Roaringwater Bay and Islands SAC (site code: 101)
Conservation objectives supporting document
-coastal habitats

Version 1

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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, 2003). 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.

Roaringwater Bay and Islands SAC (site code: 101) is designated for for a range of marine and coastal habitats including reefs, marine caves, large shallow inlets and bays, dry heaths and sea cliffs. The following coastal habitat is included as a qualifying interest for the site:

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

This backing document sets out the conservation objectives for the vegetated sea cliffs in Roaringwater Bay and Islands SAC, which is defined by a list of parameters, attributes and targets. The main parameters are (a) Area, (b) Range and (c) Structure and Functions, the latter of which is broken down into a number of attributes, including functionality, vegetation structure and vegetation composition.

The targets set for the vegetated sea cliffs is 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.

The Irish Sea Cliff Survey (ISCS) identified the following 19 sub-sites within Roaringwater Bay:

1. Baltimore
2. Hare Island South
3. Carhoona, Clear Island
4. Ballyieragh, Cape Clear
5. Lissamona, Clear Island
6. Ballyieragh Sought, Cape Clear
7. Glen West, Clear Island
8. Glen East, Clear Island
9. Comillane North
10. Comillane South
11. Cloddagh North, Sherkin Island
12. Cloddagh South, Sherkin Island
13. Slievemore North, Sherkin Island
14. Slievemore South, Sherkin Island
15. Harboursmouth, Sherkin Island
16. Kilmoon, Sherkin
17. Hare Island West
18. Skeam West
19. Skeam East

Two of these sub-sites were visited during the Irish Sea Cliff Survey (Barron *et al*., 2011) and assessed using the remote survey methodology. The two sites were Cloddagh North (located on Sherkin Island) and Hare Island West.

The conservation objective for the vegetated sea cliff habitat within the entire SAC are extrapolated from Barron *et* al. (2011) and the sea cliff database, which was produced as part of that project. It is estimated that the two sub-sites surveyed by the ISCS represent approximately 17% of the total length of vegetated sea cliffs within Roaringwater Bay and Islands SAC.

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 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 mechanical 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.

The sea cliffs in Roaringwater Bay are of the hard variety and are generally composed of sandstone, conglomerate and siltstone. The cliffs support a typical maritime flora and provide habitat for a typical diversity of cliff nesting bird species, notably peregrine falcon (*Falco peregrinus*) and chough (*Pyrrhocorax pyrrhocorax*).

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) of 3m high (soft cliffs), or no longer has a steep slope. To be considered in this study, a cliff had to be a minimum of 100m in length. Sea cliffs may support a range of plant communities such as grassland, heath, scrub and bare rock communities, among others."

3.1 Overall Objective

The overall objective for 'vegetated sea cliffs of the Atlantic and Baltic coasts' in Roaringwater Bay and Islands SAC is to 'maintain the favourable conservation condition'. This 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 the Irish Sea Cliff Survey (ISCS) (Barron *et al.,* 2011) is shown on a map in Appendix I. High rocky sea cliffs are confined to the southern and south-western sides of Clear Island and Sherkin Island. The steep areas of rocky cliffs are generally between 30m and 60m in height, but more sloping ground with a heath covering extends to 120m on Clear Island and to 100m on Sherkin Island. Low, gently sloping cliffs occur elsewhere on some of the islands and on coastal sections of the mainland (mostly less than 30m).

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 Roaringwater Bay is presented in the following table. The area of each cliff that is located within the SAC boundary is also presented.

Site name	Total area/length (km) of sea cliff from ISCS	Total area/length (km) of sea cliff within SAC boundary
Baltimore	2.00	0.79
Hare Island South	0.45	0.45
Carhoona, Clear Island	0.96	0.40
Ballyieragh, Cape Clear	7.16	7.16
Lissamona, Clear Island	1.42	1.23
Ballyieragh South, Cape Clear	0.43	0.43
Glen West, Clear Island	0.65	0.64
Glen East, Clear Island	0.35	0.35
Comillane North	0.29	0.29
Comillane South	0.11	0.11
Cloddagh North, Sherkin Island	2.18	1.94
Cloddagh South, Sherkin Island	1.05	0.97
Slievemore North, Sherkin Island	0.71	0.68
Slievemore South, Sherkin Island	1.51	1.51
Harboursmouth, Sherkin Island	1.40	1.33

Kilmoon, Sherkin	0.51	0.51
Hare Island West	1.61	1.61
Skeam West	0.22	0.22
Skeam East	0.38	0.38
Totals	**23.39**	**21.02**

There are a number of differences in the two sets of figures above. Most of the differences are explained by the fact that the ISCS mapped the total sea cliff resource at each 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 than 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 recorded by the ISCS in the Roaringwater Bay area was 23.4km. However, when this dataset was clipped to the SAC boundary 21.02km was included within the boundary. However, in reality this figure is likely to be higher as a result of these mapping anomalies.

3.3 Range

3.3.1 Habitat distribution

The distribution of sea cliffs throughout Roaringwater Bay and Islands as identified by the Irish Sea Cliff Survey is presented in Appendix I. The hard cliffs in Roaringwater Bay are not likely to be redistributed through natural processes, unlike other more dynamic coastal systems such as sand dunes or 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 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.

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.

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, the 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 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 table presents lists of species are considered typical of the different zones associated with hard cliffs by Barron *et al*. (2011), such as those found at Roaringwater Bay.

Typical splash zone species			
Ramalina spp.	*Verrucaria maura*	*Xanthoria* spp.	
Typical crevice & ledge species			
Anthyllis vulneraria	*Asplenium marinum*	*Armeria maritima*	*Aster tripolium*
Atriplex prostrata	*Beta vulgaris* ssp. m*aritima*	*Cerastium diffusum*	*Lavatera arborea*
Catapodium marinum	*Crithmum maritimum*	*Festuca rubra*	*Limonium* sp.
Inula crithmoides	*Ligusticum scoticum*	*Plantago coronopus*	*Plantago maritima*
Sedum anglicum	*Spergularia rupicola*	*Sedum rosea*	*Silene uniflora*
Typical coastal heath species			
Calluna vulgaris	*Daboecia cantabrica*	*Empetrum nigrum*	*Erica cinerea*
Erica tetralix	*Vaccinium myrtilus*	*Scilla verna*	*Ulex gallii*
Typical maritime grassland species			
Anthyllis vulneraria	*Armeria maritima*	*Daucus carota*	*Festuca rubra*
Crithmum maritimum	*Hyacinthoides non-scripta*	*Plantago coronopus*	*Plantago maritima*
Sedum anglicum	*Spergularia rupicola*	*Silene uniflora*	*Scilla verna*

The cliffs in Roaringwater Bay have a typical maritime vegetation associated with hard cliffs with sea pink (*Armeria maritima*), scurvy grass (*Cochlearia* spp.), red fescue (*Festuca rubra*), sea campion (*Silene maritima*), plantains (*Plantago maritima*, *P. coronopus*), sea samphire (*Crithmum maritimum*), tree mallow (*Lavatera arborea*) and locally, dotted sedge (*Carex punctata*), and the slender spikerush (*Eleocharis uniglumis*).

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*).

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.

The target for this attribute is that in the case of maritime grassland an/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 Manual*s, No. 53. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Browne, A. (2005). *National inventory of sea cliffs and coastal heaths.* Unpublished report to the National Parks and Wildlife Service, Dublin.

Commission of the European Communities (2003). *Interpretation Manual of European Union Habitats – EUR 25*. DG Environment-Nature and Biodiversity, Brussels.

Fossitt, J.A. (2000).*A guide to habitats in Ireland.* The Heritage Council, Kilkenny.

JNCC (2004). *Common standards and monitoring guidance for maritime cliff and slope habitats*. Joint Nature Conservation Committee, Peterborough, UK.

Appendix I – Map of Roaringwater Bay and Islands showing the distribution of vegetated sea cliffs as identified by the Irish Sea Cliff Survey (based on data from Barron *et al*., 2011).