

MIGRATIONS AND FORAGING HABITS OF BALD EAGLES IN EAST-CENTRAL ALBERTA, 1964-1983.

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Abstract

At lakes 30-60 km east of Edmonton, Alberta, 187 Bald Eagles were sighted in spring and 626 during fall, 1964-1983. First and last dates for spring and fall observations were respectively 31 March - 8 May, and 15 September - 18 December. In spring immatures have a longer migration period than adults, starting a day earlier, continuing a week later and with a peak one week later. The ratio of adults to immatures is 1:2.5. During fall, the passage of immatures was about 3 weeks in advance of the adults, and the age ratio was 1:1. Fall migration lasted 2.5 times as long as the spring movement and peaked in November, when up to 15 eagles were seen together on frozen lakes. Of 118 attempts at catching ducks, 14 were successful, of which 8 are described in detail showing a variety of hunting methods. The eagles also fed on carrion, caught voles, and attempted to seize a Muskrat.

Introduction

Bald Eagles nest in northern Alberta and sparsely in the southwestern Rocky Mountains of the province.¹⁰ They are highly migratory and few winter in Alberta. In January and February, I observed them only at two locations where industrial effluents kept water open: the Bow River downstream from Calgary, and at Wabamun Lake, 60 km west of Edmonton (unpublished field notes). During migration periods, especially in March, Bald Eagles are locally common in the foothills west of Cochrane, Alberta.³ They are seen at central Alberta lakes in late October and November.¹¹ This paper gives information

on the timing, age structure and behaviour of migrating Bald Eagles in spring and fall at Beaverhill Lake and other lakes 30-60 km east of Edmonton.

Study Area and Methods

During spring and most of autumn, my observations were restricted to Beaverhill Lake. In November and December I also visited Cooking and Hastings Lakes, and sometimes Miquelon and Ministik. Beaverhill Lake is approximately 20 x 15 km and surrounded by open and brushy pasture land. The other lakes vary from roughly 10 x 3 km to 3 x 1 km and are bordered by mixed woods of Trembling Aspen and White Spruce.

I spotted many eagles in flight, but in late fall they often sat on the ice of frozen lakes, and I spent up to 4 hours at a time observing them through 10x binoculars or a 20x telescope from a parked vehicle. From 1964 through 1983, I visited the study area 435 days in March, April and May and 463 days during September through December. Daily time afield varied from 2 to 17 hours.

Adult Bald Eagles are easily separated from immatures (by the white head and tail). I did not attempt to separate different age classes of immatures. Eight Bald Eagles with nearly white head and tail but still showing light blotches and streaking in the remainder of their plumage, especially the underwing linings, were included with the adults. Godfrey stated that because of similarities in size and plumage "immature Bald Eagles are likely to be confused with Golden Eagles".¹⁰ From 1964 through 1983, I saw only 32

Table 1. SPRING MIGRATION OF BALD EAGLES IN CENTRAL ALBERTA. DATA OVER 20 YEARS, 1964-1983.

<i>Period</i>	<i>Adult</i>	<i>Immature</i>	<i>Unclassified</i>	<i>Total</i>	<i># days</i>	<i>Eagles/day</i>
March 15-23	0	0	0	0	12	0
24-31	0	5	1	6	19	0.32
April 1-7	9	3	3	15	26	0.58
8-15	20	28	7	55	45	1.22
16-23	15	44	11	70	46	1.52
24-30	3	23	1	27	74	0.36
May 1-7	0	12	1	13	92	0.14
8-15	0	1	0	1	121	0.01
TOTALS	47	116	24	187	435	0.43

Golden Eagles in the study area, all except one over land.⁶ About 20% of all eagles seen were too far away for positive identification. If they were dark-headed and flew over land, I omitted them to avoid possible misidentification, but distant dark-headed eagles flying low over lakes or sitting on the ice were assumed to be immature Bald Eagles. Obvious and probable duplicate sightings made on the same day were excluded from the totals.

Spring and Fall Migrations

During spring, 1964-1983 I saw a total of 187 Bald Eagles at Beaverhill Lake. The adult-immature ratio was 1:2.5 (Table 1). Early and late dates were respectively 31 March and 8 May, with adults and immatures arriving at about the same time. Immatures were sighted 11-13 days after the last adults had passed (Table 2). Ninety-four percent of

adults passed from 1 to 23 April; 92% of immatures were seen from 8 April to 7 May (Table 1). Adults peaked the week of 8 April, immatures the week of 16 April.

From September to December, 1964-1983, I sighted a total of 626 Bald Eagles. The adult-immature ratio was about 1:1. Seventy-three percent of adult eagles were recorded in November. Immatures peaked in the last week of October (Table 3). Earliest and latest fall sightings were on 15 September and 18 December respectively, with adults arriving and departing 2-3 weeks later than the immatures (Table 2).

Foraging Behaviour

The Bald Eagle's "staple diet in most areas is dead or dying fish."² All lakes in the study area are highly alkaline or very shallow and contain few or no fish larger than minnows, and I have never seen

Table 2. EARLY AND LATE DATES FOR MIGRATING BALD EAGLES IN EAST-CENTRAL ALBERTA, 1964-1983.

	<i>Spring</i>		<i>Fall</i>	
	<i>Adult</i>	<i>Immature</i>	<i>Adult</i>	<i>Immature</i>
Earliest date sighted	1 April	31 March	2 Oct.	15 Sept.
Mean early date	10 April	12 April	19 Oct.	26 Sept.
Latest date sighted	26 April	8 May	18 Dec.	30 Nov.
Mean late date	17 April	28 April	21 Nov.	7 Nov.

Table 3. FALL MIGRATION OF BALD EAGLES IN CENTRAL ALBERTA.
DATA OVER 20 YEARS, 1964-1983.

<i>Period</i>	<i>Adult</i>	<i>Immature</i>	<i>Unclassified</i>	<i>Total</i>	<i># days</i>	<i>Eagles/day</i>
Sept. 8-15	0	2	0	2	46	0.04
16-23	0	5	1	6	67	0.09
24-30	0	21	7	28	59	0.47
Oct. 1- 7	9	28	10	47	51	0.92
8-15	11	16	8	35	35	1.00
16-23	11	30	9	50	40	1.25
24-31	15	41	17	73	41	1.78
Nov. 1- 7	33	22	15	70	33	2.12
8-15	45	32	69	146	30	4.87
16-23	32	20	33	85	25	3.40
24-30	48	14	11	73	17	4.29
Dec. 1- 7	5	0	0	5	13	0.38
8-15	5	0	0	5	3	1.66
16-23	1	0	0	1	2	0.50
24-31	0	0	0	0	1	0.00
TOTALS	215	231	180	626	463	1.35

eagles feeding on fish there. They often used carrion of domestic or wild mammals and waterfowl killed by botulism or other causes.

The Bald Eagle's occasional predatory habits are well-known. Spencer reviewed the feeding habits of Bald Eagles wintering in the midwestern United States and quoted numerous observers who stated that, in the absence of carrion and fish, the eagles were attracted to concentrations of waterfowl, and picked off ducks and geese crippled by hunters.¹² Bent and Dekker gave several accounts of eagles pursuing and capturing waterfowl.^{1 5}

During this study, waterfowl appeared to ignore Bald Eagles unless they approached closely; then most surface-feeding ducks and geese took to the air. Diving ducks and coots often stayed on the water during overflight by an eagle and attempted to escape direct attacks by diving. However, when the lakes were frozen and the remaining waterfowl were concentrated in patches of open water, surface-feeding ducks and Canada Geese did not always flee at the approach of eagles. It is possible that a

rather high percentage of these late-staying waterfowl are diseased. I saw several ducks spontaneously leave water-holes, either walking or sliding along the ice apparently unable to fly on their way to land. Some reached the shore, others were intercepted by eagles. One was killed by a Coyote that left the carcass on the ice. It was later eaten by eagles.

The Bald Eagles habitually sat on the ice near water holes, often in loose aggregations. The highest number counted from one vantage point was 15 on 16 November 1976 at Cooking Lake. Highest daily count occurred on 11 November 1977, when there were 11 eagles on the ice of Cooking Lake, 7 on Hastings and 5 on Beaverhill Lake.

Bald Eagles often flew towards swimming waterfowl but whether or not such approaches were hunting attempts was not clear except when the eagle actually swooped at a duck. However, I have assumed that all overflights of diving, splashing or flushing waterfowl were bonafide hunts if the eagle passed over them at an altitude of less than 3 m. Of 118 such assumed hunting attempts, 69 involved swoops at diving or flushing

waterfowl, 9 involved a brief hover over splashing or massing birds, and 3 included the pursuit of flushing or flying birds. Fourteen of these 118 assumed hunts ended in capture of prey, a success rate of 12%. On 15 other occasions I saw eagles carrying or feeding on birds, probably waterfowl which they had just caught. Incidents of piracy or attempted piracy were common, and most food items "changed hands" several times. Commensal feeding habits of Bald Eagles on wintering grounds have been reported by many observers.¹²

I observed foraging behaviour from 0900 to 1500 h. When only one or two eagles were present, they appeared to complete their foraging in the early morning. If eagles were numerous in a locality, they commonly shared most food items and foraging activity could occur throughout the day. I did not see any feeding or hunting eagles on days when the temperature did not rise above -12°C. Steenhof reported reduced foraging activity of wintering Bald Eagles during periods of unfavorable weather, apparently as an energy saving measure.¹³

During November 1976, the water holes in Cooking and Hasting Lakes were located close to roadside vantage points and remained open later than in other years, allowing exceptional opportunities for observation. Most foraging activity that I saw occurred during that month. Following are eight examples of successful hunts showing a variety of methods.

3 October 1965. 0900 h Beaverhill Lake. An immature Bald Eagle flew over the lake at about 10 m, flushing numerous waterfowl. It swooped down at a swimming Coot, that dove with a splash. The eagle flew tight circles over the area and swooped again when the Coot emerged. It dove. At the sixth swoop, the eagle seized the prey and carried it to land. Prior to this hunt, the eagle had made two similar but unsuccessful series of swoops at diving birds,

probably also coots.

6 November 1976. 1100 h Hastings Lake. Flying at about 10 m against a strong wind over the frozen lake, an adult Bald Eagle approached a water hole in which about 100 ducks, mostly Lesser Scaup were massed together and splashing about. A lone female Mallard flushed well ahead of the eagle and dropped back into the water just after the eagle had passed. In a very swift plunge the eagle doubled back, seized the Mallard and carried it to the ice.

6 November 1976. 1300 h Beaverhill Lake. An adult Bald Eagle flew up from the ice and approached a flock of about 60 Mallards swimming in a patch of open water. All except one of the ducks flushed and left. The eagle turned to the lone Mallard, seized it and carried it to the ice.

14 November 1976. 1230 h Cooking Lake. An adult Bald Eagle, that had been standing on the ice for some time, flew at 2-3 m to a water hole. About 80 ducks, mostly Lesser Scaup, hurriedly left the edge of the ice, on which they had been resting, and entered the water. The last bird, a drake scaup was seized by the eagle in one foot and carried away.

15 November 1976. 1200 h Hastings Lake. An unidentified duck left a waterhole and flew low over the frozen lake for about 0.8 km before descending onto the ice. Immediately two immature Bald Eagles that had been standing on the ice some distance away, flew towards the duck; the first eagle seized it. At the approach of the second eagle, the first one flew off, carrying the duck, but dropped it onto the ice. Both eagles fought over it and were joined by a third.



After a bald eagle catches a duck and begins feeding, magpies fly up to scavenge the remains. Although they are saucy enough to pull the eagle's tail feathers on occasion, the magpies are ignored by the big bird, which keeps an eye out for more troublesome scavengers, other eagles.

Oil painting by Dick Dekker

19 November 1976. 1400 h Hastings Lake. In about one hour's time, an adult Bald Eagle made 12 low passes over a water hole with about 200 ducks, mostly Lesser Scaup, and returned to the ice for 3-10 minutes. During six overflights, the eagle either hovered briefly over the massed ducks or swooped at a single duck that dived. On one occasion, the eagle plunged feet first into the water, sinking up to its belly, but rose without prey. Eventually, after sitting on the edge of the hole for a few minutes, it walked into the water until breast-deep and returned holding a duck in one foot.

20 November 1976. 1300 h Cooking Lake. Two immature Bald Eagles hovered against a strong wind 2-3

m above a water hole and were briefly joined by an adult, which flew to the ice nearby. The immatures each swooped several times at a single duck, probably a female Mallard, that dove every time. After a brief rest on the ice, the two immatures resumed their hunt until one of them, a light coloured individual, plunged into the water and lay on the surface with wings extended for half a minute. It rose, holding a duck in its feet, and flew to the edge of the ice, where it was immediately rushed by the adult eagle. The duck was released and escaped into the water. Presently, the two immatures again hovered over the hole and each swooped 3-4 times until the light coloured one plunged into the water. It rose with apparent difficulty, carry-

ing the duck, but dropped it when the other immature swooped at it. After a brief rest, the two eagles began hovering again with the same result as before: the light coloured eagle plunged, lay on the water for half a minute, and rose with a duck in its feet. Twice the eagle fell back into the water before it reached the ice. At the approach of the adult, the immature surrendered the wing-flapping duck, which was killed by the adult and consumed in part by the adult and the two immatures. A third immature cleaned up the leftovers.

21 November 1976. 1230 h Cooking Lake. One adult and three immature Bald Eagles were standing on the ice near a small water hole in which 15 ducks, mostly Mallards and Lesser Scaup, were swimming about. One immature flew low over the hole; all the ducks splashed and dove. After 10 minutes, the same eagle hovered briefly over the hole and plunged in, submerging up to its neck. It came up with thrashing wings and lay on the surface for a few moments and then it "rowed" to the edge of the ice about 6 m away. It climbed out of the water with apparent difficulty, holding a duck in one foot and pulling it up with its bill. The eagle fed on its prey while the other eagles stood around to snatch a severed wing or leg and clean up the remains after the captor flew to nearby trees.

On two occasions, Bald Eagles attempted to overtake ducks flushed at close range and pursued them for 10-20 m until the ducks abruptly changed course. On 13 November 1978 an immature eagle flushed a flock of ducks from the ice of Hastings Lake; all ducks returned to the water except one which flew out over the frozen lake, climbing at first, then dropping low over the ice. It was chased by the immature eagle and an adult in a close

pursuit for about 800 m. First the adult then the immature actually seized the duck in its feet, holding it for a moment until the second eagle swooped at the one holding the duck, which was then released. Eventually, the duck reached cover in reeds.

On 10 April 1966, four immature eagles stood on the ice of Beaverhill Lake near a Muskrat that did not move except to dodge an eagle's pounce. Over a period of 20 minutes I saw five or six pounces. All failed and eventually the eagles flew away.

On 8 April 1972, four immature Bald Eagles, one adult Bald and one adult Golden Eagle, appeared to be catching Meadow Voles that were flooded out of the grass in great numbers by meltwater. I observed the eagles make short flights, walk about, and pick up small dark objects that looked like voles. Numerous gulls and crows were doing the same.

Discussion and Conclusions

Although the earliest spring dates on which I recorded adult Bald Eagles roughly coincided with the earliest dates for immatures, the peak for adults was a week earlier than for immatures, which is in accordance with data from Saskatchewan, where the mid-date for adults preceded the mid-date for immatures by 7 days.⁸ However, the advent of spring migration in Saskatchewan was about two weeks earlier than in central Alberta, and the adult-immature ratio in Saskatchewan was 3:1, whereas I found a ratio of 1:2.5. The reasons for these disparities are not clear. Perhaps the Saskatchewan data, obtained from the files of the Saskatoon Natural History Society, are biased in favour of adult Bald Eagles, which are easiest to identify in the field and probably a higher percentage are reported. It is also possible that, in Alberta, early migrating adult Bald Eagles avoid the central plains and choose a different route. At Cochrane in the foothills of western Alberta, I sighted 59 adults and 6 immatures in 37 observation days in March,

1965-1980³ (Dekker, unpublished data). In 1970 I suggested that, in March, the foothills region of Alberta offers more favourable climatic conditions and better foraging possibilities for eagles than the plains east of Edmonton. Gerrard and Hatch report that migrating Bald Eagles show a preference for hilly terrain where the early formation of thermals assist them in soaring flight.⁹ Such a preference may explain the scarcity of spring migrants in the study area which is quite flat, especially around Beaverhill Lake where all spring observations were made.

Fall migration of Bald Eagles through the study area progressed much more slowly than the spring passage and some eagles stayed as long as there was some open water and waterfowl. Gerrard et al. reported a leisurely fall movement of wing-marked Bald Eagles south from Saskatchewan with a tendency of the birds to remain in favourable areas for several weeks at a time.⁷

The Bald Eagles that I observed appeared quite successful in hunting waterfowl although most of their prey were probably crippled or sick (they failed to flee or dive when approached). The interaction of the Bald Eagles and ducks offers an excellent example of the selective effect of predation. Evidence for such an effect of eagle predation on waterfowl has never been demonstrated, although Dekker reported that the failure of ducks to use escape tactics typical of the species characterized a significant majority of successful hunts by Peregrine Falcons.⁴ Observations in this study indicate that the mass of waterfowl proved to be quite capable of escaping eagle predation, whereas individual ducks that did not fly away were attacked and often caught.

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