



Aerial surveys of Harbour Seals in the Wadden Sea in 2017

Population counts still in stagnation, but more pups than ever

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Photo: Seals at Kachelot. NLPV/ Czeck



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Introduction

In 2017, coordinated aerial surveys for harbour seal counts of the entire Wadden Sea were once again carried out. However since this year Denmark has reduced the number of harbour seal counts from five to three planned counts. The counts are synchronized to the degree possible between the three Wadden Sea countries, Denmark, Germany and the Netherlands, in order to obtain a single estimate for the number of harbour seals and newborn pups in the entire Wadden Sea. Seals are counted when hauling out on land and counts are scheduled to be carried out when low-tide occurs around midday.

The variation in the number of seals hauling out from year to year and over a longer period may be affected by different weather conditions, disturbance, distance to food patches, or a change in the age and sex composition of the population (Härkönen et al. 1999). Also, the timing of birth has been shown to change over time, potentially affecting the percentage of pups counted at the same time of year over a long period (Reijnders et al. 2010). It is unclear if and how this shift might also affect the moult counts. Additional studies are needed to determine if a further shift in timing has occurred.

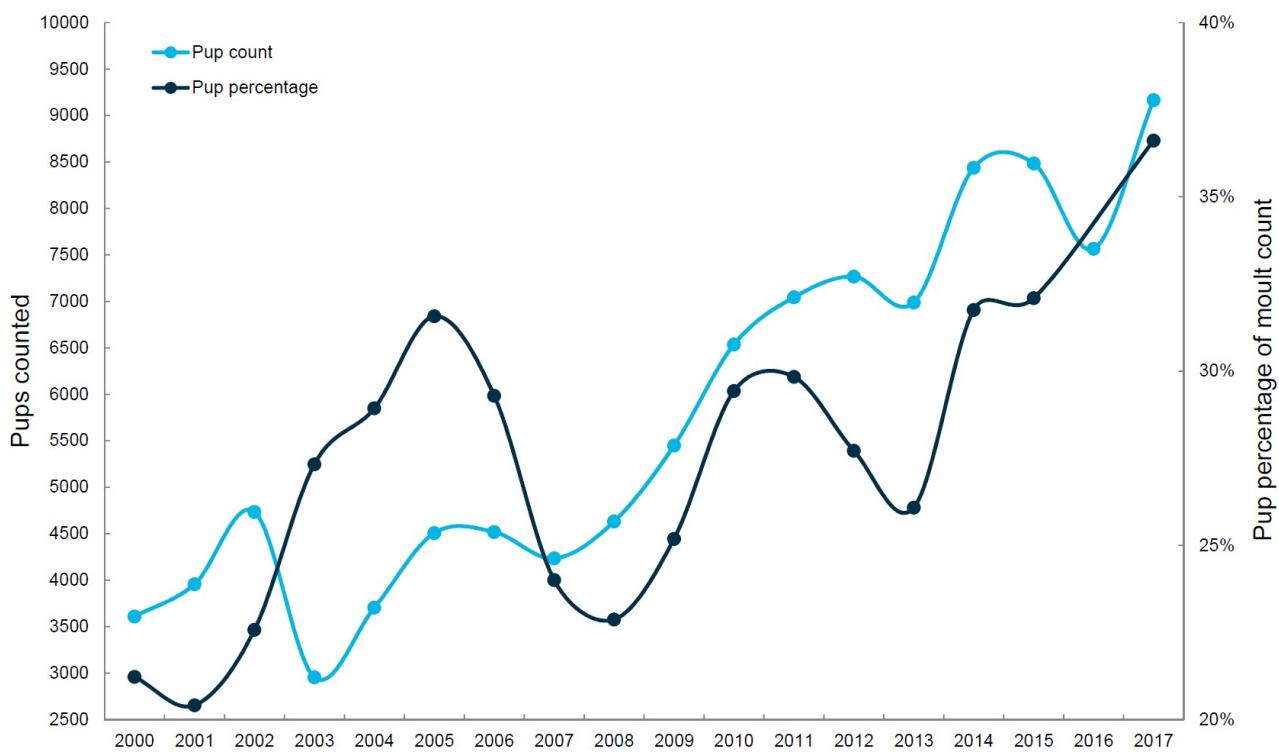


Figure 1. Number of pups counted in the Wadden Sea in June (red line, left vertical axis) in the years 2000-2017. The number of pups as a percentage of the total moult count is indicated by the blue line.

Results and interpretation

The number of newborn pups counted in June 2017 was the highest registered since 1974: a total of 9167 pups constituting an increase of 24% relative to last year's count of 7566 pups. All four regions showed record counts, 732 in Denmark (+11% from 2016), 3974 in Schleswig-Holstein (+28% from 2016), 2212 in Lower Saxony and Hamburg (+16% from 2016) and 2249 in the Netherlands (+21% from 2016).

During the moult in August 2017, there were almost 26,000 harbour seals on land. 2,971 seals were counted in Denmark, 8,834 in Schleswig-Holstein, 7,311 in Lower Saxony and Hamburg and 5,920 in the Netherlands. However in the Netherlands, an area holding approximately 800-1,000 seals could not be surveyed due to military activities. 900 animals were therefore added to this total to provide a correct estimate for the time of counting (Figure 2). These results show substantial increases in Denmark (38% from 2016), and Schleswig-Holstein (34% from 2016) and estimated decreases in the Netherlands (-16% from 2016) and Lower Saxony and Hamburg (-4% from 2015). Such shifts may indicate different proportions of seals hauling out in the different regions, caused by either variable environmental conditions (e.g. weather) or a shift in the spatial distribution of seals over time. This emphasizes that the harbour seal population in the Wadden Sea must be regarded as a whole. The total moult count has now been decreasing since 2013. The 2017 count represents a decline of 5% relative to the last survey of the entire coastline in 2015. This adds further credence to the hypothesis that the harbour seals in the Wadden Sea may be reaching the carrying capacity of the area. However, the record number of pups counted contradicts this interpretation. The phenomenon of an increased number of pups registered combined with decreasing numbers of adults could be explained by a combination of the local carrying capacity of the Wadden Sea being reached and a high degree of female fidelity for pupping sites. Under this scenario, adult seals will disperse further outside the Wadden Sea area to feed, but would return to the area during the breeding season. This interpretation is supported by a higher number of harbour seals (excluding pups) counted during the pupping season than during the moult, 26,873.

The estimate for the total Wadden Sea harbour seal population, including seals in the water during the survey, can be calculated using a correction factor estimated by Ries et al. (1998). They found that on average 32% of the seals were in the water during summer. By using this correction factor the total population size of harbour seals in the Wadden Sea in 2017 was about 38,100.

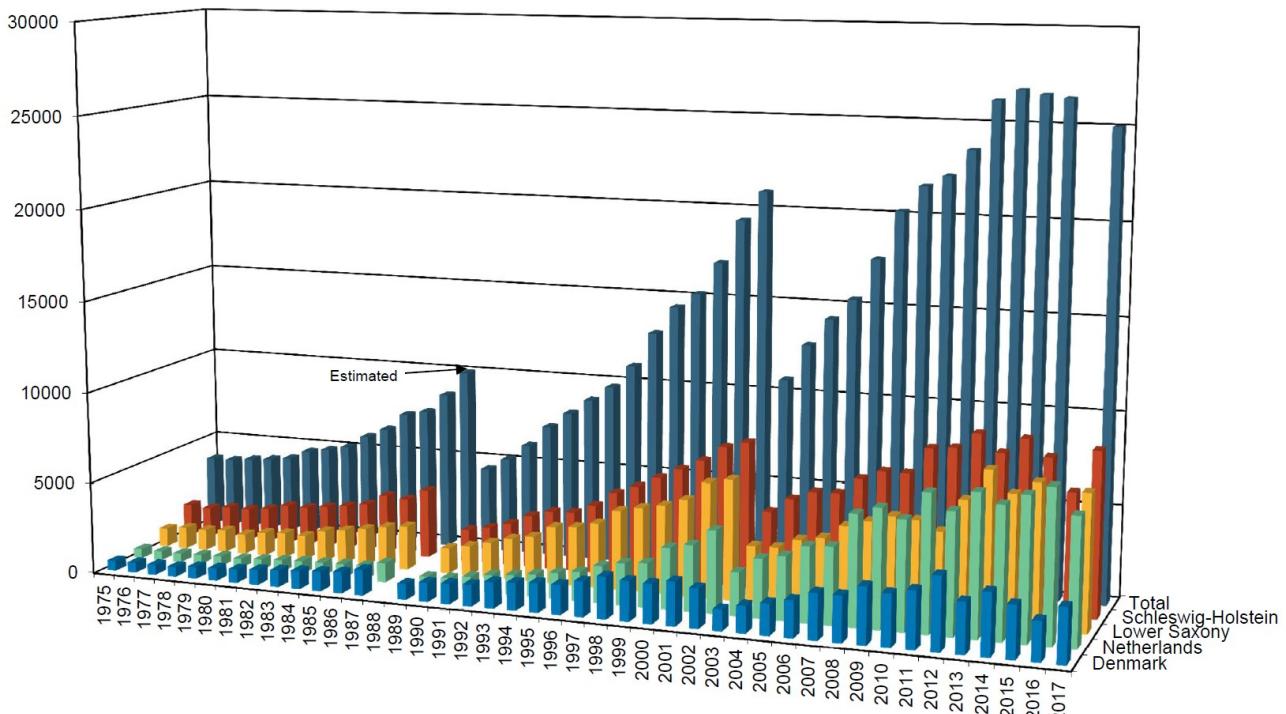


Figure 2. Total number of harbour seals counted in the Wadden Sea during the moult in August, as well as numbers for each region, from 1975-2017.

In theory, one of the signs of a population approaching carrying capacity would be a decrease in pup production or pup survival. However, pup production is not declining, but has rather increased during recent years. There is a possibility of downward trend in pup survival, which could also explain the observed decrease in the moult counts, but this cannot be tested with the available data. If pup survival is affected, this would result in a lower pup production in the future as these animals are recruited into the breeding population.

The results of the surveys of the coming years may confirm which scenario is true. Under the former scenario, according to which animals feed further away from the haul out sites, the population of the Wadden Sea will be larger than estimated from the moult surveys.

References

- Brasseur SMJM, Czeck R, Jensen LF, Jeß A, Körber P, Pund R, Siebert U, Teilmann J, Klöpper S. (2016) Aerial surveys of Grey Seals in the Wadden Sea in 2015/2016.
- Härkönen T, Harding KC, Lunneyd SG (1999) Age- and sex-specific behaviour in harbour seals *Phoca vitulina* leads to biased estimates of vital population parameters. *Journal of Applied Ecology* 36: 825-841.
- Reijnders, PJH., Brasseur, SMJM. and Meesters, EHWG. 2010. Earlier pupping in harbour seals, *Phoca vitulina*. *Biology Letters*, doi: 10.1098/rsbl.2010.0468

Ries EH, Hiby, L. R., and Reijnders, P. J. H. (1998) Maximum likelihood population size estimation of harbour seals in the Dutch Wadden Sea based on a mark-recapture experiment. *Journal of Applied Ecology* 35: 332-339.

van Neer A, Jensen LF, Siebert U. (2015). Grey seal (*Halichoerus grypus*) predation on harbour seals (*Phoca vitulina*) on the island of Helgoland, Germany. *J Sea Res* 97: 1–4. doi: [10.1016/j.seares.2014.11.006](https://doi.org/10.1016/j.seares.2014.11.006)