Decline of the Ferruginous Hawk in Saskatchewan

This species has disappeared from much of its former range, and occupies other portions in diminished numbers

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INTRODUCTION

THE FERRUGINOUS HAWK (*Buteo regalis*), North America's largest *Buteo*, is listed as the only raptor among 12 avian species that are primarily endemic to grassland and hence restricted in range (Mengel 1970). Swainson's Hawk (*Buteo swainsoni*), the Northern Harrier (*Circus cyaneus*), the Prairie Falcon (*Falco mexicanus*), the Mississippi Kite (*Ictinia mississippiensis*), the Burrowing Owl (*Athene cunicularia*), and the Short-eared Owl (*Asio flammeus*) are listed by Mengel among the 25 secondary, more widespread, avian grassland species. Since the native prairie was settled and broken by the plow, the Ferruginous Hawk has disappeared from much of its original range and occupies other portions in diminished numbers (Snow 1976, Lokemoen and Duebbert 1976, Powers and Craig 1976, Fitzner *et al.* 1977, Tate and Tate 1980).

Before the turn of the century the Ferruginous Hawk nested regularly, even commonly, on the Great Plains north to southern Alberta and southern Saskatchewan and east to southwestern Manitoba and northeastern North Dakota. Today, it no longer nests in the two latter regions (Stewart 1975, Bechard 1981). To trace its decline within Saskatchewan, we studied nest-site records left by explorers, oologists, and early settlers within what was before 1905 the territory of Assiniboia and is now southern Saskatchewan. We compared them with the distribution of currently active nest sites, and found the present population to be restricted to relict tracts of pastureland, chiefly in the southern and western fringes of the province.

Historic Nesting Information

"THE FIRST EGGS of the Ferruginous Rough-leg brought to scientific notice" (Bendire 1892) were collected by Thomas Blakiston, magnetic observer with Palliser's British North American Exploring Expedition, while on a buffalo hunt in 1858. Eggs from two sets were sent to the United States National Museum (USNM), and the British Museum (BM), respectively. The location of these nests was given by Blakiston (1861) as "between north and south branches of Saskatchewan River," by the USNM card catalogue as "plains of the Saskatchewan" and by the BM catalogue, quite erroneously, as "Fort Carlton." Fortunately a letter from Blakiston in the Jones papers in the Nova Scotia archives has been located and published (Houston 1976), allowing us to pinpoint the exact location of these nests.

These historically important nests were nearly 100 miles south of Fort Carlton, along the south shore of the most westerly of the three Anerley lakes, three miles east of the present village of Dinsmore, Saskatchewan (Fig. 1). The first nest, found on April 29, 1858, was in a tree only ten feet above the water of Anerley Lake and contained five eggs. The second nest, found the next day, was 20 feet up in an aspen and contained four eggs, one of which was illustrated in Plate 9 of Bendire's two-volume *Life Histories of North American Birds* (1892).

It was not until the 1890s that egg collectors became active in the territory of Assiniboia (Houston and Bechard 1982a). Lured by the unusual beauty of Ferruginous Hawk eggs, and their high value in trade, which was equal to that of Whooping Crane eggs, oologists recorded locations of several dozen nests. Ferruginous Hawk nests were then common throughout almost the entire territory of Assiniboia, from 49° north to 51°58′

Although museum data and firsthand reports do not permit quantitative estimates of pre-settlement populations, when compared with currently active nest sites they do show the varying degrees of decline of the Ferruginous Hawk in three areas (See Fig. 1): Area A (now vacated); Area B (where numbers have fallen drastically); and Area C (where reasonable numbers still remain).

A. Vacated range

Apart from a single known exception, no Ferruginous Hawk nests have been found in Area A for 40 years. In the Anerley Lakes area, where Blakiston collected the first Ferruginous Hawk eggs, recent visits have failed to locate a single pair. The last confirmed nest in the adjacent Coteau Hills, about 12 miles south and three miles east of Anerley, was found in 1940 by F.J.H. Fredeen (*pers comm.*).

The most northwesterly nests were found by the late R. D. Symons (*pers comm.*) in 1928 and 1929; all were ground nests on steep hillsides: in Buzzard Coulee, two miles south of Lone Rock; in Blackfoot Coulee, ten miles

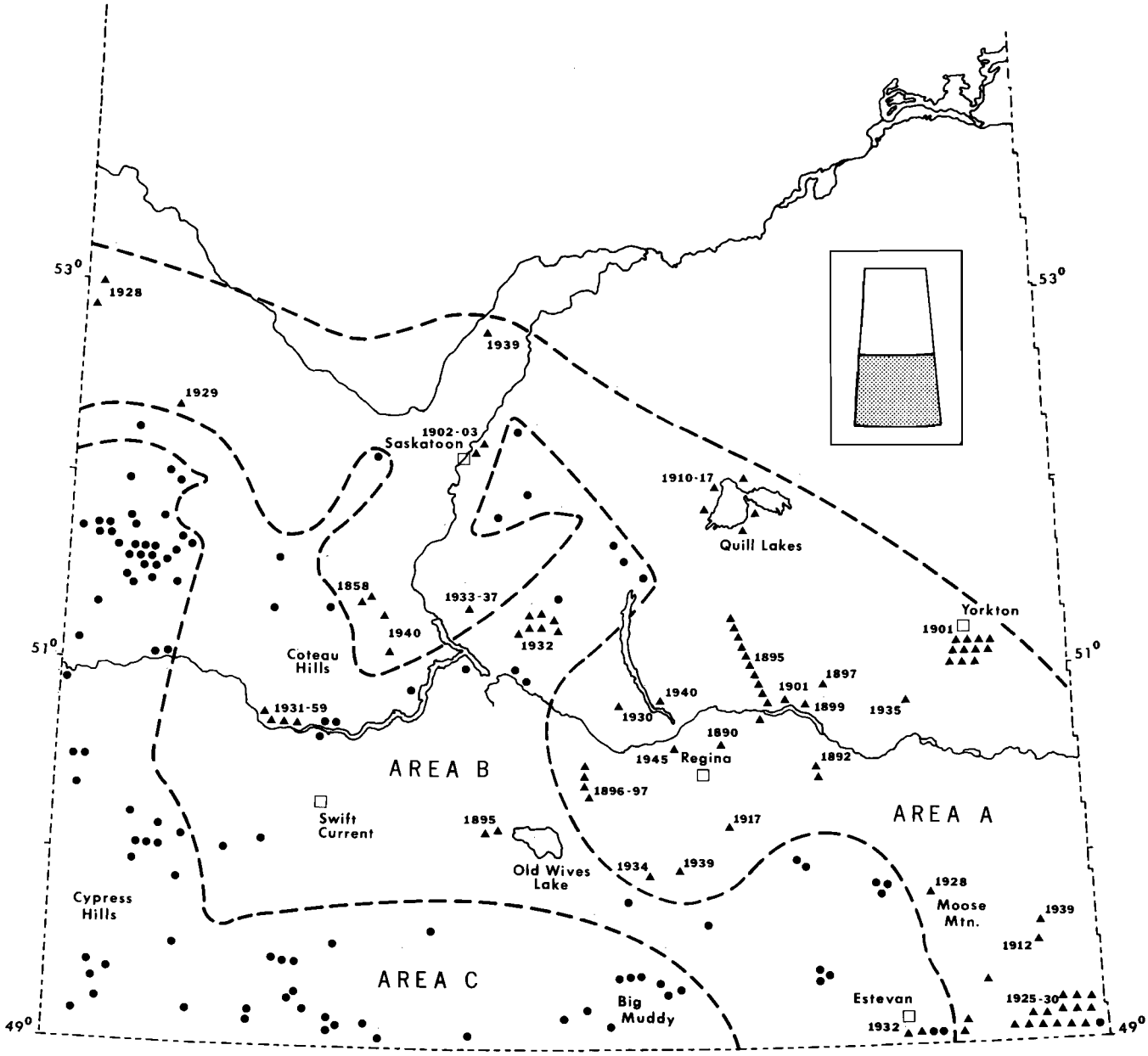

Figure 1. *Nest sites of the Ferruginous Hawk in Saskatchewan from 1858 to the present. Dots represent nests since 1960, and triangles indicate nests prior to 1960; open squares are towns. Pre-1960 nest sites in Area C have been omitted to avoid clutter.*

northwest of Marsden; and in the Ear Hills, seven miles south of Unity. At Carlton, the northernmost edge of the fire-swept grasslands in buffalo days, Ferruginous Hawks nested at least until 1939, when Farley Mowat (Houston and Street 1959) made 17 sightings of individual birds, compared to 37 of Red-tailed and 42 of Swainson's Hawks. At Saskatoon on May 5, 1902, R.T. Congdon found a nest with three eggs (Congdon 1903), and on May 1, 1903, G. Harris found a nest with five eggs, nine feet up in a willow (Western Foundation of Vertebrate Zoology). The records of R M Barnes, W. Clark, and A.C. Bent show that there were at least five sets of eggs taken between 1910 and 1917 near Big Quill Lake, where Bent observed nine birds soaring in late May 1917 over burnt prairie (Bent 1937, Houston 1959). At nearby Kutawagan Lake, P.A. Taverner saw one or two Ferruginous Hawks each day in mid-June 1920. Walter Raine evidently found a dozen nests south of Yorkton between June 5 and 13, 1901 and Atkinson found it "regularly and commonly noted from just west of Yorkton" through Saskatoon and Edmonton (Macoun and Macoun 1909).

When Mrs. Isabel Priestly arrived at Yorkton in 1935, the Ferruginous Hawk was still "fairly common in open country" (Houston 1949), but the last definite nest record was from the Louis Kirk farm, eight miles north of Neudorf in the late 1930s.

At Indian Head, William Spreadborough found two nests in 1892 (Macoun and Macoun 1909) and George Lang listed it as "moderately common" as late as 1929 (Callin 1980). In 1895, Edward Arnold made a trip of 30 miles from the west end of Pasqua Lake to the southern edge of the Touchwood Hills, and found ten Ferruginous nests in three days (Arnold 1895, Arnold 1896, Houston and Bechard 1982b). No breeding pairs have

been found there since. The last recorded nest in the Regina area was at Boggy Creek, where Doug Gilroy in 1945 described a long-used nest the size of a 45-gallon drum (Belcher 1980). Farther east near Wauchope, H.H. Pittman photographed a gigantic Ferruginous nest in a willow in 1912 (Pittman 1915, 1956) and Marion Nixon had a nest in 1939 (Nixon 1939).

In the extreme southeast corner of Saskatchewan near Gainsborough and Northgate, George Withey and G. Abbey crossed the border from North Dakota to collect over 20 sets of eggs between 1925 and 1930. The last pair in the area nested on a huge pile of sticks on a stone pile along the edge of Gainsborough Creek until about 1960 (Trevlyn Reynolds, *fide* Vere Hunt Scott *in litt.* September 8, 1971).

Figure 2. *Putting up a Ferruginous Hawk nest platform near Kindersley, Saskatchewan. Photo/ C. S. Houston.*

B. Areas of marked decline

In Area B, the number of Ferruginous Hawk nestings has declined greatly. On the South Saskatchewan River south of White Bear, Sig Jordheim (*pers. comm.*) had four pairs nesting on steep hillsides along four miles of river in 1931. By 1945 there were only two nests left, and in 1964 someone shot the nesting pair at the sole remaining nest. The amount of suitable grassland in the undulating valley breaks has not changed, but no nest has been found since.

In the Lucky Lake area, Ferruginous Hawks became greatly reduced in the 1930s and disappeared as a nesting species in the 1940s (Roy 1964). A tree-nest attempt south of Lucky Lake in 1969 failed, but each year a pair nests on steep river valley slopes near Matador (Maher 1974).

Todd's Carnegie Museum collecting party in 1932 found the Ferruginous Hawk fairly common and one of the commonest hawk species between Elbow and Last Mountain Lake. Near Davidson, between May 18 and 21, they collected six sets of eggs, and on June 8 they found a nest with eggs near Elbow (Todd 1932, 1947). The most recent nest near Davidson was adjacent to pastureland along the Upper Arm River where the senior author banded four young in 1972.

Occasional nest attempts with a higher-than-average failure rate have been noted near Luseland (1980), west of Rosetown (1974-76 and 1982), east of Biggar (1982), north of Wiseton (1983), near Dundurn (several years), northeast of Saskatoon and east of Saskatoon (1960s, both failed). One or more pairs nest regularly, with a reasonable success rate, only in large (government) pastures such as those near Tugaske, east of Simpson, near Goodwater, near Cedoux, near Frobisher, and north of Forget.

C. Areas with reasonable numbers

In the southwestern corner of Saskatchewan, where pastures are almost continuous along the Montana and Alberta borders, a reasonably stable population of Ferruginous Hawks persists. W.A. and J.E. Bowman made trips up Battle and Willow Creeks from nearby Montana in 1904, 1915, and 1917 and collected 17 sets of eggs. J.E. Grant collected five sets between 1907 and 1911 north of Maple Creek. In 1920, S.J. Darcus was able to locate 15 nesting pairs in one summer in the Cypress Hills (Ingersoll 1920). At Skull Creek on the north edge of the hills, Steve A. Mann (*pers. comm.*) had two Ferruginous nests on his ranch each year until the mid-1930s, then for eight or ten years had only one pair, and thereafter none. Nests extend east along the Montana border as far as the Big Muddy Badlands, where Bob McCall found seven nests in 1971 (*pers. comm.*).

Along the Alberta boundary, a few large pastures still support stable populations of Ferruginous Hawks. The pasture near Kerrobert has three pairs of this hawk, but usually only one pair is successful. In contrast, the 24-square-mile pasture near Kindersley had as many as six successful pairs before we installed six artificial nest platforms in the more open portions of the pasture, and as many as nine successful pairs since. This represents a density of one Ferruginous pair per 4.1 square miles before the poles and one pair per 2.7 square miles after the poles (1:7.1 km^2), perhaps the highest density of this species ever reported (Houston 1982).

Extent of the decline and its probable causes

Based on the previous accounts one can make a "ballpark estimate" that the Ferruginous Hawk population in Saskatchewan had by 1960 dropped to 10%–20% of its pre-settlement levels. This estimate is based on the following:

1. Nearly 40% of the hawk's original range is no longer occupied;
2. Another 40% is now only sparsely occupied, chiefly because few potential nest sites remain with sufficient contiguous grassland to support a pair of Ferruginous Hawks; this area is among the most intensively cultivated regions in the world, with about 70% of the land under cultivation (Coupland 1978);
3. In the remaining 20% of the original range near the Alberta and Montana borders, only about half the land is cultivated; even here, a number of previous sites, with nest trees and sufficient grassland, are no longer oc-

Figure 3. *One of four successful Ferruginous Hawk nest platforms near Kindersley, Saskatchewan. Photo/C. S. Houston.*

cupied by Ferruginous Hawks.

Why has the Ferruginous Hawk suffered such a decline? The answer does not appear to be related to low reproductive success. The Ferruginous Hawk lays a relatively large number of eggs, averaging up to four per nest (Davy 1930). In Saskatchewan, an average pair raises three young to fledging. The senior author's data show 600 young banded in 196 successful nests between 1969 and 1983, with a rate of 3.1 young per successful nest (yearly range 2.5 to 4.5). This figure is slightly above the average fledging rates reported for Ferruginous Hawks in other areas where populations continue to thrive (Smith and Murphy 1978; Schmutz, Schmutz, and Boag 1980; Blair and Schitoskey 1982; Gilmer and Stewart 1983).

The Ferruginous decline appears to be related to at least five other factors. First, it is obvious that shooting and egg-collecting took a heavy toll in the first decades of settlement, contributing to a major decline between 1880 and 1930. Ferruginous Hawks were present "in great numbers" in 1893 between Wood Mountain and the Cypress Hills, but with "increasing human population and constant persecution these hawks declined quickly," particularly between 1905 and 1913 (Spencer Pearse, quoted by Bradshaw 1915). Laurence B. Potter confirmed that in 1905 "ten or a dozen of this fine hawk's nests might have been easily found in a day's walk; last year [1929] in the same time and areas I was rewarded by finding one nest." (Potter 1930). At Crane Lake, just north of the Cypress Hills, A.C. Bent and his party found seven nests in 1905 but only three nests in 1906, "illustrating the prejudice of farmers and ranchmen against even this most useful hawk" (Bent 1907, 1937). In 1924, H. Hedley Mitchell summarized the situation when he reported that Ferruginous Hawks were "unfortunately becoming more scarce yearly, with other large beneficial hawks, owing to persistent persecution by misguided settlers."

As late as the 1930s, banding recoveries indicated a high mortality rate, mainly from shooting. Near Rosebud, Alberta, Salt reported 19% of 144 Ferruginous nestlings killed in the first ten months (Salt & Wilk, 1958), whereas the senior author's comparable recovery rate has been only 2% from 534 nestlings banded in western Saskatchewan since 1968. This change in recovery rate is due in large part to a decrease in the numbers of hawks shot in the past 40 years.

Second, ground squirrels are the main prey of both the Ferruginous Hawk and its more widely distributed relative, Swainson's Hawk (*Buteo swainsoni*). The importance of Richardson's ground squirrel (*Spermophilus richardsonii*) for grassland buteos is suggested by its Alberta range being exactly coterminous with that of its chief predator, Swainson's Hawk (Wonders 1969). There was a crash of Richardson's ground squirrel numbers throughout the southern prairie provinces in the early 1940s, coincident with the return of wet springs after a decade of drought; numbers of both Swainson's and Ferruginous Hawks diminished noticeably soon therafter. A noticeable recovery in Swainson's Hawk numbers gradually occurred after 1950, although not to previous levels.

Third, as annual prairie fires were brought under control, and aspen clumps regenerated throughout all of Area A and part of Area B (Archibold and Wilson 1980), the Red-tailed Hawk (*Buteo jamaicensis*) gradually spread and increased to become the dominant *Buteo* at the expense of Swainson's and particularly of the Ferruginous Hawk (Houston and Bechard, 1983). Although many of these aspen clumps are now being bulldozed, and Red-tailed Hawk numbers may in turn decline somewhat, the new treeless areas are converted to cropland which offers little attraction for Swainson's and none for Ferruginous Hawks.

Fourth, plowing of the remaining native grassland continues, though at a slower pace than earlier in the century, simply because only marginal lands now remain uncultivated. As land prices rise, as cattle prices drop disproportionately, as farmers try to cultivate a larger proportion of their holdings, and as mechanical rockpicking machines allow cultivation of rocky grassland for the first time, less and less acreage remains each year in native grassland. Even government pastures are being converted from native grasses to exotic grasses, with uncertain long-term effects. Not only do ground squirrel numbers decline noticeably when large tracts of grassland are plowed, but once the shorter grasses are replaced by taller grain crops the remaining animals are more easily concealed, often allowing them to avoid capture (Bechard 1982). Further, poisoning of ground squirrels with arsenic and other chemicals has been sporadic and we have encountered the death of nestling buteos in such areas.

Fifth, nesting sites appear to be a limiting factor. With the exception of "badlands" in a few valleys in the south and west, where ground nests are built on steep hillsides, Ferruginous Hawks in Saskatchewan nest in trees. We know of only two nests on rock-piles, near Smiley in the 1920s and Val Marie in the 1960s, one on a telephone pole cross-arm near Findlater in the 1930s, (Gwilym Jones, *pers. comm.*) and one on a haystack near Estlin (Goelitz 1918). Originally willows or aspens, untouched by fire along the edge rivers and sloughs, were the typical nest sites. These were later augmented as shelterbelt trees matured in abandoned farmsteads, typically about 40 years after initial settlement. Today, however, with the bulldozing of shelterbelts, and the loss of trees to cattle rubbing and debarking them and exposing their roots, the availability of nest sites is again critical, especially in large treeless pastures. For this reason we have experimented with artificial nest poles in two pastures, with encouraging success; four of the first six poles were used successfully by Ferruginous Hawks (Houston 1982). Since the amount of native grassland continues to diminish, we feel that artificial nest platforms added to large, treeless pastures offer the best hope for maintaining Ferruginous Hawk populations in Saskatchewan.

SUMMARY

THE FERRUGINOUS HAWK has experienced a long-term decline that be-

gan when the first settlers arrived before the turn of the century. Nesting pairs are now absent throughout much of the pre-settlement breeding range; today a relict population of perhaps 10% of the original population still breeds in the province. These birds are able to find adequate prey only in the remaining large pastures where Richardson's ground squirrels are abundant. With the increasing loss of suitable nest trees, government agencies should recognize the importance of their pastures to this species, and take measures that will halt the decline of this beneficial hawk.

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