COMMITTEE ON THE
STATUS OF ENDANGERED
WILDLIFE IN CANADA

OTTAWA, ONT. K1A 0H3
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COMITÉ SUR LE STATUT
DES ESPÈCES MENACÉES
DE DISPARITION AU
CANADA

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# UPDATED STATUS REPORT ON THE PRAIRIE FALCON *FALCO MEXICANUS* IN CANADA



BY

DAVID A. KIRK



AND

URSULA BANASCH



**STATUS ASSIGNED IN 1996**
**NOT AT RISK**

**REASON:** SMALL POPULATION BUT NO EVIDENCE OF DECLINE OVERALL AND NO EVIDENCE OF POPULATION CHANGE.

**OCCURRENCE:** ALBERTA, BRITISH COLUMBIA, MANITOBA, SASKATCHEWAN

COSEWIC - A committee of representatives from federal, provincial and private agencies which assigns national status to species at risk in Canada.

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# JUNE 1994

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|---|---|
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Introduction: The purpose of this report is to provide an update on the status of the Prairie Falcon *Falco mexicanus* since the species was designated Not at Risk by COSEWIC in 1978 (this status was reconfirmed in 1982) (Woodsworth and Freemark 1981). At that time it was known that:
- only a small portion of the breeding range of the Prairie Falcon is in Canada (BC, AB, SK, more rarely MB),
- the species is uncommon to fairly common throughout the western US,
- there was evidence of declining populations and productivity during the past decade in some areas, likely due to pesticide residues in food,
- more recently there was evidence of a possible trend to slowly increasing populations and range extensions in some areas, coinciding with declining pesticide residue levels,
- the Prairie Falcon population in the Prairies was considered stable or increasing overall with 50 pairs nesting annually in SK, over 250 pairs nesting in AB, and about 6 pairs nesting in BC.

## A Population size and trends

Breeding Prairie Falcons in Canada are at the northern limit of their range and thus their populations are small. They were previously considered endangered because of their restricted range (Godfrey 1970). From 1958 to 1968, occupancy of known territories declined by 34% from four of six study areas in Saskatchewan and Alberta, probably as a result of contamination by cumulative organochlorine (OC) pesticides (Fyfe et al. 1969), although this was disputed (Oliphant et al. 1976). There is little doubt that falcons that feed mainly on avian prey were affected detrimentally by contaminants. Also pest control programs (e.g., in California) caused huge losses in prey populations (e.g., Horned Larks *Eremophila alpestris*; Palmer 1988).

The total continental population of Prairie Falcons was estimated at 5,000-6,000 pairs by Palmer (1988). In Canada, Woodsworth and Freemark (1981) estimated that 250 pairs nested in Alberta, a further 50 pairs in Saskatchewan, and six pairs in British Columbia. Semenchuk (1992) suggests that the Canadian population of Prairie Falcons is small and stable, or possibly increasing. The latest reported estimate for Canada is 250-500 pairs (C.S. Houston, pers. comm. reported in Kirk and Hyslop in press).

Prairie Falcons previously nested in five midwestern states, but now nest in only three (Byre et al. 1991). In all of these it is listed as a species of 'special concern' and was considered abundant in North and South Dakota and sometimes further east. Prairie Falcons also bred in Nebraska, Kansas and Missouri (see references in Byre et al. 1991). In 1984, 60 pairs were estimated for Nebraska. Byre et al. (1991) concluded that populations of Prairie Falcons had decreased in historical time, but these decreases were local and not affecting the overall population (Evans 1982, Palmer 1988). In the western United States, Prairie Falcon populations are considered stable and it is considered common in eight of nine states (Platt and Enderson 1989), although some local losses may have occurred (White 1994). In the southwest (e.g., Mojave Desert), populations are being affected detrimentally by human disturbance (Boyce 1988).

### Migration counts

Prairie Falcons migrate as far south as central Mexico but small numbers of individuals remain on their breeding territories over winter in southern British Columbia, Alberta, Saskatchewan, and rarely Manitoba. Most recoveries of individuals banded in Alberta and Saskatchewan were from

the grassland regions of North and South Dakota, Nebraska, Kansas, Colorado, and Texas, an 'eastern migration route'. Relatively few recoveries were from Montana, Washington, Idaho, and Utah (Schmutz et al. 1991). Thus, the hawkwatch data noted below may exclude Canadian Prairie Falcons. Also, the movements of Prairie Falcons are complex (Schmutz et al. 1991) and the efficacy of trends calculated using migration count data has not been tested for this species.

An combined analysis of migration count data from four sites in the western states between 1983-1991 suggests that populations of Prairie Falcons are stable (% annual change 1.40, $P > 0.1$; Hoffman et al. 1992). Separate analyses for each hawkwatch station also showed no significant trends (Sandia Mountains, New Mexico, % annual change -0.0013, $P = 0.13$, 1985-1991, adjusted for number of observers; Manzano Mountains, New Mexico, % annual change -0.002, $P > 0.9$; 1985-1990, adjusted for number of observers; Goshute Mountains, Nevada, % annual change 0.0016, $P > 0.5$, 1983-1990). In a separate analysis from the Wellsville Mountains, Utah, there was no significant difference between the count periods 1977-1979 and 1987-1990 (Student $t = 0.12$, $P > 0.9$, adjusted for number of observers; Hoffman et al. 1992). The low counts for Prairie Falcons limit the sensitivity of migration count analyses. Hoffman et al. (1992) suggested that only trends of a relatively large magnitude would be detected in this species using migration count data.

Breeding Bird Survey (BBS)

There were insufficient data from the BBS for the Prairie Falcon to meet Canadian Wildlife Service (CWS) protocol for assessing trend estimates (a minimum of 14 routes and 40 individuals) either at the nationwide or ecozone level (Kirk and Hyslop in press).

Christmas Bird Counts (CBC)

According to an overall analysis of CBC data for North America, the Prairie Falcon increased significantly between 1959-1988 (annual increase 1.5%, $n = 488$ circles, $P < 0.01$; a mean relative abundance of 0.28 birds/100 party hours was counted; Sauer et al. 1996). This analysis was carried out using route regression and was based on similar methods to that used in analyzing BBS data. During CBCs between 1962-1973, the species was most abundant in the Great Plains and Great Basin (Root 1988).

Breeding bird atlases

There is no evidence that Prairie Falcons nest in Manitoba; occasional sightings are made from early April to early July; as well as late December, mid-January and late February (Cuthbert et al. 1990). The species is rare but recorded annually from late July to mid-November (Cuthbert et al. 1990). In southeastern Manitoba, the Prairie Falcon ocurrs occasionally from the second week in April to late July; at all other times it is rare, but can be expected to occur annually. It is an 'early annual visitor to Oak Hammock Marsh from August to October'; there are scattered sightings at other times (Cleveland et al. 1988).

In Saskatchewan, Smith (1996) described the Prairie Falcon as 'fairly common but local in the badlands' (Montana border and South Saskatchewan River) in the breeding season; adults and young disperse in late summer and the species is a summer visitor in the southwest. Breeding evidence was found in 29 quadrants (3% of provincial total); breeding was confirmed in 26 of

these 29 quadrants, it was probable in one and possible in two (Smith, 1996). The remaining records were of summer visitants (26, 3%), spring (4, 1%) and fall transients (27, 4%), and winter residents (34, 3%; Smith 1996).

During the breeding bird atlas surveys in Alberta (1987-1991), breeding was confirmed in 74 squares, it was probable in a further eight, and possible in 21 squares (Semenchuk 1992). The species was recorded in 12% of surveyed squares in the grassland natural region, and also bred to the west in the Rocky Mountain region (Semenchuk 1992).

Campbell et al. (1990) described the Prairie Falcon as a "rare resident in the Okanagan valley", a "rare later summer visitant to alpine areas of the Cascade Mountains (*and*) very rare in the south-central interior." The species is a rare transient in the southeastern part of the province and casual on the southwest coast (including southern Vancouver Island) and west Kootenay. There are 20 records (12 nests) of breeding Prairie Falcons in British Columbia (241 nonbreeding records), where it is a rare local breeder (Campbell et al. 1990). Prairie Falcons in British Columbia have apparently not recovered from population declines attributed to OC pesticides and possibly human disturbance. For example, numbers in the Okanagan valley peaked in the 1920s and 1930s; by the 1940s eyries were being abandoned. This decline coincided with the post-war use of DDE in orchards, but was more probably due to shooting (Cannings et al. 1987). Because of the number of recent sightings (one third of all records were from 1975 to 1985, and CBC data recorded birds from the Okanagan valley in the 1980s), Campbell et al. (1990) suggested that the species might be re-colonizing arid areas, and populations are now increasing (Cannings et al. 1987).

Nature Conservancy rankings or provincial designations

Nature Conservancy rankings for the Prairie Falcon are SZN (does not breed, seen on migration or in winter) for Manitoba (J. R. Duncan pers. comm.), S4B for Saskatchewan (i.e., widespread, abundant and apparently secure, with many occurrences but of long-term concern; J.R. Duncan, pers. comm., 1994) and S2 for British Columbia (imperiled in province because of rarity; 6-20 occurrences for remaining individuals; S. Cannings, pers. comm., 1994). The Prairie Falcon is on the Red List in British Columbia meaning it is considered threatened or endangered in that province (Harper et al. 1994). In Alberta, it is on the blue list, meaning the species is of "special concern because of characteristics that make them particularly sensitive to human activities or natural events; also limited information is available."

Recent research

A recent study on a portion of the Bow River in southern Alberta documented a decrease in the number of occupied nest sites from 1974 (18 territorial pairs) to 1989 (13 territorial pairs) (Hunt 1993; Hunt and Holroyd unpublished manuscript). Levels of OC pesticides were low in eggs sampled from the Bow River in 1988 (Noble et al. 1993) and the fact that unoccupied nest sites existed along the river suggested that nest sites were not limiting. However, the area of cultivated and irrigated land within the Bow River and Eastern Irrigation District doubled between 1970 and 1983 (Alberta Agriculture 1987). Given that ground squirrel populations are negatively impacted by cultivation, and that this species is the main prey of Prairie Falcon in the Bow River, Hunt and Holroyd (unpublished manuscript) suggested that a relationship exists between the area of cultivation around nest sites and nest site occupancy. However, they failed to find that less arable

land existed close to occupied sites compared to unoccupied sites in the Bow River study area. Small passerines associated with agricultural areas are a partial alternative food source for Prairie Falcons, which may account for this finding.

Band recovery distances (96 recoveries from 3447 banded) varied from 0-1900 km from their origin (Schmutz et al. 1991). These data indicate that Canadian Prairie Falcons winter not only in the northern United States (Woodsworth and Freemark 1979) but some individuals migrate as far south as Texas and Oklahoma (Schmutz et al. 1991).

Synopsis

While Prairie Falcon populations are considered stable in the western United States, the status of the species in the mid-west is a cause for concern. Published data on current Prairie Falcon productivity and nesting density in Canada are lacking (Noble et al. 1993). Given that it is susceptible to habitat loss, and that it is at the northern limit of its range in Canada, populations of this species are of long-term concern and should be monitored. The population in British Columbia might be considered threatened.

## B Habitat

Prairie Falcons inhabit dry, open areas, particularly where there are cliffs or eroded river banks (see Holthuijzen et al. 1990; Beauvais et al. 1992; Squires et al. 1993). Hunt (1993) found that the proportion of native range inhabited by ground squirrels within the home range of radio-tagged Prairie Falcons was significantly greater than expected according to its availability within a 15 km radius of their nest sites. A recent radiotelemetry study in northeastern Wyoming demonstrated that openness was the factor best relating to habitat use of Prairie Falcons (Squires et al. 1993).

In Saskatchewan, Prairie Falcons nest in the badlands (South Saskatchewan River). Waterbirds are hunted along lakeshores in the fall, as far south as the parklands (Smith, 1996). In Alberta, Prairie Falcons are found in the "vicinity of the canyons and coulees of the badlands, or about the cliffs of southern river valleys" (Semenchuk 1992). Open country devoid of trees is also inhabited in British Columbia, "foothills, valleys and river canyons with steep rocky cliffs, escarpments, and outcrops or buttes adjacent to the open areas, where they hunt" (Campbell et al. 1990). In British Columbia, Prairie Falcons may also nest at high elevation. Adults with young have been seen on cliffs at about 200 m elevation, and they definitely hunt in alpine areas throughout the breeding season at that elevation (S. G. Cannings, pers. comm.). In winter, Prairie Falcons from Alberta and Saskatchewan prefer grassland areas, as suggested by band recovery data (Schmutz et al. 1991).

Trends in habitat

Habitat loss is the most serious current threat to Prairie Falcon populations (Evans 1982; Noble et al. 1993). The most important trend in habitat is the conversion of native grazing land to cropland (see Coupland 1987, Wallis 1987, WWF 1988). Hunt (1993) and Hunt and Holroyd (unpublished manuscript) recently suggested that increased cultivation around Prairie Falcon nests may result in a decrease in the number of occupied nests. However, they sampled territories from

only a relatively small part of the species' range in Alberta. Also, because the land area examined around eyries was smaller than the foraging range of Prairie Falcon pairs, possible relationships with land use changes may be missed (Hunt and Holroyd, unpublished manuscript). Some territories may also have been abandoned because nest cliffs collapsed.

Native prairie harbouring ground squirrels is used significantly more often than expected according to its availability in core areas of radio-tagged Prairie Falcons in the Bow River study area. By contrast, irrigated crops are used significantly less than expected according to their availability (Hunt 1993).

Because the species prefers to hunt in grassland and cropland areas it may be susceptible to new generation cholinesterase-inhibiting pesticides such as organophospates and carbamates. Horned Larks are one of the main prey items of Prairie Falcons (Squires et al. 1989), particularly during the winter, when some falcons may follow this species' movements (Enderson 1964). The Horned Lark is one of the species most affected by extremely hazardous pesticides such as granular carbofuran (Mineau 1993). While some Prairie Falcons may be killed by ingestion of birds that contain sub-lethal doses of a chemical, the possible depletion of local Horned Lark populations is another indirect avenue for affecting falcon populations. One canola field in Saskatchewan contained an estimated 2,000 dead Lapland Longspurs (*Calcarius lapponicus*) following applications of granular Carbofuran in mid-May (Mineau 1993). Large flocks of Horned Larks and longspurs use agricultural fields for foraging, so this is unlikely to be an isolated incident.

For reasons unknown, populations of Richardson's Ground Squirrels (*Spermophilus richardsonii*) have decreased in the prairies over the last 10 years, perhaps as a result of drought, agricultural change or natural cyclic population fluctuations. As a result, Prairie Falcon populations may have declined locally in some areas because the ground squirrel is the most important prey item in the prairie ecoregion (Hunt 1993). Prairie Falcon productivity and nest success are lower in areas where they feed on birds than where they feed on mammals (U.S.D.I. 1979). This means that areas holding populations of ground squirrels are important. Long-term studies are needed of ground squirrel habitat requirements and demography (Hunt 1993). Hunt (1993) recommended that ground squirrel colonies must be protected, particularly in areas close to prairie rivers, as well as wetlands for waterfowl and native prairies for songbird prey species.

### D Evaluation and proposed status

In 1988, Palmer estimated the North American population of Prairie Falcons at 5,000-6,000 pairs. The latest estimate for Canada is 250-500 pairs (Kirk and Hyslop in press). In the United States, the Prairie Falcon now nests in only three of the five midwestern states, where it is now listed as a species of special concern, and is being affected by human disturbance in the southwest. However, in the western states, the Prairie Falcon is considered common in eight of nine states.

Few Canadian recoveries are from the western states so the migration count data from the west may exclude Canadian Prairie Falcons. These migration count data, however, suggest that between 1983-1991 Prairie Falcon populations were stable, but low counts limit the sensitivity of these analyses and only trends of a large magnitude would likely be detected.

Overall analyses of Christmas Bird Count data for North America showed a significant increase from 1959-1988. Breeding Bird Survey data from Canada were insufficient to determine a trend with any statistical confidence. Semenchuk (1992) suggests that concerns may exist about some local Prairie Falcon populations but the species is doing well in Alberta, even though recent

population data are scarce. Some apparent signs of decline in Alberta may be attributed to movements of falcons to follow prey species (e.g., ground squirrels) which have decreased. In British Columbia, recent data indicate that the Prairie Falcon may be recolonizing arid areas and increasing (Campbell et al. 1990); it was lost from the Okanagan Valley but one pair has returned to breed at this site.

Given the small but possibly stable or increasing population of Prairie Falcons in Canada, it is recommended that this species be designated as 'not at risk'. However, because this species is used for falconry, which can affect local population parameters adversely (Conway et al. 1995), it is of management concern in several jurisdictions. In addition, the lack of recent productivity and nesting density data, and the fact that this population is at the northern limit of its range, mean that this species is of long-term concern and should be monitored to ensure both its survival in the prairie ecosystem and to maintain biodiversity.

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