

NPWS

Ireland's Eye SAC  
(site code: 002193)

**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 (2017) Conservation Objectives: Ireland’s Eye SAC 002193. 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.

Ireland's Eye SAC is a small uninhabited island located *circa* 1.5km north of Howth in Co. Dublin. Its geology is Cambrian quartzite, which forms spectacular cliffs on the north-east side with scattered exposures elsewhere on the island, especially in the high northern half. A tall stack, which is completely cut off from the main island at mid to high tide, occurs at the eastern side of the cliffs. A low-lying, sparsely vegetated islet, known as Thulla Rocks, occurs a little to the south of the island.

Ireland's Eye is of national importance for breeding seabirds, particularly for cormorant (*Phalacrocorax carbo*), herring gull (*Larus argentatus*), kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*) and razorbill (*Alca torda*). A gannet (*Morus bassanus*) colony became established on the stack at the east end of the island in the late 1980s. Several pairs of shelduck (*Tadorna tadorna*), oystercatcher (*Haematopus ostralegus*) and ringed plover (*Charadrius hiaticula*) have been recorded as breeding on the island. In winter, small numbers of greylag goose (*Anser anser*) and light-bellied Brent goose (*Branta bernicla hrota*) graze on the island. The island is also a traditional site for nesting peregrine (*Falco peregrinus*) (NPWS, 2011). There is a grey seal (*Halichoerus grypus*) colony to the east of the island (Lyons, 2003).

Ireland's Eye SAC (site code: 002193) is selected for shingle beaches and sea cliffs. These coastal habitats are the two Qualifying Interests for the SAC:

- 1220 Perennial vegetation of stony banks
- 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

The distribution of perennial vegetation of stony banks and vegetated sea cliffs within Ireland's Eye SAC is presented in Appendix I.

## 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 objectives for the two coastal habitats listed above in Ireland's Eye SAC, which are 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 **perennial vegetation of stony banks** are based in part on the findings of the National Shingle Beach Survey (NSBS), which was carried out in 1999 on behalf of the National Parks

and Wildlife Service (NPWS) (Moore and Wilson, 1999). The NSBS visited the following sub-site associated with Ireland's Eye SAC:

Ireland's Eye (NSBS site ID: 0138)

Profiles and transects were recorded from each shingle beach and each site was assigned a crude High/Medium/Low interest ranking. A 'high interest' ranking denotes a site that is of high conservation value. The site may be of interest botanically or geomorphologically. A 'medium interest' ranking implies the site may be extensive but not of particular interest either botanically or geomorphologically. A 'low interest' ranking is reserved for small sites, highly damaged sites or sites that are of a very common classification.

The shingle beach at Ireland's Eye SAC was given a low interest ranking by the NSBS (Moore and Wilson, 1999).

The area of vegetated shingle habitat was not mapped at any of the sub-sites by the NSBS, but the vegetation was recorded, as were the human impacts and alterations at the site, which are useful tools for assessing the Structure and Functions of the habitat.

During the Coastal Monitoring Project (CMP) (Ryle *et al.*, 2009), some vegetated shingle was also recorded at Ireland's Eye (CMP site ID: 008) and the area was mapped.

The distribution of the known shingle sites in Ireland's Eye SAC is presented in Appendix I.

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 ISCS did not survey or assess any sub-sites in Ireland's Eye SAC; however, the site was assessed in an earlier inventory of sea cliffs and coastal heath (Browne, 2005). Consequently, the targets set for the vegetated sea cliffs are based primarily on the general findings and approach of the ISCS. It should be noted however, that they are generic in nature and may be subject to change in light of future survey work.

### **3 Perennial vegetation of stony banks**

Perennial vegetation of stony banks is vegetation that is found at or above the mean high water spring tide mark on shingle beaches (i.e. beaches composed of cobbles and pebbles). It is dominated by perennial species (i.e. plants that continue to grow from year to year). The first species to colonise are annuals or short-lived perennials that are tolerant of periodic displacement or overtopping by high tides and storms. Level, or gently-sloping, high-level mobile beaches, with limited human disturbance, supports the best examples of this vegetation. More permanent ridges are formed by storm waves. Several of these storm beaches may be piled against each other to form extensive structures.

At the time of survey, the shingle beach at Ireland's Eye SAC consisted of three poorly vegetated strips of mixed sand, shells and gravel of various sizes (Moore and Wilson, 1999).

### **3.1 Overall Objective**

The overall objective for 'Perennial vegetation of stony banks' in Ireland's Eye SAC is to '*maintain the favourable conservation condition*'.

This 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) Range, (b) Area and (c) Structure and Functions.

### **3.2 Area**

#### **3.2.1 Habitat area**

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target for favourable conservation condition 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.

The current extent of this habitat in Ireland's Eye SAC is unknown. The National Shingle Beach Survey recorded the presence of vegetated shingle, but did not map the extent at the Ireland's Eye sub-site. This habitat was rated 'Low interest', probably due to the limited extent of the habitat (Moore and Wilson, 1999).

During the Coastal Monitoring Project (CMP), 0.13ha of this habitat was mapped and it was stated that perennial vegetation of stony banks is the only dune habitat of note on Ireland's Eye (Ryle *et al.*, 2009).

The target is that the area should be stable or increasing, subject to natural processes, including erosion and succession.

### **3.3 Range**

#### **3.3.1 Habitat distribution**

The full distribution of vegetated shingle within Ireland's Eye SAC is unknown; however, the recorded locations of the shingle sites in the SAC are presented in Appendix I.

A shingle beach occurs above the sandy beach at Carrigeen Bay on the western side of the island (NPWS, 2014a).

The shingle beaches within Ireland's Eye SAC are vegetated fringing beaches consisting of three narrow strips of cobbles on the beach (Moore and Wilson, 1999).

The CMP noted no obvious decline in the extent of this habitat since the 1996 survey (Ryle *et al.*, 2009).

The target is that there should be no decline or change in the distribution of this habitat, unless it is the result of natural processes, including erosion and succession.

### **3.4 Structure and Functions**

A fundamental aim of shingle conservation is to facilitate natural mobility. Shingle beaches are naturally dynamic systems, making them of geomorphological interest, as well as ecological interest. They are constantly changing and shingle features are rarely stable in the long term.

#### **3.4.1 Physical structure: functionality and sediment supply**

The health and on-going development of this habitat relies on a continuing supply of shingle sediment. This may occur sporadically as a response to storm events rather than continuously. Interference with the natural coastal processes, through offshore extraction or coastal defence structures in particular, can interrupt the supply of sediment and lead to beach starvation.

The shingle beaches within Ireland's Eye SAC consist of coarse sand mixed with small shells and fine gravel (Moore and Wilson, 1999).

The target is to maintain, or where necessary restore, the natural circulation of sediment and organic matter, without any physical obstructions.

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

Ecological variation in this habitat type depends on stability; the amount of fine material accumulating between the pebbles; climatic conditions; width of the foreshore and past management of the site. The ridges and lows also influence the vegetation patterns, resulting in characteristic zonations of vegetated and bare shingle. In the frontal, less stable areas of shingle, the vegetation tends to be dominated by annuals and short-lived salt-tolerant perennials. Where the shingle is more stable, the vegetation becomes more perennial in nature and may include grassland, heathland and scrub, depending on the exact nature of the site. The presence of lichens indicates long-term stability of the shingle structure. Transitions to intertidal and sand dune habitats occur at this site.

At Ireland's Eye, there is an extensive area of bedrock shore, which grades into the sandy beaches and the shingle bank, which is backed by low sand hills (NPWS, 2014b).

The target is to maintain the range of coastal habitats, including transitional zones, subject to natural processes including erosion and succession.

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

The degree of exposure, as well as the coarseness and stability of the substrate determines species diversity.

The shingle beach at Ireland's Eye SAC has poor vegetation, mainly limited to some marram (*Ammophila arenaria*) at the back of the beach. One area of curled dock (*Rumex crispus*) was

recorded, as was silverweed (*Potentilla anserina*) and occasional spear-leaved orache (*Atriplex prostrata*). Sea kale (*Crambe maritima*), a characteristic species of this habitat, has been known from this site. Sea kale is listed as Near Threatened in the Irish Red List of Vascular Plants (Wyse Jackson *et al.*, 2016). Also occurring on the sandy/shingle beach is another species listed as Near Threatened, henbane (*Hyoscyamus niger*). Other species present here include sea campion (*Silene uniflora*), scarlet pimpernel (*Anagallis arvensis*) and common stork's-bill (*Erodium cicutarium*) (Ryle *et al.*, 2009).

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

#### **3.4.4 Vegetation composition: negative indicator species**

Where the shingle becomes more stabilised, negative indicator species can become an issue. Negative indicator species can include non-native species (e.g. *Centranthus ruber*, *Lupinus arboreus*), 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*).

At Ireland's Eye SAC, the negative indicator species creeping thistle (*Cirsium arvense*) and common nettle (*Urtica dioica*) are present but rare in this habitat (Ryle *et al.*, 2009).

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

## **4 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.”

#### **4.1 Overall Objective**

The overall objective for ‘Vegetated sea cliffs of the Atlantic and Baltic coasts’ in Ireland’s Eye 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.

#### **4.2 Area**

##### **4.2.1 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.

The distribution of vegetated sea cliffs as identified by Browne (2005) was re-digitised to match with the cliff boundary and is shown on a map in Appendix I. The length (area) of cliffs within the boundary of Ireland’s Eye SAC is estimated to be 2.57km.

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



## **4.3 Range**

### **4.3.1 Habitat Distribution**

The distribution of vegetated sea cliffs within Ireland's Eye SAC is presented in Appendix I.

The cliffs at Ireland's Eye extend from the north-west along the northern coastline to the south-east of the island and reach a height of 69m on the north-east side (NPWS, 2014a).

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

## **4.4 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.

### **4.4.1 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.

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.

### **4.4.2 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.

On Ireland's Eye, the main habitat is a mix of dry grassland with bracken (*Pteridium aquilinum*). The sea cliff flora at Ireland's Eye SAC grades into this grassland (NPWS, 2014a).

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.

#### **4.4.3 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 target is to maintain the structural variation in the sward height.

#### **4.4.4 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:

Typical pioneer slope species on soft cliffs		
<i>Agrostis stolonifera</i>	<i>Equisetum</i> spp.	<i>Tussilago farfara</i>
<i>Daucus carota</i>	<i>Lotus corniculatus</i>	
Flush on soft cliffs		
<i>Equisetum</i> spp.	Orchid species	<i>Schoenus nigricans</i>
Coastal heath on soft cliffs		
<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>	
Coastal grassland on soft cliffs		
<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:

Typical splash zone species on hard cliffs		
<i>Ramalina</i> spp.	<i>Verrucaria maura</i>	<i>Xanthoria</i> spp.
Typical crevice and ledge species on hard cliffs		
<i>Anthyllis vulneraria</i>	<i>Asplenium marinum</i>	<i>Armeria maritima</i>
<i>Aster tripolium</i>	<i>Atriplex prostrata</i>	<i>Beta vulgaris</i> subsp. <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>	
Typical coastal heath species on hard cliffs		
<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>	
Typical maritime grassland species on hard cliffs		
<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>

The sea cliff flora at Ireland's Eye SAC includes rock sea-spurrey (*Spergularia rupicola*), sea stork's-bill (*Erodium maritimum*), rock samphire (*Crithmum maritimum*), golden samphire (*Inula crithmoides*), rock sea-lavender (*Limonium binervosum*), meadow rue (*Thalictrum minor*), Portland spurge

(*Euphorbia portlandica*) and tree-mallow (*Lavatera arborea*) (NPWS, 2014a). This vegetation is indicative of hard cliff habitat.

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.

#### **4.4.5 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 seabird populations exercise a strong influence on the vegetation over much of the island and in places only those plants which can survive liberal spraying with guano manage to survive. Hogweed (*Heracleum sphondylium*), common nettle (*Urtica dioica*) and slender thistle (*Carduus tenuiflorus*) are common in such areas (NPWS, 2011).

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

#### **4.4.6 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.

No negative woody species have been recorded, but bracken (*Pteridium aquilinum*) has been recorded on the grasslands behind the cliffs (NPWS, 2014a).

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 perennial vegetation of stony banks and vegetated sea cliffs within Ireland’s Eye SAC

