

**Slieve League SAC (site code 189)
Conservation objectives supporting document
-coastal habitats**

NPWS

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Please note that this document should be read in conjunction with the following report:
NPWS (2015). Conservation Objectives: Slieve League SAC 000189. Version 1.0.
National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

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 (Commission of the European Communities, 2007). 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.

The Slieve League Special Area of Conservation (SAC) encompasses the coastline from Glen Bay, at Glencolumbkille, around to a point south-east of Teelin, in South County Donegal. Along the southern end of the site, very steep, often precipitous slopes and sea cliffs are found that are among the highest in Europe (590m O.D.), rising from the sea almost to the summit of Slieve League. The cliffs are predominantly quartzite and they are capped by an inlier of basal Carboniferous sandstones and conglomerates. Only parts of the less-steep slopes are vegetated.

Slieve League SAC (site code: 189) is designated for a range of habitats including sea cliffs. The following coastal habitats are included in the list of qualifying interests for the site:

- Vegetated sea cliffs of the Atlantic and Baltic coasts (1230)

This SAC also provides good breeding habitat for several seabird species and holds important populations of Chough and Peregrine.

This backing document sets out the conservation objective for the vegetated sea cliffs in Slieve League 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** is based 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 within Slieve League SAC is presented in Appendix I. The ISCS identified 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. This was carried out for the following 2 cliff sub-sites:

1. Malinmore
2. Malinbeg

The conservation objective for the vegetated sea cliff habitat within the entire SAC is extrapolated from Barron *et al.* (2011) and the sea cliff database, which was produced as part of that project.

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.

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 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; Commission of the European Communities, 2007; JNCC, 2004; Browne, 2005). 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."

Cliffs are known to occur along the southern side of Slieve League. Both hard and soft cliffs have been noted in this SAC (Browne, 2005; Barron *et al.*, 2011). However, it is estimated that over 80% of the cliffs are of the hard type.

The sea cliffs in this SAC are also important for sea bird colonies particularly cormorant (*Phalacrocorax carbo*), fulmar (*Fulmarus glacialis*), kittiwake (*Rissa tridactyla*), herring gull (*Larus argentatus*), great black backed gull (*Larus marinus*), lesser black-backed gull (*Larus fuscus*), shag (*Phalocorax aristotelis*), black guillemot (*Cephus grille*), guillemot (*Uria aalge*), (NPWS internal files; Lloyd, 1982).

Important populations of peregrine falcon (*Falco peregrinus*) and chough (*Pyrrhocorax pyrrhocorax*) also occur at this site.

3.1 Overall Objective

The overall objective for 'vegetated sea cliffs of the Atlantic and Baltic coasts' in Slieve League 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 extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target is 'no decrease in extent 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 extent of vegetated sea cliffs as identified during the Irish Sea Cliff Survey (ISCS) (Barron *et al.*, 2011) is shown on a map in Appendix I.

As cliffs are linear features on maps, their extent is measured in kilometres rather than hectares, as you would with 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 a length of cliff were discounted from the calculations. The total length of the cliff sections within each sub-site in Slieve League SAC is presented in the following table. The area of each cliff that is located within the SAC boundary is also presented.

There is a difference in the total mapped lengths given in the table below due to 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 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 sites was 37.34km (i.e. 15.36km and 21.98km). However when, this dataset was clipped to the SAC boundary, just 34.72km was included in the boundary. However in reality this figure is likely to be higher as a result of these mapping anomalies.

Site name	Total area/length (km) of desk survey sea cliff from ISCS	Total area/length (km) of sea cliff within SAC boundary
Malinmore	15.36	12.84
Malinbeg	21.98	21.87
Totals	37.34	34.72

3.3 Range

3.3.1 Habitat Distribution

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

The sea cliffs in Slieve League SAC are widely distributed throughout the SAC site and are best developed along the southern side, where the sea cliffs can reach heights in excess of 590m OD, rising from the sea almost to the summit of Slieve League (Browne, 2005; Barron *et al.*, 2011). Both hard and soft cliff types are present within the site, with hard cliffs being more common. The hard cliffs in Slieve League SAC are unlikely to be redistributed through natural processes, unlike more dynamic coastal systems such as sand dunes and saltmarshes.

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 Functionality and hydrological regime

Coastal protection works can disrupt the natural integrity of a sea cliff. The health and ongoing 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.

Hydrological features such as gullies, streams or cascade were identified by the ISCS as occurring at the Malinmore and Malinbeg sub-sites (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 sea bird activity. The rocky cliff flora often grades naturally into coastal heath vegetation and maritime grassland on the terrestrial side and reefs in the marine.

The Annex I habitat ‘Alpine and Boreal heaths (4060)’ occurs adjacent to the sea cliff vegetation, as well as on the summit and inland cliffs of Slieve League and on Lehan and Lergadaghtan peaks.

The target is to maintain the sea cliff habitat, 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 target is to maintain the structural variation in the sward height.

3.4.4 Vegetation composition: typical species & 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 sea birds and maritime therophyte communities are exceptions to this horizontal zonation and can occur as a mosaic with the other plant communities. The following tables presents lists of species that are considered typical of the different zones associated with soft cliffs and hard cliffs by Barron *et al.* (2011), such as those found in Slieve League SAC.

At Slieve League, vegetation occurs on steep but not vertical cliffs, with areas of large slips and loose material covered in ling (*Calluna vulgaris*) and bracken (*Pteridium aquilinum*). Other species of the cliffs include rock samphire (*Crithmum maritimum*), thrift (*Armeria maritima*), sea campion (*Silene uniflora*), devils-bit scabious (*Succisa pratensis*), bearberry (*Arctostaphylos uva-ursi*), purple saxifrage (*Saxifraga oppositifolia*) and alpine meadow-rue (*Thalictrum alpinum*). A high percentage of the cliffs are vegetated. Towards Carrigan Head to the east the cliffs become lower and steeper and are less well-vegetated. Lower cliffs also occur to the west of Slieve League. Those found about Trabane Bay support a rich flora, especially near areas of seepage. Species occurring here include common juniper (*Juniperus communis*), buck's-horn plantain (*Plantago coronopus*), sea plantain (*Plantago maritima*), thrift (*Armeria maritima*), sea campion (*Silene uniflora*), black bog rush (*Schoenus nigricans*), ivy (*Hedera helix*) as well as maidenhair fern (*Adiantum capillus-veneris*).

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.	<i>Orchid</i> species	<i>Schoenus nigricans</i>
Coastal heath		
<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>

Typical splash zone species on hard cliffs		
<i>Ramalina spp</i>	<i>Verrucaria maura</i>	<i>Xanthoria spp</i>
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>Catapodium marinum</i> <i>Festuca rubra</i> <i>Ligusticum scoticum</i> <i>Plantago maritima</i> <i>Silene uniflora</i>	<i>Atriplex prostrata</i> <i>Cerastium diffusum</i> <i>Inula crithmoides</i> <i>Limonium sp</i> <i>Sedum anglicum</i> <i>Spergularia rupicola</i>	<i>Beta vulgaris ssp. maritima</i> <i>Crithmum maritimum</i> <i>Lavatera arborea</i> <i>Plantago coronopus</i> <i>Sedum rosea</i>
Typical coastal heath species		
<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>

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 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* sp., *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*).

Bracken (*Pteridium aquilinum*) occurs on the cliffs at Slieve League.

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 the maritime grasslands and coastal heath leads to a reduction in species diversity.

Bracken occurs on the cliffs at Slieve League.

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.

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Appendix I – Distribution map of sea cliffs within Slieve League SAC

