28. Offshore circalittoral mud

Background

Mud and cohesive sandy mud in the offshore circalittoral zone, typically below 50-70 m, where a variety of faunal communities may develop, depending upon the level of silt/clay and organic matter in the sediment. Communities are typically dominated by polychaetes but often with high numbers of bivalves such as *Thyasira* spp., echinoderms, and foraminifera (JNCC, 2022).

Table A10.28.1. Offshore circalittoral mud ecological groups. Characterising species within those groups on which each group sensitivity assessment was based are listed. For a full list of species characterizing each ecological group of subtidal sedimentary habitats, see Tillin & Tyler-Walters (2013). Sensitivity scores were obtained for selected species from [1] Budd (2008), [2] Budd (2007), [3] Hill & Wilson (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, de-oxygenation; smothering and siltation changes (light).

Group number	Group description	Characterising species
Group 1(a)	Sea pens (erect, large, longer-lived epifaunal species with some flexibility)	*Pennatula phosphorea*
Group 1(c)	Soft-bodied or flexible epifaunal species	*Ascidiella aspersa, Styela gelatinosa*
Group 3	Mobile predators and scavengers	*Asterias rubens*[1]
Group 4	Infaunal very small to medium sized suspension and/or deposit feeding bivalves	*Abra alba*[2], *Thyasira flexuosa, Abra nitida*
Group 5	Small-medium suspension and/or deposit feeding polychaetes	*Ampharete falcata*
Group 6	Predatory polychaetes	*Paramphinome jeffreysii*
Group 8(c)	Ophiuroids (free-living interface suspension/deposit feeders)	*Amphiura filiformis*[3]

Rationale for spatial protection in the Celtic Sea

Offshore circalittoral mud 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 MSFD to protect them and they are amenable to spatial protection.

Sensitivity Assessment

Offshore circalittoral mud is highly sensitive to pressures associated with the construction and operation of offshore wind farms. All marine habitats and benthic species are considered to be highly sensitive to the pressure physical loss (to land of freshwater habitat), with a resistance of None and no resilience. Offshore circalittoral mud is highly sensitive to change to another seabed type. A permanent change from sediment to artificial hard substratum would change the habitat classification, meaning a resistance and resilience of None. A change in sediment type will adversely affect sea pens. Based on its reported distribution a change of 'mud' to 'sandy mud' or 'slightly gravelly mud' will probably exclude *Pennatula phosphorea* (medium confidence) (Tillin & Tyler-Walters, 2014). In addition, characterising species within group 1(a) have a high sensitivity to a change in habitat structure through extraction of the substratum (medium confidence). An extraction of sediment to 30 cm (the benchmark) will remove most resident sea pens and recovery is expected to be low (Tillin & Tyler-Walters, 2014).

Offshore circalittoral mud is highly sensitive to pressures associated with the fishing sector. Ecological group 1(a), present in offshore circalittoral muds, has a high sensitivity to fishing pressures ('Abrasion/disturbance of substratum surface or seabed' and 'Penetration or disturbance of substratum subsurface'). Towed gear is likely to remove a proportion of sea pens from the sediment. If damaged, sea pens are likely to die, but they can recover relatively quickly if displaced undamaged and returned to suitable sediment. *Pennatula phosphorea* can avoid abrasion by withdrawing into the sediment, but frequent disturbance will probably reduce feeding time and hence viability. Therefore, a sensitivity score of High has been assigned to this ecological group for abrasion and penetration of the substratum (low confidence) (Tillin & Tyler-Walters, 2014). Group 4, which includes suspension feeders, is also moderately sensitive to a change in suspended solids (medium confidence), a pressure also associated with ORE . The benchmark for this pressure involves a chronic change in suspended solids sustained for a year and such a change would likely have negative impacts on growth and fecundity by reducing filter feeding efficiency (Tillin & Tyler-Walters, 2014).

Offshore circalittoral mud is moderately sensitive to pressures associated with the shipping sector. Several characterising species were assigned a medium sensitivity to chemical pressures associated with the shipping sector (high confidence). *Asterias rubens* (Budd, 2008) and *Amphiura filiformis* (Hill & Wilson, 2008) have a medium sensitivity to hydrocarbon and PAH contamination while *Abra alba*

(Budd, 2007) and *Amphiura filiformis* have a medium sensitivity to synthetic compound contamination.

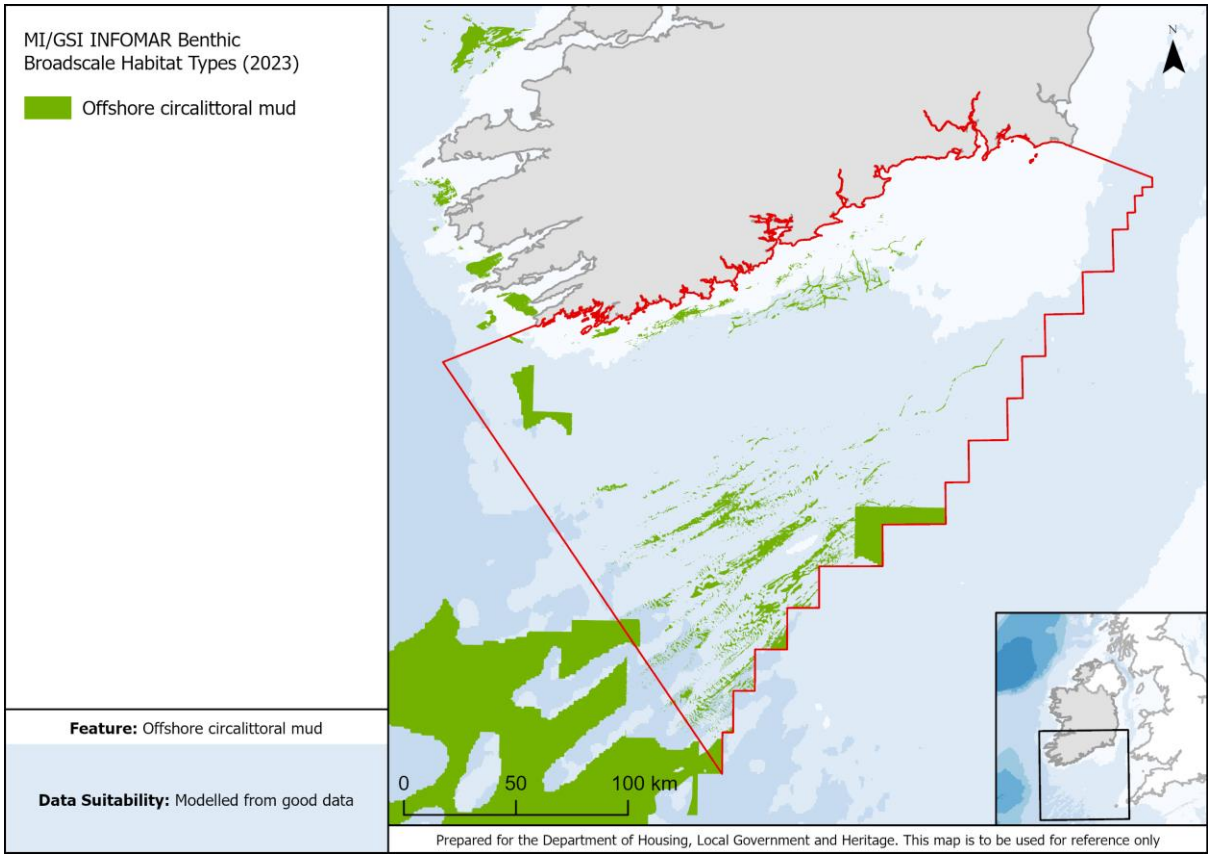

Figure A10.28.1. Data available for offshore circalittoral mud in the Celtic Sea.

Data sources available

See Figure A10.28.1 for data available for this broadscale habitat type in the Celtic Sea. This layer was used in prioritization analyses.

Further research needs

As with the 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.

References

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