

SHORT-EARED OWL

TAXONOMY

Scientific name: *Asio flammeus* (Pontoppidan, 1763)

Common name: Short-eared Owl

Family: Strigidae

Taxonomic comments:

The genetic distance (based on allozyme data) between *A. otus* and *A. flammeus* is unusually large for congeneric bird species; further study of their phylogenetic relationships is warranted. Eight or nine subspecies, of which five or six are island endemics. *A. f. flammeus*, the nominate form, is the only subspecies recognized in North America (Holt and Leasure 1993).



DESCRIPTION

Basic description: A medium-sized owl.

General description:

A medium-sized owl. Published lengths range from 37-39 cm (Cramp 1985) to 34-42 cm (Mikkola 1983), with females slightly larger than males and considerably heavier, averaging 411 g compared to 350 g for males (Mikkola 1983). Excellent flyers with long wings (95-110 cm; Cramp 1985), and light wing-loading (0.333 g/cm²; Clark 1975). There is little difference in wing length between the sexes (Clark and Ward 1974).

The back and upper wing surfaces are tawny brown to buff-colored with heavy but indistinct streaking. The ventral surfaces are much lighter, with bold, vertical brown streaking on the breast; belly is pale, lightly streaked; wings are long and have a buffy patch beyond the wrist above and a dark patch at the base of the primaries below; dark facial disc contrasts with yellow eyes; legs and feet are feathered (National Geographic Society 1983). Mature males are bright white on the underwing, while mature females show somewhat more buff coloration (Bent 1938, Village 1987). It is, nonetheless, difficult to sex or age these birds in the field. Females are generally darker than males but young birds are also darker than older ones (Mikkola 1983), thus a young male may be darker than an old female. Both sexes have a distinct, black carpal bar and dark wingtips. Juveniles possess full adult plumage by October of the first year (Bent 1938, Cramp 1985).

The facial disc is circular and whitish with dark areas around the bright yellow eyes. Recently fledged and juvenile owls show much darker coloration overall and a much darker facial disc which whitens with age. The owl gets its common name from the small ear-tufts over the eyes; these are part of the facial disc and are erected when the bird is annoyed or alert. They may aid in making birds more cryptic when in vegetation by breaking the line of the circular facial disc.

Length (cm): 42

Weight (g): 411

Reproduction:

See Johnsgard (1988) for egg dates (timing of nesting varies with latitude and prey abundance). Often only the oldest chicks survive.

Courtship and territorial defense: Wing-clapping, exaggerated or deep wing-beats, and skirmishing are three displays seen predominantly during the breeding season (Lockie 1955, Clark 1975). Generally begins courtship in mid- to late March on Nantucket Island along the coast of Massachusetts (Holt and Melvin 1986, Tate and Melvin 1987, 1988). Courtship has been reported as occurring in mid-March in Montana (Dubois 1924) and as early as late February in Jefferson County, New York. Pitelka et al. (1955) reported initial courtship activity in the first week of June at Barrow, Alaska. Unpaired males may engage in courtship flights well into the breeding season (Clark 1975). The breeding season is often reported to commence in direct relation to vole abundance with a larger prey population yielding an earlier start to breeding activities (Randall 1925, Snyder and Hope 1938, Lockie 1955, Mikkola 1983).

Nesting: Depending on latitude, nesting activities generally begin in late winter to early spring across the owl's distribution. Timing of nesting may be correlated with latitude and prey abundance (Mikkola 1983, Cramp 1985). The nesting cycle from nest initiation to fledging of young takes approximately seven to nine weeks in temperate zones lasting from mid-March to mid-September in the Northeast Region.

Unlike most owls that nest in holes or take over the abandoned nests of crows or other birds, the Short-eared Owl is unique within its family (Strigidae) in building a simple nest on the ground. The female makes a small scrape in the ground with her body and lines it with nearby material. Nests may be lined with grass, leaves, twigs or feathers (Bent 1938, Clark 1975). Generally between four and nine eggs are laid, and sometimes more (Bent 1938), although Mikkola (1983) reported a range of two to 13 from 121 European records. Pitelka et al. (1955) reported a range in clutch size of four to eight with a mean of 6.3 from 22 nests in Alaska.

Females may renest if the nest is destroyed or depredated (Lockie 1955, Mikkola 1983), although Pitelka et al. (1955) saw no evidence of renesting by Short-eared Owls in Alaska; this was apparently tied to the shorter season.

Witherby et al. (1938) reported an incubation period of 24-28 days in temperate zones. With data from six eggs in four nests, Pitelka et al. (1955) reported an incubation period for Barrow, Alaska, ranging from 26-37 days (mean = 30). He saw no evidence that incubation takes longer there than at lower latitudes. Fledging has been reported variously at 24-27 days (Witherby et al. 1938) and 31-36 days (Urner 1923). Age of first breeding is reported as one year or less (Mebs 1966, cited by Mikkola 1983, Glutz von Blotzheim and Bauer 1980).

Ecology:

Somewhat gregarious in winter; groups may gather where prey is abundant (National Geographic Society 1983, Tate 1992). Local abundance varies with vole abundance. In the winter, Short-eared Owls congregate at sites that provide good foraging (Craighead and Craighead 1956). Congregations of up to 200 birds have been reported (Bent 1938). Assemblage sites usually provide shelter and are within or adjacent to hunting areas (Clark 1975). Reported average home range size:

15-200 ha. In coastal Massachusetts, 10 territories averaged 64 ha (48-126 ha) (Holt 1992). In Manitoba, mean size of five territories was 73.9 hectares (Clark 1975).

Avian predation is known from: Great Horned Owl (*Bubo virginianus*), Snowy Owl (*Nyctea scandiaca*), Peregrine Falcon (*Falco peregrinus*), and Marsh Harrier (*Circus aeruginosus*) (Clark 1975). Northern Harrier, American Crow (*Corvus brachyrhynchos*), and European Kestrel (*Falco tinnunculus*) have been known to steal prey from Short-eared Owls (Village 1987, Tate 1991).

Migration:

Breeding populations throughout Alaska, most of Canada, and north-central U.S. move south for winter. Somewhat nomadic. Arrives in northern breeding areas mid-May to early June (Johnson and Herter 1989). Migration patterns are not well known. In North America the movement is mostly from Canada and Alaska as far south as the southern U.S. and even Mexico (Cramp 1985). Toward the central part of the species' range (temperate zones) owls are seen year-round. Because breeding birds move south in fall and winter and are replaced by migrants from more northerly areas, Clark (1975) suggests that separate populations may occupy these areas during different seasons.

It is also possible that the owl migrates only in search of food and therefore may remain year-round in an area that provides sufficient resources. The owl congregates in areas where prey is plentiful (Bent 1938, Mikkola 1983) and may migrate accordingly. This feature of the biology has earned it a reputation as an "irregular migrant," or as "nomadic," "irruptive," or "vagrant" (Clark 1975, Mikkola 1983).

Food:

Eats mainly rodents (commonly *Microtus*); also regularly other small mammals, small birds (especially in coastal areas), and insects (Terres 1980). Forages primarily by flying low, typically into wind, and dropping down onto prey, sometimes after brief hover. Sometimes caches food. Sibling cannibalism may occur among nestlings.

In Wrangell, Alaska, microtines accounted for 93% of prey items (*M. pennsylvanicus* accounting for 71%) and birds, including a Rufous Hummingbird (*Selasphorus rufus*) and a Blue Grouse (*Dendragapus obscurus*) accounted for 4% (Hughes 1982).

Phenology:

Circadian, crepuscular and diurnal. May forage day or night; may favor late afternoon and early evening (Johnsgard 1988). Hunts chiefly at dawn and dusk (National Geographic Society 1983).

Habitat:

Breeding: Broad expanses of open land with low vegetation for nesting and foraging are required. Habitat types frequently mentioned as suitable include fresh and saltwater marshes, bogs, dunes, prairies, grassy plains, old fields, tundra, moorlands, river valleys, meadows, savanna, open woodland, and heathland (Dement'ev et al. 1951, Clark 1975, Mikkola 1983, Holt and Melvin 1986). In general, any area that is large enough, has low vegetation with some dry upland for nesting, and that supports suitable prey may be considered potential breeding habitat, although many will not have breeding Short-eared Owls. Nests on ground, generally in slight depression

(Terres 1980), often beside or beneath a bush or clump of grass. Many nests are near water but are generally on dry sites.

Non-breeding: Suitable breeding habitat may also be occupied by wintering birds. Short-eared Owls tend to congregate and roost communally in the winter (Banfield 1947, Craighead and Craighead 1956, Clark 1975), often in sheltered sites near hunting areas. Winter roosts have been reported in abandoned dumps, quarries, gravel pits, storage yards, stump piles, old fields, small evergreen groves, brush thickets, and dunes (Clark 1975, Bosakowski 1986). May also roost directly on the ground in tall grasses, possibly choosing vegetation of a coloration that blends with their plumage (Craighead and Craighead 1956).

STATUS

Global rank: G5 (1996-11-27)

Global rank reasons:

Secure due mainly to extensive range; declining in some areas; trends are uncertain in many areas.

State rank: S4S5B (2004-8-14)

State rank reasons:

Relatively secure in the state due to widespread distribution, common occurrence, and low degree of threat. However, overall population status unknown. Greatest threats probably occur on wintering range outside of Alaska.

DISTRIBUTION AND ABUNDANCE

Range:

Global range:

Breeding: In North America from northern Alaska to northern Labrador, south to California, Utah, Colorado, Missouri, Illinois, Ohio, and Virginia. In Eurasia from Iceland, British Isles, Scandinavia, northern Russia, and northern Siberia south to southern Europe, Afghanistan, northern Mongolia, the northern Kurile Islands, and Kamchatka. Also in the Hawaiian Islands, Caroline Islands (Ponape), and Greater Antilles (Cuba, Hispaniola, Puerto Rico) (AOU 1983). More numerous in western and central North America than in eastern North America. Breeds in small numbers in every province and territory in Canada (Cadman and Page 1994). In the northeastern US, currently nests in Vermont, New York, Massachusetts, and Pennsylvania (Tate 1992).

Non-breeding: Mostly from the southern parts of most Canadian provinces south to southern Baja California, southern Mexico, Gulf Coast, Florida. Also in Hawaii (resident on all main islands), Greater Antilles (uncommon in Puerto Rico, including Isla Culebra). In Old World from breeding range south to northwestern Africa, Mediterranean region, Ceylon, southern China, and Japan (AOU 1983).

State range:

Breeding: Widespread throughout the state in open lowland habitat. Common breeder in north, northeast and interior parts of the state; noted at Barrow, the Colville River delta, Prudhoe Bay, Arctic National Wildlife Refuge, the Yukon North Slope and Mackenzie delta as a common visitor and common breeder in years when prey is abundant (Pitelka et al. 1955, Johnson and Herter

1989). On the western coast observed breeding near Kotzebue Sound, Nome, and Unalaska Island; and on the Aleutian Islands, Shumagin Islands, and Kodiak Island (Gabrielson and Lincoln 1959). Also considered a common breeder in interior Mt. McKinley District (Gabrielson and Lincoln 1959). Occurrence in Southeast is generally during migration – breeding and wintering is rare (Gabrielson and Lincoln 1959, Hughes 1982).

Non-breeding: A few owls may winter in the southern part of Alaska, but most migrate further south (Gabrielson and Lincoln 1959).

Abundance:

Global abundance:

In the mid-1980s, estimated number of breeding pairs in the northeastern U.S. was less than 55 (see Tate [1992] for information on status in particular states). Estimated number of breeding pairs in Canada in the early 1990s was 20,000-40,000 (Kirk et al. 1995). Estimates from other regions are unknown. Analysis of North American Breeding Bird Survey (BBS) data for 1966-2003 resulted in average observed abundances of 0.18 birds/route survey-wide, 0.13 birds/route in Canada, and 0.2 birds/route in the U.S. for this species (Sauer et al. 2004).

State abundance:

Common breeder. The nomadic nature of this species make them difficult to census (Holt and Leasure 1993). Furthermore, populations fluctuate significantly with prey population cycles. The extreme variability of small mammal numbers in the north causes marked spatial and temporal differences in owl numbers. Due to this variability and overall general lack of data, no estimate for Short-eared Owls in Alaska is available (USFWS 2000). Analysis of North American Breeding Bird Survey data for 1966-2003 resulted in an average observed abundance of 0.16 birds/survey route in Alaska (Sauer et al. 2004).

Childs (1969) estimated breeding densities of about 0.8 birds/km² in northwestern Alaska, while Derksen and Rothe (1978) found 0.03 birds/km² on measured plots in the same region. Considered a common visitor and breeder, especially in northern Alaska. More abundant in areas such as the Arctic National Wildlife Refuge, Yukon North Slope and Mackenzie River delta when prey such as voles and lemmings are especially abundant (Pitelka et al. 1955, Johnson and Herter 1989).

Trends:

Global trend:

As of the early 1990s, reported as declining in many parts of the range (Ehrlich et al. 1992). Christmas Bird Count data indicate a significant decline in North America between 1960 and 1989. Breeding Bird Survey data indicate a significant, long-term decline in much of North America between 1966 and 1989, though the population trend is unknown in remote northern Canada (Cadman and Page 1994 COSEWIC report). Analysis of North American Breeding Bird Survey results for 1966-2003 showed a survey-wide decline of -4.3%/year (P=0.01; Sauer et al. 2004). The estimated 1980-2003 trend for Canada was -9.7%/year (P=0.07) and in the U.S. was -4.3%/year (P=0.03; Sauer et al. 2004). Kirk and Hyslop (1998) estimate 20-40,000 Short-eared Owls in Canada and consider all data they reviewed to indicate the population is in a long-term decline. Erratic population fluctuations make trend detection difficult.

North America: Bent (1938) first noted diminishing numbers, and attributed this to shooting. Although never an abundant breeder in the Midwest, apparently in decline in this region. Various observers relate the decline to loss of habitat, specifically loss of native prairies. Throughout the Midwest, more commonly seen during migration and in winter. In southern Ontario, limited in distribution as a breeder and has declined during this century (Cadman et al. 1987). This decline may be related to the loss of wetlands to agriculture and housing developments. May be more abundant in northern Ontario (Cadman et al. 1987). Breeding occurs along the coasts of Hudson and James Bays and in some southern agricultural areas. Numbers of breeding owls appear to fluctuate considerably in the Maritime Provinces of Canada. Such fluctuations have led to the conclusion that numbers of breeders are no more or less abundant than in the past in this area.

In the Great Plains states and into southern Canada and westward this species is still an abundant nester where there is suitable habitat. However, in some western areas, local and regional declines have been noted; it is a rare and local breeder in Kansas where it was formerly more common; in California the owl is now absent as a breeder from many former nesting locations, particularly along the southern coast. This decline, as with others, is tied to destruction of habitat; in California, marsh and tall grassland particularly are being lost (Remsen 1978). Remsen (1978) also mentions the owl's vulnerability to shooting as a factor in its decline in California. In more northerly areas, such as northern Canada and Alaska, owls may occur irregularly in relation to the abundance of prey (Pitelka et al. 1955). In the Northeast U.S., this species has never been an abundant breeder. Its numbers, nonetheless, are definitely declining and this decline may be tied to habitat loss (Melvin et al. 1989). Presently, owls are known to nest consistently only in Vermont, New York, Massachusetts, and Pennsylvania (Tate 1992).

State trend:

Sufficient data is lacking, but analysis of North American Breeding Bird Survey data from Alaska for 1966-2003 estimated a slight increase of 4.8%/year (Sauer et al. 2004). Reliable trend estimate is unknown.

EXISTING PROTECTION

Global protection:

See State protection.

State protection:

Protected under the Migratory Bird Treaty since 1972 when raptors were added to the treaty. Raptors are protected and regulated as a game species under Alaska state regulations which prohibit the possession of game without a permit (USFWS 2000). As species occurrence is widespread throughout the state, numerous breeding areas are protected within National Wildlife Refuges and National Parks.

CHALLENGES

Global challenges:

Habitat loss is the greatest concern. Declining in many parts of the range due to destruction and degradation of marshes, grasslands, and low-use pastures (Ehrlich et al. 1992). This may be a result of development, changing land-use patterns (e.g., farmlands to woodlands, or to development),

changing farming practices (e.g., hay fields to row crops), reforestation, wetland loss, or a combination of these factors. Loss of open grasslands to later successional stages of community development reduces available hunting and breeding habitat. Also, vulnerable to mammalian predators, populations of which have been augmented because of human-caused increases in food resources. Prey abundance may be a limiting factor in the owl's distribution and breeding success (Melvin et al. 1989). This owl's reported reliance on microtine rodents emphasizes the specific grassland habitat component (Lockie 1955, Hagen 1969, Clark 1975).

Other factors: Mortality has been reported by collisions or entanglements with trains, cars, aircraft, fencing, and possibly aerial radio antennas and wires, as well as farm machinery destruction of nests (Clark 1975, Campbell et al. 1990). Interspecific competition with Barn Owls (*Tyto alba*) may occur; successful nest box programs to attract barn owls have coincided with declines in Short-eared Owls on Martha's Vineyard and Nantucket Islands, MA (Holt and Leasure 1993).

State challenges:

Habitat loss is probably not as great a threat in Alaska as on wintering grounds; however, development and the disturbance that accompanies it does occur within species' range in the state. However, there is no evidence that habitat loss has yet impacted this species in Alaska (USFWS 2000). Prey abundance may be a limiting factor in the owl's distribution and breeding success (Melvin et al. 1989); fragmentation of habitat can accentuate the magnitude of populations of microtine prey base (Fraser et al. 1999). Short-eared Owl eggs and young may fall prey to various mammalian ground predators such as foxes (*Vulpes spp.*) and mustelids.

RESEARCH AND INVENTORY NEEDS

Global research needs:

Adequate monitoring procedures are needed; many of the present monitoring techniques, such as walking large areas in an attempt to flush sitting females, are labor and time intensive. Furthermore, procedures such as counting birds seen from roadsides may underestimate the number of individuals present. Short-eared Owls are relatively inconspicuous and easily missed. Development and implementation of a standardized population monitoring procedure throughout the Northeast should be a high research priority.

Expanded efforts are needed to locate and study local breeding and wintering populations to (1) accurately determine number of breeding or wintering birds, (2) locate regularly occurring populations which would facilitate long-term ecological studies, and (3) determine more precisely the limiting factors and management needs of these populations.

Mapping of breeding territories through the observation of territorial displays during the breeding season allows for good estimation of territory size (Lockie 1955, Tate 1991). More data are needed concerning relationships between territory size and the abundance of small mammals to determine the amount of open habitat and the prey base necessary to support a breeding pair. Such information would enhance land preservation efforts.

Research on the management of open habitat and its effect on prey populations is needed. The effect of such practices as burning, mowing, or plowing on small mammal populations must be

taken into account. Any management for the restoration or maintenance of open grassland habitat must also manage for a sufficient prey base.

Other research needs include (1) the investigation of nocturnal movements, (2) the study of movement in and out of isolated populations, e.g., Nantucket Island and Monomoy National Wildlife Refuge, and (3) estimates of adult and juvenile annual mortality.

State research needs:

Assess the feasibility of monitoring Short-eared Owls in conjunction with other waterfowl surveys. Review status on St. Lawrence Island (USFWS 2000). The impacts of global warming on arctic and alpine breeding habitats, and on the food base of this species are unknown, needs study (Sinclair et al. 2003).

Other research needs include (1) the investigation of nocturnal movements, (2) estimates of adult and juvenile annual mortality and identification of causes of mortality, and (3) synthesis of literature, specimen data, and unpublished reports to develop a map that more accurately depicts species distribution in the state.

Global inventory needs:

Adequate population monitoring techniques need to be developed; females do not readily flush from nest; diligent search or dragging rope across area may reveal nest site; precautions should be taken against leading ground predators to nests (Tate 1992). Apparently, no data exist on the use of broadcasting tape-recorded vocalizations for detection or monitoring purposes.

Many Short-eared Owl nests have been found incidental to an ongoing study of waterfowl nesting at Grizzly Island Wildlife Area in California. Surveys of nesting waterfowl were made using a drag rope; it was concluded that this method was also efficient for surveying areas for nesting owls (Larsen 1987).

State inventory needs:

Monitor populations in conjunction with other raptors at migration stations (USFWS 2000). Systematic inventory of breeding grounds is needed to better assess distribution and abundance statewide. However, monitoring this species may not be feasible due to large annual variation in numbers seen in response to changes in arvicoline (microtine) populations (USFWS 2000). In conjunction with population monitoring, an assessment of prey population declines/cycles is needed. Determine wintering areas in state, if any.

CONSERVATION AND MANAGEMENT NEEDS

Global conservation and management needs:

In California, Short-eared Owls have evidently benefited from management strategies designed to increase waterfowl nesting habitat (Larsen 1987). Fields that were experimentally managed to produce a dense litter layer of dried vegetation contained both the highest density of duck nests and the highest density of owl nests; management strategies should maximize litter buildup to improve rodent and owl habitat.

Melvin et al. (1989) listed limiting factors to Short-eared Owl population success in the Northeast as (1) availability of suitable habitat, (2) sufficient prey abundance, (3) predation, and (4) human-related disturbance. Attention to conservation needs is needed soon if the Short-eared Owl is to persist as a breeding bird in the Northeast (Tate 1992); management strategies should address each of the above factors.

State conservation and management needs:

Human disturbance should be minimized at important breeding areas. Cooperation needed within and between agencies, private groups, NGO's and industry to coordinate field surveys and avoid duplication, and to share data.

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