Killala Bay/Moy Estuary SAC (site code 458)
Conservation objectives supporting document -coastal habitats

NPWS

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

Please note that this document should be read in conjunction with the following report: NPWS (2012). Conservation Objectives: Killala Bay/Moy Estuary SAC 000458. 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.

Killala Bay/Moy Estuary SAC is a relatively large site, comprising the inner part of Killala Bay, including the estuary of the River Moy from downstream of Ballina. The towns of Enniscrone and Killala occur on the eastern and western shores respectively. Sand dune systems, estuaries and intertidal areas are the main habitats of the site. Bartragh Island, a sand bar on which a sand dune system has developed, stretches across most of the outer part of the site. A further dune system protrudes westwards from Inishcrone, while more dunes occur at the Ross peninsula in the north-west of the site. Other habitats present include saltmarshes, dry grassland, reedbeds and scrub.

This large site displays an excellent diversity of dune types and Bartragh Island is recognsied as one of the most important dune systems in the north-west region. A substantial area of fixed dune remains intact despite modifications for recreational and agricultural purposes. Some humid dune slacks also occur, and there are fairly extensive examples of shifting dunes with marram, embryonic shifting dunes and annual vegetation of driftlines. A significant area of fixed dune habitat remains at Inishcrone, although much of the area of dunes has been developed as a golf course. The Moy Estuary is an important example of an estuary and has extensive intertidal sand and mud flats. This SAC site is also important for the Annex II mollusc *Vertigo angustior*, which occurs in freshwater marsh habitat. The Red Data Book plant species, hoary whitlow grass (*Draba incana*) was recorded from sand dunes along the coast east of Killala town, and is predominantly distributed in the north-west of Ireland (Curtis & McGough, 1988).

Killala Bay/Moy Estuary SAC (site code: 458) is designated for a range of coastal habitats including, saltmarsh and sand dunes. The following seven coastal habitats are included in the qualifying interests for the site (* denotes a priority habitat):

- *Salicornia* and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (ASM) (1330)
- Annual vegetation of drift lines (1210)
- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)*
- Humid dune slacks (2190)

The first two habitats are saltmarsh habitats and the last five are associated with sand dune systems, although all seven of these habitats are found in close association with each other.

Mediterranean salt meadows were also recorded from three saltmarshes within the SAC during the Saltmarsh Monitoring Project (SMP) (McCorry, 2007). However, this habitat is not listed as a qualifying interest for this site.

This backing document sets out the conservation objectives for the seven coastal habitats listed above in Killala Bay/Moy Estuary SAC, which is defined by a list of parameters, attributes and targets. The main parameters are (a) Range (b) Area and (c) Structure and Functions, the 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, 2007; McCorry & Ryle, 2009) and this document should be read in conjunction with those reports.

The SMP surveyed, mapped and assessed a total of four sub-sites within Killala Bay/Moy Estuary SAC (McCorry, 2007):

1. Bartragh Island
2. Ross
3. Rusheens
4. Castleconor

The distribution of saltmarsh habitats within Killala Bay/Moy Estuary SAC is presented in Appendix I. As part of the SMP, detailed individual reports and habitat maps were produced for each sub-site and these are included in a set of Appendices to this document (Appendix II to V).

Bartragh Island is a long narrow barrier island (4.6km long) and is located in the mouth of Killala Bay in north County Mayo. It is dominated by a large sand dune system which was also surveyed by the CMP (Ryle *et al*., 2009). The island is separated from the mainland by a wide expanse of intertidal sandflats (0.5-1km wide) and is located on a sand bar. A long band of saltmarsh (2.5km) is present along the southern central section of the island where it is more sheltered. Small patches of saltmarsh occur further south-east near to Bartragh House in small sheltered areas. A narrow band of saltmarsh continues towards the south-east tip of the island at the bottom of low cliff. All three saltmarsh habitats, *Salicornia flats*, ASM and MSM, were recorded at this sub-site (McCorry, 2007).

Ross is located 0.5-2.5km north of Killala town in the north-western part of Killala Bay. The main part of the saltmarsh is located in a small inlet or bay enclosed by the Ross Peninsula (Rinnaun Point). The bay is 1km long and 0.4km wide and the saltmarsh extends around the back of the bay. The

peninsula contains a sand dune system that was surveyed by the CMP (Ryle *et al*., 2009). The saltmarsh extends along the coastline south in to several other small inlets, including Pollnegeelar and Croghan. All three saltmarsh habitats, *Salicornia flats*, ASM and MSM, were recorded at this sub-site (McCorry, 2007).

Rusheens is located on the western side of Killala Bay near the mouth of the Moy River in County Mayo. The site is 4km south-east of Killala town. The main area of saltmarsh occurs in a small enclosed bay. A narrow band of saltmarsh continues along the shoreline to the north and south of the main area. Saltmarsh continues beyond the survey area. Both ASM and MSM occur at this subsite (McCorry, 2007).

Castleconor saltmarsh is located on the eastern side of the Moy River Estuary on the Sligo/Mayo border. It is a relatively small site and includes two small coves/bays connected by a narrow band of saltmarsh which continues to the north and south of this subsite along the shoreline. ASM is the only saltmarsh habitat recorded at this sub-site (McCorry, 2007).

The conservation objectives for the saltmarsh habitats in Killala Bay/Moy Estuary are based on a combination of the findings of the individual reports for each of these sub-sites. There are additional areas of saltmarsh known to be present within the site, however, it is estimated that the four sub-sites as surveyed by the SMP represents approximately 90% of the total area of saltmarsh within Killala Bay/Moy Estuary SAC.

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

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

1. Ross
2. Bartragh Island
3. Inishcrone

The distribution of sand dune habitats within Killala Bay/Moy Estuary SAC is presented in Appendix VI. As part of the Coastal Monitoring Project (CMP) detailed individual reports and habitat maps were produced for three sub-sites (Ross, Bartragh Island and Inishcrone) and these are included in a set of Appendices to this document (Appendices VII to IX).

Ross sand dunes are on the western shore of Killala Bay and include a number of different sand dune areas, the largest of which is at Ross Point. The dunes here extend across approximately 1.2km of north-facing coastline and cover 84.55ha. A smaller sand dune area to the south of Rinnaun Point,

comprising only 25.179ha of sand dune habitats, is separated from the Ross Point dunes by approximately 1km of rocky shore, clay cliffs and agricultural land (Ryle *et al*., 2009).

Bartragh Island lies across the mouth of Killala Bay into which the Moy Estuary flows. It is the only natural barrier island in Ireland and is approximately 4.5km long. The island is separated from the mainland by wide expanses of intertidal sand flats (0.5-1km) wide (Ryle *et al*., 2009).

Inishcrone is located on a sandy spit which lies on the eastern side of the mouth of the Moy estuary. Most of the spit is occupied by Enniscrone Golf Club (Ryle *et al*., 2009).

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

2 Conservation Objectives

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

3 Saltmarsh habitats

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

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

The first two habitats (in bold above) are listed as Qualifying Interests for Killala Bay/Moy Estuary SAC. Mediterranean salt meadows have also been recorded during the SMP, but they are not a qualifying interest. The last habitat is restricted in its distribution to sites in the southeast of the country.

The distribution of saltmarsh habitats within Killala Bay/Moy Estuary SAC is presented in Appendix I. The SMP surveyed, mapped and assessed a total of four sub-sites within Killala Bay/Moy Estuary SAC (McCorry, 2007). See Appendix I for map:

1. Bartragh Island (Appendix II)
2. Ross (Appendix III)
3. Rusheens (Appendix IV)
4. Castleconor (Appendix V)

Bartragh Island and Rusheens are sand flat type saltmarshes on a sand/gravel substrate. Ross and Castleconor are both bay type saltmarshes but Ross is sandy, while Castleconor has a muddy substrate (Curtis & Sheehy-Skeffington, 1998).

3.1 Overall Objectives

The overall objective for '*Salicornia* and other annuals colonising mud and sand' in Killala Bay/ Moy Estuary SAC is to '*maintain the favourable conservation condition'*.

The overall objective for 'Atlantic salt meadows' in Killala Bay/Moy Estuary SAC is to '*maintain the favourable conservation condition*'.

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

3.2 Area

3.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target is no decrease in extent from the baseline which was established by McCorry (2007). 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 Killala Bay/Moy Estuary SAC was produced based on the findings of the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry & Ryle, 2009) and is presented in Appendix I. A total of 55.104ha of saltmarsh habitat was mapped by the SMP within the SAC and an additional 6.151ha of potential saltmarsh habitat was identified using aerial photographs, to give a total estimated area of 61.255ha for the SAC. Of this potential saltmarsh, it is estimated that 3.342ha represents Atlantic salt meadow and 2.809ha represents Mediterranean salt meadows. Future groundtruthing may lead to an adjustment of these figures.

Baseline habitat maps were produced for the sub-sites in Killala Bay/Moy Estuary during the SMP. These maps are included with the individual site reports in the Appendices at the end of this document.

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

There are a number of differences in the figures below. Most of the differences can be explained by the fact that the SMP mapped the total saltmarsh resource at Killala Bay/Moy Estuary and not all of the saltmarsh mapped is contained within the SAC boundary. In addition, the total area within the SAC can be greater than given in the SMP as the SMP did not include any mosaics when calculating their total area (unless otherwise indicated). The following rules were applied when calculating the areas for the site's conservation objectives:

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

Sub-site	**Total area (ha) of *Salicornia* mudflats (excluding mosaics) from SMP**	**Total area (ha) of *Salicornia* mudflats within SAC boundary (including mosaics)**
Bartragh Island	0.26	0.257
Ross	0.25	0.288
Rusheens	-	-
Castleconor	-	-
Total	**0.51**	**0.545**

In view of the fact that all sub-sites were rated as 'Favourable' for extent by the SMP (McCorry, 2007), the target is that the area of *Salicornia* mudflats should be stable or increasing, subject to natural processes, including erosion and succession.

Sub-site	**Total area (ha) of ASM (excluding mosaics) from SMP**	**Total area (ha) of ASM within SAC boundary (including mosaics)**
Bartragh Island	29.11[1]	29.221
Ross	15.82	14.950
Rusheens	1.24	1.242
Castleconor	1.67	1.611
Total	**47.84**	**47.024**
Potential habitat	3.342	3.342
Total	**51.182**	**50.366**

[1] this total inclludes 50% of the 1330/rocky shore mosaic and 50% of the 1330/semi-fixed dune mosaic

In view of the fact that all sub-sites were rated as 'Favourable' for extent by the SMP (McCorry, 2007), the target is that the area of Atlantic salt meadows should be stable or increasing, subject to natural processes, including erosion and succession.

3.3 Range

3.3.1 Habitat distribution

Saltmarsh is currently known to display a wide distribution throughout the site with concentrations at Bartragh Island (29.38ha) and Ross (22.33ha).

Within Killala Bay/Moy Estuary SAC the areas of *Salicornia* habitat are limited, though on the lower marshes and extending out onto the most sheltered parts of the open mud flats, typical pioneering species occur, such as glasswort (*Salicornia* spp.) and seablite (*Suaeda maritima*).

Atlantic salt meadows (ASM) is the dominant saltmarsh habitat at the site and it was recorded at all 4 sub-sites. Mediterranean salt meadows (MSM) occur in small patches at three of the sub-sites: Bartragh Island, Ross and Rusheens.

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

3.4 Structure and Functions

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

3.4.1 Physical structure: sediment supply

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

The SMP noted from a comparison of the 6inch map (1929) to the 2000 aerial photos that the Ross sub-site has been subject to significant growth and accretion of the saltmarsh. There are signs of accretion and continuing saltmarsh growth in the inner part of the Ross Inlet with 'accretion ramps' at the seaward edge of the marsh (McCorry, 2007).

At Bartragh Island, there are indications that the saltmarsh extent is increasing at present due to accretion at its seaward edge. There may also be some loss of saltmarsh habitats as mounds on the marsh continue to develop small areas of sand dune habitat. Both of these trends are likely to be related to natural transition due to accretion and erosion cycles (McCorry, 2007).

Also at Bartragh Island, two small areas have old seawalls or protection works at the seaward side. This may be evidence of old land reclamation with the saltmarsh developing after the construction of the walls, or it may have been some coastal protection works (McCorry, 2007).

At Ross, there are some minor sea protection works around some buildings situated close to the shoreline and the edge of the marsh (McCorry, 2007).

The target is to maintain, or where necessary 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 Bartragh, the ASM pan and creek structure is poorly developed relative to other sites but this may be related to the relatively young age of the saltmarsh (McCorry, 2007).

At Ross the largest areas of saltmarsh in the north-west corner of the Ross Inlet contain well-developed salt pans and show some internal zonation along the large creeks (McCorry, 2007).

At Rusheens and Castleconor, the creek and pan structure is poorly developed as the saltmarsh is so narrow (McCorry, 2007).

The target is to to allow creek and pan networks to develop and maintain creek and pan networks where they exist, subject to natural processes, including erosion and accretion.

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 Killala Bay/Moy Estuary where it occurs in a mosaic with other saltmarsh habitats, including '*Salicornia* and other annuals colonising mud and sand' and '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 intertidal and sand dune habitats.

At Bartragh Island, the presence of a relatively large saltmarsh area has allowed the development of distinctive zonation in plant communities. This site shows some of the most distinctive zonation in plant communities seen during the SMP survey. There are interesting natural transitions from saltmarsh to brackish and freshwater plant communities at the eastern end of the island and mosaics of semi-fixed dunes and saltmarsh also present (McCorry, 2007).

At Ross, zonation is evident with typical low/mid and upper saltmarsh plant communities present. There are also some natural transitional habitats to wet and dry grassland, and fixed dune along the Ross Peninsula (McCorry, 2007).

At Rusheens, zonation is not evident in the main area of saltmarsh as it is quite uniform, but there are transitional wet grassland and brackish reedbed habitats present, which increase the overall diversity of the site (McCorry, 2007).

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 Castleconor, the absence of grazing has allowed a varied sward structure to develop (McCorry, 2007).

At Rusheens, the saltmarsh is grazed moderately, though poaching by cattle is an issue at this site (McCorry, 2007).

At Ross, the ASM vegetation along the eastern side towards Rinnaun Point is heavily grazed and quite badly poached (McCorry, 2007).

At Bartragh Island, sheep graze the island but the intensity is quite low. There are some small local areas, where the intensity is moderate along with some moderate poaching. The saltmarsh is also likely to be grazed by hare and rabbit although the intensity is likely to be low. Grazing by wintering waders and wildfowl is also likely (McCorry, 2007).

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.

There are some moderate levels of poaching at Bartragh Island, as well as tractor tracks across the saltmarsh (McCorry, 2007).

At Ross, a significant proportion of the saltmarsh is moderately to heavily poached, particularly along the eastern side of Ross Bay. Parts of the western side are also badly poached. Pollnageelar saltmarsh is low-moderately poached. The saltmarsh at Croghan is not significantly poached on the western side, with some moderate poaching on the eastern side. The saltmarsh south of the main

saltmarsh at Croghan is badly poached. Also at Ross, there are several paths across the saltmarsh to allow access to the sandflats to cattle and tractors (McCorry, 2007).

At Rusheens, the main area of saltmarsh is fenced off and is heavily poached by cattle (McCorry, 2007).

At Castleconor, part of the northern bay/cove is badly poached by cattle (McCorry, 2007).

The target is to maintain more than 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 Killala Bay/Moy Estuary area.

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

Species of local distinctiveness were recorded at a number of sub-sites throughout the SAC.

At Bartragh Island, Castleconor and Rusheens sub-sites the species diversity of the ASM is typical of this type of saltmarsh with most typical species present (McCorry, 2007).

At Ross, species diversity is typical of this habitat and there are several indicators of local distinctiveness such as lax-flowered sea-lavender (*Limonium humile*) and saltmarsh flat-sedge (*Blysmus rufus*) (McCorry, 2007).

3.4.8 Vegetation structure: negative indicator species

There are no negative indicator species recorded on the saltmarshes within Killala Bay/Moy Estuary SAC by the SMP (McCorry, 2007). However, common cordgrass (*Spartina anglica*) has been recorded in this part of the country (Preston *et al*., 2002).

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

4 Sand dune habitats

Sand dunes are hills of wind blown sand that have become progressively more stabilised by a cover of vegetation. In general, most sites display a progression through strandline, foredunes, mobile dunes and fixed dunes. Where the sandy substrate is decalcified, fixed dunes may give way to dune heath. Wet hollows, or dune slacks occur where the dunes have been eroded down to the level of the water-table. Machair is a specialised form of dune system that is only found on the northwest coasts of Ireland and Scotland. Transitional communities can occur between dune habitats and they may also form mosaics with each other. Dune systems are in a constant state of change and maintaining this natural dynamism is essential to ensure that all of the habitats present at a site achieve favourable conservation condition.

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

- **Annual vegetation of drift lines (1210)**
- **Embryonic shifting dunes (2110)**
- **Shifting dunes along the shoreline with *Ammophila arenaria* (2120)**
- **Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) ***
- Decalcified dunes with *Empetrum nigrum* (2140) *
- Decalcified dune heath (2150) *

- Dunes with *Salix repens* (2170)
- **Humid dune slacks (2190)**
- Machair (21AO) *

Five dune habitats were recorded by Ryle *et al*. (2009) and all are listed as Qualifying Interests for Killala Bay/Moy Estuary SAC. These habitats include mobile areas at the front, as well as more stabilised parts of dune systems.

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

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

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

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

Humid dune slacks are wet or moist depressions between dune ridges. They are characterised by the occurrence of a water-table that is maintained by a combination of groundwater (which may or may not be slightly saline), precipitation and an impermeable layer in the soil. In the winter, the water-table normally rises above the soil surface and inundation occurs. In spring and summer, the water-table

drops, but the top layer of the soil remains wet. Proximity of the water-table to the surface is evidenced in the vegetation, in which rushes, sedges and moisture-loving herbs such as marsh pennywort (*Hydrocotyle vulgaris*), bog pimpernel (*Anagallis tenella*), grass of Parnassus (*Parnassia palustris*), common marsh-bedstraw (*Galium palustre*) and marsh helleborine (*Epipactis palustris*) are obvious features. The frequency and duration of flooding, as well as the level of salinity, determines the vegetation composition. In addition, nutrient-enrichment can occur as a result of leaching from the surrounding dune ridges (Gaynor, 2008).

All 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 Killala Bay/Moy Estuary SAC.:

1. Ross (Appendix VII)
2. Bartragh Island (Appendix VIII)
3. Innishcrone (Appendix IX)

Detailed descriptions from the Coastal Monitoring Project (CMP) (Ryle *et al.,* 2009) of each sand dune habitat found at Ross, Bartragh Island and Innishcrone are presented in Appendices VII to IX. A total of 279.429ha of sand dune habitat was mapped within the Killala Bay/Moy Estuary SAC.

4.1 Overall objectives

The overall objective for ‘Annual vegetation of drift lines’ in Killala Bay/Moy Estuary SAC is to ‘maintain the favourable conservation condition’.

The overall objective for ‘Embryonic shifting dunes’ in Killala Bay/Moy Estuary SAC is to ‘restore the favourable conservation condition’.

The overall objective for ‘Shifting dunes along the shoreline with *Ammophila arenaria*’ in Killala Bay/Moy Estuary SAC is to ‘restore the favourable conservation condition’.

The overall objective for ‘Fixed coastal dunes with herbaceous vegetation’ in Killala Bay/Moy Estuary SAC is to ‘restore the favourable conservation condition’.

The overall objective for ‘humid dune slacks’ in Killala Bay/Moy Estuary SAC is to ‘maintain the favourable conservation condition’.

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

4.2 Area

4.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. A baseline habitat map was produced for the sand dune habitats at each sub-site in Killala Bay/Moy Estuary SAC during the Coastal Monitoring Project (CMP) (Ryle *et al*., 2009). These maps are included with the individual site reports in the Appendices at the end of this document.

At Ross, the embryo and mobile dunes at Ross Point and Rinnaun Point are restricted to only a small proportion of the seaward sand dune boundary and is symptomatic of very limited foredune development (Ryle *et al.,* 2009). There is no data available to indicate that there is any recent loss in extent of the fixed dune habitat at Ross Point. At Rinnaun Point, there is some erosion of the fixed dune habitat although it is not clear if this can be attributed solely to natural erosion or the affects of recreational activities (Ryle *et al*., 2009).

There is no evidence of any recent loss in extent of dune slack habitat at Ross Point (Ross sub-site), though in the past they may have been altered by previous large scale earth-moving at the site. Dune slacks are absent from Rinnaun Point (Ryle *et al.,* 2009).

At Inishcrone, the mobile dune habitat is patchy in distribution and is eroded back to the fixed dune in places. The natural erosion is compounded by human activities such as the presence of coastal protection works at the site. The extent of the fixed dune habitat, at Inishcrone, is reduced owing to the presence of the golf course which is expanding in to the fixed dune areas (Ryle *et al*., 2009).

At Bartragh Island, two narrow separate strips of annual strandline habitat, each over 300m in length, were recorded by the CMP on the northern side of the island. Areas of embryo dune were also recorded by the CMP, the largest of which was at the western end of the island, in an area of active accretion. Mobile dunes at Bartragh Island are present along most of the northern shore of the Island and are only absent from the easternmost end of the island, due to the proximity of the sea channel that cuts through the sand flats on the northern side. The area of fixed dunes, at Bartragh Island is extensive (120.216ha). A number of dune slacks also occur at Bartragh Island. They are small in extent and cover approximately 1.2ha (Ryle *et al*., 2009).

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

Habitat	**Total area (ha) of habitat from CMP**	**Total area (ha) of habitat within SAC boundary**
Annual vegetation of driftlines	0.582	0.582
Embryonic shifting dunes	1.556	1.555
Shifting dunes along the shoreline with *Ammophila arenaria*	12.75	12.752
Fixed coastal dunes with herbaceous vegetation	263.69	259.452
Humid dune slacks	5.088	5.088
Total	**283.666**	**279.429**

The target for this attribute in the case of each habitat is 'no decrease in extent from the established baseline'. In the case of 'annual vegetation of driftlines' and 'humid dune slacks', the general target for this attribute is that the area should be stable, or increasing. However, in the case of 'embryonic dunes' and 'shifting dunes along the shoreline with *Ammophila arenaria' and 'fixed coastal dunes with herbaceous vegetation'* losses were reported during the baseline survey (Ryle *et al*., 2009). Therefore, the conservation objective for these habitats is that they should be increasing in extent. 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 VI.

Strandline vegetation was recorded at Bartragh Island sub-site by the CMP. Embryo dune habitat was recorded at Ross and Bartragh Island. Mobile and fixed dunes occur at all four sub-sites and dune slacks are confined to Ross and Bartragh Island.

The dune slacks at Bartragh Island are narrow linear features which run parallel to the dune ridges (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 Killala Bay/Moy Estuary SAC in terms of structure and functions depends on a range of attributes for which targets have been set as outlined below.

4.4.1 Physical structure: functionality and sediment supply

Coastlines naturally undergo a constant cycle of erosion and accretion. There are two main causes of erosion: (a) those resulting from natural causes and (b) those resulting from human interference. Natural causes include the continual tendency towards a state of equilibrium between coasts and environmental forces, climatic change (particularly an increase in the frequency of storms or a shift in storm tracks), relative sea level rise and natural changes in the sediment supply. Human interference is usually associated with changes in the sediment budget, either directly, through the removal of beach or inshore sediment, or indirectly, by impeding or altering sediment movement. It is important to recognise that the process of coastal erosion is part of a natural tendency towards equilibrium. Natural shorelines attempt to absorb the energy entering the coastal zone by redistributing sediment.

Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Sediment supply is especially important in the embryonic dunes and mobile dunes, as well as the strandline communities where accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. The construction of physical barriers such as sea defences can interrupt longshore drift, leading to beach starvation and increased rates of erosion. Sediment circulation and erosion also has a role to play in the more stabilised dune habitats. Cycles of erosion and stabilisation are part of a naturally functioning dune system, where the creation of new bare areas allows pioneer species and vegetation communities to develop, increasing biodiversity. The construction of physical barriers can interfere with the sediment circulation by cutting the dunes off from the beach resulting in fossilisation or over-stabilisation of dunes.

At Inishcrone, there are sea defence/coastal protection works near the main access point to the beach (Ryle *et al*., 2009).

The target for this attribute is to maintain and where possible restore 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

The conservation of dune slacks and dunes with *S. repens* is inextricably linked with the local hydrological regime. Dune slacks are characterised by the proximity of a groundwater table that is maintained by the combination of an impermeable layer in the soil, or deeper salt water and precipitation. Dunes with *S. repens* are closely associated with dune slacks but are distinguished from them by a water-table that is at a depth that no longer exerts an influence on the vegetation. Most dune slacks are fed by a range of water sources, including precipitation water, surface water or groundwater. The latter two sources are usually somewhat calcareous while the former is acid.

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

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

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.

There are transitions from the sand dunes to saltmarsh habitats at both Bartragh Island and Ross.

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 only applies to fixed dunes 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 including 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

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

At Inishcrone, the CMP noted that a high proportion of marram (*Ammophila arenaria*) at the tip of the spit was dying. In other areas of the mobile dune habitat there is healthy and fresh growning marram but it is susceptible to trampling by walkers.

At Rinnaun Point sub-site at Ross, a sufficient proportion of marram (*Ammophilla arenaria*) in the mobile dune habitat appeared robust and healthy. At Ross Point, however, the CMP noted a certain amount of unhealthy marram (*Ammophila arenaria*).

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 fixed habitats (fixed dunes and dune slacks), where a varied vegetation structure is important for maintaining species diversity and is particularly important for invertebrates and birds. The ecological benefits of moderate levels of grazing on dunes have been well documented (Gaynor, 2008). Moderate grazing regimes lead to the development of a species-rich vegetation cover. The animals increase biodiversity by creating micro-habitats through their grazing, dunging and trampling activities. Grazing slows down successional processes and in some cases

reverses them, helping to achieve a diverse and dynamic landscape. The effects of trampling assist the internal movement of sand through the development of small-scale blowouts, while dunging can eutrophicate those dune habitats whose nutrient-poor status is crucial for the survival of certain vegetation types. Many species, from plants to invertebrates, benefit immensely from the open and diverse system created by a sustainable grazing regime. Many dune species are small in size and have relatively low competitive ability. Consequently, the maintenance of high species diversity on a dune system is dependent on the existence of some control to limit the growth of rank coarse vegetation (Gaynor, 2008).

Low numbers of cattle, sheep and some horses are kept on Bartragh Island, mostly during the summer months. The low level of grazing is reflected in the decline in condition in parts of the fixed dune habitat and the gradual spread of invasive species such as bracken (Ryle *et al*., 2009).

At Inishcrone, the fixed dune is not currently grazed though overgrazing at this site was an issue in the past. This results in an increase in rank vegetation and a decrease in species diversity (Ryle *et al*., 2009).

Ross dunes are grazed by cattle and sheep with smaller numbers of horses also present. Undergrazing of some areas of dune was also noted by the CMP and as a result the dunes are becoming rank and failing to meet their targets under Structure & Functions (Ryle *et al*., 2009).

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

4.4.7 Vegetation structure: vegetation cover

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

The target is therefore to keep the cover of *S. repens* below 40%.

4.4.8 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*).

Bartragh Island, Ross and Inishcrone support a characteristic dune flora, details of which can be found in the site reports from the CMP (Ryle *et al.,* 2009) which are included in Appendices VII to IX.

Bee orchid (*Ophyrs apifera*) was recorded at Ross by the CMP. The Red Data Book species hoary whitlow grass (*Draba incana*) was previously recorded from Ross, but is unlikely to have survived the negative affects of agricultural improvement that have gone on at the site (Ryle *et al*., 2009).

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

4.4.9 Vegetation composition: negative indicator species

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

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

The mobile dunes at Ross Point had a high cover of negative indicator species such as creeping thistle (*Cirsium arvense*) and ragwort (*Senecio jacobaea*). At Rinnaun Point, there are abundant weedy areas in the fixed dune habitat, with species such as creeping thistle (*Cirsium arvense*), common ragwort (*Senecio jacobaea*) and hogweed (*Heracleum sphondylium*) (Ryle *et al*., 2009).

Negative indicators in the fixed dune habitat at Inishcrone include ragwort (*Senecio jacobaea*), spear thistle (*Cirsium vulgare*), creeping thistle (*Cirsium arvense*), cock's foot grass (*Dactylis glomerata*), bramble (*Rubus fruticosus* agg.) and perennial rye grass (*Lolium perenne*). Within the mobile dunes, negative indicator species included common ragwort (*Senecio jacobaea*).

At Bartragh Island, there were some areas of dense bracken (*Pteridium aquilinum*) at the eastern end of the island noted by the CMP. Occasional ragwort (*Senecio jacobaea*) was recorded from the dune slacks and mobile dunes at this sub-site (Ryle *et al*., 2009).

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

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.

In fixed dunes at Ross Point, there are some scattered shrubs and stunted trees including sycamore (*Acer pseudoplatanus*), hawthorn (*Crataegus monogyna*) and elder (*Sambucus nigra*), though their combined cover is not significant (Ryle *et al*., 2009).

At Bartragh Island scrub was occasionally recorded in the fixed dunes and was composed of ivy (*Hedera helix*), bramble (*Rubus fruticosus*), blackthorn (*Prunus spinosa*) and dog-rose (*Rosa canina*).

At Bartragh Island, *Salix repens* ssp. *arenaria* was noted in dune slacks, however, its cover was only 10% and it was not generally abundant throughout the slack areas (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

Commission of the European Communities (2007). *Interpretation Manual of European Union Habitats – EUR 27.* DG Environment – Nature and Biodiversity, Brussels.

Curtis, T.G.H. & McGough, H.N. (1988). *The Irish Red Data Book*. The Stationery Office, Dublin.

Curtis, T.G.F. & 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.

Gaynor, K. (2008). *The phytosociology and conservation value of Irish sand dunes*. Ph.D. Thesis, National University of Ireland, Dublin.

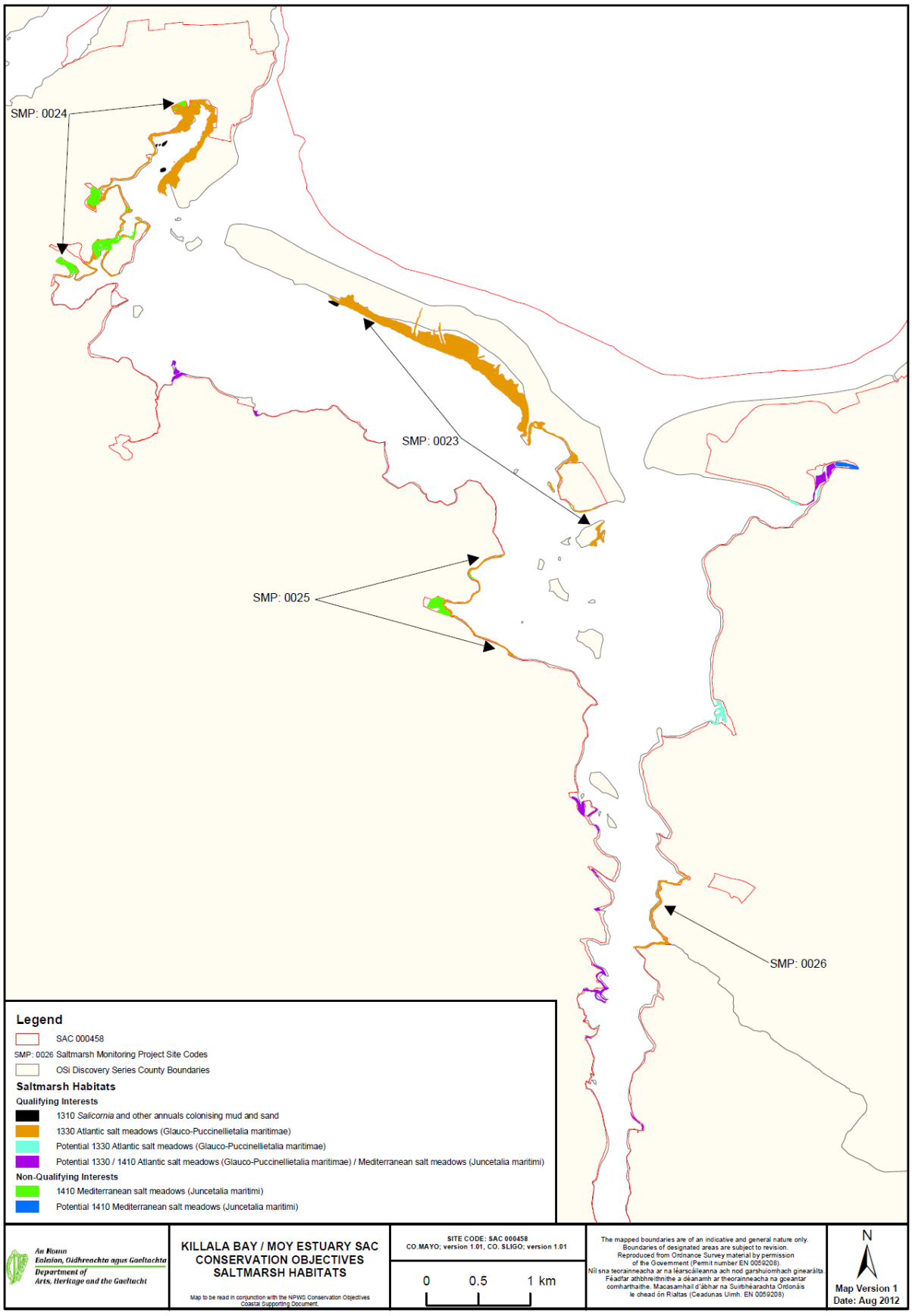
McCorry, M. (2007). *Saltmarsh Monitoring Project 2006*. Unpublished report to the National Parks and Wildlife Service, Dublin.

McCorry, M. & Ryle, T. (2009). *Saltmarsh Monitoring Project 2007-2008*. Unpublished report to the National Parks and Wildlife Service, Dublin.

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

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 Killala Bay/Moy Estuary SAC.



Appendix II – Bartragh Island site report and habitat map from the SMP (McCorry, 2007)

SITE DETAILS

SMP site name: **Bartragh Island**		SMP site code: **SMP0023**
Site name (Curtis list): **Bartragh Island**		CMP site code: **131**
		Site No: (Curtis list): **41**
NPWS Site Name: **Killala Bay/Moy Estuary**		Dates of site visit: **29/09/2006**
NPWS designation	cSAC: **458**	MPSU Plan: **Draft 2 (old format)**
	pNHA: **458**	
	SPA: Killala Bay/Moy Estuary SPA 4036	
County: **Mayo**		Discovery Map: **24** Grid Ref: **124150, 330000**
6 inch Map No: **Ma015, Ma022**		Aerial photos (2000 series): **01121-a, 01121-c, 01120-a, 01120-b, 01060-c, 01060-d**

Annex I habitats currently designated for Killala Bay/Moy Estuary cSAC:

***Salicornia* and other annuals colonizing mud and sand (1310)**

Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)

Other SMP sites within this cSAC/pNHA: **Ross, Rusheens, Castleconor**

Saltmarsh type: **Sandflats** Substrate type: **Sand/Gravel**

SITE DESCRIPTION

Bartragh Island is a long narrow barrier island (4.6 km long) located in the mouth of Killala Bay in north County Mayo. It is dominated by a large sand-dune system, which was surveyed by the Coastal Monitoring Project. The island is separated from the mainland by wide expanses of intertidal sandflats (0.5-1 km wide) and is located on a sand bar. A sandy beach and sandflats also occur on the northern side of the island. There are several small islands to the south-east of Bartragh Island. The eastern side of the island has other terrestrial grassland habitats over bedrock and is not a sand bar. The island is un-inhabited at present but Bartragh House is located at the eastern end and some of the land around the house has been cultivated in the past (1950s). Bartragh House is currently unoccupied.

Saltmarsh is also present around the edges of some of the smaller low-lying islands located to the south-east of Bartragh Island including Baunrosmore, Baunrosbeg and Horse Island.

The site was accessed by boat from Killala at high tide. The site can also be accessed at certain low tides by crossing the intertidal flats. The island is used for recreation by walkers

and campers. The site has been the subject of a high profile proposal to create a golf course in recent times.

Three Annex I habitats, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM), are found at this site. The entire saltmarsh habitat is located within the cSAC. Mediterranean salt meadows is not listed as a qualifying interest for Killala Bay/Moy Estuary cSAC.

The intertidal areas around the island are part of Killala Bay/Moy Estuary SPA (Site code 4036). A large part of the saltmarsh is also included within the SPA. Bartragh Island was excluded from the SPA and the boundary used was the 1929 6 inch map boundary. However, the island has shifted within the bay since this time so part of the island is located within the SPA (and some of the intertidal flats are excluded). Killala Bay qualifies as a RAMSAR site but has not been designated as one yet. The cSAC and SPA are important for wintering waders and wildfowl.

HABITATS

General description

A long band of saltmarsh (2.5 km) is present along the southern central section of the island where it is more sheltered. Small patches of saltmarsh occur further south-east near to Bartragh House in small sheltered areas. A narrow band of saltmarsh continues towards the south-east tip of the island at the bottom of low cliff and this transitions into rocky shoreline with pebbles and cobbles. The saltmarsh eventually stops with a small transition to embryonic dune and sandy beach towards the north-western end of the island. The saltmarsh is almost totally dominated by Atlantic salt-meadows (ASM) (1330) (Table 3.1). There are several small patches of Sea Rush (*Juncus maritimus*) (< 5 m diameter) along the narrow band of saltmarsh at the south-eastern end of the island that could be classified as Mediterranean salt meadows (1410), but they are small and not significant. Small clumps of Sea Rush occur along the length of the saltmarsh but on the whole it is quite rare. A small patch of *Salicornia* spp. is located on sandflats at the western end of the saltmarsh that can be classified as '*Salicornia* and other annuals colonizing mud and sand' (1310).

Table 3.1. Area of EU Annex I habitats listed at Bartragh Island.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	0.26
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	29.11[1]
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.01
	Total	**29.38**

[1] this total includes 50% of the 1330//rocky shore mosaic and 50% of the 1330/semi-fixed dune mosaic.

Salicornia and other annuals colonizing mud and sand (H1310)

A small patch of this habitat is located at the western end of the main part of the saltmarsh on a small sand bar. It contains relatively sparse Glasswort (*Salicornia* sp.) plants scattered over a small area. Glasswort and Annual Sea-blite (*Suaeda maritima*) also occur at other locations along the seaward side of the saltmarsh, particularly along the saltmarsh at the eastern end and parts of this community could be classified as this Annex I habitat. However, the area is very minor in size and is included in the ASM habitat for this survey.

Atlantic salt meadows (H1330)

The largest section of saltmarsh is located in the central section of the island (along the southern side) in a band adjacent to the sand dune system. This area has a generally uniform topography with a low slope from the front to the back of the marsh and is about 60 m wide at the eastern end. The widest areas are 0.2 km wide. The saltmarsh has the appearance of being relatively recently developed as the creek and pan development is relatively poor. The lack of pans on this saltmarsh is distinctive. The 1929 6 inch map also does not show any saltmarsh development along this part of the island. This section is also significant for the fairly uniform zonation of different vegetation communities similar to the saltmarsh at Bull Island (Co. Dublin) or Ballyteige (Co. Wexford).

The saltmarsh is dominated by the *Armeria-Plantago* zone. This vegetation community is dominated by Sea Pink (*Armeria maritima*) and Sea Plantain (*Plantago maritima*), with frequent or occasional Common Saltmarsh-grass (*Puccinellia martima*, Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*) and Common Scurvygrass (*Cochlearia officinalis*). There is a relatively narrow band of vegetation at the landward side of this zone that is dominated by Red Fescue (*Festuca rubra*) and Sea Rush. The saltmarsh eventually transitions to sand dune vegetation dominated by Marram Grass (*Ammophila arenaria*) through a narrow band dominated by Creeping Bentgrass (*Agrostis stolonifera*). This zone

also contains species such as Silverweed (*Potentilla anserina*), Buck's-horn Plantain (*Plantago coronopus*) and Curled Dock (*Rumex crispus*).

The pioneer/lower vegetation community is dominated by Common Saltmarsh-grass and frequent Glasswort (*Salicornia* spp.) and has relatively small amounts of Annual Sea-blite (*Suaeda maritima*) compared to the narrow band of saltmarsh. Sea-spurrey sp. (*Spergularia* sp.) is also present. This community transitions to the *Armeria-Plantago* zone on low mounds that eventually coalesce. The narrow bands of saltmarsh vegetation that extend into the sand dune system contain significant bare ground patches or green algae patches.

Significant parts of the seaward boundary are accreting at present with Common Saltmarsh-grass and Glasswort prominent. The seaward boundary also shows several low cliffs (about 0.3 m high) indicating older periods of erosion at times. The saltmarsh transitions with a generally sharp boundary into the sand dune system with semi-fixed dunes dominated by Marram Grass prominent. There are several areas where a mosaic of semi-fixed sand dune mounds and saltmarsh vegetation has developed and the boundary between the two habitats is less distinctive. There are several narrow 'channels' only 2-15 m wide that contains saltmarsh vegetation and encroach into the sand dune system.

There are two small areas of Atlantic saltmarsh to the south of Bartragh House in sheltered areas surrounded by sloping land. Both these areas have low old seawalls or protection works at the seaward side with the saltmarsh developing behind the walls, which may be as a result of infilling. There are low saltmarsh cliffs at the seaward side of both these areas. Both areas have some minor creek and pan development. Zonation of vegetation is evident with *Agrostis*-dominated, *Juncus/Festuca*-dominated and *Puccinellia*-dominated vegetation. The second area closest to Bartragh House has not totally infilled and there is a bare mud area in the centre. Common Saltmarsh-grass is colonising the area around the edges of mud. There is a transition to freshwater marsh and wet Willow-dominated woodland/scrub at the back of the saltmarsh on somewhat higher ground. A narrow band of saltmarsh continues around the shore with some breaks containing rocky shoreline/pebble beach.

Saltmarsh is also present to the north of the courtyard. This area of saltmarsh is accreting at the seaward side across sandflats, with patches of Common Saltmarsh grass. This area is one of the better-developed patches of saltmarsh with a natural transition at the back to wet grassland/freshwater marsh. Dry grassland has developed along the sides of the saltmarsh. There is a variable micro-topography with low mounds and shallow hollows developing into

pans. These show zonation of vegetation with the mounds dominated by Saltmarsh Rush (*Juncus gerardii*). Parts of the saltmarsh are moderately grazed with the *Puccinellia*-dominated zone showing the most damage with some local poaching. This section of saltmarsh is located in a small bay with a sand spit extending along the western side. The saltmarsh here also develops into brackish marsh, freshwater marsh and dune slack-like vegetation. Saltmarsh on this side of the small bay is also accreting.

A narrow band of ASM is located along the shoreline at the south-eastern end, east of Bartragh House. This narrow band of saltmarsh (2-5 m wide) is eroding and patchy in places and forms a mosaic with rocky shoreline/pebble beach. The saltmarsh has developed along the edge of a low cliff with exposed rock in places. The saltmarsh vegetation eventually disappears and the pebble-rocky shoreline continues towards the south-eastern tip of the island. The saltmarsh is dominated by Common Saltmarsh-grass and Saltmarsh Rush which forms zones in places. Other species present include Annual Sea-blite, Sea Milkwort, Sea Aster, Red Fescue, Long-bracted Sedge (*Carex extensa*), Spear-leaved Orache (*Atriplex prostrata)* and Common Scurvygrass. Curled Dock appears rarely along the upper boundary with a narrow band of Creeping Bent-grass. There are several patches of Grey Club-rush (*Schoenoplectus tabernaemontani*) along the upper boundary at the edge of the low cliff. This band of saltmarsh is grazed lightly by sheep.

The flora is notable for the absence of Lax-flowered Sea Lavender (*Limonium humile*). This species is present on adjacent saltmarsh at Ross.

Mediterranean salt meadows (H1410)

There are several small patches of *Juncus maritimus*-dominated vegetation along the south-east shoreline. These patches occur in rocky areas with eroded mud. Other species present include Sea Aster, Sea Milkwort, Common Scurvygrass and Common Saltmarsh-grass.

IMPACTS

The saltmarsh overall has a relatively low level of impacts and activities compared to other sites (Table 4.1). This is related to the fact that the saltmarsh is part of an un-inhabited island that is dominated by semi-fixed dunes. The activity codes use in Table 4.1 are given in brackets in the following text. Sheep graze the island and the saltmarsh but the overall intensity is low (140). There are some small local areas where the intensity is moderate and there is also some moderate poaching. The saltmarsh is also likely to be grazed by Rabbit

and Hare, although the intensity is likely to be low (NHA site notes indicate that Rabbit were wiped out in the 1990's by myxomatosis). Some Rabbit and Hare were observed on the island but not specifically on the saltmarsh. The saltmarsh is likely to be grazed by wintering waders and wildfowl.

Bartragh Island is the subject of a high profile proposal to create a links golf course. This development could potentially have some direst and indirect impact on the saltmarsh habitats. The island is used for recreation by walkers and campers, with local people visiting at weekends during the summer (622). There are several animal tracks across the saltmarsh. Some parts of the saltmarsh also have tractor tracks but this is relatively minor (501).

Two small areas of saltmarsh have old seawalls at there seaward side. This may be evidence of old land reclamation (802) with the saltmarsh developing after the construction of the walls, or it may have been some coastal protection works (871). Both these areas of saltmarsh are indicated on the 6 inch map.

The saltmarsh overall shows signs of natural accretion (910) with an accretion ridge present at the seaward side of the saltmarsh, although there is evidence of periods of natural erosion (900) with low saltmarsh cliffs present further back from the accretion ridge in places.

Table 4.1. Intensity of various activities on saltmarsh habitats at Bartragh Island.

EU Habitat Code[1]	Activity code[2]	Intensity[3]	Impact[4]	Area affected (ha)	Location of activity[5]
1310	140	C	0	0.26	Inside
13s	140	C	0	29.38	Inside
13s	501	C	0	< 0.001	Inside
13s	622	C	0	< 1	Inside
13s	871	C	+1	0.47	Inside

[1] EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.
[2] Description of activity codes are found in Appendix III summary report.
[3] Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.
[4] Impact is rated as –2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1= natural positive influence and +2 = strongly managed positive influence.
[5] Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

CONSERVATION STATUS

Overall Conservation Status

Overall, the saltmarsh habitats on Bartragh Island are in relatively good condition (Table 5.1). A conservation plan is available for this cSAC. The short-term future prospects are good if the current level of grazing is not increased. The long-term future prospects are poor if the proposed golf course development (or other development on the island) is carried out. Any

development of the island may directly impact on the saltmarsh by loss of habitat to other land-use, disturbance of wildlife on the saltmarsh and indirectly may affect the balance of accretion/erosion along the edge of the saltmarsh if piers and coastal protection works are constructed and channels are dredged.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Bartragh Island.

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

Atlantic salt meadows (H1330)

EXTENT

This habitat dominates the area of saltmarsh. There is no data on the previous historical extent of this habitat on Bartragh Island. Comparisons of the 6 inch map to the current aerial photos indicate that the western portion of the island has shifted somewhat in size, position and shape. The western part of the island has become narrower while the central part has widened. The main area of saltmarsh behind the sand dunes on Bartragh Island is not actually mapped on the 6 inch map (1929). Other saltmarsh to the southeast on Bartragh Island is mapped on the 6 inch map so this may indicate that this area of saltmarsh is a recent development and is related to changes in the size and shape of the island since the 1920's. These changes could be related to development of pipelines, piers, coastal protection and dredging of channels in the Killala and Ross area.

There are indications that the saltmarsh extent is increasing at present due to accretion at its seaward edge (at the expense of intertidal mud and sandflats, H1140). However, there may also be some loss of saltmarsh habitat as mounds on the marsh continue to develop small areas of sand dune habitat. Both these trends are likely to be related to natural transition due to accretion and erosion cycles. While there are likely to be few impacts on the island affecting these natural geomorphological cycles, these cycles can be affected indirectly by impacts on the intertidal area and the mainland shoreline. The extent is assessed as *favourable* as the area is mainly changing due to natural impacts.

HABITAT STRUCTURE AND FUNCTIONS

The structure and functions of this habitat are assessed as *favourable*. Twelve monitoring stops were carried out in this habitat and they all passed. Each stop passed for all attributes. Pans and creek structure are poorly developed relative to other sites but this is may be related to the relative young age of the marsh. The sward height and plant ground cover are both satisfactory. Sheep graze the island at present and the grazing is impacting on sward height but grazing overall is generally low in intensity. Likewise there is very little poaching with only some localised damage of creeks and pans covering a minor area and this is typical of any marsh with some livestock grazing. The species diversity is typical of saltmarshes in this area, although the absence of Lax-flowered Sea Lavender is notable. The presence of a relatively large saltmarsh area has allowed the development of distinctive zonation of plant communities. This site shows some of the most distinctive zonation in plant communities related to elevation along the marsh seen during the survey and is comparable to sites like Ballyteige. No Common Cordgrass (*Spartina anglica*) was recorded and there were no other negative indicators. There are interesting natural transitions with saltmarsh going to brackish and freshwater wetland plant communities at the eastern end of the island and mosaics of semi-fixed dunes and saltmarsh also present.

FUTURE PROSPECTS

The future prospects for this habitat (and the saltmarsh as a whole) are good. The future prospects are assessed as '*favourable*' assuming the proposed golf course development does not go ahead. This site has significant conservation value due to the relatively few impacts on the saltmarsh habitats and on the island as a whole, as the island is not inhabited and not farmed intensively. Any development of the island is likely to affect the saltmarsh either directly or indirectly. This site is also significant as nearly all the saltmarsh habitat has the

capacity to naturally transition to other habitats at its seaward and landward edges. Therefore the saltmarsh has the capacity to respond naturally to any future changes in sea level due to climate change. Recreational pressure on the saltmarsh and on the island as a whole are relatively low. The grazing level is currently not having a negative impact on the saltmarsh so stocking rates should not increase above this level. The grazing levels should be routinely monitoring to ensure that stocking levels are not too high as grazing from birds, rabbits and hares may increase naturally.

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

The area of this habitat was relatively small. However, there is no data on the historical extent of *Salicornia* flats in Killala Bay. Therefore the extent is assessed as *favourable*. The habitat structure and functions are typical of this habitat with sparse Glasswort plants occurring in a single species stand. Species such as Annual Sea-blite, Sea Spurrey and Common Saltmarsh-grass occur only rarely. The habitat structure and functions are assessed as *favourable.* The future prospects are also assessed as *favourable*, assuming the proposed development on the island does not go ahead. The extent of this habitat is also dependant on erosion/accretion cycles in the intertidal within the Killala area. The habitat may naturally disappear or increase in size as the sand bar on which it is located moves due to erosion and/or accretion. These cycles may be affected by coastal development along the mainland of pipelines, piers and coastal protection works.

Mediterranean salt meadows (H1410)

The area of this habitat on the island is relatively minor (0.01 ha) and can be considered not to have changed significantly in the past. The extent is assessed as '*favourable'*. No monitoring stops were carried out in this habitat on this site as the area was so small. However, the species diversity was typical of this habitat and similar to narrow bands of Sea Rush seen at other sites in Killala Bay such as Ross (SMP0024). The structure and functions are assessed as '*favourable*'. The future prospects are also assessed as '*favourable*' assuming the proposed development does not go ahead.

MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site. Routine monitoring is required to ensure the site does not suffer from overgrazing.


Legend
SAC boundary
1330 Monitoring stops
1310 Monitoring stops
Habitats
1310 Salicornia flats
1330 Atlantic salt meadows
1410 Mediterranean salt meadows
1330/1410 mosaic
1330/dune mosaic
1330/rocky shore mosaic
other
Calf Island
Bartragh House
Horse Island
Baunmore
Baunrobeg
Saltmarsh
Monitoring Project
Bartragh Island
SMP Code:
SMP0023
Map produced by: SMP 2006
Map Version: 1
Killala Bay/Moy Estuary
cSAC (000436)
0 0.2 0.4 0.6 0.8 Kilometers
Scale: 1:10389
N

Appendix III – Ross site report and habitat map from the SMP (McCorry, 2007)

SITE DETAILS

SMP site name: **Ross**		SMP site code: **SMP0024**
Site name (Curtis list): **Ross**		CMP site code: **130**
		Site No: (Curtis list): **42**
NPWS Site Name: **Killala Bay/Moy Estuary**		Dates of site visit **10/09/2006**
NPWS designation	cSAC: **458**	MPSU Plan: **Draft 2 (old format)**
	pNHA: **458**	
	SPA: **Killala Bay/Moy Estuary SPA 4036**	
County: **Mayo**		Discovery Map: **24** Grid Ref: **121490, 332250**
6 inch Map No: **Ma015, Ma022**		Aerial photos (2000 series): **01120-b, 01060-c, 01060-d**

Annex I habitats currently designated for Kilalla Bay/Moy Estuary *c*SAC:

***Salicornia* and other annuals colonizing mud and sand (1310)**

Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)

Other SMP sites within this cSAC/pNHA: **Bartragh Island, Rusheens, Castleconor**

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

SITE DESCRIPTION

This site is located 0.5-2.5 km north of Killala Town in the north-eastern part of Killala Bay (Co. Mayo). The main part of the saltmarsh is located in a small inlet or bay enclosed by the Ross Peninsula (Rinnaun Point). The bay is 1 km long and 0.4 km wide and saltmarsh extends around the back of the bay. The bay contains intertidal sandflats. The peninsula contains a sand-dune system surveyed by the Coastal Monitoring Project. Saltmarsh extends along the coastline south into several other small inlets, including Pollnageelar, and around Croghan. Most of these inlets were also surveyed. The overall surveyed area is quite large (2.4 km long) and the saltmarsh habitats are spread out over a large area. The southern point of the area surveyed is 0.5 km from Killala Town. Intertidal mud and sandflats occur along the entire coastline in this area. The terrestrial land on the landward side of the saltmarsh is dominated by improved agricultural land. The topography is one of low-lying undulating land.

Three Annex I habitats, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM), are found at this site. Mediterranean salt meadow is not listed as a qualifying interest for Killala Bay/Moy Estuary cSAC.

Nearly the entire saltmarsh habitat is included within the Killala Bay/Moy Estuary cSAC/pNHA. Some saltmarsh habitat along the landward boundaries is excluded as the 6 inch map shoreline boundary was used to draw the boundaries and there are small discrepancies between this map and the shoreline as indicated from the 2000 aerial photos. However, the intention was to include all of the intertidal shoreline and this is due to small errors in rectification. Parts of the shoreline may have also changed somewhat since the 6 inch map was drawn.

The intertidal areas in the Moy Estuary are part of Kilalla Bay/Moy Estuary SPA (Site code 4036). This includes parts of the saltmarsh where the boundaries overlap. The cSAC and SPA are important for wintering waders and wildfowl.

The site is easily accessed by minor roads that are close to the shoreline. Some of the saltmarsh is grazed regularly so care is required not to disturb livestock.

HABITATS

General description

The overall site is dominated by Atlantic salt meadows (ASM) (Table 3.1). This habitat extends along the shoreline of Ross inlet and is between 50-100 m wide on the eastern side. The largest area of saltmarsh is in the northwest corner of the bay. There are three small areas of Mediterranean salt meadows (MSM) in the part of the saltmarsh. A narrow band of ASM continues around the coastline south to Pollnageelar. There is a small inlet at Pollnageelar that widens out and is dominated by MSM.

Atlantic saltmarsh continues south towards Croghan. Here the saltmarsh is dominated by MSM and extends across a small inlet being 0.14 km wide at its widest point to connect to a small island. There are two smaller inlets to the south of this area that contain MSM. There are four small patches of *Salicornia* flats (1310) on the raised sandflats in the Ross inlet.

The landward boundaries of the saltmarsh are varied. There are some natural transitions in places to habitats such as dry or wet grassland. Atlantic saltmarsh grades to dry grassland (with CM2) in the north-east corner of Ross inlet. There are transitions to wet grassland

dominated by Soft Rush (*Juncus effusus*) along the eastern side of Ross Inlet, but many of these are heavily poached. Similar transitions occur on the island to the east of Croghan. The saltmarsh at Pollnageelar has interesting transitions to brackish marsh, wet grassland and improved grassland at the back of the marsh. Patches of Sea Club-rush (*Bolboschoenus maritimus*) and Grey Club-rush (*Schoenoplectus tabernaemontani*) indicate brackish conditions with frequent Soft Rush and Black Bog-rush (*Schoenus nigricans*) indicating the transition to wet grassland. This area also contains Saltmarsh Flat-sedge (*Blysmus rufus*). This species is mainly confined saltmarshes in the north of Ireland but has a fragmented distribution. This was the only site it was recorded at during this survey and is an indicator of local distinctiveness. There are transitions to brackish conditions developing Common Reedbeds (*Phragmites australis*) and patches of Sea Club-rush at the southern end of the surveyed area, just north of Killala Town. There are also transitions to fixed-dune vegetation at Rinnaun Point.

A significant portion of the landward saltmarsh boundary, however, is artificial and there is a distinct boundary marked by fence-lines, stone walls or ditches and hedgerows on a higher bank or low slope onto the terrestrial land. About 75% of the landward saltmarsh boundary (including the narrow band of saltmarsh) is constrained by these artificial barriers and will not be able to respond to sea level rise, so they are likely to be eroded. At present there are no indications of any erosion. In fact accretion is occurring along the seaward side saltmarsh in Ross Inlet. A comparison of the 2000 aerial photos to the 1929 6 inch map indicates that the saltmarsh has grown significantly since 1929 in Ross Inlet (by about 4 ha). (Sand-dune habitats on the peninsula at Rinnaun Point have also grown). The saltmarshes at Pollnageelar and at Croghan have remained fairly stable even though there are relatively high saltmarsh cliffs along the seaward edges of these saltmarsh areas.

Table 3.1. Area of EU Annex I habitats listed at Ross.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	0.25
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	15.82
1410	Mediterranean salt meadows (Juncetalia maritimi)	6.26
	Total	**22.33**

Salicornia and other annuals colonizing mud and sand (H1310)

There are several small isolated patches of Glasswort sp. (*Salicornia* sp.) on raised sand bars on the sandflats of Ross Inlet. None of these are connected to the main saltmarsh. These are small drier raised areas on the sandflats. There were no other plant species recorded but there are some green algae associated with these areas.

Glasswort is also present quite frequently along the lower Atlantic saltmarsh zone amongst vegetation dominated by Common Saltmarsh-grass (*Puccinellia maritima*). However, these pioneer saltmarsh communities are classified as Atlantic salt meadows for this survey.

Atlantic salt meadows (H1330)

The habitat is best developed around the edges of Ross Inlet. Saltmarsh community zonation is evident with a Common Saltmarsh-grass and Glasswort dominated zone at the seaward edge; a lower-mid zone dominated by Sea Pink (*Armeria maritima*) and Sea Plantain (*Plantago maritima*); mid-upper saltmarsh zones dominated by Saltmarsh Rush (*Juncus gerardii*) and Red Fescue (*Festuca rubra*); and a Creeping Bentgrass (*Agrostis stolonifera*) dominated zone at the landward edge. Vegetation dominated by Twitch (*Elytrigia repens*) and also containing species such as Silverweed (*Potentilla anserina*), Curled Dock (*Rumex crispus*) and Spear-leaved Orache (*Atriplex prostrata*) is present along the high water mark. The lower saltmarsh zone with Common Saltmarsh-grass is spreading over the sandflats indicating there is accretion with accretion plains fairly frequent. There are occasional small 'islands' of pioneer saltmarsh vegetation along the seaward edge of the saltmarsh.

Other common species across all of the zones include Sea Milkwort (*Glaux maritima*), Sea Aster (*Aster tripolium*), Sea Arrowgrass (*Triglochin maritima*), Greater Sea-spurrey (*Spergularia media*) and Common Scurvygrass (*Cochlearia officinalis*). Annual Sea-blite (*Suaeda maritima*) and Lax-flowered Sea Lavender (*Limonium humile*) occasionally occur in the lower and pioneer saltmarsh zones. Long-bracted Sedge (*Carex extensa*), Distant Sedge (*Carex distans*) and Autumn Hawkbit (*Leontodon autumnalis*) is present in the upper saltmarsh zones

The north-western corner of Ross Inlet contains the best developed saltmarsh topography with frequent good-sized pan development (1-4 m in length) and one major creek draining the area. The vegetation of this area is dominated by a flat uniform mid Sea Plantain/Sea Pink dominated zone. There is some internal saltmarsh vegetation zonation along the creek with Common Saltmarsh-grass and Glasswort forming narrow bands. Near the clumps of Sea

Rush (*Juncus maritimus*) there are some low-lying mounds containing Red Fescue/Saltmarsh Rush amongst shallower hollows containing the mid zone vegetation dominated by Sea Pink and Sea Plantain. The saltmarsh extends back to a minor road that marks the landward boundary in places.

The best developed saltmarsh vegetation (several communities present) is present in the north-east corner of Ross Inlet where it is ungrazed. The ASM vegetation along the eastern side towards Rinnaun Point is quite badly poached and heavily grazed. There are several enclosures fenced off along this area. The ASM in the northeast corner is also well-developed but there are parts that are moderately-heavily poached. There are small patches of ASM in the Croghan area that are similar to the rest of the site. The micro-topography is less developed as these are small or narrow band areas.

This habitat is also present as a narrow band of saltmarsh 2-5 m wide along several stretches of coastline. The vegetation of these fringes varies but they are commonly dominated by Saltmarsh Rush, with a band of Creeping Bentgrass at the landward side. Occasionally these narrow bands are overhung by overgrown hedgerows and mature trees and the saltmarsh plants are affected by the shade. Some of the saltmarsh has been impacted by tracks along the shoreline and is eroded in places. A low saltmarsh cliff (0.2-0.5 m high) has developed in places along the seaward edge of the saltmarsh. The seaward edge of the saltmarsh usually has a stony zone or cobble/shingle zone on muddy/sandy sediments. The narrow band at the eastern side of the island at Croghan contains abundant Lax-flowered Sea Lavender (*Limonium humile*).

Mediterranean salt meadows (H1410)

This habitat is located in several patches the north-west corner of Ross Inlet and is also the dominant habitat in Pollnageeler Inlet and at Croghan. The patches occurring in the north-west corner of the Ross Inlet are quite typical, being dominated by dense Sea Rush generally with a sward height of 0.4 m. Other common species include Saltmarsh Rush, Red Fescue, Sea Pink, Creeping Bentgrass, Sea Plantain and Sea Milkwort. Sea Aster, Autumn Hawkbit, Greater Sea-spurrey, Sea Arrowgrass, Lax-flowered Sea Lavender, Common Saltmarsh-grass, Spear-leaved Orache and Common Scurvygrass occur only occasionally. There are occasional small patches of mid zone and mid-upper zone ASM vegetation dominated by Sea Pink, and Sea Plantain or Red Fescue amongst the Sea Rush. The MSM habitat generally does not display zonation as it is usually quite uniform. However, the seaward side may have

patches of low-mid ASM vegetation dominated by Sea Pink and Sea Plantain while at the landward side species such as Creeping Bentgrass and Autumn Hawkbit are more common. There are relatively tall saltmarsh cliffs (0.8-1.5 m) at the seaward edge of the MSM at Croghan and Pollnageeler.

Salt pans also occur in this habitat in the north-west corner of Ross Inlet and at Croghan. This habitat is generally not grazed or only grazed lightly. There are patches of localised moderate-heavy poaching by cattle, but these are minor areas. The plant ground cover is generally quite high (0.5-1 m) with only minor amounts of bare ground.

IMPACTS

This site has a wide range of impacts and activities affecting the saltmarsh and this can be related to the fact that the saltmarsh habitats cover a wide area (2.4 km long) (Table 4.1). A significant portion of the saltmarsh is moderately-heavily poached (143), particularly along the eastern side of Ross Bay. Parts of the western side are also badly poached. Pollnageelar saltmarsh is fenced by electric fence but is low-moderately poached. The saltmarsh at Croghan is generally not significantly poached on the western side, with some moderate poaching on the eastern side. The saltmarsh to the south of the main area of saltmarsh at Croghan is badly poached.

There are several paths (infilled with hardcore) (501) across the saltmarsh to allow access to the sandflats for cattle and tractors. Cattle access grazing fields on either side of Ross Bay via the sandflats. (These paths were constructed to reduce poaching on the saltmarsh). There are several other paths or tracks across the saltmarsh that allow access for vehicles onto the sandflats. Wheel ruts were noted on the sandflats at various places and the shoreline is used for access between adjoining fields.

There has been some old infilling (800) along the northern boundary in Ross Bay. This area has been unfilled about 10 years ago (probably after the NHA survey in 1993) and is vegetated by Twitch. A small area of saltmarsh has been reclaimed in the past on the island at Croghan (MPSU plan) (802). This area now contains wet grassland and some brackish transition habitat. A drain has been excavated or cleaned out in the recent past along the minor road at the northern end of Ross Bay. The spoil from this drain has been deposited as a ridge on the saltmarsh. This ridge is vegetated by Twitch with several Hawthorn (*Crataegus monogyna*) plants developing. There has been some old drainage works across the saltmarsh

in Pollnageelar. There are some minor sea protection works (871) around some the buildings situated close to the shoreline and the edge of the saltmarsh.

There is some runoff from a silo (701) situated close to the saltmarsh at Croghan. This is enriching the mud and producing luxuriant saltmarsh vegetation. The saltmarsh is also likely to be affected by potential water pollution (701) from run-off from towns such as Ballina and Killala.

A comparison of the 6 inch map (1929) to the 2000 aerial photos indicates that there has been significant accretion and growth of saltmarsh in the Ross Inlet by 4 ha in this period (910). There are signs of accretion and continuing saltmarsh growth in the inner part of the Ross Inlet with 'accretion ramps' at the seaward edge of the saltmarsh.

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

EU Habitat Code[1]	Activity code[2]	Intensity[3]	Impact[4]	Area affected (ha)	Location of activity[5]
1310	140	C	0	0.25	Inside
1330	140	C	-1	15.82	Inside
1330	143	A	-1	7.00	Inside
1410	143	C	0	6.26	Inside
1330	501	C	-2	< 0.1	Inside
13s	701	C	-1	22.33	Outside
1330	800	C	-2	0.05	Inside
1330	910	B	+1	4	Inside

[1] EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.
[2] Description of activity codes are found in Appendix III summary report.
[3] Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.
[4] Impact is rated as –2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1= natural positive influence and +2 = strongly managed positive influence.
[5] Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

CONSERVATION STATUS

Overall Conservation Status

In general most of the saltmarsh is in fairly good condition (Table 5.1). However, a significant part has been damaged by poaching from cattle. This mainly affects the Atlantic salt meadows. The Mediterranean salt meadows are generally not as badly damaged by poaching as the quality of grazing is poorer. There are no significant impacts on the *Salicornia* flats (1310). There is a MPSU Conservation plan available for this SAC. Localised damage of saltmarsh habitats is noted. No Common Cordgrass (*Spartina anglica*) was recorded on the site.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor-moderate. Most of the landward saltmarsh boundary (75%) is constrained by sloping banks and man-made ditches with hedgerows, stonewalls and fences marking the terrestrial boundaries. These would have to be eroded to allow landward migration of saltmarsh. However, there are few 'hard', seawalls around the site. These only occur around some houses located adjacent to the shoreline and along the Killala-Ballycastle road at the southern end of the surveyed site. About 25% of the landward saltmarsh boundary features transitional brackish, wet grassland and sand-dune habitats that would allow some landward migration of saltmarsh habitat. These mainly occur along the eastern side of the Ross Inlet and in some of the small inlets at Pollnageelar and Croghan.

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

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

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

The area of this habitat was relatively small and scattered in four small patches on sandflats. There is no data on the historical extent of *Salicornia* flats in Killala Bay and patches of Glasswort on sand were not recorded during the NHA survey. Therefore the extent is assessed as *favourable*. The habitat structure and functions are typical of this habitat with sparse Glasswort plants occurring in a single species stand. There were no other species recorded although green algae were associated with the stands. The habitat structure and functions are assessed as *favourable.* All the attributes reached their targets. The future prospects are also assessed as *favourable* as there are no significant impacts on this habitat. The extent of this habitat is also dependant on erosion/accretion cycles in the intertidal area within the Ross Inlet. The habitat may naturally disappear or increase in size as the sand bar

on which it is located moves due to erosion and/or accretion. These cycles may be affected by coastal development along the mainland of pipelines, piers and coastal protection works

Atlantic salt meadows (H1330)

Extent

Overall, the extent of this habitat is assessed as *favourable*. There has been some small loss of habitat due to infilling and tracks across the saltmarsh but the areas are minor (< 0.1% of the total area). Comparison of the 6 inch map (1929) to the 2000 aerial photos indicate that the saltmarsh has grown significantly in this period (by 4 ha). There are signs of accretion and continuing saltmarsh growth in the inner part of the Ross Inlet with 'accretion ramps' at the seaward edge of the saltmarsh.

Habitat structure and functions

Eight monitoring stops were carried out in the ASM and six passed. The two other stops did not reach the target for bare ground cover (< 10%) and were significantly affected by heavy poaching. The two failed stops reflect about 28% of the total ASM area. Therefore the overall structure and functions of this habitat is assessed as *unfavourable-bad*.

The undamaged areas do have adequate habitat structure and functions. Species diversity is typical of this habitat and there are several indicators of local distinctiveness such as Lax-flowered Sea Lavender and Saltmarsh Flat-sedge. Zonation is evident with the typical low/mid and upper saltmarsh plant communities present. The largest areas of saltmarsh in the north-west corner of the Ross Inlet contain well-developed salt pans and show some internal zonation along the large creeks. There are some natural transitional habitats to wet and dry grassland, and fixed dune along the Ross Peninsula.

Future prospects

The future prospects of the main area of saltmarsh are assessed as *unfavourable-inadequate* in the short term, assuming the current grazing regime is continued and cattle poaching persists over a significant area of the ASM.

Mediterranean salt meadows (H1410)

Extent

Overall, the extent of this habitat is assessed as *favourable*. There are no indications of any loss of habitat due to infilling, tracks or recent land reclamation. Some land reclamation has been carried out in a small inlet in Croghan that probably contained this habitat. The

entrance to the inlet has been partially closed with a stone embankment (NHA survey notes 1993). This area now contains mainly brackish and wet grassland habitats. However, this reclamation predates the NHA survey so the loss of habitat is not considered for this conservation assessment. Natural erosion/accretion cycles have not had a significant impact on the MSM. The seaward side of the MSM at Pollnageelar and Croghan has remained fairly stable when comparing the 6 inch map (1929) to the 2000 aerial photos.

Habitat structure and functions

Six monitoring stops were carried out in the MSM and they all passed. Species diversity was typical of this habitat. Sward height and plant ground cover reached their targets. Only small areas of this habitat at Croghan and Pollnageelar were moderately-heavily poached by cattle. Grazing is actually absent or at a low level but this is typical of Rush-dominated vegetation, which shields the other vegetation somewhat. There were some natural transitions from this habitat to wet grassland and brackish habitats at Pollnageelar and on the island at Croghan. There were no other negative indicators present.

Future prospects

The future prospects of the main area of saltmarsh are assessed as *favourable* in the short term, assuming the current grazing levels are not increased significantly.

MANAGEMENT RECOMMENDATIONS

The main impact on the site is cattle grazing. The conservation status of this site could be improved by reducing or preventing cattle-grazing, particularly on the eastern side of the Ross Inlet. Some reduction of cattle grazing would improve the status of the transitional habitats at Pollnageelar, although these occur close to or outside the SAC boundary.

Many of the damaged areas on the Ross Peninsula and at Pollnageelar have the potential to recover quickly if the poaching pressure is reduced.

Saltmarsh Monitoring Project

Ross

SMP Code: SMP0024

Map produced by: SMP 2006

Map Version: 1

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government. (Permit number 8953)

Killala Bay/Moy Estuary cSAC (000436)

0 0.08 0.16 0.24 0.32 0.4 0.48 Kilometers

Scale: 1:7757

N

Appendix IV – Rusheens site report and habitat map from the SMP (McCorry, 2007)

SITE DETAILS

SMP site name: **Rusheens**	SMP site code: **SMP00025**
Site name (Curtis list): **Rusheens**	CMP site code: **not surveyed**
	Site No: (Curtis list): **40**
NPWS Site Name: **Kilalla Bay/Moy Estuary**	Dates of site visit: **12/09/2006**
NPWS designation cSAC: **458**	MPSU Plan: **Draft 2 (old format)**
pNHA: **458**	
SPA: **Kilalla Bay/Moy Estuary SPA 4036**	
County: **Mayo**	Discovery Map: **24** Grid Ref: **123920, 327520**
6 inch Map No: **Ma022**	Aerial photos (2000 series): **01120-d, 01121-c, 01181-b, 01182-a**

Annex I habitats currently designated for Kilalla Bay/Moy Estuary *c*SAC:

***Salicornia* and other annuals colonizing mud and sand (1310)**

Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)

Other SMP sites within this cSAC/pNHA: **Ross, Bartragh Island, Castleconor**

Saltmarsh type: **Sandflats** Substrate type: **Sand**

SITE DESCRIPTION

Rusheens saltmarsh is located on the western side of Killala Bay near the mouth of the Moy River in Co. Mayo. The site is 4 km south-east of Killala Town. The main area of saltmarsh occurs in a small enclosed bay with agricultural grassland and scrub sloping down the saltmarsh. A narrow band of saltmarsh continues along the shoreline to the north and south of the main area. Saltmarsh continues beyond the surveyed area. The site can be accessed via minor roads to the shoreline at the north of the site (Bullockpark)

Two Annex I habitats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM), are found at this site. Mediterranean salt meadow is not listed as a qualifying interest for Killala Bay/Moy Estuary cSAC. Most of the site is located within the Kilalla Bay/Moy Estuary SAC with the cSAC boundaries corresponding more closely with the actual shoreline, as indicated from the 2000 aerial photos. The main saltmarsh area at Rusheens is outside the Kilalla Bay/Moy Estuary SPA boundary (Site code 4036) that includes much of the adjacent intertidal mudflats. Parts of the saltmarsh along the shoreline outside Rusheens Bay are included within the SPA. The cSAC and SPA are important for wintering waders and wildfowl.

HABITATS

General description

The main area of saltmarsh at Rusheens is Mediterranean salt meadow (MSM) dominated by Sea Rush (*Juncus maritimus*) and is about 150 m wide and 150-200 m long (Table 3.1). Atlantic salt meadow (ASM) develops at the seaward edge and continues as a narrow band along the shoreline to the south and north of the main area. It should be noted that this narrow band of saltmarsh continues outside the survey site along the shoreline (Table 3.1). There are some additional small patches of Sea Rush along to the north of the main area. Two drains/streams flow into the main area of saltmarsh and continue along channelized drains/creeks to the intertidal area. There is a saltmarsh cliff at the seaward boundary of the main saltmarsh area. Intertidal soft mudflats occur to the seaward side of the main saltmarsh. The saltmarsh is present on a narrow band of mud that overlays a stony layer. This rocky shoreline/cobble beach is exposed at the seaward edge of the saltmarsh and then transitions to mud and sandflats.

The main saltmarsh transitions to wet grassland at the back of the saltmarsh and to dry grassland along the sides. Hedgerows, scrub and fenceline on a bank or slope mark the landward boundary at the back of the saltmarsh that follows the shoreline. There are occasional small seawalls along the shoreline at the back of the saltmarsh.

Table 3.1. Area of EU Annex I habitats listed at Rusheens.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1.24
1410	Mediterranean salt meadows (Juncetalia maritimi)	2.46
	Total	**3.7**

*note that saltmarsh habitat continues outside the surveyed site.

Atlantic salt meadows (H1330)

This habitat occurs along the seaward edge of the main saltmarsh in a narrow band on a thick layer of mud/sand substrate, with a saltmarsh cliff down onto the mudflats. It also occurs along the shoreline, as a narrow band of saltmarsh. The species diversity on the main saltmarsh is typical of this habitat being dominated by Red Fescue (*Festuca rubra*) and also containing other species such as Creeping Bentgrass (*Agrostis stolonifera*), Common Scurvygrass (*Cochlearia officinalis*), Sea Milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Sea Arrowgrass (*Triglochin maritima*), Autumn Hawkbit (*Leontodon autumnalis*) and Sea Rush.

The saltmarsh (5-10 m wide) along the northern and southern shorelines is quite typical and is dominated by bands of Common Saltmarsh-grass (*Puccinellia maritima*) and Saltmarsh Rush (*Juncus gerardii*). Other common species include Sea Pink (*Armeria maritima*), Sea Aster (*Aster tripolium*), Greater Sea-spurrey (*Spergularia media*) and Sea Plantain. The creek and pan structure is poorly developed, as the saltmarsh is so narrow. The saltmarsh to the north of the main area is notable for having abundant Flax-flowered Sea Lavender (*Limonium humile*).

Mediterranean salt meadows (H1410)

This habitat dominates the main saltmarsh area and also occurs in small patches to the north. The vegetation is dominated by Sea Rush with frequent Creeping Bentgrass, Red Fescue, Saltmarsh Rush, Sea Plantain and occasional Sea Arrowgrass, Autumn Hawkbit and Sea Milkwort. Common Reeds (*Phragmites australis*) are expanding from a Reedbed along the southern side into the saltmarsh and along some drains/creeks. Sea Club-rush (*Bolboschoenus maritimus*) occurs in small patches towards the northern side of the main area. The sward height reaches 1 m in places but is generally around 20 cm high. This area is heavily poached with small amounts of bare ground (2-5%). There are several creeks/drains through the saltmarsh that have been canalised or straightened. There are several other straight drains indicated from the aerial photo that may indicate that there were attempts to reclaim or improve this area in the past. Natural creeks and some large pans are still present.

The presence of Reeds and Sea Club-rush on the saltmarsh along with other plant indicators indicate that the main saltmarsh area is mainly upper saltmarsh and is therefore flooded less frequently. There are probably freshwater influences along the edges and along the main canalised creek that are influencing the spread of Reeds.

IMPACTS

The main saltmarsh area has been drained in the past (810) and the two main drains/creeks have been canalised in the past (pre-dating 1929). Drains crisscross this area and are visible on the aerial photo, though may have been infilled. This area of saltmarsh may have been the subject of old land improvement. The main area of saltmarsh is fenced off with an electric fence but was heavily poached by cattle (143). This is the main activity on the site (Table 4.1). The level of grazing was moderate. The saltmarsh was not grazed significantly.

Erosion is not significant as the current saltmarsh cliff corresponds to the 6 inch map (1929 position), even though there is a relatively high saltmarsh cliff.

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

EU Habitat Code[1]	Activity code[2]	Intensity[3]	Impact[4]	Area affected (ha)	Location of activity[5]
1410	143	A	-1	1.90	Inside

[1] EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.
[2] Description of activity codes are found in Appendix III summary report.
[3] Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.
[4] Impact is rated as –2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1= natural positive influence and +2 = strongly managed positive influence.
[5] Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

CONSERVATION STATUS

Overall Conservation Status

There is no historical information about the saltmarsh on this site. The site was not surveyed in detail during the NHA boundary survey (1993). Overall, the main area of saltmarsh at Rusheens has a poor conservation status at present, being heavily poached by cattle (Table 5.1). Old drainage is still probably having a residual effect on the marsh and has probably influenced the spread of Common Reeds on the marsh. The narrow band of saltmarsh that extends from the main area along the shoreline is in better condition and is typical of this type of marsh.

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

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

The main area of saltmarsh can respond to sea level rise due to climate change as there is a small area of transition habitat and wet grassland at the back of the saltmarsh. However, there is limited scope for the natural movement of saltmarsh habitats due to the topographical situation, as the saltmarsh is enclosed by elevated land. No Common Cordgrass (*Spartina anglica*) was recorded on the site.

Mediterranean salt meadows (H1410)

Extent

The extent is assessed as *favourable* as there has been no loss of habitat to erosion. There has been some transition of saltmarsh habitat to brackish/freshwater habitat along the southern drain, although the area is still quite minor.

Habitat structure and functions

One monitoring stop was carried out in this habitat at a location that was typical of the whole area. The site was too small to do four monitoring stops. The structure and functions is assessed as *unfavourable-bad* due to the high level of poaching by cattle. This was the only target that failed. Grazing is actually at a low-moderate level but this is typical of Rush-dominated vegetation, which shields the other vegetation somewhat. However, stocking cattle on these areas usually creates a high level of poaching. The small patches of this habitat along the saltmarsh north of the main area are not affected by poaching so their structure and function is assessed as *favourable*.

The species diversity and sward height were both typical of this habitat. Zonation was not evident on the main area of saltmarsh as it was quite uniform, but there were transitional wet grassland and brackish Reedbed habitats present, which increase the overall diversity of the site.

Future prospects

The future prospects of the main area of saltmarsh are assessed as *unfavourable-bad* in the short term, assuming the current grazing regime is continued and poaching is continued.

Atlantic salt meadows (H1330)

Extent

The extent of this habitat is assessed overall as *favourable* as there has been no loss of habitat in the main area to erosion.

Habitat structure and functions

Overall, the structure and functions of this habitat is assessed as *favourable*. This is because the area of habitat affected by poaching is minor compared to the area of the Atlantic salt meadow extending along the shoreline. One monitoring stop was carried out in the main saltmarsh area but this failed as the target for poaching was not reached. The narrow band of ASM that continues along the shoreline reached all the targets from a visual assessment.

Future prospects

The future prospects of the main area of saltmarsh are assessed as *favourable* as the main impact on the site, grazing, is not affecting a significant part of the narrow saltmarsh along the shoreline.

MANAGEMENT RECOMMENDATIONS

The main impact on the site is cattle grazing. The conservation status of this site could be improved by reducing or preventing cattle-grazing on this site.

Saltmarsh Monitoring Project

Rusheens

SMP Code: SMP0025

Map produced by: SMP 2006

Map Version: 1

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government. (Permit number 5953)

Killala Bay/Moy Estuary cSAC (000436)

0 90 180 270 360 Meters

Scale: 1:4546

N

Appendix V – Castleconor site report and habitat map from the SMP (McCorry, 2007)

SITE DETAILS

SMP site name: **Castleconor**	SMP site code: **SMP0026**
Site name (Curtis list): **Castleconor**	CMP site code: **not surveyed**
	Site No: (Curtis list): **39**
NPWS Site Name: **Kilalla Bay/Moy Estuary**	Dates of site visit: **12/09/2006**
NPWS designation cSAC: **458**	MPSU Plan: **Draft 2 (old format)**
pNHA: **458**	
SPA: **Kilalla Bay/Moy Estuary SPA 4036**	
County: **Sligo**	Discovery Map: **24** Grid Ref: **126020, 324320**
6 inch Map No: **Ma022, Si022**	Aerial photos (2000 series): **01248-a, 01248-b**

Annex I habitats currently designated for Kilalla Bay/Moy Estuary *c*SAC:

Salicornia and other annuals colonizing mud and sand (1310)
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)

Other SMP sites within this cSAC/pNHA: **Ross, Rusheens, Bartragh Island**

Saltmarsh type: **Bay/Fringe** Substrate type: **Sand/Gravel**

SITE DESCRIPTION

Castleconor saltmarsh is located on the eastern side of the Moy River Estuary on the Sligo/Mayo border. It is a relatively small site. The surveyed area included two small coves/bays connected by a narrow band of saltmarsh, at Castleconor and at Killanly Rectory. A narrow band of saltmarsh continues to the north and south of this site along the shoreline.

One Annex I habitat, Atlantic salt meadows (ASM), is found at this site. This habitat is listed as a qualifying interest for Killala Bay/Moy Estuary cSAC. Most of the saltmarsh habitat is included within the Kilalla Bay/Moy Estuary cSAC/pNHA. Parts of the habitat are outside the cSAC boundaries due to the use of the old 6 inch maps to draw boundaries, and there are small errors in rectification between the 6 inch maps and the 2000 aerial photos. The intertidal areas in the Moy Estuary are part of Kilalla Bay/Moy Estuary SPA (Site code 4036). This includes parts of the saltmarsh where the boundaries overlap. The cSAC and SPA are important for wintering waders and wildfowl.

HABITATS

General description

Curtis and Sheehy-Skeffington (1998) classified this site as a bay type saltmarsh. However, most of the saltmarsh along the shoreline is found in a narrow band (10-20 m wide). There is some widening of the saltmarsh in Castleconor Bay with up to 50 m between the seaward and the landward edge at the widest part and this is a typical bay-type saltmarsh. However, this is still a relatively small saltmarsh (Table 3.1). Small streams enter both the bays. The saltmarsh occurs adjacent to improved agricultural grassland with a hedgerow/rocky ditch/fence line marking the beginning of the terrestrial land along the bank.

Table 3.1. Area of EU Annex I habitats listed at Castleconor.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1.67*
	Total	**1.67**

*note that saltmarsh habitat continues outside the surveyed site.

1. Atlantic salt meadows (H1330)

This is the only Annex I saltmarsh habitat recorded along this part of the shoreline. The vegetation is typically dominated by Common Saltmarsh-grass (*Puccinellia maritima*) with frequent Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Sea Arrowgrass (*Triglochin maritima*), Greater Sea-spurrey (*Spergularia media*), Sea Pink (*Armeria maritima*), Red Fescue (*Festuca rubra*), and Sea Plantain (*Plantago maritima*). Occasional species include Flax-flowered Sea Lavender (*Limonium humile*) and Common Scurvygrass (*Cochlearia officinalis*). There is some zonation of vegetation. A zone dominated by Saltmarsh Rush (*Juncus gerardii*) occurs at the landward side of the other vegetation in places but this may also continue to the seaward edge. Finally, Creeping Bentgrass (*Agrostis stolonifera*) and Twitch (*Elytriga repens*) occurs along the upper saltmarsh boundary. A line of tidal litter marks the upper boundary from the high spring tides.

Much of the lower seaward edge of the saltmarsh is rocky in places and a low saltmarsh cliff is present. The creek and pan structure is generally poor as the saltmarsh is relatively narrow. No Sea Rush (*Juncus maritimus*) was recorded along this part of the shoreline. Occasionally

hedgerow, scrub and mature trees overhang the saltmarsh. The back of the northern cove/bay contains brackish/freshwater marsh.

2. IMPACTS

Overall, the level of grazing is low with no grazing on most of the site (140) (Table 4.1). Part of the northern cove/bay may be grazed at times as it was badly poached by cattle (143). Some rubble was dumped on saltmarsh (422) at the landward side of the southern bay at Castleconor (probably outside the cSAC boundary). This may be used for construction foundations.

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

EU Habitat Code[1]	Activity code[2]	Intensity[3]	Impact[4]	Area affected (ha)	Location of activity[5]
1330	140	C	0	1.67	Inside
1330	143	A	-1	< 0.01	Inside
1330	422	A	-2	< 0.01	Inside

[1] EU codes as per Interpretation Manual.
[2] Description of activity codes are found in Appendix III summary report.
[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.

3. CONSERVATION STATUS

4. Atlantic salt meadows (H1330)

There is no historical information about the saltmarsh habitat at this site. The extent is not likely to have changed significantly in the recent past. A small area of saltmarsh has been lost, as rubble has been dumped on it. However, this is < 1% of the total saltmarsh area so the overall extent is assessed as *favourable* (Table 5.1).

The habitat structure and functions is assessed overall as *favourable* (Table 5.1). One monitoring stop was recorded in an area that was representative of the whole site. The species diversity is typical of this type of saltmarsh with most of the typical species present. The creek and pan structure is poor but this is to be expected on a relatively narrow saltmarsh. The absence of grazing on most of the site means that sward structure is varied and the plant ground cover is okay. Overall there were no major negative indicators. A small area of saltmarsh was badly poached and would fail the targets for Atlantic saltmarsh but this is a minor area (< 1% of the site area).

The future prospects of this site are assessed as *favourable*. Small parts of the saltmarsh are excluded from the cSAC and are therefore more vulnerable to dumping, development etc. Some redrawing to the cSAC boundaries is required to reflect changes in the shoreline and discrepancies between the 6 inch map and the 2000 aerial photos.

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

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

Saltmarsh Monitoring Project

Castleconnor

SMP Code: SMP0026

Map produced by: SMP 2006

Map Version: 1

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government. (Permit number 8953)

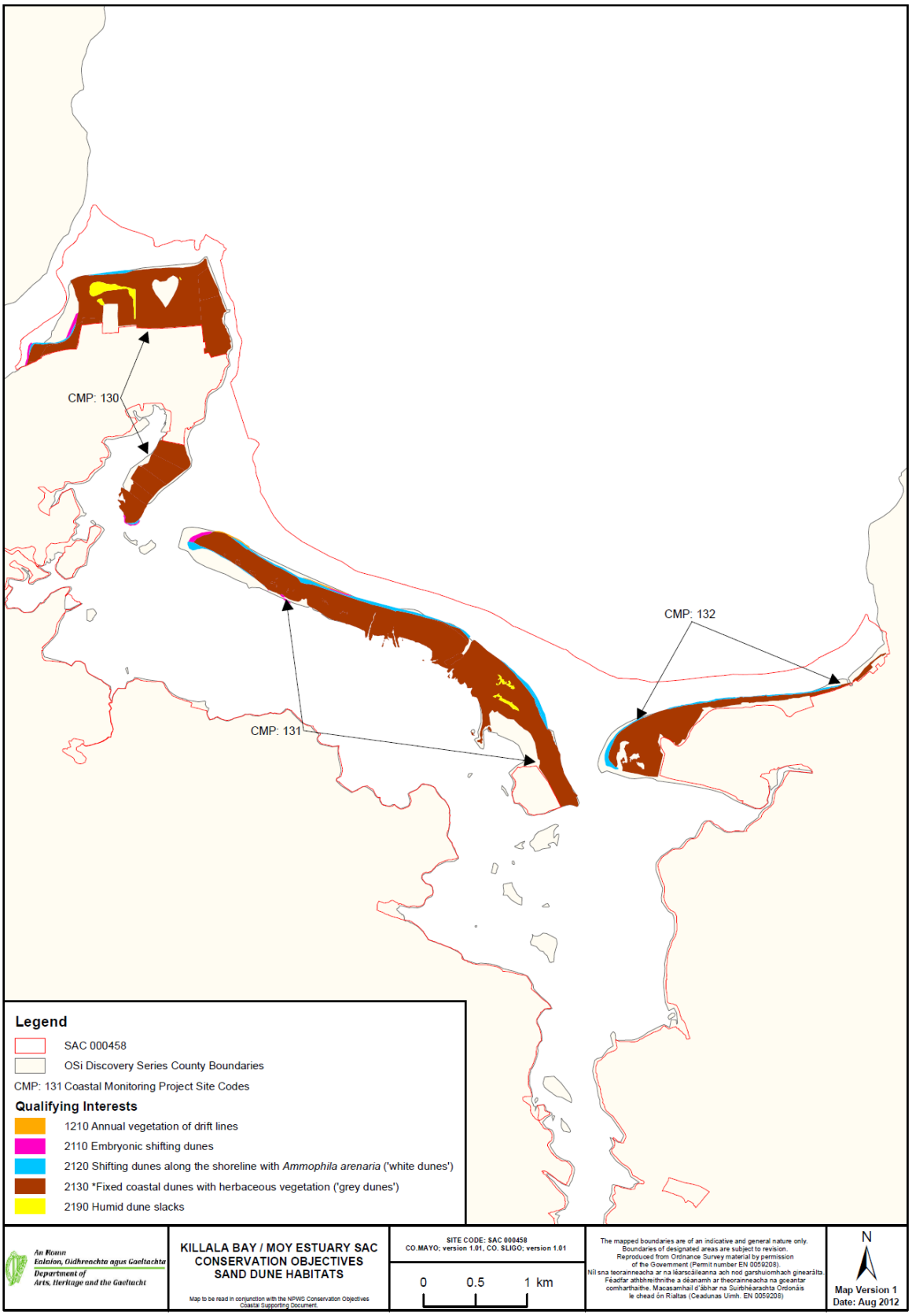
Killala Bay/Moy Estuary cSAC (000436)

0 90 180 270 Meters

Scale: 1:3359

N

Appendix VI – Distribution map of sand dune habitats within Killala Bay/Moy Estuary SAC



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

SITE DETAILS

CMP06 site name: **Ross** CMP06 site code: **130** CMP Map No.: **127**

County: **Mayo** Discovery map: **24** Grid Reference: **G 215 334**

6 inch Map No.: **Ma 15**

Aerial photographs (2000 series): **O1001-D; O1060, B, C, D; O1120-A**

NPWS Site Name: **Killala Bay / Moy Estuary**

NPWS designation: pNHA: **458** cSAC: **458** SPA: **4036**

Blue Flag Beach: **Killala**

Ranger Area: **Mayo**

MPSU Plan: **Draft 2: Consultation**

Report Author: **Kieran Connolly**

SITE DESCRIPTION

Ross sand dunes are on the western shore of Killala Bay in North Mayo. For the purposes of the present survey, the site includes a number of separate sand dune areas, the largest of which is that at Ross Point, approximately 4km north of Killala town, on the eastern side of Rathfran Bay – a small inlet in Killala Bay. The dunes here extend across approximately 1.2 km of north-facing coastline and cover 84.55ha (Table 130A), or 77%, of the total mapped sand dune area, and account for most of the conservation interest at the site

A smaller sand dune area to the south at Rinnaun Point, comprising only 25.179ha of sand dune habitats (Table 130A), is separated from the Ross Point dunes by approximately 1km of rocky shore, clay cliffs and agricultural land. It is treated in the present report and project database as a sub-site, due to its isolation from the main dune area and is referred to as 'Rinnaun Point' dunes.

A further small area (Grid reference G 215 329) to the east of Killala town was formerly known as a sand dune area, and is identified as such on the site 6'' map. It was not visited during the present survey, due to its omission from some previous habitat maps, and the

consequent failure to identify it here as a potential site of interest prior to the site visit. Notes included in the site NHA survey file indicate that the area has undergone considerable agricultural improvement and is no longer likely to be of any conservation value. It has been included on the site digital map as an area of agricultural improvement, measuring just over 6ha in area. The rare *Draba incana* (Hoary whitlowgrass) was formerly known from this area but is unlikely to have survived the negative affects of agricultural improvement. Future monitoring of Ross sand dunes should include a survey of this area to confirm its conservation status.

The dunes at Ross Point are dominated by a large expanse of fixed dunes – a priority Annex I habitat – while a significant area of dune slacks are also found within the dune grassland. Small areas of embryonic dunes and mobile dunes of restricted distribution are found at the seaward edge of the dunes (Table 130A).

Table 130A Areas of EU Annex I habitats mapped at Ross

EU Code	EU Habitat	Area (ha)
Ross Point Dunes		
H2110	Embryonic shifting dunes	0.662
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	1.435
H2130	Fixed coastal dunes with herbaceous vegetation	78.586
H2190	Humid Dune Slacks	3.867
	Total Sand dune	**84.55**
Rinnaun Point Dunes		
H2110	Embryonic shifting dunes	0.145
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	0.146
H2130	Fixed coastal dunes with herbaceous vegetation	24.888
	Total Sand dune	**25.179**

A thin band of tall dune ridges runs along northern (seaward) edge of the dunes at Ross Point. Much of the area to the landward side of these ridges is quite flat, possibly due to large-scale earthmoving operations, although there are isolated tall dunes throughout the site. Fixed dunes form the boundary along much of the northern edge, with foredune development restricted to the western side of the dunes. Foredune development is absent along the eastern boundary, as the dunes here have formed over tall clay cliffs and a rocky shoreline.

The dunes are fenced perpendicularly to the strand into a number of quite large fields, the boundaries of which are quite distinct on the site aerial photographs. Cattle and sheep graze the dunes, although substantial areas of undergrazed, rather rank grassland were noted.

Supplementary feeding of stock has caused localised damage in a few areas, through the spread of nitrophilous weed species and poaching or erosion of the soil. Agricultural improvement in the form of reseeding of swards and fertiliser application has also affected the grassland over substantial areas. However, large areas of intact, species-rich grassland remain, and much of the fixed dune habitat is well conserved.

The cSAC boundary line also serves quite well as the boundary of sand dune habitats, although some sandy ground extending beyond the boundary in the southwest corner of the dunes was mapped. In places along the southern boundary, sand dune habitats did not extend to the cSAC boundary. As a result, some small areas of the improved agricultural land that borders the dunes is mapped within the cSAC boundary. A number of separate areas within the cSAC boundary have been mapped in some previous reports as agricultural grassland, although in the present survey, most of these were not considered to have been so severely damaged as to warrant exclusion from the mapped area of dune habitats. However, one such area in the south-western part of the site, which is sufficiently damaged and intensively managed as to be no longer part of the functional dune system, has been mapped as agricultural land here. Sand cover is somewhat intermittent in the extreme southeast corner of the mapped fixed dune area, although there are at least pockets of sand throughout.

The Rinnaun Point dunes – formed on a spit or peninsula of approximately 1km in length - are divided laterally into a number of fields (the boundaries of which are indicated on the site digital map) and are quite badly damaged by the affects of intensive stock rearing activities. The dunes here are fringed on the western side by saltmarsh vegetation, and are bordered on the landward (northern) side by improved agricultural land. Foredune habitats are absent, except for a small stretch of both embryonic dunes and mobile dunes at the southern tip. The south tip of the spit is approximately only 500m from the western end of Bartragh Island (site 131 in the present report), which lies across the mouth of the inner Killala Bay.

The sand dunes at Ross are within the Killala Bay/Moy Estuary cSAC (458), a large site comprising the inner part of Killala Bay, including the estuary of the Moy River. In addition to sand dunes, the main habitats of the site are estuaries and intertidal mudflats. The cSAC was selected due to the presence of fixed dunes; and the maintenance of their present extent and quality is among the major management objectives for the site. Killala Bay/Moy Estuary

SPA, which incorporates much of the same area as the cSAC, was designated due to the internationally important numbers of overwintering Brent Geese that use the site.

Also within the cSAC are the sand dune systems at Bartragh Island and Inishcrone (sites 131 and 132, respectively, in the present report), both of which lie to the east of Ross in Killala Bay. The dunes at Bartragh Island are among the most impressive in the country, due particularly to their size, naturalness and undisturbed nature, while those at Inishcrone retain considerable interest, despite the presence of a golf course over a large proportion of the natural dune area. Lackan sand dunes (site 129 in the present report) in the north-west corner of Killala Bay, are approximately only 5km to the northwest of Ross dunes, although they are in the Lackan Saltmarsh and Kilcummin Head cSAC (516).

There is generally less information on Ross dunes than those of Bartragh Island and Enniscrone in the site NHA survey, as Ross was only added to the Killala Bay/Moy Estuary Complex during that survey, and consequently was not separately assessed then. In the site management (MPSU) plan, Ross is considered to be of only local importance, whereas Bartragh Island and Inishcrone are thought to be of national and regional importance respectively. The previous omission of Ross dunes from the designated area has resulted in a lack of information on previous agricultural management practices such as stocking rates, which could have proved useful to the current survey.

In addition to the typical flora found at the site, the dunes provide important habitat for many other species. Among those seen during the site visit were hares, skylarks and nesting ringed plover. The adjacent mud and sand flats provide an overwintering feeding site for many birds, including internationally important numbers of Brent Geese, and nationally important numbers of several other species, while otters and badgers are also known to inhabit the cSAC.

Ross point dunes may be easily accessed via a track that extends into the dune area near the centre of the site, or alternatively, along a track that leads to the western side of the site. Both access tracks are shown in the ‘Access’ theme on the site digital map. Rinnaun Point dunes are also easily accessed and a large tarmacadam car park at the northern end of the dunes provides for ample parking.

Fixed Dunes (H2130)

Ross Point

The fixed dunes at Ross Point are divided perpendicularly to the shoreline into a number of large fields. Cattle and sheep were the main grazers at the time of the site visit, while lesser numbers of horses grazed some of the eastern end of the site. Large areas of the dune grassland consist of species-rich short turf – several monitoring stops had 15 or more species – while other areas are undergrazed or of reduced conservation value due to the negative impacts of agricultural improvement, such as fertiliser application and the reseeding of swards with coarse grasses.

Foredune development is limited at the site and fixed dunes form the sand dune boundary along much of the edge of the site. Along the northern edge of the dunes, there is some erosion and slumping of fixed dune vegetation and in places erosion has created a very steep front face along the edge of the dunes.

The more common species noted in fixed dunes included *Anacamptis pyramidalis* (Pyramidal orchid), *Cerastium fontanum* (Common mouse-ear), *Crepis capillaris* (Smooth hawk's-beard), *Euphrasia officinalis* agg. (Eyebright), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Luzula campestris* (Field wood-rush), *Odontites vernus* (Red Bartsia), *Plantago lanceolata* (Ribwort plantain), *Polygala vulgaris* (Common milkwort), *Rhinanthus minor* (Yellow-rattle) and *Veronica chamaedrys* (Germander speedwell).

Also noted was *Orchis apifera* (Bee orchid): seven plants were seen in a location marked as a 'miscellaneous' point on the site digital map. Common twayblade, *Listera ovata*, was regularly noted in the tall dunes.

In the less intensively grazed areas, *Ammophila* arenaria (Marram) generally formed a significant component of the grassland vegetation.

Among the most commonly noted moss species were *Homalothecium lutescens*, *Rhytidiadelphus squarrosus*, *R. triquetrus* and *Scleropodium purum*, while *Peltigera* spp. lichens were also common in places.

There were some scattered shrubs and stunted trees of *Acer pseudoplatanus* (Sycamore), *Crataegus monogyna* (Hawthorn) and *Sambucus nigra* (Elder) in the fixed dunes but their total combined cover was not significant. Small clumps of *Rubus fruticosus* (Bramble) were scattered through some areas. There was a stand of *Salix* sp. (Willow) near the edge of a large dune slack in the western end of the site. A small clump of *Ribes nigrum* (Blackcurrant) bushes was also noted.

A large lake in the eastern half of the dunes was created, according to information in the site NHA survey notes attributed to the local conservation ranger at the time, after plans to construct an oil rig at Ross (for which excavations began in the early 1970's) were abandoned. The lake is present in aerial photographs taken in 1974, and then, as now, the adjacent fields appear considerable brighter in aerial photographic images than the other fields. It seems likely that a large area of the dunes was restructured and probably levelled by large-scale earth moving operations.

The creation of the lake would have resulted in the destruction of a large area of fixed dune habitat, although the lake does add other interest to the site in the form of aquatic and lakeshore species. It was previously known to support Snow Bunting populations in the winter.

The area occupied by the lake on the site digital map that accompanies this report, includes not only the lake, but a strip along the northern edge that supports lakeshore/wet grassland species such as *Caltha palustris* (Marsh-marigold), *Eleocharis* sp. (Spike-rush), *Galium palustre* (Common marsh-bedstraw), *Hippuris vulgaris* (Mare's-tail), *Iris pseudacorus* (Yellow Iris), *Mentha aquatica* (Water mint) and *Myosotis scorpioides* (water forget-me-not).

An area described as 'fenced off and used as a football pitch' in the site NHA survey notes was apparently no longer used as such – the area was unfenced and there were no longer any goalposts present during the site visit.

Rinnaun Point

The fixed dunes at Rinnaun Point are largely characterised by the negative impacts of intensive stock rearing practices and are consequently of limited conservation interest. Much of the dune grassland, which has been fenced laterally into a number of fields, has undergone

agricultural improvement through reseeding and presumably, artificial fertiliser application. Much of the area is dominated by agricultural grasses such as *Lolium perenne* (Perennial rye-grass).

There are also a number of livestock feeding stations, where the concentration of animals around feeders and the scattering of nutrient-rich feed remnants have created the weedy conditions typically associated with supplementary feeding. Feeding of livestock also facilitates high stocking densities which generally leads to further deterioration in the habitat quality. Over 30 cattle were present in one of the fields during the site visit. Particularly common around the feeders, and elsewhere in the grassland, was *Cirsium arvense* (Creeping thistle). Also common in the abundant weedy areas were *Senecio jacobaea* (Common ragwort) and *Heracleum sphondylium* (Hogweed).

A small proportion of species-rich short turf remains in the northeastern corner of the dunes, with several typical species present, including *Carex arenaria* (Sand sedge), *Cerastium fontanum* (Common mouse-ear), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Luzula campestris* (Field wood-rush), *Plantago lanceolata* (Ribwort plantain), *Rhinanthus minor* (Yellow-rattle) and *Veronica chamaedrys* (Germander speedwell).

The more commonly occurring moss species in the fixed dunes included *Calliergonella cuspidata*, *Rhytidiadelphus squarrosus* and *Scleropodium purum*. There were occasional *Crataegus monogyna* (Hawthorn) shrubs in the grassland, but their combined cover over the whole site was not significant.

The dunes are eroding along the eastern side; in places there is a sheer face up to 4m high, with fixed dune vegetation to the edge of the current habitat boundary. There is no foredune development here, although a generally high cover of *Ammophila arenaria* (Marram) is stabilising the vegetation at the edge.

Despite the generally poor condition of the fixed dunes, there are a number of interesting features, including a transition to saltmarsh vegetation along the western side. Among the saltmarsh species noted in the fixed dune/saltmarsh transition zone were *Armeria maritima* (Thrift), *Glaux maritima* (Sea-milkwort), *Juncus articulatus* (Jointed rush), *Juncus maritimus* (Sea rush), *Plantago coronopus* (Buck's-horn plantain) and *Plantago maritima* (Sea

plantain). The saltmarsh vegetation fringes a small estuary with sand and mudflats to the west of the sand hills.

A wet grassland patch adjacent to the saltmarsh/fixed dune transition that appeared to be fed with freshwater from a drain or stream channel had a number of typical wet grassland species such as *Carex flacca* (Glaucous sedge), *Dactylorhiza* sp., *Hydrocotyle vulgaris* (Marsh pennywort), *Iris pseudacorus* (Yellow Iris), *Lychnis flos-cuculi* (Ragged-robin), *Potentilla anserina* (Silverweed), *Prunella vulgaris* (Selfheal) and *Samolus valerandi* (Brookweed).

Dune Slacks (H2190)

Ross Point

A sizeable area of slacks, most of which was accounted for by a single slack of over 3.5ha in the western side of the site, was mapped in the Ross Point dunes. The precise alignment of the long eastern edge of this slack with a field boundary suggests that the presence and area of slacks may have been influenced by large scale earth movements at some stage, perhaps at the same time as the creation of the lake and levelling of dune ridges. The field to the east of the slack boundary is consistently over 1m above the level of the slack, suggesting a general rise in level due to the destruction of dune ridges and dispersal of sand throughout the field. The large slack contains both wet and dry areas and among the common species noted were *Calliergonella cuspidata*, *Cardamine pratensis* (Cuckooflower), *Carex arenaria* (Sand sedge), *C. flacca* (Glaucous sedge), *C. nigra* (Common sedge), *Cirsium dissectum* (Meadow thistle), *Dactylorhiza* sp. (Orchid sp.), *Filipendula ulmaria* (Meadowsweet), *Hydrocotyle vulgaris* (Marsh pennywort), *Potentilla anserina* (Silverweed), *Rhinanthus minor* (Yellow-rattle) and *Salix repens* (Creeping willow).

There were no dune slacks at the Rinnaun Point sub-site.

Mobile Dunes (H2120)

Ross Point

Mobile dunes at Ross Point consisted of two separate bands of habitat; one on the west side of the north-facing strand, and the other in the southwestern corner of the dunes, on the east side of Rathfran Bay. Characterised by the presence of *Ammophila arenaria* (Marram), the habitat condition was poor throughout much of the limited area it covered, with excessive

amounts of unhealthy Marram and a high cover of negative indicator species such as *Cirsium arvense* (Creeping thistle) and *Senecio jacobaea* (Common ragwort).

Rinnaun Point

A small strip of only 0.146ha, at the south tip of the peninsula was the only mobile dune habitat mapped at Rinnaun Point dunes. The small area of habitat was characterised by healthy *Ammophila arenaria* (Marram) and lacked a significant negative indicator species component. The generally healthy condition of the foredune habitats here can probably be attributed to the availability and mobility of sediment as it moves in the direction of the dune tip.

Embryonic Dunes (H2110)

Ross Point

Embryonic dunes at Ross Point consisted only of some small strips of habitat on the seaward side of the mobile dunes in the southwestern corner of the dunes. Amounting in total to only 0.662ha, the habitat here was characterised by the presence of healthy, flowering *Elytrigia juncea* (Sand couch), and a general absence of negative indicator species.

Rinnaun Point

A small strip of embryonic dunes, characterised by both the presence of *Elytrigia juncea* (Sand couch) and *Leymus arenarius* (Lyme–grass), was mapped at the south tip of the dunes at Rinnaun Point, on the landward side of the only mobile dune strip mapped here. The concentration of what little foredune habitat there is at Rinnaun Point dunes to the south tip probably reflects the movement of sediment and consequent greater dynamism in this area. However, the meagre foredune development mapped was unlikely to be of a permanent nature and may simply reflect a 'summer build-up' of habitat.

IMPACTS

Activities observed or known to be impacting on the sand dune habitats at Ross are shown in Table 130B.

Table 130B Intensity and impact of various activities on sand dune habitats at Ross

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2190	103	B	-1	1	Inside
H2130	103	A	-1	35	Inside
H2130	140	A	+2	80	Inside
H2130	149	C	-1	10	Inside
H2130	171	A	-1	1	Inside
H2130	190	A	-2	unknown	Inside
H2130	420	A	-1	0.2	Inside
H2130	622	C	-1	3	Inside
H2130	623	A	-1	3	Inside
H2110	900	A	0	0.5	Inside
H2120	900	A	0	1.4	Inside
H2130	900	A	0	8	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 dunes are grazed by cattle and sheep, with smaller numbers of horses also present at Ross Point. The beneficial affects of grazing in creating and maintaining species-rich short turf is described under code 140. Undergrazing (code 149) of some dune grassland areas, was considered to be an impact of low intensity.

Supplementary feeding of livestock (code 171) was observed at both Ross Point and Rinnaun Point dunes. The typical consequences included the spread of nitrophilous weed species and erosion of vegetation.

Agricultural improvement (code 103) was noted in the fixed dunes at both of the sand dune areas and also in the dune slacks at Ross Point. The more obvious practices included the reseeding of swards with coarse grasses and fertiliser application. The impact/activity was deemed to be of only medium intensity in dune slacks, but was thought to be of high intensity in fixed dunes, where the total affected area was estimated as 35ha.

The intensity of recreational use – much of which can be described under *walking, horseriding* & *non-motorised vehicles* (code 622) - is rated as low in the fixed dunes. Although both sand dune areas are readily accessed via clearly marked tracks, the dominance of agriculture as the main land use clearly deters many visitors from the dune grassland. There is also substantial fencing through much of the dunes, which further discourages

walking and associated activities. Much of the recreational use of the sites is apparently confined to the beaches.

A substantial flattened and bare area on the track which runs through the centre of the dunes is used for car parking and access to the beach (623). The location is marked with a 'miscellaneous' point on the site digital map.

Natural erosion (code 900) is affecting the northern seaward edge of the dunes at Ross Point. Foredunes were absent and fixed dunes formed the seaward boundary along much of the north-facing dune face. In places, fixed dune vegetation had slumped over the front face of the dunes. The eastern side of Rinnaun Point dunes were also affected by erosion – in places the sheer face on the eroded dune edge was up to 4m above the beach level. The foredune habitats at Ross Point have also suffered the affects of erosion, although the estimated areas here may be somewhat understated due to the absence of any previous data with which the current results can be compared.

A substantial area of the dunes at Ross Point appear to have been levelled some time ago, which may, at least in part, have been due to the creation of the lake in the eastern half of the site in the 1970's. The impact is included here under 'agricultural activity not referred to above' (Code 190). The site management (MPSU) plan also refers to sand extraction as an ongoing activity within the cSAC, although it is not specified if this refers to some or all of the sand dune sites. This may partly explain the flattening of tall dunes at Ross Point, although this could not be verified. There were no obvious current sand extraction areas noted during the site visit.

Four cars had been dumped in the southern end of the fixed dunes at Rinnaun Point. Other occasional dumping of farm machinery was also noted here. Small scale dumping of machinery parts, wheels, corrugated metal sheets etc was also noted at Ross Point. The impact is referred to in the general *discharges* category (code 420).

CONSERVATION STATUS

The conservation status of habitats is based on a combination of area (extent), structure and functions, and future prospects assessments (Table 130C). The structure and functions

assessment of habitats is determined by the percentage pass rate of monitoring stops carried out in the habitats (Table 130D). The usefulness of information in the NATURA 2000 data form and explanatory notes is limited by the fact that Ross dunes (including those at Rinnaun Point, and the area eastwards of Killala) are only one of three significant sand dune systems within the Killala Bay/Moy Estuary cSAC. Habitat information and conservation status ratings in that report deal with the entire complement of habitat within the cSAC, rather than with individual sand dune sites, as would be necessary to provide more meaningful data and observations for the purposes of comparison with the present report. In the absence of specific previous data, many of the conservation status assessments of habitats, particularly those relating to habitat extent, are based on the current condition of habitats.

Fixed Dunes (H2130)

Ross Point

There are no recent data with which the current information on habitat area may be usefully compared. Although the erosion and slumping of fixed dune vegetation along parts of the northern edge of the site confirm that erosion is taking place, it may be that it is chiefly attributable to natural causes and should therefore not be considered as a negative impact. Loss of area to the creation of the lake and to agricultural improvement pre-date the previous report information on the site, such as that included in the site NHA file, and are therefore also not considered to indicate an *unfavourable* habitat condition. In the absence of other data to demonstrate a recent loss of extent, that element of conservation status is considered *favourable*.

Of the 15 monitoring stops carried out in the fixed dunes at Ross Point, 11 passed and four failed the requisite criteria, indicating *unfavourable-bad* structure and functions. The reasons for the failure to meet the overall target requirements were generally a combination of lack of typical species and a sward height above the desirable limit, although one stop also had a negative indicator species cover in excess of the maximum limit. The most commonly recorded negative indicator species in fixed dune monitoring stops were *Cirsium arvense* (Creeping thistle), *Cirsium vulgare* (Spear thistle), *Lolium perenne* (Perennial rye-grass) and *Senecio jacobaea* (Common ragwort). Undergrazing and reseeding of swards are the principal reasons for the reduced conservation value of the dune grassland.

The future prospects of the Ross Point fixed dunes must be considered *unfavourable-inadequate*, as management practices such as supplementary feeding of stock and low stocking levels (undergrazing) are ongoing at the site. An *unfavourable-bad* judgement is avoided, as much of the damage caused to the dunes is less than severe.

The inclusion of an *unfavourable-bad* assessment in the three separate components of conservation status, indicates an overall *unfavourable-bad* assessment.

The corresponding assessment thought most appropriate under the proposed Irish conservation system is *unfavourable-unchanged*, as the unsatisfactory condition of the habitat is likely to have existed for some time.

Rinnaun Point

Erosion is occurring along the eastern edge of the dunes, although it is not clear if this can be attributed solely to natural erosion or the affects of recreational activities. The dune grassland itself is largely free of amenity pressures due to the agricultural management and fencing of the dunes, although the beach area sees considerable recreational use. Habitat extent is considered *favourable* here, due to the lack of positive evidence for human-induced erosion.

Two monitoring stops, one of which passed and the other which failed the overall monitoring criteria, were carried out in the fixed dunes at Rinnaun Point. A 50% pass rate of monitoring stops indicates *unfavourable-bad* structure and functions. The more northerly of the two stops represented the small area of species-rich dune grassland in the northeastern corner of the site, while the other stop was typical of the improved or damaged grassland that accounted for much of the total area. Two monitoring stops were deemed sufficient for the dunes here, as the more southerly reaches of the area were generally in poor condition, and a visual assessment confirmed the appropriateness of an *unfavourable-bad* assessment.

Future prospects for the fixed dunes here must be considered *unfavourable-bad*, as the intensive agricultural practices that have negatively impacted the conservation value of the dunes, are continuing at the site.

The inclusion of *unfavourable-bad* assessments in the three separate components of conservation status indicates an overall *unfavourable-bad* assessment.

The corresponding Irish assessment thought most apt is unfavourable-unchanged, as the current poor condition and lack of conservation interest is likely to have existed for some time.

Mobile Dunes (H2120)

Ross Point

Although the scarcity of foredune habitats at the site may be mostly attributable to natural causes, extent (area) is assessed as *unfavourable-inadequate* due to the poor zonation and limited area of habitat throughout the site. There are no reliable data with which to compare the extent of habitats in recent years with those mapped in the current survey. Assessments are therefore largely based on the current condition of habitats.

Table 130C Conservation status of Annex I sand dune habitats at Ross

Habitat[1]	EU Conservation Status Assessment			Overall EU conservation status assessment	Proposed Irish conservation status system[2]
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**		
Ross Point					
Fixed Dunes (H2130)	Extent	Future prospects	Structure & functions	**Unfavourable - Bad**	**Unfavourable - unchanged**
Mobile Dunes (H2120)		Extent	Structure & functions/ Future prospects	**Unfavourable - Bad**	**Unfavourable - unchanged**
Embryonic Dune (H2110)	Structure & functions	Extent/ Future prospects		**Unfavourable - Inadequate**	**Unfavourable - unchanged**
Dune Slack (H2190)	Extent/ Structure & functions	Future prospects		**Unfavourable - Inadequate**	**Unfavourable - unchanged**
Rinnaun Point					
Fixed Dunes (H2130)	Extent		Structure & functions/ Future prospects	**Unfavourable - Bad**	**Unfavourable - unchanged**
Embryonic Dune (H2110)	Structure & functions	Future prospects	Extent	**Unfavourable - Bad**	**Unfavourable - unchanged**
Mobile Dunes (H2120)	Structure & functions	Future prospects	Extent	**Unfavourable - Bad**	**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)

Monitoring stops were not carried out in mobile dunes at Ross Point due to the very limited areas of habitat present. However, the presence of a certain amount of unhealthy *Ammophila arenaria* (Marram) suggested that *unfavourable-inadequate* should be the assessment for structure and functions.

Future prospects are assessed as *unfavourable-bad* due to the ongoing affects of erosion and sediment depletion at the site.

As two of the individual elements of conservation status assessment are *unfavourable-bad*, the overall conservation status assessment is also *unfavourable-bad* (Table 130C).

As the current condition of the habitat is likely to have existed for some time, the most appropriate assessment under the corresponding Irish system is considered to be *unfavourable-unchanged*.

Rinnaun Point

There were no previous data available on the extent of habitats at Rinnaun Point with which the current data could be compared. Based on the current condition of habitats and because the total area of mobile dunes at Rinnaun Point is very small, extent is rated as *unfavourable-bad*. The intensive agricultural use of the site can also be considered to represent a significant impediment to the natural functioning of the dune system.

Monitoring stops were not carried out in mobile dunes at Rinnaun Point due to the very limited areas of habitat present. However, as a sufficient proportion of *Ammophila arenaria* (Marram) in the habitat appeared robust and healthy and because of the lack of any significant negative indicator species element, structure and functions are rated as *favourable*.

Future prospects are considered *unfavourable-inadequate* as the conditions that have resulted in the current limited extent and poor zonation of habitat are likely to persist.

As one of the parameters of conservation status is *unfavourable-bad*, that is the assessment that applies to the overall conservation status.

As the current condition of the habitat is likely to have existed for some time, the most appropriate assessment under the corresponding Irish system is considered to be *unfavourable-unchanged*.

Table 130D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Ross

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Ross Point			
Fixed Dunes (H2130)	11	4	**Unfavourable - Bad**
Embryonic Dune (H2110)	2	0	**Favourable**
Dune Slack (H2190)	3	0	**Favourable**
Rinnaun Point			
Fixed Dunes (H2130)	1	1	**Unfavourable - Bad**

Embryonic Dunes (H2110)

Ross Point

The restriction of embryonic dunes to only a small proportion of the seaward sand dune boundary is symptomatic of very limited foredune development and poor zonation and dictates an *unfavourable-inadequate* assessment for habitat extent.

Both of the monitoring stops carried out in embryonic dunes at Ross Point passed the overall criteria, indicating *favourable* structure and functions. Both stops reflected the generally healthy and abundantly flowering condition of *Elytrigia juncea* (Sand couch) within the limited area of habitat that currently exists at the site.

The general lack of foredune development throughout the site and erosion of the dunes suggests the dunes are showing the affects of sediment depletion. There would therefore appear to be little prospect of any substantial embryonic dune accretion in the short term, and future prospects are considered *unfavourable-inadequate*.

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

It would appear from site aerial photographs and NHA file notes, that the current extent of the dunes and lack of foredune development reflect a long-standing situation, as a result of which, the conservation status assessment chosen under the proposed Irish system is *unfavourable-unchanged*.

Rinnaun Point

Like those at Ross Point, the embryonic dunes at Rinnaun Point are of very limited extent and are restricted to a small part of the site. Based on this limited extent and poor zonation, extent (area) is rated as *unfavourable-bad*.

Monitoring stops were not carried out in the embryonic dunes at Rinnaun Point due to the very limited areas of habitat present. However, as a sufficient proportion of the typical species in the habitat - in this case *Elytrigia juncea* (Sand couch) - appeared robust and healthy and because of the lack of any significant negative indicator species element, structure and functions are rated as *favourable*.

The current limited extent of the habitat and the unlikelihood of any significant dune-building events in the shirt term, indicate that the future prospects for embryonic dunes should be considered *unfavourable-inadequate*.

As the individual parameters of conservation status assessment include an *unfavourable-bad* judgement, the overall assessment is also *unfavourable-bad*.

The corresponding Irish assessment thought most apt is *unfavourable-unchanged*, as the current poor condition and lack of conservation interest is likely to have existed for some time.

Dune Slacks (H2190)

Ross Point

It seems likely that area of slacks may have been altered by previous large-scale earth moving at the site. The precise correspondence of the eastern boundary of the largest slack with the adjacent field boundary, suggests that the raising of the field height to the east (possibly through levelling of dunes) may have created the damp or wet conditions in the lower field

level that supports dune slack vegetation. As there were no indications of a recent loss of area, habitat extent is rated as *favourable*.

All three monitoring strops carried out passed the requisite criteria, indicating *favourable* structure and functions. Each of the stops had a reasonable diversity of typical species and an absence or very low cover of negative indicator species. However, a certain proportion of the largest slack had been somewhat affected by agricultural improvements that could lead to a future deterioration in habitat quality.

The presence of poached ground and significant cover of negative indicator species such as *Lolium perenne* (Perennial rye-grass) in parts of the dune slacks, indicates that the habitat is being adversely affected by ongoing management practices at the site, and as such, future prospects are not guaranteed and are consequently rated as *unfavourable-inadequate*.

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

The assessment thought most appropriate in the proposed Irish system is *unfavourable-unchanged*, reflecting the probable long-term existence of several negative impacts in the habitat.

Rinnaun Point

There were no dune slacks at Rinnaun Point


SAC 458
Site Division
Habitats
Embryonic Dune
Mobile Dune
Fixed Dune
Dune Slack
Scrub
Saltmarsh
Saltmarsh (+ Juncus maritimus)
Agricultural land
Other (Undefined)
Note that part of Bartragh Island (CMP 131) is shown in the bottom of this map.
Coastal Monitoring Project 2004-2006
Ross
CMP code: 130
0 200 400 600 800 1000 Meters
N
National Parks and Wildlife Service
Killala Bay / Moy Estuary (SAC 458)
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:22850

Appendix VIII – Bartragh Island site report and habitat map from the CMP (Ryle *et al*. 2009)

SITE DETAILS

CMP06 site name: **Bartragh Island** CMP06 site code: **131** CMP Map No.: **128**

County: **Mayo** Discovery map: **24** Grid Reference: **G 240 302**

6 inch Map No.: **Ma 015 & 022**

Aerial photographs (2000 series): **O 1060-C, D; O 1120-A, B; O1121-A, C**

NPWS Site Name: **Killala Bay / Moy Estuary**

NPWS designation: pNHA: **458** cSAC: **458** SPA: **4036**

Ranger Area: **Mayo**

MPSU Plan: **Draft 2 Consultation**

Report Author: **Tim Ryle**

SITE DESCRIPTION

Bartragh Island, lies across the mouth of Killala Bay into which the Moy estuary flows. It is the only natural barrier island in Ireland and is approximately 4.5 kilometres long. The island is separated from the mainland by wide expanses of intertidal sand flats (0.5-1 km wide). The island may be reached on foot near the eastern shore on some low tides, although this may only be the case on or near spring tides. In general it is advisable to travel to the island via boat, although there is no regular service available. Consequently, it may be assumed that visitor numbers are low, although there is a barbecue site, maintained by a local angling club, at the eastern end, and evidence of camping sporadically throughout the island.

Although the island is uninhabited at present, this was not always the case. The only dwelling on the island, Bartragh house, is located the south-east end. The house is now unoccupied and in a state of considerable disrepair. Some of the land around the house has been cultivated in the past (1950s), and other terrestrial habitats namely grassland are recorded here. This is due to the occurrence of the absence of sand occurring over the bedrock.

The island has been purchased in the recent past by a consortium, including Nick Faldo, with the intentions of developing a premier golfing resort. It is currently at the design stage only and it may be a number of years until there is any further progress.

Part of Killala Bay / Moy Estuary has been designated as a Special Protection Area for birds (SPA 4036) due to the internationally important numbers of Brent Geese that overwinter at the site. It has also been proposed as a candidate Special area of Conservation (cSAC). The cSAC is important for a number of reasons, including the presence of the priority Annex I Fixed Dunes with herbaceous vegetation along with Estuaries, Mudflats and sand flats not covered by water at low tide, large shallow inlets and bays and Annual vegetation of driftlines.

The long sandy beach at Bartragh Island is only a small part of the whole cSAC. Two other sand dune systems from the national inventory are located within the cSAC. Ross (CMP 129) is located to the west of Bartragh Island, whilst Inishcrone (CMP 131) is situated to the east of Bartragh Island, in County Sligo.

Table 130A lists the areas of sand dune habitat that were recorded on Bartragh Island during the summer 2006 survey. In total, sand dunes occupied 130.287ha, although this is not the total land cover for the island. Much of the southern portion of the island is comprised of saltmarsh, which in places extends to almost 200m in width. A narrow finger of saltmarsh near the middle of the island almost penetrates through to the northern side. Both Atlantic and Mediterranean variants are estimated to account for 23.910ha. For details and a full description of the saltmarsh refer to Saltmarsh Monitoring Project report (McCorry, 2007).

Table 130A Areas of EU Annex I habitats mapped at Bartragh Island

EU Code	EU Habitat	Area (ha)
H1210	Annual vegetation of driftlines	0.582
H2110	Embryonic shifting dunes	0.749
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	7.519
H2130	Fixed coastal dunes with herbaceous vegetation	120.216
H2190	Humid Dune Slacks	1.221
	Total Sand dune	**130.287**

A sizeable area around Bartragh House in the south-east corner of the Island has been excluded from the cSAC. The area in question, which includes walled gardens and a small

patch of wet woodland, is not sandy in nature, and is mostly comprised of improved grazing grassland. Some adjacent grassland to the north-west included in the cSAC is also not sandy. The agricultural and other non-defined habitats are estimated to cover an area of 24.437ha.

Fixed Dunes (H2130)

The greater portion of Bartragh Island comprises fixed dunes, which are estimated to occupy an area of 120.216ha (Table 130A). The dunes are well developed and relatively undisturbed owing to their location. Apart from the familiar *Ammophila arenaria* (Marram), which is luxuriant in growth, the dunes have a rich and diverse flora. One monitoring stop had in excess of 30 species.

Typical fixed dune species that were consistently recorded include *Anthyllis vulneraria* (Kidney vetch), *Cerastium fontanum* (Common mouse-ear), *Euphrasia officinalis* agg. (Eyebright), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Lotus corniculatus* (Common bird's-foot-trefoil), *Trifolium repens* (White clover), *Thymus polytrichus* (Wild thyme) and *Veronica chamaedrys* (Germander speedwell). Other less abundant species included *Primula vulgaris* (Primrose), *Anacamptis pyrimidalis* (Pyramidal orchid) and *Coeloglossum viride* (Frog orchid).

Bryophytes are an important part of the vegetative structure of the fixed dunes, and in places, account for considerable cover. Commonly recorded species include *Climacium dendroides*, *Homalothecium lutescens*, *Hylocomium splendens*, *Plagiomnium undulatum*, *Rhytidiadelphus squarrosus* & *R. triquetrus*, *Scleropodium purum* and *Tortula ruraliformis*.

There were some areas of dense *Pteridium aquilinum* (Bracken) at the eastern end of the island. Another notable species was *Rosa pimpinellifolia* (Burnet rose), which is a species typically associated with maturing or acidifying dune systems. Scrub was also noted around the southern boundary of Bartragh house and some species occasionally recorded in the fixed dunes. They included *Hedera helix* (Ivy), *Rubus fruticosus* (Bramble), *Prunus spinosa* (Blackthorn) and *Rosa canina* (Dog-rose).

While the presence of dune slack vegetation was confirmed from Bartragh Island, some areas within the fixed dunes were wet. Though not ascribable to dune slack vegetation, some of the species may also found in the slacks. These wet areas are usually transition between the sandy dune grasslands and the improved or wet grassland located around Bartragh House.

The species that are recorded include *Carex flacca* (Glaucous sedge), *Parnassia palustris* (Grass-of-parnassus), *Prunella vulgaris* (Selfheal), *Selaginella selaginoides* (Lesser clubmoss) and *Succisa pratensis* (Devil's-bit scabious). Part of this land has been excluded from the cSAC and indeed its soils are not sandy. The area has a low herb diversity and is dominated by agricultural grass species such as *Anthoxanthum odoratum* (Sweet vernal-grass) and *Dactylis glomerata* (Cock's-foot).

Some heath-like elements of the vegetation were also noted. Areas of peaty soil were located on the southern side of the Island, and in places it is clear that the soils are a mixture of peat soil and sand. Clumps of *Molinia caerulea* (Purple moor grass) were recorded. Other species included *Briza media* (Quaking-grass), *Carex flacca* (Glaucous sedge), *Danthonia decumbens* (Heath-grass), *Potentilla erecta* (Tormentil), *Selaginella selaginoides* (Lesser clubmoss), *Succisa pratensis* (Devil's-bit scabious) and the bryophytes *Hypnum cupressiforme* and *Ctenidium molluscum*.

Other features or habitats of note that were recorded adjacent to or overlapping with the fixed dune grassland included a wet woodland copse comprised of *Alnus glutinosa* (Alder) and *Salix cinerea* (Grey willow). Larger trees such as *Fraxinus excelsior* (Ash) and *Acer pseudoplatanus* (Sycamore) were noted near Bartragh House.

- **Dune Slacks (H2190)**

Though not shown on earlier vegetation maps of the Island, the presence of dune slacks has previously been alluded to (pNHA site notes and NATURA 2000 dataform, additional information). The orientation of some of the darker patches on the aerial photographs suggested the presence of the slacks. Although their presence was unconfirmed on the ground, the NATURA 2000 dataform lists the cover as 1%, whilst the management plan cautiously suggests 15ha. for the entire cSAC. (The results of this survey would suggest a figure of 2ha. of dune slacks for the entire cSAC).

A number of slacks occur to the eastern side of Bartragh Island. Small in extent they cover an area that is estimated at 1.221ha (Table 130A). Though occasionally grazed by cattle, horses appear to congregate around the dune slacks as evidenced by the amount of dung and the state of the roughly grazed grasses.

Typically, the slacks were narrow linear features, which run parallel to the dune ridges and are characterised by a high preponderance of mosses and fixed dune species along with characteristic slack species. Typical slack species included *Potentilla anserina* (Silverweed), *Carex flacca* (Carnation sedge), *Hydrocotyle vulgaris* (Marsh pennywort), *Agrostis stolonifera* (Creeping bent), *Ranunculus repens* (Creeping buttercup). The characteristic bryophyte of dune slacks, *Calliergonella cuspidata* was also common. Indeed, mosses accounted for approximately 50% of the ground cover within the slacks. Common species included *Rhytidiadelphus squarrosus* & *R. triquetrus* and *Eurhynchium* spp. Prostrate *Salix repens* ssp. *arenaria* (Creeping willow) was noted in one of the two monitoring stops carried out in the dune slacks. Its cover was only 10% and it was not generally abundant throughout the slack areas. Despite the influence of grazing animals on the dune slack habitat – *Salix repens* ssp. *arenaria* was consistently over grazed, negative indicator species were not frequent. Less than 1% cover was recorded of *Senecio jacobaea* (Common ragwort) in monitoring stop 2.

It is difficult to assess the type of slack owing to the absence of previous information and the conflicting species compositions of the two monitoring stops.

Other wet patches, more typical of marsh or wet grassland habitat were noted around the fixed dunes. These areas were undoubtedly influenced by nutrient-rich waters from the organic soils. Species such as *Iris pseudacorus* (Yellow iris), *Mentha aquatica* (Water mint), *Filipendula ulmaria* (Meadowsweet), *Succisa pratensis* (Devil's bit scabious) and *Potentilla anserina* (Silverweed) were recorded.

- **Mobile Dunes (H2120)**

Mobile dune extends along much of the northern side of the island and also occurs as a wide band at the west tip of the island, beside the only significant embryonic dune habitat mapped. Characterised by vegetative cover that ranged between 30% and 80%, the mobile dunes are dominated by *Ammophila arenaria* (Marram) along with minor contributions from *Carex arenaria* (Sand sedge), *Elytrigia juncea* (Sand couch) and *Sonchus oleraceus* (Smooth sow-thistle).

Though flowering species were not a feature of the habitat, the vegetation was healthy with young fresh Marram often abundant. The presence of the negative indicator species *Senecio*

jacobaea (Common ragwort) was recorded in only 2 of the monitoring stops, which reflects its limited occurrence within the mobile dunes. Blowouts were noted in places as were a number of breaches at the outer or seaward side of the Island and landward side on the inner part of the Bay. One of these breaches is explained by a pipeline was laid through the site during the 1990's. Often bared of vegetation and sand, the shingle layer was evident. And in a few places narrow bands of saltmarsh vegetation extended along these shingle substrates.

- **Embryonic Dunes (H2110)**

Five separate patches of embryonic dune bands were mapped, the largest of which was at the western end of the island, in the area of most active accretion (Map 128). The remainder represent isolated patches or indeed clumps of *Elytrigia juncea* (Sand couch). In general, the habitat is characterised by the presence of both *Elytrigia juncea* (Sand couch) and occasionally *Leymus arenarius* (Lyme–grass). Other species that were recorded included *Ammophila arenaria* (Marram), *Honckenya peploides* (Sea sandwort) and *Salsola kali* (Prickly saltwort). Negative indicator species were not a feature of the foredunes.

Annual Strandline (H1210)

Lying perpendicular across the mouth of the Bay, the force of tidal onslaughts has resulted in the development of only small patches of strandline vegetation. Two separate, narrow strips of annual strandline habitat, each of over 300m in length were recorded on the northern side of the island, one near the west tip, whilst the other patch was located further east. The habitat was dominated by *Cakile maritima* (Sea rocket), though *Salsola kali* (Prickly saltwort) and *Atriplex* sp. were also noted. The continuous supply of windblown sand resulted in *Elytrigia juncea* (Sand couch) becoming established amongst the strandline and the formation of incipient embryonic dunes.

IMPACTS

The list of activities observed or known to be impacting on the sand dune habitats at Bartragh Island is shown in Table 130B. The most serious impacts that were recorded are associated with natural erosion evident along the islands seaward coast, and the management of the land, namely the grazing regime. The island though privately owned is currently uninhabited. Bartragh House, the only constructed dwelling on the Island is abandoned and some of the walls surrounding the property and its gardens are in a state of disrepair.

Table 130B Intensity and impact of various activities on sand dune habitats at Bartragh Island

• EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	• Area affected/ha •	Location of Activity[5]
21BB	140	C	0	10	Inside
H2130	149	A	-1	20	Inside
21BB	500	C	0	N/A	Inside
21BB	601*	A	-1	120+	Inside
H2130	608	C	0	<0.5	Inside
H2130	622	C	0	Unknown	Inside
H2130	790	C	-1	<0.5	Inside
21BB	900	B	0	Unknown	Inside
H2130	954	B	-1	3.0	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
* This is a possible activity and is included to demonstrate the potential loss of sand dune habitat.

Although the largely rank fixed dunes are variable in condition and diversity, they are maturing in places and would benefit from managed grazing of certain areas (code 149). Cattle and sheep, and some horses are kept on Bartragh Island, mostly during the summer months and even then the numbers are not high. This is reflected in the decline in the condition in parts of the fixed dune habitat and the gradual spread of invasive species such as bracken (code 954). It is estimated to occupy 3.0 ha, which represents 0.2% of the total fixed dune area on Bartragh Island. If left unmanaged, however, it could result in further loss of habitat.

Not all of Bartragh Island is sand based. Derelict agricultural fields and gardens are found on damp, organic soils located at the eastern side of the Island around Bartragh House. The few livestock that are kept here are not fenced however and can wander. Given the number of livestock, intensive grazing (code 140) is not generally a serious threat to the sand dune habitats. However localised and intensive grazing such as is seen around the dune slacks does occur. This could in part be due to the lack of fresh water on the Island for the livestock.

Erosion (code 900) is part of the natural cycle in coastal areas, and Bartragh Island is no exception. Stretching across the mouth of Killala Bay, its frontline is subject to constant assault from the sea. Its intensity is rated as medium though its impact is rated as neutral owing to the natural coastal dynamic.

Recreational activities are a negligible impact on the sand dune system. However, the island has been purchased by a consortium interested in developing the island into a golf course (code 601). Although a planning application has yet to be submitted, the development of the golf course would have obvious and detrimental impacts to the condition and overall conservation value of the sand dune system, with a potential loss of the national sand dune resource of approximately 120ha.

The nearest point of access to the island is only 500 metres away at Bullockpark, although most people who venture out to the island do so from Killala, a distance of less than 1 kilometre from the island. Tourists are less frequent, though given the relative expanse of the isolated golden beach, it is not unsurprising, that locals and tourists visit the island. Access is usually gained by small boat, although at certain tides, it is possible to cross on foot. Tracks and pathways (code 500) although present, are not considered a significant impact at the site. While most visitors do not stay on the island, there was some evidence of camping (code 608). Asides from the minor littering that is associated with some beach users, there are really few supplementary recreational impacts.

Other regular visitors to the site include the local fishing group who have a BBQ site located at the isolated eastern end of the island. They have erected a number of notices reminding users of the islands private status and to bring litter away.

CONSERVATION STATUS

The overall conservation status assessment of each of the sand dune habitats at Bartragh Island is determined on a combination of three parameters, namely *Habitat Extent*, *Structure & Functions* and *Future Prospects*. The conservation assessments that are presented in Table 130C are based upon comparisons between the baseline NATURA 2000 survey with the results of the current survey. The baseline data is further consolidated by information in the more recent management plan. The details of the numbers and pass/failure rates of the monitoring stops used to assess structure and function are given in Table 130D.

Table 130C Conservation status of Annex I sand dune habitats at Bartragh Island

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**
Dune Slack (H2190)	Extent / Structure & Functions/ Future Prospects			**Favourable**	**Favourable - Maintained**
Mobile Dune (H2120)	Extent / Structure & Functions/ Future Prospects			**Favourable**	**Favourable - Maintained**
Embryonic Dune (H2110)	Extent / Structure & Functions / Future Prospects			**Favourable**	**Favourable - Maintained**
Annual Strandline (H1210)	Extent / Structure & Functions / Future Prospects			**Favourable**	**Favourable - Maintained**

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

Fixed Dunes (H2130)

The area of fixed dunes at Bartragh Island is extensive. Although there has been a decline in the condition of some of the habitat and a gradual spread of Bracken in parts, it would appear that there has not been a decline in its overall extent. Therefore extent is rated as *favourable* (Table 130C).

Of the fifteen monitoring stops carried out in the fixed dunes, 13 met the overall target criteria, while two failed (Table 130D), in both cases due to the presence of negative indicator species and the lack of typical species or sward height. As only two monitoring stops failed, both of which were located in disturbed habitat adjacent Bartragh House, this might suggest a localised diminution of the structure and functions parameter. A large part of the dunes, however, is rank and generally homogenous in appearance and structural diversity and would benefit from increased level of grazing. For this reason the structure and functions parameter is *unfavourable-inadequate* (Table 130C).

The future prospects for the fixed dunes are considered *unfavourable-inadequate* on the basis that although this expansive site is relatively free from damaging activities, the fixed dunes would benefit from an increased grazing regime (Table 130C). This rating, however, would be obsolete if Bartragh Island were to be converted to a golf course.

Despite a positive assessment for extent, the unfavourable-inadequate rating for structure and functions and future prospects results in an *unfavourable-inadequate* conservation assessment for the fixed dunes (Table 130C). The analogous Irish conservation assessment for the dune slacks is *unfavourable-unchanged*.

Table 130D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Bartragh Island

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dune (H2130)	13	2	**Unfavourable - Inadequate**
Dune Slack (H2190)	2	0	**Favourable**
Mobile Dune (H2120)	9	0	**Favourable**
Embryonic Dune (H2110)	2	0	**Favourable**
Annual Strandline (H1210)	4	0	**Favourable**

Dune Slacks (H2190)

Other than a note in NPWS files to suggest its presence, there is little information with which to compare the extent or condition of the dune slacks. Therefore the confirmation of the presence of dune slacks on Bartragh Island is positive and the extent is rated as *favourable* (Table 130C), as they form an integral part of the sand dune dynamic.

Two monitoring stops were carried out in the habitat (Table 130D). Although variable in floristic and structural composition, both stops passed, indicating a *favourable* structure and functions of the habitat.

The future prospects for the habitat are rated *favourable* (Table 130C). Grazing is locally intensive within the habitat, although, this seems to keep any potential and excessive spread of *Salix repens* ssp *arenaria* in check.

As all three of the assessment parameters are favourably rated, the overall conservation assessment for the dune slack habitat is *favourable*. This equates to *favourable-maintained* in the Irish conservation assessment system (Table 130C).

Mobile Dunes (H2120)

As there is also no indication, based on previous data, to suggest that there has been a decrease in habitat area, habitat extent is considered as *favourable* (Table 130C). The habitat is present along most of the northern shore of the Island and is only absent from the easternmost end of the Island, due to the proximity of the sea channel that cuts through the sand flats on the northern side.

All nine monitoring stops carried out in the mobile dunes passed the target criteria, which indicates *favourable* habitat structure and functions (Table 130D).

The future prospects of the mobile dunes are positive. Although there are signs of erosion along a section of the front dune ridge, fresh sand is accumulating at either end of the spit. Therefore the future prospects are rated as *favourable* (Table 130C).

The EU conservation assessment is rated as *favourable* which corresponds to *favourable-maintained* under the proposed Irish conservation assessment scheme (Table 130C). These ratings reflect the extent and persistence of the habitat at the mouth of Killala Bay.

Embryonic Dunes (H2110)

Embryonic dunes are not generally frequent or abundant along the west coast of Ireland, given the nature of the Atlantic tides. Therefore the occurrence of foredunes on Bartragh Island is rated *favourable* in terms of extent (Table 130C).

The two monitoring stops, both of which were carried out at the western tip of the island in the only sizeable area of embryonic dunes, met the target criteria, indicating a *favourable* habitat structure and functions assessment (Table 130D).

The future prospects are *favourable* as the habitat is accreting at either end of the sand bar island (Table 130C).

The overall conservation assessment for the foredunes is *favourable*, which is a combination of the three favourable parameter ratings. This equates to an Irish rating of *favourable-maintained* (Table 130C).

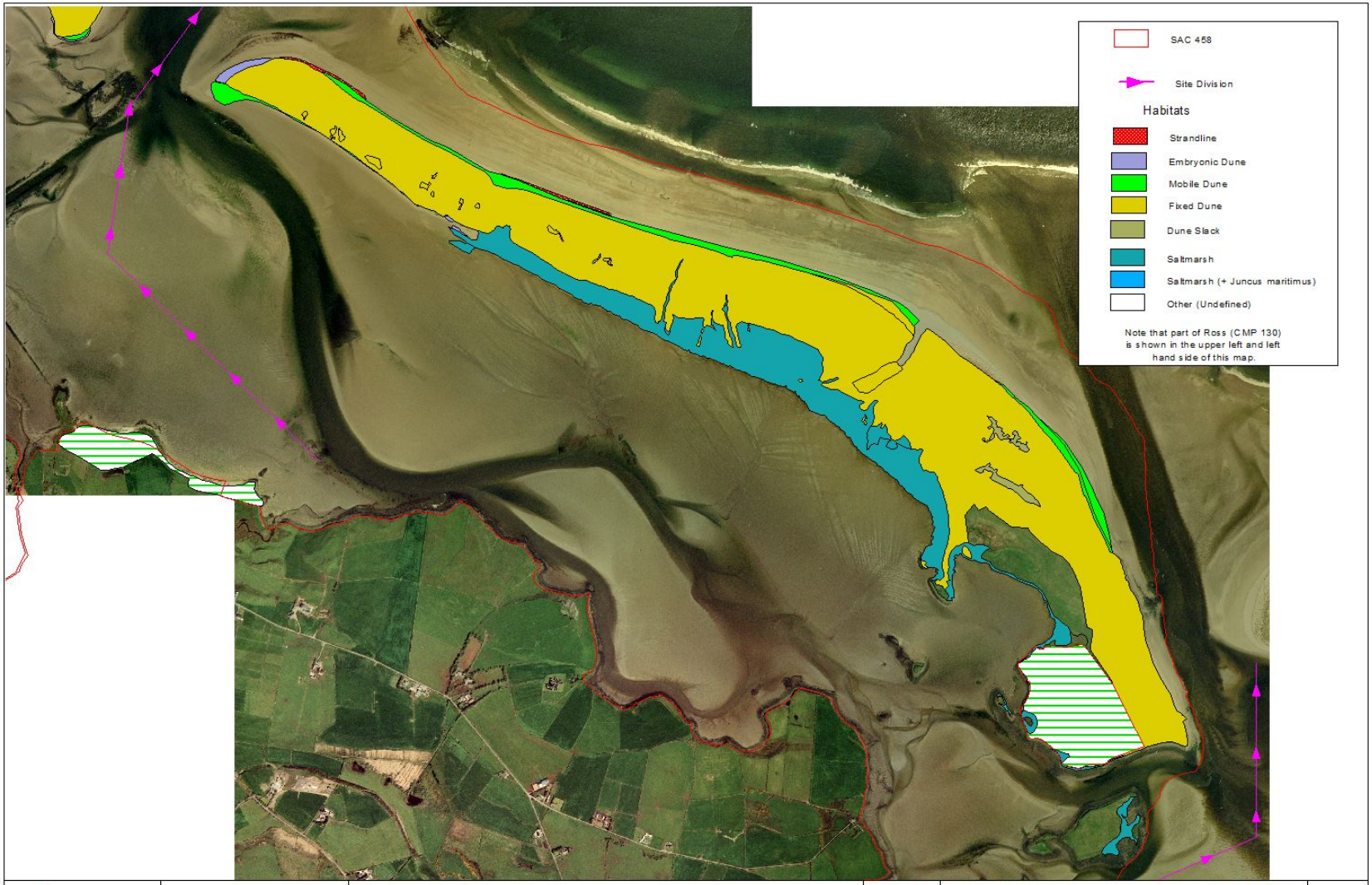
Annual Strandline (H1210)

In the absence of any evidence to the contrary, it is assumed that habitat extent is stable, and therefore also rated as *favourable* (Table 130C).

The necessary attribute target criteria were met in all four monitoring stops carried out at Bartragh Island, indicating a *favourable* structure & functions rating (Table 130D).

The future prospects for the annual strandline is considered *favourable* (Table 130C) and it is likely that the strandline vegetation will continue to develop each year as fresh sand and tidal debris accumulate.

As the three separate components of conservation status assessment are *favourable*, that is the overall rating that applies to the habitat (Table 130C). The comparable Irish conservation assessment is *favourable–maintained*.


SAC 458
Site Division
Habitats
Strandline
Embryonic Dune
Mobile Dune
Fixed Dune
Dune Slack
Saltmarsh
Saltmarsh (+ Juncus maritimus)
Other (Undefined)
Note that part of Ross (CMP 130) is shown in the upper left and left hand side of this map.
Coastal Monitoring Project 2004-2006
National Parks and Wildlife Service
Bartragh Island
Killala Bay / Moy Estuary (SAC 458)
CMP code: 131
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)
0 200 400 600 800 1000 Meters
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:22534
N

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

SITE DETAILS

CMP05 site name**: Inishcrone** CMP06 site code: **132** CMP Map No.: **129**

County: **Sligo** Discovery map: **24** Grid Reference: **G 280 297**

6 inch Map No.: **Sl 010, 016 & 022**

Aerial photographs (2000 series): **O 1121-A, C, D; O 1122-A, C; O 1183-A.**

NPWS Site Name: Killala Bay/Moy Estuary

NPWS designation: pNHA: **458** cSAC: **458** SPA: **4036**

Ranger Area**: West**

MPSU Plan**: Draft II (1999)**

Other designation: Blue Flag **– Inishcrone**

Report Author: **Melinda Swann**

SITE DESCRIPTION

There are three distinct dune systems within the Killala Bay/Moy Estuary cSAC (458) – Bartragh Island (CMP site code 131), Ross (130) and Inishcrone. The first two are on the Mayo side of the bay, while Inishcrone is on the Sligo side. All sub-sites have good examples of well-developed dune systems.

The sub-site Inishcrone is a dune system located on a sandy spit, which juts out westward into Killala Bay. High fixed and semi-fixed dunes make up the majority of the habitat while mobile dunes constitute the remainder. A sandy beach fronts the site, which is about 3.5 kilometres in length. On the southern side of the spit, in the more sheltered areas, saltmarsh has developed (NATURA 2000 Survey).

Although much of the fixed dune at Inishcrone has been developed as golf course or taken over by a caravan site, the site still contains a relatively large area of intact fixed dune, a priority habitat listed on Annex I of the EU Habitats Directive.

The beach at Inishcrone has been given [1]Blue Flag status and is manned by a lifeguard in the summer months. The area is very popular with visitors and, as a result of the presence of a large caravan site and a golf course there is high recreational pressure at the site.

[1] Blue Flag Status was lost in 2007 due to bad water quality

The estuary beside Inishcrone is an SPA (4036) and is an extremely important feeding ground for a number of bird species. It is especially important for wintering waterfowl, with eight species having populations of national importance. At times *Branta bernicla* (Brent Goose) occur in numbers of International Importance (>200). The presence of *Pluvialis apricaria* (Golden Plover) and *Limosa lapponica* (Bar-tailed Godwit) is of particular note as these species are listed on Annex I of the EU Birds Directive. The presence of these bird populations is as a result of the extensive sandflats and mudflats, which are exposed at low tide. For the most part the mudflats are un-vegetated, however, large mats of *Zostera* spp. (Eelgrass), *Ruppia maritima* (Beaked Tasselweed) and *Enteromorpha* spp. (Green algae) are present, providing valuable feeding material for birds.

Inishcrone is designated for the Annex I habitats "Fixed coastal dunes with herbaceous vegetation" and "Shifting dunes along the shoreline with *Ammophila arenaria*". As a result of the presence of Annex I habitats, Inishcrone is of significant conservation value. Furthermore, the formation of the spit at Inishcrone protects the important feeding grounds for the many bird species. The site is extremely scenic and is a significant regional amenity area for its long beach and is a popular location for summer holidays.

The EU Annex I sand dune habitats recorded at Inishcrone during the current survey are fixed dunes and mobile dunes. The total sand dune area is therefore 47ha (Table 132A).

Table 132A Areas of EU Annex I habitats mapped at Inishcrone

EU Code	EU Habitat	Area (ha)
H2130	Fixed coastal dunes with herbaceous vegetation	40*
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	3.65
	Total Sand dune	**44****
	Total Sandy substrate area including developments/modifications***	**144.1**

*Including areas of bare sand which total 2.5ha

** Total Sand dune includes an area of fixed dunes outside the cSAC (1.6ha)

*** Developments in this case include a golf course (86.1ha), caravan park outside cSAC and a playground, car park and an area of amenity grassland inside the cSAC

Fixed Dunes (H2130)

The priority habitat fixed dune comprises 40ha (approximately 91%) of the total sand dune habitat at Inishcrone (Table 132A). A large area of the fixed dunes is now part of Inishcrone golf course, which is excluded from the cSAC. The golf course currently has 27 holes and is set to expand into two 18-hole courses. There is a new fence running along the fixed dune, which seems to be the boundary of the golf course. This however, is within the cSAC and this may be a case of the golf course expanding without permission and warrants further investigation. The overall structure of the fixed dune has been extremely altered and furthermore there is a tee located on a high dune in the west of the site, as well as the 18th hole green located near to the caravan park which again, are inside the current cSAC boundary. According to the survey of Irish Golf Links (1999) there were areas of dune slack situated amongst the fixed dune within the golf course. The golf course was not surveyed during the current survey so it is not known whether dune slack habitat still remains. No other dune slacks were present in the fixed dune habitat within the cSAC. The boundary of the golf course in the south of the site was not surveyed as a result of time constraints and therefore was estimated from aerial photographs. It may need to be checked. The total area of the golf course is estimated to be 86.1 hectares.

The fixed dune has developed on a sandy spit and, in places the dunes, reach heights of >20 meters. There is an obvious ridge of these high dunes located in the western end of the site and some are semi-fixed in nature. In the past there was overgrazing by cattle, which led to a decrease in vegetation cover (ASI survey 1993). Erosion in the form of large blowouts was very apparent and occurred in high numbers throughout the fixed dune. There is currently no grazing and a dune re-instatement project, developed by Sligo County Council has been in progress at the site for the past few years. This consists of sand trapping fences located on the high, damaged dunes and signs to explain to the public that walking on the dunes is prohibited in order to allow restoration to occur. There is still evidence of damage from high recreational pressure, as there are bare, sandy tracks visible. Also towards the tip of the spit, there are still some large blowouts present. The total estimated area of bare sand within the blowouts at Inishcrone is 2.5 hectares.

There is a small area of fixed dune located in front of the amenity area (playground) at the eastern end of the beach, this area is quite disturbed and some planting of *Leymus arenarius* (Lyme grass) has been carried out towards the front. There is also some intact fixed dune at

the western end of the caravan park, at the boundary of the golf course, this area however, is mostly outside the cSAC boundary.

There is currently no grazing at the site and the monitoring process carried out in this survey indicates that the area is under grazed, as the vegetation in the fixed dune is rank. This will lead to an overall decrease in species diversity and in some areas is already occurring. The typical plant species found on the fixed dune are listed below, however it must be noted that, not all species are found in all of the monitoring stops.

Typical plant species occurring on the fixed dune are *Lotus corniculatus* (Common bird's-foot trefoil), *Galium Verum* (Lady's bedstraw), *Plantago lanceolata* (Ribwort plantain) *Trifolium repens* (White clover), *Festuca rubra* (Red fescue), *Luzula campestris* (Field wood-rush), *Hypochaeris radicata* (Cat's-ear), *Rhinanthus minor* (Yellow rattle) *Viola* spp., (Violet), *Anthyllis vulneraria* (Kidney vetch), *Carex* spp., (Sedge), *Carex arenaria* (Sand sedge), *Potentilla anserina* (Silverweed), *Polygala vulgaris* (Common milkwort), *Pilosella officinarum* (Mouse-ear hawkweed), *Cerastium fontanum* (Common mouse-ear), *Crepis capillaris* (Smooth hawk's-beard), *Erodium circutarium* (Common wstork's-bill), *Veronica chamaedrys* (Germander speedwell) and the grass *Holcus lanatus* (Yorkshire-fog).

Other fixed dune species found in the fixed dune are *Ammophila arenaria* (Marram grass), *Taraxacum* agg., (Dandelion), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Rumex* spp., (Dock), *Heracleum sphondylium* (Hogweed), *Daucus carota* (Wild carrot), *Leontodon saxatilis* (Lesser hawkbit), and *Rumex acetosella* (Sheep's sorrel), *Ranunculus* spp., (Buttercup spp), *Achillea millefolium* (Yarrow), *Anacamptis pyramidalis* (Pyramidal orchid), *Angelica sylvestris* (Wild angelica), *Centaurea nigra* (Common knapweed), *Dactylorhiza* spp., (Marsh orchid), *Leontodon autumnalis* (Autumn hawkbit), *Sambucus nigra* (Elder). A few Willow (*Salix* spp.) and Alder (*Alnus glutinosa*) bushes are scattered amongst the fixed dune. Gorse (*Ulex europaeus*) and Dog rose (*Rosa pimpinellifolia*) are found near the tip of the spit and lichens (*Peltigera* spp.) are abundant throughout the fixed dune.

Typical mosses found include: *Rhytidiadelphus squarrosus*, *Rhytidiadelphus triquestrus* and *Tortula ruraliformis*, while other mosses found include *Homalothecium* spp., *Scleropodium purum* and *Calliergonella cuspidata*.

Negative indicators occurring in the fixed dune include *Senecio jacobaea* (Common ragwort), *Cirsium palustre* (Marsh thistle), *Cirsium vulgare* (Spear thistle), *Cirsium arvense* (Creeping thistle), *Dactylis glomerata* (Cock's-foot), *Rubus fruticosus* agg. (Bramble) and *Lolium perenne* (Perennial rye-grass).

Mobile Dunes (H2120)

The mobile dune habitat comprises 3.65 ha (approximately 9%) of the total sand dune habitat at Inishcrone (Table132A). There are a number of areas of mobile dunes along the beach, but in places they have been eroded back to the fixed dune. Also in the eastern part of the beach there has been an extreme alteration of the habitat carried out. Here, Sligo County Council in association with The Department of the Marine has carried out dune re-profiling works and has in places installed hard permanent structures. This work has been carried out in an effort to decrease erosion of the dunes here. In the area situated in front of the caravan park, extensive coastal protection works have also been carried out, by installing toe protection works made of boulders and glacial till material (NPWS Internal Report). This has been sunk below the surface and then covered over by sand from here, as well as from an area of the beach below the low water mark. *Ammophila arenaria* (Marram Grass) and *Leymus arenarius* (Lyme Grass) has been planted and further down the beach in front of the golf course other man-made ridges of sand have been constructed.

The typical species *Ammophila arenaria* (Marram grass) dominates the mobile dune habitat with some areas containing *Leymus arenarius* (Lyme grass) and *Elytrigia juncea* (Sand Couch).

Other species that are present in the mobile dunes are *Anthyllis vulneraria* (Kidney vetch) *Taraxacum* agg., (Dandelion) and *Hypochaeris radicata* (Cat's-ear).

The negative indicators found are *Senecio jacobea* (Common ragwort) and *Sonchus oleraceus* (Smooth Sow-thistle).

IMPACTS

The main activities impacting the sand dunes at Inishcrone are given in Table 132B. The greatest impact on the fixed dune has been the golf course (Code 601), which has altered the system. The golf course is outside the cSAC but is intensively managed and the greens are re-

seeded (Code 103) and mown (Code 102) regularly. The greens and tees receive fertiliser (Code 120) and herbicide applications. Run-off (Code 952), as well as the spread of agricultural grasses will affect the remaining fixed dune. Furthermore, the golf course seems to be in the process of expanding into the cSAC area. A caravan park (Code 608), located on the fixed dune outside the cSAC attracts high numbers of visitors to the area. There is a playground (Code 609) and a car park (Code 400) in the far eastern part of the site, which are both within the cSAC boundary. Tracks have developed along the fixed dune as a result of high levels of pedestrian traffic (Code 622). There is a small amount of dumping of household waste (Code 421) along the track in the fixed dune and some bonfire/barbeque (code 690) sites are also scattered in places. As mentioned, the fixed dune is not grazed and as a result is now becoming under-grazed (Code 149). Overgrazing in the past, as well as overuse and trampling (Code 720) has led to an increase in the processes of natural erosion (Code 900) and a number of large blowouts are apparent in the western part of the site. The dune-reinstatement fences (Code 871) and signs erected by Sligo County Council are a positive impact and should help to curb the affects of overuse and trampling on the high dunes.

The mobile dunes are affected by walking (Code 622) and overuse and trampling (Code 720) has caused numerous tracks leading from the track in the fixed dune onto the beach. Natural erosion (Code 900) of the mobile dunes is extremely high at Inishcrone. In some places the mobile dunes have been eroded back to the fixed dune by the high winds and tides that occur, especially at the tip. The mobile dunes have been impacted by dune re-profiling (Code 870) and by the construction of sea defence/coastal protection (Code 871) near the main access point to the beach and in front of the caravan park. Furthermore, re-planting of *Ammophila arenaria* (Marram grass) and Le*ymus arenarius* (Lyme grass) has been carried out here.

Table 132B Intensity and impact of various activities on sand dune habitats at Inishcrone

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	102	B	-1	50	Outside
H2130	103	B	-1	50	Outside
H2130	120	B	-1	50	Outside & Inside
H2130	142	A	-1	35	Inside
H2130	400	A	-1	0.231	Inside
H2130	601	A	-1	86.25	Outside & Inside
H2130	608	A	-1	0.23	Inside
H2130	609	B	-1	0.57	Inside
H2130	620	B	-1	10	Inside
H2130	690	C	-1	0.01	Inside
H2130	700	C	-1	0.1	Inside
H2130	720	B	-1	3	Inside
H2130	871	C	+2	0.1	Inside
H2130	900	B	0	2.5	Inside
H2130	952	B	-1	Unknown	Inside
H2120	622	A	-1	1.7	Inside
H2120	720	B	-1	1	Inside
H2120	870	A	0	0.5	Inside
H2120	871	A	-1	0.5	Inside
H2120	900	A	0	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 the cSAC and directly impacting the sand dune habitat. Outside = activities recorded outside the cSAC but adjacent to sand dune habitat that may be impacting the sand dune habitat

CONSERVATION STATUS

The conservation status of the site is assessed in terms of extent, structure & functions and future prospects. Baseline information for this site came from the National ASI Survey (1993), the NATURA 2000 survey and the MPSU management plan. The Irish Links Survey (1999) was also consulted.

Fixed Dunes (H2130)

The extent of fixed dunes is rated as *unfavourable-inadequate* (Table 132A). This assessment is as a result of the presence of the golf course, which is expanding into the fixed dune. This has been in existence since 1918, but management of the course has altered areas of the fixed dune habitat. The recent loss of extent of the fixed dunes is estimated as approximately 9ha.

Overall Structure & Functions are rated as *unfavourable-bad* for the fixed dune habitat at Inishcrone. A total of four monitoring stops were placed in the habitat. All four monitoring stops failed some of the criteria set out in the monitoring process. The main reason for failing

is due to sward height, which ranges from 10-60 centimetres in all stops. This also means that there is a decrease in species diversity within the stops and in most cases the target of six typical species is not met. Cattle do not currently graze the fixed dunes in the site and so the sward has become tall and rank.

The fixed dune at Inishcrone has been impacted by the physical presence of the golf course and the associated activities. Parts of the remaining intact fixed dune habitat have in the past been affected by overgrazing, leading to a loss of vegetation and an increase in natural erosion. There is still a high proportion of bare sand and large blowouts are present. Trampling by people has also affected the vegetation cover, especially on the high dune ridges. The fixed dune is currently not grazed (no rabbits or their burrows were seen either) and dune restoration works are being carried out. As a result there is a change to more rank vegetation with a decrease in species diversity. The future prospects are therefore rated as *unfavourable-inadequate*.

The overall fixed dune habitat at Inishcrone has been highly altered. The remaining habitat is also declining in species diversity and therefore an assessment of *unfavourable-bad* is given for the fixed dune habitat.

The overall Irish rating is *unfavourable-declining*.

Table 132C Conservation status of Annex I sand dune habitats of Inishcrone

Habitat	EU CONSERVATION STATUS ASSESSMENT				
	Favourable	**Unfavourable – Inadequate**	**Unfavourable – Bad**	**Overall EU conservation status assessment**	**Proposed Irish conservation status system[2]**
Fixed Dunes (H2130)		Extent Future Prospects	Structure & Functions	**Unfavourable – bad**	Unfavourable-declining
Mobile Dunes (H2120)		Extent Future Prospects	Structure & Functions	**Unfavourable – bad**	Unfavourable-declining

[1]EU Codes as per Interpretation Manual

[2] Ratings are Favourable (Enhanced, Maintained, Recovered, Declining), Unfavourable (Recovering, Unchanged, Declining) and Destroyed (Partially destroyed, Completely destroyed and Unknown)

Table 132D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Inishcrone

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	0	4	**Unfavourable-Bad**
Mobile Dunes (H2120)	3	2	**Unfavourable-Bad**

Mobile Dunes (H2120)

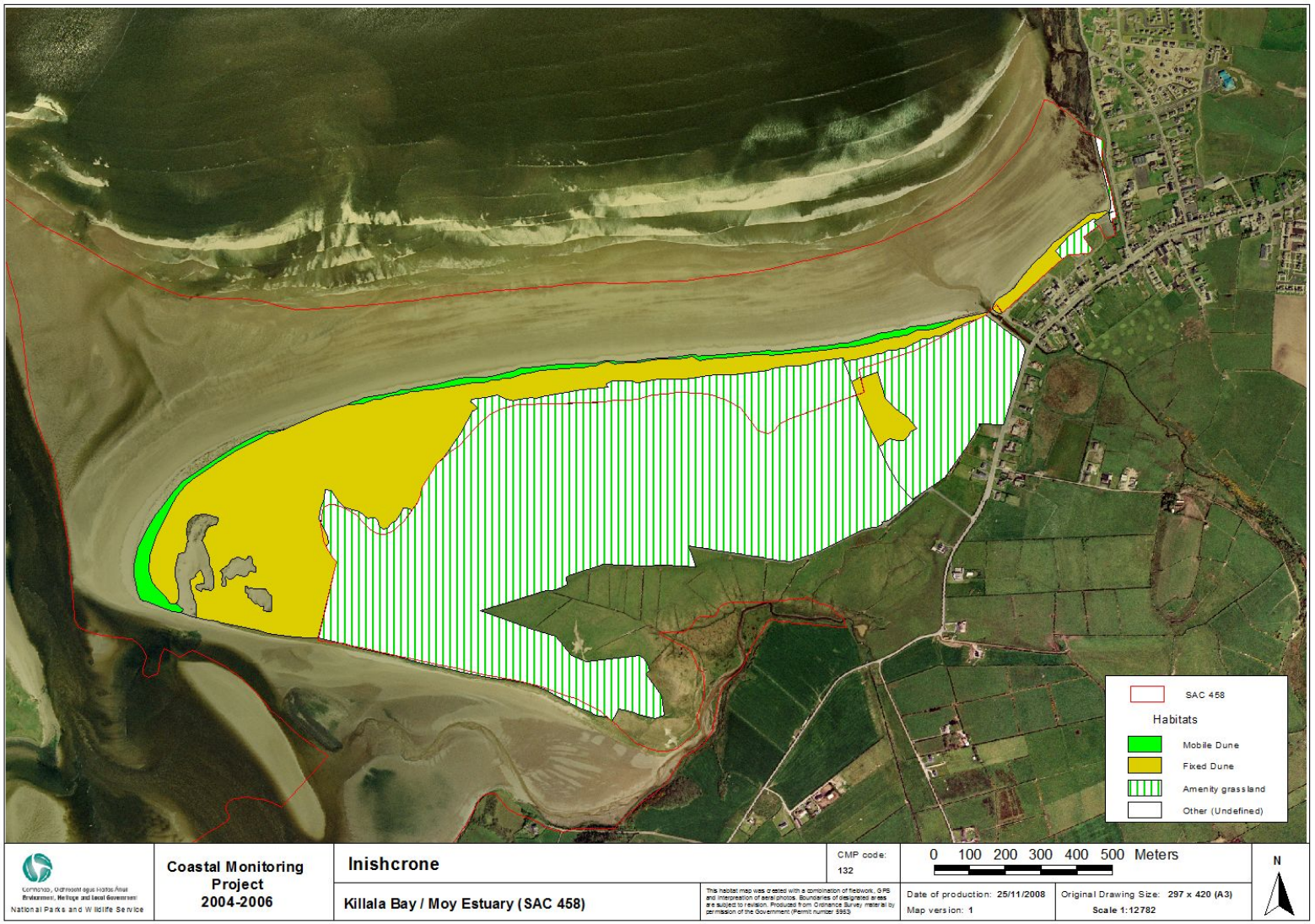
The extent of the mobile dunes is rated as *unfavourable-inadequate* at the site (Table 132C). The habitat is patchy in distribution and is eroded back to the fixed dune in places by natural erosion compounded by human activities such as the presence of the coastal protection works at the site.

The structure and functions parameter is rated as *unfavourable-bad*. A total of five monitoring stops were placed in the mobile dunes at Inishcrone. Three passed and two stops recorded at the growing tip failed (Table 132D). Both monitoring stops failed as a result of the high proportion of the *Ammophila arenaria* (Marram grass) at the tip of the spit, which is dying. There were negative indicators also recorded in this area. In other areas of the habitat there is healthy and fresh growing *Ammophila arenaria* (Marram grass) but it is susceptible to trampling by walkers.

The future prospects for the mobile dune habitat at this site are considered *unfavourable-inadequate*. The habitat is very fragmented and susceptible to increasing natural erosion compounded by anthropogenic activities.

The overall EU conservation status of mobile dunes is *unfavourable-bad* (Table 132C).

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


SAC 458
Habitats
Mobile Dune
Fixed Dune
Amenity grassland
Other (Undefined)
Coimisiún, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government
National Parks and Wildlife Service
Coastal Monitoring Project 2004-2006
Inishcrone
Killala Bay / Moy Estuary (SAC 458)
CMP code: 132
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)
0 100 200 300 400 500 Meters
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:12782
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