					3	7	1		1								
Common Grackle	3					1																1			
Pine Grosbeak		10					1			25			33				10	28		57			39	15	
Purple Finch					4									2		2									
House Finch	4			2	9									24											15
Red Crossbill																									
White-winged Crossbill				16		46			(20)			4			(16)						2				6
Common Redpoll	16	2	7	6	50	12	20	9	25	3			10	12	(16)		3		(6)	24			17	55	4
Pine Siskin		3		1																9					
American Goldfinch				1	13			9	4	4				15											
Evening Grosbeak										42			98				(2)	42		16			7	9	
House Sparrow	81	200	25	209	214	550	30	18	237		407	316	2	331	26		41	86	50	7	304	525			226
TOTAL BIRDS COUNT DAY	5568	1488	150	764	1305	10363	253	443	588	185	755	558	459	1328	126	201	157	335	350	300	961	1068	260	111	874
TOTAL BIRDS ONLY IN CP	10	0	0	0	5	0	0	0	33	0	0	0	3	0	48	0	4	0	8	12	0	3	2	0	0
TOTAL SPECIES COUNT DAY	30	27	12	20	27	44	14	18	18	17	21	12	19	35	11	11	12	14	9	20	15	24	11	16	19
TOTAL SPECIES ONLY IN CP	7	0	0	0	5	0	0	0	3	0	0	0	3	0	7	0	3	0	2	1	0	2	1	0	0

SPECIES	LEADER NORTH 30 DEC 2016	LOVE-TORCH RIVER 26 DEC 2016	LUSELAND 26 DEC 2016	MARTINEAU RIVER 27 DEC 2016	MEADOW LAKE 26 DEC 2016	MELFORT 30 DEC 2016	MOOSE JAW 20 DEC 2016	MOOSE MOUNTAIN P.P. 27 DEC 2016	MORSE 18 DEC 2016	NIPAWIN 27 DEC 2016	NISBET FOREST NW 4 JAN 2017	NISBET FOREST WEST 28 DEC 2016	ODESSA 27 DEC 2016	PIKE LAKE 2 JAN 2017	PONTEIX 17 DEC 2016	PRINCE ALBERT 18 DEC 2016	PRINCE ALBERT N.P. 27 DEC 2016	QU'APPELLE 28 DEC 2016	QU'APPELLE DAM 18 DEC 2016	RAYMORE 25 DEC 2016	REGINA 26 DEC 2016	ROKEBY 21 DEC 2016	ROSCOMMON S.D. 28 DEC 2016	ROULEAU 21 DEC 2016	ROUND LAKE (P.A.) 3 JAN 2017
Canada Goose							454												1117		1324				
Mallard							102						4						253		125				
Common Goldeneye							(1)												13						
Gray Partridge			10				14	10	127				8		52			11			249	12			
Ring-necked Pheasant	6								1				2		(1)										
Ruffed Grouse		9		7									6	1		10		3		(1)		3	19		
Sharp-tailed Grouse	14		2						75				28	73	2			9	21	2		4			
Rock Pigeon		83	81		6	161	359	24	107	55				111	44	365		74	100	47	1950	119	9	70	
Eurasian Collared-Dove			4			3	12		9						31			4	12					19	
Bald Eagle										2			2						12						
Northern Harrier	(1)						2												1		1				
Sharp-shinned Hawk														1					2		1				
Northern Goshawk					1																				
Rough-legged Hawk							20												1		13			2	
Golden Eagle	1								1																
Great Horned Owl			1				1		21				2	4	2	(1)		(2)	4	1	6			1	
Snowy Owl	2		3			3	2		3												3			3	
Great Gray Owl		1																							
Short-eared Owl							1		(5)						1						3			5	
Downy Woodpecker	1	16	2		1	5	3	3	(1)	5	1	2	4	47		10	1	20	4	3	20	17	4	1	
Hairy Woodpecker		13	1	1	1	7	4	1		6	1	2	6	28		8		16	4	1	2	15	9		1
Northern Flicker			1				2							4		1			4		3				
Pileated Woodpecker		2											2	2		3									
Merlin							2		1					1		(2)			1		2				
Northern Shrike		(1)	1			1								2						1	1				
Gray Jay		8		14		1				3						4									
Blue Jay		24	7	2		10				19		13	2	19		18		1	10	3	4	7	16		4
Black-billed Magpie	15	90	106	2	6	71	36	9	69	27		16	16	207	36	127	6	73	59	10	49	48	45	7	
American Crow							1														1			4	
Common Raven	2	233	17	10	48	179	26	9	10	224		12	20	68		176		158	16	10	318	63	22	5	2
Horned Lark			3				1		188						241			10		1	12			(4)	
Black-capped Chickadee	2	143	9	5	17	45	40	35		75	12	46	15	498		195	20	104	61	19	207	134	52		16
Boreal Chickadee		14	1	25												1									
Red-breasted Nuthatch		35	4	2	5	39	29	2	9	27	6			12	1	16	1	10	17	1	119	4	9		
White-breasted Nuthatch		8	(1)		3	4	9	2		8	4	4		17		13	4	8			16	7	5	5	1
Brown Creeper							1												1						
Golden-crowned Kinglet									4										1		5				
American Robin													2	1					4		2				
European Starling		80	12			62	491		40	220			10	91	18	21		26	93		400		20	1	
Bohemian Waxwing			31		8	451				25				1265		7690		7	77				2		
Cedar Waxwing													6	6											
Snow Bunting		245	295			76	2		3426				20	111		233		92	252	120	(150)	30	610	40	
White-throated Sparrow																					5		1		
Harris's Sparrow																									
Dark-eyed Junco			2			2	7		(3)					1		1					55		3		
Common Grackle							2														4				
Pine Grosbeak		55				13		1		25		4				52			9				2		6
Purple Finch										11				1		(2)									
House Finch			(6)				26		4					1					4	15	208				
Red Crossbill		2												2		3									
White-winged Crossbill		76	(47)			40			82	48				66		65		3	124	8			100		
Common Redpoll	1	176	9		5	16			9	30		6	2	22		2		60	20		21	43	27		4
Pine Siskin								1	(1)	2				6		40	8		4						
American Goldfinch			(6)					4	(2)	2				10		(3)		36							
Evening Grosbeak		156								91		45		1		17		1							18
House Sparrow	12	88	63		37	344	662	13	1384	45				183	640	115		151	185	122	2279	544	82	130	
TOTAL BIRDS COUNT DAY	56	1565	680	70	138	1534	2313	114	5570	953	24	150	167	2865	1072	9186	40	878	2487	364	7416	1051	1037	293	52
TOTAL BIRDS ONLY IN CP	1	1	60	0	0	0	4	0	12	0	0	1	0	0	1	8	0	3	0	1	151	0	0	4	0
TOTAL SPECIES COUNT DAY	10	25	25	11	12	22	29	13	20	23	5	10	21	33	13	25	6	23	33	16	36	16	19	14	8
TOTAL SPECIES ONLY IN CP	1	1	4	0	0	0	4	0	5	0	0	1	0	0	1	4	0	2	0	1	2	0	0	1	0

SPECIES	ROUND LAKE (Q.V.) 19 DEC 2016	SALTCOATS 26 DEC 2016	SASK LANDING P.P. 18 DEC 2016	SASK RIVER FORKS 19 DEC 2016	SASKATOON 26 DEC 2016	SAWYER LAKE 28 DEC 2016	SHAMROCK 28 DEC 2016	SNOWDEN 3 JAN 2017	SPINNEY HILL 29 DEC 2016	SQUAW RAPIDS 30 DEC 2016	SWIFT CURRENT 21 DEC 2016	THICKWOOD HILLS-SPRITWOOD 17 DEC 2016	TOGO 5 JAN 2017	TURTLE LAKE 22 DEC 2016	TURTLEFORD 29 DEC 2016	WEYBURN 17 DEC 2016	WHITE BEAR 1 JAN 2017	WHITEWOOD 30 DEC 2016	WINGARD UNDATED	YORKTON 31 DEC 2016	TOTALS COUNT DAY	TOTALS ONLY IN COUNT PERIOD	#COUNTS COUNT DAY	# COUNTS ONLY IN COUNT PERIOD
Canada Goose	1				680						1										17219	0	16	0
Mallard			1	2	19					1										2	4629	0	20	0
Common Goldeneye					1050					122											1498	1	10	1
Gray Partridge		9	20								22					72	89	3			1185	10	34	1
Ring-necked Pheasant			5				2				8					37	1				569	1	13	1
Ruffed Grouse		4		3		2						5	3		(1)			4			153	10	30	7
Sharp-tailed Grouse			126		46		4		9	(2)	14		16	1	3	104	75	5			1236	20	45	5
Rock Pigeon	33	20	11		1565	18	54		43	8	310	28	100		143	190	66	65		167	8977	15	68	1
Eurasian Collared-Dove			1		30						74					14		72			653	1	29	1
Bald Eagle	2		1			(2)				3		3			1			(1)		1	74	8	21	6
Northern Harrier							2														11	2	8	2
Sharp-shinned Hawk			1		3		(1)				2							(1)			15	4	10	4
Northern Goshawk								1									1				10	1	10	1
Rough-legged Hawk					1		1														46	0	13	0
Golden Eagle	1		(4)				1		1								1				13	4	12	1
Great Horned Owl		2	3		4		17		2		5				3	1	3				143	7	38	6
Snowy Owl			6								2			1		2	6				59	4	27	4
Great Gray Owl										3			1		(1)						6	2	4	2
Short-eared Owl															1	1					39	5	16	1
Downy Woodpecker	1	11	9	1	36		1	9	2	1	4	6	5	2	3	4		21	1	7	502	3	80	2
Hairy Woodpecker	1	10		1	14	2		9	3	2	1	5	9		3			17	2	5	368	1	71	1
Northern Flicker			2		17	2					5										47	2	13	2
Pileated Woodpecker	1				1					1			2		(1)			1		2	23	3	15	3
Merlin					7						2							(1)			19	5	10	4
Northern Shrike	1	3			1				1		1	1						1			26	2	20	2
Gray Jay							7		11				3							1	84	0	18	0
Blue Jay	1	9		6	54	4		34	11	6	4	13	37	1	3			11	5	2	612	3	62	1
Black-billed Magpie	29	14	43	24	432	9	28	54	55	17	87	32	20	8	76	21	140	24		12	4626	1	89	1
American Crow					3							(1)									13	1	8	1
Common Raven	21	11	4	18	196	12	1	98	16	34	2	25	248	41	44	7		52		285	4865	4	85	1
Horned Lark			9				97				1				(1)	8	6				1066	15	31	4
Black-capped Chickadee	39	53	29	16	852	10		94	56	18	33	29	65	10	54			238	7	72	5585	0	84	0
Boreal Chickadee				2				8		10											78	3	14	2
Red-breasted Nuthatch	2	13	1	3	211	4	1	17	8		87	1	5		1	9		29	1	25	1092	2	75	1
White-breasted Nuthatch	1	12			17			8	2			3	11	1	1	4		20	2	21	352	2	57	2
Brown Creeper	1		1		2						1										13	1	10	1
Golden-crowned Kinglet					4						10										39	0	11	0
American Robin					10						1							1		1	35	2	14	2
European Starling			1		233		51	40							3	32	10	60		141	3392	3	50	1
Bohemian Waxwing	51				460						33				(40)			127		15	12590	55	33	3
Cedar Waxwing					5						30		(6)								80	6	5	1
Snow Bunting		74	380		200	80	84	50	90		460	(35)	125	2	111		1230	479			19645	375	57	6
White-throated Sparrow					1													2			12	0	7	0
Harris's Sparrow																		(1)			6	1	6	1
Dark-eyed Junco				1	14						22				1	6		2		2	179	3	33	1
Common Grackle							1				(1)		1								13	1	7	1
Pine Grosbeak			1	6	2	4		66	5	13		7	76		4						643	6	33	1
Purple Finch																3		20			43	2	7	1
House Finch					323		3				203		8		8	10		12		9	1179	6	29	1
Red Crossbill					10						2										31	0	7	0
White-winged Crossbill				55	255		8		3	29	7	6									1267	83	33	3
Common Redpoll	15			10	110	47		80	27	55	3	67	2		13			11	2		1731	61	61	5
Pine Siskin		2			35	20					14		24		4			52		43	351	1	25	1
American Goldfinch					3													40			202	13	15	4
Evening Grosbeak				8		(2)	1	152		8			84						25		863	8	21	4
House Sparrow	105	29	64		2512	15	1425	2	12	4	715	96	32		137	404	630	449	50	135	20996	0	77	0
TOTAL BIRDS COUNT DAY	306	276	719	158	9560	229	1785	730	347	352	2167	327	877	67	617	944	2259	1819	95	948	119750	789		
TOTAL BIRDS ONLY IN CP	0	0	4	0	1	4	1	0	0	2	1	36	6	0	44	0	0	4	0	0	789			
TOTAL SPECIES COUNT DAY	18	16	22	17	42	14	20	18	19	23	34	16	22	9	21	21	14	28	9	20	94			
TOTAL SPECIES ONLY IN CP	0	0	1	0	1	2	1	0	0	1	1	2	1	0	5	0	0	4	0	0		5		

TABLE 4. Species found in fewer than 6 counts.

SPECIES	LOCALITY AND NUMBER (*=SEEN DURING COUNT PERIOD)
Snow Goose	Regina (4)
Cackling Goose	Gardiner Dam (3), Saskatoon (140)
Wood Duck	Moose Jaw (1*)
Green-winged Teal	Regina (1*)
Redhead	Gardiner Dam (10)
Ring-necked Duck	Estevan (2), Gardiner Dam (2)
Greater Scaup	Gardiner Dam (23)
Lesser Scaup	Gardiner Dam (10)
Harlequin Duck	Saskatoon (1*)
Bufflehead	Estevan (1), Gardiner Dam (8)
Hooded Merganser	Gardiner Dam (5), Squaw Rapids (1)
Common Merganser	Crooked Lake (2), Estevan (2), Gardiner Dam (187), Qu'Appelle Dam (1),
Red-breasted Merganser	Crooked Lake (1)
Ruddy Duck	Indian Head (1)
Spruce Grouse	Squaw Rapids (2)
Willow Ptarmigan	Creighton (1), Squaw Rapids (2)
Pied-billed Grebe	Moose Jaw (2)
Mourning Dove	Avonlea (1*), Craven (1*), Eastend (4), Rokeby (1), Shamrock (3)
Red-tailed Hawk	Regina (2)
American Coot	Estevan (1)
Northern Hawk Owl	Hudson Bay (1*), Lac La Plonge (1), Nisbet Forest West (1*)
Northern Pygmy-Owl	Martineau River (1)
Long-eared Owl	Gardiner Dam (1), Kyle (3), Regina (1)
Northern Saw-whet Owl	Kyle (2*), Qu'Appelle (1*)
Red-bellied Woodpecker	Nipawin (1)
American Three-toed Woodpecker	Love-Torch River (1), Martineau River (1), Nipawin (2)
Black-backed Woodpecker	Hudson Bay (1), Love-Torch River (4), Saskatchewan River Forks (1), Snowden (1), Squaw Rapids (1)
American Kestrel	Swift Current (1)
Gyrfalcon	Moose Jaw (1*)
Prairie Falcon	Luseland (1), Ponteix (1), Weyburn (1), White Bear (1)
Townsend's Solitaire	Biggar (1), Eastend (1), Estevan (1*), Floral (1)
Varied Thrush	Eastend (1), Gardiner Dam (1) Odessa (4), Saskatoon (1)
Lapland Longspur	Coronach (14), Luseland (14), Ponteix (3), Weyburn (14)
Spotted Towhee	Craven (1), Saskatoon (1)
American Tree Sparrow	Craven (2), Eastend (1), Gardiner Dam (2), Indian Head (1)
Chipping Sparrow	Regina (1)
Savannah Sparrow	Gardiner Dam (1), Moose Jaw (1*)
Fox Sparrow	Whitewood (1)
White-crowned Sparrow	Broadview (1)
Red-winged Blackbird	Estevan (2*), Indian Head (11)
Rusty Blackbird	Kyle (4), Odessa (6), Saskatchewan Landing (1), Spinney Hill (1)
Brewer's Blackbird	Kinloch (1)
Hoary Redpoll	Crooked river (4*), Love-Torch River (4), Melfort (1), Pike Lake (1)

TABLE 5. Birds not identified to species.

CATEGORY	LOCALITY AND NUMBER (*=SEEN DURING COUNT PERIOD)
Buteo sp.	Avonlea (1*)
Woodpecker sp.	Bengough (1), Pike Lake (2)
Falcon sp.	Qu'Appelle (1)

TABLE 6. New (in bold and italics) and tying high counts for individual species 2016.

LOCATION	2016 COUNT	SPECIES	PREVIOUS HIGH	LOCATION, YEAR
Regina	4	Snow Goose	4	Weyburn 1999, Regina 2015
Saskatoon	***140***	***Cackling Goose***	***105***	***Estevan 2015***
Gardiner Dam	***23***	***Greater Scaup***	***16***	***Ft Qu'Appelle 2015***
Saskatoon	1	Harlequin Duck	1	Gardiner Dam 1990, Fort Qu'Appelle 1991,Saskatoon 2015
Estevan	***335***	***Ring-necked Pheasant***	***231***	***Estevan 2009***
Estevan	2	Pied-billed Grebe	2	Regina 1955, 1973; Estevan 2011
Martineau River	***1***	***Northern Pygmy-Owl***	***NEW***	
Nipawin	1	Red-bellied Woodpecker	1	Regina 2001. 2016; Yorkton 2007; Crooked River 2010; Grenfell 2013
Swift Current	1	American Kestrel	1	North to Saskatoon
Craven, Saskatoon	1	Spotted Towhee	1	North to Turtle Lake and Saskatoon

HUMAN NATURE

Jared Clarke taking birds out of a mist net at LMBO. Photo credit: Margaret Skeel

Al Smith bands a Dark-eyed Junco at LMBO. Photo credit: Nature Saskatchewan

An Orchard Oriole at LMBO.
Photo credit: Nature Saskatchewan

Rob Warnock
Regina, SK

Last Mountain Bird Observatory (LMBO) located in Last Mountain Regional Park (LMRP) near Govan, SK is one of my favourite places to birdwatch during spring and fall migrations. Each visit is different because one never knows which species will be present. A Long-eared Owl was a real surprise during one of my visits to LMBO.

One can easily get more than 70 species in six hours during the Canadian Birdathon with LMBO as the anchor location. There are a variety of accessible habitats to visit: the treed parkland setting of LMRP, Last Mountain Lake and its shoreline, nearby grasslands of the National Wildlife area, farmyards, and a large number of wetlands. As such, one can get waterfowl, birds of prey, woodpeckers, prairie and forest songbirds and other water birds.

The 2003 Nature Saskatchewan Fall Meet at LMBO was fantastic and is still ranked as one of my favourite meets attended. I wished more people attended that meet. Two of the key highlights of this meet were a boat trip into the federal Last Mountain Bird Sanctuary at the north end of Last Mountain Lake and bird banding demonstrations. The boat trip gave participants a different perspective on the nature sanctuary and we were able to see heron and cormorant roosts as well as Bald Eagles.

Bird banding is one the reasons I like going to LMBO as it is the only monitoring station in the province and has the objective to monitor all land bird species. The emphasis is on priority species that are not being adequately monitored by other programs. The birds are monitored through the use of a daily census and systematic use of mist nets (finely woven nets strung between poles along hedgerows). Birds are removed from the nets and tagged with uniquely numbered bands. Data on species, age and sex is also recorded, and all information is forwarded to the Bird Banding Office in Ottawa. It is a great way to see a number of songbird species up close and even hold one in your hand and feel its incredibly rapid heartbeat. Alan Smith, LMBO manager, and his assistants are passionate about what they do and clearly enjoy educating others abut bird banding.

Information gathered at LMBO provides insights into population trends, longevity and movements of birds. On average, 3,400 birds of 76 species are banded annually, and since 1990, LMBO has banded 70,000 birds of 115 species. The majority of the migrating songbirds are neotropical migrants (birds breeding in northern latitudes of the Americas and wintering in the tropics). I appreciate both the effort and science behind bird banding at LMBO.

I encourage others to visit LMBO when it is open and donate to LMBO directly through Nature Saskatchewan or through the Great Canadian Birdathon. Check out the LMBO webpage at http://www.naturesask.ca/what-we-do/lmbo.

Photo credit: Dale Mierau

Photo credit: Branimir Gjetvaj

Mystery Photo
Fall 2017 (left)

THE QUESTION IS: What creature owns this distinctive face? Hint: It can be found in all three Prairie Provinces.

Please send your answers to Blue Jay editor Annie McLeod at bluejay@naturesask.ca or by letter mail: 3017 Hill Ave. Regina, SK S4S 0W2.

Those with correct answers will be entered into a draw for a prize from Nature Saskatchewan.

Mystery Photo
Summer 2017 (above)

ANSWER:

The tail feathers shown in the Summer 2017 issue of Blue Jay belong to a Merlin (*Falco columbarius*).

Have you taken a picture that may make for a good mystery photo? Send it to the editor for possible inclusion in the next issue.

Nature SASKATCHEWAN

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