NPWS

Buckroney-Brittas Dunes and Fen SAC (site code: 000729)

Conservation objectives supporting document- Coastal habitats

Version 1

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Contents

Please note that the opinions expressed in the site reports from the Saltmarsh Monitoring Project (SMP), Coastal Monitoring Project (CMP) and 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 (2017) Conservation Objectives: Buckroney-Brittas Dunes and Fen SAC 000729 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 Communities, 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.

Buckroney-Brittas Dunes and Fen SAC is a complex system of coastal habitats located about 10km south of Wicklow town, Co. Wicklow. This SAC is important for the quality and range of coastal and fen habitats, along with the occurrence of some rare and protected plant species. It is an extensive sand dune/fen system with well-developed plant communities. The sand dunes span a distance of 8-9km and comprise two adjacent sand dune systems, Brittas Bay and Mizen Head dunes, separated by the rocky coastal headland, Mizen Head. The dunes have cut off the outflow of a small river at Mizen Head where Buckroney Fen has developed. The sand dunes at Mizen Head stretch southwards to the small rocky headland at Pennycomequick Bridge. Another small sand dune system occurs south of Pennycomequick Bridge (NPWS, 2013).

Buckroney-Brittas Dunes and Fen SAC is one of the few Irish east coast sites to possess good examples of wet dune slacks and dunes with creeping willow (*Salix repens*). The SAC is also notable for the presence, in the fixed dunes, of areas of decalcified dune heath, a rare habitat type in Ireland (NPWS, 2013).

Buckroney Fen lies west of Mizen Head and is backed by a swamp of dense common reed (*Phragmites australis*). It is a fine example of a diverse wetland system, including alkaline fen, and is one of the most important fens in eastern Ireland (NPWS, 2013).

Buckroney-Brittas Dunes and Fen SAC (site code: 000729) is selected for shingle beaches, saltmarshes, sand dune habitats and alkaline fens. The following nine coastal habitats are included in the list of Qualifying Interests for the SAC (* denotes a priority habitat):

1210	Annual vegetation of drift lines
1220	Perennial vegetation of stony banks
1410	Mediterranean salt meadows (Juncetaliea maritimi)
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)*
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)*
2170	Dunes with *Salix repens* ssp. *argentea* (Salix arenariae)
2190	Humid dune slacks

Mediterranean salt meadows (1410) is a saltmarsh habitat, while habitats 1210, 2110, 2120, 2130, 2150, 2170 and 2190 are associated with sand dune systems. Perennial vegetation of stony banks (vegetated shingle) is another coastal habitat. All habitats occur in close association with each other. The distribution of the known vegetated shingle sites and that of the sand dune habitats within Buckroney-Brittas Dunes and Fen 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 nine coastal habitats listed above in Buckroney-Brittas Dunes and Fen 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 **perennial vegetation of stony banks** are based in part on the findings of the National Shingle Beach Survey (NSBS), which was carried out in 1999 on behalf of the National Parks and Wildlife Service (NPWS) (Moore and Wilson, 1999).

The NSBS did not visit any sites within Buckroney-Brittas Dunes and Fen SAC. However, the Sand Dunes Monitoring Project (SDM) (Delaney *et al*., 2013) recorded vegetated shingle habitat within the sub-site Mizen Head (SDM site ID: 018).

The distribution of the known vegetated shingle sites in Buckroney-Brittas Dunes and Fen SAC is presented in Appendix I. As part of the SDM, a detailed individual site report and habitat maps were produced for the Mizen Head sub-site and these are included in Appendix VI.

The targets set for the **saltmarsh habitat** are based primarily on the results of the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009) and this document should be read in conjunction with that report.

The SMP surveyed, mapped and assessed one sub-site associated with Buckroney-Brittas Dunes and Fen SAC (McCorry and Ryle, 2009): Buckroney (including Potter's Bar; SMP site ID: SMP0037).

As part of the SMP, a detailed individual report and habitat maps were produced for the sub-site and these are included in Appendix II. The conservation objective for the saltmarsh habitat in Buckroney-Brittas Dunes and Fen SAC is based primarily on the findings of the SMP and also the Sand Dunes Monitoring Project (Delaney *et al*., 2013).

The targets set for the **sand dune habitats** are based primarily on the results of the Coastal Monitoring Project (CMP) (Ryle *et al*., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney *et al*., 2013) and this document should be read in conjunction with those reports.

The CMP was a comprehensive national baseline survey of all known sand dune systems in Ireland. Three sub-sites associated with Buckroney-Brittas Dunes and Fen SAC were surveyed, mapped and assessed:

1. Brittas Bay
2. Mizen Head
3. Pennycomequick

As part of the Coastal Monitoring Project (CMP), detailed individual reports and habitat maps were produced for all sub-sites and those compiled for the sub-site Pennycomequick (CMP site ID: 019) are included in Appendix V at the end of this document.

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 Brittas Bay and Mizen Head, was selected as a representative sample of the national dune resource for the SDM survey. 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 Brittas Bay (SDM site ID: 017) and Mizen Head (SDM site ID: 018) sub-sites are included in Appendices III and IV.

The conservation objectives for the sand dune habitats in Buckroney-Brittas Dunes and Fen SAC are based on the findings of the CMP (Ryle *et al*., 2009) and the SDM (Delaney *et al*., 2013), combined with the results of Gaynor (2008). It is thought that the sub-sites as surveyed by the CMP and SDM represent the entire area of sand dunes within Buckroney-Brittas Dunes and Fen SAC.

3 Perennial vegetation of stony banks

Perennial vegetation of stony banks is vegetation that is found at or above the mean high water spring tide mark on shingle beaches (i.e. beaches composed of cobbles and pebbles). It is dominated by perennial species (i.e. plants that continue to grow from year to year). The first species to colonise are annuals or short-lived perennials that are tolerant of periodic displacement or overtopping by high tides and storms. Level, or gently-sloping, high-level mobile beaches, with limited human disturbance, supports the best examples of this vegetation. More permanent ridges are formed by storm waves. Several of these storm beaches may be piled against each other to form extensive structures.

3.1 Overall Objective

The overall objective for 'Perennial vegetation of stony banks' in Buckroney-Brittas Dunes and Fen SAC is to '*restore the favourable conservation condition'*.

This objective is based on an assessment of the recorded condition of the habitat under a range of attributes and targets. The assessment is divided into three main headings: (a) Range, (b) Area 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. The target for favourable condition is that there is no decrease from the established baseline. Bearing in mind that coastal systems are naturally dynamic and subject to change, even

within a season, this target is assessed subject to natural processes, including erosion and succession.

The current area of perennial vegetation of stony banks in Buckroney-Brittas Dunes and Fen SAC is unknown.

The Sand Dunes Monitoring Project (SDM) mapped the vegetated shingle habitat in the Mizen Head sub-site as 0.08ha. Although the area of shingle beach is small, the habitat has occupied all of the suitable substrate at Mizen Head and there is no sign of human interference which would reduce the extent (Delaney *et al*., 2013).

The target is that the area should be stable or increasing, subject to natural processes, including erosion and succession.

3.3 Range

3.3.1 Habitat distribution

The full distribution of perennial vegetation of stony banks within Buckroney-Brittas Dunes and Fen SAC is unknown; however, the recorded location of the known vegetated shingle sites in the SAC is presented in Appendix I.

A small area of perennial vegetation of stony banks has developed on fine shingle at the outflow of a stream in the north of Mizen Head, at the boundary with the golf course. Although perennial vegetation has colonised, the substrate appears unstable and the habitat is sparse and poorly-developed (Delaney *et al*., 2013).

The target is that there should be no decline or change in the distribution of this habitat, unless it is the result of natural processes, including erosion and succession.

3.4 Structure and Functions

A fundamental aim of shingle conservation is to facilitate natural mobility. Shingle beaches are naturally dynamic systems, making them of geomorphological interest, as well as ecological interest. They are constantly changing and shingle features are rarely stable in the long term.

3.4.1 Physical structure: functionality and sediment supply

The health and on-going development of this habitat relies on a continuing supply of shingle sediment. This may occur sporadically as a response to storm events rather than continuously. Interference with the natural coastal processes, through offshore extraction or coastal defence structures in particular, can interrupt the supply of sediment and lead to beach starvation.

Perennial vegetation of stony banks present in the Mizen Head sub-site is a marginal, poorly-developed example of the habitat. There is evidence that the area floods periodically and there are species present which indicate that the gravel may succeed to dune vegetation. In the past, the area close to the channel underwent anthropogenic disturbance when a dam was built and then removed

in an effort to regulate the water table in the dunes. The poorly-developed nature of the habitat and the instability of the substrate are considered to be related to this past disturbance (Delaney *et al*., 2013).

Flooding and fencing were recorded as neutral impacts on the shingle beach in the Mizen Head sub-site. Flooding is a natural impact which makes the substrate less stable and increases its nutrient content. Fencing prevents access by walkers, but it also has an impact on the mobility of the substrate. The shingle beach at Mizen Head shows no evidence of human intervention to limit the size of, or interfere with, the habitat (Delaney *et al*., 2013).

The target is to maintain, or where necessary restore, the natural circulation of sediment and organic matter, without any physical obstructions.

3.4.2 Vegetation structure: zonation

Ecological variation in this habitat type depends on stability; the amount of fine material accumulating between the pebbles; climatic conditions; width of the foreshore and past management of the site. The ridges and lows also influence the vegetation patterns, resulting in characteristic zonations of vegetated and bare shingle. In the frontal less stable areas of shingle, the vegetation tends to be dominated by annuals and short-lived salt-tolerant perennials. Where the shingle is more stable the vegetation becomes more perennial in nature and may include grassland, heathland and scrub, depending on the exact nature of the site. The presence of lichens indicates long term stability of the shingle structure.

Transitions to intertidal, saltmarsh and sand dune habitats occur within this SAC (NPWS, 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 composition: typical species and sub-communities

The degree of exposure, as well as the coarseness and stability of the substrate determines species diversity.

Sea sandwort (*Honkenya peploides*), sand couch (*Elytrigia juncea*), sand sedge (*Carex arenaria*), sea rocket (*Cakile maritima*) and yellow horned-poppy (*Glaucium flavum*) have been recorded from the shingle vegetation at Buckroney-Brittas Dunes and Fen SAC (NPWS, 2013).

The target for this attribute is to ensure that the typical flora of vegetated shingle is maintained, as are the range of sub-communities within the different zones.

3.4.4 Vegetation composition: negative indicator species

Where the shingle becomes more stabilised, negative indicator species can become an issue. Negative indicator species can include non-native species (e.g. *Centranthus ruber, Lupinus arboreus*), species indicative of changes in nutrient status (e.g. *Urtica dioica*) and species not considered to be typical of the habitat (e.g. *Pteridium aquilinum*).

The target for this attribute is that negative indicator species (including non-native species) should make up less than 5% of the vegetation cover.

4 Saltmarsh habitats

Saltmarshes are stands of vegetation that occur along sheltered coasts, mainly on mud or sand, and are flooded periodically by the sea. They are restricted to the area between mid neap tide level and high water spring tide level. In Ireland, there are four saltmarsh habitats listed under Annex I of the Annex I of the EU Habitats Directive (92/43/EEC):

- *Salicornia* and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)
- **Mediterranean salt meadows (Juncetalia maritimi) (1410)**
- Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) (1420)

One saltmarsh habitat, Mediterranean salt meadows (MSM), indicated in **bold** above, is listed as a Qualifying Interest for Buckroney-Brittas Dunes and Fen SAC. The last habitat is restricted in its distribution to sites in the south-east of the country.

The SMP surveyed, mapped and assessed the following saltmarsh sub-site associated with Buckroney-Brittas Dunes and Fen SAC (McCorry and Ryle, 2009): Buckroney (including Potter's Bar; SMP site ID: SMP0037)

As well as recording MSM habitat, the SMP also recorded a small area of Atlantic salt meadow vegetation in the sub-site on the northern shore of the Potter's Bar River to the north of Brittas Bay (McCorry and Ryle, 2009). This habitat is not a Qualifying Interest for this particular SAC however.

4.1 Overall Objective

The overall objective for 'Mediterranean salt meadows' in Buckroney-Brittas Dunes and Fen SAC is to '*maintain the favourable conservation condition*'.

This objective is based on an assessment of the recorded condition of the habitat under a range of attributes and targets. The assessment is divided into three main headings: (a) Area (b) Range and (c) Structure and Functions.

4.2 Area

4.2.1 Habitat area

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target is no decrease from the baseline which was established by McCorry and Ryle

(2009). Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is assessed subject to natural processes, including erosion and succession.

A baseline habitat map of all known saltmarsh in the Buckroney sub-site was produced based on the findings of the SMP (McCorry and Ryle, 2009) and is presented in Appendix II. A total of 0.17ha of saltmarsh habitat was mapped by the SMP within the Buckroney sub-site. This included an area of 0.08ha which was mapped as Mediterranean salt meadows (MSM). However, during the Sand Dunes Monitoring Project (Delaney *et al*., 2013) this area was re-classified as a fixed dune/humid dune slack mosaic.

There is the possibility that additional areas of MSM occur elsewhere within the SAC.

The general target is that the area of Mediterranean salt meadows should be stable or increasing, subject to natural processes, including erosion and succession.

4.3 Range

4.3.1 Habitat distribution

The sub-site Buckroney, which was surveyed by the SMP, is made up of two parts; the main section is situated to the south of Brittas and is separated from Brittas by the promontory headland at Mizen Head. The smaller section is situated around the mouth of Potter's Bar River, approximately 6km to the north of Buckroney, at the north end of Brittas (McCorry and Ryle, 2009; see Appendix II).

It is important to note that there may be additional areas of unsurveyed saltmarsh present within the SAC.

The general target is that there should be no decline or change in the distribution of the saltmarsh habitat, unless it is the result of natural processes, including erosion, accretion and succession.

4.4 Structure and Functions

The location, character and dynamic behaviour of saltmarshes are governed by sediment supply, tidal regime, wind-wave climate and sea level change. The slope of the saltmarsh allows the development of several ecological gradients such as tidal submergence and salinity, and this influences the development of distinctive zones of halophytic and salt-tolerant plant communities. Maintaining the favourable conservation condition of the saltmarsh habitat in Buckroney-Brittas Dunes and Fen SAC in terms of its structure and functions depends on a range of attributes for which targets have been set as outlined below.

4.4.1 Physical structure: sediment supply

Accretion and erosion are natural elements of saltmarsh systems. Maintaining the sediment supply is vital for the continued development and natural functioning of a saltmarsh system. Interruption to the sediment circulation through physical structures can starve the system and lead to accelerated erosion rates.

At Buckroney, changes over relatively short time periods (3-4 years) show that the saltmarsh is quite dynamic. The small river channel that drains Buckroney Fen and runs alongside the golf course was blocked for a relatively long period and tidal inundation was restricted. The channel was reopened and the SMP concluded that this may have had some impact on the extent of various vegetation communities found in the Buckroney sub-site (McCorry and Ryle, 2009).

The target is to maintain, or where necessary restore, the natural circulation of sediment and organic matter, without any physical obstructions.

4.4.2 Physical structure: creeks and pans

Saltmarshes can contain a distinctive topography with an intricate network of creeks and pans occurring on medium to large-sized sites. Creek density is influenced by vegetation cover, sediment supply and tidal influence. Creeks absorb tidal energy and assist with delivery of sediment into the saltmarsh. The efficiency of this process depends on creek pattern. Creeks allow pioneer vegetation to become established along their banks higher up into the saltmarsh system. Major erosion of saltmarsh is indicated by internal dissection and enlargement of the drainage network, ultimately leading to the creation of mud basins.

The target is to maintain creek and pan networks where they exist and to restore areas that have been altered.

4.4.3 Physical structure: flooding regime

The regular ebb and flow of the tide brings salinity, but also nutrients, organic matter and sediment, which are central to the development, growth and indeed survival of saltmarshes. Saltmarsh vegetation consists of a limited number of halophytic (salt-tolerant) species that are adapted to regular immersion by the tides. Species in the lowest part of the saltmarsh require regular inundation, while those higher up on the marsh can only tolerate occasional inundation.

Situated behind the tall dunes that extend southwards to Pennycomequick, the only point of access for seawater into the saltmarsh is via a small stream that runs alongside the boundary of the adjacent golf course. This stream had been blocked at its mouth for a number of years, although it is now unblocked, which has resulted in tidal waters occasionally inundating the small river, particularly during winter floods (McCorry and Ryle, 2009). There has been some change in both the composition and extent of the vegetation at Buckroney. The duration and extent of standing water at the marsh was noticeably different from 2004 to 2007 and may explain the changes in the vegetation patterns (McCorry and Ryle, 2009).

The target is to maintain a flooding regime whereby the lowest levels of the saltmarsh are flooded daily, while the upper levels are flooded occasionally (e.g. highest spring tides).

4.4.4 Vegetation structure: zonation

Saltmarshes are naturally dynamic coastal systems. In order to ensure the ecological functioning of all of the saltmarsh habitats, it is vital to maintain the zonations and transitions to other habitats, including intertidal, shingle and sand dune habitats.

The SMP noted that some of the dense sharp rush (*Juncus acutus*) area displayed features typical of saltmarsh, but also had features typical of other habitats. As noted above, it had not been functioning as a saltmarsh in the recent past as there had been infrequent tidal inundation. The suite of ecological conditions that developed resulted in a transitional type of brackish habitat in a dune slack situation (McCorry and Ryle, 2009) and resulting in the SDM classifying this area as dune slack (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.

4.4.5 Vegetation structure: vegetation height

A varied vegetation structure is important for maintaining species diversity and is particularly important for invertebrates and birds. Grazing is often used as a tool for maintaining structural diversity in the sward but stocking levels need to be appropriate. Overgrazing can lead to loss of species and destruction of the vegetation cover, while undergrazing can lead to a loss of plant diversity due to competitive exclusion.

The target is to maintain structural variation within the sward. A general guideline is that there should be a sward ratio of 30% tall: 70% short across the entire saltmarsh.

4.4.6 Vegetation structure: vegetation cover

Vegetation cover can have a major effect on saltmarsh development by reducing the velocity of the tide and thereby enhancing the deposition of sediment. Excessive bare mud, however, is often a sign of overuse by livestock or humans and can lead to destabilisation and accelerated erosion of the system.

The target is to maintain 90% of the area outside of the creeks vegetated.

4.4.7 Vegetation composition: typical species and sub-communities

Saltmarshes contain several distinct zones that are related to elevation and frequency of flooding. The lowest part along the tidal zone is generally dominated by the most halophytic (salt-tolerant) species including common saltmarsh-grass (*Puccinellia maritima*) and species more usually associated with *Salicornia* muds. The mid-marsh zone is generally characterised by sea thrift (*Armeria maritima*), sea plantain (*Plantago maritima*) and sea aster (*Aster tripolium*). This mid-zone vegetation generally grades into an herbaceous community in the upper marsh, dominated by red fescue (*Festuca rubra*), sea milkwort (*Glaux maritima*) and saltmarsh rush (*Juncus gerardii*).

Below are lists of typical species for the different saltmarsh zones, although some of these species have a restricted distribution nationally and may not occur in the Buckroney-Brittas Dunes and Fen SAC area.

Typical species

Lower marsh	Low-mid marsh	Mid-upper marsh
Salicornia spp.	*Puccinellia maritima*	*Festuca rubra*
Suaeda maritima	*Triglochin maritima*	*Juncus gerardii*
Puccinellia maritima	*Triglochin maritima*	*Armeria maritima*
Aster tripolium	*Plantago maritima*	*Agrostis stolonifera*
	Atriplex portulacoides	*Limonium humile*
	Aster tripolium	*Glaux maritima*
	Spergularia spp.	*Seriphidium maritimum*
	Suaeda maritima	*Juncus maritimus*
	Salicornia spp.	*Triglochin maritima*
	Glaux maritima	*Blysmus rufus*
	Turf fucoids	*Eleocharis uniglumis*
		Leontodon autumnalis
		Carex flacca
		Carex extensa
		Turf fucoids

The target for this attribute is to ensure that a typical flora of saltmarshes is maintained, as are the range of sub-communities within the different zones.

4.4.8 Vegetation composition: negative indicator species

The only invasive and non-native species recorded on saltmarshes during the SMP was common cordgrass (*Spartina anglica*) (McCorry, 2007; McCorry and Ryle, 2009).

The SMP did not record common cordgrass (*Spartina anglica*) in the Buckroney sub-site (McCorry and Ryle, 2009).

The aim is that negative indicators such as common cordgrass should be absent or under control. The current target for this particular SAC is that its establishment should be prevented.

5 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* ssp. *argentea* (Salix arenariae) (2170)**
- **Humid dune slacks (2190)**
- Machairs (21A0) *

Seven sand dune habitats, indicated in **bold** above, are listed as Qualifying Interests for the SAC. Six of the sand dune habitats (2110, 2120, 2130, 2150, 2170 and 2190) were recorded during the SDM by Delaney *et al*. (2013) in the Brittas Bay sub-site and five (2110, 2120, 2130, 2170 and 2190) in the Mizen Head sub-site. Five sand dune habitats (1210, 2110, 2120, 2130 and 2190) were recorded during the CMP by Ryle *et al*. (2009) in the Pennycomequick sub-site. These habitats include mobile areas at the front as well as more stabilised parts of dune systems.

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).

Atlantic decalcified fixed dune (Calluno-Ulicetea) (dune heath) occurs at the older landward edge of the fixed dunes, where leaching of basic minerals and nutrients can lower the pH over time, or where sand has blown up over rock that is siliceous (silica-rich) in nature, and conditions suitable for colonisation by heath species are created. As these decalcified or acidic conditions can only form on the older, landward extremes of dune systems, they are often vulnerable to housing or other developments. Decalcified dune heath is characterised by the presence of heathers (*Calluna vulgaris, Erica tetralix, E*. *cinerea*) and gorse species (*Ulex europaeus* and *U*. *gallii*) which differentiates it from the other dune heath habitat, decalcified dunes with *Empetrum nigrum.* Well-developed dune heath communities containing the classic dwarf ericoid shrubs, such as heathers, that are generally regarded as characterising the habitat are not well-represented in Ireland.

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 creeping willow 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 creeping willow are often found on sandy hummocks within slacks, or on the sides of dune ridges adjacent to slacks.

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).

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 Sand Dunes Monitoring Project (Delaney *et al*., 2013) of each sand dune habitat found in the Brittas Bay (SDM site ID: 017) and Mizen Head (SDM site ID: 018) sub-sites are presented in Appendix III and Appendix IV respectively. Detailed descriptions from the Coastal Monitoring Project (Ryle *et al*., 2009) of each sand dune habitat found in the Pennycomequick sub-site (CMP site ID: 019) are presented in Appendix IV. A total of 122.7ha of sand dune habitats was mapped within Buckroney-Brittas Dunes and Fen SAC, 100% of which represents habitats that are listed as Qualifying Interests for this particular SAC.

5.1 Overall Objectives

The overall objective for 'Annual vegetation of drift lines' in Buckroney-Brittas Dunes and Fen SAC is to '*maintain the favourable conservation condition*'.

The overall objective for 'Embryonic shifting dunes' in Buckroney-Brittas Dunes and Fen SAC is to '*restore the favourable conservation condition*'.

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

The overall objective for 'Fixed coastal dunes with herbaceous vegetation (grey dunes)' in Buckroney-Brittas Dunes and Fen SAC is *to 'restore the favourable conservation condition*'.

The overall objective for 'Atlantic decalcified fixed dune (Calluno-Ulicetea)' in Buckroney-Brittas Dunes and Fen SAC is *to 'restore the favourable conservation condition*'.

The overall objective for 'Dunes with *Salix repens* ssp. *argentea* (Salix arenariae)' in Buckroney-Brittas Dunes and Fen SAC is *to 'restore the favourable conservation condition*'.

The overall objective for 'Humid dune slacks' in Buckroney-Brittas Dunes and Fen 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.

5.2 Area

5.2.1 Habitat area

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. Revised and updated habitat maps were produced for the sand dune habitats in the Brittas Bay and Mizen Head sub-sites during the Sand Dunes Monitoring Project (SDM) (Delaney *et al*., 2013). These maps are included with the individual site reports in Appendices III and IV. A baseline

habitat map was produced for the sand dune habitats in the Pennycomequick sub-site during the Coastal Monitoring Project (CMP) (Ryle *et al.*, 2009). This map is included with the individual site report in Appendix V at the end of this document. The data from the CMP and the SDM have been combined to produce the Buckroney-Brittas Dunes and Fen SAC sand dunes habitat map which is presented in Appendix I

The total areas of each Qualifying Interest (QI) sand dune habitat within the Brittas Bay and Mizen Head sub-sites as estimated by Delaney *et al*. (2013) are presented in the second and third columns of the following table. The total areas of each QI sand dune habitat within the Pennycomequick sub-site as estimated by Ryle *et al*. (2009) are presented in the fourth column. The areas of these QI habitats from each sub-site that are within the boundary of Buckroney-Brittas Dunes and Fen SAC are presented in the fifth, sixth and seventh columns. The total area of each qualifying habitat within the SAC is presented in the final column.

Habitat	**Area (ha) of habitat from SDM**		**Area (ha) of habitat from CMP**	**Area (ha) of habitat within SAC boundary**			
Sub-sites	**Brittas Bay**	**Mizen Head**	**Pennycomequick**	**Brittas Bay**	**Mizen Head**	**Pennycomequick**	**Totals**
Annual vegetation of drift lines	-	-	0.48	-	-	0.48	0.48
Embryonic shifting dunes	2.14	0.22	0.35	2.02	0.22	0.35	2.59
Shifting dunes along the shoreline with *Ammophila arenaria*	3.66	-	0.70	3.66	-	0.70	4.36
Fixed coastal dunes with herbaceous vegetation	54.83	47.10	11.43	52.03	46.40	11.15	109.58
Decalcified dune heath	0.26	-	-	0.26	-	-	0.26
Dunes with *Salix repens*	0.13	0.07	-	0.13	0.07	-	0.20
Humid dune slacks	0.34	4.76	0.11	0.34	4.76	0.10	5.20
Totals	**61.36**	**52.15**	**13.07**	**58.44**	**51.45**	**12.78**	**122.67**

In the Brittas Bay sub-site, embryonic shifting dunes were found to be more extensive during the SDM (Delaney *et al*., 2013) than they were during the CMP baseline survey (Ryle *et al*., 2009), and the area had increased from 0.65ha (CMP) to 2.02ha (SDM).

At Brittas Bay, the area of marram dunes (white dunes) has increased slightly from 3.31ha during the CMP to 3.66ha during the SDM. However, in that time a large blowout free of vegetation has developed through amenity use, and this is considered a loss of habitat. The blowout is 0.18ha in size, 4.9% of the area of marram dunes (white dunes) present in the sub-site (Delaney *et al*., 2013).

The area of fixed dunes (grey dunes) at Brittas Bay decreased from 55.55ha during the CMP to 54.83ha during the SDM. Of this loss, 0.07ha is anthropogenic, as trampling caused part of the habitat to erode and has prevented regeneration. This is a loss of less than 1% per year since the CMP (Delaney *et al*., 2013).

The area of decalcified dune heath in the Brittas Bay sub-site had decreased from 0.81ha during the CMP to 0.26ha during the SDM. Two discrete areas of dune heath were recorded at Brittas Bay by the CMP. The larger area was classified as dense bracken (*Pteridium aquilinum*) and rosebay willowherb (*Epilobium angustifolium*) by the SDM. The second area where the habitat was found during the CMP had increased in area by 0.03ha (Delaney *et al*., 2013).

In the Brittas Bay sub-site, the total area of humid dune slacks has decreased from 0.83ha during the CMP to 0.34ha during the SDM, and this equates to a loss of 59%. Three of the slacks that were formerly present and had a community typical of damp conditions during the CMP were no longer present during the SDM (Delaney *et al*., 2013). The sharp decline in area since the baseline survey was considered to have been at least partially caused by human impacts (Delaney *et al*., 2013).

The sand dune habitats in the Mizen Head sub-site decreased in size since the CMP baseline survey by 0.23ha because of erosion of embryonic shifting dunes along the coast, as well as the loss of marram dunes (white dunes) which were recorded during the CMP but were no longer present on the site during the SDM survey. This was the result of natural succession (Delaney *et al*., 2013).

At Mizen Head, the area of embryonic shifting dunes decreased from 0.91ha (CMP) to 0.22ha (SDM). This is the result of succession to fixed dunes and natural erosion (Delaney *et al*., 2013).

In the Mizen Head sub-site, the area of fixed dunes increased from 45.62ha during the CMP to 47.10ha during the SDM. This occurred due to succession from marram dunes and embryonic dunes (Delaney *et al*., 2013).

The area of dunes with creeping willow (*Salix repens*) in the Mizen Head sub-site increased from the CMP baseline survey. Dunes with creeping willow had not previously been mapped at the sub-site, but the CMP Mizen Head site report indicates that creeping willow was present during the CMP (Ryle *et al*., 2009). Dunes with creeping willow at Mizen Head were found as fragmented patches with a total area of 0.07 ha (Delaney *et al*., 2013).

Humid dune slacks were extended during the SDM to include slacks which were not found during the CMP baseline survey and saline slacks which were previously mapped as non-dune habitat (Delaney *et al*., 2013). This includes the area identified as MSM by McCorry and Ryle (2009).

Pennycomequick is the least extensive of the three sub-sites and extends from Pennycomequick Bridge in the north to the townland of Johnstown North, a distance of approximately 1km. In total, the strandline is estimated as occupying less than 0.50ha and the total mobile dune area is 0.70ha. Estimated to cover 11.43ha, the fixed dunes occupy the greatest portion of the sand dune system at Pennycomequick. Although erosion is evident along parts of the fixed dune system, it would appear that there has not been any significant loss of extent in the fixed dunes. A single dune slack located in a small depression in the centre of the Pennycomequick, is surrounded by dense scrub and small in extent, being estimated to occupy 0.11ha (Ryle *et al*., 2009).

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.

5.3 Range

5.3.1 Habitat distribution

The distribution of sand dune habitats in Buckroney-Brittas Dunes and Fen SAC, as mapped by Ryle *et al*. (2009) and Delaney *et al*. (2013), is found in Appendix I.

The development of strandline vegetation at Pennycomequick is somewhat restricted owing to the nature of the tides. Most of the strandline habitat was recorded from the northern half of the sub-site, where the beach is somewhat wider. Some deposition of tidal litter was noted at the opposite end of the beach (Ryle *et al*., 2009).

Although some deposition of tidal litter was noted at Brittas Bay, strandline vegetation was not recorded. This was in part due to the high numbers of beach users, but is also as a result of tidal movements, which scour the beach and bring about erosion, particularly along the southern half of the site (Ryle *et al*., 2009).

Embryonic shifting dunes occur in the north-east of the Brittas Bay sub-site, where they are accreting (Delaney *et al*., 2013).

Embryonic shifting dunes are only found in the north of the Mizen Head sub-site, where they have developed as a narrow strip in front of the eroding face of the fixed dunes (grey dunes) (Delaney *et al*., 2013).

At Pennycomequick, the embryonic dunes occur as a narrow band along the front of the northern half of the dune system. Occasionally, the foredunes were recorded extending into the mobile dunes, particularly in areas of bare sand (Ryle *et al*., 2009).

Mobile dunes were mainly found in the north-east of the Brittas Bay sub-site during the SDM (Delaney *et al*., 2013).

Marram dunes (white dunes) were recorded during the CMP in the Mizen Head sub-site, but were not present during the SDM in 2011. This was the result of natural succession (Delaney *et al*., 2013).

The mobile dunes at Pennycomequick occupy a narrow band at the front of the cliffs and beyond the headland, at the eroding face of the fixed dunes (Ryle *et al*., 2009).

The extensive fixed dunes at Brittas Bay are well-developed and this is the most extensive habitat at Brittas Bay (Delaney *et al*., 2013).

There are places where woodland has become established on the fixed dunes in the Mizen Head sub-site. These areas were included in the fixed dunes (grey dunes) habitat because they now form an integral part of the dune system, and typical sand dune vegetation occurs below the canopy (Delaney *et al*., 2013).

Fixed dunes also occupy the greatest portion of the sand dune system at Pennycomequick (Ryle *et al*., 2009).

Decalcified dune heath is, in an Irish context, very rare and is known only from a few sites. The dune heath at Brittas Bay is considered as exemplary owing to the assemblage of its ericoid species, which is unrivalled in any sand dune system along the south and south-eastern coast (Ryle *et al*., 2009).

Three of the dune slacks which had been identified during the CMP baseline survey at Brittas Bay, were no longer present in 2011 when visited during the SDM (Delaney *et al*., 2013). Two slacks remain, which are at different stages of development, with the slack in the northern part of the site, close to the river, being younger than the slack to the south of the northern car park (Delaney *et al*., 2013).

A number of slacks have been recorded from the Mizen Head sub-site. The slacks were mainly wet, owing to the standing water that was present in areas, but there were indications, based on floristic assemblages, that some slacks were drying out and maturing. The occurrence of a range of slacks in terms of their morphological and floristic diversity adds to the ecological significance of the dune system in the Mizen Head sub-site (Ryle *et al*., 2009). The largest area of humid dune slacks at Mizen Head occurs in the north of the site, close to the river separating the site from the golf course (Delaney *et al*., 2013).

At Pennycomequick, a single dune slack is located in a small depression in the centre of the sub-site, surrounded by dense scrub. Species-poor and overgrown for the most part, the slack still had vestiges of its earlier wet growth phase (Ryle *et al*., 2009).

Dunes with creeping willow (*Salix repens*) at Mizen Head were found as fragmented patches close to the dune slacks (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.

5.4 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 Buckroney-Brittas Dunes and Fen SAC in terms of structure and functions depends on a range of attributes for which targets have been set as outlined below.

5.4.1 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.

There was no evidence of sediment depletion in the embryonic dunes in the Brittas Bay sub-site, as erosion in the south of the sub-site was more than balanced by accretion in the north of the sub-site (Delaney *et al*., 2013).

There has been some attempt to reduce erosion in the fixed dunes in the Brittas Bay sub-site by fencing areas off and using sand trapping techniques. However, it should be borne in mind that natural processes such as erosion, deposition and succession are primary drivers of change on coastal habitats (Delaney *et al*., 2013).

Much of the sand on which the embryonic dunes in the Mizen Head sub-site develop is coarse in nature. Also, the mobile dunes have a significant coarse shingle component, particularly at the front of the lower dune ridges (Ryle *et al*., 2009).

Like many sites along the east coast, erosion affects the seaward habitats of the dune system in the Pennycomequick sub-site. Both the strandline and embryonic dunes are regularly under threat from storm tides, whilst occasional high tides create breaches in the mobile dunes. Vegetation is quick to re-establish here as evidenced by the occurrence of embryonic vegetation in gaps. The shoreline at Pennycomequick is subject to strong tidal currents, which appears to starve the beach of suitable sediment, which would hinder the successful expansion of embryonic dunes. However, it would seem that the embryonic dunes recycle sand from the eroded mobile dune ridge (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.

5.4.2 Physical structure: hydrological and flooding regime

The conservation of dune slacks and dunes with creeping willow (*Salix repens*) is inextricably linked with the local hydrological regime. Dune slacks are characterised by the proximity of a groundwater

table that is maintained by the combination of an impermeable layer in the soil, or deeper salt water and precipitation. Dunes with creeping willow (*Salix repens*) are closely associated with dune slacks but are distinguished from them by a water table that is at a depth that no longer exerts an influence on the vegetation. Most dune slacks are fed by a range of water sources, including precipitation, surface water or groundwater. The last two sources are usually somewhat calcareous while the first is acid.

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

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

In the humid dune slacks in the Brittas Bay sub-site, there were indications that the water table was becoming lower. Drying out is a natural part of the ecology of dune systems, but water abstraction and the presence of scrub accelerates this process. There is no indication that drying out has slowed down or that the area of dune slacks will recover in the short term (Delaney *et al*., 2013). Groundwater is abstracted in the vicinity of the dunes and fen at Mizen Head, which may affect the hydrological functioning of the sub-site (Delaney *et al*., 2013).

The biggest slack at Mizen Head is of interest as it contains indicators of salinity, particularly sharp rush (*Juncus acutus*). It is possible that during particularly high tides, the river overflows the banks and results in an influx of saltwater. Alternatively, water abstraction may have resulted in saltwater rising close to the surface in the largest slack as the freshwater lens is depleted. Freshwater was present in the south-western part of the slack. None of the other slacks contain indicators of salinity (Delaney *et al*., 2013).

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

5.4.3 Vegetation structure: zonation

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

The close association of Buckroney Fen with the dune system at Mizen Head, especially with the dune slacks, is of particular interest at this SAC. Parts of the slacks display a distinctly halophytic element to their vegetation. In addition, large areas of the nationally scarce sharp rush (*Juncus acutus*) are recorded surrounding a number of small, floristically-rich wet slacks/brackish marsh areas. Sharp rush extends for some distance and is also recorded surrounding the open water of the fen. This is characterised by various species including common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*) and sedges (*Carex* spp.) (Ryle *et al*., 2009).

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

5.4.4 Vegetation structure: bare ground

This target applies to the fixed dunes, dunes with creeping willow (*Salix repens*) and dune slacks. It does not apply to the other habitats present where high levels of bare sand are a natural component of the habitat. In the fixed 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.

Brittas Bay has been developed as a public amenity and this has replaced agricultural use on the site. Amenity use is concentrated on the beach, in the foredunes and around access paths, but does extend into the fixed dunes and dune slacks. Several of the impacts recorded at the sub-site (trampling, recreation, paths and tracks, fires and caravan parks) are related to the use of the site as an amenity. Damage due to trampling was evident and has led to over 10% of the fixed dune habitat being occupied by bare sand (Delaney *et al*., 2013).

Pathways have been laid between the beach and the car parks, but other tracks are clearly visible throughout the dunes at Brittas Bay. Sand trapping fencing appears to have had some success on some large blow outs (Delaney *et al*., 2013).

Most of the fixed dune habitat at Mizen Head is relatively undisturbed, but there is damage in the vicinity of the path leading from the access point to the beach (Delaney *et al*., 2013).

Pennycomequick is mostly frequented by walkers and people interested in fishing. The majority of people visiting the site tend to walk along the strand. Few venture into the overgrown fixed dunes. Notwithstanding this fact, a number of tracks were evident (Ryle *et al*., 2009).

The target is not to exceed 10% bare sand, with the exception of pioneer slacks which can have up to 20% bare sand. This target is assessed subject to natural processes.

5.4.5 Vegetation structure: sward height

This attribute applies to the more fixed habitats (fixed dunes, dune heath, dunes with creeping willow (*Salix repens*) and dune slacks) 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 dunes at Brittas Bay are not grazed by livestock and the sward is generally rank and species-poor in parts due to undergrazing and a lack of other management (Delaney *et al*., 2013).

Grazing appears to be limited to the northern part of the Mizen Head sub-site, with horses and ponies present at the time of survey. Parts of the slacks were overgrazed, but grazing also had beneficial effects by reducing the potential for scrub encroachment. Parts of the site which were not grazed at the time of the SDM survey would benefit from management (Delaney *et al*., 2013).

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

*5.4.6 Vegetation structure: cover and height of creeping willow (***Salix repens***)*

This attribute only applies to the dunes with creeping willow (*Salix repens*) habitat.

The target is that there is more than 10% cover of creeping willow (*Salix repens*) and vegetation height should be in the average range of 5-20cm.

*5.4.7 Vegetation structure: cover of creeping willow (***Salix repens***)*

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

The SDM recorded excessive cover of creeping willow (*Salix repens*) in the humid dune slacks in the Mizen Head sub-site (Delaney *et al*., 2013).

The target is therefore to keep the cover of creeping willow (*Salix repens*) below 40% in humid dune slacks.

5.4.8 Vegetation composition: plant health of dune grasses

This attribute applies to the embryonic dunes and mobile dunes where blown 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.

Unhealthy marram (*Ammophila arenaria*) was noted in places in the mobile dunes in the Brittas Bay sub-site (Delaney *et al*., 2013).

At the mobile dunes at Pennycomequick, the flowering and fruiting component of the habitat was poor at the time of survey. Unhealthy marram (*Ammophila arenaria*) accounted for upwards of 5% of the habitat (Ryle *et al*., 2009).

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

5.4.9 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* 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*).

Species diversity was poor for strandline vegetation at Pennycomequick and was characterised by the presence of the two typical species, namely sea rocket (*Cakile maritima*) and prickly saltwort (*Salsola kali*) (Ryle *et al*., 2009).

Typical species of embryonic dunes at Brittas Bay are sand couch (*Elytrigia juncea*), sand sedge (*Carex arenaria*) and sea sandwort (*Honkenya peploides*). The main dune ridges are dominated by marram (*Ammophila arenaria*), with herbaceous species such sea spurge (*Euphorbia paralias*), sea-holly (*Eryngium maritimum*) and common restharrow (*Ononis repens*) occurring throughout, although lyme-grass (*Leymus arenarius*) was occasionally recorded.

The embryonic dunes in the Mizen Head sub-site are characterised by the presence of sand couch (*Elytrigia juncea*), with lyme-grass (*Leymus arenarius*) occasionally recorded (Ryle *et al*., 2009).

The embryonic dunes at Pennycomequick are characterised by sand couch (*Elytrigia juncea*) with lyme-grass (*Leymus arenarius*) occasionally recorded. Other species included marram grass (*Ammophila arenaria*), sand sedge (*Carex arenaria*), sea holly (*Eryngium maritimum*) and spurge (*Euphorbia* spp.) (Ryle *et al*., 2009).

Mobile dunes at Brittas Bay are dominated by marram (*Ammophila arenaria*), but with contributions from sand couch (*Elytrigia juncea*), sea spurge (*Euphorbia paralias*) and dandelion (*Taraxacum officinale* agg.) (Ryle *et al*., 2009).

Marram (*Ammophila arenaria*) also dominates the mobile dunes in the Mizen Head sub-site with sea spurge (*Euphorbia paralias*) and dandelion(*Taraxacum officinale* agg.) also present (Ryle *et al*., 2009).

In the mobile dunes in the Pennycomequick sub-site, marram (*Ammophila arenaria*) usually dominates, although the cover ranged from 20% to 75% during the CMP. Other species that were recorded include sea holly (*Eryngium maritimum*), cat's-ear (*Hypochaeris radicata*), dandelion (*Taraxacum officinale* agg.) and sand sedge (*Carex arenaria*). Some species typical of the fixed dune

such as red fescue (*Festuca rubra*) and common restharrow (*Ononis repens*) occur, which is indicative of erosion of the dune ridge (Ryle *et al*., 2009).

The rolling topography of the fixed dunes at Brittas Bay is dominated by marram (*Ammophila arenaria*) swards and is only replaced by a shorter red fescue (*Festuca rubra*) dominated sward where the tracks bisect the habitat. The most commonly recorded species were sand sedge (*Carex arenaria*), kidney vetch (*Anthyllis vulneraria*), lesser hawkbit (*Leontodon saxatilis*), dog violet (*Viola canina*), smooth hawks-beard (*Crepis capillaris*), fairy flax (*Linum catharticum*), lady's bedstraw (*Galium verum*) and field woodrush (*Luzula campestris*) (Ryle *et al*., 2009).

In the Mizen Head sub-site, much of the front of the fixed dune system and taller ridges are dominated by marram (*Ammophila arenaria*). Other species include red fescue (*Festuca rubra*), lady's bedstraw (*Galium verum*), common bird's-foot trefoil (*Lotus corniculatus*) and common mouse-ear (*Cerastium fontanum*). However, the dominance of marram was supplanted by large areas of more species-rich dune grassland, in which marram occurred as occasional tussocks rather as a sward. The greatest species diversity was recorded in these areas and included species such as red clover (*Trifolium repens*), germander speedwell (*Veronica chamaedrys*), field woodrush (*Luzula campestris*), ribwort plantain (*Plantago lanceolata*) and mouse-ear hawkweed (*Pilosella officinarum*). Bryophytes and lichens included dog lichen (*Peltigera* spp.), *Hypnum* spp., *Rhytidiadelphus squarrosus* and *Pseudoscleropodium purum* (Ryle *et al*., 2009). A large part of the fixed dunes in Mizen Head is aging and decalcification was indicated by the common occurrence of burnet rose (*Rosa spinosissima*), particularly from the middle to the back of the dune system. Lichen-rich communities are well-represented throughout the dunes, although they were not generally species-rich (Ryle *et al*., 2009).

Typical species that were commonly recorded in the fixed dunes at Pennycomequick included marram (*Ammophila arenaria*), red fescue (*Festuca rubra*), lady's bedstraw (*Galium verum*), sand sedge (*Carex arenaria*), ribwort plantain (*Plantago lanceolata*) and common bird's-foot trefoil (*Lotus corniculatus*). Species typical of a maturing fixed dune system, such as burnet rose (*Rosa spinosissima*), carline thistle (*Carlina vulgaris*) and bracken (*Pteridium aquilinum*) were common. Bracken in particular was more abundant towards the back of the dune system and reflects the decalcification of the dune system (Ryle *et al*., 2009).

Brittas Bay is an important site for the very rare dune heath and for its well-developed flora. Dune heath species present include ling (*Calluna vulgaris*), bell heather (*Erica cinerea*) and gorse (*Ulex europaeus*) (Ryle *et al*., 2009).

The species commonly recorded from the dune slacks in the Brittas Bay sub-site included marsh helleborine (*Epipactis palustris*), common sedge (*Carex nigra*), creeping willow (*Salix repens* ssp. *arenaria*), clovers (*Trifolium* spp.) and the moss *Calliergonella cuspidata* (Ryle *et al*., 2009).

Typical species of the dune slacks in the Mizen Head sub-site include glaucous sedge (*Carex flacca*), marsh bedstraw (*Galium palustris*), silverweed (*Potentilla anserina*) and creeping bent (*Agrostis stolonifera*). Other species include marsh helleborine (*Epipactis palustris*), common sedge (*Carex nigra*), creeping willow (*Salix repens* ssp. *argentea*) and the moss *Calliergonella cuspidata* (Ryle *et al*., 2009).

Typical species of the dune slacks at Pennycomequick include creeping bent (*Agrostis stolonifera*), marsh bedstraw (*Galium palustris*), silverweed (*Potentilla anserina*), meadowsweet (*Filipendula ulmaria*) and purple loosestrife (*Lythrum salicaria*), whilst creeping willow (*Salix arenaria* ssp. *repens*) was recorded around its edges (Ryle *et al*., 2009).

The Endangered species (Wyse Jackson *et al*., 2016) wild asparagus (*Asparagus prostratus*) occurs at Brittas Bay and Mizen Head in its most northerly Irish station. It was recorded from around the margins of the dune heath at Brittas Bay, as well as within the fixed dunes at Buckroney where it is prospering, probably due to a series of transplanting experiments. Wild asparagus is also listed on the Flora (Protection) Order, 2015 (FPO) (Statutory Instrument No. 356 of 2015).

The Near Threatened species (Wyse Jackson *et al*., 2016) Moore's horsetail (*Equisetum* x *moorei*), which is also listed on the FPO, was recorded in the marram dunes (white dunes) at Brittas Bay (Delaney *et al*., 2013).

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

5.4.10 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.

The fixed dunes at Brittas Bay contain a number of negative indicator species particularly bracken, sea buckthorn (*Hippophae rhamnoides*) and garden escapees including daisy tree (*Olearia* spp.), New Zealand flax (*Phormium* spp.) and cotoneaster (*Cotoneaster* spp.) originating from the perimeter of caravan parks that have become established in the fixed dunes (Ryle *et al*., 2009).

The fixed dunes in the Mizen Head sub-site have rank vegetation and negative indicator species including bracken (*Pteridium aquilinum*), burnet rose (*Rosa spinosissima*) and common ragwort (*Senecio jacobaea*) have been recorded (Delaney *et al*., 2013).

Some of the fixed dune habitat at Pennycomequick was farmed in the past, and the abandonment of livestock grazing has probably contributed to the extensive spread of bracken and scrub particularly at the back of the system (Ryle *et al*., 2009). Other negative indicator species at Pennycomequick include common ragwort (*Senecio jacobaea*), common horsetail (*Equisetum arvense*) and bramble (*Rubus fruticosus* agg.), although none of these species was as abundant as bracken (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.

5.4.11 Vegetation composition: scrub/trees

This attribute only applies to the fixed dunes, dune heath, dunes with creeping willow (*Salix repens*) and humid dune slacks. Scrub encroachment leads to reduction in dune biodiversity and needs to be controlled. The presence of scrub and trees which have deep roots can also lower the groundwater table which can have significant impacts on the slack communities.

Although succession to scrub and woodland is part of a natural process, many of the species encroaching at Brittas Bay are non-native. Pine (*Pinus* spp.), sea buckthorn (*Hippophae rhamnoides*) and cordyline (*Cordyline* spp.) were all recorded. Sea buckthorn represents the greatest threat due to its ability to colonise large areas in a short time (Delaney *et al*., 2013).

Sparse scrub affects 50% of the fixed dunes at Brittas Bay. Scrub was present in both of the humid dune slacks at Brittas Bay. The southern slack contained scrub at the time of the CMP baseline survey, but during the SDM it appeared that scrub encroachment had become more serious in the northern slack (Delaney *et al*., 2013). The dune heath is located in an area with a substantial cover of scrub where scrub encroachment is problematic. The dunes with creeping willow (*Salix repens*) appeared mature and well-developed, but a lack of grazing was noted in the habitat (Delaney *et al*., 2013).

Scrub species recorded at the Mizen Head sub-site include grey willow (*Salix cinerea*) and burnet rose (*Rosa spinosissima*). Grey willow is associated with the dune slacks in particular and can accelerate drying out of the habitat (Delaney *et al*., 2013).

In the Mizen Head sub-site, the humid dune slacks had excessive cover of creeping willow (*Salix repens* ssp. *argentea*). In the dunes with creeping willow (*Salix repens*), scrub encroachment was recorded as a negative impact affecting 20% of the habitat (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, with the exception of creeping willow (*Salix repens*) in dunes with creeping willow.

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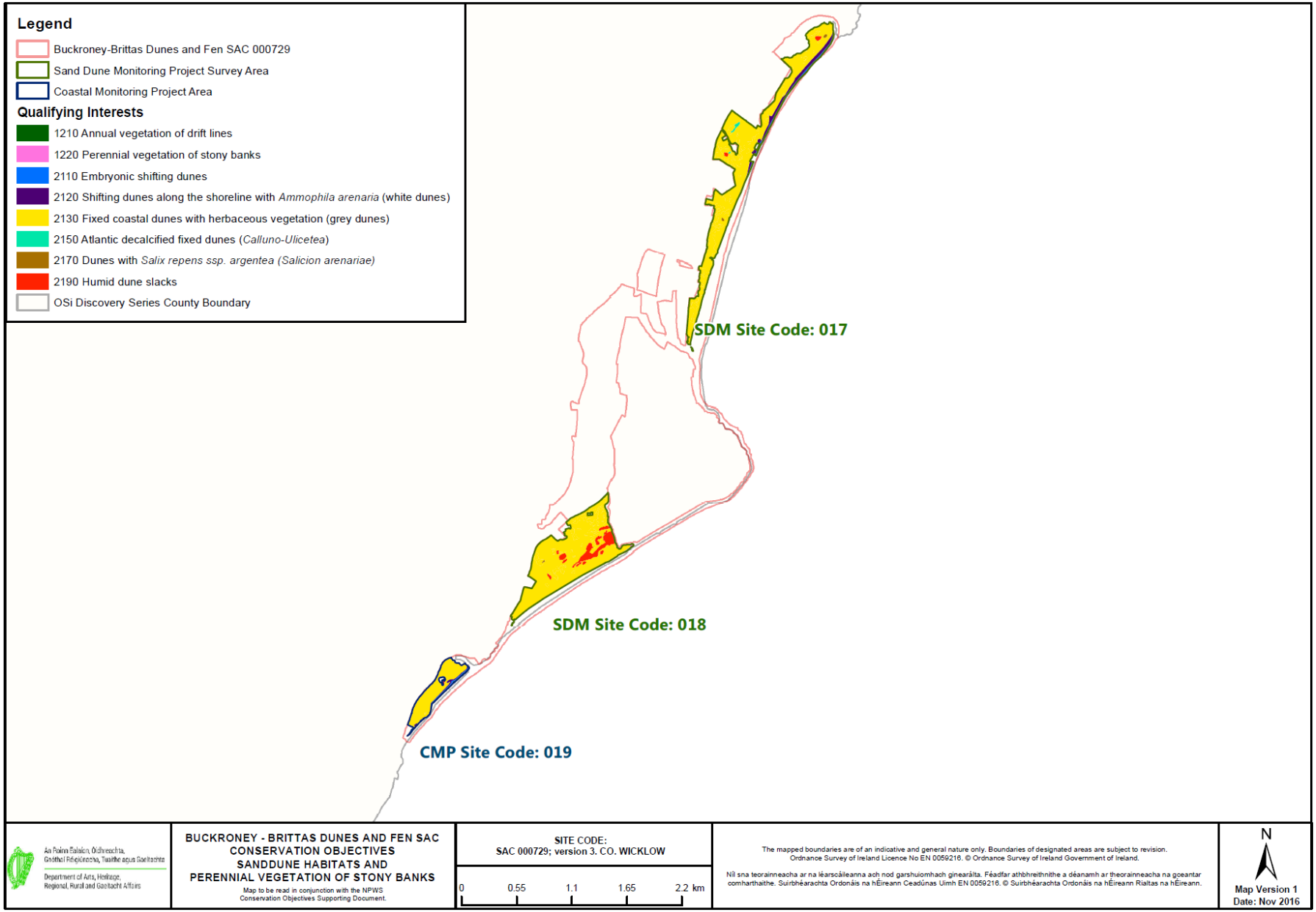
Appendix I – Distribution map of sand dune habitats within Buckroney-Brittas Dunes and Fen SAC (000729)



Appendix II – Buckroney site report and habitat map from the Saltmarsh Monitoring Project (McCorry and Ryle, 2009)

1 SITE DETAILS

SMP site name: Buckroney		**SMP site code**: SMP0037
Dates of site visit: 07/09/2007		**CMP site code:** 018
SM inventory site name: N/A		S**M inventory site code:** N/A
NPWS Site Name: Buckroney Fen and Brittas Dunes		
NPWS designation:	**SAC:** 000729	**MPSU Plan:** New Format – Draft 2: 2004-2009
	NHA: 000729	**SPA:** N/A
County: Wicklow		**Discovery Map:** 62 **Grid Ref:** 329442, 179600
Aerial photos (2000 series): O 4313-A,C; O 4197-D		**6 inch Map No:** Wi 036, 041
Annex I habitats currently listed as qualifying interests for: Buckroney Fen and Brittas Dunes SAC: H1410 Mediterranean salt meadows (Juncetalia maritimi)		
Other SMP sites within this SAC/NHA: Potters Bar, North end of Brittas Bay		
Saltmarsh type: N/A		**Substrate type:** N/A

2 SITE DESCRIPTION

This site is located in Co. Wicklow near Brittas Bay and 6 km east of the Village of Redcross. Located along the coastline between Wicklow town and Arklow, the area around Brittas Bay is easily accessible and very popular, seeing as it is within easy reach of a large population. A long sand dune system has developed in this bay and was surveyed by the Coastal Monitoring Project in 2004. Sand-hills are also found south of Mizen Head. This area is a popular tourist amenity and Brittas Bay is a popular beach during the summer. There are also caravan parks situated in this area near the coastline. This area is quite rural and adjoining landscape is low-lying and dominated by farmland.

This site is unique as it is not listed on the saltmarsh inventory published by Curtis and Sheehy-Skeffington (1998). However, one of the qualifying interests for Buckroney Fen and Brittas Dunes candidate Special Area of Conservation is the Annex I saltmarsh habitat, Mediterranean salt meadows (MSM). A small area dominated by sharp rush (*Juncus acutus*) has developed in low-lying ground behind sand hills and saltmarsh dominated by sharp rush is considered to qualify as this type of Annex I habitat. This species is much more rarely found on saltmarshes compared to sea rush (*Juncus maritimus*). Stands of saltmarsh vegetation dominated by either sea rush or sharp rush can be classified as MSM. There are few saltmarshes in Ireland with the rarer MSM sub-type dominated by sharp rush present. Sharp rush is generally found along the upper boundary of the saltmarsh/fixed dune interface and can also be found in fixed dunes and in dune slacks.

This site has also been proposed for designation as it is a relatively large coastal complex that supports 10 Annex I habitats including the priority habitat - Fixed coastal dunes with herbaceous vegetation (grey dunes), which accounts for approximately 44% of the total site area and Coastal dune heath (H2150) a habitat of limited distribution in Ireland (Ryle *et al*. 2007). Also included is the wetland complex towards the rear of Buckroney including fen habitats. A small area of MSM is known only from Buckroney, although the recent NPWS management plan suggest that other patches of MSM vegetation may occur within the site.

Two sub-sites were surveyed and the main section (called Buckroney) is situated to the south of Brittas Bay in Sandymount Townland and is separated from Brittas Bay by the promontory headland at Mizen Head. This area is part of Buckroney Nature Reserve. The northern section is situated around the mouth of Potter's Bar River. This area is situated 6 km to the north of the southern area at the northern end of Brittas Bay.

Brief mention of a second area of saltmarsh vegetation is made in the NHA notes at Potter's Bar River. Situated at the northern end of Brittas Bay Beach along the river inlet, much of the vegetation is described as non-saltmarsh and is characterised by alternating stands of common reed (*Phragmites australis*), sea club-rush (*Bolboschoenus maritimus*) or wet grasslands. Several individual clumps of sharp rush were noted on both sides of the river, although the vegetation was typically wet, poached grassland. A very small area of ASM saltmarsh was recorded at the mouth of the river.

Access to the second area of saltmarsh was by means of foot along the beach from the Brittas Bay Northern Car Park. It is possible to cross the river at low tide.

3 SALTMARSH HABITATS

3.1 General description

The recent NPWS Management plan for the cSAC indicates that a small but significant area of vegetation dominated by sharp rush occurs at Buckroney, with the possibility of smaller outliers occurring elsewhere within the site. This area was surveyed as recently as 2004 (Mizen Head) as part of the Coastal Monitoring Project (Ryle *et al*. 2007). At that time, none of the vegetation was characterised as saltmarsh.

Situated as it was behind the tall dunes that extend southwards to Pennycomequick, the only point of access for seawater into the marsh is via the small stream that runs alongside the boundary of the adjacent golf course. This had been blocked at its mouth for a number of years, although it has recently been unblocked. Apart from changes in the ground water levels due to precipitation, there had been no appreciable regular inundation of tidal waters at the site. The NPWS Management plan also stated that this area was only flooded infrequently by the tide. Therefore the vegetation dominated by sharp rush should not be classified as normal functioning saltmarsh.

Most of the low-lying ground with sharp rush at Buckroney was damp and brackish in nature. This is a distinctive area characterised by dense clumps of tall sharp rush. There are other sections with scattered clumps of sharp rush. While some salt marsh species were recorded, there was no development of any typical saltmarsh habitat. The low-lying vegetation, although dominated by sharp rush, also has features typical of dune slack vegetation. This vegetation has developed on sandy substrate. The vegetation was transitional between wetland and dune slack. It was mapped during this survey as other vegetation and not saltmarsh. The influence of tidal inundation in the past is likely to be variable in this area and some of the dense patches of sharp rush may have been flooded more frequently in the past compared to the typical dune slack type vegetation with scattered clumps of sharp rush.

The vegetation map produced by the coastal survey (Ryle *et al*. 2007) shows that there has been a change in the extent of some of the habitat boundaries since the 2004. The small river that drains Buckroney Fen and runs alongside the golf course has had its channel opened since 2004 and there has been a significant increase in the extent of the reeds and smaller graminoid species which are found in the low-lying ground adjacent the river. In addition, there has also been considerable increase in the extent of the sharp rush, which might be explained by the erection of a fence since the 2004 survey.

Table 3.1. Area of saltmarsh habitats mapped at Buckroney (and Potter's Bar).

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.085
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.084
	Total	**0.169**

*note that saltmarsh habitat may continue outside the mapped area.

3.2 Atlantic salt meadows (H1330)

Atlantic salt meadow vegetation was not recorded at Buckroney. A small area, however, was noted along rocks on the northern shore of the Potter's River to the north of the Brittas Bay. In total, it occupied an area less than 0.085ha (Table 3.1).

The vegetation occurs in a tiny cove where river mud accumulates over rock. Indeed the vegetation is fragmented by outcropping rock. Several species, typical of ASM were noted including sea pink (*Armeria maritima*), sea plantain (*Plantago maritima*), common saltmarsh-grass (*Puccinellia martima*), common scurvy-grass (*Cochlearia officinalis*) and red fescue (*Festuca rubra*).

3.3 Mediterranean salt meadows (H1410)

A small area of more typical MSM vegetation does occur at Buckroney and accounts for 0.0844ha of the total area shown for MSM. This area is dominated by sea rush and is situated adjacent to dense stands of reeds. Typically species poor, two monitoring stops which were taken adjacent to each other, but displayed differences. One stop was dominated by saltmarsh rush (*Juncus gerardii*) and creeping bent (*Agrostis stolonifera*), whilst the second stop supported sea rush and sea club-rush.

Species common to both stops included orache spp. (*Atriplex* spp.), curled dock (*Rumex crispus*) and silverweed (*Potentilla anserina*). Indeed much of the low-lying ground was dominated by a low sward of grey club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*), which often graded into the sharp rush zone. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

4 IMPACTS AND ACTIVITIES

Brittas Bay is one of the largest and most popular recreational beaches along the eastern seaboard. The neighbouring beach at Buckroney is not frequented by many people, possibly as a result of its isolated nature and owing to the coarse nature of the sand. A large part of the site is in the ownership of the National Parks and Wildlife Service and is managed as Nature Reserve. Table 4.1 lists the impacts and activities that apply to the low-lying marsh plain at Buckroney.

One of the main impacts that have been reported for Buckroney includes some of the management practices of the golf course (601) and water abstraction for the greens (NPWS management plan)). The river has in the past been blocked at its mouth with shingle preventing tidal waters from accessing the river (Ryle *et al*. 2007). At the time of the survey, a sizable amount of shingle and cobble had been removed from the channel (850). This has had the result that tidal waters occasionally inundate the small river, particularly during winter floods. There has been some change in both the composition and extent of the vegetation that were mapped at Buckroney between 2004 and 2007. A local landowner indicated that the duration and extent of standing water that occurred at the marsh was noticeably different and would explain the change in the vegetation patterns (990).

Possibly the greatest threat to the overall site is the maturing of the dune system and the subsequent drying of the substrate which has favoured the spread of bracken. As part of the management programme of the nature reserve, a small herd of horses are permitted to graze the sand dunes (140). Several areas have been fenced off including a number of exclusion experimentation plots. Much of the sharp rush habitat is found within one of these exclusions and is not grazed.

Table 4.1. Intensity of various activities on saltmarsh habitats at Buckroney and Potters Bar.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	622	C	0	0.085	Inside
1330	900	C	0	0.085	Inside
1410	990	B	0	0.084	Inside
1410	850	C	-1	0.1	Outside

[1] EU codes as per Interpretation Manual.
[2] Description of activity codes are found in Appendix III, Summary Report 2007-2008.
[3] Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.
[4] Impact is rated as –2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1= natural positive influence and +2 = strongly managed positive influence.
[5] Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

At the other end of the site, at Potter's Bar, the fragmentary patch of ASM occurs in a small cove at the base of outcropping rocks. It is not regularly accessed, although there is some evidence of people accessing the main beach (622) from nearby holiday homes (403). The impact is largely negligible. Natural erosion (900) is a natural feature, particularly at the mouth of the river, but its impact is not thought to be significant.

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the NPWS management plan, the 1995, 2000 and 2005 OSI aerial photo series. The baseline information from the NHA survey is generally limited to some descriptions of saltmarsh habitat and does not record the specific condition of this area during the survey at this site.

Buckroney is a notable site as it not included in the original saltmarsh inventory (Curtis & Sheehy-Skeffington 1998). Some of the dense sharp rush displays some features typical of saltmarsh but also has other features typical of other habitats. It has not been functioning as a saltmarsh in the recent past and there has been infrequent tidal inundation. However, this has allowed a suite of ecological conditions to develop that has created a transitional type brackish habitat in a dune slack situation.

This survey did not classify this sharp rush dominated vegetation as saltmarsh as it had not been functioning as saltmarsh and there were frequent terrestrial dune species found in association with the sharp rush. However the site is quite dynamic and recent changes in the hydrological regime may affect the development of this habitat in the future where it may have increased saline influences. The overall assessment of this site is *favourable* due to the limited extent of more typical saltmarsh habitat present at the site.

This site is located within the Buckroney Fen and Brittas Dunes SAC. A NPWS management plan is available for this SAC.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Buckroney and Potters Bar.

Habitat	**EU Conservation Status Assessment**			
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Atlantic salt meadows (1330)	Extent Structure and functions	Future prospects		**Unfavourable-inadequate**
Mediterranean salt meadows (1410)	Extent Structure and functions, Future prospects			**Favourable**

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of the habitat is rated as *favourable*. This habitat has not previously been recorded within the cSAC. This may be due to the small area of habitat and the fact that its relatively inaccessible position may have resulted in it been overlooked. There are no indications that it was more extensive at this site in the past.

5.2.2 Habitat structure and functions

The habitat structure and functions are assessed as *favourable*. Monitoring stops were not carried out due to the limited extent of habitat at Potter's Bar. Based on a visual assessment, however, of this the fragmentary patch of ASM, the floristic diversity is typical of for the habitat and that it has persisted at this site for some time.

5.2.3 Future prospects

The future prospects are rated as *unfavourable-inadequate*. It is the intention of Wicklow County Council to further facilitate access to the northern end of Brittas Strand, so as to relieve pressure elsewhere on the heavily utilised beach (Anon 2006). If this planned access improvement proceeds, then it is likely that there will be a change in the quality and possibly extent of the habitats in and around Potter's Bar.

5.3 Mediterranean salt meadows (H1410)

5.3.1 Extent

In assessing the MSM habitat at Buckroney, there is an inherent difficulty in defining its extent let alone character. Much of the sharp rush occurs on sandy substrates, most of which is rarely flooded by tidal waters. Thus it would appear that the sharp rush vegetation is more analogous to the dune slack, which was suggested in the updated NATURA 2000 explanatory notes and also by the coastal survey (Ryle *et al*. 2007). This vegetation is not considered as MSM for the purposes of this assessment.

Some more typical MSM vegetation dominated by sea rush was recorded at Buckroney. Although not identified in the coastal survey of 2004 (Ryle *et al*. 2007), there has been a change in the water levels at the site due to the reopening of the river channel, which has resulted in brackish water. The increased influence of seawater may be responsible for this limited presence of MSM vegetation. Thus the extent of the MSM habitat is assessed as *favourable*

5.3.2 Habitat structure and functions

Two monitoring stops were carried out in the most typical patch of Mediterranean salt meadow vegetation, both of which reached the target criteria. For this reason, habitat structure and functions are assessed as *favourable*. The saltmarsh is in generally good condition. There are no significant negative impacts or activities affecting this site.

This assessment relates to the small area of sea rush-dominated vegetation and assumes that the sharp rush-dominated areas are more properly characterised as part of the dune slack habitat, as much of the substrate on which it is found is sandy in nature and not as rich in organic content as that which is seen towards the small river and the reed-bed.

5.3.3 Future prospects

The future prospects of the MSM habitat at Buckroney are rated as *favourable*. This assessment is based on the fact that the site, as a nature reserve, is managed for conservation purposes. Changes to this part of the site in the past few years shows that it is quite dynamic. The river channel was blocked for a relatively long period and tidal inundation was restricted. The channel has now been reopened and this may have some impact on the extent of various vegetation communities found at the site.

6 MANAGEMENT RECOMMENDATIONS

Buckroney dunes are largely managed as a nature reserve. The site is actively managed, with the assistance of local landowners and his horses in a limited grazing programme. In terms of the marsh, it is suggested that this practice should not be altered as it does not impact the marsh. Much of the site has recently been fenced off and a number of exclusion plots installed to examine the effects of grazing on the maturing dune system.

However, the status and characterisation of sharp rush and which is the most appropriate habitat in which it is placed need to be finalised. It has been suggested in a letter contained in MPSU files (Duffy 1999) that the habitat could be included as part of the overall humid dune slack vegetation. Indeed, the coastal survey (Ryle *et al*. 2007) did not consider the site warrant the MSM designation, which may have been due to the fact the river dividing the nature reserve from the European golf course was blocked and that it had been a number of years since the site had been inundated by the sea. Perhaps this area should not be listed as a qualifying interest for this site as it is not functioning as a typical saltmarsh.

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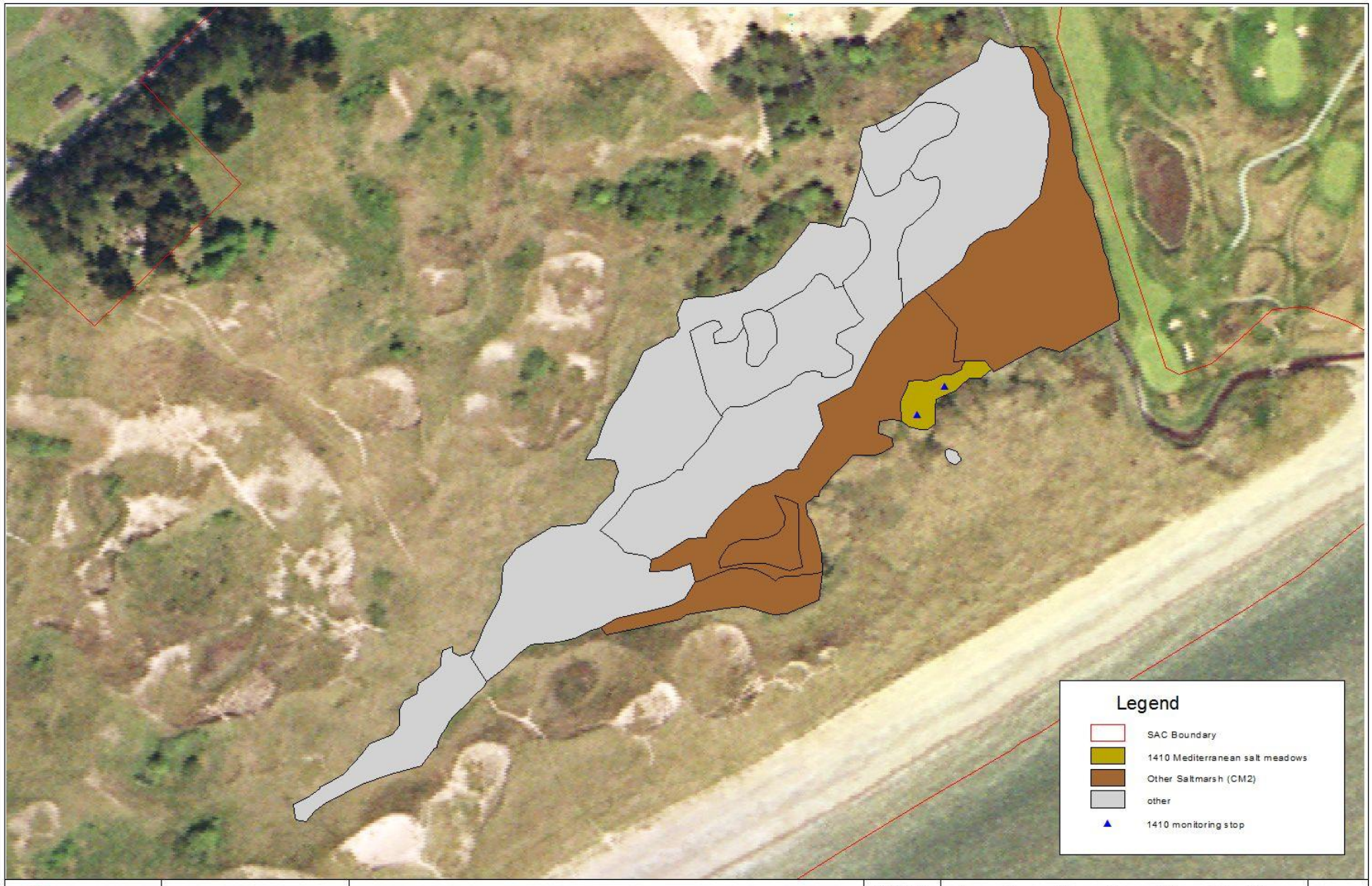
Appendix I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	*Spartina* swards
1	1310 *Salicornia* flats						
2	*Spartina* swards						
3	1330 Atlantic salt meadow	0.073		0.073			
4	1410 Mediterranean salt meadow	0.084			0.084		
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	3.171					
10	*Spartina* clump/mudflat mosaic (50/50)						
11	Isolated *Spartina* clumps on mud (5%)						
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic						
14	*Spartina* sward dominated, with some ASM						
15	1310/*Spartina* mosaic						
16	ASM dominated with some *Spartina*						
17	1330/sand dune mosaic						
18	Other SM (CM2)	2.387					
19	1330/rocky shore mosaic	0.023		0.011 5			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						



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Saltmarsh Monitoring Project 2007-2008

Buckroney (Map 1 of 2)

Buckroney-Brittas Dunes and Fens SAC (000729)

SMP code: SMP0037

This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)

0 30 60 90 120 150 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:2000

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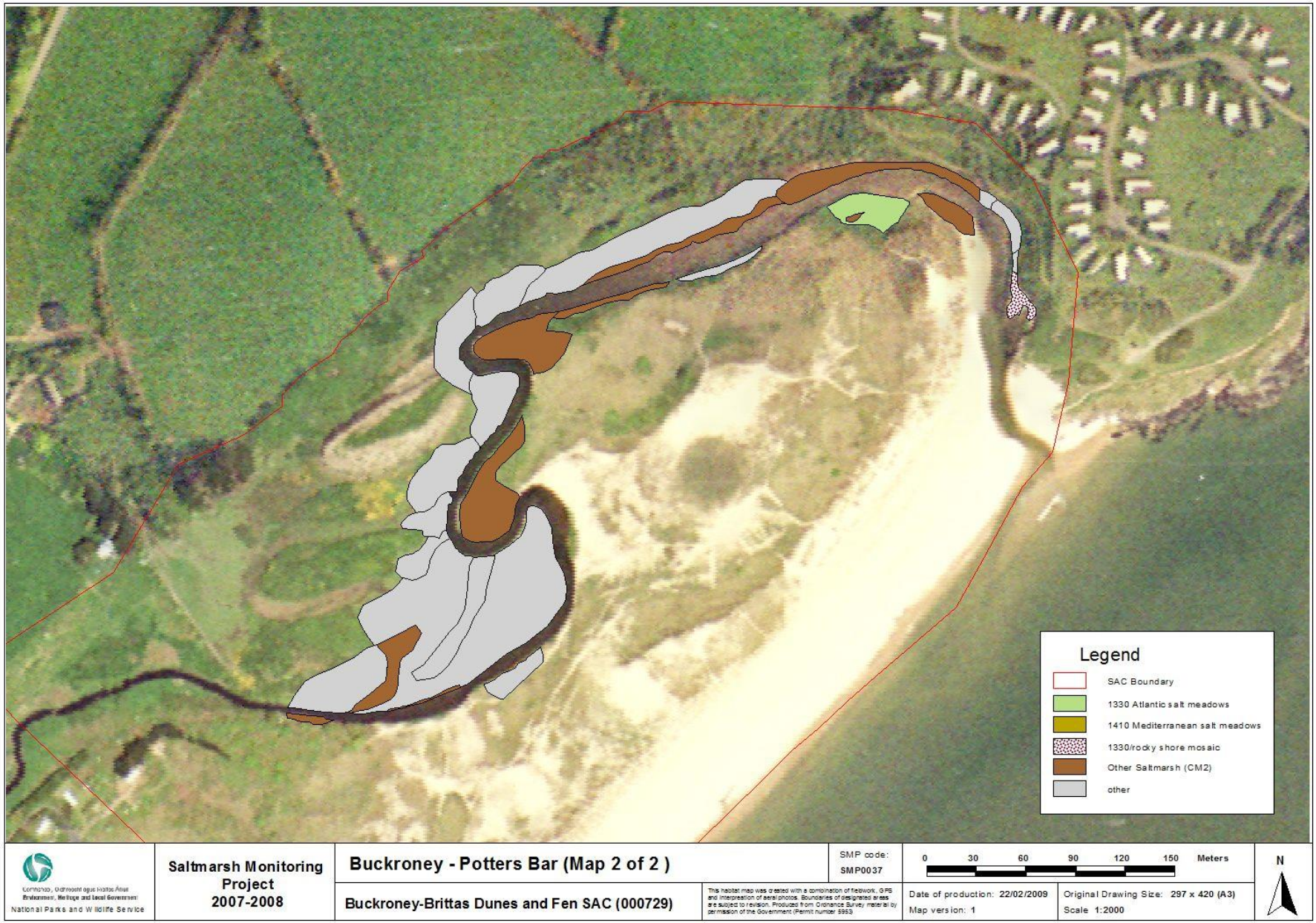

Saltmarsh Monitoring Project 2007-2008

Buckroney - Potters Bar (Map 2 of 2)

Buckroney-Brittas Dunes and Fen SAC (000729)

SMP code: SMP0037

This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953).

0 30 60 90 120 150 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:2000

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Department of Environment, Heritage and Local Government
National Parks and Wildlife Service

Appendix III – Brittas Bay site report and habitat map from the Sand Dunes Monitoring Project (Delaney *et al*., 2013)

SITE 017 BRITTAS BAY

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

Brittas Bay is located between Wicklow Town and Arklow in Co. Wicklow, just north of Mizen Head. It forms part of Buckroney-Brittas Dunes and Fen SAC (SAC 000729). Five Annex I dune habitats (* indicates a priority habitat) were recorded here during the baseline survey: **2110 Embryonic shifting dunes**, **2120 Marram dunes (white dunes)**, ***2130 Fixed dunes (grey dunes)**, ***2150 Decalcified dune heath** and **2190 Humid dune slacks** (Ryle *et al.*, 2009), and these occur as part of a complex of habitats including **7230 Alkaline fens**. Another habitat, **2170 Dunes with creeping willow**, was identified on the site during the SDM. Although the SAC links the dunes at Brittas Bay to an alkaline fen and two other sand dune systems at Buckroney and Pennycomequick, the Annex I habitats are fragmented and exist in a landscape which has been altered by development for agriculture, amenity and golf. During the CMP, *Asparagus officinalis* was found at the site, but it was not found here during the SDM. *Equisetum x moorei*, which is listed on the Flora Protection Order, was found in the **2120 Marram dunes (white dunes)** during the SDM and should be treated as a feature of interest. Brittas Bay is a popular amenity site. Caravan parks and holiday homes are common in the area. The dunes are not grazed for agriculture and are showing signs of a lack of management.

2 CONSERVATION ASSESSMENTS

2.1 Overview

Brittas Bay was surveyed on the 9th and 12th of August 2011. The habitats found at Brittas Bay during the SDM and the results of the conservation assessments are presented in Table 1. Of the six Annex I sand dune habitats recorded during the SDM, conservation assessments were carried out on four of them. **2170 Dunes with creeping willow** was not assessed because the area was underestimated by the survey team and no monitoring stops were carried out in 2011. Conservation assessment of ***2150 Decalcified dune heath** was not considered during this project due to the lack of available criteria on which to base the Structure & Functions assessment. The two foredune habitats **2110 Embryonic shifting dunes** and **2120 Marram dunes (white dunes)** were assessed as Unfavourable-Inadequate, while ***2130 Fixed dune (grey dunes**) and **2190 Humid dune slacks** were assessed as Unfavourable-Bad.

Table 1. Conservation assessment results for all Annex I dune habitats assessed at Brittas Bay, Co. Wicklow

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

2.1.1 Area

The areas of Annex I sand dune habitats at Brittas Bay are presented in Table 2. The area of ***2130 Fixed dunes (grey dunes)** presented in the baseline survey was revised to include areas which are affected by scrub invasion. The total area of Annex I sand dune habitats has increased since the baseline survey as a result of accretion in the north of the site. The area of ***2130 Fixed dunes (grey dunes)** has increased due to succession from foredune habitats and a reduction in the size of ***2150 Decalcified dune heath** and **2190 Humid dune slacks**.

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

Habitat	Baseline survey (ha)	Revised baseline (ha)	Sand Dunes Monitoring Project (ha)
2110 Embryonic shifting dunes	0.65	0.65	2.14
2120 Marram dunes (white dunes)	3.31	3.31	3.66
*2130 Fixed dunes (grey dunes)	49.72	55.55	54.83
*2150 Decalcified dune heath	0.81	0.81	0.26
2170 Dunes with creeping willow	0.00	0.08	0.13
2190 Humid dune slacks	0.83	0.83	0.34
Total	55.32	61.23	61.36

2.1.2 Structure and Functions

Table 3 shows the results of the Structure and Functions assessments. Structure and Functions were assessed for four habitats. Three habitats, **2110 Embryonic shifting dunes**, **2120 Marram dunes (white dunes)** and **2190 Humid dune slacks** were assessed as Unfavourable-Inadequate, while ***2130 Fixed dunes (grey dunes)** were assessed as Unfavourable-Bad. **2110 Embryonic shifting dunes** and **2120 Marram dunes (white dunes)** were damaged by disturbance. Multiple factors including damage and lack of species diversity affected ***2130 Fixed dunes (grey dunes)** and the most serious factor affecting the **2190 Humid dune slacks** was drying out.

Table 3. Annex I sand dune habitats at Brittas Bay 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	4	7	1
2120 Marram dunes (white dunes)	4	7	1
*2130 Fixed dunes (grey dunes)	8	11	7
2190 Humid dune slacks	2	11	1

2.1.3 Future Prospects

Brittas Bay has been developed as a public amenity since the 1950s, and this has replaced agricultural use on the site. Several of the impacts recorded at the site (trampling, recreation, paths and tracks, fires and caravan parks) are related to the use of the site as an amenity. Recreation refers to use of the site for social gatherings and sometimes antisocial behaviour. Erosion was recorded as a negative indicator in the ***2130 Fixed dunes (grey dunes)** because it has been exacerbated by human activities. The presence of holiday homes and caravan parks could be contributing to the drying out of the site through water abstraction. The lack of livestock on the dunes has resulted in undergrazing. Parts of the sward have become rank and scrub has spread throughout the site.

Table 4. Impacts recorded in Annex I sand dune habitats at Brittas Bay 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	G05.01	Trampling	Medium	Negative	30	Inside
2110	J02.12.01	Coastal protection	Medium	Neutral	10	Inside
2110	K01.01	Erosion	Medium	Neutral	2	Inside
2110	D01.01	Paths and tracks	Medium	Neutral	5	Inside
2110	G01.02	Walking	Low	Negative	50	Inside
2120	D01.01	Paths, Tracks	Medium	Neutral	5	Inside
2120	G01.08	Recreation	Medium	Negative	2	Inside
2120	G01.02	Walking	Medium	Negative	55	Inside
2120	G05.01	Trampling	Medium	Negative	35	Inside
2120	J02.12.01	Coastal protection	Medium	Neutral	10	Inside
2120	K01.01	Erosion	Medium	Neutral	5	Inside
*2130	A04.03	Lack of grazing	Medium	Negative	50	Inside
*2130	D01.01	Paths and tracks	High	Neutral	1	Inside
*2130	G01.08	Recreation	Medium	Negative	20	Inside
*2130	G02.08	Caravan Parks	Low	Negative	10	Outside
*2130	G05.01	Trampling	High	Negative	40	Inside
*2130	I01	Invasive non-natives	High	Negative	5	Inside
*2130	I02	Bracken	Medium	Negative	30	Inside
*2130	J02.12.01	Sand-trapping fencing	Medium	Positive	10	Inside
*2130	K01.01	Erosion, blow outs	High	Negative	10	Inside
*2130	K02.01	Scrub encroachment	Low	Negative	50	Inside
*2150	A04.03	Lack of grazing	Medium	Negative	100	Inside
*2150	J02.12.01	Coastal protection	-	Neutral	0	Outside
*2150	K02.01	Scrub encroachment	Medium	Negative	100	Inside
2170	A04.03	Lack of grazing	Medium	Negative	100	Inside
2170	J02.12.01	Coastal protection	-	Neutral	0	Outside
2190	G01.02	Walking	Low	Neutral	50	Inside
2190	G01.08	Recreation	Medium	Negative	10	Inside
2190	G05	Small fires	High	Negative	1	Inside
2190	J02.07.02	Water abstraction for domestic use	Medium	Negative	100	Outside
2190	J02.12.01	Coastal protection	-	Neutral	0	Outside
2190	K01.01	Erosion	High	Neutral	20	Outside
2190	K01.03	Drying out	Medium	Negative	50	Inside
2190	K02.01	Scrub encroachment	Medium	Negative	10	Outside

2.2 Annex I habitat assessments

The conservation status of the Annex I sand dune habitats at Brittas Bay 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. If human activity has clearly impeded or reduced the development of a sand dune habitat in the context of dune building, this is interpreted as habitat loss.

2.2.1 2110 Embryonic shifting dunes

2110 Embryonic shifting dunes occur in the north-east of Brittas Bay, but are absent from the south-west of the site. In the north of the site, they demonstrate a pattern of accretion and are now found below the tide line mapped on the OSI discovery map for Brittas Bay.

Area

2110 Embryonic shifting dunes were more extensive in 2011 than they were during the baseline survey, and the area had increased from 0.65 to 2.14 ha. No **2110 Embryonic shifting dunes** were found in the southern part of the site during either the CMP or the SDM. Area was assessed as Unfavourable-Inadequate during the CMP. During the SDM, Area was assessed as Favourable, an improving trend since the CMP.

Structure and Functions

Only one criterion failed during the Structure and Functions assessment, and that assessed damage due to disturbance. Trampling had caused fragmentation of the habitat. During the CMP, Structure and Functions were assessed as Favourable on the basis of a single monitoring stop. Analysis of the aerial photographs and site description from the CMP indicates that the **2110 Embryonic shifting dunes** did show signs of damage during the CMP. Structure and Functions were assessed as Unfavourable-Inadequate (stable) during the SDM.

Future Prospects

Trampling and walking were the only negative impacts recorded during the SDM. During the CMP, Future Prospects were assessed as Unfavourable-Inadequate because of sediment depletion. There was no evidence of this in 2011 as erosion in the south of the site was more than balanced by accretion in the north of the site. Other negative impacts recorded during the CMP included paths and tracks, and it is likely that this includes some of the paths generated by trampling. Future Prospects were assessed as Unfavourable-Inadequate (stable) during the SDM.

Conservation assessment

Area was assessed as Favourable (improving), while Structure and Functions and Future Prospects were assessed as Unfavourable-Inadequate (stable) during the SDM. The Conservation assessment during the CMP was Unfavourable-Inadequate. Because of the improvement in the Area assessment, the conservation status of **2110 Embryonic shifting dunes** was assessed as Unfavourable-Inadequate (Improving) during the SDM.

2.2.2 2120 Marram dunes (white dunes)

This habitat is mainly found in the north-east of Brittas Bay. It is the focus of considerable amenity use. *Equisetum x mooreii* was found in a disturbed area in this habitat, close to an access route.

Area

The area of **2120 Marram dunes (white dunes)** has increased slightly from 3.31 ha during the CMP to 3.66 ha during the SDM. However, in that time a large blowout, free of vegetation, has developed through amenity use, and this is considered a loss of habitat. The blowout is 0.18 ha in size, 4.9% of the area of **2120 Marram dunes (white dunes)** present in 2011. Area was assessed as Unfavourable-Inadequate during the CMP. During the SDM, area was assessed as Unfavourable-Inadequate (stable).

Structure and Functions

The criterion assessing damage due to disturbance failed during the Structure and Functions assessment for the SDM, while all the other criteria passed. During the CMP, Structure and Functions were assessed as Unfavourable-Inadequate due to unhealthy marram in places, erosion and bare sand. Structure and Functions were assessed as Unfavourable-Inadequate (stable) during the SDM.

Future Prospects

Trampling, walking and recreational activities were recorded as negative impacts. Beaten paths and tracks lead through the habitat causing fragmentation and instability. During the CMP, Future Prospects were assessed as Unfavourable-Inadequate due to erosion and recreational pressure. Negative impacts recorded during the CMP included paths and tracks and trampling. Improved access to the site was recorded as a positive impact. Future Prospects were assessed as Unfavourable-Inadequate (stable) during the SDM.

Conservation assessment

Conservation status was assessed as Unfavourable-Inadequate during the CMP. During the SDM, all three of the parameters were assessed as Unfavourable-Inadequate (stable). The conservation status of **2120 Marram dunes (white dunes)** was assessed as Unfavourable-Inadequate (stable) in 2011.

*2.2.3 *2130 Fixed dunes (grey dunes)*

This is the most extensive habitat at Brittas Bay. In the past, land outside the current site boundary would have supported ***2130 Fixed dunes (grey dunes),** but these areas have been converted for agriculture or used as caravan sites. The remaining area faces challenges due to undergrazing and recreational activities.

Area

Area of ***2130 Fixed dunes (grey dunes)** has decreased from 55.55 ha during the CMP to 54.83 ha during the SDM. Of this loss, 0.07 ha is anthropogenic, as trampling caused part of the habitat to erode and has prevented regeneration. This is a loss of less than 1% per year since the CMP. Area was assessed as Favourable during the baseline survey. During the SDM, Area was assessed as Unfavourable-Inadequate (deteriorating).

Structure and Functions

Seven of the criteria failed during the SDM. The criteria which failed assessed the number of positive indicator species, negative indicator species, non-native species, cover of trees and scrub, height of vegetation, cover of bare ground and damage due to disturbance. *Pteridium aquilinum* and rank vegetation were widespread. Several non-native species were present and these included *Hippophae rhamnoides* and *Cotoneaster* sp. Damage due to trampling was evident and has led to over 10% of the habitat being occupied by bare sand. During the CMP, Structure and Functions were assessed as Unfavourable-Inadequate. Under the current methodology, it is likely that the habitat would have been assessed as Unfavourable-Bad as bracken and tall vegetation were noted at several other stops. Structure and Functions were assessed as Unfavourable-Bad (stable) during the SDM.

Future Prospects

High intensity negative impacts recorded at Brittas Bay include recreational activities and trampling, invasive non-native species and erosion associated with human activities. Problematic native species (*Pteridium aquilinum*) represents a medium intensity negative impact, while caravan parks outside the site have a low negative effect on 10% of the habitat. Sparse scrub affects 50% of the habitat. There has been some attempt to reduce erosion by fencing areas off and using sand trapping techniques. During the CMP, Future Prospects were assessed as Unfavourable-Inadequate due to the threat of development within the habitat. Other impacts noted during the CMP included invasion by a species, trampling, walking, camping and caravans, paths and tracks and urbanisation. The impacts recorded during the SDM appear to be broadly similar to those recorded during the CMP. Due to the number of impacts, the extent of the habitat which they affect and the severity of the effects of the impacts on the Structure and Functions of the habitat, Future Prospects were assessed as Unfavourable-Bad (stable) during the SDM.

Conservation assessment

Area was assessed as Unfavourable-Inadequate while Structure and Functions and Future Prospects were assessed as Unfavourable-Bad. The conservation assessment during the CMP was Unfavourable-Inadequate. The more negative assessments given here are due loss of Area and change in the interpretation of the assessment guidelines for Structure and Functions and Future Prospects. The conservation status of ***2130 Fixed dunes (grey dunes)** was assessed as Unfavourable-Bad (deteriorating) during the SDM.

*2.2.4 *2150 Decalcified dune heath*

A full assessment of ***2150 Decalcified dune heath** was not carried out during the SDM. However, data on the area and the main impacts affecting the habitat were collected.

The area of ***2150 Decalcified dune heath** decreased from 0.81 ha during the CMP to 0.26 ha during the SDM. The larger polygon recorded during the CMP has disappeared and been replaced by dense *Pteridium aquilinum* and *Chamaerion angustifolium*. The second polygon where the habitat was found during the CMP had increased in area by 0.03 ha by 2011.

The main impacts affecting ***2150 Decalcified dune heath** at Brittas Bay were scrub encroachment and lack of grazing. The remaining heath is located in an area with a substantial cover of scrub.

2.2.5 2170 Dunes with creeping willow

A conservation assessment was not carried out for **2170 Dunes with creeping willow** as the area was believed to have been below the minimum monitoring area during the SDM field survey. The habitat was not recorded during the CMP, but because part of the **2170 Dunes with creeping willow** appeared mature and well-developed, a small area of the habitat was included on the revised baseline maps. Lack of grazing was noted in the habitat.

2.2.6 2190 Humid dune slacks

Three of the dune slacks which had been identified during the baseline survey were no longer present in 2011. Two slacks remain at the site, and a monitoring stop was carried out in each one. The slacks are at different stages of development, with the slack in the northern part of the site, close to the river, being younger than the slack to the south of the northern car park.

Area

The total area of **2190 Humid dune slacks** at Brittas Bay has decreased from 0.83 ha during the CMP to 0.34 ha during the SDM, and this equates to a loss of 59%. Three of the slacks that were formerly present and had a community typical of damp conditions during the CMP were no longer present during the SDM. Although drying out is a natural process for dune slacks, the speed at which these slacks have disappeared indicates that the drying process has been anthropogenically accelerated at Brittas Bay. There are several habitations and a considerable quantity of scrub in the vicinity of the dry slacks, and these may have helped to accelerate the rate of drying. The presence of excessive sand which has been deposited in one of the slacks was the result of human disturbance. During the CMP, Area was assessed as Favourable. The sharp decline in area since the baseline survey was considered to have been at least partially caused by human impacts, and the Area was assessed as Unfavourable-Bad (deteriorating) during the SDM.

Structure and Functions

One criterion failed during the Structure and Functions assessment, and this assessed scrub encroachment. Scrub was present in both of the slacks. Although bare ground was not recorded in the monitoring stops, it was present within the habitat. During the CMP, Structure and Functions were assessed as Favourable. Aerial photographs suggest that the southern slack contained scrub at the time of the baseline survey, but it appears that scrub encroachment has become more serious in the northern slack. Structure and Functions were assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

Future Prospects

Future Prospects were assessed as Unfavourable-Inadequate because there were indications that the water table was becoming lower during the CMP. The only negative impact recorded during the CMP was the presence of paths and tracks. In 2011, drying out, water abstraction, campfires, recreation, walking and scrub encroachment were recorded as negative impacts. Drying out is a natural part of the ecology of dune systems, but water abstraction for domestic use and the presence of scrub accelerates this process. There is no indication that drying out has slowed down or that the

area of dune slacks will recover over the next 12 years, and Future Prospects are assessed as Unfavourable-Bad (deteriorating).

Conservation assessment

During the SDM, Area and Future Prospects were assessed as Unfavourable-Bad (deteriorating) and Structure and Functions were assessed as Unfavourable-Inadequate (deteriorating). During the CMP, the habitat was assessed as Unfavourable-Inadequate. The conservation status of **2190 Humid dune slacks** was assessed as Unfavourable-Bad (deteriorating) during the SDM.

3 DISCUSSION

Eight Annex I sand dune habitats are listed as qualifying interests at Buckroney-Brittas Dunes and Fen SAC (SAC 000729). Six of these were found at Brittas Bay, and conservation assessments were carried out on four of them. Assessment of the conservation status of ***2150 Decalcified dune heath** is not within the remit of this project. The total area of **2170 Dunes with creeping willow** was underestimated during the SDM and no Structure and Functions assessment was carried out.

3.1 Qualifying interests for SAC

The conservation status as assessed during the SDM is less positive than that given in the Natura 2000 Standard data from (NPWS, 1999), particularly for ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks.** The structure of all of the habitats is impaired to some extent. Although restoration could be attempted, considerable effort would be required to ameliorate problems caused by recreation, non-native species, and bracken and scrub encroachment. The damage caused by water abstraction may be permanent.

Table 5. Relevant Qualifying Interests for Buckroney-Brittas Dunes and Fen SAC 000729 (NPWS, 1999)

Habitat	Area (%)	Representativity	Relative surface	Conservation status	Global assessment
1210 Annual vegetation of drift lines	1	B	C	B	B
1220 Perennial vegetation of stony banks	1	C	C	C	C
2110 Embryonic shifting dunes	2	A	C	B	B
2120 Marram dunes (white dunes)	4	B	C	B	B
*2130 Fixed dunes (grey dunes)	44	A	B	B	B
*2150 Decalcified dune heath	4	B	C	B	B
2170 Dunes with creeping willow	2	B	C	B	B
2190 Humid dune slacks	2	A	C	A	A

3.2 Amenity Use

Brittas Bay has been an amenity site since the 1950s, and the present visitor facilities, parking and caravan sites in the vicinity facilitate large numbers of visitors. The beach is about 3.5 km in length and during the summer season, 500 to 1000 visitors are expected to use it on weekends (Wicklow County Council, 2011). Amenity use is concentrated on the beach, in the foredunes and around access paths, but does extend into the fixed dunes and dune slacks. The main structural damage is due to trampling, but lighting of fires and littering is also problematic. Formal paths have been laid between the beach and the car parks, but informal, beaten tracks are clearly visible throughout the dunes. Sheep wire helps to guide visitors along the main access routes, but there is no effective fencing to

keep visitors off the dune ridges and sensitive blow outs. The difficulties of maintaining fencing on an unstable substrate and in the context of amenity use have undermined their efficacy. Sand trapping fencing appears to have had some success on some large blow outs. Currently, lack of structural integrity damages the Annex I habitats through the presence of excessive bare sand and has implications for the safety of beach users. Management to promote recovery of the Annex I sand dune habitats would be of benefit from both a conservation and health and safety point of view.

3.3 Grazing and encroachment by problematic species

Rabbits are the main grazing mammals at Brittas Bay. Rabbits are not abundant here; they do not graze sufficiently intensively to prevent the spread of bracken or scrub and nor will they graze or browse in rank, scrubby habitat. *Pteridium aquilinum* and scrub are spreading through the ***2130 Fixed dunes (grey dunes), *2150 Decalcified dune heath** and **2190 Humid dune slacks**. The ***2130 Fixed dunes (grey dunes)** sward is rank and species-poor in parts. Dense scrub reduces species diversity where it becomes established and contributes to the drying out of dune slacks. Grazing can combat scrub encroachment, but the introduction of livestock can be problematic at sites which experience high amenity use, and mowing can be used as an alternative management method to prevent the development of rank habitat. Mowing twice a year is also a recognised technique for control of *Pteridium aquilinum* (Stewart *et al.*, 2008). Excessive mowing and the use of heavy vehicles could damage sensitive dune habitats, however, so careful consideration should be given to the method of mowing if this is to be carried out.

3.4 Non-native species

Although succession to scrub and woodland is part of a natural process, many of the species encroaching at Brittas Bay are non-native. *Pinus* sp., *Hippophae rhamnoides*, *Cordyline* sp. and *Phormium* sp. were all recorded. *Hippophae rhamnoides* represents the greatest threat due to its ability to colonise large areas in a short time. The species should be monitored closely and will continue to affect the Future Prospects of the ***2130 Fixed dunes (grey dunes)** habitat for as long as it is present.

3.5 Drying out

It is unclear to what extent groundwater abstraction is on-going in the Brittas Bay area. In 2003, there was no mains water supply or group water scheme in the Brittas Bay area, and no mains sewerage (Casey *et al.*, 2003). Although permission was given for a group water scheme for residents in 2006, there is no indication that the caravan park or holiday homes located in the dune system have taken part in such a scheme. The alternative to a mains or group water supply is the private use of groundwater. The abstraction of groundwater can lower the level of the water table, accelerating the rate at which dune slacks dry out. There is also extensive scrub cover on the site, which exacerbates the problem.

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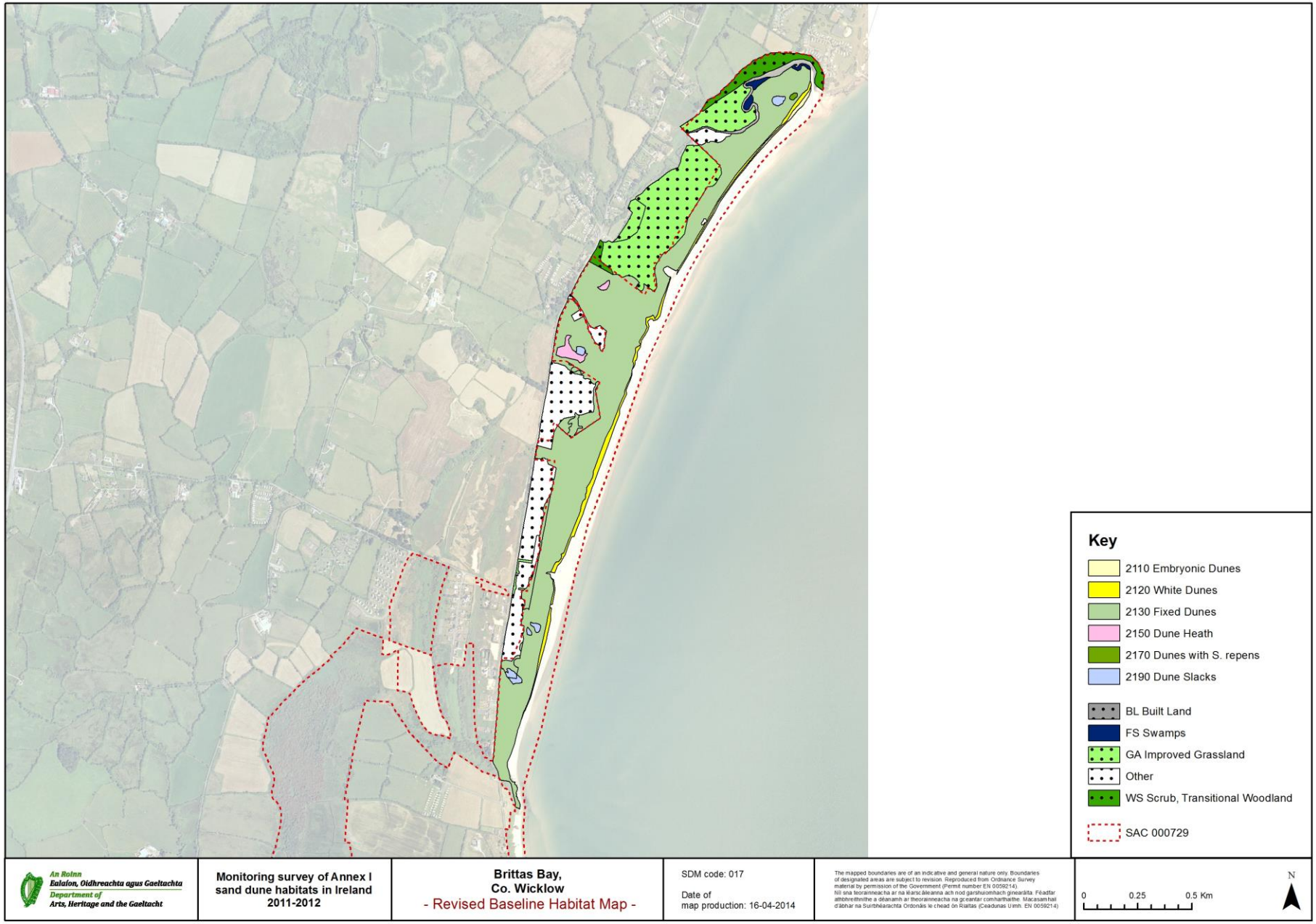
Key
2110 Embryonic Dunes
2120 White Dunes
2130 Fixed Dunes
2150 Dune Heath
2170 Dunes with S. repens
2190 Dune Slacks
BL Built Land
FS Swamps
GA Improved Grassland
Other
WS Scrub, Transitional Woodland
SAC 000729
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
Monitoring survey of Annex I sand dune habitats in Ireland 2011-2012
Brittas Bay, Co. Wicklow
- Revised Baseline Habitat Map -
SDM code: 017
Date of map production: 16-04-2014
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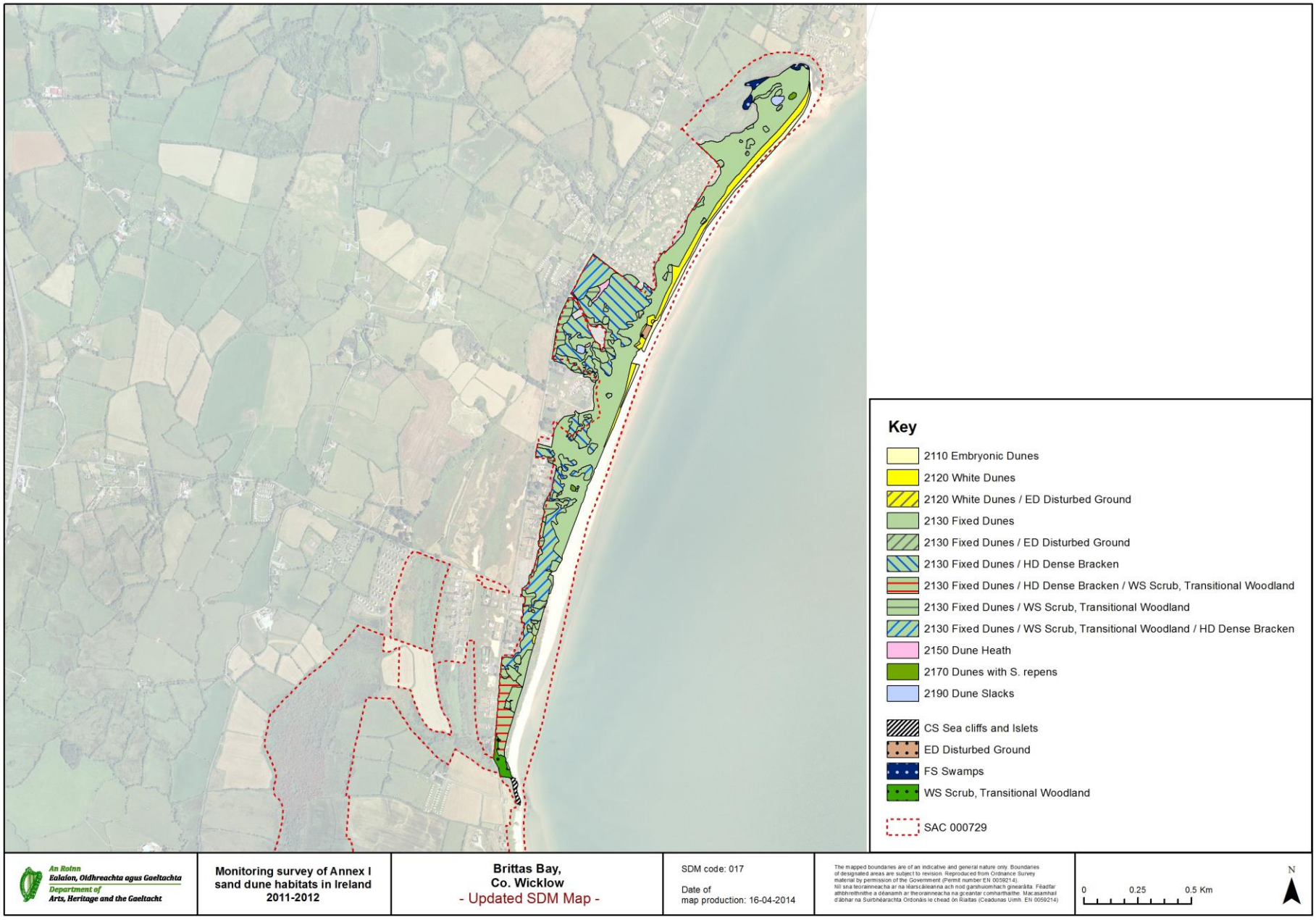
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2120 White Dunes
2120 White Dunes / ED Disturbed Ground
2130 Fixed Dunes
2130 Fixed Dunes / ED Disturbed Ground
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2130 Fixed Dunes / HD Dense Bracken / WS Scrub, Transitional Woodland
2130 Fixed Dunes / WS Scrub, Transitional Woodland
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Appendix VI – Mizen Head site report and habitat map from the Sand Dunes Monitoring Project (Delaney *et al*., 2013)

SITE 018 MIZEN HEAD

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

Mizen head is a small site located 6.5 km north-east of Arklow, Co. Wicklow. Four Annex I sand dune habitats (* indicates a priority habitat) were recorded here during the CMP: **2110 Embryonic shifting dunes**, **2120 Marram dunes (white dunes)**, ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** (Ryle *et al.*, 2009). Two more habitats were recorded during the SDM: **1220 Perennial vegetation of stony banks** and **2170 Dunes with creeping willow**. The site is part of the Buckroney-Brittas Dunes and Fen SAC (SAC 000729), which includes **7230 Alkaline fens.** The fen is found close to the dunes on the opposite side of the main access road, the R750. The rare plant *Asparagus officinalis* subsp. *prostratus* occurs in the ***2130 Fixed dunes (grey dunes)**. This plant is included on the Flora Protection order and is listed as Rare on the national Red Data List. The dunes at Mizen Head are primarily managed for conservation, and amenity is a secondary land-use here.

2 CONSERVATION ASSESSMENTS

2.1 Overview

The dunes at Mizen head were surveyed on the 7th and 27th of July 2011. The habitats found at Mizen Head in 2011 and the results of the conservation assessments are presented in Table 1. Conservation assessments were carried out in **1220 Perennial vegetation of stony banks**, **2110 Embryonic shifting dunes**, ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks**. **2120 Marram dunes (white dunes)** which were recorded during the CMP were no longer present on the site. This was the result of natural succession and was not associated with human activity. No assessment was carried out in **2170 Dunes with creeping willow** due to the area being underestimated in the field and thought to be below the minimum monitoring area (Delaney *et al.* 2013) during the survey in 2011. **2110 Embryonic shifting dunes** were assessed as Favourable, while the other habitats were assessed as Unfavourable-Inadequate. No trend could be established for **1220 Perennial vegetation of stony banks** because it was not assessed during the CMP.

Table 1. Conservation assessment results for all Annex I dune habitats surveyed at Mizen Head, Co. Wicklow.

Habitat	Area	Structure & Functions	Future Prospects	Overall result
1220 Perennial vegetation of stony banks	Favourable	Unfavourable-Inadequate	Favourable	Unfavourable-Inadequate
2110 Embryonic shifting dunes	Favourable (stable)	Favourable (stable)	Favourable (stable)	Favourable (stable)
*2130 Fixed dunes (grey dunes)	Favourable (stable)	Unfavourable-Inadequate (stable)	Unfavourable-Inadequate (deteriorating)	Unfavourable-Inadequate (deteriorating)
2190 Humid dune slacks	Favourable (stable)	Unfavourable-Inadequate (stable)	Unfavourable-Inadequate (stable)	Unfavourable-Inadequate (stable)

2.1.1 Area

The areas of Annex I sand dune habitats at Mizen Head are presented in Table 2. The baseline areas of ***2130 Fixed dunes (grey dunes)**, **2170 Dunes with creeping willow** and **2190 Humid dune slacks** all increased after revision. Dunes with dense scrub or woodland were previously excluded from the ***2130 Fixed dunes (grey dunes)** habitat, but under the mapping methodology employed during the SDM these areas were included. **2170 Dunes with creeping willow** had not previously been mapped at the site, but Mizen Head site report (Ryle *et al*., 2009) indicates that creeping willow was present during the CMP. It is likely that the decision to map the habitat in 2011 represents a change in the interpretation of the habitat. **2190 Humid dune slacks** were extended to include slacks which were not found during the baseline survey and saline slacks which were previously mapped as unspecified non-dune habitat. The site has decreased in size since the baseline survey by 0.23 ha because of erosion of **2110 Embryonic shifting dunes** along the coast, as well as the loss of **2120 Marram dunes (white dunes)** which were recorded during the CMP but were no longer present on the site in 2011.

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

Habitat	Baseline survey (ha)	Revised baseline (ha)	Sand Dunes Monitoring Project (ha)
1220 Perennial vegetation of stony banks	0.00	0.00	0.08
2110 Embryonic shifting dunes	0.91	0.91	0.22
2120 Marram dunes (white dunes)	1.10	1.10	0.00
*2130 Fixed dunes (grey dunes)	43.27	45.62	47.10
2170 Dunes with creeping willow	0.00	0.07	0.07
2190 Humid dune slacks	0.33	4.76	4.76
Total	45.61	52.46	52.23

2.1.2 Structure and Functions

Table 3 shows the results of the Structure and Functions assessment. Structure and Functions of **2110 Embryonic shifting dunes** were assessed as Favourable, while **1220 Perennial vegetation of stony banks**, ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** were assessed as Unfavourable-Inadequate. **1220 Perennial vegetation of stony banks** are poorly developed at Mizen Head, while

***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** are affected by encroachment of scrub and *Pteridium aquilinum*.

Table 3. Annex I sand dune habitats at Mizen Head 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
1220 Perennial vegetation of stony banks	2	6	1
2110 Embryonic shifting dunes	2	7	0
*2130 Fixed dunes (grey dunes)	8	11	2
2190 Humid dune slacks	4	11	1

2.1.3 Future Prospects

Impacts and activities recorded at Mizen Head are presented in Table 4. Impact codes are assigned according to Ssymanck (2010). Livestock feeding, trampling, invasive non-native species and problematic native species, scrub encroachment, rabbit damage and water abstraction from ground and surface waters were listed as negative impacts in 2011. Horse grazing was recorded as a positive impact.

Table 4. Impacts recorded in Annex I sand dune habitats at Mizen Head 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
1220	G05.09	Fencing	Medium	Neutral	1	Inside
1220	J02.04.01	Flooding	Medium	Neutral	100	Outside
2110	G01.02	Walking	Low	Neutral	100	Inside
*2130	A04.02.03	Horse grazing	Medium	Positive	20	Inside
*2130	A05.02	Livestock feeding	High	Negative	1	Inside
*2130	G01.02	Walking	Low	Neutral	40	Inside
*2130	G02.01	Golf course	Low	Neutral	20	Outside
*2130	G05.01	Trampling	High	Negative	5	Inside
*2130	G05.09	Fencing	Medium	Neutral	1	Inside
*2130	I01	Invasive non-natives	High	Negative	1	Inside
*2130	I02	Invasive natives	High	Negative	20	Inside
*2130	K01.01	Erosion	High	Neutral	5	Inside
*2130	K04.05	Rabbit damage	High	Negative	1	Inside
2170	A04.02.03	Horse grazing	Low	Positive	100	Inside
2170	K02.01	Scrub encroachment	High	Negative	20	Inside
2190	A04.02.03	Horse grazing	Low	Neutral	15	Inside
2190	G01.02	Walking	Low	Neutral	10	Inside
2190	G02.01	Golf course	Low	Neutral	30	Outside
2190	G05.09	Fencing	Medium	Neutral	1	Inside
2190	J02.07	Ground water abstraction	Low	Negative	100	Outside
2190	J02.09.01	Saltwater Intrusion	Medium	Neutral	20	Outside
2190	K02.01	Scrub encroachment	Medium	Negative	15	Inside
2190	K04.05	Rabbit activity	Medium	Negative	10	Inside

During the baseline survey, changes in cultivation, abandonment of pastoral systems, intensive grazing, paths and tracks, the golf course, walking, and invasion by a species were recorded. These were all recorded in ***2130 Fixed dunes (grey dunes).** No positive impacts were recorded. Although no negative impacts were recorded for 2190, water abstraction was indicated as a threat in the CMP site report.

2.2 Annex I habitat assessments

The conservation status of the Annex I habitats at Mizen Head 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 1220 Perennial vegetation of stony banks

A small area of **1220 Perennial vegetation of stony banks** has developed on fine shingle at the outflow of a stream in the north of the site, at the boundary with the European Golf Course. Although perennial vegetation has colonised, the substrate appears unstable and the habitat is sparse and poorly developed. This habitat was not present during the CMP, so no trend was established during the assessment.

Area

Although the area is small at 0.08 ha, the habitat has occupied all of the suitable substrate at Mizen Head and there is no sign of human interference to reduce the extent. Area was assessed as Favourable.

Structure and Functions

The Structure and Functions were assessed as Unfavourable-Inadequate because the criterion assessing the presence of positive indicator species failed. There is evidence that the area floods periodically and there are species present which indicate that the gravel may succeed to dune vegetation in future. In the past, the area close to the channel underwent anthropogenic disturbance as a dam was built and then removed in an effort to regulate the water table in the dunes (Anon, 2011). The poorly developed nature of the habitat and the instability of the substrate are considered to be related to this past disturbance.

Future Prospects

Flooding and fencing were recorded as neutral impacts. Flooding is a natural impact which makes the substrate less stable and increases its nutrient content. Fencing prevents access by walkers, but it also has an impact on the mobility of the substrate. As no negative impacts were recorded during the SDM, Future Prospects were assessed as Favourable.

Conservation assessment

Area and Future Prospects were assessed as Favourable because there was no evidence of human intervention to limit the size of, or interfere with, the habitat. However, the Structure and Functions

were assessed as Unfavourable-Inadequate. **1220 Perennial vegetation of stony banks** present at Mizen Head is a marginal, poorly developed example and is assessed as Unfavourable-Inadequate.

2.2.2 2110 Embryonic shifting dunes

2110 Embryonic shifting dunes are only found in the north of the site, where they have developed as a narrow strip in front of the ***2130 Fixed dunes (grey dunes)**.

Area

The area of **2110 Embryonic shifting dunes** has diminished from 0.91 ha during the CMP to 0.22 ha during the SDM. This is the result of succession to ***2130 Fixed dunes (grey dunes)** and natural erosion. During the CMP, Area was assessed as Favourable. Because there has been no anthropogenic loss of habitat, Area was assessed as Favourable (stable) during the SDM.

Structure and Functions

All of the criteria passed 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

The only impact recorded in 2011, walking, had a neutral effect. During the CMP, Future Prospects were assessed as Favourable as only the natural process of erosion was recorded as an impact. Future Prospects were assessed as Favourable (stable) during the SDM.

Conservation assessment

All of the parameters were assessed as Favourable in 2011. During the CMP, the habitat was assessed as Favourable. The conservation status of **2110 Embryonic shifting dunes** was assessed as Favourable (stable) during the SDM.

2.2.3 2120 Marram dunes (white dunes)

2120 Marram dunes (white dunes) were recorded during the CMP but were not present in 2011. This was the result of natural succession and was not associated with human activity. The conservation status of **2120 Marram dunes (white dunes)** was not assessed, but no anthropogenic impacts or activities were observed which would prevent reestablishment of the habitat in the future.

*2.2.4 *2130 Fixed dunes (grey dunes)*

***2130 Fixed dunes (grey dunes)** represent the most extensive habitat at Mizen Head. The vegetation is well-developed, although it is very lightly grazed or ungrazed in parts, and bracken and scrub species have become invasive. There are places where woodland has become established. These areas were included in the ***2130 Fixed dunes (grey dunes)** habitat because they now form an integral part of the dune system, and herbaceous vegetation of sand dunes and dune slacks occurs below the canopy. They may be more appropriately described as **2180 Wooded dunes of the Atlantic, Continental and Baltic region**, a habitat which has not been recognised as occurring in Ireland. The rare plant *Asparagus officinalis* subsp. *prostratus* is found in this habitat and should be treated as a feature of interest at the site.

Area

The area of ***2130 Fixed dunes (grey dunes)** increased from 45.62 ha during the CMP to 47.10 ha during the SDM. This occurred due to succession from **2120 Marram dunes (white dunes)** and **2110 Embryonic shifting dunes**. During the CMP, Area was assessed as Favourable. There was no sign of anthropogenic loss to the habitat, and Area was assessed as Favourable (stable) during the SDM.

Structure and Functions

Two of the criteria failed the Structure and Functions assessment. Damage due to disturbance affected two of the monitoring stops and negative indicator species including *Pteridium aquilinum*, *Rosa spinosissima* and *Senecio jacobaea* were present at most of the stops. There was a large blowout in the northern part of the habitat which has recovered slowly over the last decade and disturbance here appears to have allowed *Pteridium aquilinum* to become established. *Rosa spinosissima* is tall and quite dense in places. Most of the site is relatively undisturbed, but there is damage in the vicinity of the path leading from the access point to the beach. During the CMP, Structure and Functions were assessed as Unfavourable-Inadequate because of rank vegetation, *Pteridium aquilinum* and the number of large blowouts. Structure and Functions were assessed as Unfavourable-Inadequate (stable) during the SDM.

Future Prospects

Four negative impacts affect the ***2130 Fixed dunes (grey dunes)** at Mizen Head: invasive native species, trampling, non-native species and livestock feeding. Horse grazing has a positive effect on the habitat. During the CMP, Future Prospects were assessed as Favourable because horse grazing was expected to tackle the encroachment of problematic species. Although horses have had a positive impact, they are restricted to the northern part of the site and selectively graze herbaceous vegetation. Other impacts recorded during the CMP included abandonment of pastoral systems, modification of cultivation practices, paths and tracks, the golf course, walking, erosion and invasion by *Pteridium aquilinum*. Future Prospects were assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

Conservation assessment

Area was assessed as Favourable (stable), Structure and Functions were assessed as Unfavourable-Inadequate (stable) and Future Prospects were assessed as Unfavourable-Inadequate (deteriorating) during the SDM. The conservation status was assessed as Unfavourable-Inadequate during the CMP because Structure and Functions were assessed as Unfavourable-Inadequate while Area and Future Prospects were assessed as Favourable. The conservation status of ***2130 Fixed dunes (grey dunes)** was assessed as Unfavourable-Inadequate (deteriorating) during the SDM.

2.2.5 2170 Dunes with creeping willow

The area of **2170 Dunes with creeping willow** was underestimated in the field in 2011, due to the fragmentary nature of the habitat, and as the area was thought to be below the minimum monitoring area (Delaney *et al.*, 2013) no monitoring stops were carried out. It was found as fragmented patches close to dune slacks with a total area of 0.07 ha, and the maturity of the habitat suggested that it was most likely to have been present during the baseline survey. Horse grazing was recorded as a

positive impact over the entire habitat and scrub encroachment was recorded as a negative impact affecting 20% of the habitat.

2.2.6 2190 Humid dune slacks

The largest area of **2190 Humid dune slacks** at Mizen Head occurs in the north of the site, close to the river separating the site from the golf course. The biggest slack is of interest as it contains indicators of salinity, particularly *Juncus acutus*. The river was running quite close to the top of the bank on the day of survey. It is possible that during particularly high tides, the river overflows the banks and results in an influx of saltwater. Alternatively, water abstraction may have resulted in saltwater rising close to the surface in the largest slack as the freshwater lens is depleted. Freshwater was present in the south-western part of the slack on a site visit in early autumn. None of the other slacks contain indicators of salinity.

Area

The area of **2190 Humid dune slacks** has not changed since the baseline survey. During the CMP, Area was assessed as Favourable. **2190 Humid dunes slacks** were assessed as Favourable (stable) during the SDM.

Structure and Functions

All of the criteria passed in the Structure and Functions assessment with the exception of the criterion assessing the cover of scrub. Scrub was recorded at three of the four monitoring stops which were carried out. During the CMP, Structure and Functions were assessed as Unfavourable-Inadequate because of excessive cover of *Salix repens*. Structure and Functions were assessed as Unfavourable-Inadequate (stable) during the SDM.

Future Prospects

Negative impacts recorded at Mizen Head include rabbit damage, scrub encroachment and water abstraction. Parts of the slacks were overgrazed, but grazing also had beneficial effects by reducing the potential for scrub encroachment. During the CMP, Future Prospects were assessed as Unfavourable-Inadequate. This was partly due to damage associated with the horses and partly because of evidence that water was being extracted for the golf course. During the SDM, Future prospects were assessed as Unfavourable-Inadequate (stable).

Conservation assessment

Area was assessed as Favourable (stable), while Structure and Functions and Future Prospects were assessed as Unfavourable-Inadequate (stable). During the CMP, the conservation assessment was Unfavourable Inadequate. Conservation status of **2190 Humid dune slacks** was assessed as Unfavourable-Inadequate (stable) during the SDM.

3 DISCUSSION

3.1 Qualifying interests for SAC

The Natura 2000 standard data form for Buckroney-Brittas Dunes and Fen SAC (SAC 000729) records eight sand dune habitats as Qualifying Interests. These are shown in Table 5. **1210 Annual**

vegetation of drift lines, **2120 Marram dunes (white dunes)** and ***2150 Decalcified dune heath** were not found at Mizen Head in 2011. **1220 Perennial vegetation of stony banks** was ascribed representativity and conservation status scores of C, which reflect its poorly developed, disturbed character, although as it is now considered to be recovering from previous disturbance, its conservation status would be more positive than indicated in the Natura 2000 Standard Data Form. **2110 Embryonic shifting dunes** were given a conservation status of B in the Natura 2000 assessment form, while the habitat at Mizen Head was assessed as Favourable during the SDM. The difference between the SDM conservation assessment for habitats at Mizen Head and those in the Natura 2000 data is due to the inclusion of Brittas Bay within the SAC, where there is considerable amenity use of the habitat. The Natura 2000 assessments for ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** are more positive than the Unfavourable-Inadequate assessments given in the SDM would support. This cannot be explained by the inclusion of dune habitats at Brittas Bay and Pennycomequick as the dunes at Brittas Bay face considerable challenges and the area of dune habitat at Pennycomequick is relatively small.

Table 5. Relevant Qualifying Interests for Buckroney-Brittas Dunes and Fen SAC 000729 (NPWS, 1999)

Habitat	Area (%)	Representativity	Relative surface	Conservation status	Global assessment
1210 Annual vegetation of drift lines	1	B	C	B	B
1220 Perennial vegetation of stony banks	1	C	C	C	C
2110 Embryonic shifting dunes	2	A	C	B	B
2120 Marram dunes (white dunes)	4	B	C	B	B
*2130 Fixed dunes (grey dunes)	44	A	B	B	B
*2150 Decalcified dune heath	4	B	C	B	B
2170 Dunes with creeping willow	2	B	C	B	B
2190 Humid dune slacks	2	A	C	A	A

3.2 Invasion by scrub and *Pteridium aquilinum*

Expansion of scrub species and *Pteridium aquilinum* threaten the diversity of the sand dune habitats and contribute to the depletion of groundwater. Scrub species recorded at the site include *Salix cinerea* and *Rosa spinosissima*. When well-grazed, *Rosa spinosissima* can exist as part of a species-rich sward, however, a lack of grazing has allowed it to become tall and scrubby in parts of the site. *Salix cinerea* is associated with the dune slacks in particular, and can accelerate drying out of the habitat.

3.3 Grazing

During the SDM, grazing appeared to be limited to the northern part of the site, and only horses and ponies were present. Mixed grazing can be beneficial in tackling scrub invasion. The herd was excluded from much of the sensitive **2190 Humid dune slacks** habitat, but there was evidence that they were preferentially grazing the parts of the dune slack which they could access. Parts of the site which were not grazed at the time of survey would benefit from management.

3.4 Amenity use

Although the dunes at Mizen Head are primarily managed for conservation, amenity is a secondary land-use here. Visitor numbers are limited as there are no large caravan parks nearby or car-parks for

the site. There is some damage in the centre of the site, where visitors walk from the main access point to the beach and there are signs of trampling in the front dune ridge. The current level of amenity use has had a limited negative effect on the structure of the ***2130 Fixed dunes (grey dunes)** and this should be monitored in future. Boardwalks have successfully reduced erosion due to trampling at other sand dune sites (e.g. Maghera, Co. Donegal) and this may be beneficial at Mizen Head.

3.5 Water abstraction

Surface water is abstracted for the European Golf Course both from the stream at Buckroney, Mizen Head and from a reservoir upstream of the dunes. Groundwater is also abstracted for domestic use in the vicinity of the dunes and fen (Anon, 2011). Both of these activities affect the hydrological functioning of the site and groundwater abstraction in particular affects the Structure and Functions of the **2190 Humid dune slacks**.

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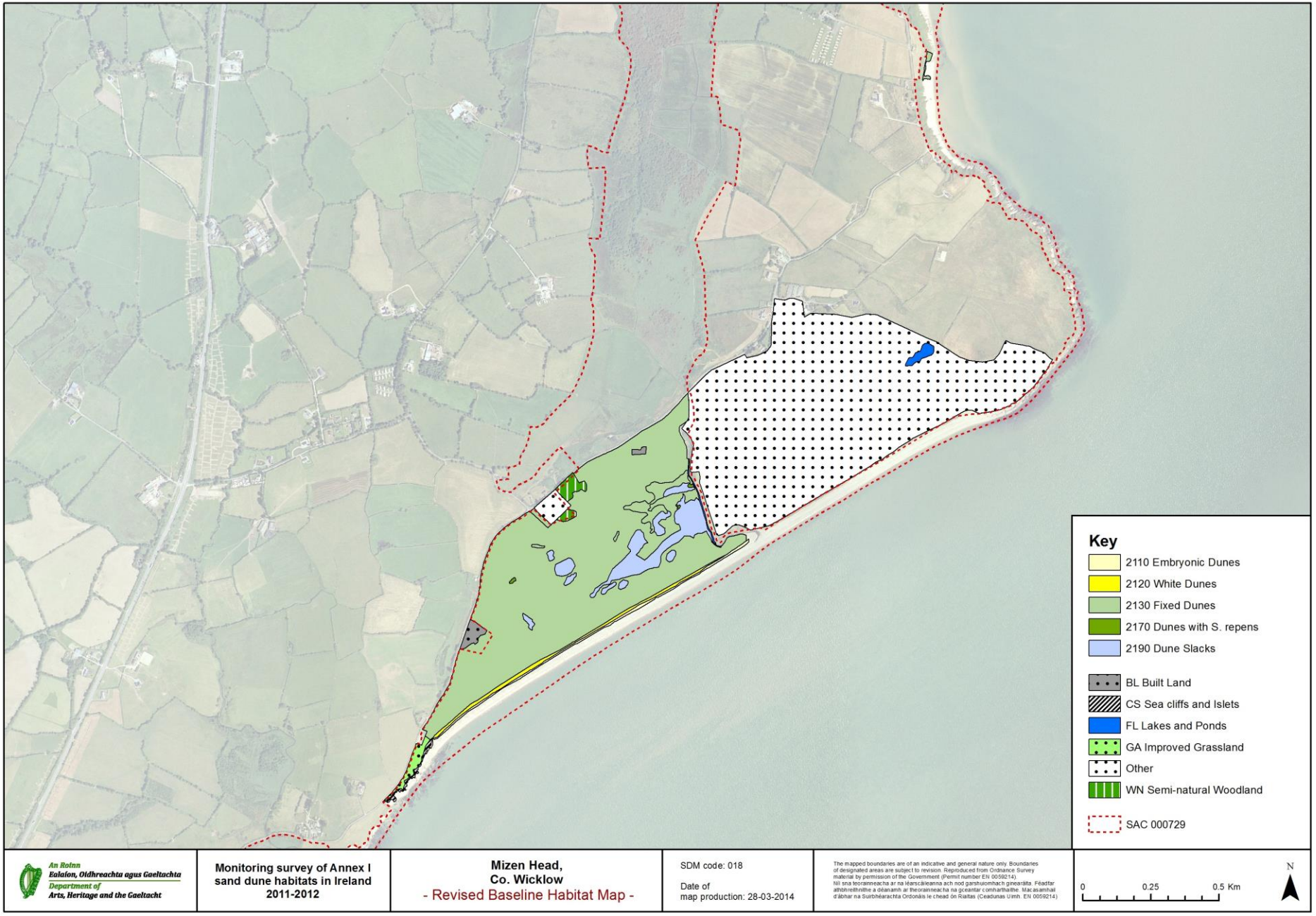
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2190 Dune Slacks
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CS Sea cliffs and Islets
FL Lakes and Ponds
GA Improved Grassland
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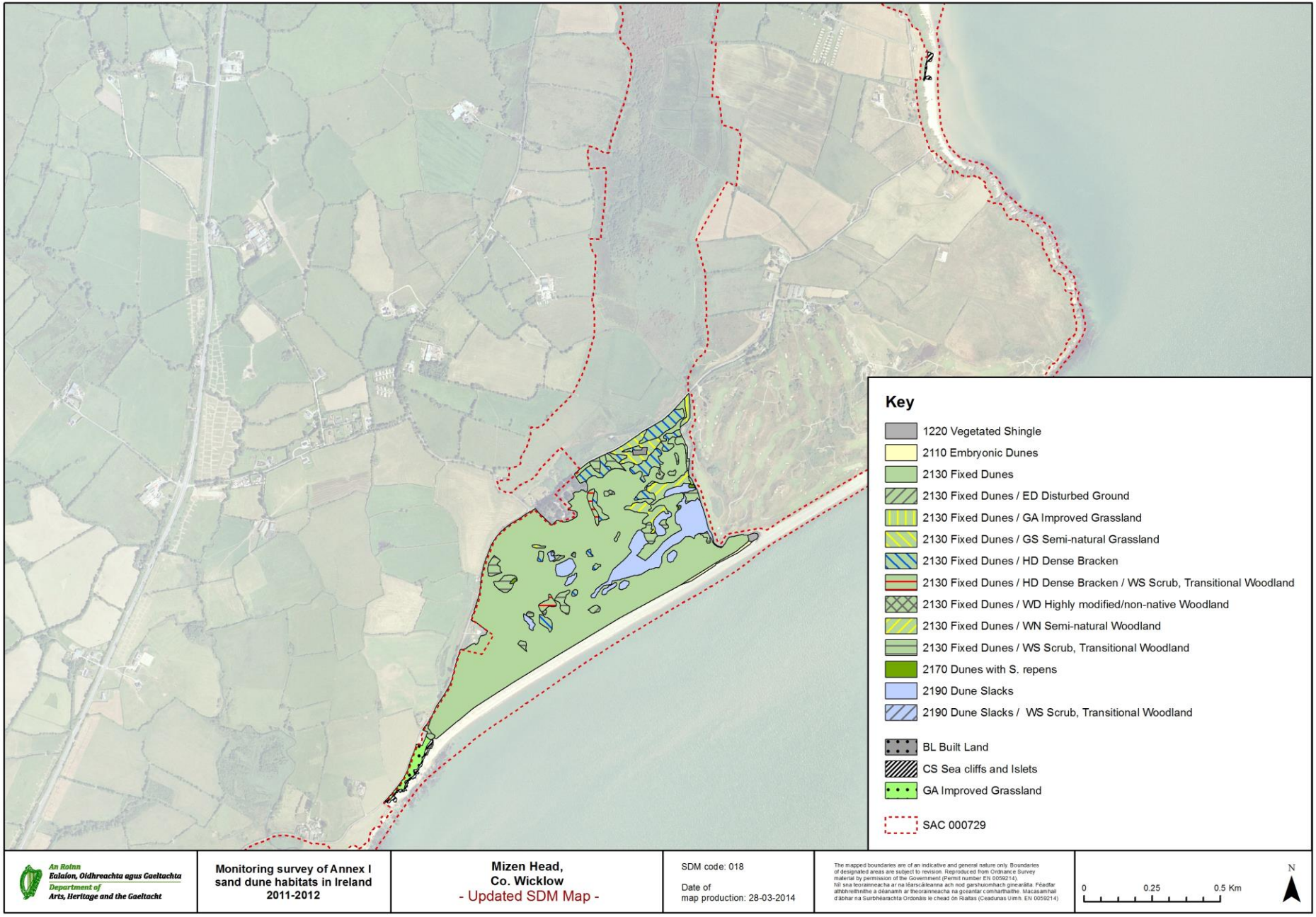
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2130 Fixed Dunes / ED Disturbed Ground
2130 Fixed Dunes / GA Improved Grassland
2130 Fixed Dunes / GS Semi-natural Grassland
2130 Fixed Dunes / HD Dense Bracken
2130 Fixed Dunes / HD Dense Bracken / WS Scrub, Transitional Woodland
2130 Fixed Dunes / WD Highly modified/non-native Woodland
2130 Fixed Dunes / WN Semi-natural Woodland
2130 Fixed Dunes / WS Scrub, Transitional Woodland
2170 Dunes with S. repens
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SDM code: 018
Date of map production: 28-03-2014
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach gineárálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail dábhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadúnas Uimh. EN 0059214)
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Appendix V – Pennycomequick site report and habitat map from the Coastal Monitoring Project (Ryle *et al.*, 2009)

PENNYCOMEQUICK

SITE DETAILS

CMP04 site name: Pennycomequick **CMP04 site code:** 019 **CMP Map No.:** 18

County: Wicklow **Discovery map:** 62 **Grid Reference:** T 294 794

6 inch Digital Maps: WI 036 & 041

Aerial photographs (2000 series): O4312-D; O4313-C; O4370-B

NPWS Site Name: Buckroney – Brittas Dunes and Fen

NPWS designation: **NHA:** 000729 **cSAC:** 000729

Other designation:

Ranger Area: Wicklow

MPSU Plan: Draft 2, May 2004

Report Author: Tim Ryle

SITE DESCRIPTION

Pennycomequick is one of three contiguous sites, the others are Mizen Head (CMP site 018) and Brittas Bay (CMP site 017), that collectively have been proposed for designation as a single candidate Special Area of Conservation – cSAC 000729 Buckroney-Brittas Dunes and Fen. The cSAC was proposed for the quality and range of a number of intact coastal and fen habitats, along with the occurrence of some rare and/or protected plant species, both in terms of local and national importance.

Notable species that have previously been recorded include *Saxifraga granulata* (meadow saxifrage), *Epipactis phyllanthes* (green-flowered helleborine), *Ornithopus perpusillus* (bird's-foot), *Vicia lathyroides* (spring vetch), *Galium uliginosum* (fen bedstraw) and the fern *Thelyptris palustris*. They were not recorded in 2004, as it known that they are generally associated with the Fen, further north of Pennycomequick at Buckroney. The presence nationally rare wild asparagus (*Asparagus officinalis* var. *prostrates*) was confirmed for Brittas and Mizen Head only, although it is not known if it was previously found at Pennycomequick.

Pennycomequick is the least extensive of the three coastal sites and extends from Pennycomequick Bridge in the north to the townland of Johnstown North, a distance of approximately 1 kilometre. Arklow, some 4 kilometres to the south is the nearest town. There is a single small access point at the southern end of Pennycomequick. Wicklow County Council does not provide any facilities at Pennycomequick, other than the provision of a small, unmetalled carpark. The majority of resources are put into the upkeep of facilities at the Blue Flag beach at Brittas.

Along this dune system, a small number of private/holiday homes and mobile homes front the beach. Bathing is not as popular here as Brittas, as much of the strand is composed of coarse sediment. The beach is used mainly by walkers and is also known for the quality of its beach fishing.

Pennycomequick is a mature dune system that is showing clear signs of decalcifying – characterised by the extent of bracken and gorse. An inventory of the coastal habitats recorded at Pennycomequick and their extent is listed in Table 19A. A small area of wet woodland (0.245ha) is recorded on sandy substrate alongside the dune slack, which would mean that the total sand dune resource at this site is approximately 13.319ha. Other ground that has been mapped - agricultural grassland, cliff and other, undefined habitats (Map 18) do not occur on sandy substrates.

Table 19A Areas of EU Annex I habitats mapped at Pennycomequick

EU Code	EU Habitat	Area(ha)
H1210	Annual vegetation of drift lines	0.483
H2110	Embryonic shifting dunes	0.354
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	0.698
H2130	Fixed coastal dunes with herbaceous vegetation	11.431
H2190	Humid dune slacks	0.108
	Total Sand dune	**13.074**
	Wet Woodland (on sandy substrate)	0.245
	Potential Sand dune habitat	**13.319**

Fixed Dunes (H2130)

Estimated to occupy 11.431ha, the fixed dunes occupy the greatest portion of the sand dune system at Pennycomequick (Table 19A). It is a mature dune system and owing to the general overgrown state of the vegetation and the relative paucity of typical fixed dune species, it is, however, of reduced ecological interest.

Typical species that were commonly recorded included *Ammophila arenaria* (marram), *Festuca rubra* (red fescue), *Galium verum* (lady's bedstraw), *Carex arenaria* (sand sedge), *Plantago lanceolata* (ribwort plantain) and *Lotus corniculatus* (common bird's-foot-trefoil).

Some of this land was farmed in the past, and the dereliction of the agricultural management through the removal of grazing has contributed to the unfavourable and extensive spread of *Pteridium aquilinum* (bracken) and scrub particularly at the back. Other negative indicator species include *Senecio jacobea* (common ragwort), *Equisetum arvense* (common horsetail) and *Rubus fruticosus* agg. (bramble), although neither of these species was as abundant as bracken. Confirming the maturity of the dune system, *Rosa pimpinellifolia* (burnet rose) was not uncommon.

However, despite the maturity of the system and the presence of a number of domestic dwellings with gardens in the southern half of the site, the threat of scrub encroachment of invasive or exotic scrub vegetation from private land was not significant.

Dune Slacks (H2190)

A single area of dune slack is located in a small depression in the centre of the Pennycomequick, surrounded by dense scrub. Small in extent, it is estimated to occupy 0.108ha (Table 19A). Species-poor and overgrown for the most part, the slack still had vestiges of its earlier wet growth phase.

Typical species include *Agrostis stolonifera* (creeping bent), *Galium palustris* (marsh bedstraw), *Potentilla anserina* (silverweed) *Filipendula ulmaria* (meadowsweet), *Lythrum salicaria* (purple

loosestrife) whilst *Salix arenaria* ssp. *repens* (creeping willow) was recorded around its edges. The negative indicator species *Rubus fruticosus* agg. (bramble) is invading.

Mobile Dunes (H2120)

The mobile dunes at Pennycomequick occupy a narrow band at the front of the glacial cliffs and beyond the headland, at the eroding face of the fixed dune. The total mobile dune area is 0.698ha (Table 19A).

The typical species *Ammophila arenaria* (marram) usually dominates, although its cover ranged from 20% to 75% of the monitoring stops. Other species that were recorded but with far less frequency include *Eryngium maritimum* (sea holly), *Hypochaeris radicata* (cat's ears), *Taraxacum* agg. (dandelion) and *Carex arenaria* (sand sedge). Although relatively floristically diverse, the flowering and fruiting component of the habitat was poor. Unhealthy generally *Ammophila* accounted for upwards of 5% of any monitoring stop. In addition, the mobile dunes are highly disturbed and floristic overlap was not uncommon. Some species typical of the fixed dune such as *Festuca rubra* (red fescue) and *Ononis repens* (common restharrow), which is indicative of erosion of the dune ridge.

Embryonic Dunes (H2110)

At Pennycomequick, the embryonic dune occurs as a narrow band along the northern half of the site. Occasionally the foredunes were recorded extending into the mobile dune, particularly in areas of bare sand.

The habitat is characterised by *Elytrigia juncea* (sand couch) although *Leymus arenarius* (lyme grass) was occasionally recorded. Other species included *Ammophila arenaria* (marram), *Carex arenaria* (sand sedge), *Eryngium maritimum* (sea holly) and *Euphorbia spp*. (spurge). Typically the vegetation cover was rarely complete and bare sand could account for up to 80% of a monitoring stop. Negative indicators species such as *Senecio jacobaea* (common ragwort) or *Cirsium arvense* (common thistle) were not recorded in this habitat.

Strandline (H1210)

The development of strandline vegetation at Pennycomequick is somewhat retarded owing to the uncompromising nature of the tides. Most of the strandline was recorded from the northern half of the site, where the beach is somewhat wider. Some deposition of tidal litter was noted at the opposite end of the beach. In total, the strandline is estimated at occupying less than 0.5ha (Table 19A).

Although not uncommon for this habitat, species diversity was poor and the strandline vegetation was characterised by the presence of the two distinctive species, namely *Cakile maritima* (sea rocket) and *Salsola kali* (prickly saltwort).

IMPACTS

Unlike Brittas Bay with its extensive dune system and wide open beach gold sand, Pennycomequick is mostly frequented by walkers and people interested in fishing. The main activities impacting on the sand dunes are given in Table 19C.

Like many sites surveyed in 2004 along the eastern coast, erosion (code 900) is a considerable threat to the front of the dune system at Pennycomequick. Both the strandline and embryonic dunes are regularly under threat from the storm tides, whilst occasional high tides create breaches in the mobile dunes. Vegetation is quick to re-establish here as evidenced by the occurrence of embryonic vegetation in gaps.

Table 19B Intensity and impact of various activities on sand dune habitats at Pennycomequick

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	141	B	-1	Unknown	Inside
H2130	403	C	-2	0.1	Inside
H2110	501	C	-1	Unknown	Inside
H2130	608	C	0	0.01	Inside
H2110	622	C	-1	Unknown	Inside
H2130	622	C	-1	0.1	Inside
H2110	900	B	0	Unknown	Inside
H2120	900	B	0	Unknown	Inside
H2130	954	A	-1	9.5	Inside

[1] EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.
[2] Description of activity codes are found in Appendix 5
[3] Intensity of the influence of an activity is rated as: A= high, B = medium, C = low influence and D = unknown.
[4] Impact is rated as: -2 = irreparable negative influence, -1 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence
[5] Location of activity: Inside = activities recorded within and directly impacting the sand dune habitat. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the sand dune habitat

In general, the abandonment of agricultural practices including grazing (code 141) has not benefited the status and floristic composition of the dune grassland at Pennycomequick. It is estimated that 85% or 9.5ha of the fixed dunes are infested with *Pteridium aquilinum* (bracken). A grazing regime similar to that already in place at Buckroney (Mizen Head, CMP site 018) is required.

The majority of people visiting the site tend to walk along the strand (code 622). Few venture into the overgrown fixed dunes. Notwithstanding this fact a number of tracks (code 501) were evident during the survey.

Dispersed habitation is a minor impact on the dune system (code 403). However, it would appear that a domestic dwelling had recently been built within the boundaries of the cSAC. While ordinarily this represents a loss of fixed dune habitat, the groundwork associated with the construction has cleared some of the bracken opening up a small part of the dune grassland. In addition, a number of caravans have been encamped within the northern end of the site (code 608). There are no facilities provided for them other than the nearby river.

CONSERVATION STATUS

The conservation status of a sand dune system is assessed on baseline information and on the condition of a site at the time of survey. Buckroney-Brittas is a nationally important site for its range of coastal habitats including the priority fixed dune habitat and the very rare - dune heath, and for its well-developed flora. There are a number of reports with which some comparisons can be made. The baseline information used for comparison was the NATURA 2000 database. It is difficult to compare

the present survey to the NATURA 2000 survey as ecological information applies to the sand dune system as a single unit rather than distinguishing them separately as was required for this project.

Overall, the sand dune system a Pennycomequick is of little conservation value, unless a management plan is enacted to tackle the decline in the condition and diversity of the sand dune system. The conservation status of the sand dune habitats for Pennycomequick is given in Table 19C, while Table 19D lists the number and outcome of the monitoring stops that were carried out at Pennycomequick.

Fixed Dunes (H2130)

The fixed dunes at Pennycomequick are also of little conservation worth and have previously been considered of moderate conservation worth in the NATURA 2000 survey. Although erosion is evident along parts of the dune system, it would appear that there has not been any significant loss of extent in the fixed dunes. However, there has been some clearance of land associated with a house that had been constructed within the confines of the cSAC boundary. The extent of the fixed dunes is therefore rated as *unfavourable-inadequate* (Table 19C).

The structure and functions are rated as *unfavourable-bad* (Table 19C). Three of the four monitoring stops failed on structure and functions (Table 19D). This is largely due to the morphological maturity of the dunes and the agricultural dereliction of the system that has resulted in the extensive spread of bracken throughout the habitat.

The future prospects are *unfavourable-bad* (Table 19C). There can be no improvement of this habitat without a significant management regime being put in place to retard the decalcification of the dunes and the spread of bracken.

The overall EU conservation status assessment for the fixed dunes at Pennycomequick is *unfavourable-bad*, which corresponds to *destroyed-partially destroyed* under the proposed Irish assessment scheme (Table 19C).

Table 19C Conservation status of Annex I sand dune habitats at Pennycomequick

Habitat[1]	EU Conservation Status Assessment			Overall EU conservation status assessment	Proposed Irish conservation status system[2]
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**		
Fixed Dunes (H2130)		Extent	Structure & Functions / Future Prospects	**Unfavourable -Bad**	**Destroyed - Partially Destroyed**
Dune Slacks (H2190)	Extent		Structure & Functions / Future Prospects	**Unfavourable -Bad**	**Destroyed - Partially Destroyed**
Mobile Dunes (H2120)	Extent	Future Prospects	Structure & Functions	**Unfavourable -Bad**	**Destroyed - Partially Destroyed**
Embryonic Dunes (H2110)	Extent / Structure & Functions / Future Prospects			**Favourable**	**Favourable - Maintained**
Annual Strandline (H1210)	Extent / Structure & Functions / Future Prospects			**Favourable**	**Favourable - Maintained**

[1] EU Codes as per Interpretation Manual
[2] Ratings are Favourable (Enhanced, Maintained, Recovered, Declining), Unfavourable (Recovering, Unchanged, Declining) and Destroyed (Partially destroyed, Completely destroyed and Unknown)

Dune Slacks (H2190)

The general occurrence of a range of slacks within the Brittas-Buckroney dune system is indicative of a well-developed sand dune system. However, whilst extensive and well-developed slacks are found at both Mizen Head and Brittas, this is not so for Pennycomequick. A single slack was found in hollow amongst the largely decalcifying dune system. Its extent is rated as *favourable* however, as there is no indication that it has decreased in area (Table 19C).

The structure and functions are rated *unfavourable-bad*. Visually, the derelict nature of the vegetation coupled with the lack of grazing and relative paucity of dune slack species was borne out as one of the two monitoring stops failed (Table 19D).

The future prospects are *unfavourable-bad* for this small slack, as it is currently not managed and is becoming overgrown.

The conservation status of the dune slack is *unfavourable-bad* in light of the poor results for both the Structure and functions and the Future prospects. The conservation status of the dune slack is *destroyed-partially destroyed* (Table 19C).

Table 19D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Pennycomequick

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	1	3	**Unfavourable -Bad**
Dune Slacks (H2190)	1	1	**Unfavourable -Bad**
Mobile Dunes (H2120)	2	2	**Unfavourable -Bad**
Embryonic Dunes (H2110)	4	0	**Favourable**
Annual Strandline (H1210)	1	0	**Favourable**

Mobile Dunes (H2120)

The extent of the mobile dunes at Pennycomequick is rated as *favourable* (Table 19C). However, the mobile dunes are undergoing natural erosion, which coupled with little evidence of fresh sand coming into the frontline, is not ideal to maintain habitat extent.

The structure and functions parameter is rated as *unfavourable-bad*. A total of four monitoring stops were carried out in the habitat and two of those failed (Table 19D).

The future prospects of the mobile dunes at Pennycomequick are rated as *unfavourable-inadequate*. This is due to sediment starvation and the general decline in the condition of the habitat.

Originally the NATURA 2000 survey considered that the range and quality of the mobile dunes for the entire cSAC to be of average conservation value. Currently, the conservation status of the mobile dunes at Pennycomequick is *unfavourable-bad*. This rating is attributable to overall decline in the condition and extent of the habitat. The corresponding assessment under the proposed Irish conservation assessment scheme is *destroyed-partially destroyed* (Table 19C).

Embryonic Dunes (H2110)

The embryonic dunes are rated as *favourable* for extent at Pennycomequick, as they occurred along most of the front of the dune system (Table 19C).

Four monitoring stops were carried in the foredune habitat and all four stops passed (Table 19D). Floristically and structurally, the foredunes are well developed. The structure and functions are rated as *favourable* at this site.

The shoreline at Pennycomequick is subject to strong tidal currents, which appears to starve the beach of suitable sediment, which would hinder the successful expansion of embryonic dunes. However it would seem that the embryonic dunes recycle sand from eroded mobile dune ridge. Therefore the future prospects are considered *favourable.*

The overall conservation assessment of the embryonic dunes at Pennycomequick is *favourable* (Table 19C). This equates to *favourable-maintained* under the Irish conservation assessment scheme.

Strandline (H1210)

Despite its exposure to considerable tidal surges and the vagaries of annual vegetation, a well-developed strandline flora was recorded along a considerable stretch of the shingle beach. Therefore the strandline at Pennycomequick is rated as *favourable* for extent.

A single monitoring stop that was placed in the habitat passed (Table 19D). Thus the structure and functions are rated as *favourable*, as the monitoring stop was reflective of the condition and structure of the habitat (Table 19C).

The future prospects are rated as *favourable* in light of the likely persistence of the habitat at this site (Table 19C).

Under the EU conservation assessment, the strandline is rated as *favourable* which corresponds to *favourable-maintained* under the proposed Irish conservation assessment scheme (Table 19C).

Comhshaol, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government
National Parks and Wildlife Service

Coastal Monitoring Project 2004-2006

Pennycomequick

Buckroney-Brittas Dunes and Fen (SAC 729)

CMP code: 018

0 80 160 240 Meters

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