

**Lambay Island SAC (site code 204)
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 (2013). Conservation Objectives: Lambay Island SAC 000204. 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.

Lambay is the largest Irish east coast island, lying 4km off the Dublin coast. The underlying geology is dominated by igneous rocks (of andesitic type) and ash. Shales and limestones of Silurian origin are also present in addition to some massive beds of old red sandstone. The bedrock is exposed on the fringing cliffs and in rocky outcrops, elsewhere it is overlain by varying depths of glacial drift. The island is surrounded by steep cliffs on the northern, eastern and southern sides. The western shore is low-lying and the island slopes gently to the summit in the centre of the island. Most of the western third of the island is intensively farmed, while the remainder is a mixture of less intensively grazed land, rock outcrops, scrub and bracken. There are small areas of woodland around Lambay Castle and farm.

Lambay Island SAC (site code: 204) is designated for the following single coastal habitat:

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

Vegetated sea cliffs is a notable habitat on the island and these are quite representative of Irish east-coast cliffs with diversity in height, slope and aspect. The north, east and south sides of Lambay have generally steep cliffs. These vary from sheer rock-face of c.60m such as at Seal Hole, to more gently sloping areas such as at parts of the north side of the island. The site is also selected for the Annex I marine habitat reefs.

The cliffs also hold internationally important populations of breeding seabirds including guillemot (*Uria aalge*), razorbill (*Alca torda*), kittiwake (*Rissa tridactyla*), puffin (*Fratercula arctica*), shag (*Phalacrocorax aristotelis*) and manx shearwater (*Puffinus puffinus*). The site is also of conservation value for populations of grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) for which the site is also designated as a Special Area of Conservation.

This backing document sets out the conservation objectives for Vegetated Sea Cliffs on Lambay Island 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 the **vegetated sea cliffs** are based in part 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. However, as the site was not visited during the ISCS, the conservation objective for the vegetated sea cliff habitat within this SAC is quite generic and may be adjusted in the future in light of new information.

2 Conservation Objectives

The conservation objective aims to define the favourable conservation condition of a habitat or species at a particular site. Implementation of these objectives 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, 2003; 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.”

3.1 Overall Objective

The overall objective for ‘vegetated sea cliffs of the Atlantic and Baltic coasts’ in Lambay Island SAC is to ‘maintain favourable conservation condition’.

The objective is based on an assessment of the current 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 distribution of vegetated sea cliffs as identified during Browne (2005) and redigitised to match with the cliff boundary 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. The total length of the cliff sections within Lambay Island SAC is presented in the following table.

Site name	Total area/length (km) of sea cliff within SAC boundary
Lambay Island	7.27
Total	7.27

The estimated area (length) of sea cliffs within Lambay Island SAC is 6.9km. The target is that the area should be stable, subject to natural processes, including erosion.

3.3 Range

3.3.1 Habitat Distribution

The distribution of sea cliffs in Lambay Island SAC as identified by Browne (2005) is presented in Appendix I. Sea cliffs are distributed along the north, east and south coastline of Lambay Island SAC. They vary from sheer rock face of c.60m, such as at Seal Hole, to more gently sloping areas such as at parts of the north side of the island.

Hard cliff is the pre-dominant cliff type. The hard cliffs in Lambay Island 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.

Within the cliffs of Lambay Island there are some sheltered gullies that have small areas of scrub woodland composed of stunted elder (*Sambucus nigra*). One or two streams flow into these gullies. Some caves also occur in the cliffs on the eastern side of the island.

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

Within Lambay Island, the zone of cliff vegetation is very narrow and confined to the cliff edge owing to grazing pressures. This results in an abrupt change from cliff-vegetation to semi-improved pasture.

The target is to maintain the range of sea cliff habitat zonations, including transitional zones, subject to natural processes including erosion and succession.

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.

Excessive grazing close to the cliff edge has confined the maritime vegetation to a narrow zone.

The target is to maintain the structural variation within the sward.

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 present 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 Lambay Island SAC.

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</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> sp	<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		
<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 vegetation of the steep cliff faces of Lambay Island has not been investigated in recent years but species such as golden-samphire (*Inula crithmoides*) and wild madder (*Rubia peregrina*) have been recorded in the past, The less steep slopes higher up have a light covering of till which grades into maritime turf with typical vegetation including spring squill (*Scilla verna*), sea campion (*Silene uniflora*), thrift (*Armeria maritima*), common scurvy grass (*Cochlearia officinalis*), rock sea spurrey (*Spergularia rupicola*) and English stonecrop (*Sedum anglicum*).

A notable feature in some areas is the dominance of bluebell (*Hyacinthoides non-scriptus*) on the maritime turf. Knotted clover (*Trifolium striatum*), spring squill (*Scilla verna*) and spring vetch (*Vicia lathyroides*), the last of which is a Red Data Book species (Curtis & McGough, 1988), were recorded on the cliff tops where gull colonies do not extend (Goodwillie *et al.*, 1988). These species are locally common on the east coast of Ireland (Preston *et al.*, 2002)

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*) is common on the gently sloping northern cliffs at Lambay.

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.

At Lambay Island, Bracken (*Pteridium aquilinum*) is common on the gently sloping northern cliffs and small sheltered gullies support scrub woodland composed mostly of stunted elder (*Sambucus nigra*).

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

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Appendix I–Distribution map of sea cliff habitat within Lambay Island SAC

