

The Nordic Greylag Goose (*Anser anser*) Project

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ABSTRACT - Neck-banding of Greylag Geese in the Nordic countries was initiated in 1984 by the Nordic Council for Wildlife Research as there was a need for a thorough knowledge of various aspects of the population ecology and migration patterns of the populations in different parts of the four countries. Since the start in 1984 more than 6400 Greylag Geese have been neck-banded, yielding more than 250,000 readings in our files. The present contribution gives an update of results presented in Andersson et al. (2001) with the special aim to elucidate changes in the migration patterns over the study period for the Greylags from SW Scania and Norway, respectively. Through the years both groups have changed their migration pattern, migrating south later and north earlier. In addition a greater proportion is now wintering further north than when the project started.

Introduction

Neck-banding of Greylag Geese in the Nordic countries was initiated in 1984 by the Nordic Council for Wildlife Research. At that time the ongoing increase in the European Greylag Goose populations had started to accelerate and there was a need for a thorough knowledge of various aspects of the population ecology of the species besides a detailed knowledge of the migration patterns of the different populations.

From the start it was planned to catch and neck-band Greylags at a number of sites throughout the four countries. During the years it was found that the data-base could be used to study a number of aspects of goose ecology not thought of from the beginning as we got a very large data-base of neckband readings from all parts of the range of the species thanks to the "army" of cr.-readers all through western Europe. Therefore we have continued the neck-banding in two of the main areas: Scania in south west Sweden and in central Norway.

A major analysis of the migration patterns of Nordic Greylag Geese based on the first 15 years of the project was published by ANDERSSON *et al* (2001). Through the years different aspects of the ecology of Greylag Geese based on the banding study have been published (NILSSON, 1998, NILSSON & KAMPE-

PERSSON, 2003, NILSON & PERSSON, 1992, 1993, 1994, 1998, 2001a, 2001b, NILSSON *et al.*, 1997, 2001, 2002). Regular up-dates from the project will also be found on the homepage: www.biol.lu.se/zoekologi/waterfowl/index.htm

In the present contribution I will give a short update from the project in relation especially to the migration study presented in ANDERSSON *et al.*, (2001) emphasizing the changes that have occurred in the Greylag populations during the years of the study.

Material and methods

Since the start in 1984 about 6400 Greylag Geese have been neck-banded in the project. Of these about 2500 have been neck-banded in the intensively studied area in SW Scania and 3000 in Norway (Fig. 1). During the early part of the study 405 geese were also banded in the province of Södermanland south of Stockholm in Sweden. Smaller numbers have also been marked in Finland and Denmark. In addition to these 85 Greylags were marked at Lake Hornborgasjön in a study started in 2004.

Over the years a network of observers was established all over the flyways of the greylags in Europe and the major staging and wintering

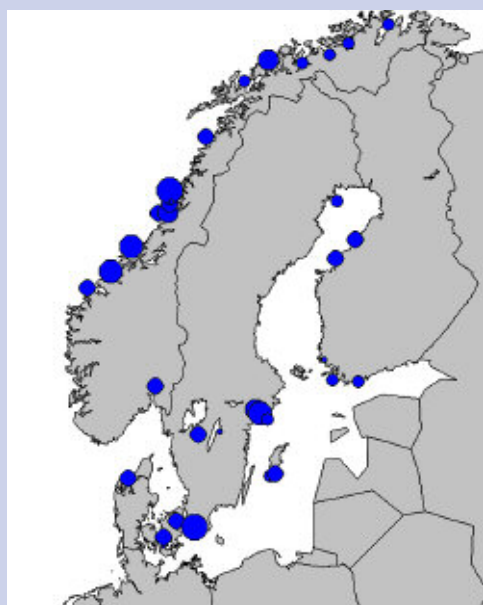


Fig. 1 Map showing the different marking sites for Greylag Geese in the Nordic countries. - Les différents sites de marquage de l'Oie cendrée dans les pays nordiques.

areas in western Europe are now well covered by observers. In addition to this, special checks for neck-banded Greylags in the study area in Scania, southwest Sweden were carried out to study various aspects of the breeding ecology (this aspect will not be further treated here, but see references in the introduction).

We now have more than 250,000 readings in our files. The re-sighting frequency for the marked birds varies between different cohorts, but is generally very high, e. g. for some groups of Norwegian marked geese staging in the Netherlands it is around 85 % (part of those not seen have probably died before reaching Holland). Of Greylags marked in SW Scania, 81 % of those marked as adults and 73 % of the juveniles were reported at least once from abroad after marking. In SW Scania we have been able to follow a sample of marked breeding birds through the years and we now have about 3600 breeding attempts (marked breeder multiplied by number of years) in the files.

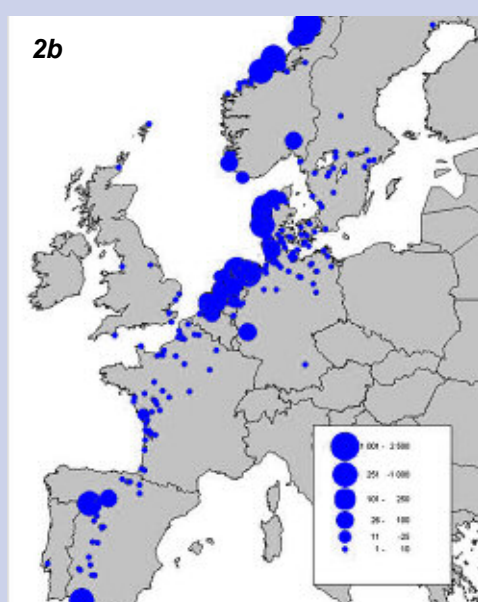
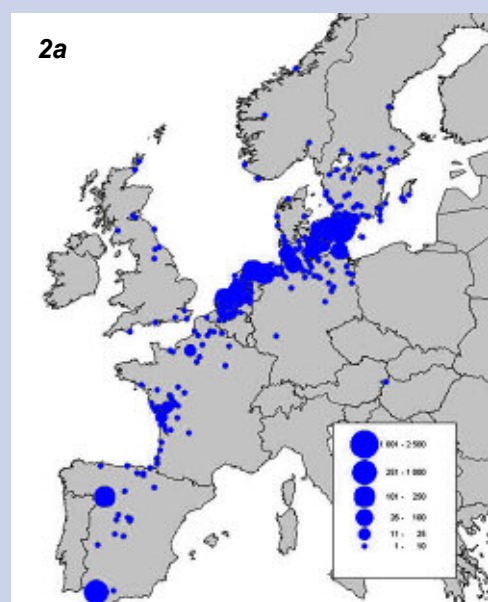


Fig. 2 - Map showing the distribution of neckband readings of Greylag Geese from Scania (2a) and Norway (2b). Only one observation per individual and site shown each year. - Distribution des lectures des colliers des Oies cendrées de Scanie (2a) et de Norvège (2b). Une seule observation par individu et par site retenue chaque année.

Table 1 - Number of individually marked Greylag Geese from Scania (south Sweden) and Norway seen at least once after marking in different countries. Reports received until December 31 2005 are included. Observations from the two marking countries are not included. Numbers marked in the two main areas shown in brackets - *Nombre d'Oies cendrées marquées en Scanie (sud de la Suède) et en Norvège et revues au moins une fois dans différents pays, jusqu'au 31.12.2005, observations dans les pays d'origine exclues. Entre parenthèses, les nombres observés dans les deux aires principales.*

Country of observation Pays d'observation	Number of individuals seen at least once in the different countries Nombre d'individus vus au moins une fois dans les différents pays		
	Marked in SW Scania (2485) Marqués en Scanie du S-O	Marked in Norway (3013) Marqués en Norvège	Total number of readings reported Nbre total de relectures
Norway - Norvège	12		
Sweden - Suède		44	
Denmark - Danemark	408	1076	6087
Germany - Allemagne	287	558	3145
The Netherlands - Pays-Bas	1221	2409	53521
Belgium - Belgique	88	23	465
United Kingdom - Royaume-Uni	6	4	67
France	152	218	5905
Spain - Espagne	739	1562	13380
Portugal	0	4	4
Morocco - Maroc	3	0	10
Estonia - Estonie	0	0	1
Poland - Pologne	0	0	49
Czech Republic - Rép. tchèque	0	0	3
Austria - Autriche	0	0	38
Hungary - Hongrie	1	2	27
Italy - Italie	0	0	5
Tunisia - Tunisie	0	0	2
Algeria - Algérie	0	0	10
TOTAL			82719

Results

Greylag Geese from the Nordic countries migrate south along the Atlantic coast of Europe to their winter quarters which formerly were mostly situated in south-western Spain, with smaller numbers wintering further north. Accordingly, observations of neck-banded Greylag Geese were found in a number of sites along the Atlantic coast (Fig. 2, Table 1).

At the start of the project, Greylag from SW Scania stayed in the country until October/ November. Then, they went to the Netherlands for a short stop that was followed by a migration of the majority of the birds further south to the traditional winter area in the Marismas in SW Spain. In spring they also made a short stop in the Netherlands before arriving in Sweden, mostly in the last week of February or early March.

The Greylags from Norway have another strategy. They leave Norway already during the summer and

quite many arrive in the Netherlands already in August or September, several of them first staging in Denmark. They stay for a relatively long period in the Netherlands (if not wintering here) before migrating to SW Spain. In the early years they arrived in Spain later than the Swedish birds. They also left Spain later, staging for a month or more in the Netherlands before migrating to the breeding areas in Norway.

Besides these differences in the general migration strategy of the geese, other differences were found when comparing the distribution of neck-banded Greylags (or more correctly the reports of neck-banded Greylags) between different areas. As is apparent from Fig. 3, a very high proportion of all neck-banded individuals are re-sighted in other countries than their country of origin. Thus more than 80% of the marked Greylag Geese from Norway were seen in the Netherlands at least once after marking. The proportion of Swedish Greylags seen in the Netherlands was only about 50 %. The Norwegian

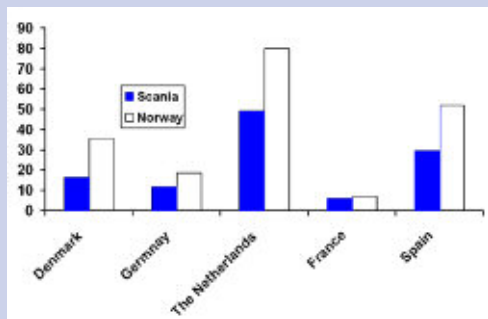


Fig. 3 - Percentage of all neck-banded Greylag Geese marked in Norway and Scania until 2004 that have been reported at least once from a number of different countries. - Pourcentage des Oies cendrées marquées en Norvège et en Scanie jusqu'en 2004 et revues au moins une fois, quel que soit le pays.

and Scanian samples are not fully comparable as most of the Norwegian birds were either adult breeders or moulting birds, whereas the sample from Scania also included a number of juveniles with higher mortality occurring shortly after marking. For adult breeders the percentage seen in the

Netherlands at least once after marking was higher, 60 % for those from Scania and 90 % for the Norwegian, this being a reflection of the longer staging period for the Norwegian birds with more chances to be seen.

The proportion of the marked Greylags seen in Spain was much lower than for the Netherlands, with actually about 33 % of the Swedish and 50 % of the Norwegian birds reported. There are however great differences in the possibilities to check for neckbands in the two countries. Especially in the Marismas it is often very difficult to find geese close enough to check for and read neckbands. Only during special situations are larger flocks found on fields where they can easily be checked.

There are also interesting differences in the way Norwegian and Scanian Greylags used different areas within the Netherlands. In the northern part of the country, Lauwersmeer and Dollard are the two main staging areas even if a large number of birds use different parts, especially of Friesland, for staging. In the big Greylag flocks of Lauwersmeer

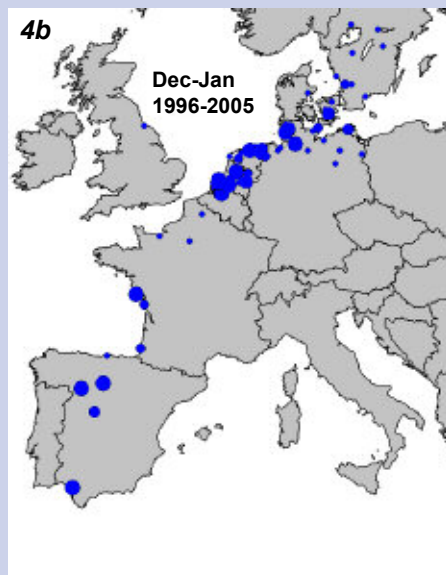
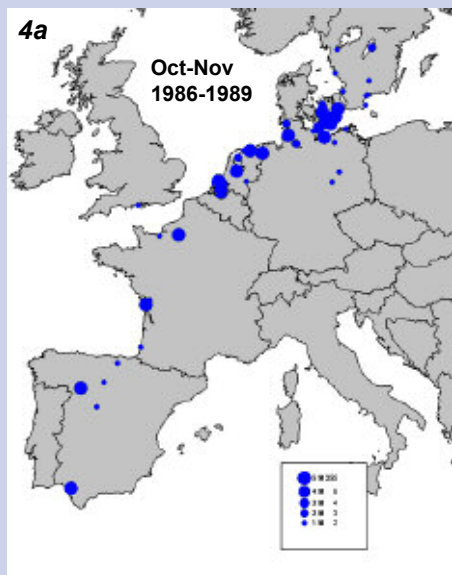
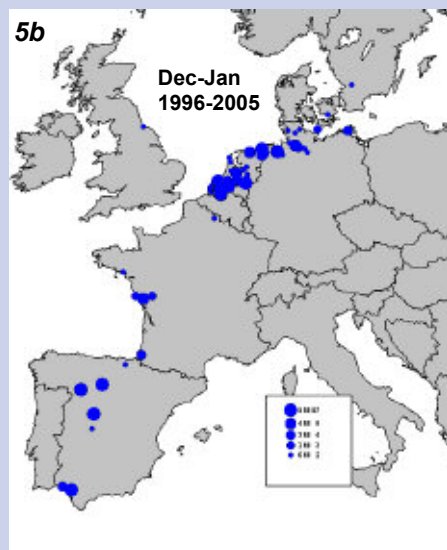
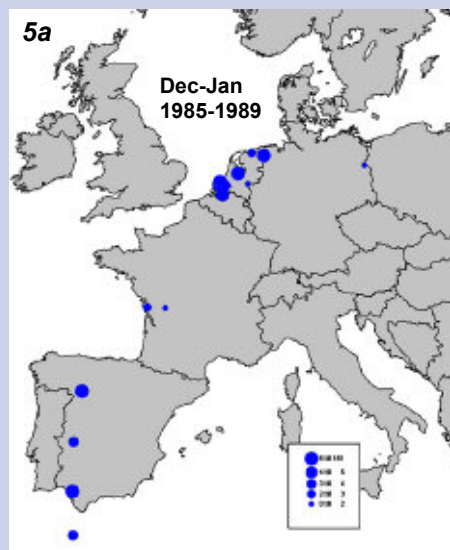


Fig. 4 - Map showing the distribution of neck-band readings of Greylag Geese from SW Scania during two autumn periods: 1986-89 (4a) and 1996-2005 (4b). Only one observation per individual and site is shown for each year. - Distribution des lectures des Oies cendrées du sud-ouest de la Scanie au cours de deux périodes automnales : 1986-89 (4a) et 1996-2005 (4b). Une seule observation par site et par année retenue.

Fig. 5 - Map showing the distribution of neck-band readings of Greylag Geese from SW Scania during two winter periods: 1985-89 (5a) and 1996-2005 (5b). Only one observation per individual and site is shown for each year. - Distribution des lectures des Oies cendrées du sud-ouest de la Scanie au cours de deux périodes hivernales : 1985-89 (4a) et 1996-2005 (4b). Une seule observation retenue par site et par année.



birds from Scania are rare, whereas large numbers of neck-banded birds from Norway can be found. On the other hand more Scanian geese are staying at the Dollard area.

Through the years this pattern changed, as is exemplified by Figs. 4 and 5 showing autumn staging areas and wintering areas, respectively for two different time periods.

Comparing the autumn maps (Fig. 4) much fewer observations are reported from Denmark during the more recent period, the geese staying longer in south Sweden and migrating directly to the Netherlands. The differences are even more obvious during the winter, with a dominance of the Netherlands compared to Spain. The majority of the Scanian Greylags now seem to winter in the Netherlands. Some birds even winter in Sweden, where a number of neck-banded geese have stayed for the entire winter only moving from the breeding areas to the coastal autumn staging area and remaining there.

The timing of the migration also changed over the years (Fig. 6). During the first years of the project the median arrival time in the Netherlands was in

mid-October, whereas it is now in late November to early December. At the same time the geese leave the winter areas in the Netherlands earlier and many are back in the breeding areas already in mid-January compared to late February to early March when the project started.

The moult migration of the birds from Scania has also changed. At the start of the project almost all young and non-breeding geese moulted at Oostvaardersplassen in the Netherlands, but they later shifted to Saltholm in the sound between Sweden and Denmark, much closer to the breeding area. There is no monitoring on Saltholm any more, but there are signs that the geese are shifting again and moult at Hornborgasjön 350 km to the north.

There have also been changes in the migration pattern of Norwegian Greylags. Maps of observations of neck-banded Norwegian Greylags show changes in the autumn and winter distributions similar to those of Scanian geese (data not shown). The timetable for the migration of Norwegian Greylag geese has also changed and the median arrival in the Netherlands is now later than during the early years of the project (Fig. 6).

During the study period the distribution of the Greylags has also changed due to habitat factors. As can be seen from the maps in Fig. 4 and 5 three important sites are now found in northern Spain compared to only one in the earlier period. This is due to the establishment of new large water reservoirs that the geese can use as roosts. These allow the geese to use new food-rich staging areas that formerly lacked roosts.

Discussion

The study of individually marked geese within the Nordic Greylag Goose project and other similar projects clearly showed the great variability of the migration systems and how fast staging and wintering traditions may change. Another lesson to learn from the project is the huge potential, which lies in the “army” of dedicated neck-band readers in Europe. Without all these volunteers it would not have been possible to follow the birds and get the detailed information summarized in this brief report and in aforementioned references.

A clear result from the study is the marked change in staging and wintering habits that happened over a quite short time period. Is it an effect of “global warming” or are other factors involved? A major factor is the occurrence of several mild winters in a row, allowing the geese to find food further north.

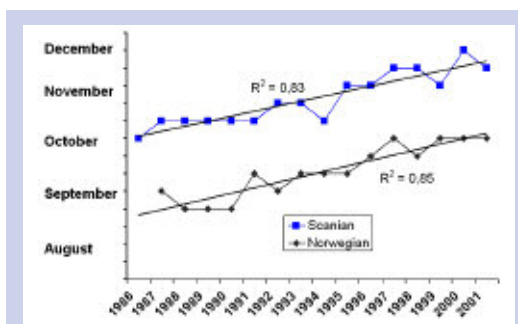


Fig. 6 - The median arrival time for Greylag Geese from Norway and SW Scania, respectively, into the Netherlands in different years. The median time is measured in ten-day periods from August 1st. - Période médiane d'arrivée aux Pays-Bas, au cours des années, des Oies cendrées de Norvège et du sud-ouest de la Scanie. Période mesurée par décade à partir du 1er août.

The major impact of food availability is clear from the differences in migration patterns between Scanian and Norwegian Greylags. In Norway, there are few good feeding areas to be found after the moult period and the geese move south early, many staging in Denmark already in August, others going to the Netherlands. There, they stay for an extended period, gaining energy for the autumn and winter after the breeding season.

In south Sweden in contrast to Norway the geese have rich food resources, first in the form of stubble fields, later in the form of left-over from the sugar beet harvest. In the first years of the study the geese had not so much food in Sweden after the stubble fields were ploughed in September/October and most Greylags left the country. The goose population in Scania (as in the rest of the country) increased and new staging areas were established among others at Foteviken close to the marking area in Scania. This was a sugar beet area and after the harvest there was plenty of food for the geese remaining much later in the autumn. More and more geese learned to use the sugar beet and, currently, the majority of the geese do not go further than the coast (distance 35 km) when they leave the inland area in autumn. They stay there as long as sugar beet is available and go on migration much later.

When arriving in the Netherlands in late autumn they find the same type of food and as long as it is not freezing for extended periods, they do not need to migrate any further and stay for the winter. As long as the winters are mild and the cold spells short this is probably a good strategy compared to making the long journey to Spain. Whereas there can be cold spells in the north there can be droughts in Spain. Moreover geese are at risks from hunting when passing France.

After a mild winter and early spring the Scanian geese wintering in the Netherlands have an advantage on the geese wintering in Spain as they can be back much earlier in the breeding areas giving them much higher chances to succeed in producing a brood of fledged young.

While we now have a rather good general picture of the migration of the Greylag Goose, it is becoming increasingly obvious over the years how much

variation there is in their migration pattern and how adaptable the geese are. Especially this matter is an interesting issue to study. It is also interesting to see how newly established populations behave. In Sweden neck-banding has therefore started at Lake Hornborgasjön, the famous bird-lake in south Sweden that was restored a few years ago. The lake has already a large Greylag population and it will be of great interest to compare this population with those studied for a long time in Scania and Norway (not to say those in other countries). So, even if there are hundreds of thousands of observations in the different data-bases there is still a need for more observations of the marked birds to solve new exciting questions to come.

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Résumé

Le projet nordique des Oies cendrées

Le marquage par collier de l'Oie cendrée dans les pays nordiques a débuté en 1984 dans le but de mieux connaître les différents aspects de l'écologie de l'espèce et les stratégies de migration des populations des différentes parties des quatre pays. Depuis le début, plus de 6.400 oiseaux ont été munis de collier et plus de 250.000 lectures ont été

enregistrées, grâce à un réseau d'observateurs couvrant les principales aires de stationnement et d'hivernage. Le pourcentage des oiseaux revus est élevé, de l'ordre de 85 % pour ceux marqués en Norvège et passant par les Pays-Bas. Si, au début du projet, des Oies cendrées ont été marquées en différents sites des quatre pays, l'effort n'a plus été pour-

suivi intensivement que dans deux des aires de reproduction principales : la Scanie, au sud-ouest de la Suède, et le centre de la Norvège. Diverses publications ont été réalisées et des mises à jour régulières peuvent être trouvées sur le site : www.biol.lu.se/zoekologi/waterfowl/index.htm

Ce projet et d'autres ont permis de montrer la grande variabilité des stratégies de migration ainsi que la rapidité avec laquelle les traditions de halte et d'hivernage peuvent changer. Un facteur important dans ces modifications est la succession d'hivers doux qui ont permis aux oies de trouver leur nourriture plus au nord.

Initialement, l'Oie cendrée des pays nordiques migrait le long de la côte atlantique jusqu'à ses quartiers d'hiver au sud-ouest de l'Espagne, un petit nombre hivernant plus au nord. La population de la Scanie quittait le pays en octobre-novembre et gagnait les Pays-Bas où, après une courte halte, la majorité des oiseaux se rendaient dans les marais salants du sud-ouest de l'Espagne. Au retour, les oiseaux marquaient également une courte halte aux Pays-Bas avant de regagner la Suède dans la dernière semaine de février ou au début de mars. Les Oies cendrées de Norvège, elles, arrivaient déjà aux Pays-Bas en août ou septembre, beaucoup d'entre elles s'arrêtant au Danemark. Le séjour aux Pays-Bas, quand elles n'y hivernaient pas, était relativement long. Elles arrivaient en Espagne plus tard que les oiseaux suédois et la quittaient aussi plus tard pour marquer une halte d'un mois ou plus aux Pays-Bas avant leur retour sur les sites de nidification norvégiens. Les lieux de halte aux Pays-Bas sont aussi différents pour les deux populations. Au nord du Pays, les sites les plus importants sont le Lauwersmeer et Dollard. Les oiseaux de Scanie sont rares au Lauwersmeer où l'on trouve de nombreux oiseaux marqués en Norvège. C'est l'inverse pour Dollard.

Ces dernières années, de moins en moins d'observations sont signalées en automne au Danemark. Les oies de Scanie restent plus longtemps en Suède avant de gagner directement les Pays-Bas où la majorité d'entre elles semble maintenant hiverner. Certaines restent même en hiver sur les sites de

halte de la côte suédoise. Ce phénomène est lié à un changement de comportement dans la recherche de la nourriture, de plus en plus d'oies exploitant maintenant les résidus des champs de betteraves alors qu'avant elles n'exploitaient que les chaumes. Le labour de ces derniers en septembre-octobre entraînait leur départ en migration et la date médiane d'arrivée aux Pays-Bas était la mi-octobre; maintenant, c'est fin novembre-début décembre. Y trouvant le même type de nourriture, elles ne migrent pas plus loin et restent pour l'hiver, tant qu'il ne gèle pas pendant une longue période. Elles quittent aussi maintenant leurs zones d'hivernage plus tôt et sont de retour sur les sites de nidification mi-janvier au lieu de fin février-début mars. Du changement dans la migration de mue a aussi été enregistré. Initialement, elles muaiement à Oostvaarderplassen aux Pays-Bas; le site de mue s'est ensuite déplacé à Salthom dans le détroit entre la Suède et le Danemark, avant un nouveau déplacement vers le lac Hornborga, 350 km plus au nord, donc plus près de leur aire de reproduction.

La stratégie migratoire des oies cendrées norvégiennes a aussi changé. Dans ce pays, peu de zones favorables à la recherche de nourriture sont disponibles après la mue. Les oies se déplacent donc tôt vers le sud, beaucoup stationnant au Danemark, d'autres se rendant aux Pays-Bas où elles restent longtemps. La date médiane d'arrivée aux Pays-Bas est maintenant plus tardive par rapport à celle du début du projet.

La distribution de l'Oie cendrée a aussi changé suite à des modifications d'habitat. Ainsi, il y a maintenant trois sites de halte importants au nord de l'Espagne, contre un précédemment, et cela suite à la création de grands réservoirs d'eau que les oies utilisent comme reposoirs. En leur fournissant ces aires de repos, ils permettent aux oies d'exploiter de nouvelles zones de transition riches en nourriture.