NPWS

Cahore Polders and Dunes SAC
(site code: 000700)

Conservation objectives supporting document- Coastal habitats

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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: Cahore Polders and Dunes SAC 000700. 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.

Cahore Polders and Dunes SAC is a relatively large coastal SAC located 10km south of Courtown, Co. Wexford. The SAC comprises a sand dune system that extends south along the coast for over 4.5km from Cahore Point and is backed by areas of polder, wetlands and drainage channels. The area is underlain by rocks of Cambrian age. A sand dune ridge and beach forms the eastern part of the SAC. These dunes are highest in the north (up to 18m high) and gradually become lower towards the south (NPWS, 2013).

The dune system is well developed and typical of the east coast. The dunes display a good zonation, with fixed dunes grading eastwards to marram-dominated dunes, embryonic dunes and, at the top of the beach, annual drift line vegetation has been recorded (Ryle *et al*., 2009). Some small dune slacks, containing a good representation of typical species, are also present. The northern part of the system is subject to erosion from the sea, while active growth is seen in the southern parts. Other habitats present include scrub, agricultural grassland and amenity grassland. The dunes are located in an area of scenic beauty and are attractive to visitors. Caravan parks are located to the north and west of the site and the main adjacent land use is agriculture (Delaney *et al*., 2013).

The SAC is notable for the presence of a number of rare and scarce plants. The Red Data Book (Curtis and McGough, 1988) species wild asparagus (*Asparagus officinalis* subsp. *prostratus*) has been recorded from the north end of the dune ridge. This is listed on the Flora (Protection) Order, 2015 (Statutory Instrument No. 356 of 2015), as is Moore's horsetail (*Equisetum* x *moorei*), a hybrid, which is confined to the coastline of Wexford and Wicklow.

Umbellate hawkweed (*Hieracium umbellatum*) has its only known Co. Wexford site on the Cahore dunes. The relatively scarce sharp rush (*Juncus acutus*), hound's-tongue (*Cynoglossum vulgare*) and marsh helleborine (*Epipactis palustris*) have also been recorded from the SAC (NPWS, 2013).

The gatekeeper butterfly (*Pyronia tithonus*) has been recorded from dunes in the SAC which is near the northern extreme of its Irish range (NPWS, 2015).

The polders to the west of the dune system were originally wetlands, which were drained and developed into improved grassland and arable land. These are interspersed with canals and drainage channels. The area forms important feeding grounds for large numbers of wintering waterfowl and is of particular importance for Greenland white-fronted goose (*Anser albifrons flavirostris*), wigeon (*Anas penelope*), golden plover (*Pluvialis apricaria*) and lapwing (*Vanellus vanellus*) (NPWS, 2010).

Cahore Polders and Dunes SAC (site code: 000700) is selected for sand dune habitats. The following four coastal habitats are the Qualifying Interests for the SAC (* denotes a priority habitat):

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

The distribution of all sand dune habitats recorded in the SAC 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 four coastal habitats listed above in Cahore Polders and 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.

The targets set for the sand dune habitats are based primarily on the results of the Sand Dunes 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 subsequently 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 Cahore Point North) was selected as a representative sample of the national dune resource for the SDM survey.

The distribution of sand dune habitats within Cahore Polders and Dunes SAC is presented in Appendix I. As part of the SDM, detailed individual reports and habitat maps (a revised baseline habitat map and an updated habitat map) were produced for each sub-site and the relevant ones for the sub-site Cahore Point North (SDM site ID: 028) are included in Appendix II.

The conservation objectives for the sand dune habitats in Cahore Polders and 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 sub-site as surveyed by the SDM represents the entire area of sand dunes within Cahore Polders and 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) *

A total of six dune habitats were recorded by Ryle *et al*. (2009) and Delaney *et al*. (2013) for Cahore Polders and Dunes SAC. Of these, four habitats, 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. Dunes with *Salix repens* and humid dune slacks were also recorded by Delaney *et al*. (2013) but are not considered Qualifying Interests for this SAC.

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 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 (*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).

Dunes with creeping willow (*Salix repens*) occur where this shrub forms a dense ground cover and are found in close association with dune slacks. The distinguishing feature is the proximity of the water table to the surface, which in the case of dunes with *S. repens* is below a level where it exerts an influence on the vegetation. As a result, the moisture-loving plants generally associated with dune slacks are noticeably reduced or absent. Dunes with *S. repens* are often found on sandy hummocks within slacks, or on the sides of dune ridges adjacent to slacks.

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.

A total of 117.85ha of Annex I sand dune habitats was mapped within the Cahore Polders and Dunes SAC, 115.50ha (98%) of which represents habitats that are listed as Qualifying Interests for this particular SAC.

Detailed descriptions from the Sand Dune Monitoring Project (Delaney *et al*., 2013) of each sand dune habitat found at the Cahore Point North sub-site are presented in Appendix II.

3.1 Overall objectives

The overall objective for 'Annual vegetation of drift lines' in Cahore Polders and Dunes SAC is to '*restore the favourable conservation condition*'.

The overall objective for 'Embryonic shifting dunes' in Cahore Polders and Dunes SAC is to '*restore the favourable conservation condition*'.

The overall objective for 'Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)' in Cahore Polders and Dunes SAC is to '*restore the favourable conservation condition*'.

The overall objective for 'Fixed coastal dunes with herbaceous vegetation (grey dunes)' in Cahore Polders and 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 at the Cahore Point North sub-site during the CMP (Ryle *et al*., 2009). During the Sand Dunes Monitoring Project (SDM) (Delaney *et al*., 2013), these baseline maps were checked and revised to account for changes in habitat interpretation and omissions. Updated maps were then produced to reflect the current situation on the ground. The revised baseline habitat map and the 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 Qualifying Interest (QI) sand dune habitat within the Cahore Point North sub-site as estimated by Delaney *et al*. (2013) are presented in the second column of the following table. The total areas of each QI sand dune habitat within the boundary of Cahore Polders and Dunes SAC are presented in the final column.

Habitat	**Total area (ha) of habitat in sub-site from SDM**	**Total area (ha) of habitat within SAC boundary**
Annual vegetation of drift lines (1210)	0	0
Embryonic shifting dunes (2110)	5.15	4.66
Shifting dunes along the shoreline with *Ammophila arenaria* (2120)	14.51	14.41
Fixed coastal dunes with herbaceous vegetation (2130)	96.90	96.44
Total	**116.56**	**115.5**

During the Coastal Monitoring Project (CMP) (Ryle *et al*., 2009), 0.19ha of annual vegetation of drift lines was recorded. This habitat was not recorded in 2011 during the SDM (Delaney *et al*., 2013). However, this was the result of natural succession to embryonic dunes and was not associated with human activity. The availability of locally recycled sediment and the accretion of sand dune habitats in the central and southern parts of the site suggest that annual strandline vegetation may be expected to appear in future years (Delaney *et al*., 2013).

The area of embryonic shifting dunes in the Cahore Point North sub-site was recorded as 5.15ha during the SDM (Delaney *et al*., 2013), an increase from 4.71ha recorded during the CMP (Ryle *et al*., 2009).

The area of mobile dunes (marram dunes) in the Cahore Point North sub-site was recorded as 14.51ha during the SDM (Delaney *et al*., 2013). This is a decline from 24.18ha recorded during the CMP (Ryle *et al*., 2009). This decline in area is primarily due to succession to fixed dunes (grey dunes) and is not considered to be habitat loss (Delaney *et al*., 2013).

The area of fixed dune habitat in the Cahore Point North sub-site had increased to 96.90ha according to the SDM (Delaney *et al*., 2013), from 81.23ha recorded by Ryle *et al*. (2009) during the CMP. This increase in area is due to accretion along the eastern seaward boundaries of the site. Nevertheless, areas of this habitat have been lost to development, with 0.5ha of the fixed dunes with herbaceous vegetation in the north of the dunes reported as being lost since 2007 due to the construction of a house and garden (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 sand dune habitats at Cahore Polders and Dunes SAC, as mapped by Delaney *et al*. (2013), is presented in Appendix I.

During the CMP, annual vegetation of drift lines was recorded as occurring at the top of the beach (Ryle *et al*., 2009), although the habitat was not recorded during the SDM (Delaney *et al*., 2013).

Embryonic shifting dunes are present as a linear habitat along almost the entire length of the dunes at Cahore Point North. They have accreted on the beach to the east of the former boundary of the sand dunes (Delaney *et al*., 2013).

Mobile dunes are quite extensive, forming a continuous strip along the entire length of the SAC and occupy a wide section of the eastern part of the site (Delaney *et al*., 2013). At the northern end, where erosion is causing the dunes to retreat, some of the mobile dunes area is only sparsely vegetated and may represent only a temporary build-up (Ryle *et al*., 2009).

There is a very gradual transition to fixed dunes (grey dunes) at Cahore Polders and Dunes SAC, which are among the most extensive on the east coast of Ireland. They consist of a continuous expanse of habitat, interrupted only by an access road in the southern half of the site. In places, these dunes exceed 300m in width and attain impressive proportions, with the tallest dunes approximately 16m tall (Ryle *et al*., 2009).

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 Cahore Polders and 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. It should be borne in mind that natural processes such as erosion, deposition and succession are primary drivers of change on coastal habitats.

Cahore Polders and Dunes SAC is quite dynamic in nature, with natural erosion and accretion occurring simultaneously in different areas. This makes it difficult to determine the overall conservation condition of the habitats, particularly for those habitats of a more ephemeral nature, such as embryonic dunes

There are notable areas of foredune accretion, particularly towards the south of the site where the embryonic dunes are up to 25m wide (Ryle *et al.,* 2009).

Erosion has claimed a significant portion of the dunes at Cahore Polders and Dunes SAC in recent years, particularly at the north end of the system. Large parts of the seaward side of the front ridge are quite bare of vegetation. In other places, erosion through the fixed dunes had caused clumps of vegetation to subside onto the front slope. In places, the eroded face of the dunes is being stabilised by growth of marram (*Ammophila arenaria*) (Ryle *et al*., 2009).

As is frequently the case at sites where natural erosion is occurring, there are difficulties in determining the degree to which certain negative trends are attributable to either natural or human induced factors. Over the years at Cahore Polders and Dunes SAC, there has been loss of dune habitat to houses, caravan parks and erosion by the sea. There is evidence of sand extraction in places, which has led to the formation of (or exacerbation in condition of existing) blowouts (Ryle *et al*., 2009).

Coastal protection in the form of timber groynes has been employed at Cahore, but has proved to be largely ineffective. An example of this protection method can currently be seen at the extreme north of the site, where the tall dunes have been severely eroded. New Zealand flax (*Phormium tenax*) has also been planted in a small area here, presumably in an attempt to stabilise the dunes. Seaweed planting (as a method of coastal protection) was also used at Cahore, but was apparently of no long-term benefit (Ryle *et al*., 2009).

As is the case with mobile dunes, the embryonic dunes have an on-going threat from recreational pressures and the contributory effect that this is likely to have on erosion (Ryle *et al*., 2009).

The loss of fixed dune habitat in the north may be due mostly to natural causes such as wind and wave action, but recreational pressures on the dunes are high and can be assumed to have at least exacerbated the effects of natural processes (Ryle *et al*., 2009).

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 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.

The SAC has a well-developed dune system typical of the east coast. The dunes display good zonation, with fixed dunes grading eastwards to mobile dunes, embryo dunes and, at the top of the beach, annual drift line vegetation has been recorded (NPWS, 2015).

The western edges of the dunes, which are outside the SAC, have been converted to improved pasture for cattle. This has eliminated the transitional habitats between the sand dunes and the wetlands, which have also been considerably altered by drainage (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 QI 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.

Activities related to recreation, such as walking, horse riding, campfires, paths and trampling represent the most frequently occurring negative impacts causing bare ground. Recreational pressures in Cahore Polders and Dunes SAC are considerable, especially at the north end of the site, with many holiday homes, mobile homes and caravans adjacent to the site. Damage due to recreation has resulted in the sand dune habitats affected becoming fragmented and vulnerable to erosion. The most severely affected part of the dunes is close to the main access point in the north of the site. Quad-biking is also known to occur in the dunes and a horse gallops of over 3km in length, is entirely within the fixed dunes (Ryle *et al*., 2009). Both of these activities result in bare ground developing. There are numerous well-worn tracks throughout the fixed dunes and, during the CMP, bare ground was recorded as exceeding 10% of the total area (Ryle *et al*., 2009).

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).

The fixed dune vegetation at Cahore Polders and Dunes SAC suffers from both undergrazing and intensive grazing; both of which have negative impacts in separate areas. Impacts related to agriculture such as intensive grazing, stock feeding and undergrazing were recorded as having a negative effect on 66% of the habitat. Rabbit activity is considered a neutral impact at Cahore Point North as the benefits of grazing are balanced by the damage to the dune structure (Delaney *et al*., 2013).

Far greater areas are affected by insufficient grazing pressure than overgrazing, which has resulted in the fixed dunes with herbaceous vegetation being affected by rank vegetation and encroachment by scrub and bracken (*Pteridium aquilinum*) (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 embryonic dunes 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 (*Ammophila arenaria*) is common, while groundsel (*Senecio vulgaris*), sea rocket (*Cakile maritima*) and dandelion (*Taraxacum* sp.) 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*).

At the top of the beach, the drift line vegetation was reported during the CMP to consist of species such as sea rocket (*Cakile maritima*), frosted orache (*Atriplex laciniata*), sea sandwort (*Honckenya peploides*) and prickly saltwort (*Salsola kali*) (Ryle *et al*., 2009).

Sand couch (*Elytrigia juncea*), marram (*Ammophila arenaria*), sea holly (*Eryngium maritimum*) and curled dock (*Rumex crispus*) occur in the embryonic dune habitat. Shifting dunes are almost entirely dominated by marram (*Ammophila arenaria*) and occur behind the embryonic dunes (NPWS, 2013).

The mature fixed dune vegetation occurs behind the shifting dunes and includes a good diversity of typical fixed dune species. Among the typical fixed dune species noted by the CMP were red fescue (*Festuca rubra*), wild carrot (*Daucus carota*), lady's bedstraw (*Galium verum*), cat's ear (*Hypochaeris radicata*), restharrow (*Ononis repens*), common bird's-foot trefoil (*Lotus corniculatus*) and wild thyme (*Thymus polytrichus*) (Ryle *et al*., 2009).

The target for this attribute is to maintain a typical flora for each 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.

Although pasture may have been the main management at Cahore in the past, grazing pressure on most of the dune system is very low, and bracken (*Pteridium aquilinum*) has become problematic in the fixed dunes with herbaceous vegetation. Bracken threatens to reduce the diversity of the habitat by shading out other species (Delaney *et al*., 2013).

Large areas of the fixed dune grassland at Cahore are heavily invaded by bracken (which covered 15% of the habitat in 2012), sea buckthorn (*Hippophae rhamnoides*), gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus* agg.). The absence of grazing livestock in the some fixed dune areas as well as recreational use opening up bare areas for colonisation, facilitated the spread of these species which occur in dense patches. Conifers have been planted and are self-seeding in the dunes. Sea buckthorn has become well-established and is particularly rampant in places. Both conifers and sea buckthorn may exert a strong pressure on the water resources of the sand dune system (Delaney *et al*., 2013).

Other negative indicator species occasionally noted in the fixed dunes were common ragwort (*Senecio jacobaea*), creeping thistle (*Cirsium arvense*), common nettle (*Urtica dioica*) and perennial rye-grass (*Lolium perenne*) (Ryle *et al*., 2009).

Parts of the site are managed intensively as pasture for sheep and cattle, and this has resulted in the localised presence of agricultural weeds, disturbed ground, supplementary feeding and high nutrient input (Delaney *et al*., 2013).

A number of non-native species, such as sycamore (*Acer pseudoplatanus*), cabbage palm (*Cordyline australis*), New Zealand flax (*Phormium tenax*), greater periwinkle (*Vinca major*) and spruce (*Picea* sp.) have been noted, although none of these were common (Ryle *et al*., 2009).

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.

Some of the fixed dune habitat of Cahore Polders and Dune SAC has been encroached by scrub, which represents a loss of sand dune area (Ryle *et al*., 2009).

As mentioned above, a number of non-native tree and shrub species, such as sycamore (*Acer pseudoplatanus*), cabbage palm (*Cordyline australis*) and spruce (*Picea* sp.) occur (Ryle *et al*., 2009).

Trees have also been planted in the fixed dunes with herbaceous vegetation at Cahore, and in 2011, the small size of the trees indicated that the activity had been recent (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.

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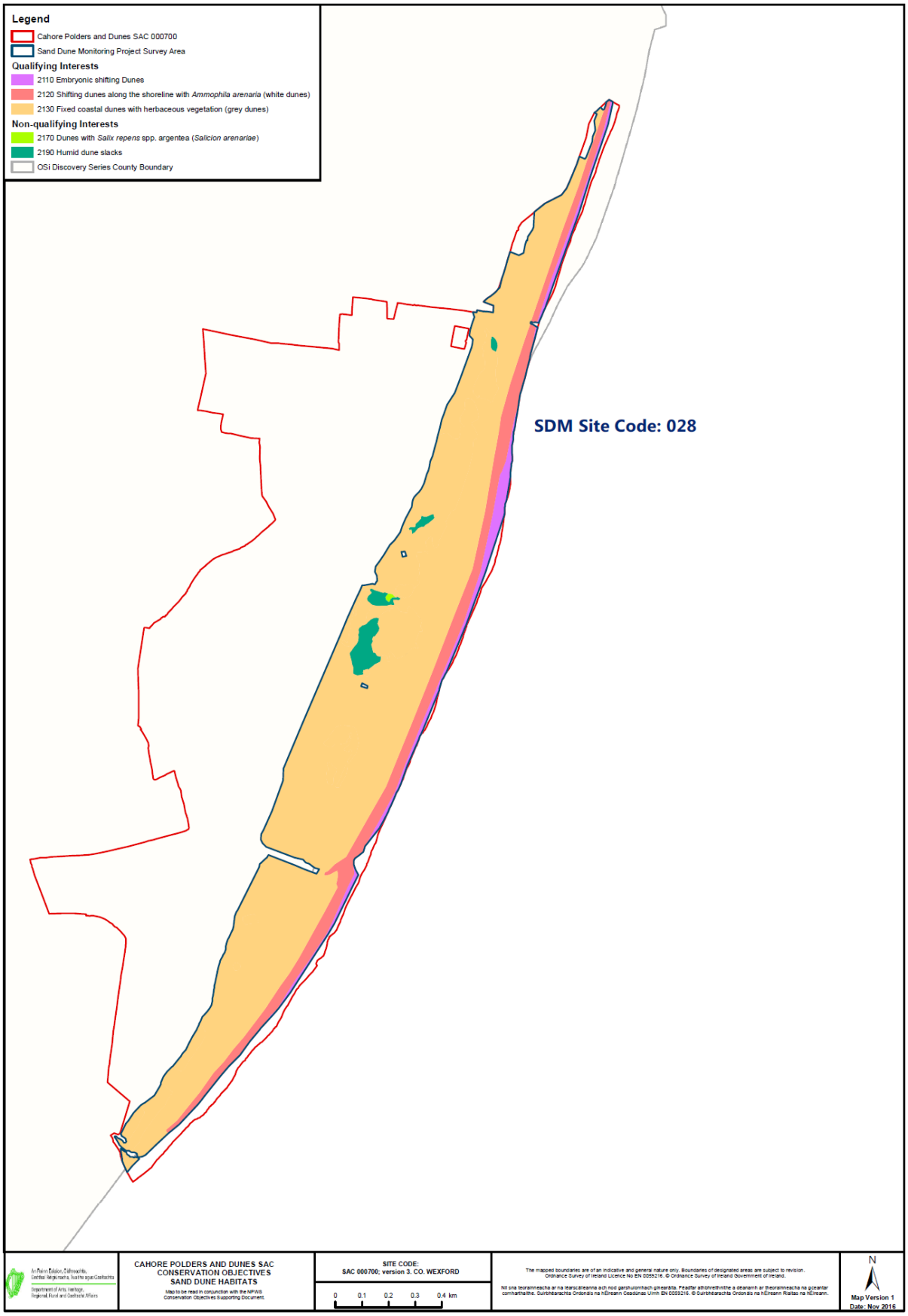
Appendix I – Distribution map of Sand Dune Habitats within Cahore Polders and Dunes SAC



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

SITE 028 CAHORE POINT NORTH

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

Cahore Point North is a large site located on the east coast of Wexford, 6 km north-east of Kilmuckridge. It forms part of Cahore Polders and Dunes SAC (SAC 000700) and lies just west of the Cahore Marshes SPA (SPA 004143), an area of polder grassland which supports large numbers of wintering waterfowl. Five Annex I sand dune habitats (* indicates a priority habitat) were recorded here during the CMP: **1210 Annual vegetation of drift lines, 2110 Embryonic shifting dunes**, **2120 Marram dunes (white dunes), *2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** (Ryle *et al*., 2009). An additional Annex I sand dune habitat, **2170 Dunes with creeping willow**, was recorded during the SDM. A number of rare plants are known to occur within this site, including *Asparagus officinalis* subsp. *prostratus*, which is included on the Flora (Protection) Order, *Equisetum* x *moorei, Cynoglossum officinale* and *Juncus acutus. Asparagus officinalis* subsp. *prostratus* was found during the CMP, but not during the SDM. The Gatekeeper butterfly (*Pyronia tithonus*) has also been recorded within the site (NPWS, 2003). The dunes are located in an area of scenic beauty and are attractive to tourists. Caravan parks are located to the north and west of the site and the main adjacent land-use is agriculture.

2 CONSERVATION ASSESSMENTS

2.1 Overview

Cahore Point North was surveyed from the 5th to the 8th of July, 2011. Mapping and most of the monitoring stops were completed on that date, but two further visits were made on the 6th of October 2011 and 16th of September 2012 to complete the monitoring stops. Of the five Annex I habitats recorded during the baseline survey, four were recorded in 2011. The habitats found at Cahore Point North during the SDM and the results of the conservation assessments are presented in Table 1. **1210 Annual vegetation of drift lines,** which was recorded during the CMP, was no longer present on the site due to natural successional processes. A small area of **2170 Dunes with creeping willow**, previously unrecorded during the CMP, was recorded in 2011. No trend could be ascribed for this habitat. Trend was not ascribed for the **2190 Humid dune slacks** assessment because the largest slack within the site, comprising 65% of the total **2190 Humid dune slack** area, was not mapped but was

likely to have been present but overlooked during the CMP. As a result, any comparison of the results would have been misleading. ***2130 Fixed dunes (grey dunes)** were assessed as Unfavourable-Bad, while the other habitats were assessed as Unfavourable-Inadequate.

Table 1. Conservation assessment results for all Annex I dune habitats surveyed at Cahore Point North, Co. Wexford. Annual vegetation of drift lines (1210), which was recorded during the CMP, could not be assessed as it was not re-found during the SDM

Habitat	Area	Structure & Functions	Future Prospects	Overall result
2110 Embryonic shifting dunes	Favourable (Stable)	Unfavourable-Inadequate (Deteriorating)	Unfavourable-Inadequate (Stable)	Unfavourable-Inadequate (Deteriorating)
2120 Marram dunes (white dunes)	Favourable (Stable)	Unfavourable-Inadequate (Deteriorating)	Unfavourable-Inadequate (Stable)	Unfavourable-Inadequate (Deteriorating)
*2130 Fixed dunes (grey dunes)	Unfavourable-Inadequate (Stable)	Unfavourable-Bad (Stable)	Unfavourable-Bad (Stable)	Unfavourable-Bad (Stable)
2170 Dunes with creeping willow	Favourable	Unfavourable-Inadequate	Unfavourable-Inadequate	Unfavourable-Inadequate
2190 Humid dune slacks	Favourable	Unfavourable-Inadequate	Unfavourable-Inadequate	Unfavourable-Inadequate

2.1.1 Area

The areas of Annex I sand dune habitats at Cahore Point North are presented in Table 2. **1210 Annual vegetation of drift lines** was not found in 2011 and the area where it had been found had succeeded to **2110 Embryonic shifting dunes**. **2170 Dunes with creeping willow** were recorded in 2011. Because the habitat was mature and stable, it seemed most likely that it had been present during the baseline survey and was added to the revised baseline map. Other revisions to the baseline maps include the inclusion of areas of bare sand and scrub within the ***2130 Fixed dunes (grey dunes)** habitat, mature **2190 Humid dune slacks** which were found in 2011 and a minor amendment to the area of **2120 Marram dunes (white dunes)**. The total area of Annex I sand dune habitat increased from 112.66 ha during the CMP to 118.94 ha during the SDM due to a process of accretion.

Table 2. Areas of Annex I habitats originally mapped at Cahore Point North 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	0.19	0.19	0.00
2110 Embryonic shifting dunes	4.71	4.71	5.15
2120 Marram dunes (white dunes)	24.20	24.18	14.51
*2130 Fixed dunes (grey dunes)	78.30	81.23	96.90
2170 Dunes with creeping willow	0.00	0.07	0.07
2190 Humid dune slacks	1.00	2.28	2.28
Total	108.4	112.66	118.91

2.1.2 Structure and Functions

Structure and Functions assessments were carried out in five Annex I sand dune habitats at Cahore Point North. Table 3 shows the results of the Structure and Functions assessment. The Structure and Functions of **2110 Embryonic shifting dunes**, **2120 Marram dunes (white dunes)**, **2170 Dunes with creeping willow** and **2190 Humid dune slacks** were assessed as Unfavourable-Inadequate. Structure and Functions of ***2130 Fixed dunes (grey dunes)** were assessed as Unfavourable-Bad.

Table 3. Annex I sand dune habitats at Cahore Point North 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
2110 Embryonic shifting dunes	8	7	1
2120 Marram dunes (white dunes)	8	7	1
*2130 Fixed dunes (grey dunes)	12	11	6
2170 Dunes with creeping willow	2	10	2
2190 Humid dune slacks	4	11	1

2.1.3 Future Prospects

Impacts and activities recorded at Cahore Point North are presented in Table 4. Impact codes are assigned according to Ssymanck (2010). Activities related to recreation, such as walking, horse riding, campfires, paths and trampling, represent the most frequently occurring negative impacts. ***2130 Fixed dunes (grey dunes)** have the most negative impacts, with bracken encroachment, undergrazing and intensive grazing the most serious. Lack of grazing is the most serious negative impact for both **2170 Dunes with creeping willow** and **2190 Humid dune slacks**.

Table 4. Impacts recorded in Annex I sand dune habitats at Cahore Point North 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
2110	G01.02	Walking, horse riding	Low	Negative	20	Inside
2110	G05.01	Trampling	High	Negative	10	Inside
2120	G01.02	Walking, horse riding	Medium	Negative	25	Inside
2120	G05	Campfires	High	Negative	1	Inside
2120	G05.01	Trampling	High	Negative	10	Inside
*2130	A04.01.01	Intensive cattle grazing	High	Negative	10	Inside
*2130	A04.01.02	Intensive sheep grazing	High	Negative	5	Inside
*2130	A04.02	Non-intensive grazing	Medium	Positive	10	Inside
*2130	A04.03	Undergrazing	Medium	Negative	50	Inside
*2130	A05.02	Stock feeding	High	Negative	1	Inside
*2130	B01	Tree planting	Low	Negative	2	Inside
*2130	D01.01	Paths and tracks	High	Negative	5	Inside
*2130	E01.03	Buildings	High	Negative	1	Inside
*2130	E04.01	Farm Buildings	High	Negative	1	Inside
*2130	G01.02	Walking, horse riding	Low	Negative	1	Inside
*2130	G05	Campfires	High	Negative	1	Inside
*2130	G05.01	Trampling	High	Negative	5	Inside
*2130	H05.01	Garbage/Waste	Medium	Negative	1	Inside
*2130	I01	*Hippophae rhamnoides*	High	Negative	5	Inside
*2130	I02	*Pteridium aquilinum* encroachment	Medium	Negative	60	Inside
*2130	K04.05	Rabbit grazing	High	Neutral	10	Inside
2170	A04.03	Undergrazing	Medium	Negative	100	Inside
2190	A04.03	Lack of grazing	High	Negative	70	Inside
2190	B01	Tree planting	Medium	Negative	5	Inside
2190	D01.01	Paths and tracks	Medium	Negative	1	Inside
2190	G01.02	Walking	Low	Neutral	5	Inside
2190	I01	Invasive non-native species	Medium	Negative	50	Outside
2190	J02.07	Drainage	Medium	Negative	100	Outside
2190	J02.09.01	Saltwater Intrusion	Low	Negative	10	Inside
2190	K01.03	Drying out	Medium	Negative	20	Inside

2.2 Annex I habitat assessments

The conservation status of the Annex I habitats at Cahore Point North is discussed below. The conservation status assessed during the SDM 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

1210 Annual vegetation of drift lines was recorded during the CMP but was not present in 2011. This was the result of natural succession and was not associated with human activity. The conservation status of **1210 Annual vegetation of drift lines** was not assessed.

2.2.2 2110 Embryonic shifting dunes

2110 Embryonic shifting dunes are present as a linear habitat along almost the entire length of the dunes at Cahore Point North. They have accreted on the beach to the east of the former boundary of the sand dunes since the CMP.

Area

The area of **2110 Embryonic shifting dunes** increased from 4.71 ha during the CMP to 5.15 ha during the SDM. During the CMP, area was assessed as Favourable. Area was assessed as Favourable (stable) during the SDM.

Structure and Functions

The criterion assessing damage due to disturbance failed in the Structure and Functions assessment, but all of the other criteria passed. The damage is most obvious close to access routes and relates to amenity use. During the CMP, Structure and functions were assessed as Favourable. Structure and Functions were assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

Future Prospects

Trampling, walking and horse riding were recorded as negative impacts during the SDM. During the CMP, Future Prospects were assessed as Unfavourable-Inadequate because of the threat of development at the site and the pressures associated with recreation. Trampling, walking and horse riding and sea defences were noted. Since the hard defences referred to in the baseline report were erected prior to designation (mid-1970s, Ryle *et al.*, 2009), and they do not appear to be having a negative effect on the **2110 Embryonic shifting dunes**, they were not considered a negative impact during the SDM. Future Prospects were assessed as Unfavourable-Inadequate (stable) during the SDM.

Conservation assessment

One of the parameters was assessed as Favourable, while the other two were assessed as Unfavourable-Inadequate. During the CMP, conservation status was assessed as Unfavourable-Inadequate, but only Future Prospects were assessed as Unfavourable-Inadequate while the other two parameters were assessed as Favourable. The conservation status of **2110 Embryonic shifting dunes** was assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

2.2.3 2120 Marram dunes (white dunes)

2120 Marram dunes (white dunes) occupy a wide section of the eastern part of the site. There was a very gradual transition to ***2130 Fixed dunes (grey dunes).**

Area

The area of **2120 Marram dunes (white dunes)** has decreased from 24.18 ha during the CMP to 14.51 ha during the SDM. This is primarily due to succession to ***2130 Fixed dunes (grey dunes)** and is not considered to be negative habitat loss. During the CMP, Area was assessed as Favourable. Area was assessed as Favourable (stable) during the SDM.

Structure and Functions

All of the conservation assessment criteria passed in the Structure and Functions assessment with the exception of the criterion assessing damage due to disturbance. Damage is particularly noticeable close to access points, but there are also trampled tracks running through the habitat parallel to the shore. During the CMP, Structure and Functions were assessed as Favourable. Structure and Functions were assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

Future Prospects

Trampling, campfires, walking and horse riding were recorded as negative impacts during the SDM. During the CMP, trampling, walking and horse riding were recorded, and Future Prospects were assessed as Unfavourable-Inadequate. As well as recreational pressures, the threat of development was cited in the Future Prospects assessment, but was not listed as an impact. Future Prospects were assessed as Unfavourable-Inadequate (stable) during the SDM.

Conservation assessment

Two of the parameters were assessed as Unfavourable-Inadequate, while the other one was assessed as Favourable. During the CMP, the habitat was assessed as Unfavourable-Inadequate because one of the three parameters was assessed as Unfavourable-Inadequate while the other two were assessed as Favourable. The conservation status of **2120 Marram dunes (white dunes)** was assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

*2.2.4 *2130 Fixed dunes (grey dunes)*

***2130 Fixed dunes (grey dunes)** are the most extensive habitat at Cahore Point North. The western edges of the dunes have been converted to improved pasture for cattle, and are excluded from the site. This has eliminated the transitional habitats between the sand dunes and the wetlands on their landward edge.

Area

Area has increased from 81.23 ha during the CMP to 96.90 ha during the SDM. This increase in area is due to accretion along the eastern seaward boundaries of the site. However, just under half a hectare (0.49 ha) of the habitat was lost after the baseline survey was carried out, as a house, septic tank and garden have been developed in the northern part of the site. This represents anthropogenic loss of 0.51%. Area was assessed as Unfavourable-Inadequate during the CMP because of habitat loss resulting from erosion associated with human activities and scrub expansion. Scrub expansion was considered under the Structure and Functions parameter under the SDM methodology. During the SDM, area was assessed as Unfavourable-Inadequate (stable).

Structure and Functions

Six criteria failed during the Structure and Functions assessment, and signs of structural damage were observed in eight monitoring stops. Although there was a good diversity of positive indicator species in the site, three monitoring stops contained fewer than four positive indicator species. Negative indicator species were present at six monitoring stops, and *Pteridium aquilinum* covered over 15% of the habitat. Non-native species such as *Acer pseudoplatanus*, *Pinus* sp. and *Hippophae rhamnoides* were recorded. *Hippophae rhamnoides* has become well-established and the spread of the species can be traced easily on aerial photographs. The vegetation was generally tall and quite rank in places and flowering and fruiting were absent from 60% of stops. Damage due to disturbance was recorded at six of the monitoring stops. During the CMP, Structure and Functions were assessed as Unfavourable-Inadequate because of the presence of negative species and disturbance leading to bare ground. Sward height was generally high during the CMP, but this did not cause stops to fail unless a second criterion failed. Dense scrub was assessed under the Area parameter rather than the Structure and Functions during the CMP. Under the current methodology, the habitat would have been assessed as Unfavourable-Bad. Structure and Functions of ***2130 Fixed dunes (grey dunes)** were assessed as Unfavourable-Bad (stable) during the SDM.

Future Prospects

Impacts related to agriculture such as intensive grazing, stock feeding and undergrazing had a negative effect on 66% of the habitat. Trees have been planted within the habitat. Recreation is also an important factor at Cahore Point North, and associated impacts include trampling, walking, campfires, littering and paths and tracks. There is a horse-training track through the site, and this is maintained free of vegetation. Building work on a new house was underway within the ***2130 Fixed dunes (grey dunes)** at the time of survey. Non-native invasive species, *Hippophae rhamnoides* in particular, have already damaged the ***2130 Fixed dunes (grey dunes)** and represent a significant threat as *Hippophae rhamnoides* is spreading. Rabbit activity is considered a neutral impact at Cahore Point North as the benefits of grazing are balanced by the damage to the dune structure. The spread of *Pteridium aquilinum* has been facilitated by a lack of grazing and also by recreational use opening up bare areas for colonisation. During the CMP, Future Prospects were assessed as Unfavourable-Inadequate. Recorded impacts included undergrazing, sand and gravel extraction, dispersed habitation, camping and caravans, other sports/leisure complexes, walking/horse riding, trampling, erosion and invasion by a species. The extent and severity of these impacts would have led to an assessment of Unfavourable-Bad under the current methodology. During the SDM, Future Prospects were assessed as Unfavourable-Bad (stable).

Conservation assessment

Area was assessed as Unfavourable-Inadequate and the remaining two assessment parameters were assessed as Unfavourable-Bad. Although the conservation status was assessed as Unfavourable-Inadequate during the CMP, it would have been assessed as Unfavourable-Bad under the current methodology. The conservation status of ***2130 Fixed dunes (grey dunes)** was assessed as Unfavourable-Bad (stable) during the SDM.

2.2.5 2170 Dunes with creeping willow

There are two small areas of **2170 Dunes with creeping willow** located close to a large, mature area of **2190 Humid dune slacks** habitat at Cahore Point North. They were not recorded during the CMP, so no trend can be established for their conservation status, though they are likely to have been overlooked at the time and have been included on the revised baseline map.

Area

The area of **2170 Dunes with creeping willow** was 0.07 ha in 2011. There is no sign of anthropogenic habitat loss and Area was assessed as Favourable.

Structure and Functions

Two of the criteria failed the Structure and Functions assessment. The vegetation was uniformly high and there was no bare soil present. Structure and Functions were assessed as Unfavourable-Inadequate.

Future Prospects

Undergrazing was the only impact recorded for this habitat, and it had a medium-intensity negative effect on the entire mapped area. Future Prospects were assessed as Unfavourable-Inadequate.

Conservation assessment

Area was assessed as Favourable, while Structure and Functions and Future Prospects were assessed as Unfavourable-Inadequate. The conservation status of **2170 Dunes with creeping willow** was assessed as Unfavourable-Inadequate.

2.2.6 2190 Humid dune slacks

There are four dune slacks which correspond to **2190 Humid dune slacks** at Cahore Point North. In the past, the habitat may have been more extensive, but there are drainage channels which run throughout the wetlands behind the sand dunes and run through the dunes at one point. OSI data indicates that the drains were established prior to designation. *Juncus maritimus*, an indicator of saline conditions, was present in two of the slacks.

Area

The area of **2190 Humid dune slacks** has remained the same at 2.28 ha since the baseline survey. During the baseline survey, Area was assessed as Favourable. Area was assessed as Favourable (stable) during the SDM.

Structure and Functions

One of the criteria failed in the Structure and Functions assessment. Less than 10% of the habitat was composed of broadleaved herb species, far below the target value of 30%. During the CMP, Structure and Functions were assessed as Favourable, but the largest of the slacks was not mapped at that time. The largest slack represents 65% of the total **2190 Humid dune slack** habitat at Cahore Point North, and because it was not included in the baseline assessment, it is very difficult to say whether the habitat was in good condition during the CMP. The proportion of broadleaved herbs can change

quickly in response to changes in management. No trend could be ascribed to the Structure and Functions, which were assessed as Unfavourable-Inadequate during the SDM.

Future Prospects

Several negative impacts were recorded in **2190 Humid dune slacks** at Cahore Point North. Although there are no drainage channels within the habitat, drainage ditches beside the sand dunes and running through the dunes deplete the water table. A reduction in the amount of fresh groundwater can lead to infiltration of salt water into the water table that feeds the sand dunes. Drying out and saltwater intrusion were observed in the slacks. Tree planting will exacerbate the drying effect of drainage. There are two dense stands of *Hippophae rhamnoides* located either adjacent to or very close to the habitat. These represent a threat as they accelerate drying out and may invade the habitat. Lack of grazing has resulted in a rank sward. Walking and tracks have a limited negative impact. No specific impacts were listed for **2190 Humid dune slacks** during the CMP, but Future Prospects were assessed as Unfavourable-Inadequate because of the threats of scrub encroachment, drying out and recreation. These three main threats have remained unchanged, and Future Prospects were assessed as Unfavourable-Inadequate (stable) during the SDM.

Conservation assessment

Structure and Functions and Future Prospects were assessed as Unfavourable-Inadequate while Area was assessed as Favourable. The habitat was assessed as Unfavourable-Inadequate during the CMP. Because 65% of the total area of the habitat was excluded from the assessment during the CMP, no trend has been established for the overall conservation assessment. The conservation status of **2190 Humid dune** slacks was assessed as **Unfavourable-Inadequate** during the SDM.

3 DISCUSSION

3.1 Qualifying interests for SAC

The Natura 2000 standard data form for Cahore Polders and Dunes SAC (SAC 000700) records four sand dune habitats as Qualifying Interests. These are shown in Table 5. **1210 Annual vegetation of drift lines** was not recorded at Cahore in 2011. The conservation status of **2110 Embryonic shifting dunes, 2120 Marram dunes (white dunes)** and ***2130 Fixed dunes (grey dunes)** recorded during the SDM is less positive than that presented in the Natura 2000 standard data form.

Table 5. Relevant Qualifying Interests for Cahore Polders and Dunes SAC 000700 (NPWS, 2003)

Habitat	Area (%)	Representativity	Relative surface	Conservation status	Global assessment
1210 Annual vegetation of drift lines	1	B	C	B	B
2110 Embryonic shifting dunes	2	B	C	B	B
2120 Marram dunes (white dunes)	18	B	C	B	B
*2130 Fixed dunes (grey dunes)	13	B	C	B	B

3.2 Development

The Wexford Coast is attractive to visitors, and there are extensive tourist developments both north of the Cahore Point sand dunes, at Cahore Point, and south of the dunes, at Kilmuckridge. There are houses within the sand dune system which have been present since before the Habitats Directive

came into force in 1994, and for the most part these were excluded from the survey area. However, development pressure remains a threat, and 0.5 ha of the ***2130 Fixed dunes with herbaceous vegetation** in the north of the dunes has been lost due to the construction of a house and garden since 2007. This house is very close to the shore, and is highly vulnerable to storm damage, which increases the likelihood that coastal protection works will be required to prevent loss of the house or garden.

3.3 Recreation

Sand dune sites on the east coast of Ireland are popular recreation amenities. Cahore Point, north of the sand dune system, has a number of holiday homes and caravan parks. There are also good access routes to the sand dunes and beach, facilitating amenity use. There is evidence that the dunes are well-used during the summer, as a network of paths and tracks was present in the fore-dunes and in the seaward part of the fixed dunes. Other signs of amenity use include campfires and littering. The site is also used to train horses, and there is a gallops running through the fixed dunes. Damage due to recreation has resulted in the sand dune habitats affected becoming fragmented and vulnerable to erosion. The most severely affected part of the dunes is close to the main access point in the north of the site.

3.4 Agriculture and land management

Agriculture is a major land use in this part of Wexford, and the dunes are flanked by intensively managed farmland. The landward part of the dune systems, west of the main access track, has been modified to the point that it was excluded from the site as the habitats are agricultural in character and do not conform to an Annex I sand dune habitat. The wetlands beyond these fields have been considerably altered by drainage. Parts of the site are managed intensively as pasture for sheep and cattle, and this has resulted in the localised presence of agricultural weeds, disturbed ground, supplementary feeding and high nutrient input. Far greater areas are affected by insufficient grazing pressure, which has resulted in the **2190 Humid dune slacks** and **2130 Fixed dunes with herbaceous vegetation** being affected by rank vegetation and encroachment by scrub and *Pteridium aquilinum*. Trees have also been planted in **2190 Humid dune slacks** and **2130 Fixed dunes with herbaceous vegetation** at Cahore, and the small size of the trees indicates that this activity has probably taken place since the implementation of the Habitats Directive.

3.5 Non-native species, scrub and *Pteridium aquilinum* encroachment

Although pasture may have been the main management at Cahore in the past, grazing pressure on most of the dune system is very low, and *Pteridium aquilinum* has become problematic in the **2130 Fixed dunes with herbaceous vegetation**. At low levels, *Pteridium aquilinum* can add to the structural diversity of the habitat, but at its current extent, it threatens to reduce the diversity of the habitat by shading out other species. Non-native species are also spreading through the **2130 Fixed dunes with herbaceous vegetation** and **2190 Humid dune slacks.** Conifers have been planted and are self-seeding in the dunes. The presence of *Hippophae rhamnoides* is of particular concern as it currently forms two dense stands, the larger of which covers an area of 2.6 ha. There is strong evidence that the species is spreading into the adjacent **2130 Fixed dunes with herbaceous vegetation** and **2190 Humid**

dune slacks. Both conifers and *Hippophae rhamnoides* exert a strong pressure on the water resources of the sand dune system, and this may cause accelerated drying out of the dune slacks.

3.6 Alterations to the hydrological function of the dunes

In the past, the dune system at Cahore Point North existed within a matrix of marine and terrestrial habitats which included a wetland area west of the dunes. The wetlands have been drained and partly converted to intensively managed agricultural land. The lack of broadleaved species within the dunes slacks may be related to nutrient enrichment of the groundwater due to agricultural practices. Continued drainage of the area is designed to maintain an artificially low water table. This is likely to speed up the rate of drying out in the dune slacks, as well as potentially causing saltwater intrusion into the groundwater.

4 REFERENCES

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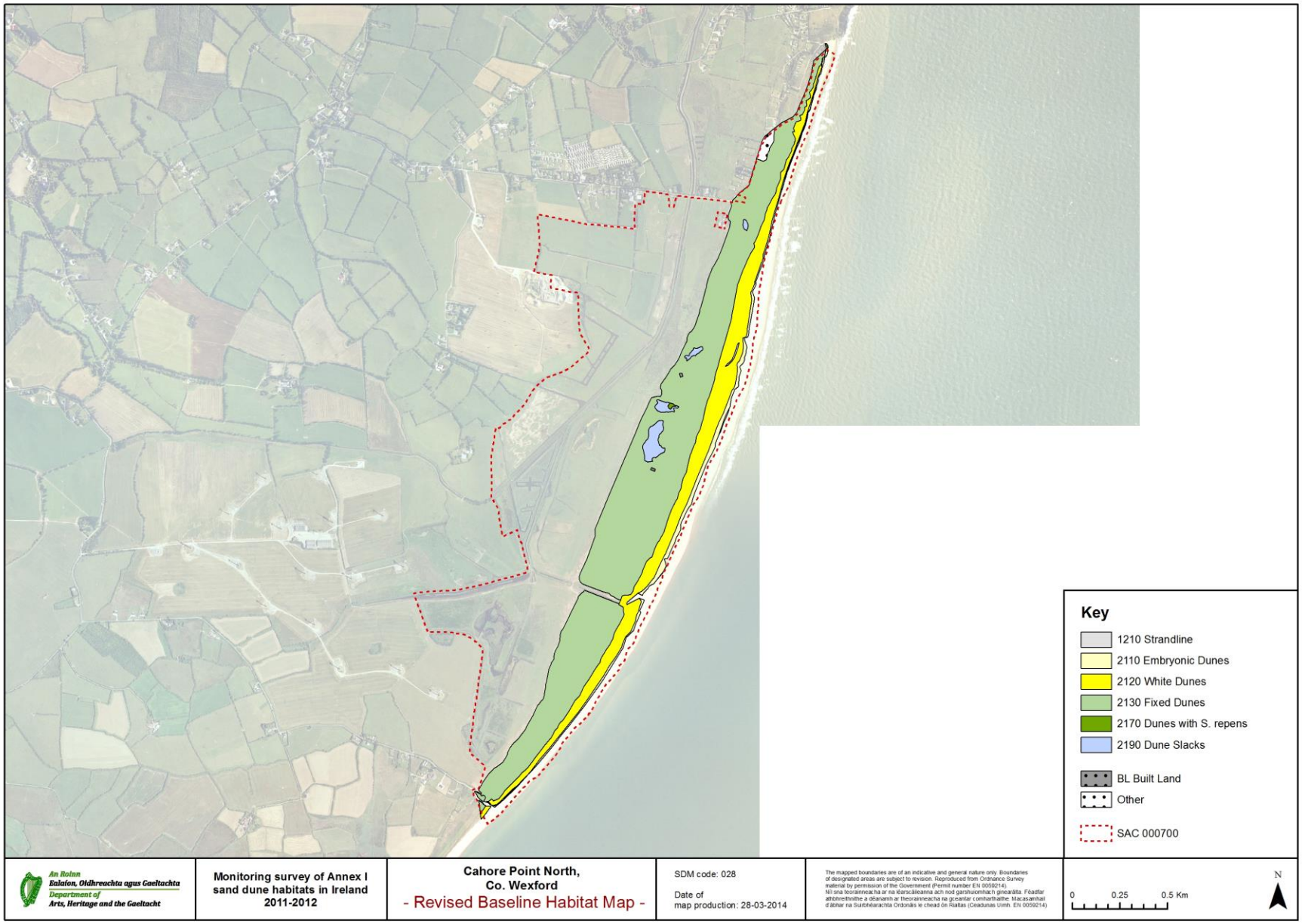
Key
1210 Strandline
2110 Embryonic Dunes
2120 White Dunes
2130 Fixed Dunes
2170 Dunes with S. repens
2190 Dune Slacks
BL Built Land
Other
SAC 000700
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
Monitoring survey of Annex I sand dune habitats in Ireland 2011-2012
Cahore Point North, Co. Wexford
- Revised Baseline Habitat Map -
SDM code: 028
Date of map production: 28-03-2014
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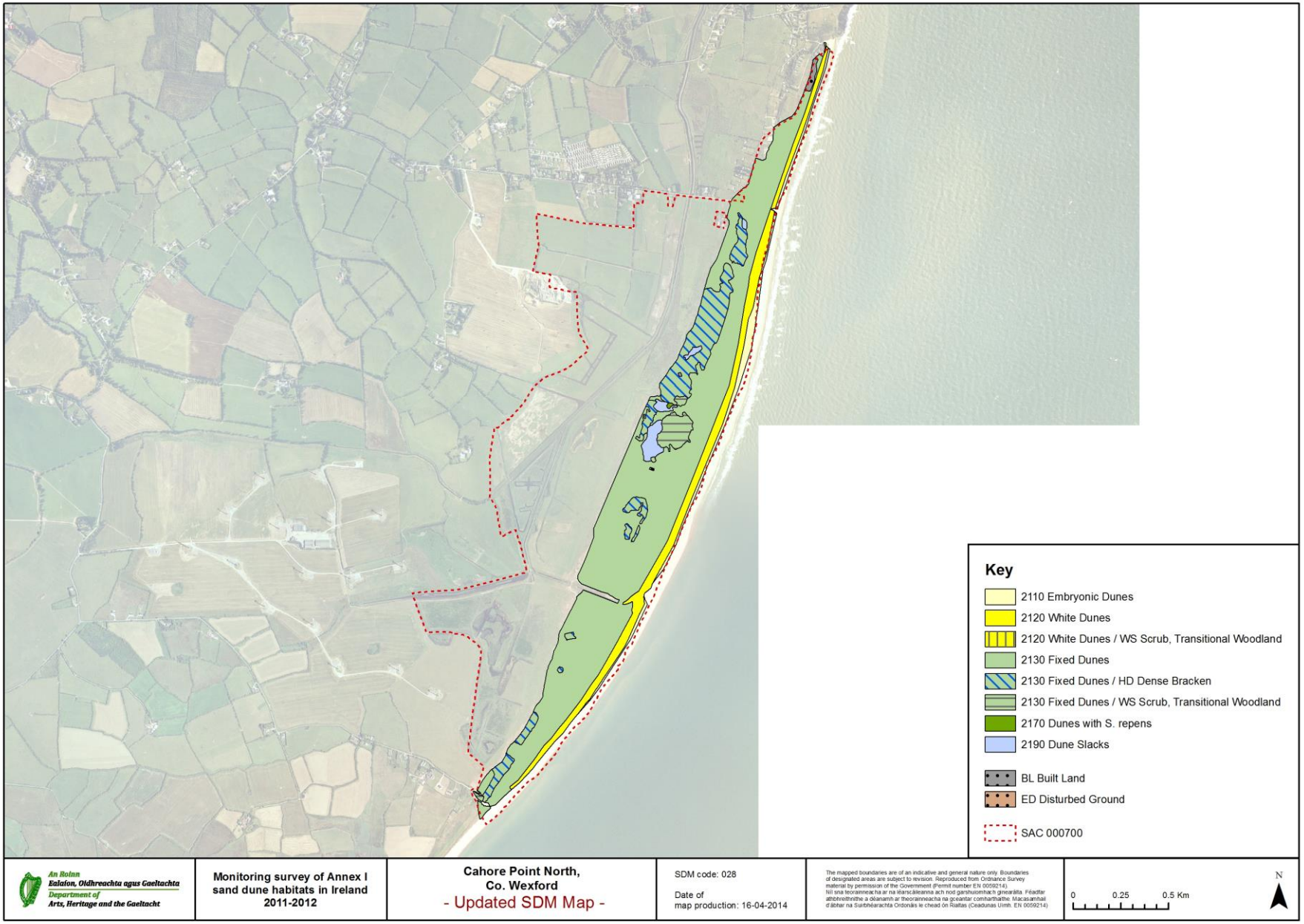
Key
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2120 White Dunes
2120 White Dunes / WS Scrub, Transitional Woodland
2130 Fixed Dunes
2130 Fixed Dunes / HD Dense Bracken
2130 Fixed Dunes / WS Scrub, Transitional Woodland
2170 Dunes with S. repens
2190 Dune Slacks
BL Built Land
ED Disturbed Ground
SAC 000700
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
Cahore Point North, Co. Wexford
- Updated SDM Map -
SDM code: 028
Date of map production: 16-04-2014
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