

NPWS

Bray Head SAC  
(site code: 000714)

**Conservation objectives supporting document-  
Coastal habitats**

Version 1

April 2017

## Contents

1	Introduction .....	2
2	Conservation Objectives .....	2
3	Vegetated sea cliffs.....	3
3.1	Overall Objective.....	4
3.2	Area .....	4
3.2.1	Habitat length .....	4
3.3	Range.....	5
3.3.1	Habitat Distribution.....	5
3.4	Structure and Functions .....	5
3.4.1	Physical structure: functionality and hydrological regime .....	5
3.4.2	Vegetation structure: zonation .....	6
3.4.3	Vegetation structure: vegetation height .....	6
3.4.4	Vegetation composition: typical species and sub-communities.....	6
3.4.5	Vegetation composition: negative indicator species .....	8
3.4.6	Vegetation composition: bracken and woody species .....	9
4	References.....	9
	Appendix I – Distribution map of Vegetated Sea Cliffs within Bray Head SAC .....	10

**Please note that this document should be read in conjunction with the following report: NPWS (2017) Conservation Objectives: Bray Head SAC 000714. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.**

## 1 Introduction

Achieving Favourable Conservation Status (FCS) is the overall objective to be reached for all Annex I habitat types and Annex II species of European Community interest listed in the Habitats Directive 92/43/EEC (European Commission, 2013). It is defined in positive terms, such that a habitat type or species must be prospering and have good prospects of continuing to do so.

Bray Head SAC is situated in north-east Co. Wicklow between the coastal towns of Bray and Greystones. Bray Head consists of a plateau of high ground, with five prominent quartzite knolls reaching a maximum height of 241m. The rocky cliffs are divided by a railway track that was built in the 1800s. The bedrock geology is Cambrian quartzites and shales (with mudstones and greywackes). The more exposed higher ground has a covering of shallow acidic soils, with protruding bedrock and scree. Elsewhere, deeper soils are formed by drift deposits and are calcareous (NPWS, 2013).

Bray Head SAC (site code: 000714) is selected for vegetated sea cliffs and European dry heath. The following coastal habitat is one of the two Qualifying Interests for the SAC:

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

## 2 Conservation Objectives

A conservation objective aims to define the favourable conservation condition of a habitat or species at a particular site. Implementation of the objective will help to ensure that the habitat or species achieves favourable conservation status at a national level.

This supporting document sets out the conservation objective for the vegetated sea cliffs in Bray Head SAC, which is defined by a list of parameters, attributes and targets. The main parameters are (a) Range (b) Area and (c) Structure and Functions, the last of which is broken down into a number of attributes, including physical structure, vegetation structure and vegetation composition.

The targets set for vegetated sea cliffs are based primarily on the findings of the Irish Sea Cliff Survey (Barron *et al.*, 2011) and this document should be read in conjunction with that report.

The distribution of vegetated sea cliff sites is presented in Appendix I. The ISCS identified sites and carried out a detailed assessment as per the methodology outlined in Barron *et al.* (2011). This included dividing the cliff length into a series of sections to reflect the variation within the site and to give a more accurate measurement for area. The following sub-site was surveyed and assessed in detail in the field:

Bray Head (ISCS site ID: 11003)

The conservation objective for the vegetated sea cliff habitat within the SAC is extrapolated from Barron *et al.* (2011) and the sea cliff database, which was produced as part of that project. It is thought that the sub-site surveyed by the ISCS represents the total extent of vegetated sea cliffs within Bray Head SAC.

### 3 Vegetated sea cliffs

Sea cliffs can be broadly divided into two categories: hard (or rocky) cliffs and soft (or sedimentary) cliffs, both of which are covered by the Annex I habitat 'vegetated sea cliffs of the Atlantic and Baltic coasts'. Hard cliffs are composed of rocks such as limestone, sandstone, granite or quartzite, which are hard and relatively resistant to erosion. Soft cliffs are composed of softer rock such as shale or unconsolidated material such as glacial till. Vegetation of hard sea cliffs in exposed situations exhibits a strong maritime influence and is relatively stable. Soft cliff habitats are more prone to slope failure which results in the presence of fast-colonising pioneer species.

Defining the limits of what constitutes a sea cliff is problematic and a number of different interpretations have been used in the past (Fossitt, 2000; JNCC, 2004; Browne, 2005; European Commission, 2013). In order to address any inconsistencies, the following definition for sea cliffs was developed and used during the Irish Sea Cliff Survey (Barron *et al.*, 2011):

"A sea cliff is a steep or vertical slope located on the coast, the base of which is in either the intertidal (littoral) or subtidal (sublittoral) zone. The cliff may be composed of hard rock such as basalt, or of softer substrate such as shale or boulder clay. Hard cliffs are at least 5m high, while soft cliffs are at least 3m high. The cliff top is generally defined by a change to an obvious less steep gradient. In some cases the cliff may grade into the slopes of a hillside located close to the coast. In these cases the cliff is defined as that part of the slope which was formed by processes of coastal erosion, while the cliff top is where there is the distinct break in slope. Both the cliff and the cliff top may be subject to maritime influence in the form of salt spray and exposure to coastal winds. A cliff can ascend in steps with ledges, and the top of the cliff is taken to occur where erosion from wave action is no longer considered to have been a factor in the development of the landform.

The cliff base may be marked by a change in gradient at the bottom of the cliff. Where the base is exposed it can be characterised by scree, boulders, a wave-cut platform or sand, among other substrates. During this survey where cliffs occur within the subtidal zone the base was considered to be the high water mark. A cliff is considered to have reached its end point where it is no longer over 5m high (hard cliffs) or 3m high (soft cliffs), or no longer has a steep slope. To be considered in this study, a cliff had to be a minimum of 100m in length. Sea cliffs may support a range of plant communities such as grassland, heath, scrub and bare rock communities, among others" (Barron *et al.*, 2011).

At Bray Head SAC, the lower cliffs are fairly steep in places but the upper cliffs are less steep, and often support heath or dry grassland vegetation. In parts the cliffs are up to 60m in height. The rocky sea cliffs extend for approximately 2km south of Bray and steep clay cliffs extend southwards for a further 1km (NPWS, 2013).

### 3.1 Overall Objective

The overall objective for ‘Vegetated sea cliffs of the Atlantic and Baltic coasts’ in Bray Head SAC is to ‘*maintain favourable conservation condition*’.

The objective is based on an assessment of the recorded condition of the habitat under a range of attributes and targets. The assessment is divided into three main headings: (a) Area, (b) Range and (c) Structure and Functions.

### 3.2 Area

#### 3.2.1 Habitat length

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target is that there is no decrease from the established baseline. Bearing in mind that coastal systems are naturally dynamic and subject to change even within a season, this target is assessed subject to natural processes, including erosion and succession.

As cliffs are linear features on maps, their extent is measured in kilometres rather than hectares, as for other habitats. During the ISCS (Barron *et al.*, 2011), each cliff was divided into sections based on physical characteristics and vegetation cover. Breaks (i.e. non-cliff areas) of between 80m and 500m along the length of cliff were discounted from the calculations.

The total area/length of the cliff sections within the sub-site Bray Head (ISCS site ID: 11003) is presented in the following table. The area/length of cliff sections that is located within the SAC boundary is also presented.

Site Name	Total area/length (km) of sea cliff sections from ISCS	Total area/length (km) of sea cliff sections within SAC boundary
Bray Head	4.66	3.27

There are a number of differences in the two sets of figures above. Most of the differences are explained by the fact that the ISCS mapped the total sea cliff resource at the site and not all of the sea cliff mapped is contained within the SAC boundary. In addition, the OSi six inch county boundary line was used to draw the line for the ISCS, while a different mapping dataset was used to draw the SAC boundary. As a result, the length of cliff inside the SAC boundary may be underestimated. The total length of cliff sections in the Bray Head sub-site was 4.66km. When this dataset was clipped to the SAC boundary, 3.27km was included within the SAC. However, in reality this figure is likely to be higher as a result of these mapping anomalies.

The target is for the area to be stable, subject to natural processes, including erosion.

### **3.3 Range**

#### **3.3.1 Habitat Distribution**

The distribution of sea cliffs throughout Bray Head SAC, as identified by the ISCS (Barron *et al.*, 2011), is presented on a map in Appendix I.

At Bray Head SAC, tall, rocky sea cliffs, approximately 2km in length, form most of the seaward boundary of the site with lower, steep clay cliffs extending for a further 1km to the south (NPWS, 2013).

The target is that there is no decline in distribution, subject to natural processes.

### **3.4 Structure and Functions**

A fundamental aim of sea cliff conservation is to facilitate some degree of natural mobility through slumping. Sea cliffs can be of geomorphological interest, as well as ecological interest, and also erosion can expose geological features of interest.

#### **3.4.1 Physical structure: functionality and hydrological regime**

Coastal protection works can disrupt the natural integrity of a sea cliff. The health and on-going development of vegetated sea cliffs relies on natural processes, such as erosion, continuing without any impingement. This is generally a bigger issue for soft cliffs which require a degree of slumping and erosion to expose bare soil for pioneer species to colonise; otherwise the vegetation is replaced by hardy grasses and scrub of little conservation value can develop. In addition, cliff erosion provides an important sediment source to sites further along the coast (e.g. sand dunes). Preventing erosion at a cliff site can lead to beach starvation at another site.

Flushes can be associated with cliffs in areas where the groundwater seeps out onto the cliff face. This is more usually associated with soft cliffs where these flushes contribute to the natural instability of the ground and provide patches of wetland habitat.

There is significant erosion of the soft cliff to the south of Bray Head SAC with ravines cutting through the cliffs. There is also erosion of the hard cliffs evident along the railway-line, with sea defence and coastal protection works. The railway-line cuts deeply into the hillside with alternating sections of cliff and wall with some boulders at the northern end (Barron *et al.*, 2011).

Farmland occurs at the cliff top and intensive agricultural cultivation is affecting plant recruitment and causing agricultural run-off (Barron *et al.*, 2011).

The target is to maintain, or where necessary restore, the natural geomorphological processes without any physical obstructions, and the local hydrological regime including groundwater quality.

### **3.4.2 Vegetation structure: zonation**

Ecological variation in this habitat type depends on a number of physical and biological factors, in particular climate, degree of exposure to sea-spray, geology and soil type, as well as the level of grazing and seabird activity. The rocky cliff flora often grades naturally into dry heath vegetation and maritime grassland, as is the case at Bray Head.

The annual plant communities which develop on the dry slopes above the cliffs at Bray Head are typical of those found only on sites in south-eastern Ireland. Common species include wood sage (*Teucrium scorodonia*), clovers (*Trifolium dubium* and *T. campestre*), scarlet pimpernel (*Anagallis arvensis*) and field madder (*Sherardia arvensis*). An uncommon annual species which can appear abundantly in the heath after a fire event is yellow fumitory (*Corydalis claviculata*). Some rare plants are found in this habitat (NPWS, 2013).

Calcareous dry grassland, typically species-rich, occurs on deposits of glacial till. The primary grass species are quaking-grass (*Briza media*), smooth meadow-grass (*Poa pratensis*) and red fescue (*Festuca rubra*). Typical calcicole herbs include pale flax (*Linum bienne*), salad burnet (*Sanguisorba minor*), burnet-saxifrage (*Pimpinella saxifraga*), carline thistle (*Carlina vulgaris*) and kidney vetch (*Anthyllis vulneraria*). Orchids are a feature of this habitat, with five species known from the area - pyramidal orchid (*Anacamptis pyramidalis*), common spotted-orchid (*Dactylorhiza fuchsii*), common twayblade (*Listera ovata*), fragrant orchid (*Gymnadenia conopsea*) and bee orchid (*Ophrys apifera*). Bloody crane's-bill (*Geranium sanguineum*) was re-found recently at Bray Head, this is a typical species of the Burren and associated areas, and is very rare in eastern Ireland (NPWS, 2013).

The heath communities which occur above the sea cliffs, especially the south-facing ones, are more open in character and dominated by grasses rather than dwarf shrubs (Barron *et al.*, 2011).

The target is to maintain the range of sea cliff habitat zonations, as well as transitional zones, including those to terrestrial communities, subject to natural processes.

### **3.4.3 Vegetation structure: vegetation height**

A varied vegetation structure is important for maintaining species diversity and is particularly important for invertebrates and birds. Grazing increases the species diversity and is particularly important for maritime grasslands and coastal heath, which are often associated with sea cliffs.

Some sheep grazing has been noted at Bray Head (Barron *et al.*, 2011).

The target is to maintain the structural variation in the sward height.

### **3.4.4 Vegetation composition: typical species and sub-communities**

Different sea cliff communities develop in a number of habitat zones related to the degree of maritime influence (exposure to wind and sea spray), geology and soil type. In general, Irish sea cliffs display a range of zones running in a series of horizontal bands up the cliff face, each of which has its own distinct sub-communities including:

- Splash zone

- Pioneer zone
- Rock crevice/cliff ledge zone
- Maritime grassland zone
- Maritime heath zone
- Maritime slope flush zone

There is considerable variation, but the general pattern would be that the maritime influence is strongest near the base of the cliff and becomes gradually less dominant towards the cliff top. At the cliff base, vegetation is naturally very open and the species present have a high tolerance to salinity. The splash zone generally has a well-developed lichen flora dominated by species such as *Verrucaria maura*, *Ramalina* spp. and *Xanthoria* spp. These plant communities are dependent on rock crevices for rooting. Moving up the cliff, between the splash zone and the cliff top, vegetation on the cliff ledges is less open and can support some species which are not exclusively associated with coastal conditions. Closer to the cliff top maritime grasslands can occur. The plant communities and physical characteristics of maritime grasslands vary depending on the degree of exposure and whether or not grazing is a factor. Plant communities typical of seabird cliffs and maritime therophyte communities are exceptions to this horizontal zonation and can occur as a mosaic with the other plant communities.

The following tables present lists of species that are considered typical of the different zones associated with soft cliffs and hard cliffs by Barron *et al.* (2011).

#### Vegetation of soft cliffs:

<b>Typical pioneer slope species on soft cliffs</b>		
<i>Agrostis stolonifera</i>	<i>Equisetum</i> spp.	<i>Tussilago farfara</i>
<i>Daucus carota</i>	<i>Lotus corniculatus</i>	
<b>Flush on soft cliffs</b>		
<i>Equisetum</i> spp.	<i>Orchid</i> species	<i>Schoenus nigricans</i>
<b>Coastal heath</b>		
<i>Calluna vulgaris</i>	<i>Erica cinerea</i>	<i>Ulex gallii</i>
<i>Daboecia cantabrica</i>	<i>Erica tetralix</i>	<i>Vaccinium myrtillus</i>
<i>Empetrum nigrum</i>	<i>Scilla verna</i>	
<b>Coastal grassland on soft cliffs</b>		
<i>Agrostis stolonifera</i>	<i>Dactylis glomerata</i>	<i>Festuca rubra</i>
<i>Anthyllis vulneraria</i>	<i>Daucus carota</i>	<i>Lotus corniculatus</i>
<i>Arrhenatherum elatius</i>	<i>Elytrigia repens</i>	<i>Tussilago farfara</i>



## Vegetation of hard cliffs:

<b>Typical splash zone species on hard cliffs</b>		
<i>Ramalina</i> spp.	<i>Verrucaria maura</i>	<i>Xanthoria</i> spp.
<b>Typical crevice and ledge species on hard cliffs</b>		
<i>Anthyllis vulneraria</i>	<i>Asplenium marinum</i>	<i>Armeria maritima</i>
<i>Aster tripolium</i>	<i>Atriplex prostrata</i>	<i>Beta vulgaris</i> ssp. <i>maritima</i>
<i>Catapodium marinum</i>	<i>Cerastium diffusum</i>	<i>Crithmum maritimum</i>
<i>Festuca rubra</i>	<i>Inula crithmoides</i>	<i>Lavatera arborea</i>
<i>Ligusticum scoticum</i>	<i>Limonium</i> spp.	<i>Plantago coronopus</i>
<i>Plantago maritima</i>	<i>Sedum anglicum</i>	<i>Sedum rosea</i>
<i>Silene uniflora</i>	<i>Spergularia rupicola</i>	
<b>Typical coastal heath species</b>		
<i>Calluna vulgaris</i>	<i>Daboecia cantabrica</i>	<i>Empetrum nigrum</i>
<i>Erica cinerea</i>	<i>Erica tetralix</i>	<i>Scilla verna</i>
<i>Ulex gallii</i>	<i>Vaccinium myrtillus</i>	
<b>Typical maritime grassland species on hard cliffs</b>		
<i>Anthyllis vulneraria</i>	<i>Armeria maritima</i>	<i>Crithmum maritimum</i>
<i>Daucus carota</i>	<i>Festuca rubra</i>	<i>Hyacinthoides non-scripta</i>
<i>Plantago coronopus</i>	<i>Plantago maritima</i>	<i>Scilla verna</i>
<i>Sedum anglicum</i>	<i>Silene uniflora</i>	<i>Spergularia rupicola</i>

At Bray Head SAC, the lower rocky cliffs are fairly steep but the upper cliffs are less steep, and often support heath or dry grassland vegetation. Typical species of the more exposed rock areas are common scurvygrass (*Cochlearia officinalis*), rock sea-spurrey (*Spergularia rupicola*), thrift (*Armeria maritima*), sea campion (*Silene vulgaris* subsp. *maritima*) and sea samphire (*Crithmum maritimum*) (NPWS, 2013).

On some sections of the cliff face, the locally scarce tree mallow (*Lavatera arborea*) is found. Species of the upper cliff flora include kidney vetch (*Anthyllis vulneraria*) and red fescue (*Festuca rubra*). A widespread species found from the mid to upper zones of the cliff face is ivy (*Hedera helix*), and associated with this is the scarce wild madder (*Rubia peregrina*). The clay cliffs in the southern part of the SAC are steep and unstable and have little vegetation (NPWS, 2013).

The target for this attribute is to ensure that the typical flora of vegetated sea cliffs is maintained, as are the range of sub-communities within the different zones.

### 3.4.5 Vegetation composition: negative indicator species

Negative indicator species can include non-native species (e.g. *Hebe* spp., *Carpobrotus edulis*, *Gunnera tinctoria*), species indicative of changes in nutrient status (e.g. *Urtica dioica*) and species not considered to be typical of the habitat (e.g. *Pteridium aquilinum*).

The target for this attribute is that negative indicator species (including non-native species) should make up less than 5% of the vegetation cover.

#### **3.4.6 Vegetation composition: bracken and woody species**

Encroachment of bracken (*Pteridium aquilinum*) and woody/scrub species on cliffs, particularly on maritime grasslands and coastal heath, leads to a reduction in species diversity.

At Bray Head SAC, bracken (*Pteridium aquilinum*) is dominant in some areas of dry heath on the slopes above the cliffs (NPWS, 2013).

Scrub and farmland occur along the cliff top with scrub dominating to the north (Barron *et al.*, 2011).

The target for this attribute is that in the case of maritime grassland and/or heath, bracken should make up less than 10% of the vegetation cover, while woody species should make up no more than 20% of the vegetation cover.

## **4 References**

Barron, S., Delaney, A., Perrin, P., Martin, J. and O'Neill, F. (2011) National survey and assessment of the conservation status of Irish sea cliffs. Irish Wildlife Manuals, No. 53. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Browne, A. (2005) National inventory of sea cliffs and coastal heaths. Unpublished report to the National Parks and Wildlife Service, Dublin.

European Commission (2013) Interpretation Manual of European Union Habitats – EUR 28. DG Environment - Nature and Biodiversity, Brussels.

Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.

JNCC (2004) Common standards and monitoring guidance for maritime cliff and slope habitats. Joint Nature Conservation Committee, Peterborough, UK.

NPWS (2013) Site Synopsis: Bray Head SAC (000714)

<https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000714.pdf>

# Appendix I – Distribution map of Vegetated Sea Cliffs within Bray Head SAC

