River Barrow and River Nore SAC (site code: 2162)
Conservation objectives supporting document
-coastal habitats

Version 1

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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, 2003). 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.

The River Barrow and River Nore SAC (site code: 2162) was designated for a range of marine, freshwater and terrestrial habitats including saltmarsh, alluvial woodlands, dry heath, estuaries, floating river vegetation and petrifying springs. The following three saltmarsh habitats are included as qualifying interests for the site:

- *Salicornia* and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)
- Mediterranean salt meadows (Juncetalia maritime) (1410)

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

The targets set for the saltmarsh habitats are based primarily on the results of the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry & Ryle, 2009) and these reports should be read in conjunction with this document.

During the Saltmarsh Monitoring Project (SMP) the following four sub-sites within the River Barrow and River Nore SAC were surveyed, mapped and assessed (McCorry & Ryle, 2009):

1. Dunbrody Abbey
2. Killowen
3. Rochestown
4. Ringville

Detailed individual reports and habitat maps were produced for each of these sites and these are included in a series of Appendices to this document. The conservation objectives for the saltmarsh habitats within the entire SAC are extrapolated from these reports. There are additional areas of saltmarsh known to be present within the site, however, it is estimated that the four sub-sites surveyed by the SMP represents over 80% of the total area of saltmarsh within the River Barrow and River Nore SAC.

2 Conservation Objectives

The conservation objectives aim 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*) (1330)
- Mediterranean salt meadows (*Juncetalia maritimi*) (1410)
- Mediterranean and thermo-Atlantic halophilous scrub (1420)

The first three of these habitats are found within the River Barrow and River Nore SAC, with Atlantic salt meadows occupying the greatest proportion of the saltmarsh area. Detailed descriptions of each habitat in each of the four sub-sites within the River Barrow and River Nore SAC can be found in Appendices I to IV.

3.1 Overall Objectives

The overall objective for '*Salicornia* and other annuals colonising mud and sand' in the River Barrow and River Nore SAC is to '*maintain the favourable conservation condition'*.

The overall objective for 'Atlantic salt meadows' in the River Barrow and River Nore SAC is to '*restore the favourable conservation condition*'.

The overall objective for 'Mediterranean salt meadows' in the River Barrow and River Nore SAC is to '*restore the favourable conservation condition*'.

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

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

Baseline habitat maps were produced for four sub-sites located within River Barrow and River Nore SAC during the SMP. These maps are included with the individual site reports in a series of Appendices at the end of this document.

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

Sub-site Name	Total area (ha) of ***Salicornia* mudflats** (excluding mosaics) from SMP	Total area (ha) of ***Salicornia* mudflats** within SAC boundary (including mosaics)
Ringville	0.028	0.027
Totals	0.028	0.027

Sub-site Name	Total area (ha) of **ASM** (excluding mosaics) from SMP	Total area (ha) of **ASM** within SAC boundary (including mosaics)
Dunbrody Abbey	1.713	1.252
Killowen	2.697	2.586
Rochestown	17.499	17.500
Ringville	6.335	6.704
Totals	28.244	28.042
Plus potential ASM	7.026	7.026
Totals	35.270	35.068

It should be noted that in addition to the total area of ASM that was mapped during the SMP, an area of 7.026ha of potential ASM habitat was also identified through an examination of aerial photographs. This gives an estimated total area of 35.068ha of ASM within the SAC.

Sub-site Name	Total area (ha) of **MSM** (excluding mosaics) from SMP	Total area (ha) of **MSM** within SAC boundary (including mosaics)
Dunbrody Abbey	0.129	0.078
Rochestown	0.040	0.040
Totals	0.169	0.118

There are a number of differences in the sets of figures presented in the three tables above. Most of the differences can be explained by the fact that the SMP mapped the total saltmarsh resource within each of the four sub-sites and not all of the saltmarsh mapped is contained within the SAC boundary. In addition, the total area within the SAC can be greater than given in the SMP as the SMP did not include any mosaics when calculating their total areas. 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 Annexed habitat.
2. Where a polygon was identified as a mosaic of two Annex I habitats, the area was divided 50:50 for each habitat.

3.3 Range

3.3.1 Habitat distribution

Saltmarsh is known to occur in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Strokestown House, in a narrow band on the channel side of *Phragmites* reed beds and in narrow fragmented

strips along the open shoreline. Atlantic salt meadows is by far the dominant saltmarsh habitat type. *Salicornia* mudflats are quite rare, although Mediterranean salt meadows occur in some of the larger areas of saltmarsh, notably at Carrickcloney, Ballinlaw Ferry and Rochestown on the west bank, Fisherstown, Alderton and Great Island to Dunbrody on the east bank.

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 all three of the saltmarsh habitats in the SAC in terms of 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 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.

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

3.4.3 Physical structure: flooding regime

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

The target is to maintain a flooding regime whereby the lowest levels of the saltmarsh are flooded daily, while the upper levels are flooded occasionally (e.g. high 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 within the Barrow/Nore area, 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.

The target is to maintain the range of saltmarsh habitats, as well as transitional zones, including those to terrestrial communities.

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.

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 and thereby enhancing the deposition of sediment. Excessive bare mud, however, is often a sign of overuse by livestock or humans and can lead to destabilisation and accelerated erosion of the system.

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

3.4.7 Vegetation composition: typical species & sub-communities

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

Three species listed on the Flora Protection Order (1999) have been recorded along the edges of the Rivers Barrow and Nore. Borrer's saltmarsh grass (*Puccinellia fasciculata*) and meadow barley (*Hordeum secalinum*) have been recorded at the upper edge of the saltmarsh in the narrow ecotonal areas bordering the grasslands where is significant percolation of salt water. The very rare divided sedge (*Carex*

divisa) has also been recorded from the site. The SMP confirmed the presence of *P. fasciculata* but did not record the other two species in 2007 (see Appendices).

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 River Barrow and River Nore area.

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

3.4.8 Vegetation structure: negative indicator species

The only invasive and non-native species recorded on saltmarshes during the SMP was common cordgrass (*Spartina anglica*). Swards of *Spartina* have been recorded within the Barrow/Nore area, particularly at the Dunbrody Abbey sub-site, where it is quite extensive (see Appendix I). More discrete patches were recorded at Rochestown and Ringville, while the species was not recorded at Killowen.

The target is that negative indicators such as *Spartina* should be absent or under control. The aim is to prevent spread to new sites and to limit expansion at known sites to less than 1% per annum during a reporting cycle.

4 References

Commission of the European Communities (2003). Interpretation Manual of the European Union Habitats – EUR 25. DG Environment-Nature and Biodiversity, Brussels.

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.

Appendix I – Dunbrody Abbey site report and habitat map from SMP

1 SITE DETAILS

SMP site name: **Dunbrody Abbey**	SMP site code: **0048**
Dates of site visit **14 & 24/09/2007**	CMP site code: **N/A**
SM inventory site name: **Dunbrody Abbey**	SM inventory site code: **213**
NPWS Site Name: **River Barrow and Nore**	
NPWS designation SAC: **2168**	MPSU Plan: **N/A**
pNHA: **698**	SPA: **N/A**
County: **Wexford**	Discovery Map: **76** Grid Ref: **271400, 115400**
Aerial photos (2000 series): **O 5568-D; O 5634-A,B**	6 inch Map No: **Wx 039**

Annex I habitats currently listed as qualifying interests for River Barrow and Nore SAC:

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

H1330 **Atlantic salt meadows (Glauco-Puccinellietalia maritimae)**

H1410 **Mediterranean salt meadows (Juncetalia maritimi)**

Other SMP sites within this SAC/NHA: **Rochestown, Ringville, Kilowen**

Saltmarsh type: **Estuary** Substrate type: **Mud/*Phragmites* peat**

2 SITE DESCRIPTION

Dunbrody Abbey saltmarsh is located in the Campile River estuary 12 .5 km south of New Ross in Co. Wexford. The Campile River is a tributary of the River Barrow Estuary and the saltmarsh site is located near the mouth of the Campile estuary. Dunbrody Abbey is located adjacent to the survey site on the southern side of the river. It is one of four Saltmarsh Inventory sites (Curtis & Sheehy-Skeffington 1998) found in the River Barrow estuary and is also the most southerly of these sites. Saltmarsh habitat is found along both sides of the Campile Estuary. The survey site extended from Saltmills Townland to Dunbrody Bridge. The Campile estuary extends further eastwards but this section mainly contains brackish habitats.

A tall stone embankment has been built along the northern side of the Campile River. A large area of low-lying tidal flats between Greatisland and Kilmannock Townlands was reclaimed in the 19th century behind this embankment. Most of this reclaimed land now contains farmland. There is still some tidal influence on the drainage channels that drain this area behind the tall embankment. Some saltmarsh, brackish and marshland habitat has developed along some of the drains behind this embankment. The Wexford-Waterford Railway was also built in the 19th century and crosses the Campile River north of Dunbrody Abbey. Several other smaller low-lying areas have been reclaimed in the past 100 years along the Campile River estuary. Some have been reclaimed more recently.

Most of the area around the site is quite rural although there is dispersed habitation along minor roads in the area. The landscape in this area is quite variable. The area around both Greatisland and Saltmills contains moderately sloped hillside. The area around Kilmannock is low-lying and flatter. Both sides are dominated by agricultural grassland with significant amounts of cereal crops. There is also some conifer plantation located to the south of the site within the area enclosed by the embankment.

The site is located within the River Barrow and Nore candidate Special Area of Conservation (SAC) (002168) and the River Barrow Estuary (698). The site was also listed as part of the River Barrow saltmarshes ASI in the Co. Wexford ASI report (Goodwillie 1979). This site was initially designated as an individual proposed Natural Heritage Area (pNHA) Dunbrody (779) and was then subsumed into the River Barrow Estuary pNHA (698). Two Annex I habitats are present at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying interests for the River Barrow and Nore SAC.

Most of the saltmarsh habitats mapped at this site is located within the SAC boundary. There are several fragments of Annex I habitats located outside the boundary around the site. Some are unintentional exclusions, as the 6 inch map was used to draw the SAC site boundary and there are some errors between this map and the actual ground as indicated from the aerial photos. Some of the habitat fragments have also been left out of the SAC due to unintentional exclusions.

The brackish and saltmarsh habitats found behind the tall embankment in Kilmannock are quite important as this area is the site of several rare species. One very notable species previously recorded at the site is Divided Sedge (*Carex divisa*). Divided Sedge is one of several species that is an indicator of Mediterranean salt meadows. This species is extremely rare in Ireland and is only known from three sites in the River Barrow estuary. It was listed as possibly extinct in the Red Data Book (Curtis & McGough 1988) but was subsequently re-found and is also listed in the Flora Protection Order. This species is known from brackish or marshy areas along the Barrow Estuary. This species is only found in two 10 km^2 squares along the Barrow Estuary since 1960 and there is also a record in one 10 km^2 square in Co. Antrim near Belfast Lough (Preston *et al.* 2002). This species was not re-found during his survey.

Other very notable species previously recorded at this site include Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum).* Both these species are listed on the Flora Protection Order and are listed in the Red Data Book (Curtis & McGough 1988). Both these species are found in more brackish conditions than found in ASM. Borrer's Saltmarsh-grass is generally found in upper saltmarsh and muddy transitional areas particularly along embankments adjacent to coastal areas. It is an indicator of a rarer sub-type of MSM. This species is only found from seven 10 km^2 squares along the Barrow Estuary, Wexford Harbour and Dublin Bay since 1960 (Preston *et al.* 2002). Meadow Barley

is found in brackish situations and in unimproved lowland meadows close to estuaries. Meadow Barley is found in brackish meadows at several locations along the River Barrow Estuary. This species is known from 21 10 km^2 squares in Ireland mainly distributed around the coastline (with some inland sites) since 1960. Both these species were recorded during this survey.

The Natura 2000 explanatory notes for this SAC assess Atlantic salt meadows and Mediterranean salt meadows together. The notes describe of the percolation of saltwater at the upper edge of the salt meadow where Divided Sedge, Borrer's Saltmarsh-grass and Meadow Barley are present. These conditions are described as indicative of the Mediterranean sub-type of saltmarsh.

The Rare Plant Survey (1990) surveyed this site for each of these species. The species are frequently associated with common terrestrial grassland species such as Tall Fescue (*Festuca arundinacea*), Creeping Thistle (*Cirsium arvense*), Common Birdsfoot (*Lotus corniculatus*) and Cocksfoot (*Dactylis glomerata*) as well as typical species found in brackish and saltmarsh conditions. Meadow Barley is known from drier terrestrial conditions, Divided Sedge is intermediate and Borrer's Saltmarsh-grass is found in the most brackish and wetter conditions.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is spread over several distinct fragments in different areas and for the purposes of this description can be divided into two sections, saltmarsh in the Campile River estuary and saltmarsh behind the embankment in Kilmannock.

3.1.1 Campile River estuary

Atlantic salt meadows is the more common Annex I habitat present (Table 3.1). This habitat is mainly found in small low-lying patches of consolidated mud that have developed along the Campile River Channel. There is also a significant amount of *Spartina* sward along the Campile River. Clumps and larger areas of Common Cordgrass are spread all along the sides of the river channel. The river channel has been considerably modified with the development of embankments on both sides of the river and the reclamation of intertidal habitats. Some of the areas of saltmarsh further south in the survey site (in Saltmills) are probably found on the original shoreline. ASM saltmarsh has developed in narrow bands along the shoreline at Saltmills and in a larger area behind a spit (or old embankment). This area also contains some MSM dominated by Sea Rush (*Juncus maritimus*). *Spartina* swards are distributed along the estuarine edge of the marsh.

Saltmarsh found higher in the estuary around Dunbrody Abbey has probably developed after the creation of the embankments and railway bridge. Several small 'islands' in the river

channel along Dunbrody Abbey contain patches of ASM surrounded by *Spartina* sward. There are also small areas of ASM/*Spartina* sward mosaic.

There are also several low-lying areas behind embankments that contain saltmarsh. These areas are connected to the main estuary via drains and there is still tidal influence on these sections. One of these areas is found to the east of Dunbrody Bridge where a small patch of modified saltmarsh is situated behind a tall Twitch-dominated embankment. This patch of saltmarsh has been modified by drainage and there have probably been attempts to reclaim it in the past. ASM saltmarsh and brackish grassland (CM2) is also found in a small area behind an embankment south of Dunbrody Abbey. This area was not surveyed due to access problems.

Atlantic salt meadows are less prominent between the railway bridge and the Dunbrody road bridge. A relatively large area of saltmarsh has been reclaimed along the southern side in the past 50 years and a new earth embankment has been built close to the river bank. Twitch-dominated grassland is found along the railway embankment and on a newer embankment along the southern river bank. This vegetation has been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The northern river bank, which is overhung by tall trees, also contains Twitch-dominated grassland. Common Cordgrass has also colonised along the edge of the Twitch in places and clumps have consolidated into *Spartina* swards.

The Campile estuary continues further east of the Dunbrody road bridge. This section of the estuary mainly contains Twitch-dominated grassland along earth embankments. Further east towards Campile, there are several patches of brackish habitat dominated by Sea Club-rush (*Bolboschoenus maritimus*) and Common Reed (*Phragmites australis*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This area was not surveyed.

3.1.2 Kilmannock

Saltmarsh is also located behind the tall stone embankment in Kilmannock. A hedge and some scrub have developed on top of the embankment. A large pasture is situated adjacent to the embankment a large drainage channel that drains this section of reclaimed land is situated along the north side of the pasture and separates the pasture from cereal crops in adjacent fields. This area is occasionally flooded via this drain, which enters the main estuary channel further west near Greatisland Power Station. Flow through the drain may be controlled by a one-way culvert that sometimes jams open, allowing tidal influence into the drainage channel. The landowner indicates that the pasture may be flooded for relatively long periods depending on the prevailing wind and spring tides. This means that the pasture can be covered by brackish water at infrequent times but for relatively long periods. The NHA notes and other sources also mention that there may be seepage of salt water under the embankment and this may be the source of the brackish conditions.

A narrow band of brackish habitat (CM2) dominated by Sea Club-rush is present along lower-lying land adjacent to the southern side of the main drainage channel in the pasture. There is only a small strip of brackish habitat on the northern side of the channel. Clumps of Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) are also present in this zone and further east this species becomes occasionally frequent. This zone also contains occasionally frequent saltmarsh species such as Sea Plantain, Sea Milkwort, Saltmarsh Rush (*Juncus gerardii*), Greater Sea-spurrey (*Spergularia media*), Sea Arrowgrass, Red Fescue, and Creeping Bent. There are also patches of ASM type vegetation within this zone. This zone widens towards the western end and forms a large patch dominated by Sea Club-rush. The brackish strip transitions to a strip of wet grassland (GS4) dominated by Hard Rush (*Juncus inflexus*) in a slightly higher zone and then to improved grassland that forms the main part of the pasture.

The main areas of brackish MSM are located at either end of this pasture. The eastern end of the pasture contains some brackish saltmarsh (MSM and ASM) mapped as a mosaic. The western low-lying end of the pasture contains the largest area of saltmarsh behind the embankment. A narrow strip of ASM has developed along the edge of the area dominated by Sea Club-rush. This area also contains a very narrow strip mapped as MSM located along the foot of the embankment that contains Borrer's saltmarsh-grass. This brackish vegetation is associated with a secondary drain that is situated along the foot of the embankment.

The large drain continues west along the embankment west of the pasture. This area has been planted with broad-leaves and conifers in the past 20 years and a narrow band of rank grassland has been left unplanted between the embankment and the conifer plantation. The NHA survey noted that some of the broad-leaves had died and this was due to saline seepage from under the embankment. There are some patches of brackish grassland along this drainage channel. Sea Club-rush has also colonised sections of the drainage channel.

The large drain also continues east along the embankment, east of the pasture. The drain is infilled with Sea Club-rush. There is a narrow strip of semi-natural grassland still remaining between the embankment and the large drain. Land adjacent to the north side of the drain contains cereal crops. There are several small patches along the eastern section the embankment that contain colonies of Borrer's Saltmarsh-grass.

Table 3.1. Area of saltmarsh habitats mapped at Dunbrody Abbey.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1.713
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.129
non-Annex	*Spartina* swards	1.208
	Total*	**3.050**

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

3.2 Atlantic salt meadows (H1330)

The best example of this habitat is found at Saltmills. The marsh is dominated by a low-mid marsh community. This community is dominated by a mixture of Sea Arrowgrass, Common Saltmarsh-grass, Sea Pink and Sea Plantain. Sea Aster is also present. Common Cordgrass is present in the ASM but is rare. Some tussocks with Red Fescue and Autumn Hawkbit are present. Attempts may have been made to reclaim this area in the past as an embankment is present along the estuarine edge of the eastern section. An old wall was built across the saltmarsh in the past and split it in half. This saltmarsh is grazed with a low-moderate intensity. Poaching damage is minor and was localised around the path onto the marsh. Zonation of saltmarsh vegetation is evident along the embankment with transition from low-mid vegetation to mid-upper vegetation dominated by Red Fescue and then a band of Creeping Bentgrass. This vegetation also contains Parsley Water-dropwort (*Oenanthe lachenalii*) and White Clover (*Trifolium repens*). The saltmarsh vegetation along the embankment transitions to Twitch-dominated vegetation higher up on the embankment.

There are also several patches of ASM on 'islands' or on patches along the embankments in the estuary channel. This ASM is mainly dominated by Common Saltmarsh-grass with occasional Sea Aster and clumps of common Cordgrass.

A small area of ASM is located at the eastern end of the pasture in Kilmannock. This area is dominated by Saltmarsh Rush and Sea Milkwort and also contains Sea Aster, Sea Plantain, Sea Arrowgrass, Creeping bent, Autumn Hawkbit, Curled Dock and Autumn Hawkbit. This area is surrounded by Sea Club-rush and this species seems to be spreading into the ASM zone. This area of ASM is moderately poached.

Further west on the narrow grassy strip adjacent to the conifer plantation there are several small unmapped patches along the drainage channel dominated by Saltmarsh Rush. This area is not grazed.

3.3 Mediterranean salt meadows (H1410)

There is a small area of classic MSM dominated by tussocks of Sea Rush at Saltmills. This area also contains frequent Sea Pink, Sea Arrowgrass and Fed Fescue, and smaller amounts of Creeping Bent, Autumn Hawkbit, Sea Aster and Sea Plantain.

Mediterranean salt meadows characterised by the presence of Borrer's Saltmarsh-grass is present at the western and eastern end of the pasture. Brackish vegetation is situated along the secondary drain along the foot of the embankment. This habitat is only several metres wide and is located between the large areas dominated by Sea Club-rush and the drier edge of the embankment.

This vegetation is dominated by grasses and contains a mixture of brackish species and species more typical of freshwater marsh and wet grassland. Species include Creeping Bent, Kneed Fox-tail (*Alopecurus geniculatus*), Curled Dock (*Rumex crispus*), Saltmarsh Rush, Celery-leaved Buttercup (*Ranunculus sceleratus*), Greater Sea-spurrey, Sea Club-rush, False

Fox-sedge (*Carex otrubae*), Spear-leaved Orache, Marsh Arrowgrass (*Triglochin palustris*), Hard Rush, Perennial Rye-grass (*Lolium perenne*), White Clover, Birdsfoot (*Lotus corniculatus*), Sea Aster, Sea Milkwort, Sea Arrowgrass, Silverweed (*Potentilla anserina*), Common Saltmarsh-grass and Toad Rush (*Juncus bufonius*). This area is grazed and is moderately poached. Brackish species like Borrer's Saltmarsh-grass can be found in small hollows while Hard Rush grows on tussocks. Borrer's Saltmarsh-grass is only found at low cover values (2-5%). Some poaching seems to be beneficial to Borrer's Saltmarsh-grass, while too much poaching will destroy the vegetation and create bare patches of substrate. Between 50-100 Borrer's Saltmarsh-grass plants were estimated to be present. The brackish influence does not extend very far into the pasture and the disappearance of species such as Sea Arrowgrass, Sea Plantain and Common Saltmarsh-grass and the greater frequency of Hard Rush and Perennial Rye-grass indicates the development of wet grassland or drier pasture.

Similar habitat is found at the western end of the pasture. There are several poached areas with Borrer's Saltmarsh-grass along the cattle track and along the edges of the secondary drain in this area. Sea Club-rush is found in the secondary drain at the foot of the embankment and the brackish influence extends fro 1-2 m either side of the drain and into small hollows along this drain.

Borrer's Saltmarsh-grass was also noted along a cattle track that is situated at the foot of the embankment at the eastern end of the site. Small poached patches that may be only 1-2 m in diameter with wetter substrate contain these species. These patches are somewhat elevated and seem to be beyond the influence of brackish water from the adjacent drainage channel and may be the result of seepage through the embankment. The NHA survey notes also note that seepage may be occurring under the embankment to create the brackish areas. Other species associated with Borrer's Saltmarsh-grass in these poached areas include Red Fescue, Creeping Bent, Perennial Rye-grass, Toad Rush, Curled Dock, Spear-leaved Orache and White Clover. Most of these patches are not mapped as habitat as they were so small, but the presence of Borrer's Saltmarsh grass was recorded in the Notable Species shapefile.

3.4 *Spartina* swards

This habitat is found in the Campile River Estuary. Common Cordgrass is not found behind the embankment in Kilmannock and is rare eastwards of the Dunbrody road bridge. However, it is frequently found in the estuary west of the Dunbrody road bridge. Common Cordgrass has mainly colonised on soft mudflats in the estuary and these clumps have coalesced to form *Spartina* swards. These patches of *Spartina* sward have mainly developed along the edges of the estuary channel. *Spartina* sward has also developed around the small low-lying 'islands' of ASM located near to Dunbrody Abbey. In some instances it has formed small patches of ASM/*Spartina* mosaic. Common Cordgrass is not a significant feature in the larger fragments of ASM saltmarsh found at Saltmills.

4 IMPACTS AND ACTIVITIES

Several impacts and activities act on the saltmarsh habitats at this site (Table 4.1). The main impact is grazing (140). Cattle graze the pasture behind Kilmannock embankment. The saltmarsh situated along the Campile River estuary is generally not grazed as most of it is inaccessible to livestock. The small area located behind an embankment at Saltmills is grazed. The grazing intensity was moderate at the time of the survey in the pasture at Kilmannock. The brackish and saltmarsh areas are moderately-heavily poached as they are wetter compared to the drier pasture (143). However the sward height is variable (5-10 cm) and is not overgrazed. This poaching damage creates bare substrate and may actually suit Borrer's Saltmarsh-grass, which seems to prefer wet brackish poached habitat. The grazing intensity may have increased somewhat within the pasture during the current monitoring period. Pictures taken during the NPWS Rare Plant Survey in 1990 indicate that the overall sward height was much higher at that time compared to the current survey.

The pictures taken during the rare plant survey also indicate that the pasture may have been improved somewhat (103) since the Rare Plant Survey. Curtis and Fitzgerald (1994) noted that the pasture in Kilmannock was the subject of some drainage works in 1992. This drainage was likely to have had a significant impact on the condition of the pasture and have reduced the area of suitable habitat. This may also involve the spreading of some fertiliser rather than reseeding of the pasture. More detailed fieldwork is required to determine the level of improvement. While the drainage works occurred outside the current monitoring period, they are considered in this assessment, due to their significance on the condition of the MSM habitat and the status of the rare species found at this site.

The narrow strip of grassland west of the pasture is not grazed. The NPWS Rare Plant Survey noted that this area was grazed at this time and that both sides of the fence were badly poached. The area west of the fence at the western end of the pasture has changed significantly as the drier parts of the filed have been planted with conifers. The development of forestry is not likely to have replaced saltmarsh or brackish habitat, although the lack of grazing or under-grazing may have affected it (149). The poaching intensity on the eastern side of the fence was been reduced, so there may not be any significant change in grazing intensity.

Common Cordgrass is present at this site and is frequently found along the Campile River estuary. This is an invasive species of saltmarsh (954). It is not known when Common Cordgrass colonised the Barrow River Estuary and if it was planted, but it was known to be present in Waterford Harbour since 1960 (Nairn 1986). This species is known in the River Barrow estuary as far as Kilowen saltmarsh.

Common Cordgrass forms mosaics in places around some of the small 'islands' in the main river channel. This species is rare in the estuary above the Dunbrody river bridge. There is a low potential for this species to expand on the ASM, mainly due to the relatively small area of ASM present in the estuary. Common Cordgrass is already present around the fringes of the

ASM islands, which is its preferred niche. The impact of its presence is assessed as a low negative impact in these areas. There may be some further potential for the spread of Common Cordgrass on intertidal mudflats along the estuary. It was not recorded in the area behind the embankment. A comparison of the OSI 2000 and 2005 series aerial photographs does not indicate any significant expansion or change in the cover of *Spartina* swards in the estuary. The 1995 photographs were not available.

Erosion of saltmarsh at this site is not significant (900). A moderate saltmarsh cliff is present along the edge of the some of the larger areas of saltmarsh present in the estuary channel, with the best example at Saltmills. Common Cordgrass is frequently present along the edge of these cliffs. There are no indications of any measurable loss of saltmarsh due to erosion from a comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos. The impact of erosion is assessed as having a neutral impact with a low intensity.

Table 4.1. Intensity of various activities on saltmarsh habitats at Dunbrody Abbey.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	103	B	-1	0.260	Inside
1330	143	B	-1	0.260	Inside
1330	802	A	-2	0.75	Inside
1330	900	C	0	0.015	Inside
1330	954	C	-1	0.2	Inside
1410	103	A	-2	0.129	Inside
1410	143	B	+1	0.129	Inside
1410	149	C	-1	0.001	Inside

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

The Campile River estuary has been considerably modified by reclamation in the past 200 years. The largest section was reclaimed in the 19th century and created the brackish and saltmarsh habitat in Kilmannock. There have also been attempts to reclaim smaller areas, mainly along the southern side of the Campile River estuary (802). A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos indicates that saltmarsh was more extensive in the past. Some of the attempts at reclamation have only been partially successful and saltmarsh and brackish habitat is still present behind some of the embankments. There are no indications that any of these reclamation works occurred during the current monitoring period.

The most recent reclamation occurred in the pasture located north of the railway bridge on the east side of the estuary at Dunbrody Abbey (802). The NHA survey notes indicated that a

new embankment had been constructed and some saltmarsh habitat was still present behind the embankment (winter 1995). This reclamation (estimated to be 0.75 ha of ASM) can be included within the assessment of impacts and activities. This area now contains improved grassland.

The main impacts and activities adjacent to the site are cultivation (100), fertilization (120) and the grazing of livestock (140) related to farming practises. Other impacts and activities include dispersed habitation (403), the Waterford-Wexford railway (503), forestry (160) and amenity use of Dunbrody Abbey (620). Wexford County Council have advertised for tenders to repair parts of the stone embankment at Kilmannock in the past few years.

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *unfavourable-bad* (Table 5.1). Dunbrody Abbey saltmarsh is a very notable site in a national context, as three rare species have been recorded from this site. The largest population of one of these species, Divided Sedge (found only at two other sites along the River Barrow estuary) was recorded from this site in the past. However the status of this species is uncertain, as it was not recorded during the 2007 survey, despite considerable searching.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Dunbrody Abbey.

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

Some saltmarsh has been reclaimed along the Campile estuary during the current monitoring period. The remaining ASM in the Campile River estuary is in generally good condition. The brackish marsh and MSM found in the pasture in Kilmannock has also been affected by drainage and land improvement works, prior to the current monitoring period. The 1995 OSI aerial photos are not available for Wexford so no comparison can be made between 1995 and 2000. Common Cordgrass is also present within the Campile River estuary, but is not thought to have had a significant impact on the extent of ASM found in the estuary.

This site is located within the River Barrow and Nore SAC. A NPWS conservation plan is not available for this SAC. Most of the saltmarsh habitat is situated within the SAC boundary.

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of this habitat is assessed as *unfavourable-bad*. There are no indications of any measurable loss of habitat due to erosion and natural habitat change within the current monitoring period. However, this habitat is mainly found in small discontinuous fragments along the Campile estuary, with small patches also found in Kilmannock behind the embankment. Common Cordgrass is present on the ASM and is frequently associated with it along the Campile Estuary. There are no indications of any significant loss of ASM habitat due to its colonisation on this site during the current monitoring period.

There has been some loss of saltmarsh due to reclamation along the Campile estuary over the past 100 years. The most recent reclamation is present north of the railway embankment on the east side of the river at Dunbrody Abbey. It is estimated that about 0.75 ha of saltmarsh was reclaimed. The NHA survey notes mention that a new embankment had been constructed in 1995 but saltmarsh was still present. This area now contains improved grassland.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Six monitoring stops were carried out in this habitat and five passed. Most of the attributes required for the structure and functions of this habitat reached their targets. One stop failed due to damage caused by heavy grazing and poaching by cattle. The ASM habitat found in the Campile estuary is not particularly well developed and is not as extensive compared to other sites in the River Barrow estuary. Most of the habitat is not subject to any significant grazing pressure as it is found in small fragments along the estuary, which are inaccessible. Common Cordgrass is found associated with many of these small fragments and sometimes forms mosaics with ASM on the low-lying islands within the Campile River estuary. However, the impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

Some habitat is associated with the brackish habitats found at Kilmannock, behind the embankment. This area is part of a pasture and is being grazed. The grazing intensity has caused some poaching damage. The grazing intensity has probably not varied significantly within the current monitoring period. The habitat structure is not particularly well-developed in this area and the habitat only covers a small zone along the edge of more brackish habitat. However, the ASM forms part of a more complex brackish area containing rare species that is influenced by seepage of seawater through or under the embankment and tidal influence along the large drainage channel.

5.2.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in the near future. Much of the habitat at this site within the Camplie Estuary is currently in good condition. No significant erosion was noted along the saltmarsh in this estuary.

Common Cordgrass is present in this estuary. This is an invasive species although it is not likely to spread significantly in the future and reduce the extent of ASM. This is mainly due to the relatively small extent of ASM already present within the estuary and the fact that some of the habitat is situated at tidal levels too high for significant colonisation. The small ASM 'islands' present within the estuary may be somewhat more vulnerable to the spread of Common Cordgrass. Common Cordgrass may also spread and increase its extent in the future at the expense of intertidal mudflats in the estuary.

Most of the saltmarsh habitats are within a SAC, so the habitat should not be affected by other land-use changes.

5.3 Mediterranean salt meadows (H1410)

5.3.1 Extent

Typical MSM vegetation is not well developed at Dunbrody Abbey site. The habitat is classified as the areas associated with Borrer's Saltmarsh-grass, Divided Sedge and Meadow Barley, which are characteristic of a MSM habitat subtype and are located behind the Kilmannock embankment. The Rare Plant Survey recorded these species as being distributed over a significant area of pasture. The extent of this habitat is assessed as *unfavourable-bad*. This habitat is now confined to two small areas at each end of the large pasture in Kilmannock, behind the embankment.

The extent of Borrer's Saltmarsh-grass has reduced significantly when compared to the previous extent outlined in the Rare Plant Survey (1990-1992). Several hundreds of plants were recorded during the Rare Plant Survey in 1990, whereas less than 50 plants were present in 2007. Borrer's Saltmarsh-grass is not found at the western side of the fence at the western side of the pasture, as this area is not grazed at present. The frequency of this species has reduced significantly. However, its distribution at the site may have increased

slightly, as no plants were noted along the eastern side of the embankment by the earlier Rare Plant Survey.

Divided Sedge was not recorded during the 2007 survey so its status remains uncertain. This species was previously abundant in places and was spread over a significant area of the pasture, as indicated by the Rare Plant Survey. Meadow Barley was also recorded from this area and was quite frequent in the pasture and was associated with the Divided Sedge, but again this species was also not recorded in the pasture in 2007. It was only recorded on the adjacent embankment.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Three monitoring stops were carried out in this habitat and two passed. One stop failed due to excessive poaching damage.

Two different sub-types of this habitat are present. A very small patch of the more typical sub-type, dominated by Sea Rush, is present in the small area of saltmarsh located at Saltmills in the Campile River Estuary. The rarer sub-type with Divided Sedge, Borrer's Saltmarsh-grass and Meadow Barley was formerly present in the pasture at Kilmannock and was distributed over a relatively large area. The Rare Plant Survey reports (1990-1992) indicate that the distribution of these species overlaps in places. Since Divided Sedge and Meadow Barley was not re-recorded in the pasture at this site in 2007, the structure and functions are assessed as *unfavourable-bad*. The absence of Divided Sedge may be due to the timing of the fieldwork late in the season or heavy grazing levels in this site. Reclamation of this area may also have had a significant impact.

Curtis and Fitzgerald (1994) described surveys of Divided Sedge Habitat in this area in 1990-1992. They noted that unless the flower heads are visible, Divided Sedge can be extremely hard to find and that heavy grazing may mean they are unnoticed for several years. Curtis and Fitzgerald (1994) also noted that this site was the subject of extensive drainage in 1992 and the range of the species (in the pasture) has reduced significantly.

Curtis and Fitzgerald (1994) noted that occasional salt influx, regular cycles of grazing and trampling and winter inundation create a vegetation pattern favourable to these specialist species. The site at Kilmannock is still being affected by salt influx via seepage and tidal influence along the drainage channel. The pasture (but not the narrow strip of grassland located further west along the woodland) is still grazed. The grazing levels are probably favourable to the status of Borrer's Saltmarsh-grass. Any reduction in extent of this habitat could be related to reclamation and land improvement in the years prior to the current monitoring period (1990-1995). Common Cordgrass is not present and does not affect this habitat.

5.3.3 Future prospects

The future prospects of this site are assessed as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. The status of Divided Sedge at the site in Kilmannock is uncertain. The extent of Borrer's Saltmarsh-grass has retracted in the current monitoring period and this is likely to be linked to drainage works during the 1990's. Drainage of the site may have created unfavourable conditions for this species (and for Divided Sedge and Meadow Barley) and it may be difficult to reverse this trend and recreate more favourable conditions.

The saltmarsh habitats are within a SAC, so the habitat should not be affected by land-use changes. (However, nature conservation designation was not able to protect the site at Kilmannock from reclamation and drainage works in the 90s).

6 MANAGEMENT RECOMMENDATIONS

This site is very important in a national context, as it was the site of three rare species in Kilmannock. The largest populations of Divided Sedge, an extremely rare species, were found at this site. The current status of Divided Sedge is uncertain as it was not recorded during the current survey in 2007.

This site is still under the influence of a notable set of ecological conditions, including infrequent salt influx, which has created these brackish conditions. Further survey work is required to confirm the status of each of the three rare species previously found at this site.

The NHA survey notes mention that several areas including the large area of immature woodland to the west of the pasture in Kilmannock could revert to saltmarsh if the embankment was breached and this was the reason why they were left in the pNHA/SAC. The NHA survey notes mentioned that some of the trees along the large drainage channel had died due to saline influence.

Some consideration should be given to actively manage the site with nature conservation as the primary objective. Perhaps some or all of the relevant land influence by brackish conditions behind the embankment could be bought by NPWS and then grazed to create a suitable regime (or regimes) for the rare species. The narrow strip of grassland that extends along the embankment to the west of the pasture should also be considered. This area should be grazed anyway to create suitable habitat for Borrer's Saltmarsh grass.

A bigger scale project could involve breaching the current embankment and re-flooding some of the land behind the embankment to re-create saltmarsh and brackish conditions (Managed retreat). All of the former intertidal area does not need to be re-flooded. Some farmland could be protected by a series of secondary embankments.

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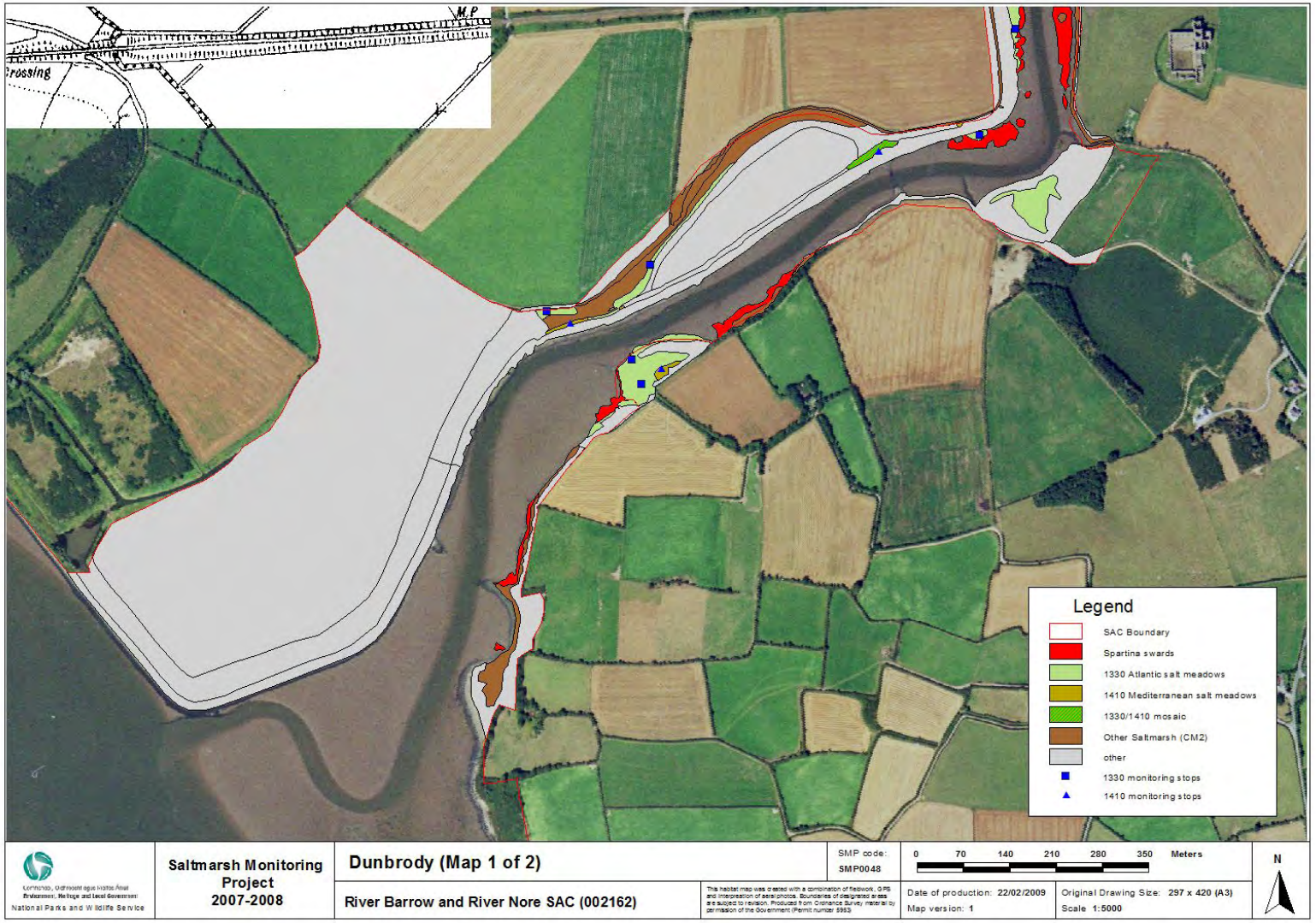
8 APPENDIX 1

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	**SM habitat description**	**Mapped Area (ha)**	**Area (ha)**				
			1310	1330	1410	1420	Spartina swards
2	Spartina swards	1.208					1.208
3	1330 Atlantic salt meadow	1.674		1.674			
4	1410 Mediterranean salt meadow	0.080			0.080		
5	ASM/MSM mosaic (50/50)	0.079		0.039	0.039		
9	Other (non saltmarsh)	34.496					
18	Other SM (CM2)	3.928					
	Total	**41.465**		**1.713**	**0.129**		**1.208**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SAC Boundary
Spartina swards
1330 Atlantic salt meadows
1410 Mediterranean salt meadows
1330/1410 mosaic
Other Saltmarsh (CM2)
other
1330 monitoring stops
1410 monitoring stops
Saltmarsh Monitoring Project 2007-2008
Dunbrody (Map 1 of 2)
River Barrow and River Nore SAC (002162)
SMP code: SMP0048
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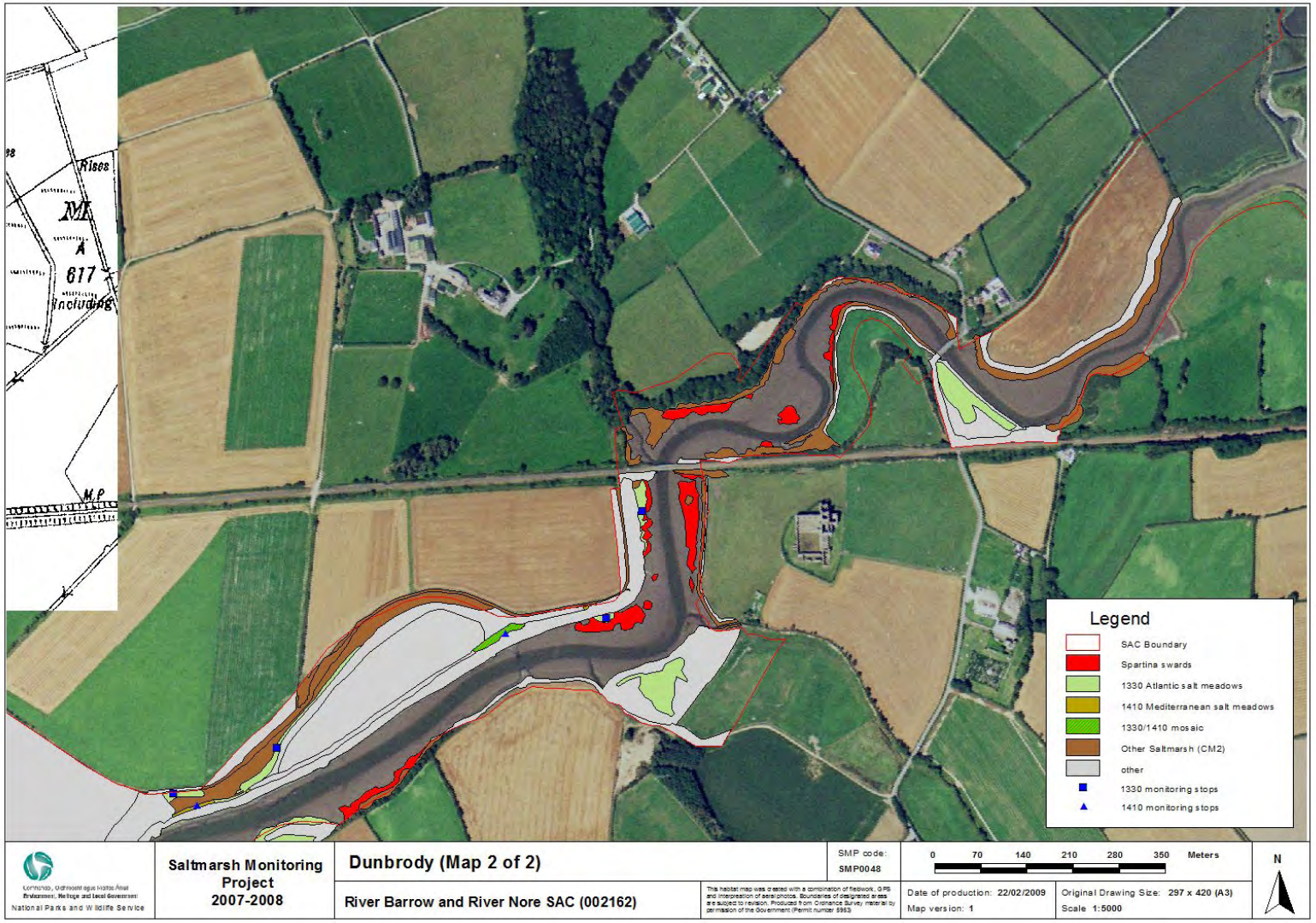
N
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:5000
National Parks and Wildlife Service


Legend
SAC Boundary
Spartina swards
1330 Atlantic salt meadows
1410 Mediterranean salt meadows
1330/1410 mosaic
Other Saltmarsh (CM2)
other
1330 monitoring stops
1410 monitoring stops
0 70 140 210 280 350 Meters
N
Saltmarsh Monitoring Project 2007-2008
Dunbrody (Map 2 of 2)
SMP code: SMP0048
River Barrow and River Nore SAC (002162)
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5963)
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:5000
National Parks and Wildlife Service

Appendix II: Killowen site report and habitat map from SMP

1 SITE DETAILS

SMP site name: **Killowen**		SMP site code: **0049**
Dates of site visit **12/09/2007**		CMP site code: **N/A**
SM inventory site name: **Killowen**		SM inventory site code: **212**
NPWS Site Name: **River Barrow and Nore**		
NPWS designation	SAC: **2168**	MPSU Plan: **N/A**
	pNHA: **698**	SPA: **N/A**
County: **Wexford**		Discovery Map: **76** Grid Ref: **268690, 120245**
Aerial photos (2000 series): **O 5503-A**		6 inch Map No: **Wx 034**

Annex I habitats currently listed as qualifying interests for River Barrow and Nore SAC:

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

H1330 **Atlantic salt meadows (Glauco-Puccinellietalia maritimae)**

H1410 **Mediterranean salt meadows (Juncetalia maritimi)**

Other SMP sites within this SAC/NHA: **Rochestown, Ringville, Dunbrody Abbey**

Saltmarsh type: **Estuary** Substrate type: **Mud/*Phragmites* peat**

2 SITE DESCRIPTION

Kilowen saltmarsh is located in the River Barrow Estuary, 7.3 km south of New Ross, in Co. Wexford. It is one of four Saltmarsh Inventory sites (Curtis & Sheehy-Skeffington 1998) found in the River Barrow estuary and the most northerly of these sites (although saltmarsh vegetation has also been recorded further north along Carrickcloney and Dungenstown Townlands). This small saltmarsh has developed in a low-lying narrow sheltered valley that is a mouth of a small stream flowing into the River Barrow. Rochestown saltmarsh is located close by around the bend to the south of the site on the Co. Kilkenny side of the river.

Most of the area around the site is quite rural although there is dispersed habitation along minor roads in the area. Both sides of the Barrow River valley slope quite steeply in places from the river channel, although there are several low-lying areas, particularly along some of the secondary inlets and where tributaries meet the main river channel. Both sides are dominated by agricultural grassland with significant amounts of cereal crops. There is a significant amount of low-lying grassland and shoreline that is being reclaimed or has been reclaimed in the past along both sides of the River Barrow in this area. Some recently reclaimed land is situated to the south of this site.

The site is located within the River Barrow and Nore SAC (002168) and the River Barrow Estuary pNHA (698). The site was also listed as part of the River Barrow saltmarshes ASI in

the Co. Wexford ASI report (Goodwillie 1979). One Annex I habitat is present at this site, Atlantic salt meadows (ASM). This habitat is listed as a qualifying interest for the River Barrow and Nore SAC. The entire saltmarsh habitat mapped at this site is located within the SAC boundary.

Several rare species listed on the Flora Protection Order including Divided Sedge (*Carex divisa*), Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum)* have been recorded from saltmarshes or brackish areas within the River Barrow Estuary pNHA. Divided Sedge is extremely rare and is only known from three sites in the River Barrow. It was listed as possibly extinct in the Red Data Book (Curtis & McGough 1988) but has been re-found (Curtis & Fitzgerald 1994). This species is only found in two 10 km^2 squares along the Barrow Estuary since 1960 and there is also a record in one 10 km^2 square in Co. Antrim near Belfast Lough (Preston *et al.* 2002). The NPWS Rare Plant Database notes an old record for Divided Sedge at marshes near Kilowen House in Dunganstown. This could indicate this saltmarsh or marshes further north in the next Townland (Dunganstown). The last record at this site was in 1921.

The site was accessed from adjacent farmland close to Kilowen House. Permission was sought to cross this land on to the saltmarsh from the farm near the end of the lane accessing this area.

3 SALTMARSH HABITATS

3.1 General description

The only Annex I saltmarsh found at this site is Atlantic salt meadows (ASM) (Table 3.1). There is also a significant amount of habitat classified as Other Saltmarsh (CM2) (Appendix I) dominated by stands of Sea Club-rush (*Bolboschoenus maritimus*) and Common Reed (*Phragmites australis*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This is quite typical of an estuarine site with significant freshwater influence. The saltmarsh has developed in a small low-lying inlet along the main River Barrow estuary. The saltmarsh is widest nearest the river channel and then narrows further east towards the landward side up the valley. The marsh is generally fairly flat, although there is some internal topography with mounds and channels and a slight slope to higher land along the northern and eastern sides. There is a moderately sloped hillside adjacent to the northern boundary and the area to the south is low-lying and has been reclaimed.

There are extensive stands of Sea Club-rush along the seaward or river channel side of the saltmarsh. Intertidal mudflats shelve steeply away from the saltmarsh into the main estuarine channel. Brackish vegetation is also located along the northern boundary and towards the eastern terrestrial side of the site. A tall hedge on a ditch marks the northern boundary of the site and the division between the marsh and the adjacent pasture on moderately sloped land.

A drain marks the southern side of the site and separates the site from a steep embankment that encloses recently reclaimed land.

There is some transition to wet grassland with freshwater marsh influence along these boundaries and particularly at the eastern side, where there is some Scrub dominated by Willow and freshwater stands of Common Reed. This transitional area along the northern boundary is quite tussocky and damaged somewhat by poaching and contains a mixture of brackish and freshwater species. This area contains Creeping Bent (*Agrostis stolonifera*), Glaucous Club-rush (*Schoenoplectus tabernaemontani*), Marsh Arrow-grass (*Triglochin palustris),* Hard Rush (*Juncus inflexus*), Yellow Flag (*Iris pseudacorus*), Brookweed (*Samolus valerandi*), Wild Celery (*Apium graveolens*), False Fox-sedge (*Carex otrubae*) and Marsh Marigold (*Caltha palustris*).

A small stream flows down the valley and along the southern side of the site before crossing the saltmarsh and entering the Barrow channel about midway along the saltmarsh. This main stream or creek divides the largest area of brackish habitat from the main area of saltmarsh.

Table 3.1. Area of saltmarsh habitats mapped at Killowen.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	2.697
	Total	**2.697**

3.2 Atlantic salt meadows (H1330)

The ASM at this site contains typical estuarine vegetation communities. The freshwater influence on the site is notable with the presence of Creeping Bent in association with Common Saltmarsh-grass (*Puccinellia martima*). There are several different typical saltmarsh communities present and zonation of these communities is present. A low-lying ridge along the seaward edge contains a mid-marsh community dominated by Common Saltmarsh-grass and Sea Milkwort (*Glaux maritima*). Other species present include Sea Aster (*Aster tripolium*), Creeping Bent, Sea Plantain (*Plantago maritima*) and Sea Arrowgrass (*Triglochin maritimum*). This community also appears along some more low-lying marsh, particularly along the main creek that divides the saltmarsh. Common Cordgrass (*Spartina anglica*) is present on the site but is rare.

The saltmarsh is dominated by a grassy mid-high vegetation community dominated by Red Fescue (*Festuca rubra*) with smaller amounts of Creeping Bent and Saltmarsh Rush (*Juncus gerardii*). Other species present include Long-bracted Sedge (*Carex extensa*), Sea Aster, Parsley Water-dropwort (*Oenanthe lachenalii*), Autumn Hawkbit (*Leontodon autumnalis*), Common Scurvygrass (*Cochlearia officinalis*), Sea Milkwort and Sea Plantain

There are small patches and strips of Sea Club-rush, Common Reed and Glaucous Sea-rush within the area mapped as ASM. These brackish species occur in some of the shallow

vegetated channels that criss-cross the marsh and probably have a greater freshwater influence due to seepage from adjacent land.

The saltmarsh has some creek and salt pan development, although its development is quite minor, which is typical of a small site like Kilowen. The internal saltmarsh topography also affects zonation. Tidal debris with patches of old Reed stems is present in places on the saltmarsh. The sward height was still quite high (near the end of the summer) and the site was only lightly grazed, (although there are signs of heavy poaching along the marshy freshwater/transitional zone along the saltmarsh boundary).

4 IMPACTS AND ACTIVITIES

There are few impacts and activities affecting this site (Table 4.1). The main impact is grazing (140). The site was being grazed by cattle at the time of the survey but the grazing intensity was quite low and the ASM does not show any signs of poaching damage. Cattle have easy access from adjacent pasture, but only seem to access the site infrequently. Some of the transitional zones (CM2) are quite tussocky and damaged by poaching. These transitional areas around the northern boundary are quite soft and marshy and this may discourage cattle from accessing this area. Common Cordgrass (954) is present on the site but is rare and has very little impact.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	2.697	Inside
1330	900	C	0	0.1	Inside
1330	954	C	0	2.697	Inside

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

Erosion of the site is not significant (900). There is a tall saltmarsh cliff along the seaward edge of the saltmarsh, although much of the seaward edge is vegetated by Sea Club-rush. A comparison of the OSI 1995, 2000 and 2005 series aerial photos indicates that there is some adjustment of the stands of Sea Club-rush and Common Reed that are situated along the seaward edge of the saltmarsh. A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos indicates that there has been no significant loss of habitat at this

site in the intervening period. The impact of erosion is assessed as neutral with a low intensity on the marsh face.

Impacts and activities adjacent to the site include dispersed habitation (403), amenity use of the Barrow River estuary (620), use of the Barrow for navigation and access to New Ross Port (509), fishing (200) and fertilization (120), the grazing of livestock (140) and tillage (100) related to farming practises. These activities have no measurable impact on the saltmarsh habitats.

There have been dredging works in the past few years along the Barrow River channel (820). A large area to the south of the site has been used to dump sediment dredged from the River Barrow navigation channel and is protected from the estuary by a high embankment. This area now contains tillage crops. These low-lying fields were reclaimed prior to the drawing of the 2nd edition 6 inch map and the embankment was also built at this stage.

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *favourable* (Table 5.1). Kilowen saltmarsh is a small site with several features of particular interest. The saltmarsh is in relatively good condition and there are few impacts and activities acting on the site in a negative way. The grazing intensity is low. The presence of brackish and freshwater marsh vegetation along the northern boundary of the saltmarsh increases the diversity of the site. There is considerable freshwater influence on this estuarine site and this has significantly influenced the vegetation of the site when compared to other types of saltmarsh. Retaining variability in the different types of saltmarsh is important for the conservation of the overall habitat.

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

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

This site is located within the River Barrow and Nore SAC. A NPWS conservation plan is not available for this SAC. The entire saltmarsh habitat is situated within the SAC boundary.

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any measurable loss of habitat due to erosion or to land-use changes within the current monitoring period. Common Cordgrass is present on the ASM but is rare and no *Spartina* swards were mapped on this site.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Four monitoring stops were carried out in this habitat and they all passed. All of the attributes required for the structure and functions of this habitat reached their targets. The ASM habitat at this site shows typical development of various saltmarsh communities related to zonation on the saltmarsh. There is significant freshwater influence on this site and this is indicated by the presence of Creeping Bentgrass in the lower saltmarsh communities. The pioneer saltmarsh community is not represented. The saltmarsh topography is moderately-developed and is quite natural. Common Cordgrass is present on the saltmarsh but is rare.

There are natural transitions to brackish and freshwater marsh habitats along the northern and eastern boundaries of the saltmarsh. This brackish and freshwater marsh vegetation adds to the diversity of the site. The Rare Plant Survey (1990) noted that this area should be searched for Divided Sedge, as it is a suitable site for this species. The southern margin of the site has been modified by the development of a tall embankment along the edge of the stream bed.

5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. Much of the habitat at this site is currently in good condition. There are no indications that this site will be affected by significant erosion in the future.

Common Cordgrass is present on the site but is rare and is unlikely to spread significantly in the future. The position of Kilowen in the Barrow Estuary means there is considerable freshwater influence on the site and this lowers the competitively of Common Cordgrass relative to the other saltmarsh species. Common Cordgrass may spread into pans on the site, although this site has relatively few pans) but it is not likely to replace significant amounts of ASM habitat.

The saltmarsh habitats are within a SAC, so the habitat should not be affected by other land-use changes.

6 MANAGEMENT RECOMMENDATIONS

No specific recommendations.

7 REFERENCES

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

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Curtis, T.G.F. & Fitzgerald, R.J. (1994). The re-discovery of *Carex divisa* Hudson, divided sedge, in Ireland. *Irish Naturalists Journal*, **24**, 496-498.

Goodwillie R. (1979). A preliminary report on the areas of scientific interest in Co. Wexford. An Foras Forthbatha.

NHA database (1990). Information from files of pNHAs held by NPWS.

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

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8 APPENDIX 1

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	**SM habitat description**	**Mapped Area (ha)**	**Area (ha)**				
			1310	1330	1410	1420	Spartina swards
3	1330 Atlantic salt meadow	2.697		2.697			
9	Other (non saltmarsh)	0.216					
18	Other SM (CM2)	3.836					
	Total	**6.749**		**2.697**			


Legend
SAC Boundary
1330 Atlantic salt meadows
Other Saltmarsh (CM2)
other
1330 monitoring stops
Saltmarsh Monitoring Project 2007-2008
Killowen
SMP code: SMP0049
0 20 40 60 80 100 Meters
N
River Barrow and River Nore SAC (002162)
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 6963)
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:1750
National Parks and Wildlife Service

Appendix III: Rochestown site report and habitat map from SMP

1 SITE DETAILS

SMP site name: **Rochestown**		SMP site code: **0050**
Dates of site visit **13/09/2007**		CMP site code: **N/A**
SM inventory site name: **Rochestown**		SM inventory site code: **211**
NPWS Site Name: **Rivers Barrow and Nore**		
NPWS designation	SAC: **2162**	MPSU Plan: **N/A**
	pNHA: **698**	SPA: **N/A**
County: **Kilkenny**		Discovery Map: **76** Grid Ref: **268950, 119500**
Aerial photos (2000 series): **Kk 044; Wx 034, 039**		6 inch Map No: **Kk 044; Wx 034, 039**

Annex I habitats currently listed as qualifying interests for River Barrow and Nore SAC:

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

H1330 **Atlantic salt meadows (Glauco-Puccinellietalia maritimae)**

H1410 **Mediterranean salt meadows (Juncetalia maritimi)**

Other SMP sites within this SAC: **Ringville, Kilowen, Dunbrody Abbey**

Saltmarsh type: **Estuary** Substrate type: **Mud**

2 SITE DESCRIPTION

Rochestown saltmarsh is located in the River Barrow estuary 8.4 km south of New Ross in Co. Kilkenny. It is one of four Saltmarsh Inventory sites (Curtis & Sheehy-Skeffington 1998) found in the River Barrow estuary. This is one of the largest areas of saltmarsh in the River Barrow estuary. It has developed along the sheltered inside of a meander in the Barrow river channel. Kilowen saltmarsh is located close by to the north of the site on the Co. Wexford side of the river, while Ringville saltmarsh is located 1.5 km south of this site.

Most of the area around the site is quite rural although there is dispersed habitation along minor roads in the area. Both sides of the Barrow River valley slope quite steeply in places from the river channel, although there are several low-lying areas, particularly along some of the secondary inlets and where tributaries meet the main river channel. Both sides are dominated by agricultural grassland with significant amounts of cereal crops. There are some small areas of woodland, particularly on steeper-sided slopes. Rochestown has developed in a low-lying area opposite a steep sided hill at Fisherstown and Poulmaloe in Co. Wexford.

The site is located within the River Barrow and Nore SAC (002168). The site was formerly designated as Rochestown Marsh pNHA (000848) before being subsumed into and the River Barrow Estuary pNHA (698). Two Annex I habitats are located at this site, Atlantic salt

meadows (ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying interests for the River Barrow and Nore SAC. The entire saltmarsh habitat mapped at this site is located within the SAC boundary.

One notable species recorded at this site is Meadow Barley (*Hordeum secalinum).* This species is listed on the Flora Protection Order and is also listed in the Red Data Book (Curtis & McGough 1988). Meadow Barley is found in brackish situations and in unimproved lowland meadows close to estuaries. Meadow Barley is found in brackish meadows at several locations along the River Barrow Estuary. This species is known from 21 10 km^2 squares in Ireland mainly distributed around the coastline (with some inland sites) since 1960 (Preston *et al.* 2002). At Rochestown it is found in several fields on the landward side of the embankment (NHA notes N22.10-N22.12) and on dry hillocks on the saltmarsh near the landward side. Meadow Barley was recorded during this survey in the fields adjacent to the saltmarsh but not in the saltmarsh area itself.

The saltmarsh was accessed by crossing adjacent pastures. Permission was sought to cross this farmland. There were several access points along the embankment with bridges over a deep drain.

3 SALTMARSH HABITATS

3.1 General description

The dominant saltmarsh habitat at Rochestown is ASM (Table 3.1). The main saltmarsh also has a substantial area (5 ha) dominated by stands of Sea Club-rush (*Bolboschoenus maritimus*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The saltmarsh is quite wide (250 -300 m) and has curved along the meander of the river channel. The seaward or river side of the saltmarsh has not been modified and contains natural transitions to estuarine habitats. There are several patches of *Spartina* swards mapped along the seaward edge of the saltmarsh. The saltmarsh transitions to a narrow band of intertidal mudflats before shelving steeply into the river channel.

The landward side of the saltmarsh has been modified in the past and there is a tall embankment along the landward side of the saltmarsh. There are significant amounts of tidal debris and debris washed down the river in floods that has been left along parts of the embankment. A deep drain has also been dug along the outside of the most of the embankment. Some Sea Club-rush is spreading in parts of this drain. This drain meets the main river channel at the southern end of the marsh and also crosses the middle section to divide the marsh into two sections, a northern section and southern section. Several drains have been dug across the northern end of the marsh in the past.

Pasture is situated in the low-lying fields behind the embankment and these fields are drained by deep drains. These pastures contain Meadow Barley. Some of these fields have been improved.

The largest area of brackish habitat (CM2) dominated by Sea Club-rush is situated at the northern end of the site, although there are smaller patches scattered over most of the marsh. Sea Club-rush has infilled a lot of the old pans in the northern section. Other species found within the areas dominated by Sea Club-rush include Red Fescue (*Festuca rubra*), Sea Aster (*Aster tripolium*), Sea Arrowgrass (*Triglochin maritimum*), Sea Plantain (*Plantago maritima*) and Creeping Bent (*Agrostis stolonifera*). The large section of Sea Club-rush also contains smaller patches of ASM dominated by Red Fescue and small sections of this area could be classified as ASM/CM2 mosaic. The saltmarsh topography and creek structure is well developed in this area.

The position of this CM2 habitat is notable as it is mainly found in the younger marsh that has developed in the past 100 years. ASM saltmarsh is actually situated to the landward side of this habitat, on the older more established saltmarsh. This habitat zonation unexpected as the brackish habitat could be expected to be found higher up on the marsh. This arrangement is likely to be due to the freshwater influence of the Barrow River acting on the northern end of the site. Tidal inundation is likely to be more influential on the southern section of the site.

Stands of Sea Club-rush has also colonised on soft mudflats along the edge of the main saltmarsh at the northern end. There is also a large patch of Common Reed (*Phragmites australis*) in main saltmarsh towards the southern end that seems to be slightly raised up compared to the surrounding marsh.

Another notable feature of this site is the development of vegetation dominated by Sea Couch (*Elytrigia pycnanthus*) along some of the larger creeks that drain this marsh. Twitch (*Elytrigia repens*) is also present within the Sea Couch-dominated zone. Other species present in this community includes Red Fescue, Creeping Bent-grass, Sea Aster and Spear-leaved Orache (*Atriplex prostrata*). There is a small patch of MSM located near the southern end that is dominated by Sea Rush (*Juncus maritimus*). The ASM area around MSM patch also contains Sea Rush but at lower densities.

Table 3.1. Area of saltmarsh habitats mapped at Rochestown.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	17.499
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.040
non-Annex	*Spartina* swards	0.049
	Total	**17.588**

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

3.2 Atlantic salt meadows (H1330)

There are several saltmarsh communities present within the ASM. The ASM at this site is particularly well-developed and this is probably related to the relatively large size of the site. The vegetation is quite grassy and a typical mid-marsh Armeria-Plantago zone is not present. Zonation of the saltmarsh vegetation is particularly well-developed. However the saltmarsh is not classically zoned with low-marsh zones at the front and upper marsh zones along the back of the marsh. There is a gentle slope from the front to the back of the saltmarsh. However, internal zonation related to the creek topography and to low ridges and hollows present on the marsh is very important and the saltmarsh vegetation also reflects this topography and is quite complicated. A pioneer ASM zone is not present at this site but patches of Sea Club-rush and Common Cordgrass (*Spartina anglica*) are colonised on soft mud along the seaward boundary of the saltmarsh. Upper-marsh zones can also be found close to the seaward boundary of the saltmarsh.

Internal zonation is evident along the larger creeks with bands dominated by Creeping Bent along the edges of the Twitch and Sea Couch-dominated vegetation, which is found along the creeks. A community with low-mid marsh vegetation dominated by Common Saltmarsh-grass (*Puccinellia martima*) and Sea Arrowgrass appears further away from the creeks in lower areas.

A low-mid marsh community that is dominated by Common Saltmarsh-grass and Sea Arrowgrass is present. This community also contains frequent Red Fescue. The freshwater influence on this site is evident by the presence and higher frequency of Creeping Bent-grass in the low-mid saltmarsh zones. Creeping Bent-grass is frequently found in association with Common Saltmarsh-grass. Other species found in this zone include Sea Aster, Common Scurvygrass (*Cochlearia officinalis*) and Sea Milkwort (*Glaux maritima*). Annual Sea-blite (*Suaeda maritima*) was recorded along the front of the marsh but Glasswort (*Salicornia* sp.) was not recorded at this site, which is notable.

The mid and mid-upper communities are indicated by increasing proportions of Red Fescue and smaller proportions of Common Saltmarsh-grass. Other species that appear in the mid and mid-upper zones include Saltmarsh Rush (*Juncus gerardii*), Autumn Hawkbit (*Leontodon autumnalis*) and Sea Club-rush. Other parts of the upper zone are dominated by Creeping Bent.

A mid-upper saltmarsh community develops in the southern section that contains tussocks created by poaching with Red Fescue, Long-bracted Sedge (*Carex extensa*) and Saltmarsh Rush. The lower hollows around the tussocks contain Common Saltmarsh-grass, Sea Arrowgrass, Creeping Bent and Common Scurvygrass. This area also contains Sea Rush and Wild Celery (*Apium graveolens*) at low cover values.

The northern section contains ASM along the back of the stands of the Sea Club-rush. The ASM area is unusual as it is quite flat and uniform with no significant topography. This area is

divided by several drains that cross the marsh. The vegetation is dominated by Red Fescue. The CM2 area contains creeks and pans but this ASM does not and it may be an indication of some modification in the past.

This saltmarsh has a complex topography and a well developed creek structure. Salt pans are also present, although there are few open pans with bare mud. Many of the pans are vegetated with patches of Sea Club-rush. The creek structure has been somewhat modified by drainage in the past. There are several small areas in the northern section of the saltmarsh where the vegetation has died back. This is possibly related to water-logging as these areas have softer mud. The saltmarsh is probably flooded by the tide via the seaward or river channel side, and also by the large deep drain along the back of the marsh. This may be the reason why there is some reverse zonation along this deep drain and lower marsh communities are present close to the embankment. The saltmarsh cliff along the seaward boundary is between 0.5-1 m high. There is some cliff toppling towards the southern end.

The ASM was grazed but at low intensities. The sward height of the ASM varies over the site but was generally higher compared to other grazed sites. There are signs of poaching that may have been caused by heavier grazing levels in the past. The poaching damage may also be related variable substrate or levels of water-logging in different parts of the marsh.

3.3 Mediterranean salt meadows (H1410)

A small patch of this habitat is present in the southern section of the marsh in the mid-upper zone of the saltmarsh. This habitat is dominated by Sea Rush. Other species that are frequent in this habitat are Creeping Bent, Red Fescue and Saltmarsh Rush. Other species occasionally or rarely found in this habitat include Sea Aster, Common Scurvygrass, Autumn Hawkbit, Sea Arrowgrass, Wild Celery, Spear-leaved Orache and Sea Club-rush. Sea Rush is also distributed within the ASM surrounding this area but at lower cover values. The MSM area is somewhat poached and tussocky with small amounts of bare ground, although this seems to be damage from previous grazing seasons, rather than the current year. This area of habitat is too small to have developed any significant topography.

3.4 *Spartina* swards

Common Cordgrass is present on the site and forms some small patches of *Spartina* sward. A narrow band of *Spartina* sward is situated along several parts of the seaward boundary of the saltmarsh, where some clumps have coalesced. This band is about 5 m wide and has colonised on soft mud along the saltmarsh cliff. There are also several other clumps of Common Cordgrass along the seaward boundary and scattered over the saltmarsh. Common Cordgrass is rare in the northern section of saltmarsh and clumps mainly appear along drains or creeks. Overall, the cover of Common Cordgrass is rare. The NHA survey notes indicate that Common Cordgrass was distributed within the River Barrow estuary as high as Strokestown House.

4 IMPACTS AND ACTIVITIES

There are few impacts and activities affecting this site (Table 4.1). The main impact is grazing by cattle (140). Cattle can enter the marsh via a wooden bridge over the deep drain towards the southern end. Most of the site is grazed. Livestock may find it difficult to graze the northern section of saltmarsh as it is cut off by some drains crossing the saltmarsh. The northern section was lightly grazed and poached. Some sections in the mid-upper zone of the southern section are more heavily poached. This area is somewhat wetter and may be softer and more vulnerable to poaching. There are also signs of poaching along some of the lower lying zones along creeks. The overall level of damage from poaching on the whole of the marsh is low-medium with some localised areas of heavy poaching (143). There are several tracks on the saltmarsh along the embankment that have been created for cattle access to the site (501).

Common Cordgrass is present on the site, but overall its cover is quite low. This is an invasive species of saltmarsh and mudflats (954). The impact of its presence is assessed as neutral. Common Cordgrass was recorded from the site by the NHA survey but does not seem to have spread significantly within the intervening period. A comparison of the OSI 1995 and 2000 series aerial photos does not indicate any significant changes in the cover of Common Cordgrass along the edge of the mudflats. This species is known in the River Barrow Estuary as Strokestown House. It is not known when Common Cordgrass colonised the Barrow River Estuary and if it was planted, but it was known to be present in Waterford Harbour since 1960 (Nairn 1986). Common Cordgrass is not noted from the old site synopses for either Ballinlaw Ferry or Rochestown Marshes (probably written around 1994) and is also not noted in the Co. Wexford ASI report for River Barrow saltmarshes dated from 1979.

Erosion of the saltmarsh is not significant (900). In fact, the saltmarsh is accreting and has expanded significantly in the past 100 years. A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos indicates that saltmarsh has expanded mainly in the northern section. There are also signs that the saltmarsh is still actively accreting and expanding, although the geo-morphological cycles are likely to have varied in the past 100 years. Most of the saltmarsh growth has occurred prior to the current monitoring period. There is a tall saltmarsh cliff along the seaward edge of the saltmarsh with some signs of recent erosion in places along the southern section. However Sea Club-rush is spreading on intertidal mud at the seaward side of the marsh and saltmarsh cliff at the northern end, indicating accretion (910) within the current monitoring period. There has been 3-5 metres growth of the Sea Club Rush stands into the river channel between 2000-2007, as indicated from a comparison of the aerial photos.

Accretion at this site may be related to changes along the river channel due to dredging. The river channel is still an important navigation route to New Ross port. There has been a long history of dredging and modification of the Barrow river channel (and reclamation of adjacent

shoreline using the dredged material). Dredging of the river channel may affect water flow along the marsh or change to the course of the river channel, leading to favourable conditions for the growth of the saltmarsh. However, these impacts can not be assessed without more detailed information.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	17.0	Inside
1330	143	B	-1	0.499	Inside
1330	501	C	-1	0.050	Inside
1330	900	C	0	0.8	Inside
1330	910	B	+1	0.8	Inside
1330	954	C	0	17.499	Inside
1410	143	B	-1	0.040	Inside

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

Several drains have been dug across the northern end of the marsh in the past (810) and are marked on the OSI 2nd edition 6 inch map. One interesting feature of this marsh is that the saltmarsh has expanded due to accretion at the northern end and these drains now do not meet the seaward side of the marsh. The large drain that is situated along the back of the marsh has also been modified in the past, although there are no indications that any of these modifications occurred within the current monitoring period. Some of the CM2 zone dominated by Sea Couch that is located along this large drain that divides the marsh is likely to have developed on spoil dug out from this drain.

The saltmarsh was probably more extensive in the past before the development of the tall embankment. The embankment is quite old and is marked on the 1st edition OSI map. Saltmarsh habitats would have probably been found in some of these low-lying fields prior to reclamation. These impacts are not considered as they occurred outside the current monitoring period.

Impacts and activities adjacent to the site include dispersed habitation (403), amenity use of the Barrow River estuary (620), use of the Barrow for navigation and access to New Ross Port (509), fishing (200) and fertilization (120), the grazing of livestock (140) and tillage (100) related to farming practises. There have been dredging works in the past few years along the Barrow River channel (820).

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the 1995, 2000 and 2005 OSI aerial photo series. The baseline information from the NHA survey is generally limited to some descriptions of saltmarsh habitat and does not record the specific condition of the saltmarsh during the survey at this site. There are no specific notes in the NHA survey for the saltmarsh at this site. There are some more detailed descriptions of the site from the Rare Plant surveys.

The overall conservation status of this site is assessed as *favourable* (Table 5.1). Rochestown is a moderately-large saltmarsh with several features of particular interest. It is one of the largest saltmarshes located within the River Barrow estuary. Meadow Barley, a species listed on the Flora Protection Order, has been recorded on the site. The saltmarsh is in relatively good condition and there are few impacts and activities acting on the site in a negative way. The grazing intensity is low. The site is actively accreting and has expanded significantly at the northern end in the past 100 years. The presence of a significant area of more brackish habitat with stands of Sea Club-rush increases the diversity of the site. There is considerable freshwater influence on this estuarine site and this has significantly influenced the vegetation of the site when compared to other types of saltmarsh. Retaining variability in the different types of saltmarsh is important for the conservation of the overall habitat.

This site is located within the River Barrow and Nore SAC. A MPSU conservation plan is not available for this SAC. The entire saltmarsh habitat is situated within the SAC boundary.

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

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 Future prospects		Structure and functions	Unfavourable - Bad

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any measurable loss of habitat due to erosion, natural habitat change or to land-use changes within the current monitoring period. This site has actually expanded in size in the past 100 years and the area of ASM has increased (although it is not likely to have increased significantly within the current monitoring period). The northern section of the saltmarsh is still actively accreting with growth of Sea Club-rush evident during the current monitoring period. Common Cordgrass is present on the ASM but is rare.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Thirteen monitoring stops were carried out in this habitat and all passed. All of the attributes required for the structure and functions of this habitat reached their targets. The ASM habitat at this site shows typical development of various saltmarsh communities related to zonation on the saltmarsh. There is significant freshwater influence on this site and this is indicated by the presence and frequency of Creeping Bentgrass over much of the saltmarsh. The pioneer saltmarsh community is not well-represented. The saltmarsh topography is well-developed and quite natural, but it has been affected by some drainage works in the past. Common Cordgrass is present on the saltmarsh but is rare and does not form a significant part of the saltmarsh structure or the vegetation assemblage.

The site is grazed lightly by cattle. This has caused some localised poaching damage in places, but overall the impact of poaching is low. There are some natural transitions to more brackish habitat represented by extensive patches of Sea Club-rush on the site. The landward boundary of the site has been significantly modified by the creation of the embankment and there are no significant transitional communities to terrestrial vegetation along the embankment. There are several patches of Common Reed along this embankment. Meadow Barley has also been recorded on dry hillocks along this embankment in the past (but not during this survey). There are natural transitions to estuarine communities (intertidal mudflats) at the lower saltmarsh boundary.

5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts or activities that are having a negative influence on the site. Grazing is the most important impact but the grazing intensity is low. Most of the habitat at this site is currently in good condition. There are no indications that this site will be affected by significant erosion in the future. The area of ASM may actually expand in the future if the current accretional trends continue in the north-eastern section. Some of the Sea Club-rush stands may develop into ASM as saltmarsh continues to accrete.

Common Cordgrass is present on the site. This is an invasive species although it is not likely to spread significantly in the future and reduce the extent of ASM. The position of Rochestown in the Barrow Estuary means there is considerable freshwater influence on the site and this lowers the competitiveness of Common Cordgrass relative to the other saltmarsh species. Common Cordgrass may spread into pans on the site, although this site has relatively few open pans) but it is not likely to replace significant amounts of ASM habitat.

Most of the saltmarsh habitats are within a SAC, so the habitat should not be affected by other land-use changes.

5.3 Mediterranean salt meadows (H1410)

5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any measurable loss of habitat due to erosion, natural habitat change or to land-use changes within the current monitoring period.

5.3.2 Habitat structure and functions

The structure and functions of this habitat is assessed as *unfavourable-bad*. One monitoring stop was carried out in this habitat and it failed. Most of the attributes required for the structure and functions of this habitat reached their targets. The main reason for the failed stop was overgrazing and poaching damage. The species composition of this habitat was somewhat different compared to other sites and this may be related to the estuarine influence on the site. Species such as Wild Celery are present. Some zonation was noted in the habitat and this was noted from other saltmarsh species. The topography was poorly developed, but this is typical of a small patch of habitat.

5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. A very small extent is present and this makes it vulnerable to small changes at the site. Grazing and related poaching damage is the man activity affecting part of the MSM at this site. There are few other impacts or activities significantly affecting this site. There are few prospects for the loss of habitat due to erosion in the future. The site is within a SAC so the habitat should not be affected by land-use changes such as development. Common Cordgrass is present at the site but this habitat is not vulnerable to invasion.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

7 REFERENCES

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8 APPENDIX 1

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
2	Spartina swards	0.049					0.049
3	1330 Atlantic salt meadow	17.499		17.499			
4	1410 Mediterranean salt meadow	0.040			0.040		
9	Other (non saltmarsh)	5.033					
18	Other SM (CM2)	8.877					
	Total	**31.498**		**17.499**	**0.040**		


Legend
SAC Boundary
Spartina swards
1330 Atlantic salt meadows
1410 Mediterranean salt meadows
Other Saltmarsh (CM2)
other
1330 monitoring stops
1410 monitoring stops
Rochestown
Saltmarsh Monitoring Project 2007-2008
Rochestown
River Barrow and River Nore SAC (002162)
SMP code: SMP0050
0 90 180 270 360 Meters
N
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:5250
National Parks and Wildlife Service

Appendix IV: Ringville site report and habitat map from SMP

1 SITE DETAILS

SMP site name: **Ringville**		SMP site code: **0051**
Dates of site visit **13 & 14/09/2007**		CMP site code: **not applicable**
SM inventory site name: **Ringville**		SM inventory site code: **210**
NPWS Site Name: **River Barrow and River Nore**		
NPWS designation	SAC: **002168**	MPSU Plan: **N/A**
	pNHA: **000698**	SPA: **not applicable**
County: **Kilkenny**		Discovery Map: **76** Grid Ref: **267000, 116000**
Aerial photos (2000 series): **O 5567-B,D**		6 inch Map No: **Kk 044; Wx 039**

Annex I habitats currently listed as qualifying interests for River Barrow and River Nore SAC:

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

Other SMP sites within this SAC: **Kilowen, Rochestown, Dunbrody**
Saltmarsh type: **Estuary** Substrate type: **Mud**

2 SITE DESCRIPTION

Ringville saltmarsh is located along the eastern (County Kilkenny) side of the River Barrow estuary. It is located 10 km south-west of New Ross. It is one of four Saltmarsh Inventory sites (Curtis & Sheehy-Skeffington 1998) found in the River Barrow estuary. The saltmarsh is situated to the north of the Ballinlaw Ferry crossing. The saltmarsh has developed in a somewhat sheltered indentation along the shoreline to the north of a small harbour or former reclaimed area protected by old seawall.

Most of the area around the site is quite rural although there is dispersed habitation along minor roads in the area. Both sides of the Barrow River valley slope quite steeply in places from the river channel, although there are several low-lying areas, particularly along some of the secondary inlets and where tributaries meet the main river channel. Both sides are dominated by agricultural grassland with significant amounts of cereal crops. There is also some conifer plantation location to the south of the site.

The site is located within the River Barrow and Nore SAC (002168) and the River Barrow Estuary (698). This site was initially designated as an individual pNHA Ballinlaw Ferry (822) and was then subsumed into the River Barrow Estuary pNHA (698). One Annex I habitats are present at this site, *Salicornia* flats, Atlantic salt meadows (ASM) All these habitats are listed as qualifying interests for the River Barrow and Nore SAC. The entire saltmarsh habitat mapped at this site is located within the SAC boundary. The SAC boundary is offset from the

actual shoreline boundaries on the ground due to offset between the 2nd edition 6 inch map and the aerial photos. This could actually works to the sites advantage as this means much of the transitional zone between the saltmarsh and the adjacent farmland is also included within the SAC. However, for management purposes, the 6 inch map excludes some of these transitional zones.

One very notable feature of this site is the presence of Divided Sedge (*Carex divisa*) at this site (Ballinlaw Ferry). Divided Sedge is one of several species that is an indicator of Mediterranean salt meadows. This species is extremely rare and is only known from three sites in the River Barrow. It was listed as possibly extinct in the Red Data Book (Curtis & McGough 1988) but was re-found (Curtis & Fitzgerald 1994) and is also listed in the Flora Protection Order. This species is known from brackish or marshy areas along the Barrow Estuary. This species is only found in two 10 km^2 squares along the Barrow Estuary since 1960 and there is also a record in one 10 km^2 square in Co. Antrim near Belfast Lough (Preston *et al.* 2002). This species was not re-found during this survey.

A second very notable species formerly recorded at this site is Meadow Barley (*Hordeum secalinum).* This species is also protected by the Flora Protection Order and is listed in the Red Data Book. This species are found in more brackish conditions than found in ASM. Meadow Barley is found in brackish situations and in unimproved lowland meadows close to estuaries. Meadow Barley is found in brackish meadows at several locations along the River Barrow Estuary. This species is known from 21 10 km^2 squares in Ireland mainly distributed around the coastline (with some inland sites) since 1960 (Preston *et al.* 2002). This species was not re-found during the survey.

The NHA notes also indicate that Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) was recorded at Ringville more recently, although not on the survey site (NHA notes 22.31, 22.39). It was found is wet brackish ditches to the north of the site. This species is only found from seven 10 km^2 squares along the Barrow Estuary, Wexford Harbour and Dublin Bay since 1960 (Preston *et al.* 2002).

This site was accessed from two points. The northern section was accessed by crossing private farmland and permission was requested to cross this land. The southern section around Ballinlaw Ferry was accessed from an adjacent minor road that leads down to the old ferry crossing. The mud in the intertidal area was quite soft and treacherous in places but it was safely crossed.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at Ringville is dominated by ASM (Table 3.1). The saltmarsh is shaped like a long cigar and is orientated NE-SW parallel to the shoreline. The saltmarsh has developed on deep mud. The saltmarsh is divided into two sections, the main section and a smaller

southern section at Ballinlaw Ferry crossing. These two sections are separated by a man-made channel. The southern section is actually an old intake that contained reclaimed land and is surrounded by an embankment, but has now reverted to intertidal habitats. Part of the larger area of saltmarsh at Ballinlaw Castle was also protected by an embankment, but this does not extend along the whole of the site.

There are several patches of *Spartina* sward within the main saltmarsh area. The estuary influence on the site is shown by the presence of patches of Sea Club-rush at several locations along the saltmarsh. There are also some bands of Twitch-dominated grassland along some of the major creeks that drain the saltmarsh. This vegetation has been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is a steep tall saltmarsh cliff about 1 m high along the seaward boundary of the saltmarsh. Mudflats are situated along the seaward edge. The river channel shelves deeply away from close to the edge of the saltmarsh to create a deep river channel. There is an old seawall or embankment along the seaward edge of the saltmarsh at the southern end near Ballinlaw Castle.

A deep drain has recently been dug along the boundary between the main saltmarsh and the adjacent agricultural grassland, although it does not stretch along the whole boundary. Spoil from the drain has been placed along the edge of the saltmarsh to create a low embankment. This embankment is fenced. There is some hedgerow development on parts of the embankment further south. There is a minor amount of saltmarsh on the landward side of the embankment at the access point onto the main saltmarsh section. There are several patches of Common Reed and Sea Club-rush along the edge of this drain on the saltmarsh. A zone dominated by Common Reed (FS1) has also developed along the landward side of this drain.

Further south along the main area (Ballinlaw Castle), there are patches of notable brackish habitat dominated by small-medium grasses (CM2) and wet grassland species appearing along the landward boundary. There are also several larger patches of Sea Club-rush also present. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This vegetation creates a diverse transitional zone between the saltmarsh and adjacent farmland.

Common Cordgrass (*Spartina anglica*) is present at this site and clumps of this species are found scattered all over the most of the saltmarsh, although it is not frequent. Several patches of *Spartina* sward or *Spartina* sward mosaics were mapped on the site at the northern tip and in the area enclosed by the seawall at Ballinlaw Ferry.

The southern section at the Ballinlaw Ferry crossing is surrounded by an old seawall. The landowner indicated that this area once contained improved land, but once the seawall was breached, the area reverted to intertidal habitats. It seems that the tidal influence has deepened this area somewhat. This seawall is vegetated by Twitch-dominated grassland. There are several openings at the northern and southern ends to allow tidal inundation. The interior of this area contains *Spartina* swards, some ASM and stands of brackish vegetation

(CM2) with Common Reed and Sea Club-rush. There is still an extensive area of bare mudflats present. There is a very narrow band of saltmarsh along the interior side of the old seawall. Divided Sedge was previously recorded along the interior edge of this seawall and on saltmarsh along the north-western corner.

The area within the southern smaller section is not grazed. The area of saltmarsh noted by the Rare Plant Survey (1990) in the north-west corner has changed significantly. This area now contains a large stand of Common Reed and grassy areas dominated by Sea Club-rush. There is a narrow grassy band dominated by Twitch and patches of vegetation dominated by creeping Bentgrass along the upper boundary and adjacent to the hedgerow. This vegetation is rank and Bindweed is also present. There are some Common Cordgrass patches along the lower edge of the saltmarsh.

There is a narrow band of *Spartina* sward along the northern seawall. This vegetation develops into a mosaic towards the seawall with more frequent cover of ASM species such as Sea Aster, Common Saltmarsh-grass, Lax-flowered Sea Lavender, Sea Pink, Sea Plantain, Sea Arrowgrass and Lesser Sea Spurrey. The higher sections of the seawall (not affected by the tide) is dominated by Sea Couch (*Elytrigia pycnanthus*) and also contains Spear-leaved Orache, Smooth Sow-thistle, Twitch, Red Fescue, White Clover, Wild Carrot, False Oat-grass, Bindweed, Frosted Orache, Sea Beet, Creeping Thistle, Curled Dock. Some of the top of the seawall has Bramble and a Blackthorn bush.

Table 3.1. Area of saltmarsh habitats mapped at Ringville.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	0.028
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	6.335
non-Annex	*Spartina* swards	0.760
	Total	**7.123**

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

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

There is only a minor amount of this habitat found at the site. Several small patches of this habitat is found on stony shingle and mixed muddy sediment situated at the northern tip of the site, under over-hanging trees. These small patches are isolated from the main saltmarsh and are associated with some clumps of Common Cordgrass. It was also found in the southern section (Ballinlaw) on soft mud adjacent to ASM. The habitat is dominated by Glasswort (*Salicornia* sp.).

3.3 Atlantic salt meadows (H1330)

There are several typical vegetation communities present at this site. Much of the main saltmarsh section is level or with a low slope from the landward to the seaward side. This

means that zonation is particularly well-developed and several different communities are quite extensive.

The sward height at this site is also quite high and this site is now not grazed, although it was grazed in the past. The freshwater of estuary influence on this site is also evident with the distribution of Creeping Bentgrass further down the saltmarsh zone compared to other types of saltmarsh. Creeping Bentgrass can be found in association with Common Saltmarsh-grass.

The lower zone is dominated by Common Saltmarsh-grass and Sea Aster. This community appears along the seaward boundary towards the northern end of the marsh and along some of the lower lying areas within the saltmarsh. A low-mid zone extends to the back of the saltmarsh in some sections.

The mid marsh zone is dominated by Sea Plantain with frequent Sea Arrowgrass and Sea Pink. There are also frequent or occasional amounts of Red Fescue and Creeping Bentgrass in this zone. Clumps of Common Cordgrass are rare in this community. This species is more common in the ASM at the northern end and much rarer towards the southern end of the main section. This is the most extensive community at this site.

A classical upper zone is not extensive at this site. A narrow band dominated by Red Fescue is found in places along the back of the marsh and along some of the larger drainage channels. Saltmarsh Rush and Long-bracted Sedge is found in this community. It is also found along the seaward boundary at the southern end of the main saltmarsh section. Several clumps of Sea rush are also present near the southern end of the main saltmarsh, but they are not extensive enough to be classified as Mediterranean salt meadows.

A slight ridge has developed along the seaward boundary of the saltmarsh and this has influenced zonation somewhat, with mid-zone or upper zone communities present along the seaward boundary and lower zone communities present further landward creating reverse zonation. This seems to be a natural phenomenon and it also seen at other sites, but there are also visible signs of an old seawall present along the seaward boundary of the main saltmarsh at the southern end.

The saltmarsh creek topography is very well developed. Several large deep undulating creeks drain this saltmarsh. One of the creeks has been modified in the past to help drainage from adjacent land and to connect the deep drain at the back of the marsh to the seaward side. A deep drain is situated along the back landward side of the saltmarsh. This drain has recently been cleaned and deepened. Some of these larger drains show some erosion, possibly related to the recent drainage works and changes in water flow along the creek. There are also some large salt pans, but these are rare. One significant feature of these larger creeks is the development of low ridges along the sides of the creeks, which are vegetated by Twitch-dominated vegetation. This community contains both Twitch and *Elytrigia pycnanthus*.

The southern section at Ballinlaw within the old seawall also contains some ASM and some ASM/*Spartina* mosaic. This saltmarsh is less consolidated and contains a low marsh community dominated by Common Saltmarsh-grass and frequent tall Sea Aster. The ASM/*Spartina* mosaic is found in lower laying areas on soft mud where ASM species are colonising in clumps of Common Cordgrass. This mosaic community is also seen along the northern seawall between *Spartina* sward and ASM and in places along the western landward side of this area where Common Saltmarsh-grass and Sea Aster are colonising in clumps of Common Cordgrass. There are occasional patches of Common Saltmarsh-grass on bare mud isolated from clumps of Common Cordgrass.

3.4 Mediterranean salt meadows (H1410)

Several clumps of Sea Rush were noted at the southern end of the main section, but these were not extensive enough to classify as MSM. The Divided Sedge habitat could also be classified as MSM. However, this species was not recorded during the first site visit. So this habitat was not mapped at this site.

A comparison of the Rare Plant Survey (1990) notes and photographs with the current situation indicates that the area where the Divided Sedge was recorded has changed somewhat. The Rare Plant Survey noted that the site was being grazed, but there were no indications that the site had been grazed in the past few years. Change seems to be most significant along the north-western corner of the enclosed area. This area is now dominated by dense patches of Common Reed and Sea Club-rush with some more open vegetation dominated by rank Creeping Bentgrass and Twitch. The Rare Plant Survey described this area as containing a narrow band of Red Fescue-dominated saltmarsh, which contained the Divided Sedge. This species was also noted along the inside of the old seawall. Its distribution seemed to cross from the lower saltmarsh zone to the upper more terrestrial zone on the wall. The vegetation along the wall has not changed significantly compared to the older descriptions. This species may not have been recorded due to the timing of the survey (September) which is probably too late to easily record sedges.

3.5 *Spartina* swards

Common Cordgrass is present on the main saltmarsh section within the ASM and forms some small patches that were classified as *Spartina* swards. These patches also contain elements of ASM dominated by Common Saltmarsh-grass. Other species present within the clumps of Common Cordgrass include Sea Aster, Spear-leaved Orache, Frosted Orache, Sea Club-rush, Sea Arrowgrass and Sea Plantain. Clumps of Common Cordgrass are also distributed over the ASM but are low in frequency and become much rarer towards the southern end of the main section. There is no indication that Common Cordgrass is spreading on the saltmarsh.

There are several small patches of typical *Spartina* sward development along the seaward edge of the main saltmarsh, where Common Cordgrass has colonised the soft mud. This

sward development is only 5-10 m wide at the northern end of the saltmarsh. There are also several minor patches towards the southern end of the main section. There is no indication that Common Cordgrass is spreading on the mudflats adjacent to the saltmarsh.

The most extensive colonisation of Common Cordgrass is within the southern section enclosed by a seawall. Clumps of Common Cordgrass are frequently scattered over the soft mudflats. Several mudflat/*Spartina* clump mosaics were mapped. The clumps have consolidated to form some areas of sward, particularly along the northern seawall and along parts of the western landward boundary. There is potential for the further spread of Common Cordgrass within this area, but no seedlings were recorded during the site visit, indicating that there is no recent spread at present.

4 IMPACTS AND ACTIVITIES

There are several impacts and activities acting on this site (Table 4.1). The main activity in the past was probably grazing (140). The landowner who owns the main section of saltmarsh indicated that the marsh was grazed in the past by cattle for several weeks during the summer. However, since the landowner is managing the farm in REPS, the marsh is not grazed as part of REPS management. These trends were also recorded on the site, where no current grazing was noted, but some signs of older grazing impacts, such as poaching were noted. The impact of grazing has decreased in the past few years as notes from the NHA survey indicate parts of the saltmarsh were severely poached. Some local people who hunt on the site (230) mentioned that since cattle-grazing has ceased on the site, the numbers of Snipe using the site have reduced significantly. The impact of the lack of grazing does not seem to have significantly affected the structure and functions of the main saltmarsh section yet as the sward height and structure is still quite diverse. However, some grazing is still probably beneficial for this site.

The lack of grazing may have affected the southern section enclosed by the seawalls. The Rare Plant Survey noted that this area was being grazed and that grazing with probably beneficial to the status of the rare species Divided Sedge (and therefore any MSM habitat), by keeping the sward more open. The affects of under-grazing (149) in the intervening period can be seen by the spread of Common Reed and Sea Club-rush and the development of rank vegetation in the area where Divided Sedge was formerly distributed. These changes may be natural and also related to adjacent farming practises (120 & 140) such as run-off of nutrients and some eutrophication.

There have been some drainage works on the main saltmarsh during the current monitoring period (810). A deep drain along the back of the saltmarsh has been excavated and there are also signs that one of the main creeks that connect this drain to the main river channel has also been excavated. Material from the excavation of the main drain has been placed along the edge to create a low embankment. Some erosion was noted along this modified creek.

Common Cordgrass is present on the site but is not a prominent feature of most of the saltmarsh. This is an invasive species of saltmarsh (954). Clumps of Common Cordgrass within the ASM but with low frequencies and there are also some small patches of *Spartina* swards and ASM/*Spartina* sward mosaic that have developed in the established marsh. Clumps of Common Cordgrass are also present on mudflats adjacent to the saltmarsh and in the area sheltered by the old seawall. There are no indications that Common Cordgrass is spreading significantly or will continue to spread in the future. A comparison of the OSI 1995 and 2000 series aerial photos does not indicate any significant changes in the cover of Common Cordgrass on mudflats. There is some scope for the spread of Common Cordgrass on the mudflats within the southern section enclosed by the old embankment. It is not known when Common Cordgrass colonised the Barrow River Estuary and if it was planted, but it was known to be present in Waterford Harbour since 1960 (Nairn 1986). This species is known in the River Barrow estuary as far as Strokestown House. Common Cordgrass is not noted from the old NPWS site synopses for either Ballinlaw Ferry or Rochestown Marshes (probably written around 1994) and is also not noted in the Co. Wexford ASI report for River Barrow saltmarshes dated from 1979.

There are clear indications that this marsh is being eroded (900). Signs of erosion are evident along the seaward boundary of the saltmarsh with significant cliff toppling visible along the saltmarsh cliff. A comparison of the OSI 1995 and 2000 series aerial photos does not indicate any significant loss of saltmarsh habitat along the seaward boundary, so the rate is likely to be slow. However, there is an obvious erosional trend and the impact of erosion is assessed as a low negative impact. There are few prospects for landward retreat of saltmarsh habitats at this site due to the topography of the river valley so erosion is assessed as having an irreparable negative influence. There are some indications of erosion and minor loss of habitat at the northern tip. This may be natural realignment of the saltmarsh. It may also be related to dredging works in the past few years further upstream along the Barrow River channel (820). The river channel is still an important navigation route to New Ross port. There has been a long history of dredging and modification of the Barrow river channel (and reclamation of adjacent shoreline using the dredged material).

A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos is not very useful at this site due to the significant offset of between 10-30 m between thee two GIS layers. The extent of the saltmarsh mapped on the 2nd edition OSI map is similar to the current extent from a visual assessment. The saltmarsh is not mapped on the 1st edition OSI map but the old seawall around the southern section and a section adjacent to Ballinlaw Castle is indicated. The landowner indicated that this area was reclaimed at one period before the seawall was subsequently breached and intertidal habitats re-developed. There are also remains of old Salmon weirs still present in the mudflats along the saltmarsh. These impacts are not assessed as they occurred outside the current monitoring period.

Impacts and activities adjacent to the site include dispersed habitation (403), forestry (160), amenity use of the Barrow River estuary (620), use of the Barrow for navigation and access to New Ross Port (509), fishing (200) and fertilization (120) and the grazing of livestock (140) related to farming practises. These activities have no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	C	0	0.028	Inside
1310	900	C	0	0.028	Inside
1330	230	C	0	6.335	Inside
1330	810	C	-1	2.000	Inside
1330	900	C	-2	0.6	Inside
1330	954	B	-1	1.0	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the 1995, 2000 and 2005, OSI aerial photo series. The baseline information from the NHA survey is generally limited to some descriptions of saltmarsh habitat and does not record the specific condition of the saltmarsh during the survey at this site. There are no specific notes in the NHA survey for the saltmarsh at this site. There are some more detailed descriptions of the site from the Rare Plant surveys.

The overall conservation status of this site is assessed as *unfavourable-bad* (Table 5.1). Ringville saltmarsh is a very important site, with several features of particular interest. This is mainly due to the presence of Divided Sedge, but this species was not recorded at the site during this survey. Two other species present on the Flora Protection Order have been recorded from the site in the past, but were not recorded during the site visit.

The main saltmarsh is generally in good condition. The site used to be grazed and this was causing some damage. However, grazing has ceased and there are no indications of grazing damage now on the site. Common Cordgrass is present on the site but is not a significant feature of most of this site. The main saltmarsh is being eroded, although probably at a slow

rate. This may be natural realignment, although it may be related to dredging within the main river channel. It is not known how dredging affects water flow along the saltmarsh.

This site is located within the River Barrow and Nore SAC. A MPSU conservation plan is not available for this SAC. The entire saltmarsh habitat is situated within the SAC boundary.

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

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	Unfavourable - Bad

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

5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There is only a very small area of this habitat located at this site, although this is quite typical of these small sites. There are no indications of any loss of habitat due to erosion or to land-use changes. There are no indications of any loss of habitat due to erosion or to land-use changes.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. No monitoring stops were carried out in this habitat due to the small extent present at the site. However, a visual assessment of the habitat indicated that it would probably pass for all attributes. This habitat was mainly found on mixed sediment located at the north of the main saltmarsh and it may be somewhat ephemeral at this location depending on the erosional or accretional cycles. Common Cordgrass is found in association with this habitat at both the northern and southern ends of the site, but does not seem to be affecting the extent of this habitat.

5.2.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts or activities affecting this habitat at this site, although a very small extent is present. This makes it vulnerable to small changes at the site. The habitat extent is likely to remain small at this site as there are no suitable extensive intertidal mud and sandflats at a suitable elevation for this habitat, apart from within the area enclosed by the old embankment.

Common Cordgrass is present at this site and is found in association with this habitat. This habitat is vulnerable to colonisation by this invasive species in the future. However, there are no indications that it is spreading significantly at present. There are some indications that the northern section of the saltmarsh is currently eroding and in the long-term this may be a negative impact. In contrast, long-term erosion of the main saltmarsh may mean the development of increased pioneer habitat and the long-term increase in extent of this habitat.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any measurable loss of habitat due to erosion or to land-use changes within the current monitoring period. The main saltmarsh is being eroded along the seaward boundary but there has been no measurable loss of saltmarsh within the current monitoring period. It is not known if this erosion is a recent phenomenon or represents a natural realignment of the shoreline of the Barrow Estuary. However, the navigation channel along this part of the Barrow Estuary has been dredged in the past few years and this may be affecting erosional trends. Common Cordgrass is present on the ASM but is not a significant feature. There are no indications of any significant loss of ASM habitat due to its colonisation on this site.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Thirteen monitoring stops were carried out in this habitat and all passed. All of the attributes required for the structure and functions of this habitat reached their targets. The ASM habitat at this site shows typical development of various saltmarsh communities related to zonation on the saltmarsh. There is significant freshwater influence on this site and this is indicated by the presence of Creeping Bentgrass in the lower saltmarsh communities. The pioneer saltmarsh community is not well-represented and is only present within the area enclosed by the old embankment. The seaward boundary of the main saltmarsh is being eroded and there currently seems to be a significant erosional trend acting on the site. The saltmarsh topography is well-developed and quite natural, but it has been affected by some drainage works during the current monitoring period. The impact, if any, of these drainage works on the saltmarsh habitat has not been observed yet.

Common Cordgrass is present on the saltmarsh but does not form a significant part of the saltmarsh structure or the vegetation assemblage of most of the marsh. Some ASM/*Spartina* sward mosaic has developed at the northern end of the marsh where its cover is higher. The impact of its spread on species composition is assessed as neutral, as there is no evidence it has spread significantly during the current monitoring period.

The site is not currently being grazed by livestock, although it was in the past. Previous levels of grazing did have a negative impact on the site so the intensity of this impact has reduced. In contrast, hunters who use the site have noted that numbers of Snipe using the site have fallen since grazing ceased on the marsh. A visual assessment of the sward height indicated that it was still quite diverse and different zones had different sward heights. However, some grazing would still probably be beneficial to the site and would increase the diversity of the sward height in the upper zones dominated by Red Fescue.

There are some natural transitions to other brackish terrestrial habitats at the upper saltmarsh boundary but much of the upper transitional area has been damaged by the cleaning of the large drain at the back of much of the main saltmarsh. There are natural transitions to estuarine communities (intertidal mudflats) at the lower saltmarsh boundary.

5.3.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in the near future. Much of the habitat at this site is currently in good condition. The site is being actively eroded and if this trend continues in the medium-term, then the extent of ASM habitat is likely to be reduced. This could be attributed to natural realignment.

The area enclosed by the old seawall was formerly reclaimed land but the seawall was breached and the area now contains intertidal habitats with a significant amount of un-vegetated mudflats. It seems that substrate has been washed out of this area if the area was formerly reclaimed land. Significant saltmarsh growth in this area is unlikely.

Common Cordgrass is present on the site. This is an invasive species although it is not likely to spread significantly in the future and reduce the extent of ASM. The position of Ringville in the Barrow Estuary means there is considerable freshwater influence on the site and this lowers the competitively of Common Cordgrass relative to the other saltmarsh species. Common Cordgrass may spread into pans on the site, although this site has relatively few pans) but it is not likely to replace significant amounts of ASM species. The bare mudflats located at the southern end of the site within the area enclosed by the old seawall are one location where there may be some future spread of Common Cordgrass.

The site is currently not being grazed, although it was grazed in the past. Currently there is no evidence that the lack of grazing is affecting the structure and functions of the saltmarsh. However the absence of grazing over a long period may have a negative affect and lower overall diversity on the site. Some of the changes within the area enclosed by the old

embankment can be attributed to the lack of grazing allowing the spread of Common Reed and Sea Club-rush to the detriment of saltmarsh containing Divided Sedge in the recent past.

Most of the saltmarsh habitats are within a SAC, so the habitat should not be affected by other land-use changes.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

The extent of this habitat is assessed as *unfavourable-bad*. Divided Sedge was not recorded on the site so consequently no MSM habitat was mapped on the site. This species was found in two situations, on grassy saltmarsh in the north-west corner and along the old embankment. The area in the north-west corner seems to have changed since it was last surveyed but the old embankments have not. It is possible that Divided Sedge is still present on these old embankments.

Borrer's Saltmarsh-grass was also recorded from the site in the past and the area with this species could also be classified as MSM.

5.4.2 Habitat structure and functions

No assessment can be made of the *structure and functions* of this habitat, as the habitat was not mapped on the site.

One of the former areas where Divided Sedge was previously recorded now contains more frequent cover of Common Reed, Sea Club-rush and other rank grassy vegetation dominated by Creeping Bentgrass and Twitch. The absence of grazing in this area is likely to be the partial cause of the spread of these tall grasses and the development of rank vegetation.

5.4.3 Future prospects

No assessment can be made of the *future prospects* of this habitat, as the habitat was not mapped on the site.

6 MANAGEMENT RECOMMENDATIONS

This site was grazed in the past, although there were indications that the intensity of grazing had damaged the site and heavy poaching was evident. Now the site is not grazed due to restrictions from REPS management. Long-term absence of grazing may be a negative influence on the site. Some grazing of the saltmarsh at a low stocking rate (3-4 weeks) should be encouraged as being beneficial for the site. The area enclosed by the old seawall should also be grazed if possible to open up the vegetation along the western shoreline.

The possibility of infilling or blocking the recently dug drain along the back of the main saltmarsh should also be considered to help restore transitional and brackish vegetation communities.

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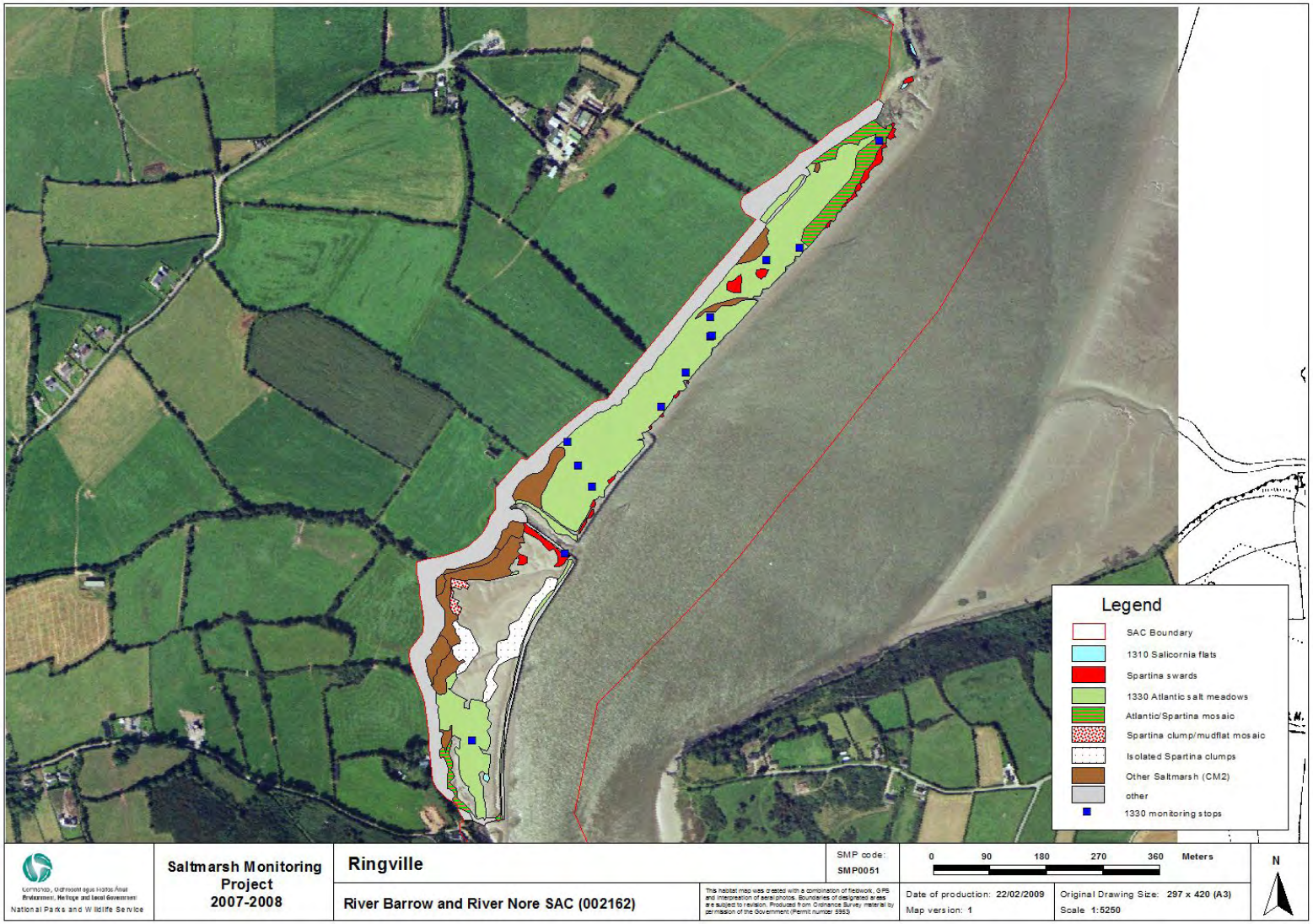
8 APPENDIX 1

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	**SM habitat description**	**Mapped Area (ha)**	**Area (ha)**				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.028	0.028				
2	*Spartina* swards	0.322					0.322
3	1330 Atlantic salt meadow	5.965		5.965			
6	ASM/*Spartina* mosaic	0.739		0.370			0.370
9	Other (non saltmarsh)	3.814					
10	*Spartina* clump/mudflat mosaic (50/50)	0.076					0.038
11	Isolated *Spartina* clumps on mud (5%)	0.618					0.031
18	Other SM (CM2)	1.501					
	Total	**13.063**	**0.028**	**6.335**			**0.760**


Legend
SAC Boundary
1310 Salicornia flats
Spartina swards
1330 Atlantic salt meadows
Atlantic/Spartina mosaic
Spartina clump/mudflat mosaic
Isolated Spartina clumps
Other Saltmarsh (CM2)
other
1330 monitoring stops
0 90 180 270 360 Meters
N
Saltmarsh Monitoring Project 2007-2008
Ringville
SMP code: SMP0051
River Barrow and River Nore SAC (002162)
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)
Date of production: 22/02/2009
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:5250
National Parks and Wildlife Service