species factsheet

| species introduction |

Common name: Arctic fox

Scientific name: *Vulpes lagopus*

The Arctic fox is a small fox with rather short legs and a long fluffy tail. Males are slightly larger than females. The Arctic fox has very thick and soft winter fur with dense underfur and long guard hairs. The species occurs in two distinct colour morphs, “blue” and “white”. Each morph also changes seasonally: ‘blue’ moults from chocolate brown in summer to lighter brown tinged with a blue sheen in winter. In winter, the “white” morph is almost pure white while in summer it is brown dorsally and light grey to white on its underside.

The Arctic fox has a circumpolar distribution in all Arctic tundra habitats. It breeds north of the tree line on the Arctic tundra in North America and Eurasia and on the alpine tundra in Fennoscandia, ranging from northern Greenland at 88°N to the southern tip of Hudson Bay, Canada, 53°N. The southern edge of the species distribution range may have moved somewhat north during the 20th century resulting in a smaller total range. The species inhabits most Arctic islands but only some islands in the Bering Strait.

Arctic fox in a winter coat. photo: Tomas Meijer

The world population of Arctic foxes is in the order of several hundred thousand animals. Most populations fluctuate widely in numbers between years in response to varying lemming numbers. Only a few populations have been studied directly, so the following population figures must be treated with caution. In most areas, however, population status is believed to be good. The species is common in the tundra areas of Russia, Canada, coastal Alaska, Greenland and Iceland. Exceptions are Fennoscandia, Mednyi Island (Russia) and the Pribilof Islands, where populations are at critically low levels. On the Pribilof Islands, fox populations are now low and appear to be declining further. Vagrant Arctic foxes are common over the northern sea-ice where they follow polar bears as scavengers.

Table 1: The status of Arctic fox in various range countries

Population: C = common, R = rare; Trend: S = stable, I = increasing, D = declining

Country (area)	Population/ Approx abundance number	Trend
Canada	C 100,000 ?	S ?
USA (coastal Alaska)	C 10,000 ?	S ?
Greenland	C > 10,000 ?	S ?
Russia (mainland)	C 2–800,000 ?	S/I ?
Russia (Mednyi Island)	R 100	?
Russia (Bering Island)	C 800–1,000	S
Iceland	C > 6,000	S
Finland	R 0-5	D
Norway (mainland)	R 100	D
Norway (Svalbard)	C 2–3,000	S
Sweden	R 150	D

| species reproduction |

Mating occurs between February and May and births take place from April to July. Gestation lasts 51–54 days. Pup weight at birth is 80 – 85g in Iceland, but may be less in areas with larger litter sizes. Captive foxes in Sweden had a birth weight of 75 - 80g. Litter size varies with food availability, being smaller in areas without rodents and larger in areas with rodents. Mean litter sizes at weaning were 4 - 6 in Iceland and Svalbard, but 6 - 7 in Canada, Russia, and Fennoscandia. In years with high lemming abundance, up to 19 pups per litter have been observed.

The ability of Arctic foxes to produce large litters is facilitated by their access to large and relatively safe dens. The primary function of breeding dens seems to be to provide shelter and protection against predators. Den sites are large with complex burrow systems, and the largest dens are preferred for breeding. These may have up to 150 entrances and are usually situated on elevated mounds, pingoes, tops of eskers, river banks or ridges, although dens located on bedrock and screes are more common in Svalbard and Iceland. Good denning sites lie above the permafrost layer, accumulate comparatively little winter snow and are sun-exposed, often facing south. The average lifespan of dens in the Canadian tundra has been estimated at 330 years. Some are used repeatedly, year after year, others infrequently.

Pup rearing is confined to the snow-free period from June to September, after which the young gradually become independent. Lactation generally lasts 4–10 weeks. Foxes reach sexual maturity at 10 months.

| species habitat |

Arctic and subarctic tundra on the continents of Eurasia, North America and the Canadian archipelago, Siberian islands, Greenland, inland Iceland and Svalbard. Subarctic maritime habitat in the Aleutian island chain, Bering Sea Islands, Commander Islands and coastal Iceland.

| species food |

The Arctic fox is an opportunistic predator and scavenger, but in most inland areas the species is heavily dependent on fluctuating rodent populations. The species' main prey items include lemmings, both *Lemmus* spp. and *Dicrostonyx* spp. In Fennoscandia, *Lemmus lemmus* was the main prey in summer (85% frequency of occurrence in faeces) followed by birds (Passeriformes, Galliformes and Caridriiformes, 34%) and reindeer (*Rangifer tarandus*, 21%). In winter, ptarmigan and grouse (*Lagopus spp*.) are common additional prey.

Changes in fox populations have been observed to follow those of their main prey in three- to five-year cycles. Foxes living near ice-free coasts have access to both inland prey and sea birds, seal carcasses, fish and invertebrates connected to the marine environment. This leads to relatively stable food availability and a more generalist strategy. In late winter and summer, foxes found in coastal Iceland feed on seabirds (*Uria aalge, U. lomvia*), seal carcasses and marine invertebrates. Inland foxes rely more on ptarmigan in winter, and migrant birds, such as geese and waders, in summer. In certain areas, foxes rely on colonies of Arctic geese, which can dominate their diet locally.

| threats |

The Arctic fox is a victim of predation, mainly from the red fox, wolverine (*Gulo gulo*) and golden eagle (*Aquila chrysaëtos*), while the brown bear (*Ursus arctos*) and wolf (*Canis lupus*) are also known to dig out dens. For Arctic foxes dependent on cyclic lemmings, starvation is an important cause of mortality during some years, particularly for juveniles.

The red fox is an especially dominant competitor and severe predator on juvenile Arctic foxes. The red fox is also known to have a similar diet and to take over Arctic fox breeding dens. A northward spread of the red fox has been recorded in Canada and an increasing range above the tree-line in Scandinavia, where the red fox has the potential to restrict the range of the Arctic fox. Other species feeding in the same small rodent guild are rough-legged buzzard (*Buteo lagopus*), snowy owl (*Nyctea scandiaca*) and skuas (*Stercorarius longicaudus*, *S. pomarinus*, *S. parasiticus*), but the degree of competition between these species is not known.

Hunting for fur has long been a major mortality factor for the Arctic fox. With the decline of the fur hunting industry, the threat of over-exploitation is lowered for most Arctic fox populations. In some areas gene swamping by farm-bred blue foxes may threaten native populations. There can also be indirect threats such as diseases and organochlorine contaminants, or direct persecution (as on St. Paul Island for example). Misinformation as to the origin of Arctic foxes on the Pribilofs continues to foster negative attitudes and the long-term persistence of this endemic subspecies is in jeopardy. The Arctic fox remains the single most important terrestrial game species in the Arctic. Indigenous peoples have always utilised its exceptional fur; and with the advent of the fur industry, the Arctic fox quickly became an important source of income. Today, leg-hold traps and shooting are the main hunting methods. Because of their large reproductive capacity, Arctic foxes can maintain population levels under high hunting pressure. In some areas, up to 50% of the total population has been harvested on a sustainable basis. However, this does not allow for hunting during population lows, as shown by the situation in Fennoscandia. The Arctic fox has nevertheless survived high fur prices better than most other Arctic mammals. Hunting has declined considerably in the last decades, as a result of low fur prices and alternative sources of income. In the Yukon, for example, the total value of all fur production decreased from $1.3 million in 1988 to less than $300,000 in 1994.

| conservation |

In most of its range, the Arctic fox is not protected. However, the species and its dens have had total legal protection in Sweden since 1928, in Norway since 1930, and in Finland since 1940. In Europe, the Arctic fox is a priority species under the Actions by the Community relating to the Environment (ACE). It is therefore to be given full protection. On St. Paul Island the declining Arctic fox population has currently no legal protection. In Norway (Svalbard), Greenland, Canada, Iceland, Russia, and Alaska, trapping is limited to licensed trappers operating in a defined trapping season. The enforcement of these laws appears to be uniformly good.

There are a large number of projects currently underway (or planned initiatives) across the distribution range. A. Angerbjörn, B. Elmhagen, K. Norén and T. Meijer (Stockholm University, Sweden) are studying conservation genetics, predation patterns, and relationships between red and Arctic foxes in Fennoscandia. N. Eide, A. Landa and O. Flagstad (Norwegian Institute for Nature Investigation, Trondheim) are investigating population status and captive breeding and behavioural ecology of Arctic foxes in Norway.

E. Fuglei (Norwegian Polar Institute Tromsø, Norway) is exploring habitat use, population ecology, ecophysiology and genetics of Arctic foxes in Svalbard, as well as the effects of persistent organic pollutants in the Arctic fox. S. Killengren, R.A. Ims, D. Ehrich (University of Tromsø) are looking at the ecology of Arctic fox and patterns of den use by Arctic and red foxes in northern Norway. They also cooperate with Russian colleagues, I. Menjushina, N. Ovsjanikov.

D. Bertaux and A. Tarroux (Quebec) are investigating the trophic dynamic of Arctic foxes on Bylot Island. E.R. Unnsteinsdóttir (University of Iceland) is researching juvenile dispersal in western Iceland. G. Samelius (Agricultural University, Uppsala) is studying population ecology, and the relationship of Arctic foxes to Arctic geese in the Queen Maud Gulf Bird Sanctuary in Nunavut, Canada. P. White (Museum of Vertebrate Zoology, University of California, Berkeley, California, USA) is studying behavioural ecology, disease, and organochlorine contaminants of Arctic foxes on St. Paul Island. M. Zakrzewski and B. Sittler (University of Freiburg, Germany) study population dynamics in North-east Greenland.

| find out more |

- Angerbjörn et al. 1995, 1999, 2004, 2013;
- Audet et al. 2002;
- Eberhardt et al.1982, 1983;
- Frafjord and Prestrud 1992;
- Garrott and Eberhardt 1982, 1987;
- Hersteinsson et al. 1989;
- Hersteinsson and Macdonald 1982, 1992;
- Killengreen et al. 2007;
- Macpherson 1969;
- Nasimovic and Isakov (eds), 1985;
- Norén et al. 2009, 2012;
- Tannerfeldt and Angerbjörn 1998;
- Tarroux et al. 2010

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