10. Icelandic cyprine (Ocean quahog) *Arctica islandica*

Irish name: Breallach quahog

Figure 1: Icelandic cyprine, *Arctica islandica.* © Dr Hilmar Hinz (marlin.ac.uk)

Background

Arctica islandica has a heavy, thick, oval to rounded shell up to 13 cm in length. The shell is sculptured with numerous fine concentric lines and the beaks are anterior. It has a thick glossy periostracum that is brown in smaller individuals, becoming greenish brown to black in larger specimens. Arctica islandica is found at extreme low water level but predominantly on sublittoral firm sediments including level offshore areas, buried (or part buried) in sand and muddy sand that ranges from fine to coarse grains (Tyler-Walters & Sabatini, 2017). *Arctica islandica* is the last surviving species of the family Arcticidae that dates back to the Jurassic and reached its highest diversity in the Cretaceous ca 135-65 million years ago (Morton, 2011).

Application of feature list inclusion criteria

Arctica islandica is listed by OSPAR with reference to its decline and was therefore nominated for inclusion on the feature list. A. islandica is a long-lived and slow maturing species that takes between ca 5 and ca 15 years to reach maturity depending on location (Tyler-Walters & Sabatini, 2017).

The western Irish Sea is a significant part of the species distribution and is not currently protected or conserved. As a sessile benthic species, adult stages are amenable to spatial protection.

Sensitivity assessment

***Arctica islandica* is highly sensitive to pressures associated with the construction and operation of offshore wind farms (high confidence).** 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') (high confidence) (Tyler-Walters et al., 2018). *A.islandica* is highly sensitive to physical change of the seabed (high confidence) and sediment type (low confidence). A change to natural or artificial hard substratum would remove the sedimentary habitat required by the species. *Arctica islandica* 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, and muds may impair filter feeding. As a result, the population is likely to suffer mortality (Tyler-Walters & Sabatini, 2017).

***Arctica islandica* is highly sensitive to fishing related activities (high confidence).** Mechanical damage and incidental catch of *A.islandica* from bottom fishing gear is known to damage shells and 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. *A.islandica* can live with some shell damage but repeated disturbance may lead to death. After its planktonic larval stage *A.islandica* 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 **'Not Assessed'** and further information is needed on the sensitivity of A. islandica to these pressures.

Further research needs

There is insufficient evidence on the effects of chemical pressures on A. islandica to form an assessment. The pressures requiring more research include transition elements and organo-metal contamination, hydrocarbon and PAH contamination, synthetic compound contamination and introduction of other substances. In addition, insufficient evidence was found to suggest that *Arctica islandia* populations were adversely affected by invasive non-indigenous species.

Figure 2. Global distribution of *Arctica islandica*, Source: https://obis.org/taxon/138802

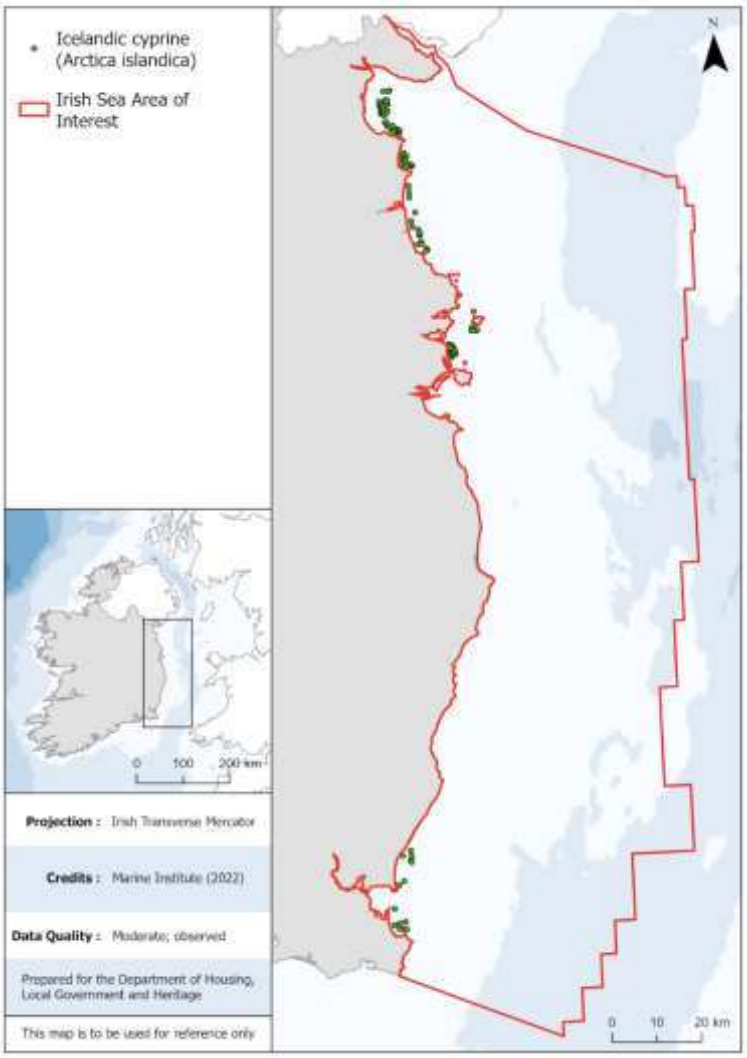

Figure 3. Data available for Icelandic cyprine*, arctica islandica* in the western Irish Sea.

Data sources and quality

Dataset Name	Data Owning Organisation	Dataset Quality	Metadata URL	Comments
Marine Institute Razor Clam Survey	Marine Institute	Moderate; observed		
Marine Institute Water Framework Directive Benthic Data	Marine Institute	Moderate; observed		

References

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**, 12pp.

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. 85pp.

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.

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. & Buys, (1998).A quantitative evaluation of the impact of beamtrawl fishery on benthic fauna in the southern North Sea. In Bergman *et al* (Eds) The distribution of benthic macrofauna in the Dutch sector of the North Sea in relation to the micro distribution of beam trawling. Final report. 1998. BEON Rapport No. 98-2:5-15.

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*., Lowestoft: MAFF Directorate of Fisheries Research.

Tyler-Walters, H. & Sabatini, M. (2017). *Arctica islandica* Icelandic cyprine. In Tyler-Walters H. and Hiscock K. *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [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. https://www.marlin.ac.uk/assets/pdf/MarESA-Sensitivity-Assessment-Guidance-Rpt-Dec2018.pdf