Sheephaven SAC (site code 1190)
Conservation objectives supporting document -coastal habitats

NPWS

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Please note that the opinions expressed in the site reports from the Saltmarsh Monitoring Project (SMP) and the Coastal Monitoring Project (CMP) are those of the authors and do not necessarily reflect the opinion or policy of NPWS.

Please note that this document should be read in conjunction with the following report: NPWS (2014). Conservation Objectives: Sheephaven SAC 001190. 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.

Sheephaven Bay is a north-facing bay, situated north of Creeslough on the north-west coast of Co. Donegal. The SAC encompasses the inner part of the bay, and includes the intertidal area at Carrigart. The bedrock geology of the site is quite varied, with schist (at least two types), quartzite and metadolerite present. The site receives the flows from a number of rivers, notably the Lackagh River, the Duntally River, the Faymore River and the Carrownamaddy River. The site contains a diversity of habitats ranging from mudflats, saltmarshes and sand dunes to lakes, rivers, heath, scrub and woodland.

Large areas of sand dune occur at Rosapenna and at Marble Hill. Some areas of sand dune at Rosapenna have been modified through agricultural improvement and golf course development has also had an impact this site (Gaynor & Browne, 1999). A relatively small area of machair occurs on flat to gently undulating ground behind the dune system, to the north-west of Carrigart village, however this area was not surveyed during the Coastal Monitoring Project (CMP) (Ryle *et al*. 2009). The machair displays an interesting gradation to saltmarsh vegetation. The dunes at Rosapenna are included in the Horn Head Important Bryophyte Area (IBrA), particularly as this is the only known locality for *Meesia uliginosa* in Ireland (Lockhart *et al*., 2012).

An extensive area of saltmarsh occurs at Back Strand, with further areas at Ards Strand to the west of Carrigart village.

Sheephaven SAC (site code: 1190) is designated for a range of coastal habitats including saltmarsh and sand dunes. The following five coastal habitats are included in the list of qualifying interests for the site (* denotes a priority habitat):

- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330) (ASM)
- Mediterranean salt meadows (*Juncetalia maritimi*) (1410) (MSM)
- Shifting dunes along the shoreline with *Ammophila arenaria* (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)*
- Machair (21A0)*

The first two habitats represent saltmarsh, the last three are associated with sand dune systems. All five of these habitats are usually found in close association with each other. The distribution of saltmarsh habitats in Sheephaven SAC is presented in Appendix I and the distribution of sand dune habitats in Appendix II.

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

The targets set for the **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 two saltmarsh sites within the Sheephaven SAC (McCorry & Ryle, 2009):

1. Creeslough (Appendix III)
2. Rosapenna (Appendix IV)

As part of the SMP, detailed individual reports and habitat maps were produced for each sub-site and these are presented in a set of Appendices at the end of this document (Appendix III and IV).

The extensive saltmarsh at Creeslough lies to the north-west of Creeslough village in one of the innermost inlets within Sheephaven Bay, around Ards Strand. The Faymore River flows into this inlet, which forms the estuary for this river. Saltmarsh has developed in low-lying land inundated by the tide on both sides of the estuarine channel. Extensive saltmarsh has developed in sheltered positions along an intricate shoreline.

Rosapenna is situated in the Rosguill peninsula in Northern Donegal. The saltmarsh itself is located in a relatively sheltered eastern inlet centred on the small village of Carrigart. Most of the saltmarsh has developed on level sand flats and is associated with the extensive sand dune system of Rosapenna (McCorry & Ryle, 2009).

Curtis and Sheehy Skeffington (1998) also recorded the presence of saltmarsh at the following sites:

1. Island Roy
2. Rosapenna
3. Creeslough
4. Ards

The distribution of saltmarsh habitats within Sheephaven SAC is presented in Appendix I. The SMP mapped a total area of 87.80ha of saltmarsh, of which 66.3ha is of qualifying interest. The remaining 21.5ha is *Salicornia* mudflats.

The conservation objectives for the saltmarsh habitats in this SAC are based on the findings from the Saltmarsh Monitoring Project (SMP) (McCorry & Ryle, 2009) as well as a combination of sources including NPWS internal files and the Coastal Monitoring Project (Ryle *et al*., 2009).

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 Sheephaven SAC (Ryle *et al*., 2009):

1. Marble Hill
2. Ards
3. Rosapenna

The distribution of sand dune habitats within Sheephaven SAC is presented in Appendix II. As part of the Coastal Monitoring Project (CMP) detailed individual reports and habitat maps were produced for each of the three sub-sites and these are included in a set of Appendices to this document (Appendix V to VII).

The sand dune system of Marble Hill (Appendix V) edges a small bay that lies north of the Ards peninsula, nestled between two rocky headlands of Knockduff and Clonmass Point (Ryle *et al*., 2009).

The Ards sand dunes are on the south side of Clonmass Bay, a small bay and estuary on the sheltered side of Sheephaven Bay (Appendix VI). The sand dunes are approximately 7km from the village of Creeslough and are within Ards Forest Park, a Coillte estate (Ryle *et al.,* 2009).

Rosapenna sand dunes (Appendix VII) are located on the eastern side of Sheephaven Bay and is an extensive coastal site dominated by sand dunes and intertidal mud and sand flats (Ryle *et al*., 2009).

The conservation objectives for the sand dune habitats in Sheephaven SAC 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 three sub-sites as surveyed by the CMP represent the total area of sand dunes within Sheephaven SAC.

2 Conservation Objectives

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

3 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*) (1330) (ASM)**
- **Mediterranean salt meadows (*Juncetalia maritimi*) (1410) (MSM)**
- Mediterranean and thermo-Atlantic Halophilous scrubs (Sarcocornetea fruticosi)

The second and third habitat (in bold) are listed as Qualifying Interests for Sheephaven SAC. The last habitat is restricted in its distribution to sites in the southeast of the country.

Curtis and Sheehy Skeffington (1998) recorded the presence of saltmarsh at the following sites:

1. Island Roy
2. Rosapenna
3. Creeslough
4. Ards

The sub-sites, Island Roy and Creeslough support bay-type saltmarsh and are underlain by a mud/gravel and sand/mud substrates respectively, while Rosapenna and Ards are sand flats-type saltmarsh with a sand and sand/peat substrate respectively (Curtis and Sheehy Skeffington, 1998).

The SMP surveyed two saltmarsh sub-sites within Sheephaven SAC (McCorry & Ryle, 2009):

- Rosapenna
- Creeslough

Both Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM) were recorded at the Rosapenna and Creeslough sub-sites. The Annex I habitat, '*Salicornia* and other annuals colonizing mud and sand' was also recorded at Creeslough, but this habitat is not listed as a qualifying interest for Sheephaven SAC.

The saltmarsh at Rosapenna is largely continuous with a break only around the village of Carrickart where a short area of seawall has been constructed. Smaller isolated patches of saltmarsh were mapped either end of the site (McCorry & Ryle, 2009).

The Creeslough saltmarsh is an extensive saltmarsh system that has developed around much of the intertidal zone surrounding Ards Strand Inlet (McCorry & Ryle, 2009).

The distribution of saltmarsh habitats within the SAC is presented in Appendix II.

3.1 Overall Objectives

The overall objective for 'Atlantic salt meadows' in Sheephaven SAC is to '*restore the favourable conservation condition*'.

The overall objective for 'Mediterranean salt meadows' in Sheephaven SAC is to '*maintain and where necessary restore the favourable conservation condition*'.

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

3.2 Area

3.2.1 Habitat 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 Sheephaven SAC was produced based on the findings of the SMP (McCorry and Ryle, 2009) and is presented in Appendix I. A total of 38.39ha of saltmarsh habitat was mapped by the SMP within the SAC at the two sub-sites and an additional 27.92ha of potential saltmarsh habitat was identified using aerial photographs, to give a total estimated area of 66.31ha for the SAC.

The following rules were applied when calculating the areas for habitat mosaics for the site's conservation objectives:

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

The total areas of each potential saltmarsh habitat within the SAC as estimated and mapped by the SMP are presented in the following tables.

Sub-site	**Total area (ha) of ASM (excluding mosaics) from SMP**	**Total area (ha) of ASM within SAC boundary (including mosaics)**
Creeslough	19.61	19.59
Rosapenna	9.16	9.13
Potential ASM	20.33	20.34
Total	**49.1**	**49.06**

Sub-site	**Total area (ha) of MSM (excluding mosaics) from SMP**	**Total area (ha) of MSM within SAC boundary (including mosaics)**
Creeslough	5.76	5.75
Rosapenna	3.92	3.92
Potential MSM	7.58	7.58
Total	**17.26**	**17.25**

For all of the saltmarsh habitats, the target is that the area should be stable or increasing, subject to natural processes, including erosion and succession.

3.3 Range

3.3.1 Habitat distribution

At Rosapenna the saltmarsh has developed on level sandflats and is associated with an extensive sand dune system. The saltmarsh is located in a sheltered inlet on the inner part of the site and extends southwards from Island Roy around the eastern flank of the Rossguill Peninsula towards Carrigart and extends northwards towards Fergart point.

At Creeslough the extensive saltmarsh has developed in sheltered positions along an intricate shoreline. Starting in the north-western part of the Ards Strand inlet, it continues southwards towards the upper tidal reaches of the Faymore River, then continues on the southern bank of the river where it gradually widens out towards Rinnasa Point. A narrow fringe of saltmarsh vegetation extends around the rocky headland at Rinnasa before it continues on towards the townlands of Magherablad and Castledoe at Rinnarispy Point (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 habitat in Sheephaven SAC 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 Creeslough sub-site, a seawall that was built in the 19th century extends along part of the northern shore of Ards Strand and for the most part remains in good condition. The SMP noted that the embankment had only been breached recently allowing one section of previously reclaimed land to revert back to saltmarsh. Overall there is an accretional trend at Creeslough and a quantifiable increase in both the ASM and MSM at the site (McCorry & Ryle, 2009).

At Rosapenna there are no indications of any measurable loss of ASM or MSM habitat due to erosion or land use changes within the current monitoring period (McCorry & Ryle, 2009).

The target is to maintain and where possible restore 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 Creeslough, the ASM has a well-developed saltmarsh topography with salt pans and creeks present (McCorry & Ryle, 2009).

At Rosapenna, the ASM topography is relatively consistent with few creeks and pans present (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 Sheephaven, where it occurs in a mosaic with other saltmarsh habitats, including 'Mediterranean salt meadows'. 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 inter-tidal, shingle and sand dune habitats.

At the Creeslough sub-site there are excellent examples of zonation on a landward gradient from pioneer through to upper marsh. There is also further transition to both MSM and *Salicornia* flats at the upper and lower ASM boundaries (McCorry & Ryle, 2009).

At Rosapenna, the SMP noted some zonation in the ASM habitat with several vegetation communities present (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 Creeslough grazing occurs throughout a large portion of the site and in some areas the land is badly damaged through excessive grazing pressure (McCorry & Ryle, 2009).

At Rosapenna the effects of grazing were observed by the SMP particularly along the western and southern side of the saltmarsh. At this sub-site cattle and sheep are allowed graze the sandy commonage as well as the saltmarsh vegetation. The intensity of grazing is more pronounced where the marsh is fenced off and poaching was noted by the SMP here (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.

Poaching from livestock is evident in the ASM at Rosapenna and trails created by livestock through the MSM were also noted at the site by the SMP (McCorry & Ryle, 2009).

Trampling, poaching and the creation of trails by livestock was noted in certain areas at the saltmarsh at Creeslough by the SMP (McCorry & Ryle, 2009).

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 Sheephaven 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* Turf fucoids	*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* Turf fucoids

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 not recorded in Sheephaven SAC by the SMP (McCorry & Ryle, 2009) nor has it been recorded in the surrounding area (Preston *et al*., 2002).

The aim is that negative indicators should be absent or under control. As *Spartina* is currently absent from this particular site, the target is that it should remain absent.

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

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

- Annual vegetation of drift lines (1210)
- Embryonic shifting dunes (2110)
- **Shifting dunes along the shoreline with *Ammophila arenaria* (2120)**
- **Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) ***
- Decalcified dunes with *Empetrum nigrum* (2140) *
- 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 Sheephaven SAC. These habitats include mobile areas at the front as well as more stabilised parts of dune systems. Annual vegetation of driftlines was also recorded at Ards and Rosapenna. Embryo dunes were recorded at all three sub-sites and humid dune slacks were recorded at Marble Hill and Rosapenna. Machair was not recorded at any of the sub-sites by the CMP (Ryle et al., 2009).

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).

Machair (21A0) is a highly specialised and complex dune habitat that is confined globally to the north-west coasts of Ireland and Scotland. It comprises a flat or gently undulating sandy plain that develops in an oceanic location with a cool moist climate. Machair systems are highly calcareous, the sediments usually containing a high percentage of shell fragments and having pH values in excess of 7. The vegetation is herbaceous, with low frequency of sand-binding species (Gaynor, 2006). Irish machair is a priority habitat under the EU Habitats Directive.

In 1996, the Biomar Machair Survey surveyed all sand dune sites at which machair formed a significant element (Crawford *et al*., 1996). Comparison of the CMP with this 1992 survey revealed considerable degradation of machair habitat which could be attributed to changes in farming practices which has seen many machair commonages being fenced (stripped) resulting in greater concentration of livestock in confined areas, overgrazing, supplementary feeding and poaching of the land (Ryle *et al.,* 2009).

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

The CMP surveyed three sub-sites within Sheephaven SAC:

1. Ards
2. Rosapenna
3. Marble Hill

Detailed descriptions from the Coastal Monitoring Project (Ryle *et al.,* 2009) of each sub-site and each sand dune habitat found at Ards, Rosapenna and Marble Hill are presented in

Appendices V to VII. A total of 271.29ha of sand dune habitat was mapped within Sheephaven SAC, of which 0.19ha represents annual vegetation of driftlines, 3.23ha represents embryonic shifting dunes and 3.19ha is humid dune slack, which are not listed as qualifying interests for this particular site.

4.1 Overall objectives

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

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

In the absence of information on the current status of 'Machair' at Sheephaven SAC, the overall objective 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.

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. Baseline habitat maps were produced for the sand dune habitats in Sheephaven SAC during the Coastal Monitoring Project (CMP) (Ryle *et al*., 2009). These maps are included with the individual site reports in the set of Appendices at the end of this document. 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**
Shifting dunes along the shoreline with *Ammophila arenaria*	7.343	5.47
Fixed coastal dunes with herbaceous vegetation	265.075	258.89
Machair	-	-
Total	**272.418**	**263.36**

Although areas of machair are known to occur at this site, they were not mapped by the CMP. This habitat was previously noted as a relatively small area occurring on flat to gently undulating ground behind a well-developed dune system, to the north-west of Carrigart village (Rosapenna).

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

4.3 Range

4.3.1 Habitat distribution

The distribution of sand dune habitats as mapped by Ryle *et al.* (2009) is presented in Appendix II.

All two out of three qualifying interest habitats occur at all three sub-sites. Machair was not recorded at any of the sub-sites by the CMP (Ryle *et al*., 2009).

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

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 Sheephaven 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 Ards sub-site the CMP noted some rock armour installations at the seaward edge of the dunes. These coastal protection works represent a negative influence on mobile dunes as they interfere with the natural movement of sediment (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 Physical structure: hydrological and flooding regime

Typically the true machair plain represents the area where wind erosion has eroded a dune system to a level just above the water table, where the wet consistency of the sand prevents further erosion. In general, the degree of flatness depends on the age of the system, as well as the underlying topography, geology, outcropping of local rocks and historical management. Machair plains can be terminated on the landward side by a lake or associated marsh/fen

(Gaynor, 2006). Consequently, the condition and conservation of the machair habitat can be inextricably linked to the local hydrology.

Wet machair can essentially be compared to humid dune slacks due to the periodic fluctuations and the proximity of the groundwater-table to the surface throughout the year. The frequency and duration of periods of flooding or inundation determines the vegetation composition. The water-table depth has been identified as the primary determining factor in vegetation variation, followed by weak trends in calcium and sodium availability. Other contributing factors include stage of development, precipitation, distance from the sea, the grazing regime, recreational pressure, nature of the sediment, soil pH and the porosity of the sediment.

Like dune slacks, machair is highly sensitive to human influences on hydrology, either through water abstraction, drainage works or increased nutrient inputs. Water abstraction interferes with the local hydrology, potentially having serious implications for the plant and animal communities of wet machair communities.

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

4.4.3 Vegetation structure: zonation

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

At Rosapenna, the sand dune habitats grade into saltmarsh habitats (McCorry & Ryle, 2009; Ryle *et al.,* 2009).

At the Ards sub-site heath vegetation occurs adjacent to the fixed dunes on the southern shore of Clonmass bay (Ryle et al., 2009).

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

4.4.4 Vegetation structure: bare ground

This target applies to machair, fixed dunes, dunes with *S. repens* and dune slacks. It does not apply to the other habitats present where high levels of bare sand are a natural component of

the habitat. In the fixed 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 such as petalwort (*Petalophyllum ralfsii*) and a range of invertebrates, helping to increase biodiversity.

The target is to achieve up to 10% bare sand, with the exception of pioneer slacks which can have up to 20% bare sand. This target is assessed subject to natural processes.

4.4.5 Vegetation composition: plant health of dune grasses

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

The CMP noted that the mobile dunes at the Ards sub-site consisted of areas with a robust and healthy growth of marram (*Ammophila arenaria*) as well as smaller areas of more sparsely vegetated and unhealthy material (Ryle *et al*., 2009).

At the Marble hill sub-site, two out of four monitoring stops failed due to high cover of unhealthy marram (*Ammophila arenaria*) which the CMP attributed to trampling by visitors (Ryle *et al.,* 2009).

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

4.4.6 Vegetation structure: vegetation height

This attribute applies to the more fixed habitats (machair and fixed dunes). 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).

At Marble Hill sub-site, parts of the fixed dunes were recorded as undergrazed by the CMP. Parts of the fixed dunes east of the channel at this site were fenced and grazed by horses which was impacting positively on the dunes resulting in good species diversity (Ryle *et al.,* 2009)

At the Ards sub-site, owing to the forestry management of the park, there are no grazing livestock in the dune grassland which results in a rank dune sward with low species diversity (Ryle *et al.,* 2009).

At Rosapenna, livestock grazing is impacting positively on the dune grassland. Cattle account for most livestock grazing in the parts of the dunes that are still managed for agricultural purposes, and horses also graze in the southernmost area of the dune grassland to the south of the golf courses. Livestock grazing was not considered to be intensive in any part of the site by the CMP at time of survey (Ryle *et al*., 2009).

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

4.4.7 Vegetation composition: typical species & sub-communities

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

The Annex II plant species *Petalophyllum ralfsii* occurs at Rosapenna.

At Rosapenna, the CMP noted that bryophyte cover was quite high and the more commonly recorded species were, *Climacium dendroides, Hylocomium splendens, Rhytidiadelphus squarrosus* and *Rhytidiadelphus triquetrus*. Interesting species such as frog orchid (*Coeloglossum viride*) and fragrant orchid (*Gymnadenia conopsea*) were recorded by the CMP at the fixed dune /fen boundary (Ryle *et al.,* 2009).

At the Ards sub-site, bryophyte cover was also noted as high by the CMP with commonly occurring species including *Hylocomium splendens, Rhytidiadelphus squarrosus,*

Rhytidiadelphus triquetrus and *Scleropodium purum.* The nationally rare thyme broomrape (*Orobanche alba*) is known to occur (Ryle *et al*., 2009).

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

4.4.8 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 Marble Hill, both sea buckthorn (*Hippophae rhamnoides*) and bracken (*Pteridium aquilinum*) occur (Ryle *et al*., 2009)

Bracken (*Pteridium aquilinum*) was also recorded at Rosapenna fixed dunes by the CMP (Ryle *et al*., 2009).

The target is that negative indicators (including non-native species) such as *Hippophae* should make up less than 5% of the vegetation cover.

4.4.9 Vegetation composition: bryophytes

This attribute applies to machair. Bryophytes are an important element of the machair flora. Moss cover is well developed within the machair habitat at this SAC and typically attains 90% cover. Frequently occurring species include *Campylium stellatum, Drepanocladus revolvens, Ctenidium molluscum* and *Philontis fontana*, most of which are indicative of wet, base-rich conditions.

The target for this attribute therefore is that the cover of bryophytes should and should always be at least an occasional component of the vegetation (Ryle *et al*., 2009).

4.4.10 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.

At the Ards sub-site scrub and trees were recorded as encroaching the dunes from the landward edge by the CMP, while scrub encroachment will be controlled to some extent by the management regime, significant areas of scrub and woodland are occupying natural dune habitat (Ryle *et al*., 2009).

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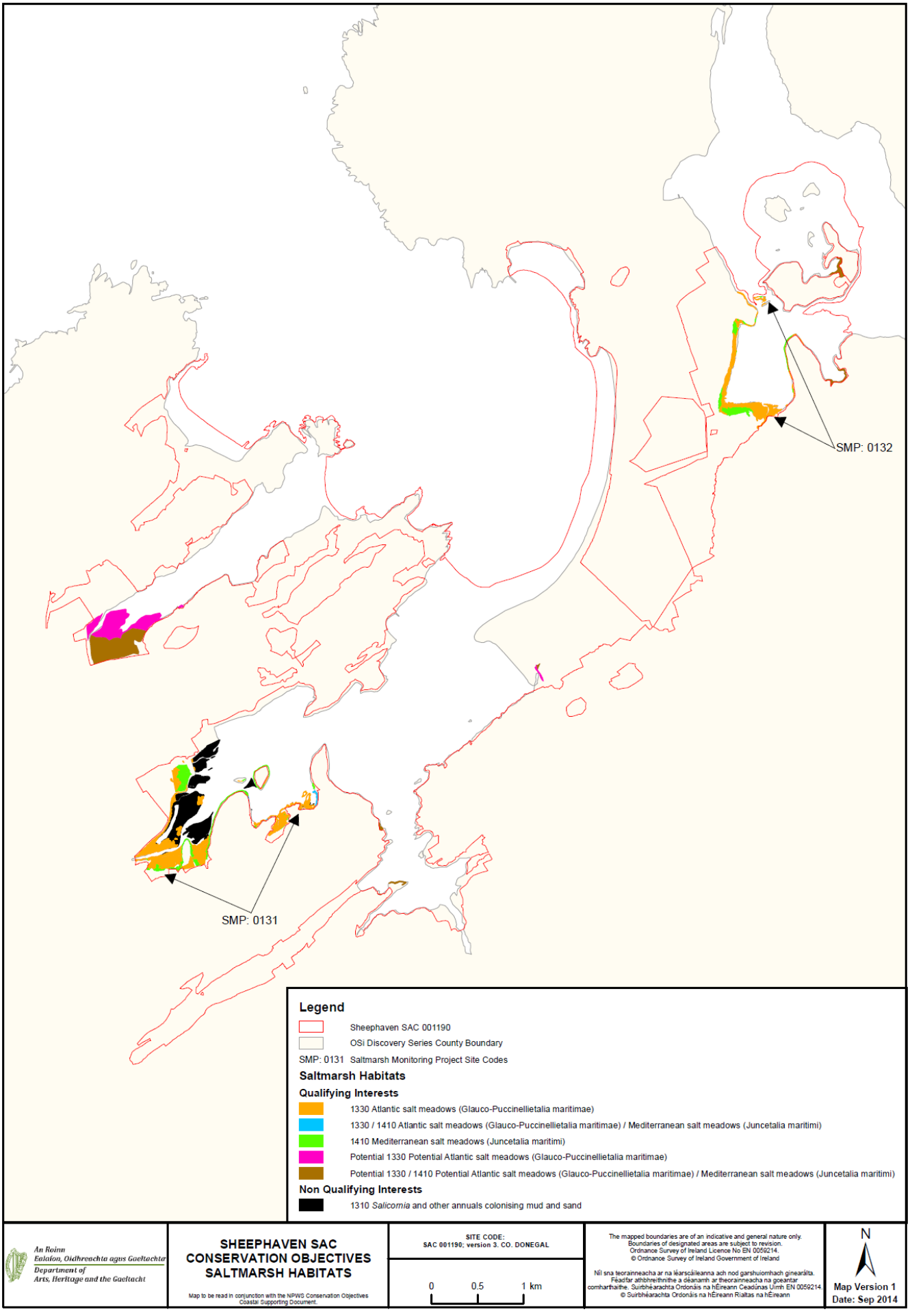
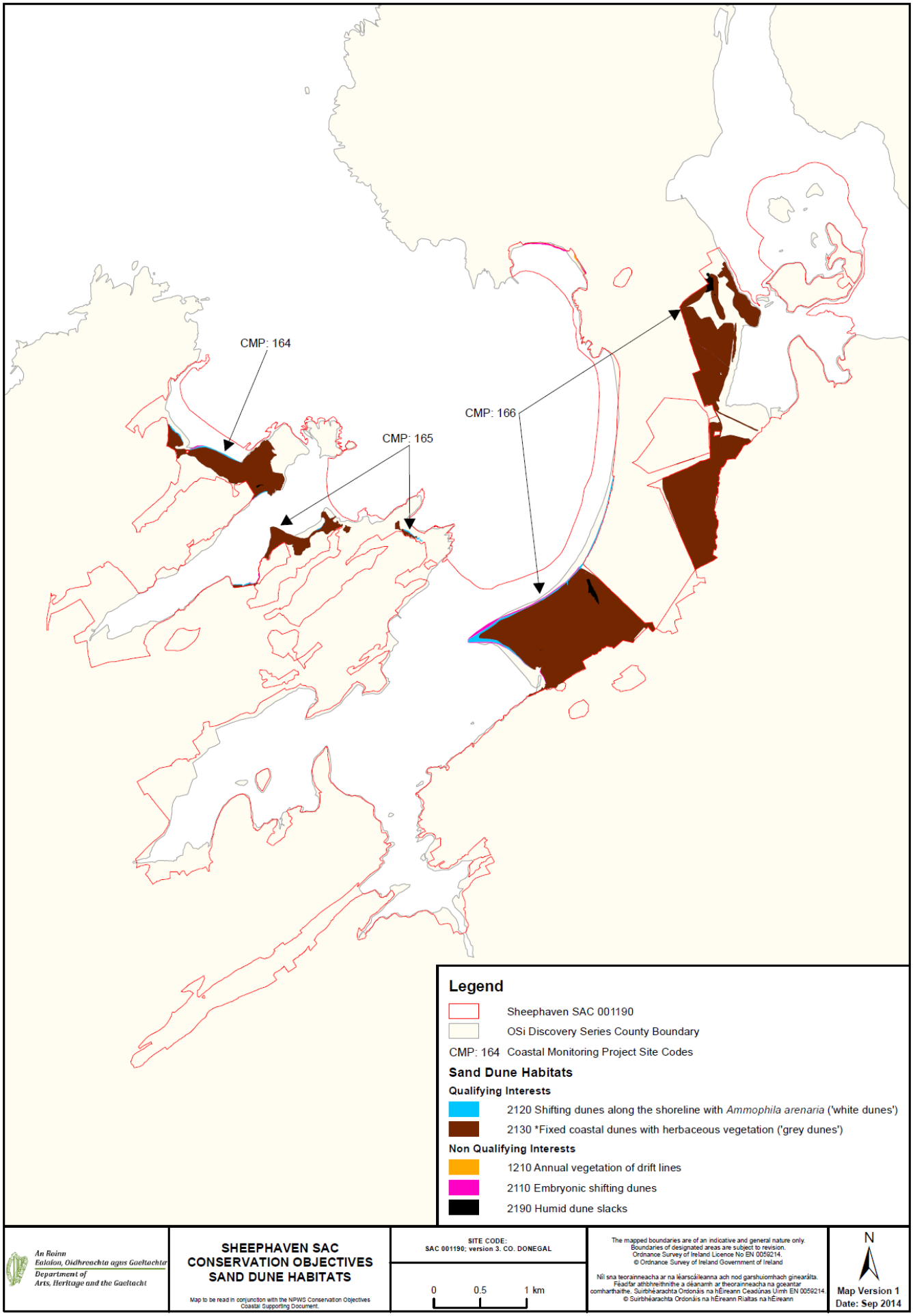
Ryle, T., Murray, A., Connolly, K. and Swann, M. (2009). *Coastal Monitoring Project 2004-2006*. Unpublished report to the National Parks and Wildlife Service, Dublin.

Appendix I: Distribution map of saltmarsh habitats within Sheephaven SAC



Appendix II – Distribution map of sand dune habitats within Sheephaven SAC.



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

1 SITE DETAILS

SMP site name: **Creeslough**		SMP site code: **0131**
Dates of site visit: **10 & 11 September 2008**		CMP site code: **N/A**
SM inventory site name: **Creeslough**		SM inventory site code: **12**
NPWS Site Name: **Sheephaven**		
NPWS designation	cSAC: **1190**	MPSU Plan: **Old Format – Draft 2: Consultation**
	pNHA: **1190**	SPA: **N/A**
County: **Donegal**		Discovery Map: **2** Grid Ref: **206562, 432210**
Aerial photos (2000 series): **O 0098-D; O 0099-C; O 0119-A,B; O 0120-A**		6 inch Map No: **Dg 026**

Annex I habitats currently listed as qualifying interests for Sheephaven cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **Rosapenna**

Saltmarsh type: **Bay** Substrate type: **Sand: Mud**

2 SITE DESCRIPTION

Creeslough is a small village in North Donegal and is approximately 25 kilometres northwest of Letterkenny. It is found in a largely rural setting and is located along the road to Dunfanaghy and elsewhere. Adjacent areas of interest include Ards Forest Park or the spiritual retreat centre at Ards. Much of the land surrounding this part of Donegal was previously owned by an English family, the Stewarts, for over a century. They later sold all the land to the Franciscan Capuchin Order in 1930, who continued to farm the land. Gradually, however, it was gradually sold off in packets to individual landowners, as the Capuchins began to concentrate on its development as a spiritual centre.

The extensive saltmarsh lies to the northwest of the Creeslough village in one of the innermost inlets within Sheephaven Bay, around Ards Strand. The Faymore River flows into this inlet, which forms the estuary for this river. Saltmarsh has developed in low-lying land inundated by the tide on both sides of the estuarine channel. Extensive saltmarsh has developed in sheltered positions along an intricate shoreline. Starting in the north-western part of the Ards Strand inlet, it continues southwards towards the upper tidal reaches of the Faymore, then continues on the southern bank of the river, where it gradually widens out towards Rinnasa Point. A narrow fringe of saltmarsh vegetation extends around the rocky headland at Rinnasa before it continues on towards the townlands of Magherablad and Castledoe at Rinnarispy Point.

Creeslough is one of a number of saltmarsh systems that are included on the national inventory and are found around Sheephaven Bay (Curtis and Sheehy-Skeffington 1998). The other sites include Ards, Island Roy and Rosapenna, although only this last site was surveyed as part of this project.

A large part of Sheephaven Bay has been designated as a candidate Special Area of Conservation (cSAC), primarily due to the presence of mudflats and sandflats not covered by seawater at low tides, along with a number of sand dune habitats, including the priority habitats 'fixed dunes with herbaceous vegetation' and 'machair'. In terms of saltmarsh habitats, both Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM) are found at this site and both are also listed as qualifying habitats for the cSAC.

A third Annex I community, *Salicornia* flats, is also found at this site. The site is particularly notable in a national context owing to its extensively vegetated intertidal zone. The sand-flats support one of the largest areas of annual vegetation dominated by Glasswort (*Salicornia europaea*) anywhere in Ireland and this is the largest extent of habitat surveyed that is not affected by Common Cordgrass, an invasive species that threatens this habitat.

As the saltmarsh occurs on both sides of the estuary, a number of landowners were contacted and permission sought for access to saltmarsh across adjoining farmland. Some of the intertidal mudflats were quite soft and treacherous.

3 SALTMARSH HABITATS

3.1 General description

Creeslough saltmarsh is an extensive saltmarsh system that has developed all around much of the intertidal zone surrounding Ards Strand Inlet. The majority of the saltmarsh development is found at the head of the inlet and on the southern side of the estuarine channel. The established saltmarsh is dominated by Atlantic salt meadows (ASM) (Table 1) on both sides of the estuarine channel, with the majority of the saltmarsh found on the southern side. Seaward of the established saltmarsh there are extensive intertidal mudflats on both sides of the estuarine channel. Much of these flats are vegetated by *Salicornia*.

The southern side of the site is divided into two main sections by a hill or headland called Red Hill. West of this hill there is some typical saltmarsh zonation with extensive ASM situated seaward of Mediterranean salt meadow (MSM). There is a landward transition to transitional wet grassland in places with the appearance of species such as Purple Moor-grass in the upper MSM vegetation. There is also some development of stands of Common Reed (*Phragmites australis*) at the seaward side of one section of established ASM. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. East of this hill there is some minor saltmarsh development around two small islands that are found on the

intertidal flats, Juniper Isle and Red Island. There is also some saltmarsh development along the indented shoreline where there is some shelter.

Throughout the site, there is considerable variation in the structure and condition of the saltmarsh, much of which is related to the historical management of the area. Low-lying land on the north side of the inlet has been reclaimed in the past. An embankment forms a boundary between the upper saltmarsh and the reclaimed land. This reclamation has modified the transition area between the saltmarsh and the former adjacent brackish and marshland habitats that would have been found in this area. This embankment has been breached in the past 10 years at the northern end and there is some extensive development of relatively immature MSM behind this embankment, along with some ASM and brackish habitats such as stands of Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*). This area is notable for some standing dead trees and scrub along a field boundary that had developed before the embankment had been breached.

Although the saltmarsh was mapped to its natural limit at either shore of the Inlet, it is possible that further patches occur further westwards on either side of the inlet. This is certainly the case on the southern side of the inlet round the headland at Doe Castle.

Table 3.1. Area of saltmarsh habitats mapped at Creeslough.

EU Code	Habitat	Area (ha)
H1310	*Salicornia* and other annuals colonizing mud and sand	21.49
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	19.61
H1410	Mediterranean salt meadows (Juncetalia maritimi)	5.76
	Total	**46.86**

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

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

This annual habitat occupies approximately 21.49ha of the intertidal zone at the Ards Strand Inlet and represents one of the largest intact areas of this habitat that was recorded in the 131 saltmarsh sites during the SMP. Characterised by the presence of Glasswort (*Salicornia* spp.) on soft intertidal mud, there are few other regularly occurring species. Occasionally species such as Annual Sea-Blite (*Suaeda maritima*), Common Saltmarsh Grass (*Puccinellia maritima*) or Greater Sea Spurrey (*Spergularia media*) were noted, these were rarely widespread in their distribution. There is considerable variation in the amount of bare ground that is recorded, ranging from less than 30% in the most densely vegetated patches to anywhere up to 95% of an individual monitoring stop.

There were several patches along the estuarine channel where there is some development of pioneer ASM and the latter species are found more frequently in an open sward with bare mud still dominating cover. Natural transitions from typical *Salicornia* flats vegetation with a mono-specific sward of Glasswort to these pioneer ASM communities are present. These vegetation transitions form part of the natural saltmarsh zonation in the pioneer zone. The presence of a significant area of pioneer habitat indicates that there is active accretion at this site, particularly along the estuarine channel.

Another feature of the vegetation was the presence of both old and new flowering stems, e.g. the woody remains of the previous years shoots. Thus it might be suggested that extensive areas of the mud and sandflats are relatively stable and that most disturbance or change in habitat substrate is centred on numerous channels that bisect the intertidal zone.

3.3 Atlantic salt meadows (H1330)

The ASM is nearly as extensive as the *Salicornia* flats. It accounts for 19.61ha, or nearly 41%, of the total saltmarsh vegetation that was recorded at Creeslough. The majority of ASM vegetation occurred within the cSAC boundary with a negligible fraction recorded outside.

Pioneer vegetation was occasionally recorded. It is characterised by the overwhelming dominance of Common Saltmarsh Grass (*Puccinellia maritima*) along with other minor contributions from Glasswort Sea Aster (*Aster tripolium*) and Common Sea Spurrey (*Spergularia media*). This community was noted along the seaward side of the saltmarsh on the northern side of the estuarine channel. There are notable examples of natural unmodified transition from the pioneer zone to lower marsh vegetation and onto mid and mid-upper vegetation along a landward gradient. The pioneer vegetation appears on an accretion ramp on the seaward side of the more established saltmarsh.

The lower marsh zone is characterised by Sea Plantain (*Plantago maritima*) and Common Saltmarsh Grass along with minor contributions from Sea Aster, Thrift (*Armeria maritima*), Sea Milkwort (*Glaux maritima*), Glasswort and Annual Sea-Blite (*Suaeda maritima*). Sea Arrow Grass (*Triglochin maritimus*) was typically an occasional component of the lower marsh, although at one stop it accounted for 51-75% cover. Another species of limited ground cover was Saltmarsh Rush (*Juncus gerardii*), which was patchily distributed in the lower marsh.

The mid marsh was more extensive, but patchily distributed. The low-lying ground was generally topographically level and extensive development of pans and some creeks were noted in some of the largest areas. There was a considerable increase in the cover afforded by species such as Thrift, Sea Plantain and Sea Arrow Grass, whilst Common Saltmarsh Grass decreased and was mainly only found in shallow hollows, pans or along creeks. Other species that were noted from the mid marsh included: Sea Aster, Common Scurvy Grass (*Cochlearia officinalis*), Sea Milkwort and Lax-flowered Sea lavender (*Limonium humile*). This last species was not commonly recorded at Creeslough and ordinarily is confined to the lower limit of the marsh.

The greatest area of ASM marsh that was recorded at Creeslough is typified by upper marsh vegetation. It is usually dominated by grasses along with a number of flowering herbs. Along with Red Fescue (*Festuca rubra*) which is a common upper marsh species, Creeping Bent (*Agrostis stolonifera*) was commonly recorded and is indicative of wetter situations. Other commonly occurring species included Saltmarsh Rush, Sea Milkwort, Sea Plantain and Sea Arrow Grass. A number of other species were locally abundant such as Common Scurvy Grass, Autumn Hawksbill and White Clover

(*Trifolium repens*) whilst other species most of which are also found in lower marsh zones were infrequently recorded.

The upper boundary of the ASM was often marked by transitions to MSM vegetation that were clearly identifiable by the presence of the taller Sea Rush (*Juncus maritimus*). However, other transitions that were occasionally noted included transitional wet grassland, Scrub or hedgerow, man-made berms or other brackish marsh (CM2) such as the presence of small stands of Common Reeds (*Phragmites australis*) or Sea Club Rush (*Bolboschoenus maritimus*). This last species was not widespread in its distribution, but was occasionally recorded along creeks within the ASM.

While most of the habitat is characterised by pure ASM of which there is some degree of zonation, mosaics with other vegetation was noted. Several small patches of ASM/MSM vegetation, in total comprising 0.210ha were recorded. These were for the most part confined to the southern side of the inlet and extended from Red Hill eastwards towards Rinnarispy Point. Elsewhere, a narrow fringe of ASM was recorded over rocky substrates. This was patchily distributed and accounted for 0.014ha.

3.4 Mediterranean salt meadows (H1410)

The MSM vegetation is widely distributed throughout this site and in places is quite extensive. However, at 5.76ha, it only accounts for 12% of the total saltmarsh area at Creeslough. It is often found towards the landward boundary of the ASM; although in a limited number of situations may extend down to the intertidal. Most of the MSM is characterised by upper vegetation, although its occurrence was noted on mud in a number of situations, most notably on the mudflats behind the damaged berm in the north-eastern part of the site. Elsewhere narrow swathes of MSM vegetation are found around rockier substrates such as on headlands or in sheltered areas adjacent to the Reeds.

The MSM is readily recognisable due to the occurrence of Sea Rush (*Juncus maritimus*), a tussocky rush which is largely which is usually avoided by livestock and always stands out from other saltmarsh communities. Red Fescue and Creeping Bent were commonly recorded throughout the MSM and generally accounted for up 40% of total ground cover. Other commonly occurring species included Saltmarsh Rush, Sea Plantain, Autumn Hawksbill, Sea Milkwort and White Clover.

Unlike the ASM, whose upper boundary was largely comprised of a single habitat (namely MSM), the MSM is very much more heterogeneous in terms of its upper boundary. Much of the upper MSM grades into wet grassland (GS4) which has a strong Twitch (*Elymus repens*) component. This transitional grassland is sometimes replaced by Sea Club Rush, although its occurrence is more common in ditches and creeks. Other non saltmarsh habitats that were noted at the upper MSM transition included Scrub and hedgerow, agricultural grassland and occasionally small bands of Reeds.

4.1 Impacts and Activities

A considerable number of impacts and activities were recorded from this site, all of which are listed in Table 4.1. Given the relative extent of the saltmarsh system, there was considerable variation in the management regimes in particular areas of the saltmarsh. Most of the activities listed in Table 4.1 are not considered to be of any great significance. The single most important activity is agricultural management, followed by drainage and erosion.

Historically, there has been much modification of the site including considerable attempts at drainage and land reclamation. These modifications include an impressive seawall which extends along parts of the northern shore of Ards Strand and was mainly built in the 19th century (870). This enclosed former saltmarsh and other marshland. A large part of the saltmarsh and its surrounding hinterland was once under the ownership and management of a Planter Family, who sold the land in the 1930's to a religious order that had established itself at Ards. A large part of the reclaimed land was managed for produce for use in the friary as well as being distributed to a network of other friaries around the country. Much of the land that was reclaimed is still actively maintained and the seawalls are for the most part in good condition. The embankment has been breached recently and one section of this reclaimed land is reverting back to saltmarsh. The saltmarsh along the southern side of the estuarine channel also still retains a definite imprint of these earlier management practices. However, for the most part, and except for where there is recent evidence of an impact, they are not assessed as they occurred outside of the current monitoring period.

The larger areas of saltmarsh are mostly separated into individual fields by fences and/or ditches. As much of the land is wet, maintenance of drains is important to improve the quality of the land. Unlike the large scale historic drainage and reclamation project that was carried out along the northern half of the site, the southern site remains exposed to tidal inundation. Drainage (810) is still carried out, although not always with any great success. Small bridges sometimes exist over drains where adjoining fields are owned by a single landowner. However, they were often badly built or poorly maintained. In one location, a small culvert had become bypassed by clay and earth that had been trampled into the ditch by livestock, so that it was no longer effective in draining the land.

Despite the attempts at drainage, grazing (140) is still the only agricultural practice that is commonly carried out at Creeslough saltmarsh and there is evidence of its occurrence throughout a large part of the site, including some of the open parts of the marsh which are found to the seaward side of the seawall. However, the levels of grazing are such in certain areas that the land is badly damaged through excessive grazing pressure, trampling and poaching (143), as well as the creataion of trails (501).

Erosion (900) and accretion (910), for which there is often some evidence at larger sites, although not usually together is difficult to quantify accurately. In terms of erosion there was some evidence such as low, perched faces or occasionally higher terracing in both ASM and MSM habitats, along with

some limited signs of undercutting. There are certainly signs of both loss and gain of habitat at Creeslough. It is not possible to indicate how much saltmarsh existed around this site prior to the mapping of the 2nd edition 6inch map, as the map shows the land to have been already modified through the construction of the sea wall. Analysis of the 6 inch maps reveal that a large part of the ASM along the northern side of the estuarine channel has developed during this period, probably up to 3 ha. About 1 ha has also developed on the adjacent southern adjacent side of the estuarine channel. This means there is an overall accretional trend at this site and the presence of accretional ridges and pioneer vegetation indicates this trend is continuing. There are also indications that some of this saltmarsh habitat has only developed very recently (about 1.4 ha) when a comparison of aerial photographs (year 2000 and 2005 series) is made. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is more than balanced by significant accretion at this site.

Elsewhere, however, there has been some quantifiable habitat gain of both ASM and MSM, at the expense of land that had previously been reclaimed. A large area of land situated behind a relatively intact seawall is being undermined at one spot in the north-eastern side of Ards Strand (870). The one-way gate has failed due to subsidence and saltwater has re-flooded a large area of ground, where saltmarsh vegetation is gradually becoming re-established. It is visible on both the year 2000 and 2005 series aerials, although it is hard to distinguish the extent of bare mud in either set of photographs. However, such is the extent of the seawater inundation that the young hazel scrub at the northern half of this area along an old green track shown on the 6inch map is dying off and remain as stunted reminders.

Outside of the site, most of the impacts are associated with the agricultural upkeep of the land and are merely a repetition of those listed as occurring inside the cSAC. However, one impact, which a number of landowners and interested locals mentioned was the lack of any sewerage treatment for the town of Creeslough and its disposal in the Faymore River (701) which flows into the intertidal zone. Locals spoke of large unsightly large algal blooms and other deposits at certain times of the year.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	910	B	+1	2.0	Inside
H1330	140	C	0	12.0	Inside
H1330	143	B	-1	4.0	Inside
H1330	501	C	0	0.02	Inside
H1330	810	C	-1	0.01	Inside
H1330	900	C	0	1.0	Inside
H1330	910	B	+1	1.4	Inside
H1410	140	C	0	3.0	Inside
H1410	143	B	-1	1.0	Inside
H1410	501	C	0	0.02	Inside

H1410	810	C	0	0.01	Inside
H1410	870	C	+1	2.8	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the 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. There is little other detailed information for this site.

Creeslough saltmarsh is a site of notable conservation interest, particularly for the presence of a extensive area of *Salicornia* flats, which is nationally important, especially as Common Cordgrass is not found at this site. There are also excellent examples of unmodified zonation between pioneer through to upper marsh saltmarsh communities. The site is actively accreting and this is having a positive influence on the site.

Not withstanding the relative abundance of three Annex I saltmarsh habitats and the presence of a full complement of marsh communities that were recorded at Creeslough, the overall conservation assessment of this site is assessed as *unfavourable-inadequate*. This determination is a reflection of the lowest individual habitat assessment at Creeslough saltmarsh (Table 5.1). Some of the saltmarsh is damaged by overgrazing.

A large part of the inlet has been historically modified through the construction of the coastal berms. A large area of land around Clonbeg Glebe, on the northern side of the inlet has been reclaimed in previous times as indicated by the 6inch map. Much of the land is still wet, although the berms and their one-way gates are for the most part still functioning and the land is still over to agriculture. As a result of the berm construction, It is likely that an accelerated deposition rate has occurred in the intertidal zone to the seaward side of the berms and that the extensive *Salicornia* flats and large parts of the ASM on either side of the upper inlet has developed over the past century.

Creeslough is a large site in which only a small number of impacts or activities are directly affecting it. The agricultural management regime is probably the greatest influence on the current condition of the land although some of this may be attributable to the recent wet summers which have rendered much of the agriculturally available land saturated for much of the year, and thus prone to damage. The

grazing intensity, although low or at least not continuous, in most parts has not protected the land from poaching and other damage including vegetation denudation.

The site is located within the Sheephaven Bay cSAC and an old format management plan is available for this site, which is now out of date.

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

Habitat	EU Conservation Status Assessment			
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Salicornia flats (H1310)	Extent Structure and functions Future prospects			Favourable
Atlantic salt meadows (H1330)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (H1410)	Extent	Structure and functions, Future prospects		Unfavourable - Inadequate

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

5.2.1 Extent

The extent of the *Salicornia* flats is assessed as *favourable* (Table 5.1). The widespread distribution of this habitat around the Ards Strand Inlet is a feature which is unrivalled in the majority saltmarsh sites throughout the country. There are no indications of any loss of habitat due to land-use changes or erosion within the current monitoring period.

5.2.2 Habitat structure and functions

The habitat structure and functions are rated as *favourable*. Seven monitoring stops were carried out across the habitat, all of which satisfied the target criteria. Although there was considerable variation in the amount of bare ground that was recorded, the overall condition of the vegetation indicates a healthily functioning and persistent habitat. Active accretion at this site is also a positive indictor. There are also natural transitions to pioneer ASM habitat from this vegetation type.

5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. Given the extensive nature of the vegetation and the relative lack of any damaging activity (except perhaps from the unquantifiable impact from the untreated sewerage entering the inlet), it would seem that any further spread is largely determined by sediment redistribution within the large intertidal sand flats. The

absence of Common Cordgrass is a notable positive indictor for the future prospects of this habitat at this site.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of the ASM is assessed as *favourable*. There are no indications of any loss of habitat due to land-use changes or erosion within the current monitoring period. Overall there is an accretional trend at this site and some of the saltmarsh has grown considerably in the past 100 years and there is also evidence of growth within the current monitoring period. This is a positive indicator. The naturally re-flooding land behind the seawall at the north of Ards Strand is a recent feature which postdates the 2005 series aerial photographs. Thus there is an ongoing, albeit gradual increase in ASM in parts of this land.

5.3.2 Habitat structure and functions

Habitat structure and functions for the ASM are assessed as *unfavourable-inadequate*. Of the 16 monitoring stops that were carried out across the ASM habitat, three failed, mostly in mid and upper marsh zones. The main reason for the failure of these stops is related to the management regime which is carried out at much of the agriculturally available land at Creeslough. A large part of the ASM was heavily utilised for grazing and as a result was badly damaged in places. Poaching, which was exacerbated this summer due to the near continual rainfall that the land was subjected to, was a common feature and areas of bare ground were not uncommon.

The ASM at this site displays well developed examples of the main saltmarsh communities including pioneer and lower marsh zones. There are excellent examples of zonation on a landward gradient from pioneer through to upper marsh. This saltmarsh also has a well-developed saltmarsh topography with salt pans and creeks present. There are still some relic modifications present in the saltmarsh structure due to drainage and land reclamation around the site. There is also further transition to both MSM and *Salicornia* flats at the upper and lower ASM boundaries and the ASM is a significant part of the larger saltmarsh and coastal ecosystem at this site. Some of the ASM saltmarsh is not grazed and the sward height is quite variable.

5.3.3 Future prospects

The future prospects for the ASM are rated as *unfavourable-inadequate*. This assessment assumes that the current management activities and intensity of impacts such as grazing continue in the near future. Except for a number of areas such as outside of the retaining berm, the ASM is in most parts utilised. Much of the substrates underlying the ASM are saturated. Consequently, the agriculturally available land is relatively easily damaged by the high volume of livestock. If the environmental conditions such as those experienced in the summer of 2008 continue, the damage is likely to continue unless there is a decrease in the numbers of livestock. Active accretion at this site is a positive indictor for the future prospects at this site.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

The extent of the MSM is determined as *favourable* (Table 5.1). There are no indications of any loss of habitat due to land-use changes or erosion within the current monitoring period. The MSM is widely distributed throughout the site and in places is extensive. It is likely to have occurred at the site for some time as indicated in earlier NPWS reports. Overall, there has been a quantifiable increase in the extent of MSM in the current monitoring period. This increase is ongoing on land formerly reclaimed from the intertidal zone, which no longer possesses any barrier from saline water flooding in.

5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. A total of six monitoring stops were carried out in this habitat, all of which satisfied the target criteria. The MSM is generally in good condition. There are areas which have remained relatively unaffected by livestock pressure or indeed are not subject to grazing as they are outside of enclosed fields. However, the majority of the MSM supports grazing livestock and in places it is clear that they are having a damaging impact on the vegetation, particularly in areas where the soils are constantly waterlogged. These impacts were not assessed by the position of the monitoring stops. Therefore the structure and functions of the MSM habitat is reassessed as *unfavourable-inadequate*.

The MSM has a typical species assemblage. There are also natural transitions to ASM and to transitional wet grassland at its upper and lower boundaries. A significant area located behind the embankment is still developing and the species assemblage and structure of this section is still quite immature.

5.4.3 Future prospects

The future prospects of the MSM at Creeslough are rated as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in the near future. Grazing is the principal activity that affects this habitat. Much of the MSM vegetation, located within enclosed sections of the marsh, is in places heavily trafficked by livestock. This has led in places to considerable poaching and in some places erosion.

6 MANAGEMENT RECOMMENDATIONS

There are no recommendations in relation to the overall management of the saltmarsh habitats at this site. However, the re-flooding that has occurred behind the seawall on the northern side of Ards Strand is noteworthy and should be monitored. There are only a very limited number of sites throughout in Ireland where this is happening and most, if not all, are due to a catastrophic failure of

sea wall and/or drainage regimes sometimes unwittingly brought about through a reduction in the maintenance programme of these reclaimed areas.

7 REFERENCES

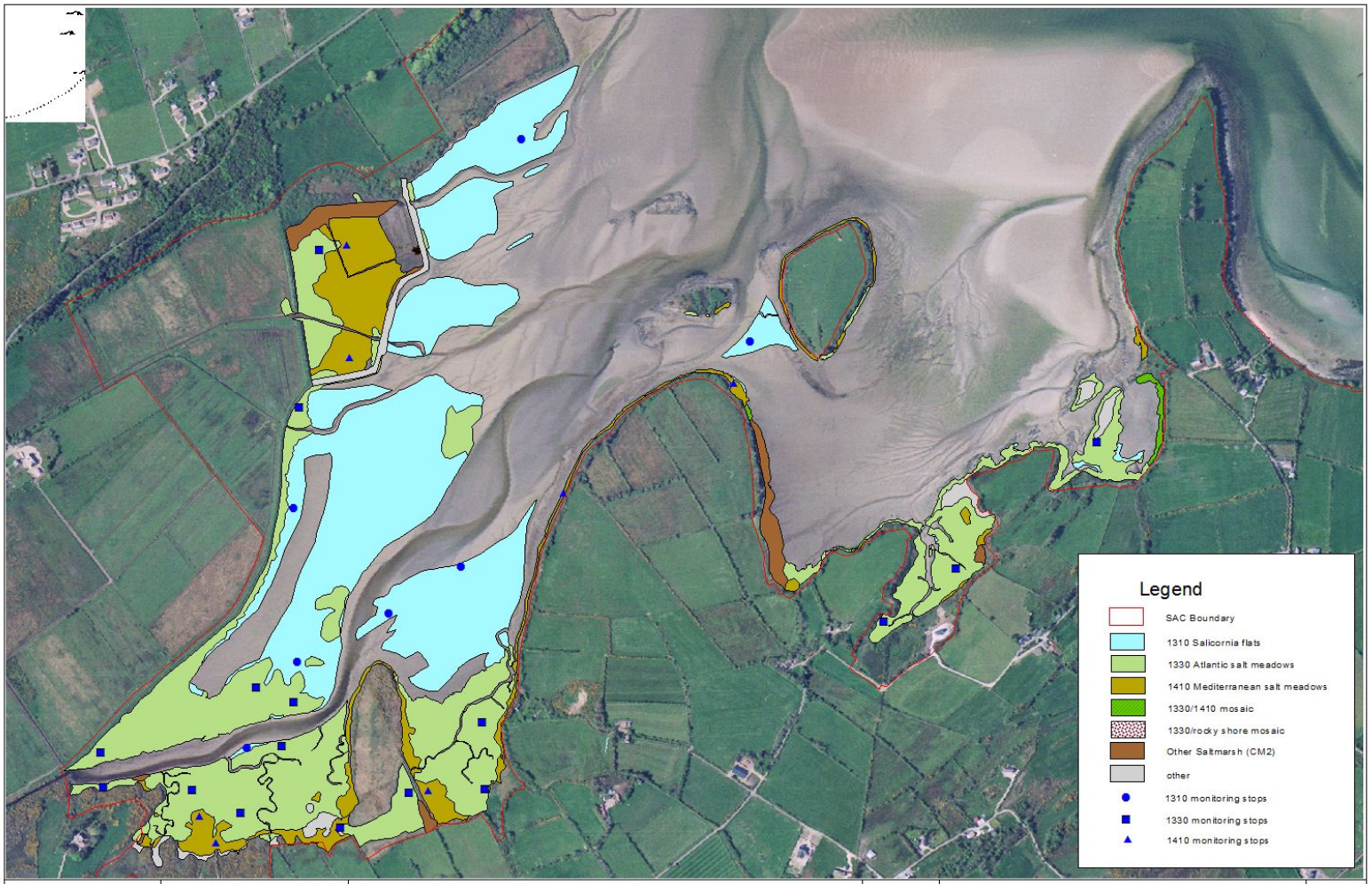
Curtis, T.G.F.C. and Sheehy-Skeffington, M.J. (1998). The saltmarshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.

MPSU (?). *Draft Conservation Plan for Sheephaven cSAC*. Government of Ireland, Unpublished.

8 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	21.494	21.494				
2	*Spartina* swards						
3	1330 Atlantic salt meadow	19.496		19.496			
4	1410 Mediterranean salt meadow	5.651			5.651		
5	ASM/MSM mosaic (50/50)	0.210		0.105	0.105		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.407					
10	*Spartina* clump/mudflat mosaic (50/50)						
11	Isolated *Spartina* clumps on mud (5%)						
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic						
14	*Spartina* sward dominated, with some ASM						
15	1310/*Spartina* mosaic						
16	ASM dominated with some *Spartina*						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.409					
19	1330/rocky shore mosaic	0.014		0.007			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**49.681**	**21.494**	**19.601**	**5.756**		



National Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

Creeslough

SMP code: SMP0131

Sheephaven SAC (001190)

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 5993)

0 80 160 240 320 400 Meters

N

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6250

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

1 SITE DETAILS

SMP site name: **Rosapenna**	SMP site code: **0132**
Dates of site visit: **9 September 2008**	CMP site code: **166**
SM inventory site name: **Rosapenna**	SM inventory site code: **11**
NPWS Site Name: **Sheephaven**	
NPWS designation cSAC: **1190**	MPSU Plan: **Old Format – Draft 2: Consultation**
pNHA: **1190**	SPA: **N/A**
County: **Donegal**	Discovery Map: **2** Grid Ref: **212720, 436945**
Aerial photos (2000 series): **O 0078-B,D; O 0079-A,C**	6 inch Map No: **Dg 016, 017**
Annex I habitats currently listed as qualifying interests for Sheephaven cSAC:	
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	
H1410 Mediterranean salt meadows (Juncetalia maritimi)	
Other SMP sites within this SAC/NHA: **Creeslough**	
Saltmarsh type: **Sand flats**	Substrate type: **Sand**

2 SITE DESCRIPTION

Rosapenna is situated in the Rosguill peninsula in Northern Donegal. The saltmarsh itself is located in a relatively sheltered eastern inlet centred on the small village of Carrickart. The site is readily accessed from a number of locations, the easiest being from the commonage on the eastern side of the Rosguill peninsula. Elsewhere, the slipway at Carrickart allows access to the saltmarsh, along the western flanks of Fegart Point. The marsh is only fenced off towards its southern flank, where it has been subdivided into a number of fields by barbed wire fencing and is grazed by cattle.

The site is situated to the west of the small village of Carrickart. The sandy surroundings of Rosapenna and the smaller holiday village of Downings to the west of Carrickart are very popular tourist destinations due in part to the recreational facilities including an unusually large number of golf courses all adjacent to each other. Several hotels and caravan parks are centred on Carrickart and a large part of the sandy peninsula is occupied by 5 golf courses. In terms of tourism, Rosapenna is the gateway to the north of the peninsula and Melmore where there are numerous caravan parks both legal and illegal.

Much of the saltmarsh has developed on level sandflats and is associated with the extensive sand dune systems of Rosapenna. The saltmarsh is located in a sheltered inlet on the inner part of the site and extends southwards from Island Roy around the eastern flank of the Rossguill peninsula towards Carrickart and extends northwards towards Fegart point. The

saltmarsh continues around the point for a short distance but increasingly becomes rockier and gradually disappears. A large part of the land behind the saltmarsh is sandy and is part of the extensive sand dune complex which was surveyed (CMP site report 166) as part of the coastal monitoring project (Ryle *et al*. 2009). A large part of the saltmarsh is in commonage and freely accessible.

The site is part of the extensive Sheephaven candidate Special area of conservation (cSAC 1190). It is one of four saltmarshes listed on the inventory (Curtis and Sheehy-Skeffington 1998) although only Rosapenna and Creeslough (SMP site 133) were visited as part of this survey. The cSAC is primarily designated due to the presence of mudflats and sandflats not covered by seawater at low tides (45%), along with fixed dunes with herbaceous vegetation (15%) and machair (3%) which are listed as priority habitats in Ireland. In terms of saltmarsh habitats, the presence of both Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM) which are also qualifying habitats account for 2% of the total area of the SAC. These figures are based on figures quoted in the outdated draft management plan for the site (NPWS undated). Other habitats which are listed as qualifying interest for the site but which were not studied include coastal lagoons and old oak woodlands.

All of the saltmarsh vegetation bar a single small polygon occurs within the confines of the cSAC boundary.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at Rosapenna occurs on the eastern side of the Rossguill peninsula, around the inner sheltered inlet that ends at Carrickart. The saltmarsh is largely contiguous, with a break only around the village of Carrickart where a short area of seawall has been constructed and where rubble has more recently been dumped in an effort to prevent erosion from tidal inundation blocking off a small road to a number of houses of Fegart Hill. Smaller, isolated patches of saltmarsh were mapped at either end of the site. However, as rocky shore substrates became more dominant, smaller patches of ASM over rocky shore were not included unless they were of significant size or length.

The saltmarsh is dominated by Atlantic salt meadows (ASM) with patches of Mediterranean salt meadows (MSM) mostly located towards the rear of the marsh. In total the ASM accounts for over 9ha. whilst the MSM occupies a little under 4ha (Table 3.1).

There are extensive intertidal sandflats at the lower boundary of the sandflats. Diverse wet grassland and machair is found adjacent to the upper boundary of the saltmarsh.

While Glasswort (*Salicornia* spp.) was recorded at the site, it was not common and does not warrant inclusion as a separate Annex I habitat. And like many parts of Donegal Common Cordgrass (*Spartina anglica*) was not recorded from the site.

One species of note that was recorded was Saltmarsh Flat-Sedge (*Blysmus rufus*). It was occasionally noted among both ASM and MSM vegetation, in particular on the open commonage plain of Rosapenna side of the marsh. This species is mainly confined to saltmarshes in the north-west of Ireland but has a fragmented distribution around the rest of Ireland's coast.

Table 3.1. Area of saltmarsh habitats mapped at Rosapenna.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	9.16
H1410	Mediterranean salt meadows (Juncetalia maritimi)	3.92
	Total	**13.08**

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

3.2 Atlantic salt meadows (H1330)

In general, a large part of the ASM habitat at Rosapenna is dominated by Upper marsh communities. However, it is possible to find examples of lower and mid marsh vegetation on the gently sloping ground, particularly on the Commonage side of the intertidal sandflats. There is limited development of pioneer saltmarsh vegetation and that which was recorded was noted on the fringing marsh over the rockier substrates that are associated with the area around Fegart Point.

In general, the topography of the ASM is relatively consistent. The ASM has developed inland over sandy substrates and the topography is not complex. There are few creeks or pans at this site, although a number of small streams outfall onto the sandflats across the saltmarsh. These are often characterised by the presence of Sea Club-Rush (*Bolboschoenus maritimus*), which extends inland over small streams and freshwater flushes.

Throughout the site, the most commonly recorded species include: Red Fescue (*Festuca rubra*), Sea Plantain (*Plantago maritima*), Sea Milkwort (*Glaux maritima*), Creeping Bent (*Agrostis stolonifera*) and Saltmarsh Rush (*Juncus gerardii*). Other species present were less abundant and at times patchily distributed, reflecting subtle topographical or edaphic conditions. They include White Clover (*Trifolium repens*), Thrift (*Armeria maritima*), Sea Aster

(*Aster tripolium*), Common Saltmarsh Grass (*Puccinellia maritima*), Extended Sedge (*Carex extensa*) and Distant Sedge (*Carex distans*).

A final group of species were occasionally recorded but did not form a significant part of the ASM at this site. They included Glasswort (*Salicornia* spp), Annual Sea-Blite (*Suaeda maritima*), Sea Arrow-Grass (*Triglochin maritima*), and Sea Hardgrass (*Parapholis strigosa*).

The ASM is grazed in most parts, but at varying intensities. The Commonage ASM is a naturally low sward which is grazed at times by cattle and possibly sheep. Further south, the land is fenced off. Generally avoiding the MSM, the cattle prefer to graze the ASM right down onto the sandflats and in places there has been considerable damage to the habitat. The poaching and grazing intensity is compounded by natural tidal inundation, which has resulted in isolated remnant tussocks of ASM vegetation along much of the southern flank of the marsh.

The upper limit of the ASM and the transition to MSM is clear cut at Rosapenna. However, where there is no MSM, the upper limit of the ASM habitat is less pronounced. The ASM transitions into coastal or dune grassland along its upper boundary. Further south as the land to the back of the ASM becomes more agriculturally influenced and the upper boundary is less distinct. There is an increase in grasses, although topographical changes and low sandy ridges can influence the ASM boundary.

Towards the eastern side of the site, there is a distinct change in the saltmarsh, delineated by the river that that drains onto the intertidal sandflats at Carrickart. The ASM is discontinuous here along a section of shoreline, mainly as the land has been modified for coastal protection. Thereafter the sandy substrate is replaced by glacially derived rocky substrate which is associated with the Fegart Hill. The narrow fringe of ASM is backed variously by transitional *Elymus repens*-dominated Grassland or MSM further north. The vegetation and ground cover is not as well developed as elsewhere at Rosapenna, a feature which reflects the rocky terrain and the regular tidal inundations that occur here.

The influence of freshwater vegetation was noted in a number of locations. Occasionally this influence was associated with small streams and drainage channels that flowed across the saltmarsh and drained onto the intertidal flats. Often the vegetation was characterised by bands of Sea Club-Rush (*Bolboschoenus maritimus*). Elsewhere the freshwater influence was indicative of the water-table near the surface of the sandy substrates. Indeed a number of slacks and transitional coastal/wet grassland was previously mapped around Rosapenna (Ryle *et al*. 2009). During this survey, a band of *Eleocharis* was noted in a hollow in the south-western corner of the site. The species assemblage here included Spike Rush (*Eleocharis* spp), Saltmarsh Flat-Sedge (*Blysmus rufus*), Sea Rush (*Juncus maritimus*) and Carnation sedge (*Carex flacca*).

3.3 Mediterranean salt meadows (H1410)

This habitat is found throughout the marsh. While most of it occurs as small patches of long linear patches, two larger areas on the Rosapenna side of the site account for the majority of this habitat. The largest portion of MSM vegetation is located in the south-western corner of the site where it occurs at the back of the ASM vegetation. The other significant area of MSM is situated in the north-eastern corner of the site below the causeway onto Island Roy.

The habitat is readily distinguished from the surrounding ASM and low-growing coastal grassland owing to the dominance of the Sea Rush (*Juncus maritimus*). This tall rush, alone, accounts for a large percentage of the ground cover. Other species that are commonly associated with this habitat include Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Common Scurvygrass (*Cochlearia officinalis*), Sea Plantain (*Plantago maritima*), Sea Milkwort (*Glaux maritima*) and Thrift (*Armeria maritima*).

Other species that were less commonly noted included Saltmarsh Rush (*Juncus gerardii*), Extended Sedge (*Carex extensa*) and Autumn Hawksbit (*Leontodon autumnalis*). Typically, these species were patchily distributed among the MSM. Other occasional species included Sea Arrow-Grass (*Triglochin maritima*), Spear-Leaved Orache (*Atriplex prostrata*), Saltmarsh Flat-Sedge (*Blysmus rufus*) and Distant Sedge (*Carex distans*).

Generally the MSM, where recorded, is found at the landward side of the ASM, although in places it extends to the front of the marsh onto the sandflats. Other than trails that have been created, there is no real zonation within the MSM habitat to speak of. The more extensive areas of MSM are generally more floristically rich, although this may in part be due to livestock freely roaming to areas of better grazing quality. In other areas such as Fegart Point, the linear MSM fringe is not wide and occurs on rocky substrates rather than the sandflats that characterise much of this site.

4 IMPACTS AND ACTIVITIES

There are few impacts and activities that are considered to be seriously affecting the saltmarsh habitats at this site (Table 4.1). Of these impacts the main one is grazing. The effects of grazing livestock are seen along the western and southern side of the saltmarsh and less so, on the rocky fringe around the eastern flank. Cattle and sheep are allowed graze the sandy commonage including the saltmarsh vegetation. Cattle are periodically let onto the marsh whilst sheep were noted at the northern end of the site below the golf courses. The naturally low sward of the commonage is maintained by grazing (140). Elsewhere the marsh is fenced off, even out onto the sand flats. The intensity of grazing here is more pronounced, although it is seriously damaging the marsh in a small number of areas where poaching (143)

is apparent. The poached ground tends to be located at the front of the marsh, which is unsurprising given the largely unconsolidated nature of the sandy substrate.

In general the cattle tend to avoid grazing the MSM as it is dominated by Sea rush which is not palatable to them. However, other species are grazed between the MSM tussocks. These areas are clearly marked with trails (501) evident throughout the MSM.

There is a break in the saltmarsh vegetation towards Carrickart, around the slipway and car park. In recent years the council (one assumes) have reinforced the sea defences here through strengthening of a seawall and the installation of boulder armour (871). This coastal protection has been in place for some time, although given the substrate it is unlikely to have been at the expense of saltmarsh habitat. Elsewhere, rubble and other boulders have been dumped along a road leading from the car park towards a group of houses on Fegart hill. This was done to prevent tidal flooding of the road which is itself in poor condition. While the ASM is patchy here, it is likely that there has been some loss of ASM habitat through disturbance.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	B	0	8.66	Inside
H1330	143	B	-1	0.5	Inside
H1330	501	C	-1	0.05	Inside
H1330	622	C	-1	0.05	Inside
H1330	900	C	0	0.45	Inside
H1330	910	C	+1	0.45	Inside
H1410	140	C	0	3.92	Inside
H1410	501	C	0	0.05	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.

The sandflats are a popular place for horse-riding/trekking (622) and there was clear evidence of horse being brought onto the saltmarsh particularly the commonage. Numerous hoof marks and some damage associated with horses congregating were noticed. However, it does impact greatly on the structural integrity of the ASM. Of greater concern here is the continued free access of cars onto the marsh, where it is clear that cars and quads have been racing and creating damage such as ruts which are bare of vegetation (501).

A comparison of the OSI 6 inch map suggests that for a large part of the saltmarsh, that the saltmarsh remains faithful to the trend of the earlier map. However, it is clear that over a long period of time, accretion of saltmarsh has occurred over the intertidal sandflats particularly in the south-western and south-eastern corner of the site.

Given that the marsh is located on low-lying sandflats; natural erosion (900) may have some impact on the saltmarsh habitats. This is the case at Rosapenna where low erosion terraces were observed along much of the marsh frontline. Indeed, remnant ASM clumps were encountered on the sandflats in places. However, there is no measurable loss of saltmarsh habitat when comparing its extent from the OSI 2000 and 2005 series aerial photos. Low accretion ridges (910) were noted in places along the lower saltmarsh boundary. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is being compensated by accretion at the site.

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of the site is assessed as *unfavourable-inadequate.* (Table 5.1). Most of the saltmarsh habitat is in good condition but there is some minor localised damage to parts from overgrazing and from vehicle use. Although large, the saltmarsh is dwarfed in extent by the Rosapenna sand dunes which are better suited to the recreational activities of the areas. Although grazed and in large parts easily accessible, the recreational and domestic impacts of humans is not as great as experienced on the sand dune system e.g. golf courses, holiday homes, etc.

This site is located within the Sheephaven Bay cSAC. An old format management plan is available for this cSAC but it is now out of date.

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

Habitat	EU Conservation Status Assessment			
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Atlantic salt meadows (H1330)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (H1410)	Extent Structure and functions, Future prospects			Favourable

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The ASM habitat accounts for the greater portion of this saltmarsh vegetation at Rosapenna. In terms of extent, it is rated as *favourable*. Some of the ASM habitat were previously mapped by the Coastal Monitoring Project (Ryle *et al*. 2009). The boundaries between the sand dune and ASM that was surveyed in 2006 generally correspond, indicating that there hasn't been any major change in these areas in 2 years. Overall, there are no indications of any measurable loss of habitat due to erosion or land use changes within the current monitoring period.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. A total of eight monitoring stops were carried through the site, all of which passed on all criteria. Most of the saltmarsh habitat is in good condition. However, there is some localised damage from overgrazing and poaching, and from vehicle damage (wheel ruts). Although not structurally diverse, some zonation in the ASM habitat was noted and several vegetation communities were present. The species diversity was typical of this habitat including the presence of Saltmarsh Flat-rush. There are natural unmodified transitions from saltmarsh to diverse wet grassland and to machair along the upper ASM boundary.

5.2.3 Future prospects

The future prospects of the ASM at Rosapenna are *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in

the near future. Grazing, vehicle use and horse-riding are the main impacts affecting this site. While large parts of the extensive ASM marsh are relatively undamaged, the continued grazing regime and localised heavy poaching within the fenced off sections of the marsh are creating a situation where the unconsolidated sandy substrate is being eroding away at a rate that is greater than that experienced anywhere else at this site. There are also few prospects that impacts of vehicle use and horse-riding will also be reduced in the near future, a fact which has previously been highlighted in the draft management plan.

5.3 Mediterranean salt meadows (H1410)

5.3.1 Extent

Although not as extensive as the ASM, there is a considerable amount of *Juncus maritimus*-dominated vegetation throughout the site. For this reason and the from other previous NPWS information, it is assumed that the MSM has been a feature of this site for some time. For this reason its extent is rated as *favourable*. Overall, there are no indications of any measurable loss of habitat due to erosion or land use changes within the current monitoring period.

5.3.2 Habitat structure and functions

Occurring largely as pure sward rather than as a patchy mosaic within the more extensive ASM, the habitat at Rosapenna displayed many typical characteristic features of MSM. All six monitoring stops carried out in the MSM habitat satisfied the criteria of the structure and functions and so are rated as *favourable*. Most of the MSM is in good condition apart from some tracks through the habitat that are used by livestock and are heavily poached. However, only a small area is affected.

5.3.3 Future prospects

The future prospects of the MSM at Rosapenna are *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. Grazing is the main impact affecting this site although it is not having a significant impact on the MSM.

6 MANAGEMENT RECOMMENDATIONS

No specific management of saltmarsh habitats is required at this site.

7 REFERENCES

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

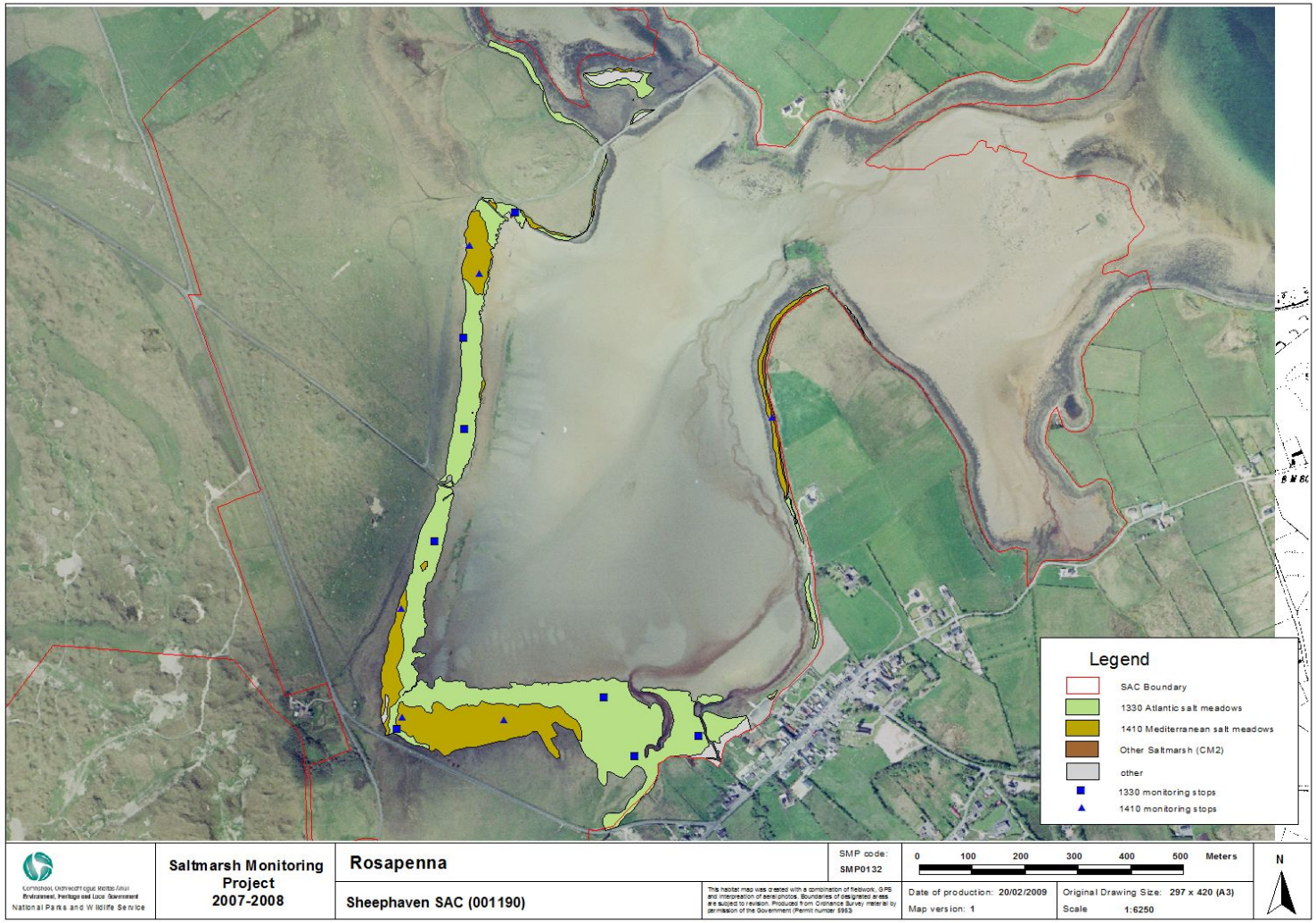
NPWS (?). *Draft Conservation Plan for Sheephaven cSAC*. Government of Ireland, Unpublished.

Ryle, T., Connolly, K., Murray, A. and Swann, M. (2009) *Coastal Monitoring Project 2004-2007.* Report to National parks and Wildlife Service, Dublin.

8 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	*Spartina* swards						
3	1330 Atlantic salt meadow	9.195		9.195			
4	1410 Mediterranean salt meadow	3.921		3.921			
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	0.478					
10	*Spartina* clump/mudflat mosaic (50/50)						
11	Isolated *Spartina* clumps on mud (5%)						
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic						
14	*Spartina* sward dominated, with some ASM						
15	1310/*Spartina* mosaic						
16	ASM dominated with some *Spartina*						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.161					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**13.755**		**13.116**			


Legend
SAC Boundary
1330 Atlantic salt meadows
1410 Mediterranean salt meadows
Other Saltmarsh (CM2)
other
1330 monitoring stops
1410 monitoring stops
Saltmarsh Monitoring Project 2007-2008
Rosapenna
Sheephaven SAC (001190)
SMP code: SMP0132
0 100 200 300 400 500 Meters
Date of production: 20/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:6250
N
National Parks and Wildlife Service

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

SITE DETAILS

CMP06 site name: **Marble Hill** CMP06 site code: **164** CMP Map No.: **161**

County: **Donegal** Discovery map: **2** Grid Reference: **C 065 365**

6 inch Map No.: **Do 16**

Aerial photographs (2000 series): **O 0077 D; O 0098 A, B**

NPWS Site Name: **Sheephaven**

NPWS designation: pNHA: **1190** cSAC: **1190**

Other designation **Blue Flag Beach : Marble Hill**

Ranger Area: **Donegal**

MPSU Plan: **Draft II**

Report Author**: Anne Murray**

SITE DESCRIPTION

Marble Hill sand dunes are part of Sheephaven cSAC, which is located in the north of County Donegal. This coastal site encompasses the inner part of Sheephaven Bay extending from Marble Hill Strand in the west, to Island Roy in the east. Two other sand dune systems occur within the cSAC and are treated as separate sites within this project, these are Ards (CMP site no. 165) and Rosapenna (CMP site no. 166). The cSAC is designated for the Annex I priority habitats Fixed dunes and Machair.

Other important habitats include semi-natural woodland, which occurs in a number of locations. One area of Hazel dominated woodland forms Duntally Nature Reserve. The woodlands of Ards Peninsula have been modified by coniferous plantations and Rhododendron infestation, but nevertheless, some areas are still ecologically diverse. The site also includes significant areas of mudflats as well as beaches, grasslands, lakes and rivers (MPSU plan, undated).

The sand dune system of Marble Hill edges a small bay that lies north of the Ards peninsula, nestled between two rocky headlands of Knockduff and Clonmass Point.

Table 164A Areas of EU Annex I habitats mapped at Marble Hill

EU Code	EU Habitat	Area (ha)
H2110	Embryonic shifting dunes	0.299
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	1.009
H2130	Fixed coastal dunes with herbaceous vegetation	31.065
H2190	Humid Dune Slacks	0.199
	Total sand dune area excluding modifications	**32.572**
	Total sand dune area including modifications	**40.572**

The sand dune system is largely confined to the southeast of the strand, east of a channel that empties onto the beach from Clonmass, with a small fragmented area of fixed dune on the northwestern edge of the channel. The fixed dunes are lowlying at Clonmass and grade into wet grassland on the landward side. They are fronted by a narrow band of mobile dunes and embryonic dunes. The fixed dunes extend onto the higher ground of Clonmass Point where they occur in a mosaic with coastal heath/dry grassland/wet grassland, from where they slope southwards down to the sandy back strand of Clonmass Bay. Most of the fixed dune area has been invaded by *Pteridium aquilinum* (Bracken) and some parts have been agriculturally improved. One large area of improved grassland at Clonmass Point has now been excluded from the cSAC. Marble Hill Strand is a Blue Flag beach, which is a popular recreational area. A large caravan park lies behind the dune system at Clonmass.

The Annex I sand dune habitats recorded at Marble Hill during this survey include Fixed dunes (priority), Dune slack, Mobile dunes and Embryonic dunes. The total area of sand dune habitat (excluding the improved grassland at Clonmass Point) is 32.572ha (Table 164A).

Fixed Dunes (H2130)

Fixed dunes are the main sand dune habitat (95% of the total area) at Marble Hill covering 31.065ha (Table 178A). An area of the fixed dunes (approx. 8ha) and wet/dry grassland has been converted to improved grassland and some of this is now excluded from the cSAC. Most of the fixed dune area is fenced into fields and lightly grazed by horses, cattle and rabbits. Some parts are undergrazed on the south-facing slope of Clonmass Point.

The small patch of rank fixed dune to the northwest of the channel at Marble Hill Strand is used by visitors as an access point from the road to the beach. This is fronted by very disturbed mobile dunes. Sea buckthorn (*Hippophae rhamnoides*) is invading this area along the channel edge.

The fixed dunes species present at Marble Hill include *Arrhenatherum elatius* (False oat-grass), *Carex arenaria* (Sand sedge), *Campanula rotundifolia* (Harebell), *Cerastium fontanum* (Common mouse-ear), *Crepis capillaries* (Smooth hawk's-beard), *Euphrasia officinalis* agg. (Eyebright), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Hypochaeris radicata* (Cat's-ear), *Luzula campestris* (Field wood-rush), *Lotus corniculatus* (Common bird's-foot-trefoil), *Plantago lanceolata* (Ribwort plantain), *Prunella vulgaris* (Selfheal), *Rhinanthus minor* (Yellow rattle), *Taraxacum* agg. (Dandelion), *Thymus polytrichus* (Wild thyme), *Trifolium repens* (White clover), *Veronica chamaedrys* (Germander speedwell), *Viola tricolor* subsp. *curtisii* (Wild pansy) and mosses - *Tortula ruraliformis, Rhytidiadelphus squarrosus* and *Rhytidiadelphus triquetrus.*

Other species present are *Agrostis stolonifera* (Creeping bent), *Ammophila arenaria* (Marram grass), *Anacamptis pyramidalis* (Pyramidal orchid), *Daucus carota* (Wild carrot), *Holcus lanatus* (Yorkshire fog), *Leontodon saxatilis* (Lesser hawkbit), *Trifolium pratense* (Red clover) and *Plagiomnium undulatum, Calliergonella cuspidata*

The negative indicator species *Senecio jacobaea* (Common ragwort) and *Cirsium arvense* (Creeping thistle) occur occasionally throughout the fixed dunes. Bracken (*Pteridium aquilinum*) is abundant in the dunes. An area of 0.34ha of *Hippophae rhamnoides* (Sea buckthorn) edges the northern side of the channel and is invading the small area of rank fixed dune there. Part of the fixed dunes still within the cSAC on Clonmass Point has been improved and contains the agricultural grasses *Lolium perenne* (Perennial rye-grass) *Cynosurus cristatus* (Crested dog's-tail) and *Dactylis glomerata* (Cocksfoot).

Dune Slacks (H2190)

A small slack is recorded in the fixed dunes that slope down to the back strand at Clonmass. The slack area contains standing water and a drain from the surrounding land empties into it. The slack is dominated by the typical species *Carex nigra* (Common sedge), *Equisetum* spp. (Horsetail spp.), *Hydrocotyle vulgaris* (Marsh pennywort), *Mentha aquatica* (Water mint), *Potentilla anserina* (Silverweed) and *Calliergonella cuspidata*.

Other species present are *Filipendula ulmaria* (Meadowsweet), *Holcus lanatus* (Yorkshire fog), *Hypochaeris radicata* (Cat's ear), *Trifolium repens* (White clover) and stands of *Iris pseudacorus* (Yellow iris).

There are no negative indicator species in the dune slack.

Mobile Dunes (H2120)

Mobile dunes edge the fixed dunes at Marble Hill strand and also along the back strand of Clonmass bay. The mobile dunes at Marble Hill are undergoing natural erosion and this is exacerbated by the intense recreational use of this beach and dunes. The mobile dunes on the back strand are also eroding but are not impacted by recreational activities as they are in a remote part of the site.

The typical species *Ammophila arenaria* (Marram grass) dominates with *Tussilago farfara* (Colt's-foot) also present.

The negative indicator species *Cirsium arvense* (Creeping thistle) and *Pteridium aquilinum* (Bracken) occur occasionally in the mobile dunes.

Embryonic Dunes (H2110)

A small area (0.299ha) of embryonic dunes has formed from recycled sand from the eroding dunes on Marble Hill Strand (Table 164A). The typical species *Elytrigia juncea* (Sand couch) is present along with the annuals *Atriplex laciniata* (Frosted orache), *Atriplex prostrata* (Spear-leaved orache) and *Salsola kali* (Prickly saltwort).

There are no negative indicator species in the embryonic dunes.

IMPACTS

The main impacts on the sand dunes at Marble Hill are listed in Table 164B. The beach has been awarded the Blue Flag over the past number of years and is a popular recreational area. There is a large caravan park (code 608) located to the south of the dunes at Clonmass. The dunes have been overused in the past and are heavily trampled near the main access point to the beach. Parts of the fixed dunes are undergrazed (code 149) and dominated by tall grassess and *Pteridium aquilinum* (Bracken) (code 954). The fixed dunes, to the east of the channel, are fenced into fields (code 150) and these are grazed by horses (code 140). Where grazing occurs, it is impacting positively on the dunes and has resulted in a good diversity of typical species. The invasion of *Pteridium aquilinum* (Bracken) has also been curtailed by grazing. An area of fixed dune located next to the excluded improved fields at Clonmass Point has also been improved (code 103). According to the MPSU plan a dune restoration project was carried out at Marble Hill in the past.

Mobile and Embryonic dunes are impacted by natural erosion (code 900) exacerbated by recreational activities.

Table 164B Intensity and impact of various activities on sand dune habitats at Marble Hill

• EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	• Area affected/ha •	Location of Activity[5]
H2130	103	A	-1	1	Inside
H2130	140	A	+1	10	Inside
H2130	149	A	-1	30	Inside
H2130	150	A	-1	10	Inside
H2130	608	B	-1	Unknown	Outside
H2120	608	B	-1	Unknown	Outside
H2130	622	A	-1	5	Inside
H2130	720	A	-1	1	Inside
H2120	720	A	-1	1	Inside
H2130	900	B	0	Unknown	Inside
H2120	900	A	0	Unknown	Inside
H2130	954	A	-1	15	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

CONSERVATION STATUS

The conservation status of a site is assessed on the condition of the site and on baseline information. For the purpose of this project the cSAC is divided into three main sites for sand dune and machair. The main source of baseline information for this site is the ASI survey, the NATURA 2000 survey and the most recent MPSU plan.

The method of assessment of conservation status differed in the NATURA 2000 survey and so, only broad comparisons between the conservation status of the two surveys were possible. The conservation status of the Annex I sand dune habitats at Marble Hill are given in Table 164C.

Fixed Dunes (H2130)

The extent of fixed dunes is rated as *unfavourable-inadequate* (Table 164C). This is attributable to the invasion of the dunes by *Hippophae rhamnoides* (Sea Buckthorn) and *Pteridium aquilinum* (Bracken). Natural erosion is also evident along the edge of the fixed dunes in places however, this is not considered unfavourable.

Table 164C Conservation status of Annex I sand dune habitats at Marble Hill

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 and functions/ Future prospects		**Unfavourable - Inadequate**	Unfavourable-declining
Dune Slack (H2190)	Extent/ Structure and functions/ Future prospects			**Favourable**	Favourable-maintained
Mobile Dunes (H2120)		Extent/ Future prospects	Structure and functions	**Unfavourable - bad**	Unfavourable-declining
Embryonic Dunes (H2110)	Structure and functions	Extent/ Future prospects		**Unfavourable – Inadequate**	Unfavourable-unchanged

[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 164D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Marble Hill

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	7	2	**Unfavourable-inadequate**
Mobile Dunes (H2120)	2	2	**Unfavourable-bad**
Embryonic Dunes (H2110)	2	0	**Favourable**

The structure and functions parameter is rated as *unfavourable-inadequate*. A total of nine monitoring stops were placed in the fixed dunes and two of these failed (Table164D). The attributes that failed were Flowering /Fruiting and Sward Height. This is attributable to undergrazing in parts of the site.

The future prospects for the fixed dunes are considered *unfavourable-inadequate*. The fixed dunes have been invaded by bracken and parts of the dunes are undergrazed. The conservation plan contains no strategies to manage grazing of the fixed dunes. This site is also a very popular recreational area and is under the on-going threat from overuse.

The conservation status of the fixed dunes in the entire cSAC is described as *average or reduced conservation* in the NATURA 2000 survey. Currently, the overall EU conservation status of fixed dune is *unfavourable-inadequate* (Table 164C).

The Irish conservation status is rated as *unfavourable-declining*.

Dune Slack (H2190)

There is one wet dune slack to the southeast of Marble Hill. The extent is rated as *favourable* as there is no apparent decline in the area of dune slack. This is based on best scientific judgement as there is no previous information on this habitat.

The structure and functions parameter is rated as *favourable*. Due to the small area of dune slack at the site, no monitoring stops were placed in the slack. The slack contained a good diversity of typical species with no negative indicator species present.

The future prospects of the dune slack are considered *favourable.* It is located in the less intensively used part of the fixed dune at Marble Hill. There are no apparent threats to this habitat.

The conservation status of the dune slack is not assessed in the NATURA 2000 survey. Currently, the overall EU conservation status of dune slack is *favourable* (Table 164C) as the slack contains a good diversity of species and is not currently under threat from human activities.
The Irish conservation status is rated as *favourable-maintained*.

Mobile Dunes (H2120)
The extent of the mobile dunes is rated as *unfavourable-inadequate* at Marble Hill (Table 164C). The mobile dunes are undergoing natural erosion, a process that is not considered as unfavourable in relation to the extent of the habitat. However, natural erosion is exacerbated by recreational use of the dunes.

The structure and functions parameter is rated as *unfavourable-bad*. A total of 4 monitoring stops were placed in the mobile dunes and two of these failed (Table 164D). The stops failed due to the high cover of unhealthy *Ammophila arenaria* (Marram grass) present as a result of trampling by visitors.

The future prospects of this habitat are considered *unfavourable-inadequate*. This is attributable to the on-going threat from amenity pressures at Marble Hill.

The conservation status of the mobile dunes within the cSAC was described as *good* in the NATURA 2000 survey. Currently, the overall EU conservation status of mobile dunes at Marble Hill is *unfavourable-inadequate* (Table 164C).

The Irish conservation status is rated as *unfavourable- declining*.

Embryonic Dunes (H2110)
The extent of the embryonic habitat is rated as *unfavourble-inadequate* (Table 164C). This is based on best scientific judgement. A small band of embryonic dunes occur at

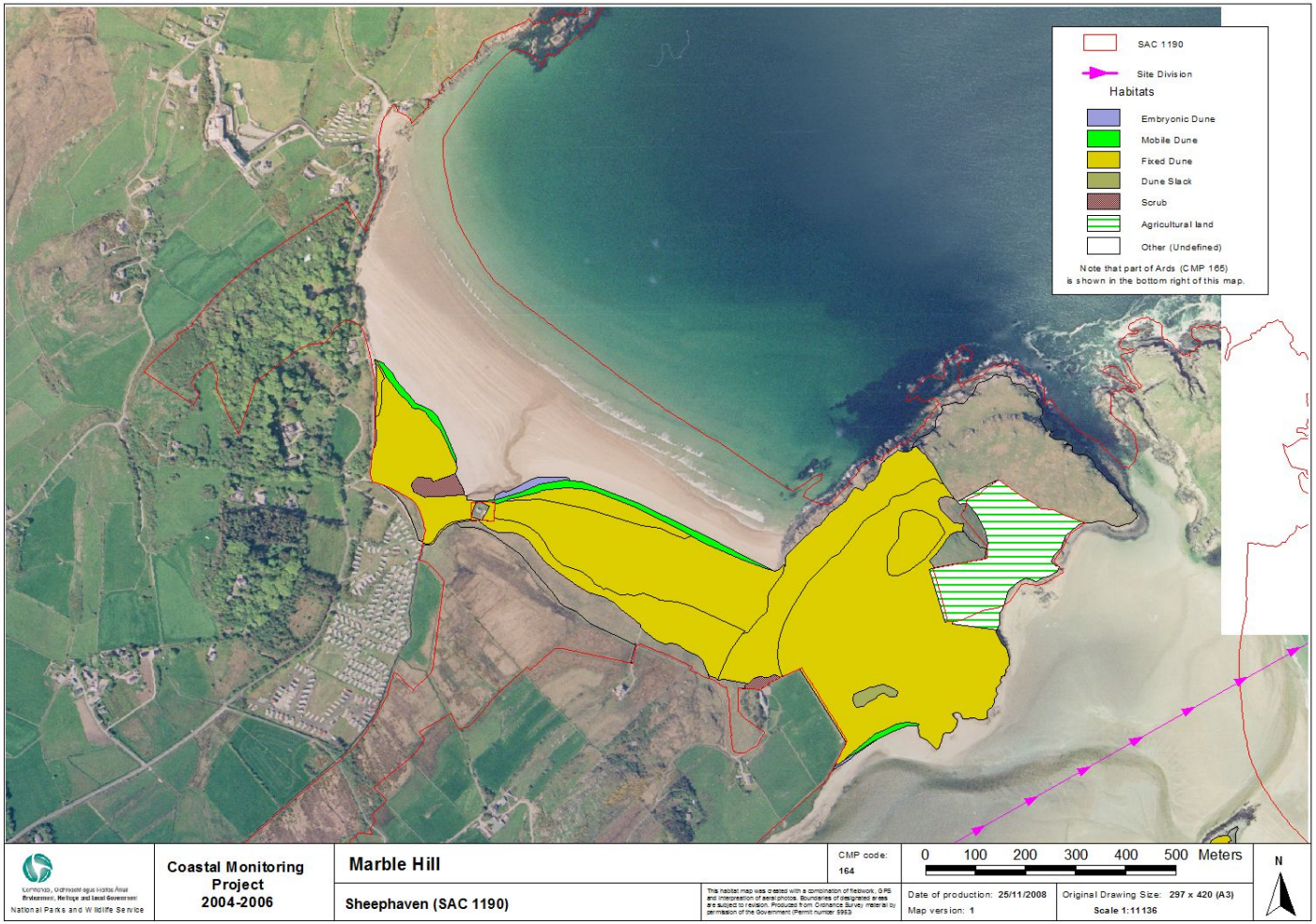
the eastern edge of the river outlet. Natural erosion compounded by recreational activities is restricting the development of this habitat.

The structure and functions parameter is rated as *favourable*. Two monitoring stops were placed in the embryonic habitat and these passed. The embryonic habitat is dominated by healthy specimens of the typical embryonic species *Elytrigia juncea* (Sand couch) with no negative indicator species present.

The future prospects of the embryonic habitat are considered *unfavourable-inadequate*, due to the on-going threats from recreational pressures at Marble Hill.

The overall EU conservation status for embryonic dunes is considered *unfavourable-inadequate*.

The overall Irish conservation status is *unfavourable-unchanged* (164C).


SAC 1190
Site Division
Habitats
Embryonic Dune
Mobile Dune
Fixed Dune
Dune Slack
Scrub
Agricultural land
Other (Undefined)
Note that part of Ards (CMP 165)
is shown in the bottom right of this map.
Coastal Monitoring Project 2004-2006
Marble Hill
Sheephaven (SAC 1190)
CMP code: 164
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 8953)
0 100 200 300 400 500 Meters
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:11136
N

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

SITE DETAILS

CMP06 site name: **Ards** CMP06 site code: **165** CMP Map No.: **162**

County: **Donegal** Discovery map: **2** Grid Reference: **C 068 329**

6 inch Map No.: **Do 26**

Aerial photographs (2000 series): **O0098-B; O0099-A**

NPWS Site Name: **Sheephaven**

NPWS designation: pNHA: **1190** cSAC: **1190**

Ranger Area: **Donegal**

MPSU Plan: **Draft 2: Consultation**

Report Author: **Kieran Connolly**

SITE DESCRIPTION

Ards sand dunes are on the south side of Clonmass Bay, a small bay and estuary on the sheltered western side of Sheephaven Bay in North Donegal. The sand dunes are approximately 7km from the village of Creeslough and are within Ards Forest Park, a *Coillte* (State Forestry Company) estate that, in addition to the sand dune system, incorporates coniferous plantations, some small areas of broadleaf woodland, and several other habitats. Much of the woodland at Ards has been modified by the planting of exotic conifer species and the spread of *Rhododendron ponticum*, although there are small pockets of deciduous woodland throughout the Park, including some Oak woodland referable to the Annex I habitat 'Old oak woods with *Ilex* and *Blechnum* in the British Isles' (H91A0).

The park has a long history and attracts large numbers of visitors, in large part due to a large network of walking paths and trails, and the provision of facilities such as a playground and picnic area. Because of the forestry management of the estate there are no grazing livestock on the dunes and this has resulted in a certain amount of undergrazed or rank dune grassland and the encroachment of scrub and tree species into sand dune habitat.

Ards sand dunes are within Sheephaven cSAC (1190), an extensive coastal site on the north Donegal coast between the Horn Head Peninsula and Rosguill Peninsula, dominated by sand dunes and intertidal mud and sand flats. Habitats occupying smaller areas within the site include saltmarsh, dry heath, scrub and woodland. The proposed designation of Sheephaven as a SAC is due to the presence of both fixed dunes (of which an extensive area occurs within the site) and machair, both priority Annex I habitats under the EU Habitats Directive. Maintaining the extent and, if possible improving the quality of these priority habitats also forms one of the main objectives of the site management (MPSU) plan.

The other significant sand dune systems within the cSAC are Marble Hill and Rosapenna, which are included in the present report as sites 164 and 166 respectively. Marble Hill dunes lie to the northwest of Ards, on the opposite side of Clonmass Bay, while Rosapenna dunes are eastwards of Ards, on the opposite side of an estuary in the inner Sheephaven Bay. Marble Hill, like Ards, is of limited size, while Rosapenna is notable for an extensive area of fixed dunes, although much of the habitat has been developed as golf courses that are now excluded from the cSAC.

Most of the sand dune habitat at Ards is along the northwest-facing shore of Clonmass Bay, and is accessible via a sizeable car park that lies to the southwest. The car park location is marked with a 'miscellaneous' point on the site digital map. In addition to the most extensive dune area on the Northwest side of the peninsula, there are two beaches on the North and West sides that are more readily accessible from the 'Ard Mhuire' retreat centre – the location of which is also identified with an information point on the site map. The first of these beaches, known locally as 'Isabella's beach' and identified as such with an information point on the site digital map, has no sand dune habitats. The more Northerly 'Lucky Shell' beach, held by two rocky headlands, has some foredune and dune grassland habitat, albeit of an insubstantial nature. The sand dune habitats at the 'Lucky Shell' beach are not treated as a sub-site of the main dune area, due to the very small area involved, and the fact that they are not managed in a substantially different way to the larger dune area to the west.

The total mapped sand dune area is small, amounting to only 12.6766ha, and is almost entirely composed of fixed dunes – a priority Annex I habitat. The remaining area is made up of small patches of embryonic dunes and mobile dunes, and an almost negligible strip of annual strandline habitat (Table 165A).

Table 165A Areas of EU Annex I habitats mapped at Ards

EU Code	EU Habitat	Area (ha)
H1210	Annual vegetation of driftlines	0.005
H2110	Embryonic shifting dunes	0.108
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	0.479
H2130	Fixed coastal dunes with herbaceous vegetation	12.074
	Total Sand dune	**12.666**

This part of Donegal is a popular holiday destination, and many of the beaches in the area see considerable recreational use. However, those at Ards are small and probably less attractive to amenity users than Marble Hill Strand, which has Blue Flag status, signifying among other things, certain standards of water quality and general cleanliness, and the presence of a lifeguard station. However, the combination of beaches, marked woodland walking trails and other amenities such as a children's playground and picnic area (both of which are adjacent to the large car park) ensures that Ards sees a considerable level of amenity use.

The well-known 'Ard Mhuire' Capuchin Friary, on the south side of the peninsula, hosts retreat and conference attendees and also caters for numerous day visitors with facilities including a shop, café and audio-visual presentation.

Fixed Dunes (H2130)

Almost the entire mapped area of sand dunes is composed of fixed dunes (Table 165A), the most extensive area of which is found on the south shore of Clonmass Bay. Nevertheless, the fixed dunes have eroded at a significant rate in recent years. Comparison with the site aerial photographs of 2000 shows a retreat of up to 30m in places on the large triangular headland in the Bay. Quite considerable clumps of fixed dune vegetation have slumped onto the beach at the northern tip of the dunes here.

Because of the forestry and amenity management of the estate, there are no grazing livestock on the dunes, which has resulted in a generally long sward with low species diversity and the encroachment of scrub and tree species into the dune grassland from the adjacent woodland areas. The most common scrub species in the dune grassland is *Rubus fruticosus* (Bramble), while a quite extensive area at the landward side of the dunes is dominated by *Pteridium aquilinum* (Bracken). There are also patches of damp scrub and fen vegetation between the dune grassland and the wooded areas to the south.

Despite the relatively low species diversity through much of the fixed dunes, a number of typical species were recorded. In addition to *Ammophila arenaria* (Marram) and *Festuca rubra* (Red fescue) which dominated much of the grassland area, other common species included *Carex flacca* (Glaucous sedge), *Galium verum* (Lady's bedstraw), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Plantago lanceolata* (Ribwort plantain), *Trifolium repens* (White clover) and *Veronica chamaedrys* (Germander speedwell).

Moss cover was generally high throughout the dune grassland, with species such as *Hylocomium splendens*, *Rhytidiadelphus squarrosus*, *R. triquetrus* and *Scleropodium purum*, among the more commonly occurring.

The nationally rare parasitic plant *Orobanche alba* (Thyme broomrape) is known from the dunes at Ards, and material from that genus (not determined to species level) was noted during the present survey.

Adjacent to the fixed dunes on the southern shore of Clonmass bay, there were some sizeable areas dominated by heath vegetation. Among the species found here were *Anacamptis pyramidalis* (Pyramidal orchid), *Antennaria dioica* (Mountain everlasting), *Campanula rotundifolia* (Harebell), *Cladonia* sp., *Coeloglossum viride* (Frog orchid), *Hypnum cupressiforme*, *Plantago maritima* (Sea plantain), *Primula vulgaris* (Primrose), *Solidago virgaurea* (Goldenrod), *Succisa pratensis* (Devil's-bit scabious), *Teucrium scorodonia* (Wood sage) and *Thymus polytrichus* (Wild thyme). Most of the heath areas were above a rocky shoreline where there is little input of

blowing sand, and there was insufficient sand cover throughout the habitat to consider assigning the vegetation communities to a dune heath habitat.

In addition to the more extensive fixed dune areas discussed above, a small area of fixed dunes behind the Northeast-facing beach known locally as 'Lucky Shell', was also mapped. However, wood and scrub is encroaching on this small patch of habitat and it is of little conservation interest.

- **Mobile Dunes (H2120)**

The total area of mobile dune mapped, at 0.479ha, consists of several separate patches of habitat throughout the site. The western extreme of the sand dunes, where a small amount of habitat lies to the seaward side of an amenity grassland and playground area, has the largest piece of mobile dune habitat. The remainder consists of small amounts around the middle of the site, and at the Northeast-facing 'Lucky Shell' beach. The habitat was characterised by the presence of *Ammophila arenaria* (Marram), some of which may have been planted as part of dune stabilisation measures. A *Coillte* booklet on the park refers to dune protection works that involved the planting of Marram, although the areas involved are not identified.

- **Embryonic Dunes (H2110)**

The total area of embryonic dune mapped at the site, extending to only 0.108ha, is mostly confined to the extreme west end of the site, where a small foredune and fixed dune zone lies to the seaward side of an amenity grassland and playground area. The remainder consists of a tiny patch of habitat, associated with mobile dunes, near the north tip of the sand dunes.

Annual Strandline (H1210)

A single tiny patch of annual strandline vegetation was mapped on the small Northeast-facing beach known as 'Lucky Shell', which lies between two protruding rocky headlands. The habitat area was too small and insignificant to warrant an assessment of conservation status.

Some strandline species - *Atriplex* sp. (Orache sp.) and *Cakile maritima* (Sea rocket) – were noted at the tip of the eroding dunes in the west of the site, although these were too uncommon and sparsely distributed to be considered as forming strandline habitat.

IMPACTS

Activities observed or known to be impacting on the sand dune habitats at Ards are shown in Table 165B.

Table 165B Intensity and impact of various activities on sand dune habitats at Ards

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	149	B	-1	10	Inside
H2110	622	C	-1	0.1	Inside
H2120	622	C	-1	0.4	Inside
H2130	622	A	-1	1	Inside
H2120	871	A	-1	Unknown	Inside
H2110	900	A	0	Unknown	Inside
H2120	900	A	0	Unknown	Inside
H2130	900	A	0	3	Inside
H2130	954	B	-1	2	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 sand dune habitat. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the sand dune habitat

Large numbers of recreational users are attracted to the park, many of whom follow the marked trails through woodland areas, although some trails do impinge on sand dune habitats and can be clearly seen on the site aerial photographs. Several people were also observed on the beaches and in sand dune habitats during the site visit (code 622), indicating that some recreational impact throughout the site may be assumed. Much of the foredune habitat – which is very limited in overall extent – is adjacent to the main car park and amenity area.

Information obtained in a Coillte booklet concerning the Forest Park confirms the planting of *Ammophila arenaria* (Marram) as a means to stabilise dunes at the site (code 871). The locations and extent of these operations are unclear and the area affected is therefore entered as 'unknown' in Table 165B. There are also some small rock armour installations – the locations of which are shown in the 'armour' theme on

the site digital map - at the seaward edge of the dunes. These coastal protection works are collectively considered to represent a negative influence on the mobile dunes (Table 165B) as any interference with the natural movement of sediment should generally be considered as such.

Because of the forestry management of the park, there are no grazing livestock in the dune grassland, as a result of which, considerable areas are undergrazed (code 149). The dune sward is generally rather rank throughout, with low species diversity. Scrub and tree species are also encroaching into the dunes from the landward edge. It can probably be assumed that scrub encroachment will be controlled to a large extent, due to the significant part that amenity usage has in the site management regime. However, as significant areas of scrub and woodland are probably occupying natural sand dune habitat, scrub invasion (code 954) is included in the list of impacts (Table 165B) as an impact of medium intensity.

Natural erosion (code 900) has clearly accounted for a large area of fixed dunes in recent times, as can be seen by comparing the aerial photographs of 2000 with the boundaries mapped here. It is assumed that substantial areas of embryonic dunes (H2110) and mobile dunes (H2120) have also been affected, although the areas concerned are, like that of the fixed dunes, entered as 'unknown'.

- **CONSERVATION STATUS**

The overall conservation status assessment of each habitat at Ards is based on a combination of *Habitat Extent*, *Structure & Functions*, and *Future Prospects* assessments (Table 165C). Structure and functions of the fixed dunes were assessed by means of monitoring stops, the results of which are shown in Table 165D. Monitoring stops were only carried out in the fixed dunes, as the other habitats were very limited in extent. Visual assessments were adequate when assessing the structure and functions of the foredune habitats. The area of annual strandline was too insignificant to warrant further consideration.

As Ards is only one of three sand dune systems include in Sheephaven cSAC, the data and miscellaneous information included in the relevant NATURA 2000 standard data

form and explanatory notes, and in the site conservation (MPSU) plan, are of limited use for the purposes of comparison with the present data. Habitat data in the earlier reports mostly deals with the cSAC as a whole, rather than with individual sand dune systems, as would be necessary to provide suitable data for comparison with the current results. For this reason, and in the absence of any other data that may be used for the comparison with the present report, the conservation status of habitats is based largely on the current condition of habitats.

Fixed Dunes (H2130)

The last few years have seen the loss of a substantial area of fixed dunes to erosion. Comparison with the site aerial photographs of 2000 illustrates the scale of erosion, and anecdotal information obtained from park visitors confirmed a significant retreat of the dunes here in recent years. However, it would seem that this couild be largely, if not entirely, attributed to natural causes such as wave and wind action. Redirection of the river channel along the northern edge of the dunes may also have a significant impact over a short space of time on the shape and extent of the dunes. Although recreational use of the Forest Park is particularly high, much of this activity is directed away from the sand dune habitats and probably has little impact in adding to the affects of natural erosion. For this reason, habitat extent is considered to be *favourable*.

Of the four monitoring stops carried out in fixed dunes, three passed and one failed the overall target attribute criteria, indicating *unfavourable-inadequate* structure and functions. The failed stop, carried out near the tip of the large triangular formation of dunes in the west side of the site, had less than the required minimum number of typical species and an excessively long sward height. A negative indicator species element in the monitoring stop - comprised of both *Cirsium arvense* (Creeping thistle) and *Rubus fruticosus* (Bramble) - amounted to less than 5% cover, and therefore did not constitute a failed element of the stop criteria. The other monitoring stops all failed on a single attribute – either sward height or typical species – and so satisfied the overall minimum target of four passed attributes.

The future prospects of the habitat are currently less than assured, as a management regime incorporating all the practices necessary to improve the conservation status of

the dune grassland, is unlikely to be implemented. Forestry management of the site currently excludes grazing stock and has resulted in a rather rank, species-poor sward through much of the site. Although the spread of trees and scrub species into the fixed dunes is - due to the importance placed on maintaining the amenity value of the site - likely to be largely controlled, there will probably be a certain area of potential fixed dune grassland permanently covered by scrub or woodland. The habitat future prospects are therefore considered to be *unfavourable-inadequate*.

Table 165C Conservation status of Annex I sand dune habitats at Ards

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 - unchanged**
Embryonic Dunes (H2110)		Extent/ Structure & functions/ Future prospects		**Unfavourable - Inadequate**	**Unfavourable - unchanged**
Mobile Dunes (H2120)		Extent/ Structure & functions/ Future prospects		**Unfavourable - Inadequate**	**Unfavourable - unchanged**

[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)

A combination of *favourable* and *unfavourable-inadequate* assessments for the individual elements of conservation status indicates an overall *unfavourable-inadequate* assessment.

The most appropriate rating under the proposed Irish system of conservation status assessment is thought to be *unfavourable-unchanged*, as the current habitat condition can be assumed to have existed for some time.

Mobile Dunes (H2120)

The current scarcity of mobile dune habitat at the site may be largely attributable to natural erosion, although recreational pressures are likely to be contributing to the overall impact, particularly as much of the current habitat area is adjacent to the car park and amenity area in the western end of the site. For this reason, and because habitat zonation may also be considered poor, extent (area) is deemed to be *unfavourable-inadequate*.

Monitoring stops were not carried out in the mobile dunes, due to the very limited area of habitat currently at the site, and the probability that much of the habitat mapped may have represented a temporary accumulation, likely to be removed by winter storms. As the habitat consisted largely of areas characterised by a robust and healthy growth of *Ammophila arenaria* (Marram), but also encompassed a smaller area of more sparsely vegetated and unhealthy material, structure and functions are considered to be *unfavourable-inadequate*.

The future prospects of the mobile dunes are considered to be *unfavourable-inadequate*, as much of the current area is in the zone of most intensive recreational use.

The overall conservation status assessment for the habitat is *unfavourable–inadequate*, as all of the individual elements of conservation status are also *unfavourable–inadequate*.

The chosen Irish conservation status assessment is *unfavourable-unchanged*, as the habitat condition has probably been similar for some time.

Table 165D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Ards

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	3	1	**Unfavourable - Inadequate**

Embryonic Dunes (H2110)

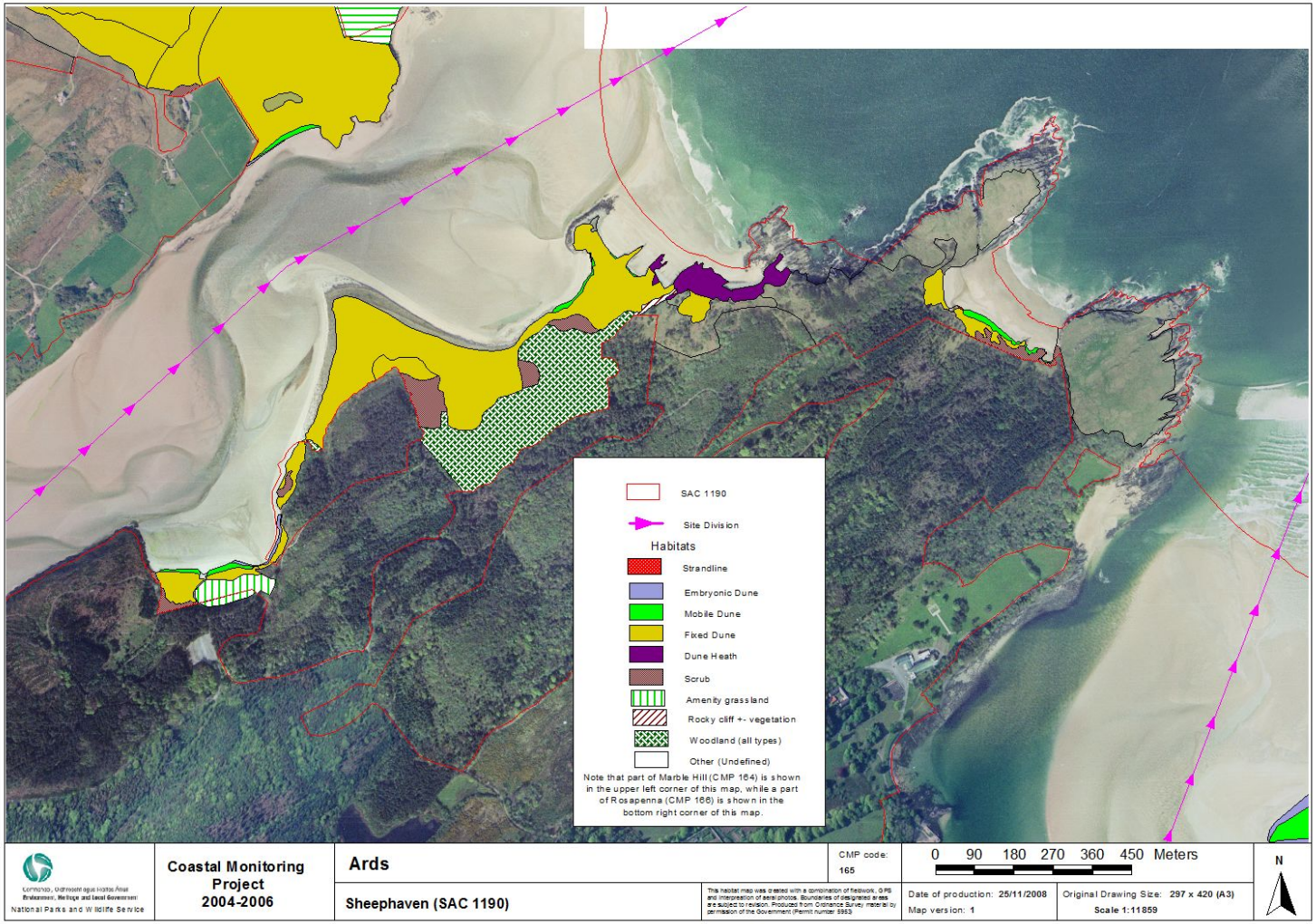
Very little embryonic dune habitat currently exists at the site, although this may be mostly attributable to natural causes, such as wind action and the erosive capacity of the wide and fast-flowing river that forms a channel along the north edge of the dunes. However, the limited distribution and zonation of the habitat throughout the site dictates an *unfavourable* assessment. On the basis that human-induced or management pressures are probably relatively unimportant in determining the current habitat area, extent (area) is considered to be *unfavourable-inadequate* rather than *unfavourable-bad*.

Monitoring stops were not carried out in the embryonic dunes, due to the very small (almost negligible) area of habitat present, but the existence of a certain amount of sparsely vegetated habitat, containing a degree of unhealthy *Elytrigia juncea* (Sand couch), dictates an *unfavourable-inadequate* structure and functions assessment.

The future prospects of the embryonic dunes are considered to be *unfavourable-inadequate*, as much of the current area is in the zone of most intensive recreational use.

As all of the individual elements of conservation status are *unfavourable–inadequate*, the overall conservation status assessment for the habitat is also *unfavourable–inadequate*.

As the condition of the habitat has probably not altered significantly in recent years, the assessment thought most appropriate under the proposed Irish system is *unfavourable-unchanged*.


SAC 1190
Site Division
Habitats
Strandline
Embryonic Dune
Mobile Dune
Fixed Dune
Dune Heath
Scrub
Amenity grassland
Rocky cliff +- vegetation
Woodland (all types)
Other (Undefined)
Note that part of Marble Hill (CMP 164) is shown in the upper left corner of this map, while a part of Rosapenna (CMP 166) is shown in the bottom right corner of this map.
Coastal Monitoring Project 2004-2006
Ards
CMP code: 165
Sheephaven (SAC 1190)
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 90 180 270 360 450 Meters
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:11859
N
National Parks and Wildlife Service

Appendix VII – Rosapenna site report and habitat map from the CMP (Ryle *et al*., 2009)

SITE DETAILS

CMP06 site name: **Rosapenna** CMP06 site code: **166** CMP Map No.: **163**

County: **Donegal** Discovery map: **2** Grid Reference: **C 108 380**

6 inch Map No.: **Do 7 & 16 & 26**

Aerial photographs (2000 series): **O0059-C,D; O0078-A,B,D; O0079-A,C; O0099-A,B,C,D; O0100-A,C**

NPWS Site Name: **Sheephaven**

NPWS designation: pNHA: **1190** cSAC: **1190**

Ranger Area: **Donegal**

MPSU Plan: **Draft 2: Consultation**

Report Author: **Kieran Connolly**

SITE DESCRIPTION

Rosapenna sand dunes, on the eastern side of sheephaven Bay, are within Sheephaven cSAC (1190), an extensive coastal site on the north Donegal coast between the Horn Head Peninsula and Rosguill Peninsula, dominated by sand dunes, and intertidal mud and sand flats. Habitats occupying smaller areas within the site include saltmarsh, dry heath, scrub, and woodland. The proposed designation of Sheephaven as a SAC is due to the presence of both fixed dunes (of which an extensive area occurs within the site) and machair, both priority Annex I habitats under the EU Habitats Directive. Maintaining the extent and, if possible improving the quality of these priority habitats forms one of the main objectives of the site management plan.

The other significant sand dune systems in the site are Marble Hill and Ards, which are included in the present report as sites 164 and 165 respectively. Ards dunes are westwards of Rosapenna, on the opposite side of an estuary in the inner Sheephaven Bay, while Marble Hill dunes lie to the northwest of Ards, on the opposite side of Clonmass Bay. Both Marble Hill and Ards sand dunes are of relatively limited extent,

although both include some significant areas of fixed dunes - a priority Annex I habitat.

Most of the fixed dunes within the cSAC are at Rosapenna, although the current area of 221.936ha (Table 166A) is exceeded by that lost to golf courses and associated recreational developments. Most of the golf course areas are now excluded from the cSAC and the natural area of sand dune no longer mapped as functioning sand dune habitat is estimated here as 230ha. The areas of all Annex I sand dune habitats mapped at the site are shown in Table 166A.

The machair component of Sheephaven cSAC also refers entirely to Rosapenna, although such is the degree of damage from developments and other impacts that one known or potential machair area is no longer considered to be sufficiently intact to warrant mapping as machair. The area in question is mapped here as amenity grassland. Another area that has previously been described as machair is regarded here as fixed dune/fen (see below). Rosapenna is not listed as a machair site on the existing NPWS inventory of sand dune sites (Curtis, 1991a).

Table 166A Areas of EU Annex I habitats mapped at Rosapenna

EU Code	EU Habitat	Area (ha)
H1210	Annual vegetation of driftlines	0.439
H2110	Embryonic shifting dunes	3.081
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	5.855
H2130	Fixed coastal dunes with herbaceous vegetation	221.936
H2190	Humid Dune Slacks	3.270
	Total Sand dune	**265.343**

The rare liverwort *Petalophyllum ralfsii* (Petalwort) has previously been recorded at the site, in the approximate area shown as the *'Petalophyllum'* theme on the digital map that accompanies this report. A brief search carried out in this area during the site visit failed to produce any finds of the species.

Machair (21A0)

A 'Gross habitat map' dated March 1998/March 2000 included in the NPWS site cSAC files identifies machair at the site as the flat grassland area adjacent to the narrow fringe of saltmarsh vegetation, that is mapped here on the western and southern edges of the sea inlet that extends to the shores of Carrickart village. The

sources on which this map was based include NHA survey material and a recent golf course survey (Gaynor & Browne, 1999). Another habitat map included in the site files depicts this area, and also a further area of grassland around Rosapenna Lough, as machair. The grassland around Rosapenna Lough is now excluded from the cSAC, indicating that the area is no longer of any significant conservation interest. It was not intensively surveyed during the site visit, although parts of it were seen to be comprised of fen vegetation. More of it is now rank grassland and there were notices of a number of planning permission applications for houses on display. The area is not included among the habitats mapped here, while substantial areas immediately to the south of it are mapped as amenity grassland. Whether the previous descriptions of this area as machair were justified cannot be determined here now, due to the degree of modification/damage that the habitat here has undergone.

The flat dune grassland that lies to the northwest of Carrickart and adjacent to the mapped area of saltmarsh vegetation, consists of fen and slack areas to the north, while some vegetation communities are transitional between saltmarsh and dune grassland vegetation. The flat grassland plain west of the saltmarsh vegetation is mapped here as fixed dune rather than machair, as the flat topography is believed to derive more from the eroding action of tidal inundation and the lack of sand input, rather than by the mechanisms through which machair is typically formed. In addition, there are apparently no data to indicate a significant proportion of shell fragments in the sand - one of the criteria generally used in the recognition of machair (Curtis, 1991b). Machair is therefore considered to be not present at Rosapenna and is not among the habitats mapped here.

Fixed Dunes (H2130)

Rosapenna contains a particularly extensive fixed dune area, although much of the system has been greatly modified by the development of golf courses. Some of the golf course areas are long established, while the expansion of others into previously intact dune grassland is continuing. The established golf courses are excluded from the cSAC and are mapped here as amenity grassland, although one 'amenity grassland' area of almost 43ha is still within the cSAC, as it is currently being developed as an extension to the existing, adjacent golf course.

There remains a sizeable undeveloped and reasonably intact fixed dune area of over 100ha at the southern end of the site. The dunes here are quite low-lying and relatively flat, except for some tall dunes that border the golf course to the north. Much of the fixed dune grassland along the eastern side of the dunes (east of the golf courses) is very flat and co-occurs with fen and slack vegetation. There are interesting transitions to both saltmarsh and fen vegetation beside the sea inlet to the northwest of Carrickart village.

There are some well-developed tall dunes within the golf course areas, although much of the interior areas are relatively flat. Species diversity varies somewhat throughout the habitat, although it is seldom particularly notable. However, some of the monitoring stops carried out had in excess of 20 species present. The dune grassland is typically a *Festuca rubra* (Red fescue)-dominated sward with numerous other typical species regularly found. The most common of these included *Carex arenaria* (Sand sedge), *C. flacca* (Glaucous sedge), *Cerastium fontanum* (Common mouse-ear), *Euphrasia officinalis* agg. (Eyebright), *Galium verum* (Lady's bedstraw), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Luzula campestris* (Field wood-rush), *Thymus polytrichus* (Wild thyme) and *Trifolium repens* (White clover).

Bryophyte cover was frequently quite high and the more commonly found moss species included *Climacium dendroides, Hylocomium splendens, Rhytidiadelphus squarrosus* and *R. triquetrus*. The landward side of the dunes (eastern side of the site) frequently contained a significant lichen (*Cladonia* and *Peltigera* spp.) component, while *Pilosella officinarum* (Mouse-ear-hawkweed) and the moss *Homalothecium lutescens* were also common, suggesting a decalcified nature to the grassland here.

The transition from fixed dune to upper saltmarsh vegetation to the west of the sea inlet and mud flats northwest of Carrickart contains species such as *Glaux maritima* (Sea-milkwort), *Plantago coronopus* (Buck's-horn plantain) and *P. maritima* (Sea plantain). The area of transitional vegetation communities is quite limited and more extensive areas consist of the fen-type vegetation that extends southwards around the southern shore of the sea inlet near Carrickart. Species noted here included *Carex nigra* (Common sedge), *Eriophorum* sp. (Bogcotton), *Pinguicula vulgaris* (Common butterwort), *Schoenus nigricans* (Black bog-rush) and *Succisa pratensis* (Devil's-bit

scabious). Interesting species seen around the fixed dune/fen boundary included *Coeloglossum viride* (Frog orchid) and *Gymnadenia conopsea* (Fragrant orchid).

A low-lying strip of ground that runs for some distance adjacent to the metalled roads in the eastern part of the site (the location of photograph 8 is an indication of the area) consists of wet grassland or fen-type vegetation that includes species such as *Hydrocotyle vulgaris* (Marsh pennywort), *Ophioglossum vulgatum* (Adder's-tongue), *Pinguicula vulgaris* (Common butterwort) and *Salix repens* (Creeping willow).

The mapping of fixed dunes was somewhat inconsistent in that a number of relatively small bare areas were mapped as open polygons and therefore excluded from the total fixed dune area, while others, some of which are bigger than the excluded bare areas, were mapped as individual polygons but included as fixed dune area. Throughout the project, there was no consistently applied threshold area, above which bare zones were automatically excluded from the surrounding habitat. The application of a consistent method in future monitoring surveys may lead to small deviations in the habitat areas reported, compared to those in the present report. Although there were some relatively extensive bare areas in the dune grassland, they were not thought to amount collectively to an area that would justify a downgrading of the conservation status assessment.

Dune Slacks (H2190)

Dune slacks occur in both the southern end of the site (Glenree/Magheramagorgan), in the most extensive unmodified area of dune grassland and also in the northern end of the site, where there is an interesting co-occurrence of dry dune grassland, fen and dune slack vegetation. Some of the slacks in the southern end of the dunes were of a drier type than those seen elsewhere. Typical fixed dune species such as *Euphrasia officinalis* agg. (Eyebright), *Galium verum* (Lady's bedstraw), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Plantago lanceolata* (Ribwort plantain) and *Rhinanthus minor* (Yellow-rattle) were common in the drier slacks, while the wetter slacks contained species such as *Calliergonella cuspidata*, *Carex nigra* (Common sedge), *Hydrocotyle vulgaris* (Marsh pennywort), *Potentilla anserina* (Silverweed) and *Salix repens* (Creeping willow).

It is likely that dune slacks exist/existed within the excluded golf course areas, although this was not confirmed during the site visit.

Mobile Dunes (H2120)

A narrow band of mobile dunes is present along much of the seaward (western) edge of the dunes at Tra more, although there are some areas of the site (including the small strand at Tra beg) where foredune development is very limited, and also restricted in its distribution. Much of the mobile dune vegetation along the seaward edge of the dunes at Tra more consists of *Ammophila arenaria* (Marram) that has colonised and stabilised bare sand at the edge of previously eroded dune grassland. The front face of the dunes here is often quiet steep and sediment movement in the foredune habitat is clearly not particularly dynamic. Sediment movement towards the southern end of the site has led to some accretion of foredunes at the extreme southern tip, and the difference in extent seen between the site aerial photographs (2000 series) used in the current digital habitat map and the extent of habitat mapped here is striking.

The habitat was characterised by the presence of *Ammophila arenaria* (Marram), while other species seen included *Elytrigia juncea* (Sand couch) and *Tussilago farfara* (Colt's-foot).

Embryonic Dunes (H2110)

Most of the 3.081ha of embryonic dunes mapped were along the seaward edge of the southernmost part of the dunes at Glenree or Magheramagorgan. Like the mobile dunes, the concentration of embryonic dunes in this part of the site may be attributed to the movement of sediment towards the southern tip of the dunes. Additional fragmented areas of habitat were mapped at the north end of the site at Tra Beg.

The habitat was characterised by the presence of *Elytrigia juncea* (Sand couch) and *Leymus arenarius* (Lyme–grass), while occasional *Ammophila arenaria* (Marram) was also found.

Annual Strandline (H1210)

A small stretch of annual strandline vegetation was mapped at Tra beg in the north end of the site, although a conservation status assessment is not provided due to the very limited area of habitat present over the whole site.

IMPACTS

Activities observed or known to be impacting on the sand dune habitats at Rosapenna are shown in Table 166B.

Table 166B Intensity and impact of various activities on sand dune habitats at Rosapenna

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	140	A	+2	200	Inside
H2130	146	B	-1	5	Inside
H2130	171	A	-1	2	Inside
H21BB	300	A	-2	Unknown	Inside
H2130	421	C	-1	1	Inside
H2130	423	B	-1	0.5	Inside
H2130	502	A	-2	3	Inside
H2130	601	A	-2	42	Inside
H2130	601	A	-2	230	Outside
H2130	607	A	-1	1	Outside
H2130	608	C	-1	1	Inside
H1210	622	C	-1	0.4	Inside
H2110	622	C	-1	3	Inside
H2120	622	C	-1	5	Inside
H2130	622	B	-1	110	Inside
H2130	623	B	-1	3	Inside
H2110	900	C	0	Unknown	Inside
H2120	900	C	0	Unknown	Inside
H2130	900	C	0	Unknown	Inside
H2130	954	C	-1	0.5	Inside

[1] EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.
[2] Description of activity codes are found in Appendix 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 sand dune habitat. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the sand dune habitat

The presence of golf courses (code 601) is the most obvious and damaging impact in the dune grassland at Rosapenna. The area of dune grassland now excluded from the cSAC as a result of golf course developments is 230ha - an area that exceeds the remaining undeveloped area. Some of the golf course areas are long established, although there are ongoing extension works at one course and proposals for further expansion in at least one other area. An area of dune grassland not excluded from the cSAC, but currently under development as an extension to an existing golf course, covers almost 43ha.

The positive impact of grazing in maintaining the shortly cropped turf that is desirable from the viewpoint of promoting species diversity is expressed under code 140 (*grazing*), and is listed as a strongly managed positive influence (Table 166B). Cattle account for most livestock grazing in the parts of the dunes that are still managed for agricultural purposes, although there were also horses in the southernmost area of dune grassland, to the south of the golf courses. Livestock grazing is not considered to be overly intensive in any part of the site, although the abundant rabbit population (code 146) is probably at least partly the cause of some small, localised patches of overgrazed sward.

Supplementary feeding of livestock (Code 171) is currently not widespread at the site, although there were a few areas in the dunes near Magheramagorgan in the south end of the site, where localised patches of nitrophilous weeds and poached soil appear to indicate the recent locations of ring feeders. A naturally sheltered area at the base of a blowout was used for the shelter and feeding of livestock.

In addition to the use of large areas for golf, other recreational activities (code 622) have a significant cumulative impact on the dunes. Horse trekking is a common leisure activity at the site, with several marked trails used by local riding schools. Tra Beg Strand in the north end of the site is a popular beach for recreational purposes and is used by local water sports schools. This part of Donegal is a popular holiday destination and there are extensive developments and mobile home parks in and around the site. The flat dune grassland adjacent to the saltmarsh vegetation to the northwest of Carrickart is accessible to motor vehicles (code 623) and several were seen there during the site visit. Some erosion of vegetation and compaction of soil were the visible consequences.

In the sand hills on the landward side of the strand and foredunes at Tra beg, *Hippophae rhamnoides* (Sea buckthorn) has spread over the remnant grassland (code 954). The area in question is excluded from the cSAC, and is not mapped here as sand dune habitat because of the modification and destruction of habitat that has resulted from the existence there of a large mobile home park.

Camping (Code 608) is unlikely to be a significant activity within the remaining intact dune areas, as only a single pitched tent was seen during the site survey. However, the presence of large amounts of dumped rubble along the main road through the site bore the hallmarks of a recent caravan encampment.

A quite substantial amount of building rubble and assorted other material (code 423) was seen in the fixed dunes. The most badly affected area seen (beside the main road (R248) that runs through the site) is indicated with a 'miscellaneous' point on the site digital map. Small-scale disposal of domestic waste and littering (Code 421) were also noted at the site.

The location of a football pitch (Code 607) behind Tra Beg Strand is marked with a 'miscellaneous' point on the digital habitat map. It is included as an impact despite the fact that the location was excluded from the mapped habitat areas, as at least some of the pitch may occupy an area that formerly comprised intact dune grassland.

There are several metalled roads (Code 502) running through the site, with an estimated total affected fixed dune area of 3ha.

Sand extraction (Code 300) was listed in the Sheephaven cSAC NPWS management plan (Draft 2:consultation) as one of the impacts affecting Rosapenna. Large volumes have been moved around the dunes during golf course construction, although the extent to which this practice continues to affect the site is not known. Small-scale removal of sand from Tra Beg Strand was also included in the list of impacts mentioned in the NPWS management plan for the site, although this could also not be verified on the site visit. Because of the uncertainty regarding the scale of the practice and locations affected, sand extraction is recorded under 21BB (entire dune habitat) and the affected areas listed as 'unknown' in Table 166B. One known sand extraction is included as an information point in the 'miscellaneous' theme on the site digital map.

The influence of natural erosion (code 900) and the areas of habitats affected cannot be reliably estimated, and are therefore described as being of 'neutral' influence and 'unknown' area. However, the existence of a steep front face along the seaward edge

of the dunes at Tra more Strand and the limited area of foredune development along much of its length suggest that natural erosion is a significant influence here. Sediment appears to move naturally towards the southernmost tip of the dunes, where there is some build-up of foredune grasses.

CONSERVATION STATUS

The overall conservation status assessment of each habitat at Rosapenna is based on a combination of *Habitat Extent*, *Structure & Functions*, and *Future Prospects* assessments (Table 166C). Details of the numbers and pass/failure rates of monitoring stops used to assess habitat structure & functions are shown in Table 166D.

As Rosapenna is only one of three significant sand dune sites within Sheephaven SAC, the habitat extent data in reports such as the Sheephaven NATURA 2000 standard data form are of limited use for the purposes of comparison with the present survey. Data in that report refers to the total area of habitats throughout the cSAC, rather than on an individual site basis, which would be necessary for the purposes of making direct comparisons with the present data. Habitat area assessments are therefore based, to some extent at least, on the current condition of the habitats.

Fixed Dunes (H2130)

Habitat extent (area) is considered to *unfavourable-bad* due to the very significant areas lost to golf course and associated developments. Although much of the existing golf course developments pre-date the start of the current reporting phase, on which the conservation status of habitats are based (1996-present), there have been significant recent extensions to at least one course.

Of the 22 monitoring stops carried out in fixed dunes, all but one passed the overall required criteria. However, even this failure rate of 4.5% is sufficiently high to determine an *unfavourable-inadequate* assessment of structure and functions. An insufficient cover of flowering and fruiting plant material and an excessive cover of negative indicator species - in this case represented entirely by *Pteridium aquilinum* (Bracken) - were the reasons behind the single failed stop. Although the area was not grazed by livestock, an abundant rabbit population may have been chiefly responsible for some localised overgrazing that suppressed the production of flowers and seeds.

Future prospects are rated as *unfavourable-inadequate* as the remaining undeveloped dune grassland is not safe from the threat of further golf course developments, while other areas continue to be affected by recreational activities.

As one of the parameters of conservation status (in this case, that of habitat extent) is *unfavourable-bad*, the overall assessment for the habitat is also *unfavourable-bad*.

The rating chosen under the Irish system of assessment is *unfavourable-declining*, as the extent of undeveloped habitat has continued to decline in recent years.

Table 166C Conservation status of Annex I sand dune habitats at Rosapenna

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)		Structure & functions/ Future prospects	Extent	**Unfavourable – Bad**	**Unfavourable - declining**
Embryonic Dune (H2110)	Structure & functions	Extent/ Future prospects		**Unfavourable – Inadequate**	**Unfavourable - unchanged**
Mobile Dunes (H2120)	Structure & functions	Extent/ Future prospects		**Unfavourable – Inadequate**	**Unfavourable - unchanged**
Dune slacks (H2190)	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)

Mobile Dunes (H2120)

Although a narrow band of mobile dunes is present along much of the seaward edge of the dunes, there are some areas (including Tra beg at the north end of the site) where foredune development is very limited and also restricted in its distribution. Habitat extent (area) is therefore rated as *unfavourable-inadequate*.

All four monitoring stops in mobile dunes passed the overall required standard, indicating *favourable* structure and functions.

Future prospects are rated as *unfavourable-inadequate* due to the ongoing pressures from recreational activities, and the management of much of the dunes as golf courses, which generally represents a major disruption to the natural functioning of dune systems.

As the individual components of conservation status assessment are a combination of *favourable* and *unfavourable-inadequate* assessments, the overall assessment is *unfavourable-inadequate*.

The rating selected under the Irish system of assessment is *unfavourable-unchanged*, reflecting the likelihood that the general status of the habitat has been similar over the course of the current monitoring and reporting period.

Table 166D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Rosapenna

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	21	1	**Unfavourable – Inadequate**
Embryonic Dune (H2110)	4	0	**Favourable**
Mobile Dunes (H2120)	4	0	**Favourable**
Dune slacks (H2190)	8	0	**Favourable**

Embryonic Dunes (H2110)

Much of the current area of embryonic dunes is restricted to the agriculturally managed portion of the sand dunes at the southern end of the site. Although there are no recent data with which the current habitat areas can be compared, this restricted zonation and relatively limited development of habitat determines a habitat extent (area) assessment of *unfavourable-inadequate*.

All four monitoring stops carried out in embryonic dunes met the required attribute target criteria, indicating *favourable* structure and functions.

Future prospects for the habitat are rated as *unfavourable-inadequate*, as there are parts of the site that are affected by intensive amenity use, while large areas have been developed as golf courses, which represents a severe disruption to the natural functioning of the system. Although the current distribution of habitat - predominantly at the undeveloped southern extreme of the dunes - may be at least partly due to the general movement of sediment to this part of the site, foredunes, and particularly embryonic dunes, are extremely sparse in the areas immediately adjacent to golf course developments.

As the individual components of conservation status assessment are a combination of *favourable* and *unfavourable-inadequate* assessments, the overall assessment is *unfavourable-inadequate*.

The rating selected under the Irish system of assessment is *unfavourable-unchanged*, reflecting the likelihood that the general status of the habitat has been similar over the course of the current monitoring and reporting period.

Dune Slacks (H2190)

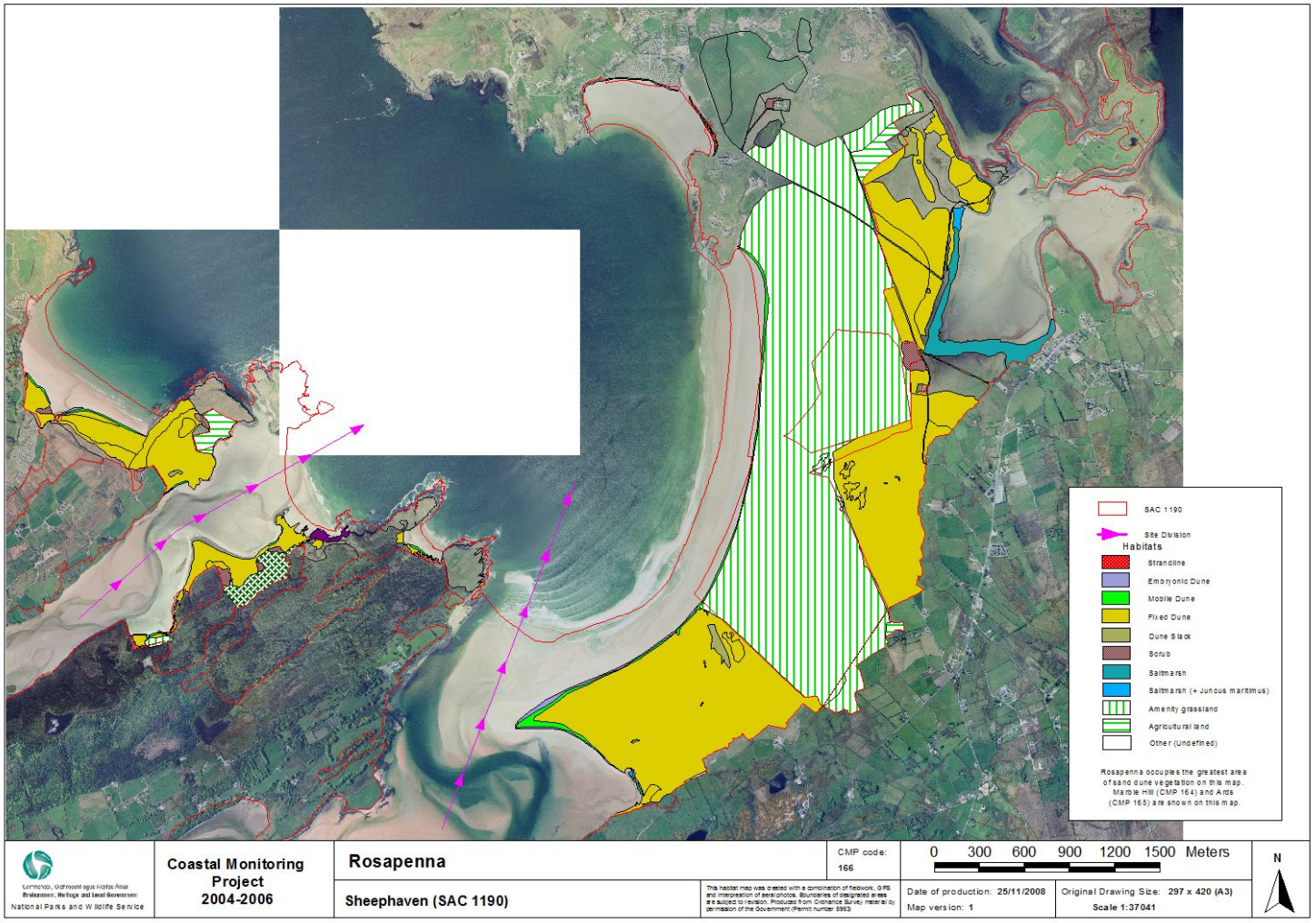
Habitat extent (area) is assessed as *favourable*, as there are no indications of a recent loss of extent within the habitat. The full extent and distribution of dune slacks at the site does not appear to have been thoroughly mapped before.

Eight monitoring stops were carried out in dune slacks, four in the southern end of the site at Glenree/Magheramagorgan and four in the northern end, near Carrickart. All eight monitoring stops passed the overall requisite targets indicating *favourable* structure and functions

Dune slack future prospects are rated as *favourable*, as the habitat areas mapped here are not apparently under imminent threat from the development or expansion of golf courses, nor are they in the areas that see the most intensive recreational pressures.

As all three of the individual parameters of conservation status are *favourable*, the overall assessment for the habitat is also *favourable*.

The rating selected under the Irish system of assessment is *favourable-maintained*, reflecting the likelihood that the extent and condition of the habitat has been stable over the course of the current monitoring and reporting period.


SAC 1190
Site Division
Habitats
Strandline
Embryonic Dune
Mobile Dune
Fixed Dune
Dune Slack
Scrub
Saltmarsh
Saltmarsh (+ Juncus maritimus)
Amenity grassland
Agricultural land
Other (Undefined)
Rosapenna occupies the greatest area of sand dune vegetation on this map. Marble Hill (CMP 164) and Ards (CMP 165) are shown on this map.
Coastal Monitoring Project 2004-2006
Rosapenna
Sheephaven (SAC 1190)
CMP code: 166
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
0 300 600 900 1200 1500 Meters
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:37041
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National Parks and Wildlife Service