

SNOWY OWL

TAXONOMY

Scientific name: *Bubo scandiacus* (Linnaeus, 1758)

Other related names: *Nyctea scandiaca* (Linnaeus, 1758)

Common name: Snowy Owl

Family: Strigidae

Taxonomic comments:

Former scientific names: *Strix nyctea*, *Strix arctica*, *Nyctea nivea*, *Nyctea nyctea*, *Nyctea scandiaca arctica* (Karalus 1987). Included in the monotypic genus *Nyctea* based on distinct plumage and weak osteological differences (Ford 1967). However, genetic studies situate it within the genus *Bubo* (Sibley and Ahlquist 1990, Wink and Heidrich 1999, Banks et al. 2003).



Photo by Chris Powell

DESCRIPTION

Basic description: A large owl.

General description:

A large northern owl; plumage generally white with dusky brown spots scattered over crown and hindneck; bars streak the abdomen, sides and flank. Females darker and larger than males, which can be almost pure white; females have dark black/brown bars throughout flight feathers, wings, and tail; subadults are heavily barred throughout. Unusual facial appearance due to wide-set eyes that are high up and narrow vertically. Face is slightly flattened. Eyes relatively small with golden irises. Ears inconspicuous; tail long and rounded. Bill black, stout and nearly concealed by long eye ring feathers. Tarsus and toes heavily feathered, almost concealing large black claws (Gabrielson and Lincoln 1959, Parmelee 1992).

Length (cm): 58 (males), 63 (females)

Weight (kg): 1.73 (males), 2.12 (females)

Reproduction:

Mostly monogamous; often pairs for life. Breeding season May to September. Pairs arrive on breeding grounds late April to mid-May. Egg laying begins mid-May and continues through June; chicks fledge early to late September. Clutch size highly variable and dependent on food supplies: 3-5 eggs when food limited; 7-11 eggs when food plentiful. Asynchronous hatching. Incubation by female around 32 days (male provides

food). Chicks tended by both parents, leave nest between 2-4 weeks (final departure ~ 25 days). Young fly well at ~ 7 weeks of age, and are fed by parents 5-7 weeks after fledging until they are able to hunt successfully for themselves (Parmelee 1992). First breeding at ~ 2 years; longevity 10+ years in the wild, and 28 years in captivity (Holt et al. 1999).

Ecology:

Resident of arctic tundra. Nomadic population breeds where and when prey is abundant; may refrain from breeding for a year or more when prey is scarce (Parmelee 1992). Breeding territory usually about 10 km² or less; may be less than 1 km² in areas of high lemming density. Females may defend territories of 150-450 ha in winter (Johnsgard 2002). Owls are important contributors to creation of fertile microhabitats in desert tundra with scarce turf and nitrogen-poor soil. These microhabitats benefit plants, lemmings and owls, as well as foxes, weasels and the humans who trap them (Parmelee 1992). In some instances, waterfowl may benefit by nesting in association with Snowy Owls which keep predators such as arctic fox at bay (Summers et al. 1994, Tremblay et al. 1997, Ebbinge and Spaans 2002, Quakenbush et al. 2002). Conversely, when lemmings are scarce, owls may prey on adult geese at the nest (Ebbinge and Spaans 2002).

Migration:

Mostly nomadic and unpredictable migrants; some remain on breeding range year-round if conditions allow (Holt et al. 1999). Disperse from breeding grounds to areas where weather and food permit overwintering. Two radio-tracked females moved three successive summers from Barrow, AK, to the north-central Russian coast, and then to northwest Canada (Fuller et al. 2003). Some authors correlate southward movements with lemming population cycles. For certain regions (e.g. northern Great Plains) dispersal probably does relate to variable local abundance of primary prey, i.e. lemming mosaics (Parmelee 1992). However, in eastern and western North America, this species shows geographically synchronous winter irruptions too large to be attributed to lemming mosaics. Other factors such as snow cover, crust characteristics and winter temperatures may be more influential (Kerlinger et al. 1985, Parmelee 1992, Elphick et al. 2001). Kerlinger et al. (1985) consider winter dynamics of coastal populations to be irruptive, whereas central Great Plains populations are regular migrants. Larger adult females winter farther north than males and immatures (Elphick et al. 2001).

Food:

Carnivore. Diet predominantly lemmings and voles; important alternate prey includes other rodents, rabbits and birds (from songbird nestlings to medium-sized geese) (Parmelee 1992). Owls wintering along the coast take waterbirds when available; Ancient Murrelets (*Synthliboramphus antiquus*) accounted for 68 % of owls' diets in the Aleutian Islands (Williams and Frank 1979). One owl estimated to consume about five lemmings a day, or 600 to 1,600 lemmings a year; an adult pair with nine owlets consumed 1900-2600 lemmings during the breeding season (Parmelee 1992).

Phenology:

Circadian. During the arctic summer may hunt during the day (by necessity) and at night (NGS 1983, Elphick et al. 2001).

Habitat:

Breeding: Open tundra from near treeline to edges of polar seas. Prefers areas with mounds, hillocks or rocks that serve as perches and nest sites, also sparse, low vegetation and dwarf shrubs and lichen (Holt et al. 1999). Nests are scraped out areas on rock or ground, lined with a bit of moss and feathers, on a high dry spot (Gabrielson and Lincoln 1959, Harrison 1978).

Non-breeding: Migratory habitat believed to be open to wooded areas (Parmelee 1992). Winter habitat includes open country such as prairie, marshes, fields, pastures and sand dunes (AOU 1983) or tidal shores where prey is most available.

Foraging: Hunts in lowland salt grass meadows or poorly drained freshwater meadows (Parmelee 1992).

STATUS

Global rank: G5 (27 Nov 1996)

Global rank reasons:

Secure – widespread and abundant.

State rank: S3B, S3N (22May2006)

State rank reasons:

Breeding range restricted to coastal tundra habitats of the North Slope and western Alaska. Clumped breeding distribution in response to prey distribution. Abundance and trends unknown; cyclic population response to prey abundance. Barrow is one of the few known places where species regularly breeds. Threats include poaching and malicious shooting near Barrow. Effects of climate change on habitat and prey populations unknown, but of concern.

DISTRIBUTION AND ABUNDANCE

Range:

Global range:

Holarctic. Estimated global extent of occurrence is 1,000,000–10,000,000 km² (BirdLife International 2005).

Breeding: Circumpolar breeder in arctic tundras of the world: Aleutian Islands and northern Alaska, throughout Canadian Arctic Islands to northern Greenland, northern Scandinavia, northern Russia, southern Novaya Zemlya and northern Siberia south to the limits of tundra in Eurasia and the Commander Islands. Rarely in the British Isles (Cramp 1985).

Snowy Owl

Non-breeding: Winters within breeding range if conditions allow. Also south to southern Canada and northern United States, primarily in the northern Great Plains, but with occasional irruptive movements east, south, and west of there; and to Iceland, British Isles and central Europe, central Russia, northern China and Sakhalin. Accidental in northwest India, Japan, Bermuda, the Mediterranean and Iran (Parmelee 1992). Some evidence exists for winter site fidelity (Oeming 1957, Follen and Leupke 1980).

State range:

Breeding: Coastal tundra of the North Slope, western coastal areas as far south as Bristol Bay (ADFG 2005). Barrow, Alaska, is one of the few places this species breeds every year (Warren 2002). Irregular along Beaufort Sea coast east of Barrow (Johnson and Herter 1989). More common from Pitt Point in the Beaufort Sea to Hooper Bay on the Yukon Delta (Gabrielson and Lincoln 1959). About five pairs nested south near Goodnews Bay in 1973, when lemming populations were high (Petersen et al. 1991). Also, western Aleutians (e.g. Attu and Buldir Islands) and Hall Island, adjacent to St. Matthew Island (Parmelee 1992).

Non-breeding: Anywhere in the state; winters from northern Alaska south to Gulf of Alaska and the Bering Sea, west along the Aleutian Islands. Leaves breeding grounds only during harsh winters when food supplies are low (Elphick et al. 2001).

Abundance:

Global abundance:

“Generally uncommon to scarce.” (Holt et al. 1999). Global population estimated at 290,000 individuals (Rich et al. 2003). Estimated number of breeding pairs in Canada in the early 1990s was 10,000-30,000 (Kirk et al. 1995).

State abundance:

Local populations may vary ten-fold depending on lemming abundance. Regular breeding species at Barrow, Alaska, but highly irregular along Beaufort Sea coast east of Barrow (Johnson and Herter 1989). Varies from common to rare on the Seward Peninsula; native Alaskans report it rarely nests at the tip of the Peninsula near Wales (Bailey 1943, Kessel 1989). In 1993, 1995, and 1996 a total of 40, 188, and 38 breeding Snowy Owls, respectively, were counted during surveys in the Barrow area (Petersen and Holt 1999).

Trends:

Global trend:

Global population trends have not been quantified, but populations appear stable (Holt et al. 1999). No evidence of a decline in Canada (Kirk 1995) or North America (but no definitive data exists) (Holt et al. 1999). Believed to have decreased in Europe, perhaps because of human hunting combined with long-term climate changes (Voous 1988, Johnsgard 2002).

State trend:

No statewide data available (USFWS 2000). On the North Slope, an average annual growth rate of 0.946 (95% CI = 0.809, 1.106) over 12 years was calculated from aerial transect surveys covering 30,755 km² (Larned et al. 2003).

EXISTING PROTECTION

Global protection:

Protected under the Migratory Bird Treaty Act (between the U.S. and Canada, Mexico, Japan, and Russia) since 1972. Portions of breeding areas and wintering grounds are protected within national wildlife refuges and national parks in the U.S., and provincial and territorial parks and sanctuaries in Canada.

State protection:

Raptors are protected and regulated as a game species in Alaska; regulations prohibit possession without a permit (USFWS 2000). Some breeding areas and wintering grounds are protected within national wildlife refuges and state and national parks. Design measures protect large birds from electrocution, airplane strikes, etc. (Parmelee 1992).

CHALLENGES

Global challenges:

Native harvest may affect local populations, but probably does not have the potential for wide-scale impact (Parmelee 1992). However, Ellis and Smith (1993) estimated that trappers in Siberia took 100,000 Snowy Owls annually. Dependence upon lemming population ecology, which may be impacted by global climate change, is of concern; Kerr and Packer (1998) predict the collared lemming (*Dicrostonyx groenlandicus*), a keystone species, will lose approximately 60 percent of its habitat in Canada due to global warming. Low lemming abundance could result in high mortality of young owls due to starvation. Exposure also kills many nestlings (up to 3 or 4 chicks per clutch) (Karalus 1987). Natural enemies are few; arctic fox and wolf prey on adults; skuas and jaegers take eggs and chicks. Many apparently die from starvation during movement southward from the arctic, but collisions with automobiles, utility lines, airplanes, gunshot wounds, and entanglement in fishing tackle are responsible for the majority of reported fatalities (Kerlinger and Lein 1988 in Petersen and Holt 1999, Holt et al. 1999). Kirk (1995) reports no imminent obvious threats in Canada.

State challenges:

Apparent remoteness does not protect raptors from human influences (Kirk 1995). Increased incidence of poaching and malicious shooting, beyond allowable subsistence harvesting, reported near Barrow, Alaska, along the road system (Deatherage and Seidensticker 2004, Federal Register 2004). Increased human presence in tundra areas (e.g., village growth and recreation, road expansion, infrastructure development) may increase disturbance (ADFG 2005).

Also, see Global threats.

RESEARCH AND INVENTORY NEEDS

Global research needs:

Evaluate impact of harvest by Siberian hunters. Migration routes and timing of movements need study. Cooperation needed between United States, Canadian, Russian and European biologists to estimate abundance, distribution and population trends (ADFG 2005). Evaluate lemming population dynamics relative to environmental/climate change. Assess changes in arctic habitats and winter sea ice conditions relative to Snowy Owl distribution along the Arctic Ocean.

State research needs:

Evaluate lemming population dynamics relative to environmental/climate change (ADFG 2005). Assess changes in arctic habitats and winter sea ice conditions relative to Snowy Owl distribution along the Beaufort and Bering Seas. Initiate a long-term banding project on traditional nesting grounds to gather information about movements, and mate and site fidelity (Peterson and Holt 1999).

Global inventory needs:

Information needed on north Asian populations (Holt et al. 1999). Variable irruptive nomadic behavior may reduce power of surveys to discern long term population trends.

State inventory needs:

Repeat and expand aerial surveys to provide index of breeding populations, abundance and distribution. Variable irruptive nomadic behavior may reduce power of surveys to discern long term population trends.

CONSERVATION AND MANAGEMENT NEEDS

Global conservation and management needs:

Continue measures to prohibit shooting and trapping owls for sport, feathers or food. Continue measures to protect large birds from electrocution, airplane strikes, etc. (Parmelee 1992). Satellite telemetry work from Barrow suggests Snowy Owls are a single Holarctic population; therefore, effective management will need to address issues throughout the arctic; i.e. protecting and managing large, international expanses of arctic tundra (Fuller et al. 2003).

State conservation and management needs:

According to the U.S. Fish and Wildlife Service, closing the legal subsistence harvest of Snowy Owls is unlikely to prevent malicious shootings near Barrow and elsewhere (Federal Register 2004). Increased public education and law enforcement presence are needed (ADFG 2005).

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Snowy Owl

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Snowy Owl

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