26. Infralittoral sand

Background

Clean sands which occur in shallow water (5-20 m), either on the open coast or in tide-swept channels of marine inlets. The habitat typically lacks a significant seaweed component and is characterised by robust fauna, particularly amphipods (*Bathyporeia*) and robust polychaetes including *Nephtys cirrosa* and *Lanice conchilega* (JNCC, 2022).

Table A10.26.1. Infralittoral sand 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] Jackson & Hiscock (2008), [2] White (2004), [3] Neal & Wilson (2008), [4] Hill (2008), [5] Neal & Pizzolla (2008), [6] Budd (2008), [7] Ager 2007, [8] Ager (2005), [9] Ager (2008) for pressures not considered by Tillin & Tyler-Walters (2014), i.e., transition elements & organo-metal contamination, hydrocarbon & Polycyclic Aromatic Hydrocarbon (PAH) contamination, de-oxygenation, smothering and siltation changes (light). There was no overlap between the small-medium infaunal bivalves, and the predatory polychaetes present in infralittoral sand and those used to characterise these ecological groups in Tillin & Tyler-Walters, so sensitivity of groups 4 and 6 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	***Sertularia cupressina***
Group 1(c)	Soft-bodied epifaunal species	***Urticina felina***[1]
Group 1(d)	Small epifaunal species with hard or protected bodies	***Balanus crenatus***[2]
Group 3	Mobile predators and scavengers	*Cancer pagurus*[3], *Liocarcinus depurator*[4], *Carcinus maenas*[5], ***Asterias rubens***[6], ***Pagurus bernhardus***

Group 4	Infaunal very small to medium sized suspension and/or deposit feeding bivalves	
Group 5	Small-medium suspension and/or deposit feeding polychaetes	*Spio filicornis*[7], *Spiophanes bombyx*[8], ***Lanice conchilega***[9], ***Scoloplos armiger***
Group 6	Predatory polychaetes	
Group 7	Very small-small, short lived (<2 years) free-living species	***Bathyporeia elegans***

Rationale for spatial protection in the Celtic Sea

Infralittoral sand is included in the features 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.

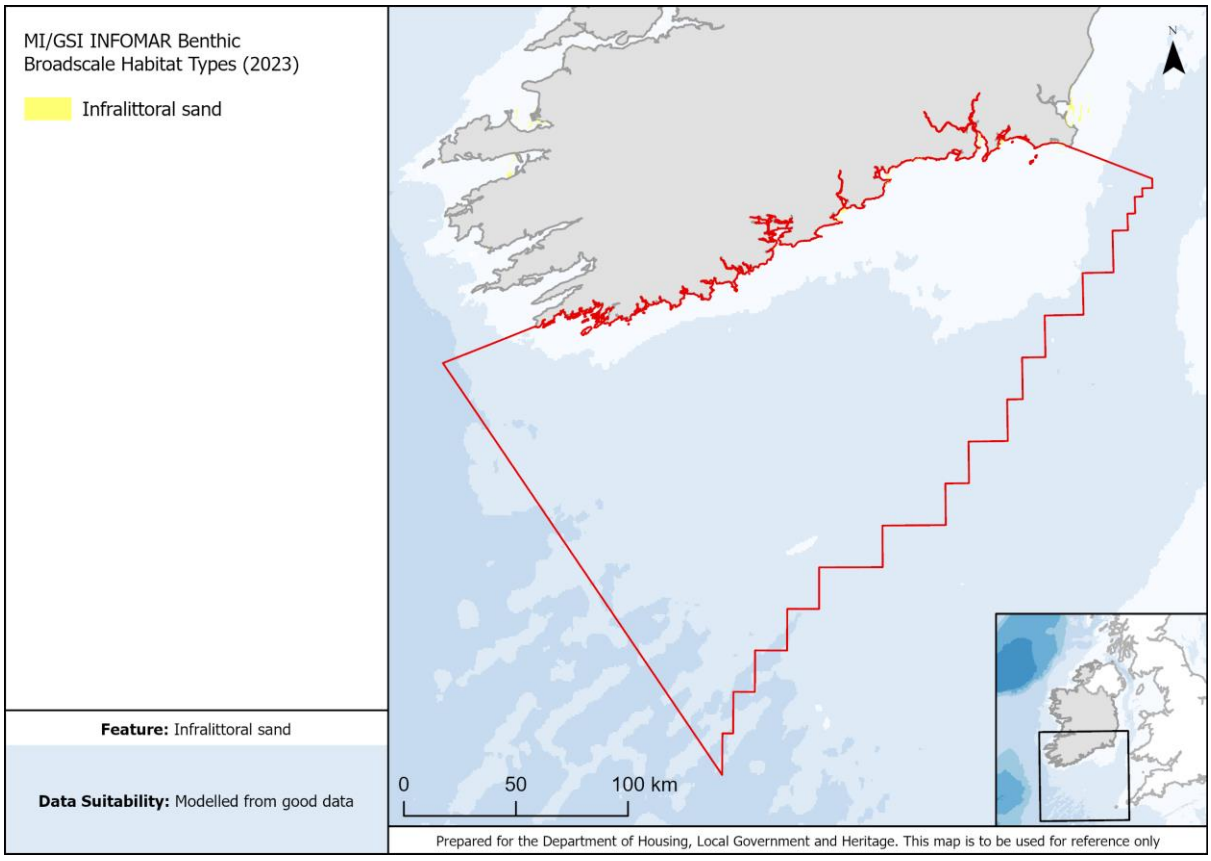

Figure A10.26.1. Data available for infralittoral sand in the Celtic Sea.

Sensitivity Assessment

Infralittoral sand is highly sensitive to pressures associated with the construction and operation of offshore wind farms. All marine habitats and benthic species are highly sensitive to the pressure 'physical loss (to land of freshwater habitat)', with a resistance of None and no resilience. Infralittoral sand 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. Some ecological groups (1(b), 1(c), 1(d), 3, 5, 6) consist of surface dwelling or shallowly buried species and removal of substratum would result in all individuals within the extraction footprint being removed. Ecological groups 1(c), 1(d), 4, and 5 are also moderately sensitive to heavy smothering and siltation changes (low confidence). Groups 1(c) and 1(d) are considered likely to express little resistance to this pressure as individuals are attached to the substratum and are likely to exhibit no or little vertical mobility. Group 5 species are shallowly buried and many, such as *Lanice conchilega*, are unable to vertically migrate through sediment meaning smothering would result in mortality (Tillin & Tyler-Walters, 2014).

Infralittoral sand is moderately sensitive to pressures associated with the fishing sector (high confidence). Ecological groups 1(c) and 4 have medium sensitivity to the pressures 'abrasion/disturbance of substratum surface' and 'penetration/disturbance of substratum subsurface'. Species of ecological group 4 are infauna found close to the sediment surface. This life habit provides some protection from abrasion at the surface, although damage to the population is likely. Penetration of the subsurface is likely to damage, kill, or remove a proportion of the population. As erect epifauna, members of group 1(c) are exposed to direct physical damage, displacement and removal from abrasion and penetration of the seabed. Ecological group 4 is moderately sensitive to a change in suspended solids (low confidence). It is not predicted to be sensitive to acute changes in turbidity. If changes are sustained for a year (the pressure benchmark), this will likely have negative impacts on growth and fecundity by reducing filter feeding efficiency and imposing costs on clearing and producing pseudofaeces (Tillin & Tyler-Walters, 2014). All the pressures mentioned above can also be associated with ORE.

Infralittoral sand is moderately sensitive to pressures associated with shipping. *Asterias rubens* and *Carcinus maenas* have medium sensitivity to hydrocarbon and PAH contamination while *Spiophanes bombyx, Spio filicornis, Lanice conchilega, Urticina felina, Cancer pagurus and Balanus crenatus* have medium sensitivity to synthetic compound contamination. Both pressures can also be associated with ORE and fishing.

Data sources available

See Figure A10.26.1 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, some 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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