

OPERATION LESSER WHITEFRONT / OPERATION FJÄLLGÅS

Pilot project for the protection of *Anser erythropus* via safe migration routes

- project plan -

The pilot project will be implemented in Sweden, Denmark and Germany

Starting date: 01.01.2006; ending date: 31.12.2007; duration in months: 24

If optional monitoring 2007/2008 incl.: ending date: 31.12.2008; duration in months: 36

1 PERFORMER AND PARTNERS (as at 10.01.2006, in alphabetical order)

- Performer: Aktion Zwerggans e.V.; Kirchhalde 13, 71083 Herrenberg, Germany;
Contact persons: Dr. Wolfgang Scholze; phone: +49-531-23540-29; e-mail: w.scholze@daec.de; Riikka Vilkuna; phone: +46-8644 2935; e-mail: riikka.vilkuna@swipnet.se; web: www.zwerggans.de; www.fjallgas.se;
- Partner (1): Allianz Umweltstiftung (AU); Maria Theresia Strasse 4a, 81675 München, Germany; Contact person: Dr. Lutz Spandau ; phone: +49-89-41073360 ; fax : +49-89-41073370; e-mail: info@allianz-umweltstiftung.de;
web: www.allianz-umweltstiftung.de;
- Partner (2): Biologische Station im Kreis Wesel; Freybergweg 9, 46483 Wesel, Germany;
Contact person: Dr. Johan Mooij, phone: +49-281-96252-13; e-mail: johan.mooij@bskw.de; web: www.bskw.de;
- Partner (3): Deutscher Aero Club (German Aero Club); Hermann-Blenk-Str. 28, 38108 Braunschweig, Germany; Contact Person: Dr. Wolfgang Scholze; phone: +49-531-23540-29; e-mail: w.scholze@daec.de; web: www.daec.de;
- Partner (4) Institute for Biodiversity – Network e.V.; Dr. Johann-Maier-Straße 4, 93049 Regensburg, Germany; Contact person: Dr. Axel Paulsch, phone: +49-941-2977761; e-mail: paulsch@biodiv.de; web: www.biodiv.de;
- Partner (5): Kiljuhanhen Ystävät ry. (Friends of the Lesser White-fronted Goose; FIN);
Contact person: Dr. Lauri Kahanpää, Torpankuja 3C 13, FIN-40740, Finland;
phone: +358-50-4652301; e-mail: kahanpaa@maths.jyu.fi;
website: <http://www.math.jyu.fi/%7Ekahanpaa/>;
- Partner (6): Lycksele Zoo (Lycksele Djurpark); Brännbergsvägen, 921 81 Lycksele, Sweden;
Contact person: Iréne Sjögren, Tel.: +46- 950-167 10, +46-70-333 36 03; e-mail: irene.sjogren@epost.lycksele.se; web: www.lyckseledjurpark.com;
- Partner (7): Svenska flygsportförbundet (Airsport Sweden); Box 750, 521 22 Falköping, Sweden; Contact person: Riikka Vilkuna, phone.: +4686442935, +46706442994; e-mail: riikka.vilkuna@swipnet.se;
- Partner (8): Zoological Garden Cottbus (Tierpark Cottbus); Kiekebuscher Str. 5, 03042 Cottbus, Germany; Contact person: Mario Wolff, Tel.: +49-355-5360; e-mail: tpfvc@yahoo.de;

There are more possible partners like the German Federal Agency for Nature Conservation (BFN), the Swedish Association for Hunting and Wildlife Management and Nordens Ark, who support the pilot project but have not come to a decision yet. The project welcomes interested authorities and organizations to join.

2 PROJECT MANAGEMENT

Project director: Dr. Wolfgang Scholze

Project manager: Dr. Johan Mooij (Monitoring), Dr. Axel Paulsch (Germany), Riikka Vilkuna (Scandinavia)

3 PROJECT SUMMARY

Objectives

The main objective of the pilot project is to test, optimize and proof the use of the microlight method within real conditions in order to elaborate it as a valuable tool in conservation and protection of the European population of *Anser erythropus* which is threatened by extinction. The European *A. erythropus* population could be built up in near future by re-introducing young birds imprinted on microlight aircrafts and guided along safe migration routes from Sweden to Germany. Thus, the main threat of hunting on the eastern traditional flyways can be avoided. Information about *Anser erythropus* and, as becoming a flagship species, about migratory species problems and other nature conservation issues shall be distributed towards a broad public.

The guided geese will be equipped with telemetry transmitters and intensive monitoring will provide detailed information on when and how the geese migrate back to their breeding grounds, which stop over places they use and if they join flocks of other geese they met in the wintering area.

Building up a breeding farm with a new stock of *A.erythropus*, mainly consisting of birds caught from the wild (Fennoscandian and western Russian birds), as suggested in preparatory discussions, is, if at all, not possible as quick as necessary, and therefore is not part of this pilot project. Nevertheless, Aktion Zwerggans and its partners support such activities. Aktion Zwerggans already has started an initiative to build up a breeding farm for *A. erythropus* in Germany, in order to be able to support future breeding, re-introduction and re-stocking programs. All birds shall be genetically tested and kept under optimal breeding conditions, in order to guarantee the quality of the stock. A breeding book is suggested to be elaborated for *A.erythropus*, compiling relevant data on as many birds as possible kept in breeding farms and having proved to be “good” and available. The pilot project shall be used to gain funds for building up such breeding farms and all measures connected to.

Actions and means involved

A maximum of 25 artificially bred *A. erythropus* from genetically tested and accepted breeding pairs in breeding centres in Sweden, Finland and Germany per year will be imprinted on microlight aircraft in 2006 and 2007. Guided by two aircrafts the young *A. erythropus* will be led from Northern Sweden (Lapland/Västerbotten) along the Swedish Baltic coast to the Lower Rhine area in Germany, where they are released for wintering. The geese will be equipped with transmitters and be monitored during wintering 2006/2007, spring migration and summer activities 2007 for evaluation of the method. Optionally a second monitoring will be carried out during wintering 2007/2008 until autumn 2008. An extensive publicity campaign shall be conducted. The planned project actions and means are in coincidence with IUCN Guidelines for re-introduction and with the International Lesser White-fronted Goose Action Plan 1996 (see appended feasibility-study). A new International Action Plan and a Swedish National Action Plan are under elaboration in the moment. In both the applicant and several of its partners are participating.

Expected results

A total of 50 (25per year) *A. erythropus* are planned to be re-introduced in Sweden within the term of the project by using the microlight aircraft method. For these birds (and their future offspring)

low mortality rates are expected according to the results of Swedish *A. erythropus* restocking/re-introduction project and microlight aircraft test project 1999. All threats *A. erythropus* suffers on the eastern flyways to our knowledge are excluded along the scheduled western route. Returning and surviving rates of about 40-50% of the birds after spring migration can be expected, which is higher than in the wild. Some birds may become lost due to diseases or predation during the guided migration and wintering. Especially male birds may follow females from other populations when meeting them and by that change wintering places and migratory routes. Intensive monitoring of the geese via telemetry data will allow to get detailed information about the spring migration. As every bird will be offspring of genetically tested and accepted parents and will be checked by veterinary means, there is no risk for a conservation problem caused by birds which will get lost and eventually join other flocks. For the same reasons there is no risk for the Norwegian wild population, in case the birds come in contact with and mix (see attached feasibility study as well). The method is expected to prove usable for further re-stocking of the already re-introduced, but still very small Swedish population in order to build up within a few years a stable population, large and viable enough to spread over parts of the former Fennoscandian breeding grounds. Therefore, especially due to genetic reasons (dilution of unwanted genes), a likely mixing of the birds from the pilot project with birds already migrating between Sweden and the Netherlands, is not regarded as a problem. As birds are marked, they will be able to be identified. Furthermore, a broad public acceptance and support for species conservation needs and improvement of acceptance of nature conservation measures can be expected.

4 MAPS

See appendix for maps of planned migratory route and starting area. The route may be changed due to welcomed suggestions of stop-over places by local/regional goose experts and nature conservation authorities.

5 BRIEF DESCRIPTIONS OF THE ACTIVITIES OF THE PERFORMER AND PARTNERS (in alphabetical order)

Performer : Aktion Zwerggans e.V.

The performer Aktion Zwerggans e.V. is a private non-profit organisation founded in 2001 with the aim to contribute to the saving of the declining population of *Anser erythropus* in Fennoscandia. The board of Aktion Zwerggans includes among others Peter Kredatus as chairman (managing director of a company), Dr. Wolfgang Scholze as vice-chairman (head of the department Environmental and Nature Protection of the Deutscher Aero Club, the umbrella organisation of air sports in Germany), Dr. Johan Mooij (director and senior researcher of the Biological Station Wesel, where the geese will be released), and Dr. Axel Paulsch (chairman of the Institute for Biodiversity – Network e.V.). Riikka Vilkkuna (Airsport Sweden) is project coordinator for Sweden and Finland. Members of Aktion Zwerggans are among others the head of waterfowl section of the Cottbus Zoological Garden, technicians for microlight aircraft, professional air transport pilots and other pilots and biologists.

Aktion Zwerggans realised a test project in 2003 when young geese bred in captivity were imprinted and trained to follow microlight aircraft in Germany/Brandenburg. Special training under the governance of the German Federal Ministry of Transport officially qualified the pilots to use microlight planes for water starts and landings.

In 2004 a test flight in Sweden (without geese) was realised with a microlight aircraft in order to train the pilots and to find suitable stop-over places for future guided migrations with geese.

Partner 1: Allianz Umweltstiftung (Allianz Environmental Foundation)

The Allianz Umweltstiftung (AU) was founded in 1990 when Allianz AG celebrated its centennial. As an operational foundation AU is engaged in nature- and species conservation, conservation of the countryside, water ecosystems, urban green, garden arts and environmental communication. The

human being is the focus of the activities of the foundation – because activities of human beings have strong influence on the environment and their dreams and visions form the world's future.

Partner 2: Biologische Station im Kreis Wesel e.V. (Biological Station Wesel)

The Biologische Station im Kreis Wesel was founded in 1984 as an independent nature conservation research and management institute. At present the Biological Station is managing more than 13.000 ha of nature reserve as well as about 7.000 ha Natura 2000 sites, advises the regional and federal government, is doing applied ecological research, monitoring of flora and fauna not only on a regional or national level, but also at an international level (Wetlands International, Ramsar, CMS, EU etc.). One of the traditional research focal points of the Biological Station is bird migration and ecology and conservation of geese, especially arctic geese.

Partner 3: Deutscher Aero Club e.V. (DAeC, German Aero Club)

The Deutscher Aero Club is the umbrella organization of air sports in Germany, representing about 100.000 members in seven air sport disciplines. Its Department Environment & Nature Conservation is dedicated to support air sport enthusiasts as well as environmental authorities and associations in order to avoid and solve possible problems with cooperative means and initiate joint projects. DAeC is supporting the project in preparation and project management, and if it should become necessary, in any matters concerning aviation in Germany.

Partner 4: Institute for Biodiversity – Network e.V.

The Institute for Biodiversity – Network e.V. was founded in 1990 as a non-profit organisation. The institute consists of a network of more than 30 experts working in different fields of biodiversity research and conservation, in Germany and abroad. One focus is consulting work to the Convention on Biological Diversity in the behalf of different German governmental agencies, another focus is cooperation with NGOs on the European level with respect to conservation and capacity building projects. Coordination of project activities and expert advice will be a main contribution to the pilot project. The ibn will realise the public awareness activities and the dissemination of results.

Partner 5: Kiljuhanhen Ystävät ry./Friends of the Lesser White-fronted Goose

The objective of the Friends of the Lesser White-fronted Goose association is the survival of the world wide threatened Lesser White-fronted Goose *Anser erythropus*. The association supports the breeding of this goose species at a breeding farm in Hämeenkoski in southern Finland in order to enable reintroduction of the Lesser White-fronted Goose in its original Fennoscandian breeding range. The association has long experiences in maintaining the largest stock of captive *Anser erythropus* in Europe.

Partner 6: Lycksele Zoo

Lycksele Zoo is the northernmost zoo in Sweden. The zoo was founded in 1959 by Holger Lithner. Today the zoo has a wide collection of Nordic animals. Lycksele Zoo is positive to the project and will support it (a letter of support will be added) if the decision by NEPA will be positive. The Zoo will actively search for a breeding and ground training location and give veterinary support, if necessary. Further activities within the project are possible, but not elaborated yet.

Partner 7: Svenska flygsportförbundet (Airsport Sweden)

Airsport Sweden is the umbrella organisation for Swedish airsport. The organisation covers eight disciplines. Airsport Sweden has app. 23 000 members in all parts of the country and will support the project in all matters concerning aviation activities in Sweden.

Partner 8: Zoological Garden Cottbus (Tierpark Cottbus)

Zoological Garden Cottbus has a renowned waterfowl collection and several breeding pairs of the Lesser White-fronted Goose. The Zoo has intensive contacts with German and European waterfowl breeding stations, several of them rearing Lesser white-fronted geese and willing to support the pilot project; the Zoo is coordinating their activities with LWfG. Zoo Cottbus is supporting the pilot project by donating eggs and providing it's expertise on site, especially during egg collection, breeding and hatching of the project geese.

6 COMPETENT AUTHORITIES, INSTITUTIONS AND ORGANIZATIONS SUPPORTING THE PILOT PROJECT (as at 10.01.2006)

The Swedish Environmental Protection Agency (NEPA) supports the pilot project and with a letter from 21.10.2005 gave the official permission for conducting the pilot project.

The German Federal Ministry for the Environment, Nuclear Safety and Nature Conservation (BMU) and the Federal Agency for Nature Conservation (BfN) have already supported a possible LIFE-project in 2004 and therefore are supporting the pilot project as well. The German State Environmental Ministries of Schleswig-Holstein, Niedersachsen and Nordrhein-Westfalen, respectively their Environmental Agencies, are supporting the pilot project as is the administration of Wesel county, which is responsible for nature conservation implementation in the target wintering site. The regional administration of the Ruhrgebiet-area (Regionalverband Ruhr, RVR), landowner of the release site of the Lesser White-fronted geese at the Bislicher Insel, is supporting the project and the University of Göttingen, Germany, Center for Nature Conservation, has also agreed to support the pilot project. The Ministry of Environment Denmark has already supported a possible LIFE-project in 2004. The County Administration of Västerbotten is supporting the project.

Naturrum Hemavan (Jessica Jonasson) and Naturrum Ammarnäs (Ludmila Wieslander), both located close to the foreseen starting area in Vindelfjällens Nature Reserve, have been informed about the project.

Sorsele Municipality (environmental inspector Annika Linberg) has been informed of the project.

Heads of all four Same Villages in or near/around the possible starting area in Vindelfjällen Nature Reserve, which are Gran, Ran, Vapsten and Umby, have been contacted. The starting area is within Ran Same Village who agreed to that plan. Västerbotten's Ornithological Society is supporting the project. The starting area in Vindelfjällens Nature Reserve, possible migration routes from there along Ume or Vindelälven rivers and a major resting area within Ume river delta were chosen according to expert suggestion of the Society.

Sorsele Flying Club has promised its support in all matters concerning flying in Västerbotten area.

7 GENERAL DESCRIPTION OF *ANSER ERYTHROPUS*

7.1 Ecology:

Anser erythropus nests in tundra with none or low tree density at lakes or near rivers up to an altitude of 800 m.a.s.l. Nests are built in grassland, between dwarf shrubs or in hollows in wetlands. *Anser erythropus* is an exclusively palearctic breeding species. Nestlings hatch after a breeding period of 25-29 days in June and beginning of July. Average number of eggs per breeding pair is four to six. The species is strictly herbivorous and feeds on a variety of different grasses and herbs on riversides, lakeshores and swamps. Its natural main predators in Fennoscandia are *Vulpes vulpes*, *Alopex lagopus*, *Corvus corax*, *Aquila chrysaetos* and *Haliaeetus albicilla*. Migrating geese arrive at breeding grounds about end of May and leave about end of August. Major parts of the Fennoscandian population migrate via the Baltic Region and Hungary to the Balkans. A second route leads via western parts of Russia to the Black sea, while a third route goes through Kazakhstan to wintering areas around the Caspian Sea. Some specimens however join other arctic geese flying to wintering areas in Germany and The Netherlands.

7.2 General distribution at European and national level and population trends:

The original range of the Fennoscandian population covered the arctic parts of all Fennoscandia. Since the first estimates of the size of the world's population in the 1950's, a drastic decrease in numbers was recorded from about 100.000 individuals in the 1950's to less than 25.000 birds in the 1990's. During the 1930's regularly flocks of c. 50.000 *Anser erythropus* were recorded in the Western Palearctic, and during the 1950's the Western Palearctic population was still estimated at more than 50.000 birds. In the 1990's numbers recorded in this region during midwinter counts never exceeded 10.000. In the first half of the 20th century the Fennoscandian population was estimated at about 10.000 birds, but in the middle of the 1990's the population was estimated at 300 - 500 birds and less than 50 breeding pairs only. A dramatic fall in numbers has been recognized in Oulu Region in Finland at traditional stop-over sites. In twenty years the number of migrating geese observed at these sites has diminished from about 100 to 10 (in 2003). Actual estimations on the remaining wild Fennoscandian population given by Ingar Øien at Lammi/Helsinki Conference (2005) are less than 50 individuals with 10-15 breeding pairs. It's not known where these birds are breeding.

The reintroduced Swedish population seems to be stable and is slowly increasing in numbers (about 100 individuals).

7.3 Main threats to the population targeted:

Threat 1: Hunting

Research showed that reproduction rate of wild *Anser erythropus* is at normal level compared to other arctic geese. Nevertheless, annual mortality is extremely high, especially within young geese (70-80%). Hunting seems to be the most important factor, as 50% of the young geese and 10% of the adults marked in Norway as well as 16% of all and 23% of young birds marked in Russia were reported to be shot (TOLVANEN et al. 1999, MOROZOV 2002). *Anser erythropus* very much resembles *Anser albifrons* and often occurs in mixed groups with this very common arctic goose species. *Anser albifrons* is the most heavily hunted goose species in Eurasia. Therefore, every year a significant number of *Anser erythropus* is shot by mistake. The existing world wide whole-year protection of *Anser erythropus* was and is not effective enough to prevent such losses. The collapse of the Soviet regime caused increased rates of illegal hunting in the Eastern European states even in strictly protected areas.

Natural predation by carnivorous mammals or birds of prey seems to play a minor role except in years of an extremely low abundance of small mammals.

Impact on the species:

Due to hunting the annual mortality rate especially of young birds exceeds reproduction rate, which leads to a decrease of the population, estimated 5% per year in the last decade.

Threat 2: Vulnerability of small populations

The still existing Fennoscandian population of *Anser erythropus* has decreased to an estimated number of less than 50 individuals. This small population size increases the risk of a total loss due to e.g. diseases or a series of subsequent years with low reproduction rates or extreme predation pressure. Additionally, the possibility to find a relative as mating companion increases, which leads to inbreeding and further loss of genetic diversity.

The reintroduced Swedish population with about 100 birds for same reasons has to be seen as vulnerable.

Impact on the species

The remaining wild population can easily get completely extinct within a short time period and loses genetic diversity. The reintroduced Swedish population as well is too small to survive for example diseases or harsh weather conditions.

Threat 3: Loss of appropriate staging and wintering areas

Along the traditional migratory route of the Fennoscandian population via Eastern Europe to the Caspian and Black Sea and in the wintering area in the Caspian region appropriate ecosystems were subject of mayor changes due to human impact. Wetlands were drained and natural grasslands were converted in agricultural land, not used by Lesser Whitefronts. This reduces availability of areas for undisturbed roosting and feeding of the species.

Impact on the species

Due to the immense negative impact of hunting the direct impact of threat 3 is impossible to quantify.

7.4 Conservation measures already taken:

Under the lead of Lambart von Essen the Swedish Association for Hunting and Wildlife Management started a project to re-introduce *A. erythropus* in Swedish Lapland in 1979 to support the remnants of the natural population. Since 1981 the project is supported by WWF-Sweden. In the scope of this project *A. erythropus* eggs were bred by semi-domestic *Branta leucopsis*, which were known to winter in the Netherlands. During moult of *Branta leucopsis* and before the goslings were fledged, the young *A. erythropus* were released together with their foster-parents in an original *A. erythropus* breeding habitat in Swedish Lapland. In autumn the families migrated to the wintering sites of *Branta leucopsis* in the Netherlands and in this way *A. erythropus* learned a new migratory route. Until 1999 in the scope of this project 348 *A. erythropus* were introduced. As a result of the project a first breeding pair (female was a reintroduced bird) was recorded in Sweden in 1986. During the period 1995 – 2004 at least 40 broods were successful and 111 fledged young *A.erythropus* were recorded, e.g. about 3 juvenile/successful brood. The total breeding population was estimated at about 5 breeding pairs annually and annual mortality at about 20-40% in the first year.

In 1989 also WWF-Finland started a reintroduction programme for *A. erythropus*. In this project artificially bred young *A. erythropus* were released in the breeding area of the small remaining wild Finnish population. Until 1998 a total of 143 birds were released of which 123 were juveniles, five were 2nd calendar-year birds and 15 adults. The released groups were no families, but usually a family with a number of more or less adopted additional juveniles. It showed that most birds followed *Anser fabalis* to Western Europe. Some birds followed the traditional migratory route to the East. Only less than 10% of the released *A. erythropus* were reported back in Finnish Lapland and only one from the introduction area. These introduced birds seem to suffer an extremely high annual mortality of about 80% in the first year and an average of 65% over 5 years. Until today no breeding pairs were reported.

Until 1999 in both projects a total of about 455 *A. erythropus* was released, with the result that the current population in Sweden is estimated at about 100 individuals. The results of the Swedish project are much better than those of the Finnish reintroduction scheme, but overall success of both projects seems insufficient to support the decreasing Fennoscandian *A. erythropus* population effectively. Besides in the range of these introduction schemes a number of hybrids between *Branta leucopsis* and *A. erythropus* were recorded that probably partly also are a result of the Swedish reintroduction programme.

In 1999 a French-German project has been carried out, supported by Lambart von Essen: The team bred a group of *A. erythropus* which was imprinted on a microlight airplane. The young geese were transported to the middle of Sweden by car. In autumn they were guided with the microlight airplane to a wintering area in Germany (Bislicher Insel, SPA 4203-401), where they were released by draw-back of the plane. With a return-rate of 40 - 50 % of the released *A. erythropus* in middle-Sweden the microlight aircraft method was rather successful. This return-rate is a much higher quota as was found in the natural population and in the Finnish re-introduction project and comparably high as in the Swedish re-introduction project, but without hybridisation risks.

In 2002 a LIFE-Starter funding was granted to Aktion Zwerggans e.V. and its partners (LIFE2002NAT/ST/D/000005) in order to prepare a life application based on the use of the microlight aircraft method to guide *A. erythropus* for re-introduction.

A second LIFE-Starter funding was granted in 2002 to a group of the Finnish WWF. Members of these two LIFE-Starter groups met at the meeting of the Wetlands International Goose Specialist Group in Coto Donana, Spain in December 2002, during the Wetlands International Goose Specialist Meeting in Odessa in March 2004, and during the Global Flyway Conference in Edinburgh in April 2004. As a result overlap of the two projects will be minor. The LIFE-application elaborated by Aktion Zwerggans and its partners in 2004 has been incomplete due to lacking support by the Ministry of Environment of Finland and therefore was rejected.

The Finnish Association “Friends of the Lesser White-Fronted Goose” supported by the Häme Regional Environment Centre has maintained and generated restocking facilities of *Anser erythropus* at Hämeenkoski Municipality in Finland. The Hämeenkoski “Bird Sanctuary Anser” contains a captive population of about 100 geese. These *Anser erythropus* are gene tested in a gene laboratory in Moscow and the geese turned out to be very uniform with the wild population. Aktion Zwerggans has contact to several breeders of geese in Germany, keeping a total of about 20 *A.erythropus* breeding pairs, and to the Swedish re-introduction project and their breeding station. Genetic analysis with newest methods including all available birds kept in captivity in Finland, Sweden and Germany is carried out at the moment by University of Heidelberg, Prof. Dr. Michael Wink for determination of geese usable for the pilot project and further restocking/re-introduction activities.

Within Wetlands International Goose Specialist Group an international expert group on *A. erythropus* coordinates national conservation measures. The EU Commission approved an International Action Plan for the conservation of *A. erythropus* in 1996. In 2005 a new International Action Plan was initiated by AEWA and is currently under elaboration by BIRDLIFE INTERNATIONAL. Aktion Zwerggans and several of the partners in the pilot project, Biologische Station im Kreis Wesel and Friends of the Lesser White-fronted Goose are engaged.

8 PROJECT AREA AND SOCIO-ECONOMIC CONTEXT

8.1 Description of the project area:

The target area for the reintroduction of *A. erythropus* in Sweden within the pilot project is Vindelfjällens Nature Reserve in Västerbotten, as suggested by specialists from Västerbotten’s Ornithological Society and County Administration of Västerbotten. It is located within the former traditional breeding area of *A. erythropus* in Swedish Lapland and holds a variable landscape with a mosaic of mire Fjäll areas and lakes of various sizes as well as some arctic hills. The area is an ideal site for Fjäll waterfowl, both breeding and migrating. Human disturbance is very low as both tourists and locals are few, and access to the area is restricted, because possible only by feet or air. Some villages in the area (Gran and Ran) as well as Sorsele municipality are informed about the pilot project. The main activities will take place at a small lake in the Vindelfjällens Nature Reserve. This place is ideal for reintroduction since the lake has some islands which offer protection and furthermore, according to locals, there is no mink in that area (elevation about 760 m). Predatory pressure will be lower than in other possible areas in lower elevation. Swampy areas and grasslands nearby offer good feeding grounds for the geese. There is a hut at the lake which, according to locals, might be usable for the project as base camp both during flight training with the birds and during monitoring in the following years. The lake itself is large enough for landing and starting with microlight aircraft.

In addition to the ecological suitability of the biotope and minimal disturbance by humans the area has also been chosen because of its optimal location in relation to the re-introduction area used by the Swedish Association for Hunting and Wildlife Management. It is likely that birds introduced by

this pilot project sooner or later will mix with birds already migrating between Sweden and the Netherlands. As all birds used in this pilot project will be genetically checked, a dilution of unwanted genes already existing in Sweden could take place; such dilution is strongly advocated by e.g. genetic experts Prof. Baker and Prof. Wink. As each of the birds used for the pilot project will be marked, there even would be a possibility to remove them, if wished so.

The area is also technically suitable, since it is not at all too remote from Hemavan airport and Hemavan, Tärnaby and Ammarnäs villages, offering accommodation and facilities needed for service and support. From Hemavan airport a helicopter service (company Lapplandsflyg) can be used for transport of equipment to the lake and for technical/safety support, if needed. The County Administration of Västerbotten is prepared to give special permissions for building up a base camp at the lake and all necessary project activities within the Nature Reserve. A local area map shall be elaborated with all areas marked which shall not be overflowed in low altitude during training flights with geese because of other important species living areas.

The Vindelälven river and, as a second possibility, the Ume river and surrounding lakes provide an easy to find migration route for the geese and the microlight aircraft leading to the south-east (see map "Västerbotten_migr-routes"). Along both rivers until Ume river delta several possible stop-over and resting places for the migration could be found during our travel in August 2005. More suitable stop over places from Umeå southwards as far as Denmark have been identified during a test flight in 2004. There are about 30 locations along the route from Umeå to the south (see map "Sweden_stop-over places migr-route") as far as the Danish border. Each of them is located at a lake and can be used for stop-over and emergency landing. Most of them have grassy areas which geese can use for feeding. Possible stop-over places are located within territories of the following regional authorities: Västerbotten, Västernorrland, Gävleborg, Västmanland, Stockholm, Uppsala, Södermanland, Östergötland, Jönköping, Kronoberg, Kalmar, Blekinge and Skåne. Only some of them might be affected, because depending on possible changes in the route planned so far and weather conditions during the migration, only a few of these places with distances of about 200-250 km in between will be actually used. From Denmark to the Bislicher Insel in Germany plenty usable stop over places are available, mainly on harvested crop fields and grasslands.

At present it is planned to avoid areas protected by national conservation legislation (e.g. Nature Reserves) as stop-over locations in Sweden and Denmark. In case Swedish and Danish authorities would find it useful to allow the project and the geese to use such areas as resting/stop-over places, the project is prepared to modify the flyway, provided that necessary permits for landing inside a reserve are given by the adequate (regional) authority. E.g., County Administration of Västerbotten and Ornithological Society of Västerbotten wish to use the Natura site Umeälvens Delta as a major stop-over area for the project. In Germany, several conservation areas, all of them important stop-over and resting places for migrating geese, are planned to be used for the pilot project; relevant authorities are ready to give special permissions.

As explained before, this western migratory route is planned to be used mainly because of security reasons for the re-introduced birds. Traditional or former eastern flyways of *A. erythropus*, e.g. crossing the Baltic Sea from Sweden towards Finland and from there to the South(east), at present mostly do not provide the necessary conditions (no hunting, effectively protected resting and wintering sites, good quality of habitats) to use them for guiding the birds along. Furthermore, most of the administrations of eastern countries, which need to be passed, are not prepared to provide necessary support and secure safety for the (flying) teams at present (see 8.2 Socio-economic context). This pilot project will result in comprehensive knowledge about the microlight method, which, if positive, will be the basis for future guided migrations on other routes as well. If in future time all countries along such traditional or former flyways will agree and will be ready to actively cooperate in a joint project for *A. erythropus* (especially providing safe and good conditions for the birds), the microlight method could and should be used to guide birds across the respective countries in future projects.

Flying to Finland (Österbotten) only has also been suggested. This route would not provide the experience required of flying a long distance with the geese. Moreover in Finland hunting on Geese is not prohibited at present.

The Bislicher Insel, the target area of the microlight aircraft re-introduction flight with young *A. erythropus*, is an area of c. 1.000 ha and a core area of the Ramsar site and SPA “Unterer Niederrhein” (SPA 4203-401) in Northrhine-Westphalia (Germany). The site is a mosaic of shallow water, reed beds, flood plain forest and grasslands and a semi-natural part of the regularly inundated flood plains of the German Lower Rhine. The Bislicher Insel is one of the most important goose sites in Germany with up to 40 breeding pairs and up to 2,000 moulting Greylag Geese in summer and up to 30,000 feeding and roosting arctic geese (mainly *A. albifrons*) in winter. The site is a traditional staging area for small numbers of endangered species like *A. erythropus* and *Branta ruficollis*. Measures for *A. erythropus* will also increase the protection status of the whole site.

8.2 Socio-economic context:

All relevant social partners including landowners, local people, reindeer keepers, municipalities, local and regional authorities, tourism-agencies, hunters clubs, nature conservation and ornithological associations and voluntary nature enthusiasts have been and further are invited to join cooperation. Support from many of them already is wide and important. There are no doubts to receive their further support. The planned flying activities are in full coincidence with the national aviation regulations of all states involved, including crossing borders. According to Swedish Civil Aviation Authorities (Luftfartsstyrelsen, inspector Nils von Koch, via e-mail) special permits are not necessary because the flights are carried out according to Swedish aviation regulations.

A flying route from Västerbotten to Greece (via Finland) has been suggested in the discussions. This route would, however, need the microlights to fly via the following countries: Finland, Estonia, Latvia, Lithuania, Poland, Slovakia, Hungary, Bosnia and Herzegovina, Serbia and Montenegro, Albania, Macedonia and Greece. As microlight flying is not internationally regulated (i.e. insurances, pilots' licences, landing on water, flight altitudes, crossing the borders) flying through these countries would require separate negotiations with each and every state's civil aviation authorities, not to forget environmental authorities and important NGOs. Considering the unstable and unclear political situation in many of the above mentioned countries, we consider this flying route totally unrealistic at this stage.

In Germany, the microlight aircraft guided *A. erythropus* test flights of 1999 and 2003 triggered an incredible engagement and public awareness for the conservation problems of the species, of migratory birds and the flyway areas by local people, landowners, hunters, nature conservationists and authorities. The pilot project will join all of them in conservation activities for the sites, the species and other migratory birds.

9 DESCRIPTION OF THE PROJECT (ACTIONS AND TIME TABLE)

Phase I-06: Preparatory actions January 1st – April 30th 2006

1) Project management: The coordination of the complex actions within Operation Lesser Whitefront/Operation Fjällgås and in cooperation with the project partners requires a project management throughout the whole project duration.

The project director will lead and coordinate all project activities directly connected to the geese and will always be on site during breeding, rearing, training and migration phases of the project. The three project managers will support the preparatory actions and mainly coordinate activities around the project (e.g. media/public relations, reporting) and the monitoring. They will serve as focus points and backup.

2) Microlight aircraft: The microlight aircraft method bases on the concept of imprinting the freshly hatched goslings on a microlight plane and of training them to follow this plane on the ground, on water and in flight. This method allows guiding the young geese on their first migration and by that to establish the new migration route to safe wintering areas. One plane will guide the group of 25 geese. The second plane is needed as a substitute in case of technical difficulties of the

other microlight aircraft. Practically it will be used for accompanying the other one, providing continuous information on the route, possible landing places (in case of emergency) and weather/wind situation to use optimal flying heights and routes. In case small groups or single geese leave the flight formations (as happened in 1999) the second microlight aircraft will join them and try leading them back to the flock. Therefore, two planes are a basic requirement for the whole project.

Two microlight planes have to be bought, modified and equipped identically. "Uniformity" in sound and optics is a basic requirement for imprinting the *A. erythropus* to the aircrafts. Planes must be able to land on water and on earth. In order to guarantee that the geese can not become injured by the propeller the planes have to be modified (propeller cages). Avionic requirements (radio air/air, air/ground, aerials, helmet/headsets, GPS, transponder, maps) have to be fulfilled in order to meet flight regulations along the planned route. As parts of the route will be flying above open (sea) water, special emergency-tools for each of the two microlight aircrafts are necessary (emergency kits, ELT's, dry suits, life vests, signal pistols).

3) Camp equipment: Both microlight aircrafts have to be accompanied by a ground team each, which helps the pilots to secure the plane and care for the the geese after landing, to prepare the camp for the night and to guarantee support for and refuelling of the planes. Both ground teams will use a camper (if possible 4WD) each. A third car (4WD) with a trailer will be needed for scouting, transport of geese, transport of microlight aircraft into and out of water, support in rough terrain (if trailers and/or cars get stuck) and generally for organising supply for both teams. In case of difficulties this car will be able to quickly reach the destination directly or a nearby position via any track for immediate help. The ground teams including the 4WD have to stay in permanent radio contact between each other and with the pilots. The equipment is a basic requirement to transport and handle the geese, carry food and water for geese and team members and to provide adequate safety. A motorized inflatable boat for security reasons and support is available by Aktion Zwerggans. Life vests (for the boat crew), tents for sleeping, catering and toilet, boxes (waterproof), water cans etc. are needed according to the number of team members. Binoculars and a telescope are needed for spotting lost geese and searching/observing the microlight aircraft guided migration flocks within great distance. Transport cages are needed for transporting the young geese by car to the starting location. Transportable overnight enclosure (for groups of geese) and electric fences, powered by a petrol generator will protect them during migration against predators. Geese have to be marked individually with legrings. A set of camouflage clothing is needed for the team members, but as well for visitors and as spare.

4) Goose number, goose related equipment, monitoring:

4a) Goose number: A main objective of this pilot project is to proof the ability of the microlight method as a valuable tool for the re-stocking and reintroduction of *Anser erythropus* in Europe. If the pilot project is successful, a main project may be started thereafter. In order to allow sound evaluation of the method and its results the number of geese which migrate and winter in flocks has to be big enough to meet the biological needs. As shown in preparatory flights in 1999 and 2003 within a group of geese there are very different characters. Many are timid ones, some others are more courageous. The courageous ones are leading the group(s). The smaller the flock, the less the possibility will be to have strong "leaders" within. Without such birds (in case they get lost, because they as well have higher mortality risk) flight training and the migration flights become much more difficult. Small flocks in general have lower survival chances during wintering and on spring migration. The flock for the pilot project therefore needs to be big enough to have several courageous "leaders" and be capable of loosing some individuals (due to disease, accident or predator attack) during the flights and especially after the groups have been released into the wild. Thus, the number of geese planned to start with is a flock of 25 geese. This is in consistency with the maximum number of 30 geese which are able to be guided by one microlight aircraft.

For the main project about 100 geese, guided by 4 (+1) microlight aircrafts per year is envisaged for four years in order to build up a viable population big enough to survive possible negative impacts and increase slowly. A pilot project with a lower number of birds than 25 in one flock would not

provide results comparable to what is to be expected under "normal" conditions. The chances of survival of the geese, by that the chances for success of the testing of the microlight method and the whole pilot project would be diminished seriously by a too small number of geese.

4b) Eggs, goose related equipment: In order to have 25 young geese for migration 40 eggs are planned to be collected from waterfowl breeding stations in Finland, Sweden and/or Germany according to the results of the genetic investigations of the breeding pairs. For transport of the eggs (within last week before hatching) to the breeding/training location mobile incubators have to be used. At the breeding/training ground eggs will be transferred into and collected within incubators. If additional waterfowl breeders have to be included in the network or breeding pairs have to be changed, additional genetic testing of adult and juvenile geese might become necessary to guarantee the quality of these geese for the release programme.

To reduce the risk of using birds of hybrid origin, according to the permission given by Swedish NEPA, only LWFG (or their offspring) that have been collected in the wild or have been genetically screened using analyses of mitochondrial DNA, at least ten microsatellite loci and the ISSR method, and sound not carrying alien genes, will be used in the project. The respective genetic testing is carried out by the University of Heidelberg, Germany. For further information on the method and the expected results a paper from Prof. Wink, University of Heidelberg, is enclosed in the appendix. Veterinary tests, including avian influenza, of all breeding pairs and if necessary from each single bird within the project flock will be conducted according to national requirements.

4c) Monitoring: In the pilot project all project birds are planned to become equipped with telemetry transmitters. Two kinds of transmitters will be used: Transmitters tracked by satellite (5) and transmitters tracked from the ground by mobile handheld receivers (20). Three handheld receivers will be needed for searching and identification of the exact position of tagged goose in the field. Transmitters are fixed at the individuals according to newest standards. All birds will be individually marked (legrings) in a way that allows individual identification in the field and also makes it possible to separate the birds from individuals belonging to the existing Swedish reintroduced population.

5) Camper/car-related equipment: Each car/camper (total: 3) has to be equipped with radio (ground/air) and GPS in order to stay in permanent contact with the aircrafts and to be able find landing positions of the aircrafts.

Phase II-06: Breeding/ground training actions May 1st – July 31st 2006

40 eggs (see phase I-06, 4b) will be transported to the breeding/ground training area near Lycksele (location will be determined with support of Lycksele Zoo). It can be expected that out of about 60-70% of the eggs viable chicks will hatch. Thus, 25-30 goslings of *A. erythropus* will be raised and trained on ground, as long as they will not be able to fly, at this location. To imprint the goslings it is necessary to habituate the birds to the sound of the microlight planes. To avoid imprinting on human personal features of individual human trainers, every person in contact with the goslings has to use full-cover camouflage clothing. Voice contact with the goslings is restricted according to the "handbook of team members' behaviour with geese". The raising area has to be completely closed to public access. From the very first day after hatching the goslings can be trained to follow the microlight aircraft. This training has to begin with the planes at a stand-still on the ground (but engine running) and, as goslings grow, they learn to follow the slowly rolling planes on the ground or swimming in the water. The imprinting and ground training is the precondition to perform the guided migration and the release in the wintering area, as the geese have to be completely familiar with the sound and movements of the planes and accept it as part of their foster parents.

Phase III-06: Flight training, migration and monitoring actions August 1st – October 31st 2006

Young *A. erythropus* accept as future breeding habitat only the area where they learned to fly. During their first flights they get used to the area (which under normal conditions would be the habitat in which they have grown up and therefore is suitable for future breeding). This natural behaviour makes it necessary to transport the young geese raised and trained in captivity to the future breeding area in Vindelfjällens Nature Reserve just a few days before they begin to fly. Transport of eggs, raising and training the geese right from the beginning in the future breeding area would be a too heavy impact on these habitats, as other breeding species might be disturbed by the presence of humans and microlight planes. At the time, when young *A. erythropus* learn to fly, other northern breeding birds have already raised their offspring and begin to migrate south, so that the disturbing impact is kept to a minimum.

After the transport of the young *A. erythropus* to the future breeding area in Vindelfjällens Nature Reserve, they learn to fly and follow the microlight planes in flight. This training has to include landing on water and, if possible, on ground as well. Flights will be conducted within the surroundings of the camp site to make the geese familiar with the area and by that accepting it as future breeding habitat.

As soon as the young geese are fit enough to follow the microlight planes for longer flight distances the migration will start (about mid of August). Young *A. erythropus* will use the migratory route they have experienced during their first migration south in subsequent years. Under natural conditions this is the route on which they followed their parents. This natural behaviour is the key factor for the idea of the guided migration as it enables the establishment a safe migratory route for the re-introduced individuals. A maximum of 25 individuals of *A. erythropus* will be guided by two microlight planes from the starting area in Swedish Lapland along the Baltic coast of Sweden via Denmark to the wintering area at the Bislicher Insel in Germany. First flights will lead the flock along Vindelälven and /or Ume rivers to the Ume River Delta. From there the migration route will lead to the south along the coastline, leaving it north of Stockholm and heading towards Denmark (see map "Sweden_stop-over places migr-route"). Fresh water lakes will be used for stop-overs and resting places in Sweden. In Denmark and Germany plenty of harvested crop fields and grasslands can be used for stop-overs. During the first days of the migration the daily distances will be comparably short as the young geese still have to build up and train their flight muscles step by step. After some days, daily distances will get longer up to 200-250 km, depending on weather conditions. Both microlight planes guiding the geese will be followed by a ground team each to ensure that the geese, the pilots and the planes receive support in case of any difficulties. Flights will preferably be performed during early daytime and stopped at noon latest. At afternoon and night, the geese will rest under guidance of the ground teams.

After arriving at the Lower Rhine end of September/first days of October the geese will be released into wild. This release is a process of a slowly drawback of the team members and the planes. Although young geese normally stay with their parents during their first winter, the 1999 test-flight showed that they have good survival prospects without further human care if they have the possibility to join mixed flocks of other arctic goose species, which winter in tens of thousands at the Lower Rhine wintering grounds. In the first days they will still search contact to their foster parents during night time, but will get more and more independent.

Phase IV-06: Evaluation and monitoring actions November 1st – December 31st 2006

All geese released at the Lower Rhine will be marked with coloured rings and equipped with satellite transmitters (5) and normal transmitters (20) right from the beginning of the migration. Regular counts and observations on the wintering site will be carried out. Exact localisation by transmitters and the collection and analysis of satellite data during winter will enable the project partners to keep track of the released geese.

All activities carried out in 2006 will be evaluated in order to improve preparations for and operations in 2007. A progress report will be elaborated and provided for all partners and authorities till end of 2006.

Phase I-07: Monitoring and preparatory actions January 1st – April 31st 2007

Monitoring (observation, counting, telemetry) of the geese will be continued at the Lower Rhine during wintering and during spring migration.

A prerequisite of Allianz Umweltstiftung for support of the pilot project is to have one flight in 2006, a monitoring of the geese in 2006/2007 and a second flight in 2007. The main reasons are that: a) the team can gather more experience by flying two times; b) problems faced during the first flight can possibly be solved during a second flight in order to optimise project performance; c) one year's success is demonstrated to be repeatable.

The first four months of 2007 will be used for preparatory actions similar to phase I-06, but will focus on optimising the detailed project plan, team organisation, checking available equipment, repair and replacement of material if necessary, hire of equipment and vehicles etc.

Phase II-07: Monitoring and breeding/ground training actions May 1st – July 31st 2007

Monitoring of the geese will be continued until birds have reached their summer grounds and further on as long as the transmitters will provide signals (esp. ARGOS).

Repeat of phase II-06.

Phase III-07: Flight training, migration and release actions August 1st – October 31st 2007

Repeat of phase III-06 but without monitoring of the released geese.

Phase IV-07: Evaluation 2007 and total evaluation 2006/2007; Nov. 1st – December 31st 2007

Phase IV-07 is planned for evaluation of the actions 2007 and overall pilot project evaluation of the years 2006/2007. A report will be produced and made available for all partners, authorities, cooperating institutions und interested third parties. The report shall be published.

10 PUBLIC AWARENESS AND DISSEMINATION OF RESULTS

1) A website for the pilot project will be set up under www.fjallgas.org, available directly and via the already existing www.zwerggans.de, www.fjallgas.se and the websites of our partners. The site will be updated continuously during the whole project duration. It will serve as a platform to inform the interested public about the ongoing of the project by publishing intermediate results and reports. The information published about Operation Fjällgås/Operation Lesser Whitefront in leaflets or during scientific conferences will also be made available in electronic versions on the website. A website can be updated very quickly, so that new information can be published without loss of time. A website is also an adequate instrument to inform about conservation issues and the Natura 2000 network in general by linking background information to the recent project. The project management will closely cooperate with all partners.

2) Guiding geese with microlight aircrafts from Swedish Lapland to Germany will rise public interest, especially when inhabited areas have to be crossed and project reports will be published in newspapers and TV. This interest offers a good opportunity to inform the public about the threats which arctic geese in general and especially the target species face and what measures are undertaken to overcome these threats. Leaflets shall be produced which, according to the migration

route through Sweden, Denmark and Germany will be in the respective languages and in English. They include information about stocking and monitoring and will be published annually for sponsors, newspapers and other interested parties. The leaflets shall be produced in 2,000 copies in each language. At the beginning of each migration, a press conference will be held. The results of the monitoring and the satellite data will also be published in international scientific papers and presented at the regular meetings of the Wetlands International Goose Specialist Group. Posters about the project results will also be presented on scientific meetings. All information material will include special reference to the European Nature 2000 network.

3) A progress report will be provided for all partners and authorities till end of 2006 and a final report till end of 2007. If a subsequent monitoring will be carried out in 2007/2008, a second progress report will be provided till end of 2007 and the final report till end of 2008.

4) A layman's report of about 5 – 10 pages (1.000 copies) will be published at the end of the project in electronic and written form. This report will be published in English, German, Swedish and Danish. In order to inform the public about the project and raise awareness of species conservation issues and the Natura 2000 network in general, a layman's report addresses not only the scientific community but also the interested public. To address people in the project area in their mother tongue, the report will be published in English, German, Swedish and Danish.

5) A small film team will accompany the teams and produce a documentary about the pilot project. Film material will be available for interested TV-stations, which have to and will pay for and by that, together with sponsors, finance the film team, production costs and lacking funds for comprehensive project funding. Additionally sponsors shall have the opportunity to support the project by donating funds and/or equipment. Thus additional actions (i.e. monitoring 2007/2008) shall be financed.

11 CONTINUATION

1) If funds are available, a second monitoring including evaluation shall be carried out in 2007/2008.

2) The pilot project aims at proofing the ability of the microlight method for establishing a viable and slowly increasing population of reintroduced *Anser erythropus* in parts of the original breeding range. If the pilot project is successful a main project could follow, even might be started during the running pilot project. This main project will envisage a duration of up to four years and has the aim to re-establish a viable population of LWfG in Scandinavia. To reach that aim it would be necessary to operate with several microlights in parallel. In order to guide about 100 geese per year, up to four microlights would be needed. After four years this would lead to a total of about 400 reintroduced LWfG which could be the basis for a growing population. All equipment bought for the pilot project will be usable for this main project and by that reduce costs. Experienced teams will be available as well, ready to share their knowledge with others who want to support the Lesser White-fronted Goose and other migratory bird species suffering similar threats. As public and sponsors will be positively stimulated by the pilot project chances are high to receive the necessary funds for carrying out the main project. Applying for a LIFE project is one option amongst others.

3) The breeding farm in Hämeenkoski and others will maintain captive *Anser erythropus* after the end of the pilot project. Genetically tested breeding pairs will produce young *A. erythropus* which will be able to be used for the main project and further re-introduction and re-stocking activities, if needed. Funding for the caretaking and breeding will have to be organised.

4) The staff from the Biological Station Wesel at the wintering site at Bislicher Insel will go on monitoring the number of geese returning to the wintering site. As all released geese will be individually marked, regular annual counts via observations may be able to cover the lifespan of the introduced geese. The station is funded by German sources. Members of the Ornithological Society

of Västerbotten and other supporting bird watchers along the migratory route will as well monitor the reintroduced birds.

12 POSSIBLE CONSTRAINTS

Possible constraints, their expected influence and how to overcome them.

Constraints	Expected influence	Overcome by
No comprehensive funding by planned media activities, sponsoring and applications to national, European and international foundations	Funds available within applicant and partners are not enough to carry out the whole project; project must be interrupted.	Project funds secure first migration and complete monitoring in 2007. Second migratory flight cannot be carried out; publicity of first migration is expected to support funding possibilities;
Controversial discussion about accordance of the planned re-introduction schemes with IUCN Guidelines (IUCN 1995)	Opposition against project implementation; delay in gaining necessary permissions and support.	See feasibility study
Controversial discussion about accordance of the planned re-introduction schemes with Lesser White-fronted Goose action plan (Council of Europe 1996)	Opposition against project implementation; delay in gaining necessary permissions and support.	See feasibility study
Genetics of breeding stock kept in captivity: The appropriate method for identification of <i>A. erythropus</i> individuals carrying <i>A. albifrons</i> genes (hybrids) still is under controversial discussion within genetic experts from Sweden, Finland, Russia and Germany.	Agreement on the appropriate method for identification and exclusion of hybrids from breeding stock may be necessary to ensure acceptance of re-introduced <i>A. erythropus</i> .	Swedish NEPA is willing to force the conclusion of the discussion. Methodological data are given in the project plan. Decision on suitable individuals for re-introduction, according to the results of the genetic investigations and suggestions from genetic experts, will be made with partners and supporting authorities.
Not enough <i>A. erythropus</i> breeding pairs with “good” genetics available.	Not enough eggs are produced; number of <i>A. erythropus</i> eggs and, as a consequence, birds available for the pilot project is lower than planned.	Intensive search in German, Swedish and Finnish (Hämeenkoski) breeding farms has been carried out in order to identify all available breeding pairs. Production of <i>A. erythropus</i> at

		<p>Hämeenkoski breeding farm could be increased.</p> <p>If less than 40 eggs respectively 25 birds will be available, project success is endangered.</p>
<p>Loss of <i>A.erythropus</i> individuals in breeding stations and project flock caused by diseases: In spite of high hygienic standards, concentrations of captive birds always bear the risk of an outbreak of infectious diseases.</p>	<p>Outbreaks of diseases within breeding stocks and goose groups foreseen for re-introduction may cause high mortality, reduced reproductive success and diminish number of re-introduced birds. Re-introduction effort could become seriously affected.</p>	<p>Keeping captive breeding stocks in Sweden, Finland, Germany and other countries helps minimize possible negative effects of such risks.</p> <p>Maximum possible numbers of breeding couples will be identified in order to receive adequate numbers of eggs/goslings.</p> <p>Experienced, qualified team members (veterinary skills) secure health conditions of <i>A.erythropus</i> in breeding stations and during microlight training and migration.</p>
<p>Loss of eggs during transport by car/air</p>	<p>Reduction of number of eggs, goslings etc. available for re-introduction.</p>	<p>Transportable incubators (special construction), transport rules and experienced team members (breeders) will minimize loss of eggs during transport.</p>
<p>Loss of team members caused by diseases</p>	<p>None, because a spare team is planned to be available; if no spare team members are available, project must be stopped.</p>	<p>Experienced, qualified team members (medical skills) secure health conditions of team members during training and migration.</p> <p>Spare team members shall be available.</p>
<p>Injuries / loss of <i>A.erythropus</i> individuals, team members and material caused by accidents: accidents during transport by car, during ground training and flights with microlights are possible.</p>	<p>Possible reduction of number of <i>A.erythropus</i> available for re-introduction.</p> <p>No other consequences, because spare team members and spare microlight are planned to be available.</p>	<p>Vehicles and Microlight planes are optimal equipped in order to avoid accidents;</p> <p>Spare team members are available;</p> <p>Spare microlight plane is available;</p> <p>Experienced, qualified team members (veterinary and medical skills) secure health conditions of <i>A.erythropus</i></p>

		and team members during training and migration.
Loss of <i>A.erythropus</i> individuals caused by predators during training and migration (predatory species intruding overnight camps, attacks of predatory birds on flying geese)	Possible reduction of number of <i>A.erythropus</i> available for re-introduction.	Protection measures (electrical fencing) against predatory species intruding overnight fencing of <i>A.erythropus</i> are planned; Attacks of birds of prey (eagles) to flying geese are seldom, but possible. The second microlight will be used as a guard in such situations.
Loss of <i>A.erythropus</i> individuals due to decision of individuals or small groups to abandon the flock during migratory flight. Such birds normally return to the last overnight location or may disappear.	Possible reduction of number of <i>A.erythropus</i> available for re-introduction.	Birds leaving the flock will be followed by the second microlight and tried to be guided back to the flock.
Loss of <i>A.erythropus</i> individuals due to decision of individuals or small groups to abandon the flock during migratory flight. Such birds normally return to the last overnight location or may disappear.	Mix of wild birds and project birds is possible.	Birds leaving the flock will be followed by the second microlight and tried to be guided back to the flock. Otherwise not possible to overcome; as all geese are individually marked, most or all of them carry transmitters and are genetically and veterinary checked, no problems arise.
Bad /extreme weather conditions: A longer period of bad weather could stop the microlight guided migration. Heavy rain or strong winds prevent the microlights from flying, the planes have to stay on ground.	If bad, “unflyable” weather conditions continue over a longer period, the migration flight is delayed and might become seriously endangered, if delayed into icy conditions.	Start of the migration in mid of August will allow certain periods of bad weather to reach the destination in time.
Technical problems of vehicles and microlight planes during migration	Short delay within time table	Start of the migration in mid of August will allow delays due to technical problems; Spare parts are carried with to allow quick repairs. Quick

		support is secured by national and local aero clubs. In case of major technical problems a spare car and a spare microlight are available.
Social conflicts within teams during training and microlight aircraft guided migration	None	Experienced team members, well known to each other (training camps in 2002, 2003, 2004, 2005)
Not enough team members available for microlight guided training and migration due to personal (familiar etc.) reasons	Flight training and migration's start must be delayed.	Adequate recruitment for team members; adequate training opportunities.
Disturbance by media people and visitors related to microlight guided migration and training activities	Disturbance during imprinting, training and migration could lead to failed imprinting efforts, safety problems for the teams and the <i>A.erythropus</i> flocks. <i>A.erythropus</i> used to human beings will lose their natural shyness against humans with resulting lower survival chances.	The location for imprinting and training will be well secured against intruding visitors. A small film team only will accompany the teams and provide material for interested media; no other media-people will be allowed to have access to the geese. A code of conduct will be prepared for the team members and the visitors as well how to behave when coming close to the geese. Access to the geese will be restricted. Every person getting in visual or even closer contact with the geese has to wear same camouflage clothing as the team members working with the geese. Team members always will be accompanying any visitor.
Failures (wrong team members behaviour, technical problems) during imprinting period, wrong behaviour of team members during microlight guided training and migration	Failed imprinting could lead to losses of <i>A.erythropus</i> during training and migration by abandoning individuals or groups. Reduction of number of <i>A.erythropus</i> available for re-introduction; project might become seriously endangered.	A code of conduct related to the behaviour of team members working with the geese is already drafted and will be finished before the project starts. Every interaction between a team member and the geese will be carried out according to these rules. This is necessary also in

		order to allow changing team members, if necessary.
Not enough <i>A. erythropus</i> re-introduced after first migration or/and at the end of the project because of technical and other problems not foreseeable	One important project aim failed	Overall risk of failure is tried to be reduced to a minimum level by project planning; unexpected problems shall be identified and tried to overcome quickly; project plan shall be optimized accordingly in order to be prepared to overcome such or similar situations in the second migratory flight. Improvement of the method is one of the major tasks of the pilot project.

APPENDIX

- 1) Feasibility study
- 2) 3 (4) maps of the planned starting area and migratory route:
 - 2.1) Starting area in Vindelfjällens Nature Reserve: “map_Starting area-detail.pdf”
 - 2.2) Migration routes from starting area to Ume River Delta: “map_Västerbotten_migr-routes.pdf”
 - 2.3) Migration route with possible stop over places in Sweden “map_Sweden_stop-over places migr-route.pdf”
 - 2.4) Complete migration Route: “map_Compl_migr-route.pdf”
- 3) Prof. Dr. Michael Wink, University of Göttingen: “Genetic analysis of LWFG”: “Genetic analysis of LWFG_WinkM300805.pdf”