Sponges and anemones on vertical circalittoral bedrock

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

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2016-07-07

This review can be cited as:
Readman, J.A.J., 2016. Sponges and anemones on vertical circalittoral bedrock. In Tyler-Walters H. and Hiscock K. (eds) *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, [on-line]. Plymouth: Marine Biological Association of the United Kingdom.
DOI https://dx.doi.org/10.17031/marlinhab.1129.1

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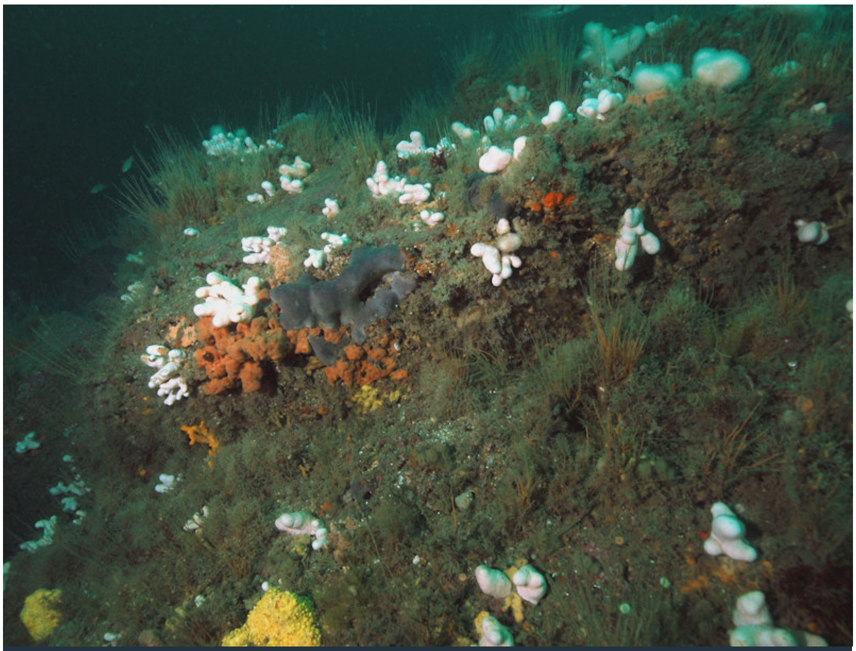

Sponges and anemones on vertical circalittoral bedrock
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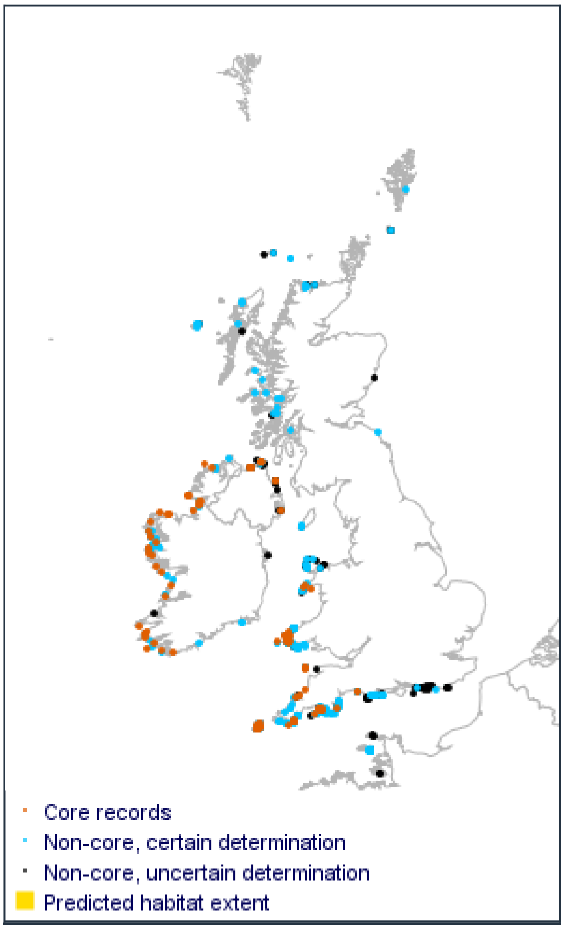

17-09-2018
Biotope distribution data provided by EMODnet Seabed Habitats (www.emodnet-seabedhabitats.eu)

Researched by John Readman **Refereed by** This information is not refereed.

Summary

UK and Ireland classification

EUNIS 2008	A4.139	Sponges and anemones on vertical circalittoral bedrock
JNCC 2015	CR.HCR.XFa.SpAnVt	Sponges and anemones on vertical circalittoral bedrock
JNCC 2004	CR.HCR.XFa.SpAnVt	Sponges and anemones on vertical circalittoral bedrock
1997 Biotope		

Description

This biotope is found on exposed to moderately wave exposed , vertical and overhanging, circalittoral bedrock, subject to strong through to weak tidal streams. This biotope is characterized by a mixed faunal turf of hydroids (*Nemertesis antennina*, *Tubularia indivisa* and *Halecium halecium*) and bryozoans (*Alcyonidium diaphanum* and crisiid turf). There is frequently a diverse range of sponges recorded, including *Cliona celata*, *Pachymatisma johnstonia*, *Dysidea fragilis* and*Hemimycale columella*. There may be dense aggregation of dead mans fingers *Alcyonium digitatum* along with clumps of the cup coral *Caryophyllia smithii*, and the anthozoans *Corynactis viridis*, *Actinothoe sphyrodeta*, *Sagartia elegans* and*Metridium senile*. Other species present include the echinoderms *Echinus esculentus*, *Asterias rubens*, *Marthasterias glacialis*, *Henricia oculata*, *Holothuria forskali* and *Antedon bifida*, clumps of the lightbulb tunicate *Clavelina lepadiformis*and the top shell *Calliostoma zizyphinum*. Three regional variations of this biotope have been recorded. The first variant is characterized by a *Bugula* turf along with the pink sea fan *Eunicella verrucosa*, and has been recorded from around southwest England and Wales. The second variant, characterized by a dense 'carpet' of *Corynactis viridis* and *Metridium senile* has been recorded predominantly from the west coast of Ireland. The final variant is characterized by a very diverse, dense faunal turf of hydroids, bryozoans and ascidians and has been recorded from the coasts around Northern Ireland. (Information from Connor *et al*., 2004).

Depth range

10-20 m, 20-30 m, 30-50 m

Additional information

-

Listed By

- none -

Further information sources

Search on:

JNCC

Sensitivity review

Sensitivity characteristics of the habitat and relevant characteristic species

The biotope occurs on vertical faces and overhangs, is wave exposed to moderately wave exposed and subject to strong to weak water flow. The biotope is characterized by a diverse community of sponges (including *Cliona celata*, *Pachymatisma Johnstonia* and *Dysidea fragilis*) and an anthazoan component (including *Corynactis viridis*, *Metridium senile* and *Sagartia elegans*). There is also a mixed faunal turf present in CR.HCR.XFa.SpAnVt made up of a variety of bryozoans and hydroids along with *Alcyonium digitatum*, *Caryophyllia smithii.*

For this sensitivity assessment the sponge community and anthozoan component are the primary focus of research as the important characterizing species defining CR.HCR.XFa.SpAnVt, with common species including *Alcyonium digitatum*, *Caryophyllia smithii* and the species making up the faunal crust (a variety of hydroids and bryozoans) considered where appropriate. Other species present in these biotopes are considered transient, mobile or ubiquitous and are, therefore, not considered significant to assessment of the sensitivity of these biotopes. However, information on the sensitivity of other characterizing species is included where appropriate.

Resilience and recovery rates of habitat

Little information on sponge longevity and resilience exists. Reproduction can be asexual (e.g. budding) or sexual (Naylor, 2011) and individual sponges are usually hermaphroditic (Hayward & Ryland, 1994). Short-lived ciliated larvae are released via the aquiferous system and metamorphosis follows settlement. Growth and reproduction are generally seasonal (Hayward & Ryland, 1994). Rejuvenation from fragments can also be considered an important form of reproduction (Fish & Fish, 1996). Marine sponges often harbour dense and diverse microbial communities. These mircrobial communities include bacteria, archaea and single-celled eukaryotes (fungi and microalgae) and can comprise up to 40% of sponge volume, and which may have a profound impact on host biology (Webster & Taylor, 2012). Many sponges recruit annually, growth can be quite rapid, with a lifespan of one to several years (Ackers *et al*, 1992). However, sponge longevity and growth is highly variable depending on the species and conditions (Lancaster *et al.*, 2014). It is likely that erect sponges are generally longer lived and slower growing given their more complex nature.

Sponges are known to be highly resilient to physical damage with the ability to survive severe damage, regenerate and reorganize to function fully again (Wulff, 2006). However, the ability to resist damage and recover varies between species (Wulff, 2006). Sponge fragments of coral reef species torn from adults during hurricanes have been observed to re-attach and continue growing (Wulff, 2006). Fowler & Laffoley (1993) monitored marine nature reserves in Lundy and the Isles Scilly and found that a number of more common sponges showed great variation in size and cover during the study period. Large colonies appeared and vanished at some locations. Some large encrusting sponges went through periods of both growth and shrinkage, with considerable changes taking place from year to year. For example, *Cliona celata* colonies generally grew extremely rapidly, doubling their size or more each year. In some years an apparent shrinkage in size also took place. In contrast, there were no obvious changes in the cover of certain unidentified thin encrusting sponges. Axinellid sponges have been described as very slow growing and little to no recovery has been observed over long periods of monitoring (Fowler & Laffoley, 1993; Hiscock, 1994, 2003). *Dysidea fragilis* readily colonizes deep water wrecks (Ackers *et al.*, 1992) *Pachymatisma johnstonia* can be massive-lobose, hemispherical to irregularly rounded and up to

30 cm or more across (Picton & Morrow, 2015). *Cliona celata* colonies generally grows extremely rapidly, doubling their size or more each year, but in some years an apparent shrinkage in size also took place (Fowler & Lafoley, 1993). *Cliona celata* occurs on rock and begins as boring sponge, but can become massive and lobose with rounded ridges up to 40 cm across (Ackers *et al.*, 1992). Van Dolah *et al.* (1987) reported that, following an experimental trawl, 32% of sponges suffered damage, with *Cliona* spp. the most affected. However the abundance of sponges had increased to pre-trawl densities, or greater 12 months after trawling.

Sebens (1985, 1986) found that the sponge *Halichondria panicea* reached pre-clearance levels of cover after 2 years. A few individuals of *Alcyonium digitatum* and *Metridium senile* colonized within 4 years (Sebens, 1986) and slower growing sponges would probably take longer to reach pre-clearance levels.

Metridium senile reproduces each year and the planulae spend months in the plankton and are likely to disperse over in excess of 10 km from parent anemones (Sebens,1985). New jetty piles at Lundy were colonized by their third year (L. Cole, pers. comm.). Settled planulae or individuals produced by basal laceration are likely to grow rapidly. Bucklin (1987a) found that, for *Metridium senile* from California, individuals showed rapid growth to large sizes when fed at frequent intervals. Mean size grew steadily during the first eight months then levelled off. An increase from 5 cm^2 pedal disk area to 45 cm^2 occurred within 12 months. However, in clearance experiments, Sebens (1985) found that it took 5-10 years for *Metridium senile* to return to pre-clearance cover. In another study, Wahl (1985) found that *Metridium senile* returned to rock walls only one week after oxic conditions returned following annual de-oxygenation events in the Inner Flensburg Fjord. Shick & Hoffman (1980, cited in Sebens, 1985) reported that pedal laceration in *Metridium* was greater at a site with higher water flow rate compared to slower flowing areas. This is presumably because successful recruitment by the planktonic larvae may be difficult in such as wave-surged environments. As a result, many of the species capable of asexual reproduction within this biotope may rely more on this method of reproduction in colonizing newly created sapce. Growth of *Metridium senile* is rapid. Bucklin (1985) working in Britain found that *Metridium senile* f. *dianthus* fragments and for newly settled *Metridium senile* f. *pallidum*, grew up to 0.6 mm and 0.8 mm in pedal diameter per day respectively. No specific resilience information for the other characterizing anemones was found. Anemones are not sessile but are capable of slow movement. For example Sebens (1981) observed immigration to cleared patches of the long-lived anemone *Anthopleura xanthogrammica* as being the primary driver towards recovery. Sebens (1981) cleared intertidal patches of *Anthopleura xanthogrammica* at Mukkaw Bay, WA observing the effects over four years. Even after four years cleared areas were not back to pre-removal population densities.

Jensen *et al.* (1994) reported the colonization of an artificial reef in Poole Bay, England. They noted that erect bryozoans began to appear within six months, reaching a peak in the following summer, 12 months after the reef was constructed. Sponges were slow to establish with only a few species present within 6-12 months but beginning to increase in number after two years, while anemones were very slow to colonize with only isolated specimens present after two years (Jensen *et al.*, 1994.). In addition Hatcher (1998) reported a diverse mobile epifauna after a year's deployment of her settlement panels. Whomersley & Picken (2003) documented epifauna colonization of offshore oil platforms in the North Sea from 1989-2000. For the first three years, hydroids and tubeworms dominated the community below the mussel band. However the hydroid community were later out-competed by other more climax communities. Recruitment of *Alcyonium digitatum* and *Metridium senile* began at 2-5 years (dependent on the oil rig). The community structure and zonation differed between four rigs, however, generally after four years, *Metrdium senile* had become the dominant organism below the mussel zone to approximately 60-80 m Below Sea Level (BSL). Zonation differed between oil rigs however, from approximately 60-90 m BSL *Alcyonium digitatum* was the dominant organism.

The *Scylla* was intentionally sunk on the 27th March 2004 in Whitsand Bay, Cornwall to act as an artificial reef. Hiscock *et al.* (2010) recorded the succession of the biological community on the wreck for five years following the sinking of the ship. Initially the wreck was colonized by opportunistic species /taxa; filamentous algae, hydroids, serpulid worms and barnacles. *Tubularia* sp. were early colonizers, appearing within a couple of months after the vessel was sunk. *Metridium senile* appeared late in the summer of the first year, but didn't become visually dominant until 2007 (three years after the vessel was sunk). *Sagartia elegens* was recorded within the summer of 2005, and by the end of 2006 was well established. *Corynactis viridis* was first recorded in the summer of the first year and quickly formed colonies via asexual reproduction. *Alcyonium digitatum* was first recorded in early summer 2005, a year after the vessel was sunk. Within one year of growth colonies had grown to nearly full size, however, did not become a visually dominant component of the community until 2009 (five years after the vessel had been sunk). The authors noted that erect branching Bryozoa (such as *Securiflustra securifrons*) are not a common part of rocky reef communities to the west of Plymouth and at the time of writing had not colonized to any great extent on 'Scylla' by the end of the study, although several species of erect bryozoans were recorded, which included *Chartella papyracea* in Auguut 2006 (two years after the vessel was sunk).

Alcyonidium diaphanum forms an erect colony that can grow up to 50 cm long but more usually 15 cm. It has a small encrusting base that attaches to hard substratum. The size, colour and colony form varies widely around the British Isles (Ager, 2007).

Resilience assessment: Sebens (1985, 1986) found that the sponge *Halichondria panicea* reached pre-clearance levels of cover after two years. A few individuals of *Alcyonium digitatum* and *Metridium senile* colonized within four years (Sebens, 1986) and slower growing sponges would probably take longer to reach pre-clearance levels. Some of the faster growing, smaller sponges (such as *Cliona celata*) would colonize new sites relatively quickly. Overall, if community suffers significant mortality from a pressure (resistance of 'None', 'Low') resilience is assessed as '**Medium**' (recovery within 2-10 years). If resistance is assessed as 'Medium' or 'High' then resilience will be assessed as '**High**' (recovery within 2 years).

Hydrological Pressures

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

The sponge *Dysidea fragilis* has been recorded from the Arctic to the Mediterranean, *Pachymatisma johnstonia* has been recorded from the Orkneys to Spain is ubiquitous across the western and southern coasts of Britain and *Cliona celata* has been recorded from Sweden to the Mediterranean (Ackers *et al.*, 1992). The sea anemone *Sargatia elegans* is found from Scandinavia to the Mediterranean (Picton & Morrow 2015), *Actinothoe sphyrodeta* is distributed from the northern coast of Scotland to Spain (Ramos, 2010; NBN, 2015) and *Metridium senile* has been reported in the Adriatic (Manual, 1988).

Berman *et al.* (2013) monitored sponge communities off Skomer Island, UK over three years with all characterizing sponges for this biotope assessed. Seawater temperature, turbidity, photosynthetically active radiation and wind speed were all recorded during the study. It was concluded that, despite changes in species composition, primarily driven by the non-characterizing *Hymeraphia*, *Stellifera* and *Halicnemia patera*, no significant difference in sponge density was recorded in all sites studied. Morphological changes most strongly correlated with a mixture of water visibility and temperature. Research by Webster *et al.* (2008, 2011), Webster & Taylor (2012) and Preston & Burton (2015) suggested that many sponges rely on a holobiont of many synergistic microbes. Webster *et al.* (2011) described a much higher thermal tolerance to sponge larval holobiont when compared with adult sponges.

Sensitivity assessment. The characterizing species are widely distributed across the British Isles. Morphological changes were observed in UK sponge communities, with temperature a factor, but the characterizing sponges assessed were not listed as the most highly contributing to these changes (Berman *et al.*, 2013). Resistance has been assessed as '**High**', resilience as '**High**' and sensitivity as '**Not Sensitive**' at the benchmark level.

Temperature decrease (local)	Medium Q: Medium A: Medium C: Medium	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

The sponge *Dysidea fragilis* has been recorded from the Arctic to the Mediterranean, *Pachymatisma johnstonia* has been recorded from the Orkneys to Spain is ubiquitous across the western and southern coasts of Britain and *Cliona celata* has been recorded from Sweden to the Mediterranean (Ackers *et al.*, 1992). Berman *et al.* (2013) monitored sponge communities off Skomer Island, UK over three years with all characterizing sponges for this biotope assessed. seawater temperature, turbidity, photosynthetically active radiation and wind speed were all recorded during the study. It was concluded that, despite changes in species composition, primarily driven by the non-characterizing *Hymeraphia Stellifera* and *Halicnemia patera*, no significant difference in sponge density was recorded in all sites studied. Morphological changes most strongly correlated with a mixture of visibility and temperature. Some sponges do exhibit morphological strategies to cope with winter temperatures e.g. *Halichondria bowerbanki* goes into a dormant state below 4°C, characterized by major disintegration and loss of choanocyte chambers with many sponges surviving mild winters in more protected areas from where it can recolonize (Vethaak *et al.*, 1982).

Crisp (1964) reported the effects of an unusually cold winter (1962-3) on the marine life in Britain, including Porifera in North Wales. Whilst difficulty distinguishing between mortality and delayed development was noted, Crisp (1964) found that *Pachymastia johnstonia* and *Halichondria panicea* were wholly or partly killed by frost, several species appeared to be missing including *Amphilectus fucorum*. Others, including *Hymeniacidon perleve*, were unusually rare and a few species, including *Polymastia boletiformis*, were not seriously affected. It should be noted that Crisp's general comments on all marine life state that damage decreased the deeper the habitat. The anemone *Sargatia elegans* is found from Scandinavia to the Mediterranean (Picton & Morrow, 2015), while *Actinothoe sphyrodeta* is distributed from the northern coast of Scotland to Spain (Ramos, 2010; NBN, 2015) and could, therefore, be affected by a reduction in temperature.

The sea anemone *Sagartia elegans* is found from Scandinavia to the Mediterranean (Picton & Morrow, 2015), *Actinothoe sphyrodeta* is distributed from the northern coast of Scotland to Spain (Ramos, 2010; NBN, 2015). Crisp (1964) reported that *Metridium senile* was unaffected by the cold winter of 1962-63. The characterizing bryozoans *Alcyonidium diaphanum*, has been recorded across the British Isles, from the Channel Isles to the northern coast of Scotland (NBN, 2015).

Sensitivity assessment. There is evidence of sponge mortality at extreme low temperatures in the British Isles. Given this evidence, it is likely that rapid cooling of 5°C would affect some of the characterizing species, and resistance is assessed as '**Medium**'. A resilience of '**High**' is recorded and sensitivity is assessed as '**Low**'.

Salinity increase (local)	No evidence (NEv) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

Marin (1997) describes the presence of *Dysidea fragilis* in a hypersaline coastal lagoon (42-47 g/l) in La Mar Menor, Spain. **'No evidence'** for other characterizing species was found.

Salinity decrease (local)	Low Q: Medium A: Medium C: Medium	Medium Q: Low A: NR C: NR	Medium Q: Low A: Low C: Low

Castric & Chassé (1991) conducted a factorial analysis of the subtidal rocky ecology near Brest, France and rated the distribution of species from estuarine to offshore conditions. *Dysidea fragilis* and *Raspailia ramosa* were rated as indifferent to this range. *Cliona celata* and *Pachymatisma johnstonia* had a slight preference for more estuarine conditions. Mean salinity difference between the two farthest zones was low (35.1 and 33.8 ‰ respectively) but with a greater range being experienced in the Inner Rade (±2.4‰ compared with ±0.1‰). It should be noted that the range of salinities identified in this study does not reach the lower benchmark level, and at least some of the characterizing sponges are likely to be affected at the benchmark level.

Although *Metridium senile* is predominantly marine, the species also penetrates into estuaries. Braber & Borghouts (1977) found that *Metridium senile* occurred in about 10 ppt Chlorinity (about 19 psu) in the Delta Region of the Netherlands suggesting that it would be tolerant of reduced salinity conditions. Shumway (1978) found that, during exposure to 50% seawater, animals retracted their tentacles whilst animals exposed to fluctuating salinity, contracted their body wall and produced copious mucus. *Sagartia elegans* and *Actinothoe sphyrodeta* occur in the littoral (Picton & Morrow, 2015) and are therefore likely to experience both higher and lower salinities than 'Full' (30-35 ppt) as per the biotope description (Connor et al., 2004).

Ryland (1970) stated that, with a few exceptions, the Gymnolaemata bryozoans were fairly stenohaline and restricted to full salinity (30-35 ppt), noting that reduced salinities result in an impoverished bryozoan fauna. Dyrynda (1994) noted that *Alcyonidium diaphanum* was probably restricted to the vicinity of the Poole Harbour entrance by their intolerance to reduced salinity.

Sensitivity assessment. Some of the characterizing bryozoans and sponges are likely to be adversely affected by a reduction in salinity. Resistance is assessed as '**Low**', resilience as '**Medium**' and sensitivity as '**Medium**'.

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

Riisgard *et al.* (1993) discussed the low energy cost of filtration for sponges and concluded that passive current-induced filtration may be of insignificant importance for sponges. Pumping and filtering occurs in choanocyte cells which generate water currents in sponges using flagella (de Vos *et al.*, 1991). The sponges *Pachymatisma johnstonia* and *Dysidea fragilis* have been recorded in biotopes from very weak to very strong water flow (0->3 m/s). The anemones *Corynactis viridis* and *Metridium senile* have been recorded in biotopes from very weak to very strong water flow (0->3 m/s).

Water flow has been shown to be important for the development of bryozoan communities and the provision of suitable hard substrata for colonization (Eggleston, 1972b; Ryland, 1976). In addition, areas subject to the high mass transport of water such as the Menai Strait and tidal rapids generally support large numbers of bryozoan species (Moore, 1977). Although, active suspension feeders, their feeding currents are probably fairly localized and they are dependent on water flow to bring adequate food supplies within reach (McKinney, 1986). A substantial decrease in water flow will probably result in impaired growth due to a reduction in food availability, and an increased risk of siltation (Tyler-Walters, 2005c).

Sensitivity assessment. This biotope is defined as a moderate to high energy and occurs in areas of moderately strong to strong tidal water flow (0.5- 3 m/s). Bryozoan communities rely on movement of water for feeding and a severe reduction in water flow over an extended period of time could cause mortality. Characterizing sponges and anemones are present in biotopes with both stronger and weaker tidal flow and are, therefore, unlikely to be affected by a change in water flow at the benchmark level (0.1-0.2 m/s). Resistance is, therefore, recorded as '**High**' with resilience as '**High**' and the biotope is '**Not sensitive'** at the benchmark level.

Emergence regime 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

Changes in emergence are '**Not relevant**' to this biotope as it is restricted to fully subtidal/circalittoral conditions - the pressure benchmark is relevant only to littoral and shallow sublittoral fringe biotopes.

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

Roberts *et al.* (2006) studied deep sponge reef communities (18-20 m) in sheltered and exposed locations in Australia. They reported greater diversity and cover (>40% cover) of sponges in wave-sheltered areas compared with a sparser and more temporal cover in exposed sites (25% cover).

Sensitivity assessment. The SpAnVt complex is found in extreme wave exposure so that a further increase is 'Not relevant'. However, a reduction in wave exposure is likely to result in faunal communities typical of moderate to low energy, and less wave exposed, habitats, e.g. the BrAs complex dominated by ascidians and brittlestars or echinoderm grazed faunal turfs. Hence, a significant reduction in wave exposure could result in reclassification and loss of the biotope. However, a 3-5% change in significant wave height (the benchmark) is probably not significant. Resistance is, therefore, recorded as '**High**' with resilience as '**High**' and the biotope is '**Not sensitive'** at the benchmark level.

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.

Mercier *et al*. (1998) exposed *Metridium senile* to tri-butyl tin contamination in surrounding water and in contaminated food. The species produced mucus 48 hours after exposure to contaminated seawater. TBT was metabolised but the species accumulated levels of butyl tins leading the authors to suggest that *Metridium senile* seemed vulnerable to TBT contamination. However, Mercier *et al*., (1998) did not indicate any mortality and, since *Metridium senile* is a major component of jetty pile communities immediately adjacent to large vessels coated with TBT antifouling paints.

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.

CR.HCR.XFa.SpAnVt is a subtidal biotope (Connor *et al*., 2004). Oil pollution is mainly a surface phenomenon its impact upon circalittoral turf communities is likely to be limited. However, as in the case of the *Prestige* oil spill off the coast of France, high swell and winds can cause oil pollutants to mix with the seawater and potentially negatively affect sublittoral habitats (Castège *et al*., 2014).

Filter feeders are highly sensitive to oil pollution, particularly those inhabiting the tidal zones which experience high exposure and show correspondingly high mortality, as are bottom dwelling organisms in areas where oil components are deposited by sedimentation (Zahn *et al*., 1981). There is little information on the effects of hydrocarbons on bryozoans. Ryland & Putron (1998) did not detect adverse effects of oil contamination on the bryozoan *Alcyonidium spp.* in Milford Haven or St. Catherine's Island, south Pembrokeshire, although it did alter the breeding period. Banks & Brown (2002) found that exposure to crude oil significantly impacted recruitment in the bryozoan *Membranipora savartii.*

Tethya lyncurium concentrated BaP (benzo[a]pyrene) to 40 times the external concentration and no significant repair of DNA was observed in the sponges, which, in higher animals would likely lead to cancers. As sponge cells are not organized into organs the long-term effects are uncertain (Zahn *et al*., 1981).

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

Hoare & Hiscock (1974) suggested that polyzoa (bryozoa) were amongst the most intolerant species to acidified halogenated effluents in Amlwch Bay, Anglesey and reported that *Flustra foliacea* did not occur less than 165 m from the effluent source. The evidence, therefore, suggests that *Securiflustra securifrons* would be sensitive to synthetic compounds.