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PINK-FOOTED GOOSE POPULATION STATUS UPDATE 2016-2017

Produced by the AEWA European Goose Management Platform Data Centre

SVALBARD PINK-FOOTED GOOSE

POPULATION STATUS REPORT 2016-2017

Report prepared by the AEWA European Goose Management Platform Data Centre

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Summary

This report compiles annual monitoring data on the population status of the Svalbard Pink-footed Goose for the season 2016/17. This information is used to assess the population development and provides input for the modelling of an optimal harvest strategy for the population for the coming hunting season (2017/18). This is part of an adaptive harvest management framework set up to support the implementation of the AEWA International Species Management Plan for the population. The estimated population size in spring 2017 was record high with 88,000 individuals, supported by a count of 88,000-104,000 geese in mid-November 2016 and an estimation of 100,700 geese based on marked birds. The increase followed a good breeding season in 2016 (19.6% juveniles in the autumn), which is in line with predictions based on temperatures in Svalbard in May 2016. The number of Pink-footed Geese harvested in Norway and Denmark in the 2016/17 hunting season was c. 16,143 which is a record high and primarily related to the re-opening of shooting in Denmark in January 2017. The breeding output in 2017 is predicted to be relatively low due to cold conditions in Svalbard in May.



Morning flight of Pink-footed Geese, Ballum Forland, Danish Wadden Sea
Photo: John Frikke

1 - Aim

The aim of this report is to compile annual monitoring data on the population status of the Svalbard Pink-footed Goose for the season 2016/17. This information is used to assess the population development and provide input data for the modelling of an optimal harvest strategy for the population for the coming hunting season (2017/18). This is part of an adaptive harvest management framework set up to support the implementation of the AEWA International Single Species Management Plan (ISSMP) for the population (see Madsen and Williams 2012; Madsen et al. 2017). Data from the previous seasons 2012/13-2015/16 have been published in separate annual reports. Previous reports and further information about the SISMP process can be found on the website <http://pinkfootedgoose.aewa.info/>.

We thank the national volunteer networks who contributed with counts to this report, as well as the Danish Environmental Protection Agency and Statistics Norway for supplying preliminary hunting bag statistics.

2 – Population estimate 2016/17

Internationally coordinated population counts were performed on 13 November 2016 and 30 April 2017. Counts were coordinated as closely as possible to these dates. Flocks were either counted when they were leaving roost sites in the morning, arriving at roost sites in the evening, or alternatively on fields. The main known sites were covered by a network of trained observers who coordinated the coverage and timing of counts. Additional information was retrieved from internet reporting portals, where birdwatchers had reported flocks in areas outside the main areas (<http://artsobservasjoner.no/>; <http://artportalen.se/>; <http://dofbasen.dk/>; <https://www.tiira.fi/>).

In mid-November 2016, the population was distributed throughout most of the non-breeding range, from Trøndelag in mid Norway in the north, Denmark, The Netherlands and south to Belgium, as well as scattered flocks in southern Sweden and Germany. Unfortunately, one important area, i.e. the Danish part of the Wadden Sea (SW Jutland), was not fully covered on the count date, and the count was not carried out until a week later. It cannot be excluded that there has been some movements between W Jutland and SW Jutland between the count dates.

The population was estimated to be within the range of 88,000-104,000 geese (Table 1). The uncertainty is due to the delayed count in SW Jutland. By mid-November, there had been little snowfall and frost in the lowlands in mid Norway, and nearly 11,000 pinkfeet (c. 11% of the total population) remained in Norway, which is unusual so late in the autumn. The extended staging period in Norway can also be a positive outcome of better hunting organisation in Trøndelag, causing reduced disturbance to geese. The trend from previous years continued, with a large proportion of the population remaining in Denmark (c. 70%), and consequent reduced numbers in Friesland, the Netherlands (11%) but relatively high numbers for November for Flanders, Belgium (8%). Another trend which has been confirmed is that pinkfeet staging in Sweden in autumn move to SE Denmark in autumn (615 geese recorded). This has been confirmed by a neckbanded goose (white AJ9) observed in Sweden in late September and turning up on Lolland, SE Denmark in November 2016 (and, moving onwards from there to NW Jutland in March, and then across to Oulu, Finland in April-May 2017).

In late April/early May 2017, the population was estimated at c. 88,000 individuals (Table 1). The large majority was concentrated in Trøndelag, mid Norway (c. 93%), while only small numbers remained in Denmark (<1%) (Fig. 1). The use of Sweden and Finland in spring continued, with 2,600 staging in the Oulu region, Finland (3%). It is also noticeable that several flocks were staging in Gudbrandsdalen between

Oslofjorden and Dovre in south Norway, which is on the traditional spring migration route. Furthermore, many scattered flocks were observed in Sweden and southern Finland.

The spring estimate of 88,000 geese is used as the estimate for the 2016/17 season (Table 1). The population size was thus record high since the start of the monitoring of the population (Fig. 2).

Table 1. Results of synchronized counts of Pink-footed Geese in autumn 2016 and spring 2017. *Counted on 20-21 November 2016. **Data from Vlaardingen still missing.

| Country | Region | Numbers | |
|--------------|------------------------------------|-----------------------|---------------|
| | | 13 Nov. 2016 | 30 April 2017 |
| Norway | Nord-Trøndelag | 8565 | 81482 |
| | Vesterålen | 0 | 558 |
| | Sør-Trøndelag | 2275 | 430 |
| | Other sites | 74 | 1893 |
| Denmark | N Jutland | 9640 | 389 |
| | W Jutland | 38780 | 56 |
| | SW Jutland | 8000-24335* | 0 |
| | SE Denmark | 615 | 5 |
| Finland | Oulu region | 0 | 2592 |
| | Various sites | 0 | 86 |
| Sweden | Various sites | 187 | 462 |
| Germany | Schleswig-Holstein + various sites | 49 | 2 |
| | Lower Saxony | 3 | 0 |
| Netherlands | Friesland | 11317 | 0 |
| | Other sites | 20** | 0 |
| Belgium | Flanders | 8449 | 0 |
| TOTAL | | 87,974-104,309 | 87,955 |

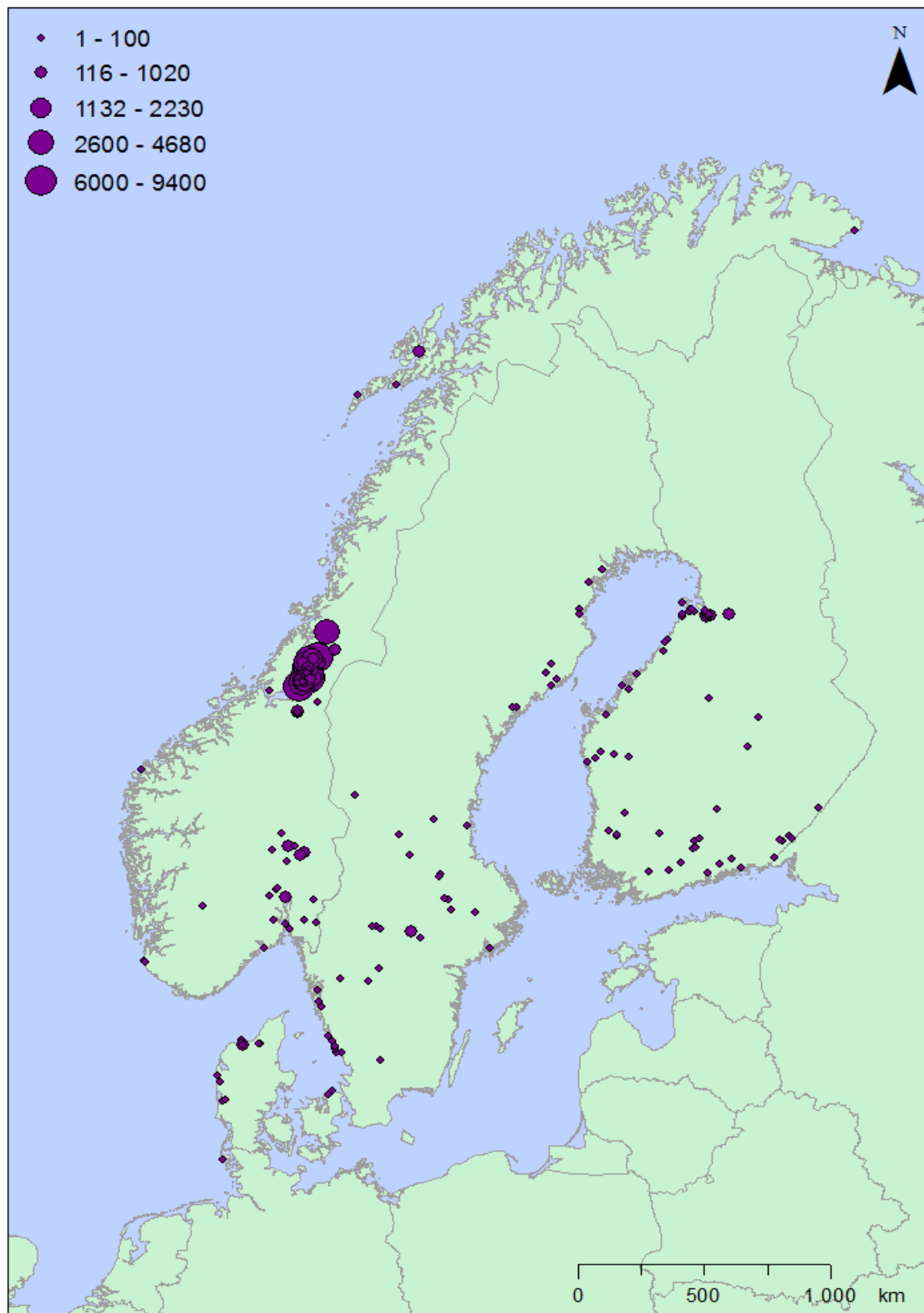


Figure 1. Distribution of Pink-footed Geese on 30 April 2017.

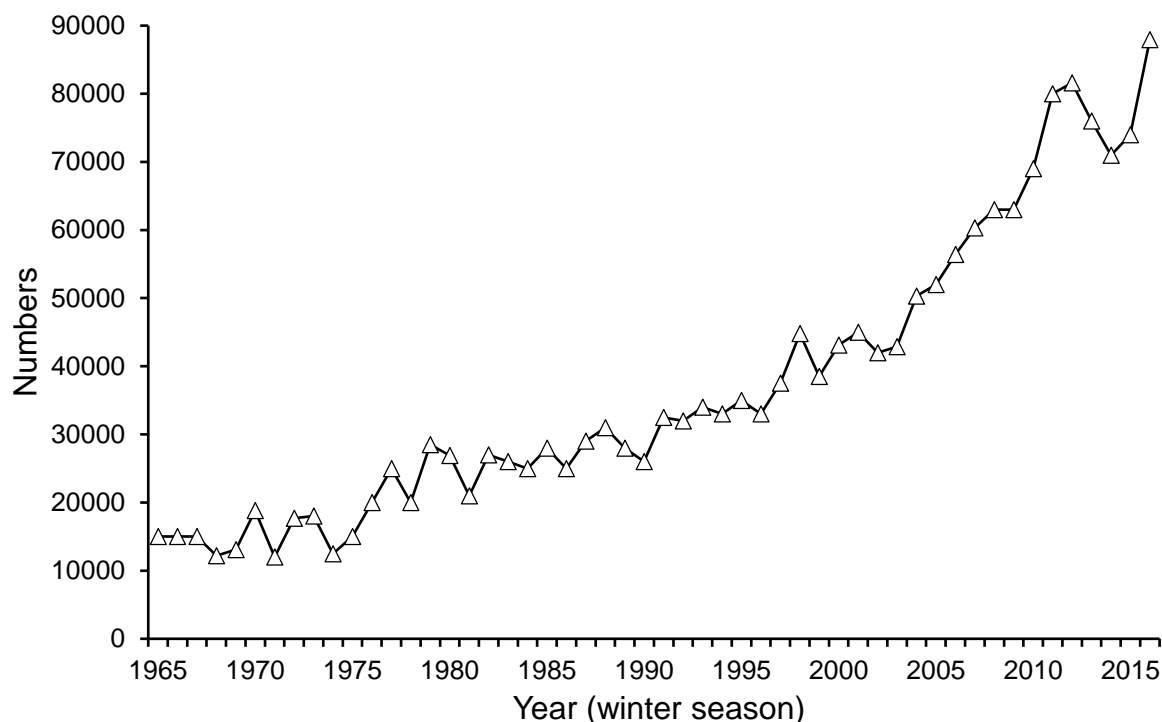


Figure 2. Development of the size of the Svalbard population of the Pink-footed Goose, 1965/66-2016/17.

To obtain an alternative estimate of total population size of Pink-footed Geese, we used a capture-recapture approach on sightings of geese marked with neck collars in Denmark, Norway and Svalbard. The estimation is based on the ratio of total geese per marked goose and the total number of marked geese in the population (cf. Sheaffer and Jarvis 1995). Recordings of marked versus unmarked individuals in flocks were started in 1991 (Ganter and Madsen 2001). In the first 20 years, recordings were made on relatively few flocks (average number of flocks scanned annually was 28; range 1-153); since 2012, the recordings have been intensified to increase the sample size (average number of flocks scanned was 320, range 287-383). For each year during 1991-2017 we estimated a weighted mean ratio of marked to unmarked geese for all flocks with marked birds.

The number of geese checked was used for weighting, and the average ratio was corrected for the number of flocks without marked birds (individuals in marked flocks/ total number of individuals checked). The number of marked geese alive was estimated based on the number of geese seen at least twice in an observation window covering mid-March to mid-May (corresponding to a period with coordinated observation efforts), corrected for the detection rate of marked birds alive. The detection rate was estimated using the program MARK (White and Burnham 1999). As the detection rate of the last year in a time series is not estimable, we assumed the detection rate and the variance for the most recent year to be identical to the previous year, as the variation between subsequent years have been moderate. The total population size was estimated as the number of geese alive divided with the corrected estimate of the ratio. The confidence limits were estimated based on the variance estimate for the population.

The population estimate derived from sampling of neckbanded geese was performed in W and NW Jutland, Denmark during October-November 2016 and March-April 2017. The estimated population size was 100,700

individuals ($\pm 12,666$ 95% CL). As shown in Fig. 3, the Lincoln index based on marked individuals generally produces higher mean estimates compared to the counts, however, throughout time series within the confidence limits. Furthermore, there seems to be no divergence between the two ways of estimation as the population has grown. In recent years, there has been a relatively good accordance between the population counts and the Lincoln index estimate.

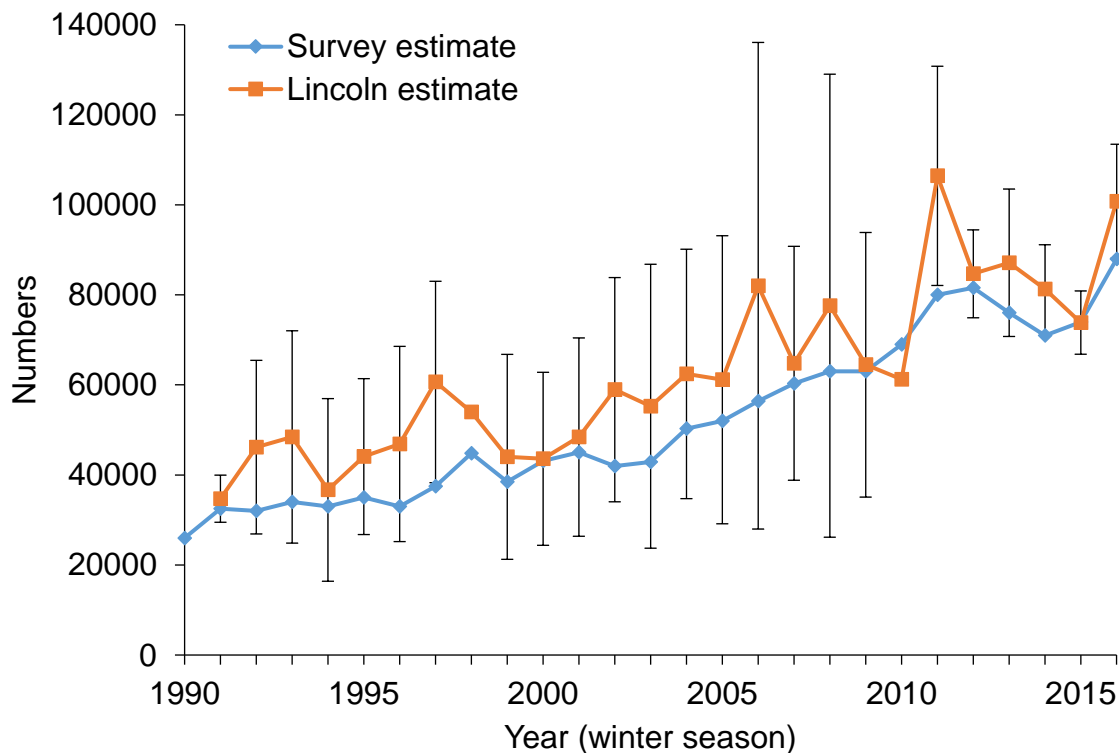


Figure 3. Comparison of population estimates based on surveys and Lincoln sampling based on marked individuals (average \pm 95% CL). During 1991-2011, the number of goose flocks scanned for marked/unmarked birds was relatively low, but since 2012 it has increased, which is the reason for the decrease in variance. In years with fewer than 10 flocks scanned (1998, 2010), the confidence limits have not been shown.

3 - Productivity

Age counts, i.e. recording of the proportion of juvenile birds in random flocks during autumn, were performed in Trøndelag, Norway, NW and W Jutland, Denmark, Friesland, Netherlands and Flanders, Belgium, during 13 October and 4 November 2016. In previous years, the proportion of juveniles has been highest in Norway; in autumn 2016, the highest proportion was found in Friesland (Table 2). The weighed estimate of 19.6% is above the long term average for the population (Table 2; Fig. 4). The high breeding output is in line with the predictions made on basis of weather conditions in Svalbard (May temperatures 2016); hence, 2016 was an early season (see Madsen et al. 2016 and Fig. 8).

Table 2. Age counts in autumn 2016 and a weighed estimate for the entire population, based on the age counts and numbers in each region in mid-November (see Table 1). Geese staging in Sweden have been merged with geese from Denmark. For Denmark, the average number of the range in numbers has been used.

| Region | No. juvs | No. adults | Total sample | % juvs | Numbers November per region | Estimated no. juvs per region |
|---------------------------------|----------|------------|--------------|--------|-----------------------------|-------------------------------|
| Trøndelag, Norway | 627 | 2483 | 3110 | 20.2 | 10914 | 2200 |
| Jutland, Denmark | 2674 | 12158 | 14832 | 18.0 | 65390 | 11789 |
| Friesland, Netherlands | 1351 | 3391 | 4742 | 28.5 | 11340 | 3231 |
| Flanders, Belgium | 754 | 3326 | 4080 | 18.5 | 8449 | 1561 |
| Total | 5406 | 21358 | 26764 | | 96093 | 18781 |
| Weighed proportion of juveniles | | | | | | 19.6 |

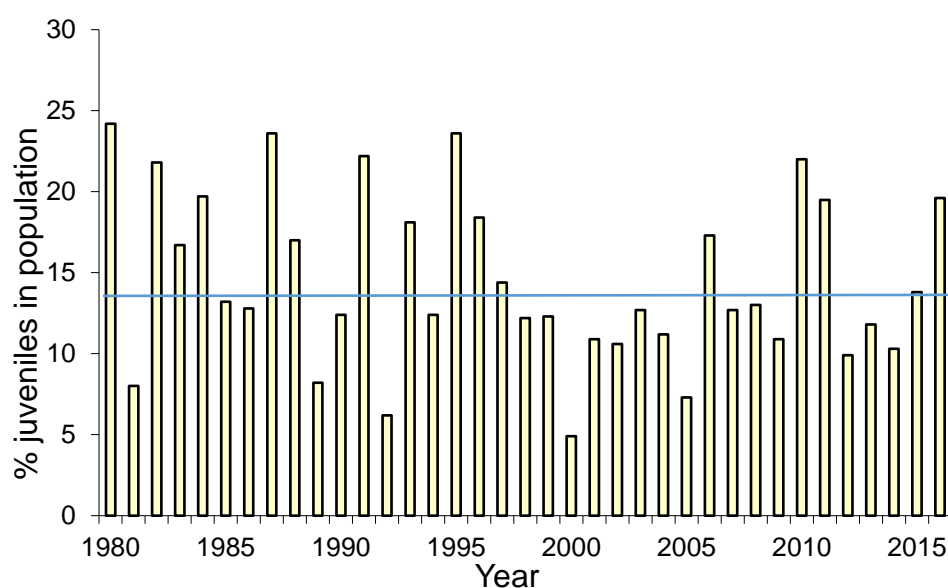


Figure 4. Proportion of juveniles in the autumn population of the Svalbard Pink-footed Goose, 1980-2016. Horizontal line shows the long-term average.

4 – Harvest in Norway and Denmark 2016/17

Following the optimal harvest strategy for the hunting season 2016/17 (Johnson and Madsen 2016), the International Working Group for the ISSMP recommended to increase the harvest of Pink-footed Geese, in order to reduce the population towards the 60,000 target. Consequently, in Denmark, the hunting season was extended to include January 2017 (the year before, January was closed). In Norway, the attempt to improve the organisation of goose hunting progressed.

Data on hunting bags from Norway has been supplied by Statistics Norway (www.ssb.no) (communicated via the Norwegian Environment Agency). Hunting bags from Denmark have been derived from the National Hunting Bag Statistics (Danish Environmental Protection Agency; Aarhus University) (<http://bios.au.dk/videnudveksling/til-jagt-og-vildtinteresserede/vildtudbytte>). In both Norway and Denmark, reporting the harvest is mandatory, and hunters report their bags online. However, since not all hunters in Norway and Denmark may have reported their hunting bags yet (as of 20 May 2017), the data for 2016/17 is still preliminary (Table 3). For Denmark, the proportion of hunters having reported their bag by 20 May was 90%; however, it is highly likely that the remaining 10% of hunters are not representative, but shoot little. Therefore, the harvest has not been corrected for lacking response.

In Norway, a total of 2,808 Pink-footed Geese were reported shot, mainly from Nord-Trøndelag. This is higher than in previous years (Table 3, Fig. 5) which can be explained by the extended staging period in Norway as well as increasingly better organisation of the hunting.

The numbers of Pink-footed Geese reported shot in Denmark was 13,335. This is slightly higher than in 2014/15 when January shooting was also allowed (Table 3). In total, the number of harvested geese was 16,143 which is record high (Fig. 5).

Table 3. *Hunting bags of Pink-footed Geese in Norway and Denmark, hunting seasons 2012/13-2016/17 (preliminary data).*

| Country | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 |
|---------|---------|---------|---------|---------|---------|
| Norway | 2169 | 1819 | 1594 | 2460 | 2808 |
| Denmark | 8580 | 9262 | 13200 | 8761 | 13335 |
| TOTAL | 10749 | 11081 | 14794 | 11221 | 16143 |

To analyse the effect of the January season extension further, the monthly distribution of shot birds was examined. This was done on the basis of wing collection and recoveries of ringed geese reported shot. In Denmark, wings from shot waterbirds are collected for analysis of age composition. Both the collection of wings from shot geese in Denmark as well as recoveries of shot ringed geese show that the extension of the hunting season with January was effective. Based on the wing collection sample, 37% of the geese harvested in Denmark were shot in January (Fig. 6), while based on recoveries, 46% of Danish shot geese were taken in January (Fig. 7). In 2014/15 when January hunting was also allowed, 47% of all geese were shot in January.

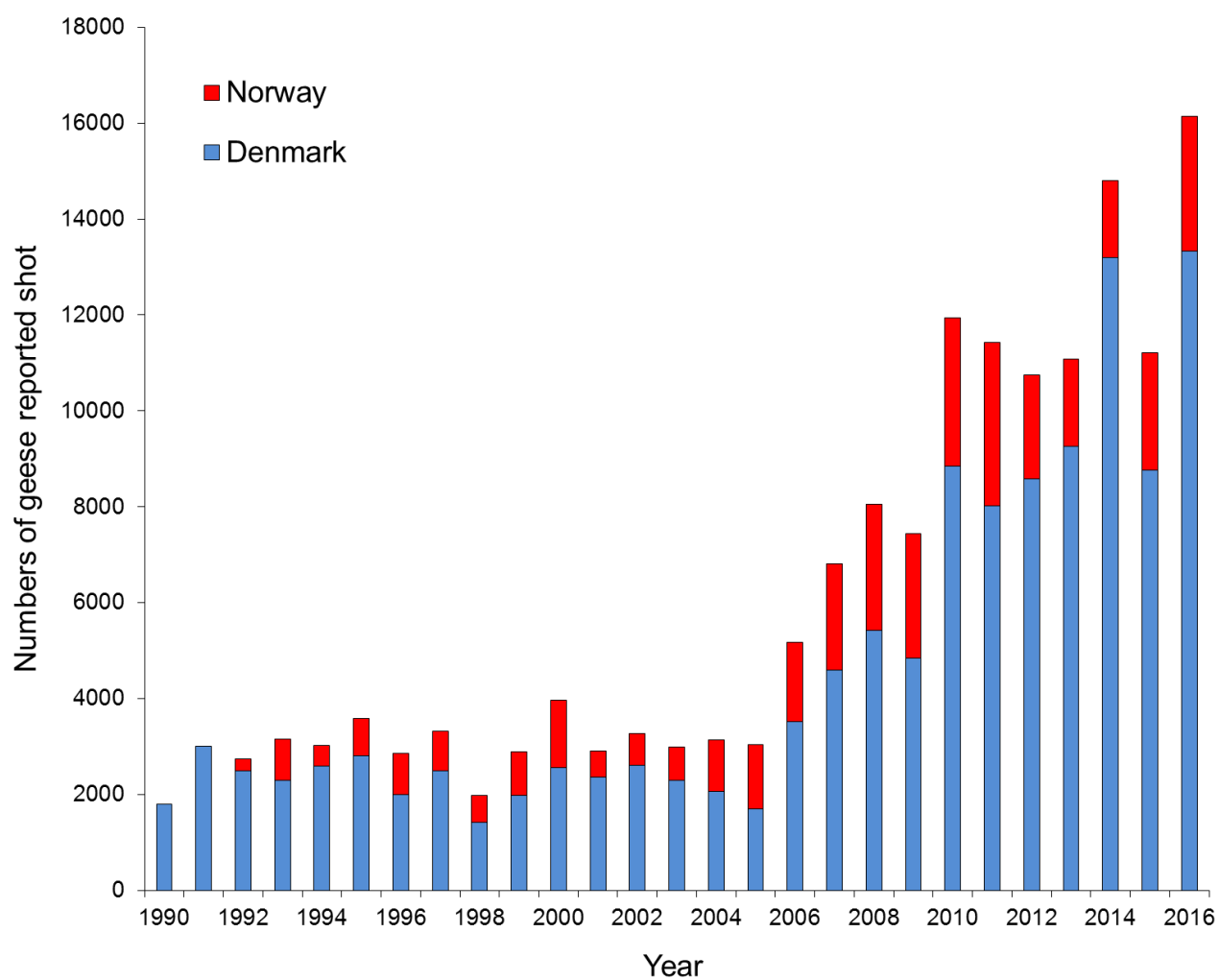


Figure 5. Development in the harvest of Pink-footed Geese in Norway and Denmark, 1990-2016. Harvest data for Norway was available from 1992 onwards.

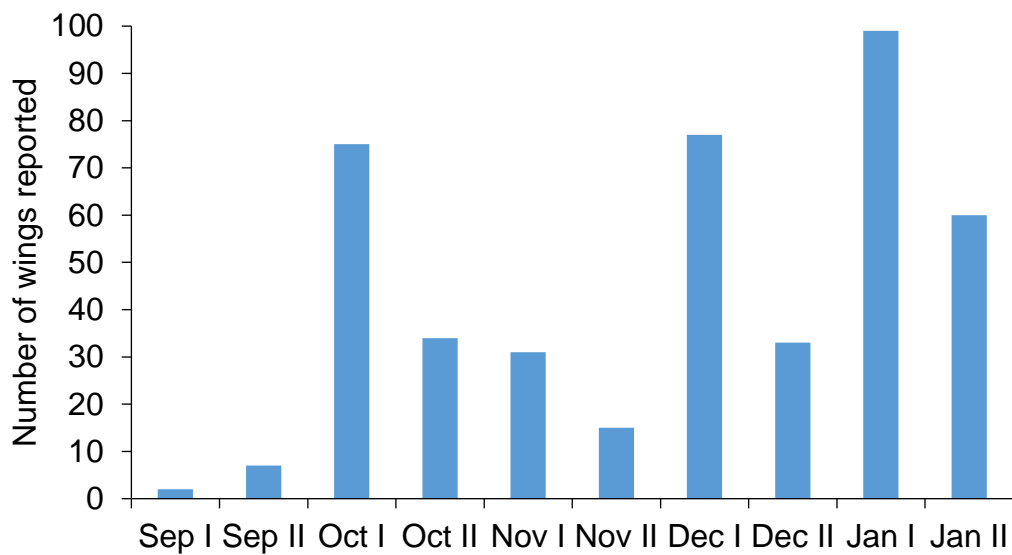


Figure 6. Number of wings of Pink-footed Geese collected from hunters in Denmark in the 2016/17 hunting season, divided into half-monthly intervals.

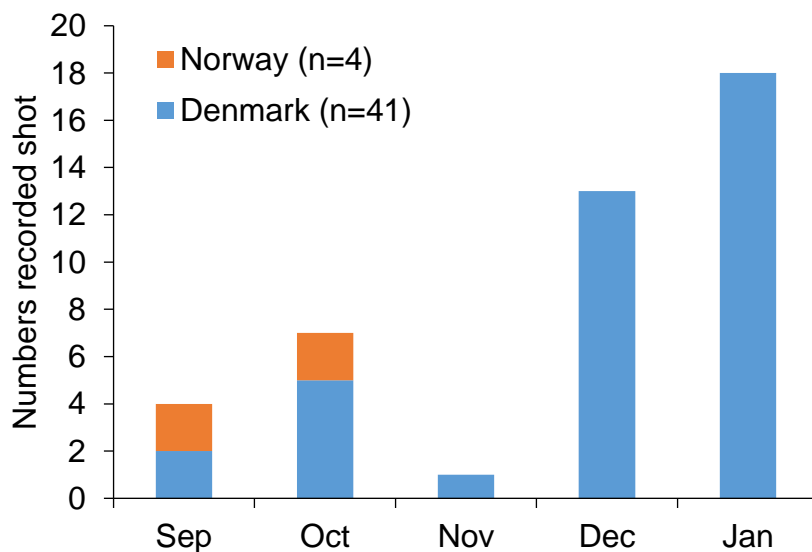


Figure 7. Number of marked Pink-footed Geese recorded as shot in the 2016/17 hunting season in Denmark and Norway.

5 – Spring weather conditions in Svalbard 2017

For the modelling of optimal harvest strategy for the hunting season 2017/18, we use the weather conditions in May in Svalbard as a predictor of the production of young (Jensen et al. 2014). The mean daily temperatures are derived from Ny Ålesund and Svalbard Airport meteorological stations (www.yr.no). In May 2017, Ny Ålesund had three thaw days and Svalbard Airport had four thaw days. For further analysis, an average of 3.5

thaw days will be used which is below the long-term average for 1990-2017 (8.1 days) (see Fig. 8). Hence, we predict the 2017 breeding season to be below the long-term average (which has on average resulted in 14% juveniles in the autumn population).

The optimal harvest strategy is reported separately (Johnson & Madsen 2017).

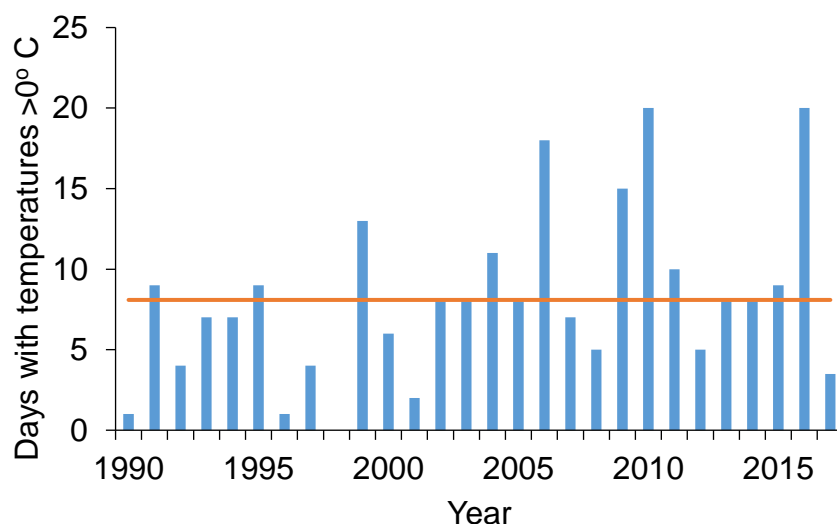


Figure 8. Number of thaw-days (days with average temperatures above 0°C) in May on Svalbard, expressed as an average for Ny Ålesund and Longyearbyen, Svalbard Airport (data source: Norwegian Meteorological Institute). Horizontal line shows long-term average.

6 - Discussion

The observed population increase in 2016/17 followed a good breeding season in Svalbard. Despite the uncertainty about the November 2016 numbers, there is a good correspondence between the counted numbers in late April 2017 and November 2016, taking into account that there was a natural mortality and a hunting mortality reducing numbers between the two dates. Hence, hunting mortality between the two count dates is estimated at 9,200 individuals, based on the relative distribution of collected wings. The count estimates are in correspondence with an independent estimate based on marked individuals.

The trend of pinkfeet using Sweden and SE Denmark as an alternative migration route and staging areas in the autumn has continued. Likewise, the trend towards more pinkfeet migrating via Sweden to Oulu in Finland has been confirmed. The spread of the population poses an increasing challenge to the monitoring of the population, and it is recommended that the alternative method of estimating the population on the basis of marked individuals is strengthened and that a standard protocol for recording is developed.

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