



Photo: Aerial survey of harbour seals in the Netherlands. S. Brasseur.

# Aerial surveys of Harbour Seals in the Wadden Sea in 2018

## Another record year for pups

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## Introduction

The seal counts of the entire Wadden Sea 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 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 several years 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. It is of importance to understand if changes in timing of pupping and moult have occurred due to changes in age composition in the population, climate change or other environmental factors. The timing of the surveys depends on this. Therefore, studies on these topics should be initiated as soon as possible. These studies could include additional coordinated surveys in some particular years or detailed studies on the number of seals on land on selected haul out sites.

## Results

### Pup counts

The number of pups counted in June 2018 was the highest registered since 1975: a total of 9,285 pups counted (Figure 1). These numbers cover a large increase in Schleswig-Holstein and decreasing counts in the other regions. In Denmark, 560 pups were counted (-23% compared to 2017), 4,576 in Schleswig-Holstein (+15% compared to 2017), 2,158 in Lower Saxony and Hamburg (-2% compared to 2017). In the Netherlands, one area was not surveyed due to military activities. In the remaining areas, 1,991 pups were counted. Despite the missing area, total numbers still constitute an increase as compared to last year's count of 9,167 pups.



Figure 1. Number of pups counted in the Wadden Sea in June (red line, left vertical axis) in the years 2000-2018. This number is underestimated in 2018 as an area in the Netherlands was not surveyed. The number of pups as a percentage of the total moult count is indicated by the blue line.

## Moult counts

During the moult in August 2018, it was not possible to obtain a complete coordinated count, as weather conditions precluded one complete aerial survey of the entire Wadden Sea. 2,675 seals were counted in Denmark, 8,058 in Lower Saxony and Hamburg and 6,774 in the Netherlands (Figure 2). However in the Netherlands, again an area could not be surveyed due to military activities and unfavourable weather conditions prevented a moult count on the same day in Schleswig-Holstein. On Helgoland, 193 harbour seals were counted. In previous years, counts in Helgoland were not included, yet these seals can be considered part of the Wadden Sea population and efforts will be made to integrate these numbers in upcoming reports.

These results show a decrease in Denmark (-10% compared to 2017) and an increase in Lower Saxony and Hamburg (10% from 2017). Such differences in numbers may be the result of a change in the survey date, varying proportions of seals hauling out, or a shift in the spatial distribution of seals over time. Moreover the moult peak depends on the total number of seals, but also the synchrony of their moulting process. Expected

changes in age composition as the population develops, could lead to more variation in the average timing of the moult, as young seals moult earlier than older seals (Härkönen et al. 1999).

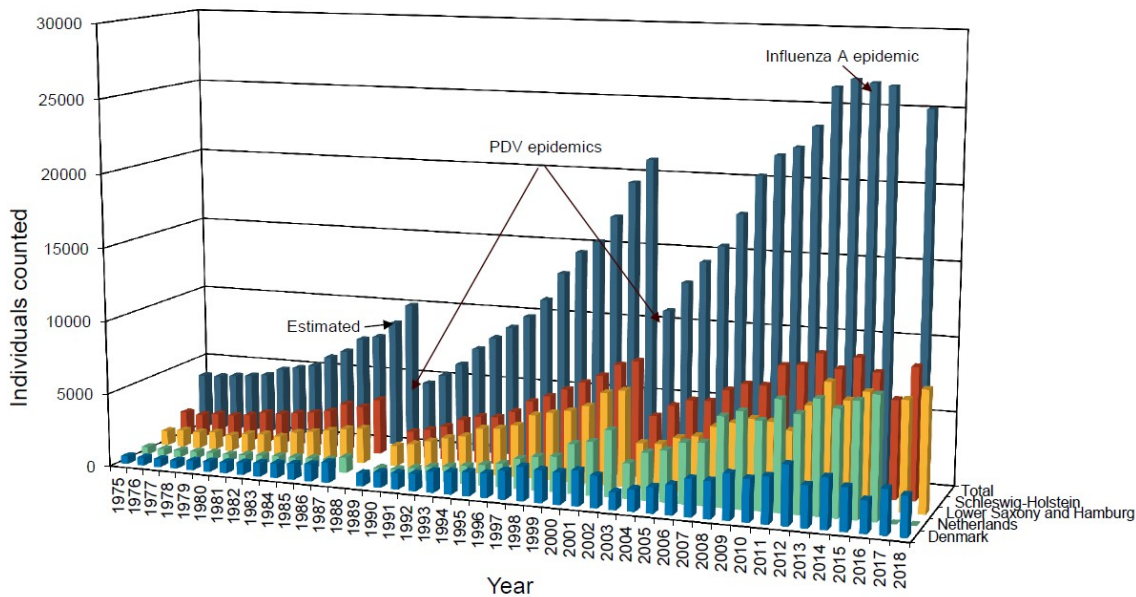


Figure 2. Total number of harbour seals counted in the Wadden Sea during the moult in August, as well as numbers for each region, from 1975-2018. The two Phocine Distemper Virus (PDV) epidemics in 1988 and 2002, as well as the influenza A epidemic in 2014 are shown on the figure.

## Conclusion

The total moult count has been stagnating between 2013 and 2017, but a total count for 2018 is not available. If counts of 2017 would be used for Schleswig-Holstein (8,834) and the Netherlands (adding 1,151 for the area that was not surveyed in 2018) an approximation of the total counts in the Wadden Sea would be 27,492 harbour seals. 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 2018 was about 40,000.

The fluctuation around 25,000-27,000 seals as observed since 2012 indicates that the population of harbour seals in the Wadden Sea has reached carrying capacity level. The stagnation in numbers could be due to limited place on land, disturbances of the seals

by human activities, limited food resources, or diseases (such as the Phocine Distemper Virus (PDV) in 1988 and 2002, or the influenza A in 2014, Figure 2) leading to an increase in mortality. It is unlikely that harbour seals emigrate in high numbers to other areas, such as the Limfjord, UK, France and the Delta area in the Netherlands (ICES WGMME, 2018; SCOS, 2017).

In theory, 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. Data on stranded deceased harbour seal pups from Schleswig-Holstein and the Netherlands don't show any clear trend when compared to the survey data and besides little fluctuations e.g. due to the recent influenza A outbreak a proportionally similar amount of pups has been found dead.

The results of the surveys of the coming years may provide more insight in these seemingly contradicting results.

## References

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