

**Rutland Island and Sound SAC (site code 2283)  
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: Rutland Island and Sound SAC 002283. 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.

Rutland Island (also known as Inishmacadurn) lies between Aran Island and Burtonport in north-west Donegal, 5km north-west of Dunglow. Rutland Channel and Sound is a complex of small islands, shallow reefs and sediment communities sheltered from wave action with varying degrees of current. Arranmore Island lies approximately 1km to the west of Rutland Island and provides some shelter to Rutland from the westerly winds. The bedrock is mainly metamorphic quartzite with intrusions of igneous granite and other rocks rich in silica on the south coast of Arranmore Island. Rutland Island has a substantial area of dunes, with highly calcareous sands over granite bedrock.

The island was previously populated and up until two hundred years ago it was the commercial capital of the North West. In the 1780s a planned settlement was installed on the island, including a street of residences and business premises, a post office and a school house, as well as a fish landing and processing facility (Walsh, 2004). When fish catches declined heavily shortly after construction in 1793, services began to close or leave the island, though it remained sparsely inhabited into the 1960s. Mains electricity reached the island in 1957, due to it being a crucial stepping stone for the Arranmore supply, but piped water has never been provided for its remaining housing stock, which consists entirely of holiday homes, mostly built in the first decade of the 2000s

Rutland Island and Sound SAC (site code: 2283) is designated for a range of coastal habitats including sand dunes. The following five coastal habitats are included in the qualifying interests for the site (\* denotes a priority habitat):

- Annual vegetation of drift lines (1210)
- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)\*
- Humid dune slacks (2190)

All five habitats are associated with sand dune systems, and are found in close association with each other.

This backing document sets out the conservation objectives for the five coastal habitats listed above in Rutland Island and Sound 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.

Rutland Island and Sound SAC was not surveyed by the Coastal Monitoring Project due to access difficulties and time constraints (Ryle *et al.*, 2009). The current targets set for the **sand dune habitats**, therefore, are based on generic targets and may change in light of future survey work

## 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 Sand dune habitats

Sand dunes are hills of wind-blown sand that have become progressively more stabilised by a cover of vegetation. In general, most sites display a progression through strandline, foredunes, mobile dunes and fixed dunes. Where the sandy substrate is decalcified, fixed dunes may give way to dune heath. Wet hollows, or dune slacks, occur where the dunes have been eroded down to the level of the water-table. Machair is a specialised form of dune system that is only found on the northwest coasts of Ireland and Scotland. Transitional communities can occur between dune habitats and they may also form mosaics with each other. Dune systems are in a constant state of change and maintaining this natural dynamism is essential to ensure that all of the habitats present at a site achieve favourable conservation condition.

In Ireland, there are 9 sand dune habitats (including annual vegetation of drift lines) listed under Annex I of the EU Habitats Directive (92/43/EEC) (\* denotes a priority habitat):

- **Annual vegetation of drift lines (1210)**
- **Embryonic shifting dunes (2110)**
- **Shifting dunes along the shoreline with *Ammophila arenaria* (2120)**
- **Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) \***
- Decalcified dunes with *Empetrum nigrum* (2140) \*

- Decalcified dune heath (2150) \*
- Dunes with *Salix repens* (2170)
- **Humid dune slacks (2190)**
- Machair (21AO) \*

Five dune habitats are listed as Qualifying Interests for Rutland Island and Sound SAC. These habitats include mobile areas at the front, as well as more stabilised parts of dune systems, including humid dune slacks.

Annual vegetation of drift lines is found on beaches along the high tide mark, where tidal litter accumulates. It is dominated by a small number of annual species (i.e. plants that complete their life-cycle within a single season). Tidal litter contains the remains of marine algal and faunal material, as well as a quantity of seeds. Decaying detritus in the tidal litter releases nutrients into what would otherwise be a nutrient-poor environment. The habitat is often represented as patchy, fragmented stands of vegetation that are short-lived and subject to frequent re-working of the sediment. The vegetation is limited to a small number of highly specialised species that are capable of coping with salinity, wind exposure, an unstable substrate and lack of soil moisture. Typical species include spear-leaved orache (*Atriplex prostrata*), frosted orache (*A. laciniata*), sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*) and prickly saltwort (*Salsola kali*).

Embryonic dunes are low accumulations of sand that form above the strandline. They are sometimes referred to as foredunes, pioneer dunes or embryo dunes, as they can represent the primary stage of dune formation. They are characterised by the presence of the salt-tolerant dune grasses sand couch (*Elytrigia juncea*) and lyme grass (*Leymus arenarius*), which act as an impediment to airborne sand. Strandline species can remain a persistent element of the vegetation.

Where sand accumulation is more rapid, marram grass (*Ammophila arenaria*) invades, initiating the transition to mobile dunes (Shifting dunes along the shoreline with *Ammophila arenaria*). Marram growth is actively stimulated by sand accumulation. These unstable and mobile areas are sometimes referred to as 'yellow dunes' (or white dunes in some European countries), owing to the areas of bare sand visible between the tussocks of marram.

Fixed dunes refers to the more stabilised area of dune systems, generally located in the shelter of the mobile dune ridges, where the wind speed is reduced and the vegetation is removed from the influence of tidal inundation and salt spray. This leads to the development of a more or less closed or 'fixed' carpet of vegetation dominated by a range of sand-binding species (Gaynor, 2008).

Humid dune slacks are wet or moist depressions between dune ridges. They are characterised by the occurrence of a water-table that is maintained by a combination of groundwater (which may or may not be slightly saline), precipitation and an impermeable layer in the soil. In the winter, the water-table normally rises above the soil surface and inundation occurs. In spring and summer, the water-table drops, but the top layer of the soil remains wet. Proximity of the water-table to the surface is evidenced in the vegetation, in which rushes, sedges and moisture-loving herbs such as marsh pennywort (*Hydrocotyle vulgaris*), bog pimpernel (*Anagallis tenella*), grass of Parnassus (*Parnassia palustris*), common marsh-bedstraw (*Galium palustre*) and marsh helleborine (*Epipactis palustris*) are obvious features. The frequency and duration of flooding, as well as the level of salinity, determines the vegetation composition. In addition, nutrient-enrichment can occur as a result of leaching from the surrounding dune ridges (Gaynor, 2008; Ryle *et al.*, 2009).

All the dune habitats indicated above occur as a complex mosaic of constantly changing and evolving vegetation communities. They are inextricably linked in terms of their ecological functioning and should be regarded as single geomorphological units. As such, no dune habitat should be considered in isolation from the other dune habitats present at a site, or the adjoining semi-natural habitats with which they often form important transitional communities.

### **3.1 Overall objectives**

In the absence of accurate information, the assessments and objectives are based on an examination of recent aerial photographs of the site, which suggests that the habitats are currently in a favourable conservation condition. These objectives may be reviewed in light of new information and survey work.

The overall objective for 'Annual vegetation of drift lines' in Rutland Island and Sound SAC is to 'maintain the favourable conservation condition'.

The overall objective for 'Embryonic shifting dunes' in Rutland Island and Sound SAC is to 'maintain the favourable conservation condition'.

The overall objective for 'Shifting dunes along the shoreline with *Ammophila arenaria*' in Rutland Island and Sound SAC is to 'maintain the favourable conservation condition'.

The overall objective for 'Fixed coastal dunes with herbaceous vegetation' in Rutland Island and Sound SAC is to 'maintain the favourable conservation condition'.

The overall objective for 'humid dune slacks' in Rutland Island and Sound SAC is to 'maintain the favourable conservation condition'.

These objectives are based on an assessment of the condition of each 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 site was not surveyed by the Coastal Monitoring Project (CMP).

There is a well developed dune system on Rutland Island with a good diversity of dune types especially on the western side, with fixed dunes, shifting marram dunes, embryonic dunes and some humid dune slacks represented. Annual driftline vegetation is also well represented (NPWS internal files).

The total area of dune habitat is probably less than 100ha. Marram and fixed dunes are the main habitat types (NPWS internal files).

## **3.3 Range**

### **3.3.1 Habitat distribution**

The sand dunes at Rutland Island run along the entire western half of the island, where strandline vegetation, embryo dunes, mobile dunes and fixed dunes have been recorded. Fixed dune grassland has covered some of the old settlements in the northern sector of the island. Dune slacks were also recorded, however they were not considered classical examples of the habitat and further survey work is required to confirm their condition (NPWS internal files).

The highly calcareous nature of the sand and aerial photography (2011/2012) suggests that the priority habitat machair may be present on the island, but a ground survey is required to confirm its current status.

There should be no decline or change in the distribution of these sand dune habitats, unless it is the result of natural processes, including erosion, and succession.

### **3.4 Structure and Functions**

The location, character and dynamic behaviour of sand dunes are governed by a combination of geographic, climatic, edaphic and anthropogenic factors. Sand dunes are highly complex, dynamic systems, where the habitats occur in a complex and constantly evolving and changing mosaic. They function as systems in terms of geomorphology and hydrology and maintaining the favourable conservation condition of the habitats present depends on allowing these processes to continue unhindered. Maintaining the favourable conservation condition of all of the sand dune habitats in Rutland Island and Sound SAC in terms of structure and functions depends on a range of attributes for which targets have been set as outlined below.

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

Coastlines naturally undergo a constant cycle of erosion and accretion. There are two main causes of erosion: (a) those resulting from natural causes and (b) those resulting from human interference. Natural causes include the continual tendency towards a state of equilibrium between coasts and environmental forces, climatic change (particularly an increase in the frequency of storms or a shift in storm tracks), relative sea level rise and natural changes in the sediment supply. Human interference is usually associated with changes in the sediment budget, either directly, through the removal of beach or inshore sediment, or indirectly, by impeding or altering sediment movement. It is important to recognise that the process of coastal erosion is part of a natural tendency towards equilibrium. Natural shorelines attempt to absorb the energy entering the coastal zone by redistributing sediment.

Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Sediment supply is especially important in the embryonic dunes and mobile dunes, as well as the strandline communities where accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. The construction of physical barriers such as sea defences can interrupt longshore drift, leading to beach starvation and increased rates of erosion. Sediment circulation and erosion also has a role to play in the more stabilised dune habitats. Cycles of erosion and stabilisation are part of a naturally functioning dune system, where the creation of new bare areas allows pioneer species and vegetation communities to develop, increasing biodiversity. The construction of physical barriers can interfere with the sediment circulation by cutting the dunes off from the beach resulting in fossilisation or over-stabilisation of dunes.

The target for this attribute is to maintain the natural circulation of sediment and organic matter throughout the entire dune system, without any physical obstructions.

### **3.4.2 Physical structure: hydrological and flooding regime**

The conservation of dune slacks is inextricably linked with the local hydrological regime. Dune slacks are characterised by the proximity of a groundwater table that is maintained by the combination of an impermeable layer in the soil, or deeper salt water and precipitation. Most dune slacks are fed by a range of water sources, including precipitation, surface water or groundwater. The last two sources are usually somewhat calcareous while the former is acidic.

The most important influence on the nature and vegetation of a dune slack is the groundwater-table, which can fluctuate considerably throughout the year. The frequency and duration of periods of flooding or inundation determines the vegetation composition. The water-table depth has been identified as the primary determining factor in vegetation variation, followed by weak trends in calcium and sodium availability. Other contributing factors include stage of development, precipitation, distance from the sea, the grazing regime, recreational pressure, nature of the sediment, soil pH and the porosity of the sediment.

Dune slack habitats should never be considered in isolation, but as part of the larger dune system that functions as an eco-hydrological unit. Dune slacks are highly sensitive to human influences on their hydrology, either through water abstraction or drainage works. Most dune slacks are fed by a range of water sources, including precipitation water, surface water or groundwater. Generally, the maintenance of a naturally functioning dune slack depends on both the amount of (a) precipitation and (b) groundwater discharge. Water abstraction interferes with the local hydrology, potentially having serious implications for the plant and animal communities of slacks. Abstraction can lower the level of the groundwater-table, causing the slacks to dry out. It can also lead to saline infiltration in slacks formed close to the front of a dune system and particularly where the underlying substrate is highly permeable (e.g. shingle).

The target is to ensure that the hydrological regime continues to function naturally and that there are no increased nutrient inputs in the groundwater.

### **3.4.3 Vegetation structure: zonation**

The range of vegetation zones on a dune system should be maintained. Gaynor (2008) highlights the highly transitional nature of much of the vegetation; therefore, it is important that the transitional communities are also conserved, including those to other habitats and vegetation communities.

On the eastern side of the island, old dune ridges with bracken (*Pteridium aquilinum*) occurring. These ridges can become heathy in places with ling heather (*Calluna vulgaris*) present (NPWS file material). The possibility that the site could also support the priority habitat 'Atlantic decalcified dunes (Calluno-Ulicetea)' needs further investigation.

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

#### **3.4.4 Vegetation structure: bare ground**

This target only applies to the fixed dunes and dune slacks. It does not apply to the other habitats present where high levels of bare sand are a natural component of the habitat. In the fixed and slack areas some degree of instability is vital. Constant cycles of erosion and stabilisation provide the necessary conditions for the establishment of pioneer species and species that favour open conditions including invertebrates, helping to increase biodiversity.

The target is to achieve up to 10% bare sand. This target is assessed subject to natural processes.

#### **3.4.5 Vegetation structure: vegetation height**

This attribute applies to the fixed dunes, where a varied vegetation structure is important for maintaining species diversity and is particularly important for invertebrates and birds. The ecological benefits of moderate levels of grazing on dunes have been well documented (Gaynor, 2008). Moderate grazing regimes lead to the development of a species-rich vegetation cover. The animals increase biodiversity by creating micro-habitats through their grazing, dunging and trampling activities. Grazing slows down successional processes and in some cases reverses them, helping to achieve a diverse and dynamic landscape. The effects of trampling assist the internal movement of sand through the development of small-scale blowouts, while dunging can eutrophicate those dune habitats whose nutrient-poor status is crucial for the survival of certain vegetation types. Many species, from plants to invertebrates, benefit immensely from the open and diverse system created by a sustainable grazing regime. Many dune species are small in size and have relatively low competitive ability. Consequently, the maintenance of high species diversity on a dune system is dependent on the existence of some control to limit the growth of rank coarse vegetation (Gaynor, 2008).

The island is grazed by sheep and cattle but is not considered to be overgrazed (NPWS internal files).

The target for this attribute is to maintain structural variation within the sward.

#### **3.4.6 Vegetation composition: plant health of dune grasses**

This attribute applies to foredunes and mobile dunes, where blowing sand is a natural feature. The health of the dune grasses (particularly *Ammophila arenaria* and *Elytrigia juncea*) is assessed by the plant parts above the ground (they should be green) and the presence of flowering heads. This gives a clear indication of the status of the supply of blown sand, which is required for these species to thrive.

The target for this attribute is that more than 95% of the dune grasses should be healthy.

#### **3.4.7 Vegetation composition: typical species & sub-communities**

Species diversity and plant distribution in dunes is strongly controlled by a range of factors, including mobility of the substrate, grazing intensities, moisture gradients, nutrient gradients and human disturbance. In the younger, more mobile dunes, marram (*Ammophila arenaria*) is common, while groundsel (*Senecio vulgaris*), sea rocket (*Cakile maritima*) and dandelion (*Taraxacum* sp.) are often present. The fixed, more stable dune vegetation includes lady's bedstraw (*Galium verum*), common birdsfoot trefoil (*Lotus corniculatus*), wild thyme (*Thymus praecox*), kidney vetch (*Anthyllis vulneraria*), wild pansy (*Viola tricolor*) and biting stonecrop (*Sedum acre*).

Notable species at Rutland Island include rue-leaved saxifrage (*Saxifraga tridactylites*) and hairy rock-cress (*Arabis hirsuta*) (NPWS internal files).

The target for this attribute is to maintain a typical flora for the particular sand dune habitat.

#### **3.4.8 Vegetation composition: cover of *Salix repens***

The only habitat where this is a specific attribute is humid dune slacks where that target is to maintain less than 40% cover of *S. repens*. This species forms a natural component of many dune slack communities in Ireland. However, high covers of this shrub can lower the level of water-table causing the slacks to dry out. It can also form a dense canopy that shades out slack species leading to a reduction in biodiversity.

The target is therefore to keep the cover of *S. repens* below 40%.

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

Negative indicators include non-native species (e.g. *Hippophae rhamnoides*), species indicative of changes in nutrient status (e.g. *Urtica dioica*) and species not considered

characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. This species has not been recorded from Rutland Island.

The main invasive species identified in Gaynor (2008) were bracken (*Pteridium aquilinum*) and sea buckthorn (*Hippophae rhamnoides*). The invasion of non-native species compromises the typical plant community structure. Bracken (*Pteridium aquilinum*) is becoming increasingly dominant, particularly where sites have been abandoned or where grazing levels have been significantly reduced. The vegetation retains many elements of the original vegetation cover, but there is a reduction in biodiversity. As the canopy becomes taller and ranker, many of the low-growing species disappear. In this case, the vegetation is treated as a sub-community of the original community that was invaded. This is always the case unless the original vegetation cover has been completely destroyed, as can happen with *H. rhamnoides*, which can form dense impenetrable thickets.

Bracken (*Pteridium aquilinum*) has been recorded from Rutland Island.

The target is that negative indicators (including non-native species) should represent less than 5% of the vegetation cover.

#### **3.4.10 Vegetation composition: scrub/trees**

This attribute only applies to the fixed dunes and dune slacks. Scrub encroachment leads to reduction in dune biodiversity and needs to be controlled. The presence of scrub and trees which have deep roots can also lower the groundwater table which can have significant impacts on the slack communities.

There is no indication that scrub encroachment is occurring on Rutland Island.

The target for this attribute therefore is that the cover of scrub and tree species should be under control or represent no more than 5% of the vegetation cover.

#### 4 References

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