

## Aerial surveys of Harbour Seals in the Wadden Sea in 2016

- Population still in stagnation



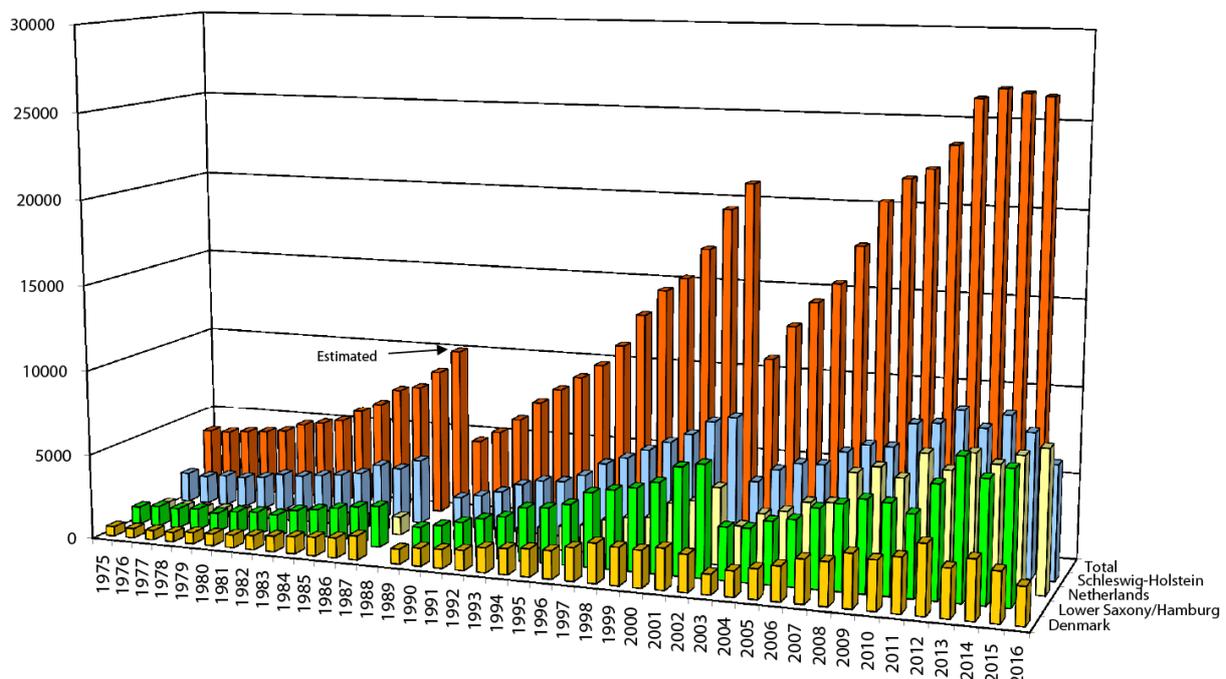
Harbour seal in the Wadden Sea. Photo: Anders Galatius

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## Introduction

In 2016, aerial surveys for harbour seal counts of the entire Wadden Sea were coordinated as in previous years (started in 1975), according to the Seal Management Plan. 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. Due to unfavourable weather conditions, it was not possible to perform a complete survey of Lower Saxony / Hamburg during the moult in 2016, rendering it impossible to provide an estimate of the annual population abundance.

Apart from seasonal variation, the number of seals hauling out may be affected by a variety of factors including different weather conditions, disturbance, change in age and sex composition of the population, and possibly other environmental factors such as food availability (Härkönen et al. 1999). The timing of birth has been shown to have changed gradually over time (Reijnders et al. 2010). It is unclear if and how this shift might also affect the moult counts. Additional studies should be carried out to determine if a further shift in timing has occurred.



**Figure 1.** Total number of harbour seals counted in the Wadden Sea during the moult in August, as well as numbers for each region, from 1975-2016.

## Results and Interpretation

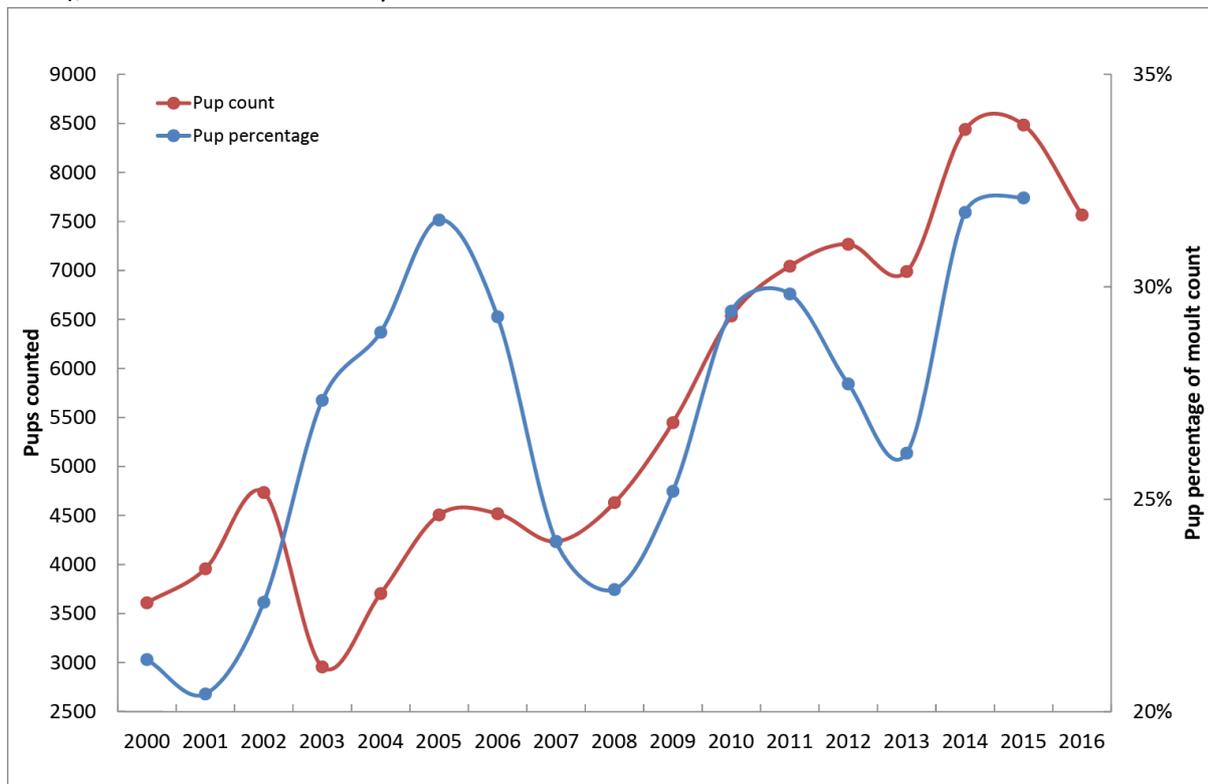
The number of newborn pups counted in June 2016 showed a decrease compared to 2015: a total of 7,566 pups were counted, representing a decrease of 11%, relative to last year's number of 8,484, which was the highest number of pups counted in the Wadden Sea since the start of the trilateral surveys in 1975.

During the moult in August, 2,150 seals were counted in Denmark (a drop of 25%, compared to 2015), 6,592 (-21%) in Schleswig-Holstein and 8,160 (+6%) in the Netherlands (Figure 2). As discussed above, unfavourable weather prevented a moult count in Lower Saxony and Hamburg. As numbers have been fluctuating in recent years, there is no trend from which to make an estimate for the 2016 moult count. However, during pupping, adults were counted providing for a maximum counted this year, which could be used as indicative: 7,437 animals. This number is similar to that

recorded in 2015, leaving us to assume that, providing movement would be limited between the countries, numbers did not change dramatically in Lower Saxony / Hamburg. The results from the other areas seem to follow last year's trend: in 2015, counts in Denmark had decreased by 25% and in Schleswig-Holstein 10%. In the Netherlands, this year's increase comes after an increase of 8% last year.

This trend could be an indication of actual population decrease, however at different rates in different areas. However, this may also indicate a change in behaviour with different proportions of seals hauling out in the different regions. This could be 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.

Though these relatively short term local changes could easily be over-interpreted, the large decreases observed in Denmark and Schleswig-Holstein could be seen as the consequence of the flu epidemic in 2014 which lead specifically to a high mortality in these two areas. However, it could also be read as further credence to the hypothesis that the harbour seals in the Wadden Sea may be reaching the carrying capacity of the area. The carrying capacity of the area is expected to fluctuate over time. For example, the increasing number of grey seals in the Wadden Sea (Brasseur et al. 2016) competing for food, or other environmental changes are likely to affect the maximum population size of harbour seals in the area. Additionally, grey seals predated on harbour seal have been reported (van Neer et al. 2015), which could also have negative effects on the harbour seal population. However, consequences of grey seals predation or competition would be expected to be most severe in the Netherlands where the concentration of grey seals is highest (Brasseur et al. 2016), and here we see the only local increase of harbour seal counts.



**Figure 2.** Number of pups counted in the Wadden Sea in June (red line, left vertical axis) in the years 2000-2016. The number of pups as a percentage of the total moult count is indicated by the blue line (not available in 2016 - right vertical axis).

The total pup count decreased by 11% in 2016. The decrease in the counted pup numbers compared to June 2015 breaks down to decreases of 11% in the Netherlands (1,858 pups), 2% in Lower Saxony

/ Hamburg (1,902 pups), 17% in Schleswig-Holstein (3,144 pups) and 3% in Denmark (662 pups). These decreasing pup counts follow a period of almost continuous increase in pup counts since 2003 (Figure 1). Decrease in pup production is considered one of the signs of a population approaching carrying capacity, next to decrease in pup survival. In addition to the explanations proposed for the observed decrease in the moult counts, a low survival rate could be an explanation. On the other hand, the influenza A in 2014-2015 that killed a few thousand animals, mostly in the eastern Wadden Sea, could have affected the age structure of the population and pup production, both in numbers or in the timing of pupping. In the following years coordinated counts, aimed at determining a possible shift should be carried out. Next to this, in lack of direct information on pup survival, stranding events throughout the Wadden Sea should be recorded in detail, to monitor possible changes in mortality.

## References

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