19. Circalittoral coarse sediment

Background

Tide-swept circalittoral coarse sands, gravel and shingle generally in depths of over 15-20 m to a maximum depth of 50 m. This habitat may be found in tidal channels of marine inlets, along exposed coasts and offshore. This habitat, as with shallower coarse sediments, may be characterised by robust infaunal polychaetes, mobile crustacea and bivalves. Certain species of sea cucumber (e.g. *Neopentadactyla*) may also be prevalent in these areas along with the lancelet *Branchiostoma lanceolatum* (JNCC, 2022).

Table A10.19.1. Circalittoral coarse sediment ecological groups. Characterising species within those groups on which each group sensitivity assessment was based are listed. For a full list of species characterising each ecological group of subtidal sedimentary habitats, see Tillin & Tyler-Walters (2013). Sensitivity scores were obtained for selected species from [1] White (2004), [2] Ager (2008) [3] Tyler-Walters (2008) for pressures not considered by Tillin & Tyler-Walters (2014), i.e., transition elements & organo-metal contamination, hydrocarbon & Polycyclic Aromatic Hydrocarbons (PAH) contamination, synthetic compound contamination, deoxygenation, smothering and siltation changes (light).

Group number	Group description	Characterising species
Group 1(d)	Small epifaunal species with hard or protected bodies	*Balanus crenatus*[1], *Spirobranchus triqueter*
Group 2	Temporary or permanently attached surface dwelling or shallowly buried larger bivalves	*Pecten maximus*
Group 3	Mobile predators and scavengers	*Pagurus bernhardus, Asterias rubens*
Group 5	Small-medium suspension and/or deposit feeding polychaetes	*Chaetozone zetlandica, Lanice conchilega*[2]
Group 6	Predatory polychaetes	*Glycera lapidum, Protodorvillea kefersteini*
Group 8(a)	Subsurface dwelling echinoids	*Echinocyamus pusillus*
Group 8(b)	Surface dwelling echinoids	*Echinus esculentus*[3]

Group 8(c)	Free living interface suspension/deposit feeders: ophiuroids	*Ophiura albida*
Group 8(d)	Large burrowing holothuroids	*Neopentadactyla mixta*
Group 10	Burrowing, soft-bodied species	*Branchiostoma lanceolatum*

Application of feature list inclusion criteria

Circalittoral coarse sediment habitat was included in the feature list as it is a Marine Strategy Framework Directive (MSFD) priority habitat and is a broadly distributed feature of ecological importance within the Celtic Sea. This habitat hosts a wide range of species, contributing to the biodiversity of Irish waters. Broadscale habitats do not have existing protection or management, but Ireland has a legal obligation under the MSFD to protect them and they are amenable to spatial protection.

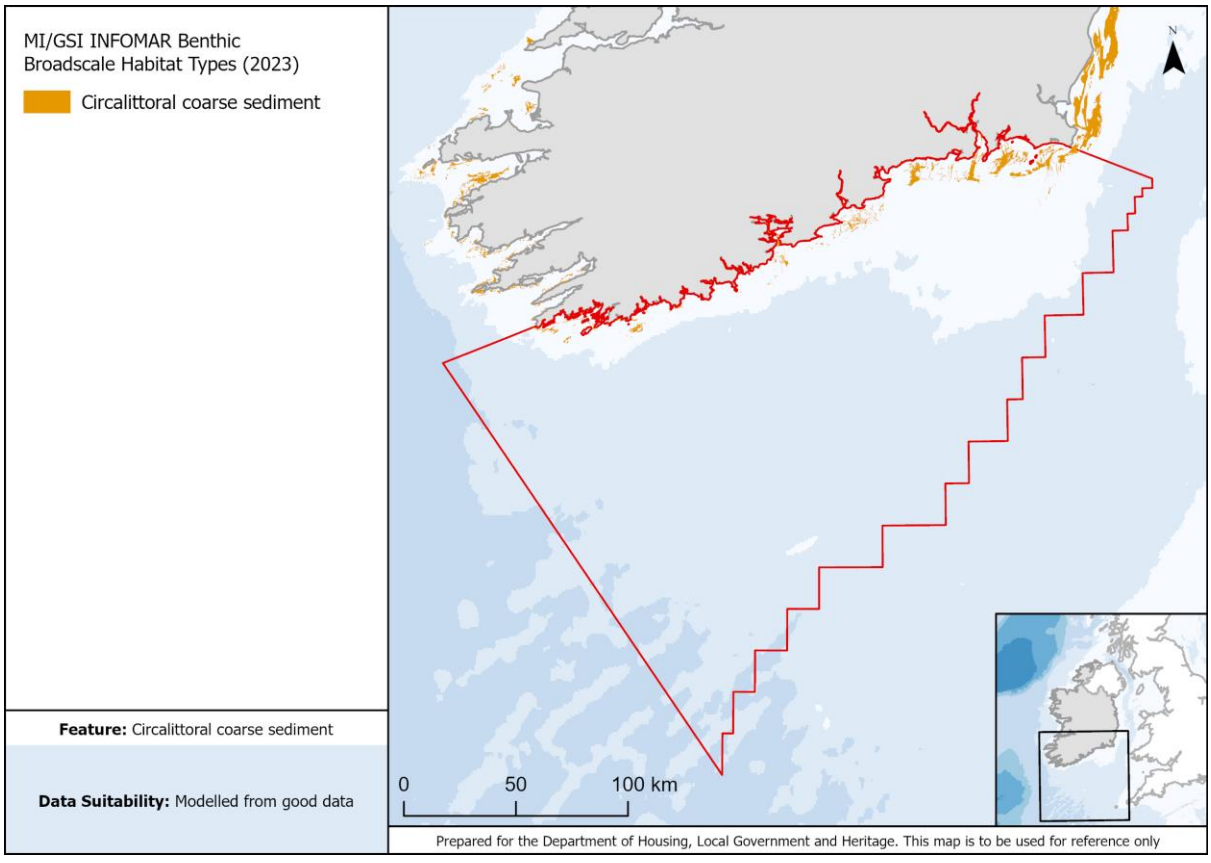

Figure A10.19.1 Data available for circalittoral coarse sediment in the Celtic Sea.

Sensitivity Assessment

Circalittoral coarse sediment is highly sensitive to pressures associated with the construction and operation of offshore wind farms. Loss or change of the physical habitat could lead to a loss of biodiversity and lead to changes in the community structure associated with this habitat (low confidence). *Neopentadactyla mixta* (group 8(d)) is only found in coarse gravel/maerl sediment. Therefore, a change in sediment type would result in a significant loss in abundance of this species, as well as major changes in the associated community (Tillin & Tyler-Walters, 2014). Small- medium suspension and/or deposit feeding polychaetes (group 5) and large burrowing holothurians (group 8(d)) are highly sensitive to the pressure 'habitat structure change-removal of substratum (extraction)'. Extraction of 30 cm of sediment, would totally remove the species in these groups meaning resistance is None and resilience is Very Low.

Circalittoral coarse sediment is highly sensitive to pressures associated with the fishing sector. As with ORE, a physical change to the seabed or sediment type can occur with surface (otter trawls) and subsurface fishing (dredging), as these fishing methods have the potential to change the sediment particle size, leading to a loss of biodiversity within this habitat (low confidence). Circalittoral coarse sediment has a high sensitivity to removal of target species (low confidence). Species within the sensitive ecological group (group 8(d)) are not targeted by commercial fisheries and hence are not directly affected by this pressure. However, maerl extraction for coralline algae can result in complete destruction of maerl beds. For example, in Brittany, the clean maerl gravel of the Glenan maerl bank described in 1969 was degraded to muddy sand dominated by deposit feeders and omnivores within 30 years (Grall & Hall-Spencer 2003). Birkett *et al.* (1998) noted that although maerl beds subject to extraction in the Fal estuary exhibited a diverse flora and fauna, they were less species-rich than those in Galway Bay, although direct correlation with dredging was unclear (Grall & Hall-Spencer 2003). Grall & Glemarec (1997, cited in Birkett *et al.* 1998) reported few differences in biological composition between exploited and control beds in Brittany. The degree of impact therefore depends on the intensity of extraction and/or on the context (Tillin & Tyler-Walters, 2014).

Circalittoral coarse sediment is highly sensitive to a shipping-related pressure, **the 'introduction or spread of invasive non-indigenous species'** (medium confidence). No information on the direct effects of non-native species on the characterising species *Neopentadactyla mixta* was found. However, beds of the invasive slipper limpet *Crepidula fornicata* may form on sedimentary habitats and Grall & Hall-Spencer (2003) note that beds of this invasive species grew across maerl beds in Brittany such that the associated community drastically changed. The presence of the slipper limpet changed the sediment character, clogging it with silt and pseudo-faeces. This would make the habitat

unsuitable for *N. mixta* such that the associated community changes dramatically (Tillin & Tyler-Walters, 2014).

Data sources available

See Figure A10.19.1 for data available for this broadscale habitat type in the Celtic Sea. This layer was used in prioritization analyses.

Further research needs

As with other MSFD broadscale habitats, better evidence is needed as to which species particularly characterise this habitat in the Celtic Sea. In addition, several 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. Further research is needed to assess the sensitivity of the full list of characterising species present to provide a more comprehensive analysis for each ecological group. Genetic data on characterising species could help identify populations with high genetic variability or distinctness, and provide information on connectivity among populations. An integrated approach where genetic data are used in combination with sensitivity and conservation prioritization analyses could provide more comprehensive spatial protection.

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