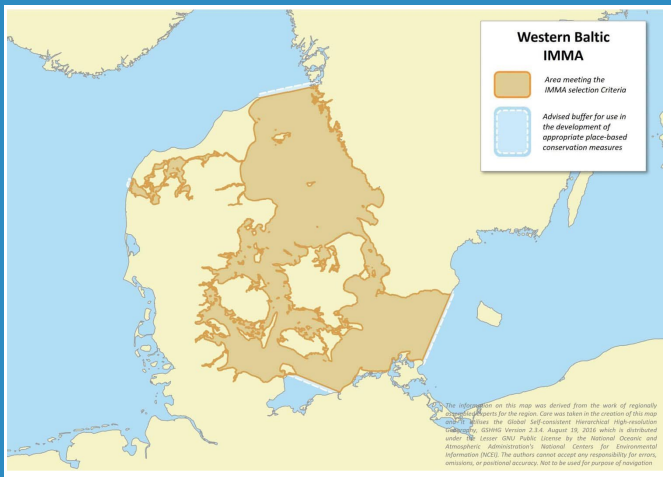

Area Size

53,137 km²

Qualifying Species and Criteria

Harbour porpoise – *Phocoena phocoena*

Criterion B (2); C (1,2); D (1)

Harbour seal – *Phoca vitulina*

Criterion B (2); C (1,2)

Other Marine Mammal Species Documented

Halichoerus grypus

Summary

The Western Baltic IMMA encompasses a diversity of habitats ranging from the shallow waters of the Kattegat to the turbulent waters in the straits of the Belt Sea connecting the open-water areas of the North Sea to the brackish Baltic Proper. This area includes the majority of the distribution of the genetically distinct Belt Sea population of harbour porpoises (*Phocoena phocoena*). As such it contains important areas for foraging and reproduction. It also serves as important habitat for three main management units of Atlantic harbour seals (*Phoca vitulina*): The Limfjord management unit consists of ~1,000 seals, while the Kattegat and the northern part of the Belt Seas holds a management unit with 10,000 seals, and the southwestern Baltic Sea is inhabited by approximately 1,000 individuals.

Western Baltic IMMA

Description:

The IMMA includes the waters of the southern Kattegat, the Belt Sea, the Sound and western Baltic Sea. The main part of the area is between 10 and 40 m deep and due to the many islands, the only passage from the central Baltic Sea to the Kattegat is through the narrow straits of Little Belt (<2 km wide), Great Belt (18 km wide), and the Sound (<7 km wide). The entire inflow into the Baltic Sea is forced through those relatively shallow (20 m depth) and narrow channels creating areas with a unique structure. The currents can vary depending on the weather situation. A salt-water inflow into the Baltic Sea happens usually after long periods of easterly winds changing within a very short time to westerly winds. The water body then shifts towards the north and east of the Baltic Sea thereby creating a drag that causes the inflow of fresh oxygenated and salty waters in the brackish waters of the Baltic Proper.

Figure 1: Harbour seal (*Phoca vitulina*) in Kattegat. Photo credit: Anders Galatius, Aarhus University

Criterion B: Distribution and Abundance
Sub-criterion B2: Aggregations

The IMMA area encompasses important habitat in the mixing zone between the saline water from the North Sea and the brackish water from the Baltic Proper. The narrow straits of Little Belt, Great Belt, the Sound and Fehmarn Belt create strong fronts, eddies and upwelling where harbour porpoises (*Phocoena phocoena*) are known to gather. Kernel density analysis based on harbour porpoise tracking data clearly identified several areas within this IMMA with higher density compared to neighbouring areas – eastern Kattegat, the Sound, the Belt Seas (including the Great Belt and Little Belt) and the western Baltic (Sveegaard et al., 2011, 2018, 2022). Several of these high-density areas have also been confirmed by aerial surveys and predictions from spatial modelling (e.g. Lacey et al., 2022; Unger et al., 2022) and passive acoustic monitoring (Hansen & Høgslund, 2023).

Harbour seals (*Phoca vitulina*) are a dominant species along the Swedish west coast, the Danish islands and along the Swedish and German coastlines. Three different management units are recognised in the Western Baltic/Kattegat area, namely: 1) the Limfjord area, connecting the Kattegat and the North Sea. Here the main haul-outs are found in Ejerslev Røn and Blinderøn, in the central fjord, 7 km apart. Smaller haul-outs are found throughout the fjord area. 2) the Kattegat. Here haul-outs are found on skerries along the Swedish coast and around Danish islands in Kattegat and the Danish coastline. Major haul-outs are around the Danish islands of Læsø, Anholt, Hesselø and Samsø and the Swedish island of Hallands Väderö and skerries in the Varberg and Tistlarna area. In Kattegat, a roughly 30 km radius around the haul out sites can be assumed to include at least 50% of the seals' home range based on telemetry data (Dietz et al., 2015). 3) the Western Baltic and Belt Seas, where major haul-outs are found at Aunø, Rødsand, Vitten, Falsterbo and Saltholm.

Counts of harbour seals in the IMMA at haul-outs during the moulting season in 2022 were ca. 1200 in the southwestern Baltic Sea, around 1,100 animals in the Limfjord and ca 8,300 in the Kattegat area (ICES, 2023). The current count data furthermore shows different trajectories for the individual management units showing that each of the genetic management units grows or shrinks at its own rate (HELCOM, 2018b, 2023).

The global population of harbour seals is estimated at 315,000 mature animals and the species is listed as Least Concern on the IUCN Red List (Lowry, 2016).

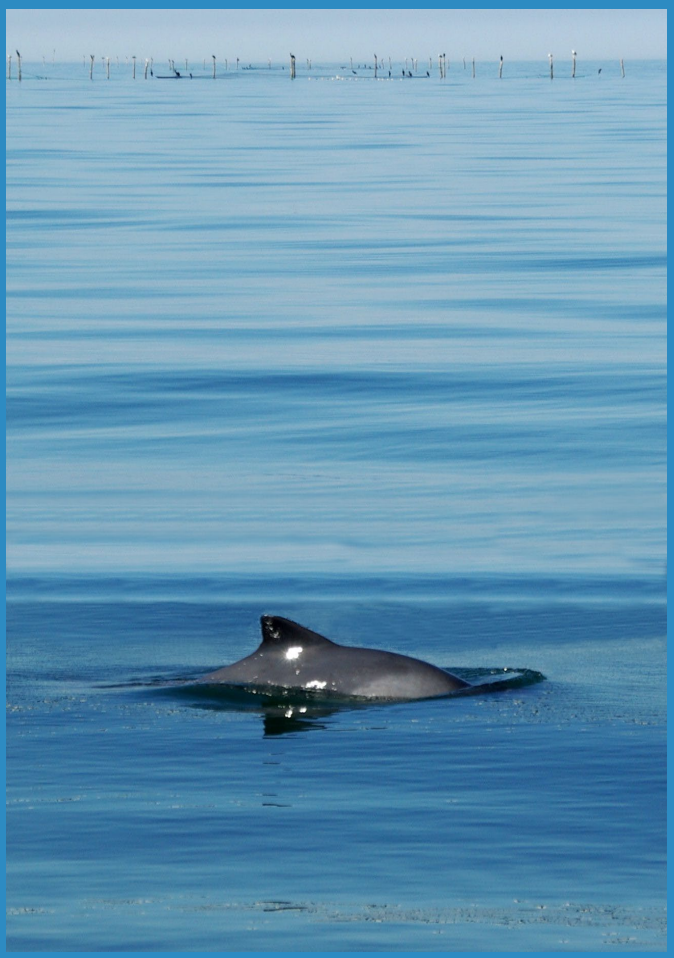

Figure 2: Harbour porpoise (*Phocoena phocoena*) in the Great Belt. Photo credit: Signe Sveegaard, Aarhus University

Criterion C: Key Life Cycle Activities
Sub-criterion C1: Reproductive Areas

In the Baltic Sea region, harbour porpoise calves are born in the summer period, with the main peak in June-August (Siebert et al., 2006; Sørensen & Kinze, 1994; Börjesson & Read, 2003). Four surveys have been conducted in July in the area: MiniSCANS 2012 (Viquerat et al., 2014), SCANS-III (Hammond et al., 2021), MiniSCANS-II 2020 (Unger et al., 2021) and SCANS-IV (Gilles et al., 2023), and through all of them mother-calf pairs have been observed in the IMMA. Furthermore, the area holds the majority of the distribution range of the Belt Sea population, so calving, rearing of young and mating all must occur within the area.

The region encompasses different management units of harbour seals with limited gene flow between them (Olsen et al., 2010, 2014). Harbour seals are considered to be more limited in range relative to grey seals, leading to much finer population structure, as seen in the IMMA (Dietz et al., 2015; Olsen et al., 2014; Liu et al., 2022). Comprehensive monitoring of breeding is only conducted in the Danish areas of Limfjorden and Kattegat. In the former area, ca. 95% of all pups are recorded at the haul-outs Ejerslev Røn and Blinderøn (Seganfreddo et al., 2023). In 2022, the total pup count in Limfjorden was ca. 400 (ICES, 2023). In Kattegat, Svanegrunden near Samsø is a very important breeding site where >1,000 pups have been recorded on occasions during recent years. Other important breeding are haul-outs are Anholt, Hesselø and Knobgrundene and Sønder Rønner at Læsø. All of these haul-outs usually have counts of several hundred pups (unpublished data, Aarhus University). The total pup count in Danish Kattegat was ca 1,900 in 2022 (ICES, 2023). There are no systematic pup counts in Sweden or the southwestern Baltic, but in the latter area, Vitten and Aunø are known to be important breeding haul-outs.

Based on travel distances from telemetry studies (Dietz et al., 2013, 2015) it must be assumed that almost all harbour seals occurring in the area are also breeding on haul-outs in the IMMA.

Sub-criterion C2: Feeding Areas

The narrow straits of Little Belt, Great Belt, the Sound and Fehmarn Belt create strong fronts, eddies and upwelling with food-rich areas providing high abundance of important prey species for both porpoises and seals.

Harbour porpoises need to eat very regularly to sustain their high metabolic rate (Kastelein, et al., 2018; Koopman, 1998; Read, 1990; Rojano-Doñate et al., 2018) and as a result they spend a considerable amount of their time foraging (Wisniewska et al., 2016). This means that harbour porpoises forage wherever they are, and that any area regularly frequented is in fact a feeding area.

Depending on their habitat, harbour seals in the area are opportunistic feeders with a broad spectrum of fish prey. Whiting (*Merlangius merlangus*), sand eel (*Ammodytes* sp.), black goby (*Gobius niger*), dab (*Limanda limanda*), sand goby (*Pomatoschistus minutus*), Norway pout (*Trisopterus esmarkii*), small sandeel (*Ammodytes tobianus*) and European eel (*Anguilla anguilla*) have been documented as prey based on otoliths from scat samples (Scharff-Olsen et al., 2018). There are clear differences in prey preferences between management units, apparently depending on the availability of prey items in the individual regions (Scharff-Olsen et al., 2018).

Analyses of available telemetry data around Anholt and Falsterbo show that waters around the haul out site are heavily used for feeding (Dietz et al., 2013, 2015), with most travel distances being within 30-50 km from the haul-out sites. In the Limfjord, seals tend to focus foraging activities on the narrow passages that are found throughout the fjord (Teilmann et al., 2020). In the southwestern Baltic, harbour seals tagged at Falsterbo tended to feed along the southern coast of Scania (Dietz et al., 2015).

Criterion D: Special Attributes
Sub-criterion D1: Distinctiveness

The Belt Sea harbour porpoise population residing in this IMMA is genetically and morphologically different from the two neighbouring populations in the Baltic Proper and the North Sea (Lah et al., 2016; Wiemann et al., 2010; Galatius et al., 2011). Morphometric studies of skulls of harbour porpoises in the Baltic Sea Region showed that the beak of the harbour porpoises in the Belt Sea population are pointing downward compared to the neighbouring populations. This is believed to be an adaptation to benthic feeding in the shallow waters of this IMMA (Galatius et al., 2011).

Supporting Information

Börjesson, P. and Andrew, J.R. 2003. 'Variation in Timing of Conception between Populations of the Harbor Porpoise'. Journal of Mammalogy 84 (3): 948–55. https://doi.org/10.1644/BEM-016.

Carlén, I., Thomas, L., Carlström, J., Amundin, M., Teilmann, J., Tregenza, N., Tougaard, J., Koblitz, J.C., Sveegaard, S., Wennerberg, D., Loisa, O., Dähne, M., Brundiers, K., Kosecka, M., Kyhn, L.A., Ljungqvist, C.T., Pawliczka, I., Koza, R., Arciszewski, B., Galatius, A., Jabbusch, M., Laaksonlaita, J., Niemi, J., Lyytinen, S., Gallus, A., Benke, H., Blankett, P., Skóra, K.E., and Acevedo-Gutiérrez, A. 2018. Basin-scale distribution of harbour porpoises in the Baltic Sea provides basis for effective conservation actions. Biological Conservation 226: 42-53. https://doi.org/10.1016/j.biocon.2018.06.031.

Dietz, R., Galatius, A., Mikkelsen, L., Nabe-Nielsen, J., Rigét, F.F., Schack, H., Skov, H., Sveegaard, S., Teilmann, J., and Thomsen, F. 2015 Marine Mammals – Investigations and preparation of environmental impact assessment for Kriegers Flak. Niras, Aarhus University, DHI.210 pp.

Dietz, R., Teilmann, J., Andersen S. M. Rigét, F., and Olsen, M.T. 2013. Movements and site fidelity of harbour seals (*Phoca vitulina*) in Kattegat, Denmark, with implications for the epidemiology of the phocine distemper virus. – ICES Journal of Marine Science, 70:186–195. e.T17013A45229114. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T17013A45229114.en, accessed 26/05/2023.

Galatius, A., Kinze, C.C. and Teilmann, J. 2012. Population structure of harbour porpoises in the greater Baltic region: Evidence of separation based on geometric morphometric comparisons. Journal of the Marine Biological Association of the United Kingdom, 92(8), 1669-1676. https://doi.org/10.1017/S0025315412000513.

Gilles, A., Authier, M., Ramirez-Martinez, N.C., Araújo, H., Blanchard, A., Carlström, J., Eira, C., Dorémus, G., Fernández-Maldonado, C., Geelhoed, S.C.V., Kyhn, L., Laran, S., Nachtsheim, D., Panigada, S., Pigeault, R., Sequeira, M., Sveegaard, S., Taylor, N.L., Owen, K., Saavedra, C., Vázquez-Bonales, J.A., Unger, B., and Hammond, P.S. 2023. Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys. Final report published 29 September 2023. 64 pp. https://www.tiho-hannover.de/itaw/scans-iv-survey.

Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Börjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, MB., Scheidat, M., Teilmann, J., Vingada, J., and Øien, N. 2021. Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Final report June 2021. https://scans3.wp.st-andrews.ac.uk/files/2021/06/SCANS-III_design-based_estimates_final_report_revised_June_2021.pdf

Hansen ,J.W. and Høgslund, S. (red.) 2023. Marine områder 2021. NOVANA. Aarhus Universitet, DCE – Nationalt Center for Miljø og Energi, 220 s. – Videnskabelig rapport fra DCE nr. 529. http://dce2.au.dk/pub/SR529.pdf.

HELCOM. 2018a. Population trends and abundance of seals. HELCOM Core Indicator Report, July 2018. HELCOM core indicator report – Population trends and abundance of seals, accessed 26/05/2023.

HELCOM. 2018b. Distribution of Baltic Seals. HELCOM Core Indicator report, July 2018. HELCOM core indicator report – Distribution of Baltic seals, accessed 26/05/2023.

HELCOM. 2023. Harbour seal abundance. HELCOM Core Indicator report, April 2023. Population-trends-and-abundance-of-seals-Harbour-seals_Final_April_2023-1.pdf (helcom.fi), accessed 26/05/2023.

ICES. 2023. Report of the ICES Working Group on Marine Mammal Ecology (WGMME). ICES Scientific Reports. 5:88. 123 pp. https://doi.org/10.17895/ices.pub.24131736.

Kastelein, R.A., Lean, H-H. and Jennings, N. 2018. 'Seasonal Changes in Food Consumption, Respiration Rate, and Body Condition of a Male Harbor Porpoise (*Phocoena phocoena*)'. Aquatic Mammals 44 (1): 76–91. https://doi.org/10.1578/AM.44.1.2018.76.

Koopman, H.N. 1998. 'Topographical Distribution of the Blubber of Harbor Porpoises (*Phocoena*

phocoena)'. Journal of Mammalogy, 260–70.

Lacey, C., Gilles, A., Herr, H., MacLeod, K., Ridoux, V., Begona Santos, M., Sheidat, M., Teilmann, J., Sveegaard, S., Vingada, J., Viquerat, S., Øien, N., and Hammond, P.S. 2022. Modelled density surfaces of cetaceans in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. University of St Andrews. https://scans3.wp.st-andrews.ac.uk/resources/.

Lah, L., Daronja, T,, Harald, B., Per, B., Þorvaldur, G., Christina, L., Ayaka, Ö., et al. 2016. 'Spatially Explicit Analysis of Genome-Wide SNPs Detects Subtle Population Structure in a Mobile Marine Mammal, the Harbor Porpoise'. Edited by Roberta IMMAruta. PLOS ONE 11 (10): e0162792. https://doi.org/10.1371/journal.pone.0162792.

Lowry, L. 2016. *Phoca vitulina*. The IUCN Red List of Threatened Species 2016:

Olsen, M.T., Andersen, S.M., Teilmann, J., Dietz, R., Edrén, S.M.C., Linnet, A., and Härkönen, T. 2010 Status of the harbour seal (*Phoca vitulina*) in southern Scandinavia. NAMMCO Scientific Publications 8:77–94.

OSPAR. 2023. Seal Abundance and Distribution (ospar.org), accessed 26/05/2023.

Rojano-Doñate, L., McDonald, B.I., Wisniewska, D.M., Johnson, M., Teilmann, J., Wahlberg, M., Højer-Kristensen, J., and Madsen, P.T. 2018. 'High Field Metabolic Rates of Wild Harbour Porpoises'. Journal of Experimental Biology 221 (23): jeb185827. https://doi.org/10.1242/jeb.185827.

Scharff-Olsen, C.H., Galatius, A., Teilmann, J., Dietz, R., Andersen, S.M., Jarnit, S., Kroner, A.M., Botnen, A.B., Lundström, K., Møller, P.R., and Olsen, M.T. 2019 Diet of seals in the Baltic Sea region: A synthesis of published and new data from 1968 to 2013. ICES Journal of Marine Science 76:284–297.

Seganfreddo, S., Teilmann, J., van Beest, F., and Galatius, A. 2023, 'Phenology of harbor seal pupping and the influence of weather on pup counts, investigated by UAV', Marine Mammal Science, bind 39, nr. 3, s. 906-917. https://doi.org/10.1111/mms.13020.

Siebert, U., Gilles, A., Lucke, K., Ludwig, M., Benke, H., Kock, K-H., and Scheidat, M. 2006. 'A Decade of Harbour Porpoise Occurrence in German Waters – Analyses of Aerial Surveys, Incidental Sightings and Strandings'. Journal of Sea Research 56 (1): 65–80.

Sørensen, T.B, and Kinze, C.C. 1994. 'Reproduction and Reproductive Seasonality in Danish Harbour Porpoises, *Phocoena phocoena*'. Ophelia 39 (3): 159–76. https://doi.org/10.1080/00785326.1994.10429541.

Sveegaard, S., Carlen, I., Carlström, J., Dähne, M., Gilles, A., Loisa, O., Owen, K., and Pawliczka, I. 2022. HOLAS-III harbour porpoise importance map: Methodology. Aarhus University, DCE – Danish Centre for Environment and Energy. Technical Report from DCE – Danish Centre for Environment and Energy Nr. 240 https://dce2.au.dk/pub/TR240.pdf.

Sveegaard, S., Galatius, A., Dietz, R., Kyhn, L., Koblitz, J.C., Amundin, M., Nabe-Nielsen, J., Sinding, M.-H.S., Andersen, L.W., and Teilmann, J. 2015. Defining management units for cetaceans by combining genetics, morphology, acoustics and satellite tracking. Global Ecology and Conservation 3: 839-850.10.1016/j.gecco.2015.04.002.

Sveegaard, S., Nabe-Nielsen, J. and Teilmann, J. 2018. Marsvins udbredelse og status for de marine habitatområder i danske farvande. Aarhus Universitet,

DCE – Nationalt Center for Miljø og Energi, 36 s. – Scientific report 284. http://dce2.au.dk/pub/SR284.pdf.

Sveegaard, S., Teilmann, J., Tougaard, J., Dietz, R., Mouritsen, H., Desportes, G., and Siebert, U. 2011. High density areas for harbor porpoises (*Phocoena phocoena*) identified by satellite tracking. Marine Mammal Science 27: 230–246.

Teilmann, J., Stepien, E.N., Sveegaard, S., Dietz, R., Balle, J.D., Kyhn, L.A., and Galatius, A. 2020, Sælers bevægelsesadfærdsmønstre i Limfjorden og de omkringliggende åer: Analyser af adfærd af spættede sæler mærket med satellitsender i Limfjorden i relation til åer med havørredproduktion. Teknisk rapport fra DCE – Nationalt Center for Miljø og Energi, nr. 176, Aarhus Universitet, DCE – Nationalt Center for Miljø og Energi, Aarhus. http://dce2.au.dk/pub/TR176.pdf.

Unger, B., Nachtsheim, D., Martinez, N.R., Siebert, U., Sveegaard, S., Kyhn, L.A., Balle, J.D., Teilmann, J., Carlström, J., Owen, K., and Gilles, A. 2021. MiniSCANS-II: Aerial survey for harbour porpoises in the western Baltic Sea, Belt Sea, the Sound and Kattegat in 2020. https://dce.au.dk/fileadmin/dce.au.dk/Udgivelser/Eksterne_udgivelser/20210913_Report_MiniSCANSII_2020_revised.pdf.

Viquerat, S., Herr, H., Gilles, A., Peschko, V., Siebert, U., Sveegaard, S., and Teilmann, J. 2014. Abundance of harbour porpoises (*Phocoena phocoena*) in the western Baltic, Belt Seas and Kattegat. Marine Biology, 161, 745-754. https://doi.org/10.1007/s00227-013-2374-6.

Wiemann, A., Andersen, L., Berggren, P., Siebert, U., Benke, H., Teilmann, J., Lockyer, C., et al. 2010. 'Mitochondrial Control Region and Microsatellite Analyses on Harbour Porpoise (*Phocoena phocoena*) Unravel Population Differentiation in the Baltic Sea and Adjacent Waters'. Conservation Genetics 11 (1): 195–211.

Wisniewska, D.M., Johnson, M., Teilmann, J., Rojano-Doñate, L., Shearer, J., Sveegaard, S., Miller, L.A., Siebert, U., and Madsen, P.T. 2016. 'Ultra-High Foraging Rates of Harbor Porpoises Make Them Vulnerable to Anthropogenic Disturbance'. Current Biology 0 (0). https://doi.org/10.1016/j.cub.2016.03.069.

Acknowledgements

We would like to thank the participants of the 2023 IMMA Regional Expert Workshop for the identification of IMMAs in the North East Atlantic Ocean. Funding for the identification of this IMMA was provided by the Water Revolution Foundation. Other sponsors for the workshop included OceanCare and ORCA (orca.org.uk), and substantial administrative support to the IMMA Secretariat was provided by the Tethys Research Institute and Whale and Dolphin Conservation.

Suggested Citation: IUCN-MMPATF (2024) Western Baltic IMMA Factsheet. IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force, 2024.

PDF made available for download at ***https://www.marinemammalhabitat.org/factsheets/western-baltic-imma/***