

12. Ocean quahog (*Arctica islandica*)

Irish name: Breallach quahog

Also known as the Icelandic cyprine.



Figure A10.12.1. Ocean quahog (*Arctica islandica*) © Hans Hillewaert, [Arctica islandica 1](#) , CC BY-SA 4.0

Background

The ocean quahog is the only extant species of the bivalve family Arctidae, a family whose diversity peaked in the Cretaceous (Morton, 2011). It is an arctic-boreal species distributed on both sides of the North Atlantic, which inhabits sand and muddy sand sediments on the continental shelf downwards from extreme low water (Tyler-Walters & Sabatini, 2017); its distribution seems to be at least partly controlled by temperature (Aquasense, 2001). The ocean quahog is a relatively large species, with shell lengths reaching approximately 10 cm; it is extremely long lived (over 100 years) and slow growing (Aquasense, 2001). It lives shallowly buried with its short siphons exposed at the sediment-water interface (Taylor & Brand, 1975).

Application of feature list inclusion criteria

The ocean quahog is included in the feature list because it is listed by OSPAR as a threatened and declining species. The ocean quahog is a long-lived and slow maturing species that takes between ca.

5 and 15 years to reach maturity depending on location (Tyler-Walters & Sabatini, 2017). The Celtic Sea is a significant part of the species distribution, and the species is not currently protected or conserved. As a sessile benthic species, adult stages are amenable to spatial protection.

Sensitivity assessment

The ocean quahog is highly sensitive to pressures associated with the construction and operation of offshore wind farms. All marine habitats and benthic species are considered to have a resistance of 'None' to physical loss (to land or freshwater habitat) and to be unable to recover from a permanent loss of habitat (resilience is 'very low') (Tyler-Walters et al., 2018). The ocean quahog is highly sensitive to physical change of the seabed and sediment type. A change to natural or artificial hard substratum would remove the sedimentary habitat required by the species. The ocean quahog is recorded from sandy muds, muddy sands, and fine to coarse sands (Rees & Dare, 1993; Cargnelli et al., 1999). A change to muds and gravels may impair burrowing, while a change to muds may impair filter feeding; mortality is likely to result from either change (Tyler-Walters & Sabatini, 2017).

The ocean quahog is highly sensitive to pressures associated with the fishing sector. Mechanical damage of ocean quahog by bottom fishing gear is known to lead to direct mortality (Piet et al., 1998; Fonds, 1991; Klein & Whitbaard, 1995). This may have a particularly significant effect on sub-adult individuals as shell strength is correlated with size. The ocean quahog can live with some shell damage but repeated disturbance may lead to death. After a planktonic larval stage, the ocean quahog settles on the seabed and is relatively stationary. It is therefore unlikely to move away or burrow rapidly to avoid damage from rapidly approaching beam trawls (OSPAR Commission, 2008).

Pressures associated with Shipping were either not relevant, not evaluated or could not be assessed for the ocean quahog (Tyler-Walters & Sabatini, 2017).

Data sources available

Data sources for the ocean quahog in the Celtic Sea AOI that were available to the MPA Advisory Group, and the quality / suitability of those data for conservation prioritization analyses (See Table 3.2.1 Main Report), are shown in Figure A10.12.3. Data were not considered suitable for inclusion in prioritization analyses: data were too sparse.

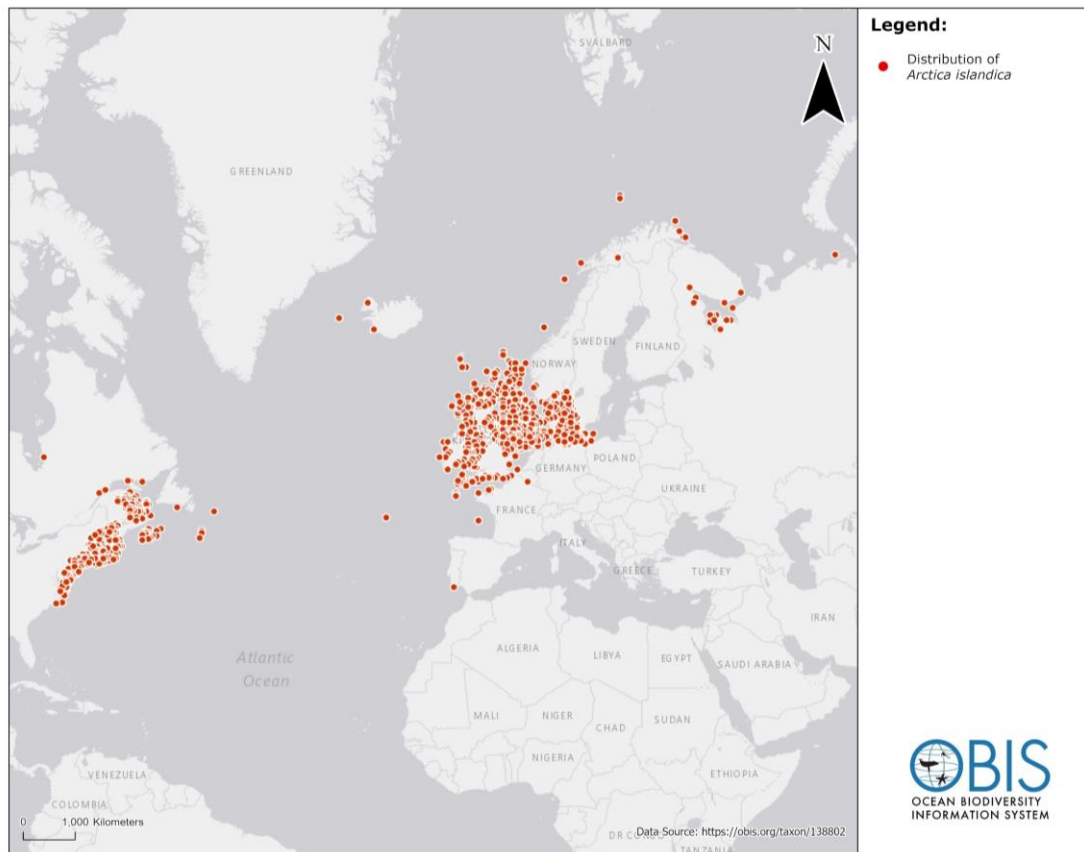


Figure A10.12.2. Global distribution of the ocean quahog (*Arctica islandica*). Source: Ocean Biogeographic Information System, www.obis.org (<https://obis.org/taxon/138802>)

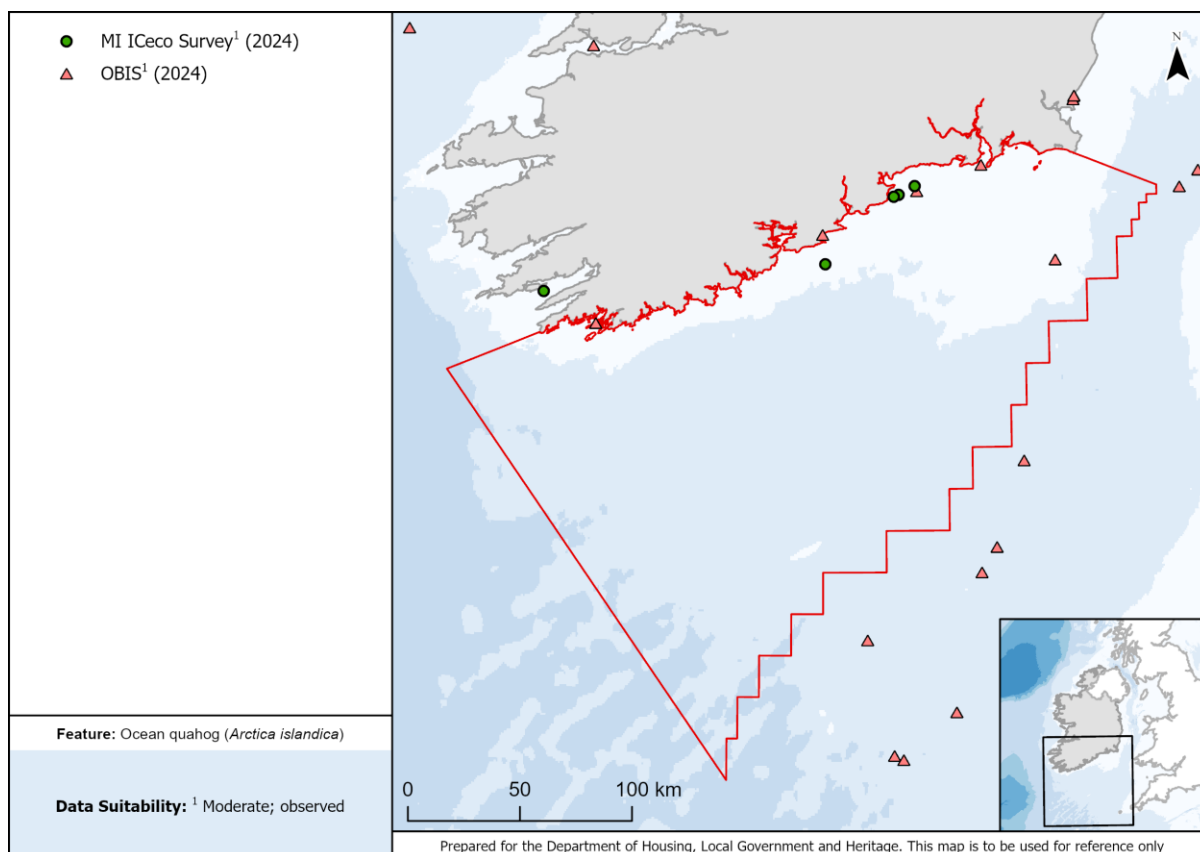


Figure A10.12.3. Data available for the ocean quahog (*Arctica islandica*) in the Celtic Sea.

Further research needs

The effects of chemical pressures including transition elements and organo-metal contamination, hydrocarbon and PAH contamination, synthetic compound contamination, and introduction of other substances require more research for the ocean quahog. More focused research is needed into the potential impacts of invasive species on the ocean quahog as no evidence was found to support a conclusive assessment for the pressure of introduction or spread of invasive non-indigenous species.

References

- AquaSense (2001). *Distribution and threats of Arctica islandica. A. islandica as an example for listing of species and habitats subject to threat or rapid decline* – Sponsor: The Netherlands Directorate-General of Public Works and Water management (RWS), North Sea Directorate. Report number: 1738
- Cargnelli, L.M., Griesbach, S.J., Packer, D.B., & Weissberger, E. (1999). Essential fish habitat source document: Ocean quahog, *Arctica islandica*, life history and habitat characteristics. *NOAA Technical Memorandum*, NMFS-NE-148, 12 pp.

- Fonds, M. (1991). *Measurements of the catch composition and survival of benthic animals in beamtrawl fishery for sole in the southern North Sea*. BEON Report 13. 85 pp.
- Klein, R., & Whitbaard, R. (1995). *Long-term trends in the effects of beam trawl fishery on the shells of *Arctica islandica**. NIOZ Rapport 1995-3.
- Morton, B. (2011). The biology and functional morphology of *Arctica islandica* (Bivalvia: Arcticidae) -- A gerontophilic living fossil. *Marine Biology Research*, 7(6), 540-553.
<https://doi.org/10.1080/17451000.2010.535833>
- OSPAR Commission (2009). *Background document for the ocean quahog *Arctica islandica**. OSPAR Commission, United Kingdom. ISBN 978-1906840-47-1. Publication Number: 407/2009.
- Piet, G.J., Rijnsdorp, A.D., Bergman, M.J.N., van Santbrink, J.W., Craeymeersch, J.A., & Buijs, J. (1998). A quantitative evaluation of the impact of beamtrawl fishery on benthic fauna in the southern North Sea. pp. 5-15 in Bergman, M.J.N., van Santbrink, J.W., Buijs, J., Craeymeersch, J.A., Piet, G.J., Rijnsdorp, A.D., Laban, C., & Zevenboom, W. (eds) *The distribution of benthic macrofauna in the Dutch sector of the North Sea in relation to the micro distribution of beam trawling*. BEON Rapport No. 98-2.
- Rees, H.L., & Dare, P.J. (1993). *Sources of mortality and associated life-cycle traits of selected benthic species: a review*. MAFF Fisheries Research Data Report, no. 33. MAFF Directorate of Fisheries Research, Lowestoft, UK.
- Taylor, A.C., & Brand, A.R. (1975). A comparative study of the respiratory responses of the bivalves *Arctica islandica* and *Mytilus edulis* to declining oxygen tension. *Proceedings of the Royal Society of London, B*, 190, 443-456. <https://doi.org/10.1098/rspb.1975.0105>
- Tyler-Walters, H., & Sabatini, M. (2017). *Arctica islandica* Icelandic cyprine. In Tyler-Walters, H., & Hiscock, K. (eds) *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, [on-line]. Marine Biological Association of the United Kingdom, Plymouth. [cited 19-04-2023]. Available from: <https://www.marlin.ac.uk/species/detail/1519>
- Tyler-Walters, H., Tillin, H.M., d'Avack, E.A.S., Perry, F., & Stamp, T. (2018). *Marine Evidence-based Sensitivity Assessment (MarESA) – A Guide*. Marine Life Information Network (MarLIN). Marine Biological Association of the UK, Plymouth. Available from: <https://www.marlin.ac.uk/publications>