NPWS

# Kilkeran Lake and Castlefreke Dunes SAC (site code: 001061)

## Conservation objectives supporting document- Coastal habitats

Version 1

December 2016

# Contents



*Please note that the opinions expressed in the site reports from the Sand Dunes Monitoring Project (SDM) are those of the authors and do not necessarily reflect the opinion or policy of NPWS.*

**Please note that this document should be read in conjunction with the following report: NPWS (2016) Conservation Objectives: Kilkeran Lake and Castlefreke Dunes SAC 001061. 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.

Kilkeran Lake and Castlefreke Dunes SAC is located at Long Strand, 5km south-east of Rosscarbery in Co. Cork. It is situated between two headlands, Cloghna Head and Galley Head. This relatively small coastal SAC has a fine diversity of coastal and wetland habitats in which a well-developed sand dune system has impounded two streams to create wetland areas of lagoon, freshwater marsh, fen, reedbed and swamp. A sandy beach, with a shingle element, extends along the seaward side of the site. The sand dune system is of importance as it is one of the few in the south-west region (Ryle *et al*., 2009).

Kilkeran Lake and Castlefreke Dunes SAC (site code: 001061) is selected for coastal lagoons and sand dune habitats. The following three coastal habitats are included in the list of Qualifying Interests for the SAC (* denotes a priority habitat):

| | |
|---|---|
| 2110 | Embryonic shifting dunes |
| 2120 | Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) |
| 2130 | Fixed coastal dunes with herbaceous vegetation (grey dunes)* |

All of these habitats are associated with sand dune systems, and are found in close association with each other. The distribution of the sand dune habitats within Kilkeran Lake and Castlefreke Dunes is presented in Appendix I.

# 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 three coastal habitats listed above in Kilkeran Lake and Castlefreke Dunes 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 the sand dune habitats are based primarily on the results of the Sand Dune Monitoring Project (SDM) (Delaney *et al*., 2013) and this document should be read in conjunction with that report. It is also recommended that this document be read in conjunction with the final report from the Coastal Monitoring Project (CMP) (Ryle *et al*., 2009). The CMP was a comprehensive national baseline survey of all known sand dune systems in Ireland. The SDM reviewed and modified the methodology used during the CMP to map and assess the conservation status of dune habitats.

A subset of 40 sites, including Castlefreke, was selected as a representative sample of the national dune resource for the SDM survey. As part of the SDM, a detailed individual report and habitat maps (a revised baseline habitat map and an updated habitat map) were produced for each site surveyed and the those for the sub-site Castlefreke (SDM site ID: 060) are included in Appendix II at the end of this document.

The conservation objectives for the sand dune habitats in Kilkeran Lake and Castlefreke Dunes SAC are based on the findings of the SDM, combined with the results of Gaynor (2008) and Ryle *et al*. (2009). It is thought that the Castlefreke sub-site as surveyed by the SDM represents the total area of sand dunes within Kilkeran Lake and Castlefreke Dunes SAC.

# 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. 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 nine 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* (white dunes) (2120)**
- **Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) ***
- Decalcified dunes with *Empetrum nigrum* (2140) *
- Atlantic decalcified fixed dune (Calluno-Ulicetea) (2150) *
- Dunes with *Salix repens* subsp. *argentea* (Salicion arenariae) (2170)
- Humid dune slacks (2190)
- Machairs (21A0) *

Five dune habitats were recorded by Delaney *et al*. (2013) from Kilkeran Lake and Castlefreke Dunes SAC, three of which, indicated in **bold** above, are listed as Qualifying Interests for the SAC. These habitats include mobile areas at the front as well as more stabilised parts of dune systems. The other habitats recorded by the SDM were annual vegetation of drift lines and humid dune slacks (Delaney *et al*., 2013).

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 strands 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 than in the embryonic dunes, 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 refer 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 (*Epipactus 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).

All of 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.

Detailed descriptions from the SDM (Delaney *et al*., 2013) of each sand dune habitat found at the Castlefreke sub-site (SDM site ID: 060) are presented in Appendix II. A total of 30.63ha of sand dune habitat was mapped within the Kilkeran Lake and Castlefreke Dunes SAC, of which 30.34ha (99.1%) represents habitats that are listed as Qualifying Interests for this particular SAC.

## 3.1 Overall objectives

The overall objective for 'Embryonic shifting dunes' in Kilkeran Lake and Castlefreke Dunes SAC is to '*maintain the favourable conservation condition*'.

The overall objective for 'Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)' in Kilkeran Lake and Castlefreke Dunes SAC is to '*maintain the favourable conservation condition*'.

The overall objective for 'Fixed coastal dunes with herbaceous vegetation' in Kilkeran Lake and Castlefreke Dunes SAC is *to 'restore the favourable conservation condition*'.

These objectives are based on an assessment of the recorded 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 area*

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. A baseline habitat map was produced for the sand dune habitats in Kilkeran Lake and Castlefreke Dunes SAC during the Coastal Monitoring Project (CMP) (Ryle *et al*., 2009). During the SDM, these baseline maps were checked and revised to account for changes in habitat interpretation and omissions. Updated maps were then produced to reflect the recorded situation on the ground. The revised baseline habitat map and updated habitat map from the SDM are included with the individual site report in Appendix II at the end of this document.

The total areas of each sand dune habitat within the Castlefreke sub-site as estimated by Delaney *et al*. (2013) are presented in the second column of the following table. The total areas of each sand dune habitat within the boundary of Kilkeran Lake and Castlefreke Dunes SAC are presented in the final column.

| **Habitat** | **Total area (ha) of habitat as mapped by SDM in sub-site** | **Total area (ha) of habitat within SAC boundary** |
|---|---|---|
| Embryonic shifting dunes (2110) | 0.04 | 0.04 |
| Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120) | 1.65 | 1.65 |
| Fixed coastal dunes with herbaceous vegetation (2130) | 28.75 | 28.65 |
| **Total** | **30.44** | **30.34** |

There was a slight increase in the total area of sand dune habitats at Castlefreke between the CMP and the SDM surveys and this was due to accretion along the shore (Delaney *et al*., 2013).

The area of embryonic shifting dunes has decreased from 0.05ha (CMP) to 0.04ha in 2011 (Delaney *et al*., 2013). The loss in area is due to habitat succession to marram dunes (white dunes) and fixed dunes (grey dunes). There were no signs that any habitat loss has occurred as a result of human activities (Delaney *et al*., 2013).

The area of marram dunes (white dunes) declined from 1.78ha in 2009 (CMP) to 1.65ha in 2011 (Delaney *et al*., 2013). This change is due to succession from marram dunes (white dunes) to fixed dunes (grey dunes).

The area of fixed dunes (grey dunes) increased from 28.19ha (CMP) to 28.75ha in 2011 (Delaney *et al*., 2013). This increase was due to recovery from damage and succession from marram dunes (white dunes) (Delaney *et al*., 2013).

The general target for this attribute in the case of each habitat is that the area should be stable, or increasing. Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is always assessed subject to natural processes, including erosion and succession.

## 3.3 Range

### *3.3.1 Habitat distribution*

The distribution of the sand dune habitats within Kilkeran Lake and Castlefreke Dunes SAC, as mapped by Delaney *et al.* (2013), is presented in Appendix I.

As a result of past geomorphological processes, few parts of the south-west coastline are orientated for the development of sand dune systems and the occurrence of several drowned river valleys have also prevented the development of sand dunes (Delaney *et al*., 2013).

The embryonic dune area comprises patches of sand couch (*Elytrigia juncea*) at the western and eastern tip of the site. Embryonic shifting dunes were not well-developed at Castlefreke in 2011. This is probably related to the exposed nature of the beach, steeply sloped shoreline and lack of available sediment for dune building. There are signs that part of the habitat close to the access point has recovered from disturbance since 2009 (Delaney *et al*., 2013).

The mobile dunes at Castlefreke occur as a thin band on the steep slope fronting the fixed dunes. The fixed dunes at Castlefreke occur behind the marram dunes (white dunes) and are expanding by succession from the marram dunes (Delaney *et al*., 2013).

The target is that 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, accretion 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 Kilkeran Lake and Castlefreke Dunes 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, thus 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.

Castlefreke Dunes appear to be stable with some erosion in the western part of the dunes and accretion of a shingle bar to the east at the mouth of Long Strand River. The shoreline and foredunes may change over the coming years due to alterations in the sediment supply to Castlefreke from coastal erosion occurring further west in Rosscarbery Bay. The mobile habitat at Castlefreke appears highly susceptible to disturbance and the growth of these dunes appears to be limited by the local recycling of sediment (Ryle *et al.*, 2009). The mobile dunes are very vulnerable to natural and human impacts as the slopes are very steep and susceptible to erosion. They are also subject to winter storms from the Atlantic Ocean. There is a large blow-out to the west of the site caused by visitors accessing the dunes in the western end, however the intensity is low (Ryle *et al.*, 2009).

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

### *3.4.2 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 saltmarsh communities.

The strandline at Castlefreke is located in front of the mobile dunes and perennial shingle vegetation occurs at the western edge of the site next to Cloghna Head. Embryonic dunes occur at the western and eastern tip of the site. The mobile dunes occur as a thin band on the steep slope fronting the fixed dunes. A wet dune slack occurs in the fixed dunes at the north-western edge of the site (Ryle *et al*., 2009).

Kilkieran Lake, which is coastal lagoon surrounded by wetlands, occurs behind the sand dunes, but the natural transition to this habitat is disrupted by a road that cuts between the dunes and wetlands (Delaney *et al*., 2013).

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 structure: bare ground*

This target applies to the fixed dunes. It does not apply to the other Qualifying Interest sand dune habitats present in the SAC where high levels of bare sand are a natural component of the habitat. In the fixed 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 not to exceed 10% bare sand. This target is assessed subject to natural processes.

### *3.4.4 Vegetation structure: sward height*

This attribute applies to the fixed dune habitat 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).

There are two distinct management approaches at Castlefreke. The dunes are state-owned and the north-eastern part of the habitat is managed as pasture for horses, while there is little intervention

in the southern part of the site. This is to establish a suitable grazing level for the development of areas of open turf with a diverse flora whilst controlling the invasion of coarse vegetation and scrub. This management has resulted in very different structures and vegetation communities occurring, with the grazed area being more herb-rich and the south-western end having a higher proportion of bracken (*Pteridium aquilinum*) trees and scrub (Ryle *et al*., 2009; Delaney *et al*., 2013).

A few trampled paths and campfires are present in the dunes however, which have disrupted the vegetation slightly (Delaney *et al*., 2013).

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

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

This attribute applies to the foredunes and mobile dunes, where blowing sand is a natural feature. The health of the dune grasses (particularly *Ammophila arenaria* and *Elytrigia juncea*) are 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.

### *3.4.6 Vegetation composition: typical species and 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 grass (*Ammophila arenaria*) is common, while groundsel (*Senecio vulgaris*), sea rocket (*Cakile maritima*) and dandelion (*Taraxacum* spp.) are also present. The fixed, more stable dune vegetation includes lady's bedstraw (*Galium verum*), common bird's-foot-trefoil (*Lotus corniculatus*), wild thyme (*Thymus polytrichus*), kidney vetch (*Anthyllis vulneraria*), wild pansy (*Viola tricolor*) and biting stonecrop (*Sedum acre*).

In the sparse embryonic dunes at Castlefreke, marram grass (*Ammophila arenaria*) occurs thinly, along with sea couch (*Elymus pycnanthus*), frosted orache (*Atriplex laciniata*) and sea sandwort (*Honckenya peploides*). Other species present include sea bindweed (*Calystegia soldanella*) (Ryle *et al*., 2009).

The typical species of the mobile dunes at Castlefreke are marram grass (*Ammophila arenaria*) and sea spurge (*Euphorbia paralias*). Other species present include sea-holly (*Eryngium maritimum*), sea bindweed (*Calystegia soldanella*), rock samphire (*Crithmum maritimum*) and sea mayweed (*Tripleurosperum maritimum*) (Ryle *et al*., 2009).

The species found in the ungrazed areas of fixed dune at Castlefreke are mainly grasses: red fescue (*Festuca rubra*), false oat-grass (*Arrhenatherum elatius*), Yorkshire fog (*Holcus lanatus*) and marram grass (*Ammophila arenaria*), along with sea bindweed (*Calystegia soldanella*), lady's bedstraw (*Galium verum*), sea spurge (*Euphorbia paralias*) and Portland spurge (*Euphorbia portlandica*) (Delaney *et al*., 2013).

In the grazed areas, there was greater diversity of typical species of fixed dunes such as red fescue (*Festuca rubra*), lady's bedstraw (*Galium verum*), common bird's-foot-trefoil (*Lotus corniculatus*),

ribwort plantain (*Plantago lanceolata*), white clover (*Trifolium repens*), common cat's ear (*Hypochaeris radicata*) and dandelion (*Taraxacum* agg.) (Ryle *et al*., 2009).

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

### *3.4.7 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.

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 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 sea buckthorn, which can form dense impenetrable thickets.

At Castlefreke Dunes, the lack of short turf and low diversity of species are both related to undergrazing and the resultant dominance of rank grasses and invasive species, such as bracken and bramble (*Rubus fruticosus* agg.). In addition, the negative indicator species common ragwort (*Senecio jacobaea*) and creeping thistle (*Cirsium arvense*) occur occasionally throughout the fixed dunes (Ryle *et al*., 2009).

Bracken is also invading the front slope of the mobile dunes (Ryle *et al*., 2009). The total cover of bracken is close to 10% of the fixed dunes (grey dunes) at Castlefreke (Delaney *et al*., 2013).

Horse grazing has been beneficial on half of the fixed dunes (grey dunes), but problems arising from undergrazing persist elsewhere (Delaney *et al*., 2013).

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

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

This attribute only applies to the fixed dunes. 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.

A stand of Monterey pine (*Pinus radiata*) occurs on the dunes in the north-west of the Castlefreke dune system. It is very mature, and several trees have fallen. This plantation appears to be spreading by self-seeding from this and other stands nearby. Mature trees with well-developed root systems can lower the groundwater table, which could contribute to the drying out of the humid dune slacks habitat (Delaney *et al*., 2013).

The total cover of trees and scrub was recorded as just under 5%. Scrub cover is currently acceptable but is indicative of lack of grazing. While some scrub can provide variety to the habitat and is not necessarily a negative feature, excessive cover can reduce the plant diversity of the sand dune habitats by shading out sensitive species (Delaney *et al*., 2013).

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


Delaney, A., Devaney, F.M., Martin, J.R. and Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. 75. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

European Commission (2013) Interpretation Manual of European Union Habitats – EUR 28. DG Environment - Nature and Biodiversity, Brussels.

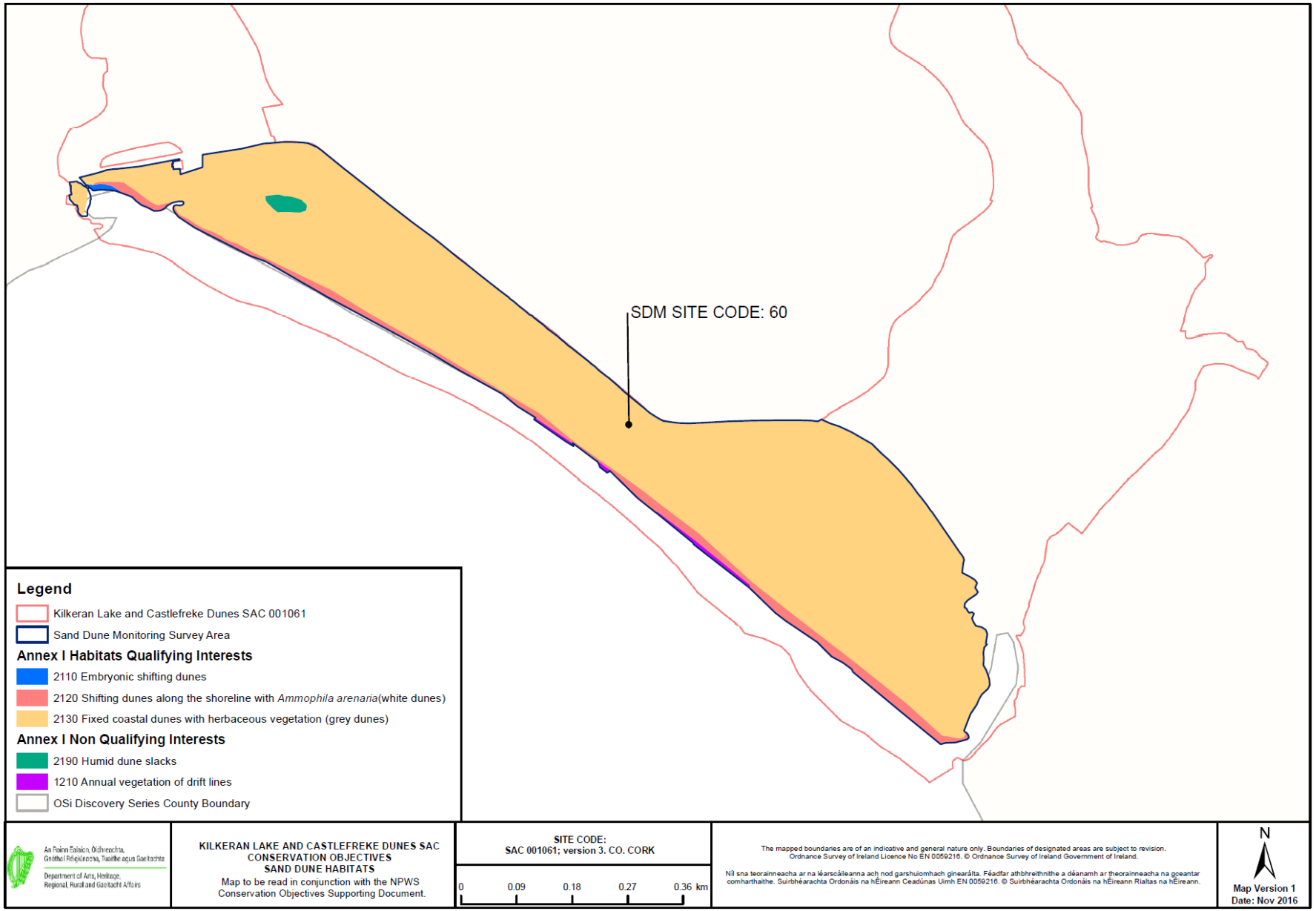
Gaynor, K. (2008) The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, National University of Ireland, Dublin.

NPWS (2012) Natura 2000: Kilkeran Lake and Castlefreke Dunes SAC (001061)
https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF001061.pdf

NPWS (2013) Site Synopsis: Kilkeran Lake and Castlefreke Dunes SAC (001061)
https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY001061.pdf

Ryle, T., Murray, A., Connolly, K. and Swann, M. (2009). Coastal Monitoring Project 2004-2006. Unpublished report to the National Parks and Wildlife Service, Dublin.

## Appendix I – Distribution map of Sand dune habitats within Kilkeran Lake and Castlefreke Dunes SAC



# Appendix II – Castlefreke site report and habitat map from the Sand Dunes Monitoring Project (Delaney *et al*., 2013)

## SITE 060 CASTLEFREKE

The following individual site report should be read in conjunction with the main report (Delaney *et al*., 2013). Please note that CMP refers to the Coastal Monitoring Project (Ryle *et al*., 2009) and SDM refers to the Sand Dunes Monitoring Project (Delaney *et al*., 2013). Unless otherwise stated, the baseline maps refer to the habitat maps produced during the CMP. These baseline maps were revised, to account for discrepancies in the original survey, before comparisons were made with the habitat maps produced during the SDM (see section 2.3 in SDM main report). These revised maps are referred to as the revised baseline maps in the following text.

## 1 SITE DESCRIPTION

Castlefreke is a small site located approximately 5 km south-east of Rosscarbery, on the south coast of Co. Cork. It is situated between two headlands, Cloghna Head and the larger Galley Head, and Kilkeran Lake is just north of the site. The site is part of the Kilkeran Lake and Castlefreke Dunes SAC (SAC 001061), and another Annex I habitat that is associated with the sand dunes at Castlefreke is ***1150 Coastal lagoons** (Kilkeran Lake). Six Annex I sand dune habitats (* indicates a priority habitat) were recorded here during the CMP: **1210 Annual vegetation of drift lines, 1220 Perennial vegetation of stony banks, 2110 Embryonic shifting dunes, 2120 Marram dunes (white dunes), *2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** (Ryle *et al*., 2009). The dunes are state owned and part of the site is managed as pasture for horses. The site is also used for recreational purposes, with a car park located nearby and a caravan park situated just west of Clogna Head. A road forms the northern boundary of the site and disrupts the natural transition to wetland and lake.

## 2 CONSERVATION ASSESSMENTS

### 2.1 Overview

Castlefreke was surveyed on the 30th of September 2011. All six habitats recorded on the site during the CMP were recorded in 2011. The habitats found at Castlefreke in 2011 and the results of the conservation assessments are presented in Table 1. No assessment was carried out on **1220 Perennial vegetation of stony banks** as it was below the minimum monitoring area in 2011 (Delaney *et al*. 2013). No trends could be established for **1210 Annual vegetation of drift lines** and **2110 Embryonic shifting dunes** as they were not assessed during the CMP. These two habitats, along with **2120 Marram dunes (white dunes)** were assessed as Favourable. ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** were assessed as Unfavourable-Inadequate.

**Table 1.** Conservation assessment results for all Annex I dune habitats surveyed at Castlefreke, Co. Cork.

| Habitat | Area | Structure & Functions | Future Prospects | Overall result |
|---|---|---|---|---|
| 1210 Annual vegetation of drift lines | Favourable | Favourable | Favourable | Favourable |
| 2110 Embryonic shifting dunes | Favourable | Favourable | Favourable | Favourable |
| 2120 Marram dunes (white dunes) | Favourable (improving) | Favourable (stable) | Favourable (stable) | Favourable (improving) |
| *2130 Fixed dunes (grey dunes) | Favourable (improving) | Unfavourable-Inadequate (improving) | Unfavourable-Inadequate (deteriorating) | Unfavourable-Inadequate (improving) |
| 2190 Humid dune slacks | Favourable (stable) | Unfavourable-Inadequate (stable) | Unfavourable-Inadequate (deteriorating) | Unfavourable-Inadequate (deteriorating) |

### *2.1.1 Area*

The areas of Annex I sand dune habitats at Castlefreke are presented in Table 2. The baseline area of ***2130 Fixed dunes (grey dunes)** was revised to include parts of the site which were affected by *Pteridium aquilinum* and scrub. The difference between the baseline area for **2120 Marram dunes (white dunes)** and the revised baseline area is an artefact of mapping. There was a slight increase in the total area of Annex I sand dune habitats at Castlefreke, and this was due to accretion along the shore.

**Table 2**. Areas of Annex I dune habitats originally mapped at Castlefreke during the baseline survey (Coastal Monitoring Project), the revised baseline areas and areas mapped during the Sand Dune Monitoring Project in 2011.

| Habitat | Baseline survey (ha) | Revised baseline (ha) | Sand Dunes Monitoring Project (ha) |
|---|---|---|---|
| 1210 Annual vegetation of drift lines | 0.09 | 0.09 | 0.14 |
| 1220 Perennial vegetation of stony banks | 0.02 | 0.02 | 0.02 |
| 2110 Embryonic shifting dunes | 0.05 | 0.05 | 0.04 |
| 2120 Marram dunes (white dunes) | 1.79 | 1.78 | 1.65 |
| *2130 Fixed dunes (grey dunes) | 26.59 | 28.19 | 28.75 |
| 2190 Humid dune slacks | 0.15 | 0.15 | 0.15 |
| Total | 28.69 | 30.28 | 30.75 |

### *2.1.2 Structure and Functions*

Structure and Functions were assessed for five habitats at Castlefreke. Table 3 shows the results of the Structure and Functions assessment. All criteria passed for **2110 Embryonic shifting dunes** and **2120 Marram dunes (white dunes),** and these habitats were therefore assessed as Favourable. One criterion failed for **1210 Annual vegetation of drift lines** and **2190 Humid dune slacks**, and two criteria failed for ***2130 Fixed dunes (grey dunes)**. Structure and Functions were not assessed for **1220 Perennial vegetation of stony banks** as this habitat was below the minimum monitoring area.

**Table 3.** Annex I sand dune habitats at Castlefreke for which Structure and Functions were assessed, with the number of monitoring stops, assessment criteria and the number of criteria that failed.

| Habitat | No. monitoring stops | Total no. assessment criteria | No. failed criteria |
|---|---|---|---|
| 1210 Annual vegetation of drift lines | 2 | 6 | 0 |
| 2110 Embryonic shifting dunes | 2 | 7 | 0 |
| 2120 Marram dunes (white dunes) | 4 | 7 | 0 |
| *2130 Fixed dunes (grey dunes) | 8 | 11 | 2 |
| 2190 Humid dune slacks | 2 | 11 | 1 |

### *2.1.3 Future Prospects*

Impacts and activities recorded at Castlefreke are presented in Table 4. Impact codes are assigned according to Ssymanck (2010). There were no impacts recorded for **1220 Perennial vegetation of stony banks, 2110 Embryonic shifting dunes** and **2120 Marram dunes (white dunes)**. ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** were both negatively affected by undergrazing. Negative impacts associated with recreation, such as trampling and campfires, were also recorded, though they only affected a small percentage of the site. The spread of bracken within the ***2130 Fixed dunes (grey dunes)** and drying out in the **2190 Humid dune slacks** were also significant negative impacts. Appropriate horse grazing was the only positive impact recorded on site, and this was only recorded within the ***2130 Fixed dunes (grey dunes).** Erosion was the only impact noted for **1210 Annual vegetation of drift lines**. As this is a natural process, the impact was recorded as having a neutral effect on the habitat.

**Table 4.** Impacts recorded in Annex I sand dune habitats at Castlefreke in 2011. Source refers to whether the impact being scored originates inside or outside the Annex I habitat being assessed.

| Habitat code | Impact code | Impact description | Intensity | Effect | Percent of habitat | Source |
|---|---|---|---|---|---|---|
| 1210 | K01.01 | Erosion | High | Neutral | 70 | Inside |
| 1220 | X | No impacts | - | - | 100 | - |
| 2110 | X | No impacts | - | - | 100 | - |
| 2120 | X | No impacts | - | - | 100 | - |
| *2130 | A04.02.03 | Appropriate horse grazing | Medium | Positive | 50 | Inside |
| *2130 | A04.03 | Undergrazing | Low | Negative | 50 | Inside |
| *2130 | G05.01 | Trampling | Medium | Negative | 1 | Inside |
| *2130 | G01.02 | Walkers | Low | Neutral | 30 | Inside |
| *2130 | G05 | Campfires | High | Negative | 1 | Inside |
| *2130 | H05.01 | Very old machine | Low | Negative | 1 | Inside |
| *2130 | I01 | Agave type, *Pinus* sp. | Medium | Negative | 5 | Inside |
| *2130 | I02 | Bracken | Medium | Negative | 10 | Inside |
| 2190 | A04.03 | Undergrazing | Low | Negative | 50 | Inside |
| 2190 | G05 | Campfires | High | Negative | 1 | Inside |
| 2190 | K01.03 | Drying out | Low | Negative | 20 | Inside |

## 2.2 Annex I habitat assessments

The conservation status of the Annex I habitats at Castlefreke is discussed below. The present conservation status in 2011 is compared with the baseline status and if a habitat is not in Favourable status, the main reasons for the Unfavourable assessment are given. Areas recorded in 2011 are compared with the revised baseline areas. It should be borne in mind that natural processes such as erosion, deposition and succession are primary drivers of change on coastal habitats.

### *2.2.1 1210 Annual vegetation of drift lines*

This habitat occurs as a very narrow band along much of the seafront at Castlefreke. Although it appears very narrow and unstable, its distribution is very similar to that mapped during the CMP. No trend in the conservation status could be ascribed because **1210 Annual vegetation of drift lines** were not assessed during the CMP.

Area

The area of **1210 Annual vegetation of drift lines** has increased from 0.09 ha during the CMP to 0.14 ha during the SDM. Area was assessed as Favourable.

Structure and Functions

Two monitoring stops were recorded from **1210 Annual vegetation of drift lines.** Although all the criteria passed the assessment, the only positive indicator species present in the stops was *Honckenya peploides*, and this indicates a depauperate community. This is considered to be the result of the exposed nature of the site rather than due to human activity, and the Structure and Functions were assessed as Favourable on the basis of expert judgement.

Future Prospects

The only impact recorded was erosion, which had a high-intensity, neutral effect. Future Prospects were assessed as Favourable.

Conservation assessment

Because all three of the parameters were assessed as Favourable, the conservation status of **1210 Annual vegetation of drift lines** was assessed as Favourable.

### *2.2.2 1220 Perennial vegetation of stony banks*

The area of this habitat was below the minimum monitoring area and no monitoring stops were recorded in it. It appears to be reasonably stable and the area of **1220 Perennial vegetation of stony banks** has not changed since the baseline survey. No negative impacts were recorded for the habitat. The habitat is located adjacent to the main access route into the sand dunes and this may prevent it from expanding, but it is hard to establish a definite link between the limited area and recreational activities.

### *2.2.3 2110 Embryonic shifting dunes*

**2110 Embryonic shifting dunes** were not well developed at Castlefreke in 2011, or during the CMP. This is probably related to the exposed nature of the beach, steeply sloped shoreline and lack of available sediment for dune building. There are signs that part of the habitat close to the access point has recovered from disturbance since the baseline survey. The habitat was not assessed during the CMP, so no trend could be ascribed to it.

Area

The area of **2110 Embryonic shifting dunes** has decreased from 0.05 ha during the CMP to 0.04 ha during the SDM. The loss in area is due to habitat succession to **2120 Marram dunes (white dunes)** and ***2130 Fixed dunes (grey dunes)**. There were no signs that any habitat loss has occurred as a result of human activities since the baseline survey and Area was assessed as Favourable.

Structure and Functions

All of the criteria passed in the Structure and Functions assessment. Structure and Functions were assessed as Favourable.

Future Prospects

No impacts were recorded and Future Prospects were assessed as Favourable.

Conservation assessment

All of the parameters were assessed as Favourable and the conservation status of **2110 Embryonic shifting dunes** was assessed as Favourable.

### *2.2.4 2120 Marram dunes (white dunes)*

**2120 Marram dunes (white dunes)** form a narrow band in front of the ***2130 Fixed dunes (grey dunes)** at Castlefreke. There is one break in the habitat where visitors access the strand, but the OSI aerial photographs indicate that the habitat has recovered considerably since the baseline survey.

Area

The area of **2120 Marram dunes (white dunes)** declined from 1.78 ha during the CMP to 1.65 ha during the SDM. This change is due to succession from **2120 Marram dunes (white dunes)** to ***2130 Fixed dunes (grey dunes)**. During the CMP Area was assessed as Unfavourable-Inadequate because of *Pteridium aquilinum* encroachment and disturbance. There appears to have been considerable recovery from disturbance at the entrance to the site and succession has resulted in the habitat moving down the beach, away from any *Pteridium aquilinum* in the ***2130 Fixed dunes (grey dues)**. Area was assessed as Favourable (improving) during the SDM.

Structure and Functions

All of the assessment criteria passed in the Structure and Functions assessment. During the CMP, Structure and Functions were assessed as Favourable. Structure and Functions were assessed as Favourable (stable) during the SDM.

Future Prospects

No impacts were recorded for this habitat during the SDM. During the CMP, *Pteridium aquilinum* encroachment was recorded as a negative impact but Future Prospects were assessed as Favourable in the context of management of the site by NPWS. Future Prospects were assessed as Favourable (stable) during the SDM.

Conservation assessment

All parts of the conservation assessment were assessed as Favourable during the SDM. During the CMP, Area was assessed as Unfavourable-Inadequate. The conservation status of **2120 Marram dunes (white dunes)** was assessed as Favourable (improving) during the SDM.

### *2.2.5 *2130 Fixed dunes (grey dunes)*

There are two distinct management approaches at Castlefreke. The north-eastern part of the habitat is managed as pasture for horses, while there is little sign of intervention in the southern part of the site. This has resulted in very different structure and vegetation communities occurring, with the grazed area being more herb-rich and the south-western end having a higher proportion of *Pteridium aquilinum*, trees and scrub. There is a small lake surrounded by wetlands behind the dunes, but the transition to this habitat is not intact as a road cuts between the dunes and wetlands. A small area of transitional habitat remains in the northern part of the sand dunes, however.

Area

The area of ***2130 Fixed dunes (grey dunes)** increased from 28.19 ha during the CMP to 28.75 ha during the SDM. This increase was due to recovery from damage and succession from **2120 Marram dunes (white dunes)**. During the CMP, Area was assessed as Unfavourable-Inadequate because of the presence of *Pteridium aquilinum* and pine trees. Under current methodology, this would not have caused the habitat to fail the Area parameter. Habitat loss was present however, where visitors accessing the site had caused erosion to the dunes, and this anthropogenic loss of area would have resulted in an Unfavourable-Inadequate assessment according to the current methodology. Area was assessed as Favourable (improving) during the SDM.

Structure and Functions

Two criteria failed in the Structure and Functions assessment, and these recorded the presence of positive and negative indicator species. Stop two only contained three positive indicator species, and was located in a rank, grass-dominated area with considerable *Pteridium aquilinum* cover. *Pteridium aquilinum* is frequent throughout most of the site, but it is particularly problematic in the western part. An area of 2.19 ha was mapped as dense *Pteridium aquilinum* on ***2130 Fixed dunes (grey dunes)**, and the total cover of the species is close to 10%. The total cover of trees and scrub was just under 5%, allowing the habitat to pass for that criterion. During the CMP, Structure and Functions were assessed as Unfavourable-Bad because of excessive sward height and lack of diversity. The *Pteridium aquilinum* and *Rubus fruticosus agg.* which were assessed under the Area parameter during the CMP would have been assessed under Structure and Functions according to the current methodology, and would have resulted in a third failed criterion. There appears to have been some improvement in the

sward height due to continued grazing, and Structure and Functions were assessed as Unfavourable-Inadequate (improving) during the SDM.

Future Prospects

Horse grazing was recorded as a positive impact affecting 50% of the habitat in 2011. This is a greater area than was recorded as being grazed during the CMP, and may account for the improvement of the structure of the community. The other half of the site is undergrazed and is affected by *Pteridium aquilinum* and Monterey Pine. Although the site is used by surfers and is served by a car park, damage due to recreation is limited. A few trampled paths and campfires are present in the dunes however and have disrupted the vegetation slightly. One very old and rusted machine was found, but dumping is not current and the presence of a single item of waste was not considered significant. During the CMP, negative impacts included undergrazing, camping and caravans and invasion by a species. Removal of the pine trees was included as a positive impact within the habitat. Because of the existence of a management plan (NPWS 2004), Future Prospects were assessed as Favourable at that time. A start was made to implement some of the recommendations of the management plan, but the trees on the site were not removed and grazing has only been introduced to 50% of the site. *Pteridium aquilinum* is still present in the grazed area, and further intervention may be required to control it. Management of the site is helping to restore the ***2130 Fixed dunes (grey dunes),** but this is a long term project and the Future Prospects are Unfavourable-Inadequate (deteriorating) in the medium term.

Conservation assessment

Area was assessed as Favourable while Structure and Functions and Future Prospects were assessed as Unfavourable-Inadequate during the SDM. During the CMP, Area was assessed as Unfavourable-Inadequate, Structure and Functions were assessed as Unfavourable-Bad and Future Prospects were assessed as Favourable. Because none of the parameters were assessed as Unfavourable-Bad during the SDM, the conservation status of ***2130 Fixed dunes (grey dunes)** was assessed as Unfavourable-Inadequate (improving).

### *2.2.6 2190 Humid dune slacks*

Only one area of **2190 Humid dune slacks** was found at Castlefreke in 2011, and this corresponded with the area mapped during the CMP. The dune slack is located close to a stand of pine which is probably affecting the hydrological functioning of the habitat.

Area

There was no change in the area of **2190 Humid dune slacks** at Castlefreke which remained stable at 0.15 ha. During the CMP, Area was assessed as Unfavourable-Inadequate due to disturbance from recreation, although it is not clear where the area lost was or how great it was. No loss in area was shown on the baseline maps. Damage due to disturbance was assessed under the Structure and Functions assessment during the SDM unless the damage had resulted in a measurable loss of habitat. The SDM assessment for area is Favourable (stable) as no measurable anthropogenic loss in area was reported during the SDM or during the CMP.

Structure and Functions

One of the assessment criteria failed during the Structure and Functions assessment. Campfires had resulted in damage to the vegetation, as had the presence of rubbish. During the CMP, Structure and Functions were assessed as Favourable, but damage due to disturbance was recorded under the Area assessment. This would have resulted in an assessment of Unfavourable-Inadequate for Structure and Functions under the current methodology. Structure and Functions were assessed as Unfavourable-Inadequate (stable) during the SDM.

Future Prospects

Undergrazing, campfires and drying out were recorded as negative impacts during the SDM. Drying out is indicated by the presence of *Salix repens* at the edge of the habitat, and is likely to be accelerated by the presence of trees and scrub on the site, which draw down the water table. During the CMP, camping and caravans and dumping were recorded as negative impacts but Future Prospects were assessed as Favourable in the expectation of appropriate future management of the site. Future Prospects were assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

Conservation assessment

One parameter was assessed as Favourable and two parameters were assessed as Unfavourable-Inadequate during the SDM. During the CMP, the attributes of the habitat would have resulted in a Favourable assessment for two parameters, Area and Future Prospects, and an Unfavourable-Inadequate assessment for Structure and Functions according to the current methodology. The conservation status of **2190 Humid dune slacks** was assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

# 3 DISCUSSION

## 3.1 Qualifying Interests for SAC

The Natura 2000 standard data form for Castlefreke records three sand dune habitats as Qualifying Interests for the SAC. **1210 Annual vegetation of drift line, 1220 Perennial vegetation of stony banks** and **2190 Humid dune slacks** were present at Castlefreke during the SDM but are not included in the Qualifying Interests for the SAC. The conservation status of **2110 Embryonic shifting dunes** and **2120 Marram dunes (white dunes)** scored more favourably during the SDM, than in the Natura 2000 standard data form.

**Table 5.** Relevant Qualifying Interests for Kilkeran Lake and Castlefreke Dunes SAC 001061 (NPWS, 1999)

| Habitat | Area (%) | Representativity | Relative surface | Conservation status | Global assessment |
|---|---|---|---|---|---|
| 2110 Embryonic shifting dunes | 2 | C | C | B | C |
| 2120 Marram dunes (white dunes) | 24 | B | C | B | B |
| *2130 Fixed dunes (grey dunes) | 3 | C | C | B | C |

## 3.2 Bracken and scrub

*Pteridium aquilinum* affects about 10% of the ***2130 Fixed dunes (grey dunes)** at Castlefreke. Scrub cover is acceptable but is indicative of lack of grazing. While both *Pteridium aquilinum* and scrub can

provide variety to the habitat and are not necessarily a negative feature, excessive cover can reduce the plant diversity of the sand dune habitats by shading out sensitive species.

### 3.3 Conifer Plantation

There is a small conifer plantation within the site. It is very mature, and several trees have fallen. Young conifers were not a feature of the site. However, mature trees with well-developed root systems can result in lowering of the groundwater table, which could contribute to the drying out of the **2190 Humid dune slacks** habitat.

### 3.4 Management

Horse grazing had a beneficial effect on half of the ***2130 Fixed dunes (grey dunes)**, but problems arising from undergrazing persist elsewhere. There were no signs that the spread of bracken or scrub was being tackled in the western part of the site in 2011.

## 4 REFERENCES

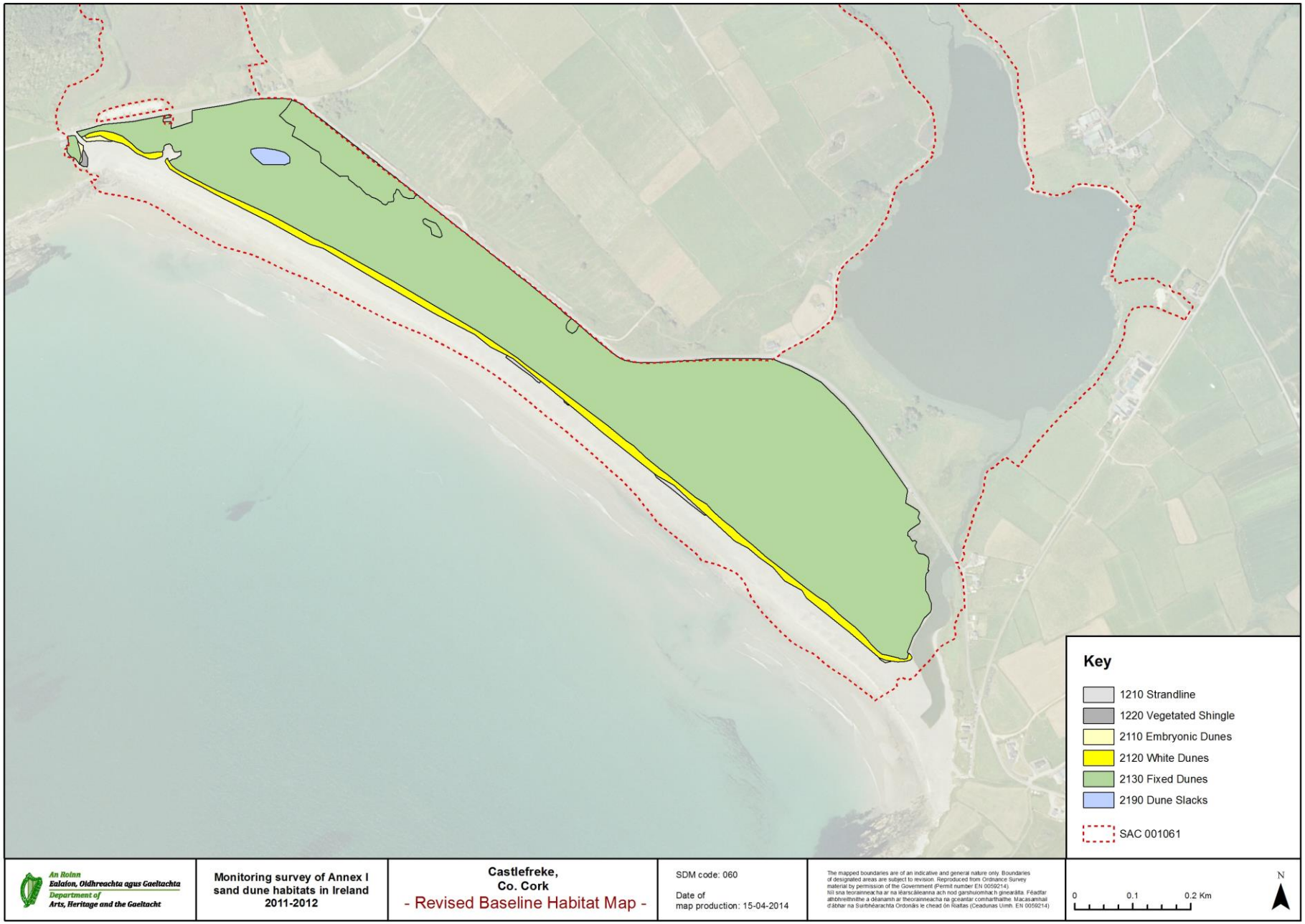

Delaney, A., Devaney, F.M, Martin, J.R. and Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manual*s, No. 75. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.

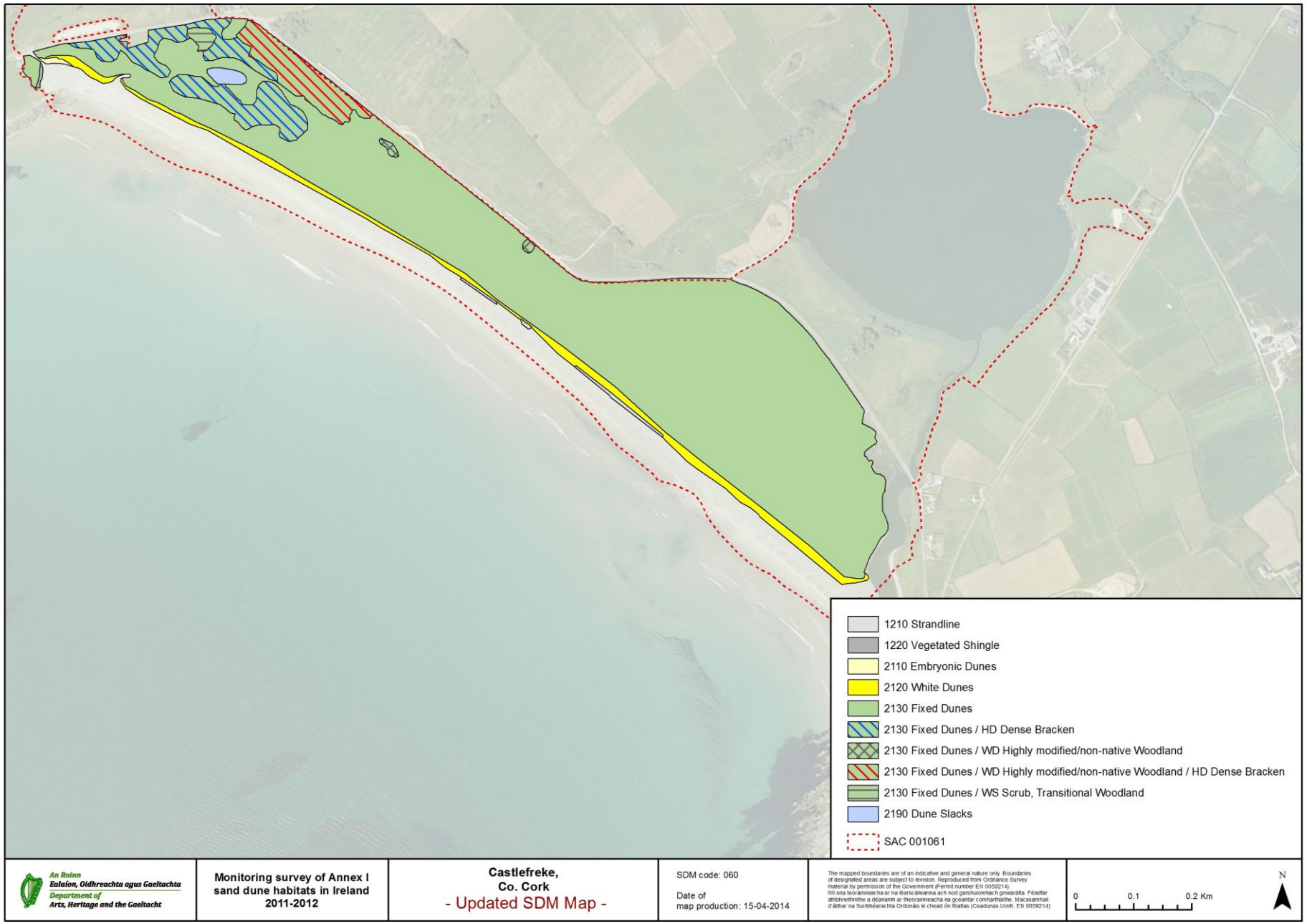
NPWS (1999*)* Natura 2000 Standard Data Form Site 001061. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. http://www.npws.ie/media/npwsie/content/images/protectedsites/natura2000/NF001061. pdf. Accessed March 2013.

NPWS (2004) National Parks and Wildlife Service Conservation Plan for 2004-2009 Draft 2, Kilkieran Lake and Castlefreke Dunes cSAC Site Code 1061 Co Cork. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Ryle, T., Murray, A., Connolly, K. and Swann, M. (2009) Coastal Monitoring Project 2004-2006. A report submitted to the National Parks and Wildlife Service, Dublin.

Ssymank, A. (2010). Reference list treats Pressures and activities (final version). http://circa.europa.eu/Public/irc/env/monnat/library?l=/expert_reporting/work-package_revision/sub-group_papers/pressures_-threats(vm=detailed&sb=Title. Accessed March 2011.


Key
1210 Strandline
1220 Vegetated Shingle
2110 Embryonic Dunes
2120 White Dunes
2130 Fixed Dunes
2190 Dune Slacks
SAC 001061
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
Monitoring survey of Annex I sand dune habitats in Ireland 2011-2012
Castlefreke, Co. Cork
- Revised Baseline Habitat Map -
SDM code: 060
Date of map production: 15-04-2014
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059214).
Níl sna teorainneacha ar na hIarscáileanna ach nod ginsiúmhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadúnas Uimh. EN 0059214)
0 0.1 0.2 Km
N


1210 Strandline
1220 Vegetated Shingle
2110 Embryonic Dunes
2120 White Dunes
2130 Fixed Dunes
2130 Fixed Dunes / HD Dense Bracken
2130 Fixed Dunes / WD Highly modified/non-native Woodland
2130 Fixed Dunes / WD Highly modified/non-native Woodland / HD Dense Bracken
2130 Fixed Dunes / WS Scrub, Transitional Woodland
2190 Dune Slacks
SAC 001061
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
Monitoring survey of Annex I sand dune habitats in Ireland 2011-2012
Castlefreke, Co. Cork
- Updated SDM Map -
SDM code: 060
Date of map production: 15-04-2014
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059214).
Níl sna teorainneacha ar na léarscáileanna ach nod ganshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comhartha ithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadúnas Uimh. EN 0059214)
0 0.1 0.2 Km
N