



Harbour seal on sand bank. Casper Tybjerg, TTF, Fisheries and Maritime Museum Esbjerg.

# Trilateral surveys of Harbour Seals in the Wadden Sea and Helgoland in 2020

## Stable population abundance, pup numbers still growing

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## Introduction

To obtain annual estimates of the number of harbour seals and newborn pups in the entire Wadden Sea and Helgoland, seal counts are synchronized to the degree possible between the three Wadden Sea countries: Denmark, Germany and the Netherlands. Seals are counted when hauling out on land and counts are scheduled to be carried out when low tide occurs around midday.

The number of seals hauling out is 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). This may lead to variation in counts from year to year and potentially over several years. Also, during 1974-2009, the timing of birth shifted towards an earlier maximum pupping date, potentially affecting the percentage of pups counted at the same time of year over a long period (Reijnders et al. 2010).

## Results

### **Pup counts in June**

The number of newborn pups counted between 17 and 22 June 2020 was the highest registered since pup surveys began in 2000. A total of 9,954 pups were counted, constituting an increase of 3% relative to last year's count (2019) of 9,684 pups. These numbers cover a decrease in Denmark, after the extraordinarily high counts in 2019 (429 pups in 2020; - 53% from 2019) and an equivalent increase in Schleswig-Holstein (4499 pups in 2020; +21% from 2019). Lower Saxony and Hamburg had a moderate decrease with 2484 pups counted (-8% from 2019), while in the Netherlands, there was a moderate increase of similar size with 2542 pups counted (+9% from 2019). On Helgoland, no pups were recorded as in 2019. The number of pups as a percentage of the total August moult count is the second highest ever recorded (35%, Figure 1).



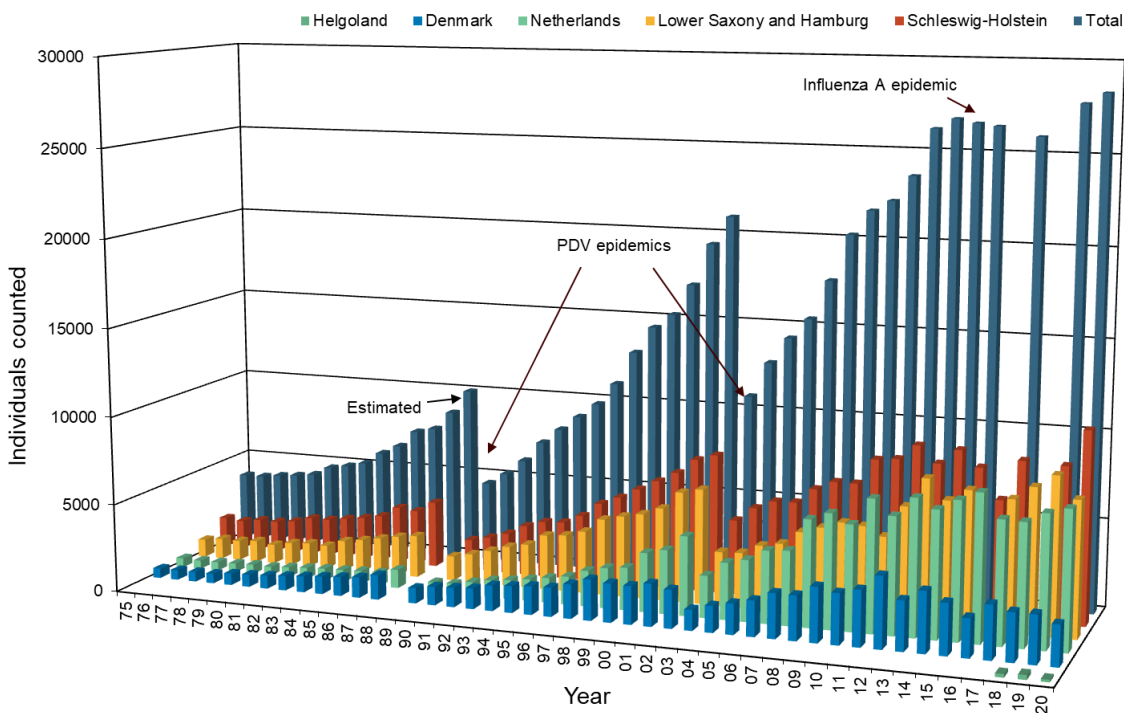
Figure 1. Number of pups counted in the Wadden Sea in June (left y-axis, light blue) in the years 2000-2020. The number of pups as a percentage of the total number of seals counted during the moult count (right y-axis, dark blue line.)

## Moult counts in August

During the moult, 28,352 harbour seals were counted in the Wadden Sea and Helgoland between 11 and 12 August. This is a slight increase of 2% relative to last year's count and the highest count recorded since counting started in 1975. It is a continuation of the stabilizing trend seen since 2012 where the average annual growth rate has been 1.2%. Between the last PDV (morbilli virus epidemic) outbreak in 2002 and 2012, there was a much higher annual growth rate (8.1%) (Figure 2). In 2020, 2,256 seals were counted in Denmark (-16% compared to 2019), in Schleswig-Holstein 10,746 (+23% compared to 2019) in Lower Saxony and Hamburg 7,553 (-14% compared to 2019) and 7,661 in the Netherlands (+4% compared to 2019) (Figure 2). On Helgoland, 136 harbour seals were counted compared to 256 in 2019 (-47%). Increasing or decreasing numbers of harbour seals between areas may be the result of variations in the survey dates, a different proportion of seals hauling out on specific days in the different regions, caused by either variable environmental conditions (e.g. weather and tide) or anthropogenic impacts.

## Conclusion

The results support that seals may move between areas. In 2020, there was a dramatic decrease in pup counts in Denmark and Lower Saxony after higher counts in 2019, while the Schleswig-Holstein and the Netherlands counts increased similarly. This could be explained by movements between these areas and emphasizes that the harbour seals in the Wadden Sea must be regarded as one large population.



*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 to 2020. In 2016 and 2018, parts of the Wadden Sea could not be surveyed on the coordinated dates, resulting in missing total counts for these years. From 2018 and onwards, data from Helgoland are included.*

The paradoxical trend of stabilizing moult counts and increasing pup counts observed since 2012 continues. In theory, one of the signs of a population approaching carrying capacity would be a decrease in pup production or increase in pup mortality. Obviously, the pup production is not declining, but rather has increased in recent years. We do not have comprehensive data on survival to investigate if a high rate of mortality can explain the observed paradox. As mentioned above, another possibility would be a shift in the moult peak. It is unclear if and how a shift might have affected the moult counts, and if in the past decades similar shifts have occurred. We could potentially have imprecise estimates of moult and pupping peaks and consequently have bias in

estimates of population size or pup production. Elucidating this would require additional counts, both early and late compared to the expected pup and moult peaks.

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, however, the accuracy of this estimate has been questioned. By using this correction factor, the total population size of harbour seals in the Wadden Sea and Helgoland in 2020 was 41,700.

## References

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