

28. Circalittoral Sand

Background

Clean fine sands with less than 5% silt/clay in deeper water, either on the open coast or in tide-swept channels of marine inlets in depths of over 15-20m to a max depth of 50m. The habitat may also extend offshore and is characterised by a wide range of echinoderms (in some areas including the pea urchin *Echinocyamus pusillus*), polychaetes and bivalves. This habitat is generally more stable than shallower, infralittoral sands and consequently supports a more diverse community (JNCC, 2022).

Table 1. Circalittoral Sand characterising species defined by Tillin & Tyler-Walters (2013).

	Characterising species	MarLIN Link
Group 4	Infaunal very small to medium sized suspensions and/or deposit feeding bivalves	
	<i>Abra prismatica</i>	
	<i>Moerella pygmaea</i>	
	<i>Spisula elliptica</i>	
	<i>Timoclea ovata</i>	
Group 5	Small-medium suspension and/or deposit feeding polychaetes	
	<i>Aonides paucibranchiata</i>	
	<i>Chaetozone setosa</i>	
	<i>Ophelia borealis</i>	
	<i>Owenia fusiformis</i>	https://www.marlin.ac.uk/species/detail/1703
	<i>Scoloplos armiger</i>	
	<i>Spiophanes bombyx</i>	https://www.marlin.ac.uk/species/detail/1705
Group 6	Predatory polychaetes	
	<i>Exogone verrugera</i>	
	<i>Glycera lapidum</i>	
	<i>Lumbrineris gracilis</i> (<i>Lumbrineris</i> spp)	
Group 7	Very small-small, short lived (<2 years) free-living species	
	<i>Bathyporeia elegans</i>	
	<i>Eudorellopsis deformis</i>	
Group 8(a)	Subsurface dwelling Echinoids	
	<i>Echinocyamus pusillus</i>	

*Within each group species (shown in bold) with a good evidence base were selected for specific sensitivity assessment to ensure that the range of biological traits or habitat preferences expressed by species within that ecological group were represented.

Rationale for spatial protection in the western Irish Sea

Circalittoral Sand habitats were included in the features list as it is an MSFD priority habitat and is a broadly distributed feature of ecological importance within the Irish Sea. This habitat hosts a wide range of species, contributing to the biodiversity of Irish waters. These broadscale habitats do not have existing protection or management but Ireland has a legal obligation under MSFD to protect them and they are amenable to spatial protection.

Sensitivity Assessment

*Sensitivity scores and the ecological groups associated were similar among MSFD habitats.

Circalittoral sands are highly sensitive to pressures associated with the construction (high confidence) and moderately sensitive to pressures associated with the operation (low confidence) of offshore renewable infrastructure. Loss of the physical habitat will result in a loss of biodiversity and lead to changes in the community structure associated with this biotope (high confidence). Pressures associated with the operation of ORE, including the physical change of the sediment type and removal of substratum, have a medium sensitivity (low confidence). Species within ecological group 8(a) vary in environmental requirements but each appears to occur in a relatively restricted range of sediment types, related to burrowing, feeding and other characteristics. The species are therefore considered to have ‘**Low**’ **resistance** to a change in sediment type (low confidence) but resilience is assessed as ‘**Medium**’ (recovery within 2-10 years) (medium confidence). It is also noted that this ecological group is not able to colonise artificial hard substratum and the introduction of this would reduce the extent of suitable habitat (Tillin & Tyler-Walters, 2014). In addition, a number of the ecological groups (4, 5, 6 & 8(a)) consists of shallowly buried species and removal of substratum would result in all individuals within the extraction footprint being removed (Tillin & Tyler-Walters, 2014).

Circalittoral sands are moderately sensitive to pressures associated with the fishing sector (low confidence). Species of ecological group 4 are infauna found close to the sediment surface. This life habit provides some protection from abrasion at the surface only, however it was considered that surface abrasion may damage and kill a proportion of the population. Members of this ecological group will also be directly impacted by penetration and disturbance of the substratum below the surface. However, the small size of members of this ecological group will confer some level of resistance. Gilkinson *et al* (1998) simulated the physical interaction of otter trawl doors with the seabed and between 58% and 70% of the bivalves in the scour path that were originally buried were completely or partially exposed at the test bed surface. However, only two out of a total of 42 specimens showed major damage. The pressure wave associated with the otter door pushes small bivalves out of the way without damaging them. Where species can rapidly burrow and reposition (typically within species occurring in unstable habitats) before predation mortality rates will be relatively low

(Tillin & Tyler-Walters, 2014). Sensitivity to changes in suspended solids is also assessed as medium for group 4 (low confidence). This ecological group is not predicted to be sensitive to acute changes in turbidity. However at the pressure benchmark the change is chronic and sustained for a year. This is predicted to have negative impacts on growth and fecundity by reducing filter feeding efficiency and imposing costs on clearing and producing pseudofaeces for the filter feeders (Tillin & Tyler-Walters, 2014).

Circolittoral sands are moderately sensitive to pressures associated with the shipping sector (low confidence). It must be stressed that this assessment is based on one characterising species only due to a lack of evidence on the remaining species. Ager (2005) found the characterising species *Spiophanes bombyx* to have a medium sensitivity to synthetic compound contamination. However, no information was found directly relating to the effects of synthetic chemicals on *Spiophanes bombyx* and the assessment is inferred based on evidence on other polychaete species. This highlights the need for further research on the effects of sectoral activities on characterising species within the MSFD broadscale habitats.

Further research needs

As with the other MSFD broadscale habitats, a better evidence base is needed as to the actual suite of species, particularly characterising species present in the habitats in the western Irish Sea. In addition, a number of the pressures in the analyses for the broadscale habitats are scored based on the sensitivity of a small number of characterising species due to a lack of evidence for others. Within the list of characterising species for this biotope only two species have been assessed for sensitivity by MarLIN. Further research is needed to assess the sensitivity of the full list of characterising species present to provide a more comprehensive analysis for each biotope.

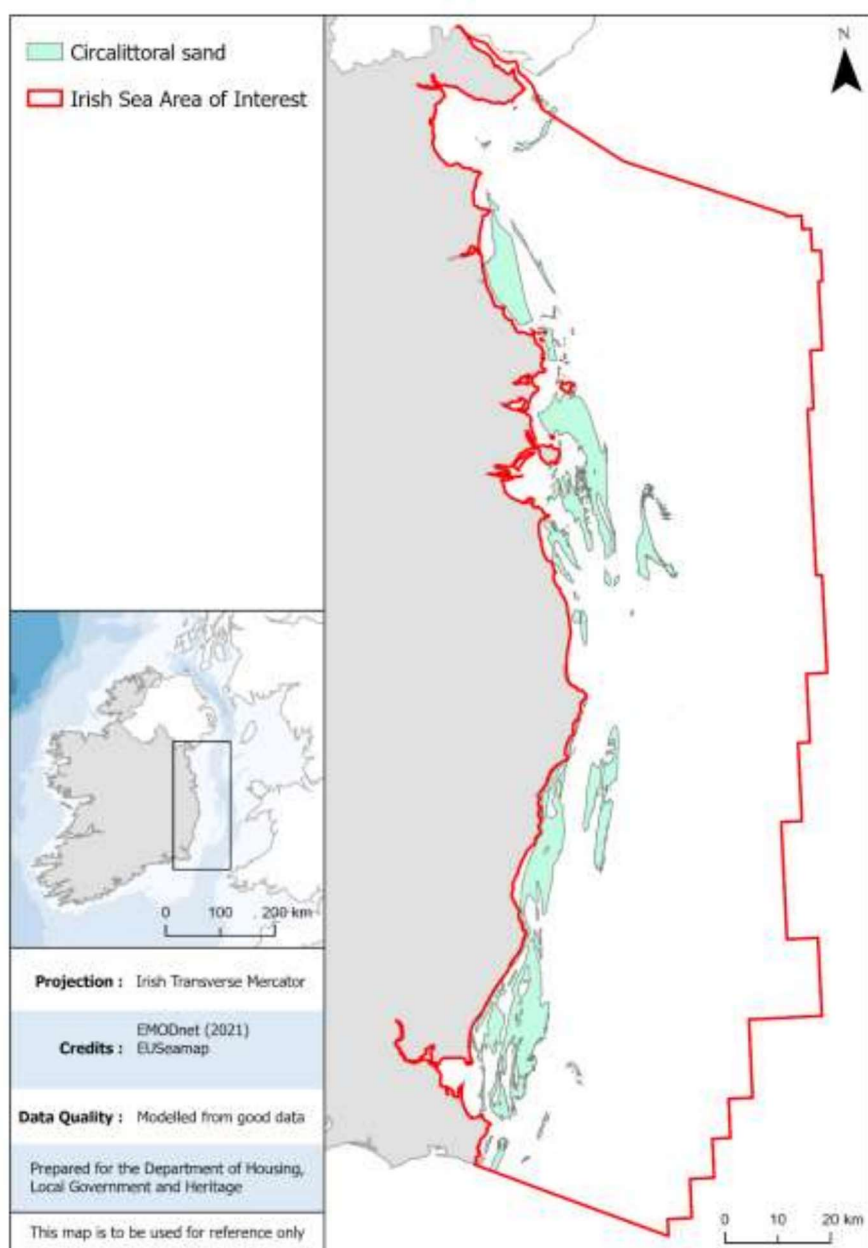


Figure 1. Data available for circalittoral sand in the western Irish Sea.

Data sources and quality

Dataset Name	Data Owning Organisation	Dataset Quality	Metadata URL	Comments
EUSeaMap EMODnet Benthic Broadscale Habitat Types	EMODnet	Modelled from good data	EUSeamap (2021)	

Information on the sensitivity assessment above has been sourced from:

Tillin, H.M. & Tyler-Walters, H. (2014). Assessing the sensitivity of subtidal sedimentary habitats to pressures associated with marine activities: Phase 2 Report – Literature review and sensitivity assessments for ecological groups for circalittoral and offshore Level 5 biotopes. JNCC Report 512B

References

Ager, O.E.D. (2005). *Spiophanes bombyx* A bristleworm. 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 22-04-2023]. Available from: <https://www.marlin.ac.uk/species/detail/1705>

Gilkinson, K., Paulin, M., Hurley, S. & Schwinghamer, P. (1998). Impacts of trawl door scouring on infaunal bivalves: results of a physical trawl door model/dense sand interaction. *Journal of Experimental Marine Biology and Ecology*, **224**, 291 - 312.

JNCC (2022) The Marine Habitat Classification for Britain and Ireland Version 22.04. Available from: <https://mhc.jncc.gov.uk/>

Tillin, H, Tyler-Walters, H. (2013). Assessing the sensitivity of subtidal sedimentary habitats to pressures associated with marine activities. Phase 1 Report: Rationale and proposed ecological groupings for Level 5 biotopes against which sensitivity assessments would be best undertaken JNCC Report No. 512A

Tillin, H.M. & Tyler-Walters, H. (2014). Assessing the sensitivity of subtidal sedimentary habitats to pressures associated with marine activities: Phase 2 Report – Literature review and sensitivity assessments for ecological groups for circalittoral and offshore Level 5 biotopes. JNCC Report 512B