MarLIN
Marine Information Network
Information on the species and habitats around the coasts and sea of the British Isles

Barren littoral coarse sand

MarLIN – Marine Life Information Network
Marine Evidence–based Sensitivity Assessment (MarESA) Review

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The Marine Life Information Network, Marine Biological Association of the United Kingdom.

Please note. This MarESA report is a dated version of the online review. Please refer to the website for the most up-to-date version [https://www.marlin.ac.uk/habitats/detail/16]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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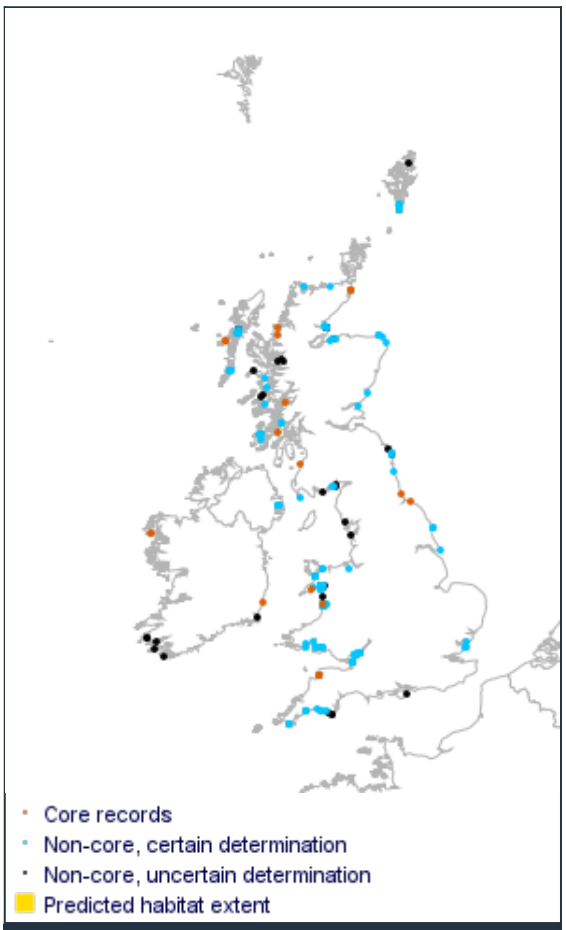
Barren littoral coarse sand
Photographer: Rohan Holt



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Biotope distribution data provided by EMODnet Seabed Habitats (www.emodnet-seabedhabitats.eu)

Researched by Dr Heidi Tillin & Georgina Budd **Refereed by** Dr John Fish

Summary

UK and Ireland classification

EUNIS 2008	A2.221	Barren littoral coarse sand
JNCC 2015	LS.LSa.MoSa.BarSa	Barren littoral coarse sand
JNCC 2004	LS.LSa.MoSa.BarSa	Barren littoral coarse sand
1997 Biotope	LS.LGS.S.BarSnd	Barren coarse sand shores

Description

Freely-draining sandy beaches, particularly on the upper and mid shore, which lack a macrofaunal community due to their continual mobility. Trial excavations are unlikely to reveal any macrofauna in these typically steep beaches on exposed coasts. Oligochaetes, probably mainly enchytraeids, and the isopod *Eurydice pulchra* may be found in extremely low abundances, but if present in any quantity should be classed as OI or AmSco.Eur. Burrowing amphipods (*Bathyporeia* spp.) may be present on very rare occasions. Occasionally, other species may be left behind in low abundance by

the ebbing tide. BarSa may occur on the mid and/or lower shore below BarSh in exposed conditions. In moderately exposed conditions, and where BarSa occurs on the upper shore, a range of relatively more species-rich clean sand communities may occur on the mid and lower shore. These include AmSco, Ol, and Po, depending on the degree of wave exposure and sediment mobility. Tal may occur on the same shore as BarSa, where driftlines of algae and other debris accumulate on the upper shore. (Information from Connor *et al.*, 2004; JNCC, 2015).

Depth range

Strandline, Upper shore, Mid shore, Lower shore

Additional information

The barren shingle/gravel shore biotope (LGS.BarSh) is also represented by this review. In Britain and Ireland the status of the LGS.BarSh biotope is listed as 'uncommon' (Connor *et al.*, 1997b) and it is differentiated from the LGS.BarSnd biotope solely on the basis of particle size (typically from 4 - 256 mm). LGS.BarSh shores have little associated fine sediment and owing to the mobility of the substratum the biotope does not support macrofauna. Furthermore, trial excavations are unlikely to reveal macroscopic infauna. Any species that are found, such as the occasional amphipod or small polychaete have probably been left stranded by the ebbing tide.

Listed By

- none -

Further information sources

Search on:

G G JNCC

Habitat review

Ecology

Ecological and functional relationships

Community and population patterns of distribution and abundance in exposed sandy beaches have been assumed to be primarily controlled by specific species responses to the hydrodynamic climate and sediment characteristics which are intimately linked, a scenario where biological interactions do not appear to play a critical role (McLachlan, 1983). Furthermore, there is a conspicuous lack of information concerning the effects of biotic factors e.g. competition, on the structure and distribution of sandy beach populations, as it is likely that detection of intra- and interspecific competition in such a dynamic environment is very complex (Branch, 1984). However, competition for space and food is unlikely to be a limiting feature in this high energy environment, as the faunal population of mobile amphipods and isopods is extremely small and they swim in the water column at high tide in search of food, only sheltering temporarily in the sediment at low tide (Peterson, 1991). Consequently, no single species can be considered a keystone species whose activity is essential to the structure of the community.

Seasonal and longer term change

The LGS.BarSnd and LGS.BarSh biotopes will be sensitive to seasonal changes in the hydrodynamic regime, and as a result of increased wave action and water movement, sedimentary disturbance is likely.

Habitat structure and complexity

- The hydrodynamic regime (tides, waves and residual currents) together with the underlying physiography and geology create the conditions for a given substrata to develop.
- Grain size, shape and degree of sorting are most important in determining porosity and permeability which influence drainage. Drainage is critical in determining the moisture content, oxygen saturation, organic content and the depth of the reducing layer (if present). Permeability increases with coarse substrate and better sorting, and drainage also increases on steeper beaches. Consequently, the sediment diameter of the coarse sand of this biotope (0.25 - 2 mm diameter) ensures that it is freely-draining.
- In the LGS.BarSnd biotope a macrophyte community is absent owing to the lack of stable substrata. However, in the LGS.BarSh biotope a temporary covering of the green algae *Ulva* may develop (via attachment to larger pebbles and cobbles) during the period of relative stability in the summer.

Productivity

Macroalgal productivity within the LGS.BarSnd biotope is likely to be very low. Macroalgae (if present) occur in extremely low abundance and is typically absent owing to the lack of a stable substratum. Therefore the benthic microalgae (microphytobenthos e.g. diatoms, flagellates and euglenoides) are probably the most significant primary producers of the depositing shore and are confined to the interstices of the illuminated sediment surface. The phytoplankton of the sea also becomes a temporary part of the sandy beach ecosystem when the tide is in and primary producers from other environments may appear on the shore. These are invariably macroalgae

that have become detached from rocky substrata and have been washed up. Eventually they decompose on the beach and contribute to the energy budget of the shore system. Consequently, most productivity on the mobile sandy shore may be categorized as secondary, derived from detritus and allochthonous organic matter. In the LSG.BarSh biotope also represented by this review, a temporary covering of the green algae *Ulva* sp. may develop during periods of relative stability during the summer and consequently contribute to the productivity of the biotope.

Recruitment processes

The burrowing amphipods *Bathyporeia pelagica* and *Pontocrates arenarius* and the isopod *Eurydice pulchra* may occur in the LGS.BarSnd and LGS.BarSh biotopes at extremely low abundance. If these species are found in any greater abundance the biotope should be classed as LGS.AEur. However, the recruitment processes of these species may be summarized as follows:

- *Eurydice pulchra* breeds between April and August once sea temperatures rise above 10°C, and the highest number of juveniles occurs around the periods of maximum summer temperatures. Males and females pair during their nightly swimming on falling spring tides and mating occurs in the sand once the female has completed her moult. Incubation of the embryos in the brood pouch takes some 7-8 weeks and after release of the young the female returns to the non-breeding condition (J. Fish, pers. comm.). Juvenile *Eurydice pulchra* first appear in July, the minimum length being 1.7 mm (J. Fish, pers. comm.). Although the first juveniles may reach sexual maturity before the onset of winter, they begin breeding in the following spring and die during their second autumn after a total lifespan of approximately 15 months. Mid-summer juveniles also mature to breed the following summer and only reached 12 months of age before dying. In contrast, the last broods appearing as late as October, do not mature until late the following summer. They breed in their second October and then overwinter for a second time, producing a second brood in the spring before dying of at 18-20 months old (Fish, 1970; Jones, 1970; Hayward, 1994).
- *Bathyporeia pelagica* may breed throughout the year, but the greatest reproductive activity occurs during spring and late summer/autumn. Males and females pair whilst swimming and mate on the night-time ebb tides following each new and full moon. Development of an egg to the stage when it is released as a juvenile takes just 15 days to complete. The overwintering population of *Bathyporeia pelagica* consists largely of juvenile animals. These mature in spring to form the majority of the next breeding population and eventually die in June and July, after a lifespan of about one year (Fish & Preece, 1970). *Bathyporeia pilosa* has a similar recruitment cycle.
- In *Pontocrates arenarius* from Irish Sea coasts, breeding has been recorded throughout the year (Fish & Fish, 1996).)

Time for community to reach maturity

Beaches are dynamic environments, even when they are neither gaining nor losing sediment they are subject to short-term changes in response to wave regimes and weather conditions. Beach profiles show alteration as beach-face sands are re-cycled and decline as the component sand grains are reduced in calibre by attrition and weathering. In some locations these trends are marked by accretion as new sandy sediment arrives and the coastline advances. Whilst in other locations there is a loss of sandy sediment, marked by diminishing beach volumes and coastline retreat (Bird, 1983). As a consequence of the dynamic nature of the habitat the faunal component of the biotope is very sparse and low in species richness. Therefore, the community might be

considered 'mature' only a few days or weeks after the last spring tide or drying event, as the mobile species migrate into the biotope from adjacent areas carried in as surf plankton.

Additional information

No text entered.

Preferences & Distribution

Habitat preferences

Depth Range	Strandline, Upper shore, Mid shore, Lower shore
Water clarity preferences	
Limiting Nutrients	Field unresearched
Salinity preferences	Full (30-40 psu)
Physiographic preferences	Open coast
Biological zone preferences	Eulittoral, Supralittoral
Substratum/habitat preferences	Coarse clean sand, Medium clean sand
Tidal strength preferences	
Wave exposure preferences	Exposed, Moderately exposed
Other preferences	

Additional Information

The species that occur are typical of unconsolidated coarse sediments that are re-mobilized as a result of strong tidal streams or wave action.

Species composition

Species found especially in this biotope

Rare or scarce species associated with this biotope

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Additional information

No text entered.

Sensitivity review

Sensitivity characteristics of the habitat and relevant characteristic species

The biotope description is taken from JNCC (2015). Coarse sands drain rapidly and the lack of water and organic content, combined with the sediment mobility which results in high-levels of abrasion, means this biotope lacks a macrofaunal community. The sensitivity assessments are therefore based on the abiotic (non-living) habitat. Occasionally, other species may be left behind in low abundance by the ebbing tide, these are not typically present in the biotope and sensitivity is not considered.

Resilience and recovery rates of habitat

This biotope is subject to high levels of abrasion resulting from sediment mobility. The species that are present (if any) are robust animals that can withstand some physical disturbance and/or recover rapidly, or migrate as adults into the biotope. The LS.LSa.MoSa.BarSa biotope is primarily identified by the type of the substratum rather than the biological community, which may be absent, or if present, occur in extremely low abundance. The mobile species that may be found in the LGS.BarSnd biotope occur throughout the littoral zone and are not dependent specifically on this biotope. Therefore the substratum type has been used primarily to indicate the sensitivity of this biotope and no species indicative of sensitivity were chosen.

Resilience assessment. As this biotope is characterized by the absence, rather then the presence of species, recovery is assessed as 'High' for any level of impact. The biotope would be considered to be sensitive to pressures that allowed the establishment of a permanent, species rich biological assemblage as low abundances and low species richness are characteristic of the biotope.

Hydrological Pressures

	Resistance	Resilience	Sensitivity
Temperature increase (local)	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is characterized by the absence of species resulting from sediment mobility and abrasion (JNCC, 2015), rather than the presence of typical species: changes in temperature will therefore not alter the biotope (based on the abiotic habitat). Resistance to an increase in temperature is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Temperature decrease (local)	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is characterized by the absence of species resulting from sediment mobility and abrasion (JNCC, 2015), rather than the presence of typical species: changes in temperature will therefore not alter the biotope (based on the abiotic habitat). Resistance to a decrease in temperature is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Salinity increase (local)	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is characterized by the absence of species resulting from sediment mobility and abrasion (JNCC, 2015), rather than the presence of typical species: changes in salinity will therefore not alter the biotope (based on the abiotic habitat). Resistance to an increase in salinity is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Salinity decrease (local)	High Q: High A: Medium C: Low	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is characterized by the absence of species resulting from sediment mobility and abrasion (JNCC, 2015), rather than the presence of typical species: changes in salinity will therefore not alter the biotope (based on the abiotic habitat). Resistance to a decrease in salinity is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Water flow (tidal current) changes (local)	High Q: Low A: NR C: NR	High Q: High A: High C: High	Not sensitive Q: Low A: Low C: Low

Changes in water flow at the pressure benchmark are considered unlikely to lead to alterations in the biotope as wave exposure would still result in sediment mobility, preventing the establishment of a more species rich biotope. Resistance is therefore assessed as 'High' and resilience as 'High' (by default) so that the biotope is considered to be 'Not sensitive'. A reduction in water flow (coupled with reduced wave exposure) exceeding the pressure benchmark, could reduce sediment mobility and this may allow the establishment of a biotope such as LS.LSa.MoSa.AmSco.Sco or LS.LSa.MoSa.AmSco.Eur where finer sands were deposited.

Emergence regime changes	Low Q: Low A: NR C: NR	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

This biotope occurs from the lower to upper shore and sediment mobility, rather than emergence, is a key factor preventing the establishment of a more species rich biotope. An increase in the emergence period of this biotope would make it even more inhospitable to marine invertebrates. Where the biotope occurs in the supralittoral zone, a reduction in saline spray and splash may favour the colonization of terrestrial plants, which if able fully to establish will have a stabilising effect on the substratum. Consequently, this factor has the potential to alter the LGS.BarSnd biotope so that its starts to become another biotope. Similarly a decrease in emergence that led to this biotope becoming fully sublittoral would result in reclassification. The LGS.BarSnd biotope would not be recognized in either scenario and resistance has therefore been assessed as 'Low'. On return to prior emergence regime sublittoral species that are intolerant of emergence and plants that may have colonized the substratum and which are intolerant to saline splash and spray will probably decline rapidly. Therefore resilience has been assessed as 'High'. This biotope is therefore considered to have 'Low' sensitivity' to changes in emergence.

Wave exposure changes (local)	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is found on shores that are judged to be moderately exposed, exposed or very exposed to wave action (JNCC, 2015). The presence of this biotope across these three categories is considered to indicate (by proxy) that increases or decreases in wave exposure at the pressure benchmark are unlikely to lead to alterations to the biotope. Resistance is therefore assessed as 'High' and resilience as 'High' (by default) so that the biotope is considered to be 'Not sensitive'. A reduction in wave exposure (exceeding the pressure benchmark), could reduce sediment mobility and this may allow the establishment of a biotope such as LS.LSa.MoSa.AmSco.Pon or LS.LSa.MoSa.AmSco.Eur where finer sands were deposited.

Chemical Pressures

	Resistance	Resilience	Sensitivity
Transition elements & organo-metal contamination	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

This pressure is **Not assessed** but evidence is presented where available. As this biotope is characterized by the lack of species, exposure to contaminants will not result in significant impacts.

Hydrocarbon & PAH contamination	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

This pressure is **Not assessed** but evidence is presented where available. As this biotope is characterized by the lack of species, exposure to contaminants will not result in significant impacts.

Synthetic compound contamination	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

This pressure is **Not assessed** but evidence is presented where available. As this biotope is characterized by the lack of species, exposure to contaminants will not result in significant impacts.

Radionuclide contamination	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

No evidence was found

Introduction of other substances	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

This pressure is **Not assessed**.

De-oxygenation	High Q: Low A: NR C: NR	High Q: High A: High C: High	Not sensitive Q: Low A: Low C: Low

As this biotope is characterized by the lack of species, de-oxygenation will not result in significant impacts. De-oxygenation is unlikely as this biotope is intertidal and exposure to air and tidal flushing is likely to recharge oxygen levels. Biotope resistance is therefore assessed as 'High', and resilience as 'High' (by default) and the biotope is considered to be 'Not sensitive'.

Nutrient enrichment	High Q: Low A: NR C: NR	High Q: High A: High C: High	Not sensitive Q: Low A: Low C: Low

As this biotope is characterized by the lack of species present due to sediment mobility, nutrient enrichment will not result in significant impacts. Biotope resistance is therefore assessed as 'High', and resilience as 'High' (by default) and the biotope is considered to be 'Not sensitive'.

Organic enrichment	High Q: Low A: NR C: NR	High Q: High A: High C: High	Not sensitive Q: Low A: Low C: Low

As this biotope is characterized by the lack of species, organic enrichment will not result in significant impacts. Organic deposits are likely to be removed rapidly by wave action although in periods of calm an organic deposit may be rapidly colonized by oligochaetes. Biotope resistance is assessed as 'High' as enrichment is likely to be very short-lived, and resilience as 'High' (by default), the biotope is considered to be 'Not sensitive'.

Physical Pressures

	Resistance	Resilience	Sensitivity
Physical loss (to land or freshwater habitat)	None Q: High A: High C: High	Very Low Q: High A: High C: High	High Q: High A: High C: High

All marine habitats and benthic species are considered to have a resistance of ‘None’ to this pressure and to be unable to recover from a permanent loss of habitat (resilience is ‘Very Low’). Sensitivity within the direct spatial footprint of this pressure is therefore ‘High’. Although no specific evidence is described confidence in this assessment is ‘High’, due to the incontrovertible nature of this pressure.

Physical change (to another seabed type)	None Q: High A: Medium C: NR	Very Low Q: High A: High C: High	High Q: High A: Medium C: Low

This biotope is characterized by coarse sands (JNCC, 2015). A change to a hard or artificial substratum would significantly alter the character of the biotope. The biotope is therefore considered to have 'No' resistance to this pressure (based on a change to a sediment habitat), recovery is assessed as 'Very low', as the change at the pressure benchmark is permanent. Biotope sensitivity is therefore assessed as 'High'.

Physical change (to another sediment type)	None Q: High A: Medium C: Low	Very Low Q: High A: High C: High	High Q: High A: Medium C: Low

The benchmark for this pressure refers to a change in one Folk class. The pressure benchmark originally developed by Tillin *et al*., (2010) used the modified Folk triangle developed by Long (2006) which simplified sediment types into four categories: mud and sandy mud, sand and muddy sand, mixed sediments and coarse sediments. The change referred to is therefore a change in sediment classification rather than a change in the finer-scale original Folk categories (Folk, 1954). The change in one Folk class is considered to relate to a change in classification to adjacent categories in the modified Folk triangle. For coarse sands a change in one folk class may refer to a change to gravels, mixed sediments or muddy sands, sandy muds and muds. A change in sediment type would result in reclassification of the biotope (JNCC, 2015) and a change to mixed or fine sediments would likely result in the establishment of a species rich and more diverse community (depending on other habitat factors). Biotope resistance is therefore assessed as 'None' and resilience as 'Very low' as the change at the pressure benchmark is permanent. Sensitivity is therefore 'High'.

Habitat structure changes - removal of substratum (extraction)	None Q: High A: Low C: NR	High Q: Low A: NR C: NR	Medium Q: Low A: Low C: Low

The process of extraction will remove the abiotic habitat; therefore a resistance of 'None' is recorded. As the coarse sands are mobile where small areas are impacted infilling is likely to be rapid following sediment redistribution by wave action. For instance, at Village Bay on St Kilda, an island group far out into the Atlantic west of Britain, an expanse of sandy beach was removed offshore as a result of winter storms to reveal an underlying rocky shore (Scott, 1960). Yet in the following summer the beach was gradually replaced when wave action was less severe. In view of such observations, that many sandy beaches disappear in winter and reappear in spring, it is likely that recovery would occur in less than a year or six months. As a result, resilience is assessed as 'High', and sensitivity as 'Medium'. Recovery where large volumes of sand are removed over wide areas may lead to slower recovery if sediments are not available and/or water transport is limited.

Abrasion/disturbance of the surface of the substratum or seabed	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is characterized by the absence of species through sediment mobility (JNCC, 2015), rather than the presence of typical species: abrasion will therefore not alter biotope character. The highly mobile species present occasionally in this biotope may only be found in extremely low abundance and are not specifically dependent on this biotope. Resistance to this pressure is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Penetration or disturbance of the substratum subsurface	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is characterized by the absence of species through sediment mobility (JNCC, 2015),

rather than the presence of typical species: abrasion will therefore not alter biotope character. The highly mobile species present occasionally in this biotope may only be found in extremely low abundance and are not specifically dependent on this biotope Resistance to this pressure is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Changes in suspended solids (water clarity)	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope occurs in scoured habitats and it is likely, depending on local sediment supply, that the biotope is exposed to chronic or intermittent episodes of high-levels of suspended solids as local sediments are re-mobilised and transported. This biotope is characterized by the absence of species through sediment mobility (JNCC, 2015), rather than the presence of typical species: changes in suspended solids will therefore not alter the biotope. Resistance to an increase or decrease in suspended solids is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Smothering and siltation rate changes (light)	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is characterized by the absence of species through sediment mobility (JNCC, 2015), rather than the presence of typical species: the addition of a single deposit of fine sediments which will be removed by wave action will therefore not alter the biotope. Resistance to this pressure is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Smothering and siltation rate changes (heavy)	High Q: High A: Medium C: NR	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Low

This biotope is characterized by the absence of species through sediment mobility (JNCC, 2015), rather than the presence of typical species: the addition of a single deposit of fine sediments which will be removed by wave action will therefore not alter the biotope. Resistance to this pressure is therefore assessed as 'High' and resilience as 'High' (by default) and this biotope is considered to be 'Not sensitive'.

Litter	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

Not assessed.

Electromagnetic changes	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

No evidence

Underwater noise changes	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant.

Introduction of light or shading	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant.

Barrier to species movement	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant.

Death or injury by collision	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant' to seabed habitats. NB. Collision by grounding vessels is addressed under surface abrasion.

Visual disturbance	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant.

Biological Pressures

	Resistance	Resilience	Sensitivity
Genetic modification & translocation of indigenous species	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

This biotope is not characterized by any typical species, those that are present, such as *Bathyporeia spp.* are not translocated and this pressure is therefore considered 'Not relevant'.

Introduction or spread of invasive non-indigenous species	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

The high levels of abrasion resulting from movement of coarse sands and the subsequent sediment instability will limit establishment of all but the most highly scour resistant invasive non-indigenous species (INIS) and no direct evidence was found for effects of INIS on this biotope. The low levels of water and organic matter retained by this biotope, are considered to additionally inhibit permanent colonization by invasive species.

Sensitivity assessment. Overall, there is no evidence of this biotope being adversely affected by non-native species. Resistance is therefore assessed as 'High', and resilience as 'High' (by default), and the biotope is considered to be 'Not sensitive'.

Introduction of microbial pathogens	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

As this biotope is characterized by the absence of a biological assemblage apart from occasional and ephemeral presence of *Bathyporeia* spp. this pressure is considered to be 'Not relevant'.

Removal of target species	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

As this biotope is characterized by the absence of a biological assemblage apart from occasional and ephemeral presence of *Bathyporeia* spp. this pressure is considered to be 'Not relevant'.

Removal of non-target species	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

As this biotope is characterized by the absence of a biological assemblage apart from occasional and ephemeral presence of *Bathyporeia* spp. this pressure is considered to be 'Not relevant'.

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