

International Single Species Action Plan for The Western Palearctic Population of The Lesser White-fronted Goose, *Anser erythropus*¹

Extract from the Third and Final Draft, version 3.0
05 May 2008

Preamble

The following text is an extract of the current (third and final) draft of the Single Species Action Plan (SSAP) for the Western Palearctic Population of the Lesser White-fronted Goose. It includes the elements related to the Fennoscandian breeding population of the species, on the reintroduced population in Swedish Lapland, and on relevant captive breeding programmes and initiatives in Finland, Sweden, Norway and Germany. Thematically this extract focuses on the potential for genetic introgression of foreign DNA into the wild Fennoscandian population from captive-bred, reintroduced birds. Please note that page references have been modified accordingly, and that annexes and literature references have been excluded from this shortened version.

The discussion of the draft SSAP will be a central element of the upcoming Committee meeting. The AEWA Secretariat therefore kindly asks the reviewers to provide their comments at the meeting on 7-8 May. The full draft SSAP for the species has meanwhile been mailed for consultation to all the Range States to the Lesser White-fronted Goose. It shall be submitted for approval at the upcoming AEWA MoP4 in September this year.

The section on biology and threats is mainly for your background information. When reviewing the document, kindly focus on the following questions:

- Are there any major problems or points in this extract that would prevent your country from adopting this draft plan?
- Particularly, are the framework for action and the activities for implementation agreeable for your country, from your perspective?

We would like to thank you in advance for your feedback and input to our discussions in Bonn!

¹ Under a contract with Birdlife International, drafted by Tim Jones of DJEnvironmental.

Biological Assessment

Population Development

Fennoscandian population

The wild Fennoscandian population in the Nordic countries (i.e. excluding the unknown number of birds nesting in the Kola Peninsula of westernmost Russia – see below) was estimated in 2004 at only 20-30 breeding pairs and there has been a sustained, statistically significant, negative trend in the population since 1990 (Tolvanen et al. 2004b; Aarvak & Øien 2004). This continues a long-term decline, from an estimated 10,000 individuals in the early twentieth century (Norderhaug & Norderhaug 1984). There have been no recent breeding records for the wild population in Sweden, where the last confirmed breeding occurred in 1991 though the footprints of adults and young were seen at a suitable locality in 1996 (Pääläinen & Markkola 1999), and a male showing breeding behaviour was seen in the same area in 1998 (A. Andersson, M. Björkland pers. comm.). In Finland, nesting was last confirmed in 1995 (Øien et al. 2001), though birds continue to be seen in suitable breeding habitat virtually annually (P. Tolvanen pers. comm.). *Figure 2* shows the overall trend in the Fennoscandian population over 25 years, but note that during the latter part of this period there was little organised searching for breeding birds in Finland and none in Sweden (P. Tolvanen pers. comm.). However, survey work in northern Sweden in 2005 generated two records for the spring migration period (end of April) and two records during the breeding season (June/July), but without any evidence of nesting (M. Björkland, pers. comm.). *Figure 3* shows the contraction in range from the 1950s to the present day.

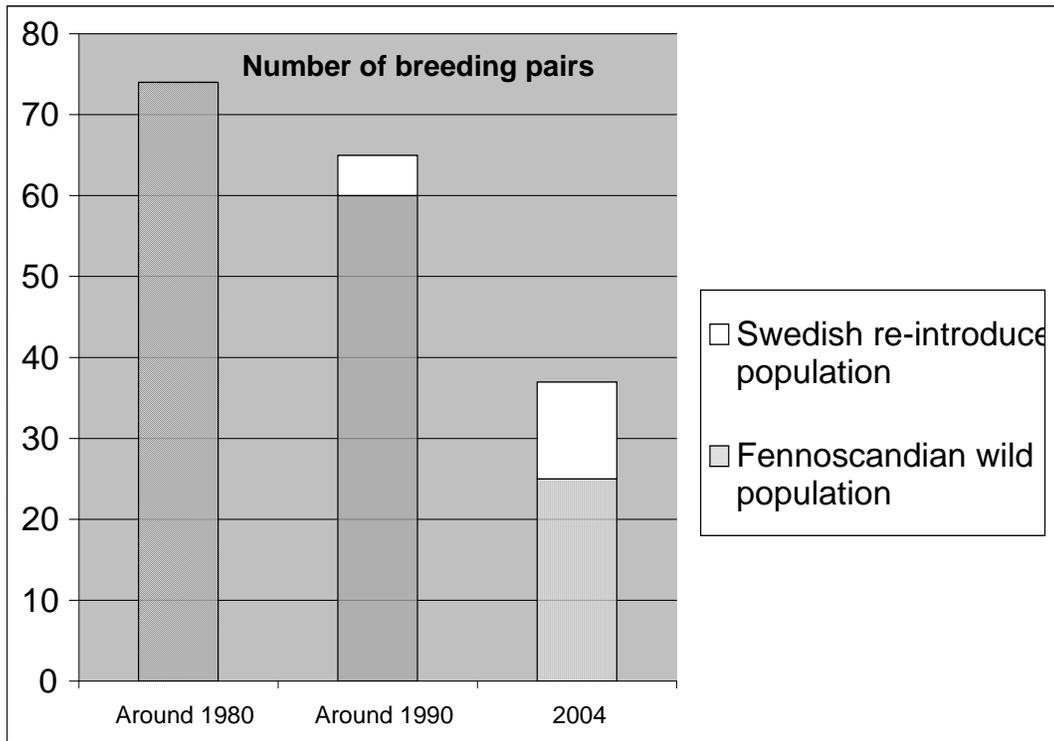


Figure 2. Trend in wild Fennoscandian Lesser White-fronted Goose numbers 1980 to 2004 (excluding birds nesting on the Kola Peninsula, Russia) and re-introduced Swedish population. *Source:* based on Andersson 2005, BirdLife

International 2004, Norderhaug & Norderhaug 1984; updated with information provided to the 2005 Lammi workshop by I.J. Øien.

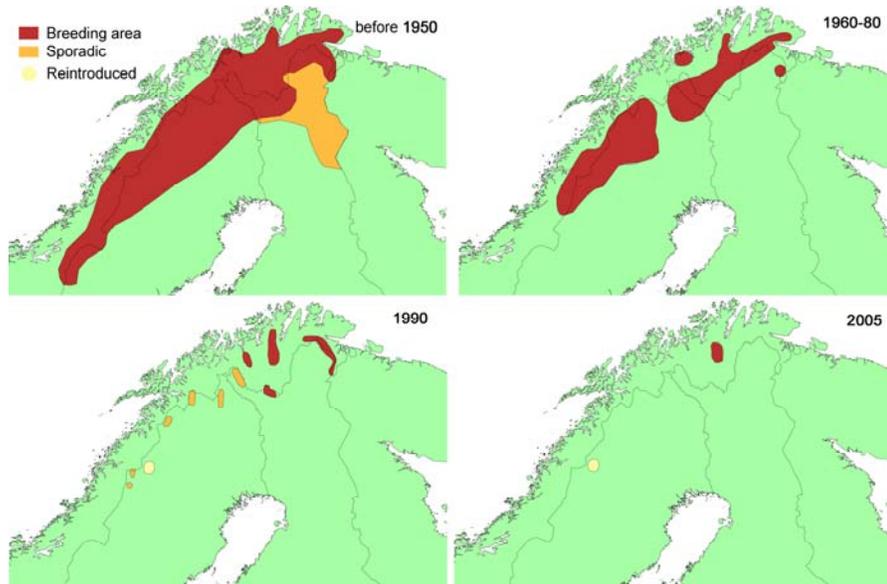


Figure 3. The breeding distribution of the Lesser White-fronted Goose in Fennoscandia before 1950 (above left), 1960-1980 (above right), at the beginning of the 1990s (below left; after von Essen et al. 1996), and in 2005 (below right).

At the Valdak Marshes, northern Norway, the most important staging area in the Nordic countries, numbers of Lesser White-fronted Geese staging in spring decreased by more than one-third between 1990 and 2003 (Aarvak & Øien 2004). A decline of 65% between 2000 and 2003 was recorded at a second spring staging area, the Bothnian Bay coast of Finland (Markkola et al. 2004), though this probably also reflects changes in migration routes, as well as random effects such as weather conditions.

Aikio et al. (2000) concluded that the status (including precise breeding and moulting areas, numbers and trends) of birds nesting on the Kola Peninsula of north-westernmost Russia was unclear and that more detailed research was required. A field expedition in June 2001 gathered some additional information and the report on this work concludes: “it is still possible that the total Lesser White-fronted Goose breeding population of the whole Kola Peninsula could be perhaps some tens of pairs, taking into account the huge area of potentially suitable and mostly intact breeding habitat” (Timonen & Tolvanen 2004).

Reintroduced population in Swedish Lapland

A Lesser White-fronted Goose captive-breeding programme was established in Sweden by Lambert von Essen in the late 1970s and the first releases into the wild took place in 1981 (e.g. von Essen 1996). The breeding stock was built up mainly with birds and eggs originating from waterfowl collections in the UK and continental Europe. During the period 1981 to 1999, 348 captive-bred Lesser White-fronted Geese were released in Swedish Lapland. Barnacle Geese *Branta leucopsis* were used as foster-parents and the reintroduced Lesser White-fronted Geese followed their foster parents to wintering grounds in The Netherlands. The birds using this artificially established migration route, which avoided countries with unsustainably high hunting pressure, show a high survival rate. A total of 66 young fledged

from breeding attempts in the release area between 1981 and 1999 (Tegelström et al. 2001). The number of fledglings reared between 1999 and 2003 ranged from 13 to 20 annually, with a total for the five-year period of 83 fledglings from 29 broods (Andersson 2004; Andersson 2005). Between 70 and 80 geese of the reintroduced population were recorded in The Netherlands during the winters of 2003/2004 and 2004/2005.

In 1999, 30-40 Lesser White-fronts of mostly Belgian origin were released in central Sweden and guided by ultra-light aircraft to Germany. Most were recaptured when they returned to the release site, but a few remained free-flying and have been observed in Finland. No breeding by these birds has been reported (L. Kahanpää pers. comm.).

No captive-bred geese were released during the period 2000–2004, following the discovery that some birds in the captive breeding stock were carrying genes of Greater White-fronted Goose *Anser albifrons* (Andersson 2004). Analysis of the nuclear genetic variation showed that the genetic differentiation between the wild Fennoscandian population and the captive breeding stock is three times as large as between the wild populations of Fennoscandia and Central Asia. Thus, the captive stock does not represent the original Fennoscandian population from a genetic perspective (Ruokonen et al 2007).

Finnish captive-breeding and reintroduction programme

In 1986 a captive breeding population was established in Finland (Markkola et al. 1999). Between 1987 and 1997 about 150 captive-bred Lesser White-fronts were released in Finnish Lapland, but high mortality occurred and no breeding attempts were made by the reintroduced birds. This reintroduction programme did not aim to modify goose migration routes (Markkola et al. 1999). Releases were stopped from 1998 (Markkola et al. 1999), though Lesser White-fronted Geese continued to be bred in captivity.

In July 2004, three Lesser Whitefront goslings were released contrary to the moratorium in northern Finland (together with their Barnacle Goose foster parents, the male of which was satellite-tagged). One of the young Lesser White-fronts was sighted among Barnacle Geese in The Netherlands in December 2004, though not in the company of its foster parents, or of reintroduced Swedish birds. There were plans to release between one and three similar families in 2005, subject to the outcome of a legal challenge over the legitimacy of the 2004 release, but a lack of suitable birds for release prevented this. (L. Kahanpää pers comm; see also the website of the Friends of the Lesser White-fronted Goose www.math.jyu.fi/~kahanpaa/Kotisivut/AnserErythropus/LWfG.html).

New captive-breeding and release initiative

A new international, German-based project aims to breed up to 400 Lesser White-fronted Geese in four years and to release them in Lapland. It is intended to use ultra-light aircraft as ‘foster parents’ to guide the birds from Swedish Lapland to wintering grounds in the Lower Rhine area of Germany. Intensive experimental work has already been conducted over the course of six years (source: Operation Lesser White-fronted Goose/Aktion Zwerggans, www.zwerggans.de).

On 20 October 2005 the Swedish Environmental Protection Agency decided to issue a permit to Aktion Zwerggans, subject to certain conditions being met, for: (a) the release in Västerbotten county of up to 25 Lesser White-fronted Geese in both 2006 and 2007; and (b) implementation of a pilot project on the use of ultra-light aircraft as a means of guiding the released geese on a new flyway through Sweden (and then through Denmark and north-west Germany to the Lower Rhine). However, plans to import wild Lesser White-fronted Geese from Russia, to use as the basis for a ‘genetically clean’ breeding stock, were delayed due to EU restrictions on bird movements in response to concerns about the spread of the H5N1

strain of avian influenza (T. Larsson pers. comm.). *The first shipment of eight wild birds from Russia was received in 2006 and another group of six birds was expected in mid-February 2007 (information to be confirmed).*

In November 2005, the Scientific Council of the Convention on Migratory Species concluded, as part of its wider recommendation on Lesser White-fronted Geese (see pages 10–11 and Annex 9a), that: *“For the present, we do not support the introduction of Lesser Whitefronts into flyways where they do not occur naturally. We have borne in mind the powerful argument concerning the improved safety of birds in these flyways, as well as practical considerations, such as current proposals that could quickly be put into effect. However, we consider that modifying the natural behaviour of Lesser Whitefronts in this respect, as well as unknown ecological effects in the chosen new flyways, and other such considerations, make this technique inappropriate until such time as it may become essential, particularly when major disruption or destruction occurs of key components of the natural flyways. We do not believe that to be the case at present.”*

Following consultations in 2006 and 2007 between the German Government, Aktion Zwerggans, the main sponsor of the proposed project, the Fennoscandian LWfG breeding Range States and the AEWa Secretariat, it was agreed that implementation of the Aktion Zwerggans experimental pilot project would be postponed to enable sufficient stock to be built up derived entirely from wild-caught Russian birds (AEWA 2007; Annex 10).

Distribution throughout the Annual Cycle

The three wild subpopulations and the reintroduced Swedish population have differing migration routes and wintering grounds, though there is known to be partial overlap in the case of the Fennoscandian and Western main populations. The main flyways are indicated in Figure 1.

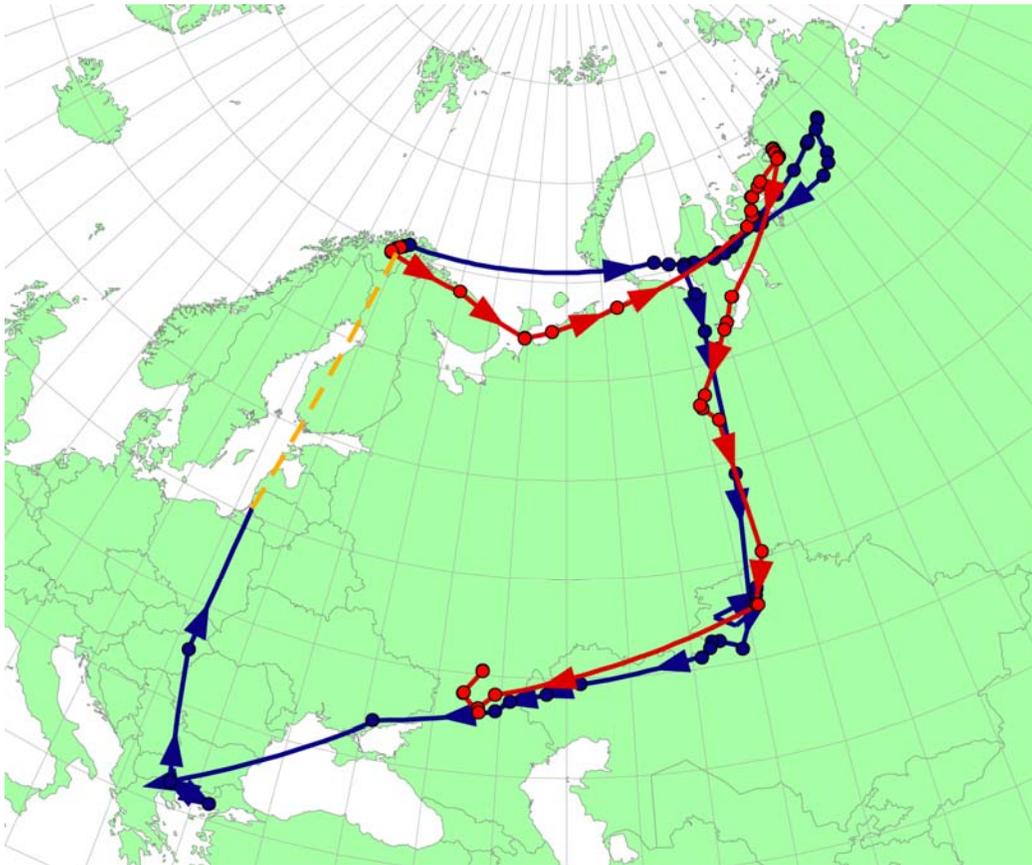
Fennoscandian population

Satellite tracking has shown that non-breeding birds from the small Fennoscandian population undertake an autumn migration eastwards to the Kanin Peninsula, Kolgujev Island (and even as far as the Taimyr Peninsula) in northern Russia (Aarvak & Øien 2003). Successful breeders moult on the breeding grounds, but then also undertake a migration eastwards to the Kanin Peninsula. There is subsequently a migratory divide, with some birds heading south-west, presumably through western Russia (Lake Ladoga region), western Estonia, Poland and eastern Germany, and then south-east, via a major staging area in Hungary (Hortobágy) and Greece (Lake Kerkini) to wintering grounds in north-east Greece (Evros Delta), adjacent to the Turkish border. There is also evidence that these birds visit the Turkish side of the Evros Delta and/or other sites in westernmost Turkey during the winter. Other birds migrate eastwards, crossing the Ural mountains, and then turning south through the Ob valley to north-west Kazakhstan and onwards to presumed Black Sea and Caspian Sea wintering areas. These are thought to be shared with the Western main population (Lorentsen et al. 1998; Aarvak & Øien 2003). However the most recent evidence from satellite tracking during 2006/2007 shows that some individuals of the Fennoscandian population undertake an astonishing loop migration to the Greek wintering grounds via the Ob Valley, north-west Kazakhstan and the Black Sea, returning north through Hungary and the Baltic (LIFE Nature project 2005–2008 “Conservation of the Lesser White-fronted Goose on European migration route” – see Figure 4). The Lesser White-fronts wintering on the Black Sea coast of Bulgaria and Romania, scattered among flocks of Greater White-fronts, are thought to belong to the Western main population.

Known spring and autumn staging areas around the Baltic Sea and close to the breeding/moulting grounds are now monitored on a regular basis. Important spring staging

sites in the region include the Nemunas Delta, Lithuania (revealed by satellite tracking in spring 2007), Matsalu, Estonia (Tolvanen 1999; Pynnönen & Tolvanen 2001; Tolvanen, Toming & Pynnönen 2004), the Bothnian Bay area, near Oulu in Central Finland (e.g. Markkola, 2001) and the Valdak Marshes, Porsangen Fjord, Norway. The major staging sites in autumn include the Valdak Marshes (Aarvak & Øien 2001).

Figure 4. Satellite tracking of birds from the Fennoscandian population in 2006/2007 shows a 'loop' migration to the wintering sites in Greece, via Russian moulting grounds. The solid lines show the actual routes followed by two male birds ('Finn' in blue & 'Imre' in red) ringed and satellite tagged at the Valdak Marshes, northern Norway, in summer 2006. The dashed orange line shows Finn's projected route for the last part of his migration. The final satellite transmission was from the Nemunas Delta, Lithuania, in April 2007 but Finn was sighted back at the Valdak Marshes on 20 May.



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Reintroduced population

As described above, a human-created flyway has now been established between the release area for captive-bred birds in Swedish Lapland and The Netherlands, crossing north-west Germany. There are sporadic records from other countries, often of individual birds mixing with flocks of other goose species, mostly Barnacle Geese. All released individuals have been colour-ringed, but as there have been no releases since 1999 and because the offspring of released birds are not ringed, the proportion of colour ringed birds in the population has gradually declined. Nevertheless, colour-ringing has enabled a relatively comprehensive picture of their movements to be established.

Available Key Knowledge

Finland (EU)

No breeding of wild Fennoscandian birds has been confirmed since 1995; the current estimate for the breeding population is 0-5 breeding pairs (P. Tolvanen and J. Merillä, pers. comm., Väisänen & Lehtiniemi, 2004). A restocking programme was implemented between 1989 and 1998, but suspended due to concerns about the genetic structure of the captive breeding population (see Markkola et al. 1999; and page 4). Three Lesser Whitefront goslings were released in 2004 in contravention of the moratorium on releases. The Bothnian Bay coast, close to Oulu, has been recognised as an important spring staging area and was formerly also an autumn staging area. Eleven different individuals were recorded in the region in spring 2007 (<http://www.piskulka.net/Recent%20sightings.htm>).

Germany (EU)

The species passes through Germany in small numbers. Niethammer (1938) stated that Lesser White-fronted Goose was a regular migrant in the northern part of Germany, but in smaller numbers than Greater White-fronted Goose. Preliminary results from recent studies show that the species is still regularly observed in the northern part of the country with a frequency of 50-100 observations per year in past decades (Mooij 2000), though these figures include both wild and reintroduced birds (see below). Data indicate that birds from more than one population migrate through Germany, with some vagrant individuals of the Western main population also wintering (Mooij & Heinicke *in prep.*). Birds of the wild Fennoscandian population tagged with satellite transmitters have been recorded in Mecklenburg-Vorpommern and Sachsen-Anhalt (eastern Germany) during autumn migration.

Birds from the Swedish reintroduction programme have been recorded increasingly frequently. A programme has been proposed to modify the flyway of reintroduced birds to a wintering site in the Lower Rhine area of Nordrhein-Westfalen. This programme is currently 'on hold' in line with the January 2007 conclusions of the AEWA Secretariat's negotiation mission (see pages 4/5 and Annex 9a).

Norway

The most recent published estimate for the Fennoscandian population (excluding the Kola Peninsula) is 20-30 breeding pairs in 2005, while field surveys of the core breeding area in summer 2006 and summer 2007 recorded 10–11 and 13 breeding pairs, respectively (http://www.piskulka.net/Recent_sightings.htm). There is one important staging area in northern Norway – the Valdak Marshes. Another staging area is the Varangerfjord area, but the significance of this site has decreased during the last 10 years. Monitoring at both sites has shown a continued decline in numbers.

Sweden (EU)

Formerly bred in large numbers, the wild population is now thought to be extinct. There have been no confirmed breeding records during the last 10 years, though there continue to be sporadic sightings. Given the great extent and remoteness of suitable habitat, it is possible that a few nesting pairs remain. Since 1977 a captive-breeding and reintroduction programme has resulted in the establishment of a free-flying population breeding in Swedish Lapland and wintering in The Netherlands, currently estimated to be 80-90 birds, with 10-15 breeding pairs. No releases have occurred since 1999, following the discovery of genes of Greater White-fronted Goose among the captive stock (Ruokonen et al. 2000, Ruokonen et al 2007, see also page 4). Nevertheless, the population continues to show a moderate rate of increase.

In addition to the brief summaries above, Annex 2 contains a table showing the latest quantitative and qualitative data and corresponding sources available for each of the 'Principal Range States'. It also contains a country-by-country analysis summarizing the current state of knowledge in both 'Principal Range States' and 'Other EU/AEWA countries'.

Threats

Description of Threats

Because of the dramatic decline of population numbers, there is a view that the species is likely to have suffered significant loss of genetic diversity, which might threaten reproductive success and ultimately viability of the wild populations. However, a study conducted by Ruokonen et al. (2004) suggested that there is probably a regular influx of male birds from western Russia, ensuring gene flow between the populations and thereby reducing or eliminating the possible harmful effects of inbreeding. This would be in conformity with the hypothesis that birds from the dwindling Fennoscandian population are increasingly likely to pair with birds from the Western main population where the two populations' flyways overlap. Furthermore, recently published research suggests that genetic variability in the Fennoscandian population is as high as in the Russian population. Thus, despite its small size, the Fennoscandian population shows no signs of inbreeding (Ruokonen et al. 2007).

In recent years, concern has been raised about the potential for reintroduced birds originating from captive-bred stock to introduce alien genes, notably those of Greater White-fronted Goose and Greylag Goose *Anser anser*, into the wild population. This issue is dealt with in detail below:

Potential genetic introgression of White-fronted Goose, Barnacle Goose and/or Greylag Goose DNA into the wild Fennoscandian population from captive-bred, reintroduced birds.

Genetic studies have shown that a proportion of individuals within the captive breeding populations used for the Finnish and Swedish reintroduction/restocking programmes are carrying DNA of other goose species, notably Greater White-fronted Goose² (Ruokonen et al. 2000, Ruokonen 2001, Ruokonen et al. 2007). The percentage of captive-reared birds carrying alien genes in the Swedish captive stock was estimated at 36% (Ruokonen et al. 2007). The Swedish authorities believe the proportion of released birds carrying alien genes may be somewhat lower, at around 5-10%. It has been concluded that the occurrence of alien genes arose through hybridisation in captivity because no signs of hybridisation have been found in the wild populations of Lesser or Greater White-fronts (Ruokonen et al. 2004). There is a risk that released birds carrying DNA from other goose species could pair and breed with wild Lesser White-fronts, thereby causing introgression of alien genes into the wild Fennoscandian population. Given that the Fennoscandian and Western main populations partially overlap outside the breeding season, contamination of Western main birds could also occur. There is not full consensus among Lesser White-fronted Goose stakeholders concerning the significance of this risk.

The status of the established free-flying, reintroduced population has been the subject of particular controversy. Some experts have argued that all these individuals must be caught and taken back into captivity to protect the genetic status of wild birds. The Swedish

² Lesser White-fronted Goose individuals found to be carrying genes of Greylag Goose *Anser anser* have never been used for reintroduction in Sweden (T. Larsson, pers comm).

authorities among others, have countered that the free-flying reintroduced population should be maintained, noting *inter alia* that it constitutes the only genetic link with the original wild population in Sweden. The latter position appeared to be strengthened by a 2005 decision of the High Administrative Court in The Netherlands, ruling that Special Protection Areas should be established for wintering birds from the reintroduced Swedish population.

Nevertheless, further releases of captive-bred birds are formally suspended (though one Lesser Whitefront family was released in Finland in 2004 in spite of the moratorium) and birds from the captive-breeding stock that have been confirmed as carrying alien genes have been removed, though it is not possible to identify (and therefore to remove) all birds carrying such genetic material. The expert workshop held in Lammi, Finland in 2005, agreed that any future releases should only be based on genetically 'clean' stock, preferably derived from the wild due to the technical impossibility of identifying all birds carrying alien DNA. This decision has been reinforced during a negotiation mission with the countries in 2007.

The Swedish authorities opened discussions with their Russian counterparts with a view to obtaining wild birds to build up a new captive-bred population from which future releases could be made. While movements of wild birds were suspended for a time owing to EU restrictions in response to the spread of the H5N1 strain of avian influenza, the first shipment of eight wild birds from Russia arrived in Sweden in 2006 and another group of six birds was received in mid-February 2007.

The IUCN Guidelines for Reintroductions, issued in 1995 by the IUCN Species Survival Commission (SSC), have no formal legal status but are generally regarded as the most authoritative internationally published guidance on species reintroductions (IUCN 1998). While the need for conformity with the IUCN Guidelines has been cited by both proponents and opponents of Lesser White-fronted Goose reintroduction initiatives, the guidance actually doesn't extend to the more controversial aspects of the Lesser White-front reintroduction programmes, namely the possible introgression of alien DNA into the wild population and modification of flyways.

Given the lack of detailed internationally accepted guidance, the Action Plan compilers undertook (at the Lammi Workshop) to submit a dossier on the issue for review by the Scientific Council of the Convention on Migratory Species (CMS) with a request that the Council should provide independent, authoritative advice on the future of restocking/reintroduction programmes for Lesser White-fronted Goose.

Taking into account the views expressed at the Lammi Workshop, as well as at earlier meetings and in relevant publications, and drawing on the first draft of this Action Plan, a dossier was transmitted by BirdLife International to the CMS Secretariat in July 2005. Some stakeholders felt that the dossier was incomplete and/or did not accurately represent the actual situation. In such cases, the stakeholders concerned were encouraged to provide the Scientific Council with additional information. Thirteen such contributions were taken into account by the Scientific Council in preparing its conclusions and recommendations, finalised in November 2005 at the 13th Meeting of the CMS Scientific Council, Nairobi, Kenya, 18 November 2005 (attached as Annex 9a; additional comments provided by Dr Robert C. Lacy are appended as Annex 9b).

The following are the Scientific Council's conclusions (numbered for clarity, but otherwise quoted verbatim):

1. "It is desirable to have a wide genetic diversity among wild Lesser Whitefronts.
2. There appears to be no undisputed answer at present to the question of whether the Fennoscandian population (as represented by the birds breeding in Norway) is genetically distinct from the nearest breeding birds to the east, in northern Russia.

- Given the uncertainty, we take the cautious approach that there might be a potentially valuable genetic distinction, and that we should not deliberately interfere with it (for instance, by boosting the Fennoscandian population with wild birds from elsewhere), unless or until such interference may become inevitable.
3. Given the small size of the wild Fennoscandian population, if possible, a captive breeding population of birds from this source should be established and maintained as a priority. We recognise that there are risks involved in taking eggs and/or young birds from the wild population, but that careful use of a known surplus (that is, those birds that would have died or been killed in their first winter) may be a practical conservation option.
 4. We consider that every effort should be made to conserve the Fennoscandian birds down their traditional migration routes into southeastern Europe and the Caspian/Central Asian region. We recognise that this is a major challenge. We endorse the current LIFE project that aims to safeguard the birds and their habitats along the western route. It is our opinion that all appropriate efforts should also be made to conserve the wild populations of the species in its other flyways.
 5. We consider that doubts do remain about the genetic make-up of the existing free-flying birds, originally introduced into the wild in Fennoscandia, and which winter in the Netherlands. It does seem to us that not all, but a large part, of the scientific community will never be completely satisfied concerning the level of genetic contamination from the Greater White-fronted Goose *Anser albifrons* and other species, which many will regard as impossible to eliminate. Despite genuine efforts to improve the genetic purity of existing captive flocks we consider that these flocks are not to be regarded as potential sources for release to the wild.
 6. Given the possibility that the above-mentioned free-flying birds, or their descendants, may pose a risk to the genetic make-up of the wild Fennoscandian population, the Scientific Council is of the opinion that these birds should be caught or otherwise removed from the wild. We do not say this lightly, nor underestimate the practical and other difficulties involved. We recommend that a feasibility study be undertaken as a matter of urgency.
 7. We believe that there is nothing against establishing a group in captivity of purebred Lesser Whitefronts from the wild, western Russian stock, and it may well prove valuable to have such a group in the future. However, we do not believe that it is appropriate to release such birds to the wild now or in the immediate future.
 8. For the present, we do not support the introduction of Lesser Whitefronts into flyways where they do not occur naturally. We have borne in mind the powerful argument concerning the improved safety of birds in these flyways, as well as practical considerations, such as current proposals that could quickly be put into effect. However, we consider that modifying the natural behaviour of Lesser Whitefronts in this respect, as well as unknown ecological effects in the chosen new flyways, and other such considerations, make this technique inappropriate until such time as it may become essential, particularly when major disruption or destruction occurs of key components of the natural flyways. We do not believe that to be the case at present. We give due weight to arguments about the continuing decline of the very small Fennoscandian population, and to the estimates of how long it may continue to be viable, but we are not persuaded that such a fact alone is enough to justify radical action.
 9. We consider that it would be appropriate to re-examine the issues once more in five years.”

The additional comments by R. Lacy included a replenishment or ‘dilution’ approach to the introgression of alien genes, whereby pure-bred birds (i.e. without alien genes) could be introduced into the population identified as carrying alien genes (see Annex 9b).

The Scientific Council's conclusions were not acceptable to all Range States and preliminary negotiations concerning this section of the draft Single Species Action Plan (July 2006 version) failed to reach a consensus. In January 2007 the AEWA Secretariat undertook a series of consultations with representatives of the governments of Finland, Germany, Norway and Sweden, with the aim of securing a consensus compromise on a way forward for this element of the Action Plan (AEWA 2007; Annex 10 to this SSAP). The following are the verbatim conclusions of the negotiation mission, as drafted by the AEWA Secretariat and supported by the parties (governments) concerned. They constitute the basis for dealing with issues of captive breeding, reintroduction and supplementing ('supplementation') of the Fennoscandian population in the framework of the SSAP.

1. "The parties agree that the main priority for the conservation of the LWfG is the preservation of the wild populations breeding in Fennoscandia and Russia and that the work on the SSAP and any decisions should follow the code of transparency and accountability so that they can be subject to scientific scrutiny at any time. The parties will be considering support for conservation on the ground along their flyways. Particular attention shall be paid to mortality due to hunting and urgent targeted measures should be implemented to reduce the magnitude of this threat, the success of which shall be promptly and regularly reviewed and evaluated. Supplementation with captive-bred birds should be considered if other conservation measures are not as quickly efficient as needed and should populations continue to decline. As with any other captive breeding, reintroduction or supplementation initiatives this project will be subject to consideration by the Committee for LWfG captive breeding, reintroduction and supplementation in Fennoscandia (*see conclusion 3 below*). The efficiency of conservation measures is to be assessed by the International LWfG Working Group (*see conclusion 2 below*).
2. The parties agree that an International LWfG Working Group should be established, consisting of governmental representatives of all Range States, who would be free to bring in their own experts and use their support. The group will be chaired by the AEWA Secretariat (*efficient chairmanship would be possible only if additional support staff (coordinator for the SSAP) and supplementary budget are made available to the Secretariat*) and will operate in accordance with ToR developed by the AEWA Secretariat, approved by the Range states and endorsed by the AEWA Technical Committee.
3. The parties agree on the establishment of a Committee³ for LWfG captive breeding, reintroduction and supplementation in Fennoscandia, consisting of governmental representatives of Sweden, Finland, and Norway, who would be free to bring in their own experts and use their support. The Committee will be chaired by the AEWA Secretariat (*efficient chairmanship would be possible only if additional support staff (coordinator for the SSAP) and supplementary budget are made available to the Secretariat*) and will operate in accordance with ToR developed by the AEWA Secretariat, approved by the three states and endorsed by the AEWA Technical Committee.
4. The parties agree that a captive stock of wild Fennoscandian birds should be established, subject to the conclusions of a feasibility study. The long-term future of all captive breeding programmes will be reviewed by the Committee for LWfG captive breeding, reintroduction and supplementation in Fennoscandia.
5. The parties agree that the Swedish captive breeding programme could carry on as

³ The parties agreed that this Committee will operate as a subgroup of the International Working Group for the implementation of this Action Plan.

long as it is based on wild birds only. The long-term future of all captive breeding programmes will be reviewed by the Committee for LWfG captive breeding, reintroduction and supplementation in Fennoscandia.

6. The parties agree that the current free-flying flock, breeding in Sweden and wintering in the Netherlands, will remain in the wild, subject to genetic screening and refinement, i.e. removal of apparent hybrids, which will be undertaken following the conclusion of a feasibility study. Further on the dilution with purebred birds is considered a principally viable option. The long-term future of all reintroduction and supplementation programmes will be reviewed by the Committee for LWfG captive breeding, reintroduction and supplementation in Fennoscandia taking full account of, amongst others, the success of conservation actions, including revival of the wild Fennoscandian population, and other pertinent factors. Decisions regarding the Swedish free-flying population should also take into account the conclusions of the independent review and evaluation of available LWfG genetic studies (*see conclusion 8 below*).
7. The parties agree that the implementation of the pilot experimental project of the NGO 'Aktion Zwerggans' will be postponed by three years. As with any other captive breeding, supplementation or reintroduction initiatives this project will be subject to consideration by the Committee for LWfG captive breeding, reintroduction and supplementation in Fennoscandia.
8. The parties agree that a review and evaluation of the existing genetic LWfG studies by an independent expert(s) with proper scientific expertise and experience (ideally in molecular DNA analysis of birds, conservation genetics and statistical proficiency) should be undertaken⁴. This work will be commissioned by the AEWA Secretariat to an independent expert(s) selected by the Secretariat too. The conclusions of this independent evaluation will be submitted to the Committee for LWfG captive breeding, reintroduction and supplementation in Fennoscandia and the International LWfG Working Group for their consideration."

⁴ In the report of its January 2007 negotiation mission the AEWA Secretariat referred to the significant accumulated body of LWfG genetic studies, but noted certain discrepancies (or even contradictions) in some of the studies' conclusions, leading to differing views of implied conservation strategies. It is therefore suggested that all available studies should be reviewed and evaluated by an independent, appropriately experienced scientific expert or team of experts. Such a review could help to unify stakeholders around a consensus view and assist with designing future conservation action.

Table 2a. Relative importance of threats to wild subpopulations of Lesser White-fronted Goose.

Threat	Fennoscandian population	Western main population	Eastern main population ⁵
(b) Factors causing reduced reproductive success			
Genetic impoverishment	Low	Unknown	Unknown
(d) Potential genetic introgression of DNA from other goose species into wild population	Potential risk exists	Potential risk exists	?

Table 2b. Relative importance of threats to reintroduced population of Lesser White-fronted Goose⁶.

Threat	Reintroduced population (Sweden/The Netherlands)
(a) Factors causing increased adult mortality	
Hunting	Low
Poisoning	Low
Human disturbance	Local
(b) Factors causing reduced reproductive success	
Human disturbance	Unknown
Predation	Local
(c) Factors causing habitat loss/degradation/conversion	
Agricultural intensification and	Low

⁵This Action Plan focuses on Lesser White-fronted Goose in the AEW Agreement Area and the territory of Member States of the European Union (i.e. the Fennoscandian and Western main subpopulations) and is not giving detailed consideration to the Eastern main subpopulation. However, threats to the latter population are shown here for completeness and to underline that certain key threats are applicable to all subpopulations.

⁶ See pages 9-12 for details of: (a) Conclusions of the CMS Scientific Council in November 2005 regarding the reintroduced population; (b) the consensus compromise reached in 2007 as a result of the negotiation mission conducted by the AEW Secretariat.

wetland drainage	
Construction of dams and other river regulation infrastructure	Low
Climate Change	High
Over-grazing	Unknown
Land abandonment	Local
Pollution of wetlands/waterbodies	Low
(d) Genetic introgression of DNA from other goose species into reintroduced population and potential for entry into wild population	Theoretical risk exists
(e) Knowledge limitations	Fundamental gaps

Recent Conservation Measures

Table 5. Summary of mechanisms and institutional arrangements for conservation of Lesser White-fronted Goose *Anser erythropus*.

Country	National Action Plan for Lesser White-fronted Goose?	National Working Group for Lesser White-fronted Goose?	National Monitoring Programme for Lesser White-fronted Goose?	Monitoring Programme in Protected Areas?	Routines for Informing the Responsible Authorities Regarding Nesting Areas and Nest Sites?
Finland	No	Yes	Yes	Yes	(Yes)
Germany	No	Yes	No	No	N/A
Norway	Yes, under revision	Yes	Yes	Yes	Yes
Sweden	In prep	Yes*	Yes*	Yes*	Yes

* Applies mainly to reintroduced population

Annex 7 provides additional information concerning recent and ongoing conservation measures in each country.

Framework for action

Table 6. Action Plan Goal and Purpose

	Objectively Verifiable Indicator	Means of Verification
<p>Action Plan GOAL To restore the Lesser White-fronted Goose to favourable conservation status within the AEWA Agreement Area</p>	<p>Neither of the wild populations in the Agreement Area qualifies as ‘threatened’ according to the IUCN Red List criteria because the Western Main population exceeds 25,000⁷ individuals, the Fennoscandian population exceeds 1,000⁸ individuals and neither population is declining. The breeding range is stable or expanding. Adequate managed and protected habitat is available at all the key sites along the species’ flyways.</p>	<p>Conservation Status Assessment of Migratory Waterbirds, Wetlands International</p> <p>Assessments by the International Lesser White-fronted Goose Working Group, to coordinate the implementation of this Action Plan</p>
<p>Action Plan PURPOSE To stop and reverse the current population decline and range contraction.</p>	<p>Neither the Western Main population nor the Fennoscandian population is declining. A 5-year moving average of the finite rate of population increase (λ) is above 1.0</p>	<p>For the westernmost flyway: counts of spring flocks at Matsalu Bay, Estonia, at Porsangerfjord, Norway; counts of spring and autumn flocks at Hortobágy, Hungary. For the main flyway: counts of autumn flocks in Kustanay oblast, Kazakhstan, <i>covering a large-enough area to avoid effects of local fluctuations caused by year-to-year variations in location and extent of suitable roosting/feeding sites.</i></p>

⁷ Figure derived from the AEWA Action Plan Table 1. This is necessary for a species being not listed as Column A species.

⁸ Figure derived from the IUCN Red List criterion D for small populations.

Table 7 Action Plan Results

Result	Objectively Verifiable Indicator	Means of Verification	Priority	Timescale
Result 4: No introgression of DNA from other goose species into the wild population occurs as a result of either further releases and DNA introgression from already released birds from captive breeding programmes is minimised	Any future release of captive-bred birds involves only individuals reared from wild-caught stock. Apparent hybrid geese are removed from existing free-flying introduced flock, subject to findings of a feasibility study.	National reports from governments. Reports from International LWfG Working Group (and captive-breeding Sub-group) Papers published in peer-reviewed scientific journals Review and evaluation of existing studies of LWfG genetics is conducted by independent scientific expert. Long-term future of all captive breeding programmes is reviewed by a specialist Sub-group of the International LWfG Working Group.	High	Short
Result 6: International cooperation maximised	All Lesser White-fronted Goose Range States are parties to the key international conservation agreements The International Lesser White-fronted Goose Working Group (and sub-group on reintroduction) is established and operating effectively National Action Plans, based on this SSAP, are established, implemented and progress shared with other Range States via the International Working Group	Status of Contracting Party lists issued by relevant agreements Progress reports by the AEWA Secretariat Reports and assessments issued by the International Working Group (once established)	Essential	Short/Ongoing

Activities

Result 4: No introgression of DNA from other goose species into the wild population occurs as a result of either further releases and DNA introgression from already released birds from captive breeding programmes is minimised.

As set out in the previous chapter, there has been a lack of consensus among Lesser White-fronted Goose stakeholders on the use of captive breeding, reintroduction/restocking, and flyway modification as valid conservation tools that can be integrated with measures directed at conservation of the surviving wild population. Proponents have argued that all efforts to date have failed to stop or reverse the decline of the Lesser White-fronted Goose and that reintroduction/restocking is the only assured means of securing the species' survival, citing the high adult survival rates achieved through diverting the flyway through 'safe' countries. Opponents have argued that introduction in areas that do not form part of the species' natural range is scientifically and ethically unsound and believe that efforts and resources should be devoted to conservation of the wild Fennoscandian population as long as it continues to exist, with reintroduction remaining an option if all other measures fail. They also highlight the risk of introgression of DNA from other goose species into the wild population, following the discovery of such DNA among the captive breeding stock.

As detailed on pages 10-11 (originally chapter 3), the Scientific Council of the Convention on Migratory Species presented a series of conclusions and recommendations on these issues in November 2005. The full text of the Scientific Council's statement, and related comments made by Dr Robert C. Lacy, can be found in Annexes 9a and 9b, respectively. The Scientific Council's findings were however not accepted by all states. In 2007 the AEWA Secretariat conducted a series of consultations with the key breeding Range States which resulted in an agreement by the parties concerned. The conclusions set out in this agreement form the basis of the Single Species Action Plan's approach to this issue. They are detailed on pages 11-12 and in Annex 10 of this Action Plan. The following is a summary only of the key points agreed by the parties:

- The main priority for the conservation of the Lesser White-fronted Goose is the preservation of the wild populations breeding in Fennoscandia and Russia and that the work on the SSAP and any decisions should follow the code of transparency and accountability so that they can be subject to scientific scrutiny at any time. Particular attention shall be paid to mortality due to hunting and urgent targeted measures should be implemented to reduce the magnitude of this threat, the success of which shall be promptly and regularly reviewed and evaluated.
- An International LWfG Working Group should be established, consisting of governmental representatives of all Range States, who would be free to bring in their own experts and use their support.
- A Committee for LWfG Captive Breeding, Reintroduction and Supplementation of LWfG in Fennoscandia should be established, operating as a sub-group to the International Lesser White-fronted Goose Working Group.
- The long-term future of all captive breeding programmes (of the states represented) will be reviewed by the Committee for LWfG captive breeding, reintroduction and supplementation in Fennoscandia.

In the meantime:

- A captive stock of wild Fennoscandian birds should be established, subject to the

conclusions of a feasibility study.

- The Swedish captive breeding programme should continue as long as it is based on wild birds only.
- The current free-flying flock, breeding in Sweden and wintering in the Netherlands, will remain in the wild, subject to genetic screening and refinement.
- The implementation of the pilot experimental project of the NGO ‘Aktion Zwerggans’ will be postponed.
- A review and evaluation of the existing genetic LWfG studies by an independent expert(s) with adequate specialised scientific expertise and experience should be undertaken.

Result 6: International cooperation maximised

Table 4 (*not included in this extract*) shows the current applicability of key international cooperation instruments to Lesser Whitefront Range States. There are currently significant gaps. These gaps should be rectified in order to maximise international cooperation for the effective implementation of this Action Plan and wider measures that are likely to benefit Lesser Whitefront conservation.

This activity is addressed to the following Range States:

- **AEWA:** Armenia, Azerbaijan, Estonia, Greece (signatory but entry-into-force is pending ratification), Islamic Republic of Iran, Iraq*, Kazakhstan*⁹, Russian Federation, Turkey, Turkmenistan
- **Bern Convention:** Armenia (signatory but entry-into-force is pending ratification), Russian Federation
- **CBD:** Iraq
- **Ramsar Convention:** Turkmenistan (Note: under the current provisions of this convention, there is no mechanism for the EU/EC to become a Contracting Party)

⁹ *Iraq and Kazakhstan are parties to the Convention on Migratory Species (CMS), and though not parties to AEWa are committed to implementation of this Action Plan through the CMS. Other states within the AEWa Agreement Area, which are parties to CMS, and which are in the process of adhering to AEWa, share a similar obligation.

Table 8. National activities by Range States required to deliver each Action Plan Result

Result	National activities and applicable Principal Range States ¹⁰	Responsibility for implementation
<p>Result 4: No introgression of DNA from other goose species into the wild population occurs as a result of further releases and introgression from already released birds from captive breeding programmes is minimised</p>	<ul style="list-style-type: none"> • Establish a special website to serve as a 'clearing house' for information on this issue. • Ensure that any future release of captive-bred birds involves only individuals reared from wild-caught stock. • Remove any apparent hybrid geese from the existing free-flying introduced flock, subject to findings of a feasibility study (Sweden). • Conduct a review and evaluation of existing studies of LWfG genetics; to be carried out by an independent, appropriately experienced scientific expert or group of experts (specialist Sub-group of the International LWfG Working Group). • Review long-term future of all captive breeding programmes (specialist Sub-group of the International LWfG Working Group). 	
<p>Result 6: International cooperation maximised</p>	<p>Achieving this result requires action (as of 17 July 2006¹¹) by the following Range States:</p> <p>AEWA: Armenia, Azerbaijan, Estonia, Islamic Republic of IRan, Iraq, Kazakhstan, Russian Federation, Turkey, Turkmenistan</p> <ul style="list-style-type: none"> • CMS: Armenia, Azerbaijan, Estonia, Iraq, Russian Federation, Turkey, Turkmenistan • Bern Convention: Armenia (signatory but entry-into-force is pending ratification), Russian Federation • CBD: Iraq • Ramsar Convention: Turkmenistan (Note: under the current provisions of this convention there is no mechanism for the EU/EC to become a Contracting Party) 	

¹⁰ Defined in Chapter 1.4

¹¹ Derived from lists of parties posted on the websites of the relevant treaty secretariats on 17 July 2006.

Implementation

Principles of implementation

The following ‘principles’ have been drawn up from the conclusions of the AEWA Secretariat’s negotiation mission in January 2007:

- The main priority for the conservation of the Lesser White-fronted Goose is the maintenance of the wild populations breeding in Fennoscandia and Russia.
- The efficiency of conservation measures is to be assessed by the International Lesser White-fronted Goose Working Group and its thematic sub-group(s).
- Implementation and future modification of this International Single Species Action Plan – and all related decisions – shall be undertaken with transparency and accountability so that progress can be subject to scientific scrutiny at any time.
- Each Range State shall consider support for ‘on-the-ground’ conservation measures, particularly along the Lesser White-fronted Goose flyway(s) that traverse(s) its territory.
- Particular attention shall be paid to mortality due to hunting and urgent targeted measures shall be implemented to reduce the magnitude of this threat, the success of which shall be promptly and regularly reviewed and evaluated.
- An International Lesser White-fronted Goose Working Group shall be established, consisting of governmental representatives of all Range States. The governmental representatives shall be free to bring in their own experts and to call on their support as required. The Working Group shall be chaired by the AEWA Secretariat (subject to additional, dedicated human and financial resources being made available to the Secretariat) and will operate in accordance with its Terms of Reference and Rules of Procedure, approved by the Range States and endorsed by the AEWA Technical Committee.
- Supplementing wild populations with captive-bred birds shall be considered if other conservation measures are not as quickly efficient as needed and should populations continue to decline. As with any other captive breeding, reintroduction or supplementation initiatives all activities will be subject to consideration by the Committee for Captive Breeding, Reintroduction and Supplementation of LWfG in Fennoscandia (operating in accordance with its Terms of Reference and Rules of Procedure).
- The SSAP should be regularly adapted and updated every 5 years.

Immediate steps required

Immediate steps towards the implementation of this SSAP include:

- Explicit endorsement by Range States of this International Single Species Action Plan;
- Establishment of the International Lesser White-fronted Goose Working Group referred to above;
- Establishment of a sub-group (under the auspices of the International LWfG Working Group) dedicated to the issues of captive breeding, reintroduction and supplementing of wild populations in Fennoscandia (as agreed by the parties to the AEWA Secretariat negotiation mission in January 2007);
- Establishment of National Lesser White-fronted Goose Taskforces (or similar groups) in each Range State;
- Establishment and resourcing of the position of ‘Lesser White-fronted Goose Single Species Action Plan Coordinator’ within the AEWA Secretariat;
- Coordinated reporting and information sharing through the International Working Group and/or the AEWA Secretariat, as appropriate;

- Preparation within one year of a National Action Plan for each Range State, in co-operation with the International Working Group and relevant National Taskforce, and based on this International Single Species Action Plan (see *AEWA Conservation Guidelines No. 1*);
- Implementation of National Action Plans, including through allocation of adequate and appropriate resources;
- Review of the International and National Action Plans at least every five years;
- Maintaining and further developing research and monitoring programmes for supporting and assessing implementation of the International Single Species Action Plan.