Barley Cove to Ballyrisode Point SAC (site code 1040)
Conservation objectives supporting document -coastal habitats

NPWS

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Please note that the opinions expressed in the site reports from the Saltmarsh Monitoring Project (SMP) 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 (2014). Conservation Objectives: Barley Cove to Ballyrisode Point SAC 001040. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

1 Introduction

Achieving Favourable Conservation Status (FCS) is the overall objective to be reached for all Annex I habitat types and Annex II species of European Community interest listed in the Habitats Directive 92/43/EEC (Commission of the European Communities, 2007). It is defined in positive terms, such that a habitat type or species must be prospering and have good prospects of continuing to do so.

Barley Cove to Ballyrisode Point SAC is situated on the Mizen Head Peninsula in the extreme south-west of County Cork. It straddles a 10km stretch of coastline from the Barley Cove inlet to Ballyrisode Point at Toormore Bay. The rock type is Old Red Sandstone and this displays a NE-SW folding which is especially visible at Crookhaven and Brow Head.

The site is particularly important for sand dunes and related habitats that occur at Barly Cove. A fine gradation of habitat occurs from the outer sandy beach through dunes and saltmarshes and then brackish lagoon. Of particular importance is the fixed dune habitat as this is a priority habitat on Annex I of the EU Habitats Directive and is one of the few examples in county Cork and South County Kerry. The dune system is of moderate size and relatively intact. It grades from an outer ridge of *Ammophila* dunes, through fixed dune hills and an extensive area of dune grassland. Long term erosion by the tidal river has reduced the sized of the dune system, though sand has been deposited elsewhere in the area.

The dunes merge with a substantial area of saltmarsh that supports both Atlantic and Mediterranean salt meadows. A fringe of glasswort (*Salicornia* species) occurs at the lowermost part of the saltmarsh and above the tidal river.

Shingle occurs mostly in sheltered coves within the site. At one location, sea kale (*Crambe maritima*), a Red Data Book species, occurs commonly on the shingle.

Barley Cove to Ballyrisode Point SAC (site code: 1040) is designated for a range of habitats including mudflats, vegetated shingle, saltmarsh, sand dunes and dry heath. The following six coastal habitats are included in the qualifying interests for the site (* denotes a priority habitat):

- Perennial vegetation of stony banks (1220)
- *Salicornia* and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (ASM) (1330)
- Mediterranean salt meadows (Juncetaliea maritimi) (MSM) (1410)
- Shifting dunes along the shoreline with *Ammophila arenaria* (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)*

The first habitat represents vegetated shingle, the next three are saltmarsh habitats and the last two are associated with sand dune systems, although all six of these habitats are found in close association with

each other. Annual vegetation of driftlines, embryo dunes and dune slacks have also been recorded at this SAC site (Ryle *et al*., 2009; Delaney *et al*., 2013). The known distribution of vegetated shingle is presented in Appendix I. The distribution of saltmarsh habitats is presented in Appendix II and sand dune habitats in Appendix III.

This backing document sets out the conservation objectives for the six coastal habitats listed above in Barley Cove to Ballyrisode Point SAC, which is defined by a list of parameters, attributes and targets. The main parameters are (a) Range (b) Area and (c) Structure and Functions, the last of which is broken down into a number of attributes, including physical structure, vegetation structure and vegetation composition.

The targets set for the **vegetated shingle** 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 & Wilson, 1999) and partly on the Sand Dunes Monitoring Project (Delaney *et al*., 2013), who recorded a small area (0.12ha) of vegetated shingle at Barley Cove.

The NSBS visited the following two sub-sites within Barley Cove to Ballyrisode Point SAC:

1. Barley Cove
2. South of Spanish Point, Crookhaven

During the NSBS, profiles and transects were recorded from each shingle beach and each site was assigned a crude High/Medium/Low interest ranking. A 'high interest' ranking denotes a site that is of high conservation value. The site may be of interest botanically or geomorphologically. A 'medium interest' ranking implies the site may be extensive but not of particular interest either botanically or geomorphologically. A 'low interest' ranking is reserved for small sites, highly damaged sites or sites that are of a very common classification. The vegetated shingle at Barley Cove was rated of low interest while shingle at south of Spanish Point, Crookhaven is rated of high interest owing to the presence of the large population of sea kale (*Crambe maritima*) (Moore & Wilson, 1999).

The habitat was not mapped at any of the sub-sites, but the vegetation was recorded, as were the human impacts and alterations at the site, which are useful tools for assessing the Structure and Functions of the site.

The Barley Cove sub-site is an unvegetated boulder strip on sand backed by low dunes. Lichens and vegetation are more or less absent indicating that the deposit gets washed by the sea quite frequently (Moore & Wilson, 1999).

South of Spanish Point, Crookhaven, consists of a cluster of small deposits of cobbles and boulders around a headland. It is a small but botanically diverse fringe deposit. This site is ranked of high interest owing to the presence of a significant population of sea kale (*Crambe maritima*) a Red Data Book species (Moore & Wilson, 1999).

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

The SMP surveyed, mapped and assessed a total of two sub-sites within Barley Cove Ballyrisode Point SAC (McCorry & Ryle, 2009):

1. Barley Cove
2. Dough

As part of the SMP detailed individual reports and habitat maps were produced for each sub-site and these are included in a set of Appendices to this document (Appendix IV and V). The conservation objectives for the saltmarsh habitats in Barley Cove to Ballyrisode Point are based on a combination of the findings of the individual reports for each of these sub-sites. There may be additional patches of saltmarsh present within the site, however, it is estimated that the two sub-sites as surveyed by the SMP represents the total area of saltmarsh within Barley Cove to Ballyrisode Point SAC.

The targets set for the **sand dune habitats** are based primarily on the results of the Sand Dune Monitoring Project (SDM) (Delaney *et al.*, 2013) and this document should be read in conjunction with that report. It is also recommended that this document be read in conjunction with the final report from the Coastal Monitoring Project (CMP) report (Ryle *et al*., 2009). The CMP was a comprehensive national baseline survey of all known sand dune systems in Ireland. The SDM reviewed and modified the methodology used during the CMP to map and assess the conservation status of dune habitats. A subset of 40 sites (including Barley Cove) were selected as a representative sample of the national dune resource for the SDM survey.

The distribution of sand dune habitats within Barley Cove to Ballyrisode Point SAC is presented in Appendix III. As part of the SDM, detailed individual reports and habitat maps (a revised baseline habitat map and an updated habitat map) were produced for all sub-sites and those for Barley Cove are included in Appendix VI.

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

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.

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, support 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. However, little is known about the distribution and nature of this habitat at this site.

3.1 Overall Objective

The overall objective for 'perennial vegetation of stony banks' in Barley Cove to Ballyrisode Point SAC is to 'maintain the favourable conservation condition'. This objective is based on an assessment of the current condition of the habitat under a range of attributes and targets. The assessment is divided into three main headings (a) Range, (b) Area and (c) Structure and Functions.

3.2 Area

3.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target for favourable condition is *'no decrease in extent from the established baseline'*. Bearing in mind that coastal systems are naturally dynamic and subject to change even within a season, this target is assessed subject to natural processes, including erosion and succession.

The current extent of this habitat in Barley Cove to Ballyrisode Point SAC is unknown, however, the National Shingle Beach Survey recorded the presence of vegetated shingle but did not map the extent at two sub-sites (Moore & Wilson, 1999):

1. Barley Cove
2. South of Spanish Point, Crookhaven,

A total area of 0.12ha of vegetated shingle was also recorded and mapped at Barley Cove during the Sand Dnes Monitoring Project (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 exact distribution of vegetated shingle within this SAC is unknown, although it has been recorded from a number of locations, which are indicated in Appendix I. Shingle in County Cork is typically found as small deposits (Moore & Wilson, 1999).

At the Barley Cove sub-site, there is an unvegetated boulder strip on sand backed by low dunes (Moore & Wilson, 1999).

At the south of Spanish Point, Crookhaven sub-site there is a cluster of small deposits of cobbles and boulders around a headland (Moore & Wilson, 1999)

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 Functionality and sediment supply

The health and ongoing 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.

The target is to maintain and restore where possible 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. At the Barley Cove site associated habitats include sand dunes, while at the 'South of Spanish Point, Crookhaven' site, transitions to intertidal shingle, rocky shore and cliff occur.

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 & sub-communities

The degree of exposure, as well as the coarseness and stability of the substrate determines species diversity. The shingle habitat in Barleycove to Ballyrisode Point SAC is known to support a typical flora for this habitat type.

At the Barley Cove sub-site, the shingle is mostly unvegetated with only rock samphire (*Crithmum maritimum*) and sea holly (*Eryngium maritimum*) recorded at the base of the dunes by the NSBS. The shingle at 'South of Spanish Point, Crookhaven' is botanically diverse and includes spear-leaved orache (*Atriplex prostrata),* common cleavers (*Galium aparine),* radish *(Raphanus raphanistrum),* bramble *(Rubus fruticosus),* sea mayweed *(Tripleurospermum maritimum),* white clover *(Trifolium repens),* birds foot-trefoil *(Lotus corniculatus),* silverweed *(Potentilla anserina),* black knapweed *(Centaurea nigra),* sea-kale *(Crambe maritima),* rock samphire *(Crithmum maritimum)* and herb robert *(Geranium robertianum).* The population of sea-kale *(Crambe maritima)* dominates the vegetation and probably represents the finest *Crambe* site in the county. Lichens were also present at this sub-site (Moore & Wilson, 1999).

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*).

No negative species were recorded by the NSBS or the CMP at subsites within this SAC (Moore & Wilson, 1999; Ryle *et al.,* 2009).

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 EU Habitats Directive (92/43/EEC):

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

The first three habitats (in bold) are listed as Qualifying Interests for Barleycove to Ballyrisode Point SAC. Detailed descriptions of each habitat in the two sub-sites recorded by McCorry & Ryle (2009) in Barley Cove to Ballyrisode Point can be found in Appendices IV and V.

The SMP surveyed, mapped and assessed a total of two sub-sites within Barley Cove to Ballyrisode Point SAC (McCorry & Ryle, 2009):

1 Barley Cove (Appendix IV)
2 Dough (Appendix V)

(Note: The SMP Dough sub-site is adjacent to the SDM and NSBS Barley Cove sub-site)

Barley Cove saltmarsh is located in south-east Cork, only 4.5km east of Mizen Head. The saltmarsh has an eastern aspect and is located at the head of a narrow inlet with an intertidal area known as White Strand. The inlet is sheltered from the open sea by the Crookhaven Peninsula. The saltmarsh is part of a lowlying coastal system that has developed between the peninsula and the mainland and therefore faces the sea on two sides. The system is dominated by sand dune habitats to the west of the saltmarsh. The saltmarsh habitat has developed on the eastern side adjacent to the more sheltered Crookhaven inlet at White Strand (McCorry & Ryle, 2009).

The Barley Cove saltmarsh is dominated by Atlantic salt meadows (ASM) and this habitat dominates the low-lying area situated to the west of the regional road. A very small patch of *Salicornia* flats is situated in a large bare salt pan found in this area. A narrow strip of Mediterranean salt meadows (MSM) habitat is found in the low-lying banks of the stream to the north of this area. Most of the MSM habitat is found along the northern shoreline of White Strand (McCorry & Ryle, 2009).

Dough saltmarsh is associated with the dunes system of the SDM Barley Cove sub-site. Saltmarsh and other coastal brackish and intertidal habitats have developed in a long tidal inlet behind the dunes. A large part of this intertidal inlet has been partially cut off by a causeway and minor road. The intertidal area to the east of

this road is known as Lissagriffen Lake and is classified as an artificial lagoon (Healy *et al.,* 2007; McCorry & Ryle, 2009).

At the Dough sub-site, the saltmarsh habitat is found on the landward side of the large sand dune system. Overall there are similar areas of Atlantic salt meadows and Mediterranean salt meadows at this site and a smaller amount of *Salicornia* flats in the tidal inlet. There are signs of a brackish gradient from north-east to south-west with brackish indicators becoming more frequent towards the north-east and east of the causeway (McCorry & Ryle, 2009).

4.1 Overall Objectives

The overall objective for '*Salicornia* and other annuals colonising mud and sand' in Barley Cove to Ballyrisode Point SAC is to '*maintain the favourable conservation condition'*.

The overall objective for 'Atlantic salt meadows' in Barley Cove to Ballyrisode Point SAC is to '*restore the favourable conservation condition*'

The overall objective for 'Mediterranean salt meadows' in Barley Cove to Ballyrisode Point SAC is to '*restore the favourable conservation condition*'.

This objective is based on an assessment of the current 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.

4.2 Area

4.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target is no decrease in extent from the 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.

Baseline habitat maps were produced for the saltmarsh in Barley Cove to Ballyrisode Point during the SMP. These maps are included with the individual site reports in the Appendices at the end of this document.

The total areas of each saltmarsh habitat within the SAC and the total area of the habitat within each sub-site as mapped by the SMP are presented in the following tables.

There are a number of differences in the figures below. Most of the differences can be explained by the fact that the SMP mapped the total saltmarsh resource at Barley Cove to Ballyrisode Point and not all of the saltmarsh mapped is contained within the SAC boundary. In addition, the total area within the SAC can be greater than given in the SMP as the SMP did not always include all mosaics when calculating their total areas. The following rules were applied when calculating the areas for the site's conservation objectives:

1. Where a polygon was identified as a mosaic of an Annex I habitat and a non-Annex I habitat, then the entire area was counted as the Annex I habitat.
2. Where a polygon was identified as a mosaic of two Annex I habitats, the area was divided 50:50 for each habitat.

Sub-site	**Total area (ha) of *Salicornia* mudflats (excluding mosaics) from SMP**	**Total area (ha) of *Salicornia* mudflats within SAC boundary (including mosaics)**
Barley Cove	0.004	0.00*
Dough	0.480	0.48
Total	**0.484**	**0.48**

*Salicornia flats were recorded in several salt pans within the ASM

Sub-site	**Total area (ha) of ASM (excluding mosaics) from SMP**	**Total area (ha) of ASM within SAC boundary (including mosaics)**
Barley Cove	0.783	0.72
Dough	5.495	5.15
Total	**6.278**	**5.87**

Sub-site	**Total area (ha) of MSM (excluding mosaics) from SMP**	**Total area (ha) of MSM within SAC boundary (including mosaics)**
Barley Cove	0.108	0.10
Dough	5.509	5.51
Total	**5.617**	**5.61**

The target for all three saltmarsh habitats is that their areas should be increasing, subject to natural processes, including erosion and succession.

4.3 Range

4.3.1 Habitat distribution

Saltmarsh is currently known to display a wide distribution throughout the site with concentrations at Dough (11.15ha) (Appendix II). Atlantic salt meadows is the dominant saltmarsh habitat recorded at the Barley Cove sub-site, however, there are more or less equal amounts of ASM and MSM at Dough.

The target is that there should be no decline or change in the distribution of these saltmarsh habitats, 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 habitats in Barley Cove to Ballyrisode Point 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.

The SMP noted that there were no indications of any significant loss of habitat due to land-use changes or erosion within the current monitoring period at the Barley Cove sub-site. However, there has been some infilling around the saltmarsh in the recent past which has affected a very minor area of saltmarsh (McCorry & Ryle, 2009).

At the Dough sub-site, the SMP noted that there has been an increase in extent of saltmarsh habitat during the monitoring period, owing to a colonisation of recently accreted sand within the tidal inlet. There has also been some loss of saltmarsh due to erosion by the tidal river but this has been more than compensated by the growth of the saltmarsh due to accretion (McCorry & Ryle, 2009).

The target is to maintain 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 main saltmarsh area at the Barley Cove sub-site has a variable topography and there are several low mounds and hollows present that display typical saltmarsh zonation. The saltmarsh topography within the ASM is well developed and there are salt pans and creeks present. Patches of *Salicornia* flats were recorded by the SMP within several of the salt pans within the ASM (McCorry & Ryle, 2009).

At the Dough sub-site, the saltmarsh is poorly developed within the ASM and there are few areas with typical mid-marsh salt pans and creeks (McCorry & Ryle, 2009).

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.

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. Unlike the case on the majority of Irish saltmarshes, ASM and MSM occur in more or less equal areas at Barley Cove to Ballyrisode Point. 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.

At the Barley Cove sub-site there is a transition to fixed dune type grassland along the upper saltmarsh boundary towards the west side of the main saltmarsh and along the northern and southern boundaries. There are also several sandy mounds within the saltmarsh area that support fixed dune grassland vegetation. These mounds represent a natural, unmodified transition from fixed dune to saltmarsh (McCorry & Ryle, 2009).

At the Dough sub-site the saltmarsh is well-developed and is part of a larger coastal system including a large sand dune system of notable conservation interest. The saltmarsh includes a significant area of *Salicornia* flats as well as a second rarer 1310 sub-type characterised by ephemeral saltmarsh vegetation with sea pearlwort (*Sagina maritima*) in the transition zone between the saltmarsh and the sand dunes. There is also a significant area of pioneer ASM saltmarsh due to accretion in the tidal inlet. The saltmarsh also includes brackish vegetation communities related to the development of the lagoon east of the causeway (McCorry & Ryle, 2009).

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.

At the Barley Cove sub-site the grazing intensity is low. The SMP noted signs of cattle poaching at the site without regular grazing. The site is also grazed by sheep though not at the time of survey (McCorry & Ryle 2009).

At Dough sub-site, grazing is having a significant impact. The sand dune system and adjacent saltmarsh is grazed as commonage and both sides of the tidal river show signs of heavy grazing pressure by cattle. The upper ASM adjacent to the sand dunes is also grazed by rabbits (McCorry & Ryle, 2009).

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 SMP noted heavy poaching damage in both the ASM and MSM at the Dough sub-site. At Barley Cove some signs of minor cattle poaching on the saltmarsh was noted by the SMP (McCorry & Ryle, 2009).

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

4.4.7 Vegetation composition: typical species & 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*).

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. 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 Barley Cove to Ballyrisode Point 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	*Plantago maritima*	*Armeria maritima*
Aster tripolium	*Atriplex portulacoides*	*Agrostis stolonifera*
	Aster tripolium	*Limonium humile*
	Spergularia sp.	*Glaux maritima*
	Suaeda maritima	*Seriphidium maritimum*
	Salicornia spp.	*Plantago maritima*
	Glaux maritima	*Aster tripolium*
		Juncus maritimus
		Triglochin maritima
		Blysmus rufus
		Eleocharis uniglumis
		Leontodon autumnalis
		Carex flacca
		Carex extensa

The saltmarsh at the Dough sub-site includes a significant area of *Salicornia* flats as well as a second rarer 1310 sub-type characterised by ephemeral saltmarsh vegetation with sea pearlwort (*Sagina maritima*) in the transition zone between the saltmarsh and the sand dunes (McCorry and Ryle, 2009)

4.4.8 Vegetation structure: negative indicator species

The only invasive and non-native species recorded on saltmarshes during the SMP was common cordgrass (*Spartina anglica*). This species was not recorded in Barley Cove to Ballyrisode Point SAC by the SMP (McCorry & Ryle, 2009) and there are no known historical records from the area (Preston *et al*., 2002).

The aim is that negative indicators such as *Spartina* should be absent or under control. However, as there are no known records of *Spartina*, the current target for this particular site is that it should be absent.

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. Machair is a specialised form of dune system that is only found on the northwest coasts of Ireland and Scotland. Transitional communities can occur between dune habitats and they may also form mosaics with each other. Dune systems are in a constant state of change and maintaining this natural dynamism is essential to ensure that all of the habitats present at a site achieve favourable conservation condition.

In Ireland, there are 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* (2120)**
- **Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) ***
- Decalcified dunes with *Empetrum nigrum* (2140) *
- Atlantic decalcified fixed dunes (2150) *
- Dunes with *Salix repens* (2170)
- Humid dune slacks (2190)
- Machair (21AO) *

The two habitats indicated in bold above are listed as Qualifying Interests for Barley Cove to Ballyrisode Point SAC. These habitats include mobile areas at the front, as well as more stabilised parts of dune systems. Annual vegetation of driftlines, embryonic shifting dunes and humid dune slacks have also been recorded at the Barley Cove sub-site (Ryle *et al*., 2009; Delaney *et al*., 2013).

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

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

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

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

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

The SDM surveyed one sub-site within Barley Cove to Ballyrisode Point SAC:

1. Barley Cove (Appendix VI)

Detailed descriptions from the Sand Dunes Monitoring Project (SDM) (Delaney *et al.,* 2013) of each sand dune habitat found at Barley Cove to Ballyrisode Point are presented in Appendix VI. A total of 23.84ha of Annex I sand dune habitat was mapped within Barley Cove to Ballyrisode Point SAC, of which 4.77ha represents habitats that are not listed as qualifying interests for this particular site (annual vegetation of driftlines, embryonic dunes and dune slacks).

5.1 Overall objectives

The overall objective for 'Shifting dunes along the shoreline with *Ammophila arenaria*' in Barley Cove to Ballyrisode Point SAC is to 'restore the favourable conservation condition'.

The overall objective for 'Fixed coastal dunes with herbaceous vegetation' in Barley Cove to Ballyrisode Point SAC is to 'restore the favourable conservation condition'.

These objectives are based on an assessment of the current 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 extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. A baseline habitat map was produced for the sand dune habitats at the Inchydoney sub-site in Barley Cove to Ballyrisode Point SAC during the Coastal Monitoring Project (CMP) (Ryle *et al*., 2009). During the Sand Dunes Monitoring Project (SDM) (Delaney *et al*., 2013), these baseline maps were checked and revised to account for changes in habitat interpretation and ommissions. Updated maps were then produced to reflect the current situation on the ground. The revised baseline habitat maps and updated habitat maps from the SDM are included with the individual site report in Appendix VI.

The total areas of each sand dune habitat within the SAC as estimated by Delaney *et al*. (2013) are presented in the second column of the following table.

Habitat	**Total area (ha) of habitat within SAC boundary**
Shifting dunes along the shoreline with *Ammophila arenaria*	0.64
Fixed coastal dunes with herbaceous vegetation	18.31
Total	**18.95**

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

There are three areas of sand dune in the SAC: the main sand dune system, the sand dunes fronting the golf course as well as the area to the west of Whitestrand.. The distribution of Annex I sand dune habitats within the SAC is presented in Appendix II.

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

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 Barley Cove to Ballyrisode Point 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, increasing biodiversity. The construction of physical barriers can interfere with the sediment circulation by cutting the dunes off from the beach resulting in fossilisation or over-stabilisation of dunes.

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

5.4.2 Vegetation structure: zonation

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

A range of coastal habitats occur at Barley Cove including saltmarsh and shingle (Moore & Wilson, 1999; Ryle *et al*., 2009; McCorry & Ryle, 2009; 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.

5.4.3 Vegetation structure: bare ground

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

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

5.4.4 Vegetation structure: vegetation height

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

The surveyed dunes are very heavily grazed by rabbits in parts, and both grazing and burrowing were observed to have a negative effect on the habitat structure in 2011 (Delaney *et al*., 2013).

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

5.4.5 Vegetation composition: plant health of dune grasses

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

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

5.4.6 Vegetation composition: typical species & sub-communities

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

The Barley Cove site supports a characteristic dune flora, details of which can be found in the site report from the SDM (Delaney *et al.,* 2013) which is included in Appendix VI. Rare elements of the flora that were previously recorded at the site include hairy birdsfoot-trefoil (*Lotus subbiflorus*) and pale dog-violet (*Viola lactea*) which are both Red Data Book Species (Curtis & McGough, 1988; Ryle *et al*., 2009).

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

5.4.7 Vegetation composition: negative indicator species

Negative indicators include non-native species (e.g. *Hippophae rhamnoides*), species indicative of changes in nutrient status (e.g. *Urtica dioica*) and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled.

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

The negative indicator species common ragwort (*Senecio jacobaea*) and creeping thistle (*Cirsium arvense*) are common throughout the fixed dunes at Barley Cove (Delaney *et al*., 2013).

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

5.4.8 Vegetation composition: scrub/trees

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

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.

6 References

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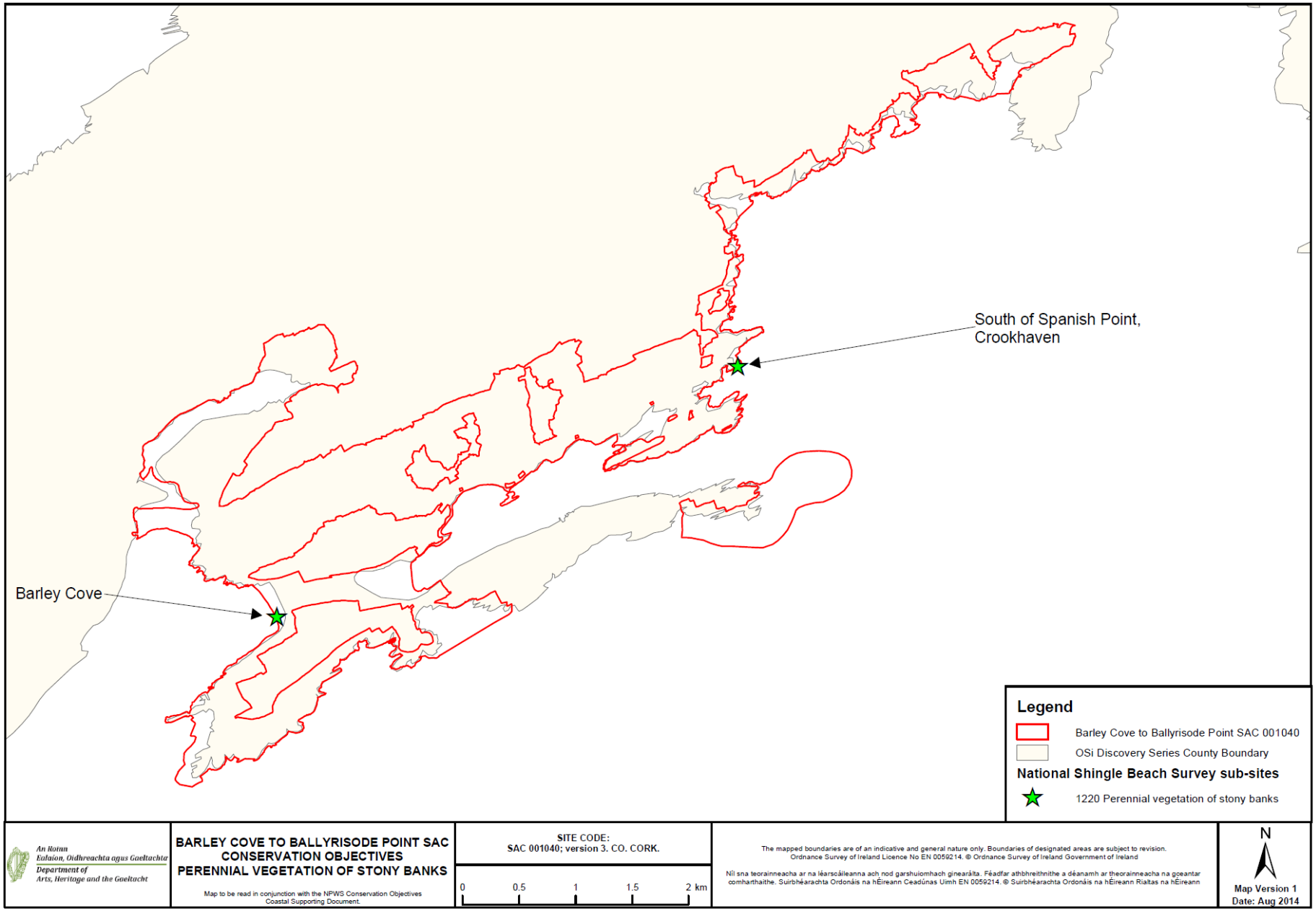
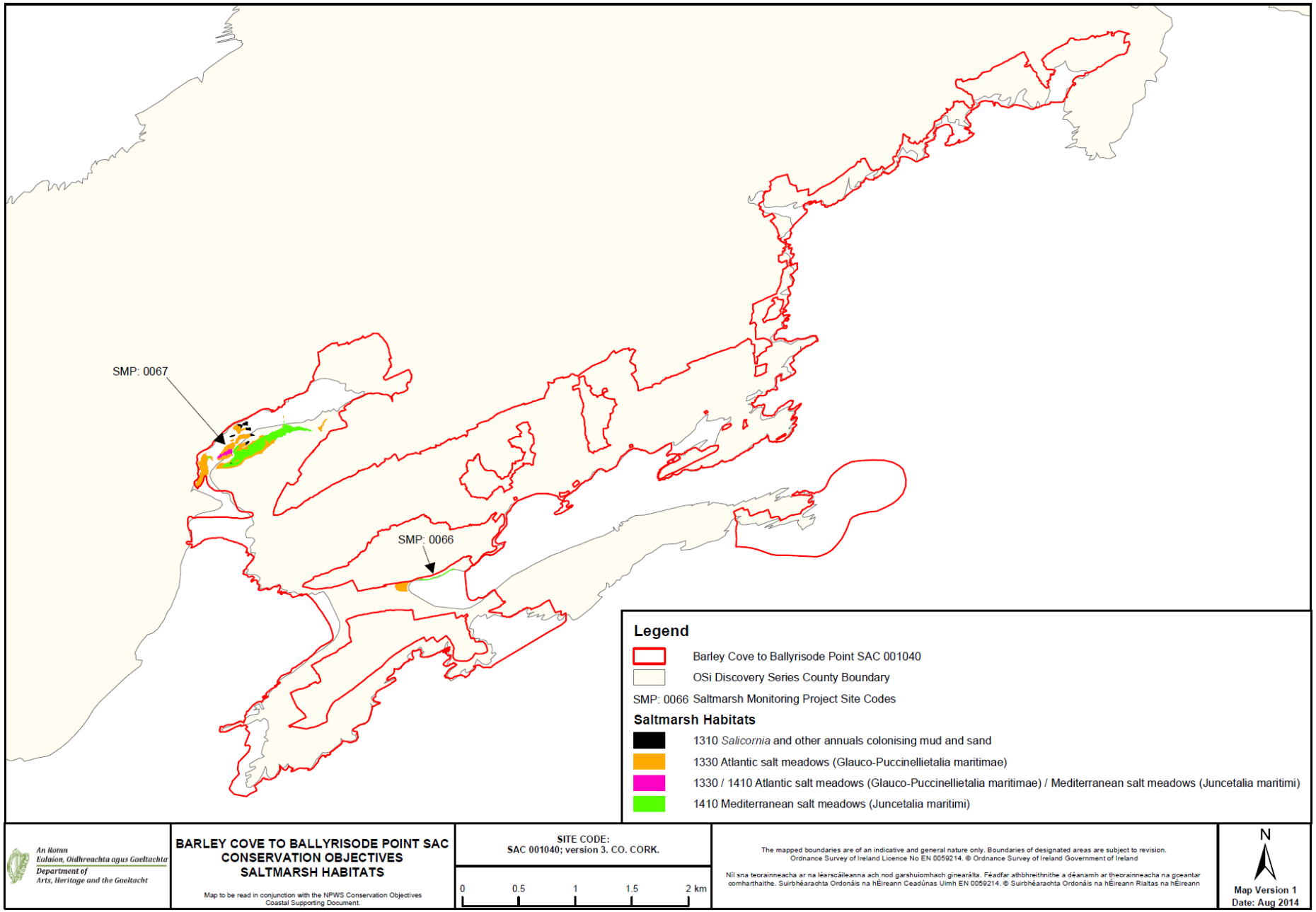
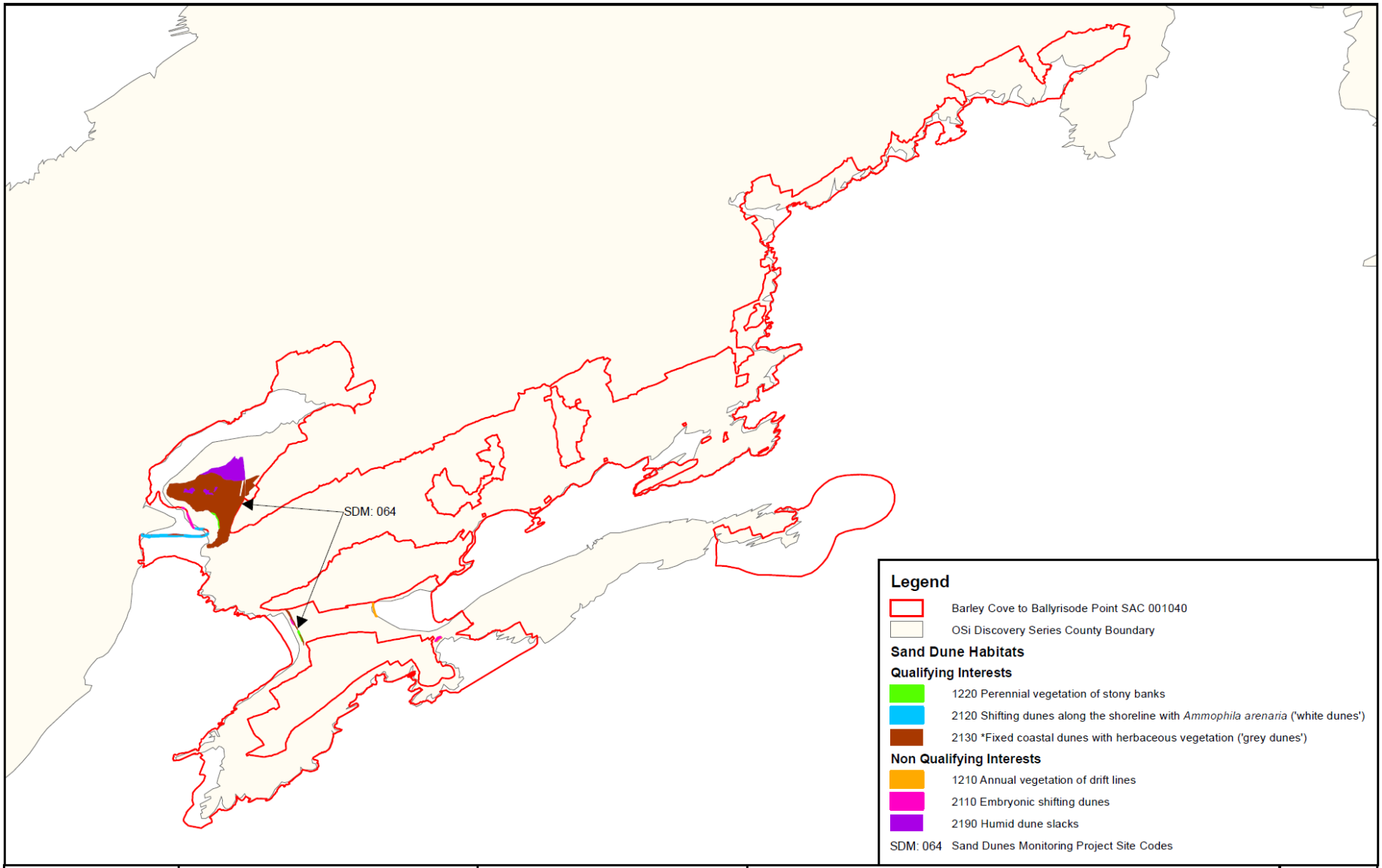
Appendix I – Distribution map of known shingle sites within Barley Cove to Ballyrisode Point SAC



Appendix II - Distribution map of saltmarsh habitats within Barley Cove to Ballyrisode Point SAC



Appendix III – Sand dune habitats distribution map within Barley Cove to Ballyrisode Point SAC



Appendix IV – Barley Cove site report and habitat map from the SMP (McCorry & Ryle, 2009)

1 SITE DETAILS

SMP site name: **Barley Cove**		SMP site code: **SMP0066**
Date of site visit **17/06/2008**		CMP site code: **64**
SM inventory site name: **Barley Cove**		SM inventory site code: **180**
NPWS Site Name: **Barleycove to Ballyrisode Point**		
NPWS designation	cSAC: **1040**	MPSU Plan: **old format plan available**
	pNHA: **1040**	SPA: **N/A**
County: **Cork**		Discovery Map: **88** Grid Ref: **078610, 024970**
Aerial photos (2000 series): **O 6804-B**		6 inch Map No: **Co 147, 152**

Annex I habitats currently listed as qualifying interests for Barleycove to Ballyrisode Point cSAC:

H1310 ***Salicornia*** **and other annuals colonizing mud and sand**
H1330 **Atlantic salt meadows (Glauco-Puccinellietalia maritimae)**
H1410 **Mediterranean salt meadows (Juncetalia maritimi)**

Other SMP sites within this SAC/NHA: **Dough**
Saltmarsh type: **Bay** Substrate type: **Sand**

2 SITE DESCRIPTION

Barley Cove saltmarsh is located in south-east Co. Cork, only 4.5 km east of Mizen Head. Barley Cove is actually a small bay with a south-western aspect to the west of this site that is located between Brow Head and Mizen Head. There is an extensive dune system at the back of this bay that is better known as Barley Cove. Saltmarsh associated with this dune system has been named Dough in the SM inventory (Curtis and Sheehy-Skeffington 1998).

Barley Cove saltmarsh actually has an eastern aspect and is located at the head of a narrow inlet with an intertidal area known as White Strand. This inlet is sheltered from the open sea by the Crookhaven Peninsula. The saltmarsh is part of a low-lying coastal system that has developed between this peninsula and the mainland and therefore faces the sea on two sides. This system is dominated by sand dune habitats to the west of the saltmarsh. An exposed cobble beach is situated on the western side of this system facing Barley Cove. Saltmarsh habitat has developed on the eastern side adjacent to the more sheltered Crookhaven inlet at White Strand.

The landscape of this area is dominated by moderate to steeply sloped hilly land, with steeper slopes to the north. The main habitats on the higher and steeply sloped land include exposed rock, wet grassland and marine heath. Much of this land has not been improved. Lower -lying land including some of the coastal system is dominated by a network of small fields containing a range of grassland types.

This site was also examined during the CMP in 2005. This survey mapped some vegetation on the cobble storm beach along the western shoreline of White Strand as perennial vegetation of stony banks (a sub site of the CMP site, Barley Cove).

Barley Cove caravan-park is located adjacent to the north-west of this site. A regional road (R591) that accesses Crookhaven been built on an embankment or ridge along the eastern shoreline. This road and embankment forms a barrier between a beach and intertidal sand flats in White Strand and other coastal habitat. A secondary road to the Mizen Head area crosses the coastal system. The main saltmarsh habitat has developed in a low-lying area between these two roads and behind the main embankment or ridge. The secondary road forms the southern boundary of this area. An access road to the caravan park marks the landward limit of the saltmarsh. A small stream flows off the adjacent hillside to the north and into White Strand. This stream flows under a bridge in the regional road and connecting channels still allow tidal inundation into the low-lying area containing the main saltmarsh habitat. A narrow band of saltmarsh has also developed along the northern shoreline of White Strand.

The majority of the site is located within the Barleycove to Ballyrisode Point cSAC and pNHA. This cSAC contains a range of coastal habitats including the larger sand dune system at Barley Cove and extensive rocky shore towards the east the sometimes develop into low cliffs. Three Annex I saltmarsh habitats have been listed as qualifying interests for this cSAC; *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are found at this saltmarsh.

Most of saltmarsh habitat mapped at this site is located within the cSAC boundary. However there are several small patches located outside the northern boundary. This is mainly due to the fact that saltmarsh habitat extends beyond the line used to draw the cSAC boundary. Therefore saltmarsh habitat was excluded in error.

The site was easily accessed from the adjacent roads.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is dominated by Atlantic salt meadows (Table 3.1). This Annex I habitat dominates the low-lying area situated to the west of the regional road. A very small patch of *Salicornia* flats is situated in a large bare salt pan found in this area. A narrow strip of MSM habitat is found along the low-lying banks of the stream to the north of this area. Most of the MSM habitat is found along the northern shoreline of White Strand.

The main saltmarsh area has a variable topography and there are several low mounds and hollows present that also display typical saltmarsh zonation. The substrate is muddy sand and this is exposed in some of the salt pans. Saltmarsh has developed on pure sand at the bridge over the stream.

There is a transition to fixed dune type grassland along the upper saltmarsh boundary towards the west side of the main saltmarsh and along the northern and southern boundaries. Some of the upper boundary has been modified in the past by the development of the access road to the caravan park. A low man-made

embankment marks a boundary along the northern side between the saltmarsh and the caravan park. There is some modified grassland adjacent to this saltmarsh boundary that may have been infilled in the past. The eastern boundary has also been modified by the development of the road along the embankment or ridge.

The upper saltmarsh boundary is difficult to distinguish in places as there is a subtle change in the vegetation composition. Species like Birdsfoot Red Clover (*Trifolium pratense*), (*Trifolium dubium*) and Ladies Bedstraw (*Galium verum*) within grassy vegetation dominated by Red Fescue indicate a transition to a terrestrial grassland type. There are also several sandy mounds within the saltmarsh area that also contains fixed dune grassland vegetation. These mounds represent a natural un-modified transition from fixed dune to saltmarsh habitat. Other species noted in the upper saltmarsh transitional area include False Fox Sedge (*Carex otrubae*), Curled Rock (Rumex crispus) and Sow-thistle (*Sonchus* sp.).

A narrow band of saltmarsh vegetation has also developed along the northern shoreline of White Strand. This shoreline is relatively steep and there is a low saltmarsh cliff about 0.5 high along the lower SM boundary. This saltmarsh vegetation is dominated by MSM. There is a transition along the upper boundary to wet grassland and some scrub. There is minor development of transitional vegetation along this boundary. This saltmarsh also contains some larger exposed rock boulders. The saltmarsh is positioned along a rocky shoreline at the lower SM boundary and this develops into intertidal sand flats further seaward.

Table 3.1. Area of saltmarsh habitats mapped at Barley Cove.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	0.004
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.783
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.108
	Total	**0.895**

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

3.2 *Salicornia* and other annuals colonizing mud and sand (H1310)

This habitat is poorly developed at this site and only covers a minor area. This habitat was recorded in several salt pans within the ASM, including one large area mapped during the survey. This habitat type is an example of pioneer saltmarsh vegetation at the site and may have developed due to disturbance to the large pan. Glasswort has colonised bare muddy substrate within these pans. The main pan is also being colonised by Common Saltmarsh-grass around the edges.

3.3 Atlantic salt meadows (H1330)

This habitat dominates the saltmarsh at this site. Several ASM communities are present and this site contains a good example of ASM zonation. The main community is a typical mid marsh community with Sea Plantain, Sea Pink and Sea Arrowgrass prominent, creating a naturally low sward (5 cm high). Other species present include Sea Aster, Saltmarsh Rush, Sea Milkwort, Red Fescue, and these species are found at low cover values. This community type also contains locally frequent Hard Grass (*Parapholis strigosa*) in places. A second mid marsh community with frequent Saltmarsh rush with Sea Plantain is also present. This community dominates the eastern section of the site. This area also contains some typical salt pans

(some containing *Salicornia* flats). It is drained by one main shallow drainage channel or creek that flows north along the road and meets the stream channel at the north-west corner of the site. Low marsh ASM communities are poorly represented. There is some Common Saltmarsh-grass-dominated vegetation along the edges of the main creek and salt pans in this area.

There is a notable transition from the mid marsh to upper marsh vegetation on ground that is at a somewhat higher elevation. This vegetation type is found on some low mounds. The upper saltmarsh vegetation is dominated by Red Fescue and has a tall sward (10-15 cm high). There are small amounts of Sea Plantain, Sea Pink, Creeping Bent, Distant Sedge (*Carex distans*) and Long-bracted Sedge, The upper marsh vegetation also contains some Hard Grass in places.

3.4 Mediterranean salt meadows (H1410)

This vegetation type is mainly found at the seaward side of the road and fringes the northern side of White Strand. A narrow band of saltmarsh vegetation, about 5 m wide, fringes the sand flats of White Strand. There is also a small patch of MSM along the stream and creek drainage channels in the north-west corner of the site. The MSM is poorly developed at this site.

The vegetation is dominated by Sea Rush. Other species present includes Red Fescue, Creeping Bent, Sea Plantain, Long-bracted Sedge, Sow-thistle (*Sonchus arvensis*), Spear-leaved Orache (*Atriplex prostrata*), Saltmarsh Rush, Common Scurvy-grass, Sea Pink and Sea Milkwort. This habitat is generally too narrow for significant zonation to develop. Some transitional terrestrial species are present in places, such as Silverweed (*Potentilla anserina*) and Sand Sedge (*Carex arenaria*). Some patches along this shoreline are quite grassy and ASM like. The saltmarsh vegetation forms a mosaic with rocky shore in places. There are few salt pans in this habitat.

4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities but the site is mainly in good condition (Table 4.1). There are signs of minor cattle poaching on the saltmarsh, although it is not likely to be grazed regularly by cattle (140). The site is also grazed by sheep, although it was not being grazed at the time of survey. The grazing intensity was low. The saltmarsh located along the northern side of White Strand is not being grazed. There are several electricity poles positioned on the saltmarsh (511). The saltmarsh has also been affected by the construction of an infilled drainage pipe across the saltmarsh in the recent past (512).

A caravan park is located adjacent to the north-west of the saltmarsh. The caravan park is positioned on dry coastal or fixed dune type grassland. An access road to this site marks the western extremity of the saltmarsh habitat. A low embankment adjacent to the saltmarsh also marks part of the north-western boundary of the saltmarsh. Both these boundaries are artificial and modified and there may have been some infilling of saltmarsh habitat in the past along these boundaries, but prior to the current assessment period. There are some signs of infilling along the southern boundary visible on the aerial photos (803) within the current monitoring period. This infilling was noted in the old format NPWS conservation plan. A minor amount of saltmarsh habitat is likely to have been infilled. This infilling may be related to dumping of construction and demolition waste.

There are no indications of any significant erosional trend at this site (900). The main saltmarsh area is protected by the embankment and regional road so it is quite sheltered. There are few signs of erosion in the narrow band of saltmarsh along the northern side of White Strand. A comparison of the OSI 2nd edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been no significant changes to the shoreline during this period. A comparison of the 1995, 2000 and 2005 OSI aerial photos also shows that there has been no measurable loss of saltmarsh habitat by erosion during the monitoring period.

Impacts and activities adjacent to the site include dispersed habitation (403), a caravan park (608), agriculture (102, 120, 140) and roads (502). The saltmarsh may be used for amenity such as walking but there are no signs of negative impacts from these activities. The impacts of infilling around the caravan park have already been assessed. These activities have little or no measurable impact on the saltmarsh habitats.

Table 4.1. Intensity of various activities on saltmarsh habitats at Barley Cove.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	C	0	0.004	Inside
1330	140	C	0	0.783	Inside
1330	511	C	0	0.001	Inside
1330	512	C	0	0.003	Inside
1330	803	C	0	0.001	Inside

[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.

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 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 the saltmarsh during the survey at this site. There is some information available about the condition of the site in the old format NPWS Conservation Plan.

Barley Cove saltmarsh is relatively small and has few features of significant conservation interest. The overall conservation status of this site is *favourable*. The saltmarsh is in good condition and is a good example of a small ASM-dominated site on a sandy substrate. There is some minor development of *Salicornia* flats in salt pans. The site is not grazed intensively, which is a positive feature. However, the main saltmarsh is somewhat enclosed by the adjacent roads and the caravan park. Much of the adjacent land around the boundaries of the saltmarsh has been modified. The CMP survey of this site assessed perennial shingle habitat (1220) adjacent to this site (in White Strand) as *favourable*.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor. There is very little low-lying wet grassland habitat or brackish habitat at a suitable elevation or topography for migration of saltmarsh habitat. The fixed dune habitat adjacent to the saltmarsh has been modified and much of the saltmarsh is surrounded by modified artificial boundaries or embankments.

Most of the saltmarsh is located within the cSAC. Therefore it should be protected from any land use changes or development that is licensed by local authorities. There is no NPWS conservation plan for this site.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Barley Cove.

Habitat	**EU Conservation Status Assessment**			
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Salicornia flats (1310)	Extent Structure and functions Future prospects			Favourable
Atlantic salt meadows (1330)	Extent Structure and functions Future prospects			Favourable
Mediterranean salt meadows (1410)	Extent Structure and functions, Future prospects			Favourable

5.2 *Salicornia* and other annuals colonizing mud and sand (H1310)

5.2.1 Extent

The extent of this habitat is assessed as *favourable*. Only a very small area of this habitat was mapped at this site. However, there are no indications of any loss of habitat due to land-use changes or erosion within the current monitoring period.

The Natura explanatory notes record that Salicornia flats habitat is extensive at Crookhaven, which is probably in this bay (White Strand), but there was no sign of any *Salicornia* flats ion the beach or sand flats.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. No monitoring stops were carried out in this habitat due to the limited extent of the habitat. However a visual assessment indicated that all the attributes required for the assessment of this habitat reached their targets. This habitat is poorly developed and is not found in its typical location seaward to the ASM. Glasswort has colonised several salt pans within the ASM including one large pan. The fringes of this salt pan are being colonised by Common Saltmarsh-

grass. This vegetation type is an example of pioneer saltmarsh vegetation within the saltmarsh. There are no impacts or activities significantly affecting this habitat.

5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts significantly affecting the *Salicornia* flats habitat at this site apart from grazing. Grazing disturbance may have been a positive influence on this habitat in the past by keeping the surface of the salt pans disturbed and suitable for pioneer colonisation by Glasswort. There are signs that these salt pans may be shrinking is size due to the colonisation of Common Saltmarsh-grass around its edges and the current grazing intensity is low.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any significant loss of habitat due to land-use changes or erosion within the current monitoring period. There has been some infilling around the saltmarsh in the recent past but this has only affected a very minor area of saltmarsh. There may have been more extensive infilling of saltmarsh prior to the current monitoring period but these impacts are not assessed.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Four monitoring stops were carried out in this habitat and all these stops passed. All of the attributes required for the structure and functions of this habitat reached their targets for this monitoring stop. The ASM habitat at this site is in good condition. There are few impacts or activities negatively affecting the ASM.

The species diversity is typical of this habitat. There are good examples of ASM zonation at this site including a mid marsh community with frequent Hard Grass, which is quite uncommon. The vegetation is influenced by the sandy substrate. The saltmarsh topography is well-developed and there are salt pans and creeks present. There are also low mounds and hollows within the ASM that develop the zonation of the habitat.

5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts significantly affecting this habitat at this site.

This habitat is found within the cSAC so land-use changes that are licensed by local authorities or by NPWS should be restricted. There has been some infilling around the site so the saltmarsh may be vulnerable to minor infilling in the future.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

The extent of this habitat is assessed as *favourable*. Only a very small area of this habitat was mapped at this site. However, there are no indications of any loss of habitat due to land-use changes or erosion within the current monitoring period.

5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. One monitoring stop was carried out in this habitat and this stop passed. All of the attributes required for the structure and functions of this habitat reached their targets for this monitoring stop.

This habitat is in relatively good condition. However it is poorly developed due to the relatively small extent of this habitat at this site. The species diversity of this habitat is typical. However the zonation is poorly developed. There is an unmodified transition to wet grassland along the upper MSM boundary. However this shoreline along the northern side of White Strand is relatively steep so the transitional zone is very narrow and the boundary is quite abrupt.

5.4.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts significantly affecting this habitat at this site. This habitat is found within the cSAC so land-use changes that are licensed by local authorities or by NPWS should be restricted.

6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site.

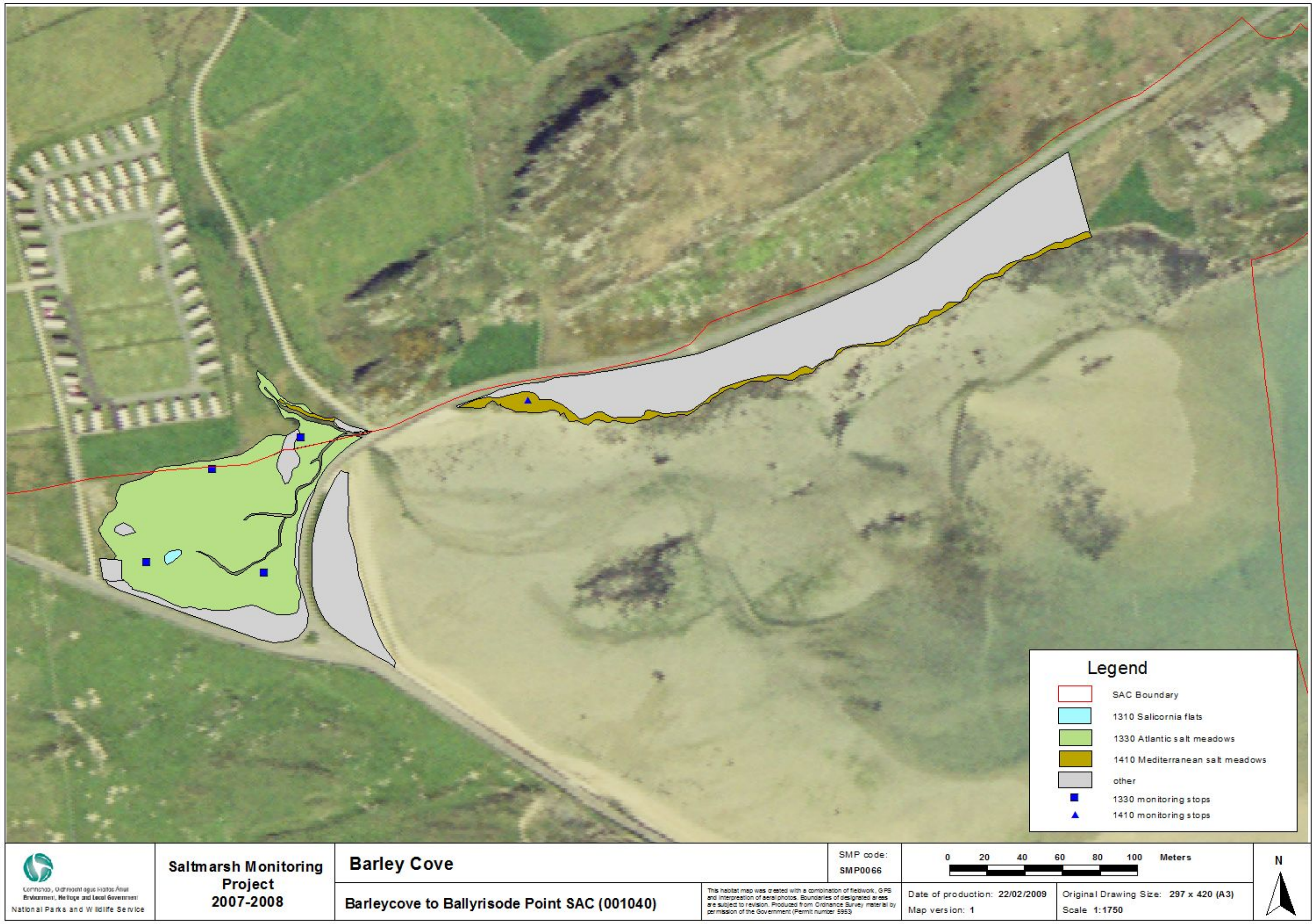
7 REFERENCES

Curtis, T.G.F.C. and Sheehy-Skeffington, M.J. (1998). The salt marshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.

8 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	0.004	0.004				
2	Spartina swards						
3	1330 Atlantic salt meadow	0.783		0.783			
4	1410 Mediterranean salt meadow	0.108			0.108		
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)	1.194					
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)						
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**2.089**	**0.004**	**0.783**	**0.108**		


Legend
SAC Boundary
1310 Salicornia flats
1330 Atlantic salt meadows
1410 Mediterranean salt meadows
other
1330 monitoring stops
1410 monitoring stops
Environment, Heritage and Local Government
National Parks and Wildlife Service
Saltmarsh Monitoring Project 2007-2008
Barley Cove
Barleycove to Ballyrisode Point SAC (001040)
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)
SMP code: SMP0066
0 20 40 60 80 100 Meters
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:1750
N

Appendix V – Dough site report and habitat map from the SMP (McCorry & Ryle, 2009)

SITE DETAILS

SMP site name: **Dough**		SMP site code: **SMP0067**
Date of site visit **18/06/2008**		CMP site code: **64**
SM inventory site name: **Dough**		SM inventory site code: **179**
NPWS Site Name: **Barleycove to Ballyrisode Point**		
NPWS designation	cSAC: **1040**	MPSU Plan: **old format plan available**
	pNHA: **1040**	SPA: **4156**
County: **Cork**		Discovery Map: **88** Grid Ref: **076970, 026080**
Aerial photos (2000 series): **O 6793-A,B,C,D**		6 inch Map No: **Co 152**

Annex I habitats currently listed as qualifying interests for Barleycove to Ballyrisode Point cSAC:

H1310 ***Salicornia*** **and other annuals colonizing mud and sand**
H1330 **Atlantic salt meadows (Glauco-Puccinellietalia maritimae)**
H1410 **Mediterranean salt meadows (Juncetalia maritimi)**

Other SMP sites within this SAC/NHA: **Barley Cove**
Saltmarsh type: **Lagoon** Substrate type: **Humus over sand**

SITE DESCRIPTION

Dough saltmarsh is located in south-west Co. Cork 4 km north-east of Mizen Head. Dough saltmarsh is part of the Barley Cove coastal system. A second site on the SM inventory (Curtis and Sheehy-Skeffington 1998) has confusingly been called Barley Cove saltmarsh and this is located further east adjacent to White Strand. Barley Cove is a small bay located between Mizen Head and Brow head. There is an extensive sandy beach and sand dune system located at the head of this bay. Saltmarsh and other coastal brackish and intertidal habitats have developed in a long tidal inlet behind these dunes. A large part of this intertidal inlet has been partially 'cut off' from the main area by a causeway and minor road. The intertidal area to the east of this road is known as Lissagriffen Lake and is classified as an artificial lagoon (Healy *et al.* 1997, NPWS 2007). This shallow lake is still intertidal and partially drained at low tide, although there are significant amounts of freshwater flowing into this shallow basin. Oliver (2005) classified the lagoon as an 'estuarine' type with a wide salinity range and prone to large inputs of saline water at one time. A wide intertidal river flows from the lake, drains the intertidal area and flows through the sand dune system into the bay.

The landscape of this area is dominated by moderate to steeply sloped hillsides around Barley Cove. The main habitats on the higher and steeply sloped land include exposed rock, wet grassland and coastal heath. Much of this land has not been improved. Lower-lying land including some of the coastal system is dominated by a network of small fields containing a range of grassland types.

Barley Cove is one of the most popular blue flag beaches in Cork and is frequented by day-trippers and holidaymakers during good weather. A hotel complex is located on the hill west of the site and there are paths and a bridge crossing the dunes and the river to allow access to the east side of the sand dune complex. There is a local road located close to the northern shoreline of the intertidal area. There is scattered habitation along the minor roads in this area.

The majority of the site is located within the Barleycove to Ballyrisode Point cSAC and pNHA. This cSAC contains a range of coastal habitats along this shoreline including extensive rocky shore towards the east that sometimes develop into low cliffs, and coastal heath on adjacent uplands. Three Annex I saltmarsh habitats have been listed as qualifying interests for this cSAC; *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are found at this saltmarsh. This site was also surveyed during the CMP in 2005 (Ryle *et al*. 2009). This survey mapped the vegetation of the sand dune system. The vegetation of the area has also been studied in detail by several other surveys including the Lagoon Survey (Healy *et al.* 1997). This report provides detailed descriptions of transects around the saltmarsh and lagoon and are very useful for monitoring purposes.

This site is notable for the presence of the second rarer Annex I *Salicornia flats* subtype (Sagino maritimae-Cochlearietum danicae) (Ephemeral saltmarsh vegetation with *Sagina maritima*). This vegetation community is generally associated with the transition from saltmarsh to sand-dune and has been recorded at several sites in Ireland (Wymer 1984, NPWS 2007b). This transition is usually very narrow (< 1 m wide but sometimes up to 5 m wide) and this plant community is associated with unstable substrate that is affected by erosion or accretion. The site is also notable for the presence of an extensive, fairly intact natural transition between the saltmarsh and the sand dune habitats and the development of extensive brackish and lagoon type vegetation towards the east of the site along the shoreline of Lissagriffen Lake.

Nearly all of saltmarsh habitat mapped at this site is located within the cSAC boundary. There is one section on the west side of the site that is positioned outside the boundary. This is due to changes in the shoreline topography due to erosion by the river and the exclusion of some coastal habitats on the west side of the river. The original shoreline was used to draw the cSAC boundary but this has now changed significantly.

SALTMARSH HABITATS

General description

The saltmarsh habitat is found on the landward side of the large sand dune system. Overall, there are similar areas of Atlantic salt meadows and Mediterranean salt meadows at this site and a smaller amount of *Salicornia* flats in the tidal inlet (Table 3.1). There are signs of a brackish gradient from north-east to south-west with brackish indicators becoming more frequent towards the north-east and east of the causeway. The majority of the Annex I saltmarsh habitat is found east of the causeway on the landward side of the large sand dune system.

East of the causeway

Saltmarsh can be found on both sides of the tidal river that flows through the dunes and into the bay. However, the largest habitat extent is found on the eastern side along the southern side of the shallow intertidal inlet and extends east to the causeway. This site has been classified as a 'Lagoon type' saltmarsh by Curtis and Sheehy-Skeffington (1998). Most of this saltmarsh has a sandy substrate with an organic layer on the surface of the more established saltmarsh. However, most of the saltmarsh habitat found west of the causeway is more typical of the 'sandflats' type.

There is a gentle gradient at the eastern side from adjacent damp fixed dune vegetation into the saltmarsh and onward into the intertidal area that is dominated by mud and sand flats. Most of this saltmarsh is MSM and is characterised by extensive Sea Rush (*Juncus maritimus*). There are some brackish indicators near the causeway with patches of Sea Club-Rush (*Bolboschoenus maritimus*) within the MSM and a band of Sea Club-rush also developing along the seaward boundary of the saltmarsh. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is very little saltmarsh habitat along the northern side of this intertidal area, as the shoreline is much steeper.

The adjacent dune vegetation has some elements of dune slacks in places and there is a relatively wide transition zone between the saltmarsh and the dune vegetation. The adjacent terrestrial vegetation was identified by the presence of species such as Birdsfoot (*Lotus corniculatus*), Glaucous Sedge (*Carex flacca*), Red Fescue (*Trifolium pratense*), Marsh Pennywort (*Hydrocotyle vulgaris*), Silverweed (*Potentilla anserina*), Black Bog-rush (*Schoenus nigricans*), Catsear (*Hypochaeris radicata*) and Bog Pimpernel (*Anagallis tenella*). This transitional vegetation also contains small amounts of Sea Rush and Saltmarsh Rush (*Juncus gerardii*). (It was noticeable that a line of driftline debris extended higher or landward of the area mapped as saltmarsh.) The upper boundary between the saltmarsh and the sand dune vegetation was difficult to identify in this area as there are subtle changes in the species assemblage. Some of the boundary is marked by a slight embankment (< 0.5 m high) in places

Further west, the sand dunes become taller and are vegetated with Marram. There is a more distinctive boundary between the saltmarsh and the sand dunes. The terrestrial dune vegetation is indicated by the presence of species such as Catsear, Birdsfoot, Sand Sedge (*Carex arenaria*) and increased moss cover in a sward dominated by Red Fescue (*Festuca rubra*) and Buck's-horn Plantain (*Plantago coronopus*). A band of ASM saltmarsh develops along the landward and seaward boundaries of the MSM and ASM becomes more prominent towards the western side of this area. There are several low-lying wide sandy 'islands' within the wide intertidal area where mainly ASM is developing. Some of these islands are also developing embryonic dune and fixed dune vegetation on elevated ridges they are positioned above the influence of the tide. Again there is a subtle difference between the fixed dune and the ASM vegetation. Pioneer saltmarsh vegetation is developing as these sandy islands are accreting. This includes some relatively large areas of *Salicornia* flats on the intertidal sand flats.

Saltmarsh on the western side of the river is dominated by ASM and has developed behind less-developed sand dunes formerly used as a golf course. There is a narrow fringe of non-Annex I brackish saltmarsh vegetation dominated by Sea Club-rush along the landward boundary of the ASM. The saltmarsh then transitions to mainly wet grassland and Gorse scrub along the landward boundary. There is a generally

steep saltmarsh cliff along the seaward boundary where the main river channel is eroding this area of saltmarsh and sand dunes.

West of the causeway

Saltmarsh habitat is also found east of the causeway around the fringes of Lissagriffen Lake. The area is more typical of the 'lagoon type saltmarsh' (Curtis & Sheehy-Skeffington 1998). This marginal vegetation is more brackish and non-Annex I saltmarsh habitat vegetation types are dominant. The largest area of saltmarsh is found along the south-west side of this lake where there is a gentle gradient from adjacent land into the intertidal area. The intertidal mud is covered with a band of Tasselweed (*Ruppia maritima*) in places along the saltmarsh. Some of this saltmarsh was classified as MSM and ASM. Most of the remaining marginal vegetation was dominated by tall Reeds including Common Reed (*Phragmites australis*), Sea Club-rush and smaller amounts of Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) (classified as CM2 or non Annex I saltmarsh). Other species present within these tall Reed stands include Sea Aster (*Aster tripolium*), Sea Plantain (*Plantago maritima*), Long-bracted Sedge (*Carex extensa*), Distant Sedge (*Carex distans*), Red Fescue, Spike Rush sp. (*Eleocharis* sp.), Bristle Club-rush (*Isolepis setacea*) and Brookweed (*Samolus valerandi*). There is also a significant area of brackish vegetation with a mixture of terrestrial wet grassland species and more typical salt marsh species.

The brackish influence of the vegetation diminishes along the landward side (southern gradient) and species like Yellow Flag (*Iris pseudacorus*) and Common Reed become more prominent. This vegetation type can be classified as wet grassland (GS4). Other species present include Brackish Water Crow-foot (*Ranunculus baudototii*), Sharp-flowered Rush (*Juncus acutiflorus*), Marsh Pennywort, Marsh arrow-grass (*Triglochin palustris)*, Purple Loosestrife (*Lythrum salicaria*), Lesser Spearwort (*Ranunculus flammula*), Black Bog-rush, Devils-bit (*Succisa pratensis*) and Marsh Ragwort (*Senecio aquaticus*).

There is a narrow fringe dominated by Sea Club-rush and/or Common Reed along the northern side of Lissagriffen Lake. The vegetation towards the eastern side of the lake is less brackish and more influenced by freshwater. Common Reed stands are prominent along the edge of the lake.

Table 3.1. Area of saltmarsh habitats mapped at Dough.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	0.480
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5.495
1410	Mediterranean salt meadows (Juncetalia maritimi)	5.509
	Total	**11.484**

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

Salicornia and other annuals colonizing mud and sand (H1310)

This habitat type is found in the wide tidal inlet north of the sand dune complex. There are several large patches of this habitat present on the sand flats. Some are associated with the accretion zones of low-lying sandy islands within this area. There are natural unmodified transition zones between pioneer ASM to the

Salicornia flats. The *Salicornia* flats vegetation is dominated by Glasswort (*Salicornia europaea* agg.*)* (5-20% cover). Other species occasionally present within this vegetation includes small patches of Common Saltmarsh-grass (*Puccinellia martima*), Sea Milkwort, Sea Plantain, Sea Arrowgrass and Annual Sea-blite (*Suaeda maritima*). There is also some green alga cover. These patches are grazed lightly in places.

There is also an additional patch of *Salicornia* flats within the MSM habitat. This patch has developed in a large bare salt pan that is heavily poached and disturbed by cattle. The *Salicornia* flats habitat has developed due to this disturbance, which is creating the conditions required for this pioneer vegetation. This vegetation type also transitions to pioneer ASM vegetation around the edges of this large salt pan.

A second rarer sub-type of this Annex I habitat characterised by the presence of Pearlwort (*Sagina* spp.) was noted at this site. This vegetation type was found at several locations on the site on both sides of the river. It was found in the typical transition zone between the saltmarsh and the fixed dune vegetation. The vegetation was characterised by prominent cover of Buck's-horn Plantain and Red Fescue. Other species present include Knotted Pearlwort (*Sagina nodosa*), Sand Sedge, Sea Milkwort (*Glaux maritima*), Sea Plantain, Hard Grass (*Parapholis strigosa*), Catsear and Long-bracted Sedge. This vegetation type also has some moss cover with several species present and there is also some bare substrate cover. The sward cover is quite short and some of the saltmarsh species are dwarfed due to heavy grazing. This community generally covered a very small extent and was sometimes distributed over a zone < 1 m wide and several metres long. This vegetation extended over a zone about 5-10 m wide at one location on the west side of the river.

Atlantic salt meadows (H1330)

This habitat is moderately well-developed at this site. There are several different zones present. There are also natural unmodified transitions to other coastal habitats including MSM, *Salicornia* flats and fixed dune vegetation. The saltmarsh topography is poorly developed and there are few areas with typical mid marsh salt pans and creeks. The ASM vegetation in the main saltmarsh area is relatively narrow. A band of lower marsh ASM is present along the seaward side of the MSM while there is a narrow band of upper marsh ASM along the landward side of the MSM, between the MSM and the dunes. The sward height is generally quite low due to heavy grazing and there are also other negative indicators such as bare substrate cover and occasional frequent green algal cover associated with the ASM.

The ASM found at the landward side of the main MSM area west of the causeway is species rich. This vegetation type contains frequent Red Fescue and prominent White Clover (*Trifolium repens*), Buck's-horn Plantain, Saltmarsh Rush, Long-bracted Sedge and Creeping Bent (*Agrostis stolonifera*) in various different locations. Other species present includes Sea Milkwort, Sea Plantain, Sea Pink (*Armeria maritima*), Distant Sedge, Autumn Hawkbit (*Leontodon autumnalis*) and Sea Arrowgrass (*Triglochin maritimum*). There is sparse cover of Sea Rush clumps within this band of saltmarsh vegetation. This ASM transitions to species rich damp fixed dune vegetation along the upper boundary.

ASM saltmarsh is also present on some of the low-lying 'islands' within the 'tidal' inlet. The extent of saltmarsh is expanding in this area. It is noticeable that some of these islands are not visible on the OSI 2000 series aerial photos but appear on the 2005 series aerial photos. The topography of these islands is

also poorly developed as this saltmarsh is relatively young. There are accretion ridges present on these island with significant areas of pioneer ASM saltmarsh dominated by patchy Common Saltmarsh-grass. Other species present include Glasswort, Sea Aster, Sea Milkwort, Sea Arrowgrass and Annual Sea-blite (*Suaeda maritima*). This community is characterised by the abundant bare sand cover that sometimes dominates the vegetation. There are natural transitions from this vegetation type to *Salicornia* flats. The more established saltmarsh has a complete sward cover of Common Saltmarsh-grass (*Puccinellia martima*). The more established islands also contain a transition to mid-upper saltmarsh vegetation dominated by Red Fescue and containing species such as Buck's-Horn Plantain and White Clover.

There is some pioneer ASM vegetation within the large MSM area. This vegetation type has developed in a badly poached area dominated by bare sand and is being colonised by Glasswort, Sea Arrowgrass, Common Saltmarsh-grass, Greater Sea-spurrey (*Spergularia media*) and Sea Milkwort. This area is vulnerable to poaching damage due to the sandy substrate. There is a subtle transition from this vegetation into *Salicornia* flats vegetation which the vegetation is dominated by Glasswort and the other saltmarsh species are absent.

The ASM found to the west of the tidal river contains scattered clumps of Sea Rush at low cover values. Much of this ASM has been classified as pioneer or lower marsh ASM. This is due to the extremely high level of disturbance to the vegetation and the frequent bare substrate cover. The heavy grazing levels seem to have affected the diversity of the vegetation in this area and a sward of Common Saltmarsh-grass is the most prominent vegetation type. There is also a second mid marsh vegetation type dominated by Sea Plantain present.

Mediterranean salt meadows (H1410)

The main area of MSM is found eastward of the causeway. This MSM is characterised by the dense cover of Sea Rush. Common Reed, Grey Club-rush and Sea Club-rush are spreading into this habitat near the causeway. This habitat also displays signs of heavy cattle grazing with significant poaching damage. This area of MSM also contains small patches of ASM vegetation or areas where Sea Rush is absent. The cover of Sea Rush is reduced towards the western end and there is a mosaic of scattered clumps of Sea Rush within mid marsh MSM.

There is some notable zonation within the MSM. The lower MSM nearer the intertidal flats is species poor while the upper MSM is species rich. The lower zone MSM also contains species such as Sea Milkwort, Sea Aster, Common Saltmarsh-grass, Saltmarsh Rush and Sea Arrowgrass. The cover of Sea Rush is noticeably higher and there is also frequent bare substrate cover. The upper zone MSM is grassier with greater cover of Sea Plantain, Red Fescue and Long-bracted Sedge. Other species present include Brookweed, Saltmarsh Rush and Creeping Bent. There are few salt pans within this area of MSM.

An ASM/MSM mosaic has developed on one of the low-lying islands in the tidal inlet. Scattered clumps of Sea Rush can be found within a sward dominated by Common Saltmarsh-grass.

MSM is also found to the east of the causeway along the southern side of the lake. This MSM is species rich and contains frequent brackish indicators. There is a narrow band of Sea Club-rush along the seaward side of this MSM on a gentle gradient into the intertidal area. The vegetation is still dominated by Sea Rush but

also contains Common Reed, Grey Club-rush and Sea Club-rush spreading through the rushes. Other species present include Sea Plantain, Saltmarsh Rush, Sea Aster, Long-bracted Sedge, Brookweed, Creeping Bent, Distant Sedge, Autumn Hawkbit, Red Fescue, Sea Milkwort, Common Saltmarsh-grass and Glasswort. The sward cover is quite damaged from cattle poaching. There is a transition on the landward side of this vegetation to stands dominated by Sea Club-rush and Grey Club-rush (classified as CM2). The MSM forms a mosaic with CM2 stands and with small patches of ASM characterised by the absence of Sea Rush in places.

IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities, of which grazing has the most significant impact (Table 4.1). The sand dune system and adjacent saltmarsh is grazed as commonage. Most of the saltmarsh on both sides of the causeway and on either side of the tidal river shows signs of heavy grazing pressure by cattle (143). Both the ASM and the MSM is heavily grazed and there is heavy poaching damage in both these habitats. Negative indicators such as a uniform extremely short saltmarsh sward (ASM), dwarfing of saltmarsh species, frequent green algal cover within the saltmarsh sward and bare substrate are frequently present. Some of the ASM is very disturbed and the disturbance pressure has affected the species assemblage and also affected the zonation with pioneer saltmarsh species prominent. Some of this ASM has > 75% bare sand cover in places. The damage to the MSM is unusual and indicates the especially heavy grazing pressure at this site. The upper ASM adjacent to the sand dunes is also grazed by rabbits.

There are several tracks across the saltmarsh that are used by vehicles (502). The main track is located in the transition zone between the saltmarsh and the sand dunes. There are also signs of vehicle damage to the saltmarsh substrate with frequent wheel ruts in places.

A small golf course (601) was formerly located on the sand dunes at the west side of the river (2005). This area is now grazed. Some of the dune grassland on the east side of the tidal river was also used as a caravan park in the past (608), but these have now been removed during the 1990s.

There is evidence of significant changes in the shoreline topography at this site. This includes both erosion (900) and accretion (910) of the saltmarsh. The tidal river is eroding the area of saltmarsh and sand dune along the western side of the river with tall salt marsh cliffs and dunes faces present. Cork County council has been concerned about erosion of the dunes by the river (CMP report) and took some mitigation measures including temporary fences and also burying long tubular bags of sand along the dune face.

There is growth of new saltmarsh within the tidal inlet in the recent past and this has more than compensated for any loss of saltmarsh habitat. Saltmarsh is developing in low sand islands within the tidal inlet and the presence of substantial pioneer ASM and *Salicornia* flats indicates that growth of saltmarsh is likely to continue. This is a recent phenomenon and saltmarsh is visible on the 2005 aerial photo series that was not visible in 2000. The lagoon survey (Healy *et* al. 1997) noted that Lissagriffin Lake was becoming shallower and was silting up. This indicates a trend changes in sedimentation towards the back of the coastal system.

A comparison of the OSI 2nd edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been significant changes to the shoreline, the position of the dunes and saltmarsh, and the profile of

the tidal river. During this period the sand dunes to the west of the river have grown in size and saltmarsh associated with this area has also developed. There has also been a significant loss of saltmarsh (about 4 ha) east of the causeway within the lagoon area. The causeway was constructed in the 19th century.

A comparison of the 1995, 2000 and 2005 OSI aerial photos also shows that there have also been visible changes in the saltmarsh profile. Between 1995-2000, the position of the tidal river where it flows into the sand dunes shifted towards the east. This lead to the erosion of a small amount of sand dune and saltmarsh habitat at the western end of the main saltmarsh area. Between 2000-2005, there has been a small loss of saltmarsh and sand dune along the western side of the river. About 3 m has been removed during to scouring along the river. However, there has been significant growth of new saltmarsh on low-lying 'islands' in the tidal inlet. There has also been some growth of saltmarsh along the seaward boundary of the main section of saltmarsh. About 1.5 ha of new ASM saltmarsh has developed. This may mean that sediment is being moved further north from the dunes into the tidal inlet. This shows that this site quite dynamic. The impact of erosion is assessed as neutral as there has been some accretion within the current monitoring period.

The site has been affected by development in this area in the past with the construction of the causeway having the most significant impact. It is likely that Annex I saltmarsh was more extensive east of the causeway in the past. The construction of the causeway created the lagoon and created more brackish conditions in this area.

Impacts and activities adjacent to the site include dispersed habitation (403), a caravan park (608) (now removed), a small golf course not in use at present (601), a hotel (600), agriculture (102, 120, 140) and roads (502). The saltmarsh may be used for amenity such as walking but there are no signs of negative impacts from these activities. These activities have little or no measurable impact on the saltmarsh habitats.

Table 4.1. Intensity of various activities on saltmarsh habitats at Dough.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	B	0	0.480	Inside
1310	910	B	+1	0.300	Inside
1330	143	B	-1	5.495	Inside
1330	502	C	-1	0.050	Inside
1330	900	C	0	0.100	Inside
1330	910	B	+1	1.500	Inside
1410	143	B	-1	5.509	inside

[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.

CONSERVATION STATUS

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 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 the saltmarsh during the survey at this site. There is some information available about the condition of the site in the old format NPWS Conservation Plan and also in the vegetation survey of the marginal areas around Lissagriffen Lake (Healy *et* al. 1997).

Dough saltmarsh is an important site and contains several features of significant conservation interest. The saltmarsh is well-developed and is part of a larger coastal system including a large sand dune system of notable conservation interest. The saltmarsh includes a significant area of *Salicornia* flats. A second rarer 1310 sub-type characterised by Ephemeral saltmarsh vegetation with *Sagina maritima* in the transition zone between the saltmarsh and the sand dunes is noted at this site. There is also a significant area of pioneer ASM saltmarsh due to accretion within the tidal inlet. The saltmarsh also includes brackish vegetation communities related to the development of the lagoon east of the causeway. However, its overall conservation status is *unfavourable-bad* and it is in poor condition due to the impacts of overgrazing.

The extent of saltmarsh has expanded during the current monitoring period. This is a quite dynamic site and has undergone significant changes in topography and the shoreline profile in the past 100 years. There are signs that the tidal inlet is accreting sediment in the recent past.

A comparison of the Lagoon vegetation survey to the current survey shows that there has been few changes to the vegetation in the past 10 years. The extent of Sea Club Rush along the margin of the main saltmarsh area has reduced in extent. However, the pioneer ASM community with sparse Common Saltmarsh-grass, the *Salicornia* flats Glasswort community and the mid-upper ASM community recorded along a transect (tA) across the saltmarsh were all still present at this location. There is also similar vegetation found in the saltmarsh to the east of the causeway (tD).

The CMP survey in 2005 assessed the status of the fixed dune habitat as *favourable*. The site was also assessed during a national conservation assessment of coastal lagoons for NPWS (NPWS 2007). Lissagriffen Lake was assessed as *unfavourable-inadequate*. The main impacts affecting the lagoon habitat were cattle poaching and eutrophication of the lake. The lake is also silting up. A camping and caravan site was located adjacent to the lake in the past. (NPWS 2007)

Table 5.1. Conservation status of Annex I saltmarsh habitats at Dough.

Habitat	EU Conservation Status Assessment			
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Salicornia flats (1310)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (1330)	Extent		Structure and functions Future prospects	Unfavourable - Bad
Mediterranean salt meadows (1410)	Extent		Structure and functions Future prospects	Unfavourable - Bad

Salicornia and other annuals colonizing mud and sand (H1310)

Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any loss of habitat due to land-use changes or erosion within the current monitoring period. In fact there has been an increase in the extent of this habitat during the current monitoring period. This is mainly due to colonisation of recently accreted sand within the tidal inlet. Information from the 1990's (Natura explanatory notes) stated that there were no extensive Salicornia flats at this site. However, Healy *et al*. (1997) did record some *Salicornia* dominated vegetation towards the west side of the main saltmarsh, where is has been mapped at present.

Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Three monitoring stops were recorded in this habitat and 2 stops passed. One stop failed within the MSM area due to heavy poaching. However, this heavy poaching damage is actually a positive influence for the *Salicornia* flats as it is creating suitable conditions for pioneer saltmarsh vegetation in this area. This area is actually quite small compared to the rest of the saltmarsh. The main *Salicornia* flats habitat is in good condition. It is grazed but there is minor poaching damage. The *Salicornia* flats are developing in accreting areas and there are unmodified natural transitions to pioneer ASM vegetation. Therefore the assessment is *unfavourable-inadequate* instead of *unfavourable-bad*.

A second rarer Annex I sub-type (Ephemeral saltmarsh vegetation with *Sagina maritima*) was recorded at this site. This vegetation type is found in the transition areas between the saltmarsh and the sand dunes. One monitoring stop was carried out in this habitat and it failed. This vegetation is heavily grazed, both by cattle and also by rabbits. The sward is very low in height and there is dwarfing of some saltmarsh species. This zone can be dynamic and subject to disturbance such as the movement of sediment. However at this site it is found on a gentle slope and there is very little naturally occurring bare sand. The presence of this habitat type enhances the overall conservation value of the site.

Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. The main *Salicornia* flats habitat is in good condition and is increasing in extent. However, this is a dynamic site and there may be reductions in extent in the future depending on changes in sedimentation patterns within the tidal inlet.

The second rarer sub-type is being damaged by heavy grazing. However, it covers a much lower area compared to the main *Salicornia* flats habitat, so this damage is less significant overall. This vegetation type is also ephemeral and subject to naturally high disturbance at times. This site is managed by Cork County Council and is located within an SAC so a grazing management plan should alleviate the damage caused by grazing.

Atlantic salt meadows (H1330)

Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any significant loss of habitat due to land-use changes or erosion within the current monitoring period. In fact there has been an overall increase in extent of this habitat during the current monitoring period. This is mainly related to the growth of saltmarsh within the tidal inlet due to accretion during this period. There has been a small loss of saltmarsh due to erosion by the tidal river during this period but this is more than compensated by the growth of the saltmarsh due to accretion.

Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Thirteen monitoring stops were carried out in this habitat and six failed (nearly 50%). There is due to heavy grazing pressure by cattle and also naturally heavy grazing by rabbits. Negative indicators such as high bare substrate cover, green algae cover, dwarfing of saltmarsh plants and a uniformly low sward height are frequently present. Some sections (west of the river) also show some impacts to zonation and the species assemblage. Heavy grazing is creating suitable conditions for pioneer species like Common Saltmarsh-grass, which dominates an area of saltmarsh that would more typically be covered with a mid marsh sward.

While most of the habitat is in poor condition to the ASM does contain some notable features of conservation interest. The habitat diversity is typical of ASM and there are several ASM communities present with typical zonation. The vegetation is influenced by the sandy substrate. There is also a brackish gradient at this site and some ASM is located along the lagoon shoreline and indicates brackish influence. There is a significant amount of pioneer ASM vegetation with patchy cover of Common Saltmarsh-grass. This vegetation type was also noted during the Lagoon survey (Healy *et al*. 1997) so accretion dates back to this time. There are natural unmodified transitions to other sand dune and other saltmarsh habitats. The saltmarsh topography is poorly developed but the relatively young age of some of the ASM should also be considered.

Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. The main impact affecting this site is heavy grazing. The County Council is likely to be managing grazing at this site. The CMP report

assessed the condition of the fixed dune as favourable, so the grazing pressure was less severe in the recent past. Cattle were not considered to be overgrazing the dune habitats during the CMP survey. Therefore there are prospects that the grazing pressure will be reduced in the future. There is no updated NPWS conservation plan for this site.

Mediterranean salt meadows (H1410)

Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any significant loss of habitat due to land-use changes or erosion within the current monitoring period. The MSM has not be affected by the recent expansion of saltmarsh at this site

Habitat structure and functions

The structure and functions of this site are assessed as *unfavourable-bad*. Six monitoring stops were carried out in this habitat and three failed. The MSM habitat is generally in poor condition and is being negatively affected by heavy grazing levels. Negative indicators such as high bare substrate cover and green algae cover are frequently present.

Other attributes are typical of this habitat. Species diversity is typical and the site displays a good example of zonation. There are unmodified natural transitions to other saltmarsh habitats and to dune habitats. There is also a brackish gradient at this site and a large area of MSM located to the east of the causeway has frequent brackish indicators present. The MSM forms a mosaic with other non-Annex I saltmarsh vegetation and with brackish wet grassland vegetation in this area.

Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. The main impact affecting this site is heavy grazing. The Lagoon conservation assessment also listed overgrazing as a negative impact affecting Lissagriffen Lake (NPWS 2007). The County Council is likely to be managing grazing at this site. The CMP report assessed the condition of the fixed dune as *favourable*, so the grazing pressure was less severe in the recent past. Cattle were not considered to be overgrazing the dune habitats during the CMP survey. There are prospects that the grazing pressure will be reduced in the future. There is no updated NPWS conservation plan for this site.

MANAGEMENT RECOMMENDATIONS

The main management recommendation is to lower the grazing intensity on the site. The saltmarsh habitat is especially vulnerable to overgrazing damage as it has a sandy substrate, so the sward surface is easily damaged. The high level of damage within the MSM is unusual and points to especially high grazing levels during 2008. This could be linked to heavy natural grazing levels by rabbits. It can be difficult to adapt a suitable grazing level that is beneficial for both the coastal saltmarsh habitats and the adjacent species rich coastal grassland. This is because cattle and sheep will prefer to graze saltmarsh.

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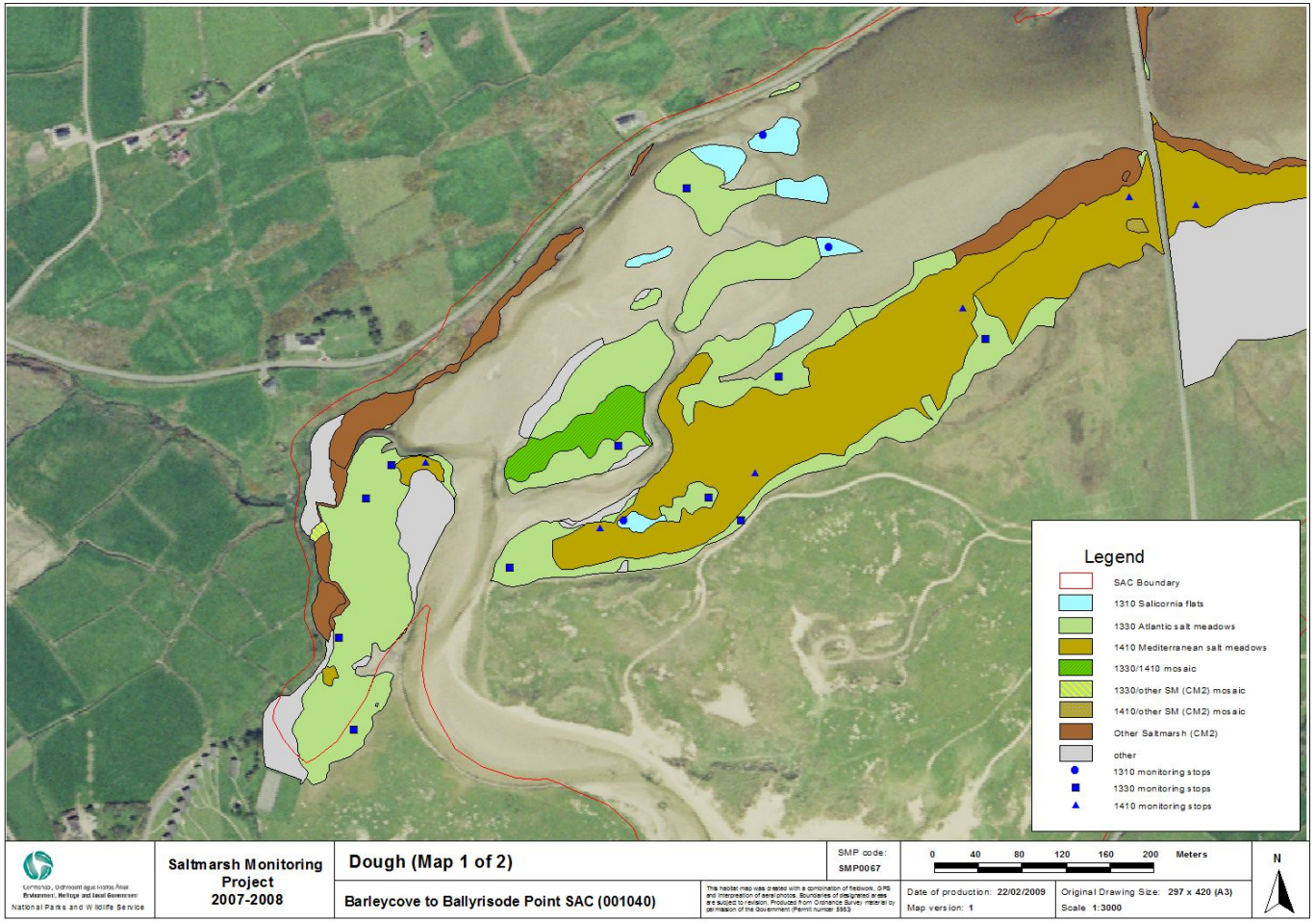
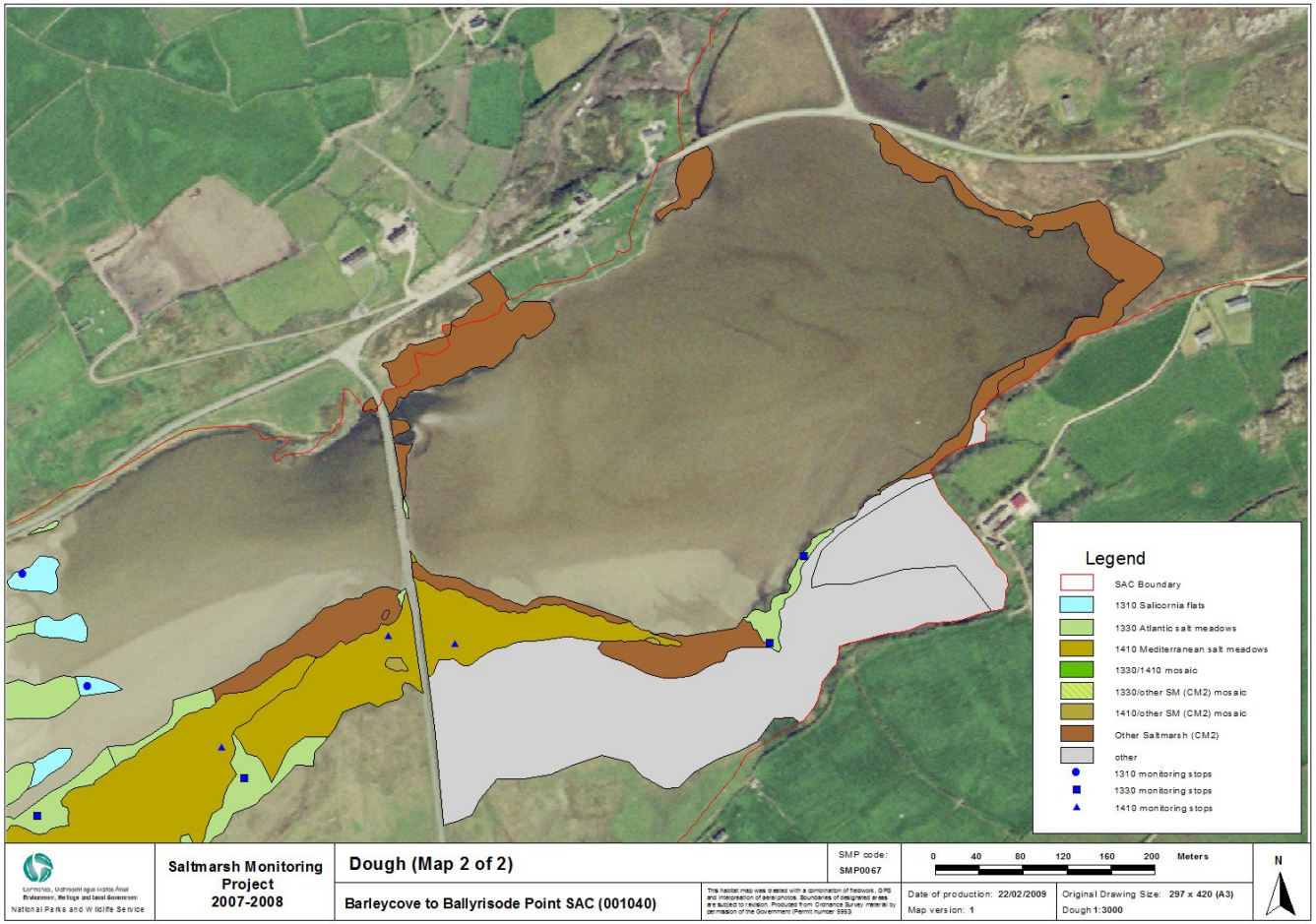
APPENDIX I

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	0.480	0.480				
2	Spartina swards						
3	1330 Atlantic salt meadow	5.279		5.279			
4	1410 Mediterranean salt meadow	5.290			5.290		
5	ASM/MSM mosaic (50/50)	0.413		0.206	0.206		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic	0.018		0.009			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	6.648					
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	0.024			0.012		
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)	3.566					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**21.718**	**0.480**	**5.495**	**5.509**		


Legend
SAC Boundary
1310 Salicornia flats
1330 Atlantic salt meadows
1410 Mediterranean salt meadows
1330/1410 mosaic
1330/other SM (CM2) mosaic
1410/other SM (CM2) mosaic
Other Saltmarsh (CM2)
other
1310 monitoring stops
1330 monitoring stops
1410 monitoring stops
Saltmarsh Monitoring Project 2007-2008
Dough (Map 1 of 2)
Barleycove to Ballyrisode Point SAC (001040)
SMP code: SMP0067
0 40 80 120 160 200 Meters
N
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:3000
National Parks and Wildlife Service


Legend
SAC Boundary
1310 Salicornia flats
1330 Atlantic salt meadows
1410 Mediterranean salt meadows
1330/1410 mosaic
1330/other SM (CM2) mosaic
1410/other SM (CM2) mosaic
Other Saltmarsh (CM2)
other
1310 monitoring stops
1330 monitoring stops
1410 monitoring stops
Saltmarsh Monitoring Project 2007-2008
Dough (Map 2 of 2)
SMP code: SMP0067
Barleycove to Ballyrisode Point SAC (001040)
0 40 80 120 160 200 Meters
N
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Dough 1:3000
National Parks and Wildlife Service

Appendix VI – Barley Cove site report and habitat map from the Sand Dunes Monitoring Project (Delaney *et al.*, 2013)

SITE 064 BARLEY COVE

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

Barley Cove is a small site located on the Mizen Head Peninsula, approximately 5 km south-west of Goleen, on the south-west coast of Cork. The site comprises two discrete areas which are situated between Mizen Head and Brow Head, and most of the site lies within the Barley Cove to Ballyrisode Point SAC (SAC 001040). Six Annex I sand dune habitats (* indicates a priority habitat) were recorded here during the CMP: **1210 Annual vegetation of drift lines, 1220 Perennial vegetation of stony banks, 2110 Embryonic shifting dunes, 2120 Marram dunes (white dunes), *2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** (Ryle *et al.*, 2009)**.** Other Annex I habitats that are associated with the sand dunes at Barley Cove include **1140 Mudflats and sandflats not covered by seawater at low tide, 1310 *Salicornia* and other annuals colonising mud and sand, 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), 1410 Mediterranean salt meadows (*Juncetalia maritimi*)** and **4030 European dry heaths.**

A tidal river bisects the north-western area of the site, and this area transitions into saltmarsh at the back of the ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** habitats**.** The Red Data Book species, *Crambe maritima*, was previously noted as being present at the site (NPWS, 2001), but it was not observed during the SDM. The site is important for Chough (NPWS, 2001), and is also considered an important stop-over point for numerous migratory birds, including Bewick's and Whopper swans. All three species are included on Annex I of the EU Birds Directive. The site's main use is as an amenity, with adjacent car parks, access roads and numerous caravan parks. Grazing also occurs on the site, with rabbits in particular, posing a threat to the sand dune habitats.

Considerable restoration works were carried out at Barley Cove before it was surveyed as part of the CMP. The site had been bought under compulsory purchase by the County Council, an unofficial caravan park had been removed and a boardwalk and pontoon had been put in place to facilitate access to the beach without further compromising the ***2130 Fixed dunes (grey dunes).**

2 CONSERVATION ASSESSMENTS

2.1 Overview

Barley Cove was surveyed on the 28th and 29th September 2011. All six Annex I sand dune habitats recorded on the site during the CMP, were also recorded during the SDM. The habitats found at Barley Cove in 2011 and the results of the conservation assessments are presented in Table 1. **1210 Annual vegetation of drift lines**, **1220 Perennial vegetation of stony banks** and **2110 Embryonic shifting dunes** were assessed as Favourable during the SDM. **2120 Marram dunes (white dunes)** and ***2130 Fixed dunes (grey dunes)** were assessed as Unfavourable-Inadequate and **2190 Humid dune slacks** were assessed as Unfavourable-Bad. Three habitats, **1210 Annual vegetation of drift lines, 2110 Embryonic shifting dunes** and **2190 Humid dune slacks,** were not assessed during the CMP and therefore no trends could be established for these habitats.

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

Habitat	Area	Structure & Functions	Future Prospects	Overall result
1210 Annual vegetation of drift lines	Favourable	Favourable	Favourable	Favourable
1220 Perennial vegetation of stony banks	Favourable (stable)	Favourable (stable)	Favourable (stable)	Favourable (stable)
2110 Embryonic shifting dunes	Favourable	Favourable	Favourable	Favourable
2120 Marram dunes (white dunes)	Unfavourable-Inadequate (stable)	Favourable (stable)	Unfavourable-Inadequate (stable)	Unfavourable-Inadequate (stable)
*2130 Fixed dunes (grey dunes)	Favourable (stable)	Unfavourable-Inadequate (stable)	Unfavourable-Inadequate (stable)	Unfavourable-Inadequate (stable)
2190 Humid dune slacks	Favourable	Unfavourable-Bad	Unfavourable-Bad	Unfavourable-Bad

2.1.1 Area

The areas of Annex I sand dune habitats at Barley Cove are presented in Table 2. The baseline area of two habitats was revised after the habitats were visited in 2011. Two new areas of **2190 Humid dune slacks** were recorded and the dune slack habitat was extended into the ***2130 Fixed dunes (grey dunes)**. The total area of sand dune habitat present during the SDM was slightly less than that present during the CMP, and this was due to losses in **1210 Annual vegetation of drift lines, 1220 Perennial vegetation of stony banks** and **2120 Marram dunes (white dunes).** In addition to the areas shown in Table 2, 19.08 ha of ***2130 Fixed dunes (grey dunes)** may be present at the site, but the area is managed as agricultural land and permission could not be obtained to survey it in 2011. This area was also not surveyed during the CMP as it was considered not to be an Annex I sand dune habitat.

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

Habitat	• Basel	• Revis	• Sand Dunes
1210 Annual vegetation of drift lines	0.29	0.29	0.06
1220 Perennial vegetation of stony banks	1.07	1.07	0.12
2110 Embryonic shifting dunes	0.05	0.05	0.16
2120 Marram dunes (white dunes)	0.77	0.77	0.71
*2130 Fixed dunes (grey dunes)	31.41	27.66	27.99
2190 Humid dune slacks	0.39	4.59	4.59
Total	33.98	34.43	33.63

2.1.2 Structure and Functions

Structure and Functions were assessed for all six Annex I sand dune habitats at Barley Cove. Table 3 shows the results of the Structure and Functions assessment. All criteria passed for **1210 Annual vegetation of drift lines, 1220 Perennial vegetation of stony banks, 2110 Embryonic shifting dunes** and **2120 Marram dunes (white dunes)**, and they were assessed as having Favourable Structure and Functions. ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** failed two and three criteria respectively and were therefore assessed as having Unfavourable Structure and Functions.

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

Habitat	No. monitoring stops	Total no. assessment criteria	No. failed criteria
1210 Annual vegetation of drift lines	2	6	0
1220 Perennial vegetation of stony banks	2	6	0
2110 Embryonic shifting dunes	2	7	0
2120 Marram dunes (white dunes)	4	7	0
*2130 Fixed dunes (grey dunes)	12	11	2
2190 Humid dune slacks	4	11	3

2.1.3 Future Prospects

Impacts and activities recorded at Barley Cove are presented in Table 4. Impact codes are assigned according to Ssymanck (2010). **1210 Annual vegetation of drift lines** and **1220 Perennial vegetation of stony banks** only had neutral impacts recorded within them, with walking common to both. **2110 Embryonic shifting dunes** had only the neutral impact of the sea wall recorded, but a small proportion of **2120 Marram dunes (white dunes)** was negatively affected by trampling. Anthropogenic activities, such as campfires in ***2130 Fixed dunes (grey dunes)** and off-road driving in **2190 Humid dune slacks,** were high intensity negative impacts, but again, only affected a small area of these habitats. Rabbit grazing and burrowing was the most serious negative impact and affected both ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks**. Non-intensive cattle grazing, on the other hand, was a neutral impact for ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks**.

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

Habitat code	Impact code	Impact description	Intensity	Effect	Percent of habitat	Source
1210	G01.02	Walking	Low	Neutral	1	Inside
1210	J02.12.01	Low sea wall	Low	Neutral	50	Outside
1220	D01.01	Track	High	Neutral	1	Inside
1220	G01.02	Walking	Low	Neutral	1	Inside
1220	J02.12.01	Low sea wall	-	Neutral	0	Outside
2110	J02.12.01	Low sea wall	-	Neutral	0	Outside
2120	G05.01	Trampling	High	Negative	5	Outside
2120	J02.12.01	Low sea wall	-	Neutral	0	Outside
*2130	A04.02.01	Non-intensive cattle grazing	Medium	Neutral	50	Inside
*2130	D01.01	Tracks and boardwalk	High	Neutral	1	Inside
*2130	G01.02	Walking	Low	Neutral	5	Inside
*2130	G05	Campfires	High	Negative	1	Inside
*2130	J02.12.01	Low sea wall	-	Neutral	0	Outside
*2130	K04.05	Rabbit grazing and burrowing	Medium	Negative	70	Inside
2190	A04.02.01	Non-intensive cattle grazing	Low	Neutral	100	Inside
2190	D01.01	Track	Low	Neutral	1	Inside
2190	G01.02	Walking	Low	Neutral	1	Inside
2190	G01.03.02	Off road driving	High	Negative	5	Inside
2190	G02.09	Bird watching	Low	Neutral	1	Inside
2190	J02.12.01	Low sea wall	-	Neutral	0	Outside
2190	K04.05	Rabbit grazing	High	Negative	20	Inside

2.2 Annex I habitat assessments

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

2.2.1 1210 Annual vegetation of drift lines

Two discrete areas of **1210 Annual vegetation of drift lines** were mapped during the SDM to the east of the site, with one area on White Strand and the other located on a small beach south of this. No monitoring stops were carried out in this habitat during the CMP, and trend is not ascribed to the conservation status of the habitat.

Area

The area of **1210 Annual vegetation of drift lines** decreased from 0.29 ha during the CMP to 0.06 ha during the SDM. The habitat has disappeared from its former location due to a combination of erosion and succession, and is now present as two very small areas on beaches in the east of the site, isolated from the main dune area. There is no evidence of loss due to human activity. Area is assessed as Favourable.

Structure and Functions

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

Future Prospects

No negative impacts were recorded for this habitat in 2011. There is a sea wall close to one of the patches of the habitat, but it has been present since prior to the enactment of the Habitats Directive and the habitat dynamics have achieved equilibrium with the wall. Walking is also a neutral impact. Future Prospects were assessed as Favourable.

Conservation assessment

All of the parameters were assessed as Favourable. The conservation status of **1210 Annual vegetation of drift lines** at Barley Cove were assessed as Favourable during the SDM.

2.2.2 1220 Perennial vegetation of stony banks

1220 Perennial vegetation of stony banks occurs as several disjunct patches of habitat at Barley Cove, and the assessment was carried out separately on each patch during the baseline survey. The part of the habitat at the main beach was excluded from the assessment during the CMP because it was subject to disturbance. This area was assessed during the SDM.

Area

The Area of **1220 Perennial vegetation of stony banks** has decreased from 1.07 ha during the CMP to 0.12 ha during the SDM. There is no sign of anthropogenic habitat loss however and Area was assessed as Favourable during the SDM. Those parts of the Area which were included in the assessment during the CMP were assessed as Favourable. Area was assessed as Favourable (stable) during the SDM.

Structure and Functions

All of the criteria passed in the Structure and Functions assessment. The criterion measuring the presence of positive indicator species was allowed to pass on expert judgement, although *Crithmum maritimum* and *Honckenya peploides* were the only frequent species for the habitat. This was a marginal example of **1220 Perennial vegetation of stony banks** and there were no signs of anthropogenic alterations to negatively impact on the Structure and Functions of the habitat. Barley Cove is a dynamic system subject to storms and tidal erosion. It was felt that these natural processes were the most likely cause of the depauperate vegetation found in this habitat. During the CMP, Structure and Functions were assessed as Favourable. Structure and Functions was assessed as Favourable (stable) during the SDM.

Future Prospects

Three neutral impacts were recorded during the SDM. There is an established track through the habitat, and walking within the habitat was also recorded. The track has covered up part of the habitat (although this is below the minimum mapping area and so was not highlighted in the area assessment), but it reduces the likelihood of damage due to disturbance in the habitat. Walking is of low intensity. There is a sea wall at the site but it has been present since prior to the enactment of the Habitats Directive and the habitat dynamics have achieved equilibrium with the wall, resulting in a neutral effect. During the CMP, Future

Prospects were assessed as Favourable. Future Prospects were assessed as Favourable (stable) during the SDM.

Conservation assessment

All of the parameters were assessed as Favourable during both the SDM and the CMP. The conservation status of **1220 Perennial vegetation of stony banks** was assessed as Favourable (stable) during the SDM.

2.2.3 2110 Embryonic shifting dunes

This habitat was not assessed during the CMP and no trend was ascribed to the conservation status during the SDM. The largest patch of the habitat is found on the depositing bank of the tidal river that runs through the site, but it is also found on two of the other small beaches included in the site.

Area

Area of **2110 Embryonic shifting dunes** increased from 0.05 ha during the CMP to 0.16 ha during the SDM. There were no signs of anthropogenic loss in the habitat and Area was assessed as Favourable.

Structure and Functions

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

Future Prospects

No negative impacts were recorded for this habitat and Future Prospects were assessed as Favourable.

Conservation assessment

All three of the parameters were assessed as Favourable. The conservation status of **2110 Embryonic shifting dunes** at Barley Cove was assessed as Favourable during the SDM.

2.2.4 2120 Marram dunes (white dunes)

Two areas of **2120 Marram dunes (white dunes)** were mapped and assessed separately during the CMP. One of the areas, beside the boardwalk, had succeeded to ***2130 Fixed dunes (grey dunes)** by 2011. The remaining habitat was found at the edge of the golf course.

Area

There has been a slight decrease in the area of **2120 Marram dunes (white dunes)** from 0.77 ha during the CMP to 0.71 ha during the SDM. This is due in part to recovery of damaged dunes, which were mapped as **2120 Marram dunes (white dunes)**, succeeding to ***2130 Fixed dunes (grey dunes)**. Area was assessed as Unfavourable-Bad for the small patch of **2120 Marram dunes (white dunes)** close to the boardwalk during the CMP and Unfavourable-Inadequate for the larger area near the golf course. Erosion linked to the tidal river and recreation were given as reasons for the Unfavourable assessments. The overall assessment would have been Unfavourable-Inadequate under the current methodology as natural erosion is not considered a reason for an Unfavourable assessment. Analysis of aerial photographs dating from 1995, 2000 and 2005 indicates that a trampled path has developed between the hotel and the strand, and this has prevented development of **2120 Marram dunes (white dunes)** in an area of about 0.03 ha. Under the current

methodology, this represents a loss in the potential habitat area. The loss is less than 1% per year, and Area was assessed as Unfavourable-Inadequate (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. During the SDM, Structure and Functions were assessed as Favourable (stable).

Future Prospects

No impacts were recorded from within this habitat during the SDM, but trampling outside the habitat was a negative impact. Trampling will prevent recovery of the lost area of **2120 Marram dunes (white dunes)** between the hotel and the strand**.** During the CMP, Future Prospects were assessed as Unfavourable-Bad for the habitat near the boardwalk and Unfavourable-Inadequate for the dunes near the golf course, and although no impacts were listed for the habitat, recreation and natural erosion were cited as reasons for the negative assessments. Natural erosion is not considered to be a negative impact under the current methodology; therefore Future Prospects would have been assessed as Unfavourable-Inadequate if assessed according to the SDM methodology. Future Prospects were assessed as Unfavourable-Inadequate (stable) during the SDM.

Conservation assessment

There has been no change in the conservation assessment of any of the parameters since the baseline survey. Area and Future Prospects were assessed as Unfavourable-Inadequate and Structure and Functions were assessed as Favourable. The conservation status of **2120 Marram dunes (white dunes)** was assessed as Unfavourable-Inadequate (stable) during the SDM.

*2.2.5 *2130 Fixed dunes (grey dunes)*

***2130 Fixed dunes (grey dunes)** are found in the townlands of Cannawee and Dough, beside the tidal river. This area is subject to erosion and accretion because of the river dynamics, and steeply eroded dune faces are present on the eroding bank. These are natural processes, but make the dunes fragile and prone to collapse in vulnerable locations.

Area

There has been a slight increase in Area of ***2130 Fixed dunes (grey dunes)** from 27.66 ha during the CMP to 27.99 ha during the SDM, and this is due to succession from **2120 Marram dunes (white dunes)**. No anthropogenic loss was recorded. During the CMP, area was assessed as Favourable. Area was assessed as Favourable (stable) during the SDM. The additional area of 19.08 ha of ***2130 Fixed dunes (grey dunes)** was not assessed during the CMP or the SDM.

Structure and Functions

Two of the criteria failed the Structure and Functions assessment. Negative indicator species, *Senecio jacobaea* in particular, were present in 11 of the 12 stops and cover was over 5% in the habitat as a whole. The structure of the habitat was damaged by rabbit activity in six of the monitoring stops. Damage included excessive bare soil due to burrowing and lack of vascular plants due to overgrazing. During the CMP, Structure and Functions were assessed as Favourable. However, negative indicator species were present in

almost every stop. At that time, damage to the habitat was not assessed under the Structure and Functions parameter. Given the description of the site, it is most likely that it would have been assessed as Unfavourable-Inadequate had the current assessment methodology been applied. Structure and Functions were assessed as Unfavourable-Inadequate (stable).

Future Prospects

No positive impacts were recorded during the SDM, but non-intensive cattle grazing, walking and the boardwalk, and the sea wall were recorded as neutral impacts. Campfires and rabbit activity were recorded as negative impacts. During the baseline survey, overgrazing by small mammals (including rabbits) was recorded as having a negative impact on 15 ha of ***2130 Fixed dunes (grey dunes)** at Barley Cove, but Future Prospects were recorded as Favourable. Collapse of terrain was also recorded as a negative impact, but this may have referred to natural erosion which is considered neutral under the current methodology. Trampling was recorded as affecting 3 ha, but this was considered to have a neutral effect. According to the methodology employed during the SDM, Future Prospects would probably have been assessed as Unfavourable-Inadequate during the CMP. During the SDM, Future Prospects were assessed as Unfavourable-Inadequate (stable).

Conservation assessment

Area was assessed as Favourable while Structure and Functions and Future Prospects were assessed as Unfavourable-Inadequate. The data suggests that there has been no change in the status of the three parameters since the CMP, although they were interpreted differently at that time. The conservation status of ***2130 Fixed dunes (grey dunes)** was assessed as Unfavourable-Inadequate (stable) during the SDM.

2.2.6 2190 Humid dune slacks

The **2190 Humid dune slacks** habitat is represented by three separate polygons at Barley Cove. Two are located within the ***2130 Fixed dunes (grey dunes)** habitat. The third polygon is found at the transition between salt marsh and ***2130 Fixed dunes (grey dunes)**. It is not clear whether it developed as a typical dune slack, but the species present suggest that it is close to the groundwater table and floods intermittently. **2190 Humid dune slacks** were not assessed during the CMP and no trends could be ascribed for the habitat.

Area

The Area of **2190 Humid dune slacks** appears to have remained stable since the baseline survey and there is no indication of anthropogenic loss. Area was assessed as Favourable during the SDM.

Structure and Functions

Three criteria failed the Structure and Functions assessment. Only one positive indicator species was found in stop two. This stop was very overgrazed by rabbits and also contained an excess of bare sand. The habitat also failed as the cover of flowering herbs was too low. The condition of the habitat is considered particularly poor in the **2190 Humid dune slacks** located within the ***2130 Fixed dunes (grey dunes)**, as these are the focus of rabbit grazing. Structure and Functions were assessed as Unfavourable-Bad.

Future Prospects

Rabbit grazing had severely impaired 20% of the habitat, while off road driving was a more localised negative impact during the SDM. Other impacts included cattle grazing, walking, tracks, bird watching, and

the sea wall, and these had a neutral effect. Although there were only two negative impacts recorded for **2190 Humid dune slacks,** and they affected a limited area of the habitat, the effects of the impacts are severe and threaten the continued presence of the **2190 Humid dune slacks** community in one of the slacks, and Future Prospects were assessed as Unfavourable-Bad.

Conservation assessment

Two of the parameters were assessed as Unfavourable-Bad, and this resulted in the conservation status of **2190 Humid dune slacks** being assessed as Unfavourable-Bad during the SDM.

3 Discussion

3.1 Rabbit grazing

The dunes are very heavily grazed by rabbits in parts, and both grazing and burrowing were observed to have a negative effect on the habitat structure in 2011. The most badly effected parts of the ***2130 Fixed dunes (grey dunes)** are low lying areas, particularly on the golf course. Here, burrowing has resulted in exposed ground being colonised by *Senecio jacobaea*, a negative indicator for the habitat. The description of ***2130 Fixed dunes (grey dunes)** in the CMP site report indicates that rabbit burrows had "undermined the structure of the fixed dunes" and negative indicator species were common throughout the habitat. The description of the site given in the CMP individual site report and aerial photographs dating to 2005, 2000 and 1995 indicate that rabbits have exerted considerable pressure on the site for some time. Because of the large rabbit population, rabbit activity now represents the greatest impediment to the ***2130 Fixed dunes (grey dunes)** and **2190 Humid dune slacks** habitats achieving Favourable status.

3.2 Management

Considerable effort has been invested in the dunes at Barley Cove beach and dunes in an effort to conserve the sand dune habitats while providing for amenity use. Access to the beaches is via a pontoon and boardwalk, and a car park has been provided. Restrictions are in place to prevent parking on the dunes adjacent to the car park, but there is evidence that cars still drive through the dunes on old tracks leading to two of the dune slacks. Driving on sand dune habitats causes compaction of the substrate and disturbs the vegetation. In the context of severe overgrazing as found in two due slacks at Barley Cove, the effects of driving are exacerbated. At least one of the dune slacks was formerly used as a caravan park, and although the caravans were removed before the CMP, it is possible that the dune slacks are still recovering. There is no evidence of efforts to manage the rabbit population.

3.3 Excluded area

According to the baseline site report (Ryle *et al.*, 2009), the NPWS had classified dunes beside Whitestrand as ***2130 Fixed dunes (grey dunes)**, and these were included within the SAC. When the land was visited during the CMP, it was found to have been altered for the purposes of agriculture and no longer comprised ***2130 Fixed dunes (grey dunes)**. 19.5 ha were believed to have been lost, but Area for the habitat at Barley Cove was assessed as Favourable. It is not clear whether the agricultural intensification occurred prior to implementation of the Habitats Directive. Permission was not obtained to enter those lands during the

SDM, but they were viewed from adjacent land where possible. Although the habitat had undergone substantial alteration, the excluded area appeared to be a mosaic of agricultural grasslands and ***2130 Fixed dunes (grey dunes)**, and restoration of at least part of the affected area would be possible. As stated above this additional area was mapped as ***2130 Fixed dunes (grey dunes)** during the SDM, but not assessed due to access difficulties. During the CMP the area was considered to no longer include ***2130 Fixed dunes (grey dunes)** and was therefore not assessed.

4 REFERENCES

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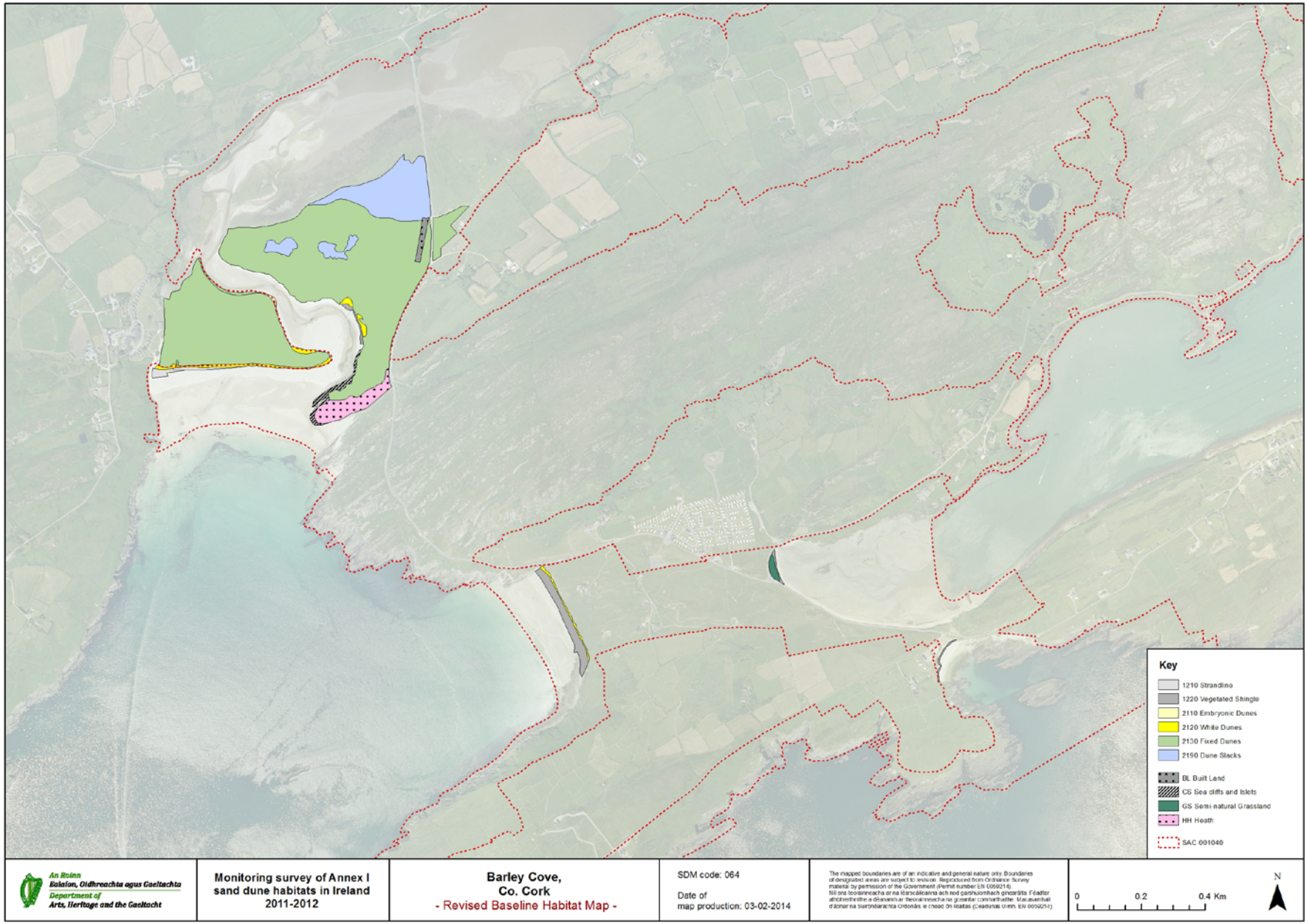
Key
1210 Strandline
1220 Vegetated Shingle
2110 Embryonic Dunes
2120 White Dunes
2130 Fixed Dunes
2190 Dune Slacks
BL Built Land
CS Sea cliffs and Islets
GS Semi-natural Grassland
HH Heath
SAC 001040
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
Monitoring survey of Annex I sand dune habitats in Ireland 2011-2012
Barley Cove, Co. Cork
- Revised Baseline Habitat Map -
SDM code: 064
Date of map production: 03-02-2014
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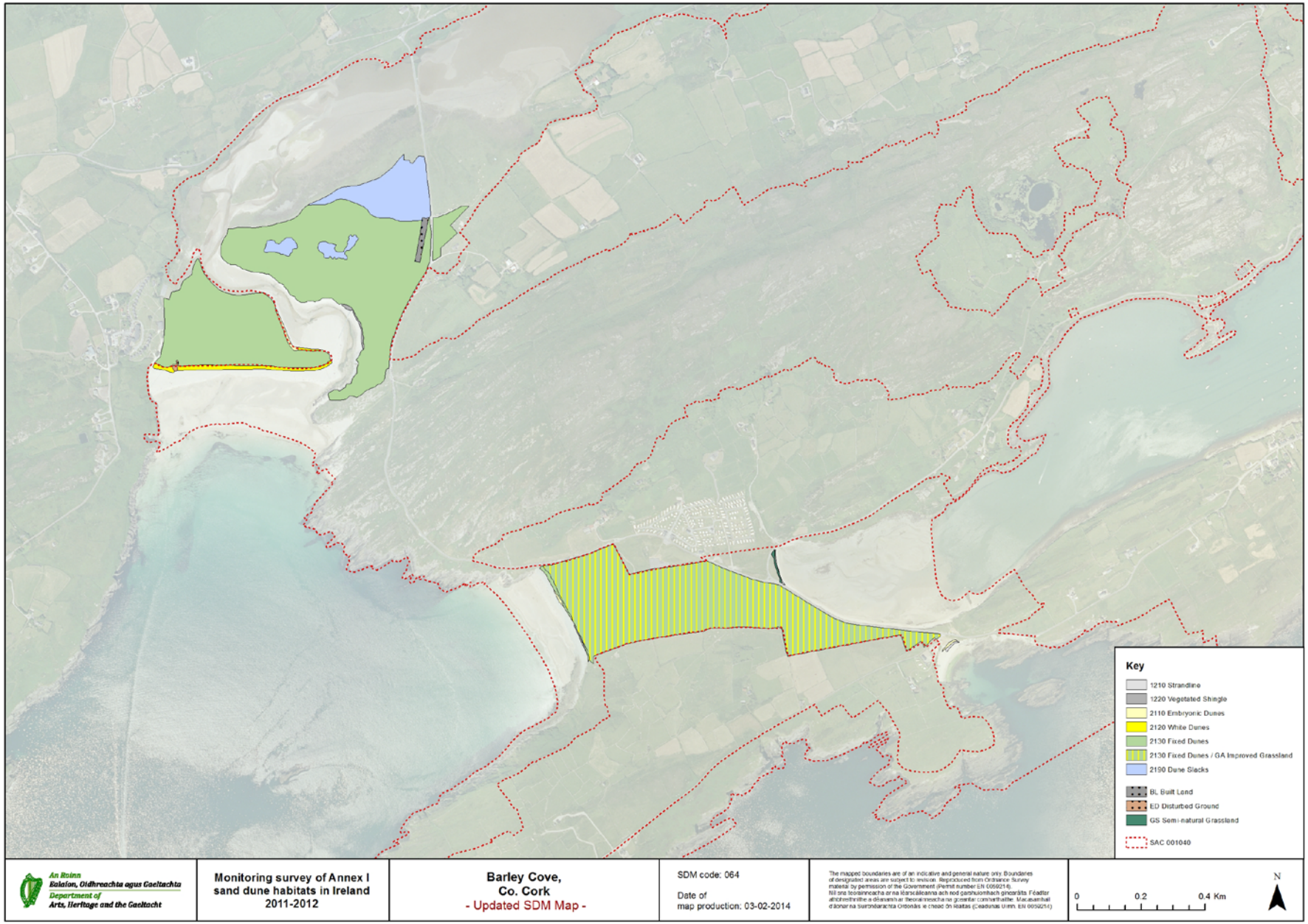
Key
1210 Strandline
1220 Vegetated Shingle
2110 Embryonic Dunes
2120 White Dunes
2130 Fixed Dunes
2130 Fixed Dunes / GA Improved Grassland
2190 Dune Slacks
BL Built Land
ED Disturbed Ground
GS Semi-natural Grassland
SAC 001040
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
Monitoring survey of Annex I sand dune habitats in Ireland 2011-2012
Barley Cove, Co. Cork
- Updated SDM Map -
SDM code: 064
Date of map production: 03-02-2014
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