Boyne Coast and Estuary SAC (site code 1957)

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 and the Coastal Monitoring Project 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 (2012). Conservation Objectives: Boyne Coast and Estuary SAC 001957. 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.

Boyne Coast and Estuary SAC is a moderately sized coastal site which is situated below the town of Drogheda and includes most of the tidal sections of the River Boyne, a substantial river which drains a large catchment. On the seaward side the site extends north and south for several kilometres to include the remaining intact areas of dune at Baltray and Mornington, as well as adjacent beaches and intertidal sand and mud flats. The main channel of the Boyne is contained by training walls for navigation purposes. As well as intertidal sand and mud flats, the inner part of the site has saltmarshes and *Spartina* swards.

Boyne Coast and Estuary SAC (site code: 1957) is designated for a range of coastal habitats including, saltmarshes and sand dunes. The following six coastal habitats are included in the qualifying interests for the site (* denotes a priority habitat):

- *Salicornia* and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (ASM) (1330)
- Mediterranean salt meadows (Juncetaliea maritimi) (MSM) (1410)
- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)*

The first three habitats are saltmarsh habitats and the last three are associated with sand dune systems, although all six of these habitats are found in close association with each other. It should be noted however, that as the status of Mediterranean salt meadows as a Qualifying Interest for this site is currently under review, conservation objectives have not been set for this habitat.

This backing document sets out the conservation objectives for the coastal habitats listed above (with the exception of Mediterranean salt meadows) in Boyne Coast and Estuary 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 latter of which is broken down into a number of attributes, including physical structure, vegetation structure and vegetation composition.

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 Boyne Coast and Estuary SAC (McCorry & Ryle, 2009):

1. Baltray, Co. Louth
2. Mornington, Co. Meath

The distribution of saltmarsh habitats within the Boyne Coast and Estuary SAC is presented in Appendix I. 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 II & III).

Estuarine saltmarshes occur fairly extensively within Boyne Coast and Estuary SAC, particularly in the sheltered estuarine part of this site. They occur along both sides of the estuary and also along parts of the embankments along the main tidal channel.

Baltray saltmarsh (Appendix II) is located east of Drogheda town and extends from Baltray at the mouth of the estuary for about 3km west to the easternmost extension of Drogheda Port. The saltmarsh is quite fragmented and spread out along the northern side of the estuary in the intertidal zone behind the training walls which were constructed for navigation purposes. Much of this saltmarsh has only developed in the last 100 years and is not mapped on the OSI 2nd edition 6 inch map. The largest area of saltmarsh development is located at the eastern side of the site at Baltray. This site also supports extensive sand dune system (Ryle *et al*. 2009). Some relic saltmarsh was found in the sheltered zone behind the sand dune system. Part of this saltmarsh was infilled when the reservoir was created. A portion of this saltmarsh still remains in this area, adjacent to Baltray Golf Course. Newer saltmarsh has developed further west in the extensive intertidal zone behind the navigation walls. Two Annex I habitats were recorded at this sub-site: *Salicornia* mudflats and ASM (McCorry & Ryle, 2009).

Mornington saltmarsh (Appendix III) is located in Co. Meath along the southern side of the Boyne Estuary and extends from the mouth of the estuary for about 2.5km west inland to Stragrennan Polder. A sand and shingle spit is found at the mouth of the estuary that extends to Durrow Spit. This was surveyed by the CMP and supports a small sand dune complex (Ryle *et al*., 2009). The saltmarsh has developed on low-lying land, mainly on the west side of the stream and this develops into a narrow band of habitat extending upstream along a narrow low-lying channel. This saltmarsh may have been more extensive in the past and a large area has been reclaimed and now supports improved grassland. This site supports two Annex I saltmarsh habitats: *Salicornia* mudflats and ASM (McCorry & Ryle, 2009).

The conservation objectives for the saltmarsh habitats in Boyne Coast and Estuary are based on a combination of the findings of the individual reports for each of these sub-sites. The two sub-sites as surveyed by the SMP are thought to represent the total area of saltmarsh within Boyne Coast and Estuary SAC.

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

The CMP surveyed, mapped and assessed a total of three sub-sites within Killala Bay/Moy Estuary SAC (Ryle *et al.*, 2009):

1. Baltray, Co. Louth
2. Mornington, Co. Meath

The distribution of sand dune habitats within Boyne Coast and Estuary SAC is presented in Appendix IV. As part of the Coastal Monitoring Project (CMP) detailed individual reports and habitat maps were produced for the two sub-sites and these are included in a set of Appendices to this document (Appendix V & VI).

A total area of 59.83ha of dune habitats were recorded within Boyne Coast and Estuary SAC by the Coastal Monitoring Project (Ryle *et al*., 2009), of which 55.020ha consisted of the qualifying interests. Other Annex I habitats recorded include annual vegetation of driftlines (3.008ha), perennial vegetation of stony banks (0.869ha) and humid dune slacks (0.932ha) (Ryle *et al*., 2009). The National Shingle Beach Survey (NSBS) surveyed two vegetated shingle sites within Boyne Coast and Estuary SAC at Laytown Strand and Mornington, however both sites were rated of low interest (Moore & Wilson, 1999).

Baltray dunes (Appendix V) lie on the northern side of the Boyne Estuary and extend as far as Clogher Head. A substantial part of the stable areas of dune support two golf courses (County Louth Golf Club and Seapoint Golf Club), which were excluded from the SAC site. An area south east of County Louth Golf Club was left within the SAC since it is actively accreting and contains species-rich semi-fixed and Marram dunes that warrant conservation (Gaynor & Browne, 1999). Embryonic dunes, marram dunes, fixed dunes, driftlines and vegetated shingle were recorded by Ryle *et al.* (2009), the first three of which are qualifying interests for this SAC.

Mornington dunes (Appendix VI) are located on the southern side of the Boyne Estuary. The training wall at the mouth of the Boyne Estuary has led to an accumulation of sand and enhanced the development of dunes in the northern part of this site. A golf course (Laytown and Bettystown Golf Club) occupy the dunes to the south of the site (Ryle *et al*., 2009). Again boundary amendments were made to exclude the golf course from the SAC site owing to the intensive management and the lack of species/habitat diversity (Gaynor & Browne, 1999). Embryonic dunes, marram dunes, fixed dunes, drifltines and dune slacks were recorded by Ryle *et al.* (2009), the first three of which are qualifying interests for this SAC.

The conservation objectives for the sand dune habitats in Boyne Coast and Estuary are based on the findings of the individual reports for each of these sites, combined with the results of Gaynor (2008). It is thought that the two sub-sites as surveyed by the CMP represent the total area of sand dunes within Boyne Coast and Estuary SAC.

2 Conservation Objectives

The conservation objective aims to define the favourable conservation condition of a habitat or species at a particular site. Implementation of these objectives will help to ensure that the habitat or species achieves favourable conservation status at a national level.

3 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 two habitats (in bold above) are listed as Qualifying Interests for Boyne Coast and Estuary SAC. Although the characteristic species sea rush (*Juncus maritimus*) was recorded at Baltray, it was not present in a quantity considered sufficient to map or to merit classification as MSM (McCorry & Ryle, 2009). The last habitat is restricted in its distribution to sites in the southeast of the country.

The distribution of saltmarsh habitats within Boyne Coast and Estuary SAC is presented in Appendix I. The SMP surveyed, mapped and assessed two sub-sites within Boyne Coast and Estuary SAC (McCorry & Ryle, 2009):

1. Mornington (Appendix II)
2. Baltray (Appendix III)

Detailed descriptions of each habitat in the two sub-sites recorded by McCorry & Ryle (2009) in Boyne Coast and Estuary can be found in Appendices II and III.

3.1 Overall Objectives

The overall objective for '*Salicornia* and other annuals colonising mud and sand' in Boyne Coast and Estuary SAC is to '*restore the favourable conservation condition'*.

The overall objective for 'Atlantic salt meadows' in Boyne Coast and Estuary SAC is to '*maintain 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.

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 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.

A baseline habitat map of all saltmarsh in the Boyne Coast and Estuary SAC was produced based on the findings of the SMP (McCorry & Ryle, 2009) and is presented in Appendix I. A total of 30.479ha of saltmarsh habitat was mapped by the SMP within the SAC.

Baseline habitat maps were produced for the sub-sites in Boyne Coast and Estuary 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 Boyne Coast and Estuary 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 include any mosaics when calculating their total areas.

Sub-site	**Total area (ha) of *Salicornia* mudflats (excluding mosaics) from SMP**	**Total area (ha) of *Salicornia* mudflats within SAC boundary (including mosaics)**
Baltray	2.840	2.911
Mornington	1.327	1.142
Total	**4.167**	**4.053**

In view of the fact that all sub-sites were rated as ‘Favourable’ for extent by the SMP (McCorry & Ryle, 2009), the target is that the area of *Salicornia* mudflats should be stable or increasing, subject to natural processes, including erosion and succession.

Sub-site	Total area (ha) of ASM (excluding mosaics) from SMP	Total area (ha) of ASM within SAC boundary (including mosaics)
Baltray	14.370	17.668
Mornington	11.242	8.759
Total	**25.612**	**26.427**

In view of the fact that all sub-sites were rated as 'Favourable' for extent by the SMP (McCorry & Ryle, 2009), the target is that the area of Atlantic salt meadows should be stable or increasing, subject to natural processes, including erosion and succession.

Although the characteristic species sea rush (*Juncus maritimus*) was recorded at Baltray, it was not present in a quantity considered sufficient to map or to merit classification as MSM (McCorry & Ryle, 2009). Therefore, no target has been target for this habitat.

3.3 Range

3.3.1 Habitat distribution

Saltmarsh is currently known to display a wide distribution throughout the site with Estuarine saltmarsh occurring fairly extensively in the sheltered estuarine part of this SAC site. The saltmarshes occur along both sides of the estuary and also along parts of the embankments along the main tidal channel. Atlantic salt meadows are by far the dominant saltmarsh habitat. This SAC site is listed for MSM, however, this habitat was not recorded at the sub-sites by the SMP, but may occur elsewhere. Sea rush (*Juncus maritimus*) was recorded at the Baltray sub-site, but is quite rare and not extensive enough to be classified as a distinct habitat (McCorry & Ryle, 2009).

At the Baltray sub-site, on the west side adjacent to Drogheda Port, there has been some extensive recent development of ASM. A large area of the intertidal zone was infilled to aid the construction of this part of Drogheda Port and saltmarsh is expanding in this area at present (McCorry & Ryle, 2009).

At Mornington, the saltmarsh may have been more extensive in the past and a large area has been reclaimed and now supports low-lying land with improved grassland (McCorry & Ryle, 2009).

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.

3.4 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 Boyne Coast and Estuary in terms of its structure and functions depends on a range of attributes for which targets have been set as outlined below.

3.4.1 Physical structure: sediment supply

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

At the Mornington sub-site, dredging of the main channel has occurred. Although no direct impact to the saltmarsh from this dredging was noted by the SMP, this activity is likely to affect the sediment supply at the site. Stagrennan Polder is located to the west of the survey site and has been used as part of a capital project by Drogheda Port Company to improve navigation in the channel. Material dredged from the channel was dumped in Stagrennan Polder. This area is currently being restored and the restoration project involves creating new intertidal flats and saltmarsh (McCorry & Ryle, 2009).

At Baltray, much of the saltmarsh has only developed in the past 100 years and is not mapped on the OSI 2nd edition 6inch map, which indicates that the area between the navigation walls and the shoreline was intertidal mud. The development of saltmarsh is likely to be affected by the construction of navigation walls and the dredging of the main channel (McCorry & Ryle, 2009).

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

3.4.2 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.

At Baltray, the structure of the ASM has been modified somewhat by drainage channels. At Bankstown, within this sub-site, the ASM is more recently developed and there is an intricate network of channels present (McCorry & Ryle, 2009).

At Mornington, the saltmarsh structure is well-developed in some sections, although it has been modified in places by drainage channels. In the low-mid zone salt pans are present. At Baltray, low depression and salt pans are dominated by common cordgrass (*Spartina anglica*) (McCorry & Ryle, 2009).

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

3.4.3 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).

3.4.4 Vegetation structure: zonation

Saltmarshes are naturally dynamic coastal systems. As is the case on the majority of Irish saltmarshes, ASM is the dominant saltmarsh habitat at Boyne Coast and Estuary where it occurs in a mosaic with the other saltmarsh habitat '*Salicornia* and other annuals colonising mud and sand'. 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 both Baltray and Mornington, there are zonations within the saltmarsh habitats as well as to adjacent to sand dune systems (McCorry & Ryle, 2009).

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

3.4.5 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 both Baltray and Mornington, the saltmarsh is not grazed by livestock and the sward height is quite variable (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.

3.4.6 Vegetation structure: vegetation cover

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

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

3.4.7 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 Boyne Coast and Estuary area.

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

3.4.8 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 recorded frequently in Boyne Coast and Estuary SAC by the SMP (McCorry & Ryle, 2009).

At Baltray *Spartina* swards are well established in some areas and are likely to continue to expand over some parts of the intertidal mudflats. It is widespread and distributed throughout the survey site (McCorry & Ryle, 2009).

At Mornington, *Spartina* swards are also well established and there are indications of significant colonisation between 2000 and 2005 when the two aerial phot series are compared (McCorry & Ryle, 2009)

The aim is that negative indicators such as *Spartina* should be absent or under control. The current target for this particular site is no significant expansion and an annual spread of less than 1%.

4 Sand dune habitats

Sand dunes are hills of wind blown sand that have become progressively more stabilised by a cover of vegetation. In general, most sites display a progression through strandline, foredunes, mobile dunes and fixed dunes. Where the sandy substrate is decalcified, fixed dunes may give way to dune heath. Wet hollows, or dune slacks, occur where the dunes have been eroded down to the level of the water-table. Machair is a specialised form of dune system that is only found on the northwest coasts of Ireland and

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

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

- Annual vegetation of drift lines (1210)
- **Embryonic shifting dunes (2110)**
- **Shifting dunes along the shoreline with *Ammophila arenaria* (2120)**
- **Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) ***
- Decalcified dunes with *Empetrum nigrum* (2140) *
- Decalcified dune heath (2150) *
- Dunes with *Salix repens* (2170)
- Humid dune slacks (2190)
- Machair (21AO) *

Five dune habitats were recorded by Ryle *et al*. (2009) but only the three habitats indicated in bold above are listed as Qualifying Interests for Boyne Coast and Estuary SAC. These habitats include mobile areas at the front, as well as more stabilised parts of dune systems.

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

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

Where sand accumulation is more rapid, 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. Detailed descriptions from the Coastal Monitoring Project (CMP) (Ryle *et al.,* 2009) of each sand dune habitat found at the sub-sites are presented in Appendices.

The CMP surveyed two sub-sites within Boyne Coast and Estuary SAC. See Appendix IV for map:

1. Baltray (Appendix V)
2. Mornington (Appendix VI)

4.1 Overall objectives

The overall objective for 'Embryonic shifting dunes' in Boyne Coast and Estuary SAC is to 'restore the favourable conservation condition'.

The overall objective for 'Shifting dunes along the shoreline with *Ammophila arenaria*' in Boyne Coast and Estuary SAC is to 'restore the favourable conservation condition'.

The overall objective for 'Fixed coastal dunes with herbaceous vegetation' in Boyne Coast and Estuary 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.

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. A baseline habitat map was produced for the sand dune habitats at each sub-site in Boyne Coast and Estuary SAC during the Coastal Monitoring Project (CMP) (Ryle *et al*., 2009). These maps are included with the individual site reports in the Appendices at the end of this document.

At Baltray, there has been no apparent decline in recent past in the extent of the mobile dunes and embryo dunes. The extent of the fixed dunes at this sub-site is being negatively impacted by human induced erosion due to recreational activities associated with the golf course (Ryle *et al*., 2009).

At Mornington, the extent of the fixed dune habitat is affected negatively by the human induced erosion due to recreational activities. There has been no decline in the extent of mobile dunes or embryonic dunes at this sub-site (Ryle *et al*., 2009).

The total areas of each sand dune habitat within the SAC as estimated by Ryle *et al*. (2009) are presented in the second column of the following table. These figures were subsequently checked and adjusted to take into account some overlapping polygons and mapping errors. The adjusted figures are presented in the final column.

Habitat	**Total area (ha) of habitat from CMP**	**Total area (ha) of habitat within SAC boundary**
Embryonic shifting dunes	3.282	3.182
Shifting dunes along the shoreline with *Ammophila arenaria*	6.108	4.966
Fixed coastal dunes with herbaceous vegetation	48.646	46.872
Total	**58.036**	**55.020**

The general target for this attribute in the case of each habitat is that the area should be stable, or increasing. However, in the case of 'fixed coastal dunes with herbaceous vegetation' losses were reported during the baseline survey (Ryle *et al*., 2009). Therefore, the target for this habitat is that it should be increasing in area. 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.

4.3 Range

4.3.1 Habitat distribution

There are two areas of sand dune, at Baltray and Mornington, which lie on opposite sides of the mouth of the estuary.

Embryo dune, mobile dune and fixed dune, were recorded at both sub-sites. The distribution of sand dune habitats as mapped by Ryle *et* al. (2009) is presented in Appendix IV.

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.

4.4 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 Boyne Coast and Estuary SAC in terms of structure and functions depends on a range of attributes for which targets have been set as outlined below.

4.4.1 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.

At the Mornington sub-site, the training wall at the mouth of the Boyne Estuary has led to an accumulation of sand. This has encouraged the development of dunes at the northern part of the site next to the town of Mornington, where there is a wide and accreting area with embryonic, mobile and fixed dunes present (Ryle *et al*., 2009).

At Baltray, the dunes are accreting at the southern end, with wide areas of embryonic dune and strand line fronting mobile and fixed dunes. At this sub-site, erosion due to recreational activities is indicated by the presence of numerous tracks on the dunes (Ryle *et al*., 2009).

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

4.4.2 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.

Both the sand dune systems at Baltray and Mornington occur adjacent to extensive estuarine saltmarshes (Ryle *et al*., 2009; McCorry & Ryle, 2009).

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

4.4.3 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.

At Mornington, the estimated area of bare sand currently accounts for greater than 10% of the fixed dune habitat (Ryle *et al*., 2009).

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

4.4.4 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).

Grazing is absent from the Mornington sub-site. However, part of the Baltray site is fenced off and used for grazing horses and cattle with overgrazing evident in places particularly the southern part of the site. There are low numbers of hare and rabbit at both sites (NPWS internal files). Areas of Baltray are also undergrazed and are dominated by rank grasses and are species-poor (Ryle *et al*., 2009).

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

4.4.5 Vegetation composition: plant health of dune grasses

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

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

4.4.6 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 polytrichus*), kidney vetch (*Anthyllis vulneraria*), wild pansy (*Viola tricolor*) and biting stonecrop (*Sedum acre*).

The Baltray and Mornington sub-sites support a characteristic dune flora, details of which can be found in the site report from the CMP (Ryle *et al.,* 2009) which is included in Appendix V and VI. Rare elements of the site flora include viper's bugloss (*Echium vulgare*), which was recorded in the fixed dunes at Baltray by the CMP. This species is locally rare in Ireland (Ryle *et al*., 2009). Mornington is the most northerly known site for wild clary (*Salvia verbenaca*) in Ireland (NPWS internal files).

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

4.4.7 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.

At both Baltray and Mornington, the negative indicator species, creeping thistle (*Cirsium arvense*), ragwort (*Senecio jacobaea*) and common nettle (*Urtica dioica*) were recorded from fixed dunes. Ragwort (*Senecio jacobaea*) was also recorded in the mobile dunes (Ryle *et al*., 2009).

No buckthorn (*Hippophae rhamnoides*) was recorded on the dunes by the CMP, although it has been recorded in the area (Preston *et al*., 2002)

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

4.4.8 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 make up less than 5% of the vegetation cover.

5 References

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Gaynor, K. and Browne A, (1999). *Survey of Irish Links Golf Courses*. Unpublished report to the National Parks and Wildlife Service, Dublin.

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Preston, C.D., Pearman, D.A. and Dines, T.D. (2002). *New Atlas of the British and Irish Flora.* Oxford University Press, Oxford.

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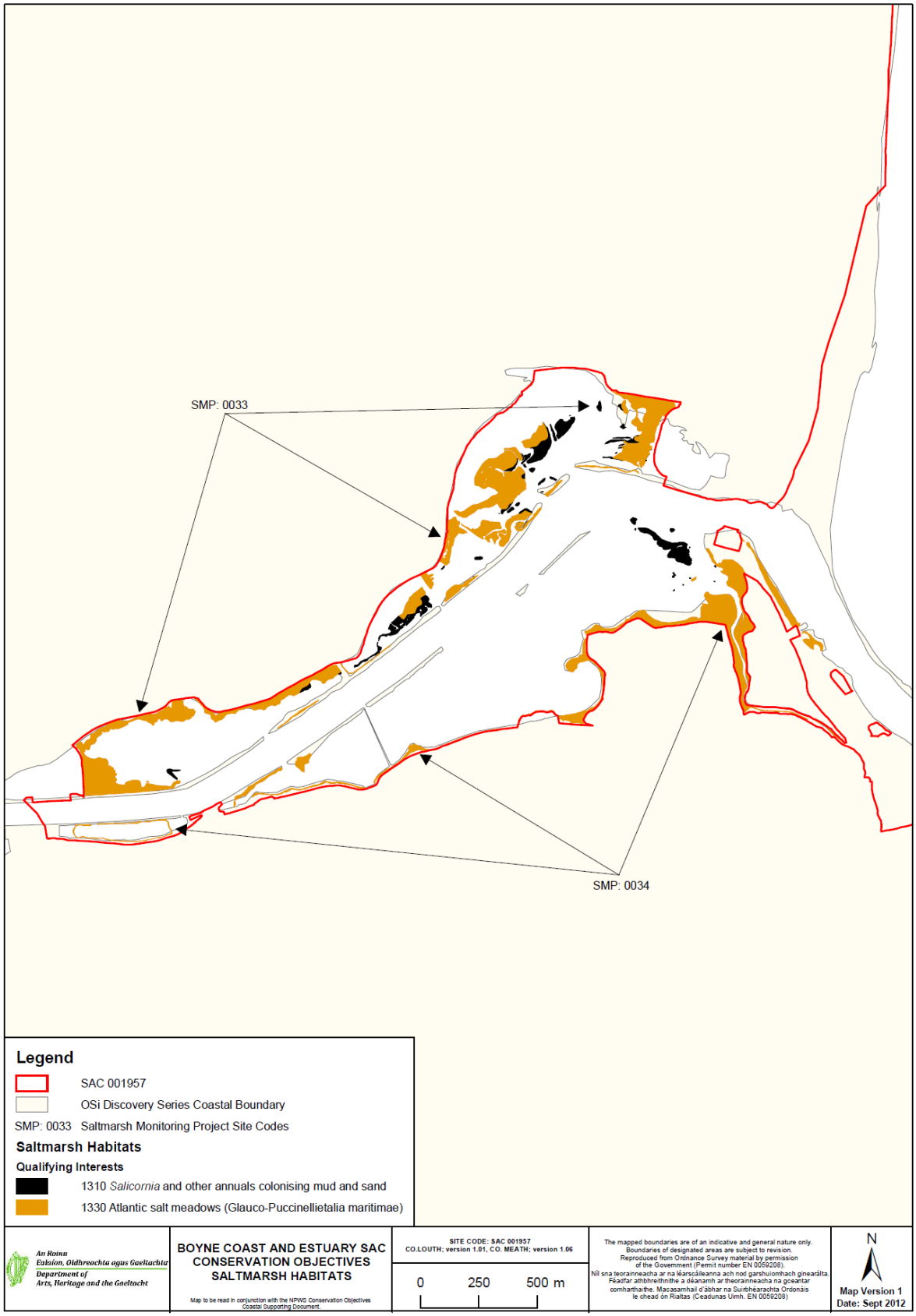
Appendix I – Distribution map of saltmarsh habitats within Boyne Coast and Estuary SAC.



Appendix II – Baltray site report and habitat map from the SMP (McCorry & Ryle 2009)

SITE DETAILS

SMP site name: **Baltray**		SMP site code: **0033**
Dates of site visit: **22 & 23 August 2007**		CMP site code: **002**
SM inventory site name: **Boyne-Baltray**		SM inventory site code: **236**
NPWS Site Name: **Boyne coast and estuary**		
NPWS designation	cSAC: **1957**	MPSU Plan: **New Format – Draft 2: 2005-2010**
	pNHA: **1957**	SPA: **4080**
County: **Louth**		Discovery Map: **43** Grid Ref: **314150, 277500**
Aerial photos (2000 series): **O 2320-A,B; O 2256-C,D; O 2319-B**		6 inch Map No: **Lh 022, 024, 025**

Annex I habitats currently listed as qualifying interests for Boyne coast and estuary 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: **Mornington**

Saltmarsh type: **Estuary** Substrate type: **Mud/Sand**

SITE DESCRIPTION

Baltray saltmarsh is located in Co. Louth along the northern side of the Boyne Estuary. The survey site is located east of Drogheda Town and extends from Baltray at the mouth of the estuary for about 3 km west to the easternmost extension of Drogheda Port. The southern side of the estuary is listed as a separate site (Mornington) on the saltmarsh inventory prepared by Curtis and Sheehy-Skeffington (1998). A shingle and sand spit located at the mouth of the estuary extends to Lady's Finger. This site contains an extensive sand dune complex and was surveyed by the Coastal Monitoring Project (Ryle *et al.* 2009). Part of this area has also been modified in the past due to the construction of a reservoir that was built in the former intertidal zone. Saltmarsh habitat has developed in the sheltered area behind this spit and adjacent to the reservoir. There are extensive intertidal mudflats in this area. A regional road is located along the shoreline between Drogheda and Baltray Village. Fragmented saltmarsh is found along the shoreline at the landward side of this road embankment. A range of habitats is found adjacent to this shoreline including improved grassland, tillage and woodland.

The Boyne estuary has been significantly modified during the past due to navigation to Drogheda Port. Old navigation walls were built in the intertidal zone along the main channel to maintain a navigable channel. These walls extend from the port to the mouth of the estuary and breached in many places, which allows tidal inundation into this intertidal zone. The construction of these walls has affected the development of

saltmarsh in the estuary. Fragmented saltmarsh of various sizes has developed in the sheltered intertidal zone between these walls and the shoreline in association with intertidal mudflats.

Baltray saltmarsh is part of Boyne Coast and Estuary candidate Special Area of Conservation (cSAC 1957). This large cSAC contains a large part of the estuary as far as Drogheda Town and extends along the coast of Cos. Meath and Louth to include extensive coastal habitats including the sand dune systems at Baltray and Mornington. Two Annex I saltmarsh habitats are found in at this site, *Salicornia* flats and Atlantic salt meadows (ASM). There is also extensive development of *Spartina* swards, which is not now considered to qualify as an Annex I habitat. A third Annex I habitat, Mediterranean salt meadows (MSM), is also listed as a qualifying interest for this SAC, but it was not recorded at this site.

Nearly the entire saltmarsh habitat is found within the digital cSAC boundary. The upper shoreline boundary as mapped by the old OSI 2nd edition 6 inch map is taken as the boundary of the cSAC along much of the estuary. Small rectification differences between the OSI 6 inch map and the OSI aerial photos means that some minor saltmarsh habitat extends behind this boundary in places.

Access to the marsh is possible from a number of locations along a public road, although caution is advised as the lower reaches of the saltmarsh are very muddy and soft.

SALTMARSH HABITATS

General description

The saltmarsh habitat is quite fragmented and spread out along the northern side of the estuary in the intertidal zone behind the training walls. Much of this saltmarsh has only developed in the past 100 years and is not mapped on the OSI 2nd edition 6 inch map.

The largest area of saltmarsh development is located at the eastern side of the site at Baltray. Some relic saltmarsh was found in this area in the sheltered zone behind the sand dune system. Part of this saltmarsh was infilled when the reservoir was created. A portion of this relic saltmarsh still remains in this area, adjacent to Baltray Golf Course. Newer saltmarsh has also developed further west in this extensive intertidal zone behind the navigation walls. The road embankment generally forms the upper limit of the saltmarsh in places. This saltmarsh is largely a mosaic of ASM and dense *Spartina* swards with some typical zonation where ASM is found landward of the *Spartina* swards. Other parts are a complicated mosaic of ASM and *Spartina* sward. There are also large parts of the intertidal flats with sparser cover and scattered clumps of Common Cordgrass (*Spartina anglica*). There is also some notable extensive development of *Salicornia* flats in the intertidal mudflats seaward of the *Spartina* sward in places.

Further west in the estuary there is more fragmented saltmarsh development where the intertidal zone between the navigation walls and the shoreline is narrower. This area is divided into several sections by a series of walls that link the shoreline to the navigation walls. The saltmarsh development within these sections is quite variable, with some complicated mosaics between ASM and *Spartina* sward developing.

The west side of the site adjacent to Drogheda Port is notable for some extensive recent development of ASM. A large area of the intertidal zone was infilled to aid the construction of this part of Drogheda Port.

The saltmarsh in this area is expanding at present. There is some development of *Spartina* sward at the seaward side of the ASM. This section also has some development of more brackish vegetation along the landward side of the ASM. This zone contains stands Twitch (*Elytrigia repens*)-dominated grassland and some Sea Club-rush and is mapped as non-Annex I saltmarsh (CM2) in accordance with the SMP project classification. These communities add to the overall diversity of the site.

Table 3.1. Area of saltmarsh habitats mapped at Baltray.

EU Code	Habitat	Area (ha)
H1310	*Salicornia* and other annuals colonizing mud and sand	2.840
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	14.370
non-Annex	*Spartina* swards	13.190
	Total	**30.400**

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

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

The extent of this habitat is notable at this site and it is rare to find large areas of *Salicornia* flats on intertidal flats. It is found in a variety of situations with the main extent found on banks of soft intertidal mud and sand. These patches extend seaward of other saltmarsh including ASM, *Spartina* sward or scattered clumps of Common Cordgrass. This habitat is also found on small raised accreting banks of mud surrounded by bare intertidal mudflats. These stands are also found in association with patches of green algae.

They are usually vegetated by an almost pure sward of Glasswort (*Salicornia* sp.). They occasionally contain scattered clumps of Common Cordgrass as well. Small patches may also be dominated by Annual Sea-blite (*Suaeda maritima*). The upper or landward boundary of this habitat sometimes contains other species like Common Saltmarsh-grass (*Puccinellia martima*), Lax-flowered Sea Lavender (*Limonium humile*) and Greater Sea-spurrey (*Spergularia media*).

This habitat is also found within the more established saltmarsh at Baltray. This saltmarsh contains an intricate network of deep creeks. Some bare sand banks have developed on places in these creeks where accretion is allowed to occur. These banks are vegetated by Glasswort in places. There is also some natural transition from *Salicornia* flats to pioneer ASM in places where Common Saltmarsh-grass increases in abundance at the upper boundary.

Atlantic salt meadows (H1330)

This habitat is well developed at this site. Several different ASM communities are found at the site including some pioneer vegetation in places. Much of the ASM is dominated by low-mid communities which is somewhat unusual. The best developed ASM is found at Baltray and at the west side of the site adjacent to Drogheda Port. This site is not grazed by livestock to the sward height is quite variable and there are no damaging activities due to excessive poaching.

The saltmarsh at Baltray is found in two main sections. The eastern section is part of the relic saltmarsh that originally developed as part of the sand dune system and spit. Saltmarsh has probably been found at this location for a long time. However, it has been modified by the infilling to create the reservoir. This area is

dominated by low-mid saltmarsh. Much of this zone is dominated by dense stand of Sea Purslane (*Atriplex portulacoides*). Low depression and salt pans are dominated by Common Cordgrass. Other species present include Common Saltmarsh-grass, Sea Aster (*Aster tripolium*), Greater Sea-spurrey, Glasswort, Lax-flowered Sea Lavender, Annual Sea-blite and Sea Plantain (*Plantago maritima*), which are found in small amounts. There is some development of pioneer ASM at the south-east corner of this section, which is dominated by a sward of Common Saltmarsh-grass and contains other low marsh species listed above. The low-marsh zone also has other habitats adjacent to the lower saltmarsh boundary, including *Salicornia* flats and *Spartina* sward of various densities. Some of the Sea Purslane seems to be spreading seaward into the *Spartina* sward zone and into the *Salicornia* flats. This is an example of current expansion of this saltmarsh.

Landward of the low marsh zone there is development of mid marsh dominated by a low sward of Sea Plantain and Sea Pink (*Armeria maritima*). There is some typical zonation to this community along landward gradients around this patch of saltmarsh. Further landward the topography is quite varied and a series of low mounds contain more frequent Red Fescue (*Festuca rubra*) as the vegetation shifts towards mid-upper communities. One large mound contains some terrestrial vegetation including species like Twitch, Sea Mayweed (*Tripleurospermum maritimum*) and Curled Dock (*Rumex crispus*). The structure of this ASM is well-developed and there is a series of creeks through this section.

Further west there has also been significant ASM development at Bankstown. This ASM has developed more recently. Nevertheless it is well-developed and there is an intricate network of channels through this ASM and the associated *Spartina* sward and ASM/*Spartina* sward mosaic. A track has been created along the central ridge of this section and divides the marsh into two main sections. The northern section has been modified by disturbance from attempted Common Cordgrass control. This species has infilled a large are of intertidal mudflats around the ASM. Much of the ASM is dominated by low marsh vegetation with Sea Purslane prominent. A large mosaic area has also developed with significant cover of Common Cordgrass (30-60% cover) in association with Common Saltmarsh-grass, Sea Aster, Lax-flowered Sea Lavender, Annual Sea-blite and Glasswort. Much of this saltmarsh has the appearance of being recently formed and it is likely to be quite dynamic. Open patches in the sward are dominated by Common Saltmarsh-grass that are surrounded by Sea Purslane plants. There is some typical saltmarsh zonation on both sides to the landward side of the central ridge where there is some development of mid marsh and mid-upper marsh vegetation. A notable community dominated by Hard-grass (*Parapholis strigosa*) is found toward the landward side and this community contains small amounts of Sea Plantain, Sea Pink, Red Fescue and rarer Sea Aster, Sea Purslane, Common Scurvy-grass and Greater Sea-spurrey. This community is not commonly found on saltmarshes.

The western side of the site contains similar ASM development. A narrow band of mainly low marsh saltmarsh dominated by Common Saltmarsh-grass and Sea Purslane extends along the shoreline and there is much more extensive ASM development at the western end, adjacent to the infilled area. Some zonation is noted along the shoreline where the saltmarsh has developed on a moderate slope with the appearance of a zone dominated by Red Fescue and Sea Plantain along the upper boundary. Several scattered clumps of Sea Rush (*Juncus maritimus*) appear in this zone in places but these are not frequent enough to map as MSM. There are several areas where there is some freshwater flow into the saltmarsh from adjacent

streams and there is some development of Common Reed (*Phragmites australis*) in these areas at the landward side of the saltmarsh. Other rarer species like Parsley Water-dropwort (*Oenanthe lachenalii*) and Wild Celery (*Apium graveolens*) appear in places along the upper zone where there is also increased cover of Creeping Bent-grass (*Agrostis stolonifera*). Long-bracted Sedge (*Carex extensa*) is also present.

The large extensive area adjacent to the infilled area is dominated by low-mid ASM. There is a gradual gradient along a landward slope to the embankment marking the edge of the infilled area and Port development. This area contains increased cover of Orache spp. (*Atriplex* spp.) particularly in the lower zone, which is unusual. There is some typical zonation from ASM to dense *Spartina* sward towards the lower boundary including the development of a significant transitional zone containing ASM/*Spartina* sward. This section of saltmarsh also has the appearance of being at a relatively young stage in its development with some patches of dense rank Common Saltmarsh-grass.

Spartina swards

This habitat is well established in some areas and seems likely to continue to expand over some parts of the intertidal mudflats. It is widespread and is distributed along the whole of the survey site. Extensive dense swards on soft mud have developed with few other saltmarsh species. Other sections contain sparse cover of scattered clumps of Common Cordgrass on intertidal mud and sand. It has mainly infilled intertidal mudflats to form dense swards seaward of other ASM vegetation. There are several areas where a mosaic of *Spartina* sward and ASM has developed. This habitat contains a mixture of lower sward marsh species including Sea Purslane, Common Saltmarsh-grass, Annual Sea-blite and Glasswort. Some of these species may be occasionally frequent or may dominate patches within the *Spartina* sward and they may also be found mixed with *Spartina* sward.

IMPACTS AND ACTIVITIES

This site is affected by few direct impacts and activities (Table 4.1). The saltmarsh at this site is not grazed and has a variable sward. The saltmarsh is generally not used for amenity activities but a track (501) is present into one section. Litter (421) collects in some of the intertidal areas between the shoreline and the navigation walls, which is brought down by the river.

Common Cordgrass is present at this site and is an invasive species of saltmarsh (954). This species has colonised significant areas of mudflats to establish dense *Spartina* swards. It is not known when this species was planted in, or colonised that estuary. However, it has been known in the estuary since 1960 (Nairn 1986). Carrouthers (1960) noted that the spread of Common Cordgrass into Dundalk Bay to the north of this site was thought to be natural. There are also areas on the intertidal flats with sparser cover of isolated clumps of Common Cordgrass of various sizes. This is one indication that the extent of *Spartina* sward is likely to increase in the future at the expense of intertidal mudflats. Scattered clumps are found in some of the patches of *Salicornia* flats and this habitat is vulnerable to colonisation by Common Cordgrass in the future.

There are also several patches of ASM/*Spartina* sward mosaic around the site. Common Cordgrass is also likely to have spread into the newly developing ASM at this site. However, it is difficult to establish the extent

of this colonisation, particularly as the extent of established saltmarsh was never mapped prior to colonisation by Common Cordgrass. The impact of its presence is assessed as moderately negative on these mosaic areas. This species has not spread significantly into the one area of relic saltmarsh that was previously established prior to the construction of the navigation walls. It is also difficult to assess if there has been any natural succession of *Spartina* sward to ASM at this site (990).

The site has also been disturbed by a failed attempt to reduce the extent of *Spartina* sward and create new unvegetated intertidal mudflats at Banktown (890). This impact was related to a capital project by Drogheda Port Company to improve the navigation of the channel. Material dredged from the channel was deposited on an intertidal area called Stagrennan Polder along the southern side of the estuary. To compensate for the loss of intertidal mudflats in this area it was decided to attempt to control *Spartina* sward in a different part of the estuary at Baltray. A bulldozer was used to attempt to remove the vegetation from the mudflats. This ultimately failed but the disturbance from this work has created a large mosaic area of ASM and *Spartina* sward and probably promoted colonisation of *Spartina* sward into the ASM. There were further plans to spray extensive *Spartina* sward with herbicides but these plans were the subject of long-running court cases due to objections from Coastwatch in relation to mitigation of the development at Stagrennan Polder.

Much of this saltmarsh has only developed in the past 100 years and is not mapped on the OSI 2nd edition 6 inch map. These maps mainly indicate that the area between the navigation walls and the shoreline was intertidal mud. The development of much of this saltmarsh is likely to be related to accretion (910) in these sheltered zones. Intermittent dredging of the main channel has also probably had some impact on the development of the saltmarsh and some mud may have been dumped in these zones in the past. These impacts are not assessed as they occurred outside the current monitoring period. The development of pioneer ASM and the presence of *Salicornia* flats is one indication that accretion is continued, but at a low rate. Accretion is assessed as having a low positive impact on the *Salicornia* flats and a portion of the ASM.

There is no indication of any erosion at this site (900). The saltmarsh is largely sheltered within the navigation walls. Tidal scour has created some typical erosion features such as saltmarsh cliffs in places. However, there has been no measurable loss of habitat due to erosion during the current monitoring period.

This area has also been modified by infilling in the past (803). A large area of saltmarsh and intertidal flats was infilled at Baltray to create the reservoir at some stage prior to the current monitoring period. A large intertidal area at the west side of the site was also infilled prior to the current monitoring period. There are frequent signs of other modifications to the saltmarsh across the site including the creation of drainage channels (810). There are no indications of any disturbance during the current monitoring period.

There are signs of continued accretion and expansion of saltmarsh at this site, particularly at the western side. There is also some development of pioneer saltmarsh around the site. However, a comparison of the 1995, 2000 and 2005 series aerial photos shows there is no measurable growth of established saltmarsh during the current monitoring period. Examination of these photos does show that the *Spartina* swards have measurably increased in extent on the intertidal mudflats during this period.

Impacts and activities around the site are mainly related to farming (100, 102, 120, 140) and to industry in Drogheda Port. Other information in NPWS files related to this SAC refers to water pollution from runoff related to this industry (700). There is ongoing development in the port with the possible threat of infilling to create new land. Dredging of the main channel has occurred during the monitoring period (850, 860). However, no impact to the saltmarsh from this dredging was noted. A golf course (601) is located at the north-east corner of the site as is a reservoir. These activities have had no measurable impact at this site. Extensive green algal mats were noted on the mudflats but this was not excessive.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	910	C	+1	2.84	Inside
H1310	954	B	-1	2.84	Inside
H1330	421	C	-1	0.5	Inside
H1330	501	C	-1	0.5	Inside
H1330	910	C	+1	1.2	Inside
H1330	954	B	-1	5.0	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 NHA survey, 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.

Baltray saltmarsh contains some notable features of conservation interest. Much of the saltmarsh has only developed in the past 100 years and is at a relatively young stage of development. The construction of the navigation walls and dredging of the main channel have both probably had a large part to play in the development of this site. Much of the saltmarsh is dominated by low-mid communities, which is somewhat unusual. Pioneer saltmarsh zone at present and there is a notable extent of *Salicornia* flats at the site. Further accretion at this site may lead to continued expansion of the saltmarsh and some natural succession to mid-upper saltmarsh communities.

The overall conservation status of this site is assessed as *unfavourable-inadequate* (Table 5.1). The saltmarsh is in relatively good condition and there are few damaging impacts at present. The main reason for this assessment is the presence of Common Cordgrass, which has already developed extensive swards.

The ASM and more particularly the *Salicornia* flats are vulnerable to further colonisation by this species in the future. This species is still spreading on the mudflats has is likely to increase its extent in the future. The site has been modified in the past by infilling, creation of drainage channels and disturbance.

It should be noted that Mediterranean salt meadows (1410) is listed as a qualifying habitat for this cSAC. However, this habitat was not recorded at Baltray or along the southern side of the estuary at Mornington. Sea Rush is present on the saltmarsh but is quite rare and not extensive enough to be classified as this habitat.

This site is located within the Boyne Coast and Estuary cSAC. A NPWS management plan is available for this cSAC.

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

Habitat	**EU Conservation Status Assessment**			
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Salicornia flats (H1310)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (H1330)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate

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

Extent

The extent of the habitat is assessed as *favourable*. There is no detailed information about the previous extent of this habitat. There is a notable area of this habitat present at the site. There are no indications that there has been any loss of habitat due to natural erosion or the spread of Common Cordgrass during the current monitoring period.

It could be reasonable to assume that this habitat was more extensive in the past, particularly in the areas where Common Cordgrass has developed dense swards. However, this was never documented.

Habitat structure and functions

The habitat structure and functions of this habitat are assessed as *unfavourable-inadequate*. Fourteen monitoring stops were carried out in this habitat and one stop failed. Most attributes for this habitat reached their targets. The failure of one stop was related to the spread of Common Cordgrass in one section, which was thought to have colonised significantly in one section.

Much of the *Salicornia* flats are found on the unvegetated flats in patches isolated from the rest of the saltmarsh. Some of this habitat contains scattered clumps of Common Cordgrass (< 1% cover). There are several small areas mapped as a mosaic of *Salicornia* flats and *Spartina* sward where there are scattered clumps of Common Cordgrass within the sward. Some of the *Salicornia* flats are found within more

established saltmarsh along the edges of creeks where accretion has created sand and mud-banks. This is an example of this habitat acting as a pioneer saltmarsh habitat.

Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts such as the spread of Common Cordgrass continue in the near future. Common Cordgrass is found within this habitat, especially where it is found on the intertidal flats. *Salicornia* flats may be vulnerable to further colonisation by Common Cordgrass in the future and may limit their extent. The *Salicornia* flats found within the more established saltmarsh are likely to persist as these habitats are dependant on natural sedimentation patterns within the creek network.

Atlantic salt meadows (H1330)

Extent

The extent of the ASM is assessed as *favourable*. There are no indications of any loss of ASM habitat due to erosion, land-use changes or the spread of Common Cordgrass during the current monitoring period. Disturbance caused by the attempts at *Spartina* sward control may have increased the extent of ASM/*Spartina* sward mosaic at the expense of some ASM, but this can not be quantified. There are some indicators around the site that the saltmarsh is at a relatively young stage of development and that the ASM is expanding seawards in places.

Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Twenty-eight monitoring stops were recorded in this habitat and they all passed. All the attributes required for favourable conservation status reached their targets. This saltmarsh is in generally good condition. There are few damaging activities affecting this habitat. Common Cordgrass is present and has created some large areas of ASM/*Spartina* sward mosaic but there are no indications that it has spread significantly within the ASM during the current monitoring period. The impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

Several typical and some rarer ASM communities were recorded at this site. Zonation was evident in places between these communities and the saltmarsh structure is well-developed in some sections. This structure has been modified in places by drainage channels. The sward height is quite variable in places as the site is not grazed. Some of the lower marsh is quite rank and low in diversity but this is also related to the relatively young stage of development of some of this saltmarsh.

Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and levels of impacts continue in the near future. There are few negative impacts directly affecting the saltmarsh at present. There has been some damage in the past from disturbance, infilling and drainage channels. However these activities are likely to be restricted in future. Common Cordgrass probably is the most significant threat to the saltmarsh. It is well-established at this site. The fact that so much of this saltmarsh is dominated by low-mid communities may mean that it is vulnerable

to further colonisation by this species in the future. Common Cordgrass has the potential to spread into this zone. This is the main reason for assessment as *unfavourable-inadequate*.

However, much of the saltmarsh is at relatively young stage of development. Further accretion could influence further natural succession of this ASM, the development of larger mid and mid-upper zones and the expansion of ASM.

MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

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Nairn, R.G.W. (1986). *Spartina anglica* in Ireland and its potential impact on wildfowl and waders – a review. *Irish Birds*. **3**, 215-258.

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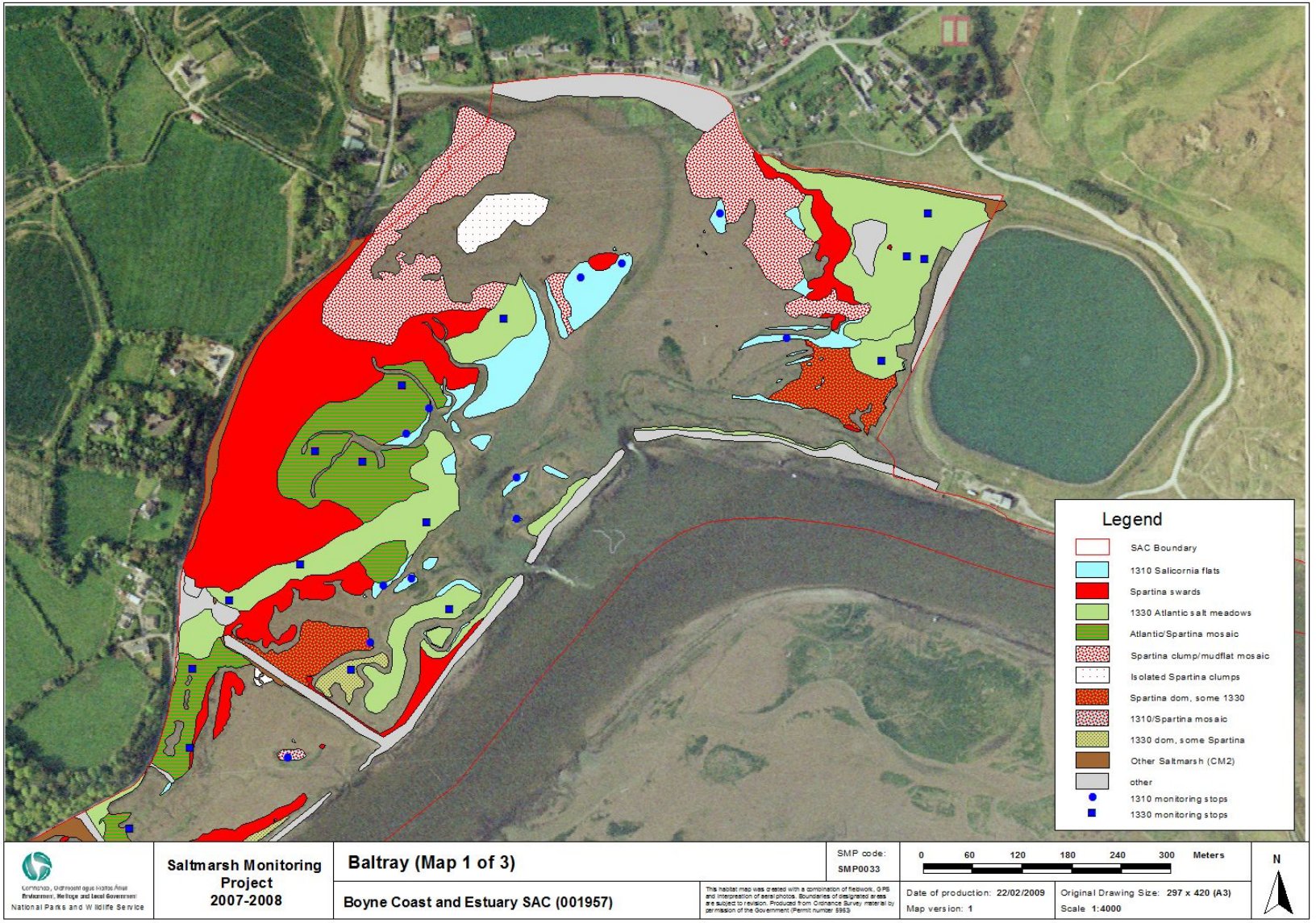
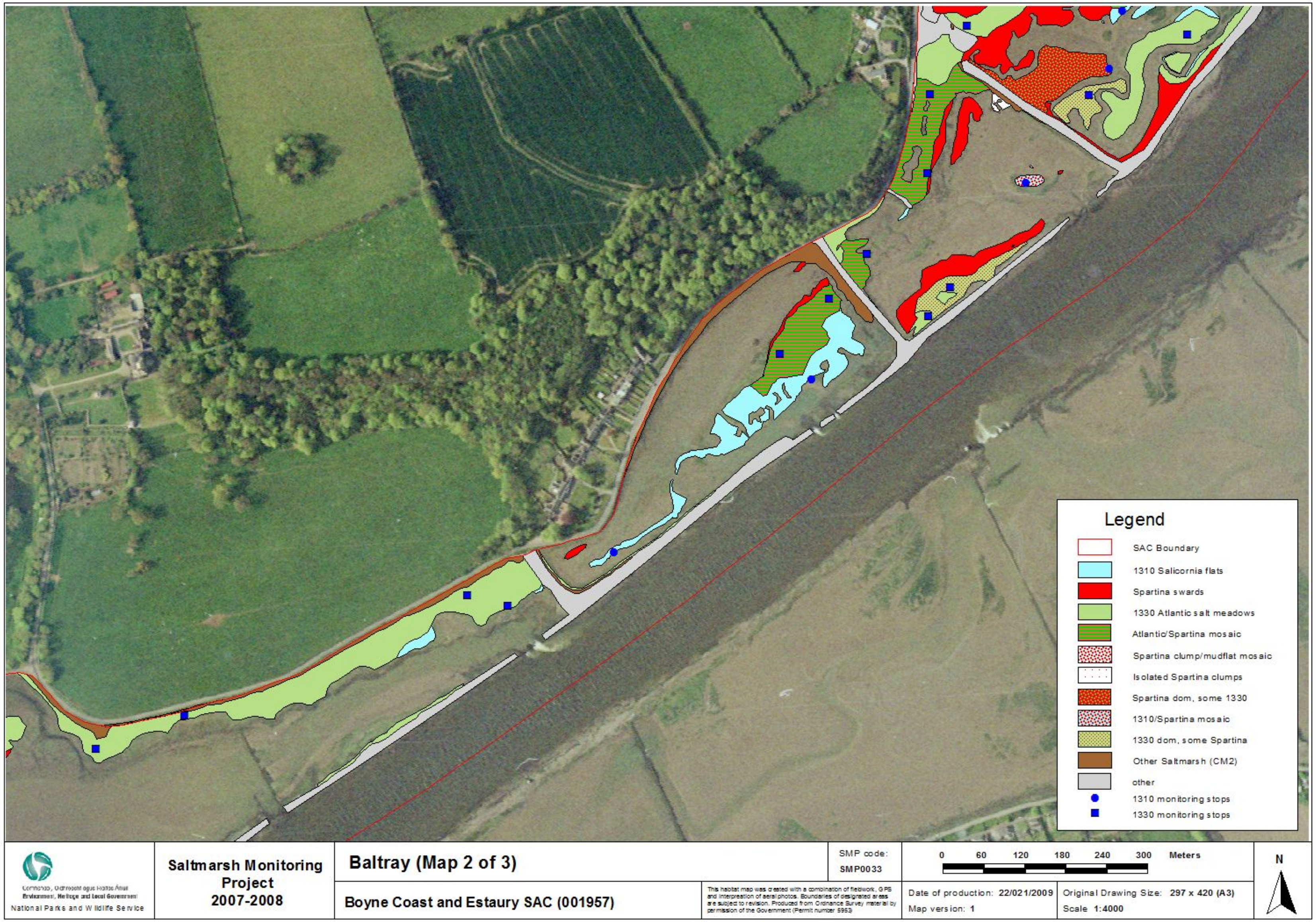
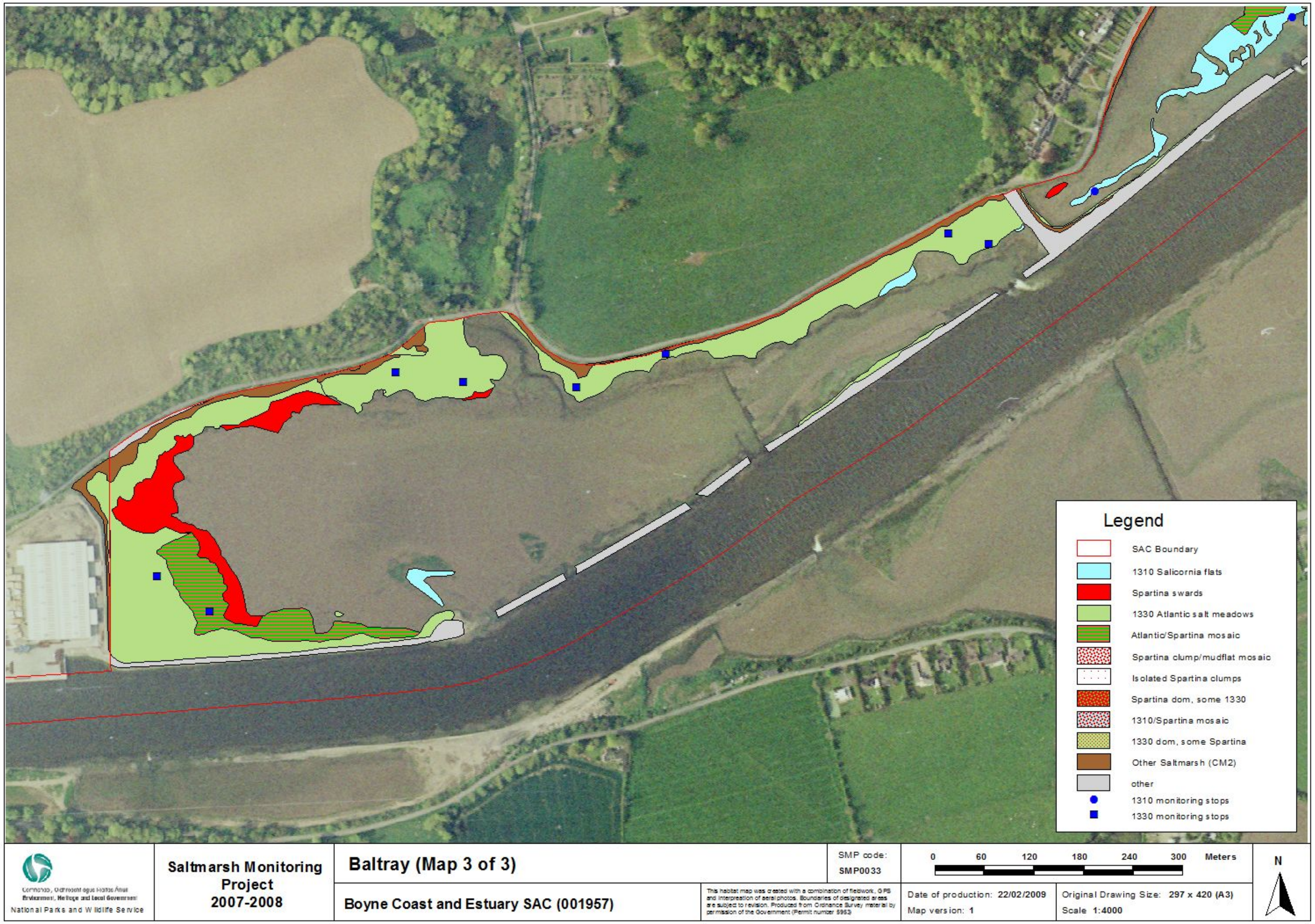
APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	*Spartina* swards
1	1310 *Salicornia* flats	2.821	2.821				
2	*Spartina* swards	7.730					7.730
3	1330 Atlantic salt meadow	11.334		11.334			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic	4.694		2.347			2.347
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	4.929					
10	*Spartina* clump/mudflat mosaic (50/50)	3.986					1.993
11	Isolated *Spartina* clumps on mud (5%)	0.481					0.024
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic						
14	*Spartina* sward dominated, with some ASM	1.315		0.329			0.986
15	1310/*Spartina* mosaic	0.039	0.0195				0.0195
16	ASM dominated with some *Spartina*	0.450		0.360			0.090
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.680					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**39.459**	**2.841**	**14.37**			**13.19**


Legend
SAC Boundary
1310 Salicornia flats
Spartina swards
1330 Atlantic salt meadows
Atlantic/Spartina mosaic
Spartina clump/mudflat mosaic
Isolated Spartina clumps
Spartina dom, some 1330
1310/Spartina mosaic
1330 dom, some Spartina
Other Saltmarsh (CM2)
other
1310 monitoring stops
1330 monitoring stops
Saltmarsh Monitoring Project 2007-2008
Baltray (Map 1 of 3)
SMP code: SMP0033
0 60 120 180 240 300 Meters
N
Boyne Coast and Estuary SAC (001957)
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 6953)
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:4000
National Parks and Wildlife Service


Legend
SAC Boundary
1310 Salicornia flats
Spartina swards
1330 Atlantic salt meadows
Atlantic/Spartina mosaic
Spartina clump/mudflat mosaic
Isolated Spartina clumps
Spartina dom, some 1330
1310/Spartina mosaic
1330 dom, some Spartina
Other Saltmarsh (CM2)
other
1310 monitoring stops
1330 monitoring stops
National Parks and Wildlife Service
Saltmarsh Monitoring Project 2007-2008
Baltray (Map 2 of 3)
Boyne Coast and Estuary SAC (001957)
SMP code: SMP0033
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)
0 60 120 180 240 300 Meters
Date of production: 22/021/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:4000
N


Legend
SAC Boundary
1310 Salicornia flats
Spartina swards
1330 Atlantic salt meadows
Atlantic/Spartina mosaic
Spartina clump/mudflat mosaic
Isolated Spartina clumps
Spartina dom, some 1330
1310/Spartina mosaic
1330 dom, some Spartina
Other Saltmarsh (CM2)
other
1310 monitoring stops
1330 monitoring stops
National Parks and Wildlife Service
Saltmarsh Monitoring Project 2007-2008
Baltray (Map 3 of 3)
SMP code: SMP0033
0 60 120 180 240 300 Meters
N
Boyne Coast and Estuary SAC (001957)
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)
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:4000

Appendix III – Mornington site report and habitat map from the SMP (McCorry & Ryle 2009)

SITE DETAILS

SMP site name: **Mornington**		SMP site code: **0034**
Dates of site visit: **21& 22/08/2007**		CMP site code: **003**
SM inventory site name: **Boyne-Mornington**		SM inventory site code: **235**
NPWS Site Name: **Boyne Coast and Estuary**		
NPWS designation	cSAC: **1957**	MPSU Plan: **New format – Draft 2: 2005-1010**
	pNHA: **1957**	SPA: **4080**
County: **Meath**		Discovery Map: **43** Grid Ref: **314300, 276800**
Aerial photos (2000 series): **O 2256-D; O 2319-B,D; O 2320-A,B,C**		6 inch Map No: **Me 020, 021**

Annex I habitats currently listed as qualifying interests for Boyne Coast and Estuary 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: **Baltray**

Saltmarsh type: **Estuary** Substrate type: **Mud/Sand**

SITE DESCRIPTION

Mornington saltmarsh is located in Co. Meath along the southern side of the Boyne Estuary. The survey site is located east of Drogheda Town and extends from the mouth of the estuary for about 2.5 km west inland to Stagrennan Polder. The northern side of the estuary is listed as a separate site (Baltray) on the saltmarsh inventory prepared by Curtis and Sheehy-Skeffington (1998).

A sand and shingle spit is found at the mouth of the estuary that extends to Durrow Spit. This area was surveyed by the Coastal Monitoring Project (Ryle *et al.* 2009) and contains a small sand dune complex. Saltmarsh has mainly developed in the low-lying sheltered area behind this spit. There are extensive intertidal mudflats adjacent to the saltmarsh. This intertidal zone is sheltered by navigation walls that have been built along the main river channel. The Boyne Estuary has been significantly modified during the past due to navigation to Drogheda Port. Old navigation walls were built in the intertidal zone along the main channel to maintain a navigable channel. These walls extend from the port to the mouth of the estuary and breached in many places, which allows tidal inundation into this intertidal zone. The construction of these walls has affected the development of saltmarsh in the estuary. Fragmented saltmarsh of various sizes has developed further west in the sheltered intertidal zone and associated with these walls.

A range of habitats is found adjacent to this shoreline including improved grassland and tillage. A regional road is found along the western section of the site and forms the upper shoreline boundary on an embankment. There is some scattered habitation along this road adjacent to the shoreline at Mornington. There are also some dwellings and associated gardens adjacent to the saltmarsh at the east end of the site. Several streams flow into this section of shoreline.

Mornington saltmarsh is part of Boyne Coast and Estuary candidate Special Area of Conservation (cSAC) (1957). This large cSAC contains a large part of the estuary as far as Drogheda Town and extends along the coast of Cos. Meath and Louth to include extensive coastal habitats including the sand dune systems at Baltray and Mornington. Two Annex I saltmarsh habitats are found in at this site, *Salicornia* flats and Atlantic salt meadows (ASM). There is also extensive development of *Spartina* swards, which is not now considered to qualify as an Annex I habitat. A third Annex I habitat, Mediterranean salt meadows (MSM), is also listed as a qualifying interest for this cSAC but was not recorded at this site.

Most of the saltmarsh habitat is found within the digital cSAC boundary. There is some habitat excluded from the cSAC. The upper shoreline boundary as mapped by the old OSI 2nd edition 6 inch map is taken as the boundary of the cSAC along much of the estuary. Small rectification differences between the OSI 6 inch map and the OSI aerial photos means that some minor saltmarsh habitat extends behind this boundary in places. This is particularly seen along the stream channel flowing into saltmarsh at the east side of the site.

Access to the marsh is possible from a number of locations along a public road and the sand spit at Mornington although caution is advised as the lower reaches of the saltmarsh are very muddy and soft.

SALTMARSH HABITATS

General description

The main saltmarsh development is found at the east end of the site and is associated with the sheltered area behind the sand spit at Durrow Point. The saltmarsh is divided into two main sections by a stream that flows into this area. Saltmarsh has developed on low-lying land, mainly on the west side of the stream and this develops into a narrow band of habitat that extends upstream along a narrow low-lying channel. This saltmarsh may have been more extensive in the past and a large area has been reclaimed and low-lying land containing improved grassland is found behind low berms. This saltmarsh is dominated by Atlantic salt meadows (ASM) (Table 4.1). Extensive *Spartina* sward has also developed seaward of this more established saltmarsh on the mudflats. A large and notable area of *Salicornia* flats is also found on these mudflats in the north-east corner. The upper boundary of this saltmarsh is generally marked by man-made earth berms on the west side and along the narrow channel, and this boundary is marked by development of Twitch-dominated vegetation. This

vegetation has been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The north-east section has a natural unmodified transition from saltmarsh to a Twitch-dominated zone along a natural embankment and there are further transitions to disturbed coastal grassland and some fixed dune vegetation.

There is some minor saltmarsh development on the east side of the sand spit along the edge of the main channel. This is dominated by ASM and there is no development of *Spartina* sward in this area. There is some transition to embryonic dunes where there are some raised sandy mounds.

Further west there is fragmented saltmarsh development along the shoreline in the intertidal area behind the navigation walls. This saltmarsh is mainly dominated by ASM and there is much less *Spartina* sward development in this section. A narrow band of ASM has developed along the back of the navigation walls at the west side of the site. Saltmarsh is also found in a small low-lying inlet in this section. This area has been partially infilled in the past. A stream flows through this inlet and some freshwater influence can be seen on the vegetation with the development of stands of Sea Club-rush (*Bolboschoenus maritimus*) and Common Reed (*Phragmites australis*). The impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

Table 3.1. Area of saltmarsh habitats mapped at Mornington.

EU Code	Habitat	Area (ha)
H1310	*Salicornia* and other annuals colonizing mud and sand	1.327
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	11.242
non-Annex	*Spartina* swards	4.322
	Total	**16.891**

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

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

A notable area of this habitat is found at this site, mainly as one large area on mudflats at the north-east corner of the site. The *Salicornia* flats have developed on mudflats along the back of the navigation wall and in isolation of the other saltmarsh habitats. This habitat is characterised by scattered aggregations of Glasswort (*Salicornia* spp.) of various densities on mud. Some of the Glasswort is quite sparse in places. This vegetation is characterised by high cover of algal mats. There are small areas within this large area of *Salicornia* flats habitat with scattered clumps of Common Cordgrass (*Spartina anglica*). However, this species does not form a significant part of the overall cover of this habitat. Other species such as Sea Aster (*Aster tripolium*), Common Saltmarsh-grass (*Puccinellia martima*) and Lax-flowered Sea Lavender (*Limonium humile*) are found in the upper section of this habitat, but they are rare.

Smaller patches of this habitat are also found around the site in association with the unconsolidated *Spartina* sward at the east side of the river channel.

Atlantic salt meadows (H1330)

This habitat is well-developed at this site and is the most extensive saltmarsh habitat found at this site. Much of the ASM saltmarsh is dominated by low-mid communities, particularly at the east end of the site, which is one indication that much of this saltmarsh is relatively young and newly established. This community is dominated by Sea Purslane, which sometimes forms dense stands with low diversity. Other species present include Common Saltmarsh-grass, Sea Aster, Lax-flowered Sea Lavender, Greater Sea-spurrey (*Spergularia media*) Sea Plantain (*Plantago maritima*), Sea Milkwort (*Glaux maritima*) and Glasswort and these species form a mixed community with Sea Purslane in places. Common Cordgrass is also present and is occasionally frequent in this lower community. Salt pans are present in this zone. There is some zonation from this zone to a band dominated by Sea Beet (*Beta maritima*) along the upper boundary adjacent to the back of the sand spit.

This community also extends along the low-lying stream channel to the south of the main saltmarsh. Some pans have been infilled by Common Cordgrass but overall its cover is rare. There is minor zonation to Red Fescue-dominated vegetation around the upper boundaries adjacent to the berms.

Further landward in the main section there is some more-established saltmarsh with mid marsh and mid upper communities predominant. This mid marsh zone is dominated by Sea Pink and Sea Plantain and there are low mounds with increased cover of Red Fescue (*Festuca rubra*). Other species present include Lax-flowered Sea Lavender, Sea Arrowgrass (*Triglochin maritimum*), Common Scurvy-grass (*Cochlearia officinalis*) and small clumps of Sea Purslane. The cover of Red Fescue increases towards the landward boundary of the berm.

Some pioneer ASM was also found in this area on the east side of the river channel. This community is represented by patches of Common Saltmarsh-grass and scattered Sea Purslane bushes and also contains clumps of Common Cordgrass and Glasswort. There is frequent cover of bare mud and green algal mats in this community.

There is some development of rank low-marsh vegetation dominated by a dense sward of Common Saltmarsh-grass in the small inlet towards the west side of the site at Mornington. This community is low in diversity being dominated by one species, although there are small amounts of Sea Plantain and Spear-leaved Orache (*Atriplex prostrata*). This may be an indication of some localised eutrophication from a stream flowing through this area. Common Cordgrass is rare in this area. A significant area further upstream is also contains vegetation dominated by Creeping Bent (*Agrostis stolonifera*) and Twitch has colonised some ridges along drains in this area. Mid-marsh vegetation dominated by Sea Plantain is also

represented. Further upstream there is some indication of increased freshwater influence with the development of Common Reed stands.

Spartina swards

This habitat is well-established at this site. A large area of dense *Spartina* sward is established on the mudflats seaward of ASM at the east side of the site and west of the stream flowing into this area. This sward has developed on bare mud and does not seen to have colonised former ASM. There is a fairly distinctive boundary between the ASM and the *Spartina* sward. The sward is characterised by dense cover of Common Cordgrass. This area contains some areas of bare mud where the sward has not consolidated and there are aggregations of large clumps of Common Cordgrass. There are indications of significant colonisation between 2000 and 2005 when the two aerial photo series are compared. Several patches of *Salicornia* flats were noted within this *Spartina* sward on unvegetated patches of bare mud near the seaward boundary. There is also some development of pioneer ASM along the seaward boundary of the *Spartina* sward with Common Saltmarsh-grass and Sea Purslane appearing. This is an indication of accretion and expansion of the saltmarsh.

There is some development of *Spartina* sward and ASM/*Spartina* sward mosaic on the east side of the stream channel at the east side of the site. There are indications of significant growth of saltmarsh in this area, including the spread of *Spartina* sward into pioneer ASM. The mosaic is characterised by clumps dominated by Common Saltmarsh-grass and also contains frequent Sea Purslane bushes and clumps of Common Cordgrass of various sizes. This vegetation is relatively undeveloped and the sward has not consolidated, leaving patches of bare mud and green algal mats within the mosaic.

IMPACTS AND ACTIVITIES

This saltmarsh is affected by some impacts and activities (Table 4.1). The remaining saltmarsh is in relatively good condition and it is not grazed by livestock. The sward height is quite variable and the surface of the saltmarsh is not damaged by excessive poaching. There is some build up of litter in places, which is brought down by the river channel. There is some access to the saltmarsh along the narrow channel, which is used by walkers (622) and for amenity activities by children. The saltmarsh is also used for mooring boats in the area behind the sand spit. However, these activities have very little impact. The small area of saltmarsh at the east side of the sand spit is damaged by wheel ruts in places (623), as there is access to the shoreline by vehicles. A track (501) marks the upper boundary of this part of saltmarsh. Some drains (810) have been dug across the saltmarsh in the past, prior to the current monitoring period.

A comparison of the OSI 2nd edition 6 inch map to the current extent of saltmarsh shows that the saltmarsh has expanded significantly since this map was drawn, especially at the east

end of the site. This is likely to be related to accretion (910) in the sheltered intertidal zones between the navigation walls and the shoreline. Similar trends were seen along the northern side of the estuary. Intermittent dredging of the main channel in the past has also probably had some impact on the development of the saltmarsh and some mud may have been dumped in these zones in the past. These impacts are not assessed as they occurred outside the current monitoring period. There is no measurable growth of saltmarsh during the current monitoring period so its impact is assessed as neutral. However, accretion is likely to be continuing, but at a low rate. This will have a positive influence on the saltmarsh and the extent of ASM and *Salicornia* flats. The impact of accretion is assessed as a positive impact on the *Salicornia* flats and a portion of the ASM.

There is no indication of any significant erosion at this site (900). The saltmarsh is largely sheltered within the navigation walls. Tidal scour has created some typical erosion features such as saltmarsh cliffs in places. However, there has been no measurable loss of habitat due to erosion during the current monitoring period.

There has been some reclamation of saltmarsh habitat at this site in the past (802). This is seen in the saltmarsh located at the east side of the site. Land adjacent to the saltmarsh is low-lying and is found behind low berms. Some of this land was probably saltmarsh in the past. Saltmarsh in an inlet located at Mornington has also been partially infilled prior to the current monitoring period (803). These impacts are not assessed as they occurred outside the current monitoring period.

Common Cordgrass is present at this site and is an invasive species of saltmarsh and mudflats (954). This species has colonised significant areas of mudflats seaward of the established saltmarsh to establish dense *Spartina* swards. It is not known when this species was planted in, or colonised this estuary. However, it has been known in the estuary since 1960 (Nairn 1986) and its presence probably pre-dates this period. Accretion at this site has also probably promoted the spread of this species. There are also small areas on the intertidal flats with sparser cover of isolated clumps of Common Cordgrass of various sizes. An examination of the 2000 and 2005 series aerial photos shows that the *Spartina* sward has consolidated and expanded in this period, mainly at the seaward side. Scattered clumps are found in some of the patches of *Salicornia* flats and this habitat is vulnerable to colonisation by Common Cordgrass in the future.

There are also several patches of ASM/*Spartina* sward mosaic around the site. Common Cordgrass may have spread into the newly developing ASM at this site. The impact of its presence is assessed as moderately negative in these mosaic areas. However, it is difficult to establish the extent of this colonisation, particularly as the extent of established saltmarsh was never mapped prior to colonisation by Common Cordgrass. This species has not spread significantly into any of the relic saltmarsh that was previously established prior to the construction of the navigation walls. There are some indications of natural succession of *Spartina* sward to ASM at this site (990) or that the establishment of *Spartina* sward lead to

development of ASM. This is seen in places where saltmarsh was not previously mapped on the OSI 2nd edition 6 inch map.

Impacts and activities around the site are mainly related to farming (100, 102, 120, 140), urbanisation (402, 403) and to industry in Drogheda Port. Other information in NPWS files related to this cSAC refers to water pollution from runoff related to this industry (700). Extensive green algae mats were noted on the mudflats adjacent to the saltmarsh and these may be an indication of eutrophication. There are also some indications of eutrophication to the saltmarsh found in the inlet at the western end of the site (700). There is ongoing development in the port with the possible threat of infilling to create new land. A driving range (601) is located in some of the reclaimed land adjacent to the saltmarsh. There have been some recent modifications to these berms and a small breach has lead to the creation of a small patch of new saltmarsh in one part. These activities have no measurable impact on the saltmarsh habitat other than those already assessed.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	910	C	+1	1.327	Inside
H1310	954	C	-1	1.327	Inside
H1330	421	C	0	0.01	Inside
H1330	501	C	0	0.03	Inside
H1330	622	C	0	0.5	Inside
H1330	623	C	-1	0.1	Inside
H1330	910	C	+1	8.0	Inside
H1330	954	B	-1	1.0	Inside
H1310	850	C	0	1.327	Outside
H1330	700	C	-1	0.9	Outside
H1330	850	C	0	11.242	Outside

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

Dredging of the main channel has occurred during the monitoring period (850, 860). However, no direct impact to the saltmarsh from this dredging was noted. Stagrennan Polder is located to the west of the survey site and has been used as part of a capital project by Drogheda Port Company to improve navigation in the channel. Material dredged from the channel was dumped in Stagrennan Polder. This area is currently being restored and the restoration project involves creating new intertidal flats and saltmarsh. No established saltmarsh had developed by the time of the survey but there was some colonisation of saltmarsh plants in the polder and around the edge of the embankments. The impacts on

Stagrennan Polder were not considered as part of this assessment as it was outside the survey site.

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 NHA survey, 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.

Mornington saltmarsh contains some notable features of conservation interest. Some of the saltmarsh has only developed in the past 100 years and is at a relatively young stage of development. The construction of the navigation walls and dredging of the main channel have both probably had a large part to play in the development of this site. Much of the saltmarsh is dominated by low-mid communities, which is somewhat unusual. Pioneer saltmarsh zone is present and there is a notable extent of *Salicornia* flats at the site. Further accretion at this site may lead to continued expansion of the saltmarsh. The saltmarsh is part of a larger coastal system with a sand-spit at the east side of the site but this spit has been significantly modified.

The overall conservation status of this site is assessed as *unfavourable-inadequate* (Table 5.1). The saltmarsh is in relatively good condition and there are few damaging impacts at present. The main reason for this assessment is the presence of Common Cordgrass, which has already developed extensive swards. The pioneer and lower marsh ASM, and more particularly the *Salicornia* flats, are vulnerable to further colonisation by this species in the future. This species is still spreading on the mudflats and is likely to increase its extent in the future. The site has been modified in the past by reclamation, infilling and creation of drainage channels.

It should be noted that Mediterranean salt meadows (1410) is listed as a qualifying habitat for this cSAC. However, this habitat was not recorded at Mornington or along the southern side of the estuary at Baltray. Sea Rush was not recorded along the southern side of the estuary. Sea Rush is present on the saltmarsh at Baltray but is quite rare and not extensive enough to be classified as this habitat.

This site is located within the Boyne Coast and Estuary cSAC. A NPWS management plan is available for this cSAC.

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

Habitat	EU Conservation Status Assessment			
	Favourable	**Unfavourable – Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Salicornia flats (H1310)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (H1330)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate

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

Extent

The extent of the habitat is assessed as *favourable*. There is no detailed information about the previous extent of this habitat. There is a notable area of this habitat present at the site. There are no indications that there has been any significant loss of habitat due to natural erosion or the spread of Common Cordgrass during the current monitoring period.

It could be reasonable to assume that this habitat was more extensive in the past, particularly in the areas where Common Cordgrass has developed dense swards. However, this was never documented.

Habitat structure and functions

The habitat structure and functions of this habitat are assessed as *favourable*. Four monitoring stops were carried out in this habitat and they all passed. Attributes required for favourable conservation status reached their targets. This habitat is in generally good condition. Much of the *Salicornia* flats are found on the unvegetated flats in patches isolated from the rest of the saltmarsh. Common Cordgrass is present within this habitat but does not form a significant part of the vegetation (< 1% cover). The impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts such as the spread of Common Cordgrass continue in the near future. Common Cordgrass is found within this habitat and there are several small patches of *Salicornia* flats within the *Spartina* sward. *Salicornia* flats may be vulnerable to further colonisation by Common Cordgrass in the future and this may limit their extent.

Atlantic salt meadows (H1330)

Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any significant loss of ASM due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. There are indications that the saltmarsh is expanding in places and pioneer SM is present, indicating active accretion and growth. This is a positive indictor for the extent of ASM.

There is also some development of ASM/*Spartina* sward mosaic. It is not known if Common Cordgrass has spread into pioneer ASM to develop this community due to the lack of accurate baseline data. This is likely to be the case. However, this impact on species composition is not assessed as it may have largely occurred prior to the current monitoring period.

Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Fourteen monitoring stops were recorded in this habitat and they all passed. All the attributes required for favourable conservation status reached their targets. This saltmarsh is in generally good condition. There are few damaging activities affecting this habitat. Common Cordgrass is present and has created some areas of ASM/*Spartina* sward mosaic but there are no indications that it has spread significantly within the ASM during the current monitoring period. The impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

Several typical ASM communities were recorded at this site. Zonation was evident in places between these communities and the saltmarsh structure is well-developed in some sections. This structure has been modified in places by drainage channels. The sward height is quite variable in places as the site is not grazed. There is a small area with increased freshwater influence that increases the diversity and structure of the saltmarsh overall.

Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and levels of impacts continue in the near future. There are few negative impacts directly affecting the saltmarsh at present. There has been some damage in the past from disturbance, infilling and drainage channels. However these activities are likely to be restricted in future. Common Cordgrass probably is the most significant threat to the saltmarsh. It is well-established at this site. The fact that so much of this saltmarsh is dominated by low-mid communities may mean that it is vulnerable to further colonisation by this species in the future. Common Cordgrass has the potential to spread into this zone. This is the main reason for assessment as *unfavourable-inadequate*.

However, much of the saltmarsh is at relatively young stage of development. Further accretion could influence further natural succession of this ASM, the development of larger mid and mid-upper zones and the expansion of ASM.

MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

REFERENCES

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Nairn, R.G.W. (1986). *Spartina anglica* in Ireland and its potential impact on wildfowl and waders – a review. *Irish Birds*. **3**, 215-258.

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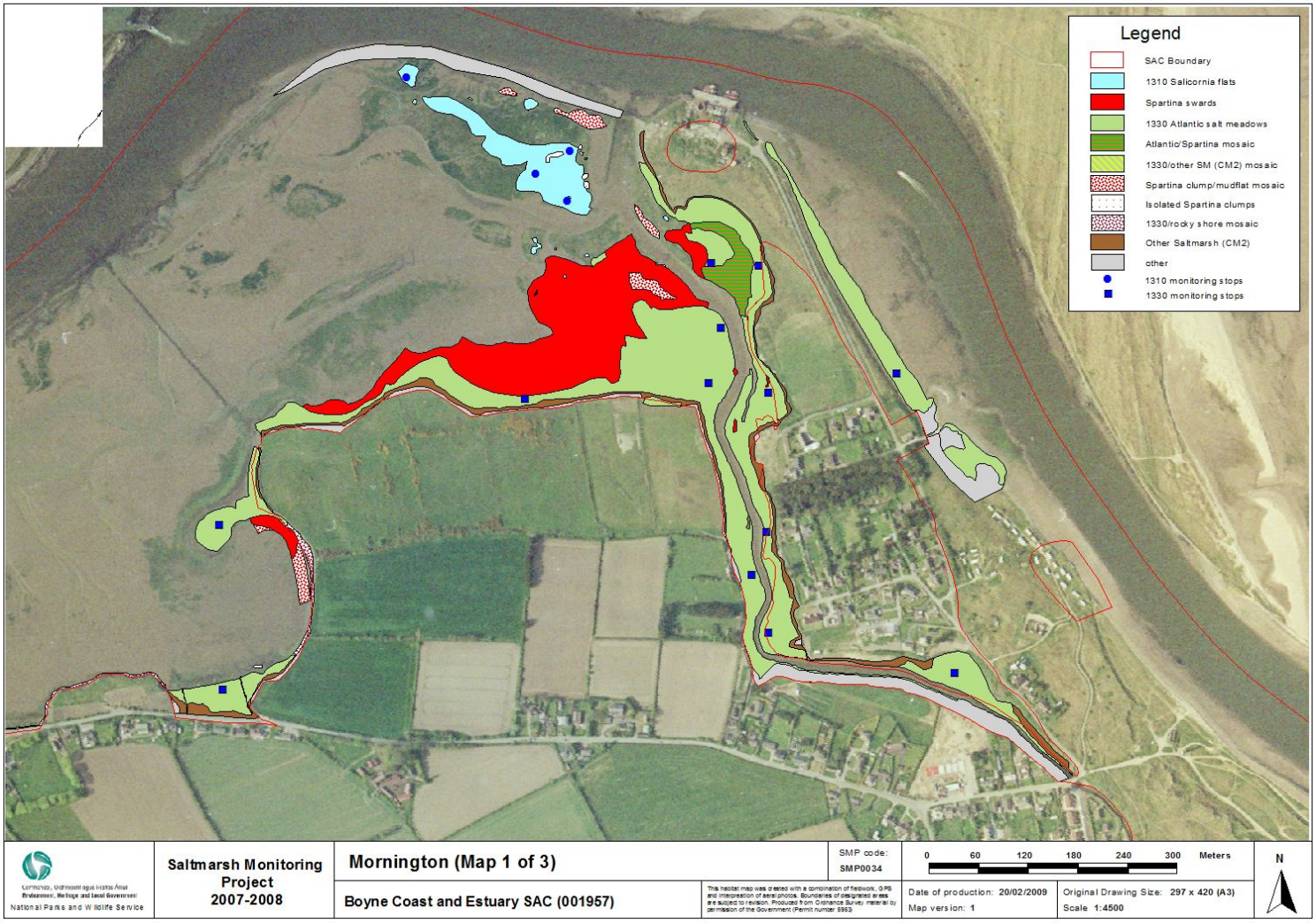
APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	*Spartina* swards
1	1310 *Salicornia* flats	1.136	1.136				
2	*Spartina* swards	3.914					3.914
3	1330 Atlantic salt meadow	10.548		10.548			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic	0.431		0.2155			0.2155
7	1330/other SM (CM2) mosaic	0.787		0.3935			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	6.467					
10	*Spartina* clump/mudflat mosaic (50/50)	0.381	0.1905				0.1905
11	Isolated *Spartina* clumps on mud (5%)	0.036					0.0018
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)	1.069					
19	1330/rocky shore mosaic	0.171		0.0855			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**24.94**	**1.33**	**11.24**			**4.32**


Legend
SAC Boundary
1310 Salicornia flats
Spartina swards
1330 Atlantic salt meadows
Atlantic/Spartina mosaic
1330/other SM (CM2) mosaic
Spartina clump/mudflat mosaic
Isolated Spartina clumps
1330/rocky shore mosaic
Other Saltmarsh (CM2)
other
1310 monitoring stops
1330 monitoring stops
Saltmarsh Monitoring Project 2007-2008
Mornington (Map 1 of 3)
Boyne Coast and Estuary SAC (001957)
SMP code: SMP0034
0 60 120 180 240 300 Meters
N
Date of production: 20/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:4500
National Parks and Wildlife Service

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

Saltmarsh Monitoring Project 2007-2008

Mornington (Map 2 of 3)

SMP code: SMP0034

0 60 120 180 240 300 Meters

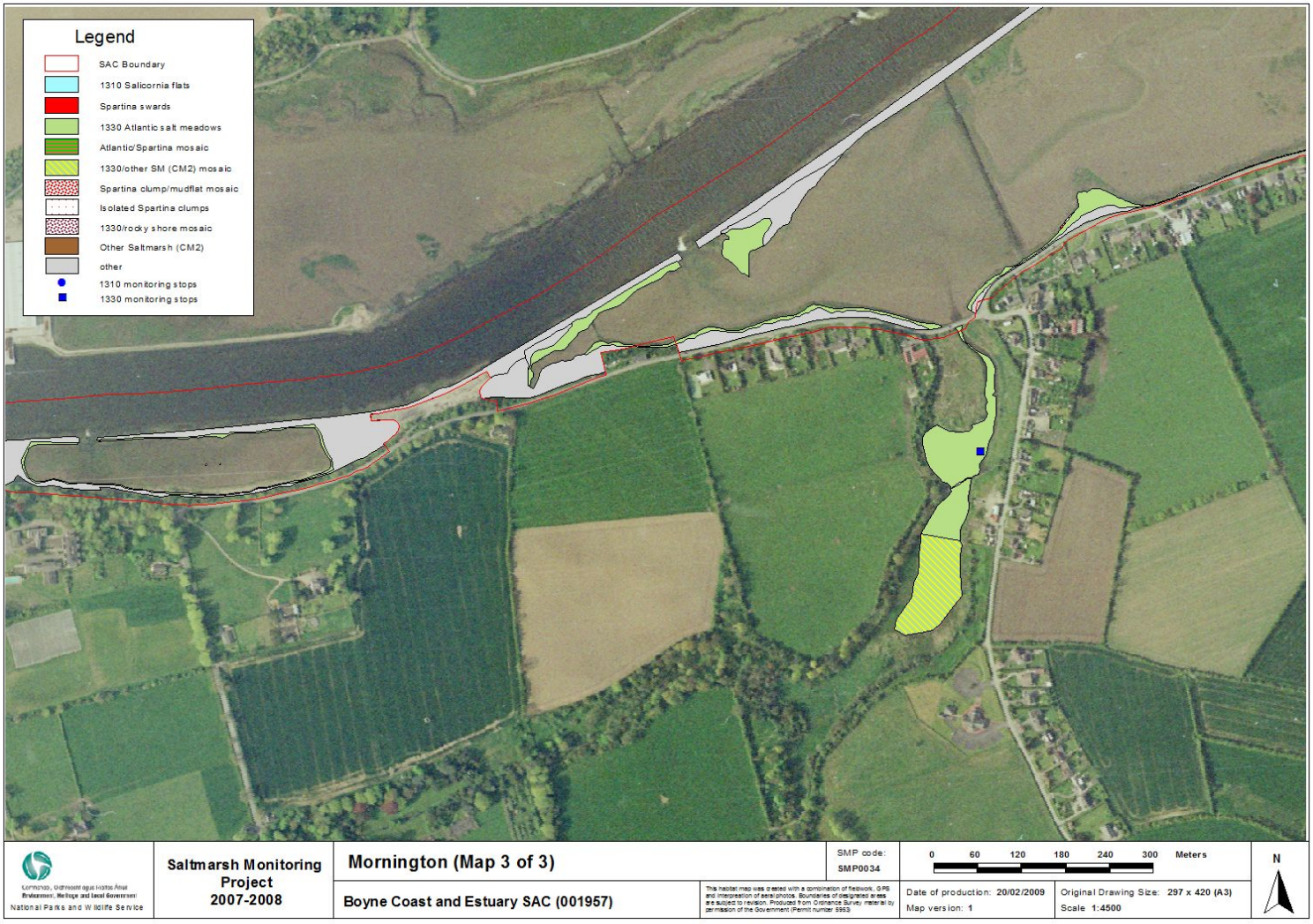
N

Boyne Coast and Estuary SAC (001957)

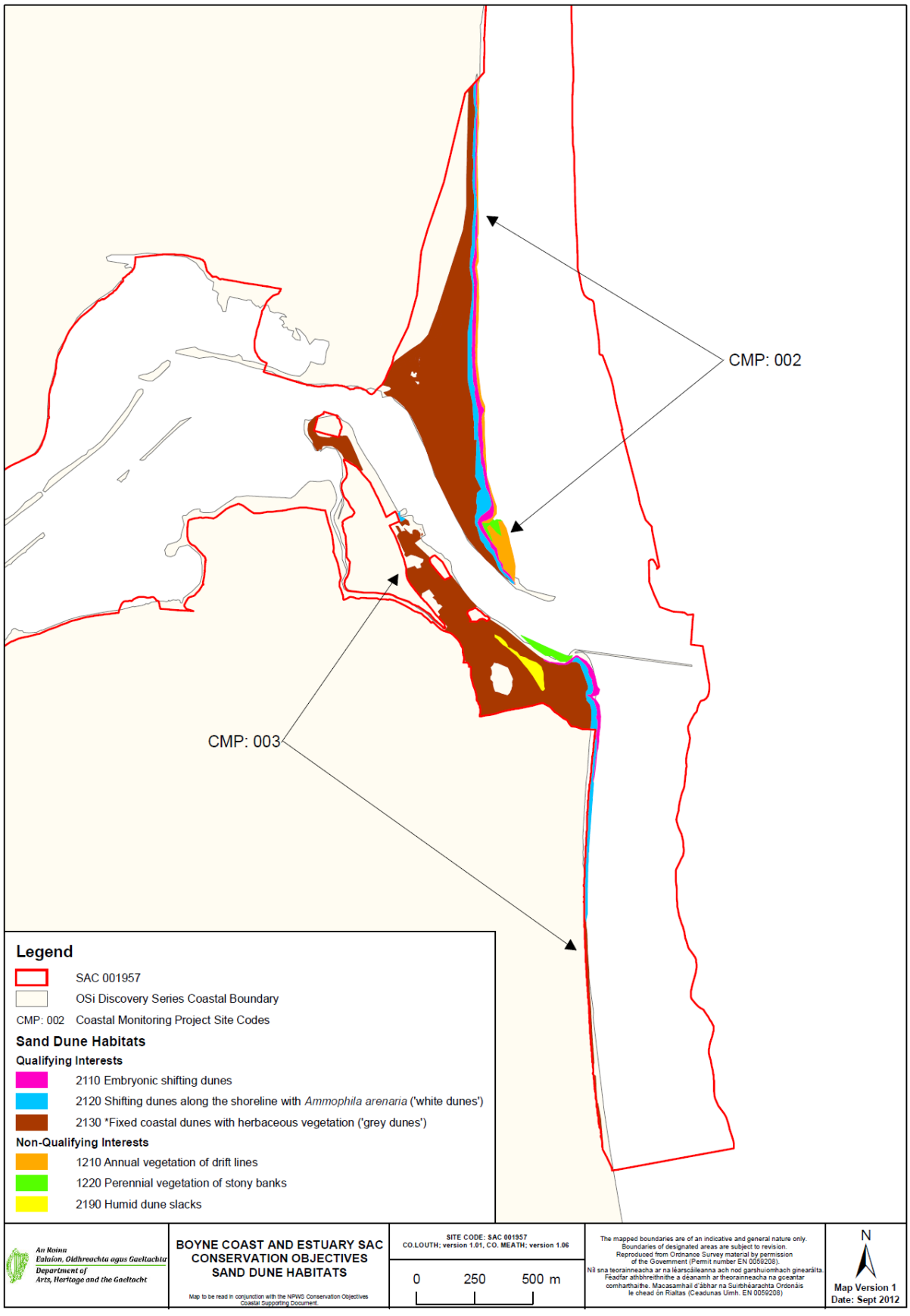
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5963)

Date of production: 20/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:4500


Legend
SAC Boundary
1310 Salicornia flats
Spartina swards
1330 Atlantic salt meadows
Atlantic/Spartina mosaic
1330/other SM (CM2) mosaic
Spartina clump/mudflat mosaic
Isolated Spartina clumps
1330/rocky shore mosaic
Other Saltmarsh (CM2)
other
1310 monitoring stops
1330 monitoring stops
Saltmarsh Monitoring Project 2007-2008
Mornington (Map 3 of 3)
Boyne Coast and Estuary SAC (001957)
SMP code: SMP0034
0 60 120 180 240 300 Meters
N
Date of production: 20/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:4500
National Parks and Wildlife Service

Appendix IV – Distribution map of sand dune habitats within Boyne Coast and Estuary SAC



Appendix V – Baltray site report and habitat map from the CMP (Ryle *et al*. 2009)

SITE DETAILS

CMP04 site name: **Baltray** CMP04 site code: **002** CMP04 Map: **2**

County: **Louth** Discovery map: **43** Grid Reference: **O 162 770**

6 inch Digital maps: **LH 022 & 025**

Aerial photographs (2000 series): **O 2194-D; O 2195-C; O 2256-B & D; O 2320-B; O 7018-A**

NPWS Site Name: **Boyne Coast and Estuary**

NPWS designation: pNHA: **1957** cSAC: **1957** SPA: **4080**

Other: Corine Biotope Wildfowl Sanctuary

Ranger Area: **Louth**

MPSU Plan: **Draft 1 (2004)**

Report Author: **Anne Murray**

SITE DESCRIPTION

Baltray sand dunes are part of the Boyne Coast and Estuary cSAC which is located on the east coast of Ireland. This site is a cSAC due to the presence of a variety of annexed coastal habitats. The listed Annex I coastal habitats at Baltray include Fixed dunes – a priority habitat, Mobile dunes, Embryonic dunes, Sa*licornia* mudflats and Atlantic salt meadows.

Baltray dunes lie north of the mouth of the Boyne Estuary and extend north as far as Clogher Head. The dunes have been modified and a substantial part of the stable areas of dune have been converted to a golf course, which is located to the north of the site. Baltray is subject to storm waves and coastal erosion however the dunes appear to be coping with storm events and erosion by natural processes of accretion. Generally the dunes are accreting at the southern end with wide areas of embryonic dune and strandline fronting mobile and fixed dunes. An area of shingle lies behind the embryonic dunes and becomes open to the sea as the dunes peter out towards the training wall at the mouth of Boyne estuary. Erosion due to recreational activities is

indicated by the presence of numerous tracks on the dunes. An area of saltmarsh is located behind the dunes and forms part of the larger saltmarsh area of the Boyne Estuary. It occurs along the training wall in the mouth of the estuary. The saltmarsh comprises pioneer *Salicornia* mudflats, lower saltmarsh (dominated *Atriplex portucoides* and *Puccinellia maritima*) and mid–to-upper saltmarsh. Cordgrass (*Spartina* sp.) is invading the *Salicornia* mudflats.

The Annex I sand habitats recorded at Baltray during this survey include Fixed dunes, Mobile dunes, Embryonic dunes, Perennial vegetation of stony banks and Annual vegetation of driftlines. The total area of sand dune at Baltray is 38 ha. (Table 4A),

The area of shingle which lies behind the embryonic dunes in the south of Baltray is considered important to ground nesting birds especially *Sterna albifrons* (Little Tern). However, they have not been recorded breeding here since 1998, mainly due to human disturbance and storm damage to the nesting site during 1998 and 1999 when part of the shingle was washed away.

Viper's bugloss (*Echium vulgare*) was recorded in the fixed dunes during this survey. This plant is locally rare in Ireland.

Fixed Dune (H2130)

The priority habitat fixed dune comprises 27.897 ha of the total sand dune habitat at Baltray (Table 4A). The habitat is generally rank with one small area of short turf as a result grazing by horses in the central section of the fixed dunes. Fixed dunes in the north of the site are dominated by *Ammophila arenaria* (Marram Grass) and *Heracleum sphondylium* (Hogweed). The fixed dunes in the south of the Baltray are dominated by *Ammophila arenaria* (Marram Grass) and scrub species, mainly *Rosa canina* (Dog-rose). The numerous tracks and bare patches in the fixed dunes indicate high recreational pressure. Some of the typical species of the fixed dunes include *Festuca rubra* (Red fescue), *Lotus corniculatus* (Common bird's-foot-trefoil), *Galium verum* (Lady's bedstraw), *Thymus polytrichus* (Wild Thyme) and *Viola tricolor* (Wild pansy).

The negative indicator species recorded include *Cirsium arvense* (Creeping thistle), *Senecio jacobaea* (Ragwort) and *Urtica dioica* (Common nettle).

Table 2A EU Annex I habitats mapped at Baltray

EU code	EU Habitat	Area (ha)
H1210	Annual vegetation of driftlines	3.293
H1220	Perennial vegetation of stony banks	0.287
H2110	Embryonic Shifting Dunes	2.617
H2120	Shifting Dunes along the shoreline with *Ammophila arenaria*	4.371
H2130	Fixed Dunes with herbaceous vegetation	27.897
	Total Sand dune area excluding developments/modifications	**38.465**
	Total Sand dune area including developments/modifications	**88.465**

Mobile Dunes (H2120)

Apart from an area of coastal protection works, the mobile dunes run along most of the length of the dunes at Baltray. The coastal protection in the form of longstop rock revetment fronts an area of eroding dunes in the northern part of the site, along the edge of Seapoint golf course. The mobile dunes comprise 4.371ha of the sand dune habitat (Table 2A). The typical species of the mobile dunes are *Ammophila arenaria* (Marram grass), *Leymus arenarius* (Lyme-grass) along with *Arrhenatherum elatius* (False-oat grass) and *Daucus carota* (Wild carrot)

The negative indicator species *Senecio jacobaea* (Common ragwort) occurs occasionally throughout the mobile dune. There are small blowouts and tracks present indicating the pressure from recreational activities. The slopes of the mobile dunes are very steep and susceptible to erosion (both natural and anthropogenic) in the northern end of the site where the main access point to the beach is located.

Embryonic Dunes (H2110)

The embryonic dunes comprise 2.617ha (Table 2A) and are largely confined to the southern part of the site beyond the golf course.

The typical species present include *Leymus arenarius* (Lyme grass) and *Elytrigia juncea* (Sand couch), with the latter dominating. Sea sandwort *(Honkenya peploides*) also occurs in this habitat. In the very south next to the training wall the embryonic dunes front an area of sand and shingle which is open to the sea and is colonised by

Elytrigia juncea (Sand couch). This area has been previously noted for its importance to ground nesting birds especially *Sterna albifrons* (Little Tern).

There are no negative indicator species present in the embryonic dunes.

Annual vegetation of driftlines (H1210)

The annual strandline vegetation occurs along length of the beach at Baltray and covers a total area of 3.293ha. This is one of the most extensive areas of this habitat recorded during this survey in County Louth and also on the east coast of Ireland. The strandline although ephemeral in nature is an important part of the sand dune system and is the precursor of vegetated sand dunes as sand builds up behind the strandline to allow the formation of embryonic dunes.

The typical species of annual strandline at Baltray include *Atriplex prostrata* (Spear-leaved orache), *Cakile maritima* (Sea rocket), *Honckenya peploides* (Sea sandwort) and *Salsola kali* (Prickly saltwort). No negative indicator species were recorded in the habitat. There appears to be no mechanical cleaning of the beach or removal of tidal litter. Therefore, most of the nutrients, organic matter and seed sources, necessary for the maintenance of the strandline vegetation, are retained within the system.

IMPACTS

The main activities impacting the sand dunes at Baltray are listed in Table 2B. Golfing is the main recreational activity (code 601) and a major international golfing event took place at Baltray in 2004 at Seapoint golf course. The golf course has recently installed long rock revetment as a form of coastal protection (code 871) on the seaward side of the dunes, in the northern part of the site.

In a recent study by Kirk McKlure Morton (2003) the coastline along the dunes was described as a natural dune system with erosion and re-growth of the dunes occurring. Therefore, the study recommended that, a ‘do nothing ‘ policy should be adopted by Louth County Council in relation to coastal protection. This allows a coastal system to rebuild its natural defences through erosion and accretion. However the fact that the golf course has recently put in coastal protection would indicate a policy of ‘do nothing’ has not been adopted.

Table 2B Intensity and impact of various activities on sand dune habitats at Baltray

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	954	C	-2	3.079	Inside
H2130	143	B	-1	5	Inside
21BB	601	C	-2	38	Outside
21BB	622	C	-1	38	Inside
21BB	622	C	-1	2	Inside
21BB	871	B	1	46	Outside

[1]EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.

[2] Description of activity codes are found in Appendix 5

[3] Intensity of the influence of an activity is rated as: A= high, B = medium, C = low influence and D = unknown.

[4] Impact is rated as: -2 = irreparable negative influence, -1 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence

[5] Location of activity: Inside = activities recorded within and directly impacting the sand dune habitat. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the sand dune habitat

Part of the fixed dunes is fenced off and used for grazing by horses and cattle with overgrazing evident in places (code 143), in the southern part of the site. The negative indicator species *Senecio jacabaea* (Common ragwort) is invading some areas of the fixed dunes where grazing has been abandoned. There is a reservoir and pump house located at the back of the dunes next to the seawall for water abstraction and this may be impacting the sand dune habitats.

Louth County Council have chosen Baltray as one of the areas it will allow *cluster-type* development in relation to planning. This is part of the council's strategy to reduce scattered ribbon development along the coastline and countryside. There are also plans to construct a bridge over the Termonfeckin River to allow access to the beach at Baltray. This may impact the level of usage of the beach and dunes (code 622 and code 720) which already show signs of overuse especially in the mobile dunes in southern part of the site.

The shingle area in the south of the dunes is managed to some extent for bird usage and signs are posted notifying visitors that it is a nesting site for *Sterna albifrons* (Little Terns).

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 was the NATURA 2000 survey and the MPSU plan (2004). The ecological information applies to two sand dune systems - Mornington and Baltray - within the SAC and does not distinguish between them. Therefore only broad comparisons are made between the previous reports and this survey. The conservation status of the Annex I sand dune habitats in Baltray are given in Table 2C below.

Fixed Dunes (H2130)

The EU conservation status of the extent of fixed dune at Baltray is rated as *unfavourable-inadequate*. Currently the main impact on the extent of the fixed dunes is human induced erosion due to recreational activities associated with the golf course.

The EU conservation status for structure and function is *unfavourable – inadequate*. Four monitoring stops were placed in fixed dune area and one of these failed (Table 2D). The monitoring stop that failed is located in an undergrazed area dominated by rank grasses and *Heracleum sphondylium* (Hogweed) with poor species diversity.

The fixed dunes are under on-going threat from the activities of the golf course and from the water abstraction facility in the south of the site. Therefore, the future prospects are considered *unfavourable-inadequate*.

Table 2C Conservation status of Annex I sand dune habitats at Baltray

Habitat[1]	EU Conservation Status Assessment				
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**	**Proposed Irish conservation status system[2]**
Fixed Dunes (H2130)		Extent, Structure & Functions, Future prospects		**Unfavourable-inadequate**	**Unfavourable-unchanged**
Mobile Dunes (H2120)	Extent	Structure & Functions, Future prospects		**Unfavourable-inadequate***	**Unfavourable-declining**
Embryonic Dunes (H2110)	Extent,	Structure & Functions Future prospects		**Unfavourable-inadequate**	**Unfavourable-unchanged**
Annual vegetation of driftlines (H1210)	Extent, Structure & Functions Future prospects			**Favourable**	**Favourable-maintained**

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

Table 2D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Baltray

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	3	1	**Unfavourable-inadequate**
Mobile Dunes (H2120)	3	1	**Unfavourable-inadequate***
Embryonic Dunes (H2110)	3	1	**Favourable**
Annual vegetation of driftlines (H1210)	4	0	**Favourable**

The fixed dunes are given a rating of *average or reduced* conservation status in NATURA 2000. Currently, the overall EU conservation status of the entire fixed dune habitat is *unfavourable – inadequate* (Table 2C).

Under the Irish scheme, the conservation status for fixed dune at this site is *unfavourable – unchanged*.

Mobile Dunes (H2120)

The extent of the mobile habitat at Baltray is considered *favourable*, as there is no apparent decline in extent in the recent past.

Four monitoring stops were placed in the mobile dunes at Baltray and one of these failed (Table 2D). The structure and functions parameter is given a conservation status rating of *unfavourable-inadequate*. This is due to the patchy distribution of the mobile habitat in the southern part of the site due to heavy trampling.

The future prospects of the mobile habitat are considered *unfavourable-inadequate*, as despite the threat from recreational pressures at this site there is no management strategy for this habitat in the conservation plan. It is likely that the pressures from recreational activities will increase in the future.

The mobile dunes are rated as *good* in the overall conservation status assessment in the NATURA 2000 form. The mobile dunes are currently regarded as *unfavourable-inadequate* under the overall EU conservation status and *unfavourable-declining* under the Irish conservation status system (Table 2C). This unfavourable rating is due to the negative impacts on the mobile dunes from human pressures.

Embryonic Dunes (H2110)

The extent of embryonic dunes at Baltray is considered *favourable*, as there is no apparent decline in extent in the recent past. This is based on best scientific judgement.

The 'structure and functions' parameter is rated as *favourable*. Four monitoring stops were placed in the embryonic dunes and these passed (Table 2D). This habitat appears to be functioning well.

Embryonic dunes naturally contain a large amount of bare sand and so it is difficult to quantify the impact of damaging activities However, it is likely that this habitat is suffering from recreational use similar to the mobile dunes. The future prospects of the habitat are considered *unfavourable-inadequate*, as the threat from recreational pressures is on-going at this site there is no management strategy for this habitat in the conservation plan.

The conservation status is rated as *good* in the NATURA 2000 notes. The present overall EU conservation status for embryonic dunes is considered *unfavourable-inadequate*.

The overall Irish conservation status is *unfavourable-unchanged* (2C).

Annual vegetation of strandlines (H1210)

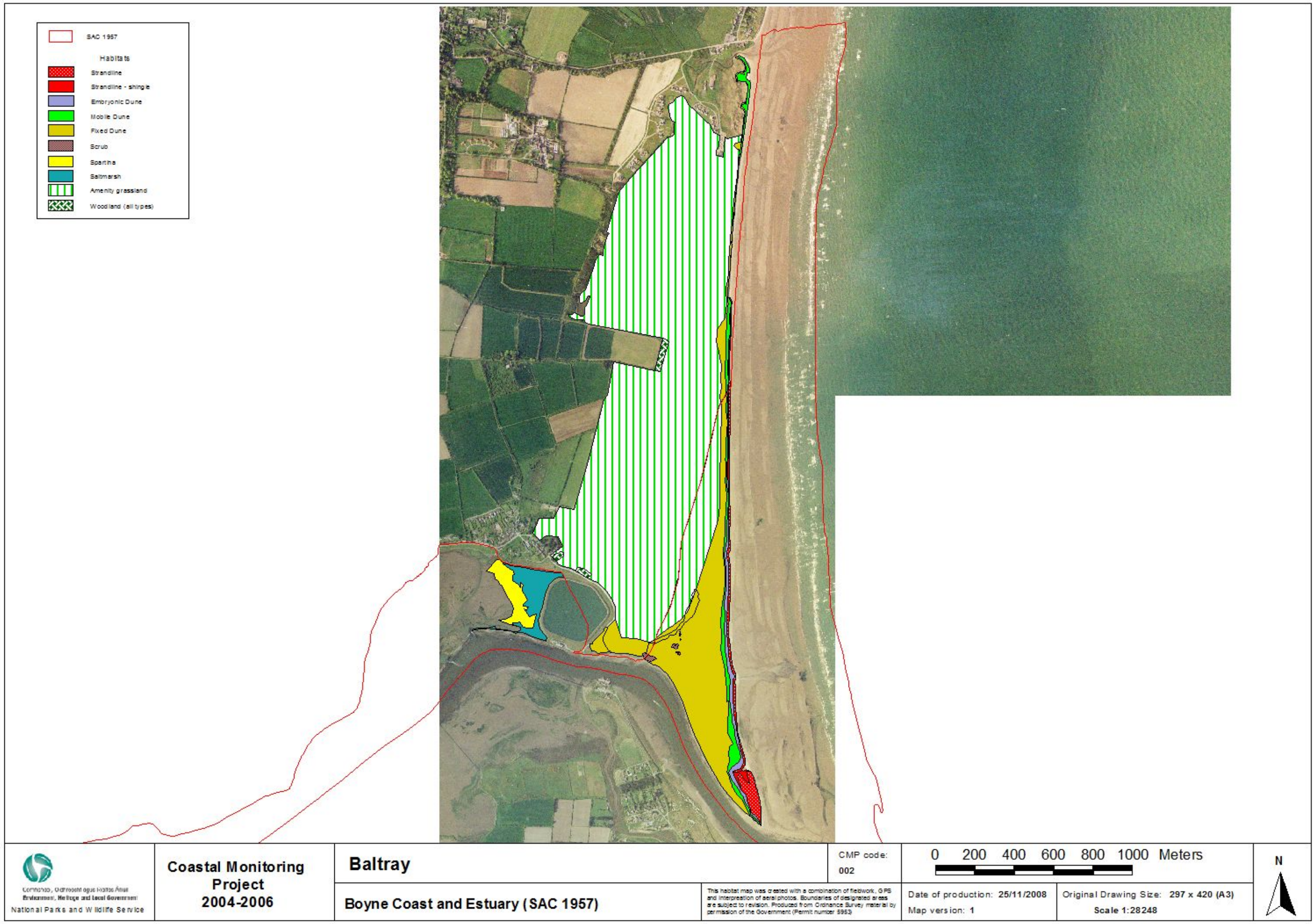
The extent is rated as *favourable* as the strandline was present along most of the length of the beach during this survey. The development of this ephemeral habitat is unhindered by human activities such as, beach cleaning.

The structure and functions parameter is rated as *favourable*. Four monitoring stops were placed in the strandline vegetation and all passed. The habitat appears to be functioning well, with plenty of diversity of annual species present on the day of survey.

The future prospects for this site are considered *favourable.* There are no apparent threats to this habitat.

The overall EU conservation status of the strandline habitat is considered *favourable.* The assessment of the EU conservation status of a habitat that is ephemeral in nature is not exact. The total area of the strandline will vary from year to year and its location may also shift in response to coastal processes.

The Irish conservation status is rated as *favourable-maintained*.


SAC 1957
Habitats
Strandline
Strandline - shingle
Embryonic Dune
Mobile Dune
Fixed Dune
Scrub
Spartina
Saltmarsh
Amenity grassland
Woodland (all types)
Environment, Heritage and Local Government
National Parks and Wildlife Service
Coastal Monitoring Project 2004-2006
Baltray
Boyne Coast and Estuary (SAC 1957)
CMP code:
002
0 200 400 600 800 1000 Meters
N
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)
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:28248

Appendix VI – Mornington site report and habitat map from the CMP (Ryle *et al*. 2009).

SITE DETAILS

CMP04 site name: **Mornington** CMP04 site code: **003** CMP Map no. **3**

County: **Meath** Discovery map: **43** Grid Reference: **O 163 755**

6 inch maps: **MH 021**

Aerial photographs (2000 series): **O 2320-B & D; O 2383-B; O 2384-A; O 7019-A & C**

NPWS Site Name: **Boyne Coast and Estuary**

NPWS designation: NHA: **N/A** cSAC: **1957**

Other designation: **Corine Biotope site**
Wildfowl Sanctuary

Ranger Area: **Meath**

MPSU Plan: **Draft 1**

Report Author**: Anne Murray**

SITE DESCRIPTION

Mornington sand dunes are part of the Boyne Coast and Estuary cSAC. They lie south of the mouth of the Boyne Estuary on the east coast of Ireland. The training wall at the mouth of the Boyne estuary has led to an accumulation of sand and enhanced the development of dunes at the northern part of the site next to the town of Mornington. Here, there is a wide and accreting area with embryonic, mobile and fixed dunes present. The dune system is highly calcareous and the high calcium content of the dune system is considered unusual especially on the east coast. The fixed dunes are more established and show greater diversity in structure and species than the neighbouring dunes at Baltray, which are contained within the same cSAC. It is also, the most northerly site for the rare plant species *Salvia verbenaca* (Wild Clary).

The dunes are heavily used, evidenced by numerous tracks and large blowouts. The dunes to the south have been largely lost to Bettystown golf course which covers an

area of approximately 50ha. The fixed dunes on the seaward side of the golf course lie outside of the cSAC boundary extending south towards Bettystown, where they occur as a narrow band of highly disturbed fixed dune ridges backing onto the golf course. The dunes are fronted by a wide flat beach, which is used intensively as a car park at Bettystown.

Table 3A Areas of EU Annex I habitats mapped in Mornington

EU Code	EU Habitat	Area (ha)
H1220	Perennial vegetation of stony banks	0.582
H2110	Embryonic Shifting Dunes	0.665
H2120	Shifting Dunes along the shoreline with *Ammophila arenaria*	1.737
H2130	Fixed Dunes with herbaceous vegetation	20.749
H2190	Humid Dune Slacks	0.932
	Total Sand Dune	**24.665**

A narrow strip of Atlantic saltmarsh, occurs along the edge of the northern tip of the dunes next to an old fish factory. This marsh is fronted by pioneer *Salicornia* flats, which have been invaded by *Spartina* sp. (Cordgrass sp.). The marsh is part of the Boyne estuary saltmarsh system.

Boyne Coast and Estuary cSAC is designated for the EU Annex I habitats - Fixed dunes (priority habitat), Mobile dunes and Embryonic dunes. Other priority EU Annex I habitats for which the site is designated include: Estuaries, Mudflats and sandflats not covered by seawater at low tide, Salicornia and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia*) and Mediterranean salt meadows (*Juncetalia maritimi*).

The EU Annex I sand dune habitats recorded at Mornington during this project include; Fixed dune (priority habitat), Dune slack, Mobile dunes, Embryonic dunes and Perennial vegetation of stony banks. The total area of sand dune at Mornington is just over 24 ha (Table 3A).

Fixed Dune (H2130)

The priority habitat fixed dune comprises 21 ha of the total sand dune habitat at Mornington (Table 3A). A large area of fixed dune has been modified by the golf course, which is outside of the cSAC. The numerous tracks and blowouts in the remaining fixed dunes indicate high recreational pressure. Two large blowouts occur

in the northern part of the site and these cover a total area of 1.4ha while the tracks account for approximately 1ha.

There is a good diversity of typical fixed dune species including: *Anthyllis vulneraria* (Kidney vetch), *Arrhenatherum elatius* (False oat-grass), *Carex arenaria* (Sand sedge), *Centaurium erythraea* (Common centaury), *Cerastium fontanum* (Common mouse-ear), *Daucus carota* (Wild carrot), *Euphrasia officinalis* agg. (Eyebright), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Hypochaeris radicata* (Cat's ear), *Linum catharticum* (Fairy flax), *Lotus corniculatus* (Bird's-foot trefoil), *Odontites vernus* (Red bartsia), *Ononis repens* (Common restharrow), *Pilosella officinarum* (Mouse-ear hawkweed), *Plantago lanceolata* (Ribwort plantain), *Rhinanthus minor* (Yellow-rattle), *Taraxacum* agg. (Dandelion), *Trifolium repens* (White clover) and *Viola tricolor* subsp. *curtisii* (Wild pansy). The typical moss species *Rhytidiadelphus squarrosus* and *Tortula ruraliformis* and lichen *Peltigera* spp. are common in the fixed dunes. Marram grass (*Ammophila arenaria*) occurs throughout the fixed dune largely as a result of undergrazing.

None of the negative indicator species listed for fixed dune (Appendix 1) were recorded in the monitoring stops but some were recorded in the general site species list, these include *Cirsium arvense* (Creeping thistle), *Senecio jacobaea* (Ragwort) and *Urtica dioica* (Common nettle).

Dune Slack (H2190)

Two dune slacks are noted in Mornington in the conservation plan (MPSU, 2004), although one dune slack is indicated on the accompanying habitat map. These slacks are noted for *Echium vulgare* (Viper's bugloss), *Equisetum variegatum* (Variegated Horsetail) and *Ophioglossum vulgatum* (Adder's tongue). These are locally rare plants in Ireland and are considered *Indicators of local distinctiveness* at this site.

The dune slack indicated on the MPSU map is also noted during this survey. It is located in the fixed dune in the northern part of the site. This slack contains the following typical species *Carex arenaria* (Sand sedge), *Equisetum variegatum* (Variegated Horsetail) and *Holcus lanatus* (Yourkshire fog) along with Viper's Bugloss (*Echium vulgare*) and *Ophioglossum vulgatum* (Adder's tongue). The slack is

susceptible to disturbance due to recreational activities, it is of poor quality and is drying out. The area of dune slack is just under 1 ha (Table 3A).

Mobile Dunes (H2120)

The training wall at the mouth of the Boyne estuary has led to an accumulation of sand and enhanced the development of the mobile dunes at the northern end next to Mornington and caused erosion towards the southern end. The mobile dune comprises 1.7 ha of the sand dune habitat (Table 3A). The typical species *Ammophila arenaria* (Marram grass) dominates with *Leymus arenarius* (Lyme grass) occasional. Other species include *Festuca rubra* (Red fescue), *Daucus carota* (Wild carrot), *Hypochaeris radicata* (Cat's ear) and *Leontodon saxatilis* (Lesser Hawkbit). The negative indicator species *Senecio jacobaea* (Common ragwort) is present but it is rare. Cars were parked in the mobile dunes on the day of the site visit.

Embryonic Dunes (H2110)

The embryonic dunes are located in the accreting northern tip of the site and total just over 0.7 ha in area (Table 3A). The typical species present are *Leymus arenarius* (Lyme grass) and *Elytrigia juncea* (Sand couch), with the latter dominating. No negative indicator species were recorded in this habitat. The embryonic dunes naturally contain a lot of bare ground and so the impacts from recreational activities are not always obvious. However, given the heavy recreational use of the site impacts from pedestrian traffic are probable.

Perennial Shingle Vegetation (H1220)

A small pocket of perennial shingle vegetation lies behind the training wall where tidal debris has gathered in the northern end of the site. This habitat covers an area of 0.6 ha. The typical species recorded in this survey include *Atriplex prostrata* (Spear-leaved Orache), *Beta vulgaris* ssp. *maritima* (Sea beet) and *Tripleurospermum maritimum* (Scentless mayweed).

IMPACTS

The main activities impacting on the sand dunes at Mornington are given in Table 3B. The fixed dunes to the south have been largely modified by Bettystown golf course (50ha). Most of the activities of the course are concentrated outside of the designated

site. The presence of caravans has also modified some of the fixed dune area with 27 caravans permanently located on the dunes. The area affected is 0.8ha and it is now outside of the designated site. The remaining fixed dune within the site is under severe recreational pressure mainly due to the ease of access to the site.

Table 3B Intensity and impact of various activities on sand dune habitats at Mornington

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	[2] Area affected/ha	Location of Activity[5]
H2130	149	A	-1	21	Inside
H2190	149	A	-1	0.9	Inside
H2130	601	A	-2	50	Outside
H2190	601	B	-1	0.9	Inside
H2130	608	C	-1	0.8	Outside
H2130	622	A	-1	15	Inside
H2120	622	A	-1	1	Inside
H2110	622	A	-1	0.7	Inside
H2130	720	A	-1	10	Inside
H2120	720	A	-1	1	Inside
H2110	720	A	-1	0.7	Inside
H2130	790	A	-1	2	Inside
H2130	900	B	0	5	Inside
H2120	900	B	0	Unknown	Inside
H2110	900	B	0	Unknown	Inside

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

Impacts associated with recreational activities such as golfing (code 601), walking (code 622), picnicing, horse riding (code 622) and sunbathing are contributing to the overuse of the dune system. This is evident throughout the entire site where trampling (code 720) has resulted in the formation of numerous tracks and blowouts. The absence of grazers (code 149) at the site has resulted in a rank sward in the fixed dunes. The introduction of a grazing regime for this site would require consideration of the recreational activities of the site but would improve greatly the condition of this habitat.

The dune slack is very susceptible to disturbance due to its close proximity to one of the main access routes to the dunes. Cars were parked next to the slack on the day of the site visit. It is currently under intense recreational pressure especially from

trampling (code 720). The slack is drying out and this may be exacerbated by changes in local hydrology due to the presence of the golf course (code 601).
The mobile and embryonic dunes are experiencing natural erosion (code 900) in the southern part of the site and accretion in the north. The shift in the dynamics of the sand dune system is largely due to the construction of the training wall at the mouth of the Boyne estuary. Walking (code 622) and trampling (code 720) are affecting all areas of the mobile and embryonic dunes, including those areas that are accreting.

One of the main issues that require urgent action at this site is visitor access. The use of many parts of the dunes and beach as informal car parking areas and the myriad of tracks that have developed to gain access to the beach are a result of the lack of appropriate management strategies for car parking and pedestrian access. A designated parking area is required at the northern end of the site. Barriers could be installed at access points, alternatively, if this is not feasible, a continuous fence may be installed along the dunes with a dedicated walkway leading onto the beach.

The impacts listed for the Boyne Estuary cSAC in the NATURA form did not apply specifically to the sand dune habitat. It was therefore not always possible to determine the habitat that an impact was related to and so comparisons with impacts recorded in this survey and the NATURA survey were not possible.

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 was the NATURA 2000 survey. The ecological information given in the NATURA form applies to two sand dune systems - Mornington and Baltray - within the SAC and does not distinguish between them. This meant that the parameters used in the EU conservation system could not be assessed fully and best scientific judgement was used to assess the present site condition and the conservation status of some of the parameters. The conservation status of the Annex I sand dune habitats in Mornington are given in Table 3C below.

Fixed Dunes (H2130)

The EU conservation status of the extent of fixed dune at Mornington is rated as *unfavourable-inadequate*. This is based on best scientific judgement. As all of the developments at the site are excluded, currently the main impact on the extent of the fixed dunes is human induced erosion due to recreational activities. The estimated area of bare sand currently accounts for greater than 10% of the fixed dune habitat.

The EU conservation status for structure and function is *unfavourable – inadequate*. Four monitoring stops were placed in fixed dune area and one of these failed (Table 3D). The monitoring stop that failed, did not reach the targets for the attributes of typical species and sward height. This is mainly on account of the lack of grazing at the site.

The control of human induced erosion is not addressed in the conservation plan for Mornington. The conservation plan does states that NPWS will ensure that the coastal walkway planned for the area will not encroach on the fixed dune. However, there is a need for action to reduce the impact of the heavy use of the dunes. This would entail the use of boardwalks and limiting human access to the dunes. The recreational pressure on these dunes is likely to increase in the future owing to the growing population in the general area.

Table 3C Conservation status of Annex I sand dune habitats at Mornington

Habitat[1]	**EU Conservation Status Assessment**			**Overall EU conservation status assessment**	**Proposed Irish conservation status system**[2]
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**		
Fixed Dunes (H2130)		Extent, Structure & Functions, Future prospects		**Unfavourable-inadequate**	**Unfavourable-declining**
Dune Slack (H2170)		Extent, Structure & Functions, Future prospects		**Unfavourable-inadequate***	**Unfavourable-declining**
Mobile Dunes (H2120)	Extent	Structure & Functions, Future prospects		**Unfavourable-inadequate***	**Unfavourable-declining**
Embryonic Dunes (H2110)		Extent, Structure & Functions, Future prospects		**Unfavourable-inadequate ***	**Unfavourable-declining**

[1]EU Codes as per Interpretation Manual
[2] Ratings are Favourable (Enhanced, Maintained, Recovered, Declining), Unfavourable (Recovering, Unchanged, Declining) and Destroyed (Partially destroyed, Completely destroyed and Unknown)
*This rating is based on best scientific judgement see text

Table 3D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Mornington

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	3	1	**Unfavourable-inadequate**
Mobile Dunes (H2120)	2	0	**Unfavourable-inadequate***
Embryonic Dunes (H2110)	2	0	**Unfavourable-inadequate***

*These assessments are based on best scientific judgement (see text)

The issue of undergrazing is listed in the conservation plan but is not specifically addressed at Mornington. Until the issues of undergrazing and human induced erosion are actively managed, the future prospects are considered *unfavourable-inadequate*.

The fixed dunes are given a rating of *average or reduced* conservation status in NATURA 2000. The fixed dune habitat is impacted significantly by human activities. Currently, the overall EU conservation status of the entire fixed dune habitat is *unfavourable – inadequate* (Table 3C).

Under the Irish scheme, the conservation status for fixed dune at this site is *unfavourable – declining*.

Dune Slack (H2190)

The extent is rated as *unfavourable-inadequate* as there is an apparent decline in the number of dune slacks since the NATURA 2000 survey. The remaining dune slack is drying out, it is heavily trampled and suffering erosion in places.

No monitoring stops were placed in dune slack due to time limits on the day of survey. An overall assessment of the structure and functions of the slack is based on best scientific judgement and the conservation status is rated as *unfavourable-inadequate*. This rating is due to undergrazing, resulting in high grass cover and the lack of typical species (Table 3D).

The future prospects for this site are considered *unfavourable-inadequate*. There are no strategies outlined in the conservation plan (2004) for this habitat. The presence of the locally rare plant species in the slack is considered an *Indicator of local*

distinctiveness. Conservation management is required in order to safeguard the future of these plants and their habitat at Mornington. Currently, the viability of this habitat is threatened by the lack of grazing and the high recreational pressures on this habitat. The dune slack is drying out and the presence of the golf course may have an impact on the slack by altering the local hydrology.

The conservation status of this habitat was described as *average or reduced* in the NATURA form. The current overall EU conservation status of dune slack is *unfavourable-inadequate* (Table 3C).

Under the Irish scheme, the conservation status for fixed dune at this site is *unfavourable – declining*.

Mobile Dunes (H2120)

The extent of the mobile habitat at Mornington has been largely affected by the training wall at the mouth of the Boyne estuary. The mobile dunes appear to have reached a dynamic balance and have shifted to the northern part of the site, while they are almost absent from the southern section of the site where the fixed dunes are fronted by a steep eroding ridge. It is difficult to determine if there has been any change in the sediment load within the system without a full sediment budget study. Therefore, extent is considered *favourable,* as there is no apparent decline in extent in the recent past. This is based on best scientific judgement.

Two monitoring stops were placed in the mobile dunes and these passed (Table 3D). However, the structure and functions parameter is given a conservation status rating of *unfavourable-inadequate*. This is based on best scientific judgement and is due to the heavy trampling of the mobile habitat in the northern part of the site. Marram grass (*Ammophila arenaria*) is highly susceptible to trampling and the vegetation has been damaged in parts.

The future prospects of the mobile habitat are considered *unfavourable-inadequate,* as despite the threat from recreational pressures at this site there is no management strategy for this habitat in the conservation plan.

The mobile dunes are rated as *good* in the overall conservation status assessment in the NATURA 2000 form. The mobile dunes are currently regarded as *unfavourable-inadequate* under the overall EU conservation status and *unfavourable-declining* under the Irish conservation status system (Table 3C). This unfavourable rating is due to the negative impacts on the mobile dunes from human pressures.

Embryonic Dunes (H2110)

As with the mobile dunes the extent of the embryonic dunes has been largely affected by the training wall at the mouth of the Boyne estuary. Until a study on sediment circulation along this stretch of coastline is available, the extent is considered *favourable*, as there is no apparent decline in extent in the recent past. This is based on best scientific judgement.

Two monitoring stops were placed in the embryonic dunes and these passed (Table 3D).

However, the structure and functions parameter is given a conservation status rating of *unfavourable-inadequate*. This is based on best scientific judgement, the embryonic dunes are heavily used in the northern part of the site. Embryonic dunes naturally contain a large amount of bare sand and so it is difficult to quantify the impact of damaging activities. However, it is likely that the pedestrian use of the dunes is impacting negatively on both the structure and viability of this habitat.

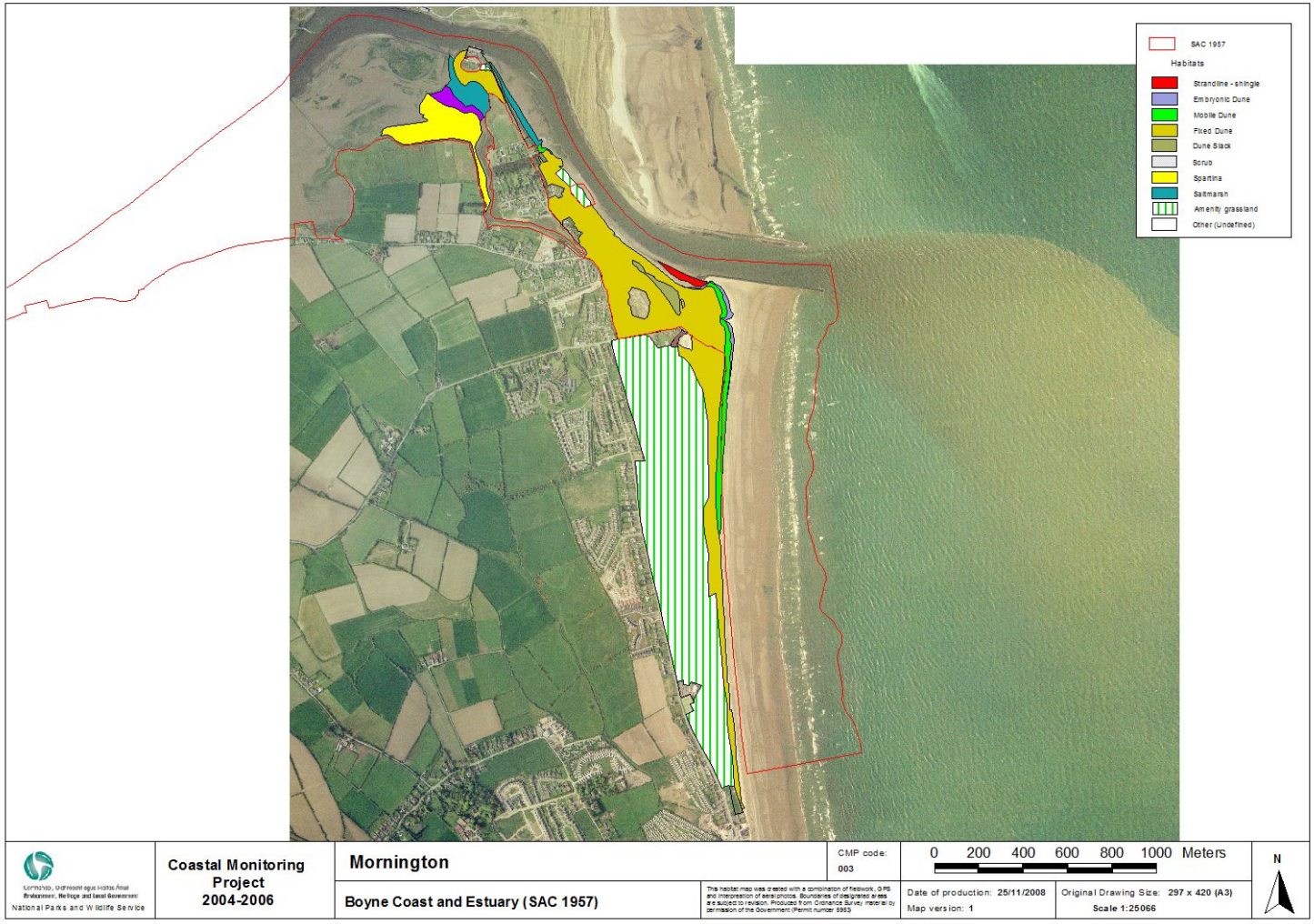
The future prospects of the mobile habitat are considered *unfavourable-inadequate*, as despite the threat from recreational pressures at this site there is no management strategy for this habitat in the conservation plan.

The conservation status is rated as *good* in the NATURA 2000 notes. The present overall EU conservation status for embryonic dunes is considered *unfavourable-inadequate*.

The overall Irish conservation status is *unfavourable-declining* (3C).

Perennial vegetation of stony banks (H1220)

There is a very small area of perennial vegetation which has developed over a small patch of cobble that has gathered behind the training wall at this site. Because of the limited area, there is no conservation status assessment for this habitat at this site.


SAC 1957
Habitats
Strandline - shingle
Embryonic Dune
Mobile Dune
Fixed Dune
Dune Slack
Scrub
Spartina
Saltmarsh
Amenity grassland
Other (Undefined)
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Boyne Coast and Estuary (SAC 1957)
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N
National Parks and Wildlife Service