

COSEWIC
Assessment and Update Status Report

on the

Short-eared Owl
Asio flammeus

in Canada



SPECIAL CONCERN
2008

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada



COSEPAC
Comité sur la situation
des espèces en péril
au Canada

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For additional copies contact:

COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa, ON
K1A 0H3

Tel.: 819-953-3215

Fax: 819-994-3684

E-mail: COSEWIC/COSEPAC@ec.gc.ca

<http://www.cosewic.gc.ca>

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COSEWIC Assessment Summary

Assessment Summary – April 2008

Common name

Short-eared Owl

Scientific name

Asio flammeus

Status

Special Concern

Reason for designation

This owl has suffered a continuing population decline over the past 40 years, including a loss of 23% in the last decade alone. Habitat loss and degradation on its wintering grounds are most likely the major threat, while continuing habitat loss and degradation on its breeding grounds in southern Canada and pesticide use are secondary threats. This species nearly meets the criteria for Threatened status.

Occurrence

Yukon Territory, Northwest Territories, Nunavut, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador

Status history

Designated Special Concern in April 1994 and April 2008. Last assessment based on an update status report.



COSEWIC Executive Summary

Short-eared Owl *Asio flammeus*

Species information

The Short-eared Owl, *Asio flammeus* (Pontoppidan), is a medium-sized owl, approximately 34-42 cm in length. Adults are cryptically coloured with a brown back and creamy-buff chest with brown streaks. The best field mark is the species' habit of flying low over open habitat with deep, moth-like wing beats.

Distribution

Short-eared Owls are a cosmopolitan species, breeding on many continents and on many islands. In North America, they breed in arctic areas, in coastal marshes, and in interior grasslands. In winter, they generally move southward and are found in coastal areas, as well as interior grasslands, with the central Great Plains typically a centre of abundance.

Habitat

A wide variety of unforested habitats are used, including arctic tundra, grasslands, sand-sage, fallow pastures, and occasionally fields planted with row-crops. Although Short-eared Owls clearly prefer open habitats, it is thought that the primary factor influencing local habitat choice (in summer and winter) is food abundance.

Biology

Short-eared Owls are a nomadic species, with most individuals wandering widely both seasonally and annually. Individuals on islands, however, appear to show higher philopatry to breeding sites. Concentrations of Short-eared Owls occur during breeding and non-breeding at sites where rodent (typically *Microtus*) populations are high. Nests are placed on the ground in open habitats, and clutches of 4-7 eggs are initiated from April to June. A single brood is typically raised. Before they can fly, nestling owls typically disperse short distances from the nest site, hiding in nearby vegetation.

Population sizes and trends

The estimated global population is about 2,000,000, with 700,000 in North America and 350,000 in Canada. Christmas Bird Count data suggest that Short-eared Owls have declined at a rate of about 3% annually over the last 40 years.

Limiting factors and threats

It is important to note that there are almost no quantitative data available on the factors affecting population declines in Short-eared Owls – rather, the ideas cited below are a summary of published hypotheses.

The primary limiting factor appears to be habitat loss and alteration, especially coastal marshes and grasslands that were formerly heavily used by wintering owls, but also grasslands on the Canadian prairies and in southern Ontario. Other, secondary, factors that may contribute (to a much lesser degree) to population declines include 1) increased nest depredation (as a result of habitat fragmentation); 2) declines in prey abundance as a result of habitat changes; and 3) collisions with vehicles, utility lines, and barbed wire fences. Although organochlorines have been found in Short-eared Owl eggs, more data are needed on the prevalence and impacts of such contamination.

Special significance of the species

Short-eared Owls were formerly a common sight on the Canadian prairies and at various sites on both coasts – they are now uncommon to rare in these areas. Despite a recent increase in grassland habitat on the U.S. Great Plains (where many Short-eared Owls winter), no apparent increase has been detected in the Canadian breeding population.

Existing protection or other status designations

Based on a previous COSEWIC report (Cadman and Page 1994), Short-eared Owls were assessed as Special Concern. The Short-eared Owl is currently classified as G5 (demonstrably widespread and secure) by NatureServe. However, NatureServe provincial status designations in Canada are: Alberta (S3), British Columbia (S3B,S2N), Labrador (S3S4B), Manitoba (S3S4B), New Brunswick (S3B), Newfoundland (S3B), Northwest Territories (SNRB), Nova Scotia (S1S2B), Nunavut (SNRB), Ontario (S3S4B), Prince Edward Island (S1S2B), Quebec (S3S4), Saskatchewan (S3B,S2N), Yukon Territory (S4B). NatureServe status designations are: S1 = critically imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = apparently secure, and SNR = Not ranked).

Short-eared Owls are protected under the *Migratory Bird Treaty Act* (Federal Register 2006) as well as under a large number of Provincial Wildlife acts (e.g., Ontario *Fish and Wildlife Conservation Act*, and the *Act Respecting the Conservation and Development of Wildlife* in Quebec). Short-eared Owls are also listed as Endangered, Threatened, or a Species of Concern in many U.S. states and as a Species of Conservation Concern by the U.S. Fish and Wildlife Service.



COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2008)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.



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Canadian Wildlife Service

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Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

**Update
COSEWIC Status Report**

on the

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Asio flammeus

in Canada

2008

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SPECIES INFORMATION

Name and classification

English name: Short-eared Owl
French name: Hibou des marais
Scientific name: *Asio flammeus* (Pontoppidan)

Description

The Short-eared Owl is a medium-sized owl, 34 to 42 cm in length. Adults are cryptically coloured with a blend of beige, brown, and black streaks, and are conspicuous only when in flight. The head is large and round, with small feather “ear” tufts that are not typically seen. Sexes are similar in appearance, but females are slightly larger and also tend to be darker dorsally with heavier streaking on the chest and belly. Juveniles are similar to adults, but with somewhat buffier plumage.

Short-eared Owls are often active at dawn and dusk. One of the simplest ways of identifying this species is by its moth-like foraging flight, characterized by deep wing-beats, occasional hovering, and the habit of quartering low over patches of grassland or marsh.

DISTRIBUTION

Global range

Short-eared Owls have one of the largest ranges among owls, breeding in open habitats across the North Temperate zone, in South America, and a large number of Oceanic islands including the Greater Antilles, the Galapagos archipelago, and Hawaii. Although the breeding range in North America is broad (Figure 1), the species occurs irregularly within this range, settling to breed in suitable unforested habitats with concentrations of small mammals.

Canadian range

In Canada, Short-eared Owls breed in all provinces and territories, but are most common in the Prairie provinces (AB, SK, MB) and along the arctic coast. During winter, the species is a regular resident in open habitats along the extreme southern British Columbia coast and in southern Ontario, an occasional resident in coastal areas of Atlantic Canada, and also occurs sporadically in the Prairie provinces where the number of wintering individuals fluctuates strongly among years.

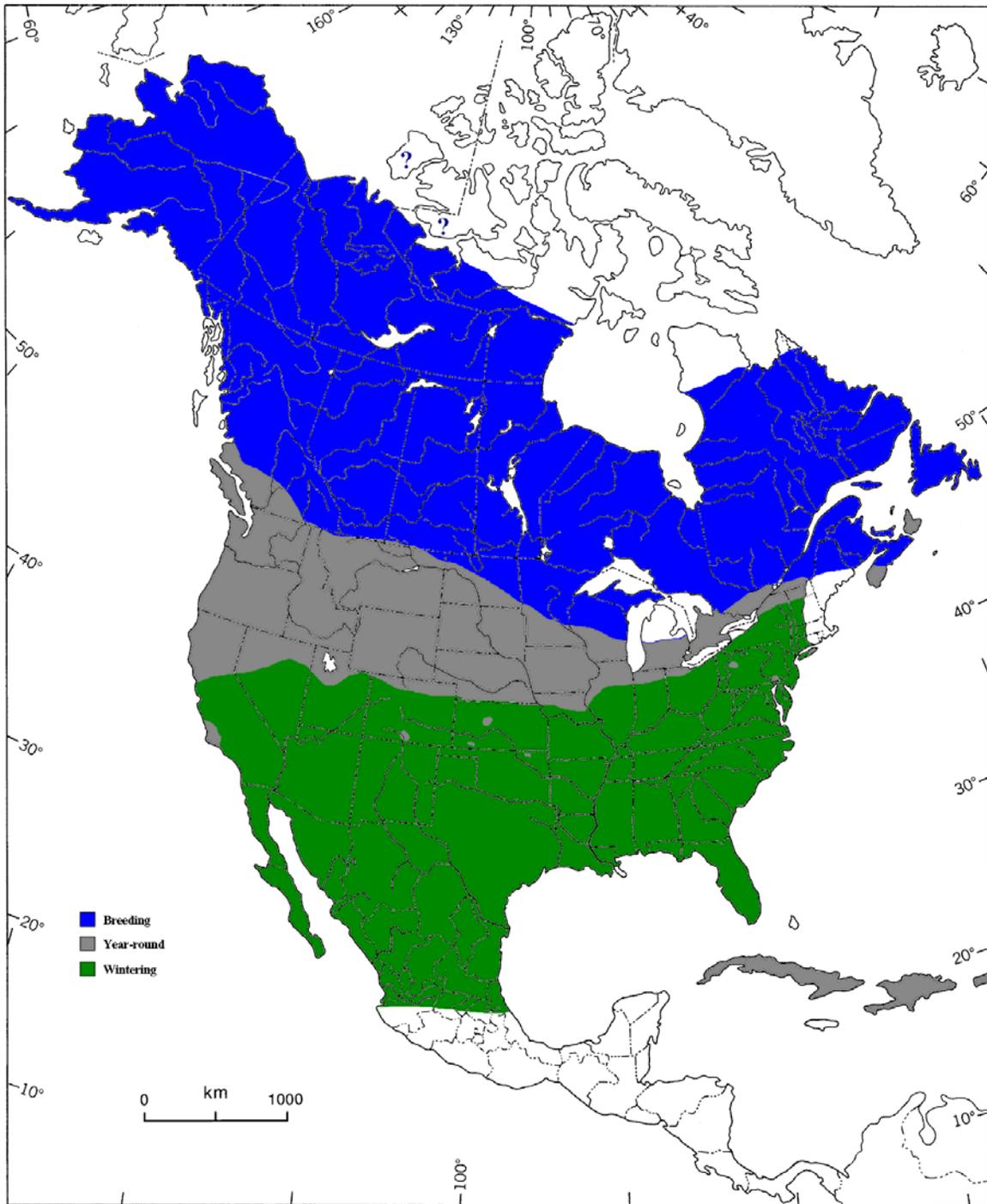


Figure 1. Range of the Short-eared Owl in North America (Modified from Wiggins *et al.* 2006). Note that within the broad range depicted, Short-eared Owls are highly nomadic, nesting and wintering in areas with local outbreaks of *Microtus* voles and other small rodents, and largely avoiding forested areas. Short-eared Owls are absent from forested and mountainous areas of the map.

The species' current regional distribution within Canada is as follows:

Yukon Territory – The Short-eared Owl is an uncommon summer resident and migrant in the Yukon, with strong fluctuations in the number of breeding pairs from year to year (Sinclair *et al.* 2003). Breeding has been documented along the coastal plain and inland tundra areas, with observations during summer suggesting that they may also breed at scattered sites in the southern Yukon. Fall migration occurs from late August to late October (Sinclair *et al.* 2003, C. Eckert, pers. comm.).

Northwest Territories – Although they may breed in suitable habitat throughout the Northwest Territories, Short-eared Owls are most commonly found breeding on coastal tundra habitat (www.nwtwildlife.rwed.gov.nt.ca/Publications/speciesatriskweb/shortearedowl.htm).

Nunavut – As in the Northwest Territories Short-eared Owls are widely distributed in Nunavut, with higher concentrations in coastal tundra areas during years of lemming outbreaks.

British Columbia – The breeding range includes the Fraser River valley in the lower mainland, the Okanagan Valley north to the Thompson-Chilcotin region, and the Peace River lowlands in the northeast (Campbell *et al.* 1990). Summer records from the Stikine River valley and the Chilkat Pass area suggest at least occasional breeding in the northwestern portion of the province. Wintering birds are largely restricted to the Lower Mainland and southern interior valleys.

Alberta – The breeding range includes most of the grassland region of the southwest, the parklands, and the Peace River region (Semenchuk 1992). Scattered summer records also suggest breeding in suitable (open) habitat in the southern boreal forest region. Winter records are largely restricted to the grasslands region and are highly variable among years.

Saskatchewan – Recent atlas work documented widespread breeding across southern and central portions of the province, with a few scattered summer records north into the boreal forest zone (Smith 1996). During winter, Short-eared Owls are occasionally found north to the southern fringe of the boreal forest.

Manitoba – Short-eared Owls were formerly common breeders in the southern third of the province, noted as abundant in the Portage la Prairie area (Thompson 1891). They are now noted as erratic breeders on the northern tundra and in open habitats in the southern portion of the province (Taylor 2003).

Ontario – Preliminary data from the recently updated Ontario Breeding Bird Atlas map (Figure 2; Birds Ontario, unpubl. data) shows breeding records concentrated on the Hudson Bay coastline near Winisk, along the Ottawa River in eastern Ontario, in widely scattered localities elsewhere in southern Ontario, and in the far west of the province in the Rainy River District. In general, the atlas data show a similar distribution

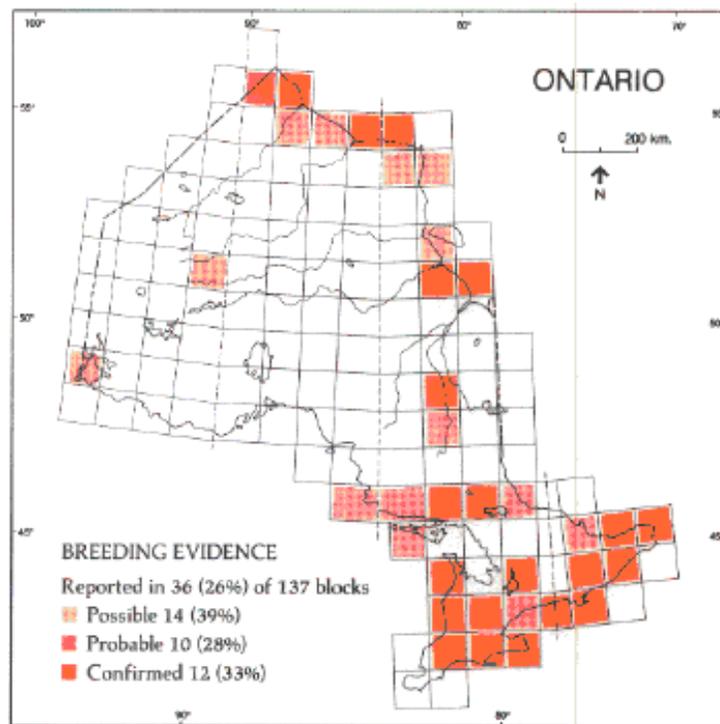
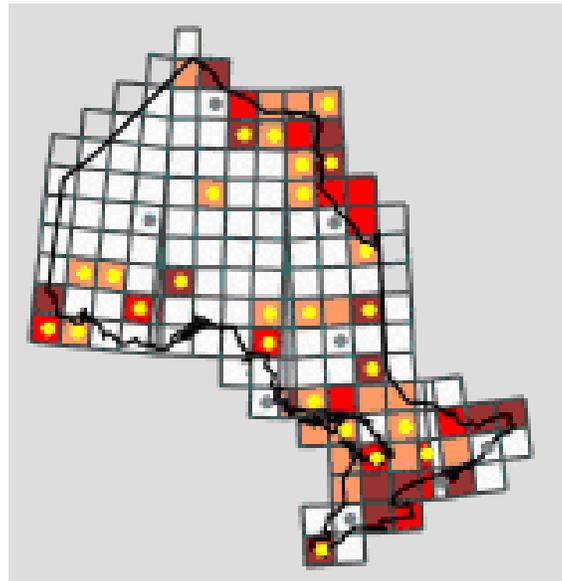


Figure 2. Comparative breeding season distributions of Short-eared Owl in Ontario, based upon recent (2000-2005; upper figure; Birds Ontario, unpubl. data) and 1980s breeding bird atlas records (Cadman *et al.* 1987). In the upper figure, the grEy dots indicate squares in which the species was found in the first atlas project, but not in the second; yellow dots indicate squares in which the species was found during the second atlas and not the first.

between the two periods, although an increase is shown when effort is accounted for. It is important to note that the apparent lack of records from (interior) northern lowland areas is likely the result of reduced survey efforts there, rather than an absence of owls.

Quebec – Although breeding season records exist over most the province, records are concentrated along the St. Lawrence estuary and the Saguenay-Lac Saint-Jean Region in the southwestern portion of the province (Cyr and Larivée 1995, LaGauthier and Aubry 1996).

New Brunswick – All recently confirmed breeding records have been from coastal sites (Erskine 1992). An important historical breeding site is the Tantramar marshes near the New Brunswick/Nova Scotia border (Squires 1952, Erskine 1992).

Nova Scotia – The most recent data available are from the Maritimes Breeding Bird Atlas project, which resulted in relatively few records of Short-eared Owls, including three confirmed breeding records along the coast (Erskine 1992).

Prince Edward Island – The Maritimes Breeding Bird Atlas found three records for Prince Edward Island, two (including one confirmed nesting record) on the northern coast, and one probable breeding record inland (Erskine 1992).

Newfoundland and Labrador – Short-eared Owls are thought to have been widespread breeders in Newfoundland and Labrador, with the vast majority of historical records at coastal sites (Schmelzer 2005). The most recent records in Newfoundland and Labrador come from dedicated Short-eared Owl surveys during July 2003. Only two owls were seen during surveys in Newfoundland, while a total of 11 individuals were seen along the Labrador coast (Schmelzer 2005).

HABITAT

Habitat requirements

Short-eared Owls breed in a large number of open habitats including grasslands, arctic tundra, taiga, bogs, marshes, old pastures, and sand-sage. They also occasionally breed in agricultural fields (Herkert *et al.* 1999), although their breeding success in such habitats is apparently low (Campbell *et al.* 1990, Cadman and Page 1994). In arctic regions, breeding habitat is primarily arctic tundra and estuaries (Sinclair *et al.* 2003). In the Canadian Maritime provinces, Short-eared Owls breed primarily in well-drained grasslands near coastal wetlands (Erskine 1992, Schmelzer 2005). In areas with extensive coastlines, some caution is warranted in summarizing breeding habitat as inland marshes and bogs are less frequently monitored and thus may be under-represented in assessments of breeding habitat (e.g., Gauthier and Aubry 1996).

Preferred nesting sites are areas of dense grassland, as well as tundra with areas of small willows (e.g., at Churchill, Manitoba; Jehl 2004). However, as with habitat selection in general, the primary factor determining Short-eared Owl nest site choice is likely proximity to a reliable source of small mammal prey.

There is some evidence of annual and geographic variation in the degree to which Short-eared Owls defend territories during the breeding season, probably largely dependent on local prey abundance. Pitelka *et al.* (1955) stated that Short-eared Owls in northern Alaska showed little territorial behaviour, and only during the beginning of the nesting cycle. Clark (1975) also found a peak in territorial behaviour during the pre-nesting and early portions of the nesting cycle. In Manitoba, Clark (1975) found that mean territory size was 74 and 121 ha in successive years, with smaller territories during a year of high food abundance.

Trends

The distribution and abundance of Short-eared Owls prior to European settlement is unknown. Based on their current distribution, the main breeding areas were probably the Prairie Provinces, arctic and subarctic tundra/wetlands, and coastal wetlands.

Many regional ornithological studies have concluded that suitable breeding, migration, and wintering habitat has declined significantly in the past century, with consequent reductions in the number of owls (see Holt 1986, Campbell *et al.* 1990, Telfer 1992, Cadman and Page 1994, Smith 1996, Clayton 2000). The primary form of habitat loss occurs when grasslands are converted to agricultural crops (e.g., Smith 1991), but also includes losses due to recreational activities, resort development, and urban expansion (Holt 1986, Campbell *et al.* 1990). These latter three factors are an acute problem at coastal breeding and wintering sites. Grassland habitats also become unsuitable when heavily grazed by livestock (e.g., Fondell and Ball 2004). Telfer (1992) estimated a loss of 39% of the native grasslands throughout the range of the Short-eared Owl in Canadian Prairie Provinces between 1949 and 1986.

Protection/ownership

Outside the arctic coastal regions, the majority of suitable (e.g., grassland, old pastures, coastal wetlands) Short-eared Owl habitat in Canada is under private or Crown/Provincial ownership. Most habitat protection programs are being carried out through voluntary land stewardship programs. Efforts underway in Alberta (Operation Grassland Community) and Saskatchewan (Operation Burrowing Owl) to preserve and enhance grassland habitats are likely having significant positive effects on Short-eared Owls (T. Wellicome, pers. comm.).

Federal land-use incentive programs in Canada (the now defunct Permanent Cover Programs I & II) and the United States (e.g., Conservation Reserve Program, Wetland Reserve Program) have provided greatly increased grassland and wetland habitat coverage, with likely benefits for Short-eared Owls. In the United States, current enrollment in Grassland and Wetland Reserve Programs exceeds 30 million acres of former agricultural land (U.S. Dept. of Agriculture). The Alternate Land Use Services (ALUS) program has recently been implemented in Manitoba and is under consideration in other provinces. ALUS provides incentives for landowners to set aside marginal agricultural land and would therefore be of great benefit to Short-eared Owls. The

recently proposed Conservation Cover Incentive Program (CCIP), which would mimic the CRP program in the United States, would also be highly beneficial to Short-eared Owls by providing breeding and foraging habitat. Finally, programs (e.g., Ducks Unlimited, Prairie Habitat Joint Venture) primarily administered to help breeding and migratory populations of waterfowl are highly beneficial given that wetland sites within grassland areas are also a primary breeding habitat for Short-eared Owls.

BIOLOGY

Reproduction

Short-eared Owls are primarily summer residents in Canada, particularly in arctic regions. South of arctic regions, Short-eared Owls settle on breeding areas from March to May, with egg laying occurring from late April through early June. In the Churchill region, Jehl (2004) notes early June as the period when nests are initiated. There is no information available on which sex chooses the site, but only the female builds the nest (Mikkola 1983), which typically is a simple scrape in the ground, lined by grasses and a few feathers. In wet areas, the nest is often on a small rise or knoll. One egg is laid every 1-2 days, and clutch size averages 7 eggs (range 3-11: Wiggins 2004). Clutch size is positively correlated with local food abundance (Clark 1975). Only a single brood is raised, but a replacement clutch is laid if the first clutch is lost.

Incubation starts once the first egg is laid, which leads to strong hatching asynchrony. Females perform all of the incubation and are fed extensively by their mates during the laying and incubation periods (Lockie 1955, Clark 1975). The incubation period is approximately 27 days, but has been reported to last up to 37 days, possibly depending on local food abundance and the amount of time females spend off the nest hunting (Lockie 1955, Clark 1975). Females brood the nestlings during the early nestling stage and do all the actual feeding of the young. During this period, males provide the majority of the food consumed by the brooding female and nestlings. Once they reach the relatively early age of 14-17 days, and before they can fly, nestling Short-eared Owls typically begin dispersing short distances from the nest, hiding in nearby vegetation.

Survival

Pre-fledging survival of nestlings is relatively high for a ground-nesting species, with most studies (4 of 7) reporting over 50% fledging success (Wiggins 2004). In southern Manitoba, Clark (1974) found 86% hatching success and 46% fledging success. There is no information available on juvenile mortality post-fledging, or on adult survival rates.

Movements/dispersal

In most areas of their North American range, Short-eared Owls are nomadic, settling in areas with plentiful prey (e.g., Poulin *et al.* 2001). Exceptions occur in temperate coastal areas and on islands, where the strong dependence on small mammal populations is tempered by a broadened prey base that includes birds.

In most other areas of the Canadian range, some migration occurs during spring and fall, but it isn't clear to what extent individuals may overwinter at coastal breeding sites. In the Yukon, Short-eared Owls are summer residents, with migration typically peaking in late April and from late August to October (Sinclair *et al.* 2003, C. Eckert, pers. comm.). Recovery of owls banded in British Columbia suggests that many individuals move south to winter along the Pacific coast, although some individuals remained over the winter (Clark 1975). Owls breeding in the Prairie Provinces are thought to move southward in winter, wintering primarily on the U.S. Great Plains (Clark 1975).

Although the same breeding areas may be used from year to year, it isn't known whether the same individuals are involved. There is some degree of natal philopatry on islands, as Holt (1992) found an owl breeding within 5 km of her natal site on an island off coastal Massachusetts.

Interspecific interactions

In many areas of North America, Short-eared Owls are found in habitats used by Northern Harriers (*Circus cyaneus*) and on a few occasions harriers have been observed chasing owls and causing them to drop prey (Clark and Ward 1974). Nonetheless, Clark and Ward (1974) concluded that there was little competition between the two species in Pennsylvania, presumably due to minimal overlap in the timing of foraging. The extent to which competition may be more important at more northerly latitudes (e.g., Canada), where there is greater overlap in foraging schedules, remains unknown.

Predation on eggs and nestlings is likely the most significant source of reproductive failure in Short-eared Owls (Lockie 1955, Pitelka *et al.* 1955). Mammalian predators include foxes, skunks, and feral cats and dogs, while avian predators include Great Horned Owls (*Bubo virginianus*), Snowy Owls (*B. scandiaca*), Red-tailed Hawks (*Buteo jamaicensis*), Rough-legged Hawks (*B. lagopus*), Northern Harriers, Northern Goshawks (*Accipiter gentilis*), Peregrine Falcons (*Falco peregrinus*), Herring Gulls (*Larus argentatus*), *Stercorarius* jaegers (I. McDonald, pers. comm.), and Common Ravens (*Corvus corax*). As nest predation may be more common in fragmented habitats (Johnson and Temple 1986), habitat degradation and fragmentation is often cited as a significant factor in the decline of Short-eared Owls in Canada (e.g., Campbell *et al.* 1990, Cadman and Page 1994).

Behaviour/adaptability

Disturbance – In general, Short-eared Owls prefer to nest in habitats (e.g., arctic tundra, wetland fringes, extensive grasslands) that are not prone to extensive human disturbance. They are apparently sensitive to human disturbance during the laying or incubation stages, as females typically desert the nest if disturbed during this period (Leasure and Holt 1991). However, in some areas they will nest in a mosaic of grassland, abandoned fields, and row crops in close proximity to agricultural activities such as haying, mowing, and livestock grazing.

Food/foraging – Although their diet is often comprised largely of *Microtus* voles, Short-eared Owls feed on a variety of small mammals including shrews (*Blarina* and *Sorex* spp.), pocket gophers (*Thomomys*), mice (*Peromyscus*), kangaroo rats (*Dipodomys*), and lemmings (Holt 1993). Holt (1993) summarized diet studies from across North America and found that small mammals typically make up over 75% of the diet. In coastal areas, their diet is more varied and more often includes small birds. Foraging is particularly intensive at dusk and dawn, presumably when prey species are most active.

The species' ability to cue in on local food sources makes them relatively flexible in breeding and wintering habitat choice, with birds (often temporarily) settling into previously unused areas that support large small mammal populations.

POPULATION SIZES AND TRENDS

Search effort

Population trend data for Short-eared Owls comes from two primary sources: the Breeding Bird Survey (BBS) and the Christmas Bird Count (CBC). The Breeding Bird Survey monitors populations of breeding birds, but is restricted to areas with roads and volunteer participants. Because of these restrictions, the BBS only has sufficient sample sizes in the southern part of the Short-eared Owl's range and its results must therefore be viewed with caution. The Short-eared Owl's wintering range is well covered by the CBC, however; about 2000 of these counts are done annually across North America. While most owls are poorly monitored by both the CBC and BBS because of their nocturnal habits, the Short-eared Owl is largely diurnal and relatively conspicuous. The Ontario Breeding Bird Atlas also provides a way to measure changes in range between the first atlas in 1981-1985 and the second atlas in 2001-2005.

Abundance

The nomadic nature of Short-eared Owls has made quantitative assessment of population trends problematical (Cadman and Page 1994, Clayton 2000). Partners In Flight estimate the global population at 2,000,000, the North American population at 700,000 and the Canadian population at about 350,000 (http://www.rmbo.org/pif_db/laped/query.aspx). In the Maritime Provinces, Erskine (1992) estimated a total of 100 breeding pairs, with some fluctuation in numbers between years. The estimated provincial totals were 60 pairs in New Brunswick, 10 pairs on Prince Edward Island, and 30 pairs in Nova Scotia (Erskine 1992).

Trends

In the northeastern United States, Short-eared Owls are now considered endangered (at the state level) in several states and are no longer found as a breeding species in many historical portions of the species' range (Holt 1986, Holt and Melvin

1986). In Canada, Short-eared Owls have declined significantly in abundance in the southern part of the breeding grounds since long-term survey work began in the late 1960s (Figure 3).

Data collected on Canadian Breeding Bird survey routes (Table 1, Downes and Collins 2007) suggest a continuing decline across southern Canada. A better perspective on the trend in Short-eared Owl numbers is to view the overall trend data in Canada from the late 1970s until 2006 (Figure 3). Although the number of Short-eared Owls appears more or less “stable” during recent years, the overall abundance is very low and has declined significantly since the 1970s.

Table 1. Results of Breeding Bird Survey data for Short-eared Owls in Canada.
In column P (statistical significance): * = p<0.05.

Region	1968-2006			1968-1985 trends			1986-2006 trends			1996-2006 trends		
	Trend	P	N	Trend	P	N	Trend	P	N	Trend	P	N
Canada	-6.3	*	134	-14.0	*	69	3.1		86	-1.7		70
Alberta	-8.8	*	50	-11.9		26	-2.0		37	-4.7		33
Saskatchewan	-8.6		34	-15.2		22	-1.8		15	-		-
Manitoba	-14.0		18	-		-	-		-			-

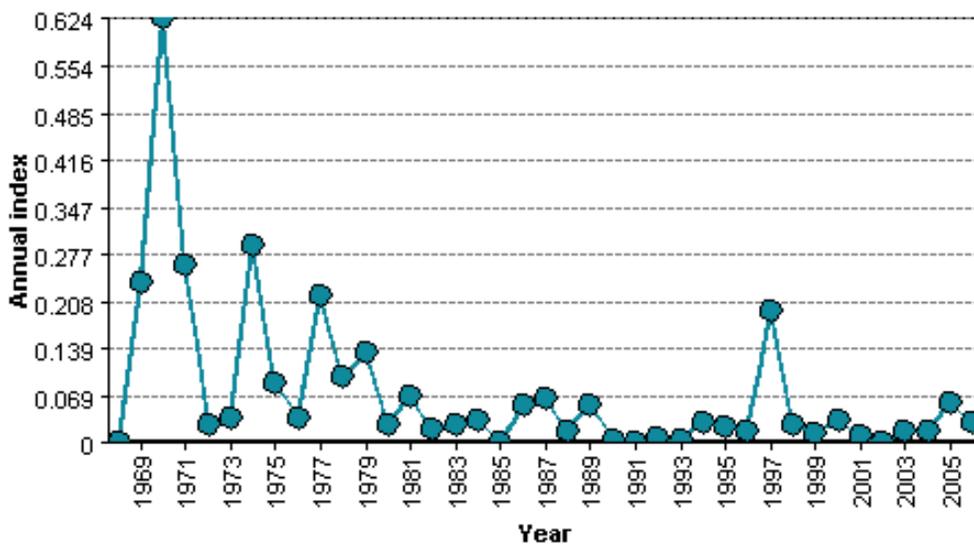


Figure 3. Annual population indices for Short-eared Owl from Breeding Bird Survey data from Canada, 1968 to 2006 (Downes and Collins 2007: www.cws-scf.ec.gc.ca).

Data from the U.S. Breeding Bird Survey (Sauer *et al.* 2007) suggest that Short-eared Owls have undergone a significant, long-term population decline in Montana (-7.4%/year since 1980), but have remained stable in North Dakota and Washington. For the United States overall, the trend from 1980-2006 was a decline of -3.7%/year ($P = 0.07$).

A recent analysis of Christmas Bird Count data found a significant annual decline of 3.07% over the past 40 years. Since a high proportion of these birds are likely from Canadian breeding populations, this is likely a good estimate of the Canadian population trend. This translates into a total decline of 27% over the past 10 years. Christmas Bird Count data from the United States are graphed in Figure 4. CBC results also show a steep decline in the numbers of Short-eared Owls wintering in British Columbia (Figure 5).

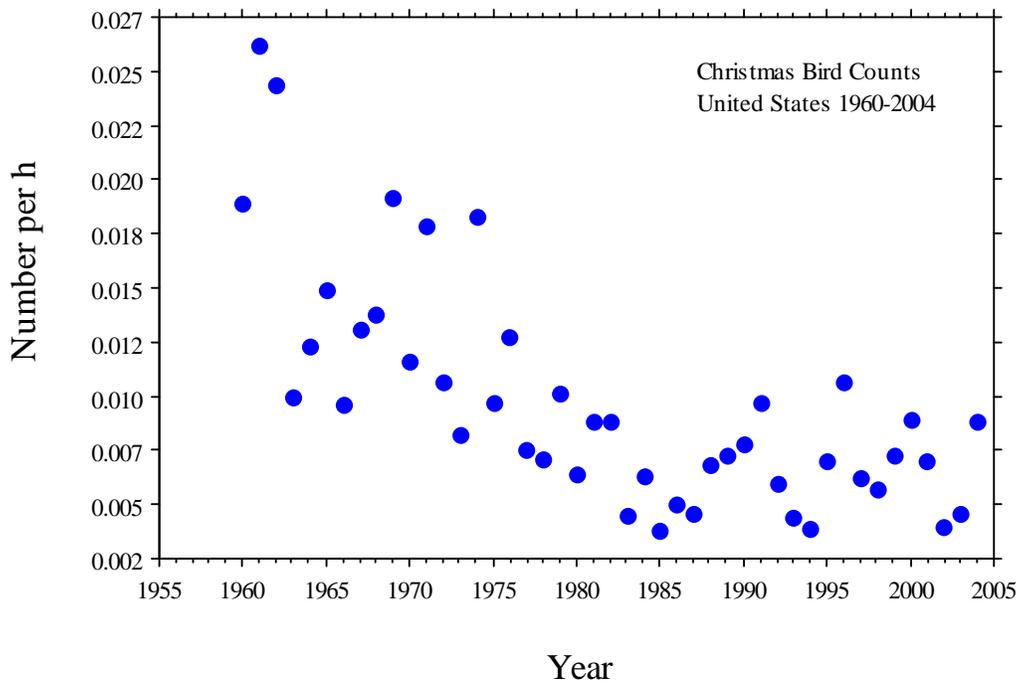


Figure 4. Long-term trend in the number of Short-eared Owls seen on Christmas Bird Counts in the United States. The negative correlation is significant (Spearman rank correlation: $r_s = -0.72$, $P < 0.001$).

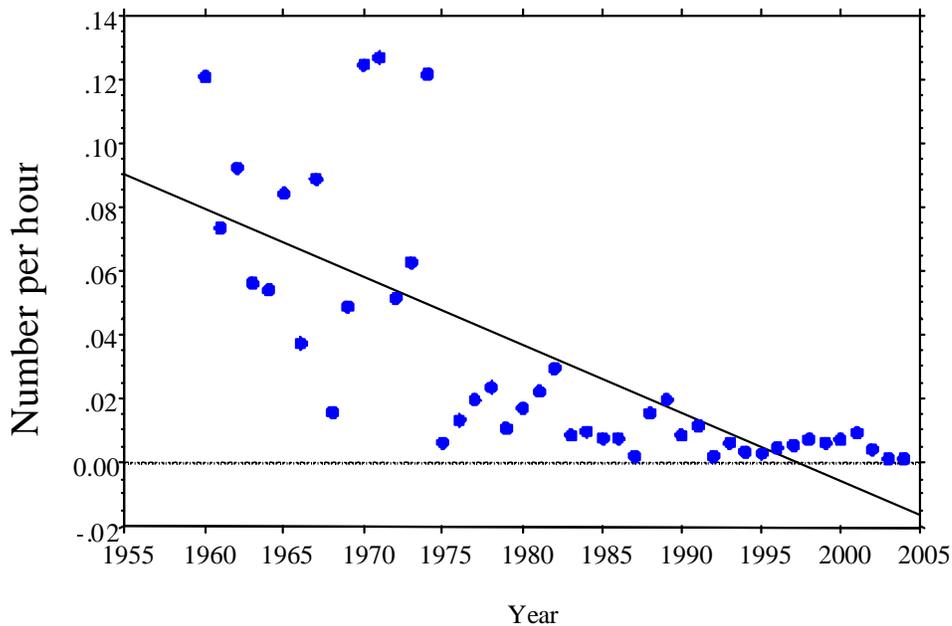


Figure 5. Temporal pattern of abundance of Short-eared Owls on Christmas Bird Counts in British Columbia from 1960 to 2004. As can be seen from the relatively high numbers of owls on counts during the 1960s and early 1970s, the Fraser River delta (where most of these sightings come from) was once a major wintering area for Short-eared Owls. The decline is statistically significant (linear regressions, $Y = 4.256 - 0.002X$, $R^2 = 0.538$, $P < 0.001$).

Yukon Territory

The Short-eared Owl is an uncommon summer resident and migrant in the Yukon, with strong fluctuations in the number of breeding pairs from year to year (Sinclair *et al.* 2003). Breeding has been documented along the coastal plain and inland tundra areas, while observations during summer suggest that they may also breed at scattered sites in the southern Yukon. There are currently no long-term data available on population trends.

Northwest Territories

No population status or trend information available.

Nunavut

No population status or trend information available.

British Columbia

Short-eared Owls are currently listed as Vulnerable in British Columbia due to a declining population trend. The (historically) relatively high density of wintering and breeding Short-eared Owls on the Fraser River delta make the area the most amenable

in Canada for analysis of long-term population trends. Campbell *et al.* (1990) suggested that habitat loss and degradation was responsible for a long-term and dramatic decline in the number of wintering (Figure 5) and breeding owls.

Alberta

Numbers have been very low since 1990, with the exception of 1997, which was a high vole year on the southern Prairies (Clayton 2000, Poulin *et al.* 2001). Clayton (2000) concluded that, despite the difficulty in accurately tracking Short-eared Owl population trends, the available data were suggestive of a significant decline in abundance over the past 30 years.

Saskatchewan

Smith (1996) suggested that Short-eared Owls have declined in abundance and are now generally rare breeders in the province, with the exception of the Last Mountain – Quill lake area where they are still “fairly common”.

Manitoba

Short-eared Owls been observed only rarely on surveys since 1980 and the species is now considered an “occasional breeder” in the province (Taylor 2003).

Ontario

Although quantitative information is lacking, several authors have suggested that abundance is much lower now in southern Ontario than in the mid-1900s (Hunt 2004). At Point Pelee National Park, the status of Short-eared Owls appears to have changed from circa 1900, when it was considered common in the Park (Taverner and Swales 1907, 1908), to uncommon but regular (Wormington 2006, A. Wormington, pers. comm.). Cadman and Page (1994) concluded that the status of Short-eared Owls had changed from a common breeding species and migrant in the early 1900s, to a rare breeder and uncommon migrant ca. 1990. In the Lake St. Clair area, the mix of marshland and tallgrass prairie supported a few (apparent) breeding pairs, but in some years up to 100 wintering owls (Wood 1949). This area is now under heavy agricultural use with fewer observations of Short-eared Owls in recent years. Thus, in addition to the apparent declines in the abundance of breeding birds in southern Ontario, the strong decline in the number of fall migrants observed in southern Ontario also suggests that the number of breeding birds may have declined in northern Ontario as well. The Ontario Breeding Bird Atlas (Cadman *et al.* 2008) shows a strong increase in the number of atlas squares occupied between 1985 (84 squares) and 2005 (158 squares); this increase is due to population or distribution changes in northern Ontario.

Quebec

There are insufficient data for estimating trends of Short-eared Owl abundance in Quebec, especially northern areas. Surveys in the 1990s suggest the largest concentration of summering birds occurs along the St. Lawrence River estuary in the southern portion of the province (Gauthier and Aubry 1996).

New Brunswick

Nocturnal owl surveys in 2001 detected no Short-eared Owls, but this was not surprising given that survey routes were largely in forested habitat (Whittam 2001). The most recent atlassing work suggested a total of approximately 60 breeding pairs in New Brunswick (Erskine 1992).

Nova Scotia

There are no long-term BBS data available for Nova Scotia. Erskine (1992) estimated an annual total of 30 breeding pairs in the province.

Prince Edward Island

There are no long-term population data available for Prince Edward Island, but a decrease in the amount of open habitat on the island (from approximately 70% in 1900 to ca. 45% in 2007; R. Curley, pers. comm., 2007) has probably led to a long-term decrease in the number of breeding pairs. The current (2007) estimate for the maximum number of breeding pairs on the island is five (R. Curley, pers. comm., 2007).

Newfoundland/Labrador

A recent summary of the known historical status in Newfoundland and Labrador concluded that there has likely been little change in the distribution and abundance of Short-eared Owls over the past century (Schmelzer 2005). That is, Short-eared Owls have always been uncommon to rare in coastal grasslands and marshes. Dedicated Short-eared Owl surveys are now being carried out in Newfoundland and Labrador, but the data are not sufficient to estimate recent population status or trends (Schmelzer 2005; Schmelzer pers. comm.).

LIMITING FACTORS AND THREATS

Habitat conversion/degradation has been correlated with population declines of Short-eared Owls in the Fraser River delta of British Columbia (Campbell *et al.* 1990) and has been implicated in declines across the Prairie Provinces (e.g., Smith 1996) and southern Ontario (Hunt 2004). Habitat conversion has probably been negligible in central and northern Canada. Telfer (1992) reported a 39% decline in native pastureland between 1946 and 1986 in the Prairie Provinces. Samson and Knopf

(1994) reported dramatic losses of native grasslands in Alberta (61% of mixed grass prairie), Saskatchewan (81% of mixed grass prairie and 85% of shortgrass prairie), and Manitoba (99% of both tallgrass and mixed grass prairie), as well as further south along the western and central Great Plains. Thus, the extensive loss of native grasslands throughout the central portions of the range have likely had a significant negative impact on Short-eared Owl abundance and population viability.

Widespread and intensive livestock grazing occurs over much of the remaining grasslands on the Canadian prairies and the U.S. Great Plains (Samson and Knopf 1994). Excessive livestock grazing is a direct threat to Short-eared Owl habitat, as relatively tall grasslands are typically preferred nesting areas (e.g., Fondell and Ball 2004). While programs (e.g., Permanent Cover Program in Canada, Conservation Reserve Program in the U.S.A.) aimed at reverting grasslands and agricultural fields to wildlife habitat have no doubt acted to increase the amount of foraging and roosting habitat available to Short-eared Owls, it is unclear how such programs may have affected breeding success.

In areas where Short-eared Owls breed amid crop fields, mowing and harvesting of hay and grains can be a significant source of egg and nestling mortality (e.g., Arroyo and Bretagnolle 1999). Although probably not a significant long-term factor in the species' decline, collisions with vehicles, barbed-wire fences, and utility lines are known to contribute to (largely winter) mortality of adults (Fitzer 1975).

Although elevated levels of DDE and heptachlor epoxide have been found in Short-eared Owl eggs (Peakall and Kemp 1980, Henny *et al.* 1984), no negative effects on owl reproduction have been detected (Cadman and Page 1994). The effects of toxic chemicals on Short-eared Owl prey populations has not been studied. As noted by Cadman and Page (1994), more data on pesticide effects are needed.

Although the extent to which West Nile virus is currently affecting Short-eared Owls is unknown, they are known to contract the virus (Fitzgerald *et al.* 2003).

SPECIAL SIGNIFICANCE OF THE SPECIES

Short-eared Owls were once common residents of prairie habitat in central Canada, and relatively common in grasslands, marshes, and tundra in other areas of North America. In the past century, populations in most parts of the species' range have apparently declined. In much of the northeastern United States, they are typically listed as Endangered at the state level with few breeding pairs remaining.

Despite widespread recognition of significant population declines, there has been little management action directed towards Short-eared Owls.

EXISTING PROTECTION OR OTHER STATUS DESIGNATIONS

The Short-eared Owl was classified by COSEWIC in 1994 as Special Concern (Cadman and Page 1994) and is currently classified as G5 (demonstrably widespread and secure) by NatureServe (2007; www.natureserve.org). However, NatureServe provincial status designations are S1 (Critically imperiled) in Prince Edward Island and Nova Scotia, S3 (Vulnerable) in British Columbia, Alberta, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland/Labrador, S4 (apparently secure) in Saskatchewan and the Yukon, with no ranking in the Northwest Territories or Nunavut. Short-eared Owls are also listed as critically imperiled through much of the northeastern United States (e.g., Massachusetts, Vermont, Maine, Pennsylvania, West Virginia) and vulnerable through much of the rest of the U.S. distribution. Short-eared Owls are also considered a Species of Conservation Concern by the U.S. Fish and Wildlife Service.

Short-eared Owls are protected under the *Migratory Bird Treaty Act* (Federal Register 2006) as well as under a large number of Provincial Wildlife acts (e.g., Ontario *Fish and Wildlife Conservation Act*, and the *Act Respecting the Conservation and Development of Wildlife* in Quebec).

Despite these widespread concerns over the species' decline, there are no management efforts currently underway in the United States, while in Canada, only Newfoundland/Labrador has initiated a management plan (Schmelzer 2005). Some management actions, such as Operation Grassland Community in Alberta and Operation Burrowing Owl in Saskatchewan are probably indirectly benefiting Short-eared Owls by increasing habitat quantity and quality, as well as increasing landowner awareness of the problems facing grassland wildlife.

TECHNICAL SUMMARY

Asio flammeus

Short-eared Owl

Hibou des marais

Range of Occurrence in Canada: All jurisdictions.

Extent and Area information	
<ul style="list-style-type: none"> extent of occurrence (EO)(km²) (from Partners in Flight Database) 	ca. 7,500,000 km ²
<ul style="list-style-type: none"> specify trend (decline, stable, increasing, unknown) 	Stable
<ul style="list-style-type: none"> are there extreme fluctuations in EO (> 1 order of magnitude)? 	No
<ul style="list-style-type: none"> area of occupancy (AO) (km²) guesstimate based on habitat availability 	ca. 1,500,000 km ²
<ul style="list-style-type: none"> specify trend (decline, stable, increasing, unknown)—assumed based on population decline 	Decline
<ul style="list-style-type: none"> are there extreme fluctuations in AO (> 1 order magnitude)? 	Probably not
<ul style="list-style-type: none"> number of extant locations 	Not applicable
<ul style="list-style-type: none"> specify trend in # locations (decline, stable, increasing, unknown) 	Not applicable
<ul style="list-style-type: none"> are there extreme fluctuations in # locations (>1 order of magnitude)? 	Not applicable
<ul style="list-style-type: none"> habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat 	Habitat loss occurring in southern parts of Canadian range
Population information	
<ul style="list-style-type: none"> generation time (average age of parents in the population) (indicate years, months, days, etc.) 	2 years
<ul style="list-style-type: none"> number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values) from Partners in Flight estimates, based on Breeding Bird Survey and other data sources. Other estimates have been much lower (10,000-40,000). 	Ca. 350,000
<ul style="list-style-type: none"> total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals 	Declining
<ul style="list-style-type: none"> if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period) 	27% over 10 years (Christmas Bird Count data)
<ul style="list-style-type: none"> are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)? 	Probably not
<ul style="list-style-type: none"> is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)? 	No
<ul style="list-style-type: none"> list each population and the number of mature individuals in each 	
<ul style="list-style-type: none"> specify trend in number of populations (decline, stable, increasing, unknown) 	
<ul style="list-style-type: none"> are there extreme fluctuations in number of populations (>1 order of magnitude)? 	
Threats (actual or imminent threats to populations or habitats)	
<ul style="list-style-type: none"> -Loss and degradation of wintering habitat -Loss and degradation of breeding habitat in southern Canada -Pesticide use 	

Rescue Effect (immigration from an outside source)	Moderate
• <i>does species exist elsewhere (in Canada or outside)?</i>	Yes
• <i>status of the outside population(s)?</i>	Declining
• <i>is immigration known or possible?</i>	Yes
• <i>would immigrants be adapted to survive here?</i>	Yes
• <i>is there sufficient habitat for immigrants here?</i>	Unknown
Quantitative Analysis	Not done
Current Status COSEWIC: Special Concern (April 1994 and April 2008)	

Status and Reasons for Designation

Status: Special Concern	Alpha-numeric code: not applicable
<p>Reasons for Designation: This owl has suffered a continuing population decline over the past 40 years, including a loss of 23% in the last decade alone. Habitat loss and degradation on its wintering grounds are most likely the major threat, while continuing habitat loss and degradation on its breeding grounds in southern Canada and pesticide use are secondary threats. This species nearly meets the criteria for Threatened status.</p>	
<p>Applicability of Criteria</p>	
<p>Criterion A: (Declining Total Population): Decline in last 10 years (23%) is too low to meet criterion for Threatened.</p>	
<p>Criterion B: (Small Distribution, and Decline or Fluctuation): Distribution too large.</p>	
<p>Criterion C: (Small Total Population Size and Decline): Population too large.</p>	
<p>Criterion D: (Very Small Population or Restricted Distribution): Population and distribution too large.</p>	
<p>Criterion E: (Quantitative Analysis): Not done.</p>	

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Authorities consulted

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BIOGRAPHICAL SUMMARY OF REPORT WRITER

David Wiggins is an ornithologist working in Sweden and North America. He completed an undergraduate degree at the University of Oklahoma, a Master's degree at Brock University (on parental care in Common Terns, under Ralph Morris), a Ph.D. at Simon Fraser University (on quantitative genetics in Tree Swallows, under Nico Verbeek), and a post-doctoral fellowship at Uppsala University in Sweden (on life-history evolution in Collared Flycatchers). David has since worked as a Research Ecologist within the Danish Environment Ministry, and is currently a consultant to the US Forest Service, working with avian conservation projects in the western United States.