

# **Common Standards Monitoring Guidance**

for

## **Maritime Cliff and Slope Habitats**

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## **Common Standards Monitoring guidance for maritime cliff and slope habitats**

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## 1. Introduction

Maritime cliff vegetation varies according to a number of physical and biological factors, but most important among these are climate, degree of exposure to sea-spray, geology and soil type, level of grazing, and the amount of seabird activity. In very exposed conditions, maritime influence can extend landward for up to 500 m and its zone of influence can encompass entire islands or headlands, depending on their size. On the seaward fringes, conditions are usually so maritime that the underlying geology has little influence on the soil or vegetation, but in more sheltered situations or further inland, the vegetation will tend to become more distinctly calcicolous, neutral or calcifugous, depending on the geology.

Cliffs composed of friable material such as clay and shale are known as soft cliffs. These have little resistance to erosion and generally have a shallower gradient than hard rock cliffs. In sheltered areas this allows for greater colonisation of plant species on the cliff slopes, but in more exposed situations, where constant erosion is taking place, soft cliff slopes may often be almost devoid of plant life. The cliff-tops may support more typical maritime grasslands, which, as on hard cliffs, may give way to maritime heath and maritime scrub in the more landward zones. However, soft cliff ecosystems will only remain in favourable condition where there is free functioning of the physical coastal processes acting on the maritime cliff and slope. They need to be free of artificial sea defences and other coastal engineering works.

Grazing is an important element of many cliff-top sites and helps to maintain the species composition of any associated maritime grassland; this composition will change in the absence of grazing. However, this element of cliff succession is often confined to a narrow strip, with much of its landward zones often lost to agricultural improvement. It is therefore important, wherever possible, to encourage the restoration and landward extension of this semi-natural grassland through appropriate management. In some areas even the remaining narrow strip may be threatened. In Pembrokeshire, for example, the rise in the numbers of walkers, especially with dogs, has increased livestock losses, and has forced many farmers to abandon these areas. The resulting lack of grazing has allowed scrub to encroach, and this may now be affecting some sites important for chough.

In some locations, maritime exposure alone can lead to the development of a thick *Festuca rubra* mattress characteristic of these sites. This is now becoming comparatively rare. In some areas, especially on islands, it forms an important habitat for burrowing seabirds.

Certain sheltered cliffs may support less typical maritime communities. In such cases the vegetation can be very similar to the adjacent hinterland such as non-maritime grassland, heathland, scrub or even woodland. Site condition monitoring of these non-maritime elements should be based on the existing guidelines for these habitats, taking into account the location and management history. In some cases, heathland, scrub or woodland targets may need to be modified to reflect the maritime situation of these habitats and site-specific circumstances, including management issues. For example coastal grasslands may never meet some of the prescriptive targets (e.g. sward height) in the grasslands guidance because of the potential limitations of management.

Unfortunately, the mild climate found on many British coasts provides conditions suitable for the spread of several invasive members of the South African plant family Aizoaceae. These are maritime species that can completely overrun native seacliff vegetation. The hottentot-fig *Carpobrotus edulis* is usually the main problem species in England, especially Cornwall, and although this species has, so far, not proved to be problematic in other parts of the UK, its close relative, the purple dew-plant *Disphyma crassifolium* has invaded a number of sea cliffs on Anglesey.

The following condition assessment methods include recommended procedures for most types of sea-cliff vegetation found in Britain. However, there is no reference to sea bird cliff communities (MC6 & MC7), since apart from occasional stands of *Lavatera arborea*, they are of limited botanical interest. They are also very unstable and ephemeral, often with a cyclical nature depending on the degree seabird activity. The guidance for soft cliffs is less well developed than for hard cliffs because our understanding of soft cliffs is poorer.

## 2. Definitions

Maritime cliffs are characterised by 12 plant communities in the NVC:

- MC1 *Crithmum maritimum* – *Spergularia rupicola* maritime rock-crevice community
- MC2 *Armeria maritima* – *Ligusticum scoticum* maritime rock-crevice community
- MC3 *Rhodiola rosea* – *Armeria maritima* maritime cliff-ledge community
- MC4 *Brassica oleracea* maritime cliff-ledge community
- MC5 *Armeria maritima* – *Cerastium diffusum* ssp. *diffusum* maritime therophyte community
- MC6 *Atriplex prostrata* – *Beta vulgaris* ssp. *maritima* sea-bird cliff community
- MC7 *Stellaria media* – *Rumex acetosa* sea-bird cliff community
- MC8 *Festuca rubra* – *Armeria maritima* maritime grassland
- MC9 *Festuca rubra* – *Holcus lanatus* maritime grassland
- MC10 *Festuca rubra* – *Plantago* spp. maritime grassland
- MC11 *Festuca rubra* – *Daucus carota* ssp. *gummifer* maritime grassland
- MC12 *Festuca rubra* – *Hyacinthoides non-scripta* maritime bluebell community

Much of the ungrazed vegetation on hard seacliffs is regulated by the natural environment of the area and can be regarded as a climatic climax community. In NVC terms this includes the rock crevice and cliff-ledge communities MC1, MC3 and MC4, the so-called seabird vegetation types MC6 and MC7, and the thin soil therophyte community MC5. This last type is a very short, open turf community in which *Armeria maritima* and *Cerastium diffusum* are usually dominant. These communities are often very susceptible to damage by grazing. Many but not all of these tend to be inaccessible to grazing stock. The maritime bluebell community MC12 is also susceptible to grazing damage.

**Rock crevice** communities are the most maritime of terrestrial plant communities in Britain, being restricted mainly to the highly maritime sea-cliffs of south and west coasts. In the south, *Aster tripolium*, *Crithmum maritimum*, *Inula crithmoides*, and *Spergularia rupicola* are the dominant plant species (MC1), whereas north of Galloway, *Ligusticum scoticum* is usually the main species (MC2). Important cliff-ledge communities include those in which *Sedum (Rhodiola) rosea* (MC3) or *Brassica oleracea* (MC4) occur. The former is restricted mainly to the northwest coast of Scotland, but there also stands in Northern Ireland (Rathlin Island and Carrickarade) and there is a small stand in Pembrokeshire, whilst the latter is confined to a few calcareous sea-cliffs in England and Wales.

**Ungrazed coastal grassland** of hard cliffs is usually synonymous with the typical sub-community of the *Festuca rubra*-*Armeria maritima* maritime grassland (MC8a). Moving landward this often gives way to a *Festuca rubra*-*Holcus lanatus* maritime grassland (MC9), and under moderate maritime influence, especially on north-facing, gentle slopes, the less common *Festuca-rubra*-*Hyacinthoides non-scripta* maritime bluebell community may be present. In the case of calcareous sites, a maritime version of calcicolous grassland (*Festuca rubra* – *Scilla verna* sub-community of the *Festuca ovina* – *Carlina vulgaris* grassland, CG1f) (Rodwell, 1992) may be present. This includes the rare *Draba aizoides* on the Gower Peninsula in South Wales.

**Grazed coastal grassland** of hard cliffs is typically composed of a short turf community that may be represented by the *Plantago coronopus* sub-community of the *Festuca rubra*-*Armeria maritima* maritime grassland (MC8e). But where there has been sustained grazing over many years, the *Festuca rubra*-*Plantago* spp maritime grasslands (MC10) is likely to predominate.

On the basis of the few studies that have been carried out, much of the **coastal vegetation of soft cliffs** may not fit any of the currently recognised NVC communities. The more unstable slopes are usually dominated by an *Agrostis stolonifera* – *Tussilago farfara* maritime mesotrophic grassland (Rodwell *et al*, 2000), with a wide variety of other plant assemblages found.

**Maritime scrub** found on coastal cliffs may be dominated by one of several species including hawthorn *Crataegus monogyna* (W21), blackthorn *Prunus spinosa* (W22), gorse *Ulex europaeus* (W23), privet *Ligustrum vulgare* or elder *Sambucus nigra*, but the species composition has often been influenced by human intervention. Hawthorn, for example, has often been introduced locally as a hedging plant, and gorse has been deliberately introduced to parts of the country as a fodder crop. It was also regularly taken from the wild either for fodder, domestic fuel or to produce dye (Mitcheley & Malloch, 1991). Prior to human intervention coastal scrub was probably somewhat different, and may have mainly consisted of blackthorn and gorse with some elder and the odd plant of privet in the more sheltered situations (Gulliver 1992). In terms of NVC (Rodwell, 1991b), it would have probably consisted mainly of the *Dactylis glomerata* sub-community of W22. Some of the rarer types of coastal scrub found around the coast Britain include wild cotoneaster (*Cotoneaster cambricus*), confined to the Great Orme in North Wales, juniper scrub (as seen on the Gower Peninsula), and dogwood (*Cornus sanguinea*), recorded for the Craig ddu–Wharley Point Cliff SSSI in Carmarthenshire.

**Coastal or maritime heath** is an internationally endangered habitat that has a requirement for highly oceanic conditions. Consequently it has a very restricted distribution in Europe. Typical plants communities include the *Calluna vulgaris* - *Scilla verna* maritime heath (NVC H7) and the *Calluna vulgaris* - *Ulex gallii* heath (NVC H8) (Rodwell, 1991a). Species-rich forms of H10 *Calluna vulgaris*-*Erica cinerea* heath are also important in Scotland.

### 3. Attributes and targets

For convenience, separate condition assessment generic guidance tables have been developed for hard and soft cliffs, but a number of the following attributes apply to both of these.

Mandatory attributes for hard cliffs are

- extent
- vegetation structure (zones and transitions, maritime therophyte vegetation, grassland sward structure)
- vegetation composition (rock-crevice/cliff-ledge vegetation, maritime therophyte vegetation, grassland, frequency of bracken and scrub)

Mandatory attributes for soft cliffs are

- extent
- geomorphological naturalness
- vegetation structure (zones and transitions, maritime slope pioneer communities, cliff top grassland).

Monitoring the indicators of local distinctiveness (e.g. notable species, presence of flushes, scrub or heathland) is mandatory where any of these indicators are present on a statutory site.

In assessing condition of grassland three generic attributes, extent of interest feature, sward composition and sward structure, can be applied to all grasslands (Robertson & Jefferson 2000). Sward composition and structure form the basis of the recording protocols for coastal grasslands. Sward composition is divided into negative and positive indicator species, and sward height is used to indicate sward structure.

#### **4. Extent**

If the area of any component habitat has been obviously reduced by anthropogenic factors, such as agricultural intensification, development or fly tipping, the condition of the whole feature should be classed as unfavourable.

##### *Recording requirements*

If not already available a baseline map, preferably using aerial photographs or other remote sensing data, should be prepared, showing the distribution of sea cliff vegetation. There should also be a targeted, site-based assessment of important features.

##### *Target*

No loss of habitat

#### **5. Physical structure: geomorphological naturalness of soft cliffs**

If the natural integrity of the site has been disrupted, for example by coast protection works, in the period since the last assessment, the condition of the feature should be classed as unfavourable, especially if the activity is affecting the natural zonation or is impinging upon the coastal processes necessary for the long term survival of the habitat.

Coastal protection systems can have a detrimental impact on coastline of all types, but on soft cliffs they reduce erosion and slumping, allowing hardy grasses of little conservation interest and scrub development to replace bare soil and early pioneer communities.

On soft cliffs, flushes may be an important feature, contributing to the unstable nature of the ground and providing patches of wetland habitat. These should not be artificially modified e.g. by modification of hydrological patterns. (see also 'Indicators of local distinctiveness: maritime slope flush vegetation'.)

##### *Recording requirements*

Assess the percentage of cliff line constrained by artificial structures. The base line should relate to the situation (% constrained) at the time of notification, but if pre-notification structures are causing problems they should be reported.

##### *Target*

No evidence of new artificial structures likely to affect the natural geomorphology of the site or modification of hydrological systems.

#### **6. Vegetation structure**

##### **6.1 Zones and transitions**

Hard rock cliffs may support up to five vegetation zones, including maritime rock crevice/cliff ledge community, maritime therophyte community, maritime grassland, maritime heath and maritime scrub. Soft cliffs may support up to three or four vegetation

zones, but these may be less distinct than on hard cliffs. Nevertheless, it should be possible to determine a pioneer zone, possibly followed by grassland and scrubland zones. Very sheltered sites on both hard and soft cliffs, however, may lack any clear zonation pattern.

#### *Recording requirements*

A transect-based study should be carried out to assess the zonation patterns typical of the site. The position of the transects should be fixed, as far as possible.

#### *Target*

Maintain the range of vegetation zones and transitions typical of the site, including transitions to other habitats. There should be no obvious recent disruption of the site's characteristic zonation pattern, as defined through previous base-line studies.

## **6.2 Hard cliffs: maritime therophyte vegetation**

Maritime therophyte vegetation is rarely grazed and is often inaccessible to domestic stock, but where grazing is possible it may help prevent colonisation by undesirable, fast-growing species and encourage more open areas suitable for annual species such as *Cerastium diffusum* ssp *diffusum*, *Catapodium marinum* and *Bromus hordeaceus* ssp. *ferronii*.

One of the crucial features to be maintained in this community is open, bare ground. When in favourable condition, the vegetation rarely exceeds more than 90% cover, and this should form the basis of any condition assessment.

#### *Recording requirements*

Record the percentage area of bare ground within a clearly defined sample area to be determined on a site-by-site basis. Because of the seasonal nature of this community it can only be properly assessed during spring or early summer. The detailed survey method is to be determined.

#### *Target*

The area of bare ground should not fall below 10% of the defined area.

## **6.3 Soft cliffs: maritime slope pioneer communities**

This vegetation is often composed of natural weed communities characterised by species such as *Agrostis stolonifera* and *Tussilago farfara*. Because of the unstable nature of this habitat, species composition and abundance will vary enormously from year to year; the objective should be to ensure that these conditions prevail, and that newly exposed soil surfaces are constantly being produced.

#### *Recording requirements*

Record the area of exposed soil using oblique fixed-point photography.

#### *Target values*

The area of exposed soil should not fall below a target value (e.g. 75% of baseline area), but this will have to be assessed on a site-by-site basis.

## **6.4 Hard cliffs: grassland sward structure**

### **6.4.1 Ungrazed coastal grassland**

The aim here is to maintain or encourage a thick 'mattress-like' maritime grassland community, which when sufficiently developed can be of value to burrowing

seabirds, especially on islands. The vegetation tends to be dominated by *Festuca rubra*, which eventually creates an underlying layer of peat.

*Recording requirements*

Assess the general height of the grass sward and its frequency within representative areas to be determined on a site-by-site basis.

*Target*

Maritime grasses should in general exceed a height of 10cm, be clearly ungrazed and dominate the vegetation. The percentage area of grassland to have a sward height of more than 10cm should be decided on a site-by-site basis.

**6.4.2 Grazed coastal grassland**

The main aim is to keep the maritime sward fairly short (< 10 cm).

*Recording requirements*

Assess the general height of the main vegetation layer (excluding emergent flower stalks and seed heads) within representative areas to be determined on a site by site basis.

*Target*

The sward height should ideally be kept to less than 10cm, especially at sites important for chough.

**7 Vegetation composition: hard cliffs**

**7.1 Maritime rock-crevice and cliff-ledge communities**

Maritime rock-crevice and cliff-ledge communities are rarely accessible to grazing stock, and would be damaged if access were possible. They are also susceptible to trampling damage, and would change if seabird nesting colonies became established.

There is unlikely to be any form of successional progression from these communities, and they should therefore remain relatively constant if left undisturbed. Some of the more important species include *Armeria maritima*, *Asplenium marinum*, *Aster tripolium*, *Brassica oleracea*, *Cochlearia officinalis*, *Crithmum maritimum*, *Inula crithmoides*, *Lavatera arborea*, *Ligusticum scoticum*, *Limonium* spp, *Plantago maritima*, *Sedum rosea*, *Sedum rosea* and *Spergularia rupicola*. However, *Brassica oleracea* and *Inula crithmoides* are Nationally Scarce so may be better assessed under 'Indicators of local distinctiveness'.

*Recording requirements*

A list of key species should be compiled and where possible their general abundance recorded using oblique fixed-point photography. In future assessments any loss or obvious decline should be regarded as cause for concern, and condition should be registered as 'unfavourable' or 'unfavourable declining' if the loss continues.

*Target*

To maintain viable populations of each key species.

**7.2 Maritime therophyte vegetation**

Maritime therophyte vegetation is characteristic of very shallow soils, and provides habitat for many winter annuals; several of these are very rare. In fact, throughout the



country as a whole, this community probably supports more rare plant species than any other form of maritime vegetation. However, as a result of the drought-prone and nutrient-poor nature of the soils, it is also one of the most unstable communities, often displaying pronounced fluctuations in species composition and abundance from year to year, depending on the amount of rainfall and incidence of drought. It is not usually threatened by invasive species such as bracken, but in southwest Britain *Carpobrotus edulis* can cause problems. Because of the seasonal nature of this community it can only be properly assessed during spring or early summer. Species expected to be present include the following annuals: *Cerastium diffusum*, ssp *diffusum*, *Catapodium maritimum*, *Bromus hordeaceus* ssp. *ferronii*.

#### *Recording requirements*

The recording method is to be determined.

#### *Target*

There should be areas of bare ground, to be determined on a site-by-site basis, and at least one of the three native species mentioned above. Any sign of alien species should be cause for concern (see 7.5. Negative indicator species).

### **7.3 Ungrazed coastal grassland: positive indicator species**

The aim is to maintain a widespread thick cover of the maritime grass *Festuca rubra*.

#### *Recording requirements*

The cover and frequency of *Festuca rubra* should be assessed using a suitable method e.g. structured walk or transects with quadrats.

#### *Target*

*Festuca rubra* should be at least abundant and preferably dominant, and should have a frequency close to 100%.

### **7.4 Grazed coastal grassland: positive indicator species**

The maritime grass *Festuca rubra* is always likely to be the dominant species, but the main aim here is to prevent *Festuca rubra*, or possibly other grasses such as *Agrostis stolonifera*, *Holcus lanatus* or *Dactylis glomerata*, becoming overly dominant on the seaward fringe, or bracken or gorse scrub becoming overly dominant in the more landward zones. This will then allow other less competitive species, such as *Aira caryophylla*, *Aira praecox*, *Anthyllis vulneraria*, *Armeria maritima*, *Lotus corniculatus*, *Plantago coronopus*, *P. maritima*, *Scilla verna* or *Silene uniflora*, to maintain a presence in the vegetation.

#### *Recording requirements*

Assess the frequency (using the DAFOR scale) of desirable maritime forbs. Ideally, sample points should be registered using a Differential Geographical Positioning System (GPS). Selection of desirable species should, however, be done on a site-by-site basis. The species selected for the maritime fringe will normally include *Anthyllis vulneraria*, *Armeria maritima*, *Crithmum maritimum*, *Daucus carota gummifer*, *Hyacinthoides non-scripta* *Ligusticum scoticum* (in Scotland), *Plantago coronopus*, *P. maritima*, *Silene uniflora* or *Scilla verna*.

#### DAFOR Scale

- **Dominant:** the species appears at most (>60%) stops and it covers more than 50% of each sampling unit.

- **Abundant:** species occurs regularly throughout a stand, at most (>60%) stops and its cover is less than 50% of each sampling unit.
- **Frequent:** species recorded from 41-60% of stops.
- **Occasional:** species recorded from 21-40% of stops.
- **Rare:** species recorded from up to 1-20% of stops.

#### *Target*

In addition to *Festuca rubra*, at least two other desirable maritime species should be at least occasional throughout the sward.

#### **7.5 Negative indicator species**

Grassland species characteristic of fertile soils may be a problem. At certain sites, invasive non-native plant species (e.g. *Carpobrotus edulis* or *Disphyma crassifolium*) may pose a threat.

#### *Recording requirements*

Assess the frequency of any undesirable 'weed' species (e.g. *Cirsium arvense*, *C. vulgare*, *Lolium perenne*, *Rumex obtusifolius*, *R. crispus*, *Senecio jacobaea*, *Urtica dioica*) or invasive non-native plant species. In exposed situations, also assess the abundance of broad-leaved grasses (e.g. *Agrostis stolonifera*, *Dactylis glomerata* and *Holcus lanatus*) relative to *Festuca rubra*.

#### *Targets*

Species characteristic of nutrient-enrichment should have a negligible presence in the sward, and should be no more than rare. In exposed situations, broad-leaved grasses, should all be sub-dominant to *Festuca rubra*. No invasive non-native plant species should be present.

#### **7.6 Frequency of bracken and scrub**

##### *Recording requirements*

On a site-by-site basis, estimate the frequency of bracken and shrub species.

##### *Targets*

Fronds of bracken and invasive shrubs should be no more than occasional on the DAFOR scale in areas where the objective is to maintain coastal grassland vegetation. However, it will often be desirable to retain established stands of scrub and selected patches of bracken, in order to enhance habitat diversity especially for invertebrates. Such areas should be clearly indicated on a site map.

### **8 Indicators of local distinctiveness**

These quality indicators are features of a site that make it 'special' (i.e. form part of the reason for notification) but which are not covered by the attributes already described or by separate guidance (e.g. for notified species features). They should be apparent from the SSSI citations or past surveys. This is a discretionary attribute in that it may not be applicable to every site, but where local distinctiveness has contributed to the selection of a site for marine cliffs it should be mandatory. The target(s) should be tailored to each site. Quality indicators may include the following:

- notable plant or animal species that are not notified features in their own right

- the presence of scrub
- the presence of heathland.

### **8.1 Notable species**

This attribute covers the presence of Red List, Near Threatened, Nationally Scarce or otherwise notable species of vascular plants, bryophytes, lichens, fungi and invertebrates. Examples of notable vascular plants of grazed maritime and para-maritime grassland are given in Table 1. Soft cliffs are especially important for certain notable invertebrates (bees, wasps, beetles, flies and butterflies) that are dependent on bare ground and pioneer plant communities associated with land slips. *Melitaea cinxia* the Glanville fritillary butterfly, for instance, is confined to sea cliffs on the Isle of Wight.

Targets are set with a view to maintaining populations at current levels and/or in current locations. Specialist advice or expertise may be needed in order to monitor some of these species. It is suggested that where possible GPS or fixed point photography are used to pinpoint the location of the species on an annotated map and to check that populations are being maintained or enhanced. Survey should be carried out at the season appropriate for the species.

### **8.2 Coastal scrub**

Where it exists, coastal scrub should be seen as an integral part of the natural zonation of maritime cliff vegetation. It is mainly found on ungrazed cliffs and usually occupies the extreme landward edge of the maritime zone. In exposed situations it is likely to represent a stable climax community, but it can be knocked back by periodic salt-spray inundation, and if (as predicted in many 'global warming' forecasts) there is an increase in the frequency of summer storms, coastal scrub may become increasingly rare.

In more sheltered situations, scrub can become overly dominant, and spread at the expense of maritime heath or maritime grassland. In these situations it is unlikely to be seen as a feature of interest, and scrub clearance programmes may be required. Maritime scrub should be assessed using the method laid down in the common standards monitoring protocol for woodland, taking account of the maritime situation.

### **8.3 Coastal heath**

Heathland is frequently interspersed with grazed coastal turf, areas of bracken and bare rock, reflecting variations in soil depth and fertility, topography and shelter from prevailing winds. These communities often form an integral part of coastal cliff sites. Their assessment should be carried out using the standard method developed for monitoring lowland heath.

### **8.4 Maritime slope flush vegetation**

Maritime slope flushes on soft cliffs support distinct plant assemblages. Uncommon species such as *Equisetum telmateia* and *Schoenus nigra* may occur, especially where base-rich conditions prevail. This vegetation is often unlikely to fit any currently recognised NVC community. The overall extent and hydrological status of flushes should be maintained, although the unstable nature of soft cliffs may mean that the distribution of flushes throughout the site may change.

#### *Recording requirements*

All the important flushes should be mapped, ideally using GPS and fixed-point photography and all key species recorded.

*Target*

The overall extent and hydrological status of important flushes should be maintained, and show no evidence of being artificially modified. There should be no loss of species richness.

**8.5 Soft cliff-top grassland**

In some cases the cliff-top vegetation on soft cliffs will be composed of improved grassland of little conservation interest and will be outside the SSSI, so no monitoring will be required. At other sites there may be important stands of grassland vegetation that will require monitoring. Maritime cliff (MC) communities, as currently defined in the NVC, rarely occur on soft cliffs, and any grasslands are likely to be typical or possibly maritime variants of inland acidic (U), mesotrophic (MG) or calcicolous (CG) grasslands, depending on the underlying geology. Their assessment should be carried out using the common standards monitoring method for the relevant grassland type, adjusted where necessary.

**9 Recommended visiting period**

Monitoring should take place between June and late September.

**10 Skills required**

Surveyors should be able to identify the typical vascular plant species and range of vegetation types of maritime cliffs. A reasonable level of fitness and mobility is also required for cliff monitoring.

**11 Methods of assessment**

The field methodology is still under consideration but should be consistent with other coastal habitat guidance.

## 12 Generic guidance tables

**Table 1. UK guidance on conservation objectives for monitoring designated sites**

**Interest feature: Hard maritime cliff and slope**

Includes the following NVC types: MC1 – MC12, CG1f, H7, H8, W21-23, and others.  
Annex I habitats: H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts.  
Phase I categories: H8.1 hard cliff, H8.3 crevice/ledge vegetation and H8.4 coastal grassland

**Reporting category: Supra-littoral rock**

Common standards monitoring guidance for woodland and lowland heathland should be used for monitoring maritime scrub and heath (adjusted where necessary for maritime situations).

All attributes and targets are mandatory, except that targets for those attributes marked \* are not applicable to all sites.

ATTRIBUTE	TARGETS	METHOD OF ASSESSMENT	COMMENTS
Habitat extent	No significant loss of feature extent. There should also be a targeted site-based assessment of important features.	A baseline map should be prepared to show the distribution of sea cliff vegetation, preferably using aerial photography and other remote sensing data. Subsequent assessments should be comparisons with this baseline, using similar methods.	It is likely to be very difficult to make accurate assessments of extent for certain habitats, especially if they form complex mosaic with other habitats. The emphasis here should be more on assessing whether any component habitat has been obviously reduced by anthropogenic factors, such as agricultural development, fly tipping, etc.
Vegetation structure: vegetation zones and transitions	The range of zones and transitions typical of the site, including transitions to other habitats, should be maintained. There should be no obvious recent disruption of the site's characteristic zonation pattern, as defined through previous base-line studies.	A baseline transect-based study should be carried out to assess the zonation patterns typical of the site. Subsequent assessments should be comparisons with this baseline, using similar methods. The position of transects should ideally be recorded using GPS.	Maritime cliffs may support up to five vegetation zones including - maritime rock crevice/cliff ledge community, maritime therophyte community, maritime grassland, maritime heath, maritime scrub. However, very sheltered sites may lack any clear zonation pattern.

Vegetation structure: maritime therophyte vegetation*	The average area of bare ground should not fall below 10% of the defined area.	Record the percentage area of bare ground within clearly defined sample areas or using transects.	There should be some bare ground, but this is likely to vary from site to site and from season to season. Because of the seasonal nature of this community it can only be properly assessed during spring or early summer.
Vegetation structure: maritime grassland	<u>Ungrazed stands</u> : the maritime grassland sward should be clearly ungrazed and should in general exceed a height of 10cm.  <u>Grazed stands</u> : the maritime grassland sward should in general be no higher on average than 10cm.	Assess the general height of the main vegetation layer within representative areas.	The objective for ungrazed stands is to maintain a thick, mattress-like community of <i>Festuca rubra</i> , which in some cases can be important for burrowing seabirds. For grazed swards the objective is to prevent the site becoming overly rank due to lack of grazing.  The percentage area of grassland to have a sward height of more or less than 10cm should be decided on a site-by-site basis.
Vegetation composition: rock-crevice and cliff-ledge vegetation	Viable populations of any of the following species found on the site should be maintained: <i>Armeria maritima</i> , <i>Asplenium marinum</i> , <i>Aster tripolium</i> , <i>Cochlearia officinalis</i> , <i>Crithmum maritimum</i> , <i>Lavatera arborea</i> , <i>Ligusticum scoticum</i> , <i>Limonium</i> spp, <i>Plantago maritima</i> , <i>Sedum rosea</i> , <i>Spergularia rupicola</i> , <i>Brassica oleracea</i> and <i>Inula crithmoides</i> .	A list of all key species for the site should be compiled. These could be recorded using Oblique Fixed Point Photography.	This is a very variable feature that may be absent from certain sites, especially some of the more sheltered sites, but should be regarded as mandatory at all sites where its present.  It may have important site-specific elements. Certain species, such as <i>Ligusticum scoticum</i> , are restricted to northern sites, whilst others, such as <i>Crithmum maritimum</i> have a more southern distribution. On calcareous cliffs the uncommon <i>Brassica oleracea</i> maritime cliff-ledge community (MC4) may be present.
Vegetation composition: maritime therophyte vegetation*	At least one of the following annual species should be at least occasional: <i>Cerastium diffusum</i> ssp <i>diffusum</i> , <i>Catapodium marinum</i> , <i>Bromus hordeaceus</i> ssp. <i>ferronii</i> .	Field observations using e.g. structured walk, transects.	The vegetation is likely to be an <i>Armeria maritima</i> - <i>Cerastium diffusum</i> ssp <i>diffusum</i> therophyte community (MC5), which is known to support a number of rare winter annuals, such as <i>Herniaria ciliolata</i> , <i>Mibora minima</i> , and <i>Ononis reclinata</i> . It may not be present at certain sites but should be regarded as mandatory at all sites where it is present  Where rare annuals are present they should also be included in the assessment under 'Indicators of local distinctiveness'.  The presence of invasive non-native species is undesirable and is covered under 'Negative indicator species'.

Vegetation composition: positive indicator species of grazed maritime grassland*	In addition to <i>Festuca rubra</i> , two or more of the following species should be at least occasional in the sward: <i>Anthyllis vulneraria</i> , <i>Armeria maritima</i> , <i>Crithmum maritimum</i> , <i>Daucus carota</i> , <i>Hyacinthoides non-scripta</i> , <i>Ligusticum scoticum</i> (in Scotland) <i>Plantago coronopus</i> , <i>Plantago maritima</i> , <i>Silene uniflora</i> , <i>Scilla verna</i> .	Assess the frequency (using the DAFOR scale) of desirable maritime forbs. Ideally, sample points should be registered using a Differential Geographical Positioning System (GPS).	The maritime fringe is normally no further than 10m from the cliff top. The vegetation within this zone is likely to be a <i>Festuca rubra</i> – <i>Armeria maritima</i> maritime grassland (MC8).  At certain sites it may be advantageous to extend this assessment into the para-maritime zones. On calcareous cliffs this may include either a <i>Festuca rubra</i> - <i>Daucus carota</i> community (MC11) or a <i>Festuca rubra</i> - <i>Scilla verna</i> sub community of the <i>Festuca ovina</i> - <i>Carlina vulgaris</i> grassland (CG1f). On acidic cliffs <i>Festuca rubra</i> – <i>Holcus lanatus</i> maritime grassland (MC9) or a <i>Festuca rubra</i> – <i>Plantago</i> spp maritime grassland (MC10) are more likely to predominate.
Vegetation composition: positive indicator species of ungrazed maritime grassland*	In exposed situations <i>Festuca rubra</i> should be at least abundant and have a frequency close to 100%.  In sheltered situations targets will be set on a site-by-site basis.	Assess the cover and frequency of <i>Festuca rubra</i> using e.g. structured walk, transects	In exposed situations, the main community type is likely to be a species poor version of the <i>Festuca rubra</i> – <i>Armeria maritima</i> maritime grassland (MC8), but in more sheltered situations the vegetation is likely to be more diverse and may be important for other plant species. The uncommon <i>Festuca rubra</i> – <i>Hyacinthoides non-scripta</i> maritime bluebell community may be present. (See also 'Indicators of local distinctiveness')
Vegetation composition: negative indicator species	1) The following species should be no more than rare: <i>Cirsium arvense</i> , <i>Cirsium vulgare</i> , <i>Lolium perenne</i> , <i>Rumex obtusifolius</i> , <i>Rumex crispus</i> , <i>Senecio jacobaea</i> , <i>Trifolium repens</i> , <i>Urtica dioica</i> .  2) In exposed situations broad-leaved grasses such as <i>Agrostis stolonifera</i> , <i>Dactylis glomerata</i> and <i>Holcus lanatus</i> should be sub-dominant to <i>Festuca rubra</i> .  3) Invasive non-native plant species should be absent or rare if already present.	Assess the frequency of undesirable species using e.g. structured walk, transects.	'Weed' species characteristic of fertile soils may be a problem.  At some sites it may be necessary to include non-native invasive species such as <i>Carpobrotus edulis</i> or <i>Disphyma crassifolium</i> .

<p>Vegetation composition: frequency of bracken and scrub*</p>	<p>Where maritime grassland or maritime heathland are deemed to be important features, bracken and scrub should be no more than occasional throughout the site.</p>	<p>Assess the frequency of bracken and scrub using the DAFOR scale.</p>	<p>At certain sheltered sites bracken can form an important community, often supporting understory species such as bluebells. Maritime scrub, such as gorse or blackthorn, may form an important part of the maritime zonation. This habitat may be important for invertebrates.</p>
<p>Indicators of local distinctiveness: notable species*</p>	<p>Populations of notable species (vascular plants, bryophytes, lichens, fungi and invertebrates) should be maintained or enhanced</p>	<p>Use GPS to pinpoint location of the species on an annotated map. For small populations use fixed point photography.  Survey should be carried out at the season appropriate for the species.</p>	<p>The key point here is to ensure that the full assemblage of rare and scarce species is not undergoing any decline, possibly towards local extinction.  In the maritime fringe of grazed grassland species such as <i>Asparagus officinalis</i> ssp. <i>prostratus</i>, <i>Parapholis incurva</i>, <i>Tephrosieris integrifolia</i>, <i>Silene nutans</i> and <i>Trifolium occidentale</i> should be considered.  In the para-maritime zone of calcareous grazed grassland, species such as <i>Aster linosyris</i> and <i>Genista tinctoria</i> spp <i>littoralis</i> may need to be considered.  In the para-maritime zone of acidic grazed grassland, species such as <i>Allium schoenoprasum</i>, <i>Astragalus danicus</i>, <i>Oxytropis halleri</i>, <i>Primula scotica</i>, <i>Trifolium occidentale</i> or <i>Tephrosieris integrifolia</i> may need to be considered.  This attribute is only applicable (mandatory) for those spp which are recognised as part of the reason for notification of the habitat feature but are not notified features in their own right or covered by other targets for this feature.</p>
<p>Indicators of local distinctiveness: coastal scrub*</p>	<p>Use the targets developed for monitoring scrub in the common standards guidance for woodlands.</p>	<p>Use the method developed for monitoring scrub in the common standards guidance for woodlands.</p>	<p>In more sheltered situations, scrub can become overly dominant, and spread at the expense of maritime heath or maritime grassland. In these situations it is unlikely to be seen as a feature of interest, and scrub clearance programmes may be required.</p>
<p>Indicators of local distinctiveness: coastal heath*</p>	<p>Use the targets developed for common standards monitoring for lowland heath.</p>	<p>Use the method developed for common standards monitoring for lowland heath.</p>	<p>Heathland is frequently interspersed with grazed coastal turf, areas of bracken and bare rock, reflecting variations in soil depth and fertility, topography and shelter from prevailing winds.</p>



**Table 2. UK guidance on conservation objectives for monitoring designated sites****Interest feature: Soft maritime cliff and slope**

Soft cliffs may include a range of vegetation types such as woodland and scrub, heathland or grassland. Much of the vegetation may not fit any of the currently recognised NVC communities.

Includes Annex I habitat: H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts.

Phase I categories: H8.2 Soft cliff, H8.4 coastal grassland, E2 flush and spring, and other associated types.

**Reporting category: Supra-littoral rock**

Common standards monitoring guidance for woodland and lowland heathland should be used for monitoring maritime scrub and heath.

All attributes and targets are mandatory, except that targets for those attributes marked \* are not applicable to all sites.

ATTRIBUTE	TARGETS	METHOD OF ASSESSMENT	COMMENTS
Habitat extent	No significant loss of feature extent. There should also be a targeted site-based assessment of important features.	A baseline map should be prepared using Phase II habitat survey methods to show the distribution of sea cliff vegetation, combined with aerial photography and other remote sensing data. Subsequent assessments should be comparisons with this baseline, using similar methods.	It is likely to be very difficult to make accurate assessments of extent for certain habitats, especially if they form complex mosaics with other habitats. The emphasis here should be more on assessing whether any component habitat has been obviously reduced by anthropogenic factors, such as agricultural development, fly tipping, etc
Geomorphological naturalness	Cliff habitat free of artificial sea defences  No artificial modification of flushes and seepages	Assess percentage of linear extent constrained by artificial structures. The baseline should relate to the situation at the time of notification, but if pre-notification structures are causing problems they should be reported. The habitat should be regarded as unfavourable if any recent activities or constructions are affecting the cliff's natural geomorphology or hydrology.	This mainly applies to coastal protection systems built in front of, and particularly on the slopes of, soft cliffs, in order to slow or stop the rate of erosion. These have the effect of stabilising the cliff face, resulting in geological exposures being obscured, bare soil and early pioneer stages being progressively overgrown, and wet flushes drying out.

<p>Vegetation structure: vegetation zones and transitions</p>	<p>The range of vegetation zones and transitions typical of the site should be maintained, including transitions to other habitats.</p> <p>There should be no obvious recent disruption of the site's characteristic zonation pattern, as defined through previous baseline studies.</p>	<p>A transect based study should be carried out to assess the zonation patterns typical of the site. Subsequent assessments should be comparisons with this baseline, using similar methods. Ideally the position of the transects should be recorded using GPS.</p>	<p>Soft cliffs may support up to three or four vegetation zones. It should be possible to determine a pioneer zone, possibly followed by grassland and scrubland zones. Very sheltered sites, however, may lack any clear zonation pattern.</p>
<p>Vegetation structure: maritime slope pioneer community</p>	<p>The area of exposed soil should not fall below a target value set on a site-by-site basis.</p>	<p>Use oblique fixed-point photography to produce a baseline. Subsequent assessments should be comparisons with this baseline, made using the same method and photography points.</p>	<p>On the basis of the few soft cliff vegetation studies that have been carried out this community is usually dominated by an <i>Agrostis stolonifera</i> – <i>Tussilago farfara</i> maritime mesotrophic grassland, but will not normally fit any of the currently recognised mesotrophic grasslands in the NVC. The extent of exposed soil will vary depending on exposure and so this assessment will need to be carried out on a site by site basis.</p>
<p>Indicators of local distinctiveness: notable species*</p>	<p>Populations of notable species (vascular plants, bryophytes, lichens, fungi, invertebrates) should be maintained or enhanced</p>	<p>Use GPS to pinpoint location of the species on an annotated map. For small populations use fixed point photography. Survey should be carried out at the season appropriate for the species.</p>	<p>The key point here is to ensure that the full assemblage of rare and scarce species is not undergoing any decline, possibly towards local extinction.</p> <p>This attribute is only applicable (mandatory) for those spp which are recognised as part of the reason for notification of the habitat feature but are not notified features in their own right or covered by other targets for this feature.</p>
<p>Indicators of local distinctiveness: maritime slope flush vegetation*</p>	<p>Site-specific targets should be set to maintain the extent and key species of flush vegetation.</p>	<p>Map all important examples, ideally using GPS, and record all key species.</p>	<p>Maritime flush communities can support a number of uncommon species, such as <i>Equisetum telmateia</i> and <i>Schoenus nigricans</i>, especially where base-rich conditions prevail. Again this vegetation is often unlikely to fit any currently recognised NVC community.</p>

<p>Indicators of local distinctiveness: extent and quality of cliff top grassland*</p>	<p>Use the targets developed for common standards monitoring for the relevant grassland type</p>	<p>Use the method developed for common standards monitoring for the relevant grassland type.</p>	<p>In some cases the cliff top vegetation will be composed of improved grassland of little conservation interest and no monitoring will be required.</p> <p>At other sites there may be important stands of grassland vegetation that will require monitoring. However, maritime cliff (MC) communities, as currently defined in the NVC, rarely occur on soft cliffs, and any grasslands are likely to be typical or possibly maritime variants of inland acidic (U), mesotrophic (MG) or calcicolous (CG) grasslands, depending on the underlying geology.</p>
<p>Indicators of local distinctiveness: Coastal scrub and woodland*</p>	<p>Use the targets developed for common standards monitoring for woodland.</p>	<p>Use the method developed for common standards monitoring for woodland.</p>	<p>In some cases the cliff top vegetation will be composed of improved grassland of little conservation interest and no monitoring will be required. At other sites there may be important stands of scrub or woodland vegetation that will require monitoring.</p>
<p>Indicators of local distinctiveness: Coastal heath*</p>	<p>Use the targets developed for common standards monitoring for lowland heath.</p>	<p>Use the method developed for common standards monitoring for lowland heath.</p>	<p>In some cases the cliff top vegetation will be composed of improved grassland of little conservation interest and no monitoring will be required. At other sites there may be important stands of heathland vegetation that will require monitoring.</p>

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