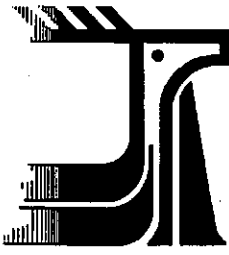


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STATUS OF ENDANGERED
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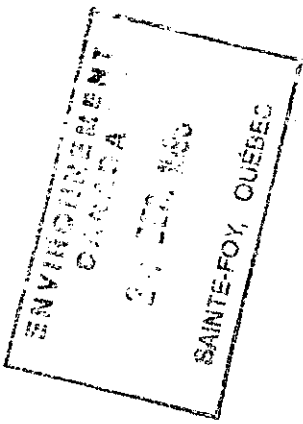
**UPDATED STATUS REPORT ON THE RED-SHOULDERED HAWK
*BUTEO LINEATUS***

QC
88
573
1996

IN CANADA

BY

DAVID A. KIRK



**STATUS ASSIGNED IN 1996
VULNERABLE**

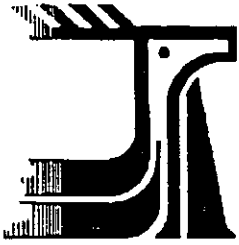
**REASON: POPULATION APPARENTLY STABLE BUT STILL
VULNERABLE TO HABITAT DISTURBANCE AND LOSS -
NO INCREASE.**

OCCURRENCE: ONTARIO AND QUEBEC



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

**CSEMDC - Un comité de représentants d'organismes
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JUNE 1994

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- SPECIES:** "Species" means an indigenous species, subspecies, variety or geographically defined population of wild fauna and flora.
- VULNERABLE: (V)** A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
- THREATENED: (T)** A species likely to become endangered if limiting factors are not reversed.
- ENDANGERED: (E)** A species facing imminent extirpation or extinction.
- EXTIRPATED: (XT)** A species no longer existing in the wild in Canada, but occurring elsewhere.
- EXTINCT: (X)** A species that no longer exists.
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**UPDATED STATUS REPORT ON THE RED-SHOULDERED HAWK
*BUTEO LINEATUS***

IN CANADA

BY

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AND

**NATIONAL WILDLIFE RESEARCH CENTRE
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**STATUS ASSIGNED IN 1996
VULNERABLE**

Introduction: The purpose of this report is to provide an update on the status of the Red-shouldered Hawk *Buteo lineatus* since the original COSEWIC report was produced and Vulnerable status assigned in 1983 (Risley 1982). At that time it was known that:

- the Red-shouldered Hawk breeds in Canada in southern Ontario, Québec, and New Brunswick,
- it prefers mesic forests composed of shade-tolerant hardwood trees in close proximity to wetland areas for foraging and exhibits strong site tenacity in these habitats,
- the Red-shouldered Hawk was very common in many areas until the 1950s, then declined apparently due to habitat loss or changes in habitat quality and possibly competition for breeding sites from other raptors (e.g., Red-tailed Hawk *Buteo jamaicensis*),
- the species was on the Blue List from 1971-1981,
- migration totals and provincial atlases suggested a Canadian population of about 2,000-5,000 pairs,
- populations appeared stable in southern Québec and in areas of Ontario where suitable habitat existed.

A Population size and trends

Before it experienced drastic population declines in the late 1950s, the Red-shouldered Hawk *Buteo lineatus* was the most common diurnal raptor breeding in southern Ontario (Weir 1987, Austen et al. 1994) and elsewhere in the deciduous forests of eastern North America (Bent 1937, Crocoll 1994). The declines, which began in the last century and were most pronounced between the 1950s and the 1970s (Risley 1982), were believed to be caused by habitat loss, principally 1) drainage of wetland and 2) deforestation and fragmentation of forests at a landscape scale (Naylor et al. 1994). At the stand level, selective logging of favoured riparian or mesic forests was likely a contributory factor (Armstrong and Euler 1983, Bryant 1986). An additional factor, linked to forest fragmentation, was possible interference competition from increasing Red-tailed Hawk and Great Horned Owl *Bubo virginianus* populations (Bednarz and Dinsmore 1981, 1982, Bryant 1986, Bryant 1994). Great Horned Owls also prey on Red-shouldered Hawks. There was some evidence that pesticides affected this species in some areas (e.g., Henny et al. 1973). Because Red-shouldered Hawks may require large forest blocks (3,000 ha for maximum occurrence, 225 ha for 50% of maximum - Robbins et al. 1989), they are sensitive to forest fragmentation. While some authors suggest that the species can occupy small woodlots (e.g., Bryant 1994), there have been no studies in Canada comparing productivity and breeding densities in fragmented landscapes with those of continuously forested areas. Red-shouldered Hawks feed largely on mammal, reptile and amphibian prey in forested landscapes so they are not as susceptible to contaminants as raptor species that feed on avian or piscivorous prey (Noble et al. 1993). The species has been 'blue listed' in various states since 1972 (Tate 1986).

Risley (1982) estimated the total Canadian population of Red-shouldered Hawks at 468 pairs. Some recent migration counts indicate that the population must be much larger (Duncan et al. 1991). For example, at Holiday Beach the highest total count was 1,400 hawks in 1987 (Benoit 1988), and there were 1,345 hawks counted in 1991 (Duncan et al. 1991). At Hawk Cliff there were 249 birds counted in 1991, but this is probably an underestimate because at this site most effort is given to banding and many *Buteos* are unidentified (Duncan et al. 1991). During the atlas, the Ontario population was estimated at 824-2,372 pairs (Austen et al. 1994, ORBBP 1994).

The latest population estimate is 2,000-5,000 pairs for the whole of Canada (see Kirk et al. 1995, Kirk and Hyslop in press).

Migration counts

Recent analyses of migration count data from hawkwatches in eastern North America suggest that populations of Red-shouldered Hawks are stable. Bednarz et al. (1990) maintained that migration data at Hawk Mountain, Pennsylvania showed a long-term decline between 1946-1982 (% annual decrease = -0.07 , $r^2 = 0.22$, $P = 0.002$), but according to Hussell and Brown (1992) the trend is clearly not linear. Populations apparently increased from 1934-1950, declined from 1950 to 1970 and have increased since then (Bednarz et al. 1990; Fig. 7). In a combined analysis of migration counts from six hawk look-outs, Titus and Fuller (1990) found no significant trends. Hussell and Brown (1992) found a significant non-linear pattern in counts of Red-shouldered Hawks at Grimsby, Ontario, with decreased numbers from 1975-1982 and increasing numbers thereafter. When the data were corrected for weather and date the increasing trend after 1982 was no longer evident (Hussell and Brown 1992). The % annual change was -0.5 ; Hussell and Brown 1992).

Breeding Bird Survey (BBS)

Breeding Bird Survey (BBS) data for Canada indicate little change in populations of Red-shouldered Hawks over the long-term period 1966-1994 (proportional annual change 0.35 , $n = 38$ routes; Downes and Collins 1996). The regression coefficient from analysis of BBS counts over the whole of Canada for a recent 10-year period was negative, but it was not significant, suggesting stable populations (proportional annual change -0.94 , $n = 19$ routes). An analysis for the mixedwood ecozone separately also suggests that populations were stable (proportional annual change 0.16 , $n = 19$ routes; Kirk and Hyslop in press). There were too few routes and insufficient individuals to analyse BBS data at the ecozone level for the more recent period (1985-94; a minimum of 14 routes and 40 individuals is needed for Canadian Wildlife Service (CWS), BBS analysis protocol (Downes and Collins 1996). It is also important to state the caveat that the BBS has limited use for monitoring Red-shouldered Hawks (and several other forest raptors) partly because the main period for their conspicuous calling and display flights is well before the mid-June BBS survey.

Christmas Bird Counts (CBC)

Most Canadian Red-shouldered Hawks winter in the United States, so Christmas Bird Count (CBC) data from the United States are useful in examining overall continent-wide trends. Using CBC data, early analyses showed decreases for all states, except California and West Virginia, between 1950-1969 (Brown 1971), but recently Titus et al. (1989) found no trends in CBC data for Red-shouldered Hawks from the northeastern United States. Hussell and Brown (1992) suggest that Fig. 5 (in Titus et al. 1989) shows a non-linear trend, with declines prior to 1970, followed by increases. The most recent analysis of CBC data (using route regression) for the whole of North America suggest that Red-shouldered Hawks have increased since 1959 (% change per year, 0.8% , $n = 1,168$ circles, $P < 0.1$; mean relative abundance 0.45 hawks/circle; Sauer et al. 1996).

Breeding bird atlases

During the Maritime atlas (1986-1990), there were 30 records of Red-shouldered Hawks. Prior to this, only one breeding record was accepted (Washademoak Lake, New Brunswick.). Erskine (1992) estimated the present population in the Maritimes to be under 20 pairs (all in New Brunswick and continuous with the population in Maine). Breeding was confirmed in only one square, it was probable in eight and possible in 11 (see Erskine 1992). Erskine (1992) noted that the population of Red-shouldered Hawks in the Maritimes was not adequately monitored during the Atlas.

Of the 2,464 squares surveyed during the Québec atlas (1984-1989), the Red-shouldered Hawk was confirmed as a breeder in 65 (2.6 %), it was probable in a further 43 squares (1.7%) and possible in 111 squares (4.5 %) (total breeding squares 8.9 % of total squares surveyed; Bird and Henderson 1995; J. Gauthier pers. comm.). Records were concentrated in the southern part of Québec which probably partly reflects coverage, but the species is mostly restricted to the Great Lakes-St. Lawrence or southern deciduous forest types. The population in Québec was stable according to check list data analysed from 1969-89 (% annual change -0003; Cyr and Larivée 1995).

In southern Ontario, Red-shouldered Hawks were reported in 382 (21%) of surveyed squares (n = 1,824) during the atlas (1981-1985; Weir 1987). Of these squares, breeding was confirmed in 68 (18%), probable in 106 (28%) and possible in 208 (54%) (Weir 1987). Given the fact that Red-shouldered Hawks were so difficult to detect during the main atlas period (their noisy courtship period occurs in the early spring before leaves are out - Weir 1987), surprisingly large numbers of nests were found, suggesting that the species is much commoner than previously thought. A population estimate of 824 to 2,372 breeding pairs was derived from the Atlas project (Austen et al. 1994).

Elsewhere in Canada there were few records from breeding bird atlases; the species is 'hypothetical' in Saskatchewan, with only four sightings between 1972-1990 (Smith 1996). Few sightings are made in British Columbia and these are all casual visits by birds from the western United States (Campbell et al. 1990).

Nature Conservancy rankings

Nature Conservancy rankings for the Red-shouldered Hawk in Ontario are S3 (i.e. rare or uncommon, 21-100 occurrences) but this should almost certainly be an S3/S4 (intermediate between S3 and S4; S4 is widespread, abundant, and apparently secure; D. Sutherland, pers. comm.). The species is considered an S4 in Québec (M. Huot, pers. comm.).

Recent research

Roadside surveys for Red-shouldered Hawks in Ontario are managed by the Ontario Ministry of Natural Resources with Long Point Bird Observatory (Agro 1993) but there are too few data to examine population trends (1990-1994). By 1994 there were 17, 19 km routes established, mostly in central and eastern Ontario (ORBBP 1994). Additional routes are needed to validate

population trends in this species (Austen et al. 1994). There have been several special research projects initiated by the Ontario Ministry of Natural Resources to study nest stand and site characteristics in Red-shouldered Hawks (Szuba et al. 1991). Habitat suitability index models for the Red-shouldered Hawk have also been developed in Ontario (e.g., Szuba et al. 1992, Naylor and Bush in preparation).

Synopsis

Titus et al. (1989) analysed BBS data (1966-1987) from the northeastern United States for the Red-shouldered Hawk and found that the species declined in the less developed regions of Pennsylvania and the northern New England physiographic region. Elsewhere trends were either positive or no trend was found. Red-shouldered Hawks increased in Maryland and the northern Piedmont strata (central New Jersey to southeastern Pennsylvania and central Maryland) (Titus et al. 1989). In the southeastern United States, the Red-shouldered Hawk is a widespread resident; BBS data (1966-1985) indicated significant increases in four of 10 southeastern states with sufficient information, while nonsignificant increasing trends were found for five more states and a nonsignificant decreasing trend in Florida (Mitchell and Millsap 1990).

It seems unlikely that Red-shouldered Hawk numbers have reached the levels that were present prior to European settlement. For example, in Michigan, Wisconsin, Illinois and Iowa, numbers are considered 90% lower than during presettlement times (Bednarz 1979, Ebberts 1986, 1991, J. Jacobs and J. Hekert in pers. comm. to Crocoll 1994).

There is considerable concern about the effects of timber harvest and forest fragmentation on the Red-shouldered Hawk. Because the species may be area-sensitive and responds negatively to selective logging, it requires special consideration during timber management plans (see Szuba et al. 1991, Naylor and Szuba 1992, Naylor et al. 1994). There is evidence that reproduction is lower in poor quality habitat (such as upland sites; e.g., Ebberts 1991). The Ontario Ministry of Natural Resources considers the Red-shouldered Hawk a species of special concern and a 'locally featured' species (Naylor et al. 1994).

B Habitat

The Red-shouldered Hawk is an area sensitive species; the area of stands with appropriate species composition, age and density must be at least 10 ha, within a greater 100 ha mature forest area (Naylor and Szuba 1992). While the species used to nest in isolated woodlots (often < 10 ha in area), they are now restricted to larger forested areas of 200 ha or more, possibly because in such situations there is less competition from Red-tailed Hawks (Szuba and Bell 1991). Typical breeding habitat for Red-shouldered Hawks in Canada is mature, dense shade-tolerant hardwood forest (Armstrong and Euler, Morris and Lemon 1983, Szuba et al. 1991). During the Ontario atlas, about 90% of records came from the Great Lakes-St. Lawrence forest regions, while the remainder were from the Carolinian and southern boreal forest regions (ORBBP 1994).

Forest stands around Ontario nests are usually composed of a high percentage of sugar maple *Acer saccharum*, yellow birch *Betula lutea* or other hardwoods (especially American beech *Fagus grandifolia*, red maple *Acer rubrum* and red oak *Quercus rubra*). Older stands are preferred

(at least 60 years old) and canopy closure must be > 70%. Optimal nesting habitat also has a total basal area of at least 20 m²/ha and at least 5 m² of this with trees > 40 cm diameter at breast height (dbh; Naylor and Szuba 1992). Because Red-shouldered Hawks forage in wetlands, on amphibians and reptiles, most active nests are generally within 250 m of a water body. Of the nest trees used by Red-shouldered Hawks in Ontario, 80% are of the following four species; American beech, sugar maple, yellow birch and white birch *Betula papyrifera* (Naylor and Szuba 1992).

In winter, both migrant and resident Red-shouldered Hawks occur in more open habitats than during the breeding season (see Crocoll 1994). In Wisconsin, J. Jacobs (in pers. comm. to Crocoll 1994) recorded wintering birds foraging on voles along woodland and field edges and some feeding on birds at feeders. Some individuals stayed on small winter territories from December to March, other birds stayed for short periods (1-7 days) and then left the area (Crocoll 1994). In Florida, similar habitats were used in the breeding and non-breeding season (open habitats and open areas with scattered trees were preferred; Bohall and Collopy 1984).

Trends in habitat

Forest clearance has adversely affected Red-shouldered Hawk populations throughout their Canadian range. Loss of forest to farmland in southwestern Ontario has had the most obvious impact; few Red-shouldered Hawks now breed southwest of Toronto (Weir 1987, ORBBP 1994). Elsewhere, cottage development has been particularly destructive because this occurs in the areas most favoured by Red-shouldered Hawks for nesting (e.g., Armstrong and Euler 1983). Bryant (1986) suggested that timber cutting for firewood may have caused declines of Red-shoulders in the Waterloo region of Ontario. However, in some parts of northeastern North America abandoned agricultural land has been reforested which has led to Red-shouldered Hawks recolonizing some areas (e.g., Peterson and Crocoll 1992). There is insufficient quantitative information on the impacts of habitat loss on populations (Crocoll 1994).

C Evaluation and recommended status

The Red-shouldered Hawk is listed as endangered in New Jersey, Illinois and Iowa, it is threatened in New York, Michigan and Wisconsin, it is of special concern in Connecticut, Minnesota, Mississippi, Nebraska and Indiana, it is rare in Missouri, and it is on the watch list in Maine and Massachusetts (Crocoll 1994).

Taken together, the available information suggests that Red-shouldered Hawk populations are either stable or possibly increasing, and that the species might be considered 'not at risk' in Canada. The fact that large numbers migrate through spring and fall hawk look outs (this was true even during the period when populations decreased in rural southern Ontario - A. Wormington in pers. comm. to ORBBP 1994), indicates that the populations north of the Great Lakes are healthy. However, the species is at the northern edge of its range in southern Canada and is also sensitive to habitat loss; even in its Canadian stronghold in Ontario the species is vulnerable to fragmentation of forests, acid rain effects, contaminants and human disturbance (ORBBP 1994).

Titus et al. (1989) suggested that BBS, CBC and hawk migration count data were likely inadequate to assess population status and trends in the Red-shouldered Hawk and that specific

surveys and research were needed for this species (as conducted by the Ontario Ministry of Natural Resources). Thus, more special survey routes and research should be implemented for this species, as recommended by Titus et al. (1989). Particularly needed are studies of breeding densities, occupancy rates and productivity in forest stands of different species composition, size and isolation. This information could be used to determine the size of forests needed by breeding Red-shoulders to permit successful reproduction.

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