

SPRING AND FALL MIGRATIONS OF PEREGRINE FALCONS IN CENTRAL ALBERTA, 1979-1983, WITH COMPARISONS TO 1969-1978

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ABSTRACT - In central Alberta, 1979-1983, 339 sightings of migrating Peregrine Falcons (*Falco peregrinus*) were recorded between 15 April and 31 May. Mean sightings per hour afield were 0.23 for the entire period and 0.29 for the main migration period 4-23 May, respectively 11 and 19% lower than for 1947-1978. Mean early dates, mid-dates and mean late dates for adults were respectively 6, 7 and 2 days in advance of immatures, and nearly identical to 1969-1978. Fall sightings were similarly scarce as in 1969-1978, totalled 24, and occurred from 17 September to 3 October. In fall, the ratio of adults to immatures was roughly 1:3 and in spring 1:1. The success rate of 191 hunting attempts was 9.4%.

Since the 1950's, the Peregrine Falcon (*Falco peregrinus*) has suffered serious population declines in North America (Hickey 1969). As a breeding bird it was extirpated in southern and central Alberta by the early 1970's (Fyfe et al. 1976), although captivity-raised and released falcons nested in Edmonton and Calgary in 1982 and 1983 (G. Erickson, Alberta Fish and Wildlife Division, pers. comm.). In spring and fall, northern peregrines migrate through central Alberta (Dekker 1979). Field surveys along the Atlantic and Texas coasts have recently shown substantial increases in the number of peregrines sighted during fall migrations (F.P. Ward, pers. comm.). This paper presents data on the characteristics of migrating peregrines in central Alberta from 1979 to 1983. Pooled data for these 5 yrs can be juxtaposed to data from 1969 to 1978 when I did similar field studies (Dekker 1979), although data for 1969-1973 are incomplete and based on less expertise. The most recent 10 yrs allow valid comparisons of number of sightings/h, age ratios and timing of migrations.

STUDY AREA AND METHODS

The study area was a crescent-shaped strip of grainfields and open pastures, roughly 10x2 km in size, bordered by Beaverhill Lake, that attracted numerous waterfowl and shorebirds in migration. In searching for peregrines no set procedures were followed, although methods were similar to those of 1969-1978. Each day afield I hiked 5-25 km, frequently pausing to scan through 10x50 binoculars. I often sat in a parked car and used a 20-40X telescope as well as binoculars. Many resting peregrines sitting on fence posts or on the ground were watched until they left of their own accord. Flying peregrines were observed for as long as they remained visible. Alarm behaviour of prey species often alerted me to the arrival of peregrines. The study area was visited from early March to early December. Pooled for 5 yrs, field days totalled 167 and 79 respectively during 15 April-31 May and 1 September-15 October. Field days lasted 3-17 and averaged 9 h within varying time frames. About 85% of peregrines sighted in spring were positively identified; distant large falcons that I could not identify were assumed to be peregrines unless I suspected

them of being Prairie Falcons (*Falco mexicanus*), that are occasionally seen in the study area in spring (Dekker 1982). During fall, when peregrines are uncommon in the study area and both the Prairie Falcon and the Gyrfalcon (*Falco rusticolus*) occur (Dekker 1983), all sightings of unidentified large falcons were deleted. (For criteria used in field identification see Dekker 1977). I paid little attention to the problem of duplicate sightings other than to delete obvious ones. For 1969-1978 I tabulated maximum and minimum sightings that show a duplication rate of 2.4. This indicates the magnitude of the problem but is only an estimate. The so-called maximum numbers of 1969-1978 "include duplicate counts except the most obvious ones", (Dekker 1979:297) and correspond to sightings in this study. Data on hunting are for 1980-1983 only; 1979 observations were presented elsewhere (Dekker 1980). Methods in recording foraging behavior were the same as in 1969-1978. Observations were written down during or at the end of the day.

RESULTS AND DISCUSSION

Numbers Sighted and Timing of Migrations - In spring, peregrines were seen from 20 April to 31 May (Fig. 1). Sightings pooled for 5 yrs ranged from 0 to 21/d and totalled 339 (Table 1). Mean numbers of sightings/h were 40-60% higher in morning and evening than between 1200H and 1500H (Table 2).

Earliest dates ranged from 20 to 30 April. Mean early dates for adults and immatures respectively, ranged from 20 April to 7 May and from 1 to 9 May. Early arriving falcons appeared to pass quickly. They often hunted over the still-frozen lake and rested on the ice far from shore. I suspect that all April sightings of unidentified falcons involved adults. That assumption would advance their mean early date to 25 April, 9 d ahead of immatures (Table 3). Mean late sightings of adults and immatures respectively, ranged from 17 to 27 and 19 to 31 May. Mean late dates and mean mid-dates (half of total sightings) were nearly equivalent to those of 1969-1978 (Table 3).

To check for the presence of summering falcons, the study area was visited about 4 times/month

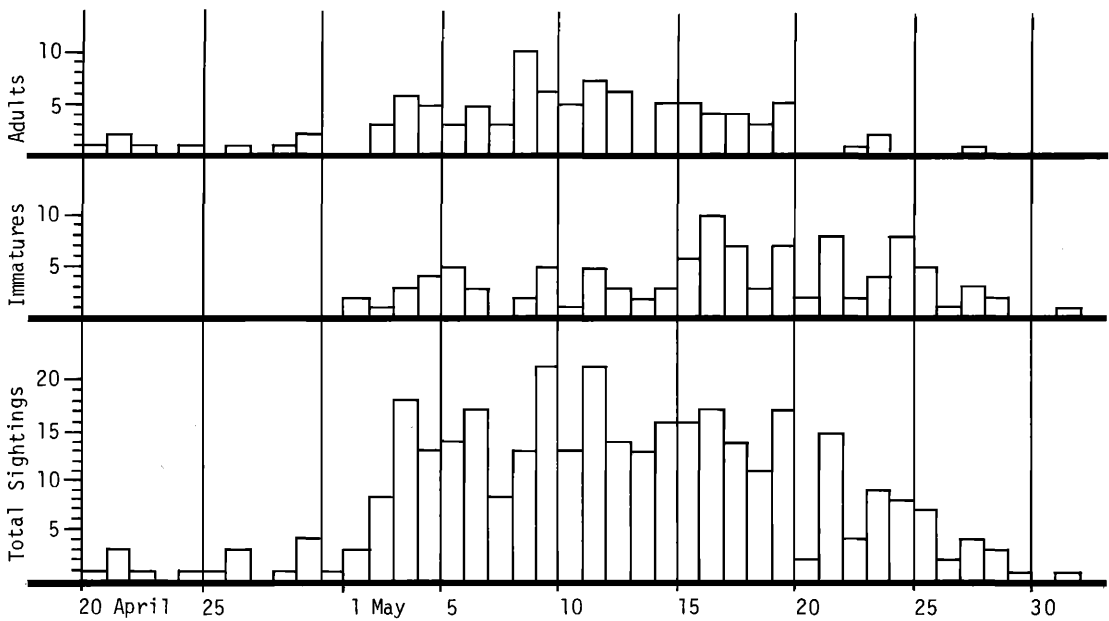


Figure 1. Peregrines sighted during spring migration in central Alberta. Total sightings include peregrines of unidentified age class.

(range 3-7) in June, July and August. One peregrine each was seen on 19 July 1980 and 2 June 1982. Both were immatures. The June sighting probably involved a late migrant, but the July bird may have originated from a captive-breeding program with releases in central and southern Alberta (G. Erickson, Alberta Fish and Wildlife Division, pers. comm.). I saw no evidence that captive-bred peregrines occurred in the study area during spring migration. Data for the autumn were similarly limited as in 1974-1978 and ranged from 17 September to 3 October.

Age and Sex Ratios - The proportion of adults and immatures in spring differed from 1974-1978 (Table 4). I attribute that difference to the following change in my criteria for identification. In 1969-1978 I differentiated the age groups mainly by dorsal coloration; adults are ashy-blue, immatures brownish. However, I have found that dorsal color is not always a reliable fieldmark as some adult peregrines look blackish-brown dorsally, resembling the spring immatures that are often light-chested (Dekker 1979). Since 1979, I have included all dorsally blackish falcons in the unidentified

category unless I saw their ventral markings, barred in the adult, streaked in the immature. The more typically-colored adults are easily identified in flight under good conditions. The proportion of adults (29%) was remarkably close to that of 1974-1978 (28%) but differed from 1969-1973 (38%). The adult and immature percentages for fall differed from 1969-1973 and 1974-1978, but sample size was small (Table 4).

The smallest males are about two-thirds the size of the largest females (Godfrey 1966). However, I was unable to determine the sex of 54% of sightings. Under some conditions, especially when flying falcons interacted with other birds, their relative size could be assessed with confidence. Large peregrines outnumbered small ones by a factor of 3:1 in the adults and 9:1 in immatures. Although females outnumbered males also in 1969-1978, values differed substantially, probably reflecting the unreliability of basing sex ratios on sightings. Females outnumbered males by a factor of 3:1 or more in coastal migration surveys (Hunt et al. 1975; Ward and Berry 1972).

Behavior - I saw falcons attack prey species 254

Table 1. Days and hours afield, and peregrines sighted, 15 April -31 May 1969-1983. (figures in brackets represent the main migration period 4-23 May, when respectively 79, 85 and 79% of pooled sightings occurred in 3 groups of 5 years).

YEAR	DAYS AFIELD	HOURS AFIELD	SIGHTINGS	MEAN SIGHTINGS/HR
1969	22(12)	-	20(9)	-
1970	25(16)	-	15(11)	-
1971	27(17)	-	33(27)	-
1972	25(16)	-	26(21)	-
1973	23(16)	-	41(39)	-
Sub-Totals	122(77)	-	135(107)	-
1974	26(16)	251(166)	46(43)	0.18(0.26)
1975	29(16)	284(171)	41(35)	0.14(0.20)
1976	30(17)	307(196)	66(53)	0.21(0.27)
1977	38(19)	378(216)	163(153)	0.43(0.71)
1978	34(19)	358(229)	90(64)	0.25(0.28)
Sub-Totals	157(87)	1570(978)	406(348)	0.26(0.36)
1979	31(16)	289(179)	57(46)	0.20(0.26)
1980	34(18)	323(194)	94(55)	0.29(0.28)
1981	34(19)	308(193)	67(59)	0.22(0.31)
1982	33(18)	276(172)	58(53)	0.21(0.31)
1983	35(19)	302(197)	63(56)	0.21(0.28)
Sub-Totals	167(90)	1498(035)	339(269)	0.23(0.29)

times. The success rate of 191 hunting attempts of which the outcome was known was 9.4%, not significantly different from the 7.7% reported for 1965-1979 (Dekker 1980). Prey captured included 9 ducks of 7 species and 9 shorebirds of 4 species.

In the first 2 h after daybreak, when I was rarely in the field (Table 2), I only once saw a falcon attack ducks, but I found falcons feeding on ducks 7 times. In one case the prey was a Gadwall (*Anas strepera*) I had seen killed by a falcon the previous evening at dusk. In the others, sunken eyes of ducks and amount of meat taken from the carcasses led me to suspect that they had been killed the previous evening, during the night or near dawn. On several occasions I saw peregrines attack ducks 0.5-1 h after sundown, and they hunted sandpipers or passerines very late in the evening. Crepuscular

foraging activity of peregrines has been reported by several observers (Beebe 1960; Clunie 1976; Dekker 1980). Some falcons that I watched at nightfall stayed on posts until it was too dark to see them and they probably roosted there. Their locations were not only over water but also on open pasture. All roosting falcons (n=9) were gone next morning at dawn.

Most resting falcons that I watched in the morning from 1 h after sunrise remained inactive until 0900-1100 H when some began to hunt; others soared to great heights and sailed away in a northerly direction, apparently resuming migration. In 1969-1978, falcons under observation left the study area in late morning by soar and sail flight at great altitudes (Dekker 1979). Each spring, 1 or 2 recognizable peregrines stayed in the study area for

Table 2. Percent of total field time for 5 daily periods, 15 April-31 May (figures in brackets represent main migration period 4-23 May). Data pooled for periods of 5 years. Mean sightings per hour afield not available for 1974-1978 when the exact time of most sightings was not recorded.

TIME PERIOD	% OF TOTAL HOURS AFIELD		MEAN SIGHTINGS/HR
	1974 - 1978	1979 - 1983	1979 - 1983
0500 - 0900	6.7 (7.7)	8.3 (10.5)	0.28 (0.33)
0900 - 1200	19.3 (21.6)	17.8 (19.1)	0.28 (0.36)
1200 - 1500	24.8 (24.3)	20.5 (20.5)	0.17 (0.21)
1500 - 1800	26.9 (24.1)	27.0 (23.7)	0.20 (0.26)
1800 - 2200	22.4 (22.3)	26.4 (26.2)	0.24 (0.31)
TOTALS	100 (100)	100 (100)	0.23 (0.29)

3-8 d, no doubt causing duplication of sightings.

Conclusions - Although mean numbers of sightings/h in spring were 11-19% lower in 1979-1983 than in the preceding 5 yrs, most yearly figures have remained similar, suggesting that no change has occurred in the size of the spring population migrating through central Alberta. An exceptional year was 1977 when sightings/h were 65-95% higher than the 5 yr mean (Table 1). The

spring of 1977 was characterized by dry climatic conditions when peregrines and their prey concentrated on the lakeshore where they were readily located.

Why peregrines were much scarcer in fall than in spring in the study area is not clear. Perhaps some peregrine populations breeding in the northwest migrate in fall via a flight path east of Alberta to the Atlantic coast, but return in spring by a more direct

Table 3. Mean early dates, mid-dates (half of total sightings) and mean late dates for adult and immature peregrines sighted during spring migration in central Alberta. Data pooled for 3 groups of 5 years, 1969-1983. ("All sightings" include falcons of unidentified age).

YEARS	MEAN EARLY DATES			MID-DATES			MEAN LATE DATES		
	ALL		SIGHTINGS	ALL		SIGHTINGS	ALL		SIGHTINGS
	ADULT	IMMATURES		ADULT	IMMATURES		ADULT	IMMATURES	
1969-1973	28	3	29	8	15	13	19	25	25
	April	May	April	May	May	May	May	May	May
1974-1978	25	7	24	7	14	12	19	25	25
	April	May	April	May	May	May	May	May	May
1979-1983	28	4	25	9	16	11	22	24	25
	April	May	April	May	May	May	May	May	May

Table 4. Age composition of peregrines in percent of total sightings during spring and fall. Data pooled for 3 groups of 5 years, 1969-1983.

YEARS	SIGHTINGS	% ADULT	% IMMATURE	% UNIDENTIFIED
Spring				
1969-1973	135	38	36	26
1974-1978	406	28	47	25
1979-1983	339	29	32	39
Sub-Totals	880	32	38	30
Fall				
1969-1973	10	50	30	20
1974-1978	17	6	65	29
1979-1983	24	21	58	21
Sub-Totals	51	26	51	23

route through the continent. Differentiation of spring and fall migration routes has been documented for some shorebird species (Godfrey 1966).

Early and late dates of fall and spring sightings in the study area were respectively 16 and 41 d apart in 1979-1983 and 24 and 45 d in 1969-1978. Why the spring passage lasts so much longer than the fall migration is not known. Perhaps spring migrant peregrines, especially subadults, linger in the study area attracted by the concentrations of migrating shorebirds, which are more numerous in May than at any time during fall.

Although the number of fall migrating peregrines was too small for comparisons, the number of sightings/d increased from 0.24 in 1969-1978 to 0.30 in 1979-1983, consistent with increases in sightings per unit effort during fall migrations along the Atlantic and Texas coasts (F.P. Ward, pers. comm.).

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