

NPWS

**Clare Island Cliffs SAC  
(site code: 002243)**

**Conservation objectives supporting document-  
Coastal habitats**

Version 1

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**Please note that this document should be read in conjunction with the following report: NPWS (2016) Conservation Objectives: Clare Island Cliffs SAC 002243. 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.

Clare Island lies at the entrance to Clew Bay, in Co. Mayo, 5km from the mainland. The island has a diverse geology, being composed of Dalradian sandstones and shales, Carboniferous sandstones, shales and conglomerates, and a variety of Silurian rocks (NPWS, 2014a).

Clare Island has been the subject of detailed scientific studies since the early 1900s and its natural history is well-documented (e.g. Praeger, 1903; Praeger, 1911; Doyle and Foss, 1986; Ryle, 2000; Synnott, 2012).

Clare Island Cliffs SAC comprises the coastal fringe of the island, extending from Kinnacorra in the east, along the north coast and around the south-western corner of the island as far east as Tonabrickill. It extends inland on the southern flanks of Knockmore Mountain (NPWS, 2014a).

The dominant feature of Clare Island is a ridge that runs east to west, attaining a height of 462m at Knockmore Mountain and forming precipitous sea cliffs (400m high) along the north-western shore. Lower sea cliffs occur elsewhere on the northern coastline, as well as on the west and south of the island. Small areas of shingle beach, boulder beach and saltmarsh are found on the eastern side of the SAC, while Knockmore Mountain supports areas of wet heath, upland acid grassland, scree and exposed rock (NPWS, 2014a).

The most notable and rare Red Data Book (Curtis and McGough, 1988) plant species which have been recorded from the SAC are: holly-fern (*Polystichum lonchitis*), moss campion (*Silene acaulis*), purple saxifrage (*Saxifraga oppositifolia*), alpine saw-wort (*Saussurea alpina*), heath cudweed (*Omalotheca sylvatica*) and sea pea (*Lathyrus japonicus* subsp. *maritimus*) (NPWS, 2014a). The last two species listed are legally protected under the Flora (Protection) Order, 2015 (Statutory Instrument No. 356 of 2015).

Clare Island Cliffs SAC supports important colonies of breeding seabirds. The site is of particular importance for fulmar (*Fulmarus glacialis*), supporting the largest population in the country. It also has nationally important populations of shag (*Phalacrocorax aristotelis*), common gull (*Larus canus*), kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*), razorbill (*Alca torda*) and black guillemot (*Cephus grylle*). A new gannet (*Morus bassanus*) colony has been established close to the island. Although it is still very small, it is still of significance as it is one of only six in Ireland and the only colony on the west coast. Other breeding species include puffin (*Fratercula arctica*), cormorant (*Phalacrocorax carbo*), lesser black-backed gull (*Larus fuscus*) great black-backed gull (*L. marinus*) and herring gull (*L. argentatus*) (NPWS, 2014b).

In addition to the seabirds, Clare Island is an important stronghold for chough (*Pyrrhocorax pyrrhocorax*), which nest on the cliff. The island is also a traditional nesting location for peregrine falcon (*Falco peregrinus*). Both these species are listed on Annex I of the EU Birds Directive (NPWS, 2014b).

Clare Island Cliffs SAC (site code: 002243) is selected for vegetated sea cliffs, calcareous rocky slopes and siliceous rocky slopes. The following coastal habitat is included in the list of 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 vegetated sea cliffs in Clare Island Cliffs 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 (ISCS) (Barron *et al.*, 2011) and this document should be read in conjunction with that report.

The distribution of vegetated sea cliffs 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 associated with Clare Island SAC was not surveyed in the field but was assessed as part of a desk study:

Capnagower (ISCS site ID: 08017)

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 Clare Island 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) of 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.”

The sea cliffs present at Clare Island Cliffs SAC are of the hard and soft cliff types, composed of quartzite bedrock with shallow, lithosolic-podzolic type soils with peaty topsoil.

The sea cliffs of the northern coastline of Clare Island consist of vertical precipices alternating with steep grassy slopes and large blocks of rock. The vertical cliffs are up to 100m high in places. The less sheer cliffs are well-vegetated with a maritime sward. The cliffs in the south-west and eastern sectors of the site are low-lying and a plantain sward occurs along the tops of some of the cliffs. The cliffs and rocky habitats correspond to the three Annex I habitats vegetated sea cliffs, siliceous rocky slopes and calcareous rocky slopes (NPWS, 2014a).

### **3.1 Overall Objective**

The overall objective for ‘Vegetated sea cliffs of the Atlantic and Baltic coasts’ in Clare Island Cliffs 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 in to sections based on physical characteristics and vegetation cover. Breaks (i.e. non-cliff areas) of between 80m and 500m along a length of cliff were discounted from the calculations.

The total length of the cliff within the sub-site Capnagower (site ID: 08017) was estimated to be 25.43km. Discounting breaks, the total area/length of cliff sections in the sub-site is presented in the following table. The area/length of cliff sections within the SAC boundary is also presented.

<b>Site Name</b>	<b>Total area/length (km) of sea cliff sections from ISCS</b>	<b>Total area/length (km) of sea cliff sections within SAC boundary</b>
Clare Island	23.48	14.69

The difference between the two figures is 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 for the ISCS sub-site Capnagower was 23.48km. When this dataset was clipped to the SAC boundary only 14.69km was included within the boundary of Clare Island Cliffs SAC. However, in reality this figure is likely to be higher as a result of these mapping anomalies.

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

## **3.3 Range**

### ***3.3.1 Habitat Distribution***

The distribution of sea cliffs throughout Clare Island Cliffs SAC, as identified by the Irish Sea Cliff Survey (Barron *et al.*, 2011), is presented in Appendix I.

Clare Island Cliffs SAC comprises the coastal fringe of the island, extending from Kinnacorra in the east, along the north coast and around the south-western corner of the island as far east as Tonabrickill.

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.

In the SAC, the ISCS noted the presence of crevices, gullies, streams/cascades and freshwater seepages (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 coastal heath vegetation and maritime grassland.

The cliffs in the south-west and eastern sectors of the SAC are low-lying with a sward of maritime grassland vegetation. On the upper cliffs, there is a concentration of alpine vegetation, which is species-rich and includes a number of rarities, in association with a species-rich bryophyte flora. Knockmore Mountain supports areas of wet heath, upland acid grassland, scree and exposed rock (NPWS, 2014a).

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

#### ***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.

The cliffs in the SAC are well-vegetated with a maritime sward of grasses and herbs. The cliffs in the south-west and east of the SAC have low-growing vegetation along the cliff top (NPWS, 2014a).

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>Ligisticum 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>

In Clare Island Cliffs SAC, the cliffs are well-vegetated, with a maritime sward of grasses and herbs such as harebell (*Campanula rotundifolia*), tormentil (*Potentilla erecta*), thrift (*Armeria maritima*), sea campion (*Silene vulgaris* subsp. *maritima*) and red fescue (*Festuca rubra*). The cliffs in the south-

west and eastern sectors of the SAC are low-lying and a plantain (*Plantago* spp.) sward of low-growing vegetation dominated by buck's-horn plantain (*Plantago coronopus*) and sea plantain (*P. maritima*) in association with a variety of plant species occurs along the tops of some of the cliffs. On the upper cliffs, there is a concentration of alpine vegetation, which is species-rich and includes a number of rarities, such as roseroot (*Rhodiola rosea*), mountain sorrel (*Oxyria digyna*), moss campion (*Silene acaulis*), alpine saw-wort (*Saussurea alpina*), saxifrages (*Saxifraga rosacea*, *S. opositifolia*, *S. spathularis* and *S. spathularis x hirsuta*), dwarf willow (*Salix herbacea*) and the ferns *Asplenium viride*, *Polystichum lonchitis*, *Cystopteris fragilis* and *Hymenophyllum wilsonii*, in association with a species-rich bryophyte flora (NPWS, 2014).

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.

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.

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## Appendix I – Distribution map of Vegetated Sea Cliffs within Clare Island Cliffs SAC

