Lesser White-fronted Geese in The Netherlands: a review of trends, phenology, distribution patterns and origin

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This report was commissioned by the Swedish Lesser White-fronted Goose Project as part of the National Single Species Action Plan.

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Contents

Summary

This report reviews the status and occurrence of Lesser White-fronted Goose in The Netherlands. It focuses on the period after the last national report from 2005 and provides information on numbers, phenology, distribution and origin of Lesser White-fronted Geese in The Netherlands. The analysis is based on records collected by a large number of volunteer observers, submitting their data to the national goose counting scheme or to citizen-science portals (see chapter 2 for details).

Lesser White-fronted Goose is a regular winter visitor in The Netherlands, with numbers up to about 120-130 individuals (2003/2004–2011/12). In 2012/13, a decline was observed, in line with reports from Sweden of losses on the breeding grounds. Arrival of larger numbers in is observed from September-October onwards and departures in March and April. During winter, numbers are rather stable, suggesting no further influxes and no major departures to other countries. Arrival in autumn has delayed in recent years, whereas departures in spring have advanced. From the six traditional staging and wintering sites in 2005, only three are still regularly used. The other sites were abandoned without obvious reason (no changes in landscape or farming systems). One of the remaining sites, Anjumerkolken in Friesland, seems to be subject to a similar abandonment. Birds have shortened their stay at this site in autumn. In autumn 2013 even no birds at all were observed. If this trend continues, nearly all Lesser White-fronted Geese in The Netherlands will only concentrate at two sites: Oudeland van Strijen in the province of Zuid-Holland and the polders near Petten in Noord-Holland. Both have been designated as SPAs, including feeding areas and night-roosts. Numbers and duration of stay at Petten have clearly increased in the past years. Today, it is the most important site, prior to departure from The Netherlands in February-March.

Reports of colour-ringed birds have clearly shown that the Lesser White-fronted Geese observed in The Netherlands mainly originate from the reinforced breeding population in Sweden. Hence, the increasing numbers in The Netherlands since the 1980s will reflect the initial increase in the Swedish population. The same applies to the decline from 2012/13 onwards. In many winter seasons, however, numbers in The Netherlands exceed those of the known size of the breeding population in Sweden. This supports the hypothesis, that also small numbers of birds from other origin, or unknown Swedish breeding sites, winter in The Netherlands. From ring sightings, there is some evidence that not all Swedish birds are discovered in Sweden, although they were observed in The Netherlands. Furthermore, several neck-banded birds from the earlier Finnish release programmes have been observed in The Netherlands. In recent winters, also released birds from Northern-Norway were reported from The Netherlands (and Germany and Denmark). This confirms that birds from several sites in Northern Fenno-Scandinavia might migrate to The Netherlands in winter. To what extent individuals from e.g. the Russian population are among the Lesser White-fronted Geese observed in The Netherlands is not known (and not confirmed by any ringing or satellite-tracking). However, given the historical observations, before the start of the Swedish reinforcement programme, and the large numbers of Greater White-fronted Geese from Russian breeding sites that winter in The Netherlands (and might pull individual Lesser White-fronted Geese to migrate to The Netherlands), it is not unlikely that occasionally Russian birds winter in The Netherlands. Finally, also some of the "feral" Lesser White-fronted Geese in the country (an estimated 10 individuals at maximum) might mix among flocks.

1. Introduction

The Lesser White-fronted Goose *Anser erythropus* is one of the most endangered goose species in the world. It is considered globally threatened and recognised as vulnerable by IUCN and ranked by BirdLife International as a 'SPEC 1' species (Jones *et al.* 2008). The species has been subject to a decline of more than 90% in the 20th century, due to hunting and habitat degradation. Hence, its breeding range has become increasingly fragmented (Lorentsen *et al.* 1999, Jones *et al.* 2008). Today, four different breeding populations are recognised: (1) Fenno-Scandinavian breeding population in the northern part of the Nordic countries (including Kola peninsula in NW-Russia); (2) Swedish reinforced breeding population in Swedish Lapland, (3) Russian breeding population in northern Russia and (4) Siberian population breeding on Taimyr and further east (Lorentsen *et al.* 1998, 1999, Jones *et al.* 2008). The Fenno-Scandinavian population migrates through the Baltic, Poland, eastern Germany and eastern Hungary to wintering sites in Greece and probably also western Turkey. Failed breeders from this population moult their flight-feathers in northern Russia, up to Taimyr in the east, and migrate via an easterly route through Kazakhstan and the Black Sea area to their wintering grounds in Greece (Jones *et al.* 2008, www.piskulka.net). The western Russian population migrates to the Black Sea and Caspian Sea area, reaching as far south as Iran and Iraq in winter (Jones *et al.* 2008). The eastern Russian population winters in China (Jones *et al.* 2008).

The former breeding population in northern Sweden has been reinforced by captive-bred geese from 1981 onwards (von Essen 1991, 1996). For this purpose, Barnacle Geese were used as foster parents in order to "learn" juvenile Lesser White-fronted Geese to migrate along a safer western flyway to wintering grounds in The Netherlands. The Netherlands originally has not been considered a core wintering range for Lesser White-fronted Geese, albeit observations and reports of shot birds in the 19th and early 20th century show that the species was a scarce wintering visitor in the country (van den Berg & Bosman 1999). The species has been observed annually from 1969 onwards, but a pronounced increase was observed from 1981 onwards, in line with the reinforcement efforts in Sweden (van den Berg & Bosman 1999). Today, The Netherlands is the main wintering site for Swedish Lesser White-fronted Geese and the population trend in winter mainly mirrors the trend in the breeding population in Sweden (Koffijberg *et al.* 2005, 2006, Ouweneel 2011). During the past decade, the species has developed traditional staging and wintering areas (Ouweneel 1998, Koffijberg *et al.* 2005, 2006, Ouweneel *et al.* 2008). Here, the birds often congregate in a single-species flock at specific feeding sites.

This report reviews the current status of Lesser White-fronted Goose in The Netherlands. It is mainly based on a follow-up of the national report of 2005 that was produced for the former Dutch Ministry of Agriculture, Nature Management and Food Quality (Koffijberg *et al.* 2005). The underlying report has been produced on request of the the Swedish Lesser White-fronted Goose Project, as part of the National (Swedish) Single Species Action Plan framework. It deals with the following aspects of Lesser White-fronted Geese in The Netherlands:

- Trends in numbers of Lesser White-fronted Geese from 1990 onwards;
- Distribution and phenology;
- Review of staging and wintering sites and their protection status;
- Factors influencing the observed numbers and trends.

In order to answer these questions, a comprehensive database was analysed, including data from the monthly waterbird counts, the citizen-science data-portals of www.waarneming.nl, www.telmee.nl and www.lauwersmeer.com (about similar to the system of www.artportalen.se in Sweden) and records submitted to the Sovon rare non-breeding bird project. These projects are based on the volunteer effort of several 1000s of observers and will give a detailed overview of the occurrence of Lesser White-

fronted Goose in The Netherlands. Chapter 2 gives more insight in the methods used. Results are presented in chapters 3 and discussed in chapter 4. The report benefited from contributions and comments from Gerard Ouweneel, Eddie Douwma and Fred Cottaar, members of the Dutch Working Group of Lesser White-fronted Goose.

2. Data and methods

This review is based on records collected by a large number of volunteer observers. For the period until 2004/05, we relied on the data collected for the national report of 2005 (Koffijberg *et al.* 2005), giving an overview for the period 1989/90–2004/05. These consisted of data from monthly waterbird counts carried out in the framework of the national ecological monitoring scheme (NEM), non-systematic data collected by the Sovon rare non-breeding bird project and records submitted online to the portals www.lauwersmeer.com and www.dutchbirding.nl (see Koffijberg *et al.* 2005 for more details). This information was added by observations of a small group of specialists that follow Lesser White-fronted Goose in The Netherlands during winter (e.g. Ouweneel 2011).

For the period from 2005/06 to 2012/13, a database with all records of Lesser White-fronted Geese observations in The Netherlands was set up. This database consisted of:

- Data from national monthly waterbird counts in The Netherlands;
- Data from the citizen-science portals www.waarneming.nl, www.telmee.nl and www.lauwersmeer.com;
- Data from the Sovon rare non-breeding bird project.

Especially the establishment and success of www.waarneming.nl (the Dutch equivalent to www.artportalen.se) enables a very detailed analysis of occurrence of Lesser White-fronted Geese in The Netherlands, albeit records are collected in a non-systematic manner. Observations are pinned on a map, or refer to small sites, allowing a detailed distribution pattern (though some small errors in localisation should be accounted for in case records were not put precisely on the map). Data from the national waterbird counts cover all important goose feeding areas in The Netherlands from September to May, and fieldwork is carried according to standardised guidelines on the scale of counting areas (see Hornman *et al.* 2013 for details). These observations are still on a detailed geographical level, but are not necessarily flock-based as in www.waarneming.nl.

Chances of mis-identification of Lesser White-fronted Geese are regarded low, as input of records is accompanied by a validation routine (waterbird counts) or records are checked by database administrators (www.waarneming.nl). Moreover, at www.waarneming.nl many observers submit photographs of their observations, enabling a check of their record.

In order to filter the database for duplicate counts (which inevitably are introduced as birds are recorded independently by several observers) and arrive at site-based numbers and national totals the database with records was analysed in three steps:

- Based on a map (ArcGis) with all records, observation sites were manually clustered to a larger scale where "regular" (i.e. within one day) exchange of flocks was assumed. A total of 141 of such clusters were recognised (figure 1). The clusters also confirmed the six traditional sites from the 2005-report (see Koffijberg *et al.* 2005, figure 2), which were kept as six separate clusters;
- For each cluster, the maximum number within a five-day period was determined, allowing calculation of phenology patterns, site-based peak counts and national totals;
- In each cluster, the period with highest numbers were checked manually to eliminate the last potential duplicate counts, like flocks moving between the traditional wintering sites within 1-2 days.

A similar routine was also used for the 2005-report, but then was carried out entirely manually. A complete manual check of all records for the purpose of this report was not possible due to the sheer number of records that had to be checked. An analysis of winter influxes of Light-bellied Brent Goose observations has shown that both methods do not really differ from each other and arrive at more or

less the same numbers (Koffijberg *et al.* 2013). Therefore, we assume that numbers presented in this report prior to 2004/05 are comparable to those from 2005/06 onwards.

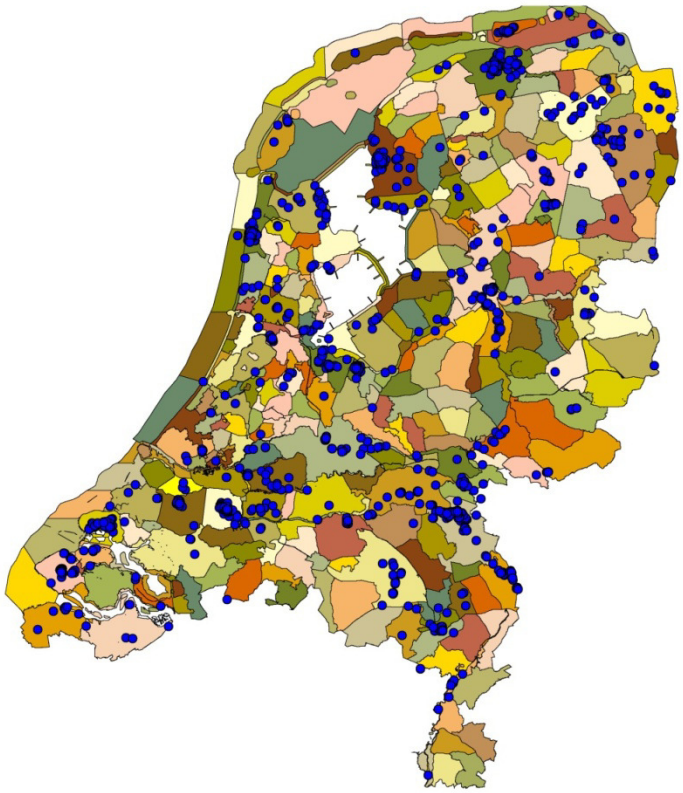

Figure 1. Clustering of sites which were used to analyse occurrence of Lesser White-fronted Geese in The Netherlands. Blue dots represent all sites were observations were made. To analyse numbers, all individual sites were clustered to a scale where daily exchange was assumed.

Figure 2. Situation of the six "traditional" staging and wintering sites for Lesser White-fronted Geese in The Netherlands (after Koffijberg et al. 2005)

3. Results

3.1 Trends in numbers of Lesser White-fronted Geese in The Netherlands

Numbers of Lesser White-fronted Geese in The Netherlands have shown a gradual increase from 1989/90 onwards (figure 3). Between 2003/04 and 2012/13, however, numbers did not increase further, but remained stable around a level of about 120-127 individuals. The small annual fluctuations in this period are probably due to birds that were overlooked, or the result of small duplicate counts that we were not able to eliminate. Within this period, significant lower numbers were recorded in 2005/06 (101), 2006/07 (91) and 2010/11 (97). Numbers in 2012/13 (67) were the lowest recorded since 2000/2001, and follow the decline that was reported from the breeding sites in Sweden (N. Liljebäck pers. com., see chapter 4). Appendix 1 gives a full account on the numbers observed.

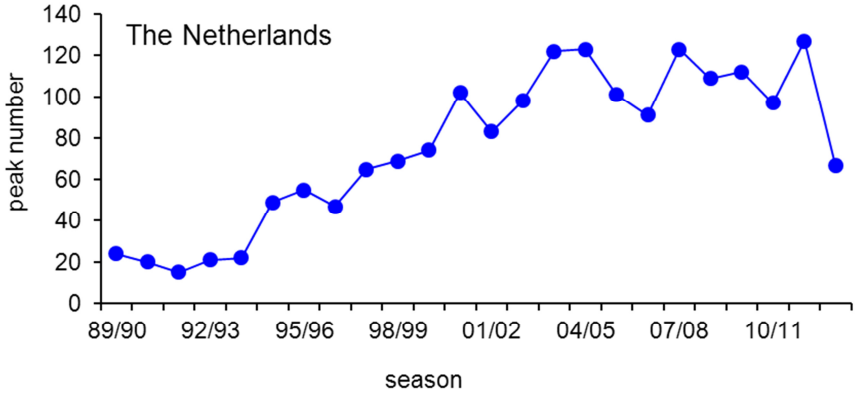

Figure 3. Trend in seasonal peak numbers in Lesser White-fronted Geese in The Netherlands from 1989/90 onwards.

3.2 Phenology in Lesser White-fronted Geese in The Netherlands

Lesser White-fronted Goose is a true winter visitor in The Netherlands, with arrival of larger numbers from September-October onwards and departures in March and April (figure 4). During winter, numbers are rather stable, suggesting no further influxes and no departures to other countries. To what extent mortality during harsh winters occurs is not clear. During the severe cold spell in January-February 2012, Lesser White-fronted Geese disappeared from the traditional staging sites and partly moved to the Biesbosch area (see also chapter 3.3). Prior to the cold spell, which started 29-30 January 2012, 116 (25 January), 100 (26 January) and 103 individuals (28 January) respectively were counted near Petten, whereas afterwards (3 March) 103 individuals returned to Petten. It is difficult to judge if the lost birds had died due to the harsh conditions. Preliminary survival analyses for Greater White-fronted Goose wintering in The Netherlands, however, do show an impact of cold winters like 1962/63 and 1978/79 (H. Schekkerman/Sovon pers. com.). Therefore, it cannot be excluded that Lesser White-fronted Geese were hit by severe winter weather (see chapter 4 for further discussion).

Furthermore, small fluctuations during winter probably occur while not all birds present are detected. Even in the traditional staging sites, it can be hard to find all birds as small flocks easily disappear between hummocks and ditches (Ouweneel *et al.* 2008). Between the two distinguished periods it seems that after 2003, Lesser White-fronted Geese arrive slightly later in autumn. Even more pronounced is an earlier departure in spring. Before 2003/04, numbers in March were nearly similar

to those in February, whereas recently relevant numbers depart already in March (see also site-based phenology in chapter 3.4 for more details).

From the phenology in figure 4, it also becomes clear that very small numbers of Lesser White-fronted Geese stay in the country over the whole year. These birds probably originate from parks and other urban habitats, and some are also assumed to breed. It has not been proven if these individuals involve any Swedish birds that have stayed after winter, but judging from the sites where Lesser White-fronted Geese were recorded in summer, this does not seem likely. During a survey in July 2005, 10 Lesser White-fronted Geese were counted (van der Jeugd *et al.* 2006). A similar survey in 2009 revealed 7 individuals (de Boer & Voslamber 2010). First breeding Lesser White-fronted Geese in The Netherlands was recorded in 2002 (van der Jeugd *et al.* 2006). In 2008 there were 3 breeding pairs (Voslamber *et al.* 2010). One of these refers to a mixed pair of Lesser White-fronted Goose x Greylag Goose (Hoorn NH, 2002-03), two others to a pair of Lesser White-fronted Goose (Spijk/Bremerberg FL, 2004; Wormer- en Jisperveld NH, 2005) (Koffijberg *et al.* 2006). It is not known where these birds stay in winter. If we assume the numbers observed in July 2005 and 2009 to mix with other geese in winter, up to 10 Lesser White-fronted Geese in The Netherlands might be of "feral" origin. In practice, the number of them reported is probably smaller as not all observers submit records of escaped waterbirds (see chapter 3.4 for further discussion).

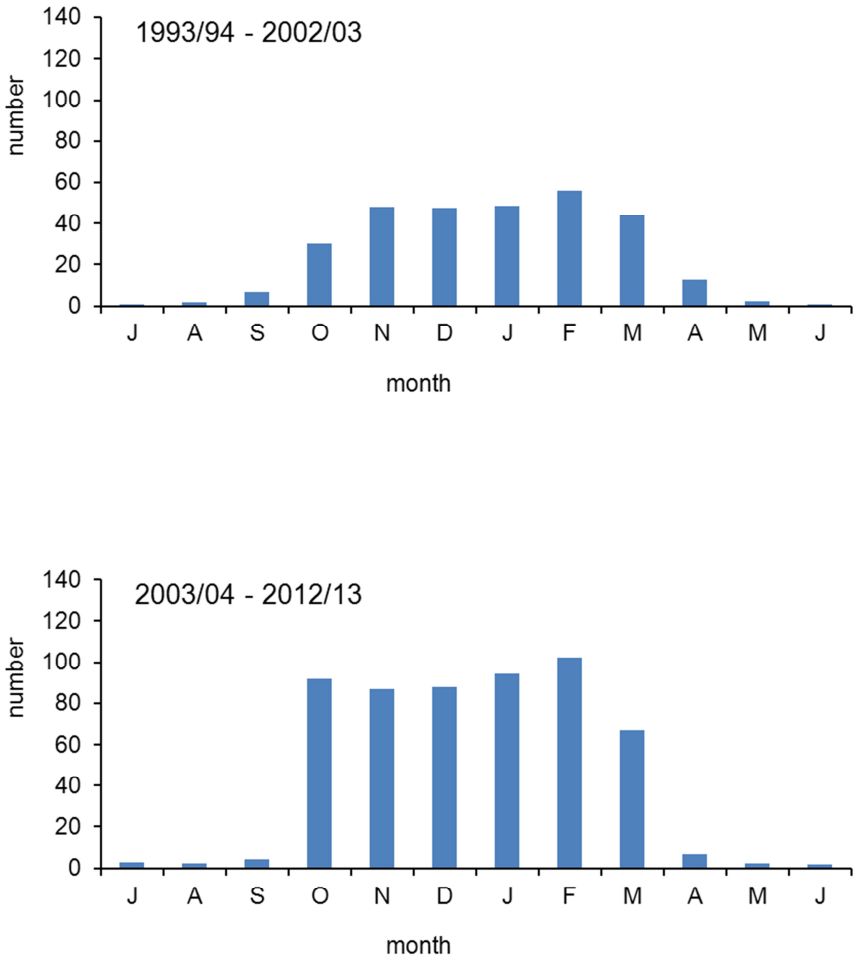

Figure 4. Phenology of Lesser White-fronted Goose in The Netherlands in two periods. Shown are average numbers per month.

3.3 Distribution of Lesser White-fronted Geese in The Netherlands

The distribution of Lesser White-fronted Geese after 2004/05 is clearly dominated by the three main staging and wintering sites (figure 5): Anjumerkolken (province of Friesland), Vereenigde Harger- and Pettemerpolder (also called Petten, Noord-Holland) and the Oudeland van Strijen (Zuid-Holland)(see figure 2 for situation of these areas within The Netherlands). These areas were also the most important sites during the review in 2005 (Koffijberg *et al.* 2005). Two other sites in Zuid-Holland – Korendijksche Slikken and Polder Biert, were nearly abandoned in the recent period (figure 7, see also chapter 3.4). The same also applies to Doniaburen in Friesland. Furthermore, there seems to be a small flock regularly staying in Flevoland during some years. Observations here have been made in February (maximum 20 in 2005), in October (maximum 17 in 2009) and in November (maximum 25 in 2007). As Flevoland is situated *en route* between Anjumerkolken and Oudeland van Strijen, and highest numbers were observed in months when movements between these two sites occur, Flevoland might function as a stop-over site between Friesland and Zuid-Holland. During the colder winters in 2010/11–2012/13 a large flock of Lesser White-fronted Geese was observed in the Biesbosch area, close to Oudeland van Strijen, in eastern direction. During cold spells, birds disappear from Oudeland van Strijen (Ouweneel 2011), and it is likely that these birds moved to the Biesbosch area, following large numbers of other geese searching for feeding areas close to open water. Observations in Biesbosch include a count of 71 and 45 in February 2012 (partly the same birds). Apart from these areas, Lesser White-fronted Geese are observed scattered all over the country, in line with the general distribution of wintering geese in The Netherlands.

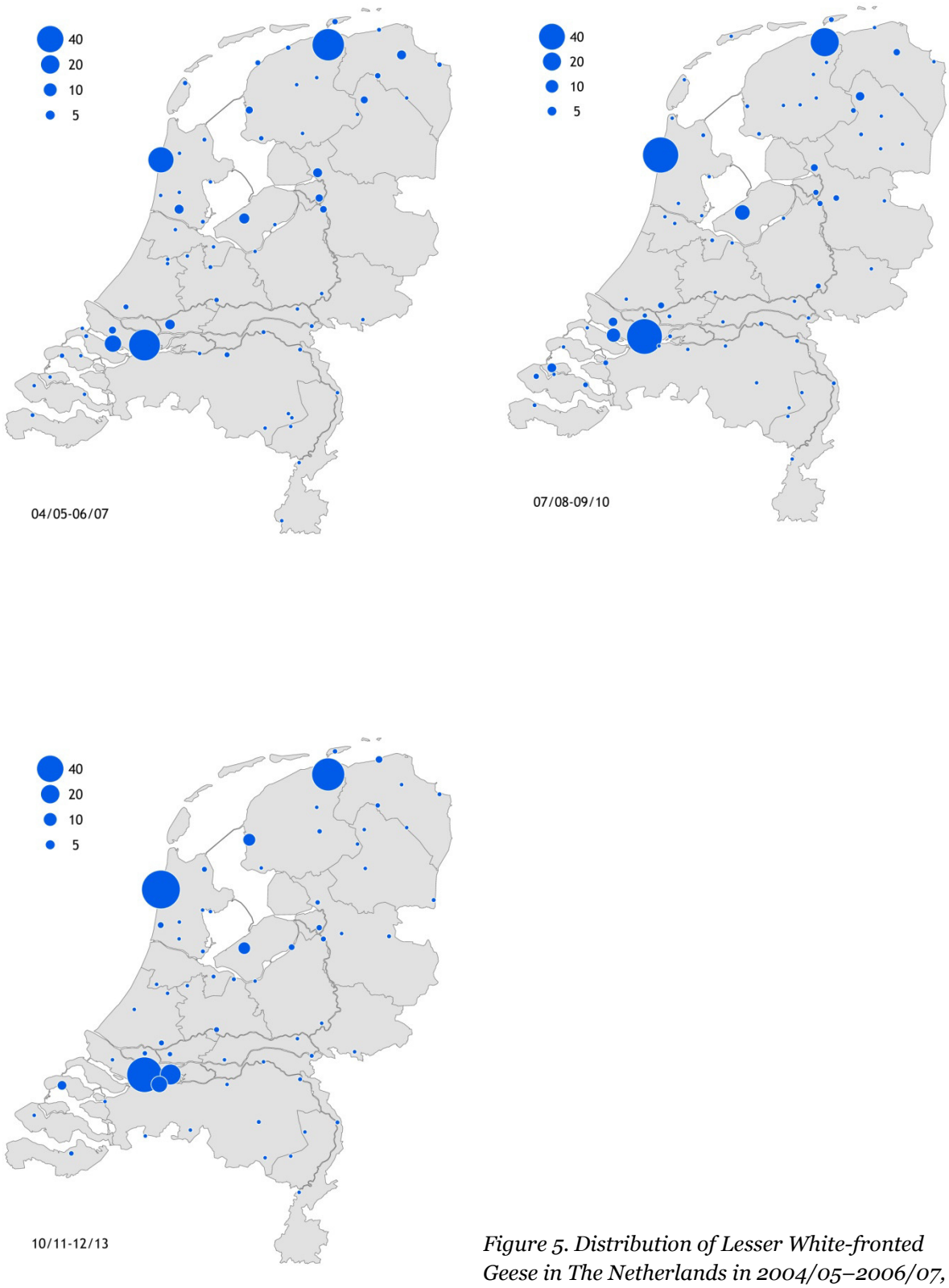

Figure 5. Distribution of Lesser White-fronted Geese in The Netherlands in 2004/05–2006/07, 2007/08–2009/10 and 2010/11–2012/13. Shown are average numbers per site (i.e. cluster of sites, see chapter 2).

3.4 Numbers and phenology at traditional staging and wintering sites

In the review of 2005, six main staging and wintering sites for Lesser White-fronted Geese were recognised: (1) Anjumerkolken/Friesland, (2) Doniaburen/Friesland; (3) Vereenigde Harger- en Pettemerpolder (Petten)/Noord-Holland, (4) Oudeland van Strijen/Zuid-Holland; (5) Korendijksche Slikken/Zuid-Holland and (6) Polder Biert/Zuid-Holland (see figure 2 for situation of these areas). Site-based trends in seasonal peak counts show that only three of these sites are still used (figure 6). The other three sites had only occasional records (Doniaburen), or no observations at all (Korendijksche Slikken, Polder Biert) in recent years (figure 7). Of the remaining three sites, Petten has shown the most pronounced upward trend. Despite the overall stabilisation of the wintering population, numbers at Petten showed an increase, up to 116 individuals in 2011/12. The same also applies to Oudeland van Strijen, which recorded numbers up to 90 in 2011/12. On the other hand, Anjumerkolken is visited less by Lesser White-fronted Geese. Maximum numbers have not really changed in the period 2003/04–2010/11, but they are only observed during a few days and in most years numbers did not exceed a level of about 60 individuals.

A closer look at the phenology pattern explains the changes between the use of Anjumerkolken, Petten and Oudeland van Strijen that have occurred in the past decade (figure 6). Anjumerkolken is a typical staging site, which has supported numbers in autumn (mainly October-November) and spring (March). However, the period that flocks of Lesser White-fronted Geese stay in Anjumerkolken in autumn has become significantly shorter. In 2010/11–2012/13 it was even only confined to the first half of October. Data from Oudeland van Strijen show that nowadays, birds quickly move from Anjumerkolken to Oudeland van Strijen. Formerly, larger numbers arrived in Strijen in November, but this has progressively advanced since 2007/08. In 2012/13, most the birds stayed only one day in Anjumerkolken (8 October) and apparently moved to Oudeland van Strijen one day afterwards. In 2013/14 (not covered in this report), there were no observations in Anjumerkolken at all (G. Ouweneel pers. com.). If this trend continues, there will only remain two traditional sites for Lesser White-fronted Geese in The Netherlands.

Highest numbers in Oudeland van Strijen are observed in October-December, after which the majority of Lesser White-fronted Geese moves on to Petten. The increase that occurred in Petten is also obvious from the phenology pattern. Moreover, in the recent period larger numbers arrive in Petten already in December, whereas in 2004/05–2006/07 this usually occurred in January. Peak occurrence is now observed in the end of February and beginning of March. In comparison to Anjumerkolken, it seems that Petten has taken over the role of spring staging site and from there birds depart directly without stopping over in Anjumerkolken anymore.

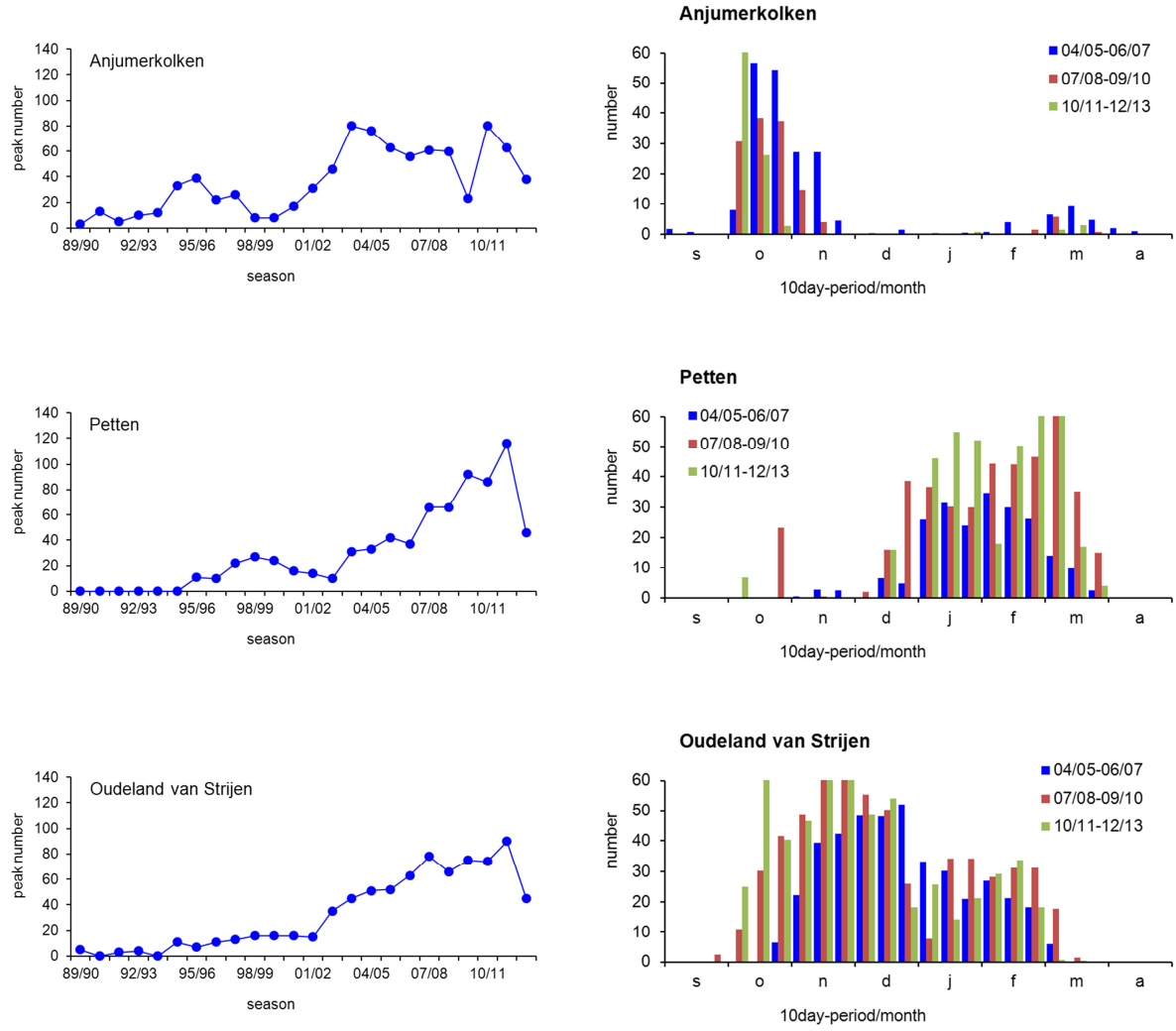

Figure 6. Trend in seasonal peak numbers and phenology at the three main staging and wintering sites of Lesser White-fronted Goose in The Netherlands. Phenology has been split up in three periods to show changes over time and shows average numbers per 10 day period.

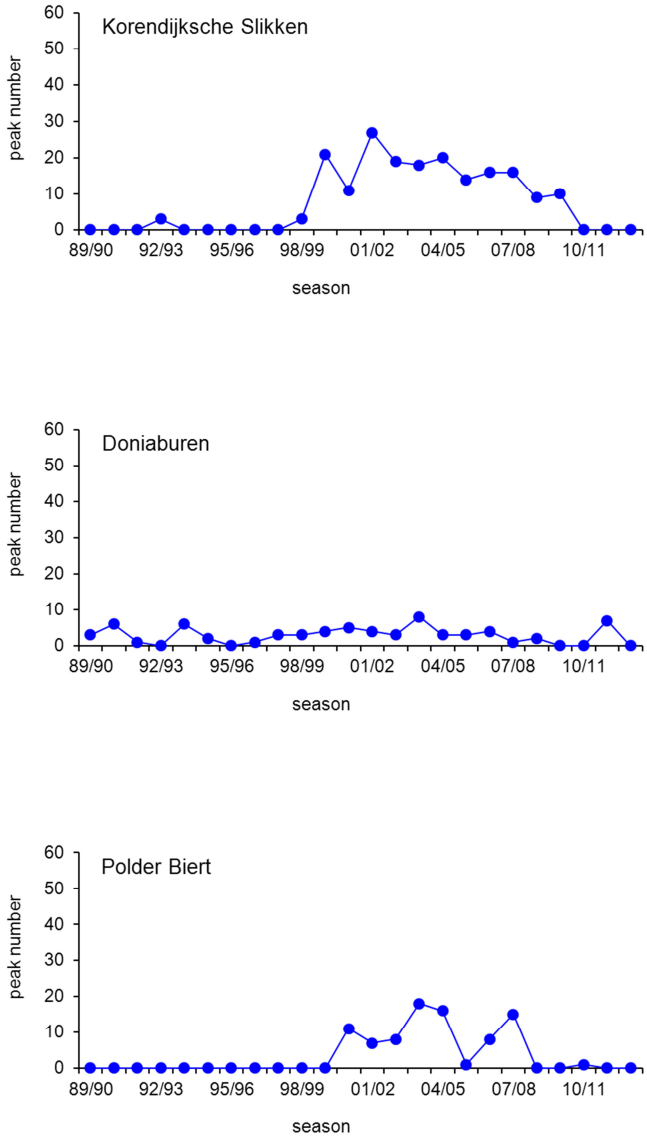

Figure 7. Trend in seasonal peak counts at the three formerly used wintering/staging sites of Lesser White-fronted Goose in The Netherlands.

3.5 Protection and legislation of Lesser White-fronted Goose in The Netherlands

Lesser White-fronted Goose is a protected species in The Netherlands according to the "Flora en Faunawet 2002". Moreover, geese in general are not listed as huntable species in The Netherlands (i.e. there is no open season for any goose species). However, shooting on some wintering goose species is allowed to scare birds from farmland in no-go areas (Greater White-fronted Goose, Greylag Goose – both with special permission, issued by the local government in the provinces). There are no known recent records of Lesser White-fronted Geese being shot accidentally when scaring Greater White-fronted Geese. From 2005/06 onwards an increasing amount of Greater White-fronted Geese have been shot (on average about 37.000 each winter, up to 47.000 in 2010/11; data KNJV, M. Montizaan pers. com.) on a national level. This derogation shooting is only carried out outside specifically designated goose feeding areas, nature reserves and Natura 2000 sites (van der Zee *et al.* 2009). Since Anjumerkolken is a designated goose feeding area, and Petten and Oudeland van Strijen have been designated as Natura 2000 sites (see below), Lesser White-fronted Geese are not likely of being shot in one of these areas. Given the small numbers occurring outside these areas, the chances of being accidentally shot is likely to be very small, but it cannot be excluded.

From 2013/14 onwards, the system of goose feeding areas will probably change, but precise details are still under discussion (situation October 2013). However, as it is intended to stop derogation shooting on migratory goose species from 1 January 2014 onwards, there will be a low risk of accidental shooting of Lesser White-fronted Goose.

Table 1 summarises the protective status at the three remaining staging and wintering sites. Both Oudeland van Strijen and Petten have been designated as Natura 2000 sites, partly because of their numbers of Lesser White-fronted Geese (in Petten it is even the only qualifying species). At both sites, all (regular) feeding sites of Lesser White-fronted Geese are situated within the boundaries of the SPA. Both sites are also managed as nature reserves: Oudeland van Strijen by Staatsbosbeheer (State Forestry Service) and Petten by Natuurmonumenten (an NGO managing numerous nature reserves in The Netherlands). Renaturation projects at Petten have been carried out with taking into account the site-specific occurrence of Lesser White-fronted Geese (Ebbinge 2008). In the Hoeksche Waard, the area where Oudeland van Strijen, Korendijksche Slikken and Polder Biert are situated, an emerging issue of potential disturbance by military helicopters was solved by restricting low-level flights to the period when geese are not present in the area (G. Ouweneel, pers. com.).

Feeding areas in Oudeland and Petten are characterised by less intense managed grassland intersected by numerous hummocks and ditches (Ouweneel *et al.* 2008). Feeding Lesser White-fronted Geese preferably use these structures to feed (Ouweneel *et al.* 2008, G. Ouweneel, pers. com.). A detailed description of the behaviour and distribution of Lesser White-fronted Geese in Oudeland van Strijen is given by Ouweneel et al. (2008). Furthermore, detailed distribution maps are given by Koffijberg *et al.* (2005) and Koffijberg & Nienhuis (2006) for the period until 2005/06.

Anjumerkolken has not been designated as an SPA because it is situated entirely in an intensively used farmland area without any nature reserve. However, Anjumerkolken is part of the network of goose feeding sites, where geese are left undisturbed and farmers get payments from agri-environmental schemes (van der Zee *et al.* 2009). Changes in agricultural use (e.g. conversion of grassland into maize), or other landscape changes, however, are possible without extensive environmental impact assessments, as done in case of SPAs. According to local expertise, it is not likely that the current decline in site-use in Anjumerkolken is associated with any changes in the area, as no changes in landscape or agricultural use are known to have occurred in the area (E. Douwma, pers. com.). Within the Anjumerkolken, the Lesser White-fronted Geese usually concentrate in a small area (Koffijberg *et al.* 2005, Koffijberg & Nienhuis 2006, E. Douwma pers. com.).

At all three feeding sites, Lesser White-fronted Geese use night-roosts that are situated within SPAs. In Petten these are situated within the boundaries of the site (lakes of Abtskolk or De Putten). Birds from Oudeland van Strijen roost in the Haringvliet area, those from Anjumerkolken in the Lauwersmeer area (see Koffijberg *et al.* 2005 for details).

Table 1. Protective status of staging/wintering sites of Lesser White-fronted Goose in The Netherlands. Given is the name of the site, the local administration (municipality / province FR Friesland, ZH Zuid-Holland, NH Noord-Holland) and details about the status of the site.

Site	Administration	Protective status	Protective status night roost
Anjumerkolken	Dongeradeel / FR	goose feeding area	SPA (Lauwersmeer)
Oudeland van Strijen	Strijen ZH	SPA 110 / NL9802103 (1570 ha)[1], goose feeding area	SPA (Haringvliet)
Petten ("Abtskolk en de Putten")	Bergen & Schagen NH	SPA 162 / NL2009162 (612 ha)[2], goose feeding area	SPA (within the site)

[1] links for detailed information (including map with designated area):
http://www.synbiosys.alterra.nl/natura2000/documenten/gebieden/110/n2k110_db_v_oudeland_van_strijen.pdf
http://www.synbiosys.alterra.nl/natura2000/googlemapsgebied.aspx?id=n2k110&groep=9

[2] links for detailed information (including map with designated area):
http://www.synbiosys.alterra.nl/natura2000/documenten/gebieden/162/PDN2009_162_Abtskolk_en_De_Putten_DEF.pdf and
http://www.synbiosys.alterra.nl/natura2000/googlemapsgebied.aspx?id=n2k162&groep=8

4. Discussion and conclusions

Lesser White-fronted Goose is a regular winter visitor in The Netherlands, with numbers up to about 120-130 individuals in winter. Recently, the species' occurrence is mainly confined to three traditional staging and wintering sites, being Anjumerkolken in Friesland, Petten in Noord-Holland and Oudeland van Strijen in Zuid-Holland. Three other sites which were used earlier, now seem to be abandoned, or support Lesser White-fronted Geese only occasionally. In addition, there is one area in Flevoland, where birds seem to stop-over regularly, and it is recommended to collect more details about these birds in order to check the area where they feed and its status. From the available data, the site in Flevoland seems to be used *en route* between Anjumerkolken and the Oudeland van Strijen.

Reports of colour-ringed birds have clearly shown that the Lesser White-fronted Geese observed in The Netherlands mainly originate from the reinforced breeding population in Sweden (von Essen 1996, von Essen *et al.* 2000). Hence, the increasing numbers in The Netherlands will reflect the initial increase in the Swedish population, and its decline from 2012/13 onwards. An analysis of sightings of colour-rings in The Netherlands showed that 164 out of 222 known used combinations (74%) had been reported at least once in The Netherlands. Data from 1995/96 onwards (that were considered more comprehensive) even showed an amount of 77 out of 92 colour-ringed individuals (84%) (Koffijberg *et al.* 2005). Taking into account an annual mortality of about 7% this means that virtually all Swedish Lesser White-fronted Geese at some stage did stay in The Netherlands.

The analysis of colour-ring sightings in 2005 also showed the interactions between the different staging and wintering sites and demonstrated the importance of Anjumerkolken as a staging site. More than 60% of the individuals recorded in the by that time six recognised areas was also observed in Anjumerkolken (Koffijberg *et al.* 2006). Given the declined use of this site recently and the observed direct migration to Oudeland van Strijen (see chapter 3.3), we assume that such interactions now probably occur less and main connections will occur between Oudeland van Strijen and Petten. The distribution of colour-ringed birds at Korendijksche Slikken and Polder Biert showed that these birds were only occasionally seen at the nearby Oudeland van Strijen. In this context, it is remarkable that these two sites are not used anymore. Did the birds from these sites finally move to Oudeland van Strijen, or does the cohort of the populations using these two sites not exist anymore? According to local expertise, there are no obvious other reasons (e.g. changes in landscape or farming systems) that these areas have been abandoned recently (G. Ouweneel, pers. com).

Although sightings of colour-rings support the thesis that (nearly) all known Swedish breeding birds migrate to The Netherlands, it remains unclear if *all* Lesser White-fronted Geese in The Netherlands belong to the reinforced Swedish population, and numbers in The Netherlands only reflect changes in this population. A previous comparison showed that numbers reported in The Netherlands matched up to 99% with the estimated size of the Swedish population (Koffijberg *et al.* 2005). However, numbers in The Netherlands in 2003/03 and 2003/04 exceeded the size of the Swedish breeding population. A comparison of recent numbers points out that this is still the case (table 1). Even if we cannot be sure if the numbers presented in figure 2 are 100% accurate, and still might include some duplicate counts (but also birds being overlooked), the difference between the estimated numbers in Sweden in autumn and numbers wintering in The Netherlands is way too large to be determined by less accurate numbers only (which is also supported by the rather 'stable' maxima seen within one winter within The Netherlands).

In the previous analysis in 2005 it was found that from the known colour-ringed individuals in Sweden reported in The Netherlands in winter, some were never observed in Sweden. This referred to 16 out of 22 individuals that never had been sighted in Sweden, but did appear in The Netherlands in winter (Koffijberg *et al.* 2005). This suggested that the Swedish population either was underestimated by that

time (perhaps while not all birds used the known sites), or Swedish birds had emigrated to other parts of the flyway (or a combination of both). These findings might be part of the explanation of the difference between Swedish in autumn and Dutch numbers in winter.

Moreover, there is also evidence that not all Lesser White-fronted Geese observed in The Netherlands originate from the Swedish breeding population. So far, there have been several neckband sightings of four different released birds from Finland: December 1990 Braakmankreek/Zeeland, H. Castelijns pers. com; March 1991 Piaam/Friesland, F. Cottaar pers, com. – same as Braakman; November 1997 Lovenpolder and Goudplaat at Noord-Beveland/Zeeland, H.Castelijns, pers. com., January 1999 Oijen/Noord-Brabant, H. Castelijns pers. com. – same as Lovenpolder and Goudplaat; December 2004, Korendijksche Slikken, G. Huijzers pers. com.; January 2003 De Peel/Noord-Brabant, F. Cottaar pers. com.). Moreover, there are numerous sightings of first-year birds that were released in the staging area of the Valdak Marshes in Northern Norway in August 2011. Out of 5 released birds, equipped with black neck-collars, two were observed in Finland in autumn 2011 and in Denmark in spring 2012, and in The Netherlands and the adjacent Lower Rhine area in Germany in winter 2012/13 (B. Voslamber pers. com; L. Schilperoord pers.com). Both the observations from released birds in Finland, and birds released in Northern-Norway suggest that at least some of these individuals do migrate to countries like Denmark, Germany and The Netherlands. On the other hand, none of the earlier colour-ringed individuals, or satellite-tracked birds from Norway (native breeding birds) was ever observed in The Netherlands. Thus, the difference in dispersal might just be a result of the origin of the birds.

Previously, it was also hypothesised that birds from Russian origin might occur in The Netherlands, e.g. migrating together with Greater White-fronted Goose (Koffijberg *et al.* 2005, 2006). However, there is no direct evidence for this from colour-ring sightings or satellite tracking. Given the historical observations before the start of the Swedish reinforcement programme, it is clear that Lesser White-fronted Geese did occur as a winter visitor in The Netherlands (van den Berg & Bosman 1999). The same applies also to other western European countries (Mooij 2010). It is likely, that in the past, when numbers were much larger, this occurred more often than at present. Increased numbers of observers, well-equipped with excellent optical devices and keen on rare birds might also have increased the chance of observations of Lesser White-fronted Geese in the 1990s and thereafter.

Finally, it is not known to what extent the wintering numbers in The Netherlands also refer to Dutch breeding birds. As stated in chapter 3, there might be up to 10 'feral' Lesser White-fronted Geese, but probably only few of them are also reported by observers. Hence, it is unlikely that the difference in numbers between Sweden and The Netherlands is entirely caused by non-migratory breeding birds from The Netherlands.

Table 2. Comparison of the size of the known Swedish population (N. Liljebäck, pers. com.) and numbers observed in The Netherlands in 2009-2012 (see figure 3, appendix 1).

Year	Numbers reported in Sweden (autumn)	Numbers reported in The Netherlands (following winter)
2009	100	112
2010	110	97
2011	104	127
2012	60	67

Since nearly all Lesser White-fronted Geese concentrate (and roost) in SPAs, the species is potentially well-managed in The Netherlands. Also there is no open season for any goose species, which means that hunting on geese in winter is only allowed with special permission (see chapter 3.4 for details). The likelihood of accidental shooting of a Lesser White-fronted Goose is actually very small. The fact that all birds concentrate at only two sites, however, makes the species still vulnerable. Moreover, it is unknown what causes have forced the abandonment of three out of the six traditional staging and wintering sites, and the changes currently observed in Anjumerkolken. According to local experts, no obvious changes have occurred at these sites, neither in landscape in general, nor in agricultural farming systems. Knowledge on these changes would also help to understand which factors determine the site-use of Lesser White-fronted Geese in The Netherlands, and eventually improve management options at the remaining sites. The density of colour-ringed birds is now probably too low to repeat the sort of analysis that was done in 2005, to examine the interactions between the traditionally used sites (Koffijberg et al. 2006), but the intention to equip Lesser White-fronted Geese with satellite-transmitters might give new insights about their behaviour and specific aspects of their site-use.

One other aspect of wintering in The Netherlands that is still not known, is what the birds do during periods of severe cold. In recent cold winters from 2009/10 onwards, it was observed that flocks of Lesser White-fronted Geese partly sometimes leave the traditional wintering sites and disperse over other sites (see chapter 3.3). This also means that they might move to sites that have not been designated SPAs, or where they might be subject to derogation shooting, carried out to scare geese from no-go areas. Until now, there is no evidence that birds leave The Netherlands to the south. Even in cold winters, at least the number of observations in goose feeding areas in Flanders, Belgium is very low. Usually, 1-2 birds are reported here, some of them regarded as "feral" birds (www.waarnemingen.be). Also Devos & Kuijken (2010) mention only a few single individuals in their report on winter influxes of geese in Flanders confirming the long-term status of the species in this country (Devos *et al.* 2005). Also with respect to movements during cold spells, birds equipped with satellite transmitters could answer the question which areas are used and how birds move around.

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Appendix 1.

Seasonal peak counts of Lesser White-fronted Geese in The Netherlands, for the entire country (NL) and for the six traditional staging and wintering sites.

Season	NL	Anjumer-kolken	Doniaburen	Petten	Oude Land van Strijen	Korendijksche Slikken	Polder Biert
89/90	24	3	3	0	5	0	0
90/91	20	13	6	0	0	0	0
91/92	15	5	1	0	3	0	0
92/93	21	10	0	0	4	3	0
93/94	22	12	6	0	0	0	0
94/95	49	33	2	0	11	0	0
95/96	55	39	0	11	7	0	0
96/97	47	22	1	10	11	0	0
97/98	65	26	3	22	13	0	0
98/99	69	8	3	27	16	3	0
99/00	74	8	4	24	16	21	0
00/01	102	17	5	16	16	11	11
01/02	83	31	4	14	15	27	7
02/03	98	46	3	10	35	19	8
03/04	122	80	8	31	45	18	18
04/05	123	76	3	33	51	20	16
05/06	101	63	3	42	52	14	1
06/07	91	56	4	37	63	16	8
07/08	123	61	1	66	78	16	15
08/09	109	60	2	66	66	9	0
09/10	112	23	0	92	75	10	0
10/11	97	80	0	86	74	0	1
11/12	127	63	7	116	96	0	0
12/13	67	38	0	46	45	0	0