

The Marine Habitat Classification for Britain and Ireland. Version 04.05

Circalittoral Rock Section

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CR Circolittoral rock (and other hard substrata)

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt), Variable (18-35ppt), Reduced/low (0.5-30ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed, Sheltered, Very sheltered, Extremely sheltered |
| Tidal streams: | Very strong, Strong, Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulders, cobbles, mixed substrata |
| Zone: | Circolittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Previous code

SR in part 96.7

Biotope description

Circolittoral rock is present all around the coast of the United Kingdom, and is characterised by animal dominated communities (a departure from the algae dominated communities in the infralittoral zone). The circolittoral zone can itself be split into two sub-zones; upper circolittoral (foliose red algae present) and lower circolittoral (foliose red algae absent). The depth at which the circolittoral zone begins is directly dependent on the intensity of light reaching the seabed; in highly turbid conditions, the circolittoral zone may begin just below water level at mean low water springs (MLWS). The biotopes identified in the field 'fall' into three energy levels: high, moderate and low energy circolittoral rock (used to define the habitat complex level). The character of the fauna varies enormously and is affected mainly by wave action, tidal stream strength, salinity, turbidity, the degree of scouring and rock topography. It is typical for the community not to be dominated by single species, as is common in shore and infralittoral habitats, but rather comprise a mosaic of species. This, coupled with the range of influencing factors, makes circolittoral rock a difficult area to satisfactorily classify; particular care should therefore be taken in matching species and habitat data to the classification.

CR.HCR**High energy circalittoral rock****Habitat classification**

| | |
|-----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed |
| Tidal streams: | Very strong, Strong |
| Substratum: | Bedrock;boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m |
| Other features: | Tideswept |

Biotope description

This habitat complex occurs on extremely wave-exposed to exposed circalittoral bedrock and boulders subject to very strong to strong tidal streams. Typically found in tidal straits and narrows. The high energy levels found within this habitat complex are reflected in the fauna recorded. Sponges such as *Pachymatisma johnstonia*, *Halichondria panicea*, *Esperiopsis fucorum* and *Myxilla incrustans* may all be recorded. Characteristic of this habitat complex is the dense 'carpet' of the hydroid *Tubularia indivisa*. The barnacle *Balanus crenatus* is recorded in high abundance on the rocky substrata. On rocky outcrops, *Alcyonium digitatum* is often present.

CR.HCR.FaT **Very tide-swept faunal communities****Habitat classification**

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed |
| Tidal streams: | Very strong, Strong |
| Substratum: | Bedrock, boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Previous code

ECR.BS 97.06

Biotope description

This biotope complex occurs in wave-exposed, tide-swept narrows and straits on circalittoral bedrock and boulders. The biotopes within this complex are characterised by a high abundance of the robust hydroid *Tubularia indivisa*, the barnacle *Balanus crenatus* is characteristic of BalTub, the cushion sponges *Halichondria panicea* and *Myxilla incrustans* are characteristic of CTub.CuSp and *Alcyonium digitatum* is characteristic of CTub.Adig. The anemones *Sagartia elegans*, *Actinothoe sphyrodeta*, *Urticina felina*, *Corynactis viridis* and *Metridium senile* are all found within this complex. Other species present in this high-energy complex are the sponges *Esperiopsis fucorum* and *Pachymatisma johnstonia*, the bryozoans *Alcyonidium diaphanum* and *Flustra foliacea*, *Cancer pagurus*, *Sertularia argentea* and *Asterias rubens*. Within this complex, two biotopes have been identified: BalTub and CTub.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|------------------------------------|
| PORIFERA | •• | Frequent | 1 |
| <i>Pachymatisma johnstonia</i> | ••• | Occasional | 2 |
| <i>Halichondria panicea</i> | •• | Frequent | 2 |
| <i>Esperiopsis fucorum</i> | ••• | Frequent | 3 |
| <i>Myxilla incrustans</i> | ••• | Frequent | 2 |
| <i>Tubularia indivisa</i> | ••••• | Abundant | 24 |
| <i>Sertularia argentea</i> | ••• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | •••• | Frequent | 7 |
| <i>Urticina felina</i> | ••• | Frequent | 3 |
| <i>Metridium senile</i> | •• | Frequent | 1 |
| <i>Sagartia elegans</i> | •••• | Common | 9 |
| <i>Actinothoe sphyrodeta</i> | •• | Common | 2 |
| <i>Corynactis viridis</i> | •• | Frequent | 2 |
| <i>Balanus crenatus</i> | •••• | Abundant | 11 |
| <i>Cancer pagurus</i> | ••• | Occasional | 2 |
| <i>Alcyonidium diaphanum</i> | ••• | Frequent | 3 |
| <i>Flustra foliacea</i> | •• | Frequent | 2 |
| <i>Asterias rubens</i> | ••• | Occasional | 2 |

CR.HCR.FaT.BalTub *Balanus crenatus* and *Tubularia indivisa* on extremely tide-swept circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed, Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Very strong, Strong |
| Substratum: | Bedrock, boulder, cobble |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 0-5 m, 5-10 m, 10-20 m, 20-30 m |

Previous code

CR.ECR.BS.BalTub 97.06

Biotope description

This biotope typically occurs on upward-facing, extremely tide-swept, circalittoral bedrock, boulders and cobbles found in a broad spectrum of different wave-exposures. It is characterised by a few species that are capable of maintaining a foothold in strong tides. These species either form a flat, adherent crust in the case of the barnacle *Balanus crenatus*, or have strong attachment points and are flexible, bending with the tide, such as the turf of the hydroid *Tubularia indivisa*. Other species able to tolerate these very strong tides, or just situated slightly out of the main force of the current, include the sponge *Halichondria panicea*, the robust hydroid *Sertularia argentea* and current-tolerant anemones such as *Sagartia elegans*, *Urticina felina* and *Metridium senile*. Mobile species such as the starfish *Asterias rubens*, the crab *Cancer pagurus* and the whelk *Nucella lapillus* may also be present.

Situation

This biotope is typically occurs in deep, very tide-swept straights, sounds and narrows with a bedrock/boulder/cobble slope. Kelp forest (LhypT) occurs in shallower water.

Temporal variation

Not known.

Similar biotopes

CR.HCR.FaT.CTub.CuSp

This biotope occurs under similar conditions to BalTub although it tends to be found more on steep and vertical faces. CTub.CuSp contains a more diverse range of sponges, bryozoans and ascidians than BalTub. They both contain dense carpets of the robust hydroid *T. indivisa*.

CR.HCR.FaT.CTub.Adig

This biotope occurs under similar wave-exposed conditions to BalTub, but is subject to slightly weaker tides, which is perhaps reflected in the greater abundance of *Alcyonium digitatum*. Both sub-biotopes have a similarly impoverished epifauna, although CTub.Adig has a slightly more diverse range of sponges.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|------------------------------|--------------------|---------------------------|--|
| <i>Halichondria panicea</i> | •• | Common | 1 |
| <i>Tubularia indivisa</i> | ••••• | Frequent | 18 |
| <i>Sertularia argentea</i> | ••• | Frequent | 5 |
| <i>Urticina felina</i> | •••• | Occasional | 4 |
| <i>Metridium senile</i> | ••• | Occasional | 3 |
| <i>Sagartia elegans</i> | •••• | Frequent | 10 |
| <i>Balanus crenatus</i> | ••••• | Abundant | 28 |
| <i>Cancer pagurus</i> | •••• | Occasional | 5 |
| <i>Nucella lapillus</i> | •• | Common | 1 |
| BRYOZOA | ••• | Occasional | 2 |
| <i>Alcyonidium diaphanum</i> | ••• | Occasional | 3 |
| <i>Flustra foliacea</i> | ••• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Occasional | 7 |

CR.HCR.FaT.CTub *Tubularia indivisa* on tide-swept circolittoral rock**Habitat classification**

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed |
| Tidal streams: | Very strong, Strong |
| Substratum: | Bedrock, boulder |
| Zone: | Circolittoral - upper, Circolittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Biotope description

This biotope is typically found on the vertical and upper faces of strongly tide-swept, wave-exposed circolittoral bedrock and boulders. It is characterised by a dense carpet of the robust hydroid *Tubularia indivisa*. The barnacle *Balanus crenatus*, where present, is recorded as common. The accompanying species in the community are determined by tidal stream strength. On the more sheltered sides of headlands, where tidal streams are accelerated, sponges such as *Pachymatisma johnstonia*, *Esperiopsis fucorum*, *Myxilla incrustans* and *Halichondria panicea* proliferate forming the CTub.CuSp sub-biotope. There may also be a scattered bryozoan turf, formed by crisiid bryozoans. However, where tidal streams are slightly reduced, but on more wave-exposed coasts, anthozoans such as *Alcyonium digitatum* become more prominent forming the CTub.Adig biotope. Other species recorded in this biotope include the anemones *Sagartia elegans*, *Actinothoe sphyrodeta*, *Corynactis viridis* and *Urticina felina*. There may be scattered clumps of hydroids such as *Sertularia argentea* and *Nemertesia antennina*. Where 'relative shelter' is afforded by the topography of the seabed, the bryozoans *Flustra foliacea*, *Alcyonidium diaphanum* and the crab *Cancer pagurus* may be found. More ubiquitous species such as *Asterias rubens* and *Calliostoma zizyphinum* may also be present.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|------------------------------------|
| PORIFERA | ●● | Frequent | 1 |
| <i>Pachymatisma johnstonia</i> | ●●●● | Occasional | 4 |
| <i>Halichondria panicea</i> | ●● | Frequent | 2 |
| <i>Esperiopsis fucorum</i> | ●●● | Frequent | 4 |
| <i>Myxilla incrustans</i> | ●●● | Frequent | 2 |
| <i>Tubularia indivisa</i> | ●●●●● | Abundant | 24 |
| <i>Nemertesia antennina</i> | ●● | Frequent | 2 |
| <i>Sertularia argentea</i> | ●● | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | 11 |
| <i>Urticina felina</i> | ●●● | Frequent | 2 |
| <i>Sagartia elegans</i> | ●●●● | Common | 7 |
| <i>Actinothoe sphyrodeta</i> | ●●● | Common | 4 |
| <i>Corynactis viridis</i> | ●●● | Frequent | 3 |
| <i>Balanus crenatus</i> | ●●● | Common | 6 |
| <i>Cancer pagurus</i> | ●●● | Rare | 1 |
| <i>Calliostoma zizyphinum</i> | ●● | Occasional | 1 |
| Crisiidae | ●● | Common | 1 |
| <i>Alcyonidium diaphanum</i> | ●● | Frequent | 2 |
| <i>Flustra foliacea</i> | ●● | Frequent | 1 |
| <i>Asterias rubens</i> | ●● | Occasional | 2 |

CR.HCR.FaT.CTub.CuSp *Tubularia indivisa* and cushion sponges on tide-swept turbid cirralittoral bedrock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Very strong, Strong |
| Substratum: | Bedrock; boulders |
| Zone: | Cirralittoral - upper, Cirralittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Previous code

CR.ECR.BS.TubS 97.06

Biotope description

This variant is typically found on the vertical and upper faces of strongly tide-swept, exposed cirralittoral bedrock and boulders. It is commonly associated with areas where turbidity levels are high for much of the year, for example, around Anglesey and the Lleyn Peninsula. From afar, this variant appears as a dense 'carpet' of *Tubularia indivisa* covering tide-swept gully walls, floors and boulders. *T. indivisa* is frequently observed growing through sheets of sponges such as *Myxilla incrustans* and *Halichondria panicea* as well as through dense patches of the barnacle *Balanus crenatus* and tubes of the amphipod *Jassa*. Several other species of sponge appear to be tolerant of the high turbidity in areas where this variant occurs, many of which are common in other biotopes. These include *Esperiopsis fucorum*, *Pachymatisma johnstonia*, *Hemimycale columella*, *Dysidea fragilis* and *Clathrina coriacea*. Robust hydroids (other than *T. indivisa*) such as *Nemertesia antennina* and *Sertularia argentea* occur in patches. The anemones *Urticina felina*, *Actinothoe sphyrodeta* and *Sagartia elegans* are typically common. A short bryozoan turf consisting of crisiid bryozoans, *Alcyonidium diaphanum*, *Bicellariella ciliata*, *Bugula turbinata* and *Bugula flabellata* may be present. *Alcyonium digitatum* may occasionally be seen although it doesn't tend to be as dominant as in CTub.Adig. Individual *Corynactis viridis* may be seen scattered across the gully walls and boulders. The starfish *Henricia oculata* may be seen on boulders and gully floors whilst typical under-boulder fauna includes the crab *Cancer pagurus*.

Situation

Above this biotope, *Laminaria* forest (LhypR) may be found.

Temporal variation

Not known.

Similar biotopes

CR.HCR.FaT.BalTub

This biotope occurs under similar conditions to CTub.CuSp, although it occurs on a more mixed range of substrata than Tub.CuSp. Both biotopes are dominated by a dense carpet of *Tubularia indivisa*, although CTub.CuSp has a more diverse sponge and bryozoan turf associated with it.

CR.HCR.FaT.CTub.Adig

This biotope occurs under similar wave-exposures to Tub.CuSp although is subject to slightly weaker tidal streams than CTub.CuSp. Both biotopes are dominated by a dense carpet of *Tubularia indivisa*. CTub.Adig does not contain such a diverse range of sponges as CTub.CuSp although dead man's fingers *Alcyonium digitatum* are typically frequent.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|------------------------------------|
| PORIFERA | ••• | Frequent | 2 |
| <i>Clathrina coriacea</i> | ••• | Frequent | 1 |
| <i>Pachymatisma johnstonia</i> | ••••• | Occasional | 4 |
| <i>Halichondria panicea</i> | ••• | Frequent | 2 |
| <i>Esperiopsis fucorum</i> | •••• | Frequent | 4 |
| <i>Myxilla incrustans</i> | •••• | Frequent | 5 |
| <i>Hemimycale columella</i> | •••• | Occasional | 3 |
| <i>Dysidea fragilis</i> | ••• | Occasional | 1 |
| <i>Tubularia indivisa</i> | ••••• | Abundant | 17 |
| <i>Nemertesia antennina</i> | ••• | Frequent | 2 |
| <i>Sertularia argentea</i> | ••• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | •••• | Occasional | 4 |
| <i>Urticina felina</i> | ••• | Frequent | 1 |
| <i>Sagartia elegans</i> | •••• | Common | 7 |
| <i>Actinothoe sphyrodeta</i> | •••• | Common | 6 |
| <i>Corynactis viridis</i> | ••• | Occasional | 2 |
| <i>Balanus crenatus</i> | ••••• | Common | 10 |
| <i>Jassa</i> | •• | Frequent | 1 |
| <i>Cancer pagurus</i> | ••• | Rare | 1 |
| Crisiidae | ••• | Common | 3 |
| <i>Alcyonidium diaphanum</i> | •• | Frequent | 2 |
| <i>Bicellariella ciliata</i> | ••• | Occasional | 1 |
| <i>Bugula flabellata</i> | ••• | Common | 2 |
| <i>Bugula turbinata</i> | ••• | Common | 2 |
| <i>Henricia oculata</i> | ••• | Occasional | 2 |

CR.HCR.FaT.CTub.Adig *Alcyonium digitatum* with dense *Tubularia indivisa* and anemones on strongly tide-swept circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed |
| Tidal streams: | Very strong, Strong, Moderately strong |
| Substratum: | bedrock; boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Previous code

CR.ECR.Alc.AlcTub 97.06

Biotope description

This variant is typically found on exposed circalittoral bedrock and boulders in sounds, narrows and around tide-swept promontories in accelerated tidal streams. It is dominated by aggregations of dead man's fingers *Alcyonium digitatum*, and dense clumps or continuous cover of the robust hydroid *Tubularia indivisa*, particularly on prominent ledges and ridges. Anemones such as *Sagartia elegans*, *Urticina felina*, *Metridium senile*, *Actinothoe sphyrodeta* and *Corynactis viridis* form a prominent component of the community. Occasionally, massive sponges such as *Pachymatisma johnstonia* and *Esperiopsis fucorum* may be present. Encrusting species such as the polychaete *Pomatoceros triqueter* and the barnacle *Balanus crenatus* may be dotted around the rocks, and the top shell *Calliostoma zizyphinum* may also be observed. Clumps of the bryozoan *Flustra foliacea* are occasionally seen. The starfish *Asterias rubens* may be seen amongst a patchy turf of *Crisia denticulata* and the bryozoan *Alcyonidium diaphanum*. This variant may also be found on tideswept wrecks and other artificial substratum.

Situation

Above this biotope, it is usual to find well-developed kelp forest in the upper infralittoral, dominated by *Laminaria hyperborea* (LhypR). In the lower infralittoral, it is usual to find a tide-swept turf of hydroids and red algae.

Temporal variation

Not known.

Similar biotopes

CR.HCR.FaT.CTub.CuSp

This biotope occurs on slightly more wave-sheltered sites than CTub.Adig. However, they are both subject to generally similar, strong tidal streams. CTub.CuSp also tends to be found slightly deeper. Although a similar suite of hydroid species are found in both biotopes, CTub.CuSp has a more diverse range of sponges, ascidian and turf-forming bryozoans such as *Bugula* spp. In addition, dense colonies of *Alcyonium digitatum* are found in CTub.Adig.

CR.HCR.FaT.BalTub

This biotope tends to be found under a broader range of wave-exposures compared to CTub.Adig. However, they are both subject to similar tidal-streams. BalTub also tends to be found on a wider range of substratum types compared to CTub.Adig. BalTub has a 'bare' appearance, dominated by *Tubularia indivisa* and *Balanus crenatus*, whereas CTub.Adig has a more diverse range of sponge, ascidian and turf-forming bryozoans.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|------------------------------------|
| <i>Pachymatisma johnstonia</i> | ••• | Occasional | 3 |
| <i>Esperiopsis fucorum</i> | •• | Frequent | 2 |
| <i>Tubularia indivisa</i> | ••••• | Common | 27 |
| <i>Alcyonium digitatum</i> | ••••• | Frequent | 21 |
| <i>Urticina felina</i> | ••• | Frequent | 3 |
| <i>Metridium senile</i> | •• | Frequent | 2 |
| <i>Sagartia elegans</i> | •••• | Common | 6 |
| <i>Actinothoe sphyrodeta</i> | •• | Frequent | 1 |
| <i>Corynactis viridis</i> | •• | Common | 3 |
| <i>Pomatoceros triqueter</i> | •• | Frequent | 2 |
| <i>Balanus crenatus</i> | •• | Common | 1 |
| <i>Calliostoma zizyphinum</i> | ••• | Occasional | 2 |
| <i>Crisia denticulata</i> | •• | Occasional | 1 |
| <i>Alcyonidium diaphanum</i> | •• | Frequent | 2 |
| <i>Flustra foliacea</i> | ••• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Occasional | 7 |

CR.HCR.DpSp Deep sponge communities

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 20-30 m, 30-50 m |

Biotope description

This biotope complex typically occurs on deep (commonly below 30m depth), wave-exposed circalittoral rock subject to negligible tidal streams. The sponge component of this biotope is the most striking feature, with similar species to the bryozoan and erect sponge biotope complex (BrErSp) although in this case, the sponges *Phakellia ventilabrum*, *Axinella infundibuliformis*, *Axinella dissimilis* and *Stelligera stuposa* dominate. Other sponge species frequently found on exposed rocky coasts are also present in low to moderate abundance. These include *Cliona celata*, *Polymastia boletiformis*, *Haliclona viscosa*, *Pachymatisma johnstonia*, *Dysidea fragilis*, *Suberites carnosus*, *Stelligera rigida*, *Hemimycale columella* and *Tethya aurantium*. The cup coral *Caryophyllia smithii* and the anemone *Corynactis viridis* may be locally abundant in some areas, along with the holothurian *Holothuria forskali*. The soft corals *Alcyonium digitatum* and *Alcyonium glomeratum* are frequently observed. The bryozoans *Pentapora foliacea* and *Porella compressa* are also more frequently found in this deep-water biotope complex. Bryozoan crusts such as *Parasmittina trispinosa* are also occasionally recorded. Isolated clumps of large hydroids such as *Nemertesia antennina* *Nemertesia ramosa* and *Sertularella gayi* may be seen on the tops of boulders and rocky outcrops. Large echinoderms such as *Echinus esculentus*, *Luidia ciliaris*, *Marthasterias glacialis*, *Strichastrella rosea*, *Henricia oculata* and *Aslia lefevrei* may also be present. The sea fan *Eunicella verrucosa* may be locally common but to a lesser extent than in ByErSp.Eun. The top shell *Calliostoma zizyphinum* is often recorded as present.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-----------------------------------|-------------|--------------------|-----------------------------|
| <i>Pachymatisma johnstonia</i> | ●●●●● | Occasional | 3 |
| <i>Tethya aurantium</i> | ●●●● | Occasional | 1 |
| <i>Suberites carnosus</i> | ●●●● | Occasional | 2 |
| <i>Polymastia boletiformis</i> | ●●●●● | Frequent | 3 |
| <i>Cliona celata</i> | ●●●●● | Frequent | 4 |
| <i>Axinella infundibuliformis</i> | ●●●●● | Frequent | 4 |
| <i>Axinella dissimilis</i> | ●●●●● | Occasional | 2 |
| <i>Phakellia ventilabrum</i> | ●●●● | Frequent | 2 |
| <i>Stelligera rigida</i> | ●●●● | Occasional | 2 |
| <i>Stelligera stuposa</i> | ●●●●● | Frequent | 3 |
| <i>Hemimycale columella</i> | ●●●● | Occasional | 1 |
| <i>Haliclona viscosa</i> | ●●●● | Frequent | 3 |
| <i>Dysidea fragilis</i> | ●●●●● | Occasional | 3 |
| <i>Nemertesia antennina</i> | ●●●● | Occasional | 2 |
| <i>Nemertesia ramosa</i> | ●●●● | Occasional | 1 |
| <i>Sertularella gayi</i> | ●●●● | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | 3 |
| <i>Alcyonium glomeratum</i> | ●●●●● | Frequent | 2 |
| <i>Eunicella verrucosa</i> | ●●● | Occasional | 1 |
| <i>Corynactis viridis</i> | ●●● | Frequent | 2 |

| | | | |
|--------------------------------|-------|------------|---|
| <i>Caryophyllia smithii</i> | ••••• | Frequent | 6 |
| <i>Calliostoma zizyphinum</i> | ••••• | Occasional | 3 |
| <i>Pentapora foliacea</i> | •••• | Frequent | 2 |
| <i>Parasmittina trispinosa</i> | ••• | Frequent | 2 |
| <i>Porella compressa</i> | ••••• | Frequent | 4 |
| <i>Luidia ciliaris</i> | •••• | Occasional | 2 |
| <i>Henricia oculata</i> | ••••• | Occasional | 3 |
| <i>Stichastrella rosea</i> | ••• | Occasional | 1 |
| <i>Marthasterias glacialis</i> | •••• | Occasional | 2 |
| <i>Echinus esculentus</i> | ••••• | Occasional | 3 |
| <i>Holothuria forskali</i> | ••••• | Frequent | 4 |
| <i>Aslia lefevrei</i> | ••• | Occasional | 1 |

CR.HCR.DpSp.PhaAxi *Phakellia ventilabrum* and Axinellid sponges on deep, wave- exposed cirralittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Cirralittoral - upper, Cirralittoral - lower |
| Depth band: | 20-30 m, 30-50 m |

Previous code

CR.MCR.XFa.PhaAxi 97.06

Biotope description

This biotope typically occurs on the upper faces of deep (commonly below 30m depth), wave-exposed cirralittoral rock subject to negligible tidal streams. Although it occurs in exposed and very exposed conditions, at such depth, the turbulent wave action appears to have a much-attenuated effect on the fauna compared with shallower depths. As the majority of records are from depths between 30-50+ m, slightly deeper than the depths of most surveys, it is possible that this biotope is more widespread than the available dataset indicates. The sponge component of this biotope is the most striking feature, with similar species to the bryozoan and erect sponge biotope complex (BrErSp) although in this case, the sponges *Phakellia ventilabrum*, *Axinella infundibuliformis*, *Axinella dissimilis* and *Stelligera stuposa* dominate. Other sponge species frequently found on exposed rocky coasts are also present in low to moderate abundance. These include *Cliona celata*, *Polymastia boletiformis*, *Haliclona viscosa*, *Pachymatisma johnstonia*, *Dysidea fragilis*, *Suberites carnosus*, *Stelligera rigida*, *Hemimycale columbella* and *Tethya aurantium*. The cup coral *Caryophyllia smithii* and the anemone *Corynactis viridis* may be locally abundant in some areas, along with the holothurian *Holothuria forskali*. The soft corals *Alcyonium digitatum* and *Alcyonium glomeratum* are frequently observed. The bryozoans *Pentapora foliacea* and *Porella compressa* are also more frequently found in this deep-water biotope. Bryozoan crusts such as *Parasmittina trispinosa* are also occasionally recorded. Isolated clumps of large hydroids such as *Nemertesia antennina*, *Nemertesia ramosa* and *Sertularella gayi* may be seen on the tops of boulders and rocky outcrops. Large echinoderms such as *Echinus esculentus*, *Luidia ciliaris*, *Marthasterias glacialis*, *Strichastrella rosea*, *Henricia oculata* and *Aslia lefevrei* may also be present. The seafan *Eunicella verrucosa* may be locally common but to a lesser extent than in ByErSp.Eun. The top shell *Calliostoma zizyphinum* is often recorded as present.

Situation

CarSp.PenPcom probably occurs above PhaAxi in shallower water where the exposure of the coast ensures that there is more water mixing due to wave action. Deeper down, this effect is attenuated, allowing PhaAxi biotope to develop.

Temporal variation

Axinella dissimilis tends to grow extremely slowly.

Similar biotopes

CR.MCR.EcCr.CarSp.PenPcom

This biotope occurs under similar conditions as PhaAxi, although it tends to be found over a shallower depth range. Although high abundances of *C. smithii* are recorded in both these biotopes, CarSp.PenPcom has a less diverse sponge fauna than PhaAxi. The latter in particular is characterised by a diverse range of erect branching sponges. *E. verrucosa* is also occasionally found in PhaAxi.

CR.HCR.XFa.ByErSp.Sag

This biotope occurs on extremely exposed to moderately exposed coasts, subject to moderately strong tides. ByErSp.Sag also occurs over a shallower

| | |
|-----------------------|---|
| CR.HCR.XFa.ByErSp.Eun | <p>depth band. ByErSp.Sag has a more restricted range of sponges compared to PhaAxi. However, there is usually a more diverse range of hydroid and bryozoan 'turf-forming' species in ByErSp.Sag. Both biotopes occur mainly around the west coast of Ireland.</p> <p>This biotope occurs under similar wave-exposure conditions as PhaAxi, but is found in sites subject to moderately strong tidal streams. ByErSp.Eun is found much shallower than the deeper PhaAxi, with a mean depth of 20m to 24m, although typically found on the same substratum. <i>E. verrucosa</i> is very abundant in this biotope, although it is still present in PhaAxi. It is the absence of significant numbers of erect sponges that distinguishes this biotope from PhaAxi.</p> |
|-----------------------|---|

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-----------------------------------|-------------|--------------------|-----------------------------|
| <i>Pachymatisma johnstonia</i> | ●●●● | Occasional | 3 |
| <i>Tethya aurantium</i> | ●●●● | Occasional | 1 |
| <i>Suberites carnosus</i> | ●●●● | Occasional | 2 |
| <i>Polymastia boletiformis</i> | ●●●● | Frequent | 3 |
| <i>Cliona celata</i> | ●●●● | Frequent | 4 |
| <i>Axinella infundibuliformis</i> | ●●●● | Frequent | 4 |
| <i>Axinella dissimilis</i> | ●●●● | Occasional | 2 |
| <i>Phakellia ventralbrum</i> | ●●●● | Frequent | 2 |
| <i>Stelligera rigida</i> | ●●●● | Occasional | 2 |
| <i>Stelligera stuposa</i> | ●●●● | Frequent | 3 |
| <i>Hemimycale columella</i> | ●●●● | Occasional | 1 |
| <i>Haliclona viscosa</i> | ●●●● | Frequent | 3 |
| <i>Dysidea fragilis</i> | ●●●● | Occasional | 3 |
| <i>Nemertesia antennina</i> | ●●●● | Occasional | 2 |
| <i>Nemertesia ramosa</i> | ●●●● | Occasional | 1 |
| <i>Sertularella gayi</i> | ●●●● | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ●●●● | Frequent | 3 |
| <i>Alcyonium glomeratum</i> | ●●●● | Frequent | 2 |
| <i>Eunicella verrucosa</i> | ●● | Occasional | 1 |
| <i>Corynactis viridis</i> | ●● | Frequent | 2 |
| <i>Caryophyllia smithii</i> | ●●●● | Frequent | 6 |
| <i>Calliostoma zizyphinum</i> | ●●●● | Occasional | 3 |
| <i>Pentapora foliacea</i> | ●●●● | Frequent | 2 |
| <i>Parasmittina trispinosa</i> | ●● | Frequent | 2 |
| <i>Porella compressa</i> | ●●●● | Frequent | 4 |
| <i>Luidia ciliaris</i> | ●●●● | Occasional | 2 |
| <i>Henricia oculata</i> | ●●●● | Occasional | 3 |
| <i>Stichastrella rosea</i> | ●● | Occasional | 1 |
| <i>Marthasterias glacialis</i> | ●●●● | Occasional | 2 |
| <i>Echinus esculentus</i> | ●●●● | Occasional | 3 |
| <i>Holothuria forskali</i> | ●●●● | Frequent | 4 |
| <i>Aslia lefevrei</i> | ●● | Occasional | 1 |

CR.HCR.XFa Mixed faunal turf communities

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock, boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Previous code

CR.MCR.XFa 97.06

Biotope description

This biotope complex occurs on wave-exposed, circalittoral bedrock, and boulders subject to strong to moderately strong tidal streams. This complex is characterised by its diverse range of hydroids (*Halecium halecinum*, *Nemertesia antennina* and *Nemertesia ramosa*), bryozoans (*Alcyonidium diaphanum*, *Flustra foliacea*, *Bugula flabellata* and *Bugula plumosa*) and sponges (*Scypha ciliata*, *Pachymatisma johnstonia*, *Cliona celata*, *Raspailia ramosa*, *Esperiopsis fucorum*, *Hemimycale columella* and *Dysidea fragilis*) forming an often dense, mixed faunal turf. Other species found within this complex are *Alcyonium digitatum*, *Urticina felina*, *Sagartia elegans*, *Actinothoe sphyrodeta*, *Caryophyllia smithii*, *Pomatoceros triqueter*, *Balanus crenatus*, *Cancer pagurus*, *Necora puber*, *Asterias rubens*, *Echinus esculentus* and *Clavelina lepadiformis*. Nine biotopes have been identified within this complex: ByErSp, FluCoAs, FluHocu, CvirCri, SwiLgAs, Mol, SubCriTf, SpNemAdia and SpAnVt.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Scypha ciliata</i> | ●●● | Occasional | - |
| <i>Pachymatisma johnstonia</i> | ●●● | Occasional | - |
| <i>Cliona celata</i> | ●●●● | Occasional | - |
| <i>Raspailia ramosa</i> | ●●● | Occasional | - |
| <i>Esperiopsis fucorum</i> | ●●● | Occasional | - |
| <i>Hemimycale columella</i> | ●●● | Occasional | - |
| <i>Dysidea fragilis</i> | ●●● | Occasional | - |
| <i>Halecium halecinum</i> | ●●● | Occasional | - |
| <i>Nemertesia antennina</i> | ●●●● | Frequent | - |
| <i>Nemertesia ramosa</i> | ●●● | Occasional | - |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | - |
| <i>Urticina felina</i> | ●●● | Occasional | - |
| <i>Sagartia elegans</i> | ●●● | Occasional | - |
| <i>Actinothoe sphyrodeta</i> | ●●● | Occasional | - |
| <i>Caryophyllia smithii</i> | ●●● | Frequent | - |
| <i>Pomatoceros triqueter</i> | ●●● | Occasional | - |
| <i>Balanus crenatus</i> | ●●● | Frequent | - |
| <i>Cancer pagurus</i> | ●●● | Occasional | - |
| <i>Necora puber</i> | ●●● | Occasional | - |
| <i>Calliostoma zizyphinum</i> | ●●● | Occasional | - |
| <i>Alcyonidium diaphanum</i> | ●●●● | Frequent | - |
| <i>Flustra foliacea</i> | ●●●● | Frequent | - |
| <i>Bugula flabellata</i> | ●●● | Occasional | - |
| <i>Bugula plumosa</i> | ●●● | Frequent | - |
| <i>Asterias rubens</i> | ●●●●● | Frequent | - |
| <i>Echinus esculentus</i> | ●●● | Occasional | - |
| <i>Clavelina lepadiformis</i> | ●●● | Occasional | - |

CR.HCR.XFa.ByErSp Bryozoan turf and erect sponges on tide-swept circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Biotope description

This biotope is typically found on wave-exposed circalittoral bedrock or boulders subject to moderately strong to strong tidal streams. It often has a thin layer of silt covering the seabed, and is characterised by a bryozoan/hydroid turf with erect sponges. Typical bryozoans to be found include crisiids, *Alcyonidium diaphanum*, *Flustra foliacea*, *Pentapora foliacea*, *Bugula plumosa* and *Bugula flabellata*, while typical hydroids include *Nemertesia antennina*, *Nemertesia ramosa* and *Halecium halecinum*. The soft coral *Alcyonium digitatum* is frequently recorded on the tops of boulders and rocky outcrops. Characteristic erect sponges include *Raspailia ramosa*, *Stelligera stuposa* and *Stelligera rigida*; other sponges present include *Cliona celata*, *Dysidea fragilis*, *Pachymatisma johnstonia*, *Polymastia boletiformis*, *Hemimycale columella*, *Esperiopsis fucorum*, *Polymastia mamillaris* and *Tethya aurantium*. Other species present include *Caryophyllia smithii*, *Actinothoe sphyrodeta*, *Corynactis viridis*, *Urticina felina*, *Balanus crenatus*, *Asterias rubens*, *Marthasterias glacialis*, *Henricia oculata*, *Echinus esculentus*, *Clavelina lepadiformis*, *Calliostoma zizyphinum* and *Necora puber*. Three variants of this biotope have been described, but all are characterised by a bryozoan turf with erect sponges. ByErSp.Eun is found primarily on circalittoral bedrock and is dominated by the seafan *Eunicella verrucosa*. ByErSp.DysAct is found under slightly stronger tide-swept conditions, and is characterised particularly by the sponge *Dysidea fragilis* and the anemone *Actinothoe sphyrodeta*. Finally ByErSp.Sag is characterised by the anemone *Sagartia elegans*.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Pachymatisma johnstonia</i> | ●●●● | Occasional | 2 |
| <i>Tethya aurantium</i> | ●●● | Occasional | 1 |
| <i>Polymastia boletiformis</i> | ●●●● | Frequent | 2 |
| <i>Polymastia mamillaris</i> | ●●● | Occasional | 1 |
| <i>Cliona celata</i> | ●●●●● | Occasional | 4 |
| <i>Stelligera rigida</i> | ●●● | Occasional | 1 |
| <i>Stelligera stuposa</i> | ●●● | Occasional | 2 |
| <i>Raspailia ramosa</i> | ●●●● | Occasional | 2 |
| <i>Esperiopsis fucorum</i> | ●●● | Frequent | 2 |
| <i>Hemimycale columella</i> | ●●●● | Occasional | 2 |
| <i>Dysidea fragilis</i> | ●●●● | Frequent | 3 |
| <i>Halecium halecinum</i> | ●●● | Frequent | 1 |
| <i>Nemertesia antennina</i> | ●●●●● | Frequent | 4 |
| <i>Nemertesia ramosa</i> | ●●●● | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | 5 |
| <i>Urticina felina</i> | ●●● | Occasional | 1 |
| <i>Actinothoe sphyrodeta</i> | ●●●● | Occasional | 2 |
| <i>Corynactis viridis</i> | ●●● | Frequent | 2 |
| <i>Caryophyllia smithii</i> | ●●●● | Frequent | 4 |

| | | | |
|--------------------------------|------|------------|---|
| <i>Balanus crenatus</i> | •• | Occasional | 2 |
| <i>Necora puber</i> | ••• | Occasional | 1 |
| <i>Calliostoma zizyphinum</i> | ••• | Occasional | 2 |
| Crisiidae | ••• | Frequent | 1 |
| <i>Alcyonidium diaphanum</i> | •••• | Frequent | 3 |
| <i>Pentapora foliacea</i> | ••• | Occasional | 1 |
| <i>Flustra foliacea</i> | ••• | Frequent | 2 |
| <i>Bugula flabellata</i> | ••• | Occasional | 1 |
| <i>Bugula plumosa</i> | ••• | Frequent | 2 |
| <i>Henricia oculata</i> | ••• | Occasional | 1 |
| <i>Asterias rubens</i> | •••• | Frequent | 3 |
| <i>Marthasterias glacialis</i> | ••• | Occasional | 1 |
| <i>Echinus esculentus</i> | •••• | Occasional | 2 |
| <i>Clavelina lepadiformis</i> | •••• | Occasional | 2 |

CR.HCR.XFa.ByErSp.Eun *Eunicella verrucosa* and *Pentapora foliacea* on wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | Bedrock |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Previous code

CR.MCR.XFa.ErSEun 97.06

Biotope description

This variant typically occurs on wave-exposed, steep, circalittoral bedrock and boulder slopes and outcrops, subject to varying tidal streams. This silty variant contains a diverse faunal community, dominated by the seafan *Eunicella verrucosa*, the bryozoan *Pentapora foliacea* and the cup coral *Caryophyllia smithii*. There are frequently numerous *Alcyonium digitatum*, and these may become locally abundant under more tide-swept conditions. *Alcyonium glomeratum* may also be present. A diverse sponge community is usually present, including numerous erect sponges; species present include *Cliona celata*, *Raspailia ramosa*, *Raspailia hispida*, *Axinella dissimilis*, *Stelligera stuposa*, *Dysidea fragilis* and *Polymastia boletiformis*. *Homaxinella subdola* may be present in the south west. A hydroid/bryozoan turf may develop in the understorey of this rich sponge assemblage, with species such as *Nemertesia antennina*, *Nemertesia ramosa*, crisiids, *Alcyonidium diaphanum* and *Bugula plumosa*. The sea cucumber *Holothuria forskali* may be locally abundant, feeding on the silty deposits on the rock surface. Other echinoderms encountered include the starfish *Marthasterias glacialis* and the urchin *Echinus esculentus*. Other fauna includes aggregations of colonial ascidians *Clavelina lepadiformis* and *Stolonica socialis*. Anemones such as *Actinothoe sphyrodeta* and *Parazoanthus axinellae* may be seen dotted across the rock surface. This biotope is present in south west England and Wales.

Situation

This biotope is commonly found on rocky outcrops, surrounded by coarse sediment. This may be in the form of shelly gravel or muddy gravel, supporting *Urticina felina*, *Cerianthus lloydi* and *Neopentadactyla mixta*. Above ByErSp.Eun, dense kelp forest containing *Saccorhiza polyschides* is usually found.

Temporal variation

Not known

Similar biotopes

| | |
|---------------------------|---|
| CR.MCR.EcCr.CarSp.PenPcom | This biotope occurs under similar wave-exposure conditions as ByErSp.Eun but is found in sites subject to only very weak tidal streams. ByErSp.Eun has a more diverse array of sponges (including erect sponges) and 'turf-forming' bryozoans. |
| CR.HCR.XFa.ByErSp.Sag | This biotope occurs under similar conditions and depths as ByErSp.Eun. A diverse group of sponges, hydroids and bryozoans are found in both biotopes, but it is the absence of <i>E. verrucosa</i> and species such as <i>Parazoanthus axinellae</i> and <i>Isozoanthus sulcatus</i> that distinguishes ByErSp.Sag from ByErSp.Eun. |
| CR.HCR.DpSp.PhaAxi | This biotope occurs under similar wave-exposure conditions as ByErSp.Eun but is found in sites subject to only very weak tidal streams and much deeper with a mean depth range of 32m-37m. Although <i>E. verrucosa</i> is present in this biotope, it is not as abundant as in ByErSp.Eun. It is the presence of significant numbers of axinellid sponges that distinguishes this biotope. |

CR.HCR.XFa.CvirCri This biotope occurs under similar conditions as ByErSp.Eun, but may occur at slightly deeper water depths. CvirCri lacks *E. verrucosa* but has a similar bryozoan and hydroid turf to ByErSp.Eun. The latter does have a slightly more diverse range of sponges and ascidians than CvirCri.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|------------------------------------|
| PORIFERA | ●●● | Occasional | 1 |
| <i>Polymastia boletiformis</i> | ●●● | Occasional | 1 |
| <i>Cliona celata</i> | ●●●●● | Frequent | 5 |
| <i>Axinella dissimilis</i> | ●●●● | Occasional | 2 |
| <i>Stelligera stuposa</i> | ●●● | Occasional | 2 |
| <i>Raspailia hispida</i> | ●●●● | Occasional | 2 |
| <i>Raspailia ramosa</i> | ●●●● | Occasional | 2 |
| <i>Dysidea fragilis</i> | ●●● | Occasional | 1 |
| <i>Nemertesia antennina</i> | ●●●●● | Frequent | 5 |
| <i>Nemertesia ramosa</i> | ●●●● | Occasional | 4 |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | 6 |
| <i>Alcyonium glomeratum</i> | ●●● | Occasional | 2 |
| <i>Eunicella verrucosa</i> | ●●●●● | Frequent | 7 |
| <i>Parazoanthus axinellae</i> | ●●● | Occasional | 1 |
| <i>Actinothoe sphyrodeta</i> | ●●●● | Occasional | 2 |
| <i>Caryophyllia smithii</i> | ●●●●● | Common | 7 |
| Crisiidae | ●●● | Occasional | 1 |
| <i>Alcyonidium diaphanum</i> | ●●●● | Frequent | 4 |
| <i>Pentapora foliacea</i> | ●●●●● | Frequent | 7 |
| <i>Bugula plumosa</i> | ●●● | Common | 1 |
| <i>Marthasterias glacialis</i> | ●●●● | Frequent | 4 |
| <i>Echinus esculentus</i> | ●●●● | Occasional | 3 |
| <i>Holothuria forskali</i> | ●●● | Frequent | 3 |
| <i>Clavelina lepadiformis</i> | ●●● | Occasional | 2 |
| <i>Stolonica socialis</i> | ●●● | Common | 2 |

CR.HCR.XFa.ByErSp.DysActMixed turf of bryozoans and erect sponges with *Dysidia fragilis* and *Actinothoe sphyrodeta* on tide-swept, wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Previous code

CR.MCR.XFa.ErSPbolSH 97.06

Biotope description

This variant typically occurs on exposed and moderately wave-exposed bedrock and boulders subject to a variety of tidal regimes (from strong through to weak). It is found mainly in the 10-20m depth range and does not usually occur deeper than 30 m. It therefore often straddles the upper circalittoral and lower infralittoral. It often has a light covering of silt and sand may be in the vicinity. Sponges form a dominant part of this variant, although cover usually appears patchy, with no one species dominating. Species present include *Dysidea fragilis*, *Pachymatisma johnstonia*, *Esperiopsis fucorum*, *Hemimycale columella*, *Cliona celata*, *Stelligera rigida*, *Polymastia boletiformis*, *Stelligera stuposa*, *Raspailia ramosa*, *Tethya aurantium*, *Polymastia mamillaris* and *Axinella dissimilis*. Tufts of large hydroids such as *Nemertesia antennina*, frequently recorded on the tops of outcrops and boulders, stand out more clearly than the understorey of finer hydroid and bryozoan turf such as *Aglaophenia pluma*, *Bugula flabellata*, *Bugula plumosa*, crisiids, *Cellaria sinuosa* and *Bugula turbinata*. Other bryozoans such as *Alcyonidium diaphanum* and *Flustra foliacea* are also frequently recorded. Other more widespread species present include *Asterias rubens*, *Actinothoe sphyrodeta*, *Balanus crenatus*, *Caryophyllia smithii*, *Corynactis viridis*, *Necora puber* and *Clavelina lepadiformis*. This variant has been recorded off the south east coast of Ireland, the Welsh coast and Lundy Island.

Situation

This biotope is typically found on exposed coasts, with exposed kelp forest in the infralittoral zone, characterised by species such as *Laminaria hyperborea* and *Saccorhiza polyschides*. The ByErSp.DysAct variant is usually found below ByErSp.Eun, with similar geographic range.

Temporal variation

Not known.

Similar biotopes

CR.HCR.XFa.ByErSp.Eun

This sub-biotope is found on very wave-exposed circalittoral bedrock with slightly weaker tidal streams than ByErSp.DysAct. ByErSp.Eun is also found slightly deeper than ByErSp.DysAct. *E. verrucosa* is absent from ByErSp.DysAct.

CR.HCR.XFa.ByErSp.Sag

This sub-biotope occurs under similar wave-exposure conditions but with weaker tides than ByErSp.DysAct. ByErSp.Sag is also found slightly deeper than ByErSp.DysAct. Both sub-biotopes have similar suites of species but distinct geographical distributions; ByErSp.DysAct only tends to be found off Wales and Lundy whereas ByErSp.Sag tends to be found off the west coast of Ireland.

CR.HCR.XFa.FluCoAs

This biotope occurs under similar wave-exposure conditions, but with slightly weaker tides than ByErSp.DysAct. Both tend to occur throughout

similar depth ranges and substratum. They also both tend to have a thin layer of silt overlying them. Sponges, hydroids and bryozoans are present in both biotopes; although *Flustra* is present in ByErSp.DysAct, it is not present to the same abundance as in FluCoAs, where it forms dense aggregations on the bedrock and boulders. In addition, species such as *Caryophyllia smithii* and *Corynactis viridis* are absent from FluCoAs.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|--------------------------------|
| <i>Pachymatisma johnstonia</i> | ●●●●● | Occasional | 4 |
| <i>Tethya aurantium</i> | ●●●● | Occasional | 1 |
| <i>Polymastia boletiformis</i> | ●●● | Frequent | 2 |
| <i>Polymastia mamillaris</i> | ●●●● | Occasional | 1 |
| <i>Cliona celata</i> | ●●●● | Occasional | 2 |
| <i>Axinella dissimilis</i> | ●●● | Occasional | 1 |
| <i>Stelligera rigida</i> | ●●●● | Occasional | 2 |
| <i>Stelligera stuposa</i> | ●●●● | Occasional | 2 |
| <i>Raspailia ramosa</i> | ●●●● | Occasional | 2 |
| <i>Esperiopsis fucorum</i> | ●●●●● | Frequent | 3 |
| <i>Hemimycale columella</i> | ●●●● | Occasional | 2 |
| <i>Dysidea fragilis</i> | ●●●●● | Frequent | 5 |
| <i>Aglaophenia pluma</i> | ●●● | Frequent | 1 |
| <i>Nemertesia antennina</i> | ●●●● | Frequent | 3 |
| <i>Alcyonium digitatum</i> | ●●●● | Occasional | 3 |
| <i>Actinothoe sphyrodeta</i> | ●●●●● | Frequent | 3 |
| <i>Corynactis viridis</i> | ●●● | Frequent | 1 |
| <i>Caryophyllia smithii</i> | ●●●● | Frequent | 3 |
| <i>Balanus crenatus</i> | ●●●● | Frequent | 3 |
| <i>Necora puber</i> | ●●●● | Occasional | 1 |
| BRYOZOA | ●●● | Frequent | 1 |
| Crisiidae | ●●● | Common | 2 |
| <i>Alcyonidium diaphanum</i> | ●●●● | Frequent | 2 |
| <i>Flustra foliacea</i> | ●●●● | Frequent | 3 |
| <i>Cellaria sinuosa</i> | ●●● | Frequent | 1 |
| <i>Bugula flabellata</i> | ●●●● | Occasional | 2 |
| <i>Bugula plumosa</i> | ●●●● | Frequent | 2 |
| <i>Bugula turbinata</i> | ●●● | Frequent | 1 |
| <i>Asterias rubens</i> | ●●●●● | Frequent | 4 |
| <i>Clavelina lepadiformis</i> | ●●● | Occasional | 1 |

CR.HCR.XFa.ByErSp.Sag Mixed turf of bryozoans and erect sponges with *Sagartia elegans* on tide-swept cirralittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | Bedrock; boulder |
| Zone: | Cirralittoral - upper, Cirralittoral - lower |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Biotope description

This variant is typically found on wave-exposed cirralittoral bedrock and boulders, on steep slopes and upper faces in moderate tidal streams. This species-rich biotope is characterised by a dense sponge, hydroid and bryozoan turf and frequent *Alcyonium digitatum*. There are frequently large growths of *Cliona celata* and *Pachymatisma johnstonia*. Other species present in this diverse sponge community include *Polymastia boletiformis*, *Haliclona viscosa*, *Polymastia mamillaris*, *Scypha ciliata*, *Hemimycale columella* and *Dysidea fragilis*. Axinellid sponges such as *Stelligera stuposa* and *Raspailia ramosa* may be present in low abundance, and are usually more abundant in deeper water. A dense hydroid turf forms a significant part of this biotope, with tufts of large hydroids such as *Nemertesia antennina* and *Nemertesia ramosa* frequently recorded. Other hydroid turf component species include *Halecium halecinum*, *Aglaophenia tubulifera* and *Abietinaria abietina*. Anemones are also well represented, with species such as *Urticina felina*, *Sagartia elegans* and *Metridium senile* recorded. The cup coral *Caryophyllia smithii* and the anemone *Corynactis viridis* are also frequently seen. The bryozoan turf is composed predominantly of *Alcyonidium diaphanum* and *Flustra foliacea*, whilst crustose species such as *Parasmittina trispinosa* contribute to a lesser extent. The delicate *Bugula plumosa* may also be present. There is a significant echinoderm component in this biotope. Species such as the starfish *Asterias rubens*, *Henricia oculata*, *Marthasterias glacialis* and *Luidia ciliaris*, the sea urchin *Echinus esculentus* and the crinoid *Antedon bifida* are all regularly recorded. Other species which may be observed include the top shell *Calliostoma zizyphinium*, the colonial ascidian *Clavelina lepadiformis* and the barnacle *Balanus crenatus*. The crab *Cancer pagurus* is typically found under boulders. This variant has been recorded from from various sites including Pembrokeshire, the Calf of Man and the west coast of Ireland.

Situation

Dense kelp forests containing *L. hyperborea* and *S. polyschides* are typically found above ByErSp.Sag.

Temporal variation

Not known

Similar biotopes

| | |
|--------------------------|--|
| CR.HCR.XFa.ByErSp.Eun | This biotope occurs under similar conditions and depths as ByErSp.Sag. A diverse group of sponges, hydroids and bryozoans are found in both biotopes, but it is the frequently recorded <i>Eunicella verrucosa</i> and the occasional presence of <i>Parazoanthus axinellae</i> and <i>Isozoanthus sulcatus</i> that distinguishes it from ByErSp.Sag. |
| CR.HCR.XFa.ByErSp.DysAct | This biotope occurs under similar wave-exposure conditions with stronger tides than ByErSp.Sag. ByErSp.DysAct is also found slightly shallower than ByErSp.Sag. Both biotopes have similar suites of species but distinct |

CR.HCR.DpSp.PhaAxi

geographical distributions; ByErSp.DysAct only tends to be found off Wales and Lundy whereas ByErSp.Sag tends to be found off the west coast of Ireland.

This biotope is found on extremely wave-exposed and wave-exposed coasts with very weak tides. It is found much deeper than ByErSp.Sag with mean depths of 32m-37m. PhaAxi has a very diverse sponge fauna with a wide range of axinellids at most sites. In addition, *Alcyonium glomeratum* and *Eunicella verrucosa* are often present. ByErSp.Sag has a wider range of hydroids including *T. indivisa*, *H. halecinum* and *Gymnangium montagui*, which are rarely found in PhaAxi.

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|--------------------------------|-------------|--------------------|------------------------------|
| <i>Scypha ciliata</i> | ●●●● | Occasional | 1 |
| <i>Pachymatisma johnstonia</i> | ●●●● | Occasional | 1 |
| <i>Polymastia boletiformis</i> | ●●●● | Frequent | 2 |
| <i>Polymastia mamillaris</i> | ●● | Frequent | 1 |
| <i>Cliona celata</i> | ●●●●● | Frequent | 4 |
| <i>Stelligera stuposa</i> | ●● | Occasional | 1 |
| <i>Hemimycale columella</i> | ●● | Occasional | 1 |
| <i>Haliclona viscosa</i> | ●●●● | Occasional | 2 |
| <i>Dysidea fragilis</i> | ●● | Occasional | 1 |
| <i>Halecium halecinum</i> | ●●●● | Frequent | 2 |
| <i>Aglaophenia tubulifera</i> | ●● | Frequent | 1 |
| <i>Nemertesia antennina</i> | ●●●●● | Frequent | 5 |
| <i>Nemertesia ramosa</i> | ●●●●● | Frequent | 3 |
| <i>Abietinaria abietina</i> | ●● | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | 6 |
| <i>Urticina felina</i> | ●●●●● | Occasional | 3 |
| <i>Metridium senile</i> | ●● | Frequent | 1 |
| <i>Sagartia elegans</i> | ●●●● | Frequent | 2 |
| <i>Corynactis viridis</i> | ●●●● | Frequent | 2 |
| <i>Caryophyllia smithii</i> | ●●●●● | Frequent | 3 |
| <i>Balanus crenatus</i> | ●●●● | Frequent | 2 |
| <i>Cancer pagurus</i> | ●●●● | Occasional | 1 |
| <i>Calliostoma zizyphinum</i> | ●●●●● | Occasional | 3 |
| <i>Alcyonidium diaphanum</i> | ●●●● | Occasional | 2 |
| <i>Parasmittina trispinosa</i> | ●● | Frequent | 1 |
| <i>Flustra foliacea</i> | ●● | Frequent | 2 |
| <i>Bugula plumosa</i> | ●● | Occasional | 1 |
| <i>Antedon bifida</i> | ●●●● | Frequent | 2 |
| <i>Luidia ciliaris</i> | ●●●● | Occasional | 2 |
| <i>Henricia oculata</i> | ●●●●● | Occasional | 3 |
| <i>Asterias rubens</i> | ●●●●● | Occasional | 3 |
| <i>Marthasterias glacialis</i> | ●●●● | Occasional | 2 |
| <i>Echinus esculentus</i> | ●●●●● | Occasional | 3 |
| <i>Clavelina lepadiformis</i> | ●●●● | Occasional | 2 |

CR.HCR.XFa.CvirCri *Corynactis viridis* and a mixed turf of crisiids, *Bugula*, *Scrupocellaria*, and *Cellaria* on moderately tide-swept exposed circalittoral rock

Habitat classification

| | |
|-----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock; very large boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m |
| Other features: | Often on vertical or steep rock |

Previous code

CR.ECR.EFa.CorCri 97.06

Biotope description

This biotope typically occurs on wave-exposed, vertical or steep, circalittoral bedrock or large boulders, usually subject to moderate or strong tidal streams. It is characterised by dense aggregations of the anemone *Corynactis viridis* and the cup coral *Caryophyllia smithii* intermixed with a short bryozoan turf of one or more *Crisia* spp., *Scrupocellaria* spp., *Bugula* spp. and *Cellaria* spp. Occasionally, this turf obscures the underlying *C. viridis* and *C. smithii*. Cushion and encrusting sponges, particularly *Pachymatisma johnstonia*, *Cliona celata*, *Esperiopsis fucorum* and *Dysidea fragilis*, are present in moderate amounts at many sites. The Axinellid sponges *Stelligera* spp. and *Raspailia* spp. are less frequently recorded. Clumps of large hydroids such as *Nemertesia antennina* and *Nemertesia ramosa* as well as the soft coral *Alcyonium digitatum* and the bryozoan *Alcyonidium diaphanum* may be found covering the hard substratum. The anemones *Actinothoe sphyrodeta* and *Sagartia elegans* are typically present in low numbers, while the hard 'coral' *Pentapora foliacea* is also occasionally observed. The most frequently recorded echinoderms are *Marthasterias glacialis* and *Asterias rubens*, although other species such as *Echinus esculentus* may also be seen. The rocky substratum may have a patchy covering of encrusting red seaweeds/algae. The crabs *Necora puber* and *Cancer pagurus* may be seen in crevices or under overhangs. This biotope is regularly recorded around south west England and Wales, often on vertical rock faces.

Situation

Due to its wave-exposed nature, kelp park and forest biotopes (LhypR and Ala) are commonly found in the infralittoral zone shallower than this biotope, and feature species such as *Laminaria hyperborea*, *Sacchoriza polyschides* and *Alaria esculenta*.

Temporal variation

Not known.

Similar biotopes

CR.HCR.XFa.ByErSp.Sag

This variant is found on slightly less exposed coasts and in slightly weaker tides than CvirCri. ByErSp.Sag is characterised by a greater diversity of sponges, hydroids and anemones and also has small amounts of polyclinid ascidians, which are rare in CvirCri. ByErSp.Sag may sometimes be found below CvirCri.

CR.MCR.EcCr.CarSp.PenPcom

This variant is subject to weaker tides than CvirCri, but is found on similar wave-exposed upward-facing bedrock. The general appearance of CarSp.PenPcom is of a fairly sparse but diverse fauna and it lacks the bryozoan turf of CvirCri, having larger amounts of brittle and encrusting bryozoans such as *Porella compressa* and *Parasmittina trispinosa*.

CR.HCR.XFa.ByErSp.Eun

This variant occurs under similar conditions as CvirCri. It is characterised by

CR.HCR.XFa.ByErSp.DysAct

the presence of *Eunicella verrucosa* and *Alcyonium glomeratum*, in combination with diverse sponges and hydroids. It also contains a much wider range of ascidians than CvirCri.

This sub-biotope occurs on similar wave-exposed bedrock and boulders as CvirCri, but is found in slightly stronger tidal streams. The sponge *Dysidea fragilis* and the anemone *Actinothoe sphyrodeta* are present in much higher abundances than in CvirCri. A more diverse range of ascidians are present in ByErSp.DysAct.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| PORIFERA | ●●● | Occasional | 1 |
| <i>Pachymatisma johnstonia</i> | ●●●● | Occasional | 2 |
| <i>Cliona celata</i> | ●●●●● | Occasional | 5 |
| <i>Raspailia ramosa</i> | ●●● | Occasional | 1 |
| <i>Esperiopsis fucorum</i> | ●●● | Occasional | 1 |
| <i>Dysidea fragilis</i> | ●●● | Occasional | 2 |
| <i>Nemertesia antennina</i> | ●●●● | Common | 3 |
| <i>Nemertesia ramosa</i> | ●●● | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ●●●●● | Common | 10 |
| <i>Sagartia elegans</i> | ●●● | Occasional | 1 |
| <i>Actinothoe sphyrodeta</i> | ●●●● | Occasional | 3 |
| <i>Corynactis viridis</i> | ●●●●● | Common | 9 |
| <i>Caryophyllia smithii</i> | ●●●●● | Frequent | 8 |
| <i>Cancer pagurus</i> | ●●● | Rare | 1 |
| <i>Necora puber</i> | ●●●● | Occasional | 2 |
| BRYOZOA | ●●●● | Frequent | 3 |
| Crisiidae | ●●●● | Common | 4 |
| <i>Alcyonidium diaphanum</i> | ●●● | Occasional | 2 |
| <i>Pentapora foliacea</i> | ●●● | Occasional | 2 |
| <i>Cellaria sinuosa</i> | ●● | Frequent | 1 |
| <i>Scrupocellaria</i> | ●● | Common | 1 |
| <i>Asterias rubens</i> | ●●●● | Frequent | 4 |
| <i>Marthasterias glacialis</i> | ●●●●● | Frequent | 4 |
| <i>Echinus esculentus</i> | ●●●● | Occasional | 2 |
| Corallinaceae | ●●● | Occasional | 1 |

CR.HCR.XFa.SwiLgAs Mixed turf of hydroids and large ascidians with *Swiftia pallida* and *Caryophyllia smithii* on weakly tide-swept circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed, Sheltered |
| Tidal streams: | Moderately strong, Weak |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Previous code

CR.MCR.XFa.ErSSwi 97.06

Biotope description

This biotope typically occurs from exposed through to sheltered circalittoral bedrock or boulders subject to moderately strong to weak tidal streams. It is found in water depths ranging from 4m to 37m. This biotope is distinguished by frequently occurring *Swiftia pallida*, abundant *Caryophyllia smithii* and a diverse range of ascidians including *Clavelina lepadiformis*, *Ascidia mentula*, *Polycarpa pomaria*, *Diazona violacea* and *Corella parallelogramma*. A sparse, yet diverse hydroid turf is often apparent, with species such as *Aglaophenia tubulifera*, *Nemertesia antennina*, *Polyplumaria frutescens*, *Halecium halecinum*, *Abietinaria abietina*, *Nemertesia ramosa* and *Halopteris catharina* often recorded. Spaces amongst the turf are usually colonised by the polychaete *Pomatoceros triqueter* and encrusting red algae. Crinoids such as *Antedon petasus*, *Antedon bifida* and *Leptometra celtica* may be seen filter feeding on the tops of outcrops and boulders, along with the soft coral *Alcyonium digitatum*. Other echinoderms such as *Echinus esculentus*, *Crossaster papposus* and *Asterias rubens* may also be recorded. There may also be a bryozoan component to the sparse faunal turf. Species such as *Securiflustra securifrons* and *Eucratea loricata* as well as the crustose *Parasmittina trispinosa* are all usually present. There may be a few isolated growths of sponge, such as *Iophonopsis nigricans*, *Axinella infundibuliformis* and *Haliclona urceolus*. Other species that may be present include the brachiopod *Terebratulina retusa* and the top shell *Calliostoma zizyphinum*. The crustacean *Munida rugosa* may be visible in crevices. All records are from the west coast of Scotland (east coast of Lewis /Outer Hebrides).

Situation

Above this biotope, kelp forest and park are typically found in the infralittoral, with *Laminaria saccharina* and *Laminaria hyperborea*. This biotope is found in Scottish Sealochs and, in the most sheltered situations, may graduate into NeoPro at greater depths.

Temporal variation

Not known

Similar biotopes

CR.MCR.EcCr.CarSwi.LgAs

This biotope is found over a broad range of sites with different wave-exposures, subject to moderately strong to very weak tidal streams. Substratum is typically similar to SwiLgAs. This biotope is more impoverished than SwiLgAs, lacking the diverse range of sponges, hydroids and bryozoans but still with frequent *S. pallida*.

CR.MCR.EcCr.CarSwi.Aglo

This biotope occurs predominantly in the sheltered end of the wave-exposure spectrum, and is subject to only weak tidal streams. It is typically found across similar depth bands as SwiLgAs. This heavily silted biotope is characterised by *Swiftia pallida*, *Alcyonium glomeratum*, *Isozoanthus sulcatus* and the prominent *Holothuria forskali*, the latter two of which are

absent from SwiLgAs. This biotope is only present around the coast of Ireland.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|-----------------------------------|--------------------|---------------------------|------------------------------------|
| <i>Axinella infundibuliformis</i> | •••• | Occasional | 2 |
| <i>Iophonopsis nigricans</i> | •••• | Occasional | 2 |
| <i>Haliclona urceolus</i> | ••• | Occasional | 1 |
| <i>Halecium halecinum</i> | •••• | Occasional | 2 |
| <i>Aglaophenia tubulifera</i> | •••• | Frequent | 4 |
| <i>Halopteris catharina</i> | ••• | Frequent | 1 |
| <i>Nemertesia antennina</i> | •••• | Occasional | 3 |
| <i>Nemertesia ramosa</i> | ••• | Occasional | 1 |
| <i>Polyplumaria frutescens</i> | •••• | Occasional | 2 |
| <i>Abietinaria abietina</i> | ••• | Frequent | 2 |
| <i>Alcyonium digitatum</i> | •••• | Occasional | 2 |
| <i>Swiftia pallida</i> | ••••• | Frequent | 6 |
| <i>Caryophyllia smithii</i> | ••••• | Frequent | 7 |
| <i>Pomatoceros triqueter</i> | •••• | Frequent | 3 |
| <i>Munida rugosa</i> | •••• | Occasional | 2 |
| <i>Calliostoma zizyphinum</i> | ••• | Occasional | 1 |
| <i>Terebratulina retusa</i> | ••• | Occasional | 1 |
| <i>Parasmittina trispinosa</i> | •••• | Occasional | 2 |
| <i>Eucratea loricata</i> | ••• | Frequent | 1 |
| <i>Securiflustra securifrons</i> | •••• | Frequent | 2 |
| <i>Antedon bifida</i> | •••• | Frequent | 3 |
| <i>Antedon petasus</i> | ••• | Frequent | 2 |
| <i>Leptometra celtica</i> | ••• | Occasional | 1 |
| <i>Crossaster papposus</i> | •••• | Rare | 1 |
| <i>Asterias rubens</i> | ••• | Occasional | 1 |
| <i>Echinus esculentus</i> | •••• | Occasional | 3 |
| <i>Clavelina lepadiformis</i> | ••••• | Occasional | 4 |
| <i>Diazona violacea</i> | •••• | Occasional | 2 |
| <i>Corella parallelogramma</i> | •••• | Occasional | 2 |
| <i>Ascidia mentula</i> | •••• | Frequent | 4 |
| <i>Polycarpa pomaria</i> | •••• | Occasional | 2 |
| Corallinaceae | ••• | Frequent | 1 |

CR.HCR.XFa.FluCoAs *Flustra foliacea* and colonial ascidians on tide-swept moderately wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Bedrock; boulder; cobble |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m |

Biotope description

This biotope typically occurs on the upper faces of moderately tide-swept, moderately wave-exposed circalittoral bedrock or boulders (although a variant is found on mixed substrata). It most frequently occurs between 10-20m water depth. The biotope is exposed to varying amounts of scour (due to nearby patches of sediment) and, as a consequence, is characteristically dominated by dense *Flustra foliacea*, a range of colonial ascidians and a variety of other scour/silt-tolerant species. In addition to *Flustra*, other bryozoans present in this biotope include *Alcyonidium diaphanum*, *Bugula flabellata* and *Bugula plumosa*. Varying amounts of the soft coral *Alcyonium digitatum* may be recorded, depending on the amount of scouring which may vary locally. Where scour is a major factor, species such as the scour-tolerant *Urticina felina* are frequently observed. Hydroids present in this biotope include *Nemertesia antennina*, *Halecium halecium*, *Tubularia indivisa* and *Hydrallmania falcata*. Other species present include the silt-tolerant sponges such as *Scypha ciliata*, *Cliona celata*, *Leucosolenia botryoides*, and the ascidians *Clavelina lepadiformis* and *Botryllus schlosseri*. *Balanus crenatus* may be recorded occasionally on the boulder/rock surface, and the crab *Cancer pagurus* may be observed finding refuge in crevices and under boulders. More ubiquitous species present include *Asterias rubens*, *Crossaster papposus*, *Ophiothrix fragilis* and *Pagurus bernhardus*. Three variants of this biotope have been defined. FluCoAs.SmAs tends to have a high abundance of barnacles, which populate the rocky seabed. The second variant (FluCoAs.Paur) is characterised by abundant *Polyclinum aurantium* in addition to *F. foliacea*, which often incorporates sand grains into itself, giving the crustose appearance of sandy rock nodules. Finally, FluCoAs.X is found on mixed substrata and is characterised by a dense hydroid turf growing alongside *F. foliacea* and other scour-tolerant species.

Temporal variation

Not known

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Leucosolenia botryoides</i> | •• | Frequent | 1 |
| <i>Scypha ciliata</i> | •••• | Frequent | 4 |
| <i>Cliona celata</i> | •••• | Occasional | 3 |
| <i>Tubularia indivisa</i> | ••• | Occasional | 2 |
| <i>Halecium halecinum</i> | ••• | Frequent | 2 |
| <i>Nemertesia antennina</i> | •••• | Frequent | 3 |
| <i>Hydrallmania falcata</i> | ••• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ••••• | Occasional | 4 |
| <i>Urticina felina</i> | •••• | Frequent | 4 |
| <i>Balanus crenatus</i> | ••• | Frequent | 1 |
| <i>Pagurus bernhardus</i> | ••• | Occasional | 1 |

| | | | |
|-------------------------------|-------|------------|---|
| <i>Cancer pagurus</i> | •••• | Occasional | 3 |
| <i>Alcyonidium diaphanum</i> | ••••• | Frequent | 6 |
| <i>Flustra foliacea</i> | ••••• | Frequent | 7 |
| <i>Bugula flabellata</i> | •••• | Occasional | 3 |
| <i>Bugula plumosa</i> | ••• | Frequent | 2 |
| <i>Crossaster papposus</i> | •••• | Occasional | 3 |
| <i>Asterias rubens</i> | ••••• | Frequent | 8 |
| <i>Ophiothrix fragilis</i> | ••• | Frequent | 2 |
| <i>Clavelina lepadiformis</i> | •••• | Frequent | 3 |
| <i>Polyclinum aurantium</i> | ••• | Frequent | 3 |
| <i>Botryllus schlosseri</i> | •••• | Occasional | 2 |

HCR.XFa.FluCoAs.Paur *Polyclinum aurantium* and *Flustra foliacea* on sand-scoured tide-swept moderately wave-exposed circalittoral rock

Habitat classification

| | |
|-----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Bedrock; boulder; cobble |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |
| Other features: | Occurs mainly on upper-faces. |

Previous code

CR.MCR.As.StoPaur 97.06

Biotope description

This variant is typically found on the upper faces of moderately exposed, moderately tide-swept, circalittoral bedrock or boulders. Sand and silt are periodically re-suspended in the water column, resulting in scour-tolerant species being characteristic of these areas. There is a dense covering of the scour-resistant bryozoan *Flustra foliacea* attached to the bedrock plains and boulders. The colonial ascidian *Polyclinum aurantium* commonly covers the rock surface at most locations within this biotope - itself incorporating sand grains into its surface to give it the appearance of sandy rock nodules. Other ascidians that may occur in this 'crust' are the flat, encrusting colonial *Botrylloides leachi*, *Botryllus schlosseri* and the colonial ascidian *Clavelina lepadiformis*, although in varying quantities at each location. A short turf of other bryozoans such as *Alcyonidium diaphanum*, *Bugula plumosa* and *Bugula flabellata* occur amongst the ascidians. Other species found in this biotope are the sponges *Cliona celata*, *Leucosolenia botryoides* and *Scypha ciliata*, the hydroids *Tubularia indivisa*, *Nemertesia antennina*, *Halecium halecinum* and the anthozoans *Alcyonium digitatum* and *Urticina felina*. Echinoderms which may be present include the starfish *Asterias rubens*, *Crossaster papposus* and the brittlestar *Ophiothrix fragilis*. Crustaceans such as the crab *Cancer pagurus*, the hermit crab *Pagurus bernhardus* and the lobster *Homarus gammarus* may be observed in crevices and under boulders. The palps of the polychaete *Polydora* may be observed whilst the nudibranch *Janolus cristatus* may be seen preying on the hydroid/bryozoan turf. This variant is commonly found on the Northumberland coast, Flamborough Head and the Lley Peninsula.

Situation

As FluCoAs.Paur tends to occur in waters with a sediment load, the resulting light penetration is reduced, meaning that kelp forests such as Lhyp, normally found shallower than FluCoAs.Paur in the infralittoral zone, are present over a narrower depth range.

Temporal variation

Not known

Similar biotopes

CR.HCR.XFa.Mol

This biotope occurs on more heterogeneous substrata, composed of bedrock ridges with cobbles and sand plains, rather than predominantly bedrock in the case of FluCoAs.Paur. Both biotopes contain *Flustra* and a similar hydroid turf, but Mol lacks the diversity of sponges and the dense polyclinid ascidians. It is the dense aggregations of *Molgula* which distinguish this biotope from others.

CR.HCR.XFa.FluCoAs.SmAs

This variant occurs on slightly more wave-exposed sites but subject to similar tidal streams. Both biotopes are found similarly on the upper faces of circalittoral bedrock/boulder. Although both biotopes feature *Flustra* as a

| | |
|----------------|--|
| | dominant feature of their fauna, FluCoAs.SmAs has a much more diverse associated sponge fauna and lacks the abundant sheets of the colonial ascidian <i>Polyclinum aurantium</i> . |
| HCR.FluCoAs.X | This variant occurs on slightly more wave-exposed sites but subject to similar tidal streams. While FluCoAs.Paur is found on circalittoral bedrock or boulders, FluCoAs.Mx occurs on mixed substrata (boulders, cobble, pebble and gravel). Although both biotopes feature <i>Flustra</i> as a dominant feature of their fauna, FluCoAs.Mx has a much more diverse associated fauna and lacks the abundant sheets of the colonial ascidian <i>Polyclinum aurantium</i> . |
| MCR.FaAlCr.Flu | This biotope is found under similar exposure and tidal stream regimes as FluCoAs.Paur but occurs in slightly deeper water depths. FaAlCr.Flu is also found on similar rocky substrata as FluCoAs.Paur. While <i>F. foliacea</i> is the dominant bryozoan present in both, it is the presence of dense aggregations of <i>Polyclinum aurantium</i> which distinguish FluCoAs.Paur from this biotope. |

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|--------------------------------|-------------|--------------------|------------------------------|
| <i>Leucosolenia botryoides</i> | ●●●● | Frequent | 5 |
| <i>Scypha ciliata</i> | ●●●●● | Frequent | 4 |
| <i>Cliona celata</i> | ●●●●● | Common | 6 |
| <i>Tubularia indivisa</i> | ●● | Occasional | 1 |
| <i>Halecium halecinum</i> | ●● | Common | 2 |
| <i>Nemertesia antennina</i> | ●●●● | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ●●●●● | Common | 4 |
| <i>Urticina felina</i> | ●●●●● | Frequent | 3 |
| <i>Polydora</i> | ●● | Frequent | 2 |
| <i>Homarus gammarus</i> | ●●●● | Present | 1 |
| <i>Pagurus bernhardus</i> | ●●●● | Present | 1 |
| <i>Cancer pagurus</i> | ●●●● | Occasional | 3 |
| <i>Janolus cristatus</i> | ●●●● | Occasional | 2 |
| <i>Alcyonidium diaphanum</i> | ●●●●● | Frequent | 5 |
| <i>Flustra foliacea</i> | ●●●●● | Common | 10 |
| <i>Bugula flabellata</i> | ●●●● | Occasional | 3 |
| <i>Bugula plumosa</i> | ●●●● | Common | 4 |
| <i>Crossaster papposus</i> | ●●●●● | Occasional | 4 |
| <i>Asterias rubens</i> | ●●●●● | Common | 6 |
| <i>Ophiothrix fragilis</i> | ●●●●● | Frequent | 3 |
| <i>Clavelina lepadiformis</i> | ●●●● | Common | 3 |
| <i>Polyclinum aurantium</i> | ●●●●● | Common | 8 |
| <i>Botryllus schlosseri</i> | ●●●● | Occasional | 1 |
| <i>Botrylloides leachi</i> | ●●●● | Occasional | 1 |

CR.HCR.XFa.FluCoAs.SmAs *Flustra foliacea*, small solitary and colonial ascidians on tide-swept circalittoral bedrock or boulders

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m |

Biotope description

This sub-biotope is typically found on the upper faces of exposed to moderately exposed, tide-swept, scoured, circalittoral bedrock or boulders. It most frequently occurs between 10-20m water depth. The biotope is characteristically dominated by dense *Flustra foliacea* with a variety of slightly scour/silt-tolerant species forming a dense turf. This turf is primarily composed of bryozoans (*Alcyonidium diaphanum*, *Bugula flabellata*, *Bugula plumosa*, *Bicellariella ciliata*) and hydroids (*Tubularia indivisa*, *Nemertesia antennina*, *Sertularia argentea*, *Hydrallmania falcata*, *Abietinaria abietina*). Where space permits, barnacles such as *Balanus crenatus* may be found encrusting on the rock surface. There may also be occasional crusts formed by the polychaete *Sabellaria spinulosa*, especially where the rock is most influenced by sand. Anthozoans which may be observed include *Urticina felina*, *Sagartia elegans*, whilst the soft coral *Alcyonium digitatum* may be recorded on the tops of boulders and bedrock ridges. A range of small solitary and colonial ascidians may be seen, including *Polycarpa scuba*, *Dendrodoa grossularia*, *Molgula manhattensis*, *Botryllus schlosseri*, *Clavelina lepadiformis* and polyclinids. Sponges found include *Scypha ciliata*, *Cliona celata*, *Esperiopsis fucorum* and *Dysidea fragilis*. Echinoderms such as *Asterias rubens*, *Henricia oculata* and *Crossaster papposus* may be seen on the rock surface. Other species found include the top shell *Calliostoma zizyphinum*, the crabs *Cancer pagurus* and *Necora puber*.

Situation

Above this variant, exposed kelp forest supporting *Laminaria hyperborea* is commonly found (LhypR). At locations where wave-exposure and/or tidal streams are less, this biotope may be replaced by *Alcyonium digitatum* and *Securiflustra securifrons* (FaA1C.Sec). Where the substrata changes to a less stable mixed substrata, then this biotope will be replaced by the sub-biotope FluCoAs.Mx, with more 'sediment' species such as *Cerianthus lloydii* and *Chaetopterus variopedatus*.

Temporal variation

Not known

Similar biotopes

CR.HCR.XFa.FluCoAs.Paur

This variant occurs on moderately wave-exposed sites but subject to similar tidal streams as FluCoAs.SmAs. Although both sub-biotopes are dominated by *Flustra*, FluCoAs.SmAs has a much more diverse associated sponge fauna and lacks the abundant sheets of the colonial ascidian *Polyclinum aurantium*.

CR.HCR.XFa.FluCoAs.X

This variant occurs under slightly more wave-exposed conditions but subject to similar tidal streams, but is found on mixed substrata (boulders, cobbles, pebbles and gravel) whereas FluCoAs.SmAs is found on bedrock and boulders. FluCoAs.Mx does not tend to have such a diverse range of sponges, and species found on more mixed sediment tend to be more prevalent (*Cerianthus lloydii*, *Chaetopterus variopedatus* and *Chlamys varia*).

CR.HCR.XFa.ByErSp.DysAct

This sub-biotope occurs under more wave-exposed conditions, with slightly

CR.MCR.EcCr.FaAlCr.Flu

stronger tides than FluCoAs.SmAs. They also both tend to have a thin layer of silt overlying them. Sponges, hydroids and bryozoans are present in both biotopes; although *Flustra* is present in ByErSp.DysAct, it is not present to the same abundance as in FluCoAs.SmAs, where it forms dense aggregations on the bedrock and boulders. In addition, species such as *Caryophyllia smithii* and *Corynactis viridis* are absent from FluCoAs.SmAs.

This sub-biotope occurs over a similar range of wave-exposures but tends to occur in sites subject to moderately strong to weak tidal streams. This biotope is found deeper than FluCoAs.SmAs, with a mean depth range of 20m to 21m. Both sub-biotopes tend to occupy the same type of substrata (bedrock, boulder, cobble and sand influenced). This sub-biotope has a much more impoverished fauna (especially sponge fauna) when compared to FluCoAs.SmAs. Key species which are absent in FaAlCr.Flu but present in FluCoAs.SmAs include *Sertularia argentea*, *Balanus crenatus*, *Bugula plumosa* and *Scypha ciliata*.

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|-------------------------------|-------------|--------------------|------------------------------|
| <i>Scypha ciliata</i> | ●●●● | Frequent | 3 |
| <i>Cliona celata</i> | ●●●● | Occasional | 1 |
| <i>Esperiopsis fucorum</i> | ●●● | Frequent | 1 |
| <i>Dysidea fragilis</i> | ●●● | Occasional | 1 |
| <i>Tubularia indivisa</i> | ●●● | Occasional | 1 |
| <i>Nemertesia antennina</i> | ●●●● | Frequent | 2 |
| <i>Abietinaria abietina</i> | ●●● | Occasional | 1 |
| <i>Hydrallmania falcata</i> | ●●●● | Frequent | 2 |
| <i>Sertularia argentea</i> | ●●●● | Frequent | 2 |
| <i>Alcyonium digitatum</i> | ●●●● | Occasional | 3 |
| <i>Urticina felina</i> | ●●●●● | Frequent | 4 |
| <i>Sagartia elegans</i> | ●●●● | Occasional | 2 |
| <i>Sabellaria spinulosa</i> | ●●● | Frequent | 2 |
| <i>Balanus crenatus</i> | ●●●● | Common | 4 |
| <i>Cancer pagurus</i> | ●●●● | Occasional | 2 |
| <i>Necora puber</i> | ●●●● | Occasional | 2 |
| <i>Calliostoma zizyphinum</i> | ●●● | Occasional | 1 |
| <i>Alcyonidium diaphanum</i> | ●●●●● | Frequent | 6 |
| <i>Flustra foliacea</i> | ●●●●● | Frequent | 6 |
| <i>Bicelliariella ciliata</i> | ●●● | Occasional | 1 |
| <i>Bugula flabellata</i> | ●●●● | Occasional | 3 |
| <i>Bugula plumosa</i> | ●●●● | Frequent | 2 |
| <i>Crossaster papposus</i> | ●●●● | Occasional | 2 |
| <i>Henricia</i> | ●●● | Occasional | 3 |
| <i>Asterias rubens</i> | ●●●●● | Frequent | 6 |
| <i>Clavelina lepadiformis</i> | ●●● | Occasional | 1 |
| <i>Polyclinum aurantium</i> | ●●● | Frequent | 1 |
| <i>Polycarpa scuba</i> | ●●● | Frequent | 2 |
| <i>Dendrodoa grossularia</i> | ●●● | Frequent | 2 |
| <i>Botryllus schlosseri</i> | ●●● | Occasional | 1 |
| <i>Molgula manhattensis</i> | ●●● | Frequent | 2 |

CR.HCR.XFa.FluCoAs.X *Flustra foliacea* and colonial ascidians on tide-swept exposed circalittoral mixed substrata

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Boulder; cobble; pebble |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Biotope description

This variant is typically found on very exposed to moderately exposed, circalittoral mixed substrata subject to moderately strong tidal streams. It most frequently occurs between 10m and 20m water depth. This variant is characterised by a dense hydroid and *Flustra foliacea* turf, along with other scour-tolerant species, growing on the more stable boulders and cobbles which overlie coarse muddy sand and gravel. Although *Nemertesia antennina* is the dominant species within the hydroid turf, other species such as *Halecium halecinum*, *Nemertesia ramosa* and *Hydrallmania falcata* may also be present. Other bryozoans found amongst the hydroid and *Flustra* turf include *Cellepora pumicosa*, *Bugula flabellata*, *Bugula turbinata*, and a crisiid turf. Encrusting red algae, the polychaete *Pomatoceros triqueter* and barnacles such as *Balanus crenatus* may be found on the smaller cobbles and pebbles, which may become mobile during extreme storms. Echinoderms such as *Asterias rubens* and *Ophiothrix fragilis* may be present on the boulders, or the coarse sediment in between. On the larger, more stable boulders, isolated sponge communities may develop, with species such as *Scypha ciliata*, *Dysidea fragilis*, *Hemimycale columella*, *Esperiopsis fucorum* and *Stelligera rigida*. In addition, small *Alcyonium digitatum*, various ascidians (*Clavelina lepadiformis*, *Botryllus schlosseri*), *Pododesmus patelliformis* and top shells (*Calliostoma zizyphinum*, *Gibbula cineraria*) may colonise the upper faces and vertical sides of larger boulders. At some shallower sites, the foliose red algae *Hypoglossum hypoglossoides* may be found on the tops of larger boulders. Within the coarse sediment underlying these boulders and cobbles, anemones such as *Cerianthus lloydii* and *Urticina felina* may be recorded. Under-boulder fauna typically consists of terebellid worms, and crabs such as *Pisidia longicornis* and *Cancer pagurus*.

Situation

This variant is found in wave-exposed locations, resulting in kelp forest in the infralittoral zone being dominated by *Alaria esculentus* and *Laminaria hyperborea*. When the substratum becomes rockier, this biotope will graduate into the variant FluCoAs.SmAs.

Temporal variation

Not known

Similar biotopes

| | |
|-------------------------|---|
| CR.HCR.XFa.FluCoAs.Paur | This variant occurs on slightly less wave-exposed sites but subject to similar tidal streams. While FluCoAs.Paur is found on circalittoral bedrock and boulders, FluCoAs.Mx occurs on mixed substrata (boulders, cobble, pebble and gravel). Although both biotopes feature <i>Flustra</i> as a dominant feature of their fauna, FluCoAs.Mx has a much more diverse associated fauna and lacks the abundant sheets of the colonial ascidian <i>Polyclinum aurantium</i> . |
| CR.HCR.XFa.FluCoAs.SmAs | This variant occurs under slightly less wave-exposed conditions but subject to similar tidal streams. They both occur around similar depths but |

CR.MCR.EcCr.FaAlCr.Flu

FluCoAs.Mx is found on a mixed substratum (boulders, cobbles, pebbles and gravel) whereas FluCoAs.SmAs tends to be found on bedrock or boulders. FluCoAs.SmAs tends to have a more diverse range of sponges, although it tends not to have the range of species found on more mixed sediment as in FluCoAs.Mx (e.g. *Cerianthus lloydii*, *Chaetopterus variopedatus* and *Chlamys varia*).

This biotope occurs on moderately wave-exposed coasts subject to similar tidal streams. This biotope is found at much deeper depths than FluCoAs.Mx, with a mean depth range of 20m to 21m. Unlike FaAlCr.Flu, FluCoAs.Mx is found on more mixed substrata, consisting of boulders, cobbles and pebbles. FluCoAs.Mx also has a diverse sponge and bryozoan 'turf' community.

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|-----------------------------------|-------------|--------------------|------------------------------|
| <i>Scypha ciliata</i> | ●●●● | Occasional | 2 |
| <i>Stelligera rigida</i> | ●●● | Occasional | 1 |
| <i>Esperiopsis fucorum</i> | ●●● | Occasional | 1 |
| <i>Hemimycale columella</i> | ●●●● | Occasional | 2 |
| <i>Dysidea fragilis</i> | ●●●● | Occasional | 2 |
| <i>Halecium halecinum</i> | ●●●● | Frequent | 2 |
| <i>Nemertesia antennina</i> | ●●●●● | Frequent | 6 |
| <i>Nemertesia ramosa</i> | ●●●● | Frequent | 2 |
| <i>Hydrallmania falcata</i> | ●●● | Occasional | 1 |
| <i>Aleyonium digitatum</i> | ●●●●● | Occasional | 3 |
| <i>Cerianthus lloydii</i> | ●●● | Occasional | 1 |
| <i>Urticina felina</i> | ●●●● | Occasional | 1 |
| Terebellidae | ●●● | Occasional | 2 |
| <i>Pomatoceros triqueter</i> | ●●●●● | Frequent | 4 |
| <i>Balanus crenatus</i> | ●●●● | Occasional | 2 |
| <i>Pisidia longicornis</i> | ●●●● | Common | 3 |
| <i>Cancer pagurus</i> | ●●●● | Occasional | 1 |
| <i>Gibbula cineraria</i> | ●●●● | Occasional | 2 |
| <i>Calliostoma zizyphinum</i> | ●●●●● | Occasional | 3 |
| <i>Pododesmus patelliformis</i> | ●●● | Frequent | 2 |
| Crisiidae | ●●● | Frequent | 1 |
| <i>Cellepora pumicosa</i> | ●●●● | Occasional | 2 |
| <i>Flustra foliacea</i> | ●●●●● | Frequent | 5 |
| <i>Bugula flabellata</i> | ●●●● | Occasional | 2 |
| <i>Bugula turbinata</i> | ●●● | Occasional | 1 |
| <i>Asterias rubens</i> | ●●●●● | Frequent | 6 |
| <i>Ophiothrix fragilis</i> | ●●● | Occasional | 1 |
| <i>Clavelina lepadiformis</i> | ●●●● | Frequent | 3 |
| <i>Botryllus schlosseri</i> | ●●●● | Occasional | 2 |
| Corallinaceae | ●●●● | Occasional | 2 |
| <i>Hypoglossum hypoglossoides</i> | ●●●● | Occasional | 2 |

CR.HCR.XFa.SpNemAdia Sparse sponges, *Nemertesia* spp., and *Alcyonidium diaphanum* on circalittoral mixed substrata

Habitat classification

| | |
|----------------|----------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | Boulders; cobbles; pebbles |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m |

Previous code

CR.MCR.ByH.SNem 97.06
Adia

Biotope description

This biotope is found on moderately wave-exposed sand-scoured, circalittoral boulders, cobbles and pebbles that are subject to moderately strong tidal streams (referred to as lag-cobbles locally). It is characterised by sparse sponges and a diverse bryozoan and hydroid turf. The sparse sponge community is primarily composed of *Dysidea fragilis* and *Scypha ciliata*. The mixed faunal turf is composed of *Nemertesia antennina*, *Nemertesia ramosa*, *Halecium halecinum*, *Sertularia argentea*, *Alcyonium digitatum*, *Bugula flabellata*, *Bugula turbinata*, *Bugula plumosa*, *Flustra foliacea*, *Cellapora pumicosa*, *Alcyonidium diaphanum*, *Cellaria fistulosa* and crisiid bryozoans. The anemones *Epizoanthus couchii*, *Sagartia elegans* and *Cerianthus lloydii* may also be recorded. Echinoderms such as the starfish *Asterias rubens*, *Crossaster papposus*, *Henricia oculata* and the crinoid *Antedon bifida*. Other species present include the colonial ascidian *Clavelina lepadiformis*, the barnacle *Balanus crenatus*, the top shell *Gibbula cineraria*, the polychaete *Pomatoceros triquetus*, the ascidian *Morchellium argus*, *Prostheceraeus vittatus* and the crab *Cancer pagurus*. It is distributed off Pen Llyn and over considerable areas of the Irish Sea.

Temporal variation

Not known

Similar biotopes

CR.HCR.XFa.FluCoAs.X

This biotope occurs under more wave-exposed conditions subject to slightly weaker tidal streams. *Flustra foliacea* is present in higher abundances in FluCoAs.X.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Scypha ciliata</i> | •• | Occasional | 1 |
| <i>Dysidea fragilis</i> | ••• | Occasional | 2 |
| <i>Halecium halecinum</i> | ••• | Occasional | 1 |
| <i>Nemertesia antennina</i> | ••••• | Occasional | 10 |
| <i>Nemertesia ramosa</i> | •••• | Occasional | 3 |
| <i>Sertularia argentea</i> | •• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ••••• | Occasional | 6 |
| <i>Cerianthus lloydii</i> | ••• | Occasional | 2 |
| <i>Epizoanthus couchii</i> | •••• | Occasional | 5 |
| <i>Sagartia elegans</i> | ••• | Frequent | 2 |
| <i>Prostheceraeus vittatus</i> | ••• | Rare | 1 |
| <i>Pomatoceros triquetus</i> | ••• | Occasional | 1 |
| <i>Balanus crenatus</i> | ••• | Common | 2 |

| | | | |
|-------------------------------|------|------------|---|
| <i>Cancer pagurus</i> | •• | Occasional | 1 |
| <i>Gibbula cineraria</i> | ••• | Occasional | 1 |
| Crisiidae | •• | Frequent | 1 |
| <i>Alcyonidium diaphanum</i> | •••• | Occasional | 2 |
| <i>Cellepora pumicosa</i> | •• | Occasional | 1 |
| <i>Flustra foliacea</i> | •••• | Occasional | 3 |
| <i>Cellaria fistulosa</i> | •• | Common | 1 |
| <i>Bugula flabellata</i> | •••• | Occasional | 4 |
| <i>Bugula plumosa</i> | •• | Occasional | 1 |
| <i>Bugula turbinata</i> | ••• | Occasional | 2 |
| <i>Antedon bifida</i> | ••• | Occasional | 2 |
| <i>Crossaster papposus</i> | ••• | Occasional | 2 |
| <i>Henricia oculata</i> | ••• | Occasional | 1 |
| <i>Asterias rubens</i> | •••• | Occasional | 3 |
| <i>Clavelina lepadiformis</i> | •••• | Occasional | 5 |
| <i>Morchellium argus</i> | •• | Frequent | 1 |

CR.HCR.XFa.SubCriTf *Suberites* spp. with a mixed turf of crisiids and *Bugula* spp. on heavily silted, moderately wave-exposed, shallow circalittoral rock

Habitat classification

| | |
|-----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | Bedrock, Boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |
| Other features: | Extremely shallow |

Biotope description

This biotope is found on heavily silted, moderately wave-exposed circalittoral bedrock and boulders (often limestone) that are subject to moderately strong tidal streams. A very high silt loading in the water column means that this 'circalittoral' biotope occurs at unusually shallow depths (1 - 10 m BCD). It is characterised by a mixed faunal turf and 'massive' examples of the sponges *Suberites ficus*, *Suberites carnosus* and *Hymeniacion perleve*. Other sponges recorded in this biotope are *Cliona celata*, *Halichondria panicea*, *Esperiopsis fucorum*, *Raspailia ramosa*, *Polymastia mamillaris*, *Dysidea fragilis*, *Scypha ciliata*, *Stelligera rigida* and *Haliclona oculata*. Also characteristic of this biotope is a dense bryozoan turf with one or more crisiid species., *Flustra foliacea* and *Bugula plumosa*. The polychaete *Polydora* sp. and the rock-boring bivalve *Hiatella arctica* are able to bore into the relatively 'soft' limestone. There is an ascidian component to the biotope, with *Morchellium argus* and *Clavelina lepadiformis* among the most abundant. There may be scattered clumps of the hydroids *Abietinaria abietina* and *Hydrallmania falcata*. Other species present include the anemones *Metridium senile*, *Sagartia elegans* and *Urticina felina*, the starfish *Asterias rubens*, the crab *Necora puber*, the nudibranch *Janolus cristatus* and the soft coral *Alcyonium digitatum*. This biotope has currently only been recorded off the east coast of Anglesey, Wales.

Temporal variation

Not known

Similar biotopes

CR.MCR.CFaVS.CuSpH.As

This biotope is similar to SubCriTf but is found in slightly more wave-sheltered sites, and at deeper depths. It also does not have 'massive' examples of *Suberites* spp. present in SubCriTf.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|------------------------------|-------------|--------------------|-----------------------------|
| <i>Scypha ciliata</i> | ●●●● | Occasional | 2 |
| <i>Suberites carnosus</i> | ●●●●● | Occasional | 3 |
| <i>Suberites ficus</i> | ●●●●● | Frequent | 5 |
| <i>Polymastia mamillaris</i> | ●●●● | Frequent | 2 |
| <i>Cliona celata</i> | ●●●●● | Frequent | 5 |
| <i>Stelligera rigida</i> | ●●●● | Frequent | 2 |
| <i>Raspailia ramosa</i> | ●●●● | Occasional | 2 |
| <i>Halichondria panicea</i> | ●●●●● | Frequent | 4 |
| <i>Hymeniacion perleve</i> | ●●●● | Frequent | 3 |
| <i>Esperiopsis fucorum</i> | ●●●●● | Frequent | 4 |

| | | | |
|-------------------------------|-------|------------|---|
| <i>Haliclona oculata</i> | •••• | Occasional | 1 |
| <i>Dysidea fragilis</i> | •••• | Frequent | 2 |
| <i>Abietinaria abietina</i> | •••• | Frequent | 2 |
| <i>Hydrallmania falcata</i> | •••• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••••• | Frequent | 4 |
| <i>Urticina felina</i> | ••••• | Occasional | 4 |
| <i>Metridium senile</i> | ••••• | Common | 6 |
| <i>Sagartia elegans</i> | ••••• | Frequent | 4 |
| <i>Polydora</i> | ••••• | Frequent | 5 |
| <i>Necora puber</i> | •••• | Occasional | 2 |
| <i>Janolus cristatus</i> | •••• | Occasional | 2 |
| <i>Hiatella arctica</i> | ••••• | Frequent | 5 |
| Crisiidae | ••••• | Frequent | 4 |
| <i>Flustra foliacea</i> | •••• | Frequent | 2 |
| <i>Bugula plumosa</i> | •••• | Frequent | 2 |
| <i>Asterias rubens</i> | ••••• | Frequent | 5 |
| <i>Clavelina lepadiformis</i> | •••• | Occasional | 2 |
| <i>Morchellium argus</i> | ••••• | Occasional | 4 |

CR.HCR.XFa.FluHocu *Flustra foliacea* and *Haliclona oculata* with a rich faunal turf on tide-swept circalittoral mixed substrata

Habitat classification

| | |
|----------------|---------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Cobble; pebble; mud |
| Zone: | Circalittoral - lower |
| Depth band: | 0-5 m, 5-10 m, 10-20 m, 20-30 m |

Previous code

CR.MCR.ByH.Flu.Hocu 97.06

Biotope description

This biotope is typically found on exposed slopes of silty cobble and pebble subject to strong to moderate tidal streams. From afar, large 'finger' growths of the sponge *Haliclona oculata* occur amongst a rich faunal turf of hydroids and bryozoans with *Flustra foliacea* prominent. The dense faunal turf growing on the cobbles is composed of the bryozoans *F. foliacea*, *Alcyonidium diaphanum* and *Crisia eburnea* and sporadic occurrences of the hydroids *Nemertesia antennina*, *Hydrallmania falcata*, *Tubularia larynx*, *Rhizocaulus verticillatus* and *Halecium halecinum*. Caprellid shrimps may be observed within this faunal turf. The hard substratum frequently has a dense covering of the sponge *Haliclona oculata* and occasionally *Esperiopsis fucorum*, while the softer gravely/sand between the cobbles provides a habitat for anemones such as *Urticina felina* and *Cerianthus lloydii*. The nudibranch *Janolus cristatus* may be seen preying on the faunal turf and the fan worm *Sabella pavonia* is occasionally seen amongst the cobbles. The soft coral *Alcyonium digitatum* is often attached to the upper faces of more stable cobbles and rocks, while in the crevices between cobbles, the anemone *Sagartia elegans*, the crab *Cancer pagurus*, the prawn *Pandalus montagui* and the amphipod *Dyopodes porrectus* may be observed. Under-cobble fauna includes terebellid worms and *Harmothoe* spp. This biotope has been recorded from the Menai Strait, Milford Haven and Morcambe Bay.

Temporal variation

Not known

Similar biotopes

| | |
|-------------------------|--|
| CR.HCR.XFa.Mol | This biotope occurs on shallow circalittoral bedrock and cobbles, subject to moderate exposure and moderately strong tidal streams. <i>Flustra</i> is also prevalent in this community, but has a more diverse ascidian and bryozoan community than Flu.Hocu, including <i>Molgula</i> and <i>Alcyonidium</i> respectively. |
| CR.MCR.EcCr.FaAlCr.Flu | This biotope occurs on moderately exposed circalittoral bedrock and boulders, subject to moderately strong tidal streams. This biotope is subject to considerable sand scour, and has an impoverished fauna dominated by <i>Flustra foliacea</i> and <i>Alcyonium digitatum</i> . FluHocu has a higher diversity of species than FaAlCr.Flu. |
| CR.HCR.XFa.FluCoAs.Paur | This biotope occurs on moderately exposed bedrock, unlike FluHocu which tends to occur on a cobblier substratum. This biotope does experience similar tidal stream regimes as FluHocu. While <i>F. foliacea</i> is the dominant bryozoan, it is the presence of dense aggregations of <i>Polyclinium aurantium</i> which distinguish this as a separate biotope. |
| CR.HCR.XFa.FluCoAs | See other variants in the FluCoAs biotope. |

Characterising species

| % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-------------|--------------------|-----------------------------|
|-------------|--------------------|-----------------------------|

| | | | |
|----------------------------------|-------|------------|---|
| <i>Esperiopsis fucorum</i> | •••• | Occasional | 1 |
| <i>Haliclona oculata</i> | ••••• | Frequent | 5 |
| <i>Tubularia larynx</i> | ••••• | Occasional | 2 |
| <i>Halecium halecinum</i> | ••••• | Occasional | 2 |
| <i>Nemertesia antennina</i> | ••••• | Frequent | 6 |
| <i>Hydrallmania falcata</i> | ••••• | Occasional | 3 |
| <i>Rhizocaulus verticillatus</i> | •••• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••••• | Frequent | 5 |
| <i>Cerianthus lloydii</i> | ••••• | Occasional | 3 |
| <i>Urticina felina</i> | ••••• | Frequent | 6 |
| <i>Sagartia elegans</i> | ••••• | Occasional | 4 |
| <i>Harmothoe</i> | ••••• | Present | 1 |
| Terebellidae | ••••• | Occasional | 4 |
| <i>Sabella pavonina</i> | ••••• | Frequent | 3 |
| PYCNOGONIDA | ••••• | Present | 2 |
| <i>Balanus crenatus</i> | •••• | Frequent | 2 |
| <i>Dyopedos porrectus</i> | ••••• | Frequent | 7 |
| Caprellidae | ••••• | Present | 2 |
| <i>Pandalus montagui</i> | •••• | Occasional | 2 |
| <i>Cancer pagurus</i> | ••••• | Frequent | 5 |
| <i>Janolus cristatus</i> | ••••• | Rare | 1 |
| <i>Crisia eburnea</i> | ••••• | Rare | 1 |
| <i>Alcyonidium diaphanum</i> | ••••• | Frequent | 5 |
| <i>Flustra foliacea</i> | ••••• | Frequent | 5 |
| <i>Asterias rubens</i> | ••••• | Frequent | 4 |

CR.HCR.XFa.Mol *Molgula manhattensis* with a hydroid and bryozoan turf on tide-swept moderately wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | Bedrock; cobble; sand |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |

Previous code

CR.MCR.As.MolPol 97.06

Biotope description

This biotope is typically found on slightly sand-scoured, tide-swept, moderately exposed circalittoral bedrock and cobbles. It is commonly recorded from the shallower reaches of the circalittoral around depths from 5m to 15m BCD, as it occurs mostly in very turbid waters. From afar, the physical characteristics are usually silted bedrock reefs and cobble, interspersed with patches of clean sand, causing a scour effect on the rock. Dense aggregations of the ascidian *Molgula manhattensis* form a silty mat on the rock and there is a sparse hydroid and bryozoan turf. A hydroid turf, composed of *Nemertesia antennina*, *Halecium beanii*, *Hydrallmania falcata*, *Sertularella gaudichaudi*, *Tubularia indivisa* and *Alcyonium digitatum*, in varying amounts, occurs at most sites on the tops of boulders and ridges. A bryozoan turf is also present, but not usually dense and includes *Flustra foliacea*, *Alcyonidium diaphanum*, *Electra pilosa* and the crust-forming bryozoan *Conopeum reticulum*. The polychaete *Lanice conchilega* thrives in the sandy patches which often occur between the rock ridges. The scour effect tends to reduce the diversity of sponges present with only *Halichondria panicea* occasionally present. Isolated clumps of the polychaete *Sabellaria spinulosa* may be present but they do not occur in dense aggregations as in the Sspi.ByB biotope. The anemones *Urticina felina* and *Sagartia troglodytes* may occur in cracks between cobbles or on stones buried in the sandy substratum. The anemone *Sagartia elegans* is more commonly found attached to crevices in the bedrock. Other species such as the hermit crab *Pagurus bernhardus*, the barnacle *Balanus crenatus*, the polychaete *Sabella pavonia* and *Pomatoceros triqueter* may all be present whilst the crab *Pisidia longicornis* may be found under cobbles and stones. Records of this biotope are distributed along the south coast of England and the north Wales coast as well as Pembrokeshire near the entrance to Milford Haven.

Situation

As this biotope is often recorded on soft rock (chalk), soft rock communities (SfR biotope complex) would be observed in close proximity with species such as *Polydora* and piddocks (*Pholas* and *Barnea* spp). Moderately exposed kelp forests may be found within the 'shallow' infralittoral zone.

Temporal variation

Not known

Similar biotopes

CR.HCR.XFa.FluHocu

This biotope occurs on wave-exposed circalittoral cobble, subject to strong to moderately strong tidal streams. *Flustra* may be found in varying amounts in both these biotopes, but Flu.Hocu has a more diverse range of hydroids and sponges, with *Haliclona oculata* dominant in Flu.Hocu yet absent in Mol.

CR.MCR.EcCr.FaAlCr.Flu

This biotope is found under similar exposure and tidal stream regimes as Mol but occurs in much less turbid conditions. *Flustra* is present in both these biotopes, but is more abundant in FaAlCr.Flu. The absence of *Molgula manhattensis* in FaAlCr.Flu is also noteworthy.

CR.HCR.XFa.FluCoAs.Paur

This biotope is found under similar conditions as Mol but the substratum

tends to be less heterogeneous, composed primarily of bedrock/boulders and it is found in less turbid conditions. *Flustra* and a similar hydroid turf may be found in both biotopes, but FluCoAs.Paur has a diverse range of sponges (including commonly occurring *Cliona celata*) and bryozoan turf with colonial and solitary ascidians. Mol has dense aggregations of *Molgula manhattensis* which distinguish it from others.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|---------------------------------|-------------|--------------------|--------------------------------|
| <i>Halichondria panicea</i> | •• | Occasional | 1 |
| <i>Tubularia indivisa</i> | •••• | Occasional | 4 |
| <i>Halecium beanii</i> | •• | Occasional | 1 |
| <i>Nemertesia antennina</i> | ••• | Occasional | 2 |
| <i>Hydrallmania falcata</i> | ••• | Occasional | 1 |
| <i>Sertularella gaudichaudi</i> | ••• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••• | Occasional | 3 |
| <i>Urticina felina</i> | ••• | Frequent | 4 |
| <i>Sagartia elegans</i> | ••• | Occasional | 2 |
| <i>Sagartia troglodytes</i> | •• | Occasional | 1 |
| <i>Sabellaria spinulosa</i> | ••• | Occasional | 2 |
| <i>Lanice conchilega</i> | •••• | Occasional | 5 |
| <i>Sabella pavonina</i> | •• | Occasional | 1 |
| <i>Pomatoceros triqueter</i> | ••• | Occasional | 2 |
| <i>Balanus crenatus</i> | ••• | Occasional | 1 |
| <i>Pagurus bernhardus</i> | ••• | Occasional | 4 |
| <i>Pisidia longicornis</i> | ••• | Occasional | 1 |
| <i>Alcyonidium diaphanum</i> | ••••• | Occasional | 11 |
| <i>Conopeum reticulum</i> | •• | Present | 1 |
| <i>Electra pilosa</i> | ••• | Present | 1 |
| <i>Flustra foliacea</i> | •••• | Occasional | 7 |
| <i>Asterias rubens</i> | ••••• | Frequent | 9 |
| <i>Molgula manhattensis</i> | ••••• | Frequent | 15 |

CR.HCR.XFa.SpAnVt Sponges and anemones on vertical cirralittoral bedrock**Habitat classification**

| | |
|-----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong, Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Infralittoral - lower, Cirralittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |
| Other features: | Vertical rock |

Previous code

IR.FaSwV.CorMetAlc 97.06
in part

Biotope description

This biotope is found on exposed to moderately wave exposed, vertical and overhanging, cirralittoral bedrock, subject to strong through to weak tidal streams. This biotope is characterised 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 characterised 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, characterised by a dense 'carpet' of *Corynactis viridis* and *Metridium senile* has been recorded predominantly from the west coast of Ireland. The final variant is characterised by a very diverse, dense faunal turf of hydroids, bryozoans and ascidians and has been recorded from the coasts around Northern Ireland.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|--|
| <i>Pachymatisma johnstonia</i> | ●●● | Occasional | 2 |
| <i>Cliona celata</i> | ●●●● | Occasional | 5 |
| <i>Hemimycale columella</i> | ●● | Occasional | 1 |
| <i>Dysidea fragilis</i> | ●●● | Occasional | 2 |
| <i>Tubularia indivisa</i> | ●●● | Occasional | 2 |
| <i>Halecium halecinum</i> | ●● | Occasional | 1 |
| <i>Nemertesia antennina</i> | ●●● | Occasional | 3 |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | 10 |
| <i>Metridium senile</i> | ●● | Occasional | 1 |
| <i>Sagartia elegans</i> | ●●● | Occasional | 2 |
| <i>Actinothoe sphyrodeta</i> | ●●● | Occasional | 3 |
| <i>Corynactis viridis</i> | ●●●● | Frequent | 10 |
| <i>Caryophyllia smithii</i> | ●●●●● | Frequent | 9 |
| <i>Calliostoma zizyphinum</i> | ●●● | Occasional | 2 |
| Crisiidae | ●● | Frequent | 1 |
| <i>Alcyonidium diaphanum</i> | ●● | Rare | 1 |
| <i>Antedon bifida</i> | ●● | Occasional | 1 |
| <i>Henricia oculata</i> | ●●● | Occasional | 2 |
| <i>Asterias rubens</i> | ●●●● | Occasional | 4 |
| <i>Marthasterias glacialis</i> | ●●● | Occasional | 3 |
| <i>Echinus esculentus</i> | ●●●● | Occasional | 5 |
| <i>Holothuria forskali</i> | ●● | Occasional | 2 |
| <i>Clavelina lepadiformis</i> | ●●● | Occasional | 2 |

CR.MCR**Moderate energy circolittoral rock****Habitat classification**

| | |
|----------------|--|
| Salinity: | Full (30-35ppt), Variable (18-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak |
| Substratum: | Bedrock;boulders |
| Zone: | Circolittoral - upper, Circolittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Biotope description

This habitat complex mainly occurs on exposed to moderately wave-exposed circolittoral bedrock and boulders, subject to moderately strong and weak tidal streams. This habitat complex contains a broad range of biotope complexes, from echinoderms and crustose communities (EcCr) to *Sabellaria* reefs (CSab) and circolittoral mussel beds (CMus).

CR.MCR.EcCr Echinoderms and crustose communities

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak |
| Substratum: | Bedrock, boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Biotope description

This biotope complex occurs on wave-exposed, moderately strong to weakly tide-swept, circalittoral bedrock and boulders. Echinoderms, faunal (*Parasmittina trispinosa*) and algal crusts (red encrusting algae) dominate this biotope, giving a 'sparse' appearance. Typical echinoderms present are the starfish *Asterias rubens*, the brittlestar *Ophiothrix fragilis* and the sea urchin *Echinus esculentus*. There may be isolated clumps of the hydroids *Nemertesia antennina* and *Abietinaria abietina*, *Alcyonium digitatum*, the anemone *Urticina felina* and the cup coral *Caryophyllia smithii*. Other species present may include the polychaete *Pomatoceros triqueter* and the top shell *Calliostoma zizyphinum*. Five biotopes have been identified within this biotope complex: CarSwi, CarSp, FaAlCr, AdigVt and UrtScr.

Characterising species

| | % Frequency | Abundance (SACFOR) |
|--------------------------------|-------------|--------------------|
| <i>Nemertesia antennina</i> | ●●● | Occasional |
| <i>Abietinaria abietina</i> | ●●● | Occasional |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent |
| <i>Urticina felina</i> | ●●● | Occasional |
| <i>Caryophyllia smithii</i> | ●●● | Frequent |
| <i>Pomatoceros triqueter</i> | ●●● | Frequent |
| <i>Calliostoma zizyphinum</i> | ●●● | Occasional |
| <i>Parasmittina trispinosa</i> | ●●● | Frequent |
| <i>Asterias rubens</i> | ●●●● | Occasional |
| <i>Ophiothrix fragilis</i> | ●●● | Frequent |
| <i>Echinus esculentus</i> | ●●●●● | Frequent |
| Corallinaceae | ●●●● | Common |

CR.MCR.EcCr.CarSwi *Caryophyllia smithii* and *Swiftia pallida* on circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed, Sheltered |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Biotope description

This biotope is typically found on the upper and vertical faces of very exposed through to wave-sheltered circalittoral bedrock and boulders, which are typically subject to weak tidal streams. It is characterised by dense aggregations of the cup coral *Caryophyllia smithii* and the sea fan *Swiftia pallida* on the silty substratum. Under the silt, bryozoan crusts such as *Parasmittina trispinosa* and encrusting red algae may be seen. This biotope may have a grazed appearance, perhaps attributable to the frequently occurring *Echinus esculentus* present. There may be a sparse hydroid turf present, with species such as *Nemertesia antennina*, *Nemertesia ramosa* and *Halecium halecinum* present. The soft corals *Alcyonium glomeratum* and *Alcyonium digitatum* may be present on the tops of boulders along with the crinoids *Antedon petasus* and *Antedon bifida*. Other echinoderms occasionally observed include the starfish *Martasterias glacialis*, *Asterias rubens* and *Luidia ciliaris*. Sponges feature only occasionally in this biotope, including species such as *Cliona celata*. The bryozoan *Porella compressa* may also be recorded. Ascidians occasionally present include *Ascidia mentula*, *Clavelina lepadiformis* and *Ciona intestinalis*. Under-boulder fauna typically consists of the crustacean *Munida rugosa*. The polychaete *Pomatoceros triqueter* may be seen encrusting the rocky surface. Two variants of this biotope have been identified; CarSwi.Aglo and CarSwi.LgAs. CarSwi.Aglo is a heavily silted biotope characterised by the sea fan *S. pallida*, the cup coral *C. smithii* and the soft coral *A. glomeratum* and is only present in Irish waters. CarSwi.LgAs has been recorded off the west coast of Scotland, and is characterised by large solitary ascidians and the cup coral *C. smithii*.

Temporal variation

Not known

Similar biotopes

| | |
|-------------------------|-------------------------|
| CR.MCR.EcCr.CarSwi.Aglo | see variant for details |
| CR.MCR.EcCr.CarSwi.LgAs | see variant for details |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|------------------------------|-------------|--------------------|-----------------------------|
| <i>Cliona celata</i> | ••• | Occasional | 2 |
| <i>Halecium halecinum</i> | •• | Occasional | 1 |
| <i>Nemertesia antennina</i> | •••• | Occasional | 4 |
| <i>Nemertesia ramosa</i> | •• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••• | Occasional | 1 |
| <i>Alcyonium glomeratum</i> | •• | Frequent | 1 |
| <i>Swiftia pallida</i> | ••••• | Frequent | 14 |
| <i>Caryophyllia smithii</i> | ••••• | Common | 22 |
| <i>Pomatoceros triqueter</i> | •• | Occasional | 1 |

| | | | |
|--------------------------------|------|------------|---|
| <i>Munida rugosa</i> | ●●● | Occasional | 2 |
| <i>Parasmittina trispinosa</i> | ●●●● | Occasional | 5 |
| <i>Porella compressa</i> | ●●● | Rare | 1 |
| <i>Antedon bifida</i> | ●●● | Occasional | 2 |
| <i>Antedon petasus</i> | ●● | Frequent | 1 |
| <i>Luidia ciliaris</i> | ●●● | Occasional | 2 |
| <i>Asterias rubens</i> | ●●● | Occasional | 2 |
| <i>Marthasterias glacialis</i> | ●●● | Occasional | 3 |
| <i>Echinus esculentus</i> | ●●●● | Frequent | 6 |
| <i>Clavelina lepadiformis</i> | ●● | Occasional | 1 |
| <i>Ciona intestinalis</i> | ●● | Occasional | 1 |
| <i>Ascidia mentula</i> | ●●● | Occasional | 3 |
| Corallinaceae | ●●● | Abundant | 4 |

CR.MCR.EcCr.CarSwi.Aglo *Caryophyllia smithii*, *Swiftia pallida* and *Alcyonium glomeratum* on wave-sheltered circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed, Sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Previous code

CR.MCR.XFa.ErSSwi 97.06

Biotope description

This variant typically occurs on sheltered, ridged, circalittoral bedrock or boulders subject to only weak tidal streams, but may be found in somewhat more exposed conditions. It is found in water depths ranging from 15m to 32m. Commonly occurring *Swiftia pallida* characterises this heavily silted biotope along with *Caryophyllia smithii* and frequent *Alcyonium glomeratum*. Under the silt, bryozoan crusts such as *Parasmittina trispinosa* may be found. There is a strong echinoderm component to the community, with the tentacles of *Aslia lefevrei* frequently seen protruding from crevices in the ridged bedrock. *Holothuria forskali* is often seen on the upper faces of boulders and bedrock. *Marthasterias glacialis*, *Asterias rubens*, *Echinus esculentus*, *Henricia oculata* and *Luidia ciliaris* may also be present. A sparse hydroid turf may also be present, with species such as *Polyplumaria frutescens*, *Halecium halecinum* and *Nemertesia antennina*. In addition, there may be anthozoans such as *Isozoanthus sulcatus* and *Corynactis viridis*. The sponge *Suberites carnosus* is typically associated with a heavily silted habitat. Other sponges present include *Cliona celata*, *Stelligera stuposa* and *Polymastia boletiformis*. The only records are from the west coast of Ireland.

Situation

Usually found on bedrock ridges and outcrops surrounded by sand and muddy gravel.

Temporal variation

Not known

Similar biotopes

| | |
|-------------------------|--|
| CR.MCR.EcCr.CarSwi.LgAs | This biotope is found over a broad range of sites with different wave-exposures, subject to moderately strong to very weak tidal streams. Substratum is typically similar to CarSwi.Aglo. CarSwi.LgAs has a lower diversity of sponges and hydroids). |
| CR.HCR.XFa.SwiLgAs | This biotope occurs in slightly more wave-exposed and more tide-swept sites than CarSwi.Aglo. They both occur across similar depth bands. SwiLgAs appears a lot more biologically diverse, with a greater range of sponges, hydroids, bryozoans and ascidians. |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Suberites carnosus</i> | ●●●● | Occasional | 8 |
| <i>Polymastia boletiformis</i> | ●●● | Occasional | 2 |
| <i>Cliona celata</i> | ●●●● | Occasional | 6 |
| <i>Stelligera stuposa</i> | ●●● | Occasional | 2 |
| <i>Halecium halecinum</i> | ●●● | Occasional | 2 |

| | | | |
|--------------------------------|-------|------------|----|
| <i>Nemertesia antennina</i> | ●●● | Occasional | 1 |
| <i>Polyplumaria frutescens</i> | ●●●● | Frequent | 4 |
| <i>Alcyonium glomeratum</i> | ●●●●● | Frequent | 6 |
| <i>Swiftia pallida</i> | ●●●●● | Common | 11 |
| <i>Isozoanthus sulcatus</i> | ●●●● | Occasional | 4 |
| <i>Corynactis viridis</i> | ●●● | Occasional | 1 |
| <i>Caryophyllia smithii</i> | ●●●●● | Common | 12 |
| <i>Parasmittina trispinosa</i> | ●●● | Occasional | 2 |
| <i>Luidia ciliaris</i> | ●●●● | Occasional | 4 |
| <i>Henricia oculata</i> | ●●●● | Occasional | 2 |
| <i>Asterias rubens</i> | ●●●●● | Occasional | 5 |
| <i>Marthasterias glacialis</i> | ●●●●● | Occasional | 5 |
| <i>Echinus esculentus</i> | ●●●● | Frequent | 4 |
| <i>Holothuria forskali</i> | ●●●●● | Occasional | 6 |
| <i>Aslia lefevrei</i> | ●●●●● | Frequent | 8 |

CR.MCR.EcCr.CarSwi.LgAs *Caryophyllia smithii*, *Swiftia pallida* and large solitary ascidians on exposed or moderately exposed circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed, Sheltered |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Previous code

CR.MCR.XFa.ErSSwi 97.06

Biotope description

This variant typically occurs on exposed to moderately wave-exposed, circalittoral bedrock and boulders rock subject to mainly weak tidal streams and has a thin layer of silt present. It is found predominantly from 10-30m water depth. From afar, this biotope is mostly distinguished by the frequently occurring seafan *Swiftia pallida*, encrusting red algae and the abundant cup coral *Caryophyllia smithii*. This biotope has quite an impoverished appearance, compared with SwiLgAs which has a strong sponge component. Other species present are typically in low abundance. Echinoderms such as *Echinus esculentus*, *Antedon bifida*, *Antedon petasus*, *Leptometra celtica*, *Marthasterias glacialis*, *Luidia ciliaris* and *Asterias rubens* may be recorded. Large hydroids such as *Nemertesia antennina* and *Nemertesia ramosa* may occasionally be seen in isolated clumps on the tops of boulders and rocky outcrops. The anthozoan *Parazoanthus anguicomus* may be recorded. Bryozoans such as *Parasmittina trispinosa* and *Porella compressa* are occasionally observed. The polychaete *Pomatoceros triqueter* may be observed encrusting the sides of rocks and boulders while occasional *Alcyonium digitatum* may also be seen. A small suite of large ascidians may be present, including *Ascidia mentula*, *Clavelina lepadiformis*, *Ciona intestinalis*, *Diazona violacea* and *Ascidia virginea*. Sponges are typically absent from this biotope, although *Cliona celata* may be recorded occasionally. The top shell *Gibbula cineraria* is usually present. Under boulders and overhangs, the squat lobster *Munida rugosa* can usually be seen hiding. All these records are from the west coast of Scotland (East coast of Lewis /Outer Hebrides).

Situation

Above this biotope in the infralittoral zone, you tend to find sheltered kelp forests, with species such as *Laminaria hyperborea*, *Laminaria saccharina* and *Sacchoriza polyschides*. This biotope is found on bedrock and boulder, which may either be protruding from the surrounding sediment, or the sediment may be in a separate 'zone' below the bedrock. These sediments may either be deep mud (with species such as *Pachycerianthus* and *Nephrops*) on the sheltered sites or slightly coarser sediments (with *Pennatula* and *Virgularia*) on slightly more exposed sites.

Temporal variation

Not known

Similar biotopes

CR.HCR.XFa.SwiLgAs

This biotope occurs in slightly more tide-swept sites than CarSwi.LgAs. They both occur across similar depth bands. SwiLgAs appears a lot more biologically diverse, with a greater range of sponges, hydroids, bryozoans and ascidians, although this difference may possibly be due to 'poor data'.

CR.MCR.EcCr.CarSwi.Aglo

This biotope predominantly occurs in the sheltered end of the wave-exposure spectrum, subject to only weak tidal streams. It is typically found across

similar depth bands as CarSwi.LgAs. This heavily silted biotope is characterised by *Swiftia pallida*, *Alcyonium glomeratum*, *Isozoanthus sulcatus* and the prominent *Holothuria forskali*. This biotope is only present around the coast of Ireland.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|------------------------------------|
| <i>Cliona celata</i> | ••• | Occasional | 1 |
| <i>Nemertesia antennina</i> | •••• | Occasional | 4 |
| <i>Nemertesia ramosa</i> | ••• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••• | Occasional | 1 |
| <i>Swiftia pallida</i> | ••••• | Frequent | 12 |
| <i>Caryophyllia smithii</i> | ••••• | Abundant | 22 |
| <i>Pomatoceros triqueter</i> | ••• | Occasional | 2 |
| <i>Munida rugosa</i> | •••• | Occasional | 4 |
| <i>Gibbula cineraria</i> | •• | Occasional | 1 |
| <i>Parasmittina trispinosa</i> | •••• | Occasional | 5 |
| <i>Porella compressa</i> | ••• | Rare | 1 |
| <i>Antedon bifida</i> | ••• | Occasional | 3 |
| <i>Antedon petasus</i> | ••• | Frequent | 3 |
| <i>Luidia ciliaris</i> | ••• | Rare | 1 |
| <i>Asterias rubens</i> | ••• | Occasional | 1 |
| <i>Marthasterias glacialis</i> | ••• | Occasional | 2 |
| <i>Echinus esculentus</i> | •••• | Frequent | 6 |
| <i>Clavelina lepadiformis</i> | ••• | Occasional | 1 |
| <i>Ciona intestinalis</i> | ••• | Occasional | 1 |
| <i>Diazona violacea</i> | ••• | Occasional | 1 |
| <i>Ascidia mentula</i> | •••• | Occasional | 4 |
| <i>Ascidia virginea</i> | ••• | Occasional | 1 |
| Corallinaceae | ••• | Abundant | 7 |

CR.MCR.EcCr.CarSp *Caryophyllia smithii*, sponges and crustose communities on wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Biotope description

This biotope typically occurs on the upper and vertical faces of wave-exposed, moderately strong to weakly tide-swept, circalittoral bedrock or boulders, with a water depth range of 20-30m. This often silty biotope has a typically sparse fauna, appearing grazed, and is characterised by common cup corals *Caryophyllia smithii*, frequent *Alcyonium digitatum* and occasional urchins *Echinus esculentus*. There may be occasional large growths of the sponge *Cliona celata*, *Haliclona viscosa*, *Pachymatisma johnstonia* and the axinellid sponge *Stelligera stuposa*. Echinoderms form a prominent feature of the fauna within this biotope, with species such as *Marthasterias glacialis*, *Asterias rubens*, *Luidia ciliaris*, *Henricia oculata*, *Holothuria forskali*, *Antedon bifida* and *Aslia lefevrei* present. Bryozoan crusts such as *Parasmittina trispinosa* and encrusting red algae cover the rock/boulder surface. The bryozoan *Porella compressa* may also be recorded occasionally. Isolated clumps of hydroids feature species such as *Nemertesia antennina*, *Nemertesia ramosa*, *Abietinaria abietina*, *Halecium halecinum* and *Sertularella gayi*. Other species observed include the anemone *Corynactis viridis*, *Urticina felina*, *Sagartia elegans*, *Calliostoma zizyphinum*, *Balanus crenatus* and *Pomatoceros triqueter*. Two variants within this biotope have been distinguished; CarSp.PenPcom and CarSp.Bri. CarSp.PenPcom tends to have the bryozoans *Pentapora foliacea* and *Porella compressa*, while CarSp.Bri features a dynamic community of brittlestars covering the seabed in a dense mat. *Ophiothrix fragilis* is usually the dominant species in shallow water but tends to be replaced by *Ophiocomina nigra* in deeper water.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Pachymatisma johnstonia</i> | ••• | Occasional | 1 |
| <i>Cliona celata</i> | ••••• | Frequent | 6 |
| <i>Stelligera stuposa</i> | ••• | Occasional | 1 |
| <i>Haliclona viscosa</i> | •••• | Occasional | 3 |
| <i>Halecium halecinum</i> | ••• | Occasional | 1 |
| <i>Nemertesia antennina</i> | •••• | Occasional | 3 |
| <i>Nemertesia ramosa</i> | ••• | Occasional | 2 |
| <i>Abietinaria abietina</i> | ••• | Frequent | 2 |
| <i>Sertularella gayi</i> | ••• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ••••• | Frequent | 6 |
| <i>Urticina felina</i> | ••• | Occasional | 2 |
| <i>Sagartia elegans</i> | ••• | Occasional | 1 |
| <i>Corynactis viridis</i> | •••• | Frequent | 4 |
| <i>Caryophyllia smithii</i> | ••••• | Frequent | 9 |
| <i>Pomatoceros triqueter</i> | ••• | Occasional | 1 |
| <i>Balanus crenatus</i> | ••• | Frequent | 1 |
| <i>Calliostoma zizyphinum</i> | •••• | Occasional | 3 |
| <i>Parasmittina trispinosa</i> | •••• | Frequent | 4 |
| <i>Porella compressa</i> | •• | Occasional | 1 |

| | | | |
|--------------------------------|-------|------------|---|
| <i>Antedon bifida</i> | ●●● | Frequent | 2 |
| <i>Luidia ciliaris</i> | ●●●● | Occasional | 3 |
| <i>Henricia oculata</i> | ●●●● | Occasional | 3 |
| <i>Asterias rubens</i> | ●●●● | Occasional | 4 |
| <i>Marthasterias glacialis</i> | ●●●● | Occasional | 4 |
| <i>Echinus esculentus</i> | ●●●●● | Occasional | 6 |
| <i>Holothuria forskali</i> | ●●● | Occasional | 2 |
| <i>Aslia lefevrei</i> | ●●● | Occasional | 2 |
| Corallinaceae | ●●● | Frequent | 2 |

CR.MCR.EcCr.CarSp.Bri Brittlestar bed overlying coralline crusts, *Parasmittina trispinosa* and *Caryophyllia smithii* on wave-exposed cirralittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Bedrock; boulder |
| Zone: | Cirralittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Biotope description

This variant is typically found on the upper faces of wave-exposed cirralittoral bedrock or boulders subject to moderately strong to weak tidal streams, on open coasts. However, the depth at which the variant occurs means that wave action is not so severe on the seabed as to displace the dense mat of brittlestars that covers the seabed. *Ophiothrix fragilis* is usually the most dominant species in shallow water, with *Ophiocomina nigra* usually found amongst them, but sometimes becoming the dominant species in deeper water. Although brittlestar biotopes are typically species-poor, the underlying fauna in this variant is relatively diverse and resembles that of CarSp.PenPcom. Species such as the anemone *Urticina felina*, the cup coral *Caryophyllia smithii*, and the anemone *Corynactis viridis* may occasionally be present. There may also be sparse clumps of various hydroids including *Halecium halecinum*, *Nemertesia antennina*, *Nemertesia ramosa*, *Sertularella gayi* and *Abietinaria abietina*. Soft coral *Alcyonium digitatum* is occasionally present and there may be sparse specimens of the sponges *Cliona celata* and *Polymastia boletiformis*. In addition, various echinoderms such as *Asterias rubens*, *Antedon bifida*, *Echinus esculentus*, *Henricia oculata*, *Marthasterias glacialis* and *Luidia ciliaris* may be observed. The barnacle *Balanus crenatus* and the polychaete *Pomatoceros triqueter* may be seen attached to any available space on the bedrock and boulders not smothered by brittlestars. Bryozoan crusts such as *Parasmittina trispinosa* may also be present.

Situation

Wave-exposed seabed composed of bedrock ridges and/or boulder, cobble slope. Shallower than this biotope, the lower infralittoral kelp park is dominated by *Laminaria hyperborea*. A dense understory may be present, containing *Antedon* spp., *Phycodrys rubens* and *Plocamium cartilagineum*.

Temporal variation

Not known

Similar biotopes

CR.MCR.EcCr.FaAlCr.Bri

This biotope is found on slightly more wave-sheltered coasts, but subject to similar moderately strong to weak tidal streams. FaAlCr.Bri also tends to be found on a more heterogeneous seabed, whereas CarSp.Bri is typically found on bedrock or boulders. Although they are both 'brittlestar' biotopes, unlike CarSp.Bri, FaAlCr.Bri is devoid of any sponges, and is characterised by graze-resistant hydroids.

CR.LCR.BrAs.AmenCio.Bri

This biotope is found on sites with greatly reduced wave-exposures and tidal streams, compared to CarSp.Bri. As AmenCio.Bri is found in 'low-energy' sites, it tends to be heavily silted compared to CarSp.Bri. Although both biotopes are dominated by 'brittlestars' AmenCio.Bri is more grazed and barren, and does not have such a diverse range of bryozoan crusts or

hydroids (it does have a diverse range of anemones).

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|------------------------------------|
| <i>Polymastia boletiformis</i> | ●●● | Occasional | 1 |
| <i>Cliona celata</i> | ●●●● | Occasional | 2 |
| <i>Halecium halecinum</i> | ●●●● | Occasional | 3 |
| <i>Nemertesia antennina</i> | ●●● | Occasional | 2 |
| <i>Nemertesia ramosa</i> | ●●● | Occasional | 1 |
| <i>Abietinaria abietina</i> | ●●● | Occasional | 1 |
| <i>Sertularella gayi</i> | ●●● | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ●●●●● | Occasional | 5 |
| <i>Urticina felina</i> | ●●●●● | Frequent | 4 |
| <i>Corynactis viridis</i> | ●●● | Frequent | 2 |
| <i>Caryophyllia smithii</i> | ●●●● | Occasional | 3 |
| <i>Pomatoceros triqueter</i> | ●●● | Occasional | 1 |
| <i>Balanus crenatus</i> | ●● | Frequent | 1 |
| <i>Calliostoma zizyphinum</i> | ●●●●● | Occasional | 4 |
| <i>Parasmittina trispinosa</i> | ●●● | Frequent | 2 |
| <i>Antedon bifida</i> | ●●●● | Occasional | 4 |
| <i>Luidia ciliaris</i> | ●●● | Occasional | 1 |
| <i>Henricia oculata</i> | ●●●●● | Occasional | 4 |
| <i>Asterias rubens</i> | ●●●●● | Occasional | 7 |
| <i>Marthasterias glacialis</i> | ●●●● | Occasional | 3 |
| <i>Ophiothrix fragilis</i> | ●●●●● | Abundant | 14 |
| <i>Ophiocomina nigra</i> | ●●●●● | Common | 12 |
| <i>Echinus esculentus</i> | ●●●● | Occasional | 4 |
| Corallinaceae | ●●● | Frequent | 2 |

CR.MCR.EcCr.CarSp.PenPcom *Caryophyllia smithii* and sponges with *Pentapora foliacea*, *Porella compressa* and crustose communities on wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulder |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Biotope description

This variant is typically found on the upper faces and vertical sides of wave-exposed bedrock or boulders subject to moderately strong to weak tidal streams. The fauna is often sparse with the frequently observed *Echinus esculentus* giving it a 'grazed' appearance, but the community may also be affected by violent storm action working into deep water during winter storms. Despite this spartan appearance, the community is relatively diverse and contains a wide range of sponges, hydroids, bryozoans and echinoderms. This variant is found on open coasts or offshore, and is characterised by the cup-coral *Caryophyllia smithii*, *Alcyonium digitatum*, the sea urchin *Echinus esculentus*, large specimens of the sponge *Cliona celata*, encrusting bryozoans and encrusting red algae. Although this variant tends to occur in deep water (depth range of 20-30m), a high degree of water clarity allows some red algae to grow at these depths. Other species recorded include large specimens of *Haliclona viscosa*, the bryozoans *Parasmittina trispinosa*, *Porella compressa* and *Pentapora foliacea*, the sea cucumbers *Holothuria forskali* and *Aslia lefevrei* and sparse hydroids such as *Abietinaria abietina*, *Nemertesia antennina*, *Nemertesia ramosa* and *Halecium halecinum*. Anemones such as *Corynactis viridis*, *Sagartia elegans* and *Urticina felina* are also frequently seen. Various other species characteristic of wave-exposed rock include the sponges *Pachymatisma johnstonia*, *Stelligera stuposa*, the starfish *Luidia ciliaris*, *Marthasterias glacialis*, *Asterias rubens*, *Henricia oculata*, the crinoid *Antedon bifida*, the barnacle *Balanus crenatus*, the top shell *Calliostoma zizyphinum* and the polychaete *Pomatoceros triqueter*. The majority of the records within this variant originate from the west coast of Ireland.

Situation

Exposed kelp forest and park biotopes such as LhypR with species such as *Laminaria hyperborea* are typically found shallower than this biotope. Deeper, this biotope is believed to graduate into PhaAx1 (deep erect sponges), as both these biotopes are common around the west coast of Ireland.

Temporal variation

Not known

Similar biotopes

CR.MCR.EcCr.FaAlCr

This biotope occurs in slightly more sheltered shallower sites with stronger tidal streams. However, they are both found on similar substratum. FaAlCr has a much less diverse, impoverished fauna than CarSp.PenPcom, possibly due to grazing pressure from *E. esculentus*. CarSp.PenPcom also has a more diverse range of sponges, hydroids and bryozoans.

CR.HCR.XFa.CvirCri

This biotope occurs on similar wave-exposed upward-facing bedrock subject to stronger tides than CarSp.PenPcom. The characterising feature of CvirCri are dense aggregations of jewel anemones *Corynactis viridis* and cup corals

| | |
|-----------------------|---|
| CR.MCR.EcCr.CarSp.Bri | <i>Caryophyllia smithii</i> with an underlying crisiid turf. CarSp.PenPcom has larger amounts of brittle and encrusting bryozoans such as <i>Porella compressa</i> , <i>Pentapora foliacea</i> and <i>Parasmittina trispinosa</i> . This biotope occurs on similar substratum in similar exposed conditions as CarSp.PenPcom but subject to a stronger tidal stream and only on upper-facing substratum. This biotope is characterised by the abundant <i>Ophiothrix fragilis</i> and common <i>Ophiocolina nigra</i> . There is typically a reduction in the abundance of <i>Caryophyllia smithii</i> . |
| CR.HCR.DpSp.PhaAxi | This biotope occurs under similar conditions as CarSp.PenPcom, although it tends to be found at significantly deeper depths. Although high abundance's of <i>C. smithii</i> are recorded in this biotope, PhaAxi has a much more diverse sponge fauna, especially erect sponges. |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Pachymatisma johnstonia</i> | ●●● | Occasional | 2 |
| <i>Cliona celata</i> | ●●●●● | Frequent | 6 |
| <i>Stelligera stuposa</i> | ●●● | Occasional | 1 |
| <i>Haliclona viscosa</i> | ●●●● | Occasional | 3 |
| <i>Halecium halecinum</i> | ●●● | Occasional | 1 |
| <i>Nemertesia antennina</i> | ●●●● | Occasional | 3 |
| <i>Nemertesia ramosa</i> | ●●● | Occasional | 1 |
| <i>Abietinaria abietina</i> | ●●● | Frequent | 2 |
| <i>Aleyonium digitatum</i> | ●●●●● | Frequent | 6 |
| <i>Urticina felina</i> | ●●● | Occasional | 2 |
| <i>Sagartia elegans</i> | ●●● | Occasional | 1 |
| <i>Corynactis viridis</i> | ●●●● | Frequent | 5 |
| <i>Caryophyllia smithii</i> | ●●●●● | Common | 10 |
| <i>Pomatoceros triqueter</i> | ●●● | Occasional | 1 |
| <i>Balanus crenatus</i> | ●●● | Occasional | 1 |
| <i>Calliostoma zizyphinum</i> | ●●●● | Occasional | 3 |
| <i>Parasmittina trispinosa</i> | ●●●● | Frequent | 4 |
| <i>Porella compressa</i> | ●●● | Occasional | 1 |
| <i>Antedon bifida</i> | ●●● | Frequent | 1 |
| <i>Luidia ciliaris</i> | ●●●● | Occasional | 4 |
| <i>Henricia oculata</i> | ●●●● | Occasional | 2 |
| <i>Asterias rubens</i> | ●●●● | Occasional | 3 |
| <i>Marthasterias glacialis</i> | ●●●●● | Occasional | 4 |
| <i>Echinus esculentus</i> | ●●●●● | Occasional | 6 |
| <i>Holothuria forskali</i> | ●●●● | Frequent | 3 |
| <i>Aslia lefevrei</i> | ●●● | Occasional | 2 |
| Corallinaceae | ●●● | Frequent | 2 |

CR.MCR.EcCr.UrtScr *Urticina felina* and sand-tolerant fauna on sand-scoured or covered circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt), Reduced (18-30ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed, Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock; cobble |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 10-20 m, 20-30 m, 30-50 m |

Biotope description

This biotope typically occurs on tide-swept circalittoral bedrock, rock adjacent to mobile sand/gravel in gullies, and cobbles on gravel and sand, characterised by scour-tolerant robust species. Although many of these species are found on subtidal rock, they tend to occur in larger numbers in these highly sand-influenced conditions. The dominant species by far is the anemone *Urticina felina* which commonly occurs on rocks at the sand-rock interface, where the scour levels are at a maximum and few species can tolerate this abrasion. The sponge *Ciocalypa penicillus* is also very characteristic of shifting sand-covered rock. This biotope is only occasionally recorded as a separate entity, because its extent is typically restricted to a very narrow band of rock at the sediment interface. Only occasionally does it cover a large extent of rock (e.g. where the wave action is strong enough to cause sand abrasion well up the rock face or where the rock is low-lying). More often, this scoured zone is recorded as part of whatever biotope occurs on the nearby hard substrata. Other species (which are able to survive, and benefit from the reduced competition) include *Balanus crenatus*, *Pomatoceros triqueter*, *Cellaria pumicosa*, *Alcyonidium diaphanum*, *Cliona celata*, encrusting red algae and *Asterias rubens*.

Situation

This biotope tends to be found in close proximity to mobile sand or gravel, producing scour that tends to limit the number of species found.

Temporal variation

Not known.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|------------------------------|-------------|--------------------|-----------------------------|
| <i>Cliona celata</i> | •• | Rare | 1 |
| <i>Ciocalypa penicillus</i> | • | Common | 1 |
| <i>Urticina felina</i> | ••••• | Common | 51 |
| <i>Pomatoceros triqueter</i> | •• | Common | 4 |
| <i>Balanus crenatus</i> | •••• | Abundant | 29 |
| <i>Alcyonidium diaphanum</i> | •• | Present | 1 |
| <i>Cellepora pumicosa</i> | ••• | Present | 4 |
| <i>Asterias rubens</i> | ••• | Rare | 4 |
| Corallinaceae | •• | Frequent | 1 |

CR.MCR.EcCr.FaAlCr Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|------------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | bedrock; boulder; cobble |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Biotope description

This biotope typically occurs on the vertical and upper faces of wave-exposed and moderately wave-exposed circalittoral bedrock or boulders subject to mostly moderate to weak tidal streams (a variant of this biotope containing brittlestar is found on bedrock, boulders and cobbles). The biotope is dominated by faunal (e.g. *Parasmittina trispinosa*) and algal (Corallinaceae) crusts, and tends to have a 'grazed' appearance; this may be partially attributable to the abundance of *Echinus esculentus* found in this biotope. Occasionally, the rock may appear pink from a distance, due to the expanses of encrusting red algae on the rock surface. *Alcyonium digitatum* is one of the few species to stand erect from the encrusted rock surface and are frequently encountered, on the tops of rocky outcrops and boulders. Hydroids do not form a prominent feature of this biotope, with only robust species such as *Abietinaria abietina* frequently recorded. Sponges and *Caryophyllia smithii* are rarely present while erect bryozoans and ascidians are scarce (although there are exceptions, see variants). The *Echinus* 'grazed' substratum may be interspersed with other encrusting species such as the polychaete *Pomatoceros triqueter* and the saddle oyster *Pododesmus patelliformis*. Other species present include *Asterias rubens*, *Ophiothrix fragilis*, *Urticina felina*, *Ophiocomina nigra*, *Pagurus bernhardus*, *Flustra foliacea*, *Gibbula cineraria*, *Calliostoma zizyphinum*, *Ophiura albida*, *Ciona intestinalis* and *Antedon bifida*. Six variants of this biotope have been recorded. FaAlCr.Flu is dominated by the silt/scour tolerant bryozoan *Flustra foliacea*. FaAlCr.Adig is dominated by *Alcyonium digitatum*. FaAlCr.Sec is dominated by *Securiflustra securifrons*. FaAlCr.Pom looks extremely impoverished (even for a grazed community). FaAlCr.Bri has a dense covering of brittlestars while FaAlCr.Car is only found under weak/very weak tides and is dominated by *Caryophyllia smithii*.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|---------------------------------|-------------|--------------------|-----------------------------|
| <i>Abietinaria abietina</i> | ●●● | Occasional | 3 |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | 12 |
| <i>Urticina felina</i> | ●●● | Occasional | 3 |
| <i>Pomatoceros triqueter</i> | ●●●● | Common | 2 |
| <i>Pagurus bernhardus</i> | ●● | Occasional | 2 |
| <i>Gibbula cineraria</i> | ●●● | Occasional | 2 |
| <i>Calliostoma zizyphinum</i> | ●● | Occasional | 1 |
| <i>Pododesmus patelliformis</i> | ●● | Occasional | 1 |
| <i>Parasmittina trispinosa</i> | ●● | Occasional | 2 |
| <i>Flustra foliacea</i> | ●● | Frequent | 2 |
| <i>Antedon bifida</i> | ●● | Occasional | 1 |
| <i>Asterias rubens</i> | ●●●●● | Occasional | 9 |
| <i>Ophiothrix fragilis</i> | ●●●● | Frequent | 7 |
| <i>Ophiocomina nigra</i> | ●● | Frequent | 2 |
| <i>Ophiura albida</i> | ●● | Frequent | 1 |
| <i>Echinus esculentus</i> | ●●●●● | Frequent | 13 |
| <i>Ciona intestinalis</i> | ●● | Occasional | 1 |

Corallinaceae

••••

Common

10

CR.MCR.EcCr.FaAlCr.Flu *Flustra foliacea* on slightly scoured silty circalittoral rock

Habitat classification

| | |
|----------------|-----------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak |
| Substratum: | Bedrock; boulder; cobble |
| Zone: | Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Previous code

CR.MCR.ByH.Flu.Flu 97.06

Biotope description

This variant is typically found on the upper faces of moderately wave-exposed circalittoral bedrock or boulders subjected to moderately strong tidal streams. These rocky patches may be interspersed with gravely sand patches, causing a scouring effect. From afar, the variant appears dominated by the bryozoan *Flustra foliacea*. *Alcyonium digitatum* may also be seen attached to the rocky substratum. Under closer inspection, the white tubes of the polychaete *Pomatoceros triqueter* may be observed on the rock and boulder, especially vertical faces. There may be sandy/gravely patches in between the boulders colonised by the anemone *Urticina felina*. The regular occurrence of large numbers of the sea urchin *Echinus esculentus* in this biotope may be responsible for 'grazing' the faunal and algal turf, thus keeping species richness relatively low. Other echinoderms that may be seen include the ubiquitous starfish *Asterias rubens* and the common brittlestar *Ophiothrix fragilis*. Sparse clumps of the hydroids *Thuiaria thuja*, *Abietinaria abietina*, *Nemertesia antennina* and *Tubularia indivisa* are occasionally seen attached to the rocky substratum. The hermit crab *Pagurus bernhardus*, the polychaete *Sabella pavonina* and sparse bryozoan crusts may also be present. This biotope is characteristic of the bedrock terraces along the Northumberland coast that are generally species impoverished compared to similar *Flustra* biotopes on the west coasts of the UK, which have a more diverse range of sponges, hydroids and bryozoans. As the turbidity levels increase in this fairly silty biotope, so the species diversity is reduced.

Situation

This biotope typically occurs around coasts subject to sand scour and siltation. Associated biotopes common around the north-east coast of England include circalittoral gravel and coarse sands. Typical species present include *Echinocardium*, *Lanice conchilega*, *Ensis* spp., *Mya truncata* and *Myxicola*. Where suitable substratum is available, exposed kelp forests occur in the infralittoral (the latter normally occupies a narrow band due to the high silt loading in the water column). Where this biotope occurs along with chalk/limestone bedrock and boulder, piddock dominated biotopes (Pid) may also be found.

Temporal variation

Not known

Similar biotopes

CR.HCR.XFa.Mol

This biotope is found under similar exposure and tidal stream regimes as FaAlCr.Flu but occurs on a shallower, more sandy/cobbly substrata. *Flustra* is also prevalent in this community, but there is a more diverse hydroid, ascidian and bryozoan community, including *Molgula* and *Alcyonidium* respectively.

CR.HCR.XFa.FluCoAs.Paur

This biotope is found under similar exposure and tidal stream regimes as FaAlCr.Flu. While *F. foliacea* is the dominant bryozoan present in both, the whole character/species richness of these two biotopes is completely

| | |
|-------------------------|---|
| CR.HCR.XFa.FluHocu | different. In addition, FluCoAs.Paur has dense aggregations of <i>Polyclinium aurantium</i> which distinguish this biotope from FaAlCr.Flu. The substratum consists predominantly of cobbles rather than bedrock and boulder. FluHocu contains <i>Flustra</i> but also has a more diverse faunal component, with <i>Haliclona oculata</i> , <i>Nemertesia antennina</i> , <i>Alcyonidium diaphanum</i> and the amphipod <i>Dyopedos porrectus</i> . |
| CR.HCR.XFa.FluCoAs.SmAs | This biotope occurs over a similar range of wave-exposures but tends to occur in sites subject to moderately strong to strong tidal streams. Both biotopes tend to occupy the same type of substrata (bedrock, boulder, cobble and sand influenced). This biotope has a very diverse sponge, hydroid and bryozoan community compared with FaAlCr.Flu. Characterising species that are absent in FaAlCr.Flu include <i>Sertularia argentea</i> , <i>Balanus crenatus</i> , <i>Bugula plumosa</i> and <i>Scypha ciliata</i> . |
| CR.HCR.XFa.FluCoAs.X | Unlike FaAlCr.Flu, the substratum is more mixed, consisting of boulders, cobbles and pebbles. This biotope also has a diverse sponge and bryozoan 'turf' community. |

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|------------------------------|--------------------|---------------------------|------------------------------------|
| <i>Tubularia indivisa</i> | ●●● | Occasional | 3 |
| <i>Nemertesia antennina</i> | ●●● | Occasional | 2 |
| <i>Abietinaria abietina</i> | ●●● | Occasional | 3 |
| <i>Thuiaria thuja</i> | ●● | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ●●●●● | Frequent | 14 |
| <i>Urticina felina</i> | ●●●● | Occasional | 4 |
| <i>Sabella pavanina</i> | ●● | Occasional | 1 |
| <i>Pomatoceros triqueter</i> | ●●●●● | Common | 13 |
| <i>Pagurus bernhardus</i> | ●●● | Occasional | 2 |
| BRYOZOA | ●● | Occasional | 1 |
| <i>Flustra foliacea</i> | ●●●●● | Frequent | 19 |
| <i>Asterias rubens</i> | ●●●●● | Occasional | 10 |
| <i>Ophiothrix fragilis</i> | ●●● | Frequent | 4 |
| <i>Echinus esculentus</i> | ●●●● | Occasional | 5 |

CR.MCR.EcCr.FaAlCr.Adig *Alcyonium digitatum*, *Pomatoceros triqueter*, algal and bryozoan crusts on wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Bedrock; boulders |
| Zone: | Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Previous code

CR.ECR.Alc.AlcC 97.06

Biotope description

This variant is typically found on the vertical, steep and upper faces of wave-exposed circalittoral bedrock or boulders subject to varying amounts of current. The variant has a very 'grazed', sparse appearance, dominated only by the presence of *Alcyonium digitatum* and large expanses of encrusting red algae and bryozoan crusts particularly (*Parasmittina trispinosa*). The sparse appearance can be attributed to the frequently observed sea urchin *Echinus esculentus*. The polychaete *Pomatoceros triqueter* can be locally abundant, and may in some cases cover far more rock surface than *A. digitatum*, especially on vertical faces. Clumps of robust hydroids such as *Abietinaria abietina* occur occasionally. Other species present include the echinoderms *Asterias rubens*, *Henricia sanguinolenta*, *Ophiothrix fragilis*, the anemone *Urticina felina*, *Calliostoma zizyphinum* and *Cancer pagurus*.

Situation

Shallower than this biotope, dense kelp forest is typically found, containing species such as *Laminaria hyperborea* and *Alaria esculentus*. Occasionally, this biotope may be found on rocky outcrops surrounding by coarse sand. With this increased scour, UrtScr may develop at the rock/sand interface. Below this biotope, coarse sediments, muddy gravel and sand are typically recorded.

Temporal variation

Not known

Similar biotopes

| | |
|---------------------------|---|
| CR.MCR.EcCr.CarSp.PenPcom | This biotope occurs at slightly more exposed, deeper sites with weaker tidal streams. However, they are both found on similar substratum. FaAlCr.Adig has a much less diverse, impoverished fauna than CarSp.PenPcom, possibly due to grazing pressure from <i>E. esculentus</i> . CarSp.PenPcom has a more diverse range of sponges, hydroids and bryozoans. |
| CR.MCR.EcCr.FaAlCr.Sec | This biotope is found under slightly less exposed conditions, subject to weaker tidal streams. FaAlCr.Sec is also found at slightly shallower water depths than FaAlCr.Adig. Although both biotopes are similarly quite 'clean' and grazed, FaAlCr.Sec has a more diverse hydroid and bryozoan turf, with <i>Securiflustra securifrons</i> dominating. |
| CR.HCR.XFa.CvirCri | This biotope is found under similar conditions as FaAlCr.Adig. Like FaAlCr.Adig, this biotope has dense <i>A. digitatum</i> . However, CvirCri has a diverse sponge community. |
| CR.HCR.FaT.CTub.Adig | This biotope is found on extremely wave-exposed, extremely tide-swept bedrock or boulders. This biotope is similarly species poor, but is characterised by <i>Tubularia indivisa</i> . |

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|--|
| <i>Abietinaria abietina</i> | ••• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••••• | Abundant | 22 |
| <i>Urticina felina</i> | ••• | Occasional | 3 |
| <i>Pomatoceros triqueter</i> | ••••• | Common | 17 |
| <i>Cancer pagurus</i> | ••• | Rare | 1 |
| <i>Calliostoma zizyphinum</i> | ••• | Occasional | 2 |
| <i>Parasmittina trispinosa</i> | ••• | Occasional | 2 |
| <i>Henricia</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Occasional | 6 |
| <i>Ophiothrix fragilis</i> | ••• | Occasional | 2 |
| <i>Echinus esculentus</i> | ••••• | Frequent | 13 |
| RHODOPHYCOTA | •• | Frequent | 1 |
| Corallinaceae | •••• | Common | 12 |

CR.MCR.EcCr.FaAlCr.Sec *Alcyonium digitatum* with *Securiflustra securifrons* on tide-swept moderately wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|------------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m |

Previous code

CR.ECR.Alc.AlcSec 97.06

Biotope description

This variant is typically found on the upper and vertical faces of moderately wave-exposed circalittoral bedrock subject to moderately strong to weak tidal streams. The rock surface is dominated by *Alcyonium digitatum* and the bryozoan *Securiflustra securifrons*. The rock between these species appears fairly sparse and 'grazed', with expanses of encrusting red algae. The sea urchin *Echinus esculentus* is frequently seen, and in collaboration with the light attenuating effects of depth, is probably the principle reason for the lack of algal turf. Other species found include the hydroids *Abietinaria abietina*, *Nemertesia antennina*, *Thuiaria thuja*, the bryozoans *Cellapora pumicosa*, *Parasmittina trispinosa*, *Flustra foliacea*, *Alcyonidium diaphanum* and other bryozoan crusts. Encrusting species such as the polychaete *Pomatoceros triqueter* and the barnacle *Balanus balanus* are frequently observed. Other species present include *Asterias rubens*, *Antedon bifida*, *Ophiura albida*, *Ophiothrix fragilis*, *Caryophyllia smithii*, *Urticina felina*, *Clavelina lepadiformis*, *Calliostoma zizphinium* and *Pandalus montagui*.

Situation

Above this biotope, you tend to find exposed kelp forest and park (LhypR). There is a tendency for slight scouring to occur in this biotope. However, if this scour increases further, for example if water movement increases, mobilising more sand, this biotope may graduate into UrtScr. In more silty sites, there is a tendency for *Securiflustra securifrons* to be replaced by *Flustra foliacea* as the dominant bryozoan, turning the biotope into FaAlCr.Flu.

Temporal variation

Whilst the great majority of species in this variant are most likely present throughout the year, *Clavelina lepadiformis* grows in spring and may show great variation in abundance from year to year.

Similar biotopes

CR.MCR.EcCr.FaAlCr.Adig

This biotope occurs on slightly more exposed sites subject to slightly stronger tidal streams. Although both biotopes are similarly quite 'clean' and grazed, FaAlCr.Sec has a more diverse hydroid and bryozoan turf, with *Securiflustra securifrons* dominating.

CR.MCR.EcCr.FaAlCr.Flu

This biotope occurs under similar conditions as FaAlCr.Sec. FaAlCr.Flu is also found on a slightly more mixed substratum. *Flustra foliacea*, and to a lesser extent *Alcyonium digitatum* are the dominant species within this biotope whereas in FaAlCr.Sec, *Securiflustra securifrons* and *Alcyonium digitatum* dominate. FaAlCr.Flu also tends to have a more silty appearance whereas FaAlCr.Sec appears clean and grazed.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|----------------------------------|--------------------|---------------------------|--|
| PORIFERA | ••• | Frequent | 1 |
| <i>Nemertesia antennina</i> | ••• | Frequent | 2 |
| <i>Abietinaria abietina</i> | •••• | Frequent | 3 |
| <i>Thuiaria thuja</i> | ••• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••••• | Common | 14 |
| <i>Urticina felina</i> | •••• | Occasional | 2 |
| <i>Caryophyllia smithii</i> | ••• | Frequent | 3 |
| <i>Pomatoceros triqueter</i> | •••• | Frequent | 5 |
| <i>Balanus balanus</i> | ••• | Occasional | 1 |
| <i>Pandalus montagui</i> | •• | Frequent | 1 |
| <i>Calliostoma zizyphinum</i> | ••• | Occasional | 1 |
| BRYOZOA | ••• | Frequent | 1 |
| <i>Alcyonidium diaphanum</i> | •• | Occasional | 1 |
| <i>Parasmittina trispinosa</i> | ••• | Occasional | 2 |
| <i>Cellepora pumicosa</i> | ••• | Occasional | 2 |
| <i>Flustra foliacea</i> | •• | Occasional | 1 |
| <i>Securiflustra securifrons</i> | ••••• | Frequent | 12 |
| <i>Antedon bifida</i> | ••• | Common | 3 |
| <i>Asterias rubens</i> | ••••• | Frequent | 6 |
| <i>Ophiothrix fragilis</i> | ••• | Common | 2 |
| <i>Ophiura albida</i> | ••• | Frequent | 3 |
| <i>Echinus esculentus</i> | •••• | Frequent | 4 |
| <i>Clavelina lepadiformis</i> | ••• | Frequent | 2 |
| Corallinaceae | •••• | Occasional | 4 |

CR.MCR.EcCr.FaAlCr.Bri Brittlestar bed on faunal and algal encrusted, exposed to moderately wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulders; cobbles; pebbles; gravel |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Previous code

| | |
|---------------------|-------|
| CR.MCR.Bri.Oph | 97.06 |
| CR.MCR.Bri.Oph.Oacu | 97.06 |

Biotope description

This variant is typically found on the upper faces of exposed and moderately wave-exposed circalittoral bedrock, boulders and cobbles subject to moderately strong to weak tidal streams. It is characterised by high densities of brittlestars (predominantly *Ophiothrix fragilis*, *Ophiocomina nigra* and *Ophiura albida*). In fact, they may form such dense beds that the seabed underneath may not be visible. The rocky substratum is usually colonised by species such as encrusting red algae and the white, calcareous tubes of the polychaete *Pomatoceros triqueter*. Only robust hydroids such as *Abietinaria abietina*, *Alcyonium digitatum* and bryozoan crusts such as *Parasmittina trispinosa* are able to tolerate the significant 'smothering' effect from the dense 'mat' of brittlestars. Other species typically seen include *Echinus esculentus*, *Asterias rubens*, *Pagurus bernhardus*, *Anapagurus hyndmanni*, *Gibbula cineraria*, *Urticina felina*, *Pododesmus patelliformis* and *Ciona intestinalis*.

Situation

Shallower than the FaAlCr.Bri variant, kelp park and forest may be found with species such as *Laminaria saccharina* and *Laminaria hyperborea*.

Temporal variation

Not known

Similar biotopes

| | |
|-------------------------|---|
| CR.LCR.BrAs.AmenCio.Bri | This biotope occurs on more wave-sheltered mixed substratum, subject to moderately strong to very weak tidal streams. It tends to have similar species diversity to FaAlCr.Bri, but robust hydroids such as <i>Abietinaria abietina</i> have been replaced by more delicate species such as <i>Kirchenpaueria pinnata</i> . Occasionally, bryozoan crusts may be present in FaAlCr.Bri as well. |
| CR.MCR.EcCr.CarSp.Bri | This biotope is found on much more exposed bedrock or boulders. A diverse range of species is associated with this biotope including numerous hydroids, bryozoans and echinoderms. |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|------------------------------|-------------|--------------------|-----------------------------|
| <i>Abietinaria abietina</i> | ●●● | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ●●●●● | Occasional | 6 |
| <i>Urticina felina</i> | ●●● | Occasional | 3 |
| <i>Pomatoceros triqueter</i> | ●●●● | Frequent | 12 |
| <i>Anapagurus hyndmanni</i> | ●● | Frequent | 1 |
| <i>Pagurus bernhardus</i> | ●●●● | Occasional | 3 |
| <i>Gibbula cineraria</i> | ●●● | Occasional | 3 |

| | | | |
|---------------------------------|-------|------------|----|
| <i>Pododesmus patelliformis</i> | •• | Occasional | 1 |
| <i>Parasmittina trispinosa</i> | •• | Occasional | 1 |
| <i>Asterias rubens</i> | ••••• | Occasional | 7 |
| <i>Ophiothrix fragilis</i> | ••••• | Abundant | 16 |
| <i>Ophiocomina nigra</i> | •••• | Common | 7 |
| <i>Ophiura albida</i> | ••• | Frequent | 2 |
| <i>Echinus esculentus</i> | ••••• | Frequent | 10 |
| <i>Ciona intestinalis</i> | ••• | Occasional | 2 |
| Corallinaceae | •••• | Common | 8 |

CR.MCR.EcCr.FaAlCr.Pom Faunal and algal crusts with *Pomatoceros triqueter* and sparse *Alcyonium digitatum* on exposed to moderately wave-exposed circolittoral rock

Habitat classification

| | |
|----------------|-----------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak |
| Substratum: | Bedrock; boulders; cobbles |
| Zone: | Circolittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Previous code

CR.MCR.GzFa.FaAl 97.06
C

Biotope description

This variant is typically found on the upper faces of exposed and moderately exposed circolittoral bedrock or boulders subjected to moderately strong to weak tidal streams. From afar, the seabed has a rather sparse, 'grazed' appearance, reminiscent of a brittlestar bed after the brittlestars have moved elsewhere. The rocky substratum is generally covered with encrusting red algae and the white, calcareous tubes of the polychaete *Pomatoceros triqueter*, dotted with the abundant urchin *Echinus esculentus*. Under closer inspection, *Alcyonium digitatum* are usually seen attached to the rocky surface underneath rock overhangs and large boulders. Although they may be recorded as abundant or common in some areas, their relatively small size means that their biomass is generally lower than in other biotopes. Sparse clumps of robust hydroids such as *Abietinaria abietina* are frequently observed, and bryozoan crusts such as *Parasmittina trispinosa* are occasionally seen. Echinoderms such as the brittlestars *Ophiothrix fragilis* and *Ophiocoma nigra*, and the crab *Cancer pagurus* may be seen within crevices in the boulders/rock whilst the starfish *Asterias rubens* may be seen on the rock surface. Muddy-gravel patches between boulders (especially within Scottish sealochs) provide a suitable habitat for the anemone *Urticina felina*. The top shell *Gibbula cineraria* is occasionally seen grazing on the rock surface. Within this biotope, there is some regional variation. The robust hydroid *A. abietina* is typically found in higher abundances in northern (Scottish) regions, especially around the Isle of May.

Situation

Above the FaAlCr.Pom variant in the infralittoral zone, species such as *Alaria esculenta* and *Laminaria hyperborea* are found in more wave exposed sites (KFaR.Ala/KFaR.Lhyp) while species such as *Laminaria saccharina* may be found above FaAlCr.Pom in the more sheltered examples. Due to moderately tide-swept conditions this variant is found in, clean, coarse sediment biotopes are generally found below FaAlCr.Pom. Typical species found in these coarse sand/gravelly biotopes include *Neopentadactyla mixta* and *Lanice conchilega* (SS.SMx.CMx). Where wave exposure increases, this variant tends to change to CarSp.PenPcom, dominated by *Caryophyllia smithii*, *Corynactis viridis*, encrusting red algae and bryozoan crusts. Where tidal stream and wave-exposure decreases, this variant develops into a similar biotope dominated by encrusting red algae, *Echinus esculentus* and *C.smithii* (FaAlCr.Car).

Temporal variation

Not known

Similar biotopes

CR.MCR.EcCr.FaAlCr.Car

This sub-biotope occurs on wave-exposed to wave-sheltered sites subject to only weak tidal streams. It is similar to FaAlCr.Pom in that it is relatively barren, but has a higher diversity of species, and has frequently occurring

| | |
|-------------------------|---|
| CR.MCR.EcCr.FaAlCr.Adig | <i>Caryophyllia smithii</i> and bryozoan crusts. This sub-biotope occurs on more wave-exposed sites, but is subject to similar tidal streams as FaAlCr.Pom. Both these sub-biotopes are very impoverished with a similar range of species, although FaAlCr.Adig tends to have much higher densities of <i>Alcyonium digitatum</i> than FaAlCr. |
| CR.LCR.BrAs.AmenCio.Ant | This biotope occurs in sheltered sea lochs, subject to weak/very weak tidal streams. This biotope is similar to FaAlCr.Pom in that it is relatively barren; heavily grazed by <i>E. esculentus</i> . Pink coralline crusts and large solitary ascidians are the prevalent species found. |

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|--------------------------------|-------------|--------------------|------------------------------|
| <i>Abietinaria abietina</i> | ●●● | Frequent | 4 |
| <i>Alcyonium digitatum</i> | ●●●● | Frequent | 8 |
| <i>Urticina felina</i> | ●●● | Occasional | 2 |
| <i>Pomatoceros triqueter</i> | ●●●●● | Common | 9 |
| <i>Pandalus montagui</i> | ●● | Occasional | 1 |
| <i>Cancer pagurus</i> | ●● | Rare | 1 |
| <i>Gibbula cineraria</i> | ●●● | Occasional | 2 |
| <i>Parasmittina trispinosa</i> | ●●● | Occasional | 3 |
| <i>Asterias rubens</i> | ●●●●● | Occasional | 10 |
| <i>Ophiothrix fragilis</i> | ●●●●● | Occasional | 11 |
| <i>Ophiocoma nigra</i> | ●● | Occasional | 1 |
| <i>Echinus esculentus</i> | ●●●●● | Frequent | 18 |
| RHODOPHYCOTA | ●● | Common | 1 |
| Corallinaceae | ●●●● | Common | 13 |

CR.MCR.EcCr.FaAlCr.Car *Caryophyllia smithii* with faunal and algal crusts on moderately wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed, Sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock; boulders |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m |

Biotope description

This variant is typically found on the upper and vertical faces of exposed and moderately wave-exposed circalittoral rock, subject to very little water movement. Where this variant is found on slightly more wave-exposed sites, it tends to be found towards the bottom of its depth range. The rocky substratum has a 'grazed' appearance, with encrusting red algae. Diversity of species is very low, possibly due to 'grazing' pressure from the sea urchin *Echinus esculentus*. From afar, there is little evident epifauna attached to the rocks apart from the white, calcareous tubes of the polychaete *Pomatoceros triqueter* and the cup-coral *Caryophyllia smithii*. In addition, bryozoan crusts such as *Parasmittina trispinosa* are frequently seen. Under closer inspection, a few more species become apparent but few are typically characterising of this particular variant. The echinoderms *Antedon bifida*, *Asterias rubens*, *Ophiothrix fragilis*, *Marthasterias glacialis*, *Ophiocomina nigra* and *Crossaster papposus* are occasionally present. Sparse clumps of hydroids such as *Halecium halecinum*, *Kirchenpaueria pinnata* and *Nemertesia antennina* may be found attached to rocky outcrops or boulders. Small specimens of *Alcyonium digitatum* may be present. The ascidians *Ciona intestinalis*, *Clavelina lepadiformis* and *Ascidia mentula* also occur in this variant but are found in greater numbers in other biotopes. The top shells *Calliostoma zizyphinum*, *Gibbula cineraria*, and the saddle oyster *Pododesmus patelliformis* may be seen on the rock surface whilst the crab *Cancer pagurus* may be seen under boulders and in crevices. The anemone *Metridium senile* may be found under rocky overhangs and on the sides of boulders.

Situation

As FaAlCr.Car occurs on moderately wave-exposed coasts, kelp forests in the infralittoral zone shallower than this variant tend to be dominated by robust kelp species such as *Laminaria hyperborea* (Lhyp) and *Saccorhiza polyschides*. Immediately below FaAlCr.Car (typically bedrock/boulder substratum), sublittoral sediment biotopes such as muddy sands, containing *Nephrops norvegicus*, *Virgularia mirabilis* and *Funiculina quadrangularis* are found. Occasionally, biotopes composed of coarser sand/gravelly material may be present, with species such as *Peachea cylindrica* and *Neopentadactyla mixta*. When wave exposure and tidal stream increase, FaAlCr.Car tends to grade into FaAlCr.Pom.

Temporal variation

Not known

Similar biotopes

| | |
|-------------------------|--|
| CR.MCR.EcCr.FaAlCr.Pom | This variant tends to be found in slightly more wave-exposed areas subject to slightly stronger tides and is distinguished from FaAlCr.Car by its lack of <i>Caryophyllia smithii</i> . |
| CR.LCR.BrAs.AmenCio.Ant | This variant is found in wave-sheltered sea lochs subject to only weak (if any) tidal streams. It has a barren appearance apart from frequent large solitary ascidians and a pink appearance due to encrusting corallines. |

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|---------------------------------|--------------------|---------------------------|--|
| <i>Halecium halecinum</i> | ••• | Occasional | 2 |
| <i>Kirchenpaueria pinnata</i> | ••• | Occasional | 1 |
| <i>Nemertesia antennina</i> | ••• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | •••• | Occasional | 2 |
| <i>Metridium senile</i> | ••• | Occasional | 1 |
| <i>Caryophyllia smithii</i> | ••••• | Frequent | 9 |
| <i>Pomatoceros triquetter</i> | ••••• | Frequent | 8 |
| <i>Cancer pagurus</i> | ••• | Occasional | 1 |
| <i>Gibbula cineraria</i> | ••• | Occasional | 1 |
| <i>Calliostoma zizyphinum</i> | ••• | Occasional | 1 |
| <i>Pododesmus patelliformis</i> | ••• | Occasional | 2 |
| <i>Parasmittina trispinosa</i> | •••• | Frequent | 4 |
| <i>Antedon bifida</i> | •••• | Frequent | 4 |
| <i>Crossaster papposus</i> | ••• | Occasional | 1 |
| <i>Asterias rubens</i> | •••• | Occasional | 4 |
| <i>Marthasterias glacialis</i> | ••• | Occasional | 1 |
| <i>Ophiothrix fragilis</i> | ••• | Occasional | 2 |
| <i>Ophiocarina nigra</i> | •• | Frequent | 1 |
| <i>Echinus esculentus</i> | ••••• | Frequent | 9 |
| <i>Clavelina lepadiformis</i> | ••• | Occasional | 2 |
| <i>Ciona intestinalis</i> | ••• | Occasional | 2 |
| <i>Ascidia mentula</i> | ••• | Occasional | 2 |
| Corallinaceae | ••••• | Abundant | 16 |

CR.MCR.EcCr.AdigVt *Alcyonium digitatum* and faunal crust communities on vertical circalittoral bedrock

Habitat classification

| | |
|-----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Very exposed, Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Infralittoral - lower, Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |
| Other features: | Vertical rock |

Previous code

| | |
|-------------------|-------|
| CorMetAlc in part | 97.06 |
| AlcByH in part | 97.06 |
| Ant in part | 97.06 |

Biotope description

This biotope typically occurs on the vertical faces and overhangs of exposed to moderately exposed lower infralittoral and upper circalittoral bedrock subject to moderately strong to weak tidal streams. Due to the large numbers of the urchin *Echinus esculentus* often recorded, this biotope tends to have a grazed appearance, and the bedrock is often encrusted with pink coralline algae, encrusting bryozoans such as *Parasmittina trispinosa* and the calcareous tubeworm *Pomatoceros triqueter*. Dense aggregations of dead mans fingers *Alcyonium digitatum* may be present along with the cup coral *Caryophyllia smithii*. Other species present include the echinoderms *Asterias rubens*, *Ophiothrix fragilis* and *Antedon bifida*, the ascidians *Clavelina lepadiformis*, *Ciona intestinalis* and *Ascidia mentula*, the anthozoans *Urticina felina*, *Corynactis viridis*, *Metridium senile* and *Sagartia elegans*, the gastropod *Calliostoma zizyphinum* and the crustacean *Cancer pagurus*. Three regional variations of this biotope have been recorded. One variant found typically off the north-east coast of Scotland and around the Northern Isles, has a very impoverished appearance dominated by anthozoans. A second variant occurs along the west coast of Scotland, extending to Rockall in the west, and the Northern Isles in the north-east, and has a more fauna, characterised by hydroids, sponges, anthozoans and echinoderms. A third variant occurs along the north-east coast of England (Northumberland) up to the Northern Isles and is dominated by *Alcyonium digitatum*, brittlestars and *Echinus esculentus*.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Alcyonium digitatum</i> | ●●●● | Common | 13 |
| <i>Urticina felina</i> | ●●● | Occasional | 2 |
| <i>Metridium senile</i> | ●● | Occasional | 2 |
| <i>Sagartia elegans</i> | ●● | Occasional | 1 |
| <i>Corynactis viridis</i> | ●● | Common | 2 |
| <i>Caryophyllia smithii</i> | ●●● | Frequent | 4 |
| <i>Pomatoceros triqueter</i> | ●●●● | Common | 8 |
| <i>Cancer pagurus</i> | ●●● | Occasional | 2 |
| <i>Calliostoma zizyphinum</i> | ●●● | Occasional | 3 |
| <i>Parasmittina trispinosa</i> | ●● | Occasional | 2 |
| <i>Antedon bifida</i> | ●●● | Frequent | 6 |
| <i>Asterias rubens</i> | ●●●● | Occasional | 8 |
| <i>Ophiothrix fragilis</i> | ●● | Occasional | 2 |
| <i>Echinus esculentus</i> | ●●●● | Frequent | 9 |
| <i>Clavelina lepadiformis</i> | ●●● | Occasional | 4 |
| <i>Ciona intestinalis</i> | ●● | Occasional | 2 |
| <i>Ascidia mentula</i> | ●● | Occasional | 2 |
| Corallinaceae | ●●●● | Common | 10 |

CR.MCR.CSab Circalittoral *Sabellaria* reefs**Habitat classification**

| | |
|----------------|-------------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | Bedrock, boulders, cobbles, pebbles |
| Zone: | Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Previous code

CR.MCR.CSab 97.06

Biotope description

This biotope complex occurs on moderately wave-exposed, circalittoral bedrock, boulders, and cobbles subject to moderately strong tidal streams. This complex is characterised by dense crusts of the polychaete *Sabellaria spinulosa* covering the substratum. Other fauna present in many cases reflects the biotopes found on nearby rock, so to a certain extent, is quite variable. Species typically present include the bryozoans *Flustra foliacea*, *Alcyonidium diaphanum* and *Pentapora foliacea*, the hydroid *Nemertesia antennina*, the sponges *Tethya aurantium* and *Phorbas fictitius*, the anemones *Urticina felina* and *Sagartia elegans*, and the ascidians *Distomus variolosus*, *Polycarpa pomaria* and *Polycarpa scuba*. The barnacle *Balanus crenatus*, the polychete *Pomatoceros triqueter* and *Salmacina dysteri*, the starfish *Crossaster papposus* and *Alcyonium digitatum* may also be recorded. Two variants of the Sspi biotope have been identified: Sspi.ByB and Sspi.As (characterised by didemnid ascidians).

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|------------------------------|--------------------|---------------------------|------------------------------------|
| <i>Tethya aurantium</i> | •• | Occasional | 1 |
| <i>Phorbas fictitius</i> | •• | Occasional | 1 |
| <i>Nemertesia antennina</i> | •• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | •• | Frequent | 3 |
| <i>Urticina felina</i> | ••• | Occasional | 5 |
| <i>Sagartia elegans</i> | •• | Occasional | 1 |
| <i>Sabellaria spinulosa</i> | ••••• | Common | 32 |
| <i>Pomatoceros triqueter</i> | •• | Frequent | 3 |
| <i>Salmacina dysteri</i> | •• | Occasional | 1 |
| <i>Balanus crenatus</i> | •• | Frequent | 1 |
| <i>Alcyonidium diaphanum</i> | •• | Occasional | 1 |
| <i>Pentapora foliacea</i> | •• | Occasional | 2 |
| <i>Flustra foliacea</i> | •••• | Occasional | 8 |
| <i>Crossaster papposus</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Occasional | 7 |
| Didemnidae | ••• | Frequent | 10 |
| <i>Polycarpa pomaria</i> | •• | Common | 2 |
| <i>Polycarpa scuba</i> | •• | Common | 1 |
| <i>Distomus variolosus</i> | •• | Common | 3 |

CR.MCR.CSab.Sspi Sabellaria spinulosa encrusted circalittoral rock**Habitat classification**

| | |
|----------------|------------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulders; cobbles |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |

Previous code

CR.MCR.CSab.Sspi 97.06

Biotope description

This biotope is typically found encrusting the upper faces of wave-exposed and moderately wave-exposed circalittoral bedrock, boulders and cobbles subject to strong/moderately strong tidal streams in areas with high turbidity. The crusts formed by the sandy tubes of the polychaete worm *Sabellaria spinulosa* may even completely cover the rock, binding the substratum together to form a crust. A diverse fauna may be found attached to, and sometimes obscuring the crust, often reflecting the character of surrounding biotopes. Bryozoans such as *Flustra foliacea*, *Pentapora foliacea* and *Alcyonidium diaphanum*, anemones such as *Urticina felina* and *Sagartia elegans*, the polychaete *Pomatoceros triqueter*, *Alcyonium digitatum*, the hydroid *Nemertesia antennina* and echinoderms such as *Asterias rubens* and *Crossaster papposus* may all be recorded within this biotope. There are two variants; the first (Sspi.ByB) contains significant cover of barnacles (*Balanus crenatus*) and bryozoans. The second (Sspi.As) has a dense turf of didemnid ascidians as well as scour-tolerant bryozoans such as *F. foliacea*, sponges such as *Tethya aurantium* and *Phorbas fictitius*, colonies of the serpulid worm *Salmacina dysteri* and patchy occurrences of the ascidians *Distomus variolosus*, *Polycarpa pomaria* and *Polycarpa scuba*. This biotope has been recorded from the Llyn Peninsula, Lundy Island (including the wreck of the MV Robert) and the north-east and south coast of England.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|------------------------------|-------------|--------------------|-----------------------------|
| <i>Tethya aurantium</i> | •• | Occasional | 1 |
| <i>Phorbas fictitius</i> | •• | Occasional | 1 |
| <i>Nemertesia antennina</i> | •• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | •• | Frequent | 3 |
| <i>Urticina felina</i> | ••• | Occasional | 5 |
| <i>Sagartia elegans</i> | •• | Occasional | 1 |
| <i>Sabellaria spinulosa</i> | ••••• | Common | 30 |
| <i>Pomatoceros triqueter</i> | •• | Frequent | 3 |
| <i>Salmacina dysteri</i> | •• | Occasional | 1 |
| <i>Balanus crenatus</i> | •• | Frequent | 1 |
| <i>Alcyonidium diaphanum</i> | •• | Occasional | 1 |
| <i>Pentapora foliacea</i> | •• | Occasional | 2 |
| <i>Flustra foliacea</i> | •••• | Occasional | 8 |
| <i>Crossaster papposus</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Occasional | 7 |
| Didemnidae | ••• | Frequent | 12 |
| <i>Polycarpa pomaria</i> | •• | Common | 2 |
| <i>Polycarpa scuba</i> | •• | Common | 1 |
| <i>Distomus variolosus</i> | •• | Common | 3 |

CR.MCR.CSab.Sspi.ByB *Sabellaria spinulosa* with a bryozoan turf and barnacles on silty turbid circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock; boulders; cobbles; pebbles; gravel; sand |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 5-10 m, 10-20 m, 30-50 m |

Biotope description

This variant is typically found encrusting the upper faces of exposed and moderately exposed circalittoral rock and mixed substrata, subject to strong and moderately strong currents and high turbidity levels. The crusts formed by the sandy tubes of the polychaete worm *Sabellaria spinulosa* may completely cover the rock, binding gravel and pebbles together. A diverse fauna may be found attached to this crust, and in many cases reflects the character of nearby biotopes. There is normally considerable variation in the associated fauna encountered. There may be a sparse bryozoan turf (*Flustra foliacea*, *Alcyonium diaphanum*, *Bicellariella ciliata*, *Bugula plumosa* and *Vesicularia spinosa*) attached to the *Sabellaria* crust and available rocky substrata. Other scour-tolerant species such as *Urticina felina* are occasionally observed. Clumps of robust hydroids such as *Tubularia indivisa*, *Nemertesia antennina*, *Hydrallmania falcata* and *Halecium halecinum* may also be observed. Other species which may be present include the polychaete *Pomatoceros triqueter*, *Balanus crenatus*, *Asterias rubens*, *Pagurus bernhardus* and *Gibbula cineraria*. Occasionally, sponges such as *Haliclona oculata* and *Halichondria panicea*, and ascidians such as *Dendrodoa grossularia* may also be observed.

Temporal variation

Not known

Similar biotopes

| | |
|---------------------|---|
| CR.MCR.CSab.Sspi.As | This biotope is found on the upper faces of moderately exposed, moderately tide-swept circalittoral bedrock, boulders and cobbles. This biotope is similar in that the polychaete <i>Sabellaria spinulosa</i> is the prevalent species. However, it is distinguished from Sspi.ByB by a dense turf of didemnid, and other colonial ascidians such as <i>Polycarpa</i> sp. |
| SS.SBR.SspiMx | This biotope is found on circalittoral mixed sediment, not rock or mixed substrata in the case of Sspi.ByB. |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|------------------------------|-------------|--------------------|-----------------------------|
| <i>Halichondria panicea</i> | ●●● | Frequent | 3 |
| <i>Haliclona oculata</i> | ●●● | Occasional | 2 |
| <i>Tubularia indivisa</i> | ●●●● | Occasional | 4 |
| <i>Halecium halecinum</i> | ●● | Frequent | 1 |
| <i>Nemertesia antennina</i> | ●●● | Occasional | 2 |
| <i>Hydrallmania falcata</i> | ●●● | Occasional | 2 |
| <i>Urticina felina</i> | ●●●●● | Occasional | 9 |
| <i>Sabellaria spinulosa</i> | ●●●●● | Abundant | 22 |
| <i>Pomatoceros triqueter</i> | ●●● | Frequent | 6 |
| <i>Balanus crenatus</i> | ●●●● | Frequent | 6 |

| | | | |
|------------------------------|-------|------------|---|
| <i>Pagurus</i> | ••••• | Occasional | 3 |
| <i>Gibbula cineraria</i> | •• | Occasional | 1 |
| <i>Buccinum undatum</i> | •••• | Rare | 2 |
| <i>Alcyonidium diaphanum</i> | •••• | Occasional | 3 |
| <i>Vesicularia spinosa</i> | •• | Occasional | 2 |
| <i>Flustra foliacea</i> | •••• | Occasional | 5 |
| <i>Bicellariella ciliata</i> | ••• | Frequent | 3 |
| <i>Bugula plumosa</i> | •• | Frequent | 2 |
| <i>Asterias rubens</i> | •••• | Occasional | 4 |
| <i>Dendrodoa grossularia</i> | •••• | Frequent | 4 |

CR.MCR.CSab.Sspi.As *Sabellaria spinulosa*, didemnid and small ascidians on tide-swept moderately wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|----------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | bedrock; boulders; cobbles |
| Zone: | Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Previous code

CR.MCR.CSab.Sspi 97.06

Biotope description

This variant is typically found on tide-swept, moderately wave-exposed circalittoral bedrock, boulder and cobble subject to slight sand-scour. It occurs predominantly in the lower circalittoral. This variant normally appears as a bedrock/boulder outcrop or reef with a dense crust of the polychaete *Sabellaria spinulosa* and a dense turf of didemnid ascidians and scour-tolerant bryozoans such as *Flustra foliacea*, *Pentapora foliacea* and *Cellaria* species. There may be discreet clumps of *Alcyonium digitatum* and sparse sponges such as *Tethya aurantium* and *Phorbas fictitius*. Patchy occurrences of the small ascidians *Polycarpa scuba*, *Polycarpa pomaria* and *Distomus variolosus* may be present on the tops of rocks and boulders whilst in crevices between, the anemone *Urticina felina* may be found. Species such as *Asterias rubens*, *Crossaster papposus*, the serpulid worm *Salmacina dysteri* and the anemone *Sagartia elegans* are occasionally seen on the rock surface. This variant has been recorded from the Llyn Peninsula, the Skerries and around Pembrokeshire in Wales.

Temporal variation

Not known

Similar biotopes

| | |
|----------------------|--|
| CR.MCR.CSab.Sspi.ByB | This biotope is similar in that the polychaete tubeworm <i>S. spinulosa</i> is the prevalent species; however, it lacks the dense turf of colonial ascidians such as didemnids and <i>Polycarpa</i> sp., and instead has more barnacles and a bryozoan turf. |
| SS.SBR.SspiMx | This biotope is found on circalittoral mixed sediment, not rock or mixed substrata in the case of Sspi.As. |

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|-----------------------------|-------------|--------------------|------------------------------|
| <i>Tethya aurantium</i> | •• | Occasional | 2 |
| <i>Phorbas fictitius</i> | •• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••• | Frequent | 6 |
| <i>Urticina felina</i> | •• | Occasional | 2 |
| <i>Sagartia elegans</i> | •• | Occasional | 1 |
| <i>Sabellaria spinulosa</i> | ••••• | Common | 26 |
| <i>Salmacina dysteri</i> | •• | Occasional | 2 |
| <i>Pentapora foliacea</i> | ••• | Occasional | 4 |
| <i>Flustra foliacea</i> | •••• | Occasional | 7 |
| <i>Cellaria</i> | •• | Frequent | 2 |
| <i>Crossaster papposus</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Occasional | 6 |
| Didemnidae | ••••• | Frequent | 21 |
| <i>Polycarpa pomaria</i> | ••• | Common | 4 |
| <i>Polycarpa scuba</i> | •• | Common | 2 |
| <i>Distomus variolosus</i> | ••• | Frequent | 4 |

CR.MCR.SfR Soft rock communities**Habitat classification**

| | |
|-----------------|------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | Bedrock |
| Zone: | Circalittoral - upper |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |
| Other features: | Soft rock |

Previous code

CR.MCR.SfR 97.06

Biotope description

This biotope complex occurs on moderately wave-exposed, circalittoral 'soft' bedrock subject to moderately strong tidal streams. As this complex is found in highly turbid water conditions, the circalittoral zone may begin at the low water mark, due to poor light penetration. This complex is dominated by the piddock *Pholas dactylus*. Other species typical of this complex include the polychaete *Polydora* and *Bispira volutacornis*, the sponges *Cliona celata* and *Suberites ficus*, the bryozoan *Flustra foliacea*, *Alcyonium digitatum*, the starfish *Asterias rubens*, the mussel *Mytilus edulis* and the crab *Necora puber* and *Cancer pagurus*. Foliose red algae may also be present. Three biotopes have been identified within this complex: Pid, Pol and Hia. Please note: in areas subject to very high turbidity, biotopes within this biotope complex may occur in the infralittoral and even the littoral zone.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|-----------------------------|--------------------|---------------------------|------------------------------------|
| <i>Suberites ficus</i> | • | Frequent | 2 |
| <i>Cliona celata</i> | •• | Occasional | 3 |
| <i>Alcyonium digitatum</i> | •• | Occasional | 2 |
| <i>Polydora</i> | •• | Abundant | 4 |
| <i>Bispira volutacornis</i> | • | Occasional | 1 |
| <i>Cancer pagurus</i> | •• | Occasional | 1 |
| <i>Necora puber</i> | •• | Occasional | 1 |
| <i>Mytilus edulis</i> | • | Common | 2 |
| <i>Pholas dactylus</i> | •••• | Common | 68 |
| <i>Flustra foliacea</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | •• | Occasional | 2 |
| <i>Foliose red algae</i> | •• | Occasional | 3 |

CR.MCR.SfR. Pid Piddocks with a sparse associated fauna in circolittoral very soft chalk or clay

Habitat classification

| | |
|----------------|------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Moderately strong |
| Substratum: | Bedrock |
| Zone: | Circolittoral - upper |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |

Previous code

CR.MCR.SfR.Pid 97.06

Biotope description

This biotope typically occurs on the upper faces of moderately wave-exposed, tide-swept, upper circolittoral soft rock such as soft chalk or clay. As soft chalk and firm clay is often too soft for sessile filter-feeding animals to attach and thrive in large numbers, an extremely impoverished epifauna results. However, the substratum is sufficiently soft to be bored by bivalves. Species vary with location, but the bivalve borer *Pholas dactylus* is typically predominant. Other species present include the sponge *Suberites carnosus* and the polychaete *Bispira volutacornis*. Foliose red algae may be present on the 'harder', more stable areas of soft rock. Mobile fauna typically consists of the crab *Necora puber*.

Temporal variation

Not known

Similar biotopes

IR.MIR.Ldig.Pid

This biotope is found on sublittoral fringe soft rock on moderately exposed coasts. It is characterised by boring bivalves and the kelp *Laminaria digitata*.

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|-----------------------------|-------------|--------------------|------------------------------|
| <i>Suberites carnosus</i> | •• | Frequent | 2 |
| <i>Bispira volutacornis</i> | •• | Occasional | 2 |
| <i>Necora puber</i> | •• | Rare | 1 |
| <i>Pholas dactylus</i> | ••••• | Common | 83 |
| RHODOPHYCOTA | •• | Occasional | 4 |

CR.MCR.SfR.Pol *Polydora* sp. tubes on moderately exposed circalittoral soft rock

Habitat classification

| | |
|----------------|--------------------------------------|
| Salinity: | Full (30-35ppt), Variable (18-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Bedrock |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 10-20 m |

Previous code

CR.MCR.SfR.Pol 97.06

Biotope description

Large patches of chalk and soft limestone are occasionally covered entirely by *Polydora* sp. tubes to the exclusion of almost all other species. This tends to occur in highly turbid conditions and spans the infralittoral and circalittoral in limestone areas such as the Great and Little Ormes (North Wales) and Gower (South Wales). It is even present on the lower shore in the Severn estuary. The boring form of the sponge *Cliona celata* often riddles the surface layer of the stone. Other sponges present include *Halichondria panicea*, *Haliclona oculata* and *Hymeniacion perleve*. *Polydora* sp. also frequently occurs in small patches as part of other biotopes (e.g. FluCoAs). Other species present include *Alcyonium digitatum*, the hydroids *Sarcodictyon roseum*, *Halecium halecinum*, *Abietinaria abietina* and *Tubularia indivisa*, the ascidians *Clavelina lepadiformis*, *Botryllus schlosseri* and *Morchellium argus*, the anemones *Urticina felina*, *Metridium senile* and *Sagartia elegans* and the bryozoans *Flustra foliacea* and a crisiid turf. The starfish *Asterias rubens*, the crabs *Inachus phalangium* and *Carcinus maenas*, the polychaete *Pomatoceros triqueter*, the barnacle *Balanus crenatus* and the brittlestar *Ophiothrix fragilis* may also be seen. Please note: in areas subject to very high turbidity, this biotope may occur in the infralittoral and even the littoral zone.

Temporal variation

Not known

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|------------------------------|-------------|--------------------|------------------------------|
| <i>Cliona celata</i> | ●●●● | Occasional | 1 |
| <i>Halichondria panicea</i> | ●●● | Frequent | 3 |
| <i>Hymeniacion perleve</i> | ●●● | Occasional | 1 |
| <i>Haliclona oculata</i> | ●●●● | Occasional | 2 |
| <i>Tubularia indivisa</i> | ●● | Frequent | 1 |
| <i>Halecium halecinum</i> | ●●● | Frequent | 5 |
| <i>Abietinaria abietina</i> | ●● | Frequent | 1 |
| <i>Sarcodictyon roseum</i> | ●●● | Common | 2 |
| <i>Alcyonium digitatum</i> | ●●●● | Common | 8 |
| <i>Urticina felina</i> | ●●●● | Occasional | 6 |
| <i>Metridium senile</i> | ●●● | Frequent | 2 |
| <i>Sagartia elegans</i> | ●●● | Frequent | 1 |
| <i>Polydora</i> | ●●●●● | Abundant | 25 |
| <i>Pomatoceros triqueter</i> | ●●● | Occasional | 1 |
| <i>Balanus crenatus</i> | ●● | Frequent | 1 |
| <i>Inachus phalangium</i> | ●●● | Occasional | 2 |
| <i>Carcinus maenas</i> | ●● | Frequent | 1 |
| Crisiidae | ●● | Common | 1 |
| <i>Flustra foliacea</i> | ●●● | Frequent | 4 |
| <i>Asterias rubens</i> | ●●● | Frequent | 4 |

| | | | |
|-------------------------------|------|------------|---|
| <i>Ophiothrix fragilis</i> | ●●● | Occasional | 2 |
| <i>Clavelina lepadiformis</i> | ●●●● | Occasional | 3 |
| <i>Morchellium argus</i> | ●●● | Frequent | 2 |
| <i>Botryllus schlosseri</i> | ●●● | Occasional | 2 |

CR.MCR.SfR.Hia *Hiatella*-bored vertical sublittoral limestone rock**Habitat classification**

| | |
|-----------------|------------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |
| Other features: | Vertical limestone or chalk. |

Previous code

AlcByH.Hia in part 97.06

Biotope description

Moderately exposed vertical and overhanging soft rock (typically chalk), subject to moderately strong to weak tidal streams, bored by the rock-boring mollusc *Hiatella arctica*. As with other biotopes in the soft rock complex, it is found in areas of high turbidity, where there is poor light penetration. There may be isolated clumps of the hydroid *Nemertesia antennina* and a sparse bryozoan turf formed by various crisiids, *Bugula plumosa* and *Bugula flabellate* (often being grazed on by the nudibranch *Janolus cristatus*), *Alcyonidium diaphanum*, *Flustra foliacea* and *Cellapora pumicosa*. A patchy 'carpet' of the brittlestar *Ophiothrix fragilis* is often recorded along with other echinoderms such as *Asterias rubens* and *Henricia sanguinolenta*. Other species present include the colonial ascidians *Polyclinum aurantium*, *Botrylloides leachi*, *Clavelina lepadiformis*, *Aplidium punctatum* and *Botryllus schlosseri*, dead mans fingers *Alcyonium digitatum* and the crab *Cancer pagurus*. Sponges present include the boring sponge *Cliona celata*, *Halichondria panicea*, *Myxilla incrustans*, *Leucosolenia botryoides* and *Dysidea fragilis*. Occasionally, the foliose red seaweed *Delessaria sanguinea* may be recorded.

Similar biotopes

MIR.HiaSw Has seaweed community.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Leucosolenia botryoides</i> | ••• | Frequent | 2 |
| <i>Cliona celata</i> | •• | Frequent | 2 |
| <i>Halichondria panicea</i> | ••• | Frequent | 2 |
| <i>Myxilla incrustans</i> | •• | Occasional | 1 |
| <i>Dysidea fragilis</i> | •• | Present | 1 |
| <i>Nemertesia antennina</i> | •• | Frequent | 1 |
| <i>Alcyonium digitatum</i> | ••• | Common | 3 |
| <i>Sabellaria spinulosa</i> | •• | Frequent | 1 |
| <i>Cancer pagurus</i> | ••• | Occasional | 2 |
| <i>Janolus cristatus</i> | •• | Frequent | 2 |
| <i>Hiatella arctica</i> | •••• | Common | 7 |
| Crisiidae | ••• | Common | 5 |
| <i>Alcyonidium diaphanum</i> | ••• | Frequent | 3 |
| <i>Cellepora pumicosa</i> | ••• | Occasional | 1 |
| <i>Flustra foliacea</i> | •• | Common | 2 |
| <i>Bugula flabellata</i> | ••• | Frequent | 2 |
| <i>Bugula plumosa</i> | ••• | Frequent | 4 |
| <i>Henricia sanguinolenta</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Frequent | 9 |
| <i>Ophiothrix fragilis</i> | •••• | Common | 10 |

| | | | |
|-------------------------------|------|------------|---|
| <i>Clavelina lepadiformis</i> | ••• | Frequent | 2 |
| <i>Polyclinum aurantium</i> | •••• | Frequent | 5 |
| <i>Aplidium punctum</i> | •• | Common | 2 |
| <i>Botryllus schlosseri</i> | •• | Occasional | 2 |
| <i>Botrylloides leachi</i> | ••• | Frequent | 4 |
| <i>Delesseria sanguinea</i> | •• | Frequent | 2 |

CR.MCR.CMus Circalittoral mussel beds

Habitat classification

| | |
|----------------|--------------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock |
| Zone: | Circalittoral, Circalittoral - upper |
| Depth band: | 5-10 m, 10-20 m |

Biotope description

This biotope complex occurs on moderately wave-exposed upper circalittoral bedrock subject to strong or moderately strong tidal streams. This complex is characterised by dense aggregations of the mussels *Mytilus edulis* or *Musculus discors* 'carpeting' the underlying substrata. Sponges that may be recorded in this complex are *Scypha ciliata*, *Tethya aurantium*, *Pachymatisma johnstonia*, *Dysidea fragilis* and *Cliona celata*. A 'sparse' hydroid/bryozoan turf composed primarily of *Nemertesia antennina*, *Alcyonidium diaphanum* and *Flustra foliacea* is often recorded. Anemones present are *Urticina felina* and *Sagartia elegans*. Other species recorded are the crabs *Cancer pagurus*, *Carcinus maenas* and *Necora puber*, the starfish *Crossaster papposus* and *Asterias rubens*, and *Alcyonium digitatum*. In this upper circalittoral complex, algae species such as *Dictyota dichotoma*, *Cryptopleura ramosa* and *Plocamium cartilagineum*. Two biotopes have been identified: CMyt (*Mytilus* dominated) and Mdis (*Musculus* dominated).

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Scypha ciliata</i> | •• | Occasional | 2 |
| <i>Pachymatisma johnstonia</i> | •• | Occasional | 2 |
| <i>Tethya aurantium</i> | •• | Occasional | 2 |
| <i>Cliona celata</i> | •• | Rare | 1 |
| <i>Dysidea fragilis</i> | •• | Occasional | 1 |
| <i>Nemertesia antennina</i> | •• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | •• | Occasional | 1 |
| <i>Urticina felina</i> | ••• | Occasional | 6 |
| <i>Sagartia elegans</i> | ••• | Occasional | 3 |
| <i>Balanus crenatus</i> | •• | Frequent | 2 |
| <i>Cancer pagurus</i> | ••• | Occasional | 4 |
| <i>Necora puber</i> | •• | Rare | 2 |
| <i>Carcinus maenas</i> | • | Common | 1 |
| <i>Mytilus edulis</i> | ••• | Abundant | 18 |
| <i>Musculus discors</i> | ••• | Super-abundant | 13 |
| <i>Alcyonidium diaphanum</i> | •• | Frequent | 1 |
| <i>Flustra foliacea</i> | ••• | Occasional | 4 |
| <i>Crossaster papposus</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Frequent | 15 |
| <i>Plocamium cartilagineum</i> | •• | Occasional | 1 |
| <i>Cryptopleura ramosa</i> | •• | Frequent | 1 |
| <i>Dictyota dichotoma</i> | •• | Frequent | 1 |

CR.MCR.CMus.CMyt *Mytilus edulis* beds with hydroids and ascidians on tide-swept, exposed to moderately wave-exposed circalittoral rock

Habitat classification

| | |
|----------------|----------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Extremely exposed, Exposed |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock; shells; pebbles; gravel |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 5-10 m, 10-20 m, 20-30 m |

Biotope description

This biotope typically occurs on the upper faces of tide-swept circalittoral bedrock, boulders and mixed substrata exposed to varying amounts of wave action. The mussel *Mytilus edulis* forms dense beds, to the exclusion of other species. The starfish *Asterias rubens* is frequently recorded, and it predares heavily on the mussels. Occasionally, the anemone *Urticina felina* may be seen within crevices in the rock or on gravel patches. Crabs such as *Necora puber* and *Carcinus maenas* may be seen on the rock or mussels whilst fauna observed in crevices typically consists of the lobster *Homarus gammarus* and the crab *Cancer pagurus*. The anemone *Sargatia elegans* can be seen attached to bedrock and cobbles, whereas the barnacle *Balanus crenatus* may be seen attached to the mussels themselves.

Temporal variation

Not known

Similar biotopes

IR.LIR.MytRS

This biotope is found on wave-sheltered, tide-swept infralittoral rock and is characterised predominantly by *Mytilus edulis*.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-------------------------|-------------|--------------------|-----------------------------|
| <i>Urticina felina</i> | ●●●● | Occasional | 8 |
| <i>Sagartia elegans</i> | ●●● | Occasional | 3 |
| <i>Balanus crenatus</i> | ●● | Frequent | 1 |
| <i>Homarus gammarus</i> | ●● | Rare | 1 |
| <i>Cancer pagurus</i> | ●●● | Rare | 3 |
| <i>Necora puber</i> | ●●● | Occasional | 4 |
| <i>Carcinus maenas</i> | ●● | Common | 3 |
| <i>Mytilus edulis</i> | ●●●●● | Abundant | 58 |
| <i>Asterias rubens</i> | ●●●● | Frequent | 12 |

CR.MCR.CMus.Mdis *Musculus discors* beds on moderately exposed circalittoral rock

Habitat classification

| | |
|----------------|-------------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed, Sheltered |
| Tidal streams: | Moderately strong |
| Substratum: | Bedrock; boulders; cobbles |
| Zone: | Circalittoral - upper |
| Depth band: | 10-20 m |

Biotope description

This biotope typically occurs on the upper faces of moderately exposed, moderately tide-swept bedrock, boulders and cobbles in slightly silty conditions. The mussel *Musculus discors* occurs in dense 'mats' and occasionally completely coats all available surfaces. There is also often a layer of pseudofaeces, forming a thick, silty matrix. A relatively diverse fauna of cushion and branching sponges is often present on rocky outcrops and other hard substratum that is free of mussels. These include *Tethya aurantium*, *Scypha ciliata*, *Pachymatisma johnstonia*, *Dysidea fragilis*, *Cliona celata* and *Stelligera stuposa*. There may be isolated clumps of silt-tolerant bryozoans such as *Flustra foliacea* and *Bugula plumosa*. Various species may be observed on top of the mussels, including *Asterias rubens*, *Crossaster papposus* and the brittlestar *Ophiura albida*. Occasional *Alcyonium digitatum* and clumps of the hydroid *Nemertesia antennina* are found attached to rocky outcrops and boulders whilst the anemone *Urticina felina* may be seen in crevices in the rock or on gravelly patches between boulders. Colonial ascidians such as *Clavelina lepadiformis* and didemnids may occasionally be present. A wide range of seaweeds may be present, including *Dictyota dichotoma*, *Plocamium cartilagineum*, *Dictyopteris membranacea*, *Cryptopleura ramosa* and *Heterosiphonia plumosa*. The crab *Cancer pagurus* may be observed in crevices. The majority of the records for this biotope are from the Lleyn Peninsula.

Temporal variation

Not known

Similar biotopes

IR.LIR.AscSpAs

Musculus discors may be present in this biotope, but at nowhere near the density present in Mdis.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Scypha ciliata</i> | ●●●● | Occasional | 4 |
| <i>Pachymatisma johnstonia</i> | ●●● | Occasional | 2 |
| <i>Tethya aurantium</i> | ●●●● | Occasional | 5 |
| <i>Cliona celata</i> | ●●● | Rare | 2 |
| <i>Stelligera stuposa</i> | ●●● | Occasional | 1 |
| <i>Dysidea fragilis</i> | ●●● | Occasional | 2 |
| <i>Nemertesia antennina</i> | ●●● | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ●●● | Occasional | 2 |
| <i>Urticina felina</i> | ●●● | Occasional | 2 |
| <i>Cancer pagurus</i> | ●●● | Occasional | 2 |
| <i>Musculus discors</i> | ●●●●● | Super-abundant | 30 |
| <i>Flustra foliacea</i> | ●●●● | Occasional | 5 |

| | | | |
|---------------------------------|------|------------|---|
| <i>Bugula plumosa</i> | ••• | Frequent | 2 |
| <i>Crossaster papposus</i> | •••• | Occasional | 4 |
| <i>Asterias rubens</i> | •••• | Frequent | 7 |
| <i>Ophiura albida</i> | •• | Frequent | 1 |
| <i>Clavelina lepadiformis</i> | ••• | Occasional | 2 |
| Didemnidae | •• | Occasional | 1 |
| <i>Plocamium cartilagineum</i> | ••• | Occasional | 2 |
| <i>Cryptopleura ramosa</i> | •• | Occasional | 1 |
| <i>Heterosiphonia plumosa</i> | •• | Occasional | 1 |
| <i>Dictyopteris membranacea</i> | ••• | Occasional | 1 |
| <i>Dictyota dichotoma</i> | ••• | Frequent | 3 |

CR.MCR.CFaVS Circalittoral variable salinity faunal communities

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Moderately strong, Weak |
| Substratum: | Bedrock, cobbles |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |

Biotope description

This biotope complex occurs on wave-sheltered, variable salinity bedrock and cobbles, subject to moderately strong to weak tidal streams. This complex contains a suite of sponges able to tolerate the variable salinity conditions like *Hymeniacidon perleve*, *Suberites ficus*, *Halichondria panicea*, *Halichondria bowerbanki*, *Cliona celata* and *Leucosolenia botryoides*. The barnacle *Balanus crenatus* is frequently recorded in this complex. A 'sparse' hydroid/bryozoan turf composed primarily of *Nemertesia antennina*, *Nemertesia ramosa*, *Plumularia setacea*, *Alcyonidium diaphanum* and *Bugula plumosa* is often recorded. Other species recorded are the ascidians *Clavelina lepadiformis*, *Morchellium argus* and *Dendrodoa grossularia*, the anemones *Metridium senile* and *Sagartia troglodytes*, the starfish *Asterias rubens* and the crab *Carcinus maenas*. Two biotopes have been identified within this complex: CuSpH (cushion sponges with hydroids) and HbowEud.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Leucosolenia botryoides</i> | •• | Frequent | 1 |
| <i>Suberites ficus</i> | •••• | Frequent | 8 |
| <i>Cliona celata</i> | •• | Occasional | 1 |
| <i>Halichondria bowerbanki</i> | ••• | Frequent | 5 |
| <i>Halichondria panicea</i> | ••• | Frequent | 6 |
| <i>Hymeniacidon perleve</i> | ••• | Frequent | 8 |
| <i>Nemertesia antennina</i> | ••• | Frequent | 5 |
| <i>Nemertesia ramosa</i> | •• | Frequent | 2 |
| <i>Plumularia setacea</i> | ••• | Occasional | 4 |
| <i>Metridium senile</i> | •• | Occasional | 3 |
| <i>Sagartia troglodytes</i> | •• | Occasional | 1 |
| <i>Balanus crenatus</i> | ••• | Common | 9 |
| <i>Carcinus maenas</i> | ••• | Occasional | 4 |
| <i>Alcyonidium diaphanum</i> | •• | Occasional | 1 |
| <i>Bugula plumosa</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | ••• | Occasional | 4 |
| <i>Clavelina lepadiformis</i> | ••• | Frequent | 8 |
| <i>Morchellium argus</i> | •• | Occasional | 2 |
| <i>Dendrodoa grossularia</i> | •• | Occasional | 1 |

CR.MCR.CFaVS.CuSpH Cushion sponges and hydroids on tide-swept, turbid, sheltered circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt), Variable (18-35ppt) |
| Wave exposure: | Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Bedrock; boulders |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |

Biotope description

This biotope is found in variable salinity environments and tends to occur on the upper faces of circalittoral bedrock and boulders, in sheltered sites subject to moderately strong tidal streams. This biotope is characterised by aggregations of cushion sponges such as *Hymeniacidon perleve*, *Halichondria panicea*, *Halichondria bowerbanki* and *Cliona celata*, other sponges (*Leucosolenia botryoides* and *Suberites fiscus*) along with occasional hydroid tufts of *Nemertesia antennina*, *Nemertesia ramosa* and *Plumularia setacea*. Other species that may be present include the colonial ascidians *Clavelina lepadiformis* and *Morchellium argus*, *Dendrodoa grossularia*, the anemones *Metridium senile* and *Sagartia troglodytes*, the barnacle *Balanus crenatus*, *Asterias rubens*, *Carcinus maenas* and *Bugula plumosa*. Two variants of this biotope have been recorded; CuSpH.VS and CuSpH.As.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Leucosolenia botryoides</i> | ●● | Frequent | 1 |
| <i>Suberites fiscus</i> | ●●●● | Frequent | 10 |
| <i>Cliona celata</i> | ●● | Occasional | 2 |
| <i>Halichondria bowerbanki</i> | ●● | Frequent | 2 |
| <i>Halichondria panicea</i> | ●●● | Frequent | 7 |
| <i>Hymeniacidon perleve</i> | ●●●● | Frequent | 10 |
| <i>Nemertesia antennina</i> | ●●● | Frequent | 6 |
| <i>Nemertesia ramosa</i> | ●●● | Frequent | 3 |
| <i>Plumularia setacea</i> | ●●● | Occasional | 5 |
| <i>Metridium senile</i> | ●●● | Occasional | 3 |
| <i>Sagartia troglodytes</i> | ●● | Occasional | 1 |
| <i>Balanus crenatus</i> | ●●● | Common | 7 |
| <i>Carcinus maenas</i> | ●●● | Occasional | 3 |
| <i>Bugula plumosa</i> | ●● | Occasional | 2 |
| <i>Asterias rubens</i> | ●●● | Occasional | 3 |
| <i>Clavelina lepadiformis</i> | ●●●● | Frequent | 9 |
| <i>Morchellium argus</i> | ●●● | Occasional | 2 |
| <i>Dendrodoa grossularia</i> | ●● | Occasional | 1 |

CR.MCR.CFaVS.CuSpH.As Cushion sponges, hydroids and ascidians on tide-swept, turbid, sheltered circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt), Variable (18-35ppt) |
| Wave exposure: | Moderately exposed, Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Bedrock; boulders |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |

Biotope description

This sub-biotope typically occurs in a mixture of turbid, full and variable salinity water, on wave-sheltered and moderately exposed bedrock or boulders. Tidal streams are typically moderately strong but may vary considerably. This sub-biotope occurs in relatively shallow water (typically 5m to 11m water depth) and is dominated by cushion sponges, hydroids and ascidians. On the silty, rocky substrata, large growths of sponge are usually associated with this biotope (*Suberites ficus*, *Hymeniacion perleve*, *Cliona celata*, *Halichondria panicea*, *Raspailia ramosa*). The tasselled form of *Esperiopsis fucorum* is also notably present. Other epifauna present includes silty hydroids such as *Nemertesia antennina*, *Nemertesia ramosa*, *Plumularia setacea*, *Hydrallmania falcata* and *Halecium halecinum*. Individual colonies of Dead mans fingers *Alcyonium digitatum* and plumose anemones *Metridium senile* may be seen attached to the tops of boulders and ridges. At some sites, whole sides of rocks may be colonised by the anemones *Sagartia elegans*, *Sagartia troglodytes* and *Actinothoe sphyrodeta*. Within crevices in the rocky substratum and at the base of boulders *Urticina felina* and *Cereus pedunculatus* may be found. Ascidians such as *Clavelina lepadiformis*, *Morchellium argus*, *Dendrodoa grossularia*, *Diplosoma listerianum* and *Distomus variolosus* may all be observed. Other ubiquitous species which may be recorded include *Polydora*, terebellid worms, *Balanus crenatus*, *Alcyonidium diaphanum* and *Asterias rubens*.

Temporal variation

Not known

Similar biotopes

| | |
|-----------------------|--|
| CR.MCR.CFaVS.HbowEud | This biotope occurs on reduced salinity circalittoral bedrock and boulders subject to strong to weak tidal streams. Very limited species diversity, unlike CuSpH.As. |
| CR.MCR.CFaVS.CuSpH.VS | This biotope is closely related to CuSpH.As, but tends to be found in areas that experience less stable, lower salinity seawater. CuSpH.As has amore diverse range of sponges, hydroids and bryozoans than CuSpH.VS. |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-----------------------------|-------------|--------------------|-----------------------------|
| <i>Suberites ficus</i> | ●●●● | Frequent | 10 |
| <i>Cliona celata</i> | ●●●● | Occasional | 3 |
| <i>Raspailia ramosa</i> | ●●● | Occasional | 1 |
| <i>Halichondria panicea</i> | ●●● | Frequent | 3 |
| <i>Hymeniacion perleve</i> | ●●●● | Occasional | 5 |
| <i>Esperiopsis fucorum</i> | ●●● | Frequent | 2 |
| <i>Halecium halecinum</i> | ●●● | Occasional | 1 |

| | | | |
|-------------------------------|------|------------|---|
| <i>Nemertesia antennina</i> | •••• | Frequent | 7 |
| <i>Nemertesia ramosa</i> | ••• | Occasional | 3 |
| <i>Plumularia setacea</i> | ••• | Occasional | 3 |
| <i>Hydrallmania falcata</i> | ••• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ••• | Occasional | 3 |
| <i>Urticina felina</i> | ••• | Frequent | 3 |
| <i>Metridium senile</i> | ••• | Frequent | 3 |
| <i>Sagartia elegans</i> | ••• | Occasional | 1 |
| <i>Sagartia troglodytes</i> | •• | Frequent | 1 |
| <i>Cereus pedunculatus</i> | ••• | Occasional | 2 |
| <i>Actinothoe sphyrodeta</i> | ••• | Occasional | 2 |
| <i>Polydora</i> | ••• | Common | 2 |
| Terebellidae | ••• | Frequent | 2 |
| <i>Balanus crenatus</i> | •• | Frequent | 2 |
| <i>Alcyonidium diaphanum</i> | •• | Occasional | 1 |
| <i>Asterias rubens</i> | ••• | Occasional | 1 |
| <i>Clavelina lepadiformis</i> | •••• | Occasional | 5 |
| <i>Morchellium argus</i> | •••• | Occasional | 4 |
| <i>Diplosoma listerianum</i> | ••• | Rare | 1 |
| <i>Dendrodoa grossularia</i> | ••• | Frequent | 2 |
| <i>Distomus variolosus</i> | •• | Frequent | 1 |

CR.MCR.CFaVS.CuSpH.VS Cushion sponges and hydroids on tide-swept, turbid, variable salinity, sheltered circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Variable (18-35ppt) |
| Wave exposure: | Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Strong, Moderately strong |
| Substratum: | Bedrock |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |

Biotope description

This sub-biotope typically occurs in turbid, variable salinity water, on wave-sheltered bedrock in estuaries subject to strong tidal regimes where circalittoral communities occur in relatively shallow water (typically 5m to 8m water depth). Cushion sponges, hydroids and ascidians dominate the biotope. Large growths (often up to 50cm across) of the sponges *Halichondria panicea* mixed with *Halichondria bowerbanki* almost entirely cover the bedrock, appearing in places like a continuous cushion. *Haliclona oculata*, *Suberites ficus*, *Leucosolenia botryoides*, various hydroids such as *Plumularia setacea*, *Nemertesia antennina*, *Nemertesia ramosa* and various bryozoans such as *Bugula plumosa*, *Bugula turbinata* and *Bowerbankia pustulosa* protude through the *Halichondria* sponge growth. Colonial ascidians such as the lightbulb ascidian *Clavelina lepadiformis* and *Morchellium argus* may also be observed. Other more ubiquitous species include *Balanus crenatus*, *Carcinus maenas*, *Asterias rubens*, *Metridium senile*, *Sagartia elegans* and *Ophiothrix fragilis*.

Temporal variation

Not known

Similar biotopes

| | |
|-----------------------|---|
| CR.MCR.CFaVS.CuSpH.As | This sub-biotope occurs in more marine conditions in the outer parts of estuaries. A diverse range of cushion sponges and hydroids are present, unlike CuSp.VS, together with a number of colonial or small solitary ascidians. |
| CR.MCR.CFaVS.HbowEud | This biotope occurs in variable saline sheltered circalittoral mixed substratum, subject to varying tidal streams. Similar species range to CuSp.VS although lacks hydroids such as <i>Eudendrium</i> spp. |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Leucosolenia botryoides</i> | •• | Frequent | 3 |
| <i>Suberites ficus</i> | •••• | Occasional | 7 |
| <i>Halichondria bowerbanki</i> | •• | Frequent | 4 |
| <i>Halichondria panicea</i> | •••• | Frequent | 10 |
| <i>Hymeniacidon perleve</i> | •••• | Frequent | 11 |
| <i>Haliclona oculata</i> | • | Occasional | 1 |
| <i>Nemertesia antennina</i> | •• | Frequent | 3 |
| <i>Nemertesia ramosa</i> | •• | Frequent | 2 |
| <i>Plumularia setacea</i> | ••• | Frequent | 4 |
| <i>Metridium senile</i> | •• | Occasional | 3 |
| <i>Sagartia troglodytes</i> | •• | Occasional | 2 |

| | | | |
|-------------------------------|------|------------|----|
| <i>Balanus crenatus</i> | ••• | Common | 10 |
| <i>Carcinus maenas</i> | ••• | Occasional | 5 |
| <i>Bowerbankia pustulosa</i> | •• | Frequent | 1 |
| <i>Bugula plumosa</i> | ••• | Occasional | 3 |
| <i>Bugula turbinata</i> | •• | Common | 1 |
| <i>Asterias rubens</i> | ••• | Occasional | 4 |
| <i>Ophiothrix fragilis</i> | •• | Occasional | 1 |
| <i>Clavelina lepadiformis</i> | •••• | Frequent | 10 |
| <i>Morchellium argus</i> | •• | Occasional | 1 |

CR.MCR.CFaVS.HbowEud *Halichondria bowerbanki*, *Eudendrium arbusculum* and *Eucratea loricata* on reduced salinity tide-swept circalittoral mixed substrata

Habitat classification

| | |
|----------------|---|
| Salinity: | Variable (18-35ppt), Reduced (18-30ppt), Low (<18ppt) |
| Wave exposure: | Sheltered, Very sheltered |
| Tidal streams: | Strong, Moderately strong, Weak |
| Substratum: | Bedrock; boulders; cobbles; pebbles |
| Zone: | Circalittoral |
| Depth band: | 0-5 m, 5-10 m, 10-20 m |

Previous code

CR.ECR.BS.HBowEud 97.06

Biotope description

This biotope typically occurs on circalittoral mixed substrata (bedrock, boulders, cobbles, pebbles and gravel) in the moderately strong, tide-swept narrows near the entrance of Loch Etive, although not in the extremely tide-swept Falls of Lora. This sea loch is unique in having a substantial freshwater input from the surrounding moorland, yielding the most brackish, large sea loch in Scotland. Large growths of the brackish-tolerant sponge *Halichondria bowerbanki* cover the cobble and boulder seabed, interspersed with *Mycale lobata*, the hydroid *Eudendrium arbusculum* and the bryozoan *Alcyonidium diaphanum* which are particularly characteristic of these conditions. Tufts of the bryozoan *Eucratea loricata* are occasional in most areas. Other species recorded include *Carcinus maenas*, *Asterias rubens*, *Crossaster papposus*, *Buccinum undatum*, *Pagurus bernhardus*, *Henricia* spp., *Onchidoris bilamellata* and *Palio dubia*, tolerant of the low salinity, are found in the circalittoral throughout this area. Ascidians such as *Ascidiella scabra* and *Corella parallelogramma* may also be present. A very impoverished low salinity version is present in the upper basin of Loch Etive. The biotope CuSpH is similar in several respects to this biotope and will develop in less brackish situations where species-richness is generally greater.

Temporal variation

Not known

Similar biotopes

| | |
|-----------------------|---|
| CR.MCR.CFaVS.CuSpH.VS | This sub-biotope occurs in very sheltered variable salinity bedrock, subject to moderately strong tidal streams. It is much more impoverished than HbowEud, lacking the hydroid <i>Eudendrium</i> spp. Also lacks many red algae species. |
| CR.MCR.CFaVS.CuSpH.As | This sub-biotope occurs in more marine conditions in the outer parts of estuaries. A diverse range of cushion sponges and hydroids are present, unlike HbowEud. |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------------|-------------|--------------------|-----------------------------|
| <i>Halichondria bowerbanki</i> | ●●●● | Occasional | 16 |
| <i>Mycale lobata</i> | ●● | Occasional | 2 |
| <i>Eudendrium arbusculum</i> | ●●●● | Frequent | 7 |
| <i>Balanus crenatus</i> | ●●●● | Frequent | 12 |
| <i>Pagurus bernhardus</i> | ●● | Frequent | 3 |
| <i>Carcinus maenas</i> | ●● | Occasional | 1 |
| <i>Buccinum undatum</i> | ●● | Occasional | 3 |
| <i>Onchidoris bilamellata</i> | ●● | Frequent | 1 |

| | | | |
|--------------------------------|-------|------------|----|
| <i>Palio dubia</i> | •• | Occasional | 1 |
| <i>Alcyonidium diaphanum</i> | ••• | Occasional | 3 |
| <i>Eucratea loricata</i> | ••••• | Frequent | 15 |
| <i>Crossaster papposus</i> | ••• | Rare | 1 |
| <i>Henricia</i> | •• | Occasional | 1 |
| <i>Asterias rubens</i> | ••• | Occasional | 3 |
| <i>Corella parallelogramma</i> | •••• | Occasional | 9 |
| <i>Asciidiella scabra</i> | •••• | Common | 11 |

CR.LCR**Low energy circalittoral rock****Habitat classification**

| | |
|----------------|--|
| Salinity: | Full (30-35ppt), Reduced (18-30ppt) |
| Wave exposure: | Sheltered, Very sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock;boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Biotope description

This habitat complex occurs on wave-sheltered circalittoral bedrock and boulders subject to mainly weak/very weak tidal streams. The biotopes identified within this habitat complex are often dominated by encrusting red algae, brachiopods (*Neocrania anomala*) and ascidians (*Ciona intestinalis* and *Ascidia mentula*). Two fouling biotopes have also been identified; Aasp has been recorded from disused fishing nets and other artificial substrata, and is characterised by aggregations of *Ascidiella aspersa* whilst AdigMsen has been recorded from steel wrecks, and is characterised by dense aggregations of *Alcyonium digitatum* and *Metridium senile*. The LgAsSp biotope is characteristic of the wave-sheltered conditions found in the Kenmare River on the west coast of Ireland.

CR.LCR.BrAs Brachiopods and ascidians

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt), Reduced (18-30ppt) |
| Wave exposure: | Sheltered, Very sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock, boulders |
| Zone: | Circalittoral - upper, Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Biotope description

This biotope complex occurs on the wave-sheltered, circalittoral bedrock and boulders subject to weak tidal streams. The biotopes within this complex are typically found in the Scottish sealochs (with the exception of LgAsSp, recorded off Ireland) and are characterised by brachiopod and ascidian communities. Ascidiaceans often recorded in this complex are *Ciona intestinalis*, *Ascidia mentula*, *Ascidia virginea* and *Clavelina lepadiformis*. The brachiopod *Neocrania anomala* is also characteristic of the biotopes within this complex recorded in Scottish sealochs. The polychaete *Pomatoceros triqueter*, the saddle oyster *Pododesmus patelliformis*, the cup coral *Caryophyllia smithii* and encrusting red algae are frequently recorded on the rocky substrata. Echinoderms such as the brittlestars *Ophiothrix fragilis*, *Ophiocoma nigra* and *Ophiura albida*, the starfish *Asterias rubens*, *Crossaster papposus* and *Henricia oculata*, the crinoid *Antedon bifida* and the urchin *Echinus esculentus* are all found in this complex. Other species present include the squat lobster *Munida rugosa*, the hermit crab *Pagurus bernhardus*, *Alcyonium digitatum*, the anemone *Protanthea simplex* and the hydroid *Kirchenpaueria pinnata*. Within this biotope complex, four biotopes have been identified: AmenCio, LgAsSp, AntAsH and NeoPro.

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|---------------------------------|-------------|--------------------|------------------------------|
| <i>Kirchenpaueria pinnata</i> | •• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | •• | Occasional | 2 |
| <i>Protanthea simplex</i> | •• | Occasional | 2 |
| <i>Caryophyllia smithii</i> | ••• | Occasional | 2 |
| <i>Pomatoceros triqueter</i> | •••• | Frequent | 8 |
| <i>Pagurus bernhardus</i> | ••• | Occasional | 3 |
| <i>Munida rugosa</i> | ••• | Occasional | 3 |
| <i>Pododesmus patelliformis</i> | •• | Occasional | 2 |
| <i>Neocrania anomala</i> | •• | Frequent | 3 |
| <i>Antedon bifida</i> | •• | Occasional | 1 |
| <i>Crossaster papposus</i> | ••• | Occasional | 2 |
| <i>Henricia oculata</i> | •• | Rare | 1 |
| <i>Asterias rubens</i> | •••• | Occasional | 5 |
| <i>Ophiothrix fragilis</i> | •••• | Frequent | 8 |
| <i>Ophiocoma nigra</i> | ••• | Frequent | 4 |
| <i>Ophiura albida</i> | •• | Occasional | 2 |
| <i>Echinus esculentus</i> | •••• | Occasional | 7 |
| <i>Clavelina lepadiformis</i> | •• | Occasional | 1 |
| <i>Ciona intestinalis</i> | •••• | Occasional | 5 |
| <i>Corella parallelogramma</i> | ••• | Occasional | 2 |
| <i>Ascidia mentula</i> | •••• | Occasional | 5 |
| <i>Ascidia virginea</i> | •• | Occasional | 1 |
| Corallinaceae | ••• | Common | 8 |

CR.LCR.BrAs.AmenCio Solitary ascidians, including *Ascidia mentula* and *Ciona intestinalis*, on wave-sheltered circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed, Sheltered, Very sheltered |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulders; cobbles |
| Zone: | Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Biotope description

This biotope predominantly occurs on the upper faces of wave-sheltered (often sealochs) circalittoral bedrock, boulder and cobble slopes with little tidal flow. Apart from the solitary ascidians *Ciona intestinalis* and *Ascidia mentula*, this biotope has a rather barren, pink appearance (due to the encrusting red algae), possibly due to 'grazing' pressure from the sea urchin *Echinus esculentus*. Other organisms found encrusting onto the rocky surface include the polychaete *Pomatoceros triqueter* and the cup coral *Caryophyllia smithii*. Other species occasionally encountered include *Alcyonium digitatum*, *Asterias rubens*, *Pagurus bernhardus*, *Crossaster papposus*, *Antedon bifida* and *Metridium senile*. Crustaceans such as *Munida rugosa* and *Cancer pagurus* may be recorded in crevices. Two variants of this biotope exist; AmenCio.Ant and AmenCio.Bri. AmenCio.Bri occurs where is a dense 'carpet' of brittlestars which sometimes completely cover the rocky substratum. Species present include *Ophiothrix fragilis*, *Ophiocomina nigra* and *Ophiura albida*.

Temporal variation

The abundance of *Ciona intestinalis* tends to fluctuate seasonally, so it may appear absent at a site at one time of year and then be present at other times, visually altering the appearance of the biotope. Other solitary ascidian species such as *Ascidia mentula* and *Ascidella aspersa* tend to be longer-lived (approximately 7 years and 3 years respectively).

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|------------------------------|-------------|--------------------|-----------------------------|
| <i>Alcyonium digitatum</i> | •• | Occasional | 2 |
| <i>Metridium senile</i> | •• | Occasional | 1 |
| <i>Caryophyllia smithii</i> | •• | Occasional | 1 |
| <i>Pomatoceros triqueter</i> | ••• | Frequent | 7 |
| <i>Pagurus bernhardus</i> | ••• | Occasional | 4 |
| <i>Munida rugosa</i> | •• | Occasional | 3 |
| <i>Cancer pagurus</i> | •• | Rare | 1 |
| <i>Antedon bifida</i> | •• | Occasional | 1 |
| <i>Crossaster papposus</i> | ••• | Occasional | 2 |
| <i>Asterias rubens</i> | •••• | Occasional | 6 |
| <i>Ophiothrix fragilis</i> | •••• | Abundant | 15 |
| <i>Ophiocomina nigra</i> | ••• | Common | 10 |
| <i>Ophiura albida</i> | •• | Occasional | 3 |
| <i>Echinus esculentus</i> | •••• | Occasional | 10 |
| <i>Ciona intestinalis</i> | ••• | Occasional | 4 |
| <i>Ascidia mentula</i> | •• | Occasional | 2 |
| Corallinaceae | ••• | Common | 8 |

CR.LCR.BrAs.AmenCio.Ant Solitary ascidians, including *Ascidia mentula* and *Ciona intestinalis* with *Antedon* spp. on wave-sheltered cirralittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed, Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock; boulders |
| Zone: | Cirralittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Biotope description

This variant occurs on cirralittoral, vertical and upward facing bedrock or boulder slopes in generally wave-sheltered conditions (often in sea lochs) with little tidal flow. Apart from the large ascidians, *Ascidia mentula* and *Ciona intestinalis*, the rock surface of this biotope has a rather sparse appearance. 'Grazing' by the sea urchin *Echinus esculentus* leaves only encrusting red algae (giving the bedrock/boulder substratum a pink appearance), cup corals *Caryophyllia smithii* and the polychaete *Pomatoceros triqueter*. There may be a few hydroid species present such as *Nemertesia* spp. and *Kirchenpaueria pinnata*, occasional *Alcyonium digitatum* and occasional *Metridium senile*. The barnacle *Balanus* spp. and the colonial ascidian *Clavelina lepadiformis* also occasionally occur. At some sites, echinoderms such as the crinoid *Antedon* spp., the starfish *Crossaster papposus*, *Asterias rubens* and the brittlestar *Ophiothrix fragilis* may be found. The squat lobster *Munida rugosa* is likely to be found in crevices, under boulders, and the hermit crab *Pagurus bernhardus* may be observed moving around the rock surface. The brachiopod *Neocrania anomala* is frequently observed (especially where this biotope occurs shallower than NeoPro for example). The saddle oyster *Pododesmus patelliformis* may occasionally be seen attached to the rock/boulder face.

Situation

This biotope is typical of one found in sheltered sealochs. On slightly more wave and tide exposed sites, a transition to the more diverse AntAsH biotope will occur. Below AmenCio.Ant, you may find the NeoPro biotope (especially situated on the sills of sealochs).

Temporal variation

The abundance of *Ciona intestinalis* tends to fluctuate seasonally, so it may appear absent at a site at one time of year and then be present at other times, visually altering the appearance of the biotope. Other solitary ascidian species such as *Ascidia mentula* and *Ascidiella aspersa* tend to be longer-lived (approximately 7 years and 3 years respectively).

Similar biotopes

CR.MCR.EcCr.FaAlCr

This biotope is found on more wave-exposed sites subject to moderately strong to weak tidal streams. They occur on similar substratum and appear similar due to their characteristically barren nature. FaAlCr tends to have a higher abundance of *Alcyonium digitatum* than AmenCio.Ant, while the latter instead has a diverse range of solitary ascidians. AmenCio.Ant also tends to appear more 'silty' than FaAlCr.

CR.LCR.BrAs.AntAsH

This biotope occurs at similar depths and conditions as AmenCio.Ant. It tends to be more species rich, with a diverse range of hydroids and echinoderms. Other species such as *Chaetopterus variopedatus* and *Sabella pavonina* may also be present occasionally.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|---------------------------------|--------------------|---------------------------|------------------------------------|
| <i>Kirchenpaueria pinnata</i> | •• | Occasional | 1 |
| <i>Nemertesia antennina</i> | •• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | •• | Occasional | 2 |
| <i>Metridium senile</i> | •• | Occasional | 2 |
| <i>Caryophyllia smithii</i> | ••• | Occasional | 5 |
| <i>Pomatoceros triqueter</i> | •••• | Frequent | 10 |
| <i>Balanus crenatus</i> | •• | Occasional | 1 |
| <i>Pagurus bernhardus</i> | •• | Occasional | 2 |
| <i>Munida rugosa</i> | ••• | Occasional | 5 |
| <i>Pododesmus patelliformis</i> | •• | Frequent | 1 |
| <i>Neocrania anomala</i> | •• | Frequent | 1 |
| <i>Antedon bifida</i> | ••• | Occasional | 4 |
| <i>Antedon petasus</i> | •• | Frequent | 2 |
| <i>Crossaster papposus</i> | •• | Occasional | 2 |
| <i>Asterias rubens</i> | ••• | Occasional | 6 |
| <i>Ophiothrix fragilis</i> | •• | Occasional | 2 |
| <i>Echinus esculentus</i> | ••••• | Occasional | 12 |
| <i>Clavelina lepadiformis</i> | ••• | Occasional | 2 |
| <i>Ciona intestinalis</i> | •••• | Frequent | 9 |
| <i>Ascidia mentula</i> | ••• | Frequent | 6 |
| Corallinaceae | ••• | Common | 7 |

CR.LCR.BrAs.AmenCio.Bri Dense brittlestars with sparse *Ascidia mentula* and *Ciona intestinalis* on sheltered circalittoral mixed substrata

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed, Sheltered, Very sheltered |
| Tidal streams: | Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulders; cobbles; gravel; sand; mud |
| Zone: | Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Biotope description

This biotope is typically found on predominantly wave-sheltered (although may be found in wave-exposed through to extremely wave-sheltered sites) circalittoral mixed substrata (Bedrock, boulders, cobbles, pebbles and gravel), subject to moderately strong to weak tidal streams. This biotope often has a silty appearance in parallel with AmenCio.Ant but is characterised by a dense carpet of brittlestars (*Ophiothrix fragilis*, *Ophiocomina nigra* and to a lesser extent *Ophiura albida*) which virtually cover seabed. Where the underlying substratum is visible, pink coralline crusts and the white calcareous tubes of the keelworm *Pomatoceros triqueter* are often observed. Hydroids and bryozoans are scarce perhaps partly due to the smothering effect of the brittlestars and possibly due to the grazing pressure of the sea urchin *Echinus esculentus* which is occasionally recorded. Other echinoderms present include *Asterias rubens* and *Crossaster papposus*. The solitary ascidian *Ciona intestinalis* may be seen attached to isolated rocks and boulders, whilst on the tops and sides of larger boulders, dead man's fingers *Alcyonium digitatum* may be recorded. The hermit crab *Pagurus bernhardus* is often recorded whilst under boulders and in crevices, the claws belonging to the long-clawed squat lobster *Munida rugosa* may be seen.

Situation

AmenCio.Bri is found in predominantly sheltered areas, so in the infralittoral zone above, kelp forest formed by dense *Laminaria saccharina* and cape-form *Laminaria hyperborea* are frequently recorded. A dense understory of red algae is also present.

Temporal variation

Not known

Similar biotopes

| | |
|------------------------|--|
| CR.MCR.BrAs.FaAlCr.Bri | This biotope occurs on more wave-exposed mixed substratum, subject to varying amounts of tide. Tends to have similar species diversity as AmenCio.Bri, but delicate hydroids have been replaced by more robust species such as <i>Abietinaria abietina</i> . Occasionally, bryozoan crusts may be present in FaAlCr.Bri. |
|------------------------|--|

Characterising species

| | % Frequency | Abundance (SACFOR) | % Contribution to similarity |
|------------------------------|-------------|--------------------|------------------------------|
| <i>Alcyonium digitatum</i> | ●●● | Occasional | 1 |
| <i>Pomatoceros triqueter</i> | ●●● | Frequent | 3 |
| <i>Pagurus bernhardus</i> | ●●● | Occasional | 4 |
| <i>Munida rugosa</i> | ●● | Occasional | 1 |
| <i>Crossaster papposus</i> | ●●● | Occasional | 2 |

| | | | |
|----------------------------|-------|------------|----|
| <i>Asterias rubens</i> | ●●●● | Occasional | 4 |
| <i>Ophiothrix fragilis</i> | ●●●●● | Abundant | 27 |
| <i>Ophiocomina nigra</i> | ●●●●● | Common | 21 |
| <i>Ophiura albida</i> | ●●● | Frequent | 4 |
| <i>Echinus esculentus</i> | ●●●● | Occasional | 6 |
| <i>Ciona intestinalis</i> | ●● | Occasional | 1 |
| Corallinaceae | ●●● | Frequent | 7 |

CR.LCR.BrAs.LgAsSp Large solitary ascidians and erect sponges on wave-sheltered circalittoral rock

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Strong, Moderately strong, Weak, Very weak |
| Substratum: | Bedrock; boulders |
| Zone: | Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Biotope description

This biotope is typically found on silty circalittoral bedrock and boulders in wave-sheltered channels subject to varying amounts of tidal flow. These fully marine inlets and channels have steep, often vertical sides with small terraces or ledges. This biotope, characterised by erect sponges and large solitary ascidians, appears to be biologically diverse. A diverse ascidian fauna is generally present, including *Ascidia mentula*, *Aplidium punctum*, *Corella parallelogramma*, *Ascidia virginea*, *Botryllus schlosseri*, *Clavelina lepadiformis* and *Ciona intestinalis*. An equally diverse sponge fauna, with massive erect sponges particularly noticeable, compliments these species. Dominant species include *Esperiopsis fucorum*, *Dysidea fragilis*, *Tethya aurantium*, *Polymastia boletiformis*, *Raspailia ramosa*, *Stelligera stuposa*, *Polymastia mamillaris* and *Pachymatisma johnstonia*. Other sponges present are *Suberites carnosus*, *Haliclona fistulosa*, *Stelligera rigida*, *Mycale rotalis*, *Haliclona simulans*, *Iophon hyndmani* and *Hemimycale columella*. Various sponge crusts may also be present but in most cases in lower abundances. Other significant components of the community include the cup coral *Caryophyllia smithii* and various echinoderms, including the sea urchin *Echinus esculentus* and the starfish *Henricia oculata* and *Marthasterias glacialis*. Small isolated clumps of *Nemertesia antennina* and individual *Alcyonium digitatum* may be seen, whilst the top shell *Calliostoma zizyphinum* may also be present. At present, there are relatively few records in this biotope, as it is only reported from around the south-western coast of Ireland, where sponge diversity is very high.

Situation

Due to the sheltered nature of the biotope, LgAsSp is usually situated as bedrock/boulder outcrops associated with mud slopes and plains. Typical species found within these circalittoral muds include the seapen *Virgularia mirabilis* and the anemone *Pachycerianthus multiplicatus*. In the infralittoral zone, sheltered kelp biotopes such as SS.SMp.KSwSS.LsacX with *Laminaria saccharina* occur frequently. In areas where there is a slightly stronger tidal-stream, the circalittoral muddy plains become more muddy gravel plains and slopes. Typical species found within these habitats include the anemones *Mesacmaea mitchellii* and *Aureliana heterocera*. When tidal-streams becomes negligible, but with similar wave-sheltered conditions, you tend to find CarSwi.Aglo biotopes occurring, especially in the same geographical location (around south-west/west Ireland) as LgAsSp.

Temporal variation

Not known

Similar biotopes

CR.LCR.BrAs.AmenCio.Ant

This biotope is found under similar silty, wave-sheltered conditions as LgAsSp but with negligible tidal streams. Found in sheltered sealochs, there is an impoverished faunal component with solitary ascidians dominating. It lacks the diverse sponge component which is characteristic of LgAsSp.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|--------------------------------|--------------------|---------------------------|------------------------------------|
| PORIFERA | •• | Frequent | 1 |
| <i>Pachymatisma johnstonia</i> | •••• | Frequent | 3 |
| <i>Tethya aurantium</i> | •••• | Frequent | 4 |
| <i>Suberites carnosus</i> | ••• | Frequent | 2 |
| <i>Polymastia boletiformis</i> | •••• | Frequent | 4 |
| <i>Polymastia mamillaris</i> | •••• | Frequent | 3 |
| <i>Stelligera rigida</i> | ••• | Frequent | 2 |
| <i>Stelligera stuposa</i> | •••• | Occasional | 3 |
| <i>Raspailia ramosa</i> | •••• | Frequent | 4 |
| <i>Mycale rotalis</i> | ••• | Frequent | 2 |
| <i>Esperiopsis fucorum</i> | ••••• | Frequent | 7 |
| <i>Iophon hyndmani</i> | ••• | Occasional | 2 |
| <i>Hemimycale columella</i> | ••• | Occasional | 1 |
| <i>Haliclona fistulosa</i> | ••• | Occasional | 2 |
| <i>Haliclona simulans</i> | ••• | Frequent | 2 |
| <i>Dysidea fragilis</i> | •••• | Frequent | 5 |
| <i>Nemertesia antennina</i> | ••• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ••• | Occasional | 1 |
| <i>Caryophyllia smithii</i> | •••• | Frequent | 3 |
| <i>Calliostoma zizyphinum</i> | ••• | Occasional | 1 |
| <i>Henricia oculata</i> | ••••• | Occasional | 4 |
| <i>Marthasterias glacialis</i> | ••• | Occasional | 2 |
| <i>Echinus esculentus</i> | •••• | Occasional | 2 |
| <i>Clavelina lepadiformis</i> | ••• | Occasional | 2 |
| <i>Aplidium punctum</i> | •••• | Frequent | 4 |
| <i>Ciona intestinalis</i> | ••• | Occasional | 1 |
| <i>Corella parallelogramma</i> | ••• | Common | 3 |
| <i>Ascidia mentula</i> | ••••• | Common | 7 |
| <i>Ascidia virginea</i> | ••• | Common | 3 |
| <i>Botryllus schlosseri</i> | •••• | Occasional | 2 |

CR.LCR.BrAs.AntAsH *Antedon* spp., solitary ascidians and fine hydroids on sheltered circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock; boulders |
| Zone: | Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Biotope description

This biotope is typically found on a silty boulder/rock slope, in the sheltered parts of sealochs, subject to slight tidal currents. The seabed consists of smooth, silty bedrock or boulders, often as outcrops on mixed muddy sediment. There are often small vertical faces on the sides of rock ridges, and at few sites, there may be more extensive steep or vertical bedrock. In sharp contrast to the barren, grazed appearance of AmenCio.Ant, the species composition of AntAsH is quite diverse, although no one phyla dominates. A wide range of encrusting species may be found, including the brachiopod *Neocrania anomala*, the saddle oyster *Pododesmus patelliformis*, encrusting red algae and the polychaetes (*Pomatoceros triqueter* and *Protula tubularia*). Other conspicuous species include crinoids on the tops of boulders (*Antedon bifida*, commoner in shallower water and *Antedon petasus*, commoner in deeper water), scattered solitary and colonial ascidians (*Ascidia mentula*, *Ascidia virginea*, *Corella parallelogramma*, *Clavelina lepadiformis* and *Ciona intestinalis*) and tufts of fine hydroids (*Kirchenpaueria pinnata*, *Nemertesia antennina*, *Obelia dichotoma* and *Halceum halecinum*). The cup coral *Caryophyllia smithii* and the crustose bryozoan *Parasmittina trispinosa* are all typically present, as are a wide range of echinoderms, including the sea urchin *Echinus esculentus*, the starfish *Asterias rubens* and *Crossaster papposus*, and the brittlestars *Ophiothrix fragilis* and *Ophiura albida*. Other species recorded are the squat lobster *Munida rugosa*, the hermit crab *Pagurus bernhardus* and the chiton *Tonicella marmorea*.

Situation

The range of biotopes shallower and deeper than AntAsH is typical of a sheltered sealoch. Silted kelp biotopes (e.g. LhypLsac, Lsac) are typically found shallower than AntAsH in the infralittoral zone. Deeper than AntAsH, the boulder slope typically grades into a muddy slope/plain (SS.SMu.CMu or SS.SMx.CMx), along with fauna commonly associated with soft-sediments (e.g. seapens and the mud snail *Turritella*).

Temporal variation

Not known

Similar biotopes

CR.FCR.FaV.Ant Ant tends to be shallower and is generally species-poor with more grazed crustose species on vertical rock.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-------------------------------|-------------|--------------------|-----------------------------|
| <i>Halceum halecinum</i> | ●●● | Occasional | 2 |
| <i>Kirchenpaueria pinnata</i> | ●●●● | Frequent | 3 |

| | | | |
|---------------------------------|-------|------------|---|
| <i>Nemertesia ramosa</i> | ••• | Occasional | 1 |
| <i>Obelia dichotoma</i> | ••• | Occasional | 1 |
| <i>Caryophyllia smithii</i> | •••• | Occasional | 2 |
| <i>Pomatoceros triqueteter</i> | ••••• | Frequent | 7 |
| <i>Protula tubularia</i> | •••• | Occasional | 2 |
| <i>Pagurus bernhardus</i> | •••• | Occasional | 3 |
| <i>Munida rugosa</i> | ••••• | Frequent | 5 |
| <i>Tonicella marmorea</i> | ••• | Occasional | 1 |
| <i>Pododesmus patelliformis</i> | ••• | Occasional | 1 |
| <i>Neocrania anomala</i> | •••• | Frequent | 3 |
| <i>Parasmittina trispinosa</i> | ••• | Occasional | 1 |
| <i>Antedon bifida</i> | •••• | Occasional | 2 |
| <i>Antedon petasus</i> | •••• | Occasional | 2 |
| <i>Crossaster papposus</i> | •••• | Rare | 1 |
| <i>Asterias rubens</i> | ••••• | Occasional | 5 |
| <i>Ophiothrix fragilis</i> | •••• | Occasional | 3 |
| <i>Ophiura albida</i> | •••• | Occasional | 2 |
| <i>Echinus esculentus</i> | ••••• | Occasional | 5 |
| <i>Clavelina lepadiformis</i> | ••• | Occasional | 2 |
| <i>Ciona intestinalis</i> | •••• | Frequent | 4 |
| <i>Corella parallelogramma</i> | ••••• | Occasional | 4 |
| <i>Ascidia mentula</i> | ••••• | Occasional | 6 |
| <i>Ascidia virginea</i> | •••• | Occasional | 2 |
| Corallinaceae | •••• | Common | 6 |

CR.LCR.BrAs.NeoPro *Neocrania anomala* and *Protanthea simplex* on low energy cirralittoral rock

Habitat classification

| | |
|-----------------|---|
| Salinity: | Full (30-35ppt), Variable (18-35ppt) |
| Wave exposure: | Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock; boulders |
| Zone: | Cirralittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |
| Other features: | Steep slopes |

Biotope description

This biotope typically occurs in full to variable salinity conditions on very wave-sheltered cirralittoral bedrock and boulder slopes subject to negligible tidal streams (this tends to be in the landward, very sheltered basins of fjordic sealochs). This biotope is characterised by often dense populations of the anemone *Protanthea simplex*, growing on the silty bedrock. The underlying rock surfaces are usually covered by encrusting red algae, the polychaete *Pomatoceros triqueter*, the brachiopods *Neocrania anomala* and *Terebratulina retusa*, the saddle oyster *Pododesmus patelliformis* and the polychaete *Sabella pavonina*. Scattered colonies of *Alcyonium digitatum* and the hydroid *Bougainvillia ramosa* may occasionally be recorded. A diverse range of ascidians including *Ciona intestinalis*, *Ascidia mentula*, *Corella parallelogramma*, *Ascidia virginea*, *Polycarpa pomaria* and *Dendrodoa grossularia* are also occasionally recorded. Echinoderms such as the common brittlestar *Ophiothrix fragilis* are frequently reported with their arms protruding from crevices in the rock, whilst the starfish *Asterias rubens*, *Henricia oculata*, and the sea urchin *Echinus esculentus* and *Psammechinus miliaris* are occasionally found on the boulder/rock surface. The whelk *Buccinum undatum* is often present but in very low numbers. The squat lobster *Munida rugosa* may be seen hiding in crevices. The hermit crab *Pagurus bernhardus* may also be recorded.

Temporal variation

Not known

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|---------------------------------|-------------|--------------------|-----------------------------|
| <i>Bougainvillia ramosa</i> | •• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | •• | Occasional | 1 |
| <i>Protanthea simplex</i> | •••• | Common | 7 |
| <i>Sabella pavonina</i> | •••• | Occasional | 4 |
| <i>Pomatoceros triqueter</i> | •••• | Frequent | 10 |
| <i>Pagurus bernhardus</i> | ••• | Occasional | 2 |
| <i>Munida rugosa</i> | ••• | Occasional | 2 |
| <i>Buccinum undatum</i> | ••• | Rare | 2 |
| <i>Pododesmus patelliformis</i> | ••• | Occasional | 4 |
| <i>Neocrania anomala</i> | •••• | Frequent | 10 |
| <i>Terebratulina retusa</i> | •• | Occasional | 1 |
| <i>Henricia</i> | •• | Rare | 1 |
| <i>Asterias rubens</i> | ••• | Occasional | 3 |
| <i>Ophiothrix fragilis</i> | ••• | Occasional | 3 |
| <i>Psammechinus miliaris</i> | ••• | Occasional | 3 |
| <i>Echinus esculentus</i> | ••• | Rare | 2 |

| | | | |
|--------------------------------|------|------------|---|
| <i>Ciona intestinalis</i> | •••• | Occasional | 6 |
| <i>Corella parallelogramma</i> | •••• | Occasional | 4 |
| <i>Ascidia mentula</i> | •••• | Occasional | 5 |
| <i>Ascidia virginea</i> | ••• | Occasional | 3 |
| <i>Polycarpa pomaria</i> | ••• | Occasional | 2 |
| <i>Dendrodoa grossularia</i> | •• | Common | 2 |
| Corallinaceae | ••• | Common | 6 |

CR.LCR.BrAs.NeoPro.FS *Neocrania anomala* and *Protanthea simplex* on very wave-sheltered circalittoral rock

Habitat classification

| | |
|-----------------|---|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock; boulders |
| Zone: | Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |
| Other features: | Steep, often near vertical slopes |

Biotope description

This variant typically occurs on deep, lower circalittoral bedrock/boulder slopes (often-vertical walls) in the landward, very sheltered basins of fjordic sealochs. In these very sheltered conditions, there are frequently dense populations of the anemone *Protanthea simplex* growing on the silty boulder/rock slope, and on the tubes of the parchment worm *Chaetopterus variopedatus*. The underlying rock surfaces are usually covered with encrusting red algae, the polychaete *Pomatoceros triqueter*, the brachiopod *Neocrania anomala*, the saddle oyster *Pododesmus patelliformis* and the conspicuous fan worm *Sabella pavanina*. Scattered colonies of *Alcyonium digitatum* are occasionally present along with the hydroid *Bougainvillia ramosa*. The barnacle *Balanus balanus* and the hermit crab *Pagurus bernhardus* is occasionally seen on boulder/rock surface, whilst underneath in crevices, the squat lobster *Munida rugosa* may be present. A diverse range of solitary ascidians, typically found in sheltered conditions, are often present including *Ciona intestinalis*, *Corella parallelogramma*, *Polycarpa pomaria*, *Ascidia mentula* and *Ascidia virginea*. Echinoderms such as brittlestars *Ophiothrix fragilis* are frequently seen with their arms protruding from crevices in the rock, whilst the starfish *Asterias rubens*, the sea urchin *Echinus esculentus* and *Psammechinus miliaris* are occasionally found on the boulder/rock surface. The whelk *Buccinum undatum* is often present but in very low numbers.

Situation

Where this biotope occurs on vertical rock cliffs, you tend to find silted sugar kelp *Laminaria saccharina* communities above NeoPro, in the infralittoral zone (Lsac). Where NeoPro occurs on a rock/boulder slope and due to the very sheltered nature of the habitat, it is common to find a mud plain community where slope ends (SS.SMu.CMu). Species such as the seapen *Funiculina quadrangularis*, the anemone *Cerianthus lloydii* and the Norway lobster *Nephrops norvegicus* are typically abundant.

Temporal variation

Not known

Similar biotopes

CR.LCR.BrAs.AntAsH

This biotope is found under slightly more exposed conditions and tends to have a more diverse range of cnidarians and echinoderms than NeoPro.FS. In AntAsH, *Antedon* spp. are occasionally recorded but absent in NeoPro.FS.

CR.LCR.BrAs.NeoPro.VS

This sub-biotope is found under similar physical conditions as NeoPro.FS, but is only found in stable, reduced salinity environments. The ascidian *Dendrodoa grossularia* is commonly recorded in this sub-biotope, but is absent in NeoPro.FS. However, the anemone *Protanthea simplex* is recorded in higher abundances in NeoPro.FS.

Characterising species

| | <i>% Frequency</i> | <i>Abundance (SACFOR)</i> | <i>%Contribution to similarity</i> |
|---------------------------------|--------------------|---------------------------|------------------------------------|
| <i>Bougainvillia ramosa</i> | •• | Occasional | 1 |
| <i>Alcyonium digitatum</i> | ••• | Occasional | 1 |
| <i>Protanthea simplex</i> | •••• | Common | 9 |
| <i>Sabella pavonina</i> | •••• | Occasional | 4 |
| <i>Pomatoceros triqueter</i> | ••••• | Frequent | 12 |
| <i>Balanus balanus</i> | •• | Occasional | 1 |
| <i>Pagurus bernhardus</i> | ••• | Occasional | 1 |
| <i>Munida rugosa</i> | ••• | Occasional | 2 |
| <i>Buccinum undatum</i> | ••• | Rare | 1 |
| <i>Pododesmus patelliformis</i> | •••• | Occasional | 6 |
| <i>Neocrania anomala</i> | •••• | Frequent | 9 |
| <i>Asterias rubens</i> | •••• | Occasional | 4 |
| <i>Ophiothrix fragilis</i> | •••• | Frequent | 4 |
| <i>Psammechinus miliaris</i> | •••• | Occasional | 4 |
| <i>Echinus esculentus</i> | •••• | Rare | 3 |
| <i>Ciona intestinalis</i> | •••• | Occasional | 5 |
| <i>Corella parallelogramma</i> | ••• | Occasional | 2 |
| <i>Ascidia mentula</i> | •••• | Occasional | 6 |
| <i>Ascidia virginea</i> | ••• | Rare | 2 |
| <i>Polycarpa pomaria</i> | ••• | Occasional | 2 |
| Corallinaceae | •••• | Common | 7 |

CR.LCR.BrAs.NeoPro.VS *Neocrania anomala*, *Dendrodoa grossularia* and *Sarcodictyon roseum* on variable salinity circalittoral rock

Habitat classification

| | |
|----------------|---|
| Salinity: | Variable (18-35ppt), Reduced (18-30ppt), Low (<18ppt) |
| Wave exposure: | Sheltered, Very sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock; boulders |
| Zone: | Circalittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m, 30-50 m |

Biotope description

This variant typically occurs on lower circalittoral silty, bedrock/boulder cliffs and ridges in very wave-sheltered fjordic sealochs subjected to variable salinity regimes (such as Loch Etive). In these sheltered conditions, there are frequently dense populations of the ascidian *Dendrodoa grossularia*, the brachiopod *Neocrania anomala* and to a lesser extent, the brachiopod *Terebratulina retusa*, which are able to tolerate the variable salinity. Other solitary ascidians that may be present include *Ciona intestinalis*, *Corella parallelogramma*, *Asciadiella scabra*, *Ascidia mentula*, *Ascidia virginea* and *Polycarpa pomaria*. The anemone *Protanthea simplex* is occasionally seen, although to a lesser extent than in NeoPro, possibly due to the variable salinity. The hydroids *Bougainvillia ramosa* and *Lafoea dumosa*, the cup-coral *Caryophyllia smithii* and *Sarcodictyon roseum* are occasionally present. The tubes formed by the polychaete *Sabella pavonina* may be observed standing erect from the rock surface. The rest of the rock surface is usually covered by encrusting red algae and the polychaete *Pomatoceros triqueter* and *Protula tubularia*. The sea cucumber *Psolus phantapus* may be found on the underside of boulders. Other species such as the hermit crab *Pagurus bernhardus* and the spider crab *Hyas araneus* may be found amongst the rock/boulders. The starfish *Asterias rubens*, *Crossaster papposus*, and *Henricia* spp. and the sea urchin *Psammechinus miliaris* are also recorded within this variant. The relatively 'bare', silty rock supports low numbers of a relatively few species. Although 'barren' rock grazed by the sea urchin *Echinus esculentus* is found in other sea loch biotopes (see FaAlCr.Pom and FaAlCr.Car), *E.esculentus* is virtually absent within NeoPro.VS.

Situation

Due to the variable/reduced salinity conditions present where this biotope is found, you tend to find reduced salinity kelp biotopes above NeoPro.RS, such as LsacRS.Psa and LsacRS.Phy. The very sheltered conditions give rise to muddy sediment slopes/plains beneath NeoPro (SS.SMu.CMu) where species such as the seapen *Funiculina quadrangularis*, the anemone *Cerianthus lloydii* and the Norway lobster *Nephrops norvegicus* are typically abundant.

Temporal variation

Not known

Similar biotopes

CR.LCR.BrAs.NeoPro.FS

This sub-biotope is found under similar physical conditions as NeoPro.RS, but is only in the fully marine, sheltered basins of fjordic sealochs. The ascidian *Dendrodoa grossularia* is absent in this sub-biotope, but is commonly recorded in NeoPro.RS. However, the anemone *Protanthea simplex* is recorded in higher abundances in NeoPro.FS.

Characterising species

% Frequency Abundance (SACFOR) %Contribution

| | | | <i>to similarity</i> |
|--------------------------------|------|------------|----------------------|
| <i>Bougainvillia ramosa</i> | ••• | Occasional | 2 |
| <i>Lafoea dumosa</i> | •• | Occasional | 2 |
| <i>Sarcodictyon roseum</i> | ••• | Occasional | 2 |
| <i>Protanthea simplex</i> | ••• | Occasional | 3 |
| <i>Caryophyllia smithii</i> | •• | Occasional | 1 |
| <i>Sabella pavonina</i> | ••• | Occasional | 3 |
| <i>Pomatoceros triqueter</i> | ••• | Frequent | 4 |
| <i>Protula tubularia</i> | •• | Occasional | 1 |
| <i>Pagurus bernhardus</i> | ••• | Occasional | 2 |
| <i>Hyas araneus</i> | •• | Rare | 1 |
| <i>Buccinum undatum</i> | ••• | Rare | 3 |
| <i>Neocrania anomala</i> | •••• | Frequent | 10 |
| <i>Terebratulina retusa</i> | ••• | Occasional | 2 |
| <i>Crossaster papposus</i> | ••• | Occasional | 2 |
| <i>Henricia oculata</i> | •• | Rare | 1 |
| <i>Asterias rubens</i> | ••• | Occasional | 1 |
| <i>Psammechinus miliaris</i> | •• | Occasional | 1 |
| <i>Psolus phantapus</i> | ••• | Occasional | 2 |
| <i>Ciona intestinalis</i> | •••• | Occasional | 6 |
| <i>Corella parallelogramma</i> | •••• | Occasional | 6 |
| <i>Ascidella scabra</i> | ••• | Occasional | 3 |
| <i>Ascidia mentula</i> | ••• | Occasional | 3 |
| <i>Ascidia virginea</i> | ••• | Frequent | 5 |
| <i>Polycarpa pomaria</i> | ••• | Frequent | 2 |
| <i>Dendrodoa grossularia</i> | ••• | Common | 14 |
| Corallinaceae | •• | Frequent | 2 |

CR.FCR

Features on circalittoral rock

Habitat classification

| | |
|-----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Very exposed, Exposed, Moderately exposed, Sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |
| Other features: | Caves, overhanging rock |

Biotope description

Circalittoral rock features include circalittoral fouling communities and circalittoral caves and overhangs. These features are present throughout the circalittoral zone in a variety of wave exposures and tidal streams.

CR.FCR.Cv Caves and overhangs (deep)

Habitat classification

| | |
|-----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Very exposed, Exposed, Moderately exposed, Sheltered |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Circalittoral |
| Depth band: | 10-20 m, 20-30 m, 30-50 m |
| Other features: | Caves, overhanging rock |

Biotope description

Caves and overhanging rock in the circalittoral zone, away from significant influence of strong wave action (compare IR.FIR.SG). This habitat may be colonised by a wide variety of species, with sponges such as *Dercitus bucklandi*, anemones *Parazoanthus* spp. and the cup corals *Caryophyllia inornatus*, *Hoplangia durotrix* and others particularly characteristic.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-------------------------------|-------------|--------------------|-----------------------------|
| <i>Porifera indet crusts</i> | ●●● | Occasional | - |
| <i>Alcyonium glomeratum</i> | ●●● | Rare | - |
| <i>Corynactis viridis</i> | ●●● | Frequent | - |
| <i>Caryophyllia smithii</i> | ●●●● | Common | - |
| <i>Hoplangia durotrix</i> | ●● | Rare | - |
| <i>Balanophyllia regia</i> | ●● | Common | - |
| <i>Leptopsammia pruvoti</i> | ●● | Common | - |
| Crisiidae | ●●● | Common | - |
| <i>Bryozoa indet crusts</i> | ●●● | Frequent | - |
| <i>Clavelina lepadiformis</i> | ●●● | Occasional | - |

CR.FCR.Cv.SpCup Sponges, cup corals and anthozoans on shaded or overhanging circalittoral rock

Habitat classification

| | |
|-----------------|-----------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Exposed, Moderately exposed |
| Tidal streams: | Weak, Very weak |
| Substratum: | Bedrock |
| Zone: | Circalittoral |
| Other features: | Overhangs; caves |

Previous code

CR.MCR.SCupPar 96.7

Biotope description

This biotope occurs on shaded and overhanging rock, such as on cave walls and ceilings although there are very few records of caves in conditions not subject to wave surge (i.e. deeper circalittoral habitats) and almost all are different in species composition. There are also a few examples of similar communities on very deep (70-100 m+) upward facing rock (in Loch Hourn) and more may be found though the use of ROVs. These often species-rich habitats are almost invariably adjacent to well-mixed turbulent water. Characteristic species include the sponges *Stryphnus ponderosus*, *Dercitus bucklandi*, *Chelonaplysilla noevus*, *Pseudosuberites* sp. and *Spongisorites* sp., the anemones *Parazoanthus* spp., the cup corals *Leptopsammia pruvoti*, *Hoplangia durotrix*, *Caryophyllia inornatus* and the soft coral *Parerythropodium coralloides*. *Thymosia guernei* is sometimes present. This biotope is likely to need further splitting with further data and analysis.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-------------------------------------|-------------|--------------------|-----------------------------|
| <i>Clathrina coriacea</i> | ●●● | Common | - |
| <i>Dercitus bucklandi</i> | ●● | Common | - |
| <i>Stelletta grubii</i> | ●●● | Common | - |
| <i>Stryphnus ponderosus</i> | ● | Occasional | - |
| <i>Thymosia guernei</i> | ● | Occasional | - |
| <i>Spongisorites</i> | ● | Occasional | - |
| <i>Parerythropodium coralloides</i> | ●●● | Abundant | - |
| <i>Parazoanthus axinellae</i> | ●● | Occasional | - |
| <i>Parazoanthus anguicomus</i> | ●● | Occasional | - |
| <i>Caryophyllia smithii</i> | ●●● | Occasional | - |
| <i>Hoplangia durotrix</i> | ●● | Occasional | - |
| <i>Leptopsammia pruvoti</i> | ●● | Occasional | - |
| <i>Parablemmius gattorugine</i> | ●● | Occasional | - |
| <i>Thorogobius ephippiatus</i> | ●●● | Occasional | - |

CR.FCR.FouFa Fouling faunal communities

Habitat classification

| | |
|----------------|--|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Moderately strong |
| Substratum: | Artificial |
| Zone: | Circolittoral - lower |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Biotope description

This biotope complex contains two biotopes which, although have different physical habitat characteristics, share the fact that they colonise 'new' areas of artificial substrata relatively quickly. The *Asciidiella aspersa* 'fouling' biotope (Aasp) is found on wave-sheltered artificial substratum such as discarded fishing nets/mooring lines subject to moderately strong to weak tidal streams. A separate 'fouling' biotope (AdigMsen) was identified on moderately wave-exposed wrecks, subject to moderately strong to weak tidal streams. This biotope has a characteristic faunal community of *Alcyonium digitatum* and the anemone *Metridium senile*. Other species recorded in this complex (primarily under the AdigMsen biotope) include the hydroid *Nemertesia antennina*, the anemones *Actinothoe sphyrodeta* and *Sagartia elegans*, the cup coral *Caryophyllia smithii*, the bryozoans *Flustra foliacea* and *Bugula plumosa*, the crabs *Necora puber*, *Cancer pagurus* and *Maja squinado* and the lobster *Homarus gammarus*.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|------------------------------|-------------|--------------------|-----------------------------|
| <i>Nemertesia antennina</i> | •• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | •••• | Occasional | 15 |
| <i>Metridium senile</i> | •••• | Frequent | 23 |
| <i>Sagartia elegans</i> | •• | Frequent | 1 |
| <i>Actinothoe sphyrodeta</i> | ••• | Occasional | 5 |
| <i>Caryophyllia smithii</i> | •• | Occasional | 1 |
| <i>Homarus gammarus</i> | •• | Rare | 1 |
| <i>Maja squinado</i> | •• | Occasional | 5 |
| <i>Cancer pagurus</i> | ••• | Rare | 7 |
| <i>Necora puber</i> | •••• | Rare | 12 |
| <i>Flustra foliacea</i> | •• | Occasional | 2 |
| <i>Bugula plumosa</i> | • | Occasional | 2 |
| <i>Asciidiella aspersa</i> | •• | Frequent | 8 |

CR.FCR.FouFa.AdigMsen *Alcyonium digitatum* and *Metridium senile* on moderately wave-exposed circalittoral steel wrecks

Habitat classification

| | |
|----------------|-------------------------|
| Salinity: | Full (30-35ppt) |
| Wave exposure: | Moderately exposed |
| Tidal streams: | Moderately strong, Weak |
| Substratum: | Artificial; wrecks |
| Zone: | Circalittoral - lower |
| Depth band: | 10-20 m, 20-30 m |

Biotope description

This biotope is found on moderately wave-exposed circalittoral steel wrecks that are subject to moderately strong to weak tidal streams. The vertical and upward facing sides of the wreck stand proud of the seabed, and may be colonised by dense aggregations of *Alcyonium digitatum*, *Metridium senile* and *Actinothoe sphyrodeta*. *Caryophyllia smithii* and *Corynactis viridis* are also recorded with varying abundance. A mixed faunal turf may also be present on the vertical sides, with *Nemertesia antennina*, *Flustra foliacea* and *Bugula plumosa*. Where tidal stream strength is elevated, for example if the wreck is situated in a straight or sound, the hydroid *Tubularia indivisa* may prevail. Crustaceans such as the crabs *Necora puber*, *Maja squinado* and *Cancer pagurus*, the lobster *Homarus gammarus* and barnacles are all recorded. The top shell *Calliostoma zizyphinum* is also recorded.

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|-------------------------------|-------------|--------------------|-----------------------------|
| HYDROZOA | •• | Frequent | 4 |
| <i>Tubularia indivisa</i> | • | Common | 2 |
| <i>Nemertesia antennina</i> | •• | Occasional | 2 |
| <i>Alcyonium digitatum</i> | ••••• | Occasional | 24 |
| <i>Metridium senile</i> | •••• | Common | 16 |
| <i>Actinothoe sphyrodeta</i> | •••• | Occasional | 8 |
| <i>Corynactis viridis</i> | •• | Occasional | 1 |
| <i>Caryophyllia smithii</i> | •• | Occasional | 2 |
| CIRRIPEDIA | •• | Frequent | 3 |
| <i>Homarus gammarus</i> | •• | Rare | 2 |
| <i>Maja squinado</i> | ••• | Occasional | 8 |
| <i>Cancer pagurus</i> | •••• | Rare | 7 |
| <i>Necora puber</i> | •••• | Present | 10 |
| <i>Calliostoma zizyphinum</i> | •• | Occasional | 1 |
| <i>Flustra foliacea</i> | •• | Occasional | 3 |
| <i>Bugula plumosa</i> | • | Frequent | 1 |

CR.FCR.FouFa.Aasp *Ascidella aspersa* fouling community on circalittoral artificial substrata

Habitat classification

| | |
|----------------|---|
| Salinity: | Full (30-35ppt), Variable (18-35ppt) |
| Wave exposure: | Sheltered, Very sheltered, Extremely sheltered, Ultra sheltered |
| Tidal streams: | Moderately strong, Very weak |
| Substratum: | Artificial; other |
| Zone: | Circalittoral |
| Depth band: | 5-10 m, 10-20 m, 20-30 m |

Biotope description

Sheltered artificial substrata (typically discarded fishing nets or scrap metal on muddy sediment plains), sometimes subject to variable salinity, frequently with high numbers of the ascidian *Ascidella aspersa* which is capable of rapidly colonising hard substrata. Other species that are quickly able to take advantage of such substrata include the dahlia anemone *Urticina felina* and the plumose anemone *Metridium senile*. Species such as edible crab *Cancer pagurus*, velvet swimming crab *Necora puber* and shore crab *Carcinus maenas* may occasionally be found hiding under the discarded nets/lobster pots/anchor chains.

Situation

As a fouling community, this biotope may be found throughout the circalittoral zone in coastal waters. It may be more prevalent around harbours/moorings/fishing grounds where suitable substratum is available. In situations where wave exposure or tidal stream increases, biotopes dominated by bryozoans and/or robust hydroids (CR.MCR.EcCr) may arise.

Temporal variation

A gradual development of more long-lived species is expected, where the artificial substrata are of a more permanent nature (eg wooden, concrete pier pilings).

Similar biotopes

| | |
|-------------------|---|
| SS.SBR.Oy | Can have similar epifaunal communities. |
| SS.SMx.CMx.CreAph | Can have similar epifaunal communities. |

Characterising species

| | % Frequency | Abundance (SACFOR) | %Contribution to similarity |
|--------------------------|-------------|--------------------|-----------------------------|
| <i>Urticina felina</i> | ●●● | Rare | 2 |
| <i>Metridium senile</i> | ●●●● | Occasional | 19 |
| <i>Cancer pagurus</i> | ●●● | Rare | 2 |
| <i>Necora puber</i> | ●●● | Occasional | 6 |
| <i>Carcinus maenas</i> | ●●● | Occasional | 3 |
| <i>Ascidella aspersa</i> | ●●●●● | Frequent | 58 |

Circolittoral Rock: Hierarchy Structure Diagram

| | | | | | | | | | | | |
|--|--|---|---|--|---|--|---|--|--|--|--|
| Circolittoral rock CR | | | | | | | | | | | |
| High energy circolittoral rock HCR | | | Moderate energy circolittoral rock MCR | | | | | Low energy circolittoral rock LCR | Features of circolittoral rock FCR | | |
| Very tide-swept faunal communities FaT | Deep sponge communities (circolittoral) DpSp | Mixed faunal turf communities XFa | Echinoderms and crustose communities EcCr | Circolittoral <i>Sabellaria</i> reefs (on rock) CSab | Soft rock communities SfR | Circolittoral mussel beds (on rock) CMus | Circolittoral faunal communities in variable salinity CFaVS | Brachiopod and ascidian communities BrAs | Circolittoral caves and overhangs Cv | Circolittoral fouling faunal communities FouFa | |
| BalTub | PhaAxi | ByErSp | CarSwi | Sspi | Pid | CMyt | CuSpH | AmenCio | SpCup | AdigMsen | |
| CTub | | ByErSp.Eun | CarSwi.Aglo | Sspi.ByB | Pol | Mdis | CuSpH.As | AmenCio.Ant | | Aasp | |
| CTub.CuSp | | ByErSp.DysAct | CarSwi.LgAs | Sspi.As | Hia | | CuSpH.VS | AmenCio.Bri | | | |
| CTub.Adig | | ByErSp.Sag | CarSp | | | HbowEud | LgAsSp | | | | |
| | | CvirCri | CarSp.Bri | | | | AntAsH | | | | |
| | | SwiLgAs | CarSp.PenPcom | | | | NeoPro | | | | |
| | | FluCoAs | UrtScr | | | | NeoPro.FS | | | | |
| | | FluCoAs.Paur | FaAlCr | | | | NeoPro.VS | | | | |
| | | FluCoAs.SmAs | FaAlCr.Flu | | | | | | | | |
| | | FluCoAs.X | FaAlCr.Adig | | | | | | | | |
| | | SpNemAdia | FaAlCr.Sec | | | | | | | | |
| | | SubCriTf | FaAlCr.Bri | | | | | | | | |
| | | FluHocu | FaAlCr.Pom | | | | | | | | |
| | | Mol | FaAlCr.Car | | | | | | | | |
| | | SpAnVt | AdigVt | | | | | | | | |