

NPWS

Ballyhoorisky Point to Fanad Head SAC
(site code: 001975)

**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: Ballyhoorisky Point to Fanad Head SAC 001975. 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.

Ballyhoorisky Point to Fanad Head SAC is a large coastal site that lies approximately 20km north of Millford, Co. Donegal and extends around the coast for over 20km. The bedrock geology is dominated by granodiorite and quartzite (NPWS, 2015).

This SAC contains a diversity of coastal habitats including sea cliffs, sandy beaches, shingle beaches, sand dunes and coastal heath, as well as blanket bog, lakes and other wetlands.

Peregrine (*Falco peregrinus*) and chough (*Pyrrhocorax pyrrhocorax*) breed on the cliffs within the site. These species are listed on Annex I of the EU Birds Directive. Other coastal habitats are of importance for wintering waterfowl (NPWS, 2015).

Ballyhoorisky Point to Fanad Head SAC (site code: 001975) is selected for shingle beaches, sea cliffs, oligotrophic lakes, hard water lakes, narrow-mouthed whorl snail (*Vertigo angustior*) and the plant slender naiad (*Najas flexilis*). The following two coastal habitats are included in the list of Qualifying Interests for the SAC:

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

The known distribution of perennial vegetation of stony banks sites in the SAC is presented in Appendix I and the distribution of vegetated sea cliffs in Appendix II.

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 Ballyhoorisky Point to Fanad Head 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 three sub-sites within Ballyhoorisky Point to Fanad Head SAC:

1. Fanad Head (NSBS site ID: 0020)
2. Ballyhiernan Bay (NSBS site ID: 0021)
3. Rinboy Point to Ballyhoorisky Island (NSBS site ID: 0022)

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 National Shingle Beach Survey (NSBS) rated all three of the sub-sites within Ballyhoorisky Point to Fanad Head SAC as being of low interest due to either poor vegetation, in the case of Fanad Head and Rinboy Point to Ballyhoorisky Island, or poor shingle deposits, in the case of Ballyhiernan Bay.

The vegetated shingle habitat was not mapped at any of the sub-sites during 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 site.

Some vegetated shingle (*circa* 0.26ha) was also recorded during the Coastal Monitoring Project (CMP) within the sub-site Magheradrumman (CMP site ID: 172) (Ryle *et al.*, 2009).

The targets set for **vegetated sea cliffs** are 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 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. A total of four sub-sites associated with Ballyhoorisky Point to Fanad Head SAC were assessed:

1. Croaghross (ISCS site ID: 03013)
2. Doagh Beg (ISCS site ID: 03014)
3. Pollet (ISCS site ID: 03043)
4. Rinboy (ISCS site ID: 03044)

None of the sub-sites above were surveyed in the field, but were assessed as part of a desk study (Barron *et al.*, 2011).

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-sites surveyed by the ISCS represent the total extent of vegetated sea cliffs within Ballyhoorisky Point to Fanad Head SAC.

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.

3.1 Overall Objective

The overall objective for 'Perennial vegetation of stony banks' in Ballyhoorisky Point to Fanad Head SAC is to '*restore 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 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 exact current extent of this habitat in Ballyhoorisky Point to Fanad Head SAC is unknown. The National Shingle Beach Survey (NSBS) recorded the presence of vegetated shingle but did not map the extent at the three sub-sites Fanad Head, Ballyhiernan Bay and Rinboy Point to Ballyhoorisky Island (Moore and Wilson, 1999).

The Coastal Monitoring Project (Ryle *et al.*, 2009) mapped an area of 0.26ha of vegetated shingle at the Magheradrumman sub-site (CMP site ID: 172) where it occurred in association with sand dunes and machair (Ryle *et al.*, 2009).

It is important to note that the total extent of vegetated shingle within the SAC is likely to be much greater.

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 Ballyhoorisky Point to Fanad Head SAC is unknown; however, the recorded locations of shingle sites in the SAC are presented on a map in Appendix I.

At Ballyhoorisky Point to Fanad Head SAC, shingle beaches are best developed in the various small sheltered bays, especially between Ballyhoorisky Point and Rinboy Point, and also along the stretch of coastline between Rinmore and Currin Point and at Glashagh Bay. Perennial shingle vegetation was recorded by the CMP (Ryle *et al.*, 2009) at Trabeg, in the western part of the Magheradrumman sub-site, where it adjoins machair. The cobble beach at Ballyhiernan Bay was described by the CMP as unvegetated (Ryle *et al.*, 2009).

The NSBS describes Fanad Head as a rocky headland with various storm and raised beaches. Ballyhiernan Bay is described as mainly a sandy beach with a small shingle deposit at the east end of the bay. Rinboy Point to Ballyhoorisky Island is described as small storm deposits of shingle (Moore and Wilson, 1999).

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.

At Ballyhoorisky Point to Fanad Head SAC, the shingle habitat is naturally sparsely vegetated and extremely mobile, reflecting the high-energy dynamic environment of this coastline. Shingle beaches are highly efficient dissipaters of wave energy often forming important natural sea defences. According to Ryle *et al.* (2009), extraction of shingle and sand is on-going at the site. This diminishes the natural protection the shingle provides as well as reducing the extent of the habitat, and also the potential for perennial vegetation to form on the cobble structures (Ryle *et al.*, 2009).

The frontline of the beach at Ballyhiernan where unvegetated cobble occurs is heavily impacted by natural erosion, compounded by recreational activities, most notably quad biking. The pressure from the quad bikes is undermining the cobble ridge and compacts the sand and shingle substrates of the beach (Ryle *et al.*, 2009).

The NSBS describes the shingle beach at Ballyhiernan Bay, as being of low importance due to poor shingle deposits and poor vegetation on this exposed site. This is a high-energy storm deposit frequently disturbed by wave action. It is a low ridge, 1.5m high, consisting of cobble and pebbles on top of a sandy beach (Moore and Wilson, 1999).

The NSBS describes the shingle at Fanad Head as consisting of granite, mudstone and sandstone. The NSBS noted numerous tyre marks on the shingle at Fanad Head and the shingle beach is impacted by extraction (Moore and Wilson, 1999).

At Rinbooy Point to Ballyhoorisky Island, the NSBS describes the exposed shingle beach as small storm deposits of shingle and considers it to be of low importance as it is poorly vegetated. It is classified as a vegetated fringing beach consisting of granite, mudstone and gravel (Moore and Wilson, 1999).

At Glashagh, the NSBS describes a very exposed beach with lots of kelp on the strandline. There is grassland covering the shingle (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 Ballyhoorisky Point to Fanad Head SAC, the NSBS describes the shingle beach at Fanad Head as having a vegetated shingle ridge that is associated with intertidal shingle, rocky shore, shingle-based grassland and cliffs. The shingle beach at Ballyhiernan Bay is described as a vegetated fringing beach which is associated with shingle-based grassland, mobile dunes and sheep-grazed machair. The tidal bay is backed by cobble-based grassland with outcrops of bedrock. At Rinbooy Point to Ballyhoorisky Island the associated habitats are cliff, machair and sand dunes (Moore and Wilson, 1999).

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.

At Ballyhoorisky Point to Fanad Head SAC, the shingle beach at Trabeg comprises a mix of shingle and sand, so there is both perennial shingle and annual strandline species present. The typical species of perennial vegetation of stony banks include curled dock (*Rumex crispus*) and scentless

mayweed (*Tripleurospermum maritimum*). The annual strandline species typical of sand substrate sea rocket (*Cakile maritima*) and orache species (*Atriplex* spp.) are also present in places where sand has gathered over the shingle. Other species present include silverweed (*Potentilla anserina*), sand couch (*Elytrigia juncea*), sea holly (*Eryngium maritimum*), sea sandwort (*Honkenya peploides*), sea mayweed (*Matricaria maritima*) and red fescue (*Festuca rubra*) (Ryle *et al.*, 2009).

The typical perennial species that dominates the vegetated shingle at Glashagh Bay is curled dock (*Rumex crispus*) along with the annual strandline species cleavers (*Galium aparine*), which is typical of shingle substrate. Other species present include silverweed (*Potentilla anserina*) and Yorkshire fog (*Holcus lanatus*) (Ryle *et al.*, 2009).

The NSBS assessed the exposed shingle beach at Fanad Head as low interest due to poor vegetation cover. The vegetation consisted of creeping bent (*Agrostis stolonifera*), spear-leaved orache (*Atriplex prostrata*), daisy (*Bellis perennis*), thistles (*Cirsium* spp.), common scurvygrass (*Cochlearia officinalis*), red fescue (*Festuca rubra*), cleavers (*Galium aparine*), Yorkshire fog (*Holcus lanatus*), ribwort plantain (*Plantago lanceolata*), broadleaved plantain (*P. major*), creeping buttercup (*Ranunculus repens*), curled dock (*Rumex crispus*), ragwort (*Senecio jacobaea*), dandelion (*Taraxacum* agg.), red clover (*Trifolium pratense*), white clover (*T. repens*), scentless mayweed (*Tripleurospermum maritimum*) and common nettle (*Urtica dioica*) (Moore and Wilson, 1999).

The NSBS recorded the sparse vegetation at Ballyhiernan Bay as consisting of curled dock (*Rumex crispus*) and marram grass (*Ammophila arenaria*). There was no vegetation on the open shingle. The stabilised raised beach is partially covered by grassland contained red fescue (*Festuca rubra*), silverweed (*Potentilla anserina*), ribwort plantain (*Plantago lanceolata*), creeping bent (*Agrostis stolonifera*) and ragwort (*Senecio jacobaea*) (Moore and Wilson, 1999).

At Rinboj Point to Ballyhoorisky Island, the NSBS recorded the species curled dock (*Rumex crispus*) and common meadow-grass (*Poa pratensis*). This shingle beach was back by grassland consisting of red fescue (*Festuca rubra*), ribwort plantain (*Plantago lanceolata*), white clover (*Trifolium repens*), red clover (*T. pratense*) and wild carrot (*Daucus carota*) (Moore and Wilson, 1999).

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 Ballyhoorisky Point to Fanad Head SAC, the NSBS noted the presence of common nettle (*Urtica dioica*) on the exposed shingle beach at Fanad Head (Moore and Wilson, 1999).

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."

At Ballyhoorisky Point to Fanad Head SAC, the Irish Sea Cliff Survey (ISCS) recorded four sub-sites all consisting of hard cliffs and ranging in height from 10m to 30m (Barron *et al.*, 2011).

4.1 Overall Objective

The overall objective for 'Vegetated sea cliffs of the Atlantic and Baltic coasts' in Ballyhoorisky Point to Fanad 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.

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. 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 area/length of the cliff sections within each of the four sub-sites associated with Ballyhoorisky Point to Fanad Head SAC is presented in the following table. The area/length of cliff sections that are located within the SAC boundary is also presented.

Sub-site Name	Total area/length (km) of sea cliff sections from ISCS	Total area/length (km) of sea cliff sections within SAC boundary
Croaghross	4.26	4.25
Doagh Beg	1.01	0.95
Pollet	4.52	4.50
Rinboy	0.73	0.73
Total	10.52	10.43

The difference between the two sets of figures is explained by the fact that the ISCS mapped the total sea cliff resource at the sub-sites and not all of the sea cliff mapped is necessarily 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 four sub-sites was 10.52km. When this dataset was clipped to the SAC boundary, 10.43km was included within the boundary of the 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 process, including erosion.

4.3 Range

4.3.1 Habitat Distribution

The distribution of sea cliffs throughout Ballyhoorisky Point to Fanad Head SAC, as identified by the ISCS (Barron *et al.*, 2011), is presented in Appendix II.

The ISCS surveyed four cliff sub-sites associated with Ballyhoorisky Point to Fanad Head SAC: Croaghross, Doagh Beg, Pollet and Rinboy (Barron *et al.*, 2011).

Vegetated sea cliffs are well-represented at Ballyhoorisky Point to Fanad Head SAC. The cliffs are generally low but are best developed to the south of Fanad Head where they reach a maximum height of 30m (Barron *et al.*, 2011).

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.

At Ballyhoorisky Point to Fanad Head SAC, the cliffs are of the rocky/hard type and no groundwater seepages or flushes associated with the sea cliffs were recorded by the ISCS (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.

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.

At Ballyhoorisky Point to Fanad Head SAC, the base of the cliffs consists of bedrock, gravel and shingle. The cliff-top soils are shallow, lithosolic-podzolic type soils with peaty topsoil (parent material mainly non-calcareous) (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.

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> 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>	
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>

At Ballyhoorisky Point to Fanad Head SAC, species such as thrift (*Armeria maritima*), sea campion (*Silene vulgaris* subsp. *maritima*), common scurvygrass (*Cochlearia officinalis*), buck's-horn plantain (*Plantago coronopus*), sea plantain (*P. maritima*), angelica (*Angelica sylvestris*) and the scarce roseroot (*Rhodiola rosea*) occur on the cliffs (NPWS, 2005). The Near Threatened species (Wyse

Jackson *et al.*, 2016) Scots lovage (*Ligusticum scoticum*) has been recorded from sea cliffs in this SAC (NPWS, 2015).

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 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.

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.

5 References

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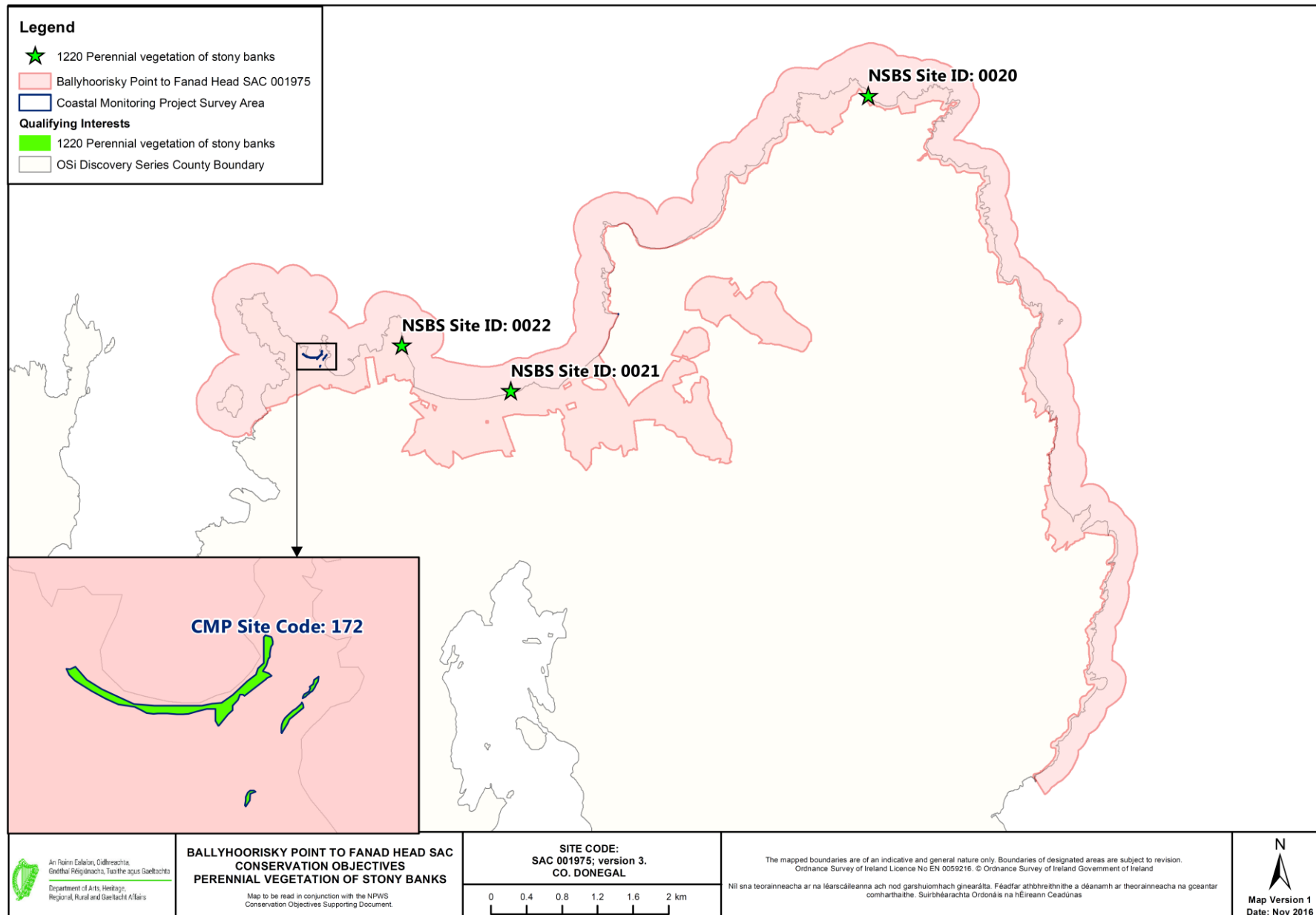
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Appendix I – Distribution map of perennial vegetation of stony banks within Ballyhoorisky Point to Fanad Head SAC



Appendix II – Distribution map of vegetated sea cliffs within Ballyhoorisky Point to Fanad Head SAC

