

## 21. Circalittoral rock and biogenic reef

### Background

Circalittoral rock occurs in the zone below the infralittoral zone, between the point at which 1% light attenuation reaches the seafloor and the bottom of the wave base. In more turbid areas, the circalittoral zone may begin at the level of mean low water springs, while the bottom of the wave base is approximately 50 -70 m. Circalittoral rock is characterised by animal-dominated communities comprising mixed species, but these communities vary widely depending on the environmental conditions present, e.g., wave action, tide strength, and turbidity (EUNIS, 2017a). In the circalittoral zone, biogenic reef can be formed by polychaetes and bivalves (EUNIS, 2017b).

Table A10.21.1. Circalittoral rock ecological groups, and biogenic reef biotopes. Characterising species within those groups on which each group sensitivity assessment was based are listed (Maher et al., 2016). *Sabellaria* reef biotope sensitivity scores were obtained from Tillin et al. (2023a, 2023b).

Group number	Group description	Characterising species
Group 2	Non-predatory mobile species	<i>Echinus esculentus</i>
Group 3	Mobile predators and scavengers	<i>Asterias rubens</i> , <i>Cancer pagurus</i> , <i>Nucella lapillus</i>
Group 4	Bivalves and brachiopods	<i>Pholas dactylus</i> , <i>Mytilus edulis</i>
Group 5	Tube-dwelling fauna	<i>Lanice conchilega</i> , <i>Sabella pavonina</i>
Group 6(a)	Attached soft-bodied species	<i>Alcyonium digitatum</i> , <i>Clavelina lepadiformis</i> , <i>Dysidea fragilis</i>
Group 6(b)	Attached encrusting species	<i>Cliona celata</i> , <i>Electra pilosa</i>
Group 6(c)	Attached erect species	<i>Axinella dissimilis</i> , <i>Eunicella verrucosa</i> , <i>Flustra foliacea</i>
Group 6(d)	Attached robust fauna	<i>Balanus crenatus</i> , <i>Spirobranchus triqueter</i>
<b>Biogenic reef biotopes</b>		
<i>Sabellaria spinulosa</i> on stable circalittoral mixed sediment		
Circalittoral <i>Sabellaria</i> reefs (on rock)		

### Rationale for spatial protection in the Celtic Sea

Circalittoral rock and biogenic reef 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. Broad-scale 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.

## Sensitivity Assessment

**Circalittoral rock and biogenic reef 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 or freshwater habitat)', with a resistance of None and no resilience. Circalittoral rock and biogenic reef is highly sensitive to change to another seabed type. A permanent change from rock to sediment would change the habitat classification, meaning a resistance and resilience of None. Ecological group 6(c), an attached erect species, is highly sensitive to heavy smothering and siltation changes. As permanently attached species that generally are less than 25 cm in height, a deposition of 30 cm would totally smother the group and cover suitable substratum for resettlement (Maher et al., 2016). *Sabellaria spinulosa* reefs on stable circalittoral mixed sediment are moderately sensitive to the pressure 'habitat structure change-removal of substratum (extraction)' (Tillin et al., 2023b); this pressure is not relevant for biotopes on rocky substratum (Tyler-Walters, 2018).

**Circalittoral rock and biogenic reef is highly sensitive to pressures associated with the fishing sector.** Ecological group 6(c), an attached erect species, is highly sensitive to the pressure 'hydrocarbon & PAH contamination'. No direct effects have been reported for the characterising species, but they have been reported for gorgonian corals (e.g., *Eunicella verrucosa*). Exposure is most likely through the ingestion of contaminated plankton and organic material, and exposure can result in damage to up to 50% of a coral population (Etnoyer et al., 2016). Sporadic recruitment and slow growth rates mean resilience is Low. Ecological group 3, mobile predators and scavengers, is highly sensitive to the pressure 'transition elements & organo-metal contamination'. Tributyl tin (TBT) used in antifouling paint can kill or reduce the reproductive capacity of both *Asterias rubens* and *Nucella lapillus*, which leads to population decline through natural mortality and poor recruitment (Maher et al., 2016). Ecological group 3 is also highly sensitive to synthetic compound contamination. Comprising predators and scavengers, this group is susceptible to bioaccumulation of contaminants. Polychlorinated biphenyls (PCBs) can accumulate in *A. rubens*, resulting in reduced survival rates of larvae (den Besten et al., 1989).

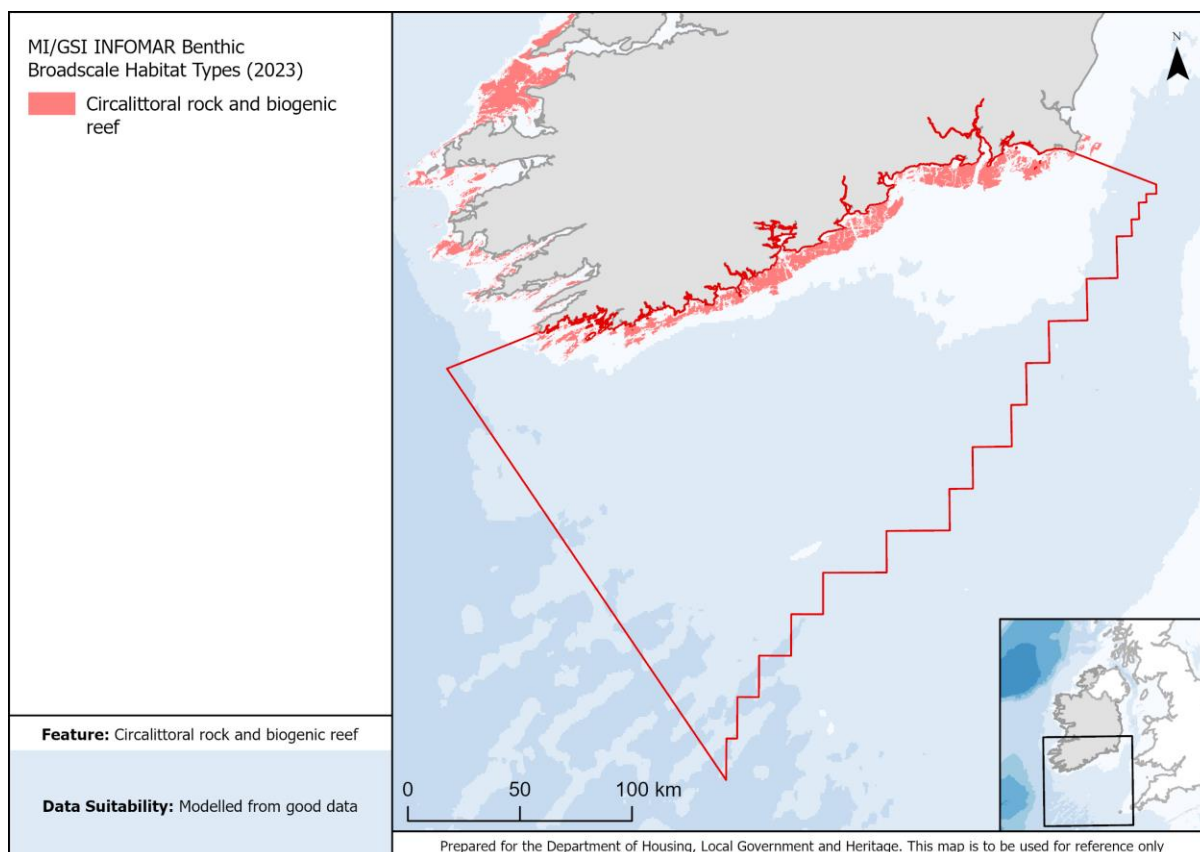


Figure A10.21.1 Data available for circalittoral rock and biogenic reef in the Celtic Sea

**Circalittoral rock and biogenic reef is highly sensitive to pressures associated with shipping.**

Circalittoral rock and biogenic reef is highly sensitive to the chemical pressures ‘transition elements & organo-metal contamination’, ‘hydrocarbon & PAH contamination’, and ‘synthetic compound contamination’ (Maher et al., 2016), the effects of which are described above in relation to the fishing sector.

**Data sources available**

See Figure A10.21.1 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. 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. There is a lack of knowledge on the prevalence and distribution of biogenic reefs in the Celtic Sea, hindering the ability to place them under appropriate protection. 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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