23. Infralittoral coarse sediment

Background

Infralittoral coarse sediment occurs at depths between 5 and 20 metres, in moderately exposed locations on the open coast or in tide-swept inlets. The sediment is composed of coarse sand, gravelly sand, shingle, and gravel that is subject to disturbance by tidal streams and wave action. Infralittoral coarse sediment is characterised by a robust fauna of infaunal polychaetes such as *Chaetozone setosa* and *Lanice conchilega*, cumaceans such as *Iphinoe trispinosa* and *Diastylis bradyi*, and venerid bivalves (JNCC, 2022).

Table A10.23.1. Infralittoral coarse sediment ecological groups. Characterising species within those groups on which each group sensitivity assessment and/or individual pressure sensitivities were based are listed. Species in bold are characterising species for the ecological group as described in Tillin & Tyler-Walters (2014). Sensitivity scores were obtained for selected species from [1] Hill (2024), [2] Budd (2008), [3] Neal & Pizzolla (2008), [4] Hill (2008b), [5] Budd (2007), [6] Ager (2008), [7] Ager (2005), [8] Budd & Hughes (2005), [9] Hill (2008a) for pressures not considered by Tillin & Tyler-Walters (2014), i.e., transition elements & organo-metal contamination, hydrocarbon & Polycyclic Aromatic Hydrocarbon (PAH) contamination, synthetic compound contamination, de-oxygenation, smothering and siltation changes (light). There was no overlap between species in groups 1(b), 2, 7, and 8(c) present in Infralittoral coarse sediment and those used to characterise these ecological groups in Tillin & Tyler-Walters, so sensitivity of these groups is based on the overall sensitivity of the groups as described by Tillin & Tyler-Walters (2014).

Group number	Group description	Characterising species
Group 1(b)	Erect, shorter lived epifaunal species	
Group 1(c)	Soft-bodied epifaunal species	***Alcyonium digitatum, Urticina felina***
Group 1(d)	Small epifaunal species with hard or protected bodies	
Group 2	Temporary or permanently attached surface dwelling or shallowly buried larger bivalves	***Pecten maximus****, Ensis ensis*[1]
Group 3	Mobile predators and scavengers	***Asterias rubens***[2]*, Carcinus maenas*[3]*, Liocarcinus depurator*[4]***, Pagurus bernhardus***
Group 4	Infaunal very small to medium sized suspension and/or deposit feeding bivalves	***Abra alba***[5]
Group 5	Small-medium suspension and/or deposit feeding polychaetes	***Lanice conchilega***[6]***, Scoloplos armiger****, Spiophanes bombyx*[7]
Group 6	Predatory polychaetes	***Glycera lapidum, Nephtys hombergii***[8]

Group number	Group description	Characterising species
Group 7	Very small-small, short lived (<2 years) free-living species	
Group 8(a)	Echinoderms – sub-surface urchins	*Echinocardium cordatum*[9]
Group 8(c)	Ophiuroids (free-living interface suspension / deposit feeders)	
Group 10	Burrowing, soft-bodied species	***Synarachnactis lloydii***

Rationale for spatial protection in the Celtic Sea

Infralittoral coarse sediment is 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. 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.

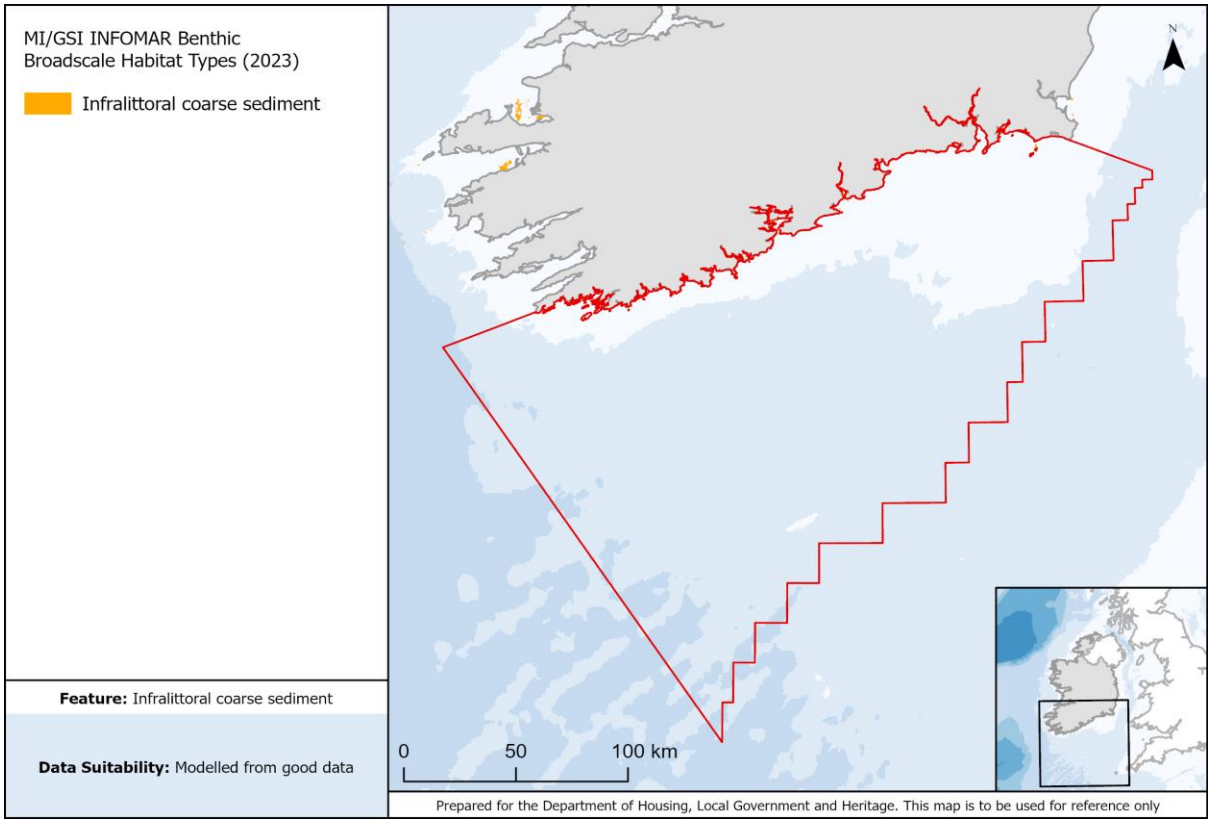

Figure A10.23.1. Data available for infralittoral coarse sediment in the Celtic Sea.

Sensitivity Assessment

Infralittoral coarse sediment 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. Infralittoral coarse sediment 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'. Many of the species dwell on the sediment surface or are infaunal, particularly members of groups 2, 4, 5, 6, 8(a) and 10, and are unable to colonise artificial hard substratum, reducing the extent of suitable habitat.

Infralittoral coarse sediment is moderately sensitive to pressures associated with the fishing sector. Species of ecological groups 2 and 4 live on the sediment surface or are shallowly buried species. Abrasion of the surface is likely to damage or kill a proportion of the populations of these species; those that are shallowly buried have some protection. Penetration or disturbance of the substratum subsurface is likely to kill, damage or remove members of ecological groups 2, 4, and 8(a). Recovery is likely within 2 – 10 years ('Medium' resilience), resulting in 'Medium' sensitivity to the pressure. Sensitivity to a change in suspended solids is 'Medium' for ecological groups 2 and 4. If changes are sustained for a year (the pressure benchmark), there will be negative impacts on growth and fecundity through reduction of filter feeding efficiency and additional costs on clearing and producing pseudofaeces (Tillin & Tyler-Walters, 2014). All the pressures mentioned above are also associated with ORE.

Infralittoral coarse sediment is moderately sensitive to pressures associated with shipping. *Ensis ensis, Carcinus maenas, Nephtys hombergii,* and *Echinocardium cordatum* have 'Medium' sensitivity to hydrocarbon & PAH contamination. *Ensis ensis, Abra alba, Lanice conchilega, Spiophanes bombyx,* and *Echinocardium cordatum* have 'Medium' sensitivity to synthetic compound contamination. Dispersing detergents used during the Torrey Canyon oil spill caused mass mortalities of *Echinocardium cordatum* and *Ensis* spp. (Smith, 1968). Resilience to both pressures for all species is 'High', as recovery is expected in 2-10 years.

Data sources available

See Figure A10.23.1 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 these habitats in the Celtic 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. Further research is needed to assess the sensitivity of

the full list of relevant 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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