



Svalbard Pink-footed Goose

(*Anser brachyrhynchus*)

AEWA European Goose Management Platform

EGMP Technical Report No.4

Population Status Report 2016-2017

AEWA European Goose Management Platform

**Svalbard Pink-footed Goose
Population Status Report
2016-2017**

Anser brachyrhynchus

EGMP Technical Report No. 4

Prepared by the AEWA European Goose Management Platform Data Centre

Compiled by: Jesper Madsen¹, Gitte Høj Jensen¹, Fred Cottaar², Ole Amstrup³, Tommy Asferg¹, Mogens Bak³, Johnny Bakken⁴, Thorsten T.J. Balsby¹, Thomas Kjær Christensen¹, Kevin K. Clausen¹, John Frikke⁵, Ove Martin Gundersen⁶, Klaus Günther⁷, Jørgen Peter Kjeldsen⁸, Kees Koffijberg⁹, Helmut Kruckenberg¹⁰, Eckhart Kuijken¹¹, Johan Månsson¹², Per Ivar Nicolaisen⁴, Henrik Haaning Nielsen¹³, Leif Nilsson¹⁴, Tore Reinsborg⁴, Jorma Pessa¹⁵, Paul Shimmings¹⁶, Ingunn Tombre⁴, Christine Verscheure¹¹

¹Aarhus University, Denmark, ²Independent Collaborator, the Netherlands, ³Amphi Consult, Denmark, ⁴Norwegian Institute for Nature Research, Norway, ⁵Nationalpark Vadehavet, Denmark, ⁶Norwegian Farmers' Union, Norway, ⁷Schutzstation Wattenmeer, Germany, ⁸ornit.dk, Denmark, ⁹SOVON, the Netherlands, ¹⁰Institute for Wetlands and Waterbird Research e.V., Germany, ¹¹Independent Collaborator, Beernem, Belgium, ¹²Swedish University of Agricultural Sciences, Grimsö Research Station, Sweden, ¹³Avifauna Consult, Denmark, ¹⁴University of Lund, Sweden, ¹⁵Centre for Economic Development, Transport and the Environment, Finland, ¹⁶Birdlife International, Norway.

Recommended citation:

Madsen J., Høj Jensen G., Cottaar F., Amstrup O., Asferg T., Bak M., Bakken J., Balsby T. T. J., Christensen T. K., Clausen K. K., Frikke J., Gundersen O. M., Günther K., Kjeldsen J. K., Koffijberg K., Kruckenberg H., Kuijken E., Månsson J., Nicolaisen P. I., Nielsen H. H., Nilsson L., Reinsborg T., Pessa J., Shimmings P., Tombre I., Verscheure C. (Compilers). 2017. Svalbard Pink-footed Goose Population Status Report 2016-2017 (*Anser brachyrhynchus*). AEWA EGMP Technical Report No. 4. Bonn, Germany.

Picture on the cover: © Magnus Elander

First published: Meeting document at the 2nd meeting of the AEWA European Goose Management International Working Group, Doc AEWA/EGM IWG 2.5 on 8 June 2017.



DISCLAIMER

The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of UNEP/CMS and UNEP/AEWA concerning the legal status of any State, territory, city or area, or of its authorities, or concerning the delimitation of their frontiers and boundaries.

1. Contents

1. Summary	4
2. Aim	4
3. Population estimate 2016/17	4
4. Productivity.....	8
5. Harvest in Norway and Denmark 2016/17	9
6. Spring weather conditions in Svalbard 2017	12
7. Discussion.....	13
8. Bibliography and references	13

1. 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 AEWIA International Species Management Plan (ISMP) 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 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.

2. 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 AEWIA ISMP 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 ISMP 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.

3. 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 have 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 organization 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%) (Figure 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 (Figure 2).

Table 1. Results of synchronized counts of Pink-footed Geese in autumn 2016 and spring 2017

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

* Counted on 20-21 November 2016. Data from Vlaardingen still missing.

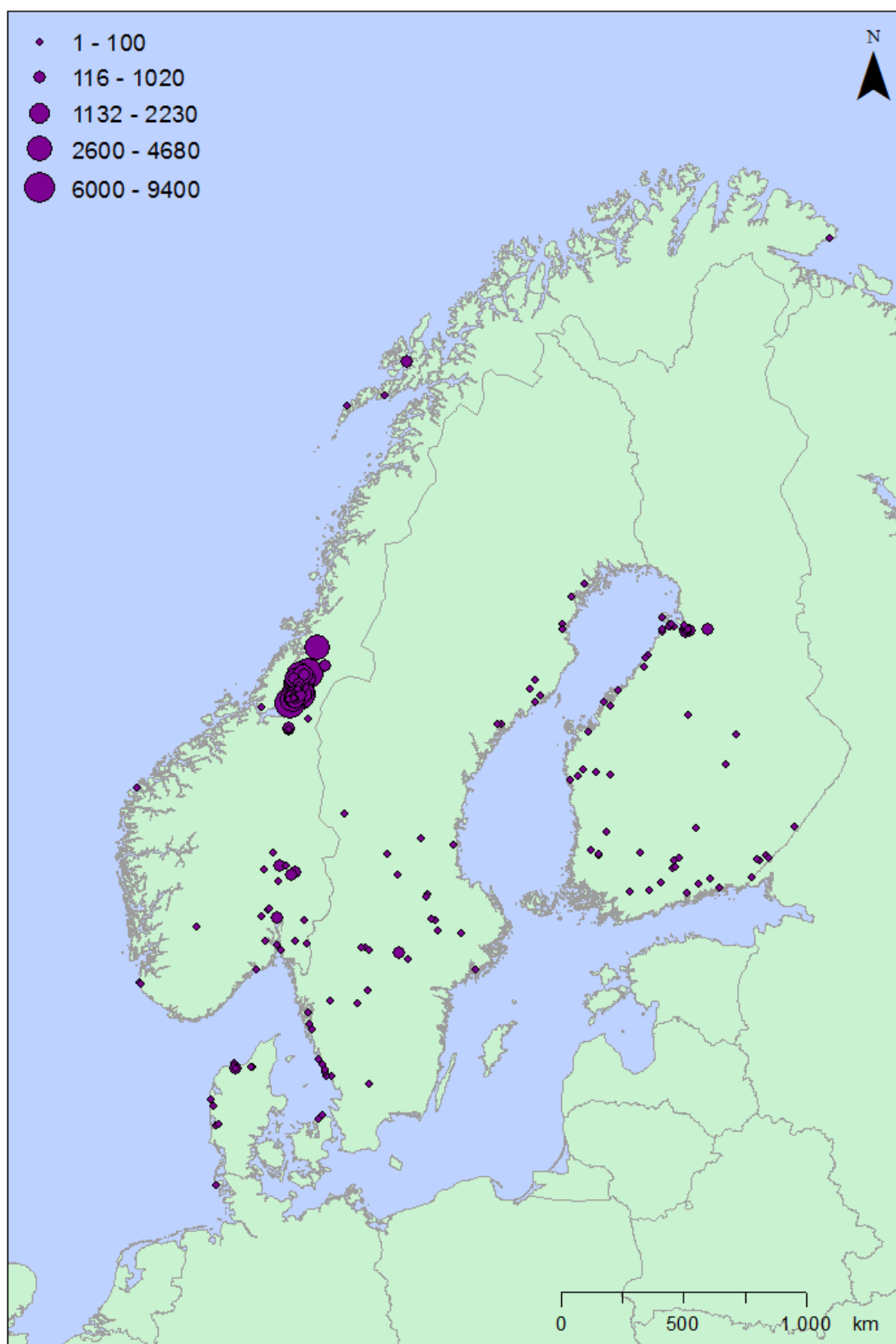


Figure 1. Distribution of Pink-footed Geese on 30 April 2017

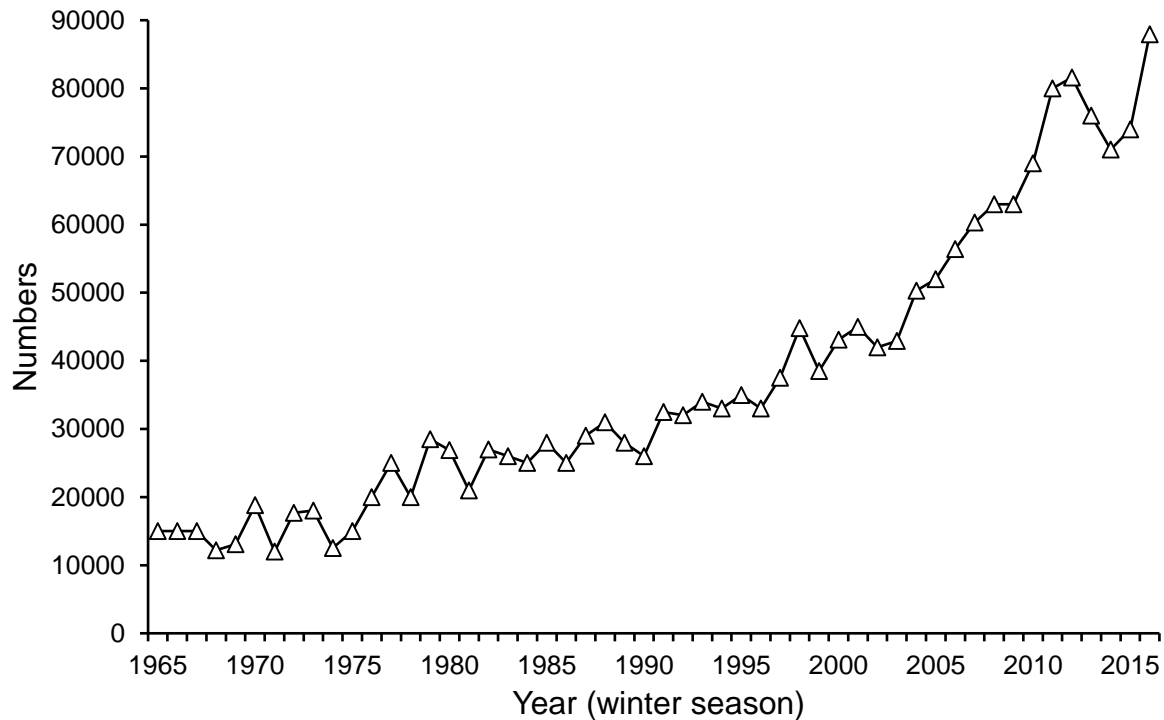


Figure 2. Development of the size of the Svalbard population of the Pink-footed Goose, 1965/66-2016/17

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. 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 two times 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. 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 Figure 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.

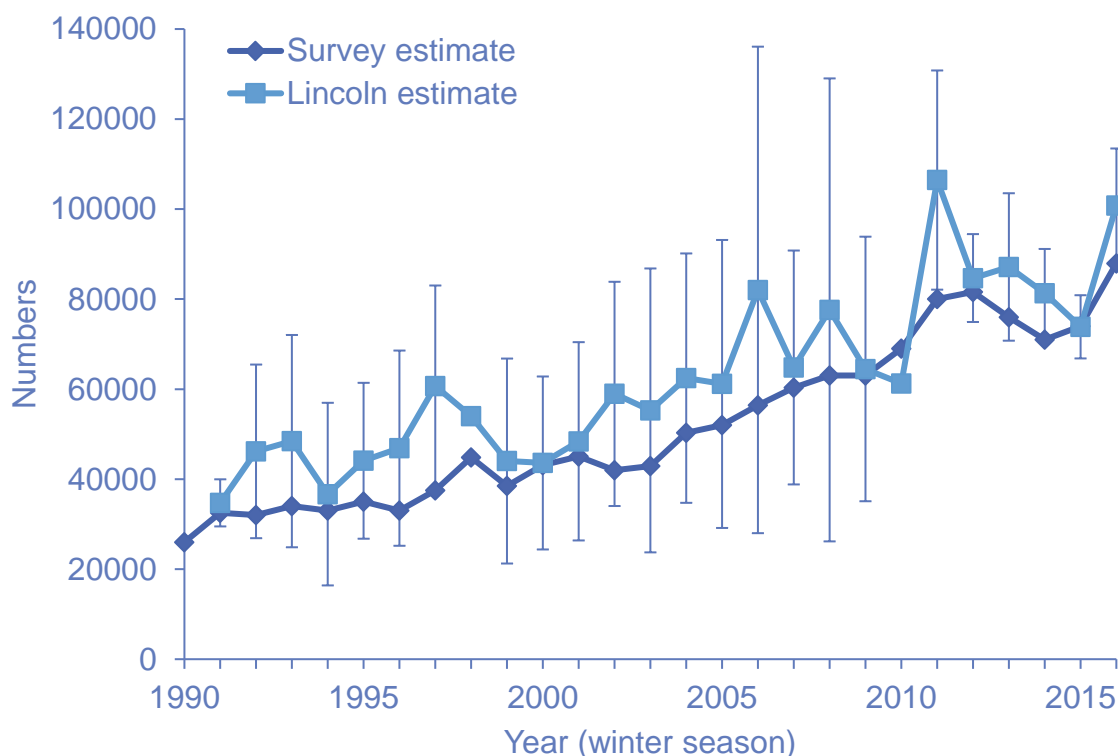


Figure 3. Comparison of population estimates based on surveys and Lincoln sampling based on marked individuals (average \pm 95% CL). During 1991-2011, the number of goose flocks scanned for marked/unmarked birds was relatively low, but since 2012 it has increased, which is the reason for the decrease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

4. 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; Figure 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	% juv	Numbers November per region	Estimated no. juvs per region
Trøndelag, Norway	627	2,483	3,110	20.2	10,914	2,200
Jutland, Denmark	2,674	12,158	14,832	18.0	65,390	11,789
Friesland, the Netherlands	1,351	3,391	4,742	28.5	11,340	3,231
Flanders, Belgium	754	3,326	4,080	18.5	8,449	1,561
Total	5,406	21,358	26,764		96,093	18,781
Weighed proportion of juveniles						19.6

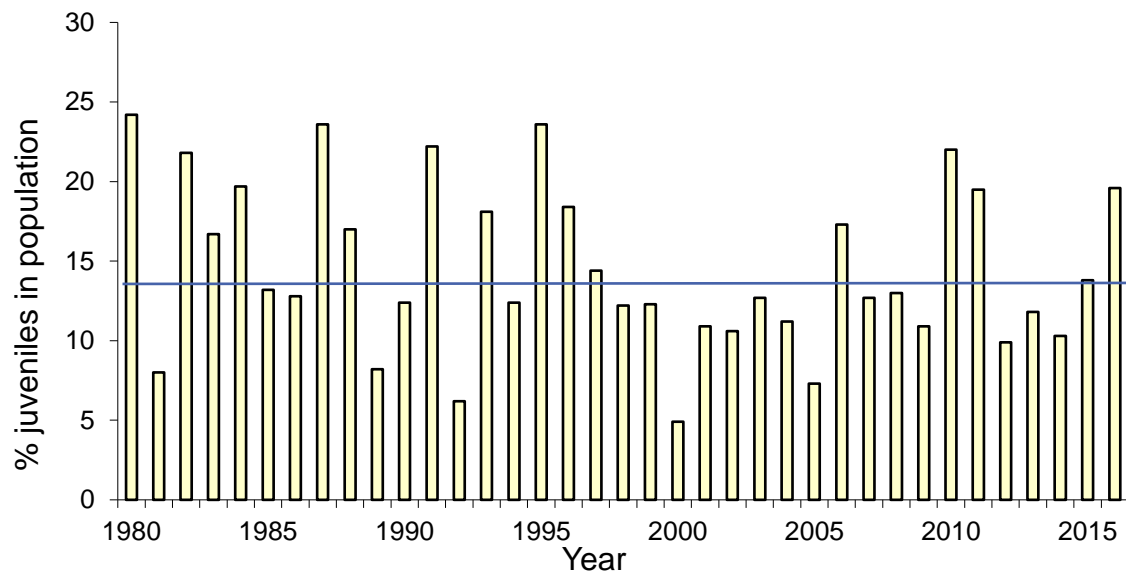


Figure 4. Proportion of juveniles in the autumn population of the Svalbard Pink-footed Goose, 1980-2016. Horizontal line shows the long-term average

5. 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 ISMP recommended to increase the harvest of Pink-footed Geese in order to reduce the population towards the 60,000 target. In consequence, in Denmark, the hunting season was extended to include January 2017 (the year before, January was closed). In Norway, the attempt to improve the organization 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 yet have reported their hunting bags (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; Figure 5) which can be explained by the extended staging period in Norway as well as increasingly better organization 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 (Figure 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	2,169	1,819	1,594	2,460	2,808
Denmark	8,580	9,262	13,200	8,761	13,335
TOTAL	10,749	11,081	14,794	11,221	16,143

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 to include January was effective. Based on the wing collection sample, 37% of the geese harvested in Denmark were shot in January (Figure 6), while based on recoveries, 46% of Danish shot geese were taken in January (Figure 7). In 2014/15 when January hunting was also allowed, 47% of all geese were shot in January.

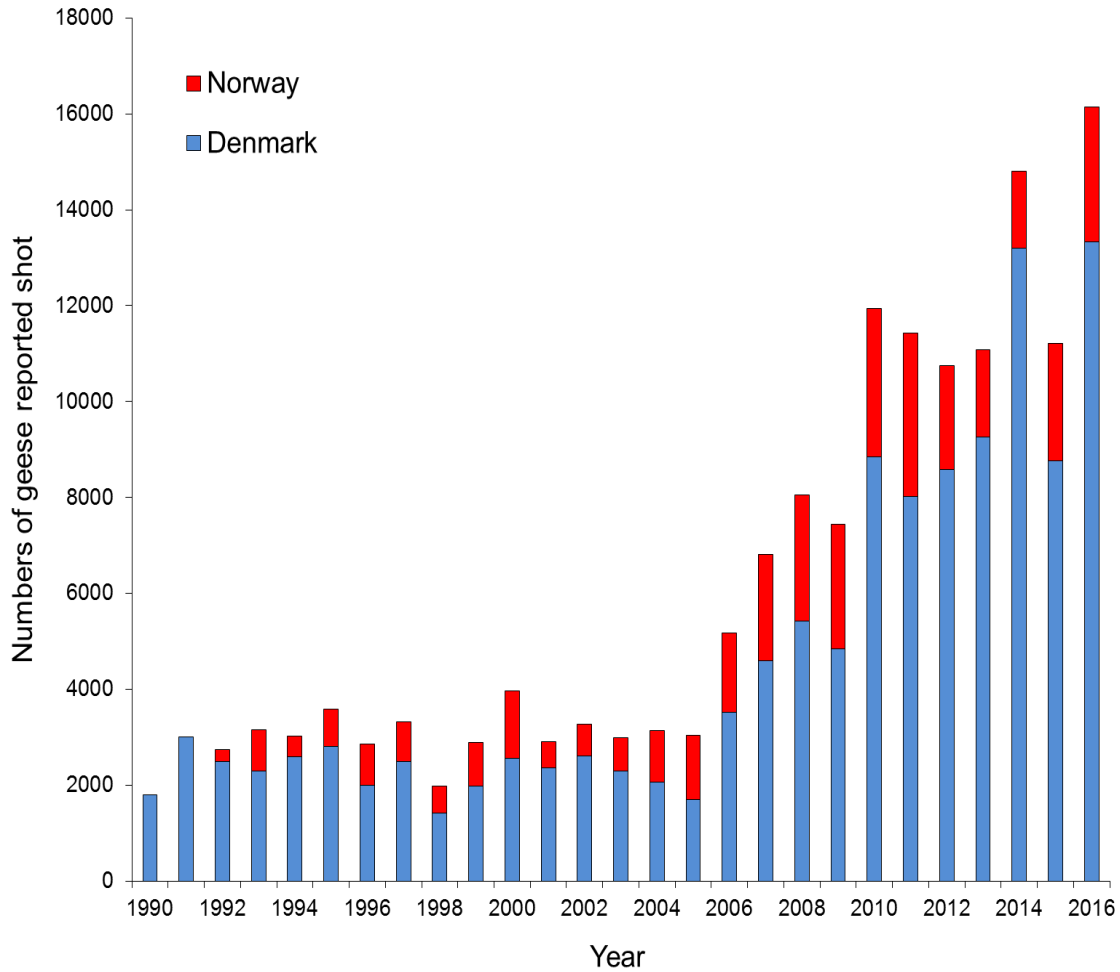


Figure 5. Development in the harvest of Pink-footed Geese in Norway and Denmark, 1990-2016. Harvest data for Norway was available from 1992 onwards

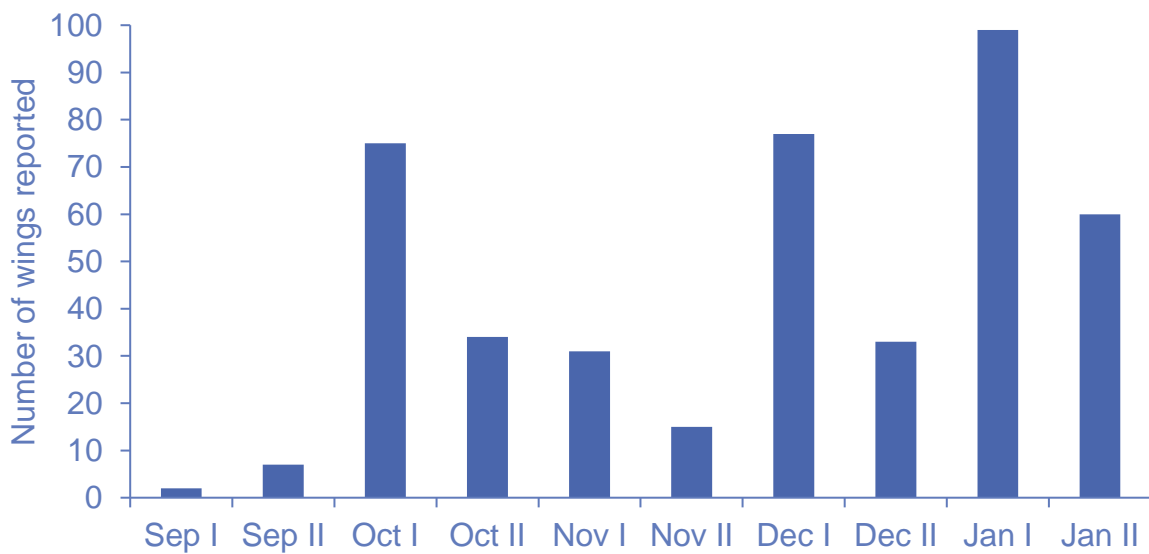


Figure 6. Number of wings of Pink-footed Geese collected from hunters in Denmark in the 2016/17 hunting season, divided into half-monthly intervals.

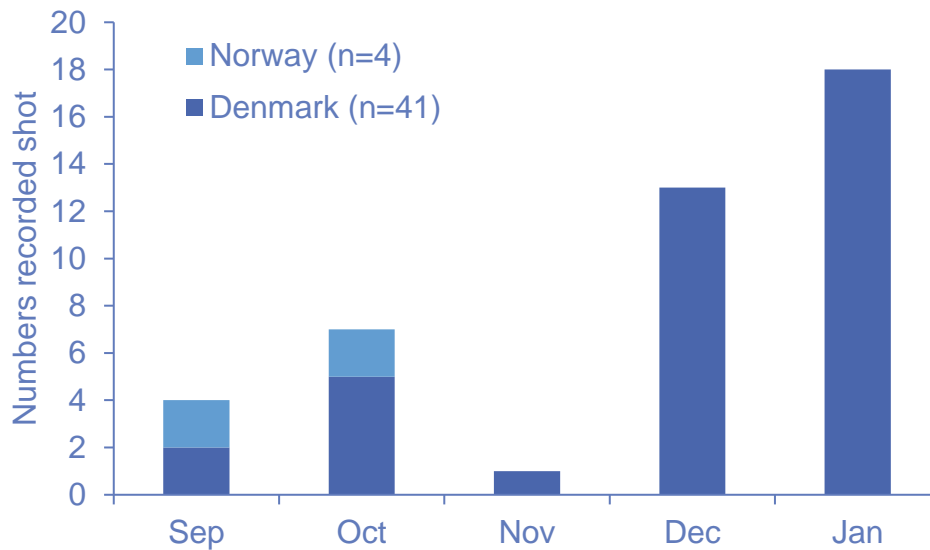


Figure 7. Number of marked Pink-footed Geese recorded as shot in the 2016/17 hunting season in Denmark and Norway

6. 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 3 thaw days and Svalbard Airport had 4 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 Figure 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).

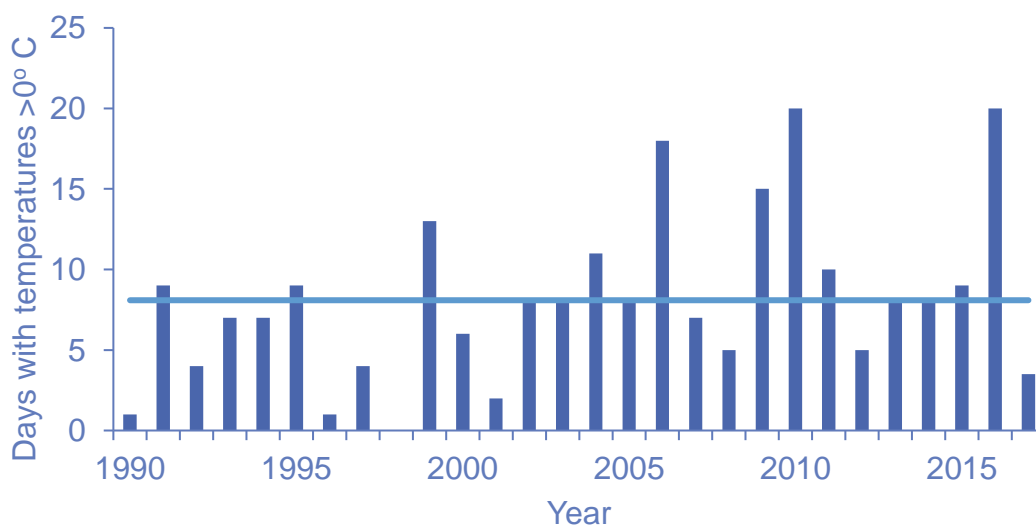


Figure 8. Number of thaw-days (days with average temperatures above 0°C) in May on Svalbard, expressed as an average for Ny Ålesund and Longyearbyen, Svalbard Airport. Horizontal line shows long-term average.

data source: Norwegian Meteorological Institute

7. 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 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.

8. Bibliography and references

- Ganter, B. and Madsen, J.** 2001. An examination of methods to estimate population size in wintering geese. *Bird Study* 48: 90-101.
- Jensen, G.H., Madsen, J., Johnson, F.A. and Tamstorf, M.** 2014. Snow conditions as an estimator of the breeding output in high-Arctic pink-footed geese *Anser brachyrhynchus*. *Polar Biology* 37: 1-14.
- Johnson, F.A. and Madsen, J.** 2016. Adaptive Harvest Management for the Svalbard Population of Pink-footed Geese. 2016 Progress Summary. Aarhus University, Danish Centre for Environment and Energy (DCE), 24 pp. Technical Report from DCE –Danish Centre for Environment and Energy No. 86.
- Johnson, F.A. and Madsen, J.** 2017. Adaptive Harvest Management for the Svalbard Population of Pink-footed Geese. 2017 Progress Summary. Draft report. AEWA EGMP Data Centre. UNEP/AEWA, Bonn.
- Madsen, J., Cottaar, F., Amstrup, O., Asferg, T., Bak, M., Bakken, J., Frikke, J., Goma, V., Gundersen, O.M., Günther, K., Kjeldsen, J.P., Kruckenberg, H., Kuijken, E., Månsson, J., Nicolaisen, P.I., Nielsen, H.H., Nilsson, L., Reinsborg, T., Shimmings, P., Tapio, T., Tombre, I., Verscheure, C. and Ødegård, P-I.** 2016. Svalbard Pink-footed Goose. Population Status Report 2015-16. Aarhus University, DCE, 14 pp. Technical Report from DCE – Danish Centre for Environment and Energy No. 82.
- Madsen, J., Williams, J.H., Johnson, F.A., Tombre, I.M., Dereliev, S. and Kuijken, E.** 2017. Implementation of the first adaptive management plan for a European migratory waterbird population: The case of the Svalbard pink-footed goose *Anser brachyrhynchus*. *Ambio* (Suppl. 2): 275-289.
- Madsen, J. and Williams, J.H.** 2012. International Species Management Plan for the Svalbard population of the pink-footed goose *Anser brachyrhynchus*. – AEWA Technical Report No. 48.
- Sheaffer, S. E. and Jarvis, R. L.** 1995. Bias in Canada Goose Population-Size Estimates from Sighting Data. *Journal of Wildlife Management* 59: 464-473.
- White, G. C. and Burnham, K. P.** 1999. Program MARK: survival estimation from populations of marked animals. *Bird Study* 46: 120-139.



AEWA European Goose
Management Platform



AEWA

UNEP/AEWA Secretariat
UN Campus
Platz der Vereinten Nationen 1
53113 Bonn
Germany
Tel.: +49 (0) 228 815 2413
Fax: +49 (0) 228 815 2450
aewa.secretariat@unep-aewa.org
www.unep-aewa.org