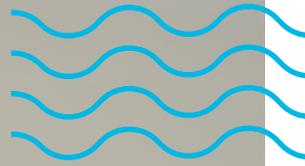


COMMON WADDEN SEA SECRETARIAT

SURVEY RESULTS OF HARBOUR SEALS IN THE WADDEN SEA IN 2022

Declines in both abundance
and pup counts





@TTF, Fisheries and Maritime Museum, Esbjerg

HARBOUR SEALS SURVEYS

INTRODUCTION

To obtain an estimate of the number of harbour seals and pups hauled out in the entire Wadden Sea area (including Helgoland), counts are synchronized between the three Wadden Sea countries, Denmark, Germany and the Netherlands.

Harbour seals are counted when hauling out on land and counts are scheduled to be carried out when low tide occurs around midday. The five counts are scheduled around five dates to describe pup production and moult numbers accurately. Three counts are aimed at pup numbers during the pupping season in June and two during the moulting season in August aim to obtain an estimate of the population size and its fluctuations.

The observed variation in the number of seals hauling out 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 each year over a long period (Reijnders et al. 2010). Though efforts are made to maximise the standardisation of the surveys with respect to weather, tides and dates, changes could influence the counts. Additional studies are needed to ascertain when the peak in birth and moult occurs.

Authors: Anders Galatius¹, Sophie Brasseur², Florian Carius³, Armin Jeß⁴, Kristine Meise⁵, Julia Meyer⁶, Jessica Schop², Ursula Siebert⁷, Ole Stejskal⁸, Jonas Teilmann¹, Charlotte B. Thøstesen⁹.

¹ Department of Ecoscience, University of Aarhus, DK

² Wageningen Marine Research, University of Wageningen, NL

³ National Park Lower Saxony, National Park Administration, D

⁴ Schleswig-Holstein Agency for Coastal Defense, National Park and Marine Conservation, National Park Authority, D

⁵ Common Wadden Sea Secretariat

⁶ Environmental Authority of the free Hanseatic city of Hamburg, National Park Administration, D

⁷ Institute for Terrestrial and Aquatic Wildlife Research, University of Veterinary Medicine, D

⁸ Niedersächsisches Landesamt für Verbraucherschutz und Lebensmittelsicherheit, Institut für Fische und Fischereierzeugnisse, D

⁹ Esbjerg Fishery- and Maritime Museum, DK

DECLINES IN BOTH ABUNDANCE AND PUP COUNTS

RESULTS AND INTERPRETATION



PUP COUNTS

In 2022, a total of 8,514 pups were counted, a decrease of 22% relative to the 2021 count of 10,903 pups. In Denmark, there was a decrease of 18% relative to 2021 with 538 pups counted. In Schleswig-Holstein, we observed a decrease of 25% with 3,839 pups counted relative to the record count of 5,096 in 2021. In Lower Saxony and Hamburg, there was a decrease of 17% with 2,176 pups counted, while in the Netherlands, there was a decrease of 22% with 1,960 pups counted. On Helgoland, one pup was recorded. The number of pups counted in June 2022 broke the increasing trend observed since 2016.

MOULT COUNTS

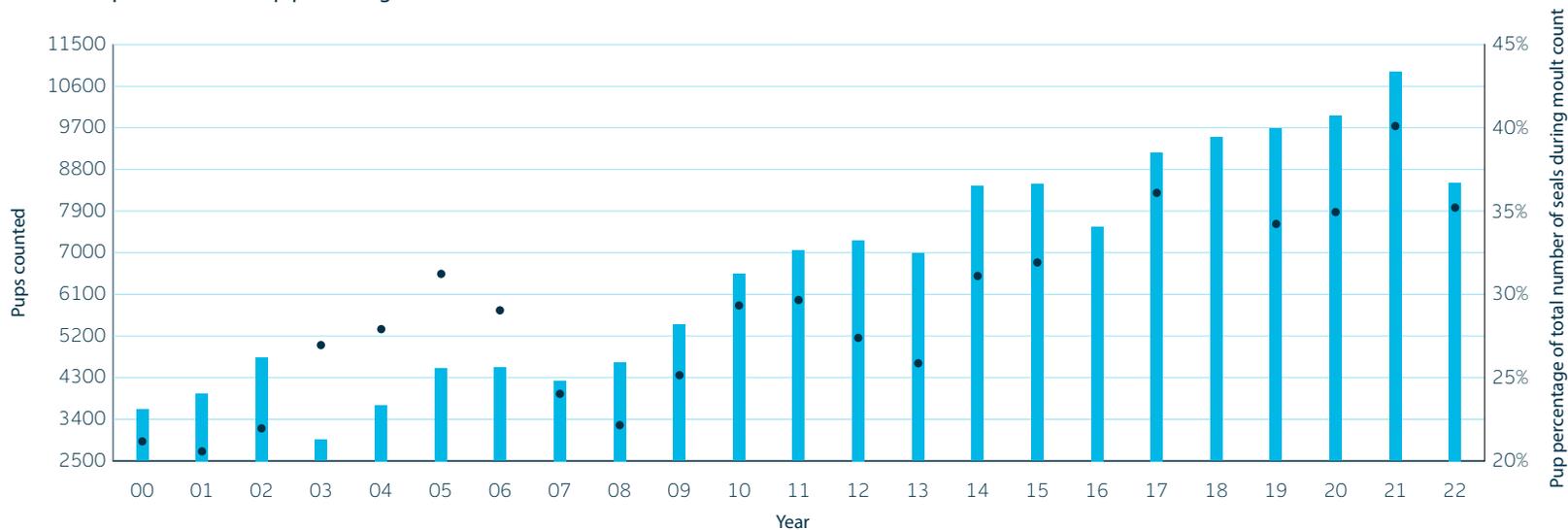
During the moult in August 2022, a total of 23,654 harbour seals were counted in the Wadden Sea area. This constitutes a decrease of 12% relative to the count in 2021 and is the lowest since 2011 (Figure 2). Though this is the second successive year with a decrease, the decline in 2022 is likely aggravated by a change in methodology in Lower Saxony, where photographic aerial surveys were introduced.

In 2022, counts of moulting harbour seals decreased in all areas except Denmark, where a count of 2800 represented an increase of 106% after a very low count of 1,355 in 2021 and preceded by further declines the previous four years. In Schleswig-Holstein, 8,384 seals were counted (-5% compared to 2021) and at Helgoland, 98 seals were counted compared to 117 in 2021 (-16%). In the Netherlands, the decline amounted to -8% relative to 2021 with 7548 seals counted.

In Lower Saxony and Hamburg, numbers decreased dramatically to 4,822 (-42% compared to 2021). However, in 2022 Lower Saxony and Hamburg updated survey methodology to using photography during the aerial surveys, which is now the standard throughout the Wadden Sea, allowing for accurate numbers and determination of seal species.

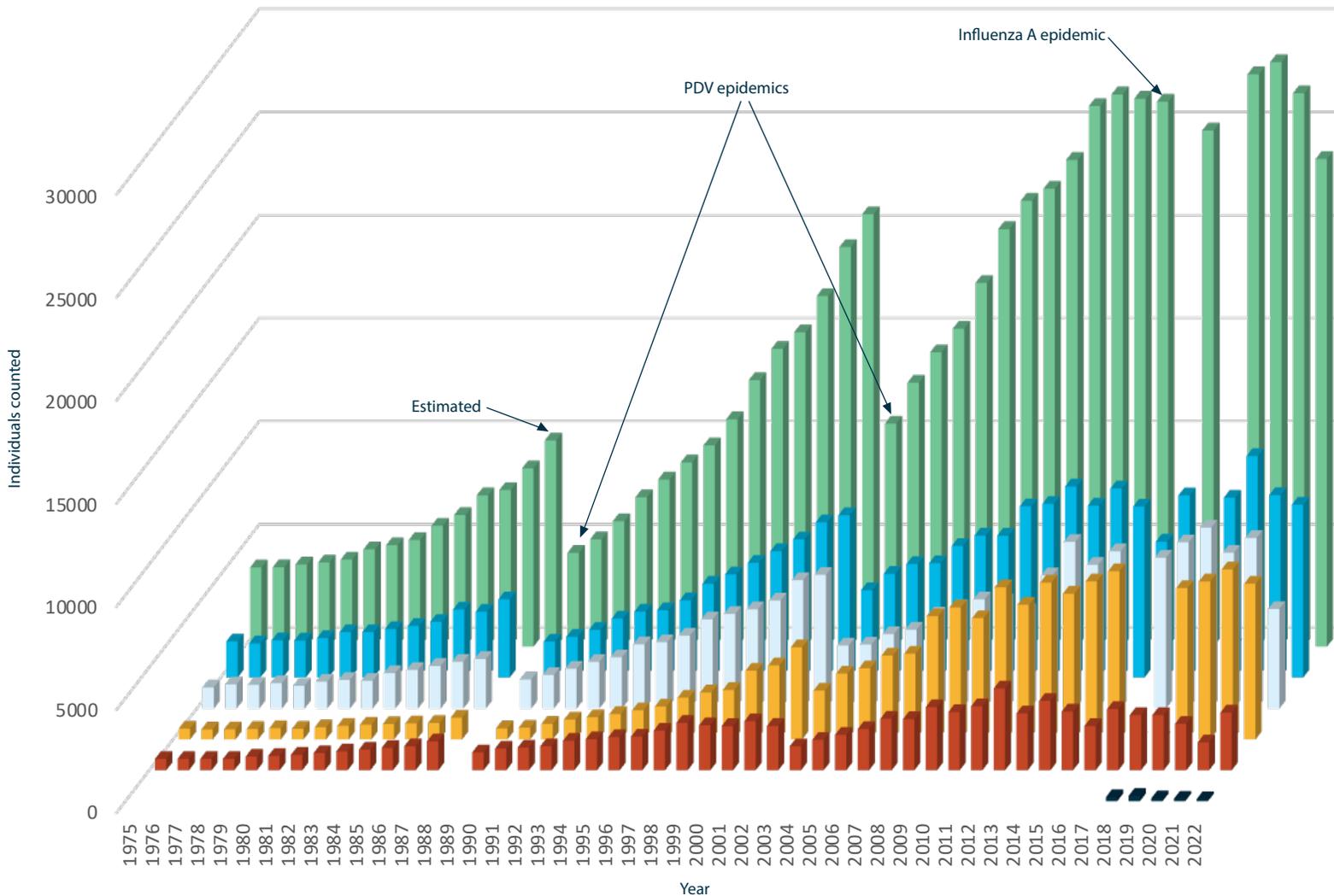
Changes in numbers between years in the standardised surveys could be the result of variable environmental conditions (e.g. weather, tide and environmental conditions). Therefore, longer-term trends should be investigated rather than minor annual variations. As such, the lack of growth in the Wadden

Figure 1
● Pup count ● Pup percentage



Number of pups counted in the Wadden Sea in June (left y-axis, light blue bars) in the years 2000-2022. The number of pups as a percentage of the total number of seals counted during the moult count in August (right y-axis, dark blue diamonds).

Figure 2
 ● Helgoland ● Denmark ● Netherlands ● Lower Saxony and Hamburg ● Schleswig-Holstein ● Total



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 2022. In 2016 and 2018, parts of the Wadden Sea could not be surveyed on the coordinated date, resulting in missing total counts for these years. Since 2018, data from Helgoland are included.

Sea population since 2013 constitutes a profound change, and effort is needed to understand the underlying mechanism, as neither immigration to other areas is observed, nor do pathological examinations and the number of dead harbour seals found stranded indicate a disease-related decline in the population.

CONCLUSION

After a period of continuous growth until 2012, the population trend changed, and from 2013 until 2021, there was hardly any growth in the moult counts despite high and increasing pup counts. Though in general, a stabilizing population could indicate that the population is approaching the carrying capacity, the growth in pup numbers seemed to contradict this. The drop in pup numbers in 2022 may represent the initiation of another change, which could potentially be interpreted as the population reaching carrying capacity, however it remains unclear what mechanism is responsible for these changes.

Although the decline in Lower Saxony and Hamburg is greater than those observed in the other regions and may to some extent be explained by updated methodology, it could be a part of the general declining trend for all the areas. Further investigations are urgently needed to help explain the changes in population trends.

Potentially, the changes in count results are influenced by demographics and change in habitat use of the area. Both would affect the number of animals seen on land. New studies on the number of seals visible during the surveys are needed to ensure that the population is estimated accurately, also given these changes.



This Report was published 2022-11-1.

This report should be cited as: Galatius A., Brasseur S., Carius F., Jeß A., Meise K., Meyer J., Schop J., Siebert U., Stejskal O., Teilmann J., Thøstesen C. B. (2022) Survey Results of Harbour Seals in the Wadden Sea in 2022. Common Wadden Sea Secretariat, Wilhelmshaven, Germany.

References

Brasseur, SMJM, Reijnders, PJH, Cremer, J, Meesters, E, Kirkwood, R, Jensen, LF, Jess, A, Galatius, A, Teilmann, J & Aarts, G 2018, 'Echoes from the past: Regional variations in recovery within a harbour seal population', PLoS One, bind 13, nr. 1, 0189674. <https://doi.org/10.1371/journal.pone.0189674>.

Galatius et al. previous reports on Wadden Sea harbor seals https://www.waddensea-secretariat.org/resources?type=8&theme=16&language=All&title_field_value=harbour+seal.

Härkönen T, Harding KC, Lunneryd 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* 6:854-857, doi: 10.1098/rsbl.2010.0468.

Ries EH, Hiby, LR, and Reijnders, PJH (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.

