

Report on the status and perspective of the

Lesser White-fronted Goose

Anser erythropus

**Report prepared by
UNEP World Conservation Monitoring Centre, Cambridge U.K.**

October, 2003

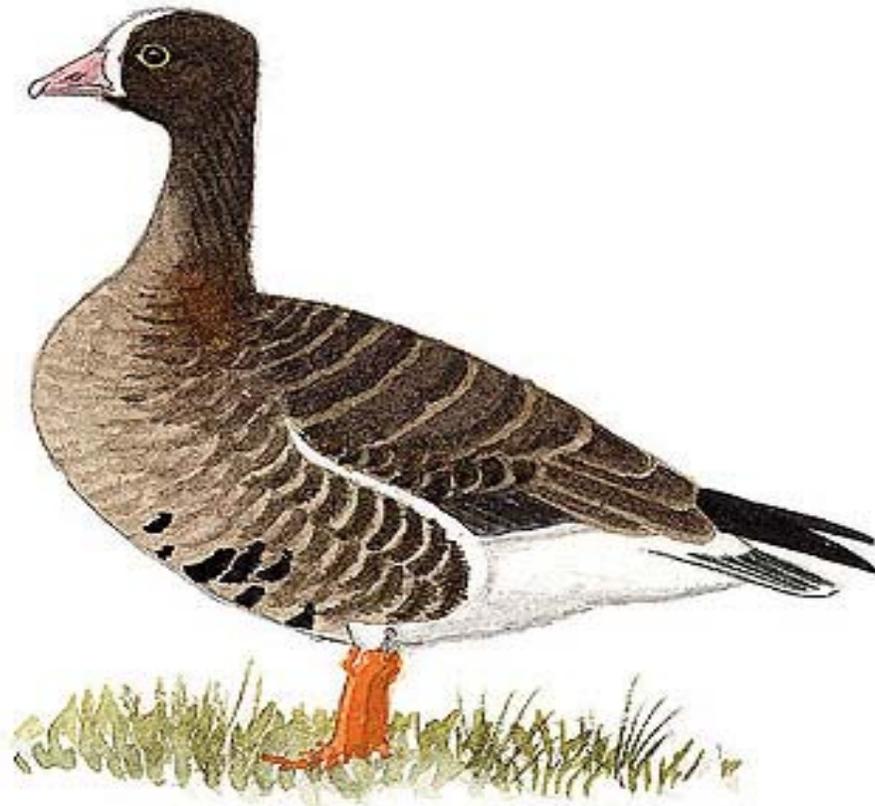


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1 Names

1.1 Scientific name

Anser erythropus Linnaeus, 1758

The species is monotypic, part of the tribe Anserini (family Anatidae) with six species in the genus.

1.2 Common names

English: Lesser White-fronted Goose

French: Oie naine

Spanish: Ansar Chico

2 Biological data

2.1 Distribution (current and historical)

2.1.1 Historical distribution

The species was widely distributed over northern subarctic Eurasia, from northern Norway through to eastern Chukotka in Asia, but it is not known whether the distribution was ever continuous.

There are two separate flyway populations: western and eastern, with the eastern Taimyr Peninsula marking the divide. The historical distribution of the eastern population is poorly known; it possibly extended from east of the Khatanga River well into the subarctic region of Chukotka.

2.1.2 Current breeding distribution

Three sub-populations have been distinguished based on genetics and migration flyways: the Central Asian or Caspian population, breeding in European Russia and Central Asia and wintering in the Caspian / Black Sea area (the most important wintering sites are unknown, but a very important staging area is located in Kostanay region, north-west Kazakstan); the East Asian population breeding in eastern Siberia and wintering in China (predominantly in East Dongting Lake Nature Reserve); and a small European or Fennoscandian population, mainly breeding in Norway and the Kola Peninsula, Russian Federation with wintering sites in Greece and Turkey.

A small population breeds in the mountain area of Finnmark, north Norway (Øien *et al.*, 2001) and the adjacent areas in northernmost Finland and Sweden. The size of the Kola Peninsula breeding population is unknown, but it is roughly estimated to have some tens of pairs, based on a two-week field survey in summer 2001 (P. Tolvanen, pers. comm.). The large majority of the remaining population breeds in the Russian Federation. Two areas in the west part of Russia are situated in the Bolshezemelskaya forest tundra north of the Urals on the border between Europe and Asia (Morozov, 1995, 1999, 2000). Recently, breeding has been noted for the Malozemelskaya Tundra further west in European Russia (Mineev and Mineev, 1999). Further breeding sites are known from the Taimyr Peninsula (Syroechkovski, 1996) and from Yakutia, including the lowlands of the middle reaches of the Olenyok River (Syroechkovski *et al.*, 1998), the Yana River valley, the middle reaches of the Indigirka River (Artyukhov and Syroechkovski, 1999; Syroechkovski, 2000), the Kolyma River basin (Degtyarev and Perfiliev, 1996) and in the middle reaches of the Anadyr River in Chukotka (Andreev, 1997).

2.2 Habitat

The species breeds in the forest tundra belt of Eurasia, with a preference for bush tundra interspersed with bogs and lakes. In Fennoscandia the population breeds in open tundra vegetation in fell birch region on mountain slopes (fells). During migration and in wintering sites the geese often join with Greater White-

fronted and other goose species, and roost and feed on grassland and lake shores. Often the Lesser White-fronted Goose prefers the lower vegetated areas closer to the water table (Lei, 2000).

2.3 Population estimates and trends (breeding)

The Lesser White-fronted Goose is globally threatened and listed as Vulnerable (BirdLife International, 2000). Its total population size declined over the last 50 years from about 100,000 and is currently estimated as between 25,000 and 30,000 (Lorentsen *et al.*, 1999) or more recently 22,000–27,000 individuals (Wetlands International 2002). At least two, possibly three different populations have been distinguished. Based on phylogenetic analyses, the Fennoscandian population has been identified as clearly distinct from the western main population and also from the eastern flyway population (Ruokonen and Lumme, 1999).

All populations have undergone a serious decline over the last 50 years. The Fennoscandian population suffered a dramatic decrease in breeding range and population size since the mid 20th century (Norderhaug and Norderhaug, 1984), and this is continuing, at least at some staging areas in Fennoscandia, during recent decades.

The Western or Fennoscandian population

The Fennoscandian population numbers about 30-45 pairs currently in the Nordic countries (Norway, Sweden and Finland), with an unknown number of breeding pairs in the Kola Peninsula, Russian Federation (Aikio *et al.*, 2000) (but see above).

Norway

Norway holds almost the entire breeding population of an estimated 30-50 pairs (Aarvak and Øien, in press) with the core area in a wetland system in the mountain plateau in Finnmark county (Øien *et al.* 2001). The most recent counts indicate a slowing down of the previously observed sharp decline. A maximum of only 50 birds was counted in spring and autumn 2001 (Aarvak and Øien, in press). Although 2001 and 2002 figures have shown lower numbers at the spring staging, the overall population numbers seem not to have changed in the last ten years. Lower numbers may be related to the early onset of spring, which allows a certain proportion of the birds to fly directly to the breeding grounds. A supposed relict population existed in Nordland County until the early 1990s, when one to three pairs may have bred, but no trace of breeding birds was found in 1997-1998 (Øien and Aarvak, 1999). However, in spring 2003 one pair of Lesser White-fronted Geese was observed in one of the former breeding areas in Nordland (Børgefjell) (I. J. Øien pers. comm.). In 1998 a pair with three goslings was observed on the southern shore of Lake Savalen close to Sinktrøvangen, Hedmark County, southern Norway (Aarvak and Øien, 1999b). In both 2001 and 2002 production was good, and at least 12 and 11 successful cases of breeding were recorded respectively. In 2001, 67 Lesser White-fronted Geese were seen in the autumn at Valdak, and 62 in 2002. There is no reason to believe that the population has been further reduced dramatically in the last three years (I. J. Øien, pers. comm.).

Sweden

In Sweden the wild population has been considered to be extinct. This may, however reflect a lack of inventories. Single observations of Lesser White-fronted Geese, of probably wild origin (including broods), have been made in northernmost Sweden in the 1980s and 1990s, even as late as 1998 (e.g. Pääläinen & Markkola 1998), but there have been no systematic field surveys. In the last 20 years there has been only one observation of wild birds breeding in northernmost Sweden, but it is probable that some pairs from the wild population still breed in Swedish mountain areas. Reintroduction has been attempted since 1981 by means of fostering, using Barnacle Geese *Branta leucopsis* to try to change the migration route south-west to the Netherlands (von Essen, 1999; von Essen *et al.*, 1996, 2000). From 1995-1999, 92 geese were released (von Essen *et al.*, 2000), most of which flew to winter in the Netherlands, fostered by Barnacle Geese. The reintroduction initiative was stopped after 1999 because Greater White-fronted Goose genes were documented in the captive stock (Ruokonen, 2000; Ruokonen *et al.*, 2000; Tegelström *et al.*, 2001). There is a concern that the semi-wild Swedish population will mix with the wild Fennoscandian population, thus putting the wild population at risk of contamination with genes from the captive stock.

Finland

No breeding has been confirmed since 1995, and the current breeding population is estimated at 0 – 5 pairs (Päälainen and Timonen, 2000; Øien *et al.*, 2001). However, single birds have been observed in the former breeding areas almost annually. A restocking programme was under way between 1989-1998. More than 150 geese were released in northern Finland (von Essen *et al.*, 1996; Tolvanen *et al.*; 1997; Markkola *et al.*; 1999; Kellomäki and Kahanpää, 2003). Due to the danger of interbreeding between the introduced stock and the genetically distinct native population, the Finnish Ministry for the Environment and the Finnish Lesser White-fronted Goose Project, led by WWF Finland, decided to stop the restocking programme in 1998 (Tolvanen *et al.*, 2000c; Tegelström *et al.*, 2001).

Russian Federation

There are no exact figures available. Within European Russia the population was estimated to be about 500 to 800 birds in 1990, but only 125 birds have been counted in the eastern part. This suggests a severe decline. However, little knowledge is available for the under-surveyed region of the European tundra (Morozov, 2000). A recent review summarised the population for the European tundra as 500 to 800 birds (Morozov and Syroechkovski, 2002). There is also some indication that the Lesser White-fronted Goose might still be breeding in the Kola Peninsula, where it had been thought to be extinct (Morozov, 1995), but there is little evidence to confirm this. Aikio *et al.* (2000) reported several observations of birds, also with juveniles, as recently as 1999, which suggests single pairs still breed. However, the status is still unclear. In summer 2001, the Finnish Lesser White-fronted Goose project organised a 2-week survey on the Kola Peninsula and found one breeding pair and two single birds. Mineev and Mineev (1999, 2002) counted 47 in 1999 and, based on 256 in 2001, estimated the total number of Lesser White-fronted Geese for the Malozemelskaya tundra of 1,000 to 1,500 birds, which could be an overestimate. It is, however, likely that those birds belong to the Central Asian population wintering in the Caspian Sea region. Morozov (1999) observed low numbers and a declining trend for the Bolshezemelskaya tundra. In 1999 in the Bolshezemelskaya tundra little change was observed compared to the previous 15 years. The breeding success was very low due to bad weather conditions in that year (Morozov, 1999). The region still holds a viable population, although the distribution area has declined, particularly near the Polar Ural area (Morozov, 2000). Most recent data suggest an equal decline of the Polar Ural population, like the others in the European tundra. Despite a viable breeding population and no obvious changes at the site the population has decreased in size and range (Morozov, 2003).

Central Asian and East Asian populations

Russian Federation

The **Central Asian population** breeding from Yamal to Taimyr migrates via north-west Kazakhstan to the Caspian Sea and Black Sea region, joining with some birds from the Fennoscandian population (Rogacheva, 1992; Tolvanen *et al.*, 1999b; Øien and Aarvak, 2001). The population in the southern Yamal area has undergone a considerable decline. It is currently estimated to be between 700 – 1,000 birds (Morozov and Syroechkovski, 2002) and there has been a decrease in the range compared to the 1970s (Morozov and Kalyakin, 1997). The breeding sites on Taimyr have been recognised as the most important in the world, but in the 1980s and 1990s the range declined considerably and the current population is estimated to be in the range of 2,000 – 3,000 pairs (Syroechkovski, 1996; Morozov and Syroechkovski, 2002). A new colony of breeding birds in the Putorana Mountains was estimated to contain about 150 pairs (Romanov, 2001; Morozov and Syroechkovski, 2002). Kalyakin (1996) discovered a nest on Novaya Zemlya on 13 July 1996 but it was destroyed by an Arctic Fox. Morozov (1996) discussed the breeding claims for these islands and concluded that regular breeding was unconfirmed and that Kalyakin's record referred to accidental nesting. Former estimates of 110,000 by Martynov (in Syroechkovski, 1996) have previously been regarded as too high, but it is apparent that a serious decline has occurred when that figure is compared to the estimates of 1,000 to 2,000 pairs in the mid 1990s (Syroechkovski, 1996).

East Asian population

Russian Federation

The number of Lesser White-fronted Geese breeding in the Indigirka region has been estimated to be between 3,500 – 4,000 individuals (Artyukhov and Syroechkovski, 1999), which amounts to about 20 to

25% of the East Asian population. Golub and Golub (2001) suspected that the species might breed in the area comprising the Meinypilgin lake-river system and Kaipilgin Lake in Chukotka. According to Degtyarev and Perfiliev (1996) the Lesser White-fronted Goose in the Lower Indigirka and Kolyma Region decreased sharply, particularly between 1980 and 1985. Syroechkovski (2000) mentioned former concentrations of moulting geese in the Lower Indigirka Delta of about 2,500 geese. Similar concentrations could not be proved in 1999, when a total of only several hundred geese scattered over a large area was recorded. Moulting geese are still assumed to be present in the area, but more scattered and possibly in decreased numbers due to human disturbance. This population migrates to winter in China.

2.4 Migratory patterns

The migration patterns are still generally poorly known, except for the Fennoscandian population. Two or three different populations are recognised, mainly based on satellite tracking of birds from Norway, Finland, Yamal and Taimyr, which possibly use more flyways (Figure 1).

The **Fennoscandian population** migrates via an important staging and stopover site on the Kanin Peninsula in Russia, through the Baltic states, Central and Eastern Europe via East Germany, Hungary to Bulgaria, Greece and Turkey (ca 50% of the Fennoscandian population) or joins the traditional flyway with the main Russian population to Kazakhstan and further south/south-west. Some birds have been observed to migrate even further East to Kolguev Island, and later joining the Central Asian population in the Piassina Delta on Taimyr (Øien and Aarvak, 2001, Aarvak and Øien, 2003).

The majority of the **Central Asian population** breeding in South Yamal and on the Taimyr Peninsula mainly migrate south along the main rivers into the Kustanay steppe region in NW Kazakhstan, where they stop over until late October. However, they first gather in the Piassina Delta in August, before migrating south, where they also meet up with some Fennoscandian birds (Øien and Aarvak, 2001). The migration route continues to the west side of the Putorana mountains (Romanov, 2001) and along the shores of the Ob river in Khanty Mansk region. After a few brief stops, the birds continue their journey to NW Kazakhstan, where they usually stay for about a month. In November the birds migrate south and west along the northern shores of the Caspian Sea, possibly to Azerbaijan, and here in particular to the shores of Kizil Agach, but also to Iran and Iraq, and possibly also to the Black Sea coast. In November 1998 one tagged bird was last recorded and shot in Dagestan, possibly shortly before reaching its final wintering destination near the Black Sea (Tolvanen *et al.*, 1998). In Iran in the major wintering areas up to 7,500 birds have been counted in the protected Miankaleh area. Regular large flooding events in the area due to the rising of the water level in the Caspian Sea, as well as hardening winters, might be leading to a redistribution of the wintering population in Iran and Azerbaijan (Lorentsen *et al.*, 1999). Small numbers of Lesser White-fronted Goose spend the winter at the inner wetlands of the Central Asian Republics and in springtime they move across the Syrdarya river basin (Shoshkakol lakes system) and further north and north-east.

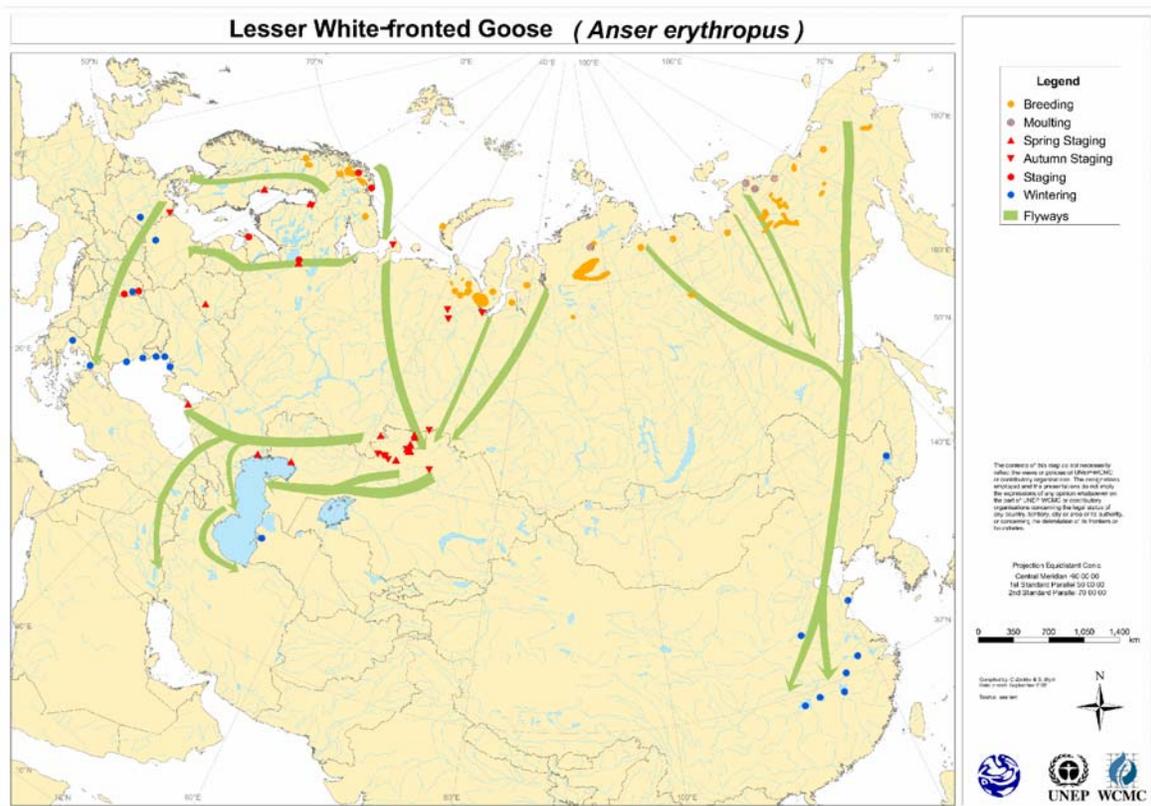


Figure 1. Distribution and migratory flyways of the Lesser White-fronted Goose *Anser erythropus*.

(Note that the flyway shown from Fennoscandia to Western Europe refers to captive manipulated birds and is not a natural flyway)

The **East Asian population** is not very well studied and its migration route is largely unknown. Birds breeding in the Eastern Taimyr Peninsula and east in Yakutia and Chukotka are believed to migrate along the large rivers, mainly the Lena, Indigirka, Kolyma and along the Sea of Ochotsk through the Khabarovsk region, through the north of China to winter in the Dongting Lake, Shenjing Lake and Pojiang Lake in the Yangtze River basin (Hunan and Jianxi region, China) (Andreev, 1997; Syroechkovski, 2000; Roslyakov, 2000; Lei, 2000; Markkola *et al.*, 2000; Lei 2001). By the year 2000 the East Dongting Lake was the most important wintering site for the goose, with maximum counts of 16,500 in 1999 (Lei, 2000). As with the Central Asian population, birds from the Indigirka region have been observed migrating north into the Delta region for moulting before starting to migrate further south (Syroechkovski, 2000).

3 Status

This section deals with non-breeding status; for breeding status see section 2.3.

The endangered status of the Lesser White-fronted Goose is widely acknowledged and the species is listed as globally threatened. The status is, however, defined as ‘Vulnerable’, based on the global population (BirdLife International, 2000). For Europe, with a very small population, the real threat is under-represented and not properly covered by 1% thresholds for designating Important Bird Areas, Natura 2000 sites and Ramsar sites (Tolvanen *et al.* 1999b). If the IUCN criteria were to be correctly applied the status for the European, and probably also for the other two populations, would be ‘Endangered’: the size of the European Lesser White-fronted Goose population is apparently less than 500 pairs (probably even lower), and the rate of the population decline must have been at least ‘moderate’ (i.e. at least 20% decline in at least one third of the population) between 1970-1990. In the *2002 IUCN Red List of Threatened Animals*, Lesser White-

fronted Goose is listed as Vulnerable by criterion A1 (an observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations).

Albania

Lamani and Puzanov (1962) reported that the species was very common in the 1940s but was very rare by the 1960s. There have been no subsequent observations (Anon., 2003a).

Armenia

A rare winter visitor and passage migrant (Adamian and Klem, 1997). Before 1900 it was very common but it is now rare with numbers ranging from 1 to 50 recorded from 1984 to 1995 (Aarvak *et al.*, 1997).

Austria

Irregular passage migrant with only two records from 1980-1990 (Ranner *et al.*, 1995). Six were recorded on 7-8 November 1999 at Larye Lake (van den Bergh, 2000).

Azerbaijan

A winter visitor recorded from the coast, Kizil Agach and the Kura River lowlands (Lorentsen *et al.*, 1999; Shelton, 2001). A total of 1,085 individuals were counted in a survey conducted in 1996 and it was suggested that the wintering population varied between 1,500 and 7,000 (Aarvak *et al.*, 1996; Paynter, 1996). About 25,000 birds were reported in 1978, 1980 and 1982/83 but the numbers steadily declined in subsequent winters (Morozov and Poyarkov, 1997; Tkachenko, 1997).

Belarus

Kozulin and Mongin (1996) recorded about 250 individuals migrating through the Pripyat' River flood-plain in spring 1995.

Belgium

There are almost annual observations of single birds, most of them belonging to Swedish reintroduction programmes, with the unusually high number of 30 individuals during 1996-1997 (De Smet *et al.*, 1999).

Bosnia and Herzegovina

A rare winter visitor (Matvejev and Vasic, 1973).

Bulgaria

The species regularly stages and possibly winters in traditional geese wintering sites near the Black Sea coast. Nankinov (1993) reported about 1,000 Lesser White-fronted Geese wintering in the Danube flood plain; however, a survey in 1996 located only 8-10 individuals and estimated the total number in the country as 30-40 (Aarvak *et al.*, 1996). Petkov *et al.* (1999) estimated the total number to be around 100 birds.

China
A passage migrant and winter visitor to eastern China, recorded in Heilongjiang, Jilin, Liaoning, Sichuan, Shandong, Henan, Anhui, Jiangsu, Zhejiang, Fujian, Jiangxi, Hunan and Guangxi. Significant counts have been made on passage at Xinghai Hu in Heilongjiang, and in winter near Qingdao in Shandong, near the Yellow River in Henan, at Shujiu Hu in Anhui, at Yancheng in Jiangsu, at Poyang Hu in Jiangxi and at Dong Dongting Hu in Hunan (BirdLife International, 2001). During the 1930s the Lesser White-fronted Goose was considered to be the most abundant goose wintering on the Yangtze River but information on trends in numbers since then is difficult to interpret because of suspected identification problems (Aarvak *et al.*, 1997). The total numbers in the country were estimated as 1,000-10,000 by Perennou *et al.* (1994) However, in February 1997, 13,700 individuals were counted at Poyang lake (Aarvak *et al.*, 1997); in February 1999 a survey counted 11,800-16,800 individuals at East Dongting Lake (Markkola *et al.*, 2000) and in April 1999 a total of 16,500 birds were counted there (Lei, 2000).

Croatia

A rare and irregular winter visitor (Kralj, 1997). N.B. The Croatia country report to CMS (2002), does not consider the country as part of the species's range.

Cyprus

A small group of three adult Lesser White-fronted Geese was seen at the Akhna Dam in the east of the island at the end of November 2003 (Jeff Gordon, pers. comm.).

Czech Republic

Rare and irregular migrating individuals stop over in the lakes of southern Moravia (O. Miculica, pers. comm.). Wintering was recorded in that area several times at the end of the 1950s and the beginning of the 1960s (Kren, 2000).

Denmark

A rare migrant with 30 individuals recorded before 1950 and 55 from 1950 to 1998 (Rasmussen, 1999).

Egypt

Vagrant (Goodman and Meininger, 1989). Scott and Rose (1996) noted that it was formerly a rare winter visitor in very small numbers, but that there had been no recent records. N.B. The Egypt country report to CMS (2002), does not consider Egypt as part of the species's range.

Estonia

Until the 1960s the species occurred regularly in small numbers, with a maximum of 346 individuals but there were no confirmed records in the 1970s. Subsequently it has become a rare passage migrant, but there were unusually high numbers in 1997-1999 with nine on 11 October and 44 on 12 October 1997 at Tali, Pärnu district. A spring staging area was revealed in western Estonia at the end of the 1990s, with at least 32 birds seen during 26 April to 15 May 1998 at Haeska, Matsalu Nature Reserve, Lääne district (Aarvak *et al.*, 1999; Tolvanen, 1999). In 1999 at least 43 were counted at Haeska between 24 April and 8 May (Tolvanen *et al.*, 2000b) In 2000, 35 birds were recorded (Pynnönen & Tolvanen 2001), and in the years 2001-2003 about 15 individuals were counted annually Colour ring readings have proved that these birds belong to the Fennoscandian breeding population.

Finland

Important staging areas of the Lesser White-fronted Goose in Finland have been located on the west coast in the vicinity of the city of Turku and the town of Pori in south-west Finland, and on the northern coast of the Bothnian Bay near the town of Oulu. This area, including the isle of Hailuoto and the Bay of Liminganlahti, is the only area still regularly used (Timonen, 1999, 2000). The sites in Hailuoto and others in the Bothnian Bay totalled about 20 to 30 birds in 2000 (Markkola, 2001). The sites are protected but autumn hunting in some of the sites continues to be a potential threat for the declining population. The species is listed in the Red Data Book for East Fennoscandia (Markkola *et al.*, 1998a).

France

A rare vagrant with only four records from 1981-1993 (Dubois and Comité d'Homologation National, 1984, 1986, 1987, 1990).

Georgia

A rare passage migrant, with 26 records since 1972, comprising 104 individuals at 12 localities, and it is recommended for inclusion in the second edition of the Georgian Red Data Book (A. Abuladze pers. comm. 30 October 2003).

Germany

The species regularly passes through in small numbers. More than 20 records have been registered in Germany in 1998, 8 of them from Brandenburg, most likely including birds of the Fennoscandian population (Deutsche Seltenheitskommission, 2002). The others might be part of the reintroduction programme or escaped birds. Birds tagged with satellite radio transmitters have been recorded in East Germany and could be located in Mecklenburg-Vorpommern and Brandenburg in the autumn migration. These birds, located by satellite tracking, are part of the Fennoscandian population migrating through Central and Eastern Europe (Lorentsen *et al.* 1998, Aarvak & Øien 2003). In Lower Saxony, Nordrhein – Westfalen and in Schleswig-Holstein birds from the reintroduction programme from Sweden have been increasingly recorded together with Greater White-fronted Geese. A total of 29 individuals were recorded in mid-November 1999 (van den Bergh, 2000).

The species is fully protected in Germany but Greater White-fronted Geese are still hunted in places and in some instances both species are mixed, as has happened in East Germany (Lorentsen *et al.*, 1998). Currently a programme is envisaged to alter the flyway of Swedish reintroduced geese to wintering places in the Lower

Rhine Delta, but these plans still require the endorsement of the Swedish Naturvårdsverket. In 1995 and 1996 one Lesser White-fronted Goose was reported shot in each region. The important staging areas in Mecklenburg Vorpommern are protected as nature reserves and listed as Ramsar sites. As hunting is not allowed inside the reserves the geese are not protected and heavily hunted in the daytime feeding areas in adjacent crops (J. H. Mooij, pers. comm.)

Greece

Greece hosts very important wintering sites for the Fennoscandian population. Most geese winter in Lake Kerkini and in the Evros Delta area, on the border with Turkey. In recent years, most reports are from Thrace, mainly the Evros delta, but also from Ismaris and Lake Kerkini. The greatest number ever recorded in Greece was at the Evros delta in 1963 (1,630 individuals) (Handrinos, 1991; Handrinos and Goutner, 1990; Handrinos and Akriotis, 1997). In 1974 a total of 487 birds was recorded and in the period 1980-1990 the records have fluctuated between 30 and 150 individuals (Aarvak *et al.*, 1996, 1997). More recently, in the winter of 1998-1999, the maximum was a total of 71 individuals at Lake Kerkini, Lake Ismaris and the Evros delta (Lorentsen *et al.*, 1998).

Hungary

The population in the Hortobagy Puszta National Park, a traditional staging area for the Fennoscandian population declined constantly over recent years from about 100,000 in the beginning of the 1950s (Sterbetz, 1982) to 400-500 in the mid 1980s (Aarvak *et al.*, 1996), to less than 100 individuals in the late 1990s, and about 100 in 2000 (Tar, 2001). The largest number to occur in recent years was 240, in October 1992 (Gorman, 1996).

India

Vagrant with about 11 records 1859-1968 (BirdLife International, 2001).

Iran

In the early 1970s, between 4,500 and 7,500 birds wintered in Iran, mainly in Miankaleh protected region, but these disappeared suddenly in the late 1970s and, since then, only small flocks have been observed in the country (Scott and Rose, 1996). Regular large flooding events in the area, due to the rising of the water level in the Caspian Sea, as well as hardening winters, may be leading to a redistribution of the wintering population in this country and Azerbaijan (Lorentsen *et al.*, 1999).

Iraq

Formerly widespread and numerous in the area, currently the species is only present in small numbers or as a vagrant (Evans, 1994).

Ireland

One record (Hutchinson, 1989). N. B. the Ireland country report to CMS (2002), does not consider Ireland as part of the species's range.

Israel

Vagrant with four records 1927-1994 (Shirihai, 1996).

Italy

Irregular winter visitor and passage migrant (Bricchetti and Massa, 1998).

Japan

This species was a regular winter visitor until the nineteenth century but currently it is only a rare (but almost annual) visitor, usually with flocks of Greater White-fronted Geese (BirdLife International, 2001).

Jordan

The only record is of 2-3 seen from November 1993 to February 1994 at Aqaba (Andrews *et al.*, 1999). N. B. the Jordan country report to CMS (2002) does not consider the country as part of the species's range.

Kazakhstan

At the end of the 19th and the early part of the 20th centuries the species occurred throughout western, central and northern parts of the country. During spring migration it was abundant in the Ural River valley, between Uyil and Or' rivers, in the Irgyz and Turgay rivers and on lakes between the Ishim and Tobol rivers. In the autumn it was widely dispersed, occurring in the Irtysh river valley, lakes in central and western Kazakhstan, and on the north coast of the Caspian Sea between the Ural River and the Volga River deltas. A dramatic decrease in numbers was noted by 1970 although no special research was conducted. Currently, the main areas where the species occurs in large numbers during migration, especially in autumn, are Kustanay Oblast, Akmola Oblast and some areas in the northern part of the country. Considerable numbers also stage in the middle reaches of the Ural River in autumn and spring, and on small lakes near Aktyubinsk in autumn. In autumn the following totals were counted, 1997: 10,413, 1998: 6,389, 1999: 6,910 according to Yerokhov *et al.* (2000), although Tolvanen *et al.* (1999a) give an estimated count of 7,300 for 1998 and Tolvanen *et al.* (2000a) give an estimated count of 3,880 for 1999. In 1996 a total of 7,900 were counted in Kustanay Oblast (Aarvak *et al.*, 1996; Tolvanen and Pynnönen, 1998). In May 1997 a total of 2,000 birds were recorded in Kustanay Oblast (Markkola *et al.*, 1998b) and in September-October 2000 about 1,830 Lesser White-fronted Geese were counted there.

[Korea, Democratic People's Republic of

Listed as occurring by CMS (2003) but Tomek (1999) stated that it had not been recorded there.]

Korea, Republic of

A very rare winter visitor with six records 1917-1997 (BirdLife International, 2001).

Kuwait

Vagrant (Cramp, 1997).

Latvia

The species is a rare migrant in Latvia, with single individuals seen on migration. A flock of 90 was seen on 22 September 1958 and, more recently, a flock of 43 was seen on 4 October 1996 (Aarvak *et al.*, 1997).

Lithuania

There is little information on migrating geese from Lithuania, but it is assumed that the Fennoscandian population passes through in spring and also on autumn passage. Svazas (1996) and Svazas *et al.* (1997) reported that until the 1960s flocks of up to 800 Lesser White-fronted Geese were seen in coastal areas, especially at Kurshiu Lagoon and Nemunas River Delta. Subsequently, it was characterised as a very rare and irregular migrant with only single birds or small flocks recorded. However, recent findings indicate that it is still an uncommon but fairly frequent migrant in the west of the country. A staging flock of 200-230 birds was reported in the Nemunas Delta area in October 1995 and small staging flocks were recorded in several coastal sites in autumn 1996 and 1997 (Stoncius and Markkola, 2000). Since July 2000 the species has been listed in the Red Data Book of the country and protected from hunting. A penalty for killing stands at 300 Litas = US\$80.

[Luxembourg

Listed as possibly occurring by CMS (2003) but no other references for its occurrence have been traced.]

Macedonia, the former Yugoslav Republic of

Listed as occurring by Anon. (2003b).

Moldova, Republic of

A rare passage migrant, recorded on the Lower Prut Lakes (45°42'N 28°11'E) (Frazier, 2002) and the Lower Dniester (Bejenaru *et al.*, 2003). N. B. the Moldova country report to CMS (2002) does not consider that the country is a range state for the species.

Mongolia

It is very likely that the Lesser White-fronted Goose passes regularly through Mongolia during migration between their Russian breeding and Chinese wintering grounds. The species was first recorded in Mongolia in September 2000, when a small flock was seen in Dornod (Tseveenmyadag, pers. comm.).

Myanmar

Vagrant, known by a single record (BirdLife International, 2001).

Netherlands

Lesser White-fronted Geese regularly visit the wintering grounds in the Netherlands, mixed with Greater White-fronted Geese. They winter annually in Zuid Holland and Zeeland (Lorentsen *et al.*, 1999) and belong to the reintroduction programme in Sweden. In the winter of 1998/1999, 75 geese from the Swedish reintroduction programme were observed wintering in the Netherlands.

Norway

Four staging areas are known. Two of these used to be used by the very small population in Nordland County but none has been seen there since the 1980s, until one pair was observed in spring 2003. The remaining, important staging areas are in Finnmark County: a traditional one at the Valdak marshes in the Porsangen Fjord, where between 56 and 84 birds have been recorded in spring in the years 1993-2000, with the maximum in 1998 (Aarvak and Øien, 1999a, 2000, 2001); and a “new” one, Skjåholmen in Varangerfjord (Lorentsen *et al.*, 1999; Ruokolainen *et al.*, 1999). Small numbers have been found staging in the Varangerfjord area and eastern Finnmark, ranging from 50 in 1995 to only 3 in 1999 (Tolvanen, 2000). The species is listed in the Red Data Book for East Fennoscandia (Markkola *et al.*, 1998).

Oman

One was recorded as occurring from 18 November 1993 to 10 January 1994 (Anon., 1997)

Pakistan

Vagrant with 10 records 1871-1967 (BirdLife International, 2001).

Poland

Very scarce migrant, possibly less frequent recently (Tomialojc, 1990). As part of the flyway of the migrating Fennoscandian population Poland hosts a few Lesser White-fronted Geese on passage. Some of the satellite tagged geese in 1995 have been tracked flying over Poland. One bird tagged in 1997 spent the winter in Poland and East Germany (Øien and Aarvak, 2001, Aarvak and Øien, 2003), but little information from other observations is available. Hunting of geese is still common practice and the species is protected only *pro forma*.

Romania

An unknown number of Lesser White-fronted Geese, associated with Greater White-fronted Geese, annually pass through Romania in the Dobrogea area in the south-east. The highest number recorded was 1,000 in 1989 (Munteanu *et al.*, 1991). A survey on 1-2 December 1996 failed to locate any Lesser White-fronted Geese (Aarvak *et al.*, 1997). The birds that pass through are part of the flocks that remain in eastern Bulgaria in the winter, and the percentage of Lesser White-fronted Geese is supposed to be similar to that in Bulgaria. Since Greater White-fronted Geese are intensively hunted it is likely that Lesser White-fronted Geese are also shot annually. It is classified as rare according to the Red List issued by Biosphere Reserve Danube Delta 2000 (Romania country report to CMS, 2002)

Russian Federation

A staging area on the Kanin Peninsula was rediscovered in 1994, and comprises about 50 km² of annually flooded marshland between the mouths of the Mesna and Torna Rivers on the western coast of the Kanin Peninsula (68°01'N 44°20'E). Satellite telemetry and marking programmes suggest that this may be the gathering place for the whole Fennoscandian breeding population (Lorentsen *et al.*, 1998), i.e. 100-200 individuals, depending on the yearly variation in breeding success (Aarvak *et al.*, 1996). A network of waterbodies within the Kuma-Manych Basin are used as stopover sites both in spring and autumn, with a maximum of 600 birds recorded in autumn (Vinogradov, 1990; Nankinov, 1992). In the Nizheneye Dvuobye, within the borders of the Shuryshkarski District of the Tyumen Region, the birds use the flooded meadows, floodplains and scrub along the Ob River during autumn. Many thousand individuals were

recorded there 30 years ago but no counts have made since then. In southern Transuralia birds use wetlands in south Tchelyabinsk region during spring migration with a maximum of 500-800 recorded (Korovin, 1997; Zakharov and Migun, 1997; Gordienko, 2001). Some staging areas are also known from the eastern shores of the Sea of Azov. (Lorentsen *et al.*, 1999)

Additional data on migration or staging areas is provided by various authors: Artiukhov (2003) noted that the Lesser White-fronted Goose comprised 0.5% of all geese numbers migrating through the Bryansk Oblast in spring, but there had been no records in autumn since about 1980. Belkovsky and Fomin (1998) recorded the species on Bering Island on 3 May 1997 and 4 May 1998. Bulgakov and Grishanov (2000) recorded 100 Lesser White-fronted Geese migrating through the Kaliningrad Oblast in spring 2000. Gerasimov and Gerasimov (1997, 1998) recorded this species at various sites in Kamchatka in the 1970s and 1980s, including up to 400 in spring 1981 and 1983. Mischenko *et al.* (2003) recorded individuals in spring in four years (1987-2002) on the Faustovo floodplain, Moscow Oblast and Volkov *et al.* (1997) recorded a total of 218 Lesser White-fronted Geese during surveys in 1984-1989 and 1991-1997. Nechaev (1996) noted that the species was a rare migrant in Sakhalin Island. Semenov (1998) recorded the species only once during surveys in 1997 and 1998 in the upper reaches of the Taz River, west Siberia.

The species is listed in the Russian Red Data Book (RSFSR, 1983) and in the Red Data Book of Yakutia.

Serbia and Montenegro

A rare winter visitor and passage migrant (Matvejev and Vasic, 1973).

Slovakia

Irregular passage migrant (Trnka *et al.*, 1995)

Spain

Surprisingly, single groups of up to 9 birds have frequently been seen visiting the Guadalquivir Delta. The reserves where Lesser White-fronted Geese have been observed recently are all protected and the geese are not hunted (Persson, 2000). According to H. Persson (*in litt.*) the area appears suitable for reintroducing Lesser White-fronted Geese, as in the Netherlands, but this has not been recommended due to the high hunting activity reported in neighbouring France. N. B. The Spain country report to CMS (2002) does not consider the country to be part of the range of the species.

Sweden

In spring the Swedish native breeding population used to arrive from the Finnish side of the Gulf of Bothnia. There are several observations showing that flocks, after crossing the Gulf, used the green fields along the Swedish coast as staging sites until the breeding grounds were sufficiently free of ice and snow (Lorentsen *et al.*, 1999).

Switzerland

Vagrant, not reported since 1851 (Winkler, 1987).

Syria

Vagrant: three records (Baumgart, 1995).

Turkey

Only two reported records, both in 1993 (Kirwan and Martins, 2000), but birds wintering on the Greek side of the Evros Delta may well visit the Turkish side at times. Aarvak *et al.* (1997) reported a flock of 63 Lesser White-fronted Geese coming from the south-east (i.e. the Turkish side) and landing on the Greek side of the delta.

Turkmenistan

The species stages through in small numbers but is regarded as nearly extinct (Vasiliev and Gauzer, 2001a). Scott and Rose (1996) mapped two minor wintering sites (< 1% of flyway population) on the Iranian border but no further details have been traced. In March 1999, about 400 individuals were recorded in the International Waterbird Census (Markkola, 2000).

Ukraine

Lesser White-fronted Geese have been increasingly observed with the increasing numbers of roosting geese in the Crimea. Total numbers have exceeded 1,000 birds, often in mixed flocks with Red-breasted Geese. The species is highly threatened by poaching and illegal hunting, due to the novelty of its presence in the area, and to the lack of management experience (Ardamatskaya, 1996; Kondratyev *et al.*, 2000; Rudenko *et al.*, 2000; Grinchenko, 2001). Zhmud (1996) mentioned one individual that was collected in the Ukrainian part of the Danube Delta in 1983 and speculated that it was possible that single individuals might winter in the region with Greater White-fronted Geese.

United Kingdom

Vagrant, with 47 recorded up to 1957 and 89 recorded from 1958 to 2000 (Rogers and the Rarities Committee, 2001).

United States

Vagrant (AOU, 1998).

Uzbekistan

It has been shown through satellite tracking that birds migrate along the shores of Lake Aral. Some birds might pass through Uzbekistan more regularly. A recent report on waterbirds in the country (Kreuzberg-Mukhina and Markkola, 2000; Kreuzberg-Mukhina and Lanovenko, 2003) revealed important wintering sites close to the Afghan and Tajikistan border areas. From hunting bags, the numbers are estimated to be around 2,000 to 4,000. In the southern Aral region and at the lakes Dengizkul and Aydarkul there is a migrating and wintering population of 200 to 2,000 individuals (Red Data Book Uzbekistan, 2003), in southern Uzbekistan near Bukhara, Kashkadarya and Surkhandarya a new wintering site for geese has recently been found with a total of 144 Lesser White-fronted Geese in the winter of 2001, none in 2002, and 63 in 2003 (E. Kreuzberg-Mukhina, *in litt.*). The species is included in the National Red Data Book of threatened species as Vulnerable (ref?).

4 Actual and potential threats

4.1 Habitat degradation/loss

China

The most severe threat to the Eastern flyway population is the change of the major wintering sites in China. The major wintering populations at East Dongting Lake and other lakes in the Yangtze valley are threatened by the construction of the Three Gorges Dam, which will change the seasonal flow of water in the Yangtze River and could significantly affect the wetlands downstream of the dam (Iwabuchi *et al.*, 1997; Lei, 2000). Suitable habitat in the main wintering area in China has been decreased by 50% over the last 50 years (Lei, 2000). Overgrazing by Water Buffaloes *Bubalus bubalis* has been reported in the main wintering areas in East Dongting Lake area (Lei, 2001).

Greece

Marsh areas in the north-eastern part of Ismaris in Greece were reclaimed for agriculture in the past. There are plans to drain a large part of the flooded area east of Vistonis. This area constitutes a feeding site for geese and possibly for the Lesser White-fronted Goose. Last, but not least, the replacement of cereals by other, more economically beneficial crops, has been seen as an issue affecting geese. The shrinkage of the cereal crops has restricted the alternative feeding sites, since the species primarily feeds in natural range fields and alternatively in cereal crops. Moreover, the greater damage caused by the geese in the remaining wheat fields, raises the understandable reaction of the farmers against the geese. This problem is particularly intense at the Ismaris area. Overgrazing has been mentioned as a factor leading to habitat degradation in the Evros delta in Greece (Lorentsen *et al.*, 1999).

Uzbekistan

The staging areas in the southern Aral in Uzbekistan lake depression have been widely destroyed, subject to severe changes in the water regime (E. Kreuzberg-Mukhina, *in litt.*).

Fennoscandia

The extensive overgrazing of the tundra vegetation by semi-domesticated Reindeer is also potentially a threat for the Lesser White-fronted Geese.

4.2 Exploitation: direct and incidental

Exploitation by man is the most severe threat throughout the region and affecting all flyways. Most severe is the hunting practised in Russia, China and Kazakhstan, the countries which are responsible for the well being of the large majority of the global population. More than 95% of the Lesser White-fronted Goose population is being affected, if we take into account the Fennoscandian birds, some of which migrate east to Kanin, and others as far east as Taimyr (Tolvanen *et al.*, 1998); other birds migrate southwards through many parts of Russia without any protection from hunting at all. These three countries are not Parties to CMS, leading to difficulties in the implementation of international action.

Bulgaria

The species is legally protected, yet the extensive hunting pressure on all geese in the area particularly threatens it (Petkov *et al.* 1999). A special awareness-raising campaign has been launched to address hunters about the threatened status of the species and how to distinguish the Lesser White-fronted Goose from the Greater White-fronted Goose (Kostadinova *et al.*, 1999)

China

The threat by hunting in the major wintering area in China is substantial. Shooting, netting and poisoning of waterfowl are common practices in the wintering areas. In the East Dongting lake area (even inside the East Dongting Lake Nature Reserve) the geese are poisoned with Funandan, frequently affecting Lesser White-fronted Geese, whereas Greater White-fronted Geese are less vulnerable since this species usually frequents the higher elevated grass areas (Lei, 2000; Markkola *et al.*, 2000).

Greece

Illegal hunting near the species's feeding sites is a problem, particularly intense at lake Ismaris, but also in other areas in Greece where the Lesser White-fronted Geese feed outside of the protected zones. The protection area in the Evros Delta is evidently too small and the hunting season too long. In the main wintering area, the Evros Delta, where geese tagged with satellite radio transmitters have been tracked, overgrazing by cattle and illegal hunting have been named as the major threats (Bourdakis and Varetzidou, 2000).

Kazakhstan

The hunting pressure in Kazakhstan is high, as in many other Central Asian and former Soviet countries. Almost all Lesser White-fronted Geese migrating with satellite transmitters have been lost due to shooting. Enormous hunting pressure has been recorded in north-west Kazakhstan. While the number of hunters has decreased from 14,000 to 4,500 in the Kustanay region, illegal hunting and disturbance through hunting pressure remain serious threats (Tolvanen *et al.*, 2000a). V. V. Morozov (*in litt.*) noticed a continuous decline in the species over the last 15 years in the European tundra. He did not find any reasons to suspect local threats or habitat changes and suspects the hunting pressure in Kazakhstan and other countries along the flyway to Central Asia to be responsible for the decline in range and population of the species.

Russian Federation

The hunting pressure in Russia also extends to the breeding season, with spring hunting extending into June in Yakutia.

4.3 Other threats

Predators

Recent studies show that the breeding success and juvenile production of Lesser White-fronted Goose are comparable to other goose species, indicating that conditions for breeding are reasonably good in general. Foxes and other predators, including birds, as well as reindeer herds, may be responsible for losses of broods, but this cannot account fully for the sharp decrease, as other species breeding in the neighbourhood have not experienced similar declines. However, recent interruptions and irregularities in the lemming and vole cycles

noticed in Scandinavia, as well as in other regions, may be leading to increasing pressure from predators that normally prey on small rodents. On the Fennoscandian breeding grounds (Norway, Finland, Sweden) the increase of the Red Fox *Vulpes vulpes*, and the expansion of the range of the Red Fox to tundra areas is a potential threat. In Finnish Lapland, the Forest and Park Service has tried to limit the Red Fox population by systematic fox hunting. .

Human activities

Human disturbance throughout the staging and wintering range, and rarely on the breeding grounds, is also a serious threat for the geese. Other disturbances include access to the feeding sites of the Lesser White-fronted Goose by visitors who wish to observe the birds at a short distance. This problem is particularly severe in the Evros delta in Greece. The deliberate disturbance by farmers when they see geese feeding on crops has been observed in almost all agriculturally dominated areas, which are mostly used by the geese as stop-over or wintering areas. This problem is particularly intense at lake Ismaris in Greece.

China

Pressure from fishermen living near grazing areas by lakes put the species under enormous pressure. Fishermen also partially drain lakes to increase their uptake of fish, putting sites at peril (Lei, 2000).

Norway

Helicopters and 4WD terrain vehicles have been reported to represent serious disturbances in Skjåholmen and in the breeding areas in Norway (Øien *et al.*, 2001). The breeding area, as well as the staging areas in the Valdak marshes are not sufficiently protected (Øien *et al.*, 2001) and increasing human disturbances, among other reasons, has been held responsible for the low breeding success in 2000. Furthermore, tourist development of the region is an additional threat. In Finland, hunting is still allowed at some of the (otherwise strictly protected) traditional autumn staging areas, causing serious disturbance.

5 Legislation

5.1 International

The most important countries responsible for the well being of more than 95% of the species are Russia, China and Kazakhstan, which are not Parties to CMS. Hence, concerted efforts in the framework of the Convention are difficult to implement. China, Kazakhstan and Russia have, however, signed Memoranda of Understanding for the protection of certain species, such as the Siberian Crane and the Slender-billed Curlew. Similar action plans and MoUs can be developed for the Lesser White-fronted Goose and the above-mentioned countries should be encouraged to collaborate in such agreements. The European action plan for the species does not include the Eastern population, and only a flyway approach can safeguard the population recovery.

The AEWFA appears to be a powerful instrument for the implementation of international action to conserve species on a flyway. Again, however, the Eastern population is not fully captured under a similarly powerful agreement. The Asian Pacific Flyway strategy at least addresses the issue. A reinforcement of the concerted action on the Asia Pacific Flyway is a necessary measure.

The legal regulation of hunting appears to be the most important instrument for the protection of a sharply declining population. A ban of hunting on all 'grey' geese *Anser* spp. is necessary as the Lesser White-fronted Goose is likely to be mixed with the more abundant Greater White-fronted Goose. A total ban on hunting geese in the form of a memorandum, as already practised by the Netherlands, would be ideal. However, such a measure is unlikely to be endorsed by the countries in question. A shift of the timing for spring hunting of geese may partly ease the pressure.

The designation of a network of protected areas has been suggested for north-west Kazakhstan (Bragina, 2000), and for the Indigirka region (Syroechkovski, 2000) and other regions in Siberia, which do not enjoy any protection to date.

Officially, many of the wintering sites appear to be adequately covered by protected areas. However, failure to implement many of the existing regulations has led to habitat degradation.

In the EU Birds Directive, Lesser White-fronted Goose is listed in Annex I. According to the directive, the species mentioned in Annex I should be the subject of special conservation measures concerning their habitat to ensure their survival and reproduction in their area of distribution.

5.2 National

Albania

Protected by the law No. 7875 (23/11/1994) and by the respective Hunting Regulation No. 2 (23/07/1995) prepared and approved by the Ministry of Agriculture and Food (Anon., 2003).

Armenia

?

Austria

?

Azerbaijan

According to Madsen (1996) and Lorentsen *et al.* (1999) it is formally protected.

Belarus

?

Belgium

?

Bosnia and Herzegovina

?

Bulgaria

The species is protected by the Act 342 (1986). Possession, transport or trade is prohibit or regulated. (ECOLEX, 2003) Goose hunting is not permitted at Ramsar sites. A penalty, which in 1996 was soon to be increased from US\$2.30 to US\$460, has been imposed for shooting a Lesser White-fronted Goose.

China

The species is not nationally protected in mainland China, but it is protected by the wildlife laws of the following provinces and municipalities: Beijing, Hebei, Liaoning, Heilongjiang, Shanxi, Hunan and Shandong (BirdLife International, 2001).

Croatia

Protected (Anon., 2003a).

Czech Republic

Was hunted during a fixed season (Kren, 2000) but now taken out of the list of species that can be hunted (Czech Republic country report to CMS, 2002)

Denmark

?

Egypt

?

Estonia

Protected (Anon., 2003a).

Finland

Protected under the Nature Conservation Act, staging areas near Oulu are protected, but autumn hunting in part of these sites is still allowed. According to Lorentsen *et al.* (1999), the species has been protected since 1969 and some actions to ensure their conservation and reproduction have been implemented in the coastal meadows. The Nature Conservation Decree No. 160 /1997 implements the Nature Conservation Act, which lists the species as endangered and strictly protected; it prohibits its possession, transport or national or international trade (ECOLEX, 2003).

France

?

Georgia

?

Germany

Strictly protected.

Greece

Since 1993, hunting of all goose species has been banned. The species is considered as a specially protected species according to the Decision 414985/85 (GG 757 B/19-12-1985) of the Ministry for Agriculture. The most important sites are protected by national law and protected internationally by the Bern Convention and listed as Ramsar sites.

Hungary

Strictly protected (Gorman, 1996; Madsen, 1996). Goose hunting is no longer permitted at Ramsar sites. The ?? No. 1/1982 on protected and specially protected species of plants and animals, refers to the species as totally protected (ECOLEX, 2003).

India

?

Iran

?

Iraq

Unknown, apart from the World Heritage Convention, Iraq has not signed any international agreements for conservation (Ramsar, Biodiversity, Bonn Conventions) nor possesses legislation for the conservation of natural areas (Lorentsen *et al.*, 1999).

Ireland

?

Israel

?

Italy

Bassilicata, Regional Act No. 14 implements the EU Council Directive 79/409 on the conservation of wild birds, in which *A. erythropus* is listed. Act No. 221 from the year 2002, supplementing Act No. 157 of 11 February 1992 sets the provisions for the protection of wildlife and restrictions on hunting and implements the EU Council Directive 79/409 at national level.

Japan

?

Jordan

Act No. 113/1973 for the protection of birds and wildlife and regulation of their hunting, lists the animals that can be hunted.

Kazakhstan

The species is not protected (Lorentsen *et al.*, 1999)

Korea, Republic of

?

Kuwait

?

Latvia

According to the CMS report (2002) the species is considered a specially protected species.

Lithuania

Protected since July 2000 by Order 306.

Macedonia

The species is enlisted in the Act of Hunting No. 375/1996, although there is no reference to its management/harvesting/hunting status (ECOLEX, 2003).

Moldova

?

Mongolia

The species is not protected.

Myanmar

?

Netherlands

All geese have been protected from hunting throughout the year from 2000 onwards (de Waard, 1999).

Norway

According to Lorentsen *et al.* (1999) the species is protected.

Oman

?

Pakistan

?

Poland

?

Romania

According to Lorentsen *et al.* (1999) the species is protected. The Law on Hunting and the Protection of Game No. 103/1996 regulates hunting, management and harvest of all Globally Threatened species; *A. erythropus* is enlisted as a prohibited species for hunting and compensation for its killings are regulated as well (ECOLEX, 2003; FAOLEX, 2003)

Russian Federation

According to Lorentsen *et al.* (1999) hunting and other utilisation of the species are prohibited.

Serbia and Montenegro

?

Slovakia

?

Spain

The Catalonian Act on animal protection (No. 3 1988) confers total protection for the species; its possession, transport or national trade are prohibit or regulated (ECOLEX, 2003).

Sweden

The species has been fully protected since 1964 (Lorentsen *et al.*, 1999)

Switzerland

?

Syria

?

Turkey

Turkey's hunting regulation from 1997-1998 established total protection of the species (ECOLEX, 2003).

Turkmenistan

Protected (Markkola, 2000).

Ukraine

Protected (Madsen, 1996).

United Kingdom

Protected.

United States

?

Uzbekistan

The species is protected, with a ban on hunting.

6 Conservation measures

Bulgaria

The major certain staging area, Shabla Lake, has recently been designated as a protected area. Goose hunting is not permitted at Ramsar sites. Action is being taken to give better protection and habitat management to Lake Shabla (by the Ministry of Environment, the Bulgarian Academy of Science and the Bulgarian Society for the Protection of Birds). A penalty, soon to be increased from US\$2.30 to US\$460, is imposed for shooting a Lesser White-fronted Goose. Regular monitoring (2 counts per month) is undertaken at the most important wintering sites by BSPB and is expected to be continued with governmental support.

China

Protection of the species needs to be improved on its wintering grounds, by the establishment of nature reserves at the sites where the species concentrates (Krechmar, 1989). Lu (1990) and MacKinnon *et al.* (1996) made specific recommendations for the conservation of many of the sites where the Lesser White-fronted Goose occurs in China. Eight poachers were arrested in the Dong Dongting Hu lake in Hunan, China, in October 2000, accused of killing 677 Lesser White-fronted Geese in the latter half of that month. Almost 200 of these specimens were reported to have been shot in one day only. The authority in Hunan has claimed that they will punish poachers severely, with prison sentences of up to three years being imposed on poachers (Lei, 2000).

Finland

Staging areas near Oulu are protected, but autumn hunting in part of these sites is still allowed. Coastal meadows are managed for the Lesser White-fronted Geese (grazing and mowing). Timonen and Niemelä (1999) refer to a management plan being developed for the coastal meadows of Säärenperä, 50 km south-west of Oulu. Practically all potential breeding areas situated in the protected wilderness areas managed by the Forest and Park Service.

Germany

The main sites are protected as nature reserves and Unterer Niederrhein and Galenbecker and Putzarer See and are Ramsar sites. A hunting Memorandum for all 'grey' geese as in the Netherlands is proposed. Especially in Eastern Germany, protected sites have to be enlarged to safeguard feeding sites.

Greece

The three most important sites, Evros delta, Kerkini Lake and Lake Mitrikou, are Ramsar sites and EU Special Protection Areas (RCB, 1990). Since 1993, hunting of all goose species has been banned, and this has probably led to the recent establishment of a small wintering population. However, hunting of other game species continues in areas used by the Lesser White-fronted Geese. Habitat restoration is carried out in the Evros delta, with the aim of maintaining its lagoon characteristics. Greece has established a species action plan.

Hungary

The major autumn staging areas in Hungary are protected, including a general shooting ban on waterfowl. Goose hunting is no longer permitted at Ramsar sites, and this may be the cause of the recent increase in wintering and staging numbers of the Lesser White-fronted Goose. However, illegal hunting away from these areas is likely to pose a threat. The hydrology of the fishpond system in the Hortobágy is managed

specifically to create conditions for feeding Lesser White-fronted Geese as well as roosting Common Cranes *Grus grus*. Special protection of the species included the inundation of the traditional roosting areas since 1997, the production of information material mainly addressed to hunters and field research, including monitoring of the population (Aarvak *et al.*, 1997; Tar, 2001).

Iran

The species has been recorded in 17 localities, of which eight have formal protection (Lorentsen *et al.*, 1999).

Kazakhstan

A network of protected areas has been proposed by WWF, but no national conservation measures have so far been put in place at the most important sites (Bragina, 2000).

Netherlands

The main wintering areas are protected as nature reserves.

Norway

Pre-nesting staging areas in the Porsanger Fjord, northern Norway, are protected; breeding areas are partly within national parks but the most important sites remain unprotected. However, not all of the remaining breeding area is yet protected, and adequate management has not been set in place to prevent disturbances. Norway established a species action plan in 1996.

Romania

In December 1995 the Romanian Parliament adopted a new law for protection of the environment. This makes it possible to designate important bird areas (IBAs) as statutory protected areas. The Danube Delta and the Razelm-Sinoie complex (Tulcea, Constanta) form a Biosphere Reserve consisting of several nature reserves where hunting is forbidden. However, some parts of the area remain unprotected and hunting is carried out on the feeding sites outside the protected areas (Lorentsen *et al.*, 1999).

Russian Federation

Part of the central breeding area in Taimyr is within the Taimyr State Reserve. In 1997 one year after the crucial finding of the stop-over site on the Kanin Peninsula, the area was designated as a protected area. Several more of the known breeding localities should be granted reserve status, such as the upper reaches of the Ozhogina, Tyung and Ercha rivers, as well as several sites in the Abij lowland and north of the Alazaya mountains (Degtyarev and Perfilev, 1997; Syroechkovski, 2000). Special feeding grounds should be created at the staging sites, where geese could be better protected while they are on passage. The spring hunting season on the species has been banned in Yakutia since 1995 (A. G. Degtyarev and V. I. Perfilev, *in litt.* 1997). However, this measure is not as effective as intended due to the lack of control in most of these remote areas.

Sweden

Former breeding areas are partly within national parks. A reintroduction programme is currently under reconsideration.

Turkmenistan

A national action plan has been produced (Vasiliev and Gauzer, 2001b).

7 International Action plans

The European Commission established an International Action plan (Madsen, 1996), covering most of the Western and Central flyway population. The management plan has been approved by the Ornis Committee. The action plan needs to be implemented in Azerbaijan, Bulgaria, Finland, Germany, Greece, Hungary, Kazakhstan, Lithuania, Norway, Romania, Russia, Sweden, Turkey and Ukraine. The short-term aims of this action plan are to maintain the current population of the Lesser White-fronted Goose in known areas throughout its range and to locate and assess the existing poorly known breeding and (especially) staging and wintering areas of the species, and, if possible, remove the current threats. In the longer term, the aim is to conserve and manage all major sites to encourage increased use by the species and ultimately a population recovery.

8 International co-operation

In Scandinavia, different initiatives, under the auspices of an informal Fennoscandian Lesser White-fronted Goose Conservation project, have been taken to meet the decline of the breeding population. In the Russian Federation the Goose and Swan Study Group of Eastern Europe and North Asia have established a sub working group to address the conservation of the Lesser White-fronted Goose. Both groups are organised by the Wetlands International Goose Specialist Group, which has undertaken biennial meetings since 1995 with Species task force groups, as in the case of the Lesser White-fronted Goose.

9 Research activities

The Fennoscandian Lesser White-fronted Goose conservation project, led by WWF Finland and the Norwegian Ornithological Society has been the main initiator and promoter of various research activities throughout the range of the species. With a range of activities ranging from monitoring on breeding, staging and wintering sites, to genetic analyses, the group has covered almost the entire range of scientific research on the species. The Finnish WWF established a working group for this species in 1983. Its work has included interviewing reindeer herders and hikers visiting breeding areas, monitoring, conducting surveys in Lapland, and conducting research on the biology of the species.

In 1997-1999, the Finnish Lesser White-fronted Goose Life-Nature project of the European Union was implemented to determine breeding, migration time, staging and wintering sites by satellite tracking, and improved conservation in these areas.

In Russia, the Goose and Swan Study Group of Eastern Europe and North Asia has undertaken several research studies to explore the conservation status of the Lesser White-fronted Goose in northern Russia. In particular Bolshezemelskaya Tundra, South Yamal, Taimyr and Yakutia have been the focus of the group in the last five years. Monitoring of the Bolshezemelskaya Tundra and Yamal population will continue for four further years. On important staging areas in the Putorana Mountains monitoring is secured for three further years. The Russian Goose Group designed a GIS connected database to store all records of the Lesser White-fronted Goose.

The main focus in Sweden remains on the reintroduction of Lesser White-fronted Goose into the wild through using Barnacle Geese as foster parents. The project has had some success as the birds have been regularly returning to the places of their release. But recently the project became increasingly under scientific dispute, when genetic analyses demonstrated the distinct genome of the Fennoscandian population and the danger of mixing the last of the wild populations with a different genetic set.

Reintroduction

In connection with the Swedish re-introduction programme and, in the face of the increasing threats on the main staging and wintering grounds in Eastern Europe and Kazakhstan, new conservation projects envisage the possibility to establish new and safer flyways, using ultra light aeroplanes. In collaboration with German

goose researchers and with the support of the Ministry of Environment it is proposed to guide newly bred Lesser White-fronted Goose from sites in northern Sweden across Denmark to the Lower Rhine area. Again, this project has been criticised for similar reasons in relation to the risk of interbreeding between two distinct populations. On the other hand, the remaining Fennoscandian population is in a most critical situation, and it is therefore likely to face extinction in the next ten years. Careful consideration about the introduction of new geese and new genes should not be excluded, but also should remain the last resort.

10 Needs and recommended actions

a) Policy and legislation

The most important countries for the protection of the species, the Russian Federation, China and Kazakhstan are not Parties to the Convention, and concerted efforts are difficult to implement when the most important range states are not committed to any action plans. China, Kazakhstan and the Russian Federation have signed some Memoranda of Understanding for the protection of species, such as the Siberian Crane and the Slender-billed Curlew. Similarly, action plans and MoUs could be developed for the Lesser White-fronted Goose, and the above-mentioned countries should be encouraged to collaborate in such an agreement.

The Lesser White-fronted Goose could be included among the species action plans under the AEWA, and the East Asian flyway population could be addressed in a multilateral agreement between the Russian Federation, China, Korea and Japan.

The most important single measure for the conservation of this species in Asia is the passing and enforcement of legislation in its range states, mainly the Russian Federation, China and Kazakhstan, to reduce the level of hunting pressure, particularly at passage and wintering sites. The hunting of this species should be banned in the Russian Federation, at least during the spring passage period, since hunters are often unable to distinguish Lesser White-fronted Geese from Greater White-fronted Geese. A ban on shooting of both species or even all 'grey' geese may therefore be the most effective conservation measure that could be put into practice.

The species should also be designated as a nationally protected species in mainland China. The enforcement of legislation to control hunting at the key wintering sites in the Yangtze valley and elsewhere in China is critical for the conservation of the Asian population of this species. Given the practical difficulty in distinguishing this from other geese, efforts should be made to control the hunting of all goose species. A memorandum of understanding preventing the shooting of 'grey' geese (*Anser* spp.) has been implemented in the Netherlands (de Waard, 1999) and is currently under revision in some German Länder, and other European countries. The success of these measures is, of course, very much dependent on the number of parties joining in such a memorandum.

b) Species and habitat protection (reintroduction)

The reintroduction programme in Sweden seems to be successful but careful consideration needs to be given to the potential of interbreeding with genetically distinct populations in the wild. Reintroduction in Sweden has been stopped for the time being because Greater White-fronted Goose genes have been documented in the captive stock. The use of Barnacle Geese as foster parents has also introduced problems such as hybridisation.

The translocation and the establishment of a new flyway to safe wintering grounds appear initially to be attractive and widely popular solutions to rescue declining migratory populations. However, both these approaches raise a number of questions. Firstly, they might imply that sensitive geese populations can be exploited and restored on request and at our convenience using modern technology. This might also have wider considerations, which will go far beyond the protection of the Lesser White-fronted Goose itself.

- For how many other species could a similar approach be equally applied, and who would decide on the correct new flyway route?

- What happens if a currently threatened population recovers after a new flyway population has become well established?
- Should an increase in the old flyway population be discouraged?
- Should two parallel populations be allowed to co-exist or should the old one be culled?
- Should the well-balanced genetic setting of the various populations and species involved be interfered with and what steps would need to be taken to avoid this unwanted interference?

The redirection of migratory populations into ‘safe’ staging and wintering areas might be attractive and very popular with the support of modern technology, but could in the long term cause more problems not yet fully understood. The Convention on Migratory Species (CMS), its agreements, namely the AEWA and its technical bodies, are requested to consider and advise on the issue of establishing new flyway populations, as requested for the Lesser White-fronted Goose by part of the scientific community, with the potential of more species to be considered in the near future. The IUCN guidelines for reintroduction should be used as the basis for consultation on the matter, but require further scrutiny in terms of the migratory species requirements and their implications for other species and nature conservation in general.

Most importantly, every conservation measure should primarily focus on safeguarding the natural population and their naturally established flyways along the entire flyway before other measures are considered. This approach also has the advantage of safeguarding species otherwise not under the immediate attention of the conservation community. The Lesser White-fronted Goose can therefore play a crucial role as an ‘umbrella’ species safeguarding the wider conservation of a whole array of habitats.

c) Monitoring and research

Monitoring needs to be continued and maintained to enable the identification and assessment of key areas for the Lesser White-fronted Goose. Satellite tracking, which has already been used to study the western and central population of this species, might be used to determine and monitor its movements in the eastern part of its range, and possibly identify further important breeding, passage or wintering sites. This already has led to the protection of the major stop-over site of the laidia saltmarshes on the Kanin Peninsula. Further research is necessary to assess its current status on the breeding grounds and at moulting sites. In China, populations should be surveyed and monitored at the sites where significant numbers have occurred in the past, and at other wetlands with the potential to support important populations, in order to improve understanding of the pressures that the species is facing, and to develop appropriate conservation measures. A study should be conducted on the habitat requirements of this species at Dong Dongting Hu Nature Reserve, so that the management of this important site can be improved.

d) Public awareness and training

Training and capacity building, particularly in relation to the enforcement of conservation measures, appear to be the most important actions that need to be taken to increase the level of knowledge among the field workers responsible for the management of reserves. Several initiatives have been undertaken in Hungary, Bulgaria, the Russian Federation and Kazakhstan to improve the knowledge on the species. Additional attempts should be undertaken in China’s most important wintering sites.

11 Additional remarks

While the most important countries for the species, the Russian Federation, China and Kazakhstan are not Parties to CMS, the protection and implementation of international action is very limited. All three countries should be encouraged to join the Convention or join a multilateral Memorandum of Understanding, to protect the species efficiently along its various flyways.

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