

The Pembina Valley 2012 Spring Raptor Migration



**A Rocha - Pembina Valley
Biodiversity Report Series
No. 3**

**J. Paul Goossen, Al Schritt
and Valorie Goossen**

A Rocha
Inspiring Change. Caring for Creation

December 2012



About A Rocha

A Rocha is an international Christian organization that engages in scientific research, environmental education and community-based conservation projects.

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Executive Summary

Migrating raptors were monitored in Manitoba's Pembina Valley from 18 February – 20 April 2012. Observers spent 59 days (421.5 h) monitoring the spring raptor migration near Windygates, about 125 km southwest of Winnipeg. Fifteen raptor species, totaling 4,447 birds were counted. The four most common raptors were Red-tailed Hawks (2,667), Bald Eagles (1,102), Broad-winged Hawks (181) and Sharp-shinned Hawks (153). Unusually mild weather during the 2012 migration and little to no snow cover appear to have resulted in raptors dispersing more broadly than usual during their migratory movements. Of the 15 species of raptors recorded in 2012, nine (60.0%) had their lowest or second lowest count in the past eight years. The 2012 total count of raptors was the lowest in the history of standardized raptor counts in the Pembina Valley.

Acknowledgements

We are indebted to Jack Nichol for use of his property for monitoring raptors. We also thank bird watchers and others for their assistance with the count. In particular, we thank Luc Blanchette and Bob Shettler. Funding support for the raptor migration project was provided by the Canadian Wildlife Federation and private donations made to A Rocha Canada.



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Table of Contents

	Page
Executive Summary	i
Acknowledgements	ii
1.0 INTRODUCTION	1
2.0 STUDY AREA	2
3.0 METHODS	2
4.0 RESULTS	4
5.0 DISCUSSION	10
6.0 RECOMMENDATIONS	13
7.0 LITERATURE CITED	14
APPENDICES	17
Appendix 1. Scientific names of migratory raptors seen in the Pembina Valley during spring 2012.	18
Appendix 2. February, March and April 2012 temperature and precipitation data for select weather stations near Windy gates, Manitoba.	19
Appendix 3. Summary of the 2012 spring raptor migration count near Windy gates, Manitoba	21
 List of Tables	
Table 1. Observer numbers and effort (h) for the 2012 spring raptor migration near Windy gates, Manitoba.	5
Table 2. Total number of raptors by species for the 2012 spring count near Windy gates Manitoba.	6

Table 3. Mean migration date and migration count intervals for the 2012 spring raptor migration near Windygates, Manitoba.....	6
Table 4. Number of raptors and time of day near Windygates, Manitoba (2012).	9

List of Figures

Figure 1. Location of the Pembina Valley Windygates raptor migration count site.	3
Figure 2. Number of raptors observed near Windygates, Manitoba during 18 February – 20 April 2012	7
Figure 3. Number of Bald Eagles and Red-tailed Hawks observed near Windygates, Manitoba during 18 February – 20 April 2012.....	8
Figure 4. Percent of raptors observed in relation to time of day near Windygates, Manitoba (2012).....	9

1.0 INTRODUCTION

One of the purposes of monitoring migrating raptors is to determine their conservation status (Hussell and Ruelas Inzunza 2008). Knowledge of long-term population trends of individual raptor species is essential to assessing conservation and research needs. Monitoring raptors can also lead to recognition of the value of habitat. In Lebanon, counts of migrating raptors have contributed to sites being designated by BirdLife International as Important Bird Areas (A Rocha Lebanon and the Society for the Protection of Nature in Lebanon 2008, BirdLife International n. d.). Monitoring top of the food chain predators is also relevant to humans as it aids in assessing environmental health.

Nearly 200 sites in North America are monitored for migrating birds of prey (Hawk Migration Association of North America 2012a). One of the most northerly raptor count sites in North America is located in Manitoba's Pembina Valley near Windygates, southwest of Winnipeg. Each spring thousands of birds of prey use the Pembina Valley as a migration corridor (Goossen et al. 2009). The Red-tailed Hawk (see Appendix 1 for scientific names of raptors) is the most abundant of the 16 raptor species that migrate through the valley. Its numbers are sufficiently great enough that, on average, the Windygates site ranks well within the top spring counts in North America (Schritt et al. 2007).

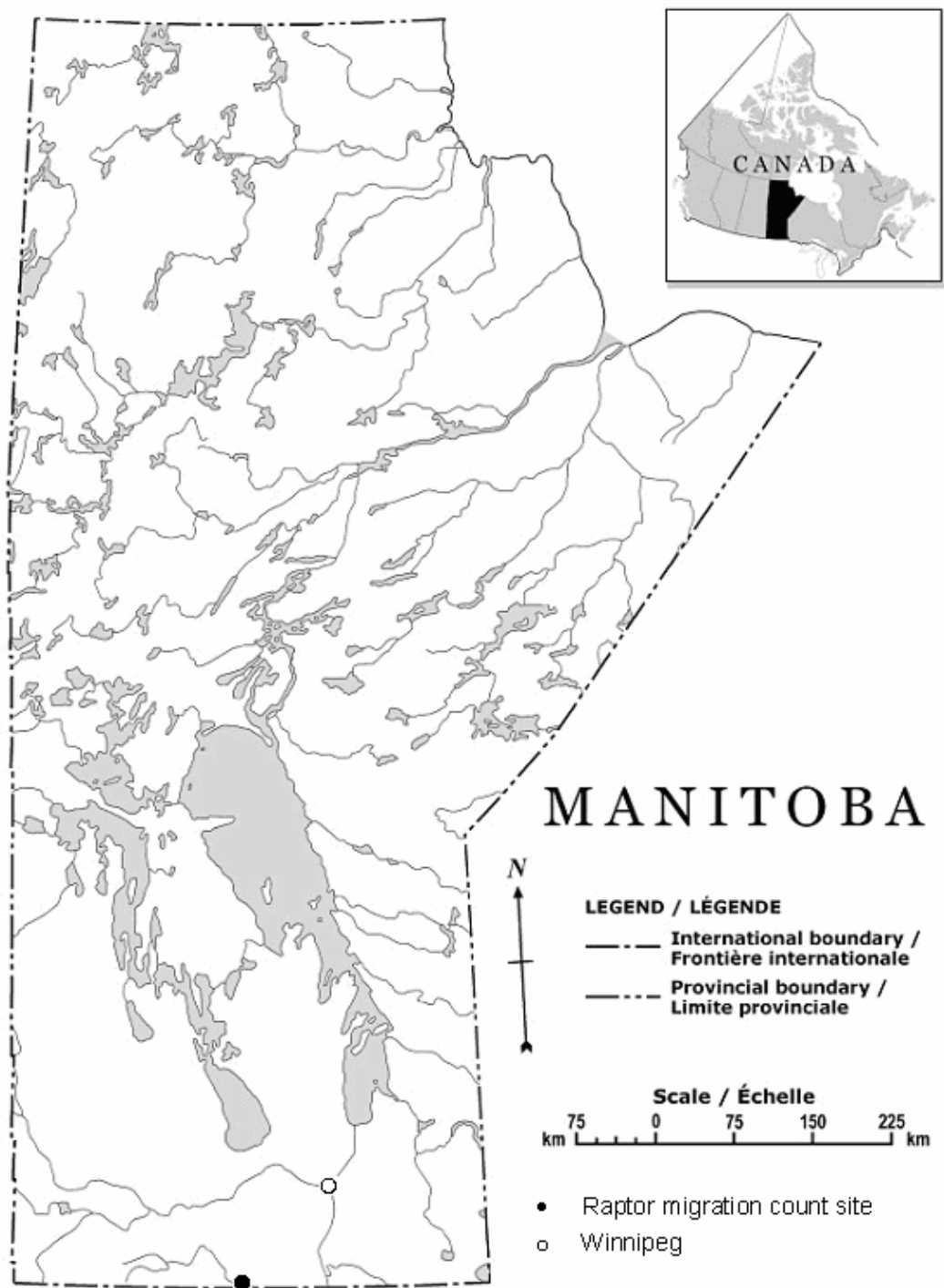
A Rocha has conducted standardized counts of spring migrating raptors in the Pembina Valley since 2005 (Schritt et al. 2007). In this current report, we document the 2012 spring raptor migration in the Pembina Valley, discuss species counts and the potential effect of weather on the 2012 migration and make recommendations for the Windygates count.

2.0 STUDY AREA

The Pembina Valley, located about 125 km southwest of Winnipeg, Manitoba (Figure 1), lies within the Aspen Parkland region. The Windygates count site is located near the Canada - United States border in the vicinity of where the Pembina River and Provincial Road No. 201 intersect. The Pembina River originates in the Turtle Mountains and flows 550 km southeastward before emptying into the Red River in North Dakota. The valley is characterized by both natural and agricultural landscapes. Habitats include pastures, cultivated fields, riparian vegetation, mixed deciduous woods and valley slopes. At the count site, the Pembina Valley is relatively narrow thereby facilitating raptor counting.

3.0 METHODS

Raptor migration monitoring was carried out at the Windygates site from 18 February to 20 April 2012. One observer (A. Schritt) carried out most of the daily counts but was also at times assisted by volunteers and visitors. The number of qualified observers on any given day ranged from 1-5. Observers tried daily to arrive before the birds began flying and generally stayed up to 0.5 h after what was assumed to be the last migrating raptor for that day. Counts started as early as 0745 h and ended as late as 1900 h. Raptor numbers, sky conditions, precipitation, and temperatures were recorded on a standardized form. At the end of the day, raptor numbers were tallied for each species and posted on the Hawk Migration Association of North America's HawkCount project website (Hawk Migration Association of North America 2012b). Binoculars and spotting scopes were used to aid with raptor identification. Observers often checked the wind



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Sa Majesté la Reine du chef du Canada, Ressources naturelles Canada.

Figure 1. Location of the Pembina Valley Windygates raptor migration count site.
(Map source: <http://atlas.gc.ca>).

direction before entering the valley and set up for data collection at the appropriate location in the valley. When winds were southerly, monitoring was done from the north slope of the valley. Northerly breezes moved the birds to the southern part of the valley and observers moved accordingly to the south slope. Mechanical counters were used to keep track of the more numerous species. Immature and adult eagles were recorded separately as were dark and light morphs of buteos. A guest book was kept to record the names of observers and visitors to the count site. Additional information on methods can be found in Schritt et al. (2007).

4.0 RESULTS

In total, 421.5 h of observations were logged over 59 days (Table 1). The overall monitoring efforts averaged 7.1 h /day. Inclement weather prevented counting on four days: 21, 26 February and 2, 4 March. Observers documented 15 migratory raptor species at the Windygates site (Table 2). The total number of raptors counted was 4,447. The four most common species were the Red-tailed Hawk (2,667), Bald Eagle (1,102), Broad-winged Hawk (181) and Sharp-shinned Hawk (153). Of the 2,667 Red-tailed Hawks seen, 110 (4.1%) were dark morphs as were nine (29.0%) of the 31 Rough-legged Hawks. Of the 1,102 Bald Eagles recorded, at least 396 (35.9%) were sub-adults while only 10 (13.3%) of the 75 Golden Eagles were identified as sub-adults. The mean migration date for the 2012 migration was 19 March (Table 3). The 95% migration count interval was 9 March – 18 April. Raptor numbers peaked at 574 on 21 March (Figure 2). Bald Eagle numbers first peaked on 9 March when 150 were counted and then a second peak occurred on 17 March when 134 were counted. Golden Eagle numbers peaked at 15 on 9 March (Figure 3). Ninety percent of raptors were counted during the period 1000 h to 1700 h (Table 4). The time interval with the highest percentage of raptors counted was 1300-1400 h (Figure 4).

Table 1. Observer numbers and effort (h) for the 2012 spring raptor migration near Windygates, Manitoba.

Month	February 2012																														
Day	18	19	20	21	22	23	24	25	26	27	28	29																			
No. of observers ¹	1	2	3	0	1	1	1	1	0	1	1	1																			
Observation hours	6.8	5.5	6.0	0.0	5.3	5.0	5.3	5.0	0.0	5.0	5.5	4.8																			
Month	March 2012																														
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
No. of observers	1	0	1	0	1	1	1	1	2	3	2	1	1	1	4	5	5	5	2	1	3	3	1	1	1	3	1	3	2	4	2
Observation hours	5.0	0.0	4.5	0.0	5.8	3.5	5.0	5.3	8.4	8.3	9.0	6.1	9.0	8.3	9.3	9.5	9.8	10.0	9.5	10.0	9.8	9.6	8.0	5.5	8.3	9.5	5.8	7.5	5.0	9.8	10.8
Month	April 2012																														
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20											
No. of observers	5	1	2	2	1	1	2	1	1	1	1	5	1	1	2	1	1	1	1	1											
Observation hours	10.0	7.3	9.5	8.3	9.3	9.3	7.5	5.5	6.5	5.5	6.5	7.0	5.0	7.5	5.1	5.8	5.7	8.3	5.5	7.8											

¹ Number of observers represents maximum number of individuals in a given hour of observation with sufficient experience to help with identification of raptors in flight.

Table 2. Total number of raptors by species for the 2012 spring count near Windygates, Manitoba.

Species	Total Count
Turkey Vulture	44
Osprey	12
Bald Eagle	1102
Northern Harrier	33
Sharp-shinned Hawk	153
Cooper's Hawk	40
Northern Goshawk	21
Broad-winged Hawk	181
Red-tailed Hawk	2667
Ferruginous Hawk	1
Rough-legged Hawk	31
Golden Eagle ¹	75
American Kestrel	6
Merlin	16
Peregrine Falcon	7
Unidentified raptor	58
Total	4447

¹Two Golden Eagles were seen by A. Schritt on 13 February 2012 but are not included in official count.

Table 3. Mean migration date and migration count intervals for the 2012 spring raptor migration near Windygates, Manitoba.

Parameter	2012
Mean migration date	19 March
Migration count interval (66%)	15 March – 31 March
Migration count interval (90%)	9 March -18 April
Migration count interval (95%)	9 March -18 April

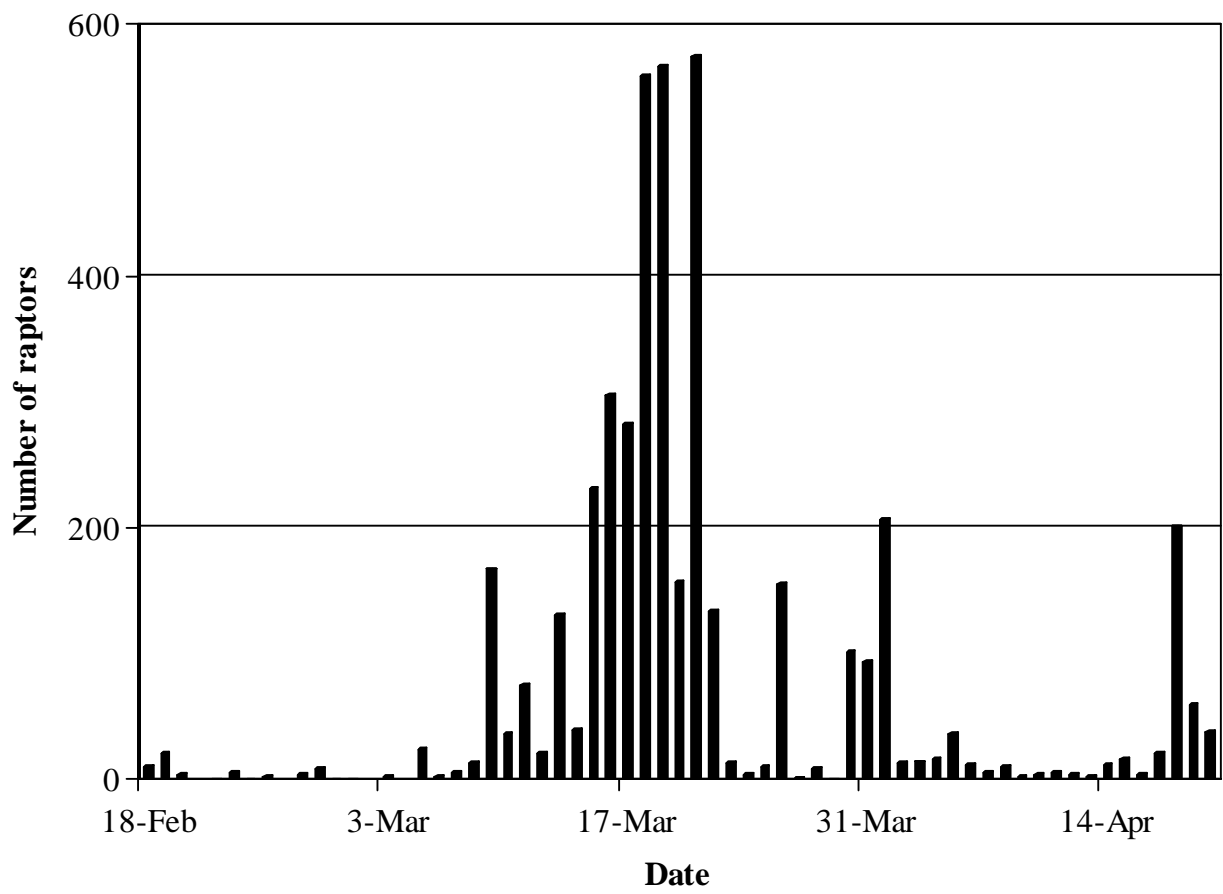


Figure 2. Number of raptors observed near Windygates, Manitoba during 18 February – 20 April 2012.

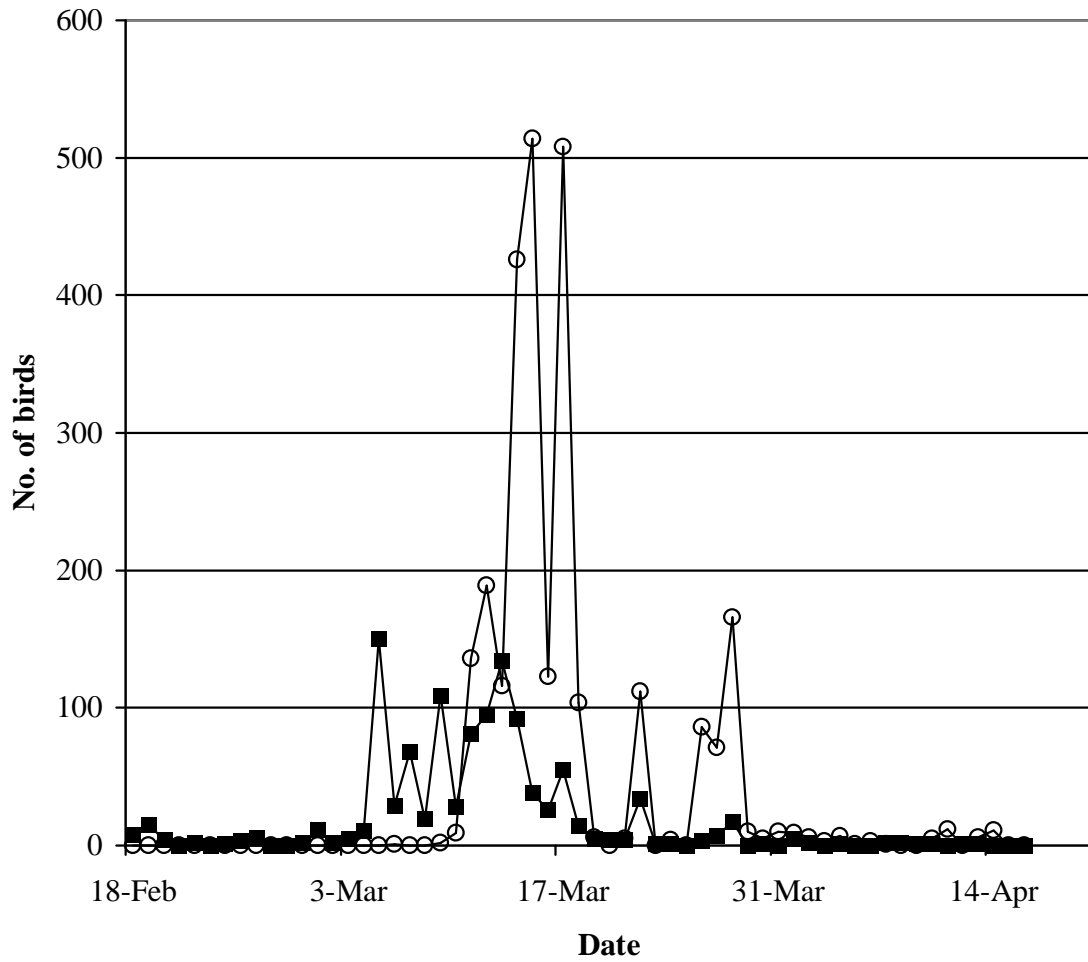


Figure 3. Number of Bald Eagles (■) and Red-tailed Hawks (○) observed near Windygates, Manitoba during 18 February – 20 April 2012.

Table 4. Number of raptors and time of day near Windyates, Manitoba (2012).

Hour (CST)	0800-0900	0900-1000	1000-1100	1100-1200	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900
No. of raptors	43	196	548	551	526	678	584	543	506	192	5
No. of hours	13	32	41	52	57	58	54	46	27	10	1
Percent	1.0	4.5	12.5	12.6	12.0	15.4	13.3	12.4	11.5	4.4	0.1

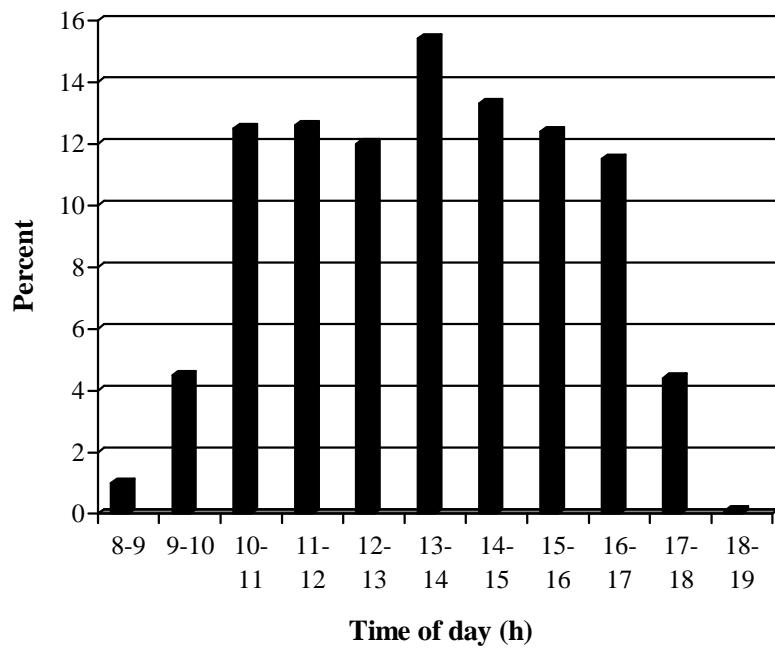


Figure 4. Percent of raptors observed in relation to time of day near Windyates, Manitoba (2012).

5.0 DISCUSSION

The 2012 raptor migration in the Pembina Valley got off to an early start and appeared to be relatively normal with good numbers of Bald and Golden eagles. Although Bald Eagle numbers totaled over 1000 individuals, their count was, however, only the 5th highest count in the past eight years (Schritt et al. 2007, A Rocha unpubl. data). The highest count for Bald Eagles in the Pembina Valley was 1,540 in 2009 (A Rocha unpubl. data). The total count of 75 Golden Eagles in 2012 was also only the 5th highest count. The highest count for this species in the Pembina Valley was 95 in 2010 (A Rocha unpubl. data).

The first sighting of a Turkey Vulture was 19 March, an unusually early date for this species. The 2012 total of 44 Turkey Vultures was the lowest count in the past eight years. The highest count for this species in the Pembina Valley was 190 in 2010 (A Rocha unpubl. data). The count of 12 Osprey in 2012 was the highest in the last eight years, however, Northern Harriers had their lowest, with only 44 counted. In 2005, 154 harriers were counted (Schritt et al. 2007) making that count the highest for this site. Sharp-shinned Hawks, too, had their lowest count (153) in 2012. In 2010, a high count of 919 (A Rocha unpubl. data) was made for this species. Cooper's Hawks peaked at 76 birds in 2010 (A Rocha unpubl. data), but in 2012 the final count (40) was the second lowest during the last eight years. Swainson's Hawks, although previously recorded in small numbers during six of the past eight counts, were not seen in 2012.

The peak count for Red-tailed Hawks of 10,896 in 2011 (A Rocha unpubl. data) was unprecedented in the history of standardized and casual counts in the Pembina Valley. The 2012 count (2667), in contrast, was the lowest in the past eight years. Remarkably, the 2012 total

count of Red-tailed Hawks was less than a daily count made on 6 April 2011 of 3,150. A Ferruginous Hawk was sighted on 20 April 2012 by B. Shettler. This species was last recorded at the count site during the spring migration in 2005 (Schritt et al. 2007). Rough-legged Hawks had their lowest count (31) in 2012. In 2007, a high count of 77 was made. A count of six American Kestrels and 16 Merlins in 2012 was the second lowest during the past eight years. Highest counts for American Kestrels (27) and Merlins (44) were made in 2008. Seven Peregrine Falcons tied last year's high count for this species. Peregrine Falcons have been recorded during seven of the eight counts since 2005.

Overall, most raptor species counted in 2012 had fewer numbers than in 2011. Of the 15 species of raptors recorded in 2012, nine (60.0%) had their lowest or second lowest count in the past eight years.

The weather was the big story for the winter and spring of 2012. Unseasonably warm temperatures with relatively little snow cover resulted in a very mild winter and early spring. The Pembina Valley, along with other parts of southern Manitoba, experienced temperatures of about seven degrees above normal for the period December 2011 – February 2012 (Environment Canada 2012a). The Prairies experienced its 2nd warmest and its driest winter on record (Environment Canada 2012a). The North American jet stream, a fast moving westerly airflow at altitudes of 7-12 km (Wikipedia 2012) was located over or just north of the Canada – United States border during February and March (National Oceanic and Atmospheric Administration 2012 b, e) . The effect of the jet stream was to block off cold air from the north and allow warm air to move further north (Parry 2012). Snow cover for the contiguous United States was below average for December 2011 through February 2012 (National Oceanic and Atmospheric

Administration 2012a). Temperatures were at record high levels for January through March in the contiguous U.S states (National Oceanic and Atmospheric Administration. 2012c). In February, inclement weather was evident in the Southeast, Midwest and Great Plains regions of the United States including tornadoes (National Oceanic and Atmospheric Administration 2012b) which were also evident in March (National Oceanic and Atmospheric Administration 2012c). March was the warmest on record in the contiguous United States (National Oceanic and Atmospheric Administration 2012c). Snow cover in the lower 48 states was at 36.2% at the beginning of March but had dropped to 8.8% by month's end. By 14 March, southern Manitoba near the U. S. border to Texas was essentially free of snow cover (National Oceanic and Atmospheric Administration 2012d). Spring (March, April, May) in the Prairies had favourable weather with the 5th warmest spring on record and temperatures averaging 2.3° C above normal (Environment Canada 2012b).

The fair weather conditions during much of the Pembina Valley count, as well as mild temperatures and lower than average snow cover in the United States, appear to have influenced the raptor migration in 2012. The evidence for this lies in the number of raptors recorded in 2012. The total count in 2012 was the lowest count on record for the Pembina Valley. Red - tailed Hawks, which account for the majority of raptors in the Pembina Valley annual counts, also had their lowest count on record. Storms in the United States during the raptor migration count period of 2012 combined with little to no snow cover may have affected migration flights of at least some birds of prey. We speculate that with little snow cover, raptors would not have to be as reliant on thermals or updrafts in valleys and ridges, and therefore their flight paths would be more widely distributed and less concentrated. Bald and Golden eagles did not appear to be

greatly affected by weather patterns, at least in terms of numbers. Bald Eagle numbers were slightly down (20) from 2011 while Golden Eagles were actually up by 15 birds.

The 2012 Pembina Valley count may be reflective of what might be expected in the future if average global temperatures continue to rise. Warmer temperatures combined with less snow cover and greater variation in storms may mean that raptors may not migrate through the Pembina Valley to the extent they have in the past.

6.0 RECOMMENDATIONS

Long-term monitoring is critical to assessing the status and population trends of migrating raptors. The authors recommend that the spring raptor migration through the Pembina Valley continue to be monitored until at least 2014. Standardized spring counts of raptors were initiated in the Pembina Valley by A Rocha in 2005. The completion of the 2014 count would result in 10 years of standardized count data. This is the minimum period required for data collection before population trend analyses takes place for the Raptor Population Index (Farmer and Hussell 2008). We suggest that monitoring continue from about mid February to late April. The high count of 181 Broad-winged Hawks during the 3rd week in April 2012 suggests that this species may migrate through the valley in greater numbers than previously recorded. Extending the count into May would help assess how many Broad-winged Hawks use the Pembina Valley migration corridor.

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APPENDICES

Appendix 1. Scientific names of migratory raptors seen in the Pembina Valley during spring 2012.

Turkey Vulture.....	<i>Cathartes aura</i>
Osprey	<i>Pandion haliaetus</i>
Bald Eagle.....	<i>Haliaeetus leucocephalus</i>
Northern Harrier.....	<i>Circus cyaneus</i>
Sharp-shinned Hawk.....	<i>Accipiter striatus</i>
Cooper’s Hawk	<i>Accipiter cooperii</i>
Northern Goshawk.....	<i>Accipiter gentilis</i>
Broad-winged Hawk	<i>Buteo platypterus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Ferruginous Hawk.....	<i>Buteo regalis</i>
Rough-legged Hawk	<i>Buteo lagopus</i>
Golden Eagle.....	<i>Aquila chrysaetos</i>
American Kestrel	<i>Falco sparverius</i>
Merlin.....	<i>Falco columbarius</i>
Peregrine Falcon	<i>Falco peregrinus</i>

Appendix 2. February, March and April 2012 temperature and precipitation data for select weather stations near Windygates, Manitoba.

Table 1. Temperature (°C) data for February, March and April 2012 at three locations near Windygates, Manitoba.

Location	February				March				April			
	Normal Mean	Mean	Mean Min Temp	Mean Max Temp	Normal Mean	Mean	Mean Min Temp	Mean Max Temp	Normal Mean	Mean	Mean Min Temp	Mean Max Temp
Morden, Manitoba ¹	-11.7	-6.5	-12.2	-0.7	-4.9	2.4	-3.1	7.9	4.7	6.7 ²	-0.2	13.3 ²
Pilot Mound, Manitoba ¹	-12.8	-7.8	-14.0	-1.6	-6.5	1.9	-4.0	7.9	3.5	5.9	-0.8	12.7
Langdon, North Dakota ³	-13	-9.2	-14.5	-3.8	-6	1.9	-3.3	7.1	4	6.2	-0.3	12.6

¹ Source: Environment Canada (2012c).

² Some data missing.

³ Source: North Dakota Agricultural Weather Network (2012).

Table 2. Precipitation (mm) data for February, March and April 2012 at two locations near Windygates, Manitoba.

Location	February		March		April	
	Normal	Total	Normal	Total	Normal	Total
Morden, Manitoba ¹	19.2	6.4 ²	25.0	35.2 ²	35.5	17.8 ²
Pilot Mound, Manitoba ¹	16.6	1.6	22.7	21.8	35.9	24.5

¹ Source: Environment Canada (2012c).

² Incomplete data.

Appendix 3. Summary of the 2012 spring raptor migration count near Windygates, Manitoba.

Table 1. Species and number of raptors seen during 18 -29 February 2012 near Windygates, Manitoba.

February 2012													
Species	18	19	20	21 ¹	22	23	24	25	26 ¹	27	28	29	Totals
Turkey Vulture	0	0	0		0	0	0	0		0	0	0	0
Osprey	0	0	0		0	0	0	0		0	0	0	0
Bald Eagle	8	15	4		0	2	0	1		3	6	0	39
Northern Harrier	0	0	0		0	0	0	0		0	0	0	0
Sharp-shinned Hawk	0	0	0		0	0	0	0		0	0	0	0
Cooper's Hawk	0	0	0		0	0	0	0		0	0	0	0
Northern Goshawk	1	1	0		0	1	0	0		0	1	0	4
Broad-winged Hawk	0	0	0		0	0	0	0		0	0	0	0
Red-tailed Hawk	0	0	0		0	0	0	0		0	0	0	0
Ferruginous Hawk	0	0	0		0	0	0	0		0	0	0	0
Rough-legged Hawk	0	0	0		0	0	0	0		0	0	0	0
Golden Eagle	1	5	0		0	2	0	1		1	1	0	11
American Kestrel	0	0	0		0	0	0	0		0	0	0	0
Merlin	0	0	0		0	0	0	0		0	0	0	0
Peregrine Falcon	0	0	0		0	0	0	0		0	0	0	0
Unidentified	0	0	0		0	0	0	0		0	0	0	0
Total	10	21	4		0	5	0	2		4	8	0	54

¹No count due to weather.

Table 2. Species and number of raptors seen during 1-31 March 2012 near Windygates, Manitoba.

March 2012																																	
Species	1	2 ¹	3	4 ¹	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Totals	
Turkey Vulture	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Osprey	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bald Eagle	0	2			12	2	5	11	150	29	68	19	109	28	81	95	134	92	38	26	55	14	5	4	4	34	1	1	0	3	7	1029	
Northern Harrier	0	0			0	0	0	0	0	0	0	1	3	0	1	2	2	3	0	2	1	0	1	0	0	1	0	1	0	3	2	23	
Sharp-shinned Hawk	0	0			0	0	0	0	0	0	0	0	1	0	4	7	15	31	7	0	3	6	0	0	0	1	0	2	0	1	8	86	
Cooper's Hawk	0	0			0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	0	0	0	3	0	0	0	2	4	13	
Northern Goshawk	0	0			0	0	0	0	2	1	0	0	1	0	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	16	
Broad-winged Hawk	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	0	0			0	0	0	0	0	1	0	0	2	9	136	189	116	426	514	123	508	104	6	0	5	112	0	4	0	86	71	2412	
Ferruginous Hawk	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rough-legged Hawk	0	0			0	0	0	0	0	0	0	0	1	0	4	4	6	4	2	3	3	1	1	0	0	0	0	0	0	2	0	31	
Golden Eagle	0	0			11	0	1	2	15	4	7	0	10	3	0	3	1	0	2	1	1	1	0	0	1	0	0	0	0	0	0	0	63
American Kestrel	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	
Merlin	0	0			0	0	0	0	0	1	0	0	0	0	1	2	1	0	0	1	0	0	0	0	0	2	0	0	0	3	0	11	
Peregrine Falcon	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Unidentified	0	0			1	0	0	0	0	1	0	1	4	0	1	0	5	1	1	0	0	7	0	0	0	2	0	0	0	0	0	24	
Total	0	2			24	2	6	13	167	37	75	21	131	40	231	305	282	559	566	157	574	134	13	4	10	155	1	8	0	101	94	3712	

¹No count due to weather.

Table 3. Species and number of raptors seen during 1 -20 April 2012 near Windyates, Manitoba.

April 2012																					
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Totals
Turkey Vulture	5	1	2	0	6	3	0	0	0	0	2	0	1	4	1	0	4	10	4	0	43
Osprey	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	3	2	2	3	12
Bald Eagle	17	0	1	0	5	2	0	1	0	0	2	2	1	1	0	1	1	0	0	0	34
Northern Harrier	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	5	1	1	10
Sharp-shinned Hawk	12	0	4	4	12	0	0	0	0	1	0	0	1	2	1	1	1	8	15	5	67
Cooper's Hawk	0	1	0	0	2	0	1	1	1	0	0	1	0	0	0	0	0	14	1	5	27
Northern Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Broad-winged Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136	25	20	181
Red-tailed Hawk	166	10	5	10	9	6	3	7	1	3	1	0	0	5	12	0	6	11	0	0	255
Ferruginous Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Rough-legged Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Golden Eagle	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
American Kestrel	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	4
Merlin	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	5
Peregrine Falcon	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	6
Unidentified	4	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	4	13	9	0	34
Totals	206	13	14	16	36	11	5	10	2	4	5	4	3	12	16	4	21	201	60	38	681

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- No. 1.* Schritt, A., D. Schritt, L. Blanchette, J.P. Goossen and V. Goossen. 2007. The Pembina Valley 2005 and 2006 spring raptor migration. A Rocha Pembina Valley Biodiversity Report Series. No. 1. 26 pp. plus appendices.
- No. 2.* Goossen, J.P., L. Danielson and V. Goossen. 2012. Mini-bioblitz 2009 Livingston Nature Park, Morden, Manitoba. A Rocha - Pembina Valley Biodiversity Report Series No. 2. 5 pp. plus appendices.