# Saltmarsh Monitoring Project 2007-2008

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# Final Report (2009)



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#### A Report for Research Branch, National Parks and Wildlife Service



Comhshaol, Oidhreacht agus Rialtas Áitiúil Environment, Heritage and Local Government

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# **Bunratty**

#### 1 SITE DETAILS

SMP site name: Bunn	ratty	SMP site code: 0081				
Dates of site visit: 23	& 26 May 2008	CMP site code: N/A				
SM inventory site nan	ne: Bunratty	SM inventory site code	e: <b>146</b>			
NPWS Site Name: Lo	ower River Shannon					
NPWS designation	cSAC: 2165	MPSU Plan: Old Form	nat – Draft 2: Consultation			
	pNHA: <b>2048</b>	SPA: <b>4077</b>				
County: Clare		Discovery Map: <b>58,</b> <b>64, 65</b>	Grid Ref: 145275, 159966			
Aerial photos (2000 s 4619-C; O 4678-B; O	eries): O 4618-C,D; O 4679-A,B	6 inch Map No: <b>CI 061, 062</b>				
Annex I habitats curre	ently listed as qualifying inter	ests for Lower River Sh	annon cSAC:			
H1310 Salicornia	and other annuals coloniz	ing mud and sand				
H1330 Atlantic sa	It meadows (Glauco-Pucci	nellietalia maritimae)				
H1410 Mediterranean salt meadows (Juncetalia maritimi)						
Other SMP sites within this SAC/NHA: Carrigafoyle, Barrigone/Aughinish, Beagh, Shepperton/Fergus Estuary, Inishdea/Owenshere, Killadysart/Inishcorker, Knock, Querin, Rinevilla Bay						
Saltmarsh type: Estua	ary Sub	strate type: Mud				

#### 2 SITE DESCRIPTION

Bunratty saltmarsh is located in the upper part of the Shannon Estuary in Co. Clare. Bunratty Castle is a distinctive landmark on the N19 road between Limerick and Ennis and is a popular tourist attraction, due in part to its proximity of Shannon airport. The area has had a dramatic and turbulent history. The first known dwellings to occupy the site, in 970, were part of a Viking trading camp, which had made its way up the River Shannon and settled alongside the Ratty River. Indeed, the site gets its name from the old Irish, which translated means "the bend in the River Ratty". The castle was not built until the 13<sup>th</sup> century, but has gone through several incarnations as this Norman stronghold was repeatedly ransacked by Irish.

The landscape around this area is quite low-lying. Embankments are a characteristic feature of the shoreline along this part of the estuary and there is substantial amount of land reclaimed behind the embankments. There are also several small islands in the estuary close to the shoreline. This part of the Shannon estuary empties at low tide to expose extensive mudflats. There are few buildings close to the shoreline apart from a large sewage treatment plant.

It should be noted that saltmarsh and other marginal vegetation along this part of the estuary is almost continuous and extends into many of the shoreline undulations west to Shannon Airport. Marginal brackish vegetation also extends east towards Limerick. This site is notable for the extensive stands of Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*), which is found seaward of the more established saltmarsh and has spread onto the adjacent mudflats. This is an indication of the estuarine influence on the site. The survey site extends for about 7 km along the shoreline and is centred at the Ratty River channel.

The saltmarsh at Bunratty is located to the south of the iconic castle. Starting at the N19 road-bridge over the Ratty River, the marsh extends along both banks of the River. The roadbridge was selected as a cut-off point as it is the uppermost inland extension of saltmarsh vegetation. There is a significant reduction in the amount of saltmarsh vegetation, which was replaced, almost entirely by brackish vegetation typified by very large stands of Common Reeds and Sea Club-rush that was recorded. The saltmarsh extends downstream along either bank of the narrow Ratty River before it joins the Shannon River. The site extends in both an easterly and westerly direction away from the confluence of the two rivers.

The site continues upstream around the townlands of Moyhill and Ballymorris towards Ballymorris Point which is fronted by Bush Island. The survey was stopped at this point as there is a significant reduction in the typical saltmarsh vegetation and there was also a distinct change to the brackish vegetation with some development of Saw Sedge (*Cladium mariscus*) and Grey Club-rush (*Schoenoplectus lacustris spp. tabernaemontani*).

Downstream the narrow saltmarsh is constrained by the curvilinear embankment around llaunbeg Point and Tradree Point. The western boundary is demarcated by Inishcullin Point, as there is a short break in the vegetation along the rocky shoreline around the Point (~150 metres). However, marsh vegetation (both brackish and saltmarsh) reappears in the shallow bay into which Ballycassey Creek drains. The marsh extends, apparently continuously downstream towards Shannon Airport (the next site listed on the National Inventory).

Bunratty saltmarsh is located within the Lower River Shannon candidate Special Area of Conservation (cSAC). This very large site encompasses approximately 120 kilometres of the lower reaches of the Shannon and extends seawards towards the open estuary between Loop Head on its northern boundary and Kerry Head (west of Beal Point). It includes many secondary estuaries including the Fergus Estuary and a great many freshwater tributaries. The site is considered to be of national ecological importance owing to the presence of eighteen important Annex I habitats. The site is primarily designated for its estuarine and coastal habitats and is also important for Annex II species such as Bottlenose Dolphin. The Shannon is also notable for the range of rare or threatened plant species. These include a number of saltmarsh species such as Three-headed Club-Rush (*Scirpus triqueter*), Wall Barley (*Hordeum secalinum*) and Sea Dock (*Rumex maritimus*). Three Annex I habitats are listed as qualifying interests for this SAC: *Salicornia* flats, Atlantic salt meadows (ASM) and

Mediterranean salt meadows (MSM). The latter two habitats were found at this site in addition to *Spartina* swards, which is not now considered to qualify as an Annex I habitat.

In total, twenty one separate saltmarsh sites are listed for the lower reaches of the River Shannon, occurring in counties Limerick, Kerry and Clare. Fourteen are found along the Co. Clare shoreline (Curtis and Sheehy-Skeffington 1998). Several of these other saltmarshes were surveyed during the SMP project (see above table).

The site was accessed at a number of locations, most of which required the permission of individual landowners so that the saltmarsh could be accessed by traversing private property. The embankment is well maintained and had recently been repaired, as indicated by the lush sward of Perennial Ryegrass (*Lolium perenne*).

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

The saltmarsh covers approximately 7 kilometres of Lower Shannon frontline, centred on where the Ratty River enters the Shannon River. Bunratty is the most easterly developed saltmarsh along the estuarine stretch of the Shannon River and while there may in places be small patches of saltmarsh vegetation further upstream, the brackish element increases and there is much less development of typical saltmarsh communities.

Unusually, this site is characterised by very extensive stands of Common Reed and Sea Club-rush spreading onto the soft mudflats, rather than Common Cordgrass (*Spartina anglica*). Measuring approximately 84.5ha, the brackish marsh is 2.5times greater in extent than the saltmarsh. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification, (although in estuarine situations these Reed stands should more accurately be classified as 'Reed and tall sedge swamps - FS1' (Fossitt 2000)). Twitch (*Elytrigia repens*)-dominated grassland on the embankments was also classified as other saltmarsh (CM2). It should be noted that the saltmarsh, was arbitrarily stopped at both its eastern and western flanks where there was a gap in saltmarsh vegetation. The site continues on along each end of this site, indeed it extends into another saltmarsh system at Shannon Airport and Ringmoylan, neither of which were surveyed as part of this project.

This site is characterised, not alone by the widespread and extensive development of brackish vegetation, but also by the fact that for much of the upper part of the marsh, it is embanked. These embankments were largely constructed in the 18<sup>th</sup> and 19<sup>th</sup> centuries but there have been some recent changes and modifications since then. Much of the saltmarsh is found on the seaward side of the embankments and is likely to be the relic remains of

former more extensive saltmarsh that was found in this area prior to the reclamation and saltmarsh that has developed on the embankments after they were constructed. Notwithstanding this fact, the saltmarsh at Bunratty is listed as an estuarine type of saltmarsh which is largely associated with mud (Curtis and Sheehy-Skeffington 1998).

Although the saltmarsh is characterised as a single contiguous unit, it should be noted that individual saltmarsh habitats are not continuous. Over the length of the saltmarsh there is considerable variation in the distribution and condition of the saltmarsh vegetation. The brackish influence upon the marsh is overwhelming. The remaining saltmarsh communities are less extensive. The ASM is the most extensive of all the saltmarsh habitats and is widespread in its distribution (Table 3.1). Typically it occurs as a narrow band at the landward side of the brackish vegetation. More often than not it is recorded on perched ground above the mudflats, the terrace face ranging anywhere from several centimetres to 1.75metres. The MSM is not as widespread as the ASM. It is generally found as small discrete patches within the ASM, although one patch extended for some 190metres.

The majority of the saltmarsh occurs within the confines of the cSAC boundary, although there are replaces where small patches extend beyond the limit of the designated site. These reflect minor cartographical errors and as such are not considered to be significant.

There are no known species of note or rare or threatened saltmarsh species listed for this part of the Shannon. More recently, however, the presence of Triangular Club-rush (*Schoenoplectus triqueter*) was newly reported in the Ratty River, north of the N18 roadbridge (Deegan and Harrington 2004). The area in which it was recorded is largely brackish and lies upstream of the saltmarsh site. Its presence was not confirmed during this survey.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	26.968
H1410	Mediterranean salt meadows	0.865
non-Annex	Spartina swards	0.284
	Total	28.117

**Table 3.1.** Area of saltmarsh habitats mapped at Bunratty.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

#### 3.2 Atlantic salt meadows (H1330)

Estimated to measure almost 32ha (Table 3.1), the ASM occupies the greatest area of all saltmarsh communities that were recorded at Bunratty. Most of the ASM occurs as a relatively narrow fringe perched atop a distinct terrace to the landward side of the brackish vegetation. In places, such as in sheltered coves, the development of the ASM vegetation increases and some small plains are mapped. In terms of saltmarsh development, the

distribution and extent of the ASM is constrained by the brackish marsh which is extensive along much of the mudflats along the frontline.

For the most part, the substrates on which the ASM is recorded consists of consolidated muds and fibrous peats. However, other substrates of limited extent or distribution include muds and mud/shingle mosaics, such as is encountered along the western side of Tradree point, adjacent to the waterworks. Occasionally the ASM is characterised by naturally low-growing sward. However, in most cases, the sward is kept relatively short due to the intensity of the grazing.

There is little development of zonation. Small patches of lower marsh were recorded, on lowlying ground and mixed mud/shingle sediments. Although minor amounts of Annual Glasswort (*Salicornia europaea* agg.) were recorded at Bunratty, there is no development of it on the mudflats. It is possible that its extent is limited by the extent of the brackish vegetation on the mudflats. Where Annual Glasswort was recorded, it was generally noted among poached ground in the lower parts of the ASM. Other species indicative of the lower regions of the marsh include Common Saltmarsh-grass (*Puccinellia maritima*). This grass was occasionally recorded extending along creeks into the upper ASM. There is little differentiation between low and mid marsh and species such as Thrift (*Armeria maritima*), Sea Aster (*Aster tripolium*) and Common Scurvy-grass (*Cochlearia officinalis*) were noted. These areas were often characterised by bare ground, which could at times account for up to 30% of a monitoring stop.

It is not surprising, however, given that the saltmarsh is recorded on perched ground above the mudflats, that the ASM largely comprises upper marsh vegetation. Commonly recorded grasses include Red Fescue (*Festuca rubra*) and Creeping Bent (*Agrostis stolonifera*), which was indicative of the damp soil conditions that were characteristic of much of this site. Saltmarsh Rush (*Juncus gerardii*) was also quite frequent in some sections. Other common species include Sea Milkwort (*Glaux maritima*), Autumn Hawksbill (*Leontodon autumnalis*), White Clover (*Trifolium repens*), Distant Sedge and Sea Arrow-grass (*Triglochin maritimum*). The ASM was quite diverse at this site and included some untypical species, probably due to the estuarine influence on the site. These included Marsh Ragwort (*Senecio aquaticus*), Brookweed and Wild Celery (*Apium graveolens*). Brackish Water Crowfoot (*Ranunculus baudotii*) was noted in one pan. Across the ASM, Sea Club-rush was a regularly occurring feature, often accounting for up to 5% cover in a monitoring stop.

The upper boundary was often marked by a band of disturbed grassland between the saltmarsh vegetation and the embankment. The vegetation was often characterised by Twitch (*Elytrigia repens*)-dominated grassland, but in places which had been reseeded. Perennial Ryegrass (*Lolium perenne*) was recorded. Where the ground conditions change, a definite increase in the species diversity was noted. This last group of species that are recorded from the ASM reflect the differing ground conditions that were noted. While much of the narrow

ASM band was damp, in places in was waterlogged or was subject to flushing from higher ground. Species such as Silverweed (*Potentilla anserina*), Curled Dock (*Rumex Crispus*), Brookweed (*Samolus valerandi*) and even Kneed Foxtail (*Alopecurus geniculatus*).

#### 3.3 Mediterranean salt meadows (H1410)

The MSM is not well developed at this site and is generally confined to narrow fragmented patches in the ASM or towards the back of the marsh. It was also recorded on the mudflats themselves, although lower marsh development was far from extensive. Measuring approximately 0.87ha, it represents less than 0.2% of the saltmarsh vegetation that is mapped or 0.007& of the total marsh area that was surveyed.

The habitat is easily recognised by the presence of Sea Rush (*Juncus maritimus*). Where the habitat is noted on mudflats, typically Sea Rush is the only species recorded. Other species that are more prevalent on consolidated substrates rather than mud include Creeping Bent, Red Fescue, Saltmarsh Rush (*Juncus gerardii*) Sea Milkwort, Sea Arrow-grass and other species commonly recorded from upper ASM communities.

Surface water draining off higher ground resulted in flushing within the saltmarsh and species such as Marsh Ragwort and Cuckooflower (*Cardamine pratensis*) were occasionally recorded. Elsewhere, the agricultural influence was characterised by disturbance and species such as Greater Plantain (*Plantago major*) were recorded.

#### 3.4 Spartina swards

Unlike many other saltmarsh systems that occur along the Shannon River, Common Cordgrass (*Spartina anglica*) was not a significant feature. In terms of the overall marsh, it is estimated to cover approximately 0.28ha which represents less than 0.001%. Typically the Cordgrass vegetation is confined to mudflats, although small patches were noted among the ASM in creeks and pans and alongside the MSM. Stands of Sea Club-rush and Common Reed are much more extensive. Small patches of Spartina sward are found in association with stands of Sea Club-rush are on patches seaward of these Sea Club-rush stands. The cover of Spartina sward increased towards the west, indicating that the estuarine conditions probably limited its competitiveness in this area with other species like Sea Club-rush.

#### 4 IMPACTS AND ACTIVITIES

Despite its proximity to Bunratty Castle, this is largely a rural site which is privately owned by multiple owners. It is not readily accessible to tourists or other recreational users. The

majority of the land behind the marsh has been embanked. A small number of activities and impacts are recorded from this site and are listed in Table 4.1, the most apparent of which is the agricultural management of the area.

The principal activity at this site is grazing (140). The majority of the land within the saltmarsh and its hinterland is given over to livestock grazing, although not all the saltmarsh was grazed. Some of the saltmarsh to the west of the site is grazed by sheep and cattle, while the eastern side of the site is grazed by cattle. While grazing in itself is not necessarily damaging, the consistency and widespread occurrence among the damp ground conditions was such that parts of the saltmarsh were showing signs of damage (143), which was unlike most other sites that were surveyed in County Clare. Although the saltmarsh fringe is managed by multiple owners, the consistency with which it is grazed, particularly the "larger" plains was almost uniform. Grazing is important for maintaining the diversity of the saltmarsh vegetation and it was noticeable that some fenced off areas that were not grazed were dominated by rank grasses such as Twitch or Sea Club-rush. Within individual management parcels, trails (501) are not uncommon. Invariably the trails are of limited impact in the larger patches of marsh and only become negatively damaging where they occur along the narrow stretches of saltmarsh connecting headlands. The wet ground is often heavily trampled and in places poached. The greatest poaching was often around crossing points and along narrow saltmarsh corridors. Several areas were so badly damaged that the ground was completely churned up. The MSM, unlike the ASM, is not as badly impacted, as livestock tend to avoid grazing this rank vegetation.

One of the main features of this site is the relatively narrow extent of saltmarsh vegetation that is recorded. Much of the site has in the past been modified through land reclamation and drainage (801, 810). A large part of the upper marsh is constrained by an earthen berm which was constructed to curtail the effects of following on the low-lying land found behind the embankment. The construction of the embankment is not assessed as it is clearly pre-dates the current monitoring period.

However, the embankments are still regularly maintained (800) and a number of outfall points including sluice gates and one-way drains have been repaired in the recent past. In addition to these mechanical repairs and clearing of drains (810), localised repairs have been made to the embankment, not all of which were carried out by the OPW. The repairs include regrading the earthen berm to level it off or repair areas that have been undermined through heavy livestock volumes. In places, the repaired berm was largely reseeded with Perennial Ryegrass, which further encourages a repetition of livestock-induced damage. These works have had a limited impact on the adjacent saltmarsh.

Common Cordgrass is present at this site and is an invasive species of saltmarsh (954). While it has rapidly colonised estuaries and creeks along the Shannon since it was first transplanted in the Shannon region in 1928, at Bunratty, its development is completely

overshadowed by the brackish vegetation (Nairn 1986). This is likely to be due to the increased freshwater conditions in this part of the estuary. Common Cordgrass has mainly spread onto the mudflats adjacent to the more established saltmarsh and forms small patches surrounded by Sea Club-rush. It has not spread significantly onto the ASM or MSM. For this reason its impact is assessed as neutral. The extent of *Spartina* swards on the adjacent mudflats is much less significant compared to the extent of brackish Reed and Sea Club-rush stands.

A comparison of the current habitat map to the OSI 2<sup>nd</sup> edition 6 inch map shows that the extent of the stands of Sea Club-rush and Common Reed has changed somewhat in this period. These changes are likely to be natural (990). The development and extent of the brackish marsh is not assessed, nor is it possible to realistically estimate if there has been any loss of Annex I saltmarsh habitat due to its occurrence. Most of the saltmarsh occurs atop perched ground which is fronted by dense stands of Sea Club-rush or Reeds.

The small areas of saltmarsh that were found on low-lying or muddy substrates were showing no real signs of erosion (900). Occasionally the terraced marsh was not fronted by brackish vegetation. In such situations, the frontline was highly indented or convoluted. There was little sign of any appreciable undercutting or slumping. Overall, there has been no significant measurable erosion when the OSI 2000 and 2005 series aerial photographs are examined. The impact of erosion is assessed as neutral on a small portion of the saltmarsh.

While the distribution of the saltmarsh is largely constrained by the embankment, it also serves to limit the influence of other activities and their impacts which occur outside the site. The area is rural and any settlement (403) is not an issue, as it is found some distance away from the saltmarsh. The only industrial plant is the waterworks around Tradree Point. This plant, which serves Shannon Town Centre, has been in existence for some time. It is managed under strict guidelines and there are no sign of any discharges (420) or pollution (700) emanating from this plant.

Most of the hinterland is given over to agriculture, grazing in the main, although some fields were cut for silage (120). It is likely that some agricultural improvement is carried out in some of the fields with fertilisers (102) and clearance of drains undertaken (810).

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	С	0	14.0	Inside
H1330	143	В	-1	11.6	Inside
H1330	501	С	0	0.75	Inside
H1330	800	С	-1	0.2	Inside
H1330	810	С	0	0.2	Inside
H1330	900	С	0	1.0	Inside
H1330	954	С	0	26.968	Inside
H1410	140	С	0	0.6	Inside
H1410	143	В	-1	0.1	Inside
H1410	501	С	0	0.1	Inside
H1410	954	С	0	0.865	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

#### 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

Bunratty saltmarsh contains several features of notable conservation interest. The extensive development of brackish vegetation is one notable feature and is indicative of the estuarine influence on the site. It is the most inland saltmarsh that was surveyed along the River Shannon, which explains the transition from maritime to brackish conditions. This influence can also be seen within the ASM with the appearance of species such as Marsh Ragwort. The ASM vegetation is relatively diverse in places due to this freshwater influence. There are also diverse transitions to other terrestrial and brackish communities, which increases the diversity of the site as a whole. The saltmarsh structure is poorly developed at this site and

has been modified by the construction of tall embankments along the seaward side of the saltmarsh.

The overall conservation status of this site is *unfavourable-inadequate* (Table 5.1). This is a relatively narrow saltmarsh system which has been highly modified in the past. High grazing intensities have damaged some of the saltmarsh due to heavy poaching in places. Common Cordgrass is present at this site but is not a significant feature of the vegetation.

This site is located within the Lower River Shannon cSAC. An old format NPWS Conservation management plan is available for this cSAC but is now out of date.

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

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

#### 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

The extent of the ASM is rated as *favourable*. While a considerable part of this site is characterised by brackish marsh vegetation, the ASM is the most extensive of the saltmarsh communities that is recorded at Bunratty. The majority of the ASM occurs behind the brackish vegetation and so is not prone natural erosion, as might be expected. There are no indications of any significant loss of ASM due to erosion, spread of Common Cordgrass land-use changes or embankment works.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are rated as *unfavourable-inadequate*. While a high proportion of the characteristic species was recorded from the ASM at Bunratty, there is little development of zonation and other features such as creek and pan development are not well developed and usually have been modified to some degree by excavation associated with draining the land behind the berm. Fifty percent (eight) of the monitoring stops that were carried out in the ASM failed to achieve the target criteria. The saltmarsh fringe crosses a number of differing landholdings, most of which were grazed to some degree. Although the

grazing levels varied from light to heavy across the site, rarely was the relatively narrow band of ASM vegetation undamaged. The levels of trampling and poaching were high in many areas as the saltmarsh was well utilised as a feeding resource by the livestock.

Common Cordgrass is present at this site but is not a prominent feature of this habitat, so its spread is not assessed as a negative indicator for species composition.

#### 5.2.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. The assessment assumes that there will be no significant change in the management regime at Bunratty in the future. The high grazing intensity is likely to continue in the future so damage is likely to continue from cattle poaching. The ASM is not likely to be vulnerable to colonisation by Common Cordgrass, due to estuarine influence on this site, which limits its competitiveness.

#### 5.3 Mediterranean salt meadows (H1410)

#### 5.3.1 Extent

The extent of the MSM is assessed as *favourable* (Table 5.1). The MSM does not occur extensively at this site and over the course of the approximate 6 kilometre of frontline only thirteen separate, relatively small patches are mapped. Given the absence of previous information as to its occurrence, it seems likely that this is the natural extent of the MSM at this site. There are no indications of any significant loss of MSM due to erosion, land-use changes or embankment works at this site.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are rated as *unfavourable-inadequate*. One of the four monitoring stops failed, due to the excessive nature of the poaching that was recorded around that area. Despite the relative paucity of this habitat at Bunratty, many of the features that are characteristic of the MSM in this part of the country were noted. However, the habitat was showing signs of localised damage, which is unsurprising given the intensity of livestock traffic along parts of the site.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. The assessment assumes that there will be no significant change in the management regime at Bunratty in the future. The high grazing intensity is likely to continue in the future so some of the MSM is likely to vulnerable to continued damage from cattle poaching. This habitat is not vulnerable to colonisation by Common Cordgrass.

#### **6 MANAGEMENT RECOMMENDATIONS**

There are no specific management recommendations for this site. .

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#### 8 APPENDIX I

#### Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)			Area (ha	)	
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards	0.284					0.284
3	1330 Atlantic salt meadow	26.899		26.899			
4	1410 Mediterranean salt meadow	0.865			0.865		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic	0.138		0.069			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	21.138					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)	0.002					0.0001
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	88.922					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	138.248		26.968	0.865		0.284



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Saltmarsh Monitoring Project 2007-2008 Bunratty (Map 1 of 3)

Lower River Shannon SAC (002165)

This habitat map was or eated w and interpretation of aeral photo are subject to revision. Produce permission of the Government (

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# Inishdea, Owenshere

#### 1 SITE DETAILS

SMP site name: Inish	idea, Owenshere	SMP site code: 0083				
Dates of site visit: 48	& 5 September 2008	CMP site code: N/A				
SM inventory site nan	ne: Inishdea, Owenshere	SM inventory site code: 140				
NPWS Site Name: Lower River Shannon		MPSU Plan: Old Format – Draft 2: Consultation				
	pNHA: 2048	SPA: <b>4077</b>				
County: Clare		Discovery Map: 57	Grid Ref: 129600, 166575			
Aerial photos (2000 s <b>4556-A,B</b>	eries): <b>4496-B,C,D; O</b>	6 inch Map No: <b>CI 050</b>				
Annex I habitats currently listed as qualifying interests for Lower River Shannon cSAC:						
H1310 Salicornia and other annuals colonizing mud and sand						
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)						
H1410 Mediterran	ean salt meadows (Junce	alia maritimi)				
Other SMP sites within this SAC/NHA: Carrigafoyle, Barrigone/Aughinish, Beagh, Bunratty, Shepperton/Fergus Estuary, Killadysart/Inishcorker, Knock, Querin, Rinevilla Bay						
Saltmarsh type: Estua	ary Sub	strate type: Mud				

#### 2 SITE DESCRIPTION

Inishdea saltmarsh is located in southern Co. Clare, along the western side of the Fergus Estuary. This site is associated with Ballycorick Creek, which is located approximately two kilometres north of Ballynacally. This village is located approximately twenty kilometres south-west of Ennis along the R473. Ballycorick Creek flows through a number of townlands including Inishdea, Mount, Inishaellaun, Ballycorick and Island O'Brien. While the Townland of Inishdea and its hinterland occupies much of the southern portion of the saltmarsh, Owenshere was not located on any map. This area is rural and is dominated by fertile farmland. The landscape is quite low-lying in places, particularly along the creek, although there is higher ground around the site, particularly along the shore of the Fergus Estuary towards the north. There is scattered habitation in this area. This part of the Fergus Estuary is quite shallow and there are extensive intertidal mudflats adjacent to the shoreline that are exposed at low tide.

The main part of the survey site is the saltmarsh that has developed along the main channel that extends inland. Part of the main Fergus Estuary shoreline to the north of Horse Island was also surveyed. The survey site begins at the R473 Ballycorick Bridge and extends downstream where a number of tributary creeks merge into the main Ballycorick Creek channel. This winds its way roughly in a northerly direction, before turning in an easterly direction where it enters the Fergus Estuary. Horse Island, which was formerly inhabited, lies

across the mouth of the Ballycorick Creek at this point. It should be noted that this is not a discrete site and saltmarsh habitat is distributed along the Fergus River estuary beyond the limits of the survey site. The size of the survey site has to be restricted due to time limitations.

Inishdea, Owenshere is a long and complex site that has in parts been considerably altered through the construction of earthen berms as a means both to protect against flooding and also to reclaim land. The site is composed of saltmarsh and brackish marsh vegetation. Indeed, the margins of upper Ballycorick Creek are extensively vegetated by large stands of Common Reeds (*Phragmites australis*).

Inishdea, Owenshere saltmarsh is located within the Lower River Shannon candidate Special Area of Conservation (cSAC). This very large site encompasses approximately 120 kilometres of the lower reaches of the Shannon and extends seawards towards the open estuary between Loop Head on its northern boundary and Kerry Head (west of Beal Point). It includes many secondary estuaries including the Fergus Estuary and a great many freshwater tributaries. The site is considered to be of national ecological importance owing to the presence of eighteen important Annex I habitats. The site is primarily designated for its estuarine and coastal habitats and is also important for Annex II species such as Bottlenose Dolphin. The Shannon is also notable for the range of rare or threatened plant species. These include a number of saltmarsh species such as Three Headed Club-Rush (Scirpus triqueter), Wall Barley (Hordeum secalinum) and Sea Dock (Rumex maritimus). Three Annex I habitats are listed as qualifying interests for this cSAC: Salicornia flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats were found at this site in addition to Spartina swards, which is not now considered to qualify as an Annex I habitat.

In total, twenty one separate saltmarsh sites are listed for the lower reaches of the River Shannon, occurring in counties Limerick, Kerry and Clare. Fourteen are found along the Co. Clare shoreline (Curtis and Sheehy-Skeffington 1998). Several of these other saltmarshes were surveyed during the SMP project (see above table).

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 and McGough 1998). Meadow Barley is found in brackish situations and in unimproved lowland meadows close to estuaries. This species is known from 21 10 km<sup>2</sup> squares in Ireland mainly distributed around the coastline (with some inland sites) since 1960. At Inishdea, Owenshere it was recorded on dry transitional mounds on the saltmarsh and it was also locally frequent within some of the transitional grassland and upper saltmarsh, along the upper saltmarsh boundary. It is already known from this 10 km<sup>2</sup> grid square and has recently been recorded on saltmarsh found around some of the islands in the southern part of the Fergus Estuary (Canon Island) (NPWS Rare plant survey).

For the most part, this large site, which occurs along both sides of the Ballycorick Creek, is not publicly accessible. While limited number of public rights of way exists, they are not readily identifiable. They generally comprise narrow tracks between fields, but more often than not are overgrown and easily overlooked. Some saltmarsh was accessed after crossing adjacent farmland. Permission was sought to enter this land.

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

Inishdea, Owenshere is a large and complicated site that is characterised by a sinuous Ballycorick Creek which winds its way downstream from the Ballycorick Bridge at the R473 towards the Fergus Estuary. The northern most extent of the saltmarsh occurs along the main shoreline of the Fergus Estuary and is taken as the townland boundary of Island O'Brien. There is an abrupt decline in the *Spartina* sward at this point, where the shoreline becomes rocky. The southern boundary of the survey site along the Fergus Estuary is taken as the concrete seawall on the eastern side of Inishdea. Between this point and Horse Island, the development of saltmarsh vegetation is confined to small isolated pockets among the exposed limestone shoreline.

Three Annex I saltmarsh habitats were recorded from this site including Atlantic salt meadows – H1330 (ASM) and Mediterranean salt meadows – H1410 (MSM). The third habitat is *Salicornia* and other annuals colonizing mud and sand – H1310 (*Salicornia* flats), which was recorded as a single small patch. *Spartina* sward was also recorded from this site. The total area of the individual habitats is shown in Table 3.1. For the purposes of this report it is treated as a single marsh, although it should be remembered that the saltmarsh is largely characterised by discontinuous or fragmented bands of vegetation. The largest area is found in a low-lying area in Inishdea Townland along the south side of the main channel. Other habitats associated with the saltmarsh include brackish vegetation, particularly towards the upper parts of the Ballycorick Creek. Appendix I details the full breakdown of the various habitats and mosaics that were recorded throughout this site.

This is a site that retains many vestiges of earlier attempts to reclaim land as well as protection against flooding of low-lying ground. A considerable part of the site has been embanked, which is well maintained to this day. The marsh is characterised by large swathes of Common Reeds (*Phragmites australis*) along the margins of the creek, with some fragmented development of saltmarsh vegetation in sheltered corners and as small fringing bands behind the brackish vegetation. The stands of Common Reed were mapped as non-Annex I vegetation or CM2. The saltmarsh vegetation is not extensive in the upper parts of the creek, often confined to a narrow band on the seaward side of the embankment.

Heading downstream, the majority of the brackish vegetation occurs on the western side of the creek, although it occasionally thins out on bends in the creek or where tributary creeks join the main creek channel. The opposite bank is more open and the brackish vegetation is often missing from in front of the narrow saltmarsh band.

A stronger maritime influence appears at the first major downstream bend in the creek and there is an abrupt decrease in the freshwater influence, which is marked by the fact that around this section, the creek almost fully drains at low tide. Common Cordgrass (*Spartina anglica*) makes its first appearance. It occurs as a thin discontinuous band along either side of the creek. Shortly thereafter, there is a considerable increase in saltmarsh vegetation.

The greatest extent of saltmarsh is located around the first bend in Ballycorick Creek west of Horse Island. Unlike the fringing ASM-dominated saltmarsh which is recorded alongside the brackish vegetation further upstream, and which is rarely much higher than the level of the creek water, the perched saltmarsh plain can be up to 2 metres above the drained creek channel. This area is characterised by an extensive development of both MSM and ASM, and there is often a complex pattern between these two habitats along with some intermixing with Common Cordgrass and other transitional drier grassland areas. Much of the saltmarsh plain is bisected by a network of drainage creeks and man-made ditches. Much of this ground is grazed by livestock, with livestock access to outlying parts facilitated through a number of small land-bridges. Despite its elevated position, much of the peaty substrate is water-logged and the vegetation was heavily poached in places.

The extensive MSM is often backed by ASM vegetation, whereas the upper ASM boundary is often characterised by transitional grassland. This site is notable for the relatively extensive natural transitions to unimproved dry calcareous grassland (GS1) on thin soils with frequent exposed bare limestone. Some adjacent dry land adjacent to the saltmarsh has been improved, re-seeded and cleared of exposed rock. Towards the eastern side of the main saltmarsh plain, the saltmarsh vegetation, mostly ASM tends to be more transitional, particularly as the soils are shallower and better draining. This is as a result of the proximity of the underlying limestone bedrock to the surface. Indeed, swallow holes were occasionally noted.

Heading out through the narrow, but deep forded channel between the mainland and Horse Island, there is some limited development of saltmarsh along the southern shoreline. There is considerable outcropping of limestone along the exposed coastline here and small patches of ASM were noted, as well as the only patch of *Salicornia* flats, at the south-eastern extent of the site.

While a limited amount of saltmarsh vegetation was observed around the inner parts of Horse Island, most of the maritime vegetation was characterised by patches of Common Cordgrass. Its greatest development however, occurred northwards of Horse Island, where a narrow

perched band running along the front to the embankment, gradually developed into a considerable sward which extends out over the mudflats, towards the townland of Island O'Brien. There were some limited fragments of ASM vegetation along this narrow band, which also expanded to form a near-continuous band circling around the back of the *Spartina* sward.

Given the size of this site and the extent of the brackish marsh in places, some of the ground was visually surveyed. This included the upper reaches of the Ballycorick Creek where there was little or no evidence of saltmarsh vegetation and where access was difficult. Elsewhere the islands around Horse Island were not visited, due to the treacherous nature of the mudflats. It is possible to access Horse Island via the ford at very low tide, but it was not attempted due to time limitations.

Whilst springs are not uncommon in limestone areas, one of the unusual features of this site is the reputed presence of springs which outflow on the mudflats. A number are shown on the 6inch map, particularly around the north-western edge of Horse Island. This might explain the occurrence of a large stand of Common Reed some distance out on the mudflats where conditions should be more typically maritime.

The majority of the saltmarsh is recorded from within the cSAC boundary. The majority of the small patches that are mapped outside the current boundary merely reflect cartographical differences between the 6inch maps with what occurs on the ground. However, a small area of saltmarsh, measuring 0.891ha, occurs in the townland of Inishdea and is excluded from the site. There is a significant change in the trend of the boundary, where it follows the edge of a creek as indicated by the 6inch map and does not take into account the land behind the creek.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.003
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	19.636
H1410	Mediterranean salt meadows (Juncetalia maritimi)	11.553
non-Annex	Spartina swards	13.236
	Total	44.428

 Table 3.1.
 Area of saltmarsh habitats mapped at Inishdea, Owenshere.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

This habitat is not well developed at Inishdea, Owenshere. Indeed a single patch occupying a negligible 0.003ha was recorded (Table 3.1). The vegetation is naturally species poor and comprised Annual Glasswort (*Salicornia europaea* agg.) along with minor Annual Sea-Blite (*Suaeda maritima*). It occurred on a mud/shingle substrate in a small sheltered cove and

graded into grazed ASM vegetation fringe over outcropping limestone. Common Cordgrass is not present in this area.

#### 3.3 Atlantic salt meadows (H1330)

Measuring nearly 19.2 ha (Table 3.1), the ASM is the most extensive of the saltmarsh habitats recorded from this site. It is widely distributed, although rarely is it extensive. Indeed, in the main part of the saltmarsh, the MSM is co-dominant with the ASM in terms of extent. Much of the ASM is quite fragmented and forms mosaics with MSM. The remaining ASM is often narrow, constrained as it was by the embankment.

Within the ASM, there were few extensive areas with well-developed zones. There was no extensive pioneer or lower marsh vegetation. Some limited low/mid marsh vegetation was noted, mostly towards the upper parts of Ballycorick Creek. Similarly, mid and mid/upper vegetation was not well developed. The majority of the ASM is accounted for by upper marsh (14 of 17 monitoring stops), which is not unsurprising, given that most of the saltmarsh is perched quite high above the adjacent mudflats and intertidal channel.

Species that were recorded from the upper ASM are typical of the habitat. The most common species included Red Fescue (*Festuca rubra*), Thrift (*Armeria maritima*), Sea Plantain (*Plantago maritima*), Sea Arrow Grass (*Triglochin maritimum*) and Sea Aster (*Aster tripolium*). Creeping Bent (*Agrostis stolonifera*) was also commonly recorded and at times surpassed Red Fescue in its cover. Other species which were less common but nonetheless typical include Common Saltmarsh-grass (*Puccinellia maritima*) which was often found in wet depressions within the perched saltmarsh and along low-lying creeks. White Clover (*Trifolium repens*) and Autumn Hawksbill (*Leontodon autumnalis*) were two species that were not uncommon, although of limited ground cover. Two species indicative of the drier conditions were Perennial Rye-Grass (*Lolium perenne*) and White Clover (*Trifolium pratense*). These were two of the more common species as well as Meadow Barley and Twitch (*Elytrigia repens*) that were associated with transitional ASM/grassland areas. Sea Wormwood was also recorded at one location along the shoreline of the Fergus Estuary along the upper saltmarsh boundary.

The structure of the main saltmarsh was well developed with frequent depressions, salt pans and intricate drainage creeks. One large salt pan was filled with Tasselweed (*Ruppia* sp.). One notable feature of the ASM at Inishdea was the development of slightly raised natural ridges of Twitch-dominated grassland along the edges of the established saltmarsh and along old embankments on the saltmarsh. Some of these ridges were mapped as CM2 vegetation. They also contained occasional Meadow Barley.

Other species that were recorded with the ASM in low-lying areas included Common Cordgrass, which was found along creeks and in a number of pans. In addition, it is mapped occurring as a mosaic with ASM. Brackish elements were more commonly recorded at the

upper parts of the Creek, where they were clearly delineated from the ASM. However, there were a number of instances when small patches of Common Reeds or more often than not Sea Club Rush occurred within the ASM habitat.

The upper boundary of the saltmarsh, in terms of the ASM, was rarely distinctive. Much of it was characterised by transitions, of which there were several types depending on the location. In agriculturally-managed areas such as the main body of the marsh, there was a gradation to various forms of grassland or Blackthorn (*Prunus spinosa*)-dominated scrub where there was a noticeable decrease in soil depth. Elsewhere, the ASM is often more fragmented in its distribution and is constrained by the embankment. It was not uncommon to record transitional grassland (CM2), dominated by Twitch (*Elymus repens*) behind the ASM. Typically, this transitional grassland was not extensive. Often it was less than two metres wide and only rarely was it more than a few metres wide. Some of the ASM has developed behind former berms that have deteriorated. One section at Inishdea has been recently drained and there have been some recent coastal protection works.

#### 3.4 Mediterranean salt meadows (H1410)

Unlike the ASM, which is heterogenous, depending on the intensity of grazing and also its position in the marsh relative to its distance and height above the mudflats, the MSM is very much more homogenous in appearance. Covering an area estimated at 11.61ha, the majority of the MSM is associated with the main body of saltmarsh plain, with some smaller fringing fragments recorded elsewhere. It is generally perched up to 2 metres above the mudflats, although, this can rise to 3 metres along the exposed central creeks.

Characterised by the tall growing Sea Rush (*Juncus maritimus*), the vegetation is typically rank. Although the tough Sea Rush is generally avoided by livestock, nonetheless trails are not uncommon and the cover provided by this rush is not always complete. Tussocks of Sea Rush are intermingled by common saltmarsh species here, many of them also found in the upper ASM. The constant species include Saltmarsh Rush (*Juncus gerardii*), Creeping Bent, Red Fescue, White Clover and Autumn Hawksbill.

Most of the MSM is characterised as upper marsh and is mapped as pure habitat with a distinct change to other habitats recorded. However, a limited amount (0.167ha) of ASM/MSM mosaic is recorded. The upper boundary of the MSM is often marked by ASM, although in some cases, this is replaced by other non saltmarsh habitats.

#### 3.5 Spartina swards

Easily identified by the presence of its mono-specific sward, Common Cordgrass (*Spartina anglica*) is a non-native grass that was purposely introduced into the Shannon Estuary as far back as 1928 and has since spread voraciously (Nairn 1986).

At Inishdea, Owenshere it is widely distributed throughout this site. The greatest extent of sward development is recorded extending northwards of Horse Island, where the intertidal mudflats are shallow and the sward can extends in a seaward direction ranging between 40 and 100 metres. Elsewhere it is less extensive but nonetheless abundant and occurs a considerable distance along the Ballycorick Creek, where it is replaced by extensive bands of Common Reeds on either side of the branching creek. Scattered patches are found on the intertidal mud in the deep channels that divide the main saltmarsh.

While the greatest concentration is recorded from soft mudflats and low-lying ground along the creek, in areas that are not suitable for other saltmarsh habitats, it is not solely confined to muddy substrates. It extends inland along smaller creeks and drains and in places patches of sward are recorded within the more established saltmarsh. While there is some development of ASM/*Spartina* mosaic at the back of the *Spartina* sward, the majority of this mixed vegetation is found perched above the mudflats in heavily poached ground and drainage runnels.

#### 4 IMPACTS AND ACTIVITIES

This is a large and complex site which covers a considerable area. There are many landowners and the management regime is often different, depending on the area and accessibility of the available saltmarsh. Large parts of the site have been modified either through embanking or through attempts to drain the low-lying ground in the past. The list of impacts and activities that were recorded at Inishdea, Owenshere are shown in Table 4.1. There are few current activities, other than grazing which are considered to be causing any serious damage at this site.

Much of the low-lying ground adjacent Ballycorick Creek has been extensively remodelled through the construction of an embankment. Anecdotally, the tidal influence during high tides extended further upstream of the Ballycorick Bridge. It was often the case that the low-lying ground was flooded for extended periods and unsuitable for livestock. As a result the embankment was commissioned and extends along much of the north-western bank of the Creek as well as some parts along the opposite bank, in the townland of Inishdea. This was constructed in the 19<sup>th</sup> century. The embankment mostly comprises an earthen bund, although downstream it has been modified with boulders or in some cases concrete seawall. It is still maintained and at the time of survey, the OPW had a maintenance crew working along a stretch of the berm. As the embankment has been in existence for some time prior to the current monitoring period, its impact is not assessed.

Ongoing maintenance of the embankment, however, includes repairing of sluice gates and clearing drains behind the embankment (810). As there was little or no saltmarsh behind the embankments, its impact are not thought to be major.

Most of the land surrounding the marsh has been given over to agriculture, namely grazing, for some time. Historical management practices, of which there are relics includes the network of drainage creeks, particularly in the main section of the saltmarsh. Some of the saltmarsh is isolated by wide creeks and small bridges and fords were constructed across mudflats. These are still in existence and some are maintained (810) enabling livestock to access otherwise isolated parts of the marsh.

Grazing (140) is widespread throughout this site, and there are few areas of ungrazed saltmarsh. Elsewhere, the remainder of the land is characterised by brackish marsh and stand of Reeds that are so extensive that it is generally avoided by livestock. The intensity of grazing is related to the individual landowner and the amount of land which is available to them. It is not surprising, that during this unseasonably wet summer that the impacts and damage caused by livestock may have been exacerbated. Trails (501) were not uncommon and at times the level of trampling was such that the ground was highly churned (143). The poaching was, not surprisingly, mostly concentrated in larger expanses of saltmarsh such as the main section west of Horse Island.

There has been some recent reclamation at Inishdea (801). An embankment enclosing some saltmarsh in the upper part of the saltmarsh has been re-profiled. A recently constructed drainage ditch adjacent to this embankment has resulted in ground drying out (810). It is likely that saltmarsh habitat has been lost in the area behind the embankment as indicated by the remnant flowering head of distinguishable species such as Sea Aster. This area is within the SAC. Asides from that there are no other real threats from agricultural restructuring.

There was some evidence of natural erosion (900) and a number of indicators were recognised. These included isolated tussocks of saltmarsh vegetation, such as was noted, in the narrow channel between the mainland and Horse Island. The most prominent indicator however was the exposed front face of the marsh, which was perched above the mudflats. It was possible to see the effects of tidal undercutting or slumping of narrow chunks of vegetation. However, there was no measurable loss of habitat, especially when the current map is compared with the year 2000 or series 2005 aerial photographs. The impact of erosion is assessed as neutral on small portion of the habitat.

Common Cordgrass is considered as non-native invasive species of saltmarsh and mudflats in Ireland (954) and has become rapidly established at this site sometime after 1928, when it was first planted in the River Shannon. While it fronts most of the established saltmarsh along the lower parts of the Creek and occurs on deeper mud, its greatest concentration is towards the northern part of the site in the main Fergus Estuary. The largest expanse of sward is recorded on intertidal muds and it appears to be still extending outwards at the expense of intertidal mudflats. It is found on the ASM and has developed some ASM/*Spartina* sward mosaics where it is more common. However, the area of these mosaics is quite small (about 0.5 ha). The presence of Common Cordgrass is assessed as a negative influence (-1) on these mosaic areas due to its density.

Much of the land outside of the site is similarly managed. Grazing is the main activity, although there are instances of supplemental feeding (171) as well as field improvement through fertilisation (120). It is not possible to quantify any nutrient enrichment, if any, that occurs within the saltmarsh. Some limited tillage is also carried out (100).

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	140	В	0	0.003	Inside
H1330	140	В	0	8.5	Inside
H1330	143	В	-1	8.5	Inside
H1330	501	С	-1	1.0	Inside
H1330	801	С	-1	1.0	Inside
H1330	810	С	-1	0.1	Inside
H1330	900	С	0	0.15	Inside
H1330	954	В	-1	0.5	Inside
H1410	140	В	0	5.0	Inside
H1410	143	В	-1	6.0	Inside
H1410	501	С	-1	0.5	Inside
H1410	810	С	-1	0.03	Inside
H1410 900 C		С	0	0.02	Inside

Table 4.1. Intensity of various activities on saltmarsh habitats at Inishdea, Owenshere.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural

positive influence and +2 = strongly managed positive influence.

<sup>b</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

#### 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

Inishdea saltmarsh contains several features of notable conservation interest. The most notable feature is the relative abundance of Meadow Barley, which was widely distributed over the site and was found on the saltmarsh and also in adjacent transitional grassland. Sea Wormwood, another species of local distinctiveness, was also recoded at this site. The natural transitions from saltmarsh to adjacent unmodified dry-calcareous grassland and scrub are relatively extensive at this site, as not all the adjacent land has been improved and reseeded. Some of the saltmarsh is still unmodified and has a complex natural structure. The underlying limestone bedrock has introduced some unusual features to parts of the saltmarsh, such as shallow-holes. Much of the saltmarsh along the main channel has been modified in the past by the construction of embankments. Former saltmarsh has been reclaimed in places.

The overall conservation status of this site is *unfavourable-bad* (Table 5.1), which is largely due to excessive poaching damage to a significant area of saltmarsh. Common Cordgrass is also present at this site. It is largely found in the intertidal mudflats and in the deep intertidal channels found in this site. However, it has also spread to some extent onto the established saltmarsh.

This site is located within the Lower River Shannon cSAC. An old format NPWS Conservation management plan is available for this cSAC but is now out of date.

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

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at Inishdea, Owenshere.

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

#### 5.2.1 Extent

A single patch of annual vegetation that was recorded occurred in a small sheltered cove on mixed mud/shingle sediment. There is no information on the previous extent of this habitat at this site. It is unlikely that it was ever widespread at this site. Most of the available and

vegetated mudflats are composed of deep oozing mud and are diurnally flooded. It is not thought likely that this annual habitat could become established let alone expand under such conditions. Given the overall lack of previous information, the occurrence of this habitat is assessed as *favourable* (Table 5.1).

#### 5.2.2 Habitat structure and functions

Monitoring stops were not carried out in this habitat given its very limited distribution. However, based on a visual assessment of the vegetation and its condition, the structure and functions are rated as *favourable*.

#### 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 such as grazing continue in the near future. It is difficult to determine the future prospects of this habitat, given the lack of information as to its previous extent or condition. The sheltered cove in which it occurred is freely accessible to livestock who roam down along the shoreline. Despite the many hoof-prints that were observed in this vegetation, it is unlikely to pose any real damage to this pioneer habitat. This habitat is vulnerable to colonisation by Common Cordgrass in the future. This is the main reason fro the assessment of *unfavourable-inadequate*.

#### 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The extent of the ASM is rated as *favourable* (Table 5.1). There are no indications of any significant habitat loss at this site due to erosion during the current monitoring period. A small area was damaged by attempted reclamation within the current monitoring period. A drain was constructed and an adjacent embankment was re-profiled. This has damaged a small area of saltmarsh but there has been no significant loss of habitat yet as there is still some tidal influence. Common Cordgrass has spread on this saltmarsh but there is no evidence that it has spread significantly during the current monitoring period (mainly due to the lack of accurate baseline data).

#### 5.3.2 Habitat structure and functions

Four of the seventeen monitoring stops carried out in this habitat did not satisfy the target criteria. For this reason, the structure and functions are assessed as *unfavourable-inadequate*. A significant part of the ASM is grazed and has suffered some form of damage from the excessive grazing pressure. While the damage in the largely water-logged saltmarsh developed on deep mud at Inishdea may have been compounded by the unseasonably wet summer, nonetheless the ground was heavily trampled and poaching was

not uncommon in the main part of the saltmarsh. Much of the saltmarsh found on shallower soil is well-drained and less vulnerable to poaching.

The structure of some of the intact saltmarsh at Inishdea is relatively unmodified and there is a complex network of creeks, salt pans and depressions. The structure of some of the ASM is further diversified by the presence of features such as exposed rock and sinkholes, related to the underlying limestone bedrock. Some of the ASM has developed on thin substrates that overlay this bedrock. This is a feature of local distinctiveness.

Much of the other saltmarsh along the main creek has been modified in the past with the construction and maintenance of the embankments. Common Cordgrass is present at this site and is mainly found in the intertidal channels and on the mudflats where it has spread at the expense of bare mudflats. However, it has also created some patches of ASM/*Spartina* mosaic where is has spread into established saltmarsh. It has spread into low-mid ASM and changed the structure of this vegetation. However, there is no evidence that it has spread significantly during the current monitoring period (mainly due to the lack of accurate baseline data) so its spread is not considered to be a negative indicator at this site.

Several typical communities were noted at this site. These include some rare transitional communities along the upper boundary of the ASM which included Meadow Barley. These are positive indicators for species composition. This species was more abundant in the adjacent drier grassland which would not be considered ASM saltmarsh but it was still found occasionally in upper saltmarsh. The presence of this species of local distinctiveness enhances the overall diversity of the site.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management regime, in particular, grazing continues in the near future. The large parts of the saltmarsh vegetation are freely grazed by livestock and the damage impacts are unlikely to change. More recently, there have been some attempts to drain a small area of the upper marsh. This has resulted in the significant damage to some ASM and possible losses of extent. Continued reclamation could reduce the extent of ASM and also damage adjacent transitional habitats that contain Meadow Barley, a species listed on the Flora Protection Order.

Common Cordgrass is found at this site and has already spread into the ASM. However, much of the ASM found at this site is upper ASM. This zone is much less vulnerable to colonisation by this species as it is uncompetitive. Therefore, Common Cordgrass is not likely to spread significantly at this site at the expense of ASM. Most of the ASM is quite sheltered within the creek and is not vulnerable to significant erosion. There are no signs of any significant erosional trends at this site.

#### 5.4 Mediterranean salt meadows (H1330)

#### 5.4.1 Extent

The extent of the habitat is assessed as *favourable* (Table 5.1). The MSM is well represented at Inishdea, Owenshere. It is widespread in its distribution and in places forms extensive swards. There is no accurate information with which to compare its previous extent. There were some limited signs of erosion along the seaward side of the MSM, particularly along the main channel where there is some undercutting of the terraced saltmarsh face. However, there has been no measurable loss of MSM at this site due to erosion.

#### 5.4.2 Habitat structure and functions

The structure and functions of this habitat are rated as *unfavourable-bad*. Of the six monitoring stops that were carried out, two failed to reach the target criteria. This was largely due to the levels of poaching which were, in places considerable. Much of the MSM was damaged to some extent by the heavy grazing levels.

The structure of some of the intact saltmarsh at Inishdea is relatively unmodified and there is a complex network of creeks, salt pans and depressions. The structure of some of the MSM is further diversified by the presence of features such as exposed rock and sinkholes, related to the underlying limestone bedrock. The vegetation assemblage is typical for the habitat. There is little habitat differentiation within the MSM and other than a limited fringe occurring on sheltered muds, the majority of the MSM is classified as upper marsh. There are natural transitions to other coastal habitats such as ASM and to low mounds with Twitch-dominated vegetation.

#### 5.4.3 Future prospects

The future prospects for this habitat are rated as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts such as grazing continue in the near future. A significant portion of the MSM has been damaged by heavy poaching and grazing. This is likely to continue in the future.

Common Cordgrass is present in this habitat. MSM is not usually vulnerable to colonisation by this species, but heavy poaching in some of the MSM may promote the spread of Common Cordgrass. The MSM is not likely to be vulnerable to significant erosion in the future.

#### 6 MANAGEMENT RECOMMENDATIONS

The presence of Wall Barley (*Hordeum secalinum*) at this site increases the conservation status of this site. This threatened species is not common, certainly within the Lower River Shannon. It was relatively widespread at Inishdea, Owenshere and was generally found on drier parts of the upper ASM marsh and ASM transition to MSM. It does not appear to be

affected by the levels of grazing or damage associated with trampling and poaching. It is vulnerable to reclamation, especially of the adjacent drier grassland to the saltmarsh. Reclamation and reseeding in the past has probably negatively impacted the population of this species. Given its overall status in Ireland, it would be advisable to monitor its condition and status periodically.

#### 7 **REFERENCES**

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

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

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## 8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)					Area (ha)
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats	0.003	0.003				
2	Spartina swards	12.976					12.976
3	1330 Atlantic salt meadow	19.227		19.227			
4	1410 Mediterranean salt meadow	11.469			11.469		
5	ASM/MSM mosaic (50/50)	0.167		0.0835	0.0835		
6	ASM/ <i>Spartina</i> mosaic	0.519		0.2595			0.2595
7	1330/other SM (CM2) mosaic	0.077		0.0385			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	12.256					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	7.837					
19	1330/rocky shore mosaic	0.054		0.027			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	64.585	0.003	19.636	11.553		13.236







	SAC Boundary
	1310 Salicornia flats
	Spartina swards
	1330 Atlantic salt meadows
	1410 Mediterranean salt meadows
	1330/1410 mosaic
	Atlantic/Spartina mosaic
	1330/other SM (CM2) mosaic
	1330/rocky shore mosaic
1	Other Saltmarsh (CM2)
	other
	1330 monitoring stops
<b>^</b>	1410 monitoring stops
-	
240	320 400 Meters N

This habitat map was treated with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)

SMP code:

SMP0083

Date of production: 22/ Map version: 1

80

0

# Killadysart, Inishcorker

## 1 SITE DETAILS

SMP site name: Killad	lysart, Inishcorker	SMP site code: 0084			
Dates of site visit: 3 September 2008		CMP site code: N/A			
SM inventory site nam Inishcorker	e: Killadysart,	SM inventory site code: 139			
NPWS Site Name: Lov	wer River Shannon				
NPWS designation	cSAC: 2165	MPSU Plan: Old Forr	nat – Draft 2: Consultation		
	pNHA: <b>2048</b>	SPA: <b>4077</b>			
County: Clare		Discovery Map: 64	Grid Ref: 127120, 158400		
Aerial photos (2000 se C; O 4674-A,B,C,D	eries): O 4614-D; O 4615-	6 inch Map No: <b>CI 059, 060</b>			
Annex I habitats currer	ntly listed as qualifying inte	rests for Lower River Sh	annon cSAC:		
H1310 Salicornia a	and other annuals coloniz	ing mud and sand			
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)					
H1410 Mediterranean salt meadows (Juncetalia maritimi)					
Other SMP sites within this SAC/NHA: Carrigafoyle, Barrigone/Aughinish, Beagh, Bunratty, Shepperton/Fergus Estuary, Inishdea/Owenshere, Knock, Querin, Rinevilla Bay					
Saltmarsh type: Estua	iry Sub	ostrate type: Mud			

## 2 SITE DESCRIPTION

This site is located in the south-west corner of the Fergus Estuary, where it joins the River Shannon Estuary. Killadysart is a small rural town in County Clare, approximately twenty-five kilometres south-west of Ennis along the coastal R473 road to Labasheeda (Leaba Shíoda). This site is located on the opposite side of the River Shannon from Aughinish Island. A small island called Inishcorker is located adjacent to this town. There is a narrow intertidal channel called Killadysart Creek between the island and the mainland and the island can be reached by a ford at low tide. A small quay is located in this creek adjacent to the town.

This site is located in a rural area, which is dominated by farmland. There is some low-lying land adjacent to the shoreline east of Killadysart that has been reclaimed in the past. Tall embankments were built around this shoreline to enclose this land in the 18<sup>th</sup>-19<sup>th</sup> centuries. There is higher ground around Killadysart and on Inishcorker Island, although some low-lying land on Inishcorker was also enclosed by embankments. This part of the Fergus Estuary/Shannon Estuary is quite shallow and there are extensive intertidal mudflats adjacent to the shoreline that is exposed at low tide. There are several other small islands in the estuary adjacent to this area with associated saltmarsh development and are surrounded by mudflats. Sub-tidal estuarine channels are located between these islands.

The survey site includes the saltmarsh found along Killadysart Creek and the shoreline adjacent to the townlands of Lackannashinagh and Crovraghan, north-east of Killadysart. The main part of the marsh is located in this area and there is fragmented marsh on both sides of Killadysart Creek. Some of this marsh has been modified by the creation of the embankments. The Ballyvohane River flows into this creek at Killadysart Quay and there is also some saltmarsh along this river channel, where it is tidal (east of the road bridge). There is no significant development of saltmarsh along the exposed eastern side of Inishcorker and much of the substrate is composed of rock and shingle. It should be noted that this is not a discrete site and saltmarsh habitat is distributed along the Fergus River estuary and the River Shannon shorelines beyond the limits of the survey site. The size of the survey site has to be restricted due to time limitations.

Inishdea, Owenshere saltmarsh is located within the Lower River Shannon candidate Special Area of Conservation (cSAC). This very large site encompasses approximately 120 kilometres of the lower reaches of the Shannon and extends seawards towards the open estuary between Loop Head on its northern boundary and Kerry Head (west of Beal Point). It includes many secondary estuaries including the Fergus Estuary and a great many freshwater tributaries. The site is considered to be of national ecological importance owing to the presence of eighteen important Annex I habitats. The site is primarily designated for its estuarine and coastal habitats and is also important for Annex II species such as Bottlenose Dolphin. The Shannon is also notable for the range of rare or threatened plant species. These include a number of saltmarsh species such as Three Headed Club-Rush (Scirpus triqueter), Wall Barley (Hordeum secalinum) and Sea Dock (Rumex maritimus). Three Annex I habitats are listed as qualifying interests for this SAC: Salicornia flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). The latter two habitats were recorded at this site in addition to Spartina swards, which is not now considered to qualify as an Annex I habitat.

In total, twenty one separate saltmarsh sites are listed for the lower reaches of the River Shannon, occurring in counties Limerick, Kerry and Clare. Fourteen are found along the Co. Clare shoreline (Curtis and Sheehy-Skeffington 1998). Several of these other saltmarshes were surveyed during the SMP project (see above table).

There are few publicly accessible access points to this extensive saltmarsh. The shoreline was accessed at several points by crossing adjacent farmland. Permission was sought to cross this land and also to access the island.

## **3 SALTMARSH HABITATS**

#### 3.1 General description

Although not as large as some of the other saltmarsh sites visited in County Clare such as Shepperton/Fergus or Bunratty, this site was nonetheless one of the longest that was visited during the current survey. The site extends along almost four kilometres and there is considerable variation in the distribution of the various habitats along with their structural and floristic composition. The established Annex I saltmarsh is dominated by ASM. However, the area of *Spartina* sward is much more extensive compared to the established saltmarsh.

Fragments of established ASM and MSM saltmarsh is scattered along both sides of the Killadysart Creek and in the channel of the Ballyvohane River. The embankment, which appears to be in relatively good condition, starts 0.5 km north of the small quay in Killadysart Creek and extends northwards for some distance. Much of the reclaimed land behind the embankment is pasture with wet grassland prominent. Much of this saltmarsh on the mainland has been significantly modified by the construction of the embankments and the remaining saltmarsh is a relic of former more extensive saltmarsh. Much of this saltmarsh occupies narrow bands adjacent to the embankments. *Spartina* swards have also developed in relativity small patches within this intertidal channel and adjacent to some of the more established saltmarsh. A large part of the fringing saltmarsh vegetation is classified as ASM, as the MSM is mostly confined to the southern end of the site, south of the ford to the island. It largely replaces ASM and occurs as a small number of discrete patches alongside patches of Common Cordgrass and transitional brackish vegetation.

The distribution of the saltmarsh vegetation is shaped not only by the embankment but also by the surrounding landscape. Much of the ground is composed of hard rock, particularly towards the southern end of Killadysart Creek. The upper boundary is often constrained by the rocky landscape, resulting in fragmented patches of saltmarsh along this irregular coastline. The shoreline along the Ballyvohane River and parts of Inishcorker has been unmodified and there are natural transitions from ASM or MSM to adjacent wet grassland along the shoreline. *Spartina* sward has also developed at the lower seaward boundary of this saltmarsh.

Inishcorker is somewhat different, in that the saltmarsh is poorly developed. Small patches were recorded around the ford and along the eastern side of Killadysart Creek. However, for large parts and most of the exposed eastern side of the island, the shoreline is rocky and a small amount of ASM/rocky shore mosaic was recorded. There is some reclaimed low-lying ground in the northern part of Inishcorker located behind an embankment. There are signs of brackish influence in the drains of this land with some stands of Sea Club-rush but there was no typical saltmarsh development. These stands were mapped as other saltmarsh (CM2) or non-Annex I saltmarsh vegetation. Twitch (*Elytrigia repens*)-dominated vegetation was also classified as other saltmarsh (CM2).

Further north a large area of mudflats has been covered with *Spartina* sward. There is also some relic MSM and ASM between this sward and the adjacent embankment. There is also some development of stands of brackish vegetation comprising Common Reed (*Phragmites australis*) or Sea Club Rush (*Bolboschoenus maritimus*) along the embankment, particularly in the northern half of the site.

In terms of notable species, no mention was found within the NPWS literature of any rare or threatened having been recorded from this part of the Shannon Estuary. However, one species of local distinctiveness recorded at this site is Sea Wormwood (*Artemisia maritima*). It was noted along the base of a small section of seawall at the northern end of the Killadysart Creek.

The majority of the saltmarsh is mapped as occurring within the boundary of the cSAC. A number of relatively small patches extend beyond the boundary. These are mostly associated with minor cartographical boundary errors relating to the old 6inch map, rather than changes or extension in the distribution of any saltmarsh habitat per se.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	2.94
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.709
non-Annex	Spartina swards	15.31
	Total	18.96

Table 3.1. Area of saltmarsh habitats mapped at Killadysart, Inishcorker.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

#### 3.2 Atlantic salt meadows (H1330)

The ASM is widely distributed throughout this site. It is the dominant Annex I saltmarsh habitat that was recorded at this site (Table 3.1). However, this represents but a fraction of the *Spartina* sward, which is over 5 times more extensive. Unlike the Common Cordgrass, which occurs as an extensive sward or as large patches throughout the site, the ASM is discontinuous in its distribution and rarely occurs as an extensive plain. Throughout the ASM, bare ground was not common, reflecting the relative lack of livestock that are allowed onto the saltmarsh.

The majority of the ASM occurs as a relatively narrow band behind the *Spartina* sward or as fragmented patches atop remnant perched peat/mud. Occasionally, it may occur directly on the mudflats, such as around the sheltered parts in Killadysart Creek. Although the majority of the ASM is classified as upper marsh, it is possible to recognise some degree of zonation. However it is fragmented and rarely sequential and there are no notable examples of typical ASM with distinctive zones. Another feature of the site is that while creeks are noted, particularly in the more extensive sward saltmarsh plain toward the northern half of the site,

elsewhere creek and pan development is poor. This is likely a reflection of the narrow nature of the saltmarsh vegetation and modifications caused by reclamation in the past.

Where it is recorded, the lower parts of the ASM are characterised by a small number of commonly occurring species. These include Common Saltmarsh-grass (*Puccinellia maritima*) which typically accounts for 75-100% cover as well as Common Scurvy Grass (*Cochlearia officinalis*) and Sea Milkwort (*Glaux maritima*). This vegetation assemblage was not widespread.

There is some limited mid-marsh development, although it was often found as part of an intricate mosaic with the upper marsh. The mid marsh communities were only recorded in the northern half of the site behind the extensive *Spartina* sward. Its species assemblage consisted of Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea Plantain (*Plantago maritima*), Saltmarsh Rush (*Juncus gerardii*) and Red Fescue (*Festuca rubra*). The sward, which was largely ungrazed was typically less than 20cm in height.

The upper marsh, which is the most extensive of all the ASM zones, is typified by grass-rich vegetation, which is somewhat more diverse than other zone. The main species include Red Fescue and Creeping Bent (*Agrostis stolonifera*), which was at times as abundant as Red Fescue, particularly where the substrates were saturated. Other common species included Saltmarsh Rush, Sea Plantain, Sea Arrowgrass (*Triglochin maritimum*) and Sea Aster. Other species that were common throughout but of lesser cover include White Clover (*Trifolium repens*), Autumns Hawksbill (*Leontodon autumnalis*) and Common Scurvy-grass.

Mosaics recorded at this site included the occurrence of ASM along MSM communities or as a mosaic with Common Cordgrass at the landward side of the mosaic. Common Cordgrass has spread onto established marsh in places to form *Spartina* sward and mosaics. Other features that were noted were the occurrence of small patches of Sea Club-rush or occasionally Common Reed. However, these were more extensive towards the back of the saltmarsh in the northern half of the site, where freshwater influence draining off the surrounding higher ground was noticeable. The upper boundary of the ASM was rarely distinct, even alongside the embankment. It graded into transitional wet grassland, gradually becoming replaced by Twitch (*Elymus repens*)-dominated grassland. This transitional grassland was rarely more than a few metres wide.

## 3.3 Mediterranean salt meadows (H1410)

In terms of extent, the MSM is not well developed at Killadysart, Inishcorker. One area was mapped in the northern half of the site at the back of a band of ASM. The MSM is mostly confined to the lower half of the site, where it occurs to the south of the ford in Killadysart Creek. The MSM largely replaces the ASM at this location.

Floristically the vegetation is not diverse and in most places is rank in nature. Dominated by Sea Rush (*Juncus maritimus*), this robust plant is tussocky and largely avoided by cattle. It has few constant companions. These include species that are also typical of the upper ASM such as Red Fescue which is often the most abundantly recorded species, accounting for 51-75% cover. Other common species include Creeping Bent (*Agrostis stolonifera*), Sea Plantain, Sea Milkwort and Autumn Hawksbill. Other species which were occasionally noted include Saltmarsh Rush, White Clover and Common Scurvy Grass. The saltmarsh structure within the MSM is poorly developed as these areas are relatively small. However some natural modified zonation was noted along the landward boundary to brackish wet grassland communities in places.

#### 3.4 Spartina swards

Largely characterised by mono-specific swards, Common Cordgrass overwhelmingly dominates this site, particularly in the northern half. The sward has extensively developed on the mudflats and in places reaches 200 metres in width. Elsewhere discrete patches of varying sizes occur around the Killadysart creek which winds its way along the western side of Inishcorker Island. While there are a number of large patches, that never replicate the extent of the sward that occupies the mudflats further north.

The majority of the sward is well-established and mature. Some of this sward has developed on previously established saltmarsh. There are some natural transitions from ASM to *Spartina* sward along a gentle seaward gradient in places. Species such as Common Saltmarsh-grass, Greater Sea-spurrey and Sea Aster are present along the upper sward boundary but there distribution is limited to a narrow zone close to the upper boundary. There are some limited signs of dieback at the most northerly extent of the sward. It is not known why the dieback is occurring, although it is interesting that it occurs along a shallow creek, in which the freshwater may be influencing the Common Cordgrass. Further inland, the large stands of Reeds are showing signs of gradual expansion in a seaward direction. There area also signs of continued seaward growth of the sward on the mudflats. A large part of the sward occurs of perched mud that is somewhat consolidated. However, another band of open sward occurs on lower oozing mudflats. This is typical of younger habitat and is indicative of ongoing expansion. Indeed, small isolated clumps of young Common Cordgrass were noted in front of the main sward, indicating recent recruitment.

#### 4 IMPACTS AND ACTIVITIES

The distribution of the saltmarsh is constrained by the rocky nature of its coastline, as well as human interference such as the embankment. The site is not easily accessible and for the most part, it is either too narrow or else the ground is too treacherous to allow cattle to access

the marsh. The list of all the impacts and activities that were recorded at this site are listed in Table 4.1. The site is not used for amenity activities.

Unlike many other saltmarsh systems, grazing (140) was not recorded as a major activity at this site. Large parts of the fringing saltmarsh occur outside of agricultural fields and are largely inaccessible to livestock due to fences on the embankments. Indeed, six out of eight of the ASM monitoring stops indicate that there was no grazing associated with them. Some small areas of saltmarsh along the embankments were accessible to cattle and grazing was noted. There are a small number of places where patches of saltmarsh are clearly grazed and indeed trampling and poaching (143) was evident. This damage was noted around the southern part of the site in and around the fringing saltmarsh vegetation on either side of the ford crossing over to Inishcorker.

This site has been significantly modified by the construction of embankments in the 18-19<sup>th</sup> centuries and reclamation of saltmarsh behind these embankments (801). There is some evidence as well of more recent reclamation of established saltmarsh and *Spartina* sward at one location in the north part of the site. A new berm has been extended out onto the intertidal flats to take in this marsh, which has been drained and improved and now contains improved grassland (although it is likely to revert to wet grassland if it is not managed). It is not known if this reclamation took place during the current monitoring period.

The spread of Common Cordgrass, an invasive species (954), at this site is significant. This sward is likely to have developed since the 1930's and is well-established (Nairn 1986). Most of the sward has developed on formerly unvegetated mudflats. However it has also spread onto former established saltmarsh adjacent to the embankment, especially at the northern end of the site. This is particularly visible when the current habitat map is compared to the extent of saltmarsh as mapped by the OSI 2<sup>nd</sup> edition 6 inch map. Much of this colonisation is likely to have occurred prior to the current monitoring period so the impact of its spread is assessed as neutral. The colonisation may have been promoted by maintenance works to the embankments or the use of mud from the adjacent saltmarsh and mudflats to construct new embankments. The presence of Common Cordgrass within the ASM is assessed as a negative impact (-1) due to its abundance within the ASM, the creation of ASM/*Spartina* sward mosaics and the fact that some *Spartina* sward has developed in areas with previously established saltmarsh.

There are some signs of natural erosion (900) within the ASM and MSM habitats at this site. These are mostly concentrated around the southern half of the site and along the perched fragments on the northern side of the Killadysart Creek. In places there is a tall saltmarsh cliff along the seaward boundary. The frontline is often indented and in places undercut by wave action. Subsidence or slumping was not a particular feature of this site, except around one or two sluice gates in the northern part of Killadysart Creek. Some of the saltmarsh vegetation in the southern end of the site occurred on lower terraces and even on mixed mud/stone

substrates. Occasionally, isolated clumps of Sea Rush or tussocks of eroded ASM vegetation were noted. There has been no significant loss of saltmarsh from erosion when the current extent of saltmarsh is compared to the marsh mapped on the OSI 2<sup>nd</sup> six inch map. Overall there has been no measurable loss of saltmarsh habitat from erosion during the current monitoring period. The impact of erosion is assessed as neutral on a small portion of the saltmarsh face.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	С	0	0.5	Inside
H1330	143	С	-1	0.2	Inside
H1330	501	С	0	0.1	Inside
H1330	900	С	0	0.1	Inside
H1330	954	В	-1	1.5	Inside
H1410	140	С	0	0.1	Inside
H1410	143	С	-1	0.001	Inside
H1410	501	С	0	0.001	Inside
H1410	900	С	0	0.01	Inside
H1410	954	С	0	0.7	Inside

Table 4.1. Intensity of various activities on saltmarsh habitats at Killadysart, Inishcorker.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> 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 main impacts and activities adjacent to the survey site are grazing (140) and silage production (102) although some limited cultivation was noted (100). It is likely that associated impacts would include agricultural improvement (103), fertilisation (120) and restructuring of agricultural holding (150). There are few houses within any significant distance of the saltmarsh and most are clustered around the small town of Killadysart (400). Pollution both domestic and agricultural is another impact which could have some impact on the condition of the saltmarsh vegetation.

## 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

information for this site. No specific or useful mention is made of the saltmarsh at Killadysart, Inishcorker in the Natura 2000 files.

Killadysart, Inishcorker saltmarsh has few features of conservation interest. This is not an extensive or well developed saltmarsh system. The saltmarsh vegetation which is primarily located to the landward side of the sward is quite fragmented and rarely is it recorded other than as a narrow fringe. There is some degree of natural transition from the *Spartina* sward to the narrow saltmarsh fringe that is behind. In addition, to admixtures between the ASM, MSM and Common Cordgrass, relatively large stands of brackish habitats occur, especially towards the northern half of the site.

Historically, the site has been modified and an extensive embankment was constructed to prevent flooding of the land reclaimed from the estuary. The embankment is in relatively good condition and the low-lying ground behind it is still under agricultural management. The remaining saltmarsh adjacent to the embankment is the relic remains of much more extensive saltmarsh. Much of this established saltmarsh has also been colonised by Common Cordgrass to create extensive *Spartina* swards. There is no baseline data to accurately indicate when this marsh was colonised by Common Cordgrass. However, this colonisation is likely to have occurred prior to the current monitoring period to the current impact of Common Cordgrass is assessed as neutral. This is mainly because Common Cordgrass is already well established at this site and is unlikely to continue to significantly spread at the expense of the remaining ASM. While the spread of Common Cordgrass is assessed as neutral (mainly due to the lack of accurate baseline data), the extent of Common Cordgrass has had a significant impact on the structure of this marsh.

The overall conservation assessment for the site is *favourable* (Table 5.1). There are few current activities which are considered to be negative impacting the marsh. Most of the saltmarsh is relatively inaccessible and is grazed or used for amenity activates. Some of the marsh may be vulnerable to reclamation in the future. Part of the marsh (ASM and *Spartina* sward) has been reclaimed recently but it is not known if this area was reclaimed during the current monitoring period.

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

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## 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

The extent of this habitat is assessed as *favourable* (Table 5.1). Although it pales into insignificance besides the extensive *Spartina* sward, they occupy largely different ecotopes. The *Spartina* sward is extensively developed on the intertidal mudflats, whereas the ASM occurs on perched land at the back of the sward. Common Cordgrass is likely to have spread onto established ASM in the past to create extensive *Spartina* swards. However the impact of this colonisation is not assessed as it occurred before the current monitoring period.

## 5.2.2 Habitat structure and functions

The structure and functions attribute for this habitat is rated as *favourable*. Eight monitoring stops were carried out in the habitat and they all passed. All of the attributes required for favourable conservation status reached their targets. Most of the habitat is in generally good condition although there is some localised poaching damage from cattle grazing. While the ASM is not extensive, it does nonetheless exhibit many features that are characteristic of the habitat including a certain degree of zonation. Common Cordgrass is present within the ASM and forms some minor ASM/*Spartina* sward mosaics. However, there is no evidence that it has spread significantly during the current monitoring period (mainly due to the lack of accurate baseline data) so its spread is not considered to be a negative indicator on species composition at this site.

## 5.2.3 Future prospects

The future prospects of this site are assessed as *favourable* (Table 5.1). This assessment assumes that the current management activities and levels of impacts continue in the near

future. Other than some natural erosion, it is unlikely that there will be any major change in the extent or condition of this habitat in the near future. Common Cordgrass is well established at this site and the remaining ASM is not likely to be vulnerable to further colonisation, as it is already well established.

Further reclamation has the capacity to further reduce the extent of saltmarsh at this site. However, this should be controlled by the designation of the saltmarsh within the cSAC.

## 5.3 Mediterranean salt meadows (H1330)

#### 5.3.1 Extent

The extent of the MSM is assessed as *favourable* (Table 5.1). Relative to the ASM or in particular the *Spartina* swards, the MSM is not extensive. While it is not possible to determine if it was previously more widespread, its current distribution is considered to reflect its natural extent. There are no indications of any significant loss of MSM during the current monitoring period.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Two monitoring stops were carried out in the habitat, both of which satisfied the target criteria. The largely rank vegetation, although not extensive, displayed typical characteristics of the habitat. The species assemblage and structure is typical of this habitat. The MSM is not affected by any significant damaging activities. Common Cordgrass is found in this vegetation and forms swards adjacent to the MSM on lower mudflats. However, it has not colonised the MSM to the same extent as the ASM.

#### 5.3.3 Future prospects

The future prospects for this habitat are assessed as *favourable*. The assessment assumes that the current management activities and levels of impacts continue in the near future. Other than some limited grazing and poaching, which are not considered to be significant, there are no significantly damaging activities that are likely to threaten the persistence of the MSM at this site. This habitat is less vulnerable to colonisation by Common Cordgrass in the future.

#### 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site.

## 7 REFERENCES

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

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

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

## 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards	15.264					15.264
3	1330 Atlantic salt meadow	2.933		2.933			
4	1410 Mediterranean salt meadow	0.709			0.709		
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic	0.019		0.0095			0.0095
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	2.608					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)	0.040					0.040
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	2.329					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	23.90		2.94	.709		15.31

Table 8.1. Areas of SMP habitats mapped using GIS.





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Saltmarsh Monitoring Project 2007-2008

# Killadysart, Inishcorker (Map 2 of 2)

Lower River Shannon SAC (002165)

This habitat map was create and interpretaion of aeral ph are subject to revision. Prod permission of the Governme

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photos. Boundark oduced from Ord nent (Permit num	es of designated areas inance Survey material by Iber 5953)	Map version	1: 1	Scale 1:55	00	2 450 (HO)	A

# Knock

## **1 SITE DETAILS**

SMP site name: Knoc	ck	SMP site code: 0085			
Dates of site visit: 3 S	September 2008	CMP site code: N/A			
SM inventory site nan	ne: Knock	SM inventory site code	e: <b>137</b>		
NPWS Site Name: Lo	ower River Shannon				
NPWS designation	cSAC: 2165	MPSU Plan: Old Form	nat – Draft 2: Consultation		
	pNHA: <b>0027</b>	SPA: <b>4077</b>			
County: Clare		Discovery Map: 64	Grid Ref: 108880, 153305		
Aerial photos (2000 series): O 4791-A 6 inch Map No: Cl 068					
Annex I habitats currently listed as qualifying interests for Lower River Shannon cSAC:					
H1310 Salicornia	and other annuals coloniz	ing mud and sand			
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)					
H1410 Mediterranean salt meadows (Juncetalia maritimi)					
Other SMP sites within this SAC/NHA: Carrigafolye, Barrigone/Aughinish, Beagh, Bunratty, Shepperton/Fergus Estuary, Inishdea/Owenshere, Killadysart/Inishcorker, Querin, Rinevilla Bay					
Saltmarsh type: Estuary Substrate type: Mud					

## 2 SITE DESCRIPTION

Knock is located along the northern side of the outer River Shannon Estuary in Co. Clare. It is one of the smaller saltmarsh systems and occurs on the western side near the mouth of Clonderlaw Bay. The site is located 4 km west of Moneypoint Power Station and the Killimer Ferry Terminal. The site is located around a small inlet at Rusheen Point, approximately 1 kilometre due west of the small village of Knock along the R486 road. The adjacent landscape is quite hilly and there are moderate-steep slopes with a northern aspect to this site. There is some low-lying land south of Rusheen Point that has been reclaimed in the past and has a tall embankment around the shoreline. This area is quite rural and is dominated by farmland, some of which is quite poor on the hillier area and wet grassland is the main habitat.

The saltmarsh is mainly found around the fringes of this small inlet between Rusheen Point and the mainland. Much of this inlet has been infilled with *Spartina* sward. There are mudflats along the seaward fringe that extend into Clonderlaw Bay and are much more extensive. The land to the south of Rusheen Point has been reclaimed and is fronted by a stone/concrete embankment, ranging in height from 75cm, to over 2.5 metres. This ground is bisected by a number of linear drainage features that forces the water towards a system of one-way gates that drain out into the Shannon. There is some saltmarsh development behind this embankment and along these drains where there is still some tidal influence. This is probably related to some saline water entering though the sluice during some high tides.

Knock saltmarsh is located within the Lower River Shannon candidate Special Area of Conservation (cSAC 2165). This very large site encompasses approximately 120 kilometres of the lower reaches of the Shannon and extends seawards towards the open estuary between Loop Head on its northern boundary and Kerry Head (west of Beal Point). It includes many secondary estuaries including the Fergus Estuary and a great many freshwater tributaries. The site is considered to be of national ecological importance owing to the presence of eighteen important Annex I habitats. The site is primarily designated for its estuarine and coastal habitats and is also important for Annex II species such as Bottlenose Dolphin. The Shannon is also notable for the range of rare or threatened plant species. These include a number of saltmarsh species such as Three Headed Club-Rush (*Scirpus triqueter*), Wall Barley (*Hordeum secalinum*) and Sea Dock (*Rumex maritimus*). Three Annex I habitats are listed as qualifying interests for this cSAC: *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). The latter two habitats were recorded at this site in addition to *Spartina* swards, which is not now considered to qualify as an Annex I habitat.

In total, twenty one separate saltmarsh sites are listed for the lower reaches of the River Shannon, occurring in counties Limerick, Kerry and Clare. Fourteen are found along the Co. Clare shoreline (Curtis and Sheehy-Skeffington 1998). Several of these other saltmarshes were surveyed during the SMP project (see above table). Although the site is located in Clonderlaw Bay, it is separated from the larger Clonderlaw Bay saltmarsh system listed as a separate site on the saltmarsh inventory (Curtis and Sheehy-Skeffington 1998). This larger saltmarsh site is located in the head of the bay and was not surveyed as part of this survey.

There is no public access to this site. Access to the site was via a small farm access track leading from R486. Permission was sought to cross this private land.

## **3 SALTMARSH HABITATS**

## 3.1 General description

Knock is classified as an estuarine saltmarsh whose substrate is largely mud (Curtis and Sheehy-Skeffington 1998), although wet clays and peaty soils were found in the upper parts of the saltmarsh. In comparison to the overwhelming dominance of the *Spartina* sward at Knock, the remainder of the saltmarsh communities are measurably less prominent. In addition to the *Spartina* swards, three Annex I saltmarsh habitats were recorded at this site. They include: *Salicornia* and other annuals colonizing mud and sand – H1310 (*Salicornia* flats), Atlantic salt meadows – H1330 (ASM) and Mediterranean Salt meadows – H1410

(MSM). The total area mapped for each of the four habitats is shown in Table 3.1. Asides from a small amount of transitional ASM (0.162ha) that was recorded along a man-made drainage channel in agricultural land, the majority of the saltmarsh occurs inside the cSAC boundary.

Most of the saltmarsh is located in the narrow inlet between Rusheen Point and the mainland. A large part of this shallow intertidal inlet has been infilled with *Spartina* swards. There is a small fringe of ASM along parts of the landward boundary of the *Spartina* sward on Rusheen Point and along the mainland. A small patch of *Salicornia* flats was also found at this location. Most of the intertidal *Spartina* sward backs onto transitional grassland dominated by Twitch (*Elymus repens*) or in some cases, stands of Sea Club-rush (*Bolboschoenus maritimus*) where there is no ASM development. These stands were classified and mapped as other saltmarsh (CM2) or other Non-Annex saltmarsh vegetation in accordance with the SMP project.

Some of this land on Rusheen Point has been modified in the past by reclamation and there is a low embankment along the north side of this spit. Some ASM and MSM saltmarsh is found behind this embankment where there is some tidal influence from drains. There is some more extensive ASM development in the reclaimed area south of the spit and behind the embankment. There is a subtle transition from this ASM to wet grassland along gentle gradients from the drains that flood this area. The terrestrial mosaic that occurs alongside the ASM is largely characterised by a variety of agriculturally-managed grasslands, including wet improved grassland or transitional acid or coastal grasslands, most of which occur on damp substrates in the low-lying ground further south and west to Burrane Point.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.029
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.740
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.144
non-Annex	Spartina swards	4.788
	Total	5.701

Table 3.1. Area of saltmarsh habitats mapped at Knock.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

Salicornia flats are not well developed at this site, which may be due to the extensive development of Common Cordgrass. Occupying 0.029ha, it accounts for less than 0.005% of the total saltmarsh vegetation (Table 3.1). This habitat has developed along the edge of a narrow ridge or spit of ASM that extended into the *Spartina* sward. Species recorded in this habitat included Annual Glasswort (*Salicornia europaea* agg.), Common Saltmarsh-grass (*Puccinellia maritima*) and Annual Sea-blite (*Suaeda maritima*). As the habitat is found

adjacent to Common Cordgrass, it was not surprising to see some *Spartina* within the linear band of this annual habitat.

## 3.3 Atlantic salt meadows (H1330)

The development of the ASM is very much limited on its seaward boundary by the extensive *Spartina* sward and on its landward boundary by heavily modified or transitional grasslands. Much of this ASM vegetation is characterised by low marsh, although some limited zonation was apparent. It was dominated by a fringe of Common Saltmarsh-grass and also contained small amounts of Sea Aster, Sea Pink and Sea Plantain. This vegetation type is found on the narrow ridge that extends into the *Spartina* sward and has a stony substrate in places. Some of the fringe along the edge of the *Spartina* sward is dominated by Saltmarsh Rush. The structure of this ASM is poorly developed as it is quite minor in extent.

Much of the ASM found behind the embankment south of Rusheen Point is more typical of mid-upper marsh. The structure of this saltmarsh is poorly developed as it was reclaimed in the past and has since reverted to saltmarsh vegetation due to increased tidal influence. Some zonation was present along the drains where narrow fringes of low marsh vegetation dominated by Common Saltmarsh-grass were evident. The gentle gradients from these drains affected the zonation of the habitat. There were also some terrestrial ridges adjacent to the drains where spoil from the drains had been placed in the past. Stands of Sea Clubrush were also found in these drains and within the ASM in places. This area was grazed by cattle.

The mid-upper marsh community contained Red Fescue (*Festuca rubra*), along with Creeping Bent (*Agrostis stolonifera*), which was common in wetter areas. Other sections were dominated by Saltmarsh Rush. Other species included Thrift (*Armeria maritima*), Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Saltmarsh Rush (*Juncus gerardii*) and Sea Plantain (*Plantago maritima*). Other species that were occasionally recorded in this community included White Clover (*Trifolium repens*), Autumn Hawksbill (*Leontodon autumnalis*), Sea Arrow-grass (*Triglochin maritimum*) and Common Sea-spurrey (*Spergularia media*).

The upper boundary of the ASM behind the embankment was rarely distinct and often graded into wet grassland with species such as Selfheal (*Prunella vulgaris*) and Silverweed (*Potentilla anserina*), along with agricultural grasses such as Perennial Ryegrass (*Lolium perenne*) and Crested Dogs-tail (*Cynosurus cristatus*). These species occasionally occurred on low mounds within the ASM. Elsewhere, and in particular along northern half of the site, the upper boundary of small ASM patch is characterised by disturbed ground as well as species indicative of brackish conditions such as Sea Club Rush and Twitch.

## 3.4 Mediterranean salt meadows (H1410)

The MSM vegetation is patchily distributed around this site and is quite minor in extent. It is confined to the southern side of the site, where it was recorded as five separate patches. Typically, these are surrounded by ASM vegetation.

The habitat is characterised by stands of Sea Rush (*Juncus maritimus*), along with grasses and rushes such as Red Fescue, Creeping Bent and Saltmarsh Rush. The herbaceous component of the vegetation is similar to that encountered in the ASM and includes Thrift, Sea Aster and Sea Milkwort. The MSM is distinctly taller than the surrounding ASM vegetation, which is more heavily impacted by grazing. Some transitional species more typical of wet grassland were noted in the patches of MSM including Thistle spp. and Glaucous Sedge (*Carex flacca*).

#### 3.5 *Spartina* swards

This habitat is the overwhelmingly dominant vegetation type associated with this site. A dense sward of Common Cordgrass is extensively established throughout the intertidal inlet around Rusheen Point. Smaller patches were also found, which extended into other habitats along creeks. This species has also spread into the area behind the embankment to form some sward. The Common Cordgrass does not appear to be greatly impacting the ASM or MSM habitats. Indeed, the occurrence of some ASM in the upper reaches of the sward, mapped as ASM/Spartina mosaic, is positive in terms of the development of ASM. Small amounts of Common Saltmarsh-grass and other species such as Sea Aster are spreading into the upper *Spartina* sward. The development of this sward may have had an impact on the development of *Salicornia* flats.

## 4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). Grazing (140) is the principal activity which is carried out at this site. Cattle and horses make use of the low-lying area behind the embankment. The saltmarsh vegetation is relatively limited in extent and as the site is freely accessible to livestock, the distinction between saltmarsh and other transitional habitats is obscured. While the mudflats are avoided by the livestock, the remainder of the saltmarsh has suffered some damage (143) including overgrazing, trampling and in many places heavy poaching.

The extensive colonisation of the invasive species Common Cordgrass (954) commenced sometime after 1928, when it was first introduced into the Shannon River. It has spread prodigiously, including into this site, where it is now well established and forms mature swards. There are no indications that Common Cordgrass spread onto established saltmarsh around this inlet as no marsh is mapped on the OSI 2<sup>nd</sup> edition 6 inch map. The Common Cordgrass has developed on formerly unvegetated intertidal mudflats. On the ground,

however, there is some evidence that the narrow inlet may become largely infilled as the sward continues to spread slowly into the un-vegetated mudflats and along the gravel ridge where the *Salicornia* vegetation was recorded. The current ASM marsh has a limited amount of Common Cordgrass so its impact is assessed as neutral (Table 4.1).

The development of this *Spartina* sward may encourage further development of ASM along the landward boundary in the future, due to natural succession. The occurrence of some ASM/*Spartina* mosaic is indicative of the natural progression of the marsh communities at this site (990).

The site had recently been further modified through the importation of rubble and other material (423). Much of the area on Rusheen Point and along the north side of the main drain flowing east-west has been disturbed recently and there is substantial bare substrate present. It had been brought in along the access track and also bull-dozed out onto *Spartina* sward at one location at the inner most part of the narrow inlet. This limited reclamation (803) may have been carried out as a means of limiting the flooding of tidal waters out over the main road. There certainly has been some loss of ASM and MSM on Rusheen Point, but it is likely that the greater loss was suffered by the Common Cordgrass sward in the inlet.

The construction of the embankment and the resultant land reclamation has obscured any evidence of previous saltmarsh distribution (801). The OSI 2<sup>nd</sup> edition 6 inch map gives some indication that the low-lying ground was wet, but this is shown in the reclaimed low-lying ground. It is obvious that the distribution and extent of the former saltmarsh has been greatly reduced by the construction of the embankment. However as this occurred outside of the current monitoring period, it is not assessed. There has been some recent modifications to the network of narrow channels between fields and these drains are largely kept clear of vegetation (810) thus improving the drainage flow towards the one-way gates under the embankment.

Natural erosion (900) is not a significant feature of this site. As much of the Annex I saltmarsh habitats occur landward of the *Spartina* sward, there is little evidence of erosion, except possibly some shallow terracing around the ASM at the north-eastern end of the site.

The land outside the site is largely given over to agriculture including activities such as fertilising, land modification, grazing, silage production and overgrazing (102, 103, 120, 140, 143). The impact of these activities is largely undeterminable. The northern boundary of the cSAC is demarcated by the road (502) and a number of dispersed houses (403). However these have been in existence for some time and are not considered to be of any significant impact.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	954	С	-1	0.029	Inside
H1330	143	В	-1	0.5	Inside
H1330	423	А	-2	0.214	Inside
H1330	801	А	-2	0.214	Inside
H1330	810	С	-1	0.2	Inside
H1330	954	С	0	0.74	Inside
H1330	990	С	+1	0.005	Inside
H1410	140	С	0	0.08	Inside
H1410	423	С	-2	0.05	Inside
H1410	801	С	-2	0.05	Inside
H1410	954	С	0	0.14	Inside

Table 4.1. Intensity	y of various	activities or	n saltmarsh	habitats a	t Knock
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<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> 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.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

## 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

Knock saltmarsh is poorly developed and has few features of conservation interest. It has been greatly modified in the past through the construction of the embankment and the reclamation of land for agricultural purposes. The main saltmarsh habitat is *Spartina* swards, which has infilled a small intertidal inlet. Common Cordgrass has not spread into established marsh at this site and there was never any extensive established saltmarsh along the seaward side of the embankment. The saltmarsh behind the embankment has redeveloped on previously reclaimed land and is characterised by fragmented patches of marsh vegetation in wet hollows and along drainage creeks. Much of this vegetation is transitional, often grading imperceptibly into wet grassland, depending on subtle sub-surface hydrological conditions.

The overall conservation status of the saltmarsh at this site is *unfavourable-bad* (Table 5.1). Currently it is all grazed and is clearly suffering owing to the high grazing levels, which are causing some poaching damage. There has been some recent infilling and reclamation at this site on Rusheen Point. This is likely to have infilled some hollows that formerly contained saltmarsh.

Common Cordgrass is present although there are no indications that it is spreading landward into the ASM.

This site is located within the Lower River Shannon cSAC. An old format NPWS Conservation management plan is available for this cSAC but is now out of date.

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

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

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

#### 5.2.1 Extent

The extent of this habitat is rated as *favourable*. A single linear patch of this annual vegetation was recorded at Knock. It is not known if it is the remnants of a greater extent or if it is naturally limited in extent at this site, as there are no known records as to its previous occurrence. However, given the establishment of Common Cordgrass on the adjacent mudflats, it is not surprising that this habitat is not more extensive.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Given the paucity of the habitat, a single monitoring stop was carried out. This stop satisfied the target criteria, although it was noted that Common Cordgrass, which alone accounts for the majority of the available intertidal mudflats as this site, accounted for between 11 to 15% of the total area. This is indicative of its gradual spread into this sole patch of *Salicornia*-

dominated vegetation. Therefore the assessment was revised to *unfavourable-inadequate*. There were no other negatively impacting activities affecting this habitat.

#### 5.2.3 Future prospects

The future prospects for this habitat are rated as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts such as the spread of Common Cordgrass will continue in the near future. This habitat is vulnerable to continued spread of Common Cordgrass into this habitat, which will reduce its extent.

## 5.3 Atlantic salt meadows (H1330)

## 5.3.1 Extent

The extent of this habitat is assessed as *unfavourable-bad*. There has been some recent infilling and reclamation at this site. This is likely to have destroyed a small area of ASM saltmarsh located behind the embankment on Rusheen Point. There are no indications of any significant loss of ASM habitat due to the spread of Common Cordgrass at this site.

#### 5.3.2 Habitat structure and functions

The structure and functions of the habitat are rated as *unfavourable-inadequate* (Table 5.1). Three monitoring stops were carried out across this habitat, two of which satisfied the target criteria. Most of the habitat is in good condition. One monitoring stop failed due to a high grazing intensity and the associated level of poaching that the area had suffered. Much of the ASM has developed behind the embankment on previously reclaimed land, so its structure is poor. Several zones and typical ASM communities are present. Common Cordgrass is present and forms a small area of sward but there is evidence that this developed within the current monitoring period due to the lack of accurate baseline data, so the impact of its spread during the current monitoring period is assessed as neutral. There are no indications that it is spreading landward into the ASM. Reclamation works and infilling have disturbed some of the remaining saltmarsh found behind the embankment.

There is also some minor ASM development along the seaward side of the embankment and adjacent to the *Spartina* sward. This ASM is also poorly developed due to its relatively limited extent.

## 5.3.3 Future prospects

The future prospects for this habitat are rated as *unfavourable-inadequate*. The assessment assumes that the current management activities and level of impacts such as grazing continue in the near future. The current grazing intensity coupled with continuing waterlogged conditions is damaging the ASM with some heavy poaching noted and this is likely to continue into the future. This site is also vulnerable to further infilling and reclamation, although this area is located within the cSAC. The development of ASM behind the embankment is related to some tidal influence entering the site through the sluice. This area

was reclaimed in the past and a one-way sluice allows drainage from the site. Modifications to the sluice or any other activities that limit tidal influence will affect the development of saltmarsh behind the embankment. Most of the ASM found at this site is not likely to be vulnerable to colonisation by Common Cordgrass in the future, due to its position behind a seawall and the relatively low cover of the low ASM zones compared to the higher extent of the mid and upper ASM zones.

## 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of this habitat is assessed as *unfavourable-inadequate*. There has been some recent infilling and reclamation at this site. This is likely to have destroyed a small area of MSM saltmarsh located behind the embankment on Rusheen Point.

#### 5.4.2 Habitat structure and functions

The habitat structure and functions are assessed as *unfavourable-inadequate* (Table 5.1). A single monitoring stop was carried out in one of the larger MSM patches and it is indicative of the remaining four patches of MSM that are recorded from Knock. Although every available bit of land is grazed by livestock, the MSM is usually avoided, as it is less palatable. While there may be some trampling in and around the separate MSM patches, the damage is not extensive. The species assemblage is typical of the habitat. Common Cordgrass is not found within this habitat. There has been some disturbance to the remaining MSM from infilling and reclamation and this is the main reason for the revised assessment of *unfavourable-inadequate*.

#### 5.4.3 Future prospects

The future prospects for this habitat are rated as *unfavourable-inadequate*. The assessment assumes that the current management activities and level of impacts such as grazing continue in the near future. This site is also vulnerable to further infilling and reclamation, although this area is located within the cSAC. This may further reduce the extent of MSM at this site. This habitat is not vulnerable to colonisation by Common Cordgrass.

## 6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

## 7 REFERENCES

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

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

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

## 8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)					Area (ha)
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats	0.029	0.029				
2	Spartina swards	4.785					4.785
3	1330 Atlantic salt meadow	0.735		0.735			
4	1410 Mediterranean salt meadow	0.144			0.144		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic	0.005		0.0025			0.0025
7	1330/other SM (CM2) mosaic	0.004		0.002			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	5.855					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.045					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	11.602	0.029	0.740	0.144		4.788



Connehaol, Oldressent ague Histos Átuar Brvisanment, Heltage and Local Government National Parks and Wildlife Service Project 2007-2008

Lower River Shannon SAC (002165)

This habitat map was created wi and interpretation of aeral photos are subject to revision. Produces permission of the Government (

L	egend
	SAC Boundary
	1310 Salicornia flats
	Spartina swards
	1330 Atlantic salt meadows
	1410 Mediterranean salt meadows
	Atlantic/Spartina mosaic
	1330/other SM (CM2) mosaic
	Other Saltmarsh (CM2)
	other
	1310 monitoring stops
	1330 monitoring stops
	1410 monitoring stops

			and the second second			and the second second		
SMP code:	0	40	80	120	160	200	Meters	N
with a combination of fieldwork, G PS cs. Boundaries of designated areas ad from Ordinance Survey material by t (Permit number 5953)	Date of pro	oduction: on: 1	22/02/2009	Origin	nal Drawin 1:3000	ng Size:	297 x <mark>4</mark> 20 (A3)	A

# Lahinch

# **1 SITE DETAILS**

SMP site name: Lahinch	SMP site code: SMP0008						
Site name (Curtis list): Lahinch	CMP site code: <b>85</b>						
	Site No: (Curtis list): 132						
NPWS Site Name: Inagh River Est	uary Dates of site visit: 26-27/07/2006						
NPWS designation cSAC: <b>3</b>	6 MPSU Plan: none						
pNHA: 3	36						
Wildfow	l Sanctuary: IE05, Inagh River						
County: Clare	Discovery Map: 51/57 Grid Ref: 110180, 189260						
6 inch Map No: Cl015	Aerial photos (2000 series): <b>04024-d</b> , <b>04083-a</b> , <b>04083-b</b> , <b>04083-c</b> , <b>04083-d</b>						
Annex I habitats currently designated for Inagh River Estuary cSAC:							
Salicornia and other annuals colonizing mud and sand (1310)							
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)							
Mediterranean salt meadows (Juncetalia maritimi) (1410)							
Saltmarsh type: EstuarySubstrate type: Mud, Sand							

## **2** SITE DESCRIPTION

Lahinch saltmarsh is located along the coast of Co. Clare in Liscannor Bay. The saltmarsh is sheltered from the sea by an extensive sand-dune system now containing Lahinch Golf Course. Lahinch Town is located to the south-west of the saltmarsh. The saltmarsh is situated in a flat flood plain in a wide valley with undulating hills on both sides and towards the back of the saltmarsh. The flood plain is tidal and is the estuary of two rivers, the Inagh River and the Dealagh River. The Inagh River channel is located along the southern side of the estuary and meanders towards the north-west. Here it joins the Dealagh River, which flows along the northern side of the valley. One main channel flows past the northern end of the sand-dune system and enters Liscannor Bay. The valley narrows upstream along the Inagh River and there is further saltmarsh development along the channel.

Three Annex I habitats, *Salicornia* flats (1310), Atlantic salt meadows (ASM) (1330), Mediterranean salt meadows (MSM) (1410), are present at this site. All of these habitats are listed as qualifying interests for the Inagh River cSAC. Nearly the entire Lahinch saltmarsh habitat is located within the Inagh River Estuary cSAC. There are small minor areas of saltmarsh outside the cSAC boundary on Lahinch Golf Course and upstream of New Bridge, Ballingaddy Townland. The main part of this site can be accessed from a farm at Lissatunna after getting the landowners permission. Saltmarsh to the west of the Inagh River can be accessed via O'Briens Bridge. The area on the southern side of the Inagh River further upstream in Dough and Cloonaveige Townlands was not surveyed. No permission could be obtained to cross farmland to access this area. This area has potential for saltmarsh habitats. Aerial photos and views from distance were not clear as this area could be wet grassland dominated by Soft Rush (*Juncus effusus*) or may be Mediterranean salt meadow dominated by Sea Rush (*J. maritimus*).

#### **3 HABITATS**

#### 3.1 General description

Saltmarsh is mainly situated between the two river channels (Inagh River and the Dealagh River) occupying the flat central plain. This area is dominated by Mediterranean salt meadows (MSM) (Table 3.1). Atlantic salt meadow (ASM) habitat is mainly situated along the west side of this area and along the banks of both the river channels. MSM saltmarsh seems to be distributed landward of the ASM, which is mainly distributed closer to the river channels. MSM saltmarsh extends to the east, where several fields on the plain have developed brackish habitats and wet grassland. The land then becomes sloped and improved agricultural grassland is present.

Interesting mosaics with transitions from saltmarsh to brackish habitats, wet grassland, dry coastal grassland, dry acid grassland, dry heath and scrub have developed due to the topography of the section and these other habitats cover a significant area, mainly in the central section. This also made mapping difficult at this site. Dry coastal grassland with affinities to fixed dune is situated in the northwest section. The topography of the area has been modified somewhat and tracks have been laid down on infill. There are other long narrow banks where material taken from adjacent drains has been dumped and these elevated banks have developed terrestrial vegetation. Some of the tracks are now grassy (wet and dry grassland).

Atlantic salt meadow is also situated along the western side of the Inagh River channel, between the channel and Lahinch Golf Course (dry coastal grassland). ASM saltmarsh continues along the southern side of the Inagh River with MSM developing further landward to the south. The MSM and ASM form a mosaic in this area. At the landward (southern) side of the saltmarsh mosaic there are patches of wet grassland and Common Reed Beds. Saltmarsh continues along the Inagh River upstream towards the eastern side of Lissatunna and Dough Townlands. It eventually transitions to brackish and freshwater habitats that become more common along the river.

There are only small patches of saltmarsh along the northern side of the Dealagh River with both ASM and MSM being present. A small patch of saltmarsh is situated in the outer estuary, west of the sand-dune system and the O'Briens road bridge. Most of the saltmarsh along the Dealagh River is situated west of a road bridge at New Bridge, Ballingaddy Townland. There is only a small strip of saltmarsh upstream of this bridge and transitional brackish habitats with Common Reedbeds become more prevalent.

There are small amounts of *Salicornia*-dominated habitat that can be classified as 1310. These patches of Glasswort (*Salicornia* sp.) are generally situated in old salt pans or in recently accreted patches of sand/mud. The overall area of this habitat is quite small (Table 3.1) and is probably under-estimated somewhat. Smaller salt pans containing this habitat were not mapped.

Much of the MSM saltmarsh has also been modified in the past by drainage. This has occurred north of the track dividing the central area between the two river channels There are several very deep drains (trenches) criss-crossing this area and dividing it into regular blocks. Some of these blocks have been further drained with smaller regular drains orientated north-south. These smaller drains are now being silted up and most have re-vegetated. The drainage works were super-imposed over the existing saltmarsh creek and salt topography. This distinctive saltmarsh topography is still visible from the aerial photos. Many of these creeks are still active or are becoming functional again. Drainage works have also occurred to the south of the Inagh River channel in east part of Dough Townland, but this area was not surveyed. It is not known if this area contains MSM or wet grassland. Some saltmarsh or brackish habitats would be likely in this area.

Much of the MSM was classified as wet grassland during the NHA survey (it is Rushdominated). This may have been a simple error in classification as it is difficult to separate wet grassland and MSM saltmarsh from distance. While it could also indicate that there has been transition or restoration back to saltmarsh it is unlikely that dense stands of Sea Rush would have developed in this period (1993-2006) with no remnants of the previous wet grassland species (Soft Rush).

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	0.21
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	49.97 <sup>1</sup>
1410	Mediterranean salt meadows (Juncetalia maritimi)	56.71 <sup>1</sup>
	Total	106.89

\*includes 50% of the 1330/1410 mosaic.

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

This habitat is located on the western side of the Inagh River in the north-west corner. This area is in transition as there has been fairly recent shifts in the river channel. An old channel has now silted up and is dry. The central part of this area is colonised by a monoculture of Glasswort on muddy sand. There is occasional Annual Sea-blite (*Suaeda maritima*) and Common Saltmarsh-grass (*Puccinellia maritima*) plants in this area. The monoculture of Glasswort transitions to pioneer saltmarsh around the edges, dominated by Common Saltmarsh-grass and containing frequent Glasswort. With further accretion, this habitat is likely to disappear in the near future as it transitions to lower saltmarsh vegetation dominated by Common Saltmarsh-grass.

A similar area is present further south but saltmarsh succession is more progressed. This area is currently vegetated with a lower saltmarsh community dominated by Common Saltmarsh-grass and containing frequent Sea Milkwort (*Glaux maritima*), Sea-spurrey sp. (*Spergularia*), Glasswort, and occasional Sea Pink (*Armeria maritima*) and Annual Sea-blite. This area was unvegetated on the 2000 aerial photo but did have 80-90% plant cover during the survey in 2006. It is likely to have contained *Salicornia*-dominated vegetation around 2000. This is a good example of how transient the *Salicornia*-dominated 1310 habitat is and how quickly it can transition to other habitats.

There are several other large pans in the main area of saltmarsh between the two rivers that were colonised with a dense sward of Glasswort and correspond with this habitat. Mosaics have formed with lower saltmarsh vegetation and the pans are in various stages of succession with patches dominated by Common Saltmarsh-grass and Glasswort, and patches dominated by a monoculture of Glasswort. Annual Sea-blite is occasional in these areas. Some of these are moderately poached by cattle. Disturbance of these pans by cattle may also increase the abundance of *Salicornia*-dominated 1310 by continually keeping the salt pans disturbed and allowing colonisation by these pioneer species.

There are further small patches of this habitat in bands along the eastern side of the Inagh River. These bands can be quite narrow (< 0.5 m wide) and have developed on accreting sandbanks on this side.

## 3.3 Atlantic salt meadows (H1330)

This habitat is mainly situated along the two river channels with the largest sections between the Lahinch Golf Course and the Inagh River and in the south-west of the central section between the two river channels. The vegetation of these ASM areas is dominated by mid and mid-upper saltmarsh plant communities. The mid-upper saltmarsh is dominated by Saltmarsh Rush (*Juncus gerardii*) and Red Fescue (*Festuca rubra*) with frequent Sea Plantain (*Plantago maritima*). Other species present include Common Scurvygrass (*Cochlearia officinalis*). Clumps of Sea Rush are occasionally present and may be locally frequent. Only the larger areas were mapped as MSM or mosaic 1330/1410 areas. Species such as Long-bracted Sedge (*Carex extensa*), Autumn Hawkbit (*Leontodon autumnalis*) and White Clover (*Trifolium repens*) appear in the upper saltmarsh zones, particularly in the transition to dry coastal grassland and in the mosaic areas with MSM. This transition is dominated by species such as Silverweed (*Potentilla anserina*) and Creeping Bent-grass (*Agrostis stolonifera*). The relative abundance of White Clover may be an indicator of

agricultural enrichment probably from long-term cattle grazing. This area is not likely to have been fertilised.

A mid-marsh zone is dominated by a typical low sward community of Sea Pink and Sea Plantain. This community also contains Sea Milkwort (*Glaux maritima*), Sea Arrowgrass (*Triglochin maritimum*), Red Fescue (*Festuca rubra*) and Sea Aster (*Aster tripolium*).

Thin bands of lower zone saltmarsh are situated on the eastern side of the Inagh River on more recently accreted sediment banks. These are dominated by Common Saltmarsh-grass with frequent Glasswort and occasional Annual Sea-blite and Greater Sea-spurrey (*Spergularia media*). Lesser Sea-spurrey (*Spergularia marina*) was also recorded in some vegetated shallow creek beds. There is a layer of tidal debris along the strandline.

The ASM generally has a complicated topography and the creeks and salt pans are well-developed. The creeks are quite meandering. Some of the salt pans are quite large. Some of the pans are bare and contain exposed muddy sediment. Some of the pans contain a monoculture of Glasswort and have been classified as 1310 and some pans contain lower saltmarsh plant communities dominated by Common Saltmarsh-grass. There are also frequent low mounds and wide shallow hollows, and some old banks on the ASM probably relate to old river channels. The ASM area to the west of the Inagh River has a more complicated structure with lower shallow hollows containing saltmarsh vegetation and transitioning into dry coastal grassland that develops on higher mounds. Some of these smaller patches of dry coastal grassland may be mapped within the ASM area due to the complicated topography.

There is also significant internal zonation of saltmarsh vegetation along the edges of creeks and salt pans. Bands of pioneer and lower saltmarsh vegetation are situated along these creeks and pans. These zones generally contain the most badly poached areas. An interesting mosaic of mid and mid-upper saltmarsh zones is situated to the west of the Inagh River channel. This area contains small mounds with upper saltmarsh vegetation (Saltmarsh Rush/Red Fescue dominated) interspersed between shallow hollows containing the mid-saltmarsh vegetation (Sea Pink/Sea Plantain dominated). Atlantic salt meadow is also present in ASM/MSM mosaic areas. These
areas have clumps of Sea Rush scattered through the ASM and either habitat may be dominant.

The sward height of the ASM is generally low due to grazing (1-2 cm). However, there are patches within the ASM/MSM mosaic and in the MSM dominated areas that have a higher general sward height (5-10 cm).

# 3.4 Mediterranean salt meadows (H1410)

This habitat is generally dominated by a dense cover of Sea Rush. Other species typically present include Creeping Bent-grass, Red Fescue, Saltmarsh Rush, White Clover, Sea Plantain, Autumn Hawkbit, Sea Arrowgrass, Common Scurvygrass, Sea Aster, Sea Pink, Sea Milkwort, Silverweed and Parsley Water-dropwort (*Oenanthe lachenalii*). Spear-leaved Orache (*Atriplex prostrata*) is present in some of the pans. There are large expanses of this habitat in the north-east section that are quite uniform, with a very dense cover of Sea Rush (up to 100%). In other areas the cover of Sea Rush is lower and the vegetation is more diverse with the other species, particularly the grasses and White Clover, becoming more abundant. In the southwest area there is a mosaic between the ASM and MSM. This area contains assorted clumps of Sea Rush interspersed with ASM vegetation.

Much of this habitat occupies the upper saltmarsh zone. Some of this habitat that is situated in the wide saltmarsh plain may occupy a particular elevation that is flooded by the tide very infrequently. The wide flat saltmarsh plain allows the development of very gradual slopes and therefore wider zones. Therefore, a transitional saltmarsh-terrestrial zone may occupy a larger area at this site. This may be why White Clover and Silverweed are particularly abundant at some locations in this site. At other sites these two species indicate a transition to terrestrial vegetation. At some sites Sea Rush also extends higher than the upper tide boundaries, so Sea Rush-dominated vegetation may not necessarily be saltmarsh but occupy more brackish conditions. An alternative reason for the abundance of White Clover is long-term agricultural enrichment due to cattle grazing.

Different vegetation zones are not particularly evident in this habitat, as it is generally defined by the presence of Sea Rush. However, plant community zonation is evident where the MSM transitions to terrestrial habitats along slopes. Zonation is also

evident along the old creeks and some of the newer drains. Here narrow strips of ASM vegetation characterised by the absence of Sea Rush and dominated by the grasses are positioned alongside the creeks and drains.

The central area contains more elevated land where terrestrial habitats have developed (wet grassland, dry acid grassland, wet heath and Gorse (*Ulex europaea*) scrub. These areas were formerly enclosures. This has led to the development of interesting mosaics of MSM and terrestrial vegetation. Thin bands of MSM are situated in lower drainage channels between some of these higher patches of land. There are transitions from MSM to wet grassland dominated by Purple Moor-grass (*Molinia caerulea*), with frequent Tufted Hair-grass (*Deschampsia caespitosia*), Devils-bit (*Succisa pratensis*), Tormentil (*Potentilla erecta*) and Sweet Vernal-grass (*Anthoxanthum odoratum*). An interesting transitional habitat co-dominated by Purple Moor-grass and Sea Rush, which also contains occasional Marsh Pennywort (*Hydrocotyle vulgaris*) and frequent Parsley Water-dropwort is present.

Common Reed (*Phragmites australis*) appears in some places, particularly along some of the larger drains in the north-east section. There are also several patches of Sea Club-rush (*Bolboschoenus maritimus*), Grey Club-rush (*Schoenoplectus tabernaemontani*) and Common Reed positioned in several pools, at the end of some long meandering creeks. These indicate a transition to more brackish conditions or up-welling of freshwater at these locations. Patches of Yellow Flag (*Iris pseudacorus*) and Purple Loosestrife (*Lythrum salicaria*) occur along parts of the terrestrial boundary south of the track through the central section.

There is also a well-developed creek and pan structure in this habitat. This habitat is situated in the area significantly affected by the old drainage works in the north-east section. These drains cut across the creeks and pans that originally were in the saltmarsh. Many of the creeks have recovered and are functioning again. However, some of the old creeks have infilled as the larger drains are still functional and are functioning like creeks. Some of the drains have partly infilled with MSM vegetation. The remaining open parts of drains act as salt pans and pools. Parallel groups of pans and pools are visible on the aerial photo.

The grazing is generally low in this habitat although cattle do graze in these areas as opposed to some sites where sheep avoid these areas. The cattle do cause some heavy localised poaching. Some of the MSM south of the track is tussocky and has been damaged by long-term poaching.

# 4 IMPACTS AND ACTIVITES

The chief activity on the saltmarsh habitats is grazing by cattle (140) (Table 4.1). The activity codes used in Table 4.1 are given in brackets in the following text. Cattle graze both the ASM and MSM in the central section. They also cross the river and graze the saltmarsh west and south-west of the Inagh River. Grazing levels are variable and are generally low-moderate, creating a typical low sward in the ASM areas. The impact of the cattle grazing can be seen along the ASM/golf course boundary. The golf course is ungrazed while the saltmarsh is grazed.

Cattle are causing some poaching of the saltmarsh (143). There are small local areas of heavy poaching at some locations in both habitats. Some enclosures on the saltmarsh are moderately-heavily poached and the MSM is tussocky. The lower saltmarsh zone, which is situated around the edge of creeks and pans, is dominated by Common Saltmarsh-grass and is generally the most damaged from poaching (this is particularly seen in the ASM to the west of the Inagh River).

Saltmarsh is likely to have been more extensive in the past. The 6 inch map indicates that the tide flows much higher upstream than the extent of the current saltmarsh. Historical land improvement and drainage has had a significant impact on the habitats present in the Inagh and Dealagh River estuary inside and outside the current cSAC boundary. These 'historical' activities are not considered during assessment of impacts.

Parts of the current saltmarsh have been subject to old drainage and land improvement activity, particularly in the north-eastern section and south of the Inagh River channel in Dough Townland. These activities occurred before 1930 (6 inch map) and are likely to have had a significant impact on the saltmarsh habitats, particularly on the creek structure and functions. This drainage is still probably having a residual impact on the saltmarsh, but the saltmarsh has recovered to some extent (or the drainage and

land improvement failed) and the functionality of the creeks is recovering. Some of the deeper drains are likely to have been cleaned or deepened during the intervening period (1930-2006). Several tracks were laid down in the past and infilled with gravel or hardcore. Two areas upstream on both sides of the Inagh River (in Dough and Lissaturna) were also embanked with attempts at land improvement in association with drainage. The embankments have since been breached and are eroding. Both these areas now contain a range of brackish, freshwater marsh, wet grassland and dry grassland habitats but were likely to have continued some saltmarsh in the past. The remnants of the saltmarsh creek and pan topography are still visible on the aerial photos. Some embankment may have also taken place along the southern edge of the Dealagh River in association with the drainage works.

The saltmarsh has also been used for other historical activities. Part of the site in the south-west section, including the saltmarsh and transitional areas, was used as the site of an old Ennistimon RDC sewage works. The old Lahinch race course route also passed over the edge of the saltmarsh in the south-west area.

Natural erosion (900) and accretion (910) is occurring along the Inagh River. The main channel has shifted its position, particularly in the north-west section where it joins the Dealagh River. Minor channels that cut off parts of the saltmarsh and created islands in the channel have also changed significantly between 1930-2006 when comparing the 6 inch map and the 2000 aerial photos. Several old 'islands' are now connected to the main saltmarsh and the channels are infilled or are becoming smaller and now act as creeks. Erosion and accretion is dependent on whether the saltmarsh is situated on inside (accretion) or the outside (erosion) of a meander in the river. Accretion is currently occurring on the eastern side of the channel in the southwest section. There is some re-colonisation along an older saltmarsh cliff. The western side is being eroded. Accretion then switches to the western side further north as the channel changes direction. Natural erosion and accretion in the channels are generally in balance.

Accretion and erosion is also affecting the relative abundance of sand-dune habitats, coastal grassland and saltmarsh, although there is no information on the previous extent of these habitats. Sand-dune habitats are currently developing in the north-

west section due to accretion and this will probably lead to further development of saltmarsh behind the sand-dunes.

Telegraph lines and poles cross the saltmarsh (511). There are occasional patches with wheel ruts at the edge of the track through the central area and in some other areas (501). The strandline along the Inagh River contains frequent rubbish and litter deposited by the tide (421).

Activities adjacent to the saltmarsh habitats include farming (120, 140), urban areas (400), golf courses (601), caravan parks (608) and roads (502). There is likely to be some water pollution (701) upstream from Ennistimon and from the surrounding valley farming and dwellings.

EU Habitat	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected	Location of
Code				(na)	activity
1310	143	А	-1	0.21	Inside
13s	140	В	0	106.89	Inside
1330	143	А	-1	12.5	Inside
1410	143	А	-1	14	Inside
1330	421	С	-1	< 0.1	Inside
13s	501	С	-1	< 0.1	Inside
13s	511	С	-1	< 0.1	Inside
13s	900	С	0	/	Inside
13s	910	С	0	/	Inside
13s	120	С	-1	106.89	Outside
13s	140	С	-1	106.89	Outside
13s	400	С	0	106.89	Outside
13s	502	С	0	106.89	Outside
13s	601	С	0	106.89	Outside
13s	608	С	0	106.89	Outside
13s	701	С	-1	106.89	Outside

**Table 4.1.** Intensity of various activities on saltmarsh habitats at Lahinch.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> 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

Overall, the conservation status of this site is *unfavourable-bad* (Table 5.1). No conservation plan is available for this cSAC. Cattle-induced poaching is causing some damage to the vegetation ground cover and ground structure. However, this

damage is localised and generally affects the lower saltmarsh zones or some enclosures where there has been over-stocking. A significant part of the site was drained in the past but the saltmarsh habitats are recovering. Some of the larger drains are still active and have a significant drainage function. No Common Cordgrass (*Spartina anglica*) was recorded at this site.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are good. The main part of this site has developed in a low, flat flood plain acting as the estuary of two rivers. There is a significant area between the two river channels and along the southern boundary that contains brackish and terrestrial habitats, but these occur on low mounds or in flat areas with shallow slopes and could easily transition to saltmarsh habitats in response to sea-level rise. Any landward saltmarsh migration upstream along the river channels may be dependent on geomorphological changes as the large sand spit containing Lahinch Golf Course protects the estuary and regulates the tidal levels somewhat. There is some potential for landward migration of saltmarsh habitats upstream along the rivers. Some of the land in the river valleys has been improved in the past, although it is reverting naturally back to brackish, freshwater marsh and wet grassland conditions.

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

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

#### 5.2.1 Extent

Overall, the extent of this habitat is assessed as *favourable* in the absence of other information on the previous extent of this habitat. The extent of this habitat is transient with patches within the saltmarsh appearing for several years in recently accreted areas and then disappearing due to succession to lower saltmarsh vegetation. Patches of this habitat are also present in some of the salt pans of the ASM. Poaching by cattle in some of these pans may be actually increasing the extent of this habitat, as poaching is disturbing the bare mud basins in these salt pans and assisting their colonisation by these pioneer species. Small patches of this habitat also develop within the Inagh River channel on accreted sediments and these also can change shape and shift position in response to geomorphological cycles in the river channel.

The actual area of this habitat may be under-estimated somewhat as not all the salt pans that contained this habitat were mapped. Many of these were quite small but cumulatively may cover 0.1-0.5 ha.

#### 5.2.2 Habitat structure and functions

The structure and functions is assessed as *unfavourable bad*. There were two stops carried out in this habitat with one stop failing. This stop failed due to poaching damage and disturbance by cattle. So while poaching may help the development of pioneer species by disturbance of the mud basins, after the Glasswort and other species have grown, cattle trample the plants and poaching disturbs this habitat and uproots the Glasswort. As some of these salt pans contain a significant mapped portion of this habitat, the structure and functions has failed as targets for levels of disturbance and negative indicators have been breached.

#### 5.2.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable bad*. This assumes that the current grazing regime is continued and poaching of the Glasswort patches in salt pans continues. However, there are no indications that geomorphological cycles have changed to limit the accretion of sediment banks that this habitat favours.

#### 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

Overall, the extent of this habitat is assessed as *favourable*. There is some information available from the Natura database on extent of this habitat but its accuracy is poor and any comparisons to this data would perhaps indicate false trends. There are no indications that there have been any recent losses in the extent of this habitat due to land reclamation or any other activities. Natural erosion is occurring along the Inagh River channel but this is balanced by accretion on the opposite sides of the meanders of the rivers.

#### 5.3.2 Habitat structure and functions

Overall the structure and functions of this habitat is assessed as *unfavourable-bad*. Twelve stops were carried out and three stops failed (25%). The failed stops did not reach targets for bare ground cover and were quite disturbed from poaching. The lower saltmarsh zones generally had the worst poaching damage and in some areas a network of poached channels is visible amongst less badly damaged low mounds. Grazing has created a low close-cropped sward in much of the ASM but this was not considered overgrazed. The effects of grazing are visible along one of the boundaries where there is no grazing on one side. However, all the other attributes of structure and functions reached their targets. Species diversity was normal with all the typical species appearing. One notable record is the Lax-flowered Sea Lavender (*Limonium humile*), which is not found very often along the west Irish coast and has not been recorded here before (Preston *et al.* 2002).

Several different ASM vegetation communities are present and zonation is present depending on elevation. The most notable transitions of ASM to other habitats is the transition to fixed-dune or disturbed coastal grassland. There is also internal zonation of saltmarsh plant communities along the edges of the creeks and pans. Bands of ASM are present along the creeks in the MSM dominated areas.

The salt pan structure is relatively well-developed and some of the pans contain patches of pioneer *Salicornia* sp. that can be classed as 1310. Some of the pans and the lower saltmarsh zones are more vulnerable to poaching by cattle, as they are inundated by the tide more often. The creek structure is also well developed in this

habitat, although some creeks have been modified or affected by old drainage works. Some of these creeks are recovering their function.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*. This assessment assumes that the current management practises and stocking rates continue in the near future. The current stocking rates and management practises are causing poaching damage in some of the ASM but the damaged areas only affect between 10-20% of the habitat extent.

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

Overall, the extent of this habitat is assessed as *favourable*. Previous data had underestimated significantly the area of MSM at this site due to poor habitat classification. There are no indications that there have been any recent losses in the extent of this habitat due to land reclamation or any other activities. Natural erosion and accretion is occurring along the Inagh River channel but this mainly affects the ASM. The actual area of this habitat may be under-estimated somewhat as part of the site was not surveyed and extent in this area was estimated from the aerial photos.

#### 5.4.2 Habitat structure and functions

Overall the structure and functions of this habitat is assessed as *unfavourable-inadequate*. Thirteen stops were carried out in this habitat and eleven stops passed. The remaining two stops failed due to excessive poaching and excessive bare ground cover. Overall, the species diversity is high in this habitat. There are several other typical indicators of good structure and function present including creeks and pans, internal zonation of vegetation communities along the creeks and natural transitions to other terrestrial habitats.

This site has several distinctive features (features of local distinctiveness), particularly the relative abundance of transitional species such as White Clover and Silverweed amongst more typical saltmarsh vegetation dominated by Sea Rush, Red Fescue, Creeping Bentgrass and Saltmarsh Rush. One hypothesis put forward is that much of this habitat containing these transitional species is situated at an elevation that only allows several tidal inundations a year (perhaps less inundation on this habitat compared to other sites). A second interesting feature are the transitions to terrestrial habitats on raised land within the wide saltmarsh basin located between the two rivers.

A significant portion of this habitat has been affected in the past by drainage. While the drains may be still having a residual impact, much of this area is recovering, with some of the smaller drains infilling and some of the larger creeks functioning normally.

# 5.4.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management practises and stocking rates continue in the near future. The current stocking rates and management practises are causing poaching damage in some of the MSM, but the damaged areas only affect between 10-20% of the habitat extent.

# **6 MANAGEMENT RECOMMENDATIONS**

Some reduction in grazing pressure on parts of the site is required to enhance the overall conservation status of the site. Monitoring of the site is also required, as the site may be vulnerable to drainage works in the future. Some current drains, draining land adjacent to the saltmarsh may be cleaned or deepened in the future.

# 7 **REFERENCES**

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





# Querin

# **1 SITE DETAILS**

SMP site name: Quer	rin	SMP site code: 0086				
Dates of site visit: 2 S	September 2008	CMP site code: N/A				
SM inventory site nam	ne: Querin	SM inventory site code	e: <b>135</b>			
NPWS Site Name: Lo	ower River Shannon					
NPWS designation	cSAC: 2165	MPSU Plan: Old Forr	nat – Draft 2: Consultation			
Ũ	pNHA: <b>0065</b>	SPA: <b>40</b>				
County: Clare		Discovery Map: 63	Grid Ref: 92058, 153725			
Aerial photos (2000 se B; O 7054-A	eries): O 4727-C; O 4787-	6 inch Map No: <b>CI 066</b>				
Annex I habitats curre	ently listed as qualifying inter	ests for Lower River Sh	annon cSAC			
H1310 Salicornia	and other annuals colonizi	ing mud and sand				
H1330 Atlantic sa	It meadows (Glauco-Pucci	nellietalia maritimae)				
H1410 Mediterranean salt meadows (Juncetalia maritimi)						
Other SMP sites within this SAC/NHA: Carrigafoyle, Barrigone/Aughinish, Beagh, Bunratty, Shepperton/Fergus Estuary, Inishdea/Owenshere, Killadysart/Inishcorker, Knock, Rinevilla Bay						
Saltmarsh type: Estuary Substrate type: Mud:gravel			1			

# 2 SITE DESCRIPTION

Querin is a rural site in County Clare that is located toward the mouth of the River Shannon, a short distance west of Poulnasherry Bay. The small saltmarsh system is found on the leeward side of an east-facing sand ridge and extends between Querin Point and Corliss Point where a minor, unnamed river enters the uppermost part of this small inlet. In terms of the Shannon navigation, Querin Point is a landmark point and a light beacon and transmitter station are located alongside the quay.

This is a largely rural setting where most of the region is given over to agriculture. Much of the land within the survey site, however, which is held in common is not suitable for intensive agricultural purposes. The land is grazed by a small number of horses and occasionally cattle. More recently, individual holiday homes have been springing up throughout the larger Loop Head region including around Querin. The nearest village is Doonaha, although Carrigaholt to the west is more readily recognised as a village, while the nearest centre of population is Kilkee, approximately 10 kilometres to the north.

Querin saltmarsh is located within the Lower River Shannon candidate Special Area of Conservation (cSAC 2165). This very large site encompasses approximately 120 kilometres of the lower reaches of the Shannon and extends seawards towards the open estuary between Loop Head on its northern boundary and Kerry Head (west of Beal Point). It

includes many secondary estuaries including the Fergus Estuary and a great many freshwater tributaries. The site is considered to be of national ecological importance owing to the presence of eighteen important Annex I habitats. The site is primarily designated for its estuarine and coastal habitats and is also important for Annex II species such as Bottlenose Dolphin. The Shannon is also notable for the range of rare or threatened plant species. These include a number of saltmarsh species such as Three-headed Club-Rush (*Scirpus triqueter*), Wall Barley (*Hordeum secalinum*) and Sea Dock (*Rumex maritimus*). Three Annex I habitats are listed as qualifying interests for this SAC: *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats were found at this site in addition to *Spartina* swards, which is not now considered a qualifying interest.

In total, twenty one separate saltmarsh sites are listed for the lower reaches of the River Shannon, occurring in counties Limerick, Kerry and Clare. Fourteen are found along the Co. Clare shoreline (Curtis and Sheehy-Skeffington 1998). Several of these other saltmarshes were surveyed during the SMP project (see above table).

The site is easily accessible along a narrow dirt track which leads out onto the Commonage. A local landowner indicated that the land was held in commonage, but that recently a fence had been erected to prevent horses from getting off the site, but also to discourage people from venturing onto the sandy isthmus.

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

The saltmarsh is confined to a small inlet that opens out onto the main Shannon Estuary at Querin Point. It is offered some protection from all but the worst onslaught of the Shannon's environmental fluctuations by a long sandy ridge extending eastwards from Corliss Point. Saltmarsh vegetation occurs on both sides of the inlet; indeed it occupies a significant portion of the intertidal mudflats. The upper limits of the tidal influence in this inlet are easily recognised, as there is an abrupt change in the *Spartina* sward to brackish vegetation, where an unnamed river enters the inlet alongside the Templeneagh Graveyard.

The saltmarsh at Querin is overwhelmingly characterised by the presence of an extensive sward of Common Cordgrass (*Spartina anglica*). This non-native invasive is commonly found in many of the saltmarsh systems along the lower River Shannon.

Curtis and Sheehy-Skeffington (1998) characterised the site as an estuarine marsh which occurs on mud and gravel. This is indeed the case, although a large part of the Annexed saltmarsh habitats occur on sandy substrates. The total area mapped for each of the four habitats is shown in Table 3.1.

The *Spartina* sward occupies a significant portion of the intertidal mudflats and occurs along both side of the inlet. The majority of the remaining saltmarsh habitats are found along the southern side of the site, between the *Spartina* sward and transitional area to coastal dune grassland. However smaller discontinuous fringes of ASM and also MSM vegetation are also recorded along the northern half of the site. They are not as well developed as on the southern half and are largely replaced by transitional and brackish vegetation dominated by Common Reed (*Phragmites australis*) or Sea Club Rush (*Bolboschoenus maritimus*). These stands were classified and mapped as other saltmarsh (CM2) or other Non-Annex saltmarsh vegetation in accordance with the SMP project.

The majority of the Annexed saltmarsh habitats occur inside the confines of the cSAC. Small patches of the ASM and MSM occur outside the boundary but their extent is not significant and is related to minor mapping differences between the statutory 6inch maps with actual boundaries on the ground.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.19
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	3.56
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.008
non-Annex	Spartina swards	31.42
	Total	35.178

Table 3.1. Area of saltmarsh habitats mapped at Querin.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

Two patches of annual Glasswort-dominated vegetation were recorded at Querin. They are located on the north-eastern half of the site on sandflats. This area has developed on a breach in the sandy ridge around the southern side of the site. They occupy an area approximately 0.19ha. The vegetation is not dominated by its eponymously named Glasswort (*Salicornia europaea* agg.), but by Annual Sea Blite (*Suaeda maritima*) which occupies between 75 and 100% of ground cover on the sandflats where it is recorded. The only other species that was recorded is Common Saltmarsh Grass (*Puccinellia maritima*) and its contribution was small, typically <1%.

#### 3.3 Atlantic salt meadows (H1330)

The ASM occupy an area of 3.56ha, most of which occurs inside the cSAC (Table 3.1). The majority of the ASM is confined to a narrow band which continues along the entire southern sandy ridge between the *Spartina* sward and the transitional/dune grassland. Elsewhere, the

ASM is fragmented, often occurring as small discontinuous patches behind the *Spartina* sward. Some of this fringing vegetation occurs alongside the access track which skirts the western boundary of the site, whilst the remaining ASM habitat occur as smaller outliers alongside the upper boundary of the saltmarsh alongside the main road.

In terms of saltmarsh development and zonation, many of the species typical of all of the zones are recorded. However, most of the vegetation comprises lower and mid/upper communities and despite the presence of many creeks across the *Spartina* sward, there is little development of a creek and pan system within the ASM itself.

Most of the ASM is bounded on its seaward side by the extensive *Spartina* sward. Occasionally the ASM is marked by a discontinuous ASM/*Spartina* mosaic. The majority of the ASM, however, is mapped as pure habitat, although occasionally, there was some minor occurrence of Common Cordgrass within the ASM, notably along creeks or in small pans. The most commonly recorded and abundant species include Red Fescue (*Festuca rubra*) Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*) and Common Saltmarsh Grass. Annual Glasswort is common throughout the lower parts of the ASM and accounted for 6-10% of the cover in three of four monitoring stops. Another species of minor occurrence within the ASM is Annual Sea Blite.

In places, where the *Spartina* sward is extensively developed and wide, the influence of salt laden water decreases and there is an increase in grassland species. Depending on the depth of sand beneath the vegetation, the saltmarsh transitions into wet grassland or dune grassland along the upper boundary. Within this upper community the distinction between drier and wetter areas is typified by the presence of Creeping Bent (*Agrostis stolonifera*), although Carnation Grass (*Carex flacca*) was locally frequent. ASM has also developed in one low-lying depression where the saltmarsh extends into hollows within the sandy ridge. The vegetation in this area is typical of mid-upper marsh and is dominated by Sea Plantain with less frequent Red Fescue and occasional Sea Pink and Long-bracted Sedge (*Carex extensa*).

Elsewhere, the ASM is nowhere near as abundant as in the southern half and is much more fragmented. The upper boundary is often demarcated by disturbed ground such as along the access track or transitional grassland communities that are variously characterised by admixtures of grasses including Twitch (*Elymus repens*), along with stands of Reeds or Sea Club Rush.

#### 3.4 Mediterranean salt meadows 9H1410)

MSM vegetation is not well represented at this site and occurs as a single almost insignificant patch along the landward side of the marsh. Occupying a mere 0.008ha, the greater part occurs inside the designated site boundary. The vegetation is characterised by the presence of Sea Rush (*Juncus maritimus*).

Fronted on its seaward boundary by the expansive *Spartina* sward, the MSM is separated from other saltmarsh habitats. Its upper boundary is characterised by brackish vegetation, mostly transitional *Elymus repens* –dominated grassland, although there is some fringing Sea Club Rush present also.

#### 3.5 Spartina swards

This site is predominantly characterised by the Spartinion, which is almost exclusively made up of extensive *Spartina* sward, which has infilled this small bay that formerly containing intertidal flats. It has developed on the intertidal zone within this sheltered inlet and is largely confined to muds or admixtures of mud, shingle and gravel. It is not found on sand. Of the total 31.42ha that is mapped for this habitat, however, only a small amount does not consist of a mono-specific sward. There is some development of ASM/*Spartina* sward approximately, 0.364ha in total. This habitat has developed in the transition zone between the ASM and the upper boundary of the *Spartina* sward. It contains a mixture of species like Common Saltmarsh-grass and Common Cordgrass with small amounts of Glasswort. A further 0.0005ha is mapped as isolated clumps, which are located towards Querin Point where the inlet is more exposed.

#### **4 IMPACTS AND ACTIVITIES**

This is largely a rural saltmarsh site that is largely characterised by Common Cordgrass, with some fringing, albeit, fragmented saltmarsh vegetation. There are few impacts and activities that are considered to be negatively affecting the saltmarsh habitats at this site. Indeed, none are recorded for the fragmentary MSM. All impacts are listed in Table 4.1 and include some indication of outside influences on the condition of the saltmarsh within the cSAC.

In terms of saltmarsh development, it is clear that the majority of the saltmarsh at Querin has developed in the past century. The 2<sup>nd</sup> edition 6 inch map does not show much saltmarsh in this inlet. Indeed, there is no indication on the map of the extent of tidal inundation around the low-lying hinterland. Much of the saltmarsh development is accounted for by the spread of Common Cordgrass. This is an invasive species of saltmarsh and mudflats (954). Common Cordgrass was first planted in the Shannon Estuary, in Poulnasherry Bay, in 1928 (Nairn 1986). The development of this sward was not assessed as it largely occurred outside of the current monitoring period and is likely to be quite stable.

In terms of more recent habitat change, most of the Annexed habitats occur landward of the Common Cordgrass sward. The sward is mature and does not appear to be progressing in a landward direction. There was no real difference discernible in the extent of other saltmarsh communities when the 2005 aerial photographs were compared with the year 2000. For this

reason the impact of Common Cordgrass is assessed as neutral. However there also appears to be some natural succession (990) and the development a ASM/*Spartina* sward mosaic in areas with no previously mapped ASM is indicative of this progression. There is an increase in the sand content in the older substrates found along the upper or landward side of the *Spartina* sward, which favours the gradual encroachment of ASM species. It could also be suggested that the extent of the *Salicornia* vegetation could be limited by the extensive nature of the Common Cordgrass. However, this is not the case at Querin as the *Spartina* sward does not occur on the sandflats.

The site has only developed in the past century or so and the land is either individually owned or held in common by a number of separate owners. Thus here hasn't been much development within the site and the only real activity is grazing (140). However, given the extent of the *Spartina* sward, the only land that is suitable for grazing occurs around the edges of the saltmarsh. There is some limited grazing by horses and cattle along the barrier ridge. Anecdotally, one landowner is attempting to change the management regime on the barrier ridge and has erected a fence (150) across the ridge and saltmarsh. It has been suggested that there has been an increase in the number of horses being brought onto the site to graze. Asides from some localised damage and poaching (143), the overall impact is limited.

Given the relatively small size of the site and its recent genesis, land reclamation and/or modified drainage (800, 810) is not a significant impact unlike other saltmarsh sites along the Lower River Shannon. It is clear that some of the agricultural fields that lie outside the site, on the northern side of the road have in places been improved or had the drainage system cleared. However, it is not possible to quantify its impact if any on the saltmarsh.

There are some limited indications of erosion (900) at this site, such as isolated clumps of *Spartina* on the mudflats. However as most of the remaining saltmarsh communities occur behind the saltmarsh, so there are few signs of habitat loss. There is a case for some minor change in the ASM around a creek at the eastern tip of the barrier ridge, but overall, it is not possible to estimate any loss based on an analysis of the year 2000 and series 2005 aerial photographs. The impact of erosion is assessed as neutral on a small portion of the saltmarsh face.

In the main, it would appear the *Spartina* sward is generally quite stable with the possibility of some minor expansion of the sward along the seaward edge. However, there is no appreciable difference between the year 2000 and 2005 series aerial photographs. In terms of the other habitats, there are no measurable signs of accretion (910), although it is possible that succession in the ASM/*Spartina* mosaic will over time result in a gradual decline in the cover of Common Cordgrass, as the substrate becomes more consolidated and sandy.

Other impacts are limited in extent or influence. In terms of recreational pursuits, occasionally walkers access the site, but there are few signs of any damage in the naturally low sward such as trails (501), etc. Most pedestrian traffic is confined to the upper parts of the marsh or along the dune grassland along the barrier ridge.

All of the land outside of the cSAC is located to the north and western boundaries of the site. This land is mostly given over to agriculture (140), although a number of houses are found along the road (403). These impacts have remained constant for a considerable amount of time and any large-scale impacts to the saltmarsh are largely limited by a local road that runs along the northern side of the site. There were signs of dumping (700), mainly garden waste and at one location, building rubble. However, this was not extensive and mostly occurred on transitional vegetation rather than saltmarsh alongside the road. None of these impacts is considered to be of serious concern.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	954	С	0	0.19	Inside
H1330	140	С	0	3.06	Inside
H1330	143	В	-1	0.5	Inside
H1330	501	D	0	0.005	Inside
H1330	900	С	0	0.002	Inside
H1330	954	С	0	3.56	Inside
H1330	990	С	+1	0.18	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

#### **5 CONSERVATION STATUS**

#### 5.1 Overall Conservation Status

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

Querin is not a large site and the Annex I saltmarsh habitats are overshadowed by the extent of the *Spartina* sward, which is of relatively recent origin. As has previously been mentioned, there is no early indication of the occurrence of saltmarsh in this area on the 6inch map. Common Cordgrass was first reported in Poulnasherry Bay in 1928, when it was planted as a means of stabilising the changing mudflats any saltmarsh. So it is likely to have spread to the nearby site sometime thereafter.

The overall conservation status of this saltmarsh, which is a combination of the individual habitat assessments (Table 5.1), is rated as *unfavourable-inadequate*. Most of the site is in good condition and there is some localised damage from excessive poaching. There are indications of natural succession of the *Spartina* sward to ASM in places.

This site is located within the Lower River Shannon cSAC. An old format NPWS Conservation management plan is available for this cSAC but it is now out of date.

Habitat	EU Conse	ervation Status As	sessment	
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Salicornia flats (H1310)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (H1330)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (H1410)	Extent Structure and functions Future prospects			Favourable

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at Querin.

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

#### 5.2.1 Extent

Although not extensively developed at this site, the extent of the annual habitat is assessed as *favourable*. There is no previous information as to its extent at this site. And while is not possible to determine if there has been any great increase in the habitat during the current monitoring period, its occurrence on sandy substrates, some distance removed from the *Spartina* sward is a positive feature.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. A single monitoring stop was carried out in the habitat and it fulfilled the target criteria. The annual vegetation is naturally species poor and typically found in environments that are prone to change. This includes tidal inundation and changes in the sediment distribution on which the vegetation occurs. At Querin, the relatively constant cover, up to 75%, was indicative of a stable

community. Common Cordgrass was not found within this community but it is found adjacent to this area. The *Salicornia* flats form part of the pioneer community at this site and their presence is a positive feature and enhances the overall diversity of the site.

#### 5.2.3 Future prospects

The future prospects are rated as *unfavourable-inadequate*. The assessment assumes that there will be no significant change in the management regime at Querin in the future. It is unlikely that Common Cordgrass will significantly colonise within this annual habitat, given that this species is confined to the intertidal mudflats. The *Salicornia* flats are mainly found on sandy substrate, which does not favour the colonisation of Common Cordgrass, although it is probable that some of the habitat will be colonised.

# 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The extent of the habitat is assessed as *favourable* (Table 5.1). Notwithstanding the fact that it is greatly dwarfed in terms of extent by the *Spartina* sward, the ASM is the most extensive of all the Annexed saltmarsh habitats that was recorded at Querin. There are no indications that the *Spartina* sward developed at the expense of ASM in the past. Other than a small area of erosion around the tip of the site towards Querin Point, there are few other indicators of erosion. Indeed, it may be that there is a gradual increase in the habitat, as consolidated substrates towards the back of the *Spartina* sward become colonised by ASM species.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are rated as *unfavourable-inadequate*. In total, four monitoring stops were carried out and one stop failed. Most of the saltmarsh is in good condition but some localised habitat is damaged by excessive poaching. While most of the ASM, along the southern half of the site is grazed by horses and occasionally cattle, the damage is not great.

The ASM is characterised by a naturally low sward and any damage, such as poaching is localised in nature. The saltmarsh structure is mainly poorly developed at this site. Some zonation is evident and there are examples of several different vegetation zones at this site including low, mid and upper communities. There is a zone of transitional vegetation from ASM to *Spartina* sward along the lower boundary on a minor gradient. Common Cordgrass is present but is not a significant part of the ASM. The development of the ASM/*Spartina* sward and not vice versa, as no ASM was previously mapped in these areas. Therefore Common Cordgrass is not considered a negative indicator on species composition.

#### 5.3.3 Future prospects

The future prospects of the ASM are rated as *unfavourable-inadequate*. The assessment assumes that there will be no significant change in the management regime at this site. There is a small amount of damage from grazing at the site that is causing excessive poaching and this is likely to continue in the future. It does not appear that the overwhelming dominance of the *Spartina* sward at this site is impacting greatly on the extent of the ASM. Indeed, it may be that such is the Common Cordgrass spread out onto the mudflats, that in places the sediments have been suitably consolidated. This enabled the gradual expansion of ASM into new ground due to natural succession of habitats.

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of this habitat is assessed as *favourable* (Table 5.1). Although not extensively recorded from this site, the MSM is located towards the landward or mature part of the marsh. No direct impacts were noted and there is no indication of any recent loss of habitat as a result of the extensive *Spartina* sward.

#### 5.4.2 Habitat structure and functions

Monitoring stops were not carried out in this habitat, given its relative paucity. However, based on visual assessment, the extant MSM vegetation is structurally and floristically similar to that encountered in other sites with more extensive tracts of the habitat. For this reason, the structure and functions are rated as *favourable*.

#### 5.4.3 Future prospects

The future prospects for the habitat are assessed as *favourable*. Although it is not extensively developed at Querin, there are no indications of any great damaging activities or other impacts such as the spread of Common Cordgrass. It is likely to persist at Querin for some time.

#### **6 MANAGEMENT RECOMMENDATIONS**

There are no recommendations for the management of this site.

# 7 REFERENCES

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

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

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

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats	0.185	0.185				
2	Spartina swards	31.243					31.243
3	1330 Atlantic salt meadow	3.381		3.381			
4	1410 Mediterranean salt meadow	0.008			0.008		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic	0.364		0.18			0.18
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	8.636					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)	0.001					0.00005
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.357					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	44.18	0.185	3.56	0.008		31.42

Table 8.1. Areas of SMP habitats mapped using GIS.



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Saltmarsh Monitoring Project 2007-2008 Querin

Lower River Shannon SAC (002165)

This habitat map was create and interpretaion of aeraiph are subject to revision. Prod permission of the Governme

SMP code: SMP0086	0	60	120	180	240	300	Meters	N
d with a combination of flebwork, GPS lotos. Boundaries of designated areas luced from Ordinance Survey material by ent (Permit number 5953)	Date of pro Map version	duction: 22 n: 1	/02/2009	Original I Scale 1:	Drawing Siz 4000	e: 297 x	420 (A3)	

# **Rinevilla Bay**

### 1 SITE DETAILS

SMP site name: Rinevilla Bay	SMP site code: 0087				
Dates of site visit: 2 September 2008	CMP site code: N/A				
SM inventory site name: Rinevilla Bay	SM inventory site code: 133				
NPWS Site Name: Lower River Shannon NPWS designation cSAC: 2165 pNHA: N/A	MPSU Plan: <b>Old Format – Draft 2: Consultation</b> SPA: <b>N/A</b>				
County: Clare	Discovery Map: 63 Grid Ref: 83610, 149779				
Aerial photos (2000 series): O 4848-B,D	6 inch Map No: <b>CI 065, 072</b>				
<ul> <li>Annex I habitats currently listed as qualifying interests for Lower River Shannon cSAC:</li> <li>H1310 Salicornia and other annuals colonizing mud and sand</li> <li>H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)</li> <li>H1410 Mediterranean salt meadows (Juncetalia maritimi)</li> </ul>					
Other SMP sites within this SAC/NHA: Carrigafoyle, Barrigone/Aughinish, Beagh, Bunratty, Shepperton/Fergus Estuary, Inishdea/Owenshere, Killadysart/Inishcorker, Knock, Querin					
Saltmarsh type: Estuary Sub	ostrate type: Mud:peat				

### 2 SITE DESCRIPTION

Rinevilla Bay is a small remote site which is located halfway along the southern side of Loop Head in County Clare. It is the most westerly saltmarsh site occurring along the lower reaches of the Shannon River. The bay comprises both Rinevilla Bay proper to the west and a second smaller bay that is separated by a narrow rocky headland at Cloonconeen Point. The site is largely rural and the nearest village is Carrigaholt, whose quay is the starting point for many dolphin watching expeditions.

Although the underlying geology is composed of carboniferous limestone and shales with some more recent glacial till overburden, the ground is very wet and in places is waterlogged. Much of the surrounding landscape is intricately subdivided into fields of various sized and orientations by a series of ditches, hedgerows and drains. All of this agricultural improvement was started a long time ago and relics of the drainage and reclamation regime are still visible throughout the site.

The saltmarsh is small and is characterised by a fragmented and heterogeneous vegetation mosaic, which is largely confined to the low-lying ground behind a shingle ridge which extends around the eastern half of Rinevilla Bay. This area was cut for peat in the past. Curtis and Sheehy-Skeffington (1998) classified this saltmarsh as an estuarine site. However, it is more typical of a 'Lagoon type' site, as the saltmarsh is confirmed behind a shingle ridge with no permanent tidal connection to the outer bay. Overflow during spring tides seems to be the

main tidal inundation into this area and there is a large permanent lagoon adjacent to the area where there is overflow. This pool called Cloonconeen Pool has been identified as lagoon and has been surveyed for NPWS in the past (Healy *et al.* 1997, Oliver 2005, NPWS 2007). It is classified as a sedimentary lagoon with a mid-range salinity. Healy *et al.* (1997) describes the pool as being over-topped during spring tides and seepage zones through the barrier were also noted. No daily tidal fluctuation in the pool was noted. A smaller drainage channel with a connection to the outer bay is present at the west side of the site.

Rinevilla Bay saltmarsh is located within the Lower River Shannon candidate Special Area of Conservation (cSAC 2165). This very large site encompasses approximately 120 kilometres of the lower reaches of the Shannon and extends seawards towards the open estuary between Loop Head on its northern boundary and Kerry Head (west of Beal Point). It includes many secondary estuaries, including the Fergus Estuary and a great many freshwater tributaries. The site is considered to be of national ecological importance owing to the presence of eighteen important Annex I habitats. The site is primarily designated for its estuarine and coastal habitats and is also important for Annex II species such as Bottlenose Dolphin. The Shannon is also notable for the range of rare or threatened plant species. These include a number of saltmarsh species such as Three Headed Club-Rush (*Scirpus triqueter*), Wall Barley (*Hordeum secalinum*) and Sea Dock (*Rumex maritimus*). Three Annex I species are listed as qualifying interests for this cSAC: *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats were found at this site in addition to *Spartina* swards, which is not now considered to qualify as an Annex I habitat.

In total, twenty one separate saltmarsh sites are listed for the lower reaches of the River Shannon, occurring in counties Limerick, Kerry and Clare. Fourteen are found along the Co. Clare shoreline (Curtis and Sheehy-Skeffington 1998). Several of these other saltmarshes were surveyed during the SMP project (see above table).

The site is readily accessible through a number of gates along a local road which runs parallel to the marsh. The majority of the land, however, is privately owned by a number of different landowners and is fenced off. During the survey, most owners were eventually located and permission was granted to carry out the survey. The water level in the lagoon was quite high at the time of the survey so there was no access to the edge of the pool.

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

The saltmarsh vegetation was largely confined to the one half of Rinevilla Bay, on the eastern side of Cloonconeen Point. It is not an extensive saltmarsh. A discontinuous fringe of

saltmarsh vegetation was recorded along the rocky shoreline extending eastwards from Clonconeen Point. There was a significant increase in its extent along the inner part of this secondary bay. The vegetation is typically located in low-lying ground behind a shingle/cobble ridge and is constrained on its seaward boundary by a shingle/cobble ridge extending most of the way around the eastern half of the Rinevilla Bay. Its upper boundary is now largely constrained by an elevated local road on an embankment.

The extant saltmarsh forms a single contiguous unit around the smaller part of the bay. However, it is heterogeneous in composition and appearance, as it is confined to waterlogged soils, which have been greatly modified in the past through the construction of many drains in an attempt to reclaim agriculturally-useful land. A mosaic of various different habitats has developed.

There is considerable diversity in the extent and distribution of the individual saltmarsh communities and transitions with brackish vegetation characterised by species such as Common Reed (*Phragmites australis*) and Sea Club Rush (*Bolboschoenus maritimus*) are common. This vegetation was mapped as other saltmarsh (CM2) or non-Annex I vegetation in correspondence with the SMP classification. However the greatest extent of transitional vegetation comprises wet grassland dominated by species such as Twitch (*Elymus repens*), Creeping Bent (*Agrostis stolonifera*) and Silverweed (*Potentilla anserina*). This non Annex I saltmarsh vegetation is also classified as brackish marsh (CM2).

The site has seen a considerable reduction in its extent over time. This is clearly indicated on the 2<sup>nd</sup> edition 6 inch map and shows the previous limit of the shoreline some 115metres further out into the small bay. Despite the presence of the barrier ridge, the influence of the sea is apparent and the character of the land reflects the meeting of saline and brackish waters.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.001
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	11.73
H1410	Mediterranean salt meadows (Juncetalia maritimi)	2.45
Non-Annex	Spartina swards	1.53
	Total	15.711

 Table 3.1.
 Area of saltmarsh habitats mapped at Rinevilla Bay.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

The occurrence of annual vegetation is not well represented at this site. A single patch measuring approximately 0.001ha was recorded along a disturbed track at the landward side of the saltmarsh. This small access track onto the marsh is characterised by grass-dominated vegetation, which is in places showing signs of excessive trampling by livestock. This habitat,

which is normally confined to intertidal mudflats, was largely distinguished by the spartan occurrence of Annual Glasswort (*Salicornia europaea* agg.) on a small patch of bare ground, denuded of all grassland species.

#### 3.3 Atlantic salt meadows (H1330)

The ASM at this site is dominated by mid and upper marsh communities and together account for 11.73ha or almost 75% of the total saltmarsh habitat that is mapped. There is very little pioneer or lower marsh vegetation developed at this site.

The lower reaches of the ASM was typically bounded by the shingle ridge, which could rise to more than 1metre above the level of the ASM, although there is a storm-cut breach at its eastern side, fronting the lagoon. Although the lower marsh zones are absent from Rinevilla, Common Saltmarsh Grass (*Puccinellia maritima*) is occasionally recorded throughout the site, especially along wetter ground adjoining drainage creeks. Common Sea-spurrey (*Spergularia media*) is another species typical of lower marshes that was commonly recorded.

The ASM vegetation is characterised by its grassy sward dominated by Red Fescue (*Festuca rubra*) and Creeping Bent (*Agrostis stolonifera*), along with a number of abundantly occurring species such as Sea Aster (*Aster tripolium*), Saltmarsh Rush (*Juncus gerardii*), Sea Plantain (*Plantago maritima*), Sea Milkwort (Glaux maritima), Common Scurvy Grass (*Cochlearia officinalis*) and Sea Arrow Grass (*Triglochin maritimus*). Spear-leaved Orache (*Atriplex prostrata*), although not providing much ground cover (<1%) was nonetheless common throughout the ASM.

While most of the ASM might be characterised as upper marsh vegetation, there was some development of mid marsh community towards the western end of the site. It was not extensively developed and the vegetation was similar in floristic composition, differing in the cover of individual species. The mid marsh was characterised by a somewhat better drainage pattern than the remainder of the site, although this may have been because of the occurrence of deeper drainage creeks among the shallow peats and glacial tills. The development of pans was not recorded at the western end of the site. However, there was some limited development of pans among the naturally low-growing sward towards the southern side of the lagoon.

The transition to other habitats, notably wet grassland was often gradual. Elsewhere the transition to brackish marsh was clear cut and patches of Sea Club Rush were not uncommon. In many cases, particularly towards the landward side of the saltmarsh, the transitional ASM vegetation was represented by admixtures of upper ASM species along with Common Reeds. One sizable stand of the transitional vegetation occurred at the back of the saltmarsh along the roadway, where the reeds had extensively spread along a ditch beside the road. Indeed the upper boundary of the ASM was often demarcated by other brackish

saltmarsh communities – usually large stands of Reeds or transitional wet grassland dominated by Twitch (*Elymus repens*).

#### 3.4 Mediterranean salt meadows (H1410)

Along with Sea Rush (*Juncus maritimus*), grasses including Creeping Bent and Red Fescue were very much constant species throughout this habitat. Other species that were commonly recorded included Saltmarsh Rush, Sea Aster and Common Scurvy Grass. Species from other habitats were indicative of the saturated nature of the soils along with the freshwater influence. These included Sea Club Rush and some Reeds as well as Silverweed which was locally common on ground that was largely abandoned.

#### 3.5 Spartina swards

Common Cordgrass is locally abundant and even overwhelmingly extensive in many saltmarshes along the lower parts of the River Shannon. However, this was not the case at Rinevilla Bay. Two separate areas of sward were recorded. The first area is located toward the northern or inner part of Cloonconeen Point. It is characterised by a mono-specific sward that has developed in a shallow pool and rarely are other species found except in transitional zones. The second area of sward is concentrated around the lagoon and some of its islands. Smaller patches were also recorded towards the eastern half of the lagoon in front of the MSM.

#### 4 IMPACTS AND ACTIVITIES

Rinevilla bay is a small saltmarsh system, situated towards in the open mouth of the River Shannon. Asides from its exposed location and the current grazing regime, there are few impacts or activities that are negatively impacting upon the saltmarsh. There is some scattered settlement, but the area remains largely rural and is not on main tourist trails. The list of these impacts and activities is shown in Table 4.1.

The individual plots or fields are not large and are sometimes in multiple ownership. Previously, peat cutting and seasonal pasturing were carried out. All of the land within and surrounding the saltmarsh is still wet and is not really suitable for agricultural improvement. Given the treacherous nature of the saturated ground conditions, grazing (140) is the only practice that is carried out at this site. Most of the saltmarsh is still grazed and only a small number of areas are cordoned off by electric fences preventing livestock access. The ground in most parts is very wet and boggy and the extent of the lagoon is deceptive, surrounded as it is by Common Cordgrass and other brackish vegetation types. There are places where the

saltmarsh is showing signs of damage (143). Trampling and poaching are localised in occurrence and are mostly confined to the western half of the site. There are a small number of trails created by cattle in the vegetation (501). They are, however, of no great impact.

It is clear from the 2<sup>nd</sup> edition OSI 6inch map that this small wetland in Rinevilla Bay was at one time more extensive. However, over time and given the exposed nature of the site, it is clear that there has been a considerable loss of ground. The current shingle bar now lies approximately 115 metres inland of its previous limit as shown on the 6 inch map. This long-term retreat is not assessed as it occurred outside of the current monitoring period. However, it is an indication of an erosional trend at the site (900).

Along the seaward side of the shingle at the western side of the site, small tufts of ASM vegetation were noted, some of them with small clumps of vegetation still remaining. Elsewhere, unvegetated sods of clay sitting atop the shingle/mud intertidal zone indicate an earlier frontline limit. To the west of east of the site, around the mouth of the lagoon, there is some sign of vegetation loss around unvegetated cobble breach. The stony beach is prone to redistribution of the cobble during severe tidal conditions, resulting in some minor ASM loss. While there has been a gradual loss of saltmarsh and other vegetation through the years, the erosion is not large-scale and most of the saltmarsh vegetation lies in some shelter behind the shingle bar. It was not possible to distinguish any real change in habitat extent when the year 2000 and series 2005 aerial photographs of the site were examined. The impact of erosion is assessed as having a low negative impact. There are good prospects for landward retreat of saltmarsh at this site so erosion is assessed as having a repairable influence.

A small patch of land along the minor road at the west side of the site has been infilled during the monitoring period (803). It is likely that some ASM was infilled and destroyed but most of the adjacent vegetation is dominated by Common Reed. Much of the land has been modified and still bears some imprint of the land subdivision and drainage. Most of the drains were constructed in historical times, but some are still maintained, particularly towards the north-eastern half of the site alongside the north-south running dirt track (810) and despite the drainage features, considerable stands of Reeds and Sea Club Rush still remain. The greatest extent of brackish vegetation is towards the landward side of the marsh. The occurrence of large stands of brackish vegetation alongside the saltmarsh reflects the freshwater influence throughout this wet site. While there is some indication of the limited spread of brackish vegetation along drains, it is considered as a natural process (990) rather than spread of an invasive species (954).

Common Cordgrass is present at this site and is an invasive species of saltmarsh (954). It was first planted in a number of locations along the Shannon as early as 1928 (Nairn 1986). Given its rapid colonisation at other sites throughout the Shannon estuary, it is not surprising that it has become established at Rinevilla Bay. It is difficult to fully quantify its impact, during the current monitoring period, as it is associated with both saltmarsh and brackish marsh

habitats. A comparison of the current extent of *Spartina* sward to the habitat drawn by Healy *et al.* 1997) shows that *Spartina* sward has increased its extent, mainly as emergent vegetation in the lagoon. However, it would not appear to be significantly increasing in extent in the ASM and MSM. It only affects a small area of the ASM, about 0.1 ha around the fringes of the *Spartina* swards, and it is assessed as having a negative impact on this area. It has very little impact of the MSM. It has no current impact on the miniscule amount of *Salicornia* flats.

Outside of the site, most of the impacts and activities are similarly associated with the management regime. All of the land is subdivided by drains, some of which are maintained (810), although Reeds were noted extending along some drains. Most of the land is under grass and is either grazed (140) or cut for silage (102). It is likely that as part of the grassland management, fertilisers (120) are used to improve the quality of the sward and that they would have some impact on the saltmarsh, seeing as a large number of the fields drain into the saltmarsh. Some fields, particularly to the east of the saltmarsh had been left derelict, possibly due to waterlogged conditions of the soils and young reeds were expanding (990) into previously cut grasslands. These activities have no measurable impact on the saltmarsh at this site.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	143	В	1	0.001	Inside
H1330	140	С	0	4.0	Inside
H1330	143	С	-1	1.0	Inside
H1330	501	С	0	0.01	Inside
H1330	810	С	-1	0.08	Inside
H1330	900	С	-1	1.0	Inside
H1330	954	В	-1	0.1	Inside
H1330	990	С	0	0.1	Inside
H1410	140	С	0	1.0	Inside
H1410	501	С	0	0.01	Inside
H1410	810	С	-1	0.05	Inside
H1410	900	С	-1	0.25	Inside
H1410	954	С	-1	0.001	Inside
H1410	990	С	0	0.045	Inside

Table 4.1. Intensity of various activities on saltmarsh habitats at Rinevilla Bay.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

# 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the NPWS management plan, 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 this area during the survey at this site. There is some more detailed information in a survey of Cloonconeen Pool by Healy *et al.* (1997). However, this survey only covers the marginal vegetation around the edge of this lagoon.

The saltmarsh at Rinevilla is notable as it is the most westerly saltmarsh that is found along this mighty river, occurring as it does in the mouth of the Shannon. It has several notable conservation features including being part of a Lagoon complex. There is extensive development of brackish habitats in this type of site and the ASM and MSM both form complex mosaics with other habitats. Its exposed location means that it is subject to harsh environmental conditions and coupled with the presence of the shingle bar make it a notable, albeit small site.

The overall conservation status of the saltmarsh vegetation at Rinevilla is *unfavourable-inadequate* (Table 5.1). Most of the saltmarsh habitat is in good condition but there is some localised damage from excessive poaching. Most of the site is grazed by cattle but some sections are not grazed at all. The structure of this site has been modified in the past by drainage, reclamation and peat cutting in the past. Common Cordgrass is present at this site. It is unusual to see this species in a Lagoon type site and it seems to have spread in the shallow part of the lagoon. However, it is not a significant part of the saltmarsh vegetation around the lagoon has not changed significantly since the 1997 survey (Healy *et al.* 1997) although there seems to be some increase in the cover of *Spartina* sward.

The conservation status of the lagoon habitat at this site have also been assessed as part of an overall assessment of conservation status of lagoons in Ireland (NPWS 2007). The status of the lagoons has been assessed as *unfavourable-inadequate* mainly due the possibility of erosion disturbing the shingle barrier and destroying this lagoon.

This site is located within the Lower River Shannon cSAC. An old format NPWS Conservation management plan is available for this cSAC but is now out of date.

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

#### Table 5.1. Conservation status of Annex I saltmarsh habitats at Rinevilla Bay.

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

#### 5.2.1 Extent

The extent of this habitat is rated as *favourable*. *Salicornia* flats are not well developed at Rinevilla. Indeed a single minor patch along a disturbed track was all that was recorded. However, its presence at this site increases the structural diversity of the entire saltmarsh. Healy *et al.* (1997) recorded a small area of this habitat around the margin of the site but this area was flooded at the time of the survey.

#### 5.2.2 Habitat structure and functions

The structure and functions of this annual habitat are assessed as *favourable*. Given its limited extent, monitoring stops were not carried out and the determination is based on a visual assessment. The spartan vegetation, although occurring on a disturbed track, is typical of similar and establishing saltmarsh vegetation recorded elsewhere in Ireland. Common Cordgrass was not present.

#### 5.2.3 Future prospects

The future prospects for this habitat are tentatively rated as *unfavourable-inadequate*. There is no information of its previous distribution at Rinevilla. The development of this vegetation is probably related to disturbance along this track. It is unlikely that this vegetation was ever widespread, given the topographical and substrate conditions at this exposed site. Its occurrence towards the back of the saltmarsh on bare ground is not its typical habitat. Over time the habitat may not persist and other saltmarsh may recolonise, at the expense of the annual habitat.

# 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The ASM is the most extensive of all of the saltmarsh habitats that were recorded at Rinevilla. Its extent is rated as *favourable*. This site is a heterogeneous mixture of saline and brackish communities, whose distribution is controlled by the inflow of freshwater along relic and modern drainage features and tidal inundation mainly over the shingle bar. And while there has been a considerable loss of the entire saltmarsh system over time, there is little measurable evidence of any significant change in the extent of the ASM habitat during the current monitoring period. While some *Spartina* swards have developed at this site, there is no evidence that the extent of ASM has been reduced through colonisation by Common Cordgrass during the current monitoring period, mainly due to the lack of accurate baseline data. Its impact on extent is assessed as neutral.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat is assessed as *unfavourable-inadequate* (Table 5.1). Four monitoring stops were carried out in this habitat. They all satisfied the target criteria. Most of the ASM is generally in good condition but there is some localised damage in places due to excessive poaching by livestock. Therefore the conservation assessment is revised on best scientific judgement as *unfavourable-inadequate*.

There are a range of vegetation communities at this site. Some zonation is evident. Some of the saltmarsh is not grazed and the sward height is quite variable. The structure of this area has been modified in the past by drainage, land reclamation and peat-cutting. The ASM is found in a mosaic with a range of other habitats including MSM, *Spartina* sward, brackish stands of Sea Club-rush and Common Reed and drier grassland dominated by Twitch. Common Cordgrass is found in this habitat but only affects a small proportion of it. Therefore the impact of its spread is assessed as neutral.

#### 5.3.3 Future prospects

The future prospects of this habitat are rated as *unfavourable-inadequate*. The assessment assumes that the current management activities and levels of impacts such as grazing continue in the future. Although it is a small site, livestock are still allowed to graze most of the saltmarsh. The damage caused by trampling and poaching in particular, has been compounded by a number of unfeasibly wet years, which effectively means that the vegetation has no time to recover. Some of this saltmarsh may be vulnerable to further colonisation by Common Cordgrass in the future, especially if there is severe poaching damage. There is a long-term erosional trend at this site, although there are good prospects of landward retreat of saltmarsh at this site.

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of this habitat is assessed as *favourable*. Although not as extensive as the ASM, the development of the MSM is nonetheless impressive and it is widely distributed throughout the site. There are no real indications of any loss of habitat due to erosion, natural changes and land-use. There has been a gradual decline in the area of the overall site, but this cannot be measured during the time-frame of the current monitoring period.

#### 5.4.2 Habitat structure and functions

Two monitoring stops were carried out in this habitat. The attributes required to meet a satisfactory structure and functions were satisfied and hence the assessment is *favourable*. There are few impacts and activities acting on this habitat apart from grazing, which is not as damaging as it is on the ASM. Common Cordgrass is present within this habitat but is quite rare.

#### 5.4.3 Future prospects

The future prospects of this habitat are rated as *favourable*. The assessment assumes that there will be no significant change in the management regime at this site. This would appear to be unlikely, given the size and condition of the overall saltmarsh. The only impacts are grazing, which is not a major problem, and the natural spread of brackish species as part of the natural development of this site. This habitat is not vulnerable to colonisation by Common Cordgrass. There is a long-term erosional trend at this site, although there are good prospects of landward retreat of saltmarsh at this site.

#### 6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

#### 7 REFERENCES

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Oliver, G. A. (2005). Seasonal changes and biological classification of Irish coastal lagoons. Ph. D Thesis. University College Dublin. www.irishlagoons.ie

# 8 APPENDIX I

# Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)					
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards	
1	1310 Salicornia flats	0.001	0.001					
2	Spartina swards	1.525					1.525	
3	1330 Atlantic salt meadow	11.570		11.570				
4	1410 Mediterranean salt meadow	2.451			2.451			
5	ASM/MSM mosaic (50/50)							
6	ASM/ <i>Spartina</i> mosaic							
7	1330/other SM (CM2) mosaic	0.323		0.1615				
8	1330/coastal grassland mosaic							
9	Other (non saltmarsh)	2.332						
10	Spartina clump/mudflat mosaic (50/50)							
11	Isolated Spartina clumps on mud (5%)	0.002					0.002	
12	pioneer 1330/1310/ <i>Spartina</i> mosaic							
13	1410/other SM (CM2) mosaic							
14	Spartina sward dominated, with some ASM							
15	1310/ <i>Spartina</i> mosaic							
16	ASM dominated with some Spartina							
17	1330/sand dune mosaic							
18	Other SM (CM2)	5.886						
19	1330/rocky shore mosaic	0.004		0.002				
20	1420 Mediterranean scrub							
21	1310/1330 mosaic							
	Total	24.09	0.001	11.73	2.451		1.527	


SAC Boundary 1310 Salicornia flats Spartina swards 1330 Atlantic salt meadows 1410 Mediterranean salt meadows 1330/other SM (CM2) mosaic Is olated Spartina clumps 1330/rocky shore mosaic Other Saltmarsh (CM2) other 1330 monitoring stops 1410 monitoring stops



Saltmarsh Monitoring Project 2007-2008

Contraction of the local division of the loc

**Rinevilla Bay** 

Lower River Shannon SAC (002165)



# Scanlan's Island

# 1 SITE DETAILS

SMP site name: Scanlan's Island		SMP site code: SMP0088				
Dates of site visit 16/10/2007		CMP site code: N/A				
SM inventory site name: Scanlan's Island		SM inventory site cod	e: <b>130</b>			
NPWS Site Name: Ga	alway Bay Complex					
NPWS designation	cSAC: 000208	MPSU Plan: old form	at plan available			
	pNHA: <b>000208</b>	SPA:				
County: Clare		Discovery Map: 51	Grid Ref: 125800, 211410			
Aerial photos (2000 s	eries): O 3625-A,B,C,D	6 inch Map No: Cl002,Cl003				
Annex I habitats curre	ently listed as qualifying intere	ests for Galway Bay Co	mplex cSAC:			
H1310 Salicornia	and other annuals colonizi	ng mud and sand				
H1330 Atlantic sa	H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)					
H1410 Mediterran	ean salt meadows (Juncet	alia maritimi)				
Other SMP sites withi Kilcaimin, Oranmore	n this SAC/NHA: Kinvarra-V North, Roscom West & So	Vest, Kileenaran, Tyrc outh, Seaweed Point,	ne House-Dunbeacon Bay, Barna,			
Saltmarsh type: Bay	Sub	strate type: <b>Mud</b>				

# 2 SITE DESCRIPTION

Scanlan's Island is located along the south-west part of Galway Bay in County Clare. It is located 4 km north-east of Ballyvaughan at the east side of Ballyvaughan Bay and at the neck of a narrow inlet that extends south-east to Bealaclugga. It is one of 19 Saltmarsh Inventory sites listed in Galway Bay (Curtis & Sheehy-Skeffington 1998). It is one of the most westerly saltmarsh sites located along the south side of Galway Bay (only Ballyvaughan saltmarsh at Rinn Point (inventory code 131) is more westerly). This part of the County Clare coastline is rural and undeveloped, with the main habitat being agricultural grassland. There are also significant areas of semi-natural scrub and exposed rock in places, associated with steeper slopes and hillsides.

Scanlan's Island is a small island that is located in a semi-circular bay close to the mainland. A relatively narrow and shallow inlet only 100-200 m wide is situated between the island and the mainland. The island is sheltered from Galway Bay by a narrow peninsula (Finvarra). Saltmarsh has developed along the sides of the sheltered inlet on both the island and the mainland shores. The inlet contains significant patches of intertidal exposed rock covered with brown algae and areas of intertidal mixed sediment. The inlet was previously used for collecting or temporarily storing lobsters in the past. A small weir or breakwater with lobster holding bays is located at the west side of the site, where a small sandy spit has developed at the end of the peninsula.

The site is located within the Galway Bay Complex cSAC (000208). Two Annex I habitats are present at this site, *Salicornia* flats and Atlantic salt meadows (ASM). Both these habitats are listed as qualifying interests for the Galway Bay Complex cSAC. Sea Purslane (*Atriplex*)

*portulacoides*) is one species of local distinctiveness that is present at this site. Most of the saltmarsh habitats mapped at this site are located within the cSAC boundary. There are several fragments of Annex I habitats and upper saltmarsh vegetation (CM2) located outside the boundary around the site. Some are unintentional exclusions, as the 6 inch map was used to draw the cSAC site boundary and there are some errors between this map and the actual ground as indicated from the aerial photos. One larger exclusion is due to the lower shoreline boundary being used to draw the cSAC boundary in error.

The saltmarsh was easily accessed by several points where minor roads pass along the shoreline. A relatively new track across the intertidal zone accesses the island.

# 3 SALTMARSH HABITATS

### 3.1 General description

The saltmarsh habitat is distributed along both sides of the inlet between Scanlan's island and the mainland. The main saltmarsh development is situated along both sides of the more sheltered eastern part of the inlet, in a small area sheltered by the sandy spit and along the northern mainland shore. There is also minor saltmarsh development with narrow ribbons of habitat developing along some parts of the shoreline around the inlet. There is no or very little saltmarsh development along the more exposed western and southern sides of Scanlan's Island. Some of the shoreline around the inlet has low steep cliffs several metres high along glacial deposits, which prevent saltmarsh development.

The minor road that accesses this area from Finvarra passes along the northern shoreline and the main section of saltmarsh development in this section. There are signs of old coastal protection or fish traps, land division creating enclosures and possible land reclamation in this section of saltmarsh. Part of the shoreline has been infilled as possible coastal protection measures and the path across intertidal zone to the island has also be cleared or improved in the recent past. The saltmarsh transitions to dry coastal grassland at its upper boundary that is somewhat semi-improved, with Creeping Thistle (*Cirsium arvense*) Perennial Rye-grass (*Lolium perenne*), White Clover (*Trifolium repens*) and Twitch (*Elytrigia repens*). Other species present in a more typical landward transition are Sea Beet (*Beta maritima*), Creeping Bent-grass (*Agrostis stolonifera*), Sea Mayweed (*Tripleurospermum maritimum*), Silverweed (*Potentilla anserina*), Lesser Sea-spurrey (*Spergularia media*), Spear-leaved Orache (*Atriplex prostrata*) and Frosted Orache (*Atriplex lacinata*). The saltmarsh transitions to mixed sediment and cobble at its lower boundary.

Saltmarsh has also developed in the leeward side of a sheltered sandy spit with two separate inlets that is situated at the western side of the site. This saltmarsh is also sheltered by a breakwater. There are several yachts and boasts moored in this area. The saltmarsh transitions to fixed dune grassland at its upper boundary on the spit. There are also transitions to a low glacial till cliff along the northern part of shoreline. There are transitions to intertidal sand flats and to muddy shingle at the lower saltmarsh boundary

The eastern side of the inlet contains abundant scattered exposed rock in the intertidal area. There are several sections of saltmarsh that have developed amongst and on exposed limestone pavement in the intertidal area along the mainland shore. Some of the saltmarsh is mapped as a mosaic of ASM and rocky shore. This area also contains several low stone walls across the intertidal zone that may be old fish traps or areas to collect brown algae.

Several large patches of grassy saltmarsh are situated along the island shoreline, where the shoreline is more gradually sloped towards the intertidal zone. A track accessing different parts of the island follows this shoreline and crosses the saltmarsh occasionally. This saltmarsh transitions to tussocky dry coastal grassland. These patches of saltmarsh also show signs of old coastal protection works.

The main saltmarsh habitat at this site is Atlantic salt meadows (ASM) (Table 3.1). *Salicornia* flats are also present. This habitat is associated with some of the pans in the ASM and is also distributed along the sheltered lower boundary of the ASM at the eastern end of the inlet. This habitat is also found in the sandy inlet protected by the spit and the western side of the site. There is natural gradual transition from ASM to *Salicornia* flats at this location.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	0.113
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	4.457
	Total	4.570

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

This habitat is found in several different areas and in different situations at this site. Several small patches (<  $5 \text{ m}^2$  in diameter) are situated in some of the pans in the northern saltmarsh section. These pans contain both Glasswort and Annual Sea-blite, and also contain cobbles.

This habitat is also found on a sandy accretion ridge in one of the small inlets adjacent to the sandy spit. The vegetation is again dominated by Glasswort, with several Annual Sea-blite plants also present. Zonation within the habitat is not really evident but there is a natural gradual transition between the *Salicornia* flats and the adjacent ASM habitat. There are also several patches associated with pioneer saltmarsh zones on mixed muddy shingle and mixed gravel/cobble sediment. These patches also contain infrequent Lax-flowered Sea Lavender and several Sea Purslane plants.

This habitat is also found in a narrow strip along the seaward ASM boundary on the east side of Scanlan's Island.

# 3.3 Atlantic salt meadows (H1330)

There are several typical saltmarsh communities present at this site with lower, upper and pioneer vegetation represented. The typical mid marsh *Armeria-Plantago* sward is poorly represented. Zonation of the saltmarsh plant communities is clearly seen. The saltmarsh topography is poorly developed, but that is typical of these relatively small sections of saltmarsh habitat.

The saltmarsh located in the sandy spit at the western side of the site does not contain any typical saltmarsh topography, as it is essentially a ribbon of habitat around a semi-circular bay in the northern inlet. Rocks and cobbles are occasionally scattered over the saltmarsh that have been blown over from the storm beach along the outer spit. The southern inlet is narrower and is emptied by a single narrow creek. Zonation of the saltmarsh vegetation is evident in this section, even though the saltmarsh is relatively narrow in places. The lower

zone is dominated by Common Saltmarsh-grass and also contains Lax-flowered Sea Lavender *Limonium humile*), Annual Sea-blite (*Suaeda maritima*), Glasswort, Sea Aster (*Aster tripolium*), Sea Plantain (*Plantago maritima*) and Sea Pink (*Armeria maritima*). The upper zone is dominated by Red Fescue and also contains Creeping Bent-grass, Sea Pink, Sea Milkwort (*Glaux maritima*), Sea Beet (*Beta maritima*), Spear-leaved Orache, Sea Arrowgrass (*Triglochin maritimum*), Sea Plantain and Curled Dock (*Rumex crispus*). The sandy spit is not grazed. Sea Purslane is relatively rare in this section.

An accretion ridge is located along the seaward boundary of the ASM in one of the small inlets adjacent to the sandy spit. There is a transition from ASM to *Salicornia* flats along part of this ridge. Another section directly transitions to sand flats. The pioneer zone contains Common Saltmarsh-grass, Glasswort and Annual Sea-blite. Another patch of pioneer saltmarsh also contains Sea Purslane.

A small strip of ASM saltmarsh is situated behind a relatively new embankment and lane that accessed the house and weir at the west of the site. This saltmarsh contains Sea Purslane and also contains patches of pioneer saltmarsh that are colonising the old lane access.

The northern section of saltmarsh has similar vegetation communities. The vegetation zonation is well-developed. The lower zone is dominated by Common Saltmarsh-grass and Red Fescue is abundant in the upper saltmarsh zones. Part of this saltmarsh also has a low ridge or stone wall marking the boundary between the upper and lower saltmarsh and may be an indication of older land reclamation or infilling of this section. There is a typical low saltmarsh cliff (0.4 m high) along the edge of the northern section of saltmarsh. There are some signs of erosional features with tussocks present. Some of the erosion along the seaward edge may be poaching induced. Some of this saltmarsh cliff is protected by an old stone wall. Some salt pans are present in the saltmarsh area along the northern side of the inlet, which contain small patches of *Salicornia* flats habitat. There are no significant creeks but this is typical of these relatively small sections of saltmarsh.

The larger saltmarsh areas that have developed along the eastern side of Scanlan's Island are similar in nature to the saltmarsh described above. The saltmarsh is lightly grazed. Most of the saltmarsh contains a lower-mid saltmarsh community dominated by common Saltmarsh-grass and Sea Plantain. This saltmarsh vegetation transitions into a virtually pure Red Fescue-dominated sward. There are also several low embankments that mark the boundary between lower and upper saltmarsh and probably indicate infilling and attempts at reclamation in the past.

An unusual saltmarsh community has developed along the east side of the inlet. Exposed rock is much more frequent on the saltmarsh. Saltmarsh vegetation has developed on thin layers of mud amongst and overlaying exposed limestone pavement. The patches of saltmarsh are eroded and the overall topography is quite irregular with frequent exposed pavement and loose rock. The vegetation is dominated by Common saltmarsh-grass. There are frequent small hollows. There are occasionally thick patches of brown algae on the lower saltmarsh patches. The upper saltmarsh zone contains rare Sea Purslane bushes.

The saltmarsh at the southern end of the island eventually develops into a narrow strip of patchy vegetation with Lax-flowered Sea Lavender and Sea Beet growing on cobbles along a storm beach shoreline. Some of the saltmarsh on the eastern side of the inlet shows signs of heavier grazing ad poaching intensity.

# 4 IMPACTS AND ACTIVITIES

Several impacts and activities affect this site with a range of intensities (Table 4.1). The main impact is grazing. Most of the saltmarsh is probably lightly grazed (140) by cattle or not grazed significantly. Much of the saltmarsh on Scanlan's Island may be accessed by cattle that are moving from one pasture to the next. However, there are several areas with signs of heavier poaching damage (143), usually associated with the lower saltmarsh. Some of the erosional features along the lower saltmarsh boundary may be poaching induced. The eastern side of the mainland also displayed signs of poaching damage.

The track and/or breakwater across the intertidal zone to the island has been improved in the recent past (501). It is not known if these improvements occurred during the current monitoring period. This has not affected adjacent saltmarsh habitats. The track continues along the eastern side of the island and allows access to different enclosures. This track occasionally crosses the saltmarsh or small patches of saltmarsh are situated along the edge of the track.

There has been some infilling of a small area along side the minor road that passes along to the tip of the Finvarra peninsula. This infilling may be related to coastal protection (871) and/or disposal of waste road material. Some rock armour has also been built along side the road further west where the road meets the shoreline (871) but no saltmarsh was affected. A relatively new access lane to a house and weir/lobster holding area at the western side of the site has also been constructed in the recent past (501). It is not known if these improvements occurred during the current monitoring period. The old access lane along the shoreline is still visible. The OSI 1995 series aerial photos are not available for this site.

Erosion (900) at the site is not significant. Some of the lower saltmarsh boundaries have low saltmarsh cliffs and erosional features like tussocks but this is typical of this sort of sheltered site. However, there has been no measurable loss of saltmarsh within the current monitoring period.

A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the OSI 2000 series aerial photos shows that there have been no significant changes along the edge of the saltmarsh in the past 100 years but these losses are not assessed. There are some minor losses of saltmarsh along the northern saltmarsh section. There are also signs of accretion (910) on the ground along part of the lower ASM boundary in one of the saltmarsh sections, although there are no indications from the comparison of the maps and aerial photos that the saltmarsh has grown measurably. The position of the sandy spit and associated saltmarsh has changed somewhat at its tip in the past 100 years, with some minor losses and gains to the saltmarsh.

Impacts and activities adjacent to the site include dispersed habitation (403), and fertilization (120) and grazing of livestock (140) related to farming practises. There does not seem to be any aquaculture or fishing at present in the local area. The sandy spit is used for mooring yachts (621). These activities have little or no impact on the saltmarsh habitats present at the site.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	С	0	0.113	Inside
1330	140	В	0	4.382	Inside
1330	143	В	-1	0.075	Inside
1330	501	С	-1	1.00	Inside
1330	871	А	-2	0.02	Inside
1330	900	С	0	4.457	Inside
1330	910	С	0	4.457	Inside

Table 4.1. Inte	ensity of various	activities on sa	Itmarsh habitats	at Scanlan's	Island.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

# **5 CONSERVATION STATUS**

#### 5.1 Overall Conservation Status

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

Scanlan's Island is a relatively small saltmarsh but with several features of interest such natural transitions to other coastal habitats and the presence of an unusual saltmarsh/exposed limestone pavement mosaic A species of local distinctiveness (Sea Purslane) is present on the site. Two monitoring stops out of thirteen failed.

The overall conservation status of this site is *unfavourable-inadequate* (Table 5.1). There are few impacts or activities that are significantly affecting this site. Small parts of the saltmarsh have been damaged by heavy poaching (10%) but most of the saltmarsh is in good condition and is only lightly grazed. Small sections have also been negatively impacted by infilling for coastal protection (0.4%).

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are low-moderate. Much of the saltmarsh is enclosed by stone walls and/or embankments that protect agricultural grassland and there are few prospects for landward migration. Some of the saltmarsh has landward transitions to dry coastal grassland and therefore provide some scope for natural landward transition. However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC. A MPSU conservation plan is available for the saltmarsh habitats at this SAC. However, not all the saltmarsh habitat is located within the cSAC boundary.

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

Table 5.1. Conservation status of Annex I saltmarsh habitats at Scanlan's Island.

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

# 5.2.1 Extent

The extent of this habitat is assessed as *favourable*. This habitat is found is several different situations and is also found on an accretion ridge. There are no indications of any loss of habitat due to erosion or to land-use changes during the current monitoring period.

# 5.2.2 Habitat structure and functions

The structure and function of this habitat is assessed as *favourable*. The habitat is found in several different situations and on different substrates. It is found on sandy substrate, muddy shingle and mixed sediment. It is found in pans amongst the ASM, on an accretion ridge with a gradual transition to pioneer ASM and on bare sediment along the seaward boundary (very low SM cliff) of the ASM.

# 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 affecting this habitat at this site. Continuing accretion at several locations where there are accretion ridges may increase the extent of this habitat in the future.

# 5.3 Atlantic salt meadows (H1330)

# 5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any significant loss of habitat due to erosion or to land-use changes within the current monitoring period. A small patch of ASM is likely to have been destroyed by infilling related to coastal protection. However, this is only a minor area (0.4% o the total ASM area).

There are indications of attempted land reclamation on the saltmarsh in the past. However, these attempts do not seem to have affected the extent of saltmarsh significantly, (the saltmarsh may have re-developed in the re-claimed area). Some saltmarsh along several tracks on the site may have been lost due to improvement. There are likely to be some natural losses and gains of saltmarsh habitat related to the movement of the sandy spit at the western side of the site. These impacts are not assessed as they occurred outside the current monitoring period.

### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Eleven monitoring stops were carried out in this habitat and two failed. Most of the attributes required for the structure and functions of this habitat reached their targets. The main reason for the failed stops was overgrazing and poaching damage. Several typical ASM communities were recorded on this site and zonation was evident with upper mid and lower zone saltmarsh communities. In addition some pioneer ASM vegetation is present at this site, as is a notable vegetation type where saltmarsh vegetation forms a mosaic with exposed limestone pavement. The saltmarsh topography is poorly developed but this is typical of a small site of this nature. There are natural transitions to other coastal habitats including *Salicornia* flats at both the lower and upper saltmarsh boundaries. The Atlantic salt meadows form part of a larger coastal ecosystem.

Sea Purslane is also present at this site and was recorded at several locations. This is another species of local distinctiveness. This species is mainly distributed along the eastern coast of Ireland and is only found in six 10 km<sup>2</sup> squares along the west coast. Curtis and Sheehy-Skeffington (1998) have discussed the distribution of this species and hypothesised that its lack of abundance on the west coast compared to the east coast is related to the higher levels of grazing on west coast saltmarshes. The lack of grazing on some of the saltmarshes in Galway Bay may be one of its reasons for its presence on saltmarshes in Galway Bay.

### 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 such as grazing continue in the near future. Overgrazing and poaching damage is the man activity affecting part of the ASM at this site less than 10% of the ASM is affected. 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 cSAC so the most of the habitat should not be affected by land-use changes such as development. (Some of the habitat is located outside the cSAC boundary and is therefore unprotected by the nature conservation designation. Impacts and activities such as coastal protection and infilling should be controlled and licensed by local and national authorities.

# 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations recommended for this site.

# 7 REFERENCES

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

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats	0.113	0.113				
2	Spartina swards						
3	1330 Atlantic salt meadow	4.273		4.273			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic	0.282		0.141			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	4.226					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.173					
19	1330/rocky shore mosaic	0.085		0.043			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	9.152	0.113	4.457			

Table 8.1. Areas of SMP habitats mapped using GIS.

# Legend

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Connishabi, Oldhreacht agus Hiaitas Áthui Brutianment, Heitiage and Local Government

National Parks and Wildlife Service

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SAC Boundary 1310 Salicornia flats 1330 Atlantic salt meadows 1330/other SM (CM2) mosaic 1330/rooky shore mosaic Other Saltmarsh (CM2) other 1310 monitoring stops 1330 monitoring stops

> Saltmarsh Monitoring Project 2007-2008

Scanlan's Island

317

ETAD)

Galway Bay Complex SAC (000268)

This habitat map was create and interpretaion of aeral ph are subject to revision. Prod permission of the Governme

	SMP code:	0 60	120	180 240	300	Meters	N
	SMP0088					and and an	- 1
hotos. Boundarie duced from Ordin tent (Permit numb	s of designated areas ance Survey material by ter 5953	Date of production: Map version: 1	22/02/2009	Original Drawi Scale 1:4000	ing Size: 29	7 x 420 (A3)	A

# Shepperton, Fergus Estuary

# **1 SITE DETAILS**

SMP site name: Shepperton, Fergus Estuary		SMP site code: 0082				
Dates of site visit: 27	May 2008	CMP site code: N/A				
SM inventory site nam Estuary	ne: Shepperton, Fergus	SM inventory site code	e: <b>142</b>			
NPWS Site Name: Lo	wer River Shannon					
NPWS designation	cSAC: 2165	MPSU Plan: Old Forn	nat – Draft 2: Consultation			
	pNHA: <b>2048</b>	SPA: <b>4077</b>				
County: Clare		Discovery Map: 458	Grid Ref: 136235, 169920			
Aerial photos (2000 series): O 4438-D; O 4439- A,C; O 4497-B; O 4498-A		6 inch Map No: <b>CI 042, 050, 051</b>				
Annex I habitats curre	ntly listed as qualifying intere	ests for Lower River Sha	annon cSAC:			
H1310 Salicornia	and other annuals colonizi	ng mud and sand				
H1330 Atlantic sa	It meadows (Glauco-Pucci	nellietalia maritimae)				
H1410 Mediterranean salt meadows (Juncetalia maritimi)						
Other SMP sites within Inishdea/Owenshere	n this SAC/NHA: <b>Carrigafoy</b> , <b>Killadysart/Inishcorker, K</b>	le, Barrigone/Aughini nock, Querin, Rinevill	sh, Beagh, Bunratty, a Bay			
Saltmarsh type: Estua	arv Sub:	strate type: Sand:pebbles				

# 2 SITE DESCRIPTION

This site is located along the north-east side of the Fergus Estuary in Co. Clare. The site is properly listed as Shepperton, Fergus Estuary in the National Inventory (Curtis and Sheehy-Skeffington 1998). This refers to a house named Shepperton House in Ballysallagh West Townland, close the site. Extending downstream of Clarecastle, County Clare, the Fergus Estuary is a long estuary which enters the River Shannon to the west of Shannon Airport. The survey site extends from Ing Point northwards towards Crow Island, where the estuary narrows considerably, before splitting off along the Latoon Creek where surveying was stopped beside the old Latoon Bridge, a distance of approximately 6 kilometres. This part of the shoreline is about 3 km east of Newmarket-on-Fergus. The site crosses a number of townlands, including - Ing, Ing East and Ing West, Ballygirreen and Latoon South. The surrounding landscape is quite low-lying and a substantial part of the shoreline is marked by tall embankments that were built to reclaim adjacent land. These are regularly maintained, as some of the land behind them is lower then that river. Wet grassland and improved grassland are the main habitats found behind these embankments. There is some higher ground around a mound near Ing Point. This area is quite rural and there are few dwellings close to the shoreline apart from at Ing Point.

Saltmarsh habitats are spread along this shoreline and form an almost continuous band of habitat from Ing Point to Latoon Bridge. The development of saltmarsh varies along this

shoreline and is less extensive towards the northern end where the estuary narrows. Much of the saltmarsh has been modified by the construction of the embankments, although there are still large sections of relic saltmarsh that are relatively intact. This saltmarsh has developed adjacent to soft intertidal mudflats in the estuary. Further north the intertidal channel deepens considerably. Large areas of mono-specific vegetation are not uncommon, either *Spartina* sward or brackish vegetation such as Common Reed (*Phragmites australis*) or Sea Club-rush (*Bolboschoenus maritimus*).

It should be noted that this survey has only mapped part of the saltmarsh in the Fergus Estuary. The opposite side of the estuary is listed as a separate site on the saltmarsh inventory - Islandavanna (Curtis & Sheehy-Skeffington 1998). Saltmarsh is also found south of Ing Point.

This site is located within the Lower River Shannon candidate Special Area of Conservation (cSAC). This very large site encompasses approximately 120 kilometres of the lower reaches of the Shannon and extends seawards towards the open estuary between Loop Head on its northern boundary and Kerry Head (west of Beal Point). It includes many secondary estuaries including the Fergus Estuary and a great many freshwater tributaries. The site is considered to be of national ecological importance owing to the presence of eighteen important Annex I habitats. The site is primarily designated for its estuarine and coastal habitats and is also important for Annex II species such as Bottlenose Dolphin. The Shannon is also notable for the range of rare or threatened plant species. These include a number of saltmarsh species such as Three Headed Club-Rush (Scirpus triqueter), Wall Barley (Hordeum secalinum) and Sea Dock (Rumex maritimus). Three Annex I habitats are listed as qualifying interests for this SAC: Salicornia flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Atlantic salt meadows was the only Annex I saltmarsh habitat found at this site in addition to Spartina swards, which is not now considered to qualify as an Annex I habitat. One plant species of note that was previously recorded as occurring in the River Fergus Estuary is Golden Dock (Rumex maritimus). It was not refound during the current survey.

In total, twenty one separate saltmarsh sites are listed for the lower reaches of the River Shannon, occurring in counties Limerick, Kerry and Clare. Fourteen are found along the Co. Clare shoreline (Curtis and Sheehy-Skeffington 1998). Several of these other saltmarshes were surveyed during the SMP project (see above table).

The site, although several kilometres in length, is not freely accessible, although it is possible to gain access along a maintenance track at the upper end of the site adjacent to the Latoon Bridge/N18 flyover. While much of the saltmarsh vegetation lies outside of managed land, it often requires crossing private land to reach it. Theoretically, it is possible to walk along most of the site unhindered by creeks or rivers and other man-made drainage features. However the land is managed variously by a considerable number of landowners and each

management unit is often demarcated by fencing. Several landowners were identified along the site and permission sought.

# **3 SALTMARSH HABITATS**

### 3.1 General description

The Fergus Estuary is similar to the Lower Shannon Estuary in that it has very extensive mudflats and is subject to strong tides. The estuary contains extensive areas of intertidal mudflats along with saltmarsh and wet marsh habitats. Extensive areas of brackish marsh vegetation occur along each side of the estuary along its upper reaches. In addition to the current site, Curtis and Sheehy-Skeffington (1998) recognise two additional saltmarshes from the Fergus Estuary, namely Islandavanna on the opposite side of the estuary, and Inishmacnaghtan, at the confluence of the Fergus and Shannon estuaries.

The saltmarsh is described in the National Inventory as estuarine and is associated with sand and pebble substrates. It extends a considerable distance along the eastern side of the Fergus estuary, approximately 6.5 kilometres. Notwithstanding this fact, the saltmarsh is not diverse in terms of its habitats that are present. The site is overwhelmingly dominated by Atlantic salt meadows – 1330 (ASM) and the non-Annexed *Spartina* Sward. There are, however, many admixtures between both of these habitats and mosaics are not uncommon. In addition to these mosaic, other vegetation that was associated with the saltmarsh is largely comprises brackish marsh with Common Reeds (*Phragmites australis*) and Sea Club Rush (*Bolboschoenus maritimus*) forming large stands, particularly towards the upper parts of the site. This reflects the increasing estuarine conditions for the site. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project, (although in estuarine situations these Reed stands should more accurately be classified as 'Reed and tall sedge swamps - FS1' (Fossitt 2000)). Twitch (*Elytrigia repens*)-dominated grassland on the embankments was also classified as other saltmarsh (CM2).

The total area of the individual habitats is shown in Table 3.1. It should be noted that while the main body of saltmarsh vegetation was surveyed, isolated patches of fringing saltmarsh vegetation were noted on other banks. These were not surveyed as they were considered to form part of another saltmarsh system listed for the estuary. Indeed, a comprehensive survey of the entire Fergus estuary would entail a considerable number of field days and the cooperation of many landowners on both side of the estuary, as it is large and complex site which is not easily accessible by the public.

The majority of the saltmarsh occurs within the confines of the cSAC boundary, although there are places where it extends beyond the limit of the designated site. This is partially explained by the fact that much of the site has been heavily modified through embanking, which was extensively carried along parts of the estuary as a means of flood relief and land reclamation. The berms provide landmarks with which to define boundaries, which is the case with the 6inch maps, which is the statutory mapping standard. Often, however, there is a reasonable difference between what is encountered on the ground with that which is mapped on the 2<sup>nd</sup> edition OSI 6inch map. These relatively minor differences reflect differences in the levels of accuracy at the time of its production.

Over the length of the saltmarsh, there is some variation in the structural composition of the habitats and there is a degree of variation in the gradient from the front to the back. The development of a relatively large marsh in the low-lying areas is mostly found towards the southern end of the estuary. In the townland of Ing, there is an extensive development of ASM, which extends down onto the mudflats, with a narrow Spartina fringe. Occasionally, the freshwater influence draining onto the marsh results in a mosaic between the ASM and Sea Club Rush. Further north, the ASM is greatly reduced and is replaced by a narrow fringe of young Spartina on the mudflats. The ASM returns further north, although now it is generally found perched above the mudflats. The face of the terrace ranges between 30cm and 1 metres, but the trend is for an increase further north. This second extensive plain of ASM has been influenced by human interference a linear band of trenches where soils are excavated for incorporation into the berm. Sluice gates, draining the wet agricultural land behind the embankment, become more common and deep creeks channels bisect the saltmarsh. There is a considerable increase in the amount of Spartina sward fronting the ASM in the section, which mirrored the very extensive development which was observed on the opposite side of the Fergus estuary.

The structural composition of the saltmarsh changes, south of where the Latoon Creek leads off from the main estuarine channel. There is a startling decrease in the abundance of *Spartina*, which is gradually replaced by large stands of Sea Club Rush. The ASM, although still extensive, is heterogeneous in its distribution and patches of Sea Club-rush and Common Reeds are found along creeks and topographical depressions.

Departing the main estuarine channel, the ASM extends along the Latoon Creek. Indeed, it is quite extensive at the first bend and it is notable that there is very little development of brackish vegetation fronting the saltmarsh at this point. Further upstream, however, it reappears along both sides of this modified creek. The ASM decreases into a narrow fringe of highly disturbed vegetation which is fronted by Common Reeds as far as the upper extent of the site at Latoon Bridge.

Throughout the entire length of this site, much of the upper boundary of the saltmarsh is demarcated by transitional vegetation, much of it characterised by Twitch (*Elymus repens*)-dominated vegetation along the embankments, although in places, the saltmarsh extends

right up to the grassy berm. Elsewhere, Scrub was recorded but overall it is not extensively encountered at the back of the saltmarsh.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	35.935
non-Annex	Spartina swards	7.524
	Total*	43.459

Table 3.1. Area of saltmarsh habitats mapped at Shepperton, Fergus Estuary.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

### 3.2 Atlantic salt meadows (H1330)

Although there is some extensive development of *Spartina* swards in parts of the Fergus Estuary, the majority of this site is characterised by ASM vegetation. Although largely contiguous, it is characterised by a number of individual larger marsh plains which are connected by narrow bands to the landward side of the mudflats and *Spartina* sward. Asides from some ground towards the south of the site, most of the vegetation is grazed to some degree. There are signs of damage, mostly poaching although overgrazing was also recorded in places.

There is some example of zonation at this site ranging from lower to mid and upper marsh. Most however is characterised by mid and upper communities and large parts are relatively uniform in terms of structural and floristic composition. Some of the ASM is recorded on the mudflats. This is generally confined to the southern end of the site and often occurs as discrete patches with Common Cordgrass (*Spartina anglica*). For the most part, the marsh is raised above the mudflats. The height of the terrace was rarely less than 30cm and reached over 2metres at the upper parts of the marsh along the Latoon Creek.

The lower parts of the marsh were dominated by Common Saltmarsh-grass (*Puccinellia maritima*) along with other species such as Common Sea-spurrey (*Spergularia media*), Common Scurvy-grass (*Cochlearia officinalis*) and Sea Aster (*Aster tripolium*). Annual Glasswort (*Salicornia europaea* agg.) was occasionally recorded but never in any great abundance. It is not surprising, given its relative abundance at this site, that Common Cordgrass was a common component of the lower ASM community. Bare ground was another feature of the lower parts of the marsh and could be as much as 20%.

There was some limited development of mid marsh with Saltmarsh Rush (*Juncus gerardii*), Sea Aster, Common Saltmarsh-grass and Sea Arrow-grass (*Triglochin maritimum*) commonly noted. It was not uncommon for species from other zones to be recorded, which reflected the complexity of this site. The majority of the ASM is characterised by mid-upper and upper marsh vegetation. It is widely distributed throughout the site and was often the vegetation that showed the greatest degree of damage or interference. Sea Arrow-grass was the only species which was more commonly recorded in the mid-upper rather than upper marsh. Otherwise the species was fairly similar. The vegetation was dominated by Red Fescue (*Festuca rubra*) along with Saltmarsh Rush and Creeping Bent (*Agrostis stolonifera*) in many parts. Common associate species included Sea Milkwort (*Glaux maritima*), Thrift (*Armeria maritima*), Sea Plantain (*Plantago maritima*), Long Bracted Sedge (*Carex extensa*) and Distant Sedge (*Carex distans*). There is a notable estuarine influence on this site and this is reflected in the abundance of Creeping Bent within the ASM towards the northern end of the site.

The upper boundary of the saltmarsh is roughly delineated by the protective berm which extends a considerable distance along the southern shore of the Fergus estuary. However, while the saltmarsh vegetation abutted the berm in places, there was often a transitional component of the vegetation, with the ASM grading into Twitch-dominated grassland.

### 3.3 *Spartina* swards

The *Spartina* sward is well established along the River Shannon. Since its introduction into Poulnasherry Bay the 1928 (Nairn 1986), it has rapidly spread and is now extensively established on the mudflats throughout the Fergus Estuary. While large linear swards occur on the intertidal muds and occasionally along creeks and drainage trenches within the saltmarsh, it was more extensively developed on the opposite side of the estuary (Islandavanna).

It is well developed in parts of this site, with most of it recorded on the mudflats, although some transitional mosaic or as isolated patches were recorded as high up as upper marsh. Most of the habitat is characterised by a mono-specific sward. Other species are not common and are generally only recorded at the upper or landward transition where Common Cordgrass occurs in its various mosaics with the ASM vegetation.

There is a significant decline in the abundance and distribution of Common Cordgrass further upstream where conditions become more estuarine and it is effectively replaced by Sea Clubrush or Common Reeds within the Latoon Creek.

### 4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). However, given the size and extent of the site, some of the impacts are locally important. There is considerable diversity in the management practices and condition of the vegetation. It is largely a rural

setting in which the land is given over to pasture. Most of the saltmarsh is grazed to some extent by cattle or horses (140). Most of the low-lying land along the seaward side of the embankment is divided into separate landholdings which are associated with the farm holding that are located on higher ground. The saltmarsh is also divided into management units to reflect these separate landholdings. Livestock trails (501) were not uncommon throughout the site but were rarely considered as a negative impact. Some areas have been damaged (143) through overgrazing and poaching.

This site has been considerably modified by reclamation and construction of the embankments in the 18<sup>th</sup> and 19<sup>th</sup> centuries. Former areas of saltmarsh were likely to be reclaimed in this way (801). This reclamation has also occurred in a piecemeal fashion, with newer embankments being created in front of old ones to reclaim more land. Some reclamation has occurred more recently in the 20<sup>th</sup> century. However, the effects of this reclamation are not assessed as they commenced prior to the current monitoring period.

The influence of the sea is still apparent beyond the embankment, although the sea defences largely prevent the widespread development of saltmarsh vegetation in the reclaimed or protected fields. Routine maintenance, however, is still carried out along the embankment by the OPW and local landowners (810). Most of this work is carried out on the landward side of the berm and so does not directly affect the saltmarsh communities. However, repairs in the fabric of the berm are carried out by excavating soils from the saltmarsh and placing it atop the berm. In a number of locations it is possible to see trenches where soils had been recently excavated. This operation clearly has an immediate effect as it results in a defined loss of habitat, usually ASM (820). Over time, however, these trenches become infilled with fresh mud and gradually become revegetated – at first with Common Cordgrass or Sea Clubrush. However, the spread of Common Saltmarsh-grass among some of these areas is indicative of the restoration of some ASM vegetation.

In the past, Common Cordgrass was planted to assist in stabilisation and potentially for land reclamation. This is an invasive species of saltmarsh habitats (954). It is now widespread at this site either through planting or by natural colonisation. It has mainly established its sward on the previously unvegetated mudflats, seaward of the more established saltmarsh. It does not seem to have spread significantly into ASM to replace this vegetation. Some *Spartina* sward/ASM mosaics are evident along the site but many of these are related to recolonisation of areas damaged by the removal of sediment for maintenance of the embankments. Common Cordgrass can not be considered to have naturally spread into this ASM. However, the impact of invasive Common Cordgrass is assessed a negative impact (-1) as it has spread at the expense of ASM. If it was not present some of these areas would revert back to lower marsh ASM dominated by Common Saltmarsh-grass.

There are also some instances where ASM species are spreading into the upper *Spartina* sward to create small areas of mosaic and this reflects natural saltmarsh succession (990). However, this is a fairly minor occurrence.

There were some indicators of natural erosion (900) along the site. Much of the ASM is found perched behind the *Spartina*-vegetated mudflats. However, there are situations where the ASM terrace, which can reach up to 2 metres, was not fronted by other habitats. Such is the tidal range at this site that the exposed ASM is in places undercut by wave action or is scoured by the river flow and elsewhere slumping was occasionally recorded. Erosion is particularly evident at one point in the northern part of the site where the main River Fergus channel comes close the saltmarsh and berm. However, there has been no measurable erosion at this site when the current extent of the saltmarsh habitats is compared to the extent as indicated from the OSI 2000 and 2005 series aerial photos. The impact of erosion is assessed as neutral on a small portion of the saltmarsh face.

A comparison of the current extent of saltmarsh to the extent mapped by the OSI 2<sup>nd</sup> edition 6 inch map shows some differences. The seaward boundary of the established saltmarsh has changed in places, mainly by some seaward growth of ASM. This is especially evident where the Latoon Creek meets the Fergus River. There has been some significant growth of mainly a large stand of Sea Club-rush at this point. The extent of ASM at this location has remained relatively unchanged. The expansion of the saltmarsh is likely to be related to changes in sedimentation (910) that may be related to reclamation in the estuary and upriver of this location. However, this is not assessed as there has been no significant growth of saltmarsh during the current monitoring period.

The NATURA 2000 datasheet notes that domestic and industrial waste water is discharged into the Fergus Estuary at a number of locations (421, 422) and that the threat of a serious pollution incident is ever present given that a number of large industrial complexes are situated along the Shannon and Fergus estuaries. Alongside this fact, the continued urbanisation of places like Clarecastle and Ennis (400) might be expected to have an impact on the Annexed habitats and species, particularly the fish and avian fauna. There were no indications of pollution at this site.

Elsewhere outside of the site, most of the land is agricultural. Most of the settlement is scattered or is found a considerable distance back from the saltmarsh. There are few houses and little settlement along the corridor running alongside either side of the estuarine channel, reflecting the areas past tendency to flood. Most of the houses/farm-buildings are situated on higher ground, outside of the cSAC (403). Much of the land is improved agriculture and is actively maintained as such. This requires maintenance of the drainage channels. There is some risk of polluting materials including fertilisers (102) making their way into the saltmarsh environment, but the risk is not quantifiable.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	В	0	30.00	Inside
H1330	143	В	-1	3.5	Inside
H1330	501	С	0	0.4	Inside
H1330	810	С	0	0.4	Inside
H1330	820	А	-2	2.5	Inside
H1330	900	С	0	1.5	Inside
H1330	954	В	-1	3.0	Inside
H1330	990	С	+1	0.1	Inside

Table 4.1.	Intensity of	various a	activities o	n saltmarsh	habitats a	at Shepperton	, Fergus Estuary.
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<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence. <sup>5</sup> 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**

#### **Overall Conservation Status** 5.1

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

Shepperton saltmarsh is a moderately sized site with few features of significant conservation Much of the saltmarsh occurs as a fringe along the seaward side of the interest. embankment, which connects a number of more extensive saltmarsh plains which extend some distance inland such as at the southern end of the site. Throughout the saltmarsh, there is considerable diversity in the management practices and condition of the vegetation, all of which influences the conservation status of the site. There is a distinctive estuarine influence on the vegetation of the site with increased brackish vegetation appearing in the northern section where the estuary channel narrows and becomes Latoon Creek. The structure of the saltmarsh has been considerably modified by the construction of the embankments and reclamation in the past although some larger sections are still intact.

The overall conservation status of this site is assessed as unfavourable-inadequate (Table 5.1). Much of the saltmarsh is grazed by cattle and there is some localised poaching. Common Cordgrass is present at this site and has formed extensive swards mainly seaward of the established ASM. It has also spread into the ASM where it has been disturbed by berm maintenance works.

Habitat	EU Conse			
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (H1330)		Extent, Structure and functions Future prospects		Unfavourable - Inadequate

Table 5.1. Conservation status of Annex I saltmarsh ha	abitats at Shepperton, Fergus Estuary.
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# 5.2 Atlantic salt meadows (H1330)

### 5.2.1 Extent

The extent of this habitat is assessed as *unfavourable-inadequate*. Repair work to parts of the embankment involved excavating soil from the saltmarsh and putting it on top of the berm. This action has left deep bare trenches of mud in the ASM. Some of these have re-vegetated with a mosaic of *Spartina* sward and ASM or with stands of Sea Club-rush. This activity has reduced the extent of ASM along the site by about 2.5 ha and encouraged the colonisation of Common Cordgrass into the ASM. This represents a loss of about 6%. There are indications that Common Saltmarsh-grass swards are developing on infilling trenches so ASM may redevelop in some of these trenches. However, at present it is assessed as an irreversible negative impact as most of these trenches are likely to infill with vegetation not typical of ASM. There are no indications of any loss of ASM due to erosion at the site during the current monitoring period.

### 5.2.2 Habitat structure and functions

The habitat structure and functions of the ASM are assessed as *unfavourable-inadequate*. Sixteen monitoring stops were carried out across the ASM habitat and its various mosaic habitats throughout the site. Four stops, all of them located in lower and low-mid marsh failed due to the high level of poaching. There was some development of zonation throughout the marsh, although mid-upper and upper communities dominated. Much of the saltmarsh has been modified by the creation of the embankments in the past, which has altered the structure of this saltmarsh. Some of the larger patches of ASM still retain a natural creek and salt pan structure.

More recent maintenance works has damaged the ASM and encouraged the spread of Common Cordgrass into previously established ASM. However, the total spread of this species during the current monitoring period is not likely to be greater than 10%. There the impact of its spread is assessed as neutral. This invasive species is otherwise largely confined to the mudflats adjacent to the seaward edge of the ASM, the natural drainage channels and the disturbed areas within the ASM.

### 5.2.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. The assessment assumes that there will be no significant change in the levels of activities and their impacts recorded at this site. The levels of grazing and its associated damaging effects are likely to continue into the future. In addition, flood relief works and berm maintenance continues to pose a threat in the upper stretches of the site, where soils are excavated from the marsh. Continued berm maintenance will also encourage further colonisation of Common Cordgrass into the ASM. These are negative indicators.

Common Cordgrass is not likely to extensively spread within the undisturbed ASM. At present it is largely confined to the mudflats seaward of the ASM and the disturbed areas. Indeed, its gradual seaward expansion may have a positive effect on the extent of ASM as accretion within the *Spartina* sward encourages natural succession of this habitat to ASM along the landward boundary.

### 6 MANAGEMENT RECOMMENDATIONS

The use of the saltmarsh habitat to supply material for berm maintenance works should limited to prevent further damage to the saltmarsh.

### 7 REFERENCES

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

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# 8 APPENDIX I

 Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards	7.524					7.524
3	1330 Atlantic salt meadow	33.062		33.062			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic	0.809		0.4045			0.4045
7	1330/other SM (CM2) mosaic	2.921		1.461			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	2.223					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina	1.061		1.008			0.053
17	1330/sand dune mosaic						
18	Other SM (CM2)	16.609					
19	1330/rocky shore mosaic	0.072		0.036			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	64.281		35.935			7.524





Comnehabi, Oldhreacht agus Hiatlas Áthur Emvlichment, Heitlige and Local Government National Parks and Wildlife Service

Project 2007-2008

# Shepperton, Fergus Estuary (Map 2 of 3)

Lower River Shannon SAC (002165)

This habitat map was created with a combination of fieldwork, G.P.S and interpretation of aeral 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 1:6500



Project 2007-2008

Connishabi, Oldhroacht agus Hiattas Átiut Brvikanment, Heitioge and Local Government

National Parks and Wildlife Service

Lower River Shannon SAC (002165)

This habitat map was create and interpretation of aeral ph are subject to revision. Prod permission of the Governme

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# Ballybrack

# 1 SITE DETAILS

SMP site name: Ballybrack		SMP site code: SMP	SMP site code: SMP0064				
Date of site visit 17/06/2008		CMP site code: N/A	CMP site code: N/A				
SM inventory site name: Ballybrack		SM inventory site coo	SM inventory site code: 183				
NPWS Site Name: R	oaringwater Bay and Is	slands					
NPWS designation cSAC: 101		MPSU Plan: not ava	MPSU Plan: not available				
	pNHA: <b>101</b>	SPA: N/A					
County: Cork		Discovery Map: 88	Grid Ref: 088400, 028570				
Aerial photos (2000 s	eries): <b>O 6783-A</b>	6 inch Map No: <b>Co 1</b> 4	6 inch Map No: <b>Co 148</b>				
Annex I habitats curre	ently listed as qualifying	interests for Roaringwater E	Bay and Islands cSAC:				
None							
Other SMP sites with	in this SAC/NHA: Seafo	ort					
Saltmarsh type: Fring	ge	Substrate type: Mud/Peat					

# 2 SITE DESCRIPTION

Ballybrack saltmarsh is located in south-west Cork, 5.5 km south-west of Skull Village. The site is located at the head of a small inlet that forms part of Croagh Bay. This inlet is long and narrow and orientated in an east-west direction and is open to the sea from the east. The inlet is sheltered from the sea by a small hilly peninsula known as Ballybrack. The landscape of this area is characteristic of West Cork and there are frequent unimproved grassland, exposed rock and dry heath on hilly outcrops. This area is low-lying and somewhat flatter and therefore contains much more improved grassland close to the coast. The shoreline in this general area is mainly exposed with significant amount of exposed rock forming cliffs in places. Saltmarsh only develops in sheltered area like at Ballybrack. There are scattered dwellings along the minor roads close to the shoreline in this area.

The saltmarsh is located at the western end of this inlet. This is the only part of the inlet with a suitable low-lying topography where saltmarsh can develop. Most of the saltmarsh habitat is found along the southern side of the inlet. There is only a minor fringe of habitat found along the northern side of the bay. Much of the northern shoreline adjacent to the main saltmarsh has been recently modified by infilling and reclamation. There is also steeper sloping hilly land close o the shoreline on the northern side of the bay, which precludes saltmarsh development. Low cliffs with some coastal heath, and exposed rocky shorelines develop further east towards the open sea. The upper part of this inlet empties at low tide to expose intertidal mudflats. A small drain/stream enters at the head of the inlet, the western end.

The majority of the site is located within the Roaringwater Bay and Islands cSAC and pNHA. This cSAC was mainly designated for its marine value but it also contains important coastal habitats such as sea cliffs and coastal heath. However, there are no Annex I saltmarsh habitats listed as qualifying interests for this cSAC. Two Annex I saltmarsh habitats are found

at Ballybrack saltmarsh, Atlantic salt meadow (ASM) and Mediterranean salt meadow (MSM). Three SM inventory sites (Curtis and Sheehy-Skeffington 1998) are located within this cSAC and two of these sites Seafort and Ballybrack, were surveyed during the SMP. An additional site located on Sherkin Island was not surveyed.

Most of saltmarsh habitat mapped at this site is located within the cSAC boundary. However there are several small patches located outside the boundary, particularly along the northern side of the inlet. This is mainly due to the fact that the lower shoreline boundary on the OSI 6 inch map was used to draw some of the cSAC boundaries and saltmarsh is located above this boundary. There is also a significant offset between the OSI 6 inch map and OSI aerial photos series. This offset works to exclude much of the saltmarsh habitat when the digital cSAC boundary is applied.

This shoreline was accessed via adjacent fields. Other the southern side of the bay was surveyed as this side contained the greatest proportion of habitat. Part of the northern side of the bay was being infilled and reclaimed at the time of the survey.

# **3 SALTMARSH HABITATS**

# 3.1 General description

The main Annex I saltmarsh habitat found at this site is Atlantic salt meadows (ASM) (Table 3.1). About one third of the total saltmarsh habitat is MSM. Most of this habitat is found along the southern side of the bay and forms a band of habitat about 0.6 km long. The saltmarsh habitat varies in width with the widest section being 50 m wide. The saltmarsh habitat is divided into several sections and does not form a continuous band of habitat, so some of the habitat is quite narrow (< 5 m long). Both habitats are distributed as an overall mosaic, with ASM being most prominent in the head of the inlet. The saltmarsh has developed on muddy peat. This substrate is exposed around the edges of the saltmarsh.

There is generally a tall saltmarsh cliff marking the seaward boundary of the main saltmarsh along the southern side. This saltmarsh cliff is sometimes between 1-2 m high. Intertidal mudflats are found adjacent to the saltmarsh. There are also several small isolated 'islands' of saltmarsh within the bay with the largest being 40 m long and 20 m wide and surrounded by mudflats. Both ASM and MSM vegetation can be found on these islands, which are perched on peat substrate with saltmarsh cliffs about 1 m high around the edge.

There are several small saltmarsh 'islands' along the northern side of the bay that are still intact. Some of the shoreline has been modified recently and there is now a seawall built with rock along the shore and adjacent land has been reclaimed and improved to create improved grassland. Not all the shoreline has been modified in this way and a narrow band of ASM was still present along some of the shoreline. Other parts of the shoreline had construction and demolition infill deposited on the saltmarsh.

The saltmarsh along the southern side of the bay is situated adjacent to improved agricultural grassland in several fields. There is very little transitional vegetation between the saltmarsh and the improved grassland. There is a low embankment or earth-bank marking the upper saltmarsh boundary along the edge of the improved grassland. A narrow band of non-Annex I, Twitch (*Elytrigia repens*)-dominated grassland forms in places along this upper boundary. Other species present include Curled Dock (*Rumex crispus*). Patches of Wet grassland

dominated by Yellow Flag (*Iris pseudacorus*) is also present in this interface. This only develops along the landward side of the widest sections of saltmarsh. Further east the saltmarsh is narrower and situated on a steeper shoreline. This means the upper boundary is quite abrupt and there is little development of transitional vegetation. There are several different management units along the southern side of the bay and some of the adjacent land has not been improved and contains wet grassland and some scrub. Improved grassland is also the most common habitat adjacent to the saltmarsh along the northern side of the bay.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.887
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.426
	Total	1.313

**Table 3.1.** Area of saltmarsh habitats mapped at Ballybrack.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

# 3.2 Atlantic salt meadows (H1330)

Atlantic salt meadows are the most prominent saltmarsh habitat found at this site. Several vegetation communities are present within this habitat. ASM also forms a mosaic with MSM in places on the main saltmarsh and also on some of the saltmarsh 'islands' within the bay. The zonation of these vegetation types is related to the variable topography of the saltmarsh along the shoreline. The widest section of saltmarsh displays the most developed zonation. The saltmarsh topography is moderately well-developed at this site and there are some large salt pans present within this habitat. However, there are few typical drainage channels or creeks. This is because most of the saltmarsh is found in relatively small sections that do not need drainage channels.

The mid-upper marsh community is the most prominent vegetation type. This community is dominated by Sea Plantain (*Plantago maritima*) and also contains Sea Aster (*Aster tripolium*), Sea Pink (Armeria maritima), Saltmarsh Rush (Juncus gerardii), Red Fescue (Festuca rubra), Sea Milkwort (Glaux maritima) and Lax-flowered Sea Lavender (Limonium humile) at lower Sea Rush (Juncus maritimus) is also sparsely distributed within this cover values. community. There may be small patches of denser Sea Rush cover that were not mapped as MSM as they were too small. The mid-upper marsh community transitions to an upper vegetation community in the widest area. This community is dominated by Red Fescue. Other species frequently found in this community is Saltmarsh Rush. Saltmarsh Rush occasionally dominates within this zone. Other species present include Autumn Hawkbit (Leontodon autumnalis) and Parsley Water-dropwort (Oenanthe lachenalii). Creeping Bent (Agrostis stolonifera) becomes dominant along the landward boundary of this habitat and transitional species such as Silverweed (*Potentilla anserina*). There are several lower lying areas where a low-mid vegetation community has developed but this community is less extensive. This community type is also found along the seaward boundary on top of the saltmarsh cliff. This community is dominated by Common Saltmarsh-grass. Other species present in Glasswort (Salicornia sp.), Sea Aster, Sea Pink, Sea Rush and Sea Arrowgrass.

The sward cover is generally in good condition and the sward height was between 5-20 cm. Most of the main saltmarsh had not been grazed at the time of the survey. However there was localised poaching damage in places with frequent bare substrate exposed.

# 3.3 Mediterranean salt meadows (H1410)

Sea Rush is quite widely distributed over the saltmarsh at this site and is also found within the ASM at low cover values (< 20%). It does not show typical zonation towards the landward side of the site and clumps of Sea Rush are present along the seaward boundary in places. Only large areas with higher abundance of Sea Rush were mapped as MSM at this site. There are several patches with typical dense cover of Sea Rush. MSM is found in mosaic with ASM in some areas where there are frequent small patches of MSM and ASM together. MSM also forms a narrow strip of vegetation at the eastern end of the site where the saltmarsh narrows in width towards the open sea.

Several vegetation types were noted within the MSM. Most of the MSM is a mid-upper saltmarsh vegetation type and contains similar species to the surrounding ASM vegetation. Sea Plantain is a prominent part of this vegetation and other species present include Sea Pink, Sea Arrowgrass, Red Fescue, Greater Sea-spurrey (*Spergularia media*), Sea Aster and Saltmarsh Rush at lower cover values. Common Saltmarsh-grass and Lax-flowered Sea Lavender is found in this vegetation type at one location along the seaward boundary of the site and this is an indication of a lower saltmarsh vegetation community. The MSM becomes grassier towards the landward boundary and Red Fescue becomes more prominent.

The saltmarsh topography was poor-moderately developed within this habitat type. Several salt pans were present. However there were no typical creeks.

# 4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). The main impact affecting this site is infilling and reclamation (802). Much of the shoreline along the northern side of the bay has been modified in the recent past and there is only some of the original saltmarsh still present. About 0.5 ha has been infilled. This represents about 33% of the original ASM habitat visible from the 2000 series aerial photos. The reclamation is in various stages. A seawall has been built along part of the shoreline at the western end and the saltmarsh has been infilled and re-sown. A large area of saltmarsh and mudflats adjacent to one field was infilled between 2000-2005. Scrub in the adjacent fields has also been removed this year and the grassland has been ploughed up and is ready for re-sowing. Some of the remaining saltmarsh towards the east has piles of rubble, soil and cobble distributed over it, probably in readiness for further reclamation and infilling. Most of this infilled area is situated outside the cSAC boundary.

Most of the saltmarsh along the southern side of the bay is grazed (140). There are several management units present and some of the smaller fields are grazed more intensively. There are no fences separating the saltmarsh habitat from adjacent improved grassland. The isolated islands of saltmarsh in the bay are not grazed. There is some localised poaching damage (143) but most of the saltmarsh is in good condition. Slurry (120) was being spread on the improved grassland located at the western end of the inlet. Some of the adjacent saltmarsh was being covered in this slurry inadvertently.

There are some signs of an erosional trend at this site along the seaward saltmarsh boundary (900). A relatively tall saltmarsh cliff is present around much of the habitat and there are places where the top of the cliff is bare of vegetation. Some of the saltmarsh cliff is also undercut. Some of this may be related to poaching-induced erosion. There are more

frequent erosion indicators further east towards the open sea. A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the current OSI 2005 series aerial photos shows that several of the isolated saltmarsh 'islands' have reduced in size during this period. This indicates that there is some erosional trend at this site. However, there has been no significant change to the shoreline during this period. Many of the inundations in the shape of the shoreline drawn on the 6 inch map are still present in the saltmarsh. A comparison of the 1995, 2000 and 2005 OSI aerial photos shows that there has been no measurable loss of saltmarsh habitat by erosion during the monitoring period. The impact of erosion is assessed as a negative impact on a portion of the ASM and MSM.

There are signs of old modifications to the shoreline around the site. These modifications include old seawalls (871) in places and old earth embankments (803) along the upper saltmarsh boundary in places. Large rocks indicate this embankment or ditch in places. Some of the adjacent land has been improved for agriculture (803). A small pier is located along the northern shoreline. These impacts have not been assessed, as they occurred outside the current monitoring period.

Impacts and activities adjacent to the site include dispersed habitation (403), agriculture (102, 120, 140) and roads (502). The indirect impacts of agriculture such as the imput of fertiliser have already been assessed. The other impacts have little or no measurable impact on the saltmarsh habitats.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	120	С	-1	0.005	Inside
1330	140	С	0	0.837	Inside
1330	143	С	-1	0.05	Inside
1330	802	А	-2	0.470	Inside
1330	900	С	-1	0.04	Inside
1410	140	С	0	0.426	Inside
1410	900	С	0	0.02	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> 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.

The overall conservation status of this site is *unfavourable-bad*. Ballybrack is a small saltmarsh with few notable features of conservation interest. It contains typical examples of both ASM and MSM saltmarsh. The site has been damaged by infilling and reclamation along the north side of the bay. Most of the original saltmarsh along this shoreline has been infilled. Most of the main saltmarsh along the southern side of the bay is in good condition. There is some minor localized poaching damage. There are also indications of erosion at this site with undercutting of the saltmarsh cliff in places and reduction in size of the some of the saltmarsh 'islands'.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor. There is very little low-lying wet grassland habitat or brackish habitat at a suitable elevation or topography for migration of saltmarsh habitat. Some wet grassland located at the head of the bay has been infilled and reclaimed since the OSI 6 inch map was drawn.

One notable aspect about this site is the absence of Sharp Rush (*Juncus acutus*). This species is found an adjacent saltmarsh at Seafort within 2 km of this site. Seafort is found at the head of a small inlet that meets the open sea in Croagh Bay, close to where the Ballybrack inlet meets this bay.

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

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at Ballybrack.

# 5.2 Atlantic salt meadows (H1330)

### 5.2.1 Extent

The extent of this habitat is assessed as *unfavourable-bad*. This assessment is mainly based on infilling of saltmarsh along the northern side of the bay. The majority of saltmarsh along this side of the bay has been reclaimed in the recent past and the remaining saltmarsh has also been damaged by infilling and disposition of spoil. An examination of the aerial photos indicates that most if not all of the infilled saltmarsh was ASM. There is measurable loss of saltmarsh due to erosion during the current monitoring period even though there is evidence of an erosional trend at this site.

# 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Four monitoring stops were carried out in this habitat (on the south side) and one stop failed. Most of the attributes for the assessment of this habitat reached their targets. There are signs of minor poaching damage in this habitat and this was the reason for the one failed monitoring stop. In addition, the remaining ASM saltmarsh across the bay on the northern side also displays signs of damage from infilling. Therefore the assessment was upgraded to *unfavourable-bad*.

Most of this habitat along the southern side of the bay is in generally good condition. This habitat has a typical species diversity and is moderately well-developed at this site. There are several vegetation communities present and zonation of this habitat is also evident and related to the natural saltmarsh topography and the gradient along the shoreline. The ASM forms mosaics with MSM in places. The sward height of most of the ASM was typical and the sward surface was in good condition. Salt-pans are present within this habitat and the saltmarsh topography is moderately well-developed. There is some development of natural unmodified transitional communities at the landward boundary of the ASM. However, much of the landward boundary of the saltmarsh has been modified in the past by land reclamation and this is a negative indicator.

# 5.2.3 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 ASM at this site has been negatively affected by the impacts of grazing and also by infilling in the past. There are signs that some of the remaining saltmarsh along the northern side of the bay will be infilled in the near future. Most of this saltmarsh is located outside the cSAC boundary so there are low prospects for the protection of this habitat at this location. It is likely that the extent of ASM will be further reduced at this site.

The main section of saltmarsh is mostly in good condition. However, there is minor localised poaching and damage by cattle grazing. There is also evidence of an overall erosional trend at this site. However, the rate of erosion is likely to be quite low. There was no measurable loss of saltmarsh from a comparison of the various OSI aerial photos series available.

# 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 loss of habitat due to land-use changes or erosion within the current monitoring period.

# 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Three monitoring stops were carried out in this habitat and all three stops passed. All of the attributes required for the structure and functions of this habitat reached their targets for each monitoring stop. This habitat is in relatively good condition and contains several different vegetation communities. The species composition and diversity of this habitat was typical of this habitat. The sward structure was also in good condition. This habitat is grazed but there are few signs of significant grazing damage compared to the ASM.

The saltmarsh topography is moderately well-developed in this habitat and there are several large salt pans present in the largest sections. Much of the landward boundary of the saltmarsh has been modified by the development an earth-bank along part of the upper boundary and development of adjacent grassland. However, there is still some un-modified transition of MSM to brackish and terrestrial vegetation types, particularly towards the eastern side of the site.

# 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts and activities negatively affecting the MSM at this site. The intensity of grazing at the site is not affecting MSM to the same extent as the ASM. There is also evidence of an overall erosional trend at this site. However, the rate of erosion is likely to be quite low. There was no measurable loss of saltmarsh from a comparison of the various OSI aerial photos series available. ASM is generally found at the seaward side of the MSM and shields most of this habitat, apart from the narrow fringe of vegetation towards the east of the site.

# **6 MANAGEMENT RECOMMENDATIONS**

There are no management recommendations for this site

# 7 **REFERENCES**

None available

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	0.837		0.837			
4	1410 Mediterranean salt meadow	0.376			0.376		
5	ASM/MSM mosaic (50/50)	0.100		0.050	0.050		
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	1.889					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)						
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	3.202		0.887	0.426		

# Table 8.1. Areas of SMP habitats mapped using GIS.


# Ballymacoda

# **1 SITE DETAILS**

SMP site name: Ballymacoda		SMP site code: SMP0	SMP site code: SMP0055			
Dates of site visit 27&28/09/2007		CMP site code: 54				
SM inventory site nam	ne: Ballymacoda	SM inventory site code	e: <b>200</b>			
NPWS Site Name: Ba	Illymacoda (Clonpriest 8	& Pillmore)				
NPWS designation	cSAC: 77	MPSU Plan: <b>N/A</b>				
	pNHA: <b>78</b>	SPA: <b>4023</b>				
County: Cork		Discovery Map:	Grid Ref: 206500, 073000			
Aerial photos (2000 se 6393-C; O 6347-C,D	eries): O 6392-A,B,C,D; C	<b>0</b> 6 inch Map No: <b>0 625</b>	6 inch Map No: <b>O 6254-C; (O 6253-D)</b>			
Annex I habitats curre	ntly listed as qualifying int	terests for Ballymacoda c				
<ul> <li>H1310 Salicornia and other annuals colonizing mud and sand</li> <li>H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)</li> <li>H1410 Mediterranean salt meadows (Juncetalia maritimi)</li> </ul>						
Other SMP sites withi	n this SAC/NHA: <b>N/A</b>					
Saltmarsh type: Estuary Subs		Substrate type: Mud				

# 2 SITE DESCRIPTION

Ballymacoda Estuary is located near the eastern border of Co. Cork 5 km, south-west of Youghal Town. The estuary flows into Youghal Bay. The Womanagh River flows into this estuary, which widens out and contains a significant area of intertidal flats, saltmarsh and other habitats before the channel narrows again and flows into the sea. The estuary is sheltered from the outer bay by two sand dune spits. The landscape around this area is low-lying and dominated by farmland. Several other smaller rivers and streams flow into the estuary. A substantial area of the land adjacent to the estuary has been reclaimed in the past and there are tall berms along the edges of the estuary shoreline. These berms extend along the Womanagh River. The estuary forms part of a larger coastal system and sand dunes have developed on either side of the narrow channel connecting the estuary to the outer Youghal Bay. There is scattered habitation around this area and Ballymacoda Village is located to the south of the estuary.

Saltmarsh has developed in several areas in this estuary and were surveyed as a series of sub-sites. Saltmarsh has developed on the landward side of the sand dunes on the eastern side of the estuary. There is also several saltmarsh 'islands' within the estuary that contain estuarine channels on both sides at Clonpriest East. Saltmarsh is also present along the western side of the estuary and extends northwards into 'The Duck'. Newly forming saltmarsh is developing in former agricultural farmland in the north-west corner of the site near Crompaun Bridge.

This is the largest site surveyed in Co. Cork and one of the largest sites surveyed during the Saltmarsh Monitoring Project. The survey site includes the whole of the estuary south of the

Crompaun Bridge. The tidal influence extends further north along the Womanagh River for a about 4 km. However, this area was not surveyed due to time constraints. The aerial photo series indicate that there may be some Annex I habitat along the river channel, but most of the habitat is likely to be brackish and dominated by non-Annex I habitat types (such as Common Reed and Sea Club-rush). Several of the smaller saltmarsh 'islands' within the estuary were not surveyed due to access problems (a significant length of soft tidal mudflat had to be crossed to access these areas).

This site is located within Ballymacoda (Clonpriest & Pillmore) cSAC. This small cSAC includes the intertidal parts of the estuary, coastal habitats, adjacent grasslands and part of the outer bay. The intertidal flats of the estuary and the adjacent grasslands are also used by notable numbers of wintering waterfowl. Three Annex I saltmarsh habitats are present at Ballymacoda, *Salicornia* flats, Atlantic salt meadows and Mediterranean salt meadows. All three saltmarsh habitats are listed as qualifying interests for this cSAC. There is also a significant area of *Spartina* swards on the intertidal flats at this site, although this habitat is not considered as an Annex I habitat any more. Ballymacoda has also been surveyed by the Coastal Monitoring Project. This survey mapped the sand dune habitats on either side of the narrow channel at Ring Point and beach habitats along Youghal Bay.

Most of the saltmarsh habitat mapped at this site is located within the cSAC boundary. Small amounts of habitat are excluded. This is mainly because the upper shoreline boundary on the OSI 6 inch map was used as the cSAC boundary and saltmarsh habitat extends beyond this boundary at several locations. A berm has been breached at one of these locations and saltmarsh has developed behind the berm in previously reclaimed land excluded from the cSAC. Some saltmarsh is also present in an exclusion for a football pitch from the digital cSAC boundary located at the north-east corner at Pilmore.

This site is listed as a 'lagoon' type site in the SM inventory (Curtis and Sheehy-Skeffington 1998). However it is more typical of a sandflats type site as most of the saltmarsh within the survey site does not shows significant estuarine influences. A 'lagoon' type saltmarsh develops where saltmarshes have is present along edges of lagoons or areas that have developed behind sand/shingle bars that have a restricted tidal influence (Curtis and Sheehy-Skeffington (1998). Brackish vegetation is more typical of these saltmarsh types.

The site is notable for the presence of Borrer's Saltmarsh-grass (*Puccinellia fasciculata*). This species was recorded in the former farmland recently re-flooded by the tide near Crompaun Bridge. This species is listed on the Flora Protection Order and is also listed in the Red Data Book. This species is found in more brackish conditions than found in typically 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 also an indicator of a rarer sub-type of MSM. This species is only found from seven 10 km<sup>2</sup> squares along the Barrow Estuary, Wexford and Dublin shorelines since 1960 with the most westerly record in the past 20 years being the Barrow Estuary (Wexford) (Preston *et al.* 2002). This site was previously unknown as a location for this species. It has been found further south-west at Commoge tidal Lagoon in Kinsale and has been re-recorded at this site in 2006 (O' Mahony 2007).

# **3 SALTMARSH HABITATS**

#### 3.1 General description

Saltmarsh has developed at several locations around the Ballymacoda Estuary. These are described as a series of sub-sites. The main saltmarsh habitat is Atlantic salt meadows (Table 3.1) with much smaller amounts of *Salicornia* flats and Mediterranean salt meadows being present. A significant amount of *Spartina* swards has also developed, mainly on former intertidal mudflats.

#### Pilmore

This saltmarsh has developed behind a smaller sand spit at the north-east corner of the estuary. Originally, there was a band of saltmarsh dominated by ASM along the back of this sand spit on a moderate sloped shoreline. This saltmarsh has a poorly developed topography. The sand dune spit and saltmarsh has grown in length compared to the extent marked on the 2<sup>nd</sup> edition six inch map. This saltmarsh is an excellent example of saltmarsh zonation and is dominated by a low-mid marsh Sea Purslane sward. There is a natural unmodified transition between the sand dune habitat and the upper saltmarsh boundary. This transition zone contains Sea Purslane, Red Fescue, Lax-flowered Sea Lavender, Common Scurvy-grass and Sand Couch (*Elytrigia atherica*). There has been significant expansion of saltmarsh habitat at this location due to a combination of accretion, natural habitat transition and the colonisation of Common Cordgrass.

The northern estuary shoreline has been significantly modified by the construction of a seawall. A large part of the intertidal flats enclosed between the sand spit and the estuary seawalls has been infilled with *Spartina* swards. This has created a mosaic of dense *Spartina* sward, *Sptina* sward/ASM mosaic and ASM where there has been some natural succession. A deep tide intertidal creek winds its way through this saltmarsh. There is some development of *Salicornia* flats along the edge of the more established saltmarsh.

A small brackish area is located on the east side of this sub-site on the landward side of the seawall, adjacent to the sluice. This small area contains some Sea Rush and was classified as a mosaic of ASM and MSM.

#### Ringpoint

This saltmarsh is a sandflat type saltmarsh and has developed along the back of the larger sand dune system at Ring Point. The eastern boundary is adjacent to the sand dunes while the southern boundary is adjacent to farmland. There is some transitional vegetation along the upper saltmarsh boundary with a band of Twitch and Sea Club-rush is also present in places. It has developed on thick mud. This saltmarsh is quite uniform and is made up of ASM. There is very little Common Cordgrass on this saltmarsh and it is confined to some of the large salt pans. The main vegetation communities are lower marsh Sea Purslane stands and a typical mid marsh *Armeria-Plantago* sward. The development of the saltmarsh salt pan topography is excellent with frequent large shallow pans present. Sea Purslane dominates along the edges of the large drains and the salt pans in this saltmarsh.

There is frequent evidence of old land use and reclamation attempts with several deep wide drains through the saltmarsh. These drains have modified the natural creek morphology, but some creeks are still present. Some of the small drains have partially infilled. This saltmarsh looks like it was reclaimed on the 1<sup>st</sup> edition OSI 6 inch map. An old incomplete sea

wall/embankment is located along the seaward boundary of this saltmarsh. There are small patches of *Salicornia* flats associated with the intertidal banks adjacent to the seawall. The saltmarsh narrows into a very narrow strip of habitat that extends along the sand dunes to the tip of Ringfort. There is natural unmodified zonation along this narrow strip of habitat between *Salicornia* flats, the ASM and the adjacent fixed dune habitat.

# The Duck

The Duck is known as the northern part of the estuary and is a narrower inlet. This saltmarsh is much more dispersed along the estuary shoreline and is mainly found on the western shoreline north of a small hill. The eastern and northern shorelines are significantly modified by the construction of a seawall and land behind the seawall is low-lying. The saltmarsh is mainly a mosaic of *Spartina* swards and ASM. Some MSM has developed along the landward side of the more established ASM in part of this saltmarsh and the shoreline north of the hill has not been modified by the creation of a seawall. There are several ASM saltmarsh 'islands' in the intertidal area that are isolated from the main saltmarsh. Much of the intertidal flats in The Duck contains scattered clumps of Common Cordgrass at various densities. Common Cordgrass seems to be spreading on the mudflats at this location.

#### **Clonpriest East**

This saltmarsh includes saltmarsh that has developed along the western shoreline of the estuary and a large 'island' dominated by saltmarsh.

The island contains a significant area of established saltmarsh and is dominated by ASM with a smaller amount of MSM. There is a narrow deep intertidal channel between the mainland and the island with *Spartina* swards on both sides. There is a small terrestrial grassy ridge dominated by Twitch and Sea Couch also present on this island. A small patch of Bramble is also present on higher ground. This established area has a well-developed saltmarsh topography with salt pans and creeks. This established area is marked as an island on both the 1<sup>st</sup> and 2<sup>nd</sup> edition OSI 6 inch maps and there is a significant contrast between the established saltmarsh and the more recently formed saltmarsh on the aerial photos. This area contains complex internal zonation of vegetation related to the various different heights of the creeks, pans and low mounds. *Spartina* swards are developing on the eastern side of this island, which is accreting. This younger area also contains extensive pioneer ASM and *Salicornia* flat saltmarsh communities.

Saltmarsh has also developed on the main shoreline along Clonpriest East. This saltmarsh generally contains a band of *Spartina* sward along the seaward edge of ASM. Saltmarsh has developed behind an old berm in a formerly reclaimed area and a large area of *Spartina* swards and smaller amounts of *Spartina* sward/ASM mosaic has developed that is surrounded by a narrower band of ASM. The berm is covered with Twitch-dominated vegetation. Further north a small hill is present and this is one of few parts of the estuary shoreline that has not been modified by the development of seawalls. There is some development of brackish vegetation on the landward side of the ASM at this location, dominated by Sea Club-rush. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project. Twitch (*Elytrigia repens*)-dominated grassland was also classified as other saltmarsh (CM2). There is a significant area of *Salicornia* flats developed along the shoreline further north along the edge of the hill.

#### Near Crompaun Bridge

This newly forming saltmarsh is mainly found behind the berm on the eastern side of the main channel. This area was formerly reclaimed for agriculture and contained improved grassland. However the berm was breached during storms around 2000. Attempts at repairing the berms failed and there are now several breaches that allow an extensive low-lying area to be inundated by the tide. A comparison of the aerial photo series in 2000 and 2005 shows the continued development of mudflats and saltmarsh behind the berm during this period. Some field boundaries and hedgerows have also been inundated and there are standing dead scrub areas still present along some of these old boundaries. There is no evidence of any former saltmarsh topography within this area.

Much of this area now contains bare intertidal mudflats. A band of saltmarsh about 10-20 m wide is developing around the outer extent of the tidal inundation. This saltmarsh is quite immature and the sward is quite open. It is mainly dominated by ASM, but there is small patches of pioneer saltmarsh dominated by *Salicornia* flats. Common Cordgrass is present but is generally found at low cover values. This saltmarsh is notable for the presence of Borrer's Saltmarsh-grass, which is widely distributed along the band of saltmarsh. A larger area of saltmarsh has developed at the northern end and this is dominated by a mosaic of ASM and newly colonising *Spartina* sward.

A small more established saltmarsh is present on the estuary side of the berm at the southern end of this area. This saltmarsh is dominated by ASM and is surrounded by a band of *Spartina* swards. A band of Twitch-dominated vegetation marks the transition along the upper saltmarsh boundary adjacent to the berm.

#### **Other locations**

Saltmarsh has also developed at other locations around the estuary with the largest area found on a small island at the south-west corner of the estuary. This saltmarsh was not surveyed. Small patches of ASM and *Spartina* sward are present on both sides of the main estuary channel along the berms towards Crompaun Bridge.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	1.565
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	27.058
1410	Mediterranean salt meadows (Juncetalia maritimi)	1.704
non-Annex	Spartina swards	15.570
	Total*	45.897

**Table 3.1.** Area of saltmarsh habitats mapped at Ballymacoda.

<sup>\*</sup> note that saltmarsh habitat may continue outside the mapped area.

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

This habitat is found at several locations around the estuary. There are no large patches of this habitat but added together they make a notable extent (1.5 ha) of this habitat (in a national context). Accretion within the estuary promotes the current extent of this habitat. The largest areas are found at Pilmore and along the western shoreline at Clonpriest East and The Duck. *Salicornia* flats at Pilmore are dominated by Glasswort spp. (*Salicornia europaea* agg. and *Salicornia decumbans* agg.), and also contain Annual Sea-blite. It

develops on intertidal mud along the steep edges of the main creek and on the seaward side of ASM and *Spartina* sward. There are scattered small clumps and seedlings of Common Cordgrass within this habitat. *Salicornia* flats have developed on a similar habitat along the east side of the island at Clonpriest East. There are frequent clumps of common Cordgrass found in this habitat.

*Salicornia* flats have developed on sand along the estuary shoreline south of The Duck. This area is likely to be quite dynamic due to the narrow channel between the mainland and the large island at Clonpriest East.

This habitat is vulnerable to the further spread of Common Cordgrass in the estuary, particularly in The Duck and along the east side of the island at Clonpreist East. Both these locations are immature and Common Cordgrass is still spreading. *Salicornia* flats is likely to still persist in Pilmore as this sward is more established and the *Salicornia* flats is confirmed to the main creek, which will not be vegetated by Common Cordgrass due to water movements and its topographical position. This habitat is also likely to persist on the sandy substrate south of the Duck, as this substrate is less suitable for Common Cordgrass.

# 3.3 Atlantic salt meadows (H1330)

ASM is the dominant saltmarsh habitat found at this site and its extent is notable in a regional context (25 ha). Due to its relatively large extent and the fact that saltmarsh has developed on different substrates and in different situations this habitat is quite diverse and a range different communities are present.

Pioneer ASM is frequently found at this site. Some typical pioneer ASM with some Common Cordgrass is present in the damaged area within the small saltmarsh at the west side of the estuary. Common Saltmarsh-grass, Glasswort, Sea Aster, Sea Pink and Sea Purslane are all colonising an area that is still dominated by bare mud cover.

Pioneer vegetation is also found behind the berm in the saltmarsh near Crompaun Bridge. The vegetation at the southern end is the best developed and starting to display some typical zonation. An upper zone dominated by Red Fescue is present, while there is a central zone dominated by Saltmarsh Rush and a lower pioneer zone dominated by Sea Plantain and Common Saltmarsh-grass. The upper boundary of this saltmarsh is not marked definitely as a change in vegetation and there are clumps of Hard Rush within the upper zone in places. This probably indicates the immaturity of this vegetation type.

The ASM developing in a narrow band towards the northern end near Crompaun Bridge is still quite open with frequent bare mud cover. Mud is being colonised by a mixture of Common Saltmarsh-grass, Sea Club-rush, Greater Sea-spurrey, Lax-flowered Sea Lavender, Sea Plantain, Spear-leaved Orache and Saltmarsh Rush. There is no significant zonation yet. Glasswort forms some small patches along the lower boundary in places. Green algae are occasionally quite extensive in cover. Common Cordgrass is quite rare within this zone. Some of this saltmarsh has been poached by cattle but most is not grazed extensively.

The most typical ASM community found at this site is a lower-mid marsh community dominated by Sea Purslane. This is seen at Pilmore where a band of this vegetation extends along the upper boundary of the adjacent *Spartina* sward and along the sand spit. Zonation is well-developed at this sub-site and there is a gradual increase in the extent of Common Cordgrass on a moderate gradient towards the *Spartina* swards. This Sea Purslane

community contains more frequent Common Saltmarsh-grass, Sea Aster and Glasswort at its lower boundary.

The saltmarsh at Ringport is dominated by mid marsh communities. This saltmarsh is quite flat and there is a mosaic of *Armeria-Plantago* sward and a low-mid community dominated by Common Saltmarsh-grass and Sea Aster created by subtle differences in surface topography. These communities also contain Lax-flowered Sea Lavender. Sea Purslane is also frequently found around the salt pans and the wide drains within this saltmarsh. There is some development of a zone dominated by Saltmarsh Rush towards the back of the marsh and there is a tiny area dominated by upper marsh Red Fescue at the south-west corner of the sub-site. A very narrow band dominated by Creeping Bent and containing Common Scurvy-grass, Sea Milkwort and Autumn Hawkbit marks the upper boundary of the ASM.

# 3.4 Mediterranean salt meadows (H1410)

The largest extent of this habitat is found on the island at Clonpreist East. This saltmarsh is well-established and has a well developed saltmarsh topography. There is some saltmarsh dominated by dense Sea Rush. This is a typical grassy upper MSM community and is located along the terrestrial grassy ridge and represents one of the upper saltmarsh communities in the overall saltmarsh zonation. Neither of these areas was grazed and a tall sward height is present. Other species present include frequent Red Fescue and smaller amounts of Creeping Bent, Saltmarsh Rush, Common Scurvy-grass, Sea Milkwort, Sea Plantain and Sea Arrowgrass. Curled Dock is also present on some mounds.

A similar community is also found in the established saltmarsh along the west side of The Duck. This community also contains Parsley Water-dropwort and Distant Sedge. Sea Rush occasionally extends its distribution into a transitional zone landward of the MSM that is dominated by Twitch.

There is also some mosaic type vegetation present with less frequent cover of Sea Rush inter-mixed with a mid marsh *Armeria-Plantago* sward. The Sea Rush clumps are present on small grassy tussocks with Red Fescue and Sea Milkwort. Other species present in this vegetation community include Sea Aster, Lax-flowered Sea Lavender, Saltmarsh Rush and Sea Purslane. This community has a well-developed salt pan topography. Common Cordgrass is rarely found within this community within some of the pans.

A rarer sub-type of MSM with Borrer's Saltmarsh-grass as an indicator species is present at this site (0.203 ha). This species is found in the newly developing saltmarsh behind the berm near Crompaun Bridge. The Borrer's Saltmarsh-grass is found in a fairly open sward on bare mud in association with Sea Pink, Greater Sea Spurrey, Glasswort, Lax-flowered Sea Lavender, Sea Aster, Creeping Bent, Saltmarsh Rush and Common Saltmarsh-grass. Without the presence of Borrer's Saltmarsh-grass, this vegetation type is a typical ASM sward. Common Cordgrass is present but is found rarely in this zone. Borrer's Saltmarsh-grass is generally found in a narrow zone (2-4 m wide) along this new saltmarsh (overall 10-15 m wide) towards the upper limit but not exclusively at this limit. This vegetation community is still developing and can be considered to be pioneer vegetation. Borrer's Saltmarsh-grass is found occasionally within this zone. A zone dominated by Red Fescue and Twitch and also containing Silverweed and Spear-leaved Orache is developed along the upper limit of this vegetation type. Borrer's Saltmarsh-grass is found rarely within this zone. The development of wet grassland dominated by Hard Rush marks the upper saltmarsh limit.

A small area towards the west side and close to a newly dug channel draining adjacent farmland is dominated by Borrer's Saltmarsh-grass. While Borrer's Saltmarsh-grass is found only rarely or occasionally overall within this area, this is the most extensive population of this species recorded during the SMP in terms of the frequency of the plant. Common Saltmarsh-grass is out-competing the Borrer's Saltmarsh-grass in places due to its vegetative growth. It could be considered that if this sward is allowed to mature, then the status of Borrer's Saltmarsh-grass may be threatened. Heavy grazing would be beneficial to this species by maintaining an open sward (this area was not grazed in 2008).

# 3.5 *Spartina* swards

Common Cordgrass forms extensive swards at this site. It has mainly formed swards on the intertidal mud. These swards are in various stages of development and the swards at Pilmore are the most established. A substantial area of this sward is a dense monoculture of Common Cordgrass. However, there are also some mosaic type areas and this is an indication of succession of this sward to ASM occurring with the appearance of frequent Common Saltmarsh-grass, Sea Purslane, Annual Sea-blite and Glasswort into this sward. The cover of Common Cordgrass varies from being quite sparse in places to becoming dominant. This natural saltmarsh succession may be developing in association with accretion within the estuary. Sea Purslane also extends along the creek edges within the *Spartina* sward at Pilmore. There are small patches of Glasswort (*Salicornia* flats) in places along the seaward boundary of the *Spartina* sward in various places around the estuary.

Some of these swards are much younger and are still spreading. *Spartina* swards around the island at Clonpriest East are quite open and the clumps are still coalescing. There is also happening to some extent at The Duck. This area also contains scattered clumps of Common Cordgrass at low densities (< 1% cover) that probably will eventually coalesce to form swards.

There are frequent examples of transitional vegetation between ASM and *Spartina* sward at this site. Some of this vegetation is found at Pilmore on a well-zoned saltmarsh along the landward boundary of the *Spartina* sward. This transitional zone contains frequent Common Cordgrass, but also contains frequent common Saltmarsh-grass and Sea Purslane. Other species present include Sea Aster, Greater Sea-Spurrey, Glasswort and Annual Sea-blite. Other transitional vegetation is found north of the island at Clonpreist East. However, this is a pioneer saltmarsh community and is characterised by an open sward of patches of Common Cordgrass, Glasswort, Common Saltmarsh-grass and Sea Purslane.

Natural unmodified transitions are also found between *Spartina* sward and *Salicornia* flats. Usually the *Salicornia* flats appear as a band alongside the edge of the dense *Spartina* sward. A small area located at Pilmore was mapped as a mosaic of *Spartina* clumps and *Salicornia* flats and this area contains frequent clumps within an area of mud dominated by Glasswort.

# 4 IMPACTS AND ACTIVITIES

This large site is affected by a range of impacts and activities (Table 4.1). Most of the saltmarsh is not grazed by livestock. However, there are multiple landowners around the site and small area of ASM is grazed along the north-west side of The Duck (140). Some sections are overgrazed and badly poached (143). Saltmarsh located behind the berm at Clonpriest East was grazed. Some of the saltmarsh developing behind the berm near

Crompaun Bridge was cut for silage (102). This saltmarsh is developing adjacent to improved grassland. There are indications that this saltmarsh near Crompaun Bridge was grazed in the past (wire fences preventing accessing to the soft mudflats area) but there has been no grazing this year. A small area of saltmarsh south of this area has been recently damaged by the extraction of earth or mud (302) possibly for the repair of the adjacent berms. This area is now recolonising and contains pioneer saltmarsh but frequent wheel ruts are still present.

#### **Common Cordgrass**

Common Cordgrass is present at this site and is an invasive species of saltmarsh and mudflats (954). It is not known when this species colonised or was planted in Ballymacoda Estuary but it has been planted since the 1960s (Nairn 1986). Notes from NPWS site files state that is has established since the late 1970's. This species has now formed extensive swards (about 15 ha) in the estuary including some mosaic areas with ASM. Most of these swards have colonised on formerly unvegetated mudflats. These mosaic areas may indicate some succession from *Spartina* swards to ASM due to natural saltmarsh succession (990), especially as these saltmarshes have developed on former intertidal mudflats and there is evidence of accretion. There probably has been some colonisation by Common Cordgrass of the lower ASM at various places around the site, including Pilmore and the small saltmarsh at the western side of the estuary (south of Crompaun Bridge).

There is evidence that *Spartina* swards will continue to grow in extent in the estuary in the future. Scattered clumps of Common Cordgrass are frequently found on the mudflats within The Duck and these are increasing in extent from a comparison of the 2000 and 2005 aerial photo series. The spread of *Spartina* sward will be at the expense of intertidal mudflats.

There is no evidence that Common Cordgrass has spread significantly during the current monitoring period at the expense of ASM. There is a substantial amount of *Spartina* sward/ASM mosaic habitat present (3.7 ha) and some of this habitat developed as a result of succession from *Spartina* swards. Some pioneer saltmarsh vegetation has developed with a combination of Common Cordgrass and ASM species within the current monitoring period (saltmarsh near Crompaun Bridge). This saltmarsh can be considered to be negatively impacted by an invasive species within the current monitoring period. This is the main reason for an assessment of the presence of Common Cordgrass as having a negative impact on the ASM. It is also present within the *Salicornia* flats where seedlings are present.

#### **Coastal protection and reclamation**

Much of the estuary shoreline has been significantly modified in the past by the construction of sea walls and this has affected the saltmarsh within the estuary. Significant areas of saltmarsh located behind the sea walls have been reclaimed in the past 150 years. Some of the smaller rivers flowing into the estuary were tidal for some distance upstream, but this tidal influence has been reduced by the creation of sluices. Some of the existing saltmarsh has been reclaimed in the past but has reverted back to saltmarsh (Ring Point). This saltmarsh has been significantly modified by drainage. The berms on the east side of the estuary are well-maintained and have been modified in the past 10 years (870). There has been some dumping of material on the west side of The Duck along the edge of the saltmarsh for the purposes of coastal protection (or possibly waste disposal). This material is loose and does not form an actual structure (871). There are sluices allowing flow from drains and small streams into the estuary from adjacent land.

A storm around 2000 breached the berms on both sides of the river channel near Crompaun Bridge. The western berm was repaired by the OPW due to possible risks to flooding to Ballymacoda Village and the flooded land has been improved and reclaimed in the past 10 years. Attempts were made to repair the berm on the east side of the river by the land owner, but these have failed and there are now large several breaches. This has lead to the development of saltmarsh and mudflats behind the berm.

#### **Accretion and Erosion**

An examination of the various maps available for this site shows that there have been significant changes to the estuary shoreline within the past 150 years. The 1<sup>st</sup> edition OSI six inch map shows that the estuary channel was much wider at this stage and the sand dune spits at Pilmore and Ring Point where much shorter. Both of these spits had grown when the  $2^{nd}$  edition six inch map was drawn and the estuary channel was narrower. Currently the estuary channel is much narrower and both sand dune spits have grown in length in the intervening period. This has influenced the development of saltmarsh around the estuary, particularly at Pilmore. This saltmarsh has grown significantly in size during this period (910) and extended along the back of the new part of the sand spit.

Saltmarsh along the shoreline at Clonpriest East and saltmarsh along the west side of The Duck has grown in size during this period. These changes may be due to natural shifts in sediment deposition within the estuary. The construction of seawalls along large parts of the estuary shoreline and the Womanagh River channel to protect and reclaim adjacent land may have also contributed to changes in the shoreline profile of the estuary within the past 150 years. The presence of these seawalls may mean that sediment loads that would have been deposited along the lower floodplain of the Womanagh River are now deposited within the estuary and this is contributing to accretion and saltmarsh growth (910). Over half the saltmarsh currently found in Ballymacoda Estuary (including *Spartina* swards) has developed in the past 90 years. Accretion is assessed as having a positive impact on the *Salicornia* flats and a portion of the ASM.

The sand dune system at Ring Point has also shifted in position further west in the past 90 years. This is likely to be related to coastal erosion. The shift in position of this sand dune system was reduced the area of the saltmarsh along the back of the sand dunes somewhat, as the seaward boundary of the saltmarsh has not changed during this period and the sand dunes have encroached over the saltmarsh. This is an example of natural habitat transition (990). Some of the sediment eroded from this shoreline may be contributing to the growth of the sand dune spits on both sides of the estuary channel.

There have also been some losses of saltmarsh at various locations during the last 90 years due to erosion (900). These losses have mainly occurred within The Duck where several saltmarsh islands have disappeared. There has been a small amount of erosion along the seaward boundary of the saltmarsh at Ring Point and saltmarsh along the western side of the estuary that could be attributed to natural erosion from the adjacent river channel. However, losses due to erosion are quite minor compared to the growth of saltmarsh within the past 90 years. The impact of erosion is assessed as neutral.

There is no evidence of any significant growth of saltmarsh in the intertidal parts of the estuary during the current monitoring period. However, there were frequent signs of accretion along the eastern boundary of the island during the field survey. *Spartina* swards and pioneer ASM are developing in this area and there is also a significant area of *Salicornia* flats. There

are also signs of continued development of Spartina sward and isolated Spartina clumps in The Duck area on the intertidal flats. However, the evidence presented above suggests there was continued growth of saltmarsh at this site during the current monitoring period and this is likely to continue in the future.

There has been some growth of saltmarsh (990) behind the berm near Crompaun Bridge. This saltmarsh has developed during the current monitoring period with about 2.4 ha ASM and 1.3 ha of Spartina sward/ASM mosaic already developed.

Impacts and activities adjacent to the site include agriculture (102, 120, 140), scattered habitation (403) and roads (502). Related impacts such as runoff from the road may have some impact on the saltmarsh but these impacts are low or not detected.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	910	С	+ 1	1.565	Inside
1310	954	В	-1	1.00	Inside
1330	102	С	-1	0.01	Inside
1330	140	С	0	2.5	Inside
1330	143	С	-1	1.3	Inside
1330	302	В	-1	0.15	Inside
1330	871	С	0	0.005	Inside
1330	900	С	0	0.1	Inside
1330	910	С	+1	0.5	Inside
1330	954	В	-1	4.0	Inside
1330	990	А	+1	2.4	Inside
1410	140	С	0	0.2	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural

positive influence and +2 = strongly managed positive influence.

Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

#### **CONSERVATION STATUS** 5

#### **Overall Conservation Status** 5.1

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. This means it is difficult to assess the impact of the extent of Common Cordgrass cover during the assessment and to assess if this species has spread significantly during the current monitoring period.

Ballymacoda saltmarshes have several features of notable conservation interest. The most important feature is the presence of Borrer's Saltmarsh-grass with the largest population recorded during the SMP survey at a previously unknown location for this species. This species is found in newly forming saltmarsh in an area formerly reclaimed and protected from the tide by an embankment. The presence of a notable area of newly forming saltmarsh is also a significant feature. Saltmarsh in other parts of the estuary has also grown significantly in extent during the past 100 years and there are indications of continued expansion and growth of saltmarsh related to accretion in the future.

Several of the sub-sites display excellent examples of saltmarsh zonation and contain many typical saltmarsh features and saltmarsh plant communities. The relative abundance of Sea Purslane reflects lack of intensive grazing on this site. There is a substantial area of *Spartina* sward in the estuary and the area of this sward is likely to increase in the future at the expense of intertidal mudflats. There are also indications of succession of ASM from *Spartina* sward that developed in previously unvegetated mudflats.

The overall conservation status of this site is *unfavourable-inadequate* (Table 5.1). Most of the saltmarsh is in good condition. However, minor areas have been affected by damaging activities including overgrazing. Common Cordgrass is present at the site and this poses a threat to the *Salicornia* flats in the future. This invasive species is also likely to colonise accreting and newly forming pioneer ASM.

Nearly the entire saltmarsh habitat is located within Ballymacoda (Clonpriest & Pillmore) cSAC. There is no management plan available for this site.

Habitat	EU Conse			
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
<i>Salicornia</i> flats (1310)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (1330)	Extent	Structure and functions, Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (1410)	Extent Structure and functions,	Future prospects		Unfavourable - Inadequate

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at Ballymacoda.

# 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 a notable area of this habitat present at this estuary. There are no indications of any loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. However, there is no accurate baseline data in indicate if *Salicornia* flats were more extensive in the past. This habitat is found adjacent to *Spartina* swards and it is likely that it may have occupied sections of accreting areas within the estuary prior to the development of extensive *Spartina* swards. However, the development of these swards is not assessed as they mainly developed prior to the current monitoring period.

# 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Thirteen stops were carried out in this habitat and they all passed. All the attributes required for the favourable conservation of the habitat reached their targets. This habitat is dominated by Glasswort spp. There is some Annual Sea-blite present. The main impact affecting this habitat is the presence of Common Cordgrass, an invasive species. This species was found in 10 out of 13 stops, generally at very low cover (< 1%) but sometimes higher (10-20%). Small clumps and seedlings are present at various locations around the site. The presence of seedlings indicates that Common Cordgrass is spreading within this habitat so the conservation assessment is revised as *unfavourable-inadequate*. There are few other impacts affecting this habitat at this site. This habitat is developing on accreting muddy banks. Accretion within the estuary is likely to be beneficial to this habitat.

# 5.2.3 Future prospects

The future prospects of the habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in the near future. Common Cordgrass is present at in this habitat at low densities and this habitat is also located adjacent to *Spartina* sward. This species is likely to continue to spread in the future at the expense of *Salicornia* flats habitat, especially in the areas where there are frequent seedlings present. It should also be noted that *Salicornia* flats habitat is a pioneer saltmarsh habitat so some succession to other saltmarsh habitats could be expected. Continued accretion is required to maintain the current extent of this habitat so changes in sedimentation patterns could affect the status of this habitat. There are few other impacts or activities that can negatively affect 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 loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. Common Cordgrass is a prominent part of the lower marsh ASM vegetation, especially at Clonpreist East, Pilmore and The Duck and some mosaic *Spartina* sward/ASM areas have developed. Some of these are likely to have developed where Common Cordgrass has invaded lower marsh ASM. Other mosaic areas have developed where there is succession to ASM from the original *Spartina* sward that developed on intertidal mud. Common Saltmarsh-grass, Sea Purslane and other species are spreading into this habitat at various locations, especially at Pilmore.

There is significant evidence of the growth of saltmarsh including ASM (possibly doubling in extent) in the past 100 years. This is a positive indicator. Some of the ASM is relatively young and immature. There has also been measurable growth of the saltmarsh within the current monitoring period in the saltmarsh found behind the berm near Crompaun Bridge.

# 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Thirtyfour monitoring stops were carried out in this habitat and all the stops passed bar one stop. All the attributes required for the favourable conservation of the habitat generally reached their targets. Most of the saltmarsh is in good condition and is not grazed. However, several small areas were damaged by over-grazing.

The ASM at this site has a typical species assemblage. There are several ASM communities present including typical communities of mud and sandy substrates. There are excellent examples of ASM zonation at this site as well as natural transitions to other saltmarsh habitats. Some of the ASM is relatively young and immature and there is also a significant area of pioneer ASM at several locations around the estuary, especially at Clonpriest East Island and in the new saltmarsh behind the berm. The saltmarsh topography is well-developed in several of the sub-sites. The sward height is quite variable and is related to the variation in ASM plant communities.

Common Cordgrass is present in this habitat (a negative indicator for species composition), and is a prominent part of the lower marsh communities in places. There are several areas where Common Cordgrass has formed a mosaic with the ASM. However, there is no evidence of any significant expansion of Common Cordgrass within the ASM within the current monitoring period so the impact of its spread is assessed as neutral.

# 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. Most of the habitat is in good condition although there are some minor areas being damaged by grazing or other activities. There are few significant damaging activities affecting the ASM around the estuary. Most of the habitat is located within the cSAC boundary so the habitat should not be affected by any land-use changes that have to be licensed by local or national authorities. There are prospects for further growth of ASM in the area behind the embankment near Crompaun Bridge. The land-owner has stated his intentions to repair the embankment and reclaim this land in the future.

Common Cordgrass is present at this site and is found on the ASM. There may be some potential for the spread of this species into this habitat in the future, especially in the ASM/*Spartina* sward mosaic areas. This is likely to happen in the immature saltmarsh at Clonpriest East Island and behind the berm near Crompaun Bridge, where there is a significant area of pioneer ASM. However, not all the ASM is vulnerable to the spread of this species. There is likely to be some continued succession of ASM from *Spartina* sward, although at a slow rate. There is also significant evidence of accretion and growth of saltmarsh in the estuary, which is also likely to promote the expansion of the ASM.

# 5.4 Mediterranean salt meadows (H1410)

# 5.4.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. The more typical form of MSM dominated by Sea Rush has not been affected by accretion or the spread of Common Cordgrass within the estuary.

The development of the saltmarsh behind the embankment near Crompaun Bridge has lead to the development of the rarer sub-type of MSM with Borrer's Saltmarsh-grass as an indicator species. This saltmarsh has developed within the current monitoring period.

# 5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Eight stops were carried out in this habitat and they all passed. All the attributes required for the favourable conservation of the habitat reached their targets. This habitat (typical form dominated by Sea Rush) is in good condition. It contains a typical species assemblage. The habitat is not grazed and there is variable sward height. There is some zonation within this habitat and there are also natural unmodified transitions to other habitats. The saltmarsh on the island at Clonpreist East is not affected by any impacts or activities. Common Cordgrass is present in this habitat but is quite rare and is confined to creeks and salt pans on the island.

This site is notable for the development of the rarer sub-type of MSM with Borrer's Saltmarshgrass as an indicator species. This site contains the largest population of this species recorded during the SMP and it is located at a site that is previously unknown for this species. The Borrer's Saltmarsh-grass is present in a narrow band of saltmarsh developing along the upper extent of tidal inundation in the area behind the embankment.

# 5.4.3 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 no impacts or activities significantly affecting the typical form of this habitat. The typical form of habitat is not vulnerable to the spread of Common Cordgrass. This habitat is less likely to increase in extent due to the overall growth of the saltmarsh in the estuary but this may occur in the longer-term.

The rarer sub-type of MSM with Borrer's Saltmarsh-grass as an indicator species is thriving at present with the largest population recorded during the SMP found at this site. One of the main reasons is that this saltmarsh is relatively immature and at a pioneer stage. This species prefers disturbed conditions and an open sward, so it is likely to be reduced in frequency as the saltmarsh naturally matures and the sward becomes denser. Borrer's Saltmarsh-grass will not compete with other saltmarsh species such as Common Saltmarsh-grass. This site was not grazed intensively during 2008. Heavy grazing levels would promote the conservation status of this species by introducing disturbance and creating the microhabitats with bare mud that this habitat prefers. The long-term absence of grazing would have a negative impact on the status of this species by promoting the development of denser closed sward.

This species and habitat is also threatened if the embankments are repaired and the land behind the embankments is reclaimed again in the future.

# **6 MANAGEMENT RECOMMENDATIONS**

NPWS should put a management programme in place to protect the new saltmarsh with Borrer's Saltmarsh-grass that is developing behind the old berm in the north-west part of the site. NPWS could also look at purchasing this site and leasing it back to farmers for grazing. Grazing levels should be moderate-heavy to help maintain an open and disturbed sward, which is preferred by Borrer's Saltmarsh Grass. The current owner plans to eventually fix the breaches in the berms and this would destroy this site by excluding the tidal influence.

# 7 REFERENCES

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# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats	1.553	1.553				
2	Spartina swards	13.567					13.567
3	1330 Atlantic salt meadow	25.134		25.134			
4	1410 Mediterranean salt meadow	1.631			1.641		
5	ASM/MSM mosaic (50/50)	0.146		0.073	0.073		
6	ASM/Spartina mosaic	3.702			1.851		1.851
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	42.929					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)	2.814					0.141
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic	0.023	0.012				0.012
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)						
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic	0.473					
	Total	91.972	1.565	27.058	1.704		15.57

Table 8.1. Areas of SMP habitats mapped using GIS.





6

Comnehabl, Oldhrosofit agus Hiaitas Áituit Emvlianment, Heitiage and Local Government

National Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

1014115 13

Ballymacoda (Map 2 of 3)

Ballymacoda SAC (000077)

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# Legend



Comnehabl, Oldhreacht agus Hiattas Áthuir Emvlianment, Heittage and Local Government

National Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

# Ballymacoda (Map 3 of 3)

Real Property in

Ballymacoda SAC (000077)



# **Ballyrisode House**

# 1 SITE DETAILS

SMP site name: Ballyrisode House		SMP site code: SMP0065				
Date of site visit: 17/06/2008		CMP site code: N/A				
SM inventory site name: Ballyrisode House			SM inventory site code: 181			
NPWS Site Name: N/	A					
NPWS designation	cSAC: N/A		MPSU Plan: <b>N/A</b>			
	pNHA: <b>N/A</b>		SPA: <b>N/A</b>			
County: Cork			Discovery Map: 88	Grid Ref: 084370, 030720		
Aerial photos (2000 series): O 6783-A			6 inch Map No: Co 14	48		
Other SMP sites withi	n this SAC/NHA: <b>N/A</b>					
Saltmarsh type: Fringe		Subs	strate type: <b>Peat</b>			

# 2 SITE DESCRIPTION

Ballyrisode House saltmarsh is located in south-west Co. Cork, 8.5 km west of Skull Town and 12.5 km north-east of Mizen Head. The landscape of this area is characteristic of West Cork and has a complex hilly topography. It is dominated by a mosaic of habitats including dry heath, wet heath, wet grassland, exposed rock and scrub, and most of the land is unimproved. There are scattered dwellings along the main road and Ballyrisode House is located on the west side of the bay. The site is located in one of the main inlets of Toormore Bay. The main regional road (R591) crosses this inlet at Ballyrisode Bridge and divides the site into two main sections. A small stream flows into this inlet from the adjacent hillside.

Most of the saltmarsh habitat has developed along the head of the inlet where the stream enters the bay. This section is 'cut off' from the main bay by the regional road and bridge, although the stream flows under bridge. A minor road is found along the western side of this inlet. Some intertidal mudflats are exposed at low tide north of the bridge.

Some saltmarsh is also found along sheltered low-lying parts of the shoreline of the outer bay. The main habitat around the shoreline in the outer bay is exposed rock leaving few opportunities for saltmarsh development. There are extensive intertidal mud and sand flats and exposed rock outcrops within the outer inlet. Part of the bay adjacent to the main road has also been cut off by an embankment accessing some private property, creating a small lagoon with several saltmarsh 'islands'.

This 'lagoon' was filled during the time of the survey, leaving these islands inaccessible. Oliver (2005) classified this area as an artificial lagoon (Toormore Lagoon), created by the construction of the embankment. This lagoon has a relatively high salinity range due to tidal flushing over the embankment.

This site is not located within a designated area. Two Annex I saltmarsh habitats are present at Ballyrisode House saltmarsh, Atlantic salt meadow (ASM) and Mediterranean salt meadow (MSM). Several of the other saltmarshes are listed on the SM inventory (Curtis and Sheehy-

Skeffington 1998) and surveyed during the SMP are located nearby. Seafort and Ballybrack are located within 5 km to the east of this site, and Dough and Barely Cove saltmarshes are located 8 km south-west of the site. An additional site, Toormore, is also located nearby in an inlet to the west of this site but was not surveyed during the SMP. This site was originally on the site survey list but very little saltmarsh habitat was present around Toormore Bridge.

The shoreline was accessed from the adjacent regional and minor roads.

# 3 SALTMARSH HABITATS

#### 3.1 General description

The main saltmarsh habitat found at this site is Mediterranean salt meadows (MSM) (Table 1). The MSM has mainly developed on deep peat. Curtis and Sheehy-Skeffington (1998) labelled this site as 'bay' type saltmarsh with a mud substrate. However, most of the saltmarsh is of the 'fringe' type. This is typically seen north of the main road where a thin band of saltmarsh dominated by dense Sea Rush (*Juncus maritimus*) vegetation is found along the shoreline with a tall saltmarsh cliff marking the lower saltmarsh boundary. There is mixed, bare, muddy, intertidal substrate at the base of the saltmarsh. Some of this saltmarsh has developed on mud. Further north, the saltmarsh has developed on several relatively flat and uniform peat 'islands' within the intertidal area with steep saltmarsh cliffs of exposed peat between 1-2 m high. Most of the saltmarsh has developed in this area on flat low-lying ground influenced by the tide. There is some development of brackish saltmarsh vegetation with Common Reed spreading into Sea Rush-dominated vegetation upstream at the upper part of the intertidal area. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This area is affected by the greater influence of freshwater.

The saltmarsh north of the road generally transitions to wet grassland and heath vegetation along the upper boundary. The upper saltmarsh boundary is generally quite abrupt as the shoreline topography is quite steep. However, there are several locations where a narrow band of upper transitional vegetation has developed with a mixture of Sea Rush and terrestrial species such as Purple Moor-grass (*Molinia caerulea*), Birdsfoot, (*Lotus corniculatus*) and Black bog-rush (*Schoenus nigricans*). There are also several patches of Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) and Sea Club-rush (*Bolboschoenus maritimus*) in the saltmarsh and around the shoreline of the small lagoon in places. Sea Rush distribution extends above the saltmarsh boundary in places. The saltmarsh generally transitions to wet grassland vegetation but some is situated adjacent to steeper out-crops covered with dry heath and patches of scrub.

Fringe type saltmarsh is also found within the small 'lagoon' area. There are several isolated peat islands within this area. The saltmarsh found around the outer part of the bay has developed on thinner substrate, some of which is mud.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.025
1410	Mediterranean salt meadows (Juncetalia maritimi)	1.106
	Total	1.131

**Table 3.1.** Area of saltmarsh habitats mapped at Ballrisode House.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

# 3.2 Atlantic salt meadows (H1330)

There are several very small patches of this habitat found mainly around the shoreline of the outer bay. The ASM has mainly developed on thin mud in small sheltered low-lying places that overlay rocky outcrops along the shoreline. ASM vegetation has developed in situations where typical steep rocky shoreline topography is broken by shallower slopes allowing overlaying soils to be inundated by the tide. Most of the ASM is typically a mid-marsh type with Sea Plantain and Sea Pink prominent in the vegetation. Other species present include Saltmarsh Rush, Common Saltmarsh-grass, Sea Aster, Common Scurry-grass and Lax-flowered Sea Lavender. This habitat is poorly developed due to the small sizes of the patches present. Some zonation of the vegetation was noted with patches dominated by Saltmarsh Rush and or Red Fescue in places.

# 3.3 Mediterranean salt meadows (H1410)

This habitat is characterised by dense Sea Rush fringing the shoreline north of the road. Other species present within the MSM include Creeping Bent, Red Fescue, Sea Plantain, Sea Pink, Brookweed (*Samolus valerandi*), Sea Aster, Sea Arrowgrass, Spear-leaved Orache, Common Scurvy-grass, Sea-Spurrey (*Spergularia media*), Distant Sedge (*Carex distans*) Parsley Water-dropwort (*Oenanthe lachenalii*) and Saltmarsh Rush (*Juncus gerardii*). Lax-flowered Sea Lavender and Common Saltmarsh-grass are also found north of the road along the seaward boundary and the saltmarsh cliff but both species are rare. False fox-sedge (*Carex otrubae*), Sow-thistle (*Sonchus arvensis*), Twitch (*Elytrigia repens*) and Curled Dock (*Rumex crispus*) were also found within this vegetation close to the upper boundary in places.

Zonation is poorly developed in the saltmarsh vegetation fringing the shoreline but can be seem in the distribution of species such as Common Saltmarsh-grass only being found along the seaward boundary. Some of the MSM is rank and species poor in places, being completely dominated by Sea Rush. The MSM also contains small patches of ASM type vegetation with typical *Armeria-Plantago* sward most commonly found. Patches dominated by Saltmarsh Rush are also present within the MSM. Several of these patches could be classed as an ASM/MSM mosaic. Some of the larger sections of saltmarsh do contain some zonation of the MSM into two distinct communities; (a) Sea Rush with species such as Sea Pink, Lax-flowered Sea Lavender and Sea Plantain, (b) Sea Rush with Red Fescue, Creeping Bent, Sea Milkwort and transitional terrestrial species. The MSM saltmarsh found on the islands within the small lagoon area is a mid marsh vegetation type. The vegetation is dominated by Sea Rush and also contains Red Fescue, Sea Pink and Sea Plantain.

The sward height is between 0.4-1 m high and the ground cover is intact. Some naturally exposed peat can be found within the MSM. Most of the habitat is not grazed so there is no

poaching damage or significant amounts of exposed substrate. The saltmarsh topography is poorly developed at this site. Some of the larger sections of MSM contain salt pans. Some minor drainage channels or runnels are also present along the shoreline.

# 4 IMPACTS AND ACTIVITIES

There are relatively few impacts and activities affecting the saltmarsh habitat at this site (Table 4.1), as most of the saltmarsh habitat is inaccessible. Most of the site is not grazed and most of the saltmarsh is found on inaccessible 'peat islands'. There is a small patch of saltmarsh located adjacent to grazed grassland in the north-east corner of the site that is badly poached by cattle (143).

There are no indications of any significant erosional trend at this site (900). This is because most of the saltmarsh is sheltered from the outer bay by embankments and the main regional road. This area is quite sheltered so it is likely that erosional pressure in this area is quite low. A relatively tall saltmarsh cliff is present around much of the habitat, but signs of erosion are not significant. A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been no significant changes to the shoreline during this period. A comparison of the 1995, 2000 and 2005 OSI aerial photos also shows that there has been no measurable loss of saltmarsh habitat by erosion during the monitoring period. The impact of natural erosion is assessed as neutral.

This site is likely to have been affected by old shoreline modifications related to the construction of the road embankments and bridge at this location. However these modifications occurred in the 18<sup>th</sup> century and there has been no changes to the toad layout since then. The impacts of these modifications are not assessed.

Impacts and activities adjacent to the site include dispersed habitation (403), agriculture (140) and roads (502). These activities have little or no measurable impact on the saltmarsh habitats.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1410	143	В	-1	0.005	Inside
1410	900	С	0	0.01	Inside

 Table 4.1. Intensity of various activities on saltmarsh habitats at Ballrisode House.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>&</sup>lt;sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

positive influence and +2 = strongly managed positive influence. <sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

# **5 CONSERVATION STATUS**

## 5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *favourable* (Table 5.1). Ballyrisode House saltmarsh is a relatively small saltmarsh, with few features of significant conservation interest. Nearly all the saltmarsh habitat is in good condition and there are no impacts or activities significantly affecting the conservation status of the habitat at this site. The site is one of the few surveyed that is not located within an area designated for nature conservation value.

The conservation status of the lagoon at this site has also been assessed as part of an overall assessment of conservation status of lagoons in Ireland (NPWS 2007). The status of the lagoons has been assessed as *unfavourable-inadequate* mainly due to eutrophication.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor. There is very little low-lying wet grassland habitat or brackish habitat at a suitable elevation or topography for migration of saltmarsh habitat.

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

Table 5.1. Conservation status of Annex I saltmarsh habitats at Ballrisode House.

# 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

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

# 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. No monitoring stops were carried out in this habitat as the overall extent was so small. However, a visual assessment indicates that typical attributes such as sward cover and vegetation diversity reached their targets and negative indicators were largely absent. The majority of the ASM is in good condition. However the ASM saltmarsh is poorly developed due to the relatively small extent of habitat present. Most of the habitat is found around inaccessible parts of the shoreline and this habitat is not negatively affected by any impacts or activities.

# 5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts significantly affecting ASM at this site. This site is not part of any area designated for nature conservation value.

# 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 loss of habitat due to land-use changes or erosion within the current monitoring period.

# 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Eight monitoring stops were carried out in this habitat and all these stops passed. All of the attributes required for the structure and functions of this habitat reached their targets for each monitoring stop. This habitat is in relatively good condition and contains several different vegetation communities. The species composition and diversity was typical of this habitat. The sward structure was also in good condition. Most of this habitat is not negatively affected by impacts such as grazing. A small area at the north-east corner of the site is grazed and poached but this is only minor area. There is some development of transitional vegetation to terrestrial wet grassland and heath communities, particularly in low-lying areas north of the road.

# 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts and activities negatively affecting the MSM at this site. This site is not part of any area designated for nature conservation value.

# 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site.

# 7 REFERENCES

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

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# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	0.025		0.025			
4	1410 Mediterranean salt meadow	1.106			1.106		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	0.374					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.060					
19	1330/rocky shore mosaic	0.000					
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	1.565		0.025	1.106		

 Table 8.1.
 Areas of SMP habitats mapped using GIS.



6 Connishabi, Oldrivoent agus Histas Átuar Brvisnment, Heltoge and Lecal Government National Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

**Ballyrisode House** 

Not Designated

This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)





1330 Atlantic salt meadows 1410 Mediterranean salt meadows 1330/rocky shore mosaic Other Saltmarsh (CM2) other 1410 monitoring stops

	1		3	-			
	10	R S					
		3					
AND DE	ALC N						
					- Hope -	-	
SMP code:	0	40	80	120	160	200	Meters

Scale 1:2500

Map version: 1

A

# **Barley Cove**

# 1 SITE DETAILS

SMP site name: Barley Cove		SMP site code: SMP0066			
Date of site visit 17/06/2008		CMP site code: 64			
SM inventory site nan	ne: Barley Cove	SM inventory site cod	le: 180		
NPWS Site Name: Ba	arleycove to Ballyrisode Po	int			
NPWS designation	cSAC: 1040	MPSU Plan: old form	nat plan available		
	pNHA: <b>1040</b>	SPA: N/A			
County: Cork		Discovery Map: 88	Grid Ref: 078610, 024970		
Aerial photos (2000 s	eries): <b>O 6804-B</b>	6 inch Map No: <b>Co 147, 152</b>			
Annex I habitats curre	ently listed as qualifying intere	ests for Barleycove to I	Ballyrisode Point cSAC:		
H1310 Salicornia	and other annuals colonizi	ng mud and sand			
H1330 Atlantic sa	It meadows (Glauco-Pucci	nellietalia maritimae)			
H1410 Mediterran	ean salt meadows (Junceta	alia maritimi)			
Other SMP sites within this SAC/NHA: Dough					
Saltmarsh type: Bay	Sub	ostrate type: Sand			

# 2 SITE DESCRIPTION

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

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

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

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

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

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

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

The site was easily accessed from the adjacent roads.

# **3 SALTMARSH HABITATS**

# 3.1 General description

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

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

There is a transition to fixed dune type grassland along the upper saltmarsh boundary towards the west side of the main saltmarsh and along the northern and southern boundaries. Some of the upper boundary has been modified in the past by the development of the access road to the caravan park. A low man-made embankment marks a boundary along the northern side between the saltmarsh and the caravan park. There is some modified grassland adjacent to this saltmarsh boundary that may have been infilled in the past. The eastern boundary has also been modified by the development of the road along the embankment or ridge.

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

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

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

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

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

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

# 3.3 Atlantic salt meadows (H1330)

This habitat dominates the saltmarsh at this site. Several ASM communities are present and this site contains a good example of ASM zonation. The main community is a typical mid marsh community with Sea Plantain, Sea Pink and Sea Arrowgrass prominent, creating a naturally low sward (5 cm high). Other species present include Sea Aster, Saltmarsh Rush, Sea Milkwort, Red Fescue, and these species are found at low cover values. This community type also contains locally frequent Hard Grass (*Parapholis strigosa*) in places. A second mid marsh community with frequent Saltmarsh rush with Sea Plantain is also present. This community dominates the eastern section of the site. This area also contains some typical salt pans (some containing *Salicornia* flats). It is drained by one main shallow drainage channel or creek that flows north along the road and meets the stream channel at the northwest corner of the site. Low marsh ASM communities are poorly represented. There is some Common Saltmarsh-grass-dominated vegetation along the edges of the main creek and salt pans in this area.

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

# 3.4 Mediterranean salt meadows (H1410)

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

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

# 4 IMPACTS AND ACTIVITIES

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

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

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

period. A comparison of the 1995, 2000 and 2005 OSI aerial photos also shows that there has been no measurable loss of saltmarsh habitat by erosion during the monitoring period.

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

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

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural

positive influence and +2 = strongly managed positive influence.

<sup>b</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

# **5 CONSERVATION STATUS**

# 5.1 Overall Conservation Status

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

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

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor. There is very little low-lying wet grassland habitat or brackish habitat at a suitable elevation or topography for migration of saltmarsh habitat. The fixed dune

habitat adjacent to the saltmarsh has been modified and much of the saltmarsh is surrounded by modified artificial boundaries or embankments.

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

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

Table 5.1.	Conservation	status of Annex	l saltmarsh habitats	at Barley Cove.
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# 5.2 Salicornia and other annuals colonizing mud and sand (H1310)

# 5.2.1 Extent

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

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

# 5.2.2 Habitat structure and functions

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

# 5.2.3 Future prospects

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

# 5.3 Atlantic salt meadows (H1330)

# 5.3.1 Extent

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

# 5.3.2 Habitat structure and functions

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

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

# 5.3.3 Future prospects

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

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

# 5.4 Mediterranean salt meadows (H1410)

# 5.4.1 Extent

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

# 5.4.2 Habitat structure and functions

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

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

# 5.4.3 Future prospects

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

# 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site.

# 7 REFERENCES

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

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats	0.004	0.004				
2	Spartina swards						
3	1330 Atlantic salt meadow	0.783		0.783			
4	1410 Mediterranean salt meadow	0.108			0.108		
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	1.194					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/Spartina mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)						
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	2.089	0.004	0.783	0.108		

#### Table 8.1. Areas of SMP habitats mapped using GIS.



National Parks and Wildlife Service

2007-2008

Barleycove to Ballyrisode Point SAC (001040)

# Bawnard

#### 1 SITE DETAILS

SMP site name: Baw	nard	SMP site code: SMP0	057			
Date of site visit 16/0	6/2008	CMP site code: N/A				
SM inventory site nan	ne: Bawnard	SM inventory site code: 198				
NPWS Site Name: Gr	reat Island Channel					
NPWS designation	cSAC: <b>1058</b>	MPSU Plan: <b>N/A</b>				
	pNHA: <b>1058</b>	SPA: <b>4030</b>				
County: Cork		Discovery Map: 81	Grid Ref: 188160, 070095			
Aerial photos (2000 series): O 6432-D; O 6433- C; O 6474-B		6 inch Map No: <b>Co 088</b>				
Annex I habitats curre H1330 Atlantic sa	ently listed as qualifying inter It meadows (Glauco-Pucci	ests for Great Island Ch <b>nellietalia maritimae)</b>	annel cSAC:			
Other SMP sites withi	n this SAC/NHA: Carrigator	nil				
Saltmarsh type: Estua	ary Sub	strate type: Mud				

# 2 SITE DESCRIPTION

Bawnard saltmarsh is located in the north-eastern part of Cork Harbour, 3.4 km south of Midleton, in Co. Cork. This part of Cork Harbour is quite sheltered and forms the estuary of the Dungourney River, flowing from Midleton. Bawnard is found in a small sheltered bay isolated from the main estuary. The landscape to the north of the site is low-lying while there is a large hill along the southern side. The area is dominated by agricultural land. There are scattered houses and other buildings along roads to the east and the south of the site. Great Island is located to the west of the site.

The saltmarsh habitat fringes around the shoreline of the small bay at Bawnard. Most of the habitat is found at the head of the bay. There are two small shingle spits extending from the northern and southern sides of the bay that shelter much of this bay. The entire bay empties at low tide to expose soft intertidal mudflats. There were some green algal mats on the mudflats during the survey. The shoreline has been modified around the bay in the past and there is a low seawall along the eastern shore. Some of the land behind this seawall is inundated by the tide and contains saltmarsh. Saltmarsh also appears along the base of the seawall. Some of the southern shore has been infilled and is utilized for industrial use.

One Annex I saltmarsh habitat is found at Bawnard saltmarsh, Atlantic salt meadow (ASM). There is also some development of *Spartina* swards within this site, although this is not considered to qualify as an Annex I habitat. Atlantic salt meadow is the only saltmarsh habitat listed as a qualifying interest for this cSAC. Several of the other nearby saltmarshes are listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and were also surveyed during the Saltmarsh Monitoring Project (Carrigatohil located north-west of this site). Two other sites listed on the SM inventory and found in this cSAC, (Harper's Island and Foaty Island), were not surveyed during the SMP.

Most of saltmarsh habitat mapped at this site is located within the cSAC boundary. However there are several small patches located outside the boundary. This is mainly due to the fact that saltmarsh habitat extends above the upper shoreline boundary on the OSI 6 inch map, which was used to draw some of the cSAC boundaries. Therefore saltmarsh habitat was excluded in error.

The shoreline was accessed via private property towards the south-west of the site. Permission was sought to access the shoreline.

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

Bawnard is a very small saltmarsh site. The main Annex I saltmarsh habitat found at this site is Atlantic salt meadows (Table 3.1). There is also some development of *Spartina* swards on mudflats and adjacent to ASM along the shoreline. The majority of the saltmarsh habitat is located behind an old seawall with several breaches. A narrow band of ASM vegetation or patches of *Spartina* sward develops along the base of this seawall in places. There are also several larger isolated patches of *Spartina* sward further out on the mudflats. ASM continues along the northern shoreline where it is quite narrow and also extends along the back of the shingle spit. There is also a continuous narrow band of *Spartina* sward along the seaward side of the ASM on the northern shoreline. Both ASM and *Spartina* sward are also quite patchy in distribution along the southern shoreline.

Two of the largest patches of ASM are found behind the old seawall in the north-eastern and south-eastern corners of the small bay that form the outer parts of several fields. The land behind the seawall is somewhat low-lying. Most of this saltmarsh habitat found behind the old seawall is actually brackish and contains other saltmarsh communities such as stands of Sea Club-rush (*Bolboschoenus maritimus*), Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) and mixed transitional brackish and wet grassland vegetation. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project. Twitch (*Elytrigia repens*)-dominated grassland was also classified as other saltmarsh (CM2). Saltmarsh located behind the eastern seawall at the northern side does have some typical vegetation succession from ASM saltmarsh to brackish saltmarsh dominated by tall reeds and then to wet grassland at the back of the field. There is a transition from typical ASM to a stand dominated by Sea Club-rush and also containing Sea Plantain, Creeping Bent, Red Fescue, Sea Milkwort and Common Survey-grass. Sea Club-rush becomes more dominant towards the landward side of the reeds.

The southern section has developed on a steeper topography so the vegetation successions are more abrupt and there is development of mixed wet grassland, brackish reed communities and some ASM. This vegetation community contains Sea Club-rush, Red Fescue, grey Club-rush, Celery-leaved Buttercup (*Ranunculus sceleratus*), Creeping Bent, Sea Rush, Hard Rush (*Juncus inflexus*). There are several patches of more typical ASM vegetation within this area that are dominated by Sea Plantain (*Plantago maritima*) and Red Fescue (*Festuca rubra*) but these are very minor in area and are found along the low-lying channel that drains this area and allows the tide to inundate it. The total area of the brackish (CM2 type) saltmarsh is greater than the ASM found at the site. While Sea Rush was

recorded at this site it was not considered to form a typical Mediterranean salt meadow (MSM) community and its cover was limited.

There is a natural unmodified habitat zonation to intertidal mudflats along the lower saltmarsh boundary where there is no *Spartina* sward. Most of the ASM has developed on thin substrate and there is mixed substrate along the seaward boundary. This boundary is marked by the edge of the saltmarsh substrate and there is no SM cliff. Some of the lower ASM boundary is marked by a transition from ASM to *Spartina* sward. Some of the *Spartina* sward has developed on the mixed substrate around the shoreline. The substrate contains more shingle and pebbles towards the northern shingle bar. Some of the ASM has grown over this shingle behind the bar. Some of the lower ASM boundary has been modified in the past by the construction of the seawalls.

The upper saltmarsh boundaries have also been significantly modified by reclamation around the site in the past. Saltmarsh that has developed on the northern and southern shorelines is usually located adjacent to a treeline or hedgerow positioned on a low earth bank along the shore. The southern shoreline has been significantly modified by construction of houses and other building close to the shoreline and parts have been infilled in the past. There is some development of upper non-Annex habitat vegetation dominated by Twitch (*Elytrigia repens*) and Sea Couch-grass (*Elytrigia pycnanthus*) along the upper boundary of the ASM located in the south-east corner, in front of the seawall. This vegetation type also contains Sea Beet (*Beta maritima*), Curled Dock (*Rumex crispus*) and Red Fescue.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.388
non-Annex	Spartina swards	0.246
	Total	0.634

Table 3.1. Area of saltmarsh habitats mapped at Bawnard.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

#### 3.2 Atlantic salt meadows (H1330)

The ASM at this site is relatively poorly developed with only small narrow portions of habitat present. However, due to a variety of shoreline topography and impacts of disturbance there are several vegetation communities present. Most of the ASM has developed on a thin layer of mud and some of the saltmarsh has developed on mixed substrate. The ASM found in the fields at the eastern side of the bay is grazed has a low sward height and sections are badly poached with a high cover of bare mud substrate. ASM found around northern and southern sides of the bay and along the seaward side of the seawall is not grazed and has a variable sward height related to the community type.

The saltmarsh found along the base of the seawall is not grazed and contains Lax-flowered Sea Lavender, Sea Plantain, Sea Milkwort, Sea Purslane, Sea Arrowgrass and Common Saltmarsh-grass. There are also some clumps of Common Cordgrass but the cover of this species within the ASM is minor. This ASM is quite limited in area being only several metres wide. There is some minor zonation of species in several sections, although there is no development of different communities. Some of the ASM along the seawall is a pioneer community with species such as Annual Sea-blite, Lax-flowered Sea Lavender and Common

Saltmarsh-grass dominating the vegetation. This community is quite open and is colonising mixed gravely substrate along the base of the seawall.

ASM saltmarsh found at the north-eastern corner of the site and behind the seawall is heavily poached. The vegetation is dominated by Common Saltmarsh-grass, Sea Arrowgrass, Creeping Bent, Saltmarsh Rush, Sea Aster, Sea Milkwort and Greater Sea-spurrey. This vegetation community is not typical and may be related to the heavy poaching damage with colonisation of the ground by grasses such as Creeping Bent and common Saltmarsh-grass. There is a band of dry grassland (GS1) along the seaward side adjacent to the seawall. This area is flooded via a small breach in the seawall. There is some zonation of the ASM vegetation along this ridge with Creeping Bent and White Clover becoming dominant. There is also some development of a sward dominated by Saltmarsh Rush and also by Red Fescue towards the landward side of this area. There is no Common Cordgrass within the ASM behind the seawall.

The narrow band of ASM found along the northern shoreline is heavily shaded by the adjacent tree-line. The vegetation is dominated by Lax-flowered Sea Lavender and is quite open with frequent cover of green algae. The ASM becomes dominated by Sea Purslane towards the north-western corner of the site and where the shingle spit meets the shoreline.

The saltmarsh topography at this site is poorly developed with few typical saltmarsh features. Most of the saltmarsh is quite narrow so typical salt pan and creek features would not be expected to develop.

#### 3.3 Spartina swards

A small amount of *Spartina* sward is found in this site and is patchy is distribution, mainly scattered around the shoreline. Most of the *Spartina* sward is found adjacent to ASM vegetation. The narrow band of *Spartina* sward (< 5 m wide) along the northern shoreline is quite diffuse in places and is represented by scattered clumps of Common Cordgrass. There is a natural unmodified transition between the *Spartina* sward and the ASM. Lax-flowered Sea Lavender, Sea Plantain and Common Saltmarsh-grass appear in the upper part of the *Spartina* sward. There are also several isolated patches of *Spartina* sward located on the mudflats. There are also scattered isolated small clumps along the seaward edge of the eastern seawall and the southern shoreline. There were no indications of any significant spread of Common Cordgrass in the recent past.

# 4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). Part of the site is grazed by cattle (140). The ASM and non-Annex saltmarsh located behind the eastern seawall is grazed and there are signs of heavy poaching in places (143). Saltmarsh found around the other shorelines is not accessible to livestock and is not grazed. There has also been some recent infilling (803) around the site within the current monitoring period. Some of this infilling is located north-west of the shingle spit and does not affect any saltmarsh habitat. There has also been some infilling behind the eastern seawall at one location adjacent to the ASM but the ASM has not been affected.

Common Cordgrass is present at this site. This is an invasive species of saltmarsh (954). It was planted in Cork Harbour at Inchera House, Little Island in 1925 (Glavin 1947) although it

is not known when it appeared in this part of the estuary. Common Cordgrass does not form a significant part of the ASM vegetation and its overall cover is quite low (< 5%). Therefore the impact of its presence is assessed as neutral. The *Spartina* sward cover is quite low relative to the cover of ASM saltmarsh and the remaining intertidal mudflats. There are no indications that it has spread significantly during the current monitoring period from the survey or from an examination of the aerial photos. There are also no indications that it has spread at the expense of ASM habitat. Common Cordgrass does form extensive swards in other parts of Cork Harbour.

There are no indications of any significant erosional trend at this site (900). There are some signs of erosion along the lower saltmarsh boundary but these are not significant. This area is quite sheltered so it is likely that erosional pressure in this area is quite low. A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been no significant changes to the shoreline during this period. A comparison of the 1995, 2000 and 2005 OSI aerial photos also shows that there has been no measurable loss of saltmarsh habitat by erosion during the monitoring period. The impact of erosion is assessed as neutral.

There is evidence around this site that saltmarsh habitat has been modified or destroyed in the past due to land use changes and reclamation. The most visible sign of these modifications is the seawall along the eastern side of the bay, probably built in the 18<sup>th</sup>-19<sup>th</sup> centuries (871). Part of the shoreline along the southern side of the bay has also been infilled in the past (803). 1995 series aerial photos are not available for this area so it is not known if this infilling occurred during the current monitoring period. However a visual assessment indicated that infilling probably occurred prior to the current monitoring period.

The main Impacts and activities adjacent to the site are related to agriculture. Improved grassland adjacent to the site is grazed (140) and some is also fertilised (120) and cut (102) for cattle fodder. Other impacts and activities include dispersed habitation (403) and roads (502). Part of the shoreline is used by a waste disposal company and there is some run-off from this site into the bay (424). There is also a discharge pipe in the centre of the bay. The impact of these discharges is likely to be limited. There is also some recent housing development around the site (402). The agricultural activities have little or no measurable impact on the saltmarsh habitats.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	803	С	-1	0.388	Inside
1330	900	С	0	0.002	Inside
1330	954	С	0	0.388	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as  $A = \frac{1}{2}$  irreparable positive influence  $A = \frac{1}{2}$  and  $A = \frac{1}{2}$ 

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> 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.

<sup>&</sup>lt;sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

# 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.

Bawnard saltmarsh is a relatively small site with few features of conservation interest. The overall conservation status of this site is assessed as *unfavourable- inadequate* (Table 5.1). The saltmarsh is relatively poorly developed and the main sections have been modified in the past by the construction of a seawall along the shoreline. Most of the saltmarsh is in relatively good condition although some parts are badly poached. Common Cordgrass is present at this site but does not form a significant area of *Spartina* sward on the adjacent mudflats and does not form a significant part of the ASM vegetation either.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are moderate. ASM is located behind a seawall and there is a natural unmodified transition to brackish reed communities and transitional wet grassland vegetation. There are some prospects for ASM development in the north-east and south-east corner of the site into these brackish and transitional communities.

This site is located within the Great Island Channel cSAC and pNHA. A NPWS Conservation management plan is not available for this cSAC.

Habitat	EU Conse	ervation Status As	sessment	
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (1330)	Extent	Structure and functions, Future prospects		Unfavourable - Inadequate

d.
d

# 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

The extent of this habitat is assessed as *favourable* even though the total area of habitat is relatively low. There are no indications of any loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. ASM may have been more extensive in the past before the construction of the seawall around the eastern side of the site. However, the impact of the seawall is not assessed as it was constructed prior to the current monitoring period.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Four monitoring stops were carried out in this habitat and only one of these stops failed. Most of the attributes required for the structure and functions of this habitat reached their targets for each monitoring stop. The stop that failed was located in an area of ASM that was severely poached. However, most of the habitat is in relatively good condition and is not grazed. The sward height is diverse and sward cover of most of the habitat is largely intact. The ASM contains several different vegetation communities, although zonation is poorly developed because the habitat is quite small. The diversity of the ASM is related to modifications to the site in the past and the construction of the seawall. This led to the development of saltmarsh at two different levels, at the base of the wall and in parts behind the seawall. The diversity of the vegetation was typical of this habitat.

Common Cordgrass is present within this habitat but only a few clumps are present and it does not form a significant part of the ASM habitat. The impact of its spread is assessed as neutral.

The saltmarsh topography at this site is poorly developed but this is typical of a small site. There is some zonation and un-modified transition to *Spartina* swards at the lower ASM boundary. However, much of the upper boundary of the saltmarsh has been modified in the past. There are also some natural vegetation successions to wet grassland and brackish reed communities present.

#### 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 significantly affecting this site. The most significant impact was poaching in some of the saltmarsh located behind the seawall. There has been some infilling around the site but this does not affect any saltmarsh habitat. The site may be vulnerable to infilling in the future. This assessment assumes there will be no further infilling of saltmarsh although portions may be vulnerable to further infilling in the future. Most of the habitat is located within the cSAC boundary so the habitat should not be affected by any land-use changes that have to be licensed by local or national authorities.

# 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site.

# 7 REFERENCES

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

Glavin, H. (1947). *Spartina townsendii* H. and J. Groves - an experiment in reclamation. *Irish Naturalists' Journal*, **9**, 74-75.

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats						
2	Spartina swards	0.239			0.239		
3	1330 Atlantic salt meadow	0.356		0.474			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic	0.009		0.005	0.005		
7	1330/other SM (CM2) mosaic	0.055		0.028			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	1.699					
10	Spartina clump/mudflat mosaic (50/50)	0.004			0.002		
11	Isolated Spartina clumps on mud (5%)	0.003			0.000		
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/Spartina mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.679					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	3.044		0.506	0.246		

#### **Table 8.1.** Areas of SMP habitats mapped using GIS.



		Legend SAC Boundary	
	R	Spartina swards 1330 Atlantic salt me Atlantic/Spartina mos 1330/other SM (CM2 Spartina clump/mudf	adows saic ) mosaic lat mosaic
		Isolated Spartina clus         Other Saltmarsh (CM         other         1330 monitoring stop	m ps 12) >5
SMP co SMP00	57 (k, GPS	0 30 60 90 120 150 Meters	
and interpreation of aeral photos. Boundaries of designated are subject to revision. Produced from Ordnance Survey in permission of the Government (Permit number 5953)	areas aterial by	Map version: 1 Scale 1:2000	13)

# Carrigatohil

#### 1 SITE DETAILS

SMP site name: Carrigatohil	SMP site code: SMP0060
Date of site visit 04/06/2008	CMP site code: N/A
SM inventory site name: Carrigatohil	SM inventory site code: 196
NPWS Site Name: Great island Channel	
NPWS designation cSAC: 001058	MPSU Plan: not available
pNHA: <b>001058</b>	SPA: 004030
County: Cork	Discovery Map: 81/87 Grid Ref: 179225, 072456
Aerial photos (2000 series): O 6340-A; O 6385- B; O 6386-A	6 inch Map No: <b>Co 075</b>
Annex I habitats currently listed as qualifying int H1330 Atlantic salt meadows (Glauco-Puc	erests for Great Island Channel cSAC: cinellietalia maritimae)
Other SMP sites within this SAC/NHA: Bawnord	t
Saltmarsh type: Estuary Si	ubstrate type: Mud

# 2 SITE DESCRIPTION

Carrigtohil saltmarsh is located in Cork Harbour along the northern side of Foaty Island and 1 km east of Carrigtohil Village. This part of Cork Harbour is called Slatty Water and this is part of a secondary branch of the estuary that is positioned between Little Island and Foaty Island. The landscape of this area is fairly low-lying and dominated by improved habitats. Some of the surrounding land has been significantly modified and built up in places. The N25 Cork-Waterford dual-carriageway is positioned adjacent to northern side of the Slatty Water on a tall embankment and forms the shoreline along this side of the estuary. A secondary road accessing Foaty Island forms the eastern boundary of the estuary. Adjacent land to the east of this secondary road is farmed. There is a strip of mature mixed woodland along the northern side of Foaty Island. This island also contains a golf course and a recently constructed hotel and other leisure facilities. There are several smaller islands towards the west of the Slatty Water (Browns Island and Harper's Island) and the dual-carriageway has been constructed across these two small islands.

The saltmarsh habitat is mainly found fringing the southern Slatty Water shoreline (the northern shoreline of Foaty Island). The northern and eastern shorelines of the Slatty Water have been significantly modified by road construction. While these shorelines probably contained saltmarsh in the past, there is very little intact saltmarsh left. A secondary road that forms the eastern boundary of the estuary has cut off a small part of the original estuary. This area now contains open water, Reedbeds and fringing scrub with some tidal influence. The Slatty Water drains at low tide exposing a significant area of intertidal mudflats.

The majority of the site is located within the Great Island Channel cSAC and pNHA. This estuarine cSAC is dominated by intertidal flats and also contains some patches of saltmarsh at other locations. It is also important for wintering waders and wildfowl within Cork Harbour.

Two Annex I saltmarsh habitats are present at Foaty Island saltmarsh, *Salicornia* flats (1310) and Atlantic salt meadow (ASM). There is also some development of *Spartina* swards within this site, although this is not considered to qualify as an Annex I habitat. Atlantic salt meadow is the only saltmarsh habitat listed as a qualifying interest for this cSAC. Several of the other saltmarshes are listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and were also surveyed during the Saltmarsh Monitoring Project (Bawnard located further south). Two other sites listed on the SM inventory, (Harper's Island and Foaty Island), were not surveyed during the SMP. Foaty Island saltmarsh includes much of the saltmarsh that has developed around the southern sides of the island.

Most of saltmarsh habitat mapped at this site is located within the cSAC boundary. However there are several small patches located outside the boundary. This is mainly due to the fact that saltmarsh habitat extends above the upper shoreline boundary on the OSI 6 inch map, which was used to draw some of the cSAC boundaries. Therefore saltmarsh habitat was excluded in error.

The site was accessed from Foaty Island via the Sheraton-Fota hotel complex. Permission was sought to access the site via this private land.

# **3 SALTMARSH HABITATS**

# 3.1 General description

The main Annex I saltmarsh habitat found at this site is Atlantic salt meadow (ASM) (Table 3.1). Several small patches or bands of *Salicornia* flats were also recorded at this site. Common Cordgrass (*Spartina anglica*) is also present and there were several small patches of *Spartina* sward mapped at this site. The saltmarsh is mainly distributed in several small patches that have developed in sheltered areas along the north side of Foaty Island and are separated from each other. Saltmarsh has developed behind a low shingle ridge in one section. There are also several small patches that are located along the northern side the Slatty Water, adjacent to the dual-carriageway embankment.

Other saltmarsh type vegetation (not mapped as Atlantic salt meadows) is also present. These stands have been classified and mapped as CM2 or other non-Annex saltmarsh vegetation in accordance with the SMP project. This mainly includes patches of Twitch (*Elytrigia repens*)-dominated vegetation along low gravel ridges. There are natural vegetation successions between the ASM at its upper boundary and this vegetation community in places. These are positioned above the ASM vegetation. Some Common Reed Beds (*Phragmites australis*) located in the brackish area east of the road bridge have also been classified as other saltmarsh (CM2). There are signs of brackish influence on the vegetation in this section with other species such as Sea Pink (*Armeria maritima*), Spear-leaved Orache (*Atriplex prostrata*) and Sea Plantain (*Plantago maritima*) also appearing along the edge of the intertidal area. However, the tidal influence on this section is restricted and this may act more like a brackish lagoon during spring tides, dependant on restricted flow under the road-bridge. This area probably drains to expose bare mudflats during neap tides.

One notable aspect about this site is that the saltmarsh is shaded by tall woodland along Foaty Island. These trees and mature Rhododendron scrub overhang the intertidal zone in places and significantly shade some of the saltmarsh vegetation. There are upper transitions from saltmarsh to old stone embankments along the edge of the woodland. A band of

transitional Twitch-dominated vegetation may appear along this boundary. There are transitions at the lower saltmarsh boundary to soft intertidal mudflats for the most part. Some of the adjacent mudflat area is mixed with cobbles and pebbles. The lower saltmarsh boundary is marked by a low saltmarsh cliff or ledge. Clumps of *Spartina* sward have developed along the lower saltmarsh boundary in places. One section of saltmarsh has a narrow band of *Salicornia* flats developed on mixed substrate along the lower ASM boundary.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	0.038
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1.245
non-Annex	Spartina swards	0.162
	Total *	1.445

Table 3.1. Area of saltmarsh habitats mapped at Carrigatohil.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

This habitat only forms a very small area in total at this site and is found in several small patches. A band of *Salicornia* flats has generally developed on mixed or mixed substrate. There is a natural vegetation succession from an ASM pioneer vegetation community to the patches of *Salicornia* flats. This habitat is only several metres wide. It is dominated by Glasswort (*Salicornia* sp.). Lax-flowered Sea Lavender (*Limonium humile*) and Common Saltmarsh-grass (*Puccinellia martima*) are also present but are rare. Common Cordgrass is present at this site but is not found within any of the patches of this habitat.

# 3.3 Atlantic salt meadows (H1330)

This is the dominant saltmarsh habitat at this site. Several ASM communities are present. Some of the ASM is dominated by an unusual low-mid vegetation community dominated by Sea Aster (*Aster tripolium*). This community also contains Red Fescue (*Festuca rubra*), Common Scurvy-grass (*Cochlearia officinalis*), Common Saltmarsh-grass, Lax-flowered Sea Lavender and Sea Plantain. The saltmarsh contains some small salt pans vegetated with Spear-leaved Orache. This vegetation type may be influenced by shade from the adjacent tall woodland. The sward height is quite tall due to the lack of grazing (10-20 cm). The ASM also contains some clumps of Common Cordgrass in several pans but its cover within the ASM is rare.

A second unusual vegetation type dominated by Lax-flowered Sea Lavender and Sea Milkwort (*Glaux maritima*) is present. This is a lower saltmarsh community and also contains Sea Spurrey (*Spergularia media*), Sea Plantain and Buck's-horn Plantain (*Plantago coronopus*). There are some signs of zonation between different ASM communities and zonation is also indicated by the dominance of Common Saltmarsh-grass around some of the salt pans and along the edges of creeks within other saltmarsh vegetation. A sward of Common Saltmarsh-grass has developed to dominate one section of the ASM.

A more typical grassy vegetation community is also present. This community is dominated by Red Fescue and is found along the upper SM zone of some of the narrower bands of saltmarsh. This community also contains Creeping Bent (*Agrostis stolonifera*), Sea Milkwort, Sea Aster and Sea Plantain.

A pioneer ASM vegetation community is present along some of the lower ASM boundary. Pioneer vegetation is developing on shingle rich substrate with Lax-flowered Sea Lavender prominent and also containing Common Saltmarsh-grass, Annual Sea-blite (*Suaeda maritima*) and some Glasswort. This community is quite open with abundant bare substrate and green algae cover. It has developed on part of the saltmarsh with a relatively steep slope. There is no significant SM cliff along the edge of this community.

The saltmarsh topography is poorly developed at this site, but this is typical of relatively small portions of habitat. Some of the larger sections do contain salt pans but the smaller sections are generally quite uniform in topography. Several sections are drained by small creeks leading from drainage channels from the adjacent woodland. There are some dead tree trunks lying on the saltmarsh.

# 3.4 Spartina swards

There are several small patches of *Spartina* swards mapped at this site. The *Spartina* sward is not extensive and is mainly formed from coalescing large clumps of Common Cordgrass growing on soft mud. The *Spartina* sward is much less extensive compared to the ASM. The *Spartina* sward is dominated by Common Cordgrass and there are few other saltmarsh species appearing within these patches. There are some signs of die-back within the *Spartina* sward in places. Common Cordgrass is also present within the ASM. There are no indications that *Spartina* sward has developed on former saltmarsh at this site. It has developed on bare mudflats.

# 4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). This site is not grazed (140) by livestock but signs of natural grazing of saltmarsh vegetation, possibly by rabbits, were noted. The site is relatively inaccessible so it is not used for amenity use.

Part of the saltmarsh has been infilled (803) during the current monitoring period, probably between the period 2001-2005. The saltmarsh had developed behind a stone embankment. This saltmarsh was visible on the 2000 series aerial photos but is now completely destroyed and covered in spoil. This infilling is probably related to recent construction and development of the adjacent hotel, golf and leisure complex. The infilling may be disposal of construction and demolition waste. Some wheel ruts (501) were noted on a second portion of saltmarsh.

Common Cordgrass is present at this site. This is an invasive species of saltmarsh (954). It was planted in Cork Harbour at Inchera House, Little Island in 1925 (Glavin 1947) although it is not known when it appeared in this part of the estuary (Slatty Water). Common Cordgrass does not form a significant part of the ASM vegetation. The *Spartina* sward cover is quite low relative to the cover of ASM saltmarsh and the remaining intertidal mudflats. There are no indications that it has spread significantly during the current monitoring period from the survey or from an examination of the aerial photos. Common Cordgrass has formed extensive swards to the south of Foaty Island but these swards are not considered within the current site. There is very little Common Cordgrass in the ASM or *Salicornia* flats, so the impact of its presence is assessed as neutral.

There are no indications of any significant erosional trend at this site (900). A saltmarsh cliff is present but signs of erosion are not significant. An accretion ridge is present along one

part of saltmarsh. This area is quite sheltered so it is likely that erosional pressure in this area is quite low. A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been no significant changes to the shoreline during this period. A comparison of the 1995, 2000 and 2005 OSI aerial photos also shows that there has been no measurable loss of saltmarsh habitat by erosion during the monitoring period. The impact of erosion is assessed as neutral on a portion of the ASM.

There is evidence around this site that saltmarsh habitat has been modified or destroyed in the past due to land use changes and reclamation. The dual carriageway has been built on an embankment along the northern side of the Slatty Water shoreline. This construction may have destroyed some minor saltmarsh habitat, but no significant habitat was lost along this shoreline. The construction of a sluice at the Slatty Bridge at an earlier date (19<sup>th</sup> century) cut off part of the intertidal zone including some saltmarsh habitat. This area now contains brackish habitat. An old stone embankment has been built around the Foaty Island shoreline and this embankment was built across the front of one of the saltmarsh sections, now infilled recently. These impacts are not considered during the current monitoring period.

Impacts and activities adjacent to the site include agriculture (140), discontinuous habitation (402), a dual-carriageway (502), a water treatment plant (424) and a golf course (601). The presence of the golf course and associated leisure development has probably led to infilling of one section of saltmarsh but this has already been assessed. The presence of the dual-carriageway so close to the site has also impacted on saltmarsh habitat in the past, but direct impact of habitat loss are likely to have occurred outside the current monitoring period. Related impacts such as runoff from the road may have some impact on the saltmarsh but these impacts are low or not detected.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	954	С	0	0.038	Inside
1330	501	С	-1	0.001	Inside
1330	803	А	-2	0.800	Inside
1330	900	С	0	0.06	Inside
1330	954	С	0	1.245	Inside

<b>Table 4.1.</b> Intensity of various activities on saltmarsh habitats at Carrigato
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<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> 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.

The overall conservation status of this site is assessed as *unfavourable-bad* (Table 5.1). This assessment takes account of the relatively significant area of saltmarsh that has been infilled during the current monitoring period. However the remaining saltmarsh is in relatively good condition. Common Cordgrass is present at this site but does not form a significant area of *Spartina* sward and does not form a significant part of the ASM vegetation either. It is not known why Common Cordgrass has spread significantly on mudflats to form mature swards to the south of Foaty Island but has not spread significantly in the Slatty Water.

A Local Area Development Plan for the Carrigatohil area published by Cork County Council (Cork County Council 2005) states that there are plans to replace the sluice at the Slatty Bridge with a pumping station to pump water at any time from the Slatty Pond. This is not likely to affect the existing saltmarsh habitat along the northern side of Foaty Island but may impact on the brackish vegetation east of Slatty Bridge.

Habitat	EU Conse	ervation Status As	sessment	
	Favourable	Unfavourable - Inadequate	Unfavourable – Bad	Overall EU conservation status assessment
Salicornia flats (1310)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (1330)	Structure and functions, Future prospects		Extent	Unfavourable - Bad

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

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

# 5.2.1 Extent

The extent of this habitat is assessed as *favourable*. It does not form a significant part of the saltmarsh at this site. There are no indications of any loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. This habitat is found in typical pioneer areas adjacent to the ASM. There is no indication that *Salicornia* flats were more extensive in the past.

# 5.2.2 Habitat structure and functions

The structure and functions of this habitat is assessed as *favourable*. No monitoring stops were carried out in this habitat due to its relatively small extent. However, a visual assessment indicated that this habitat is in relatively good condition. The small patches of habitat only form a very minor portion of the overall saltmarsh habitat. They have a typical species assemblage and have developed adjacent to pioneer ASM vegetation and form part of the greater saltmarsh zonation. Common Cordgrass is present at this site but this invasive species is not yet present within the small patches of *Salicornia* flats.

#### 5.2.3 Future prospects

The future prospects of the habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in the near future. Common Cordgrass is present at this site. This species has the potential to continue to spread in the future at the expense of *Salicornia* flats, although there are no indications that it is spreading at the moment. There are few other impacts or activities that can negatively affect this habitat.

# 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The extent of this habitat is assessed as *unfavourable-bad*. There has been a significant loss of habitat (0.8 ha) due to infilling within the current monitoring period. This represents a loss of roughly 40% of the original habitat at this site. There are no signs of any erosional trend at this site. There is no evidence that a significant area of habitat has been lost during the current monitoring period due to erosion.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Four monitoring stops were carried out in this habitat and all the stops passed. All of the attributes required for the structure and functions of this habitat reached their targets for each monitoring stop. This habitat is in relatively good condition and contains several different vegetation communities. Some of these vegetation communities are unusual in a national context and may be influenced by shading from adjacent trees. The diversity of the vegetation was typical of this habitat. Zonation is present and there is zonation to pioneer and *Salicornia* flats vegetation.

The saltmarsh topography is poorly developed but this is typical of these small patches of habitat. Common Cordgrass is present in this habitat. This is a negative indicator but it is only found rarely (< 1%) on the ASM. Therefore the impact of its spread is assessed as neutral. There is some natural un-modified transition to other vegetation communities dominated by Twitch along the upper ASM boundary in places, although much of the actual upper saltmarsh boundary has been modified in the past.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts significantly affecting this site. The most significant impact was the infilling of a large section of saltmarsh. This assessment assumes there will be no further infilling of saltmarsh although portions may be vulnerable to further infilling in the future. Most of the habitat is located within the cSAC boundary so the habitat should not be affected by any land-use changes that have to be licensed by local or national authorities. This site is inaccessible and unlicensed infilling would be difficult to detect without direct site access.

Common Cordgrass is present at this site but does not form a significant part of the ASM vegetation. There may be some potential for the spread of this species into this habitat in the future. However, not all the ASM is vulnerable to the spread of this species.

# 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site. The area of saltmarsh damaged by infilling has been completely infilled and it would be very difficult to restore this habitat.

# 7 REFERENCES

Cork County Council (2005). The Carrigatohil special draft Local Area Development Plan. http://www.corkcoco.ie/co/pdf/604991653.pdf

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

Glavin, H. (1947). *Spartina townsendii* H. and J. Groves - an experiment in reclamation. *Irish Naturalists' Journal*, **9**, 74-75.

# 8 APPENDIX I

SM Habitat code	SM habitat description Area (ha)			Area (ha)			
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats	0.038	0.038				
2	Spartina swards	0.159					0.159
3	1330 Atlantic salt meadow	1.230		1.23			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic	0.002		0.001			0.001
7	1330/other SM (CM2) mosaic	0.027		0.014			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	4.891					
10	Spartina clump/mudflat mosaic (50/50)	0.003		0.003			0.0015
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/Spartina mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.141					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	7.491	0.038	1.245			0.162

#### Table 8.1. Areas of SMP habitats mapped using GIS.

# Legend

Comnehabl, Oldhrosofit agus Hiaitas Áituit Emvlianment, Heitiage and Local Government

National Parks and Wildlife Service



Saltmarsh Monitoring Project 2007-2008

Carrigtoohil

Great Island Channel SAC (001058)



# Dough

# 1 SITE DETAILS

SMP site name: Dough	SMP site code: SMP0067
Date of site visit 18/06/2008	CMP site code: 64
SM inventory site name: Dough	SM inventory site code: 179
NPWS Site Name: Barleycove to Ballyrisoc	le Point
NPWS designation cSAC: 1040	MPSU Plan: old format plan available
pNHA: <b>1040</b>	SPA: <b>4156</b>
County: Cork	Discovery Map: 88 Grid Ref: 076970, 026080
Aerial photos (2000 series): O 6793-A,B,C,D	6 inch Map No: <b>Co 152</b>
Annex I habitats currently listed as qualifyingH1310Salicornia and other annuals colH1330Atlantic salt meadows (Glauco-P	interests for Barleycove to Ballyrisode Point cSAC: onizing mud and sand Puccinellietalia maritimae)
H1410 Mediterranean salt meadows (Ju	ncetalia maritimi)
Other SMP sites within this SAC/NHA: Barley	y Cove
Saltmarsh type: Lagoon	Substrate type: Humus over sand

# 2 SITE DESCRIPTION

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

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

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

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

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

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

# **3 SALTMARSH HABITATS**

#### 3.1 General description

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

#### East of the causeway

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

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

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

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

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

#### West of the causeway

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

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

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

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

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

This habitat type is found in the wide tidal inlet north of the sand dune complex. There are several large patches of this habitat present on the sand flats. Some are associated with the accretion zones of low-lying sandy islands within this area. There are natural unmodified transition zones between pioneer ASM to the *Salicornia* flats. The *Salicornia* flats vegetation is dominated by Glasswort (*Salicornia europaea* agg.) (5-20% cover). Other species occasionally present within this vegetation includes small patches of Common Saltmarsh-grass (*Puccinellia martima*), Sea Milkwort, Sea Plantain, Sea Arrowgrass and Annual Sea-

blite (*Suaeda maritima*). There is also some green alga cover. These patches are grazed lightly in places.

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

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

# 3.3 Atlantic salt meadows (H1330)

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

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

ASM saltmarsh is also present on some of the low-lying 'islands' within the 'tidal' inlet. The extent of saltmarsh is expanding in this area. It is noticeable that some of these islands are not visible on the OSI 2000 series aerial photos but appear on the 2005 series aerial photos. The topography of these islands is also poorly developed as this saltmarsh is relatively young. There are accretion ridges present on these island with significant areas of pioneer ASM saltmarsh dominated by patchy Common Saltmarsh-grass. Other species present include Glasswort, Sea Aster, Sea Milkwort, Sea Arrowgrass and Annual Sea-blite (*Suaeda maritima*). This community is characterised by the abundant bare sand cover that sometimes

dominates the vegetation. There are natural transitions from this vegetation type to *Salicornia* flats. The more established saltmarsh has a complete sward cover of Common Saltmarshgrass (*Puccinellia martima*). The more established islands also contain a transition to midupper saltmarsh vegetation dominated by Red Fescue and containing species such as Buck's-Horn Plantain and White Clover.

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

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

# 3.4 Mediterranean salt meadows (H1410)

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

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

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

MSM is also found to the east of the causeway along the southern side of the lake. This MSM is species rich and contains frequent brackish indicators. There is a narrow band of Sea Club-rush along the seaward side of this MSM on a gentle gradient into the intertidal area. The vegetation is still dominated by Sea Rush but also contains Common Reed, Grey Club-rush and Sea Club-rush spreading through the rushes. Other species present include Sea Plantain, Saltmarsh Rush, Sea Aster, Long-bracted Sedge, Brookweed, Creeping Bent, Distant Sedge, Autumn Hawkbit, Red Fescue, Sea Milkwort, Common Saltmarsh-grass and Glasswort. The sward cover is quite damaged from cattle poaching. There is a transition on

the landward side of this vegetation to stands dominated by Sea Club-rush and Grey Clubrush (classified as CM2). The MSM forms a mosaic with CM2 stands and with small patches of ASM characterised by the absence of Sea Rush in places.

# 4 IMPACTS AND ACTIVITIES

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

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

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

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

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

A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been significant changes to the shoreline, the position of the dunes and saltmarsh, and the profile of the tidal river. During this period the sand dunes to the west of the river have grown in size and saltmarsh associated with this area has also developed. There has also been a significant loss of saltmarsh (about 4 ha) east of the causeway within the lagoon area. The causeway was constructed in the 19<sup>th</sup> century.

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

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

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

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

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as -2 = irreparable negative influence -1 = reparable negative influence 0 = neutral +1 = nature

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

# 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

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

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

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

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

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

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

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

#### 5.2.2 Habitat structure and functions

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

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

# 5.2.3 Future prospects

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

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

# 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

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

#### 5.3.2 Habitat structure and functions

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

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

#### 5.3.3 Future prospects

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

# 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

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

#### 5.4.2 Habitat structure and functions

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

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

#### 5.4.3 Future prospects

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

# 6 MANAGEMENT RECOMMENDATIONS

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

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# 8 APPENDIX I

SM Habitat code	SM habitat description Area (ha)		Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats	0.480	0.480				
2	Spartina swards						
3	1330 Atlantic salt meadow	5.279		5.279			
4	1410 Mediterranean salt meadow	5.290			5.290		
5	ASM/MSM mosaic (50/50)	0.413		0.206	0.206		
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic	0.018		0.009			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	6.648					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic	0.024			0.012		
14	Spartina sward dominated, with some ASM						
15	1310/Spartina mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	3.566					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	21,718	0.480	5.495	5.509		

Table 8.1. Areas of SMP habitats mapped using GIS.



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Saltmarsh Monitoring Project 2007-2008 Dough (Map 1 of 2)

Barleycove to Ballyrisode Point SAC (001040)

This habitat map was created with a combination of file and interpretation of aeral photos. Boundaries of design are subject to revision. Produced from Ordnance Surv permission of the Government (Permit number 5953)

		Legend
100	23	SAC Boundary
	A	1310 Salicornia flats
and the	1 Partie	1330 Atlantic salt meadows
1 Beach	11	1410 Mediterranean salt meadows
TPER	and the second	1330/1410 mosaic
and the second		1330/other SM (CM2) mosaic
2 1 4 5 5	e. 73.	1410/other SM (CM2) mosaic
	- / 4	Other Saltmarsh (CM2)
1-		other
Sec. YA	a star is	<ul> <li>1310 monitoring stops</li> </ul>
	S. 21 1855	1330 monitoring stops
	14/ 1033	1410 monitoring stops
+	19	
SMP code:	0 40 80	120 160 200 Meters M
SM P00 67		
d with a combination of fieldwork, GPS otos. Boundaries of designated areas uced from Ordnance Survey material by nt (Permit number 5953)	Date of production: 22/02/20 Map version: 1	09 Original Drawing Size: 297 x 420 (A3) Scale 1:3000



-	-	4	and the second	
	1			egend
1		1.5		SAC Boundary
	1			1310 Salicornia flats
		1330 Atlantic salt meadows		
		1		1410 Mediterranean salt meadows
		-		1330/1410 mosaic
				1330/other SM (CM2) mosaic
		-		1410/other SM (CM2) mosaic
				Other Saltmarsh (CM2)
				other
			•	1310 monitoring stops
		1	-	1330 monitoring stops
*				1410 monitoring stops
		1		

SM P00 67 This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)

SMP code:

Date of production: 22/02/2009 Map version: 1 Original Drawing Size: 297 x 420 (A3) Dough 1:3000
# **Harbour View**

#### 1 SITE DETAILS

SMP site name: Harbour View		SMP site code: SMP0062				
Dates of site visit 05-06/06/2008		CMP site code: 57				
SM inventory site name: Harbour View		SM inventory site code	e: <b>189</b>			
NPWS Site Name: Co	ourtmacsherry Estuary					
NPWS designation	cSAC: <b>1230</b>	MPSU Plan: old form	at plan available			
	pNHA: <b>1230</b>	SPA: N/A				
County: Cork		Discovery Map: 87	Grid Ref: 153260, 045210			
Aerial photos (2000 s 6668-C,D	eries): O 6695-A,B,C,D; O	6 inch Map No: <b>Co 123, 124, 136, 137</b>				
Annex I habitats curre	ently listed as qualifying inter	ests for Courtmacsherry	y Estuary cSAC:			
H1310 Salicornia	and other annuals coloniz	ing mud and sand				
H1330 Atlantic sa	It meadows (Glauco-Pucci	nellietalia maritimae)				
H1410 Mediterranean salt meadows (Juncetalia maritimi)						
Other SMP sites within	Other SMP sites within this SAC/NHA:					
Saltmarsh type: Sand	lflats Sub	strate type: Sand/Mud				

#### 2 SITE DESCRIPTION

Harbour View saltmarsh is located in outer part of Courtmacsherry Estuary in west Co. Cork. This site is located at the head of Coolmain Bay and is positioned in the outer part of this estuary in the north-eastern corner in a secondary inlet that forms part of the main estuary. A small sand dune spit shelters most of the inlet at the southern end. This inlet has a mainly north-south orientation. Kilbrittain village is located 1.5 km to the north of this site and Timeoleague Town is located 6.5 km to the west of this site. The landscape of this area is dominated by low-lying farmland. A small river flows into the inlet. The sand dune complex and beach along the front of the spit is an important local amenity. There are several tracks across the sand dunes. There are minor roads along the shoreline on both sides of the inlet.

Saltmarsh has developed at several different locations at this site. This inlet is sheltered by a sand dune spit that extends from the west side and cuts off a large intertidal area called Garreneteen Strand. A small river flows into the inlet at the northern end. The inlet is quite narrow at the northern end and becomes much wider in the southern section. The intertidal area is divided into two main sections by a regional road bridge (R600) that crosses the estuary and the southern section is called Garreneteen Strand. Garreneteen Strand is a wide area of intertidal mudflats that drains through a much narrower channel between the sand dune complex and the mainland on the eastern side of the estuary. Part of the saltmarsh has developed in the sheltered intertidal area behind a sand dune complex on the west side of the site. Saltmarsh has also developed in the intertidal area north of the road bridge. Saltmarsh is also present in the northern part of this inlet in previously re-claimed land.

Harbour View saltmarsh is part of Courtmacsherry Estuary cSAC. This cSAC is designated for its range of coastal habitats including extensive intertidal mudflats in the estuary and the sand spit located at Harbour View. Several sand dune habitats are found on this sand spit and there are notable transitions to freshwater and saltmarsh on the landward side of this spit. The intertidal flats of the estuary are also used by notable numbers of wintering waterfowl.

Three Annex I saltmarsh habitats are present at Harbour View, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three saltmarsh habitats are listed as qualifying interests for this cSAC. There is also a significant area of *Spartina* swards on the intertidal flats at this site, although this habitat is not considered as an Annex I habitat any more. Saltmarsh has also developed at other locations in the estuary including Timeoleague and Courtmacsherry. Timeoleague saltmarsh is listed on the SM inventory (Curtis and Sheehy-Skeffington 1998). This site was not surveyed during the SMP. Harbour View sand dune complex was surveyed by the Coastal Monitoring Project in 2006.

Nearly all of saltmarsh habitat mapped at this site is located within the cSAC boundary. Only small narrow strips of habitat have been excluded by the digital cSAC boundary. The OSI 6 inch map was used to draw this boundary and there are very small differences at several locations between the 6 inch map and the current shoreline. ASM saltmarsh extends higher than the lower shoreline boundary (used to draw the cSAC boundary) at several locations and these small areas are excluded (about 0.025 ha).

This site is notable for the presence of Sharp Rush (*Juncus acutus*) at several locations on the sand dune complex and along the upper saltmarsh boundary with the saltmarsh at Harbour View. This uncommon species has a scattered distribution along the southern and south-east coast of Ireland. It is much more rarely found on saltmarshes compared to Sea Rush (*Juncus maritimus*). Stands of saltmarsh vegetation dominated by either Sea Rush or Sharp Rush can be classified as MSM. There are very few saltmarshes in Ireland with the rarer MSM sub-type dominated by Sharp Rush present.

## 3 SALTMARSH HABITATS

## 3.1 General description

The saltmarsh can be divided into 4 main sub-sites, Garreneteen Strand, Garreneteen Strand east, north of the road bridge and Glandduff at the northern end. There is also some minor saltmarsh development in other parts of the site around the shoreline.

## Garreneteen Strand

This saltmarsh has developed at the back of the sand spit at Harbour View and a mainly sandy substrate. It is the largest and most diverse sub-site. Saltmarsh has developed adjacent to fixed dunes, freshwater marsh and scrub habitats that are present at the back of the sand spit. This sub-site is notable for the excellent zonation that has developed between the saltmarsh habitats and the other coastal habitats in this coastal complex. *Salicornia* flats have developed at the seaward (eastern) edge of the saltmarsh. A large area of *Spartina* swards has developed on the north-east corner of this site adjacent to the intertidal mudflats. Atlantic salt meadows are present at the landward side of these habitats. The ASM is sub-divided by several ridges with fixed dune grassland. The main fixed dune ridge runs along the main track in a north-south orientation and divides the saltmarsh into two main sections.

This ridge may not be a natural feature. This ridge contains a transitional fixed dune community along the western side and adjacent to the saltmarsh that is characterised by large clumps of Sharp Rush and is dominated by Twitch and some Sea Couch. This zone is about 20-30 m wide. It has developed on sand and also contains species such as Red Fescue, Birdsfoot, Ladies Bedstraw, Sow-thistle, Sea Milkwort, Common Scurvy-grass, Sea Pink, Curled Dock Parsley Water-dropwort, Sea Purslane, Long-bracted Sedge and Marram. The presence of the fixed dune indicators meant that it was not classified as MSM.

Further west on the landward side of this ridge and the main track there is significant development of MSM and ASM/MSM mosaic in the area between the western shoreline and the sand dunes. There is also a small amount of the second MSM sub-type dominated by Sharp Rush in this area. Sharp Rush is also found in adjacent fixed dune grassland and this was not considered to be part of the Annex I habitat. There is some development of non-Annex I saltmarsh stands dominated by Common Reed and Sea Club-rush along the landward side of this saltmarsh.

Some of this saltmarsh is relatively young and has only developed in the past 150 years. This saltmarsh development is related to the growth of the sand dune spit. The 1<sup>st</sup> and 2<sup>nd</sup> edition OSI six inch maps show that the sand dune spit was much smaller in the past, as was the other habitats including the saltmarsh habitats developing behind the sand dune spit.

#### **Garreneteen Strand East**

This saltmarsh is a much smaller area and is located to the east of the main saltmarsh behind the sand dune spit. This saltmarsh is dominated by a large area of dense *Spartina* sward that has vegetated an elevated bank of intertidal mudflats. *Salicornia* flats have developed on the seaward (western side) of this *Spartina* sward.

#### North of the road bridge

This large area of saltmarsh is dominated by ASM and is positioned towards the northern part of the inlet. This saltmarsh has developed on a muddy substrate. There are small amounts of MSM on this saltmarsh. Common Cordgrass has colonised parts of this saltmarsh along he southern side and has also infilled small patches of mudflats between small saltmarsh 'islands'. The river channel is positioned on the west side of this saltmarsh and there are smaller minor channels on the east side near the shoreline that are infilling with Common Cordgrass. A saltmarsh cliff is present along the western (channel) side of this saltmarsh and marks the lower boundary. This large area has been established for a relatively long time and is marked on the 1<sup>st</sup> edition OSI 6 inch map.

Further south there are several smaller patches of saltmarsh isolated from the main section. These smaller patches are younger and are subject to changes related to changes in the position of the channel. Therefore, they are more dynamic. One of these sections has an area of saltmarsh where there is some accretion and there is zonation between *Salicornia* flats, *Spartina* sward and pioneer ASM. There is also some saltmarsh development on the west side of the main channel.

#### Glanduff

This saltmarsh is located at the northern end of the inlet. The saltmarsh is found behind an old berm that is built on along the seaward edge and is now breached at several locations. A

drain is positioned along the inner side of this berm. The berm is covered with coastal grassland and there are also patches of scrub along the berm. This saltmarsh was reclaimed in the past but has now reverted back to the saltmarsh. The saltmarsh is dominated by ASM and is sub-divided into several sections by drains. There is a small amount of *Spartina* sward at the southern end of the area. There are several small patches of ASM in the main river channel outside the berm. There is some transition along the landward side of this saltmarsh to a non Annex I saltmarsh community dominated by Sea Club-rush.

At the northern end of the inlet a small amount of reed marsh dominated by Sea Club-rush has developed. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project. A transition between this vegetation and a small amount of wet grassland is present at the point where the highest tide flows up the river. Twitch (*Elytrigia repens*)-dominated grassland was also classified as other saltmarsh (CM2).

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	1.183
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	11.040
1410	Mediterranean salt meadows (Juncetalia maritimi)	3.937
non-Annex	Spartina swards	4.926
	Total	21.086

Table 3.1.	Area of saltmarsh	habitats mapped	at Harbour View.
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<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

There is a significant and notable area of *Salicornia* flats developed at this site. The largest area has developed on a raised accreting muddy sandflat bank adjacent to *Spartina* sward at Garreneteen Strand East. There are few other saltmarsh species within this area apart from scattered clumps of Common Cordgrass (overall cover < 1% within the *Salicornia* flat habitat). Some of this habitat adjacent to the *Spartina* sward on the eastern side could be classified as pioneer ASM with the appearance of species Common Saltmarsh-grass, Sea Purslane, Laxflowered Sea Lavender and Sea Pink and Greater Sea Spurrey with the *Salicornia* flats habitat and the adjacent *Spartina* sward, which is quite open and contains abundant bare substrate cover. This may be a indication of succession to ASM at this location in the future.

A narrow band of *Salicornia* flats has also developed along the east side of the ASM and *Spartina* sward at Garreneteen Strand. Small clumps of Common Cordgrass are locally frequent within this habitat. The *Salicornia* flats have developed adjacent to the edge of the ASM dominated by Sea Purslane.

There is a small amount of *Salicornia* flats to the north of the road bridge. This is also developing on an accreting mud bank in association with *Spartina* swards and pioneer ASM. Small clumps of Common Cordgrass are found within this *Salicornia* flat (overall cover < 5%).

## 3.3 Atlantic salt meadows (H1330)

The ASM is quite well-developed and is also quite diverse in structure due to the presence of saltmarsh of various ages, including some relatively young saltmarsh, and the development of saltmarsh on different substrates.

Several vegetation communities are present within the ASM at this site. This is best seen at Garreneteen Strand. The ASM is divided into several sections by several features such as the main track and several old embankments. ASM saltmarsh to the east of the track is dominated by a low marsh community and has indicators of being relatively young and undeveloped compared to other more established saltmarsh. ... This is dominated by Sea Purslane and Common Saltmarsh-grass. There are signs of natural succession within this ASM with the spread of Sea Purslane and some more established sections are dominated by this species. Other species present include Glasswort, Sea Pink, Sea Plantain, Annual Seablite, green algae and Red Fescue. A mid-marsh community dominated by a typical *Armeria-Plantago* sward along the track.

An upper marsh community has developed along the north-east sandy ridge at Garreneteen Strand. This community is dominated by Red Fescue and also contains Sea Purslane, Common Scurry-grass, Long Bracted Sedge, Sea Plantain, Sea Milkwort, Sand Couch (*Elytrigia atherica*) and Sea Beet. There are also some transitional species present such as Curled Dock, Birdsfoot, Kidney Vetch present along the landward boundary with the fixed dune.

A mid-marsh community has developed on the north-west side of the main ridge that divides the Garreneteen Strand saltmarsh. This community is dominated by Sea Plantain and contains locally frequent clumps of Common Cordgrass (10-20%). The saltmarsh topography is very well-developed in this area and there are frequent salt pans present.

The lower-mid marsh ASM at Garreneteen Strand has locally frequent clumps of Common Cordgrass spread through this habitat. The Common Cordgrass has largely colonised creeks and salt pans within this zone. Some of this saltmarsh is classified as a mosaic of ASM and *Spartina* sward due to the frequency of these clumps. This community also contains frequent Sea Purslane, Common Saltmarsh-grass and occasional Sea Aster, Lax-flowered Sea Lavender and Sea Arrowgrass. Small patches of Common Cordgrass are also scattered of the established saltmarsh to the north of the road bridge.

The ASM saltmarsh found north of the road bridge is largely dominated by a mid marsh Sea Plantain sward. Common Cordgrass is present within creeks and pans of this saltmarsh and the overall cover within this area is 5-10%. The pans also contain a low marsh community dominated by Common Saltmarsh-grass and Sea Purslane. This saltmarsh also contains scattered clumps of Sea Rush at low densities, so it was not mapped as MSM. The saltmarsh topography is well developed in this area and there are frequent salt pans and creeks. Some of the saltmarsh is quite fragmented at the southern end.

The large area of ASM found at Glanduff is protected by an old berm, which is now breached in several places. This saltmarsh was reclaimed in the past and there are signs of drainage. However, some old pans and creeks still remain within the saltmarsh. Several typical ASM communities are present within this area including a low marsh sward dominated by Common Saltmarsh-grass along some of the creeks and drainage channels, a typical mid marsh Sea Plantain sward, a mid-upper sward dominated by Saltmarsh Rush and an upper zone with Red Fescue, Saltmarsh Rush and Creeping Bent all frequent.

The ASM sward is mostly ungrazed with different heights due to different communities. The ASM saltmarsh at Glanduff is quite rank and has a tall sward in places due to the lack of grazing.

## 3.4 Mediterranean salt meadows (H1410)

The MSM at this site is best developed at Garrensteen Strand. This saltmarsh is an excellent example of zonation on a gradual slope from typical MSM sward into a transitional zone and then into a terrestrial zone dominated by scrub. There are also small patches of MSM in the saltmarsh north of the road bridge.

The MSM is typically dominated by Sea Rush. Some of the MSM contains patchy clumps of Sea Rush intermixed with grassy ASM vegetation. The denser MSM also contains Red Fescue, Parsley Water-dropwort and Sea Arrowgrass. ASM can extend into the MSM habitat, especially along the creeks, which are frequently dominated by Sea Purslane.

There is very little Common Cordgrass within the MSM and this is mainly confined to saltmarsh pans and creeks within the MSM habitat. There are also rare large clumps of sharp Rush within the MSM dominated by Sea Rush.

The MSM transitions to a transitional type vegetation along its landward boundary at the south-west end of Garreneteen Strand. This community develops on a slight slope. This transitional community also contains Sea Rush but also contains Bindweed, Red Fescue, Twitch, Yellow Flag, Sliverweed (*Potentilla anserina*), Scrub dominated by Bramble develops at higher level on the slope that is outside the influence of the highest tides.

The MSM transitions to more typical fixed dune or coastal grassland at the south-east end of the MSM. There is a wide brackish transitional zone that contains frequent Sea Rush but also contains elements of damp fixed dune such as Glaucous Sedge (*Carex flacca*), Silverweed, Birdsfoot and Sand Sedge (*Carex arenaria*). There are small shallow hollows within the transitional area that contain more typical saltmarsh vegetation.

A rarer community dominated by Sharp Rush is also present at this site at Garreneteen Strand. This species is found along the upper saltmarsh and fixed dune boundary. A transitional fixed dune community with Sharp Rush has already been described. A second community characterised by frequent Sharp Rush (30-40% cover) and more typical of saltmarsh is also present in small areas. This community is found along the fixed dune ridge that divides the saltmarsh into two main sections. This community also contains Red Fescue and some Twitch. This community is also found at the very upper limit of the saltmarsh located at the south-west corner of the site. This area contains dense clumps of Sharp Rush. There is some zonation within this area. Bindweed and Silverweed are present in the upper zone adjacent to the fixed dune habitat. Other species such as White Clover and Birdsfoot appear in the lower zone.

## 3.5 Spartina swards

A dense mature *Spartina* sward has developed at Garreneteen Strand. This is the most mature sward and contains and extensive saltmarsh creeks. This sward has developed on previously unvegetated mud and sand flats. There is some succession of the ASM along the creek edges, which are dominated by Sea Purslane. There are also patches within this sward that could be classified as a *Spartina* sward/ASM mosaic due the frequency of Sea Purslane and Common Saltmarsh-grass within the sward at various places. There is a natural transition along the landward boundary of this sward to ASM. The upper part of the sward along the ASM boundary contains frequent Sea Purslane, Common Saltmarsh-grass and occasional Sea Aster, Common Scurvy-grass and Greater Sea-spurrey. There is a natural transition to a narrow band of *Salicornia* flats along the eastern side of this sward.

There is also some Common Cordgrass within the adjacent ASM and *Salicornia* flats at Garreneteen Strand. However, most of this Common Cordgrass is at a low density and there are few large dense patches that were mapped as *Spartina* sward. Some of this saltmarsh has been mapped as a *Spartina* sward/ASM mosaic where *Spartina* is more frequent. Common Cordgrass seems to be spreading into the lower saltmarsh damaged by ploughing or drainage and forming mosaic areas.

A younger *Spartina* sward has developed on a raised muddy sandflat bank at Garreneteen Strand East. This sward is quite dense and there are some signs of succession within this sward to ASM along the western side. This side is quite open and is situated adjacent to *Salicornia* flats. There were some signs that this sward was spreading towards the southern end of this sward.

Smaller patches of *Spartina* sward are present on the saltmarsh north of the road bridge. These swards have generally colonised on bare mudflats that are found between some of the saltmarsh fragments and has infilled some of these areas, forming a mosaic with the more established ASM. Common Cordgrass has also spread into some of the open saltmarsh habitats such as pioneer ASM and *Salicornia* flats on raised mudflats where there is accretion.

Common Cordgrass has also infilled some salt pans within the established saltmarsh north of the road bridge and in the enclosed saltmarsh at Glanduff.

#### 4 IMPACTS AND ACTIVITIES

The site is affected by several different impacts and activities (Table 3.1). Most of the saltmarsh is not grazed by livestock. The only section that may be grazed is the enclosed formerly reclaimed area at Glanduff. This area was not been grazed at the time of the survey but there are signs of grazing in previous years. The NPWS conservation plan noted that the saltmarsh at Garreneteen Strand had been grazed in the past by cattle and horses.

There are frequent signs of disturbance to the saltmarsh at Garreneteen Strand that is related to relatively easy access by vehicles and amenity use. This area is disturbed by an established track across the saltmarsh and dunes that is regularly used by vehicles (501). There are patches of ASM with frequent wheel ruts. The NPWS conservation plan notes that the sand dunes and salt marsh are used by ATV vehicles (623). Some of the saltmarsh to the east of the main track has been recently ploughed. This may be related to cleaning of tractor ploughs with sand or setting up the plough for ploughing competitions (like in Strangford Lough). This activity was noted by the NPWS conservation plan. There are older signs of ploughing and disturbance to this area with the appearance of vegetated channels and ridges in this saltmarsh. Ploughing of the ASM may promote the spread of Common Cordgrass into the ASM and also creates pioneer ASM saltmarsh vegetation.

Common Cordgrass is present at this site. This is an invasive species of saltmarsh and mudflats (954). It is not known when it appeared in Courtmacsherry Estuary but is likely to have been here for at least 40 years. Nairn (1986) notes that it has been present since 1960. The first ASI report (Fahy 1972) noted the presence of Common Cordgrass in the Courtmacsherry Estuary. Common Cordgrass has formed two large areas of *Spartina* sward at Garreneteen Strand and Garreneteen Strand East on former mudflats. Both these sward areas are relatively young and have developed in areas where there was no saltmarsh in the

past. The development of the *Spartina* sward is probably related to the growth of the saltmarsh in general in response to the growth of the sand spit and changes in sediment accretion at these two locations. Other saltmarsh habitats such as pioneer ASM and *Salicornia flats* may have been more extensive at these two locations in the past.

There are smaller more frequent patches of *Spartina* sward in the saltmarsh north of the road bridge and at Glanduff. Most of this sward has developed on mudflats adjacent to the established saltmarsh, which is quite fragmented at the southern end. Common Cordgrass has infilled small areas between these fragments of saltmarsh. Common Cordgrass has also developed on accreting areas further south in association with *Salicornia* flats and pioneer ASM. This is the main reason for an assessment of the presence of Common Cordgrass as having a negative impact on the *Salicornia* flats and some of the ASM. It has no major impact on the MSM at this site.

There were no significant signs of recent significant expansion of *Spartina* sward during the field survey. An examination of the OSI 1995, 2000 and 2005 aerial photo series and the field survey GPS points indicates that there has not been much expansion of *Spartina* sward during this period. The NPWS Conservation management plan also noted that the spread of Common Cordgrass had abated in recent times (2000). The largest area of *Spartina* sward at Garreneteen Strand is quite mature and there has been some succession to ASM dominated by Sea Purslane along the saltmarsh creeks within the sward. There has been a small expansion of the sward at the southern end of Garreneteen Strand East in the recent past. There are also small clumps associated with the narrow mudflat channels on the east side of the established saltmarsh north of the road bridge that indicate potential spread in the recent past and the in the future.

There are significant signs of accretion (910) and the growth of saltmarsh at this site. This has mainly occurred at Garreneteen Strand where the 2<sup>nd</sup> edition 6 inch map maps a much reduced sand dune spit and associated saltmarsh compared to its current status. The saltmarsh and sand dune spit have grown in length and width in the past 100 years. There are still signs of accretion along the east side of this saltmarsh with the presence of a narrow band a *Salicornia* flats habitats. The saltmarsh at Garreneteen Strand East is also relatively newly established and was not mapped in the 2<sup>nd</sup> edition OSI map. Signs of recent accretion and saltmarsh growth were also noted in some of the younger patches of saltmarsh north of the road bridge. However, an examination of the OSI 1995, 2000 and 2005 aerial photo series and the field survey GPS points indicates there has been no significant growth of saltmarsh within the current monitoring period. The accretional trend means that accretion is assessed as having a positive impact on the *Salicornia* flats and a portion of the ASM. There was no evidence of any erosion of saltmarsh at the site.

There are indications of the natural succession of some of the *Salicornia* flats into ASM (990), particularly at Garreneteen Strand East.

There are signs of old drainage attempts within the saltmarsh at Garreneteen Strand. This saltmarsh is relatively young compared to the rest of the saltmarsh north of the road bridge so these may be related to more recent drainage attempts. The saltmarsh at Glanduff was also reclaimed in the past but has since reverted back to saltmarsh when the berms were breached (802). The NPWS Conservation management plan noted that a small area of saltmarsh and mudflats north-east of Garreneteen Strand had been infilled and reclaimed (802). These impacts were not assessed as they occurred prior to the current monitoring period.

The NPWS Conservation management plan noted eutrophication within the estuary and this was related to agricultural practises and sewage from villages such as Kilbrittain (420). Extensive green alga mats were noted along the east side of Garreneteen Stand and covering the lower saltmarsh including the ASM and *Salicornia* flats.

Impacts and activities adjacent to the site include agriculture (102, 120, 140), scattered habitation (403) and roads (502). Related impacts such as runoff from the road may have some impact on the saltmarsh but these impacts are low or not detected.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	910	С	+1	1.183	Inside
1310	954	С	-1	1.183	Inside
1310	990	С	0	0.05	Inside
1330	502	С	-1	0.5	Inside
1330	623	С	-1	0.5	Inside
1330	910	С	0	0.5	Inside
1330	954	В	-1	1.5	Inside
1410	954	С	0	0.05	Inside

Table 4.1. Intensity of various activities on saltmarsh habitats at Harbour View.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> 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.

Harbour View saltmarsh contains several notable conservation features, including a large area of saltmarsh being part of a larger coastal system dominated by a sand dune spit. There are also notable natural transitions between saltmarsh communities and to adjacent sand dune and brackish wet grassland communities, pioneer ASM is present, there is a notable extent of *Salicornia* flats (> 1 ha) and there is development of saltmarsh on sand and muddy substrates, increasing the diversity of the saltmarsh communities and its structure. Sharp Rush is also present at this site and is found along the upper saltmarsh boundary and on adjacent fixed dune habitat. Some of this Sharp Rush can be classified as a rarer form of

MSM (dominated by Sharp Rush) and this habitat type is very rare on saltmarsh around the coast of Ireland. It was found on four sites during the SMP (out of 133 sites).

The overall conservation status of this site is *unfavourable-inadequate* (Table 5.1). Most of the habitat is in good condition. However, this assessment takes account of the fact that some of the saltmarsh has been damaged by long-term vehicle use and by ploughing. Common Cordgrass is present at the site and this poses a threat to the *Salicornia* flats. The CMP report assessed the conservation status of the adjacent fixed dunes as *unfavourable-inadequate*, partly due to the presence of well worn tracks though this habitat. The assessment for the other dune habitats were assessed as *favourable*.

Nearly the entire saltmarsh habitat is located within Courtmacsherry cSAC. There is an old format NPWS Conservation management plan available for this site.

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

 Table 5.1.
 Conservation status of Annex I saltmarsh habitats at Harbour View.

## 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 a notable amount of this habitat present at this site. There are no indications of any loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. This habitat is found adjacent to *Spartina* swards and it is likely that it may have occupied parts of these accreting areas prior to the development of these swards. However, the development of these swards is not assessed as they mainly developed prior to the current monitoring period.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Three stops were carried out in this habitat and they all passed. All the attributes required for the favourable conservation of the habitat reached their targets. This habitat is dominated by Glasswort. There is some Annual Sea-blite present. Some patches are more diverse and could be

classified as pioneer ASM. The main impact affecting this habitat is the presence of Common Cordgrass, an invasive species. Small clumps of this species are found in this habitat at low densities (< 1% - 5%). There are few other impacts affecting this habitat at this site. This habitat is developing on accreting muddy banks. Accretion is still occurring and this is a positive indicator for this species

#### 5.2.3 Future prospects

The future prospects of the habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in the near future. Common Cordgrass is present at in this habitat at low densities and this habitat is also located adjacent to *Spartina* sward. This species has the potential to continue to spread in the future at the expense of *Salicornia* flats habitat, although there are no indications that it is spreading significantly at the moment. It should also be noted that *Salicornia* flats habitat is a pioneer saltmarsh habitat so some succession to other saltmarsh habitats could be expected. There are indications that this is already occurring at Garreneteen Strand East and in the saltmarsh north of the road bridge. Continued accretion is required to maintain the current extent of this habitat and this is also unlikely in the long-term. There are few other impacts or activities that can negatively affect 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 significant loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. There is significant evidence of the growth of saltmarsh including ASM at Garreneteen Strand in the past 100 years. This is a positive indicator. Some of the ASM is relatively young and immature. However, there has been no measurable growth of the saltmarsh within the current monitoring period.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Sixteen monitoring stops were carried out in this habitat and all the stops passed. All the attributes required for the favourable conservation of the habitat reached their targets. Most of the saltmarsh is in good condition and the monitoring stops reflect this. The site is not grazed and there is no poaching damage. However, some of the saltmarsh at Garreneteen Strand has been damaged by long-term vehicle use and ploughing. The ploughing may promote the spread of Common Cordgrass into the ASM in the damaged areas. The assessment for habitat structure and functions was therefore re-assessed as *unfavourable-inadequate*.

The ASM at this site has a typical species assemblage. There are several ASM communities present including typical communities of mud and sandy substrates. The zonation within this saltmarsh is particularly well-developed and there is zonation within the ASM as well as natural transitions to other saltmarsh habitats. Some of the ASM is relatively young and immature and there is also a significant area of pioneer ASM at Garreneteen Strand. The saltmarsh topography is well-developed at this site. The sward height is quite variable and is related to the variation in ASM plant communities.

Common Cordgrass is present in this habitat (a negative indicator), although overall it is found at low densities and is confined to creeks and pans in large sections of the ASM. There are

small areas where Common Cordgrass has formed a mosaic with the ASM and has a more frequent cover value. However, there is no evidence of any expansion of Common Cordgrass within the ASM in current monitoring period, mainly due to the lack of accurate baseline data), so the impact of its spread is assessed as neutral.

#### 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. The habitat is being damaged by vehicle use and ploughing. Most of the habitat is located within the cSAC boundary so the habitat should not be affected by any land-use changes that have to be licensed by local or national authorities.

Common Cordgrass is present at this site and is found on the ASM. There may be some potential for the spread of this species into this habitat in the future. However, not all the ASM is vulnerable to the spread of this species. The pioneer ASM has largely developed on sandy substrate at Garreneteen Strand, which is less suitable for widespread colonisation of Common Cordgrass compared to muddy sediment.

An old format NPWS Conservation management plan is available for this site and it already contains objectives to mitigate some of the damaging impacts to the saltmarsh, such as reducing vehicle use and preventing ploughing. However, these activities are still continuing.

## 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

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

#### 5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Nine stops were carried out in this habitat and they all passed. All the attributes required for the favourable conservation of the habitat reached their targets. This habitat is in good condition. It contains a typical species assemblage. The habitat is not grazed and there is variable sward height. This site contains an excellent example of zonation within the MSM and also natural unmodified transitions to other habitats such as fixed dune and damper brackish coastal grassland. Rare clumps of Sharp Rush are also present within this habitat. Common Cordgrass is also present in this habitat but is quite rare and is confined to creeks and salt pans.

Harbour View saltmarsh is notable for the presence of small patches of a rarer type of MSM dominated by Sharp Rush. This species can also be considered a species of local distinctiveness. This vegetation type is much rarer than the more typical MSM vegetation type dominated by Sea Rush.

#### 5.4.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts or activities significantly affecting this habitat. This habitat is not vulnerable

to the spread of Common Cordgrass. There are indications of natural vegetation succession along the upper MSM boundary. Some of the saltmarsh may naturally develop into more brackish grassland with along the back of the sand dunes as the saltmarsh grows.

## **6 MANAGEMENT RECOMMENDATIONS**

There are no specific management recommendations for this site.

## 7 REFERENCES

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

Fahy, E. (1972). A Preliminary Report on Areas of Scientific Interest in County Cork. Dublin, An Foras Forbartha.

## 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats	1.183	1.183				
2	Spartina swards	4.657					4.657
3	1330 Atlantic salt meadow	10.319		10.319			
4	1410 Mediterranean salt meadow	3.455			3.455		
5	ASM/MSM mosaic (50/50)	0.879		0.482	0.482		
6	ASM/Spartina mosaic	0.475		0.237			0.237
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	8.129					
10	Spartina clump/mudflat mosaic (50/50)	0.063					0.031
11	Isolated Spartina clumps on mud (5%)	0.022					0.000
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.393					
19	1330/rocky shore mosaic	0.002		0.001			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	30.662	1.183	11.04	3.937		4.926

#### Table 8.1. Areas of SMP habitats mapped using GIS.



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Saltmarsh Monitoring Project 2007-2008 Harbourview (Map 1 of 3)

Courtmacsharry Estuary SAC (001230)

This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)

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Date of production: 22/02/2009

Map version: 1

Original Drawing Size: 297 x 420 (A3)

Scale 1:5000

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Contribution of the service and the service of the

Saltmarsh Monitoring Project 2007-2008 Harbourview (Map 2 of 3)

Courtmacsharry Estuary SAC (001230)

This habitat map was created with a combination of file and interpretation of aeral photos. Boundaries of design are subject to revision. Produced from Ordnance Surv permission of the Government (Permit number 5953)

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Saltmarsh Monitoring Project 2007-2008

Harbourview (Map 3 of 3)

Courtmacsharry Estuary SAC (001230)

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This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)

SMP0062

Date of production: 22/02/2009 Original Drawing Size: 297 x 420 (A3) Scale 1:5000 Map version: 1

# Jamesbrook Hall

#### **1 SITE DETAILS**

SMP site name: Jame	esbrook Hall	SMP site code: SMP0056					
Date of site visit 04/0	6/2008	CMP site code: N/A	CMP site code: N/A				
SM inventory site nam	ne: <b>Jamesbrook Hall</b>	SM inventory site coc	SM inventory site code: 199				
NPWS Site Name: Rostellan Lough, Aghada Shore and Poulnabibe Inlet							
NPWS designation	cSAC: N/A	MPSU Plan: N/A					
	pNHA: <b>1076</b>	SPA: <b>4043</b>					
County: Cork		Discovery Map: 81	Grid Ref: 188160, 067495				
Aerial photos (2000 series): O 6432-D; O 6433- C; O 6474-B		6 inch Map No: <b>Co 0</b>	6 inch Map No: <b>Co 088</b>				
Other SMP sites within this NHA: None							
Saltmarsh type: Estua	ary S	Substrate type: Mud					

## 2 SITE DESCRIPTION

Jamesbrook Hall saltmarsh is located on the east side of Cork Harbour in Co. Cork. The site is located 5.5 km south of Midleton Town. The saltmarsh has developed in a narrow sheltered inlet of Cork Harbour called Poulnabibe Inlet. This inlet is also known as Saleen Creek. The inlet is orientated east-west and there is a steep hillside on the northern side. A minor road is located along the northern shoreline. The southern and eastern side of the inlets are covered in mature mixed conifer woodland and there is generally a steep slope along much of this shoreline.

The inlet is sheltered somewhat by a shingle bank at the western end of the inlet that is connected to the southern shore. Saltmarsh has developed in the sheltered are behind this bank. Saltmarsh has also developed at two other locations where the shoreline is low-lying and affected by tidal inundations. Most of the saltmarsh is found along the southern shore with only several fragments along the northern shoreline. A small river flows into the inlet at the eastern end. The inlet drains at low tide to expose soft intertidal mudflats.

The majority of the site is located within the Rostellan Lough, Aghada Shore and Poulnabibe Inlet pNHA. This pNHA covers much of the shoreline habitats along the Cork Harbour shoreline from this inlet south to Agthada. Much of the pNHA is intertidal and is important for wintering and resident waterbirds. Three Annex I saltmarsh habitats were recorded at Jamesbrook Hall saltmarsh, *Salicornia* flats (1310), Atlantic salt meadow (ASM) and Mediterranean salt meadows (MSM). There is also some development of *Spartina* swards within this site, although this is not considered to qualify as an Annex I habitat. The nearest saltmarsh on the SM inventory (Curtis and Sheehy-Skeffington 1998) is Bawnard and this is located to the north of Jamesbrook hall in the Great Island Channel.

Most of saltmarsh habitat mapped at this site is located within the cSAC boundary. However there are several small patches located outside the boundary. This is mainly due to the fact that at one location an arbitrary line was used to draw the pNHA boundary and saltmarsh habitat extends beyond this boundary. Some saltmarsh habitat is also excluded by the digital pNHA boundary along the northern side of the inlet due to a small offset between the OSI 6 inch map series and the OSI 2000 & 2005 aerial photo series. The northern shoreline was used as the pNHA boundary but due to the slight offset the saltmarsh habitat along the shoreline is located north of this digital boundary and outside the pNHA (but inside if the 6 inch maps are used to distinguish the NHA boundary).

The site was accessed via the Coillte woodland at Oldtown and also by Coillte tracks at Saleen.

## 3 SALTMARSH HABITATS

#### 3.1 General description

The saltmarsh at this site is found in three main sections or sub-sites, saltmarsh behind the shingle spit at the western end of the site, and two small areas influenced at the eastern end of the inlet. The main saltmarsh habitat at this site is Atlantic salt meadows (Table 3.1). Each sub-site is dominated by this habitat.

#### Western saltmarsh

The western saltmarsh has developed behind a shingle bank. The bank is vegetated with dry grassland and some scrub. There have been attempts to reclaim this saltmarsh in the past and a small embankment or seawall (1m high) was built along the seaward side of the saltmarsh to attempt to enclose it. These reclamation attempts date back to the 19<sup>th</sup> century. However, there is a large breach in the middle of the seawall that allows tidal inundation of this saltmarsh. The seawall is vegetated by Twitch-dominated grassland and it has some elements of vegetation found along the upper saltmarsh boundary such as Sea Beet (*Beta maritima*) and Curled Dock (*Rumex crispus*). These stands have been classified and mapped as CM2 or other non-Annex saltmarsh vegetation in accordance with the SMP project classification.

This saltmarsh is largely dominated by ASM. Clumps of Common Cordgrass are also frequently found in places on this saltmarsh and form small patches of *Spartina* swards in places. There is a narrow band of MSM along the central part of the saltmarsh. *Salicornia* flats have developed on the seaward side of the old seawall in the northern section of saltmarsh and along on a smaller shingle bank a small patch of ASM towards the east. A small patch of *Spartina* swards is also found on the seaward side of the seaward side seaward side of the seaward side seaward side of the seaward side seaward side of the seaward sea

The southern boundary of the saltmarsh is shaded by tall mature woodland. There is no transitional habitat along this boundary as the trees are growing on a tall bank. There are natural unmodified transitions to dry grassland along the shingle bank on the western and northern boundaries of the saltmarsh.

#### **Central saltmarsh**

This saltmarsh has developed in a formerly reclaimed area that was planted with woodland (1<sup>st</sup> edition OSI 6 inch map). The saltmarsh has developed in a low-lying circular area with the western side adjacent to the inlet and is also surrounded by tall mature mixed woodland

on higher land on the other sides. A seawall was built along the western side of the saltmarsh to enclose this piece of land but this has now been breached at the northern end and the land has reverted back to saltmarsh. There are signs of the former reclamation attempts with regular drains through this saltmarsh. The saltmarsh is dominated by ASM with some development of MSM along the landward boundary of the saltmarsh. Common Cordgrass is also found on this saltmarsh but is much less frequent and forms several small patches of *Spartina* sward. There is a moderate slope from adjacent woodland to the saltmarsh. A narrow zone of dry grassland has developed in places between the woodland and the saltmarsh along the southern boundary and this is shaded by the tall trees. There is a wider band of Twitch-dominated grassland along the eastern boundary on a slightly elevated ridge situated above the saltmarsh.

#### Eastern saltmarsh

This saltmarsh is the smallest found in Poulnabibe Inlet. It has also been enclosed by a low embankment along the northern boundary in the past and there are also signs of attempted reclamation with regular linear drains through the saltmarsh. This saltmarsh is also dominated by ASM with a small patch of MSM also present. There is a narrow transitional band of brackish grassland along the landward side of this saltmarsh and this grassland then transitions to scrub on drier higher ground. No Common Cordgrass was noted in this saltmarsh. However there are several small patches of *Spartina* sward developing on the mudflats within the inlet. Twitch-dominated grassland and patches of Sea Club-rush are found along the northern shoreline adjacent to this saltmarsh. These stands have been classified and mapped as CM2 or other non-Annex saltmarsh vegetation in accordance with the SMP project classification.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	0.082
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	4.140
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.287
non-Annex	Spartina swards	0.144
	Total*	4.653

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

This habitat is found on the seaward side of the western saltmarsh, outside the old seawall that protects this saltmarsh. There is a moderately sloped ridge of shingle material along the front of this seawall that is vegetated by a narrow band of Glasswort several metres wide. Other species present include occasional Common Saltmarsh-grass, Annual Sea-blite and Greater Sea-spurrey. There are also several clumps of Common Cordgrass. This vegetation transitions along the upper boundary to lower ASM dominated by Sea Purslane.

The shingle ridge extends eastwards and a second small knoll of saltmarsh has developed at the end of this ridge. *Salicornia* flats at found around the edges of this small patch of ASM and on the lower ridge between this small ASM and the main saltmarsh. This Glasswort is found on softer mud and there is occasionally frequent green algal cover also present.

## 3.3 Atlantic salt meadows (H1330)

This habitat is moderately well-developed at this site. Several vegetation communities are present and there is some development of saltmarsh topography. However the creek morphology has been modified by the drainage and attempted reclamation of these areas. The western saltmarsh is notable for the large area of lower zone saltmarsh dominated by Sea Purslane and Common Saltmarsh-grass. This community also contains small amounts of Common Scurvy-grass, Sea Aster, Lax-flowered Sea Lavender and Sea Pink. Small clumps of Common Cordgrass are also present, particularly in some of the drains and salt pans.

There is notable development of mid marsh and mid-upper marsh vegetation in the central saltmarsh. The mid zone is a typical short sward community dominated by a combination of Sea Arrowgrass, Sea Plantain and Sea Pink. Other species present include Lax-flowered Sea Lavender, Red Fescue, Common Saltmarsh-grass and Saltmarsh Rush. This zone is also characterised by the presence of typical large irregularly shaped salt pans. Common Cordgrass is present in this community but is confined to the drains and salt pans in this area. The upper vegetation community is characterised by the greater dominance of Red Fescue and Saltmarsh Rush and is found along the embankment along the seawall and along the back of the saltmarsh near the landward boundary.

The vegetation of the eastern saltmarsh is characterised by the presence of rank upper zone grassland dominated by Red Fescue. Other species occasionally found within this vegetation type include Sea Arrowgrass, Sea Plantain Sea Rush and Sea Milkwort. Twitch and Sea Mayweed are also found within the ASM on elevated tussocks in this marsh.

## 3.4 Mediterranean salt meadows (H1410)

This habitat is found in small portions on each of the three saltmarshes. These patches are characterised by the presence of Sea Rush. The cover of Sea Rush is sometimes quite sparse in places with these patches. Several zones or vegetation types are present. Sea Rush is quite dense and tussocky within the eastern saltmarsh due to the lack of grazing. This MSM is dominated by grasses, especially Red Fescue. Other species present include Creeping Bent, Saltmarsh Rush, Sea Arrowgrass and Spear-leaved Orache. Some lower zone species such as Sea Aster and Common Saltmarsh-grass are present along the drains within this area. There are also transitional elements within the vegetation and Sea Rush can be found mixed with Twitch in places. Other transitional species include Sea Mayweed.

MSM found on the central saltmarsh is a mid-upper marsh type. Sea Rush is found associated with both upper grassy vegetation and other mid-upper vegetation dominated by Sea Arrowgrass and Saltmarsh Rush. Other species present within this community at low cover values include Sea Plantain, Sea Pink, Lax-flowered Sea Lavender, Sea Purslane and Red Fescue. There are some large salt pans present within this habitat. These pans probably developed after the site reverted back to saltmarsh. Common Cordgrass is present within the salt pan.

## 3.5 Spartina swards

There is a small amount of this habitat present in Saleen Creek. Most of the intertidal flats remain unvegetated. There are several small patches of sward located at the eastern end on soft mud where the inlet is narrow. There are also clumps scattered around the shoreline. A small patch has also developed on a small shingle bar adjacent to the seawall of the western

saltmarsh. This patch has not completely coalesced to form a complete sward. There are patches of bare substrate within the sward which are vegetated with patches of Glasswort. There is also frequent green algal cover within the sward.

There are also several patches of sward mapped within the western and central saltmarshes. These patches are dominated by Common Cordgrass but also contain frequent cover of Sea Purslane and Common Saltmarsh-grass. Common Cordgrass clumps are also occasionally frequent within the ASM (but not mapped) and also appear in some of the drains in both saltmarshes.

#### 4 IMPACTS AND ACTIVITIES

There are few impacts or activities affecting this site (Table 4.1). The saltmarshes are located adjacent to old mixed Coillte woodland and are therefore quite isolated from impacts and are not subject to significant damaging activities related to development or farming. The saltmarsh is not grazed by livestock and the vegetation is quite rank in places, particularly in the eastern sub-site. The lack of grazing may be influenced by the development of the Twitch-dominated grassland in places along the landward boundary of the saltmarsh.

The main impact affecting this site is the presence of Common Cordgrass. This is an invasive species of saltmarsh (954). It was planted in Cork Harbour at Inchera House, Little Island in 1925 (Glavin 1947) although it is not known when it appeared in this part of the estuary (Saleen Creek). There is no extensive development of *Spartina* sward in Saleen Creek and it is mainly represented by a few small patches and occasional clumps scattered along the shoreline on the mudflats. Common Cordgrass is found on the western saltmarsh and is occasionally frequent in cover, forming small patches of *Spartina* swards within the ASM and associated with some pans. For this reason its impact is assessed as negative impact (-1). It is also found outside the seawall and adjacent to the *Salicornia* flats. It is also present on the central saltmarsh, but with reduced cover, but is not found on the eastern saltmarsh. It does not affect the MSM. There are no indications that it has spread significantly during the current monitoring period from the survey or from an examination of the aerial photos. The western saltmarsh may be more vulnerable to the spread of Common Cordgrass in the future as this saltmarsh has a significant area of low marsh vegetation.

There are no indications of any significant erosional trend at this site (900). Most of the saltmarsh is protected by old seawalls and this part of Cork Harbour is likely to be quite sheltered by the presence of the two shingle bars at the western side of the inlet. An accretion ridge on a shingle bank is present along the outer seaward side of the western saltmarsh and *Salicornia* flats have colonised along the edge of the ASM. A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been no significant changes to the shoreline during this period. A comparison of the 1995, 2000 and 2005 OSI aerial photos also shows that there has been no measurable loss of saltmarsh habitat by erosion during the monitoring period.

There are signs of old reclamation attempts on each of the three saltmarshes in the past with the presence of the seawalls and old drains in the saltmarsh (801). The central saltmarsh was planted with trees in the 18<sup>th</sup> century before the seawall was breached. The eastern saltmarsh was also planted to some extent in the past with forestry. There are few signs left that these sites were planted with trees apart from the regular drains though the marsh, which

are infilling but are still present in places. The impacts of these reclamation works are not assessed but they are likely to be having residual some impact on the development of the saltmarsh and the structure of the vegetation. For example, Common Cordgrass has spread into some of the drains that were dug across the saltmarsh.

Impacts and activities adjacent to the site include agriculture (100, 102, 120, 140) along the northern side of the inlet, scattered habitation (403), a minor road (502) and forestry (160) along the southern side of the inlet. These activities have little or no measurable impact on the saltmarsh habitat.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	954	С	-1	0.082	Inside
1330	954	С	-1	1.600	Inside

Table 4.1. Intensity of various activities on saltmarsh habitats at Jamesbrook Hall.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> 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.

Jamesbrook Hall saltmarsh has few features of significant conservation interest. The site does have three Annex I saltmarsh habitats present and some of the saltmarsh has redeveloped in areas that were previously reclaimed for forestry. The overall conservation status of this site is assessed as *unfavourable-inadequate* (Table 5.1). The saltmarsh is in good condition, is not grazed and is not affected significantly by damaging impacts and activities. Common Cordgrass is present at this site but does not form a significant area of *Spartina* sward and does not form a significant part of the ASM vegetation either. However, this invasive species does have the potential to reduce the extent of *Salicornia* flats vegetation in the future.

The site is not designated as an cSAC so there is no NPWS Conservation management plan available. The site may be included within the Coillte Biodiversity programme due to its proximity to Coillte property.

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

#### Table 5.1. Conservation status of Annex I saltmarsh habitats at Jamesbrook Hall.

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

#### 5.2.1 Extent

The extent of this habitat is assessed as *favourable*. It does not form a significant part of the saltmarsh at this site. There are no indications of any loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. This habitat is found in typical pioneer areas adjacent to the ASM. There is no indication that *Salicornia* flats were more extensive in the past.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. One monitoring stop was carried out in this habitat and is passed. Common Cordgrass is present within this habitat but it is low in overall cover (< 1-5%).

#### 5.2.3 Future prospects

The future prospects of the habitat are assessed as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts continue in the near future. Common Cordgrass is present at this site. This species has the potential to continue to spread in the future at the expense of *Salicornia* flats, although there are no indications that it is spreading at the moment. This is the main reason for the assessment of *unfavourable-inadequate*. There are few other impacts or activities that can negatively affect 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 that the extent of this habitat has been reduced during the current monitoring period due to land-use change, development or the spread of Common Cordgrass.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Six monitoring stops were carried out in this habitat and they all passed. All the attributes required for favourable conservation status reached their targets. This habitat is in good condition. It is not grazed. The species diversity is typical of this habitat and there are several different ASM communities present. There are natural transitions to coastal grassland along the landward boundaries on the shingle bar and in the other saltmarshes. Some transitional ASM-brackish grassland vegetation has developed in a narrow zone in the eastern saltmarsh. Some of the transitional vegetation is quite rank due to the lack of grazing. However the sward height overall is quite diverse due to the variety of vegetation types.

The saltmarsh creek and pan topography has been affected by old reclamation attempts and drainage, and these impacts are still likely to be affecting the structure and development of the saltmarshes. Common Cordgrass is present and this is a negative indicator. However, it only forms several small patches of *Spartina* swards within the ASM. Smaller clumps of Common Cordgrass are also present within the other ASM but overall it is generally low in cover within the ASM (< 5%).

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts significantly affecting this site. The main impact is the potential for Common Cordgrass to spread further at this site at the expense of ASM. Only the western saltmarsh is vulnerable to the spread of this species as the other two saltmarshes are dominated by mid and mid-upper saltmarsh communities in which Common Cordgrass does not have a competitive advantage. The western saltmarsh is dominated by low marsh vegetation with Sea Purslane prominent. If Common Cordgrass spreads into this community it is not likely to exclude the Sea Purslane and a mosaic type habitat of ASM and *Spartina* sward is likely to develop. Therefore the impact of the potential spread of Common Cordgrass is assessed as minor. This site is not located within a cSAC so there is no NPWS Conservation Plan available for this site.

## 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications that the extent of this habitat has been reduced during the current monitoring period due to land-use change, development or the spread of Common Cordgrass.

#### 5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Two monitoring stops were carried out in this habitat and they both passed. All the attributes required for favourable conservation status reached their targets. This habitat is not well developed at this site and is relatively small in extent. However, the small patches that are present are in good condition. They are not grazed and there are a variety of vegetation types present. The species diversity is typical of this habitat. Common Cordgrass is found in this habitat but is rare in cover. There are some saltmarsh topographical features within this habitat with some large salt pans. The saltmarsh topography has been damaged by drainage associated with the attempted reclamation of these saltmarshes.

#### 5.4.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts significantly affecting this site. The MSM is not vulnerable to the spread of Common Cordgrass due to its position in the mid-upper zones of the saltmarsh. This site is not located within a cSAC so there is no NPWS Conservation Plan available for this site.

## 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site.

## 7 REFERENCES

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

Glavin, H. (1947). *Spartina townsendii* H. and J. Groves - an experiment in reclamation. *Irish Naturalists' Journal*, **9**, 74-75.

## 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats	0.082	0.082				
2	Spartina swards	0.140					0.140
3	1330 Atlantic salt meadow	4.120		4.120			
4	1410 Mediterranean salt meadow	0.287			0.287		
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic	0.007		0.003			0.003
7	1330/other SM (CM2) mosaic	0.033		0.016			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	2.565					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)	0.000					
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.499					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	7.733	0.082	4.140	0.287		0.144

#### Table 8.1. Areas of SMP habitats mapped using GIS.



Cornshop, Octropent ague Histos Ánul Brytanment, Heltage and Local Government Nation al Parks and Wildlife Service Saltmarsh Monitoring Project 2007-2008

# Jamesbrook Hall

Rostellaan Lough, Aghada Shore and Poulnabibe Inlet NHA(001076)

This habitat map was creat and interpretation of aeral p are subject to revision. Pro permission of the Governm

	Legend         NHA Boundary         1310 Salicornia flats         Spartina swards         1330 Atlantic salt meadows         1410 Mediterranean salt meadows         Atlantic/Spartina mosaic         1330/other SM (CM2) mosaic	
SMP code: SMP0056	Is olated Spartin a clumps Other Saltmarsh (CM2) other 1310 monitoring stops 1330 monitoring stops 1410 monitoring stops 1410 monitoring stops	N A

## **Rock Castle, Brandon Estuary**

#### **1 SITE DETAILS**

SMP site name: Rock Castle, Bandon Estuary		ary	SMP site code: SMP0061				
Dates of site visit 05/06/2008			CMP site code: N/A				
SM inventory site name: Rock Castle, Bando Estuary		on	SM inventory site code: 190				
NPWS Site Name: Ba	andon Valley below Inis	shanı	non				
NPWS designation	cSAC: N/A		MPSU Plan: <b>N/A</b>				
	pNHA: <b>1515</b>		SPA: N/A				
County: Cork			Discovery Map: 87	Grid Ref: 157466, 052539			
Aerial photos (2000 series): O 6578-D; O 6579- C; O 6609-A,C; O 6639-A,B,C,D		<b>'9</b> -	6 inch Map No: <b>Co 111</b>				
Other SMP sites within this SAC/NHA: None							
Saltmarsh type: Estuary Su		Subs	trate type: <b>Mud</b>				

## 2 SITE DESCRIPTION

Rock Castle, Bandon Estuary is located in west Cork and 5 km west of Kinsale. The site is located along the upper intertidal section of the Bandon River Estuary. The area surveyed is located 2km south of Inishannon Town extends 6.5 km to Ballinadee Village. Rock Castle is the site of an old castle called Carriganassig Castle opposite Suippool Wood. This section of the Bandon River Estuary is quite narrow (100-300 m long) and sinuous with several bends and is characterised by relatively steep sloped hillsides along the estuary. This part of Co. Cork is fertile and the landscape is dominated by farmland over rolling hillsides with both improved grassland and land used for cultivation common. There are also some smaller patches of forestry along the estuary as well as patches of unimproved land on some very steep slopes that contain scrub. There is scattered habitation on both sides of the estuary. The northern section of the survey site had minor roads on both sides of the river valley close to the shoreline. However much of the southern shoreline could only be accessed by crossing adjacent farmland.

The tidal influence along the estuary extends up the river valley as far as Inishannon. This is a typical estuarine site and there is a brackish gradient along the survey site that influences the vegetation. Much of the marginal vegetation north of Suippool Wood is brackish and is dominated by tall Reedbeds. More typical Annex I saltmarsh is found at several different locations along the estuary south of this point and these were surveyed as a series of subsites. These saltmarshes have developed on mud in sheltered areas and there are soft intertidal mudflats on moderate slopes on both sides of the main river channel. Some of these saltmarshes have developed in the sheltered insides of meanders or bends in the river valley where mud can build up and develop into saltmarsh.

Most of the largest areas of saltmarsh were surveyed. One area located north of Rock Castle (Knockroe) could not be accessed during the survey and was only mapped using a visual assessment from the adjacent road and from woodland on the adjacent shoreline. Other

small patches of saltmarsh were mapped and assessed using the aerial photos (Doon Creek and Ballydooley). Several of the sub-sites are not located in the main Bandon River channel but are found in connecting smaller channels. The largest of these is at Ballinadee Creek. There is only minor saltmarsh development along the shore in the estuary between Ballinadee Creek and the Kinsale area.

Part of the survey site is located within the Bandon Valley below Inishannon pNHA. This pNHA extends south from Inishannon Town as far as Leighmoney Beg. The upper tidal reaches of the Bandon River and some adjacent woodland along the valley have been included within the pNHA. Much of the marginal vegetation in the river valley within the pNHA is classified as tall Reed beds and is brackish, although there are two large areas at Knockroe and Leighmoney Beg that are dominated by Annex I saltmarsh vegetation.

#### 3 SALTMARSH HABITATS

#### 3.1 General description

Five main sub-sites were examined during the ground survey. These sub-sites were located from north to south along the river at Skanagore, Knockroe, Leighmoney, Kilmacsimon and Ballinadee Creek. The saltmarsh at Knockroe on the west side of the river north of Rock Castle was not examined with a ground survey as it could not be accessed. The total amount of Annex I habitat mapped at this site was about 10 ha (Table 3.1) with equal amounts of Atlantic salt meadows and Mediterranean salt meadows. However it should be noted that 15 ha of other saltmarsh vegetation (mainly brackish stands of Common Reed (*Phragmites australis*), Sea Club-rush (*Bolboschoenus maritimus*) and Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*)) were mapped at the site (Appendix I). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project, (although in estuarine situations these tall Reed stands should more accurately be classified as 'Reed and tall sedge swamps - FS1' (Fossitt 2000)).

#### Skanagore

This saltmarsh is located north of Shipool Wood on the eastern side of the river channel. It is dominated by brackish non-Annex I saltmarsh vegetation. Wide stands dominated by Sea Club-rush and Common Reed are most prominent along the river margins on the channel edges. More typical freshwater marginal vegetation develop dominated by Reed Canary-grass (*Phalaris arundinacea*) further landward towards the shore in places and there is likely to be little tidal influence on this vegetation due to the local topography, which may be at a slightly higher elevation. Indicators of the tidal influence in the marginal vegetation are also present including Sea Aster (*Aster tripolium*), Sea Arrowgrass (*Triglochin maritimum*), Red Fescue (*Festuca rubra*), Saltmarsh Rush (*Juncus gerardii*), Creeping Bent (*Agrostis stolonifera*), Common Scurvy-grass (*Cochlearia officinalis*) and Common Saltmarsh-grass (*Puccinellia martima*).

These typical saltmarsh species as distributed further north along the river channel were observed as far as Frankfort. However, the marginal river vegetation from this point towards the north is dominated by brackish or typical marginal freshwater vegetation communities. Some of the Reedbeds have a narrow fringe of brackish ASM vegetation associated with them that is dominated by Creeping Bent and contains Sea Aster and Common Scurvy-grass. There were no significant areas of typical development of Annex I saltmarsh vegetation.

Several 'islands' within the river channel towards Frankfort are dominated by Grey Club-rush and also contain Sea Aster, Twitch (*Elytrigia repens*), Common Scurvy-grass, Curled Dock (*Rumex crispus*) and Creeping Bent.

#### Knockroe

This saltmarsh is located on the bend of the river opposite Shippool Wood and about 0.4 km south of the marshes at Skanagore. This saltmarsh does contain some typical MSM vegetation. However, there is still a significant estuarine influence on this sub-site and the northern section is dominated by Common Reed. The southern section is dominated by Sea Rush but also contains patches of Sea Club-rush. There is a small mound on the saltmarsh with scrub present on it. This saltmarsh is not grazed.

#### Leighmoney

This saltmarsh is found 1.3 km south of Knockroe on the east side of the river. It is one of the larger saltmarshes and is semi-circular shaped. It is dominated by dense tall tussocky Sea Rush (*Juncus maritimus*) (MSM) with only several small patches of ASM development. There is still some significant estuarine influence on this sub-site with frequent large patches of dominated by either Sea Club-rush or Twitch. Both these species are inter-mixed in places. Some of this vegetation is a mosaic type with frequent cover of other saltmarsh species including Sea Rush. These are distributed around the marsh in various places and are also associated with the saltmarsh creeks. There are also large patches of tidal and river litter in some of the salt pans and creeks. This saltmarsh is not grazed.

Sea Club-rush is also spreading along the seaward side of this saltmarsh on estuarine mud at the eastern end. The saltmarsh creek topography is well-developed. There is also some development of Twitch-dominated grassland along the landward boundary of this saltmarsh as well as brackish wet grassland transitional vegetation. This vegetation type is characterised by species like Yellow Flag (*Iris pseudacorus*), Bramble (*Rubus fruticosus*), Greater Tussock Sedge (*Carex paniculata*) and Wild Celery (*Apium graveolens*) appearing along the upper boundary. Intertdal mudflats develop adjacent to the saltmarsh and there is a moderate slope from the edge of the saltmarsh into the main river channel

#### Kilmacsimon

This sub-site is located on the west side of the river 0.7 m south of Leighmoney. The saltmarsh is quite narrow and distributed along the shoreline for 0.5 km. The saltmarsh is located adjacent to a recently disused quarry (that has been used in the recent past). This shoreline is not grazed. There is a track extending onto the saltmarsh onto a small raised infilled area used for launching boats into the river. There is only minor development of both MSM and ASM along the shoreline. The ASM and MSM vegetation transitions along the landward boundary to Twitch-dominated vegetation that also contains Sea Mayweed (*Tripleurospermum maritimum*), Sow-thistle (*Sonchus* sp.), Bramble, Birdsfoot (*Lotus corniculatus*) and Bindweed (*Calystegia sepium*). There is also some transition further south to Common Reed beds at the landward boundary on gentler sloping shoreline. Sea Clubrush and Sea Rush (*Juncus maritimus*) are spreading on the adjacent estuarine mud along the southern part of this saltmarsh. This saltmarsh is found on eroded mud tussocks.

#### **Ballinadee Creek**

This sub-site is the largest saltmarsh surveyed in the Bandon River and is located in a small channel called Ballinadee Creek. This site is located 1.7 km south of Kilmacsimon. There is saltmarsh developed on both sides of this inlet. It has similar landscape surrounding it with fairly steep hillside on both sides of the inlet. This saltmarsh contains the largest area of ASM dominated by upper zone grassy vegetation. Most of the saltmarsh is not grazed apart from a section of saltmarsh west of the old quarry. There is also some MSM present. This sub-site displays few estuarine indicators and there is no significant development of Sea Club-rush and Common Reed stands. The saltmarsh is positioned along a steep hillside and there is a narrow transition zone along the upper boundary. The transition zone contains Twitchdominated vegetation and also contains Curled Dock, Yorkshire Fog (Holcus lanatus), False Oat (Arrhenatherum elatius), Bindweed, False Fox Sedge (Carex otrubae) and Wild Celery (Apium graveolens). This saltmarsh shows signs of former land-use with embankments used as field boundaries and old drains present. An old seawall/low embankment is present along the seaward boundary in places, indicating old reclamation attempts. There are steep saltmarsh cliffs along the lower saltmarsh boundary onto soft intertidal mudflats.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5.357
1410	Mediterranean salt meadows (Juncetalia maritimi)	5.044
	Total*	10.401

 Table 3.1.
 Area of saltmarsh habitats mapped at Rock Castle, Bandon Estuary.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

## 3.2 Atlantic salt meadows (H1330)

There are several small patches of ASM vegetation in the saltmarsh at Leighmoney. These are characterised by the lack of Sea Rush cover. The vegetation is dominated by abundant Red Fescue and also contains some Sea Club-rush. Other species present includes Spear-leaved Orache (*Atriplex prostrata*), Creeping Bent and Curled Dock.

Some ASM is present at Kilmacsimon. This ASM community is tussocky and is not grazed. It is dominated by Red Fescue and contains Sea Rush, Creeping bent, Twitch, Common Scurvy-grass, Sea Arrowgrass, Spear-leaved Orache and Saltmarsh Rush,. There are few signs of zonation within this narrow band of saltmarsh, allow there is some Sea Aster, Sea Pink (*Armeria maritima*) and Common Saltmarsh-grass only distributed along the edge of this community.

The ASM at the north-east end of Ballinadee Creek is an upper marsh vegetation type. It is dominated by grasses including abundant Red Fescue and also contains Sea Milkwort (*Glaux maritima*), Saltmarsh Rush, Common Scurvy-grass, Creeping Bent, Sea Arrowgrass and Sea Aster. There is some sparse cover of Sea Rush within the ASM. This cover of Sea Rush gradually becomes denser and is then classified as MSM. This saltmarsh has a well-developed saltmarsh topography and there are frequent pans and undulating creeks present. Sea Rush is infilling some of the saltmarsh creeks in this saltmarsh.

A low-mid marsh zone has developed at the eastern end of Ballinadee Creek. Some typical small salt pans and creeks are present. The vegetation is dominated by a Sea Plantain-Sea

Pink sward in places and there is also some Common Saltmarsh-grass-dominated sward in places.

#### 3.3 Mediterranean salt meadows (H1410)

Mediterranean saltmarsh vegetation is best developed at Leighmoney. There are smaller amounts of this vegetation at Ballinadee Creek, Kilmacsimon and Knockroe.

MSM saltmarsh at Leighmoney is characterised by very dense tussocky Sea Rush cover in places. It is generally quite uniform, dominated by an upper zone vegetation type and there is little zonation. Other sections have a co-dominance of Sea Rush and Red Fescue. This saltmarsh has not been grazed for some time. Other species present include Sea Plantain, Red Fescue, Common Scurvy-grass, Spear-leaved Orache, Saltmarsh Rush and Sea Aster. There is some MSM with frequent Sea Club-rush present. Transitional indicators such as Sea Beet and Curled Dock are scattered across the saltmarsh within the MSM and indicate estuarine influence on the saltmarsh. There is a tall saltmarsh cliff along the seaward boundary that separates the saltmarsh from the intertidal mudflats. The creek and salt pan topography is very well developed on this saltmarsh.

A lower pioneer MSM vegetation type is also found at Leighmoney where Sea Rush is spreading onto the intertidal mud adjacent to the established saltmarsh dominated by MSM. There is a saltmarsh cliff between these two zones and the intertidal flats are at a level between 0.5-1 m below the established saltmarsh. There are no other saltmarsh species in this community. This community is also found at Kilmacsimon where there are scattered clumps on soft mud with 50% cover.

Some zonation is present within the MSM saltmarsh at Leighmoney. Upper marsh transitional type vegetation is present. Species like Ragged Robin (*Lychnis flos-cuculi*), Marsh Bedstraw (*Galium palustre*) and Yorkshire Fog appear in the MSM near the upper boundary in vegetation dominated by Sea Rush. These transitional species appear on some of the large tussocks that are probably at a higher elevation than the ground level.

A similar MSM type is found on the saltmarsh at Ballinadee Creek. This MSM is characterised by variable cover of Sea Rush and frequent cover of Red Fescue. Some dense Sea Rush is colonising bare mud within the saltmarsh creeks and there are few other saltmarsh species present.

## 4 IMPACTS AND ACTIVITIES

There are few impacts and activities affecting the saltmarsh at this site (Table 4.1). Most of the saltmarsh is fairly inaccessible so it is not vulnerable to some damaging activities. The majority of the saltmarsh is not grazed at present, apart from a small area on the west side of Ballinadee. There is some minor poaching damage caused by cattle grazing in this section (143) (west of the quarry). Some of the saltmarsh shows signs of under-grazing and this may be affecting the diversity of the site and also may influence the spread of Sea Club-rush in some places. Some of the saltmarsh at Leighmoney and Ballinadee Creek is quite tussocky and rank. The saltmarsh at Leighmoney was grazed by sheep in the past but is now managed in REPS and is not grazed at all.

There are some signs of erosion or cliff toppling along the seaward edge of the Leighmoney saltmarsh, particularly towards the western end (900). This is related to scouring by the river and could be expected at this location due to the topography of the river channel. A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been erosion of a zone about 5-7 m wide at this location during this period. A comparison of the 1995, 2000 and 2005 OSI aerial photos shows that there has been no measurable loss of saltmarsh habitat by erosion at this location during the monitoring period. These changes probably reflect natural changes in the position of the main river channel within the estuary. The impact of erosion is assessed as neutral on a small portion of the MSM saltmarsh face.

Saltmarsh cliffs are typically found along most of the established saltmarsh but there is no evidence of significant saltmarsh loss along these other boundaries. There are no indications of any significant overall erosional trend at this site (900). Both Sea Rush and Sea Club-rush are re-colonising on mud in places and Leighmoney and Kilmacsimon and these may be indicating some accretion of sediment (910). A comparison of the 2000 and 2005 OSI aerial photos shows some growth of the Sea Club-rush stands at these locations (< 5 m growth at the seaward edge).

There has been a small patch of infilling on the saltmarsh at Kilmacsimon (803). This is related to the development of an area used for launching boats into the river.

There are frequent signs of old land use of these saltmarshes, especially on the saltmarsh at Ballinadee. This saltmarsh has an old seawall/embankment and associated drains around its seaward perimeter and there are also ditches and drains crossing the saltmarsh (802). Further north of Shippool Wood most of the marginal vegetation shows signs of reclamation attempts and several sections have been embanked, remained and now contain improved grassland. These impacts were not assessed during this survey as they occurred outside the current monitoring period.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	С	0	0.450	Inside
1330	143	С	-1	0.001	Inside
1410	149	С	-1	5.044	Inside
1410	803	С	0	0.001	Inside
1410	900	С	0	0.300	Inside
1410	910	С	0	0.250	Inside

Table 4.1.	Intensity of various	activities on	saltmarsh	habitats a	at Rock	Castle,	Bandon
Estuary.							

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>&</sup>lt;sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>&</sup>lt;sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>&</sup>lt;sup>b</sup> 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.

Impacts and activities adjacent to the site are dominated by agricultural activities (100, 102, 120, 140). Other impacts and activities include scattered habitation (403) a now disused quarry (301) and minor roads (502). These activities have little or no measurable impact on 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.

The overall conservation status is *unfavourable-inadequate* (Table 5.1). Rock Castle saltmarsh is a notable estuarine site as a brackish gradient is present in the various sub-sites surveyed along the Bandon estuary. The northern saltmarshes display a much greater estuarine influence on the vegetation. The saltmarshes are in generally good condition, although the lack of grazing means that some of the MSM is rank and tussocky. No Common Cordgrass was recorded within this estuary. This is notable, as this invasive species is found in several adjacent bays and inlets along the Co. Cork coastline, such as Courtmacsherry Bay.

Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) has been recently reconfirmed at an adjacent saltmarsh called Colloge tidal lagoon near Kinsale (Irish Naturalists Journal 2007). This site is outside the survey site of Rock Castle but is part of the Bandon River estuary. This site is an outlier compared to the distribution of this species around the south-east coast of Ireland.

There is no NPWS management plan available for this site.

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

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at Rock Castle, Bandon Estuary.

## 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications that the extent of this habitat has been reduced during the current monitoring period due to land-use change, development or erosion.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Eight monitoring stops were carried out in this habitat and all but one passed. Most of the habitat is in good condition and is not grazed. One stop failed due to minor poaching damage in and area covering about 2-3% of the site. The species diversity was typical of this habitat. Most of the ASM found at this site is an upper saltmarsh zone type and the zonation is relatively poorly developed. The sward heights around this habitat are diverse and reflect the type of vegetation community. There is some development of mid-upper and low-mid ASM communities but these vegetation types cover a relatively small area. The saltmarsh topography is well-developed in several of the sub-sites. There is some transitional vegetation along the upper ASM boundary in places.

#### 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 significantly affecting this site. Most of the site is in good condition and only a minor area is affected by poaching. Only some of the saltmarsh habitat in the survey site is protected by the NHA designation. There is no NPWS conservation plan for this site.

## 5.3 Mediterranean salt meadows (H1410)

#### 5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications that the extent of this habitat has been reduced during the current monitoring period due to land-use change, development or erosion. A minor area is affected by erosion but this is at a slow rate and is related to natural changes in the position of the main river channel within the estuary. Any erosion is likely to be compensated by the development of new saltmarsh with the spread of Sea Rush on bare intertidal mudflats adjacent to established saltmarsh.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Seven monitoring stops were carried out in this habitat and they all passed during assessment in the field. All the attributes reached their targets. However, most of the MSM is not grazed and is quite tussocky and rank in places. It was therefore decided to reassess the status of the habitat structure and functions as unfavourable-inadequate due to under-grazing. Some of the saltmarsh has been grazed in the past.
Most of the MSM is in good condition and has a species diversity typical of this habitat. The zonation is poorly developed and most of the MSM is of an upper zone type. However, there is some zonation with a transitional brackish habitat developing at Leighmoney and the MSM also forms mosaic with Sea Club-rush and Twitch-dominated vegetation in places. This site shows significant signs of estuarine influence on the saltmarsh, particularly the northern saltmarshes.

# 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. There are few impacts significantly affecting this site. Most of the site is in good condition but the lack of grazing may be creating dense rank tussocky vegetation with a lower diversity in places. Only some of the saltmarsh habitat in the survey site is protected by the NHA designation. There is no NPWS conservation plan for this site.

# **6 MANAGEMENT RECOMMENDATIONS**

There are no management recommendations for this site.

# 7 **REFERENCES**

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

Fossitt, J.A. (2000). A guide to habitats in Ireland. The Heritage Council, Dublin.

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	5.326		5.326			
4	1410 Mediterranean salt meadow	5.044			5.044		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic	0.062		0.031			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	1.357					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	14.451					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	26.24		5.357	5.044		

# **Table 8.1.** Areas of SMP habitats mapped using GIS.





Corrinshop, Octropent ague Histop Átuat Brylianment, Heltioge and Local Government Nation al Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

# Rock Castle, Bandon Estuary (Map 2 of 3)

Bandon Valley below Inishannon NHA (001515)

This habitat map was created and interpretation of aeral phot are subject to revision. Produpermission of the Governmen

Le	gend
	NHA B
	1330 A
	1410 N
	1330/0
	Other \$
	other
	1330 m
	1410 m

NHA Boundary	
1330 Atlantic salt meadows	
1410 Mediterranean salt meadows	
1330/other SM (CM2) mosaic	
Other Saltmarsh (CM2)	
other	
330 monitoring stops	
410 monitoring stops	

	SMP code: SMP0061	0	200	400	600	800	Meters	N
d with a combination of fieldwork, GPS otos. Boundaries of designated areas luced from Ordinance Survey material by ent (Permit number 5953)		Date of production: 22/02/2009 Map version: 1			inal Drawing le 1:11000	x 420 (A3)		



# Seafort

## 1 SITE DETAILS

SMP site name: Seaf	ort	SMP site code: SMP	SMP site code: SMP0063				
Date of site visit: 17/0	6/2008	CMP site code: N/A					
SM inventory site nar	ne: Seafort	SM inventory site coo	le: <b>184</b>				
NPWS Site Name: Re	oaringwater Bay and Is	slands					
NPWS designation	cSAC: 101	MPSU Plan: <b>N/A</b>					
	pNHA: <b>101</b>	SPA: N/A					
County: Cork		Discovery Map: 87	Grid Ref: 089977, 030305				
Aerial photos (2000 s	eries): <b>O 6783-A,B</b>	6 inch Map No: Co 14	6 inch Map No: <b>Co 148</b>				
Annex I habitats curre	Annex I habitats currently listed as qualifying interests for Roaringwater Bay and Islands cSAC:						
None							
Other SMP sites with	in this SAC/NHA: Ballyl	brack					
Saltmarsh type: Fring	/gravel						

# 2 SITE DESCRIPTION

Seafort saltmarsh is located in south-west Co. Cork, 3 km west of Skull Town. The site is located at the head of a small narrow sheltered bay called Croagh River. Two minor roads meet at the head of this bay and are located on both sides adjacent to the shoreline. The landscape of this area is characteristic of West Cork and there are frequent unimproved lands with exposed rock and dry heath on outcrops. This area is low-lying and somewhat flatter and therefore contains much more improved grassland. There are scattered dwellings along the minor roads in this area.

The saltmarsh is found at the head of the narrow bay. This is the only part of the bay with suitable shoreline topography. The shoreline further south towards the sea is steeper and dominated by exposed rock outcrops. The upper part of the bay empties at low tide and exposes intertidal mud and sand flats. There are several small islands within the bay that contain exposed rock outcrops, scrub and heath. A small stream flows into the head of this bay.

The majority of the site is located within the Roaringwater Bay and Islands cSAC and pNHA. This cSAC was mainly designated for its marine value but it also contains important coastal habitats such as sea cliffs and coastal heath. However, there are no Annex I saltmarsh habitats listed as qualifying interests for this cSAC. Two Annex I saltmarsh habitats are found at Seafort saltmarsh, Atlantic salt meadow (ASM) and Mediterranean salt meadow (MSM). Three SM inventory sites (Curtis and Sheehy-Skeffington 1998) are located within this cSAC and two of these sites Seafort and Ballybrack, were surveyed during the SMP. An additional site located on Sherkin Island was not surveyed.

One notable feature of this site is the presence of Sharp Rush (*Juncus acutus*). This uncommon species has a scattered distribution along the southern and south-east coast of

Ireland. It is much more rarely found on saltmarshes compared to Sea Rush (*Juncus maritimus*). Stands of saltmarsh vegetation dominated by either Sea Rush or Sharp Rush can be classified as MSM. There are very few saltmarshes in Ireland with the rarer MSM sub-type dominated by Sharp Rush present.

Most of saltmarsh habitat mapped at this site is located within the cSAC boundary. However there are several small patches located outside the boundary on the east side and most of the saltmarsh along the west side of the bay is also excluded. This is mainly due to the fact that saltmarsh habitat extends above the upper shoreline boundary on the OSI 6 inch map, which was used to draw some of the cSAC boundaries. There is also a significant offset between the OSI 6 inch map and OSI aerial photos series. The saltmarsh along the west side of the bay is quite narrow so much of it is excluded due to this offset when the digital cSAC boundary is applied.

The shoreline at this site was easily accessed via adjacent minor roads.

### **3 SALTMARSH HABITATS**

#### 3.1 General description

The main saltmarsh habitat found at this site is Mediterranean salt meadows (MSM) (Table 1). The saltmarsh has mainly developed on mud substrate around the head of the bay. Some of the larger patches of MSM have developed on a peat substrate. Most saltmarsh is found on the eastern side and there is only a narrow band of fragmented saltmarsh patches along the eastern side. Some of these fragments of saltmarsh habitat are positioned adjacent to a minor road along the shoreline. This saltmarsh is dominated by MSM (both the Sea Rush and Sharp Rush sub-types) with several small Atlantic salt meadow (ASM) patches. There is some typical saltmarsh zonation with a line of Sea Rush positioned at the landward side of the band of ASM. Further south along the east side of the bay the saltmarsh eventually disappears as the shoreline topography becomes unsuitable for saltmarsh development.

A minor road also marks much of the upper shoreline boundary along the eastern side of the upper bay. There is some development of a mosaic of scrub, wet grassland and scrub on low-lying terrestrial land at the head of the bay with an irregular shoreline. Saltmarsh fringes these other habitats. Further south-east there is more extensive saltmarsh development. MSM and ASM form some relatively large flat uniform areas of habitat in this area

Sharp Rush is locally frequent along both shorelines. It is not exclusively found on the saltmarsh but is also found in transitional habitats along the upper saltmarsh boundary such as the earth-banks along the eastern road. It is occasionally distributed along a linear band on the upper saltmarsh boundary. Clumps of Sharp Rush can be found adjacent to Gorse (*Ulex europaeus*) and Blackthorn (*Prunus spinosa*). Further south, Gorse scrub marks the upper saltmarsh limit. Some saltmarsh habitat can also been found in drains along the edge of the road at the back of an elevated earth-bank and in one low-lying area north of the road, where drainage channels under the road still allow some tidal influence.

In general there is little development of transitional brackish vegetation along the upper saltmarsh boundary. Much of the upper saltmarsh boundary has been modified by the construction of the minor roads or low seawalls around the bay. Most of the unmodified shoreline has a relatively steep shoreline with an abrupt change from saltmarsh to terrestrial habitats such as scrub. There is some development of a non-Annex I saltmarsh dominated by Twitch (*Elytrigia repens*) along the upper saltmarsh boundary in the north-east part of the saltmarsh between the MSM and the road. This vegetation has been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

A typical saltmarsh cliff about 0.5 m high marks the lower saltmarsh boundary along the eastern side of the site. There are mixed intertidal mud and gravel substrate adjacent to the patches of saltmarsh along the lower seaward boundary on both sides of the site. Mudflats develop further seaward of this mixed sediment.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.470
1410	Mediterranean salt meadows (Juncetalia maritimi)	1.944
	Total	2.414

	Table 3.1.	Area of	saltmarsh	habitats	mapped	at Seafort.
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<sup>\*</sup> note that saltmarsh habitat may continue outside the mapped area.

# 3.2 Atlantic salt meadows (H1330)

There are several small fragments of ASM with low, mid and mid-upper saltmarsh communities present on the western side of the site, adjacent to the road. Some of this saltmarsh is dominated by Saltmarsh Rush (*Juncus gerardii*). A second community contains a typical Sea Pink (*Armeria maritima*)-Sea Plantain (*Plantago maritima*) sward. There is a low saltmarsh cliff marking the lower saltmarsh boundary of this habitat. Hard grass (*Parapholis strigosa*) was noted within the upper ASM adjacent to the road. Zonation was poorly developed but the small patches of saltmarsh are located on a relatively steep shoreline.

ASM is better developed on the eastern side of the site. There are several larger areas of this habitat with a complex topography in places. These areas contain several different typical vegetation communities. Zonation is moderately well-developed due to the relatively shallow slopes from the landward to the seaward boundaries in places. A low-mid community dominated by Common Saltmarsh-grass (*Puccinellia martima*) and containing Sea Pink, Sea Plantain, Sea Arrow-grass (*Triglochin maritimum*) and Greater Sea-spurrey (*Spergularia media*) is present along the seaward boundary along the low saltmarsh cliff. This community also appears on some lower-lying saltmarsh over soft mud close to the road side and is an example of reverse zonation. This community also shows signs of poaching in places but this damage seems to be related to grazing the previous year, as the sward height is normal (10-20 cm). Most of the saltmarsh is dominated by a typical mid marsh community with Sea Pink, Sea Plantain and Sea Arrowgrass prominent. This area also contains low mounds where there is dominance of Saltmarsh Rush. There are also several clumps of Sharp Rush found within this vegetation type on the east side of the marsh. Sea Rush can also be found scattered within the MSM.

Some of the ASM in the north-eastern side of the site adjacent to the terrestrial boundary and scrub is dominated by Red Fescue (*Festuca rubra*) and is an upper saltmarsh community. This vegetation type also contains Sea Milkwort (*Glaux maritima*), Saltmarsh Rush, Sea Aster (*Aster tripolium*), Spear-leaved Orache (*Atriplex prostrata*), Sea Arrow-grass, White Clover

(*Trifolium repens*) and Lax-flowered Sea Lavender (*Limonium humile*). Some of this saltmarsh vegetation is quite rank and species poor in places. The sward height varies between 10-30 cm high. Parts of this habitat are probably not grazed at all.

ASM vegetation can also be found along the drain adjacent to the eastern road. This vegetation is dominated by Common Saltmarsh-grass and also contains Common Scurvy-grass (*Cochlearia officinalis*), Sea Arrowgrass and Spear-leaved Orache.

# 3.3 Mediterranean salt meadows (H1410)

This site is notable for the presence of large tussocks of Sharp Rush on the saltmarsh that can be classified as the rarer MSM subtype. This species forms large tussocks up to 2 m high. Some of the massive tussocks of this species are isolated within vegetation dominated by Sea Rush and are not mapped as the Sharp Rush MSM sub-type. However, there are several locations where there are frequent large tussocks of Sharp Rush found with upper saltmarsh species such as Red Fescue, Creeping Bent (Agrostis stolonifera), Twitch and Common Scurvy-grass and it is the most dominant feature of the vegetation. There are several small patches with dense cover of Sharp Rush and the tall dense tussocks shade out other saltmarsh vegetation between the clumps. These areas were mapped as the Sharp Rush MSM sub-type. This vegetation type occasionally contains terrestrial and transitional shoreline species such as Bramble (Rubus fruticosus), Curled Dock (Rumex crispus), False Fox Sedge (Carex otrubae), Smooth Sow-thistle (Sonchus oleraceus), Bindweed and Twitch that are associated with the large tussocks, as their height positions the terrestrial species outside the normal influence of the tide. Some of the patches containing Sharp Rush are associated with more frequent Sea Rush and more typical MSM vegetation. These patches also contain species such as Sea Aster, Saltmarsh Rush and Sea Milkwort (Glaux maritima). The MSM sub-type dominated by Sharp Rush was mapped at several locations on the east and west sides of the bay.

The more typical MSM found along the western side of the site is dominated by Sea Rush. The Sea Rush cover varies between sparse cover (20%) to denser patches greater than 75% in cover. The MSM generally forms a narrow strip of habitat that is patchy in places. These small patches of vegetation also contain prominent Sea Pink, Saltmarsh Rush, Common Scurvy-grass, Sea Plantain, Annual Sea-blite (*Suaeda maritima*), Sea Milkwort, Greater Sea-spurrey, Long-bracted Sedge (*Carex extensa*), and Common Saltmarsh-grass. Other species present include Buck's-horn Plantain (*Plantago coronopus*) and False-Fox Sedge. The MSM forms a band of vegetation at the seaward side of ASM at this location. Saltmarsh topography is poorly developed along this side of the bay.

There is some zonation of vegetation communities within the MSM dominated by Sea Rush. This is most evident on the east side of the site in the larger sections of the habitat. Some of this saltmarsh is relatively flat with a typical slight slope from the seaward to the landward boundary, whereas other parts have a variable topography with some low mounds present. The saltmarsh topography is also well developed in this area and there are some large salt pans present. Further south along the east side the MSM is found on thinner substrate.

There are typical mid-upper and upper MSM communities present in the habitat located on the east side of the bay. The mid-upper community is characterised by Sea Rush with more frequent cover of Sea Plantain, Saltmarsh Rush and Sea Plantain. The upper community is dominated by grasses with both Red Fescue and Creeping Bent prominent. These larger sections also contain some typical saltmarsh creek and pan development. Some of the pans are quite large and contain bare mud. An additional lower MSM community characterised by Sea Rush growing amongst dominant Common Saltmarsh-grass is also present along the seaward boundary. The sward height is between 0.5-1 m high in this habitat and there is very low amount of bare substrate cover. There are several seepage channels with freshwater flow into the saltmarsh. These channels increase the diversity of the vegetation and other species are present.

# 4 IMPACTS AND ACTIVITIES

There are relatively few impacts and activities affecting the saltmarsh habitat at this site (Table 4.1). The main impact is grazing. The western side of the site is ungrazed. The western side was fenced for cattle (140) but there were no signs of grazing around the time of the survey. There are several different management units present. There are signs of some minor poaching-induced erosion in places, perhaps caused by grazing during previous years (143). There are also some isolated mounds and tussocks of saltmarsh along the seaward boundary in places. There are also sections that do not seem to be grazed at all and contain some rank vegetation. The small patch of habitat located north of the road on the eastern side of the site was badly poached (143).

A part of the shoreline at the south-west corner of the saltmarsh has been infilled (803) in the recent past. This only affects a small area and a very minor area of MSM habitat (< 0.001 ha).

There are no indications of any significant erosional trend at this site (900). This area is quite sheltered so it is likely that erosional pressure in this area is quite low. A relatively tall saltmarsh cliff is present around much of the habitat, but signs of erosion are not significant. A comparison of the OSI 2<sup>nd</sup> edition 6 inch map to the current OSI 2005 series aerial photos shows that there have been no significant changes to the shoreline during this period. A comparison of the 1995, 2000 and 2005 OSI aerial photos also shows that there has been no measurable loss of saltmarsh habitat by erosion during the monitoring period. The impact of erosion is assessed as neutral on a small portion of the saltmarsh face.

The saltmarsh at this site is likely to have been affected by old shoreline modifications related to the construction of the road embankments and the seawall around some of the shoreline. However these modifications occurred in the 18<sup>th</sup> century and there has been no changes to the road layout since then. Old channels have been dug in the past across the eastern saltmarsh. There are also old earth-banks across the saltmarsh marking field boundaries present. The impacts of these modifications are not assessed.

Impacts and activities adjacent to the site include dispersed habitation (403), agriculture (102, 120, 140) and roads (502). An old boat-house is located at the northern end of the bay. These activities have little or no measurable impact on the saltmarsh habitats.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	С	0	0.449	Inside
1330	143	В	-1	0.021	Inside
1330	900	С	0	0.02	Inside
1410	140	С	0	0.944	Inside
1410	143	С	-1	0.005	Inside
1410	803	А	-2	0.001	Inside
1410	900	С	0	0.04	Inside

Table 4.1.	Intensity of	various	activities	on	saltmarsh	habitats	at Seafort.
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<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.
 <sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside =

<sup>5</sup> 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.

The overall conservation status of Seafort is assessed as *unfavourable-inadequate* (Table 5.1). However, nearly all the saltmarsh habitat is in good condition and there are few impacts or activities significantly affecting the conservation status of the saltmarsh at this site. A small area of the site was badly damaged by grazing and poaching. Seafort saltmarsh is a relatively small saltmarsh located at the head of a small bay. However, this site is notable for the presence of Sharp Rush. There were only three sites where the rarer MSM sub-type dominated by Sharp Rush was mapped.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor. There is very little low-lying wet grassland habitat or brackish habitat at a suitable elevation or topography for migration of saltmarsh habitat.

This site is located within the Roaring Water Bay and islands cSAC. A NPWS management plan is not available for this site.

Habitat	EU Conse			
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (1330)	Extent ,	Structure and functions, Future prospects		Unfavourable – Inadequate
Mediterranean salt meadows (1410)	Extent Structure and functions, Future prospects			Favourable

Table 5.1. Conservation status of Annex I saltmarsh habitats at	Seafort.
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# 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 loss of habitat due to land-use changes or erosion within the current monitoring period.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Three monitoring stops were carried out in this habitat and all three passed. All the attributes for the assessment of this habitat reached their targets. Most of this habitat is in generally good condition. There are signs of minor poaching damage in this habitat that probably were caused by poaching damage during previous years. However the sward height was typical and the sward surface was recovering from this damage. However, there is a small badly poached area of habitat located north of the road in a grazed field (~5% of the total habitat). Therefore the assessment for this habitat is unfavourable-inadequate.

This habitat has a typical species diversity and is moderately well-developed at this site. There are several vegetation communities present and zonation of this habitat is also evident. There are natural un-modified transitions to MSM and to some transitional communities at the landward boundary. However, much of the landward boundary of the saltmarsh has been modified by the development of the minor roads and associated seawalls along the shore. This is also a negative indicator.

### 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 significantly affecting the ASM at this site apart from grazing. Some of this habitat is located in adjacent fields north of the site and the grazing intensity is unlikely to be reduced. This field is located outside the cSAC boundary. Some of the ASM habitat found seaward of the eastern minor road is also likely to be grazed at some

stage during the summer, although it had not been grazed at the time of the survey. There were signs of grazing damage from pervious years.

# 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 loss of habitat due to land-use changes or erosion within the current monitoring period.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Six monitoring stops were carried out in this habitat and all these stops passed. All of the attributes required for the structure and functions of this habitat reached their targets for each monitoring stop. This habitat is in relatively good condition and contains several different vegetation communities. The species composition and diversity of this habitat was typical of this habitat. The sward structure was also in good condition. Some of this habitat is grazed but there are few signs of significant grazing damage.

The saltmarsh topography is well-developed in this habitat and there is some zonation of this habitat type with several vegetation types present. The zonation is usually indicated by other saltmarsh species more typical of ASM such as Common Saltmarsh-grass and Saltmarsh rush. Much of the landward boundary of the saltmarsh has been modified by the development of the minor roads and associated seawalls along the shore. However, there is still some small areas of un-modified transition of MSM to brackish and terrestrial vegetation types, particularly in the north-east part of the saltmarsh, where there is a mosaic of saltmarsh, scrub and wet grassland.

This site is notable for the presence of Sharp Rush. The frequency of this species is high enough to map several patches of saltmarsh as the rarer sub-type of MSM dominated by Sharp Rush. This species is also found in the more typical MSM dominated by Sea Rush.

### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts and activities negatively affecting the MSM at this site. Most of this habitat is found within the cSAC boundary.

# 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site.

# 7 REFERENCES

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

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	0.469		0.469			
4	1410 Mediterranean salt meadow	0.943			0.943		
5	ASM/MSM mosaic (50/50)	0.002		0.001	0.001		
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	0.534					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/Spartina mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.149					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	2.096		0.470	0.944		

# **Table 8.1.** Areas of SMP habitats mapped using GIS.



National Parks and Wildlife Service

2007-2008

Roaringwater Bay and Islands SAC (000101)

# Creeslough

# 1 SITE DETAILS

SMP site name: Cree	slough	SMP site code: 0131			
Dates of site visit: 10 & 11 September 2008		CMP site code: N/A			
SM inventory site nan	ne: Creeslough	SM inventory site code	e: <b>12</b>		
NPWS Site Name: Sh	neephaven				
NPWS designation	cSAC: 1190	MPSU Plan: Old Form	nat – Draft 2: Consultation		
	pNHA: <b>1190</b>	SPA: <b>N/A</b>			
County: Donegal		Discovery Map: 2	Grid Ref: 206562, 432210		
Aerial photos (2000 series): O 0098-D; O 0099- C; O 0119-A,B; O 0120-A		6 inch Map No: <b>Dg 02</b>	6		
Annex I habitats currently listed as qualifying interests for Sheephaven cSAC:					
H1330 Atlantic sa	It meadows (Glauco-Pucci	nellietalia maritimae)			
H1410 Mediterranean salt meadows (Juncetalia maritimi)					
Other SMP sites within this SAC/NHA: Rosapenna					
Saltmarsh type: Bay Subs		strate type: Sand: Mud			

### 2 SITE DESCRIPTION

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

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

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

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

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

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

### **3 SALTMARSH HABITATS**

#### 3.1 General description

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

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

accordance with the SMP project classification. East of this hill there is some minor saltmarsh development around two small islands that are found on the intertidal flats, Juniper Isle and Red Island. There is also some saltmarsh development along the indented shoreline where there is some shelter.

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

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

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

**Table 3.1.** Area of saltmarsh habitats mapped at Creeslough.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

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

There were several patches along the estuarine channel where there is some development of pioneer ASM and the latter species are found more frequently in an open sward with bare

mud still dominating cover. Natural transitions from typical *Salicornia* flats vegetation with a mono-specific sward of Glasswort to these pioneer ASM communities are present. These vegetation transitions form part of the natural saltmarsh zonation in the pioneer zone. The presence of a significant area of pioneer habitat indicates that there is active accretion at this site, particularly along the estuarine channel.

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

#### 3.3 Atlantic salt meadows (H1330)

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

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

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

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

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

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

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

#### 3.4 Mediterranean salt meadows (H1410)

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

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

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

#### 4.1 Impacts and Activities

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

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

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

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

Erosion (900) and accretion (910), for which there is often some evidence at larger sites, although not usually together is difficult to quantify accurately. In terms of erosion there was some evidence such as low, perched faces or occasionally higher terracing in both ASM and MSM habitats, along with some limited signs of undercutting. There are certainly signs of both loss and gain of habitat at Creeslough. It is not possible to indicate how much saltmarsh existed around this site prior to the mapping of the 2<sup>nd</sup> edition 6inch map, as the map shows the land to have been already modified through the construction of the sea wall. Analysis of the 6 inch maps reveal that a large part of the ASM along the northern side of the estuarine channel has developed during this period, probably up to 3 ha. About 1 ha has also developed on the adjacent southern adjacent side of the estuarine channel. This means there is an overall accretional trend at this site and the presence of accretional ridges and pioneer vegetation indicates this trend is continuing. There are also indications that some of this saltmarsh habitat has only developed very recently (about 1.4 ha) when a comparison of aerial photographs (year 2000 and 2005 series) is made. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is more than balanced by significant accretion at this site.

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

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	910	В	+1	2.0	Inside
H1330	140	С	0	12.0	Inside
H1330	143	В	-1	4.0	Inside
H1330	501	С	0	0.02	Inside
H1330	810	С	-1	0.01	Inside
H1330	900	С	0	1.0	Inside
H1330	910	В	+1	1.4	Inside
H1410	140	С	0	3.0	Inside
H1410	143	В	-1	1.0	Inside
H1410	501	С	0	0.02	Inside
H1410	810	С	0	0.01	Inside
H1410	870	С	+1	2.8	Inside

Table 4.1.	Intensity of	various	activities	on saltmarsh	habitats at	Creeslough.
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<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

## 5 CONSERVATION STATUS

### 5.1 Overall Conservation Status

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

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

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

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

Creeslough is a large site in which only a small number of impacts or activities are directly affecting it. The agricultural management regime is probably the greatest influence on the current condition of the land although some of this may be attributable to the recent wet summers which have rendered much of the agriculturally available land saturated for much of the year, and thus prone to damage. The grazing intensity, although low or at least not continuous, in most parts has not protected the land from poaching and other damage including vegetation denudation.

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

Habitat	EU Conse			
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
<i>Salicornia</i> flats (H1310)	Extent Structure and functions Future prospects			Favourable
Atlantic salt meadows (H1330)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (H1410)	Extent	Structure and functions, Future prospects		Unfavourable - Inadequate

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

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

#### 5.2.1 Extent

The extent of the *Salicornia* flats is assessed as *favourable* (Table 5.1). The widespread distribution of this habitat around the Ards Strand Inlet is a feature which is unrivalled in the

majority saltmarsh sites through out the country. There are no indications of any loss of habitat due to land-use changes or erosion within the current monitoring period.

#### 5.2.2 Habitat structure and functions

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

### 5.2.3 Future prospects

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

### 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

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

#### 5.3.2 Habitat structure and functions

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

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

#### 5.3.3 Future prospects

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

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

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

#### 5.4.2 Habitat structure and functions

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

monitoring stops. Therefore the structure and functions of the MSM habitat is reassessed as *unfavourable-inadequate*.

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

#### 5.4.3 Future prospects

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

# 6 MANAGEMENT RECOMMENDATIONS

There are no recommendations in relation to the overall management of the saltmarsh habitats at this site. However, the re-flooding that has occurred behind the seawall on the northern side of Ards Strand is noteworthy and should be monitored. There are only a very limited number of sites throughout in Ireland where this is happening and most, if not all, are due to a catastrophic failure of sea wall and/or drainage regimes sometimes unwittingly brought about through a reduction in the maintenance programme of these reclaimed areas.

### 7 REFERENCES

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

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

# 8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats	21.494	21.494				
2	Spartina swards						
3	1330 Atlantic salt meadow	19.496		19.496			
4	1410 Mediterranean salt meadow	5.651			5.651		
5	ASM/MSM mosaic (50/50)	0.210		0.105	0.105		
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.407					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.409					
19	1330/rocky shore mosaic	0.014		0.007			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	49.681	21.494	19.601	5.756		



6 Commission, Oran recent egus Riortas Antur Brylramment, Peritage and Lacal Government National Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

Creeslough

Sheephaven SAC (001190)

This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)

SMP code:

SMP0131

Real	
	Legend
· 7 9	SAC Boundary
1000	1310 Salicornia flats
	1330 Atlantic salt meadows
	1410 Mediterranean salt meadows
all and	1330/1410 mosaic
	1330/rocky shore mosaic
3.24	Other Saltmarsh (CM2)
1 The same	other
- Lasta	1310 monitoring stops
	1330 monitoring stops
MANA A	1410 monitoring stops
141 1	
0 00 40	20 240 220 400 Maters

1 SITE DETAILS					
SMP site name: Dooey	SMP site code: 0130				
Dates of site visit: 10 September 2	008 CMP site code: 160				
SM inventory site name: Dooey	SM inventory site code: 15				
NPWS Site Name: Ballyness Bay					
NPWS designation cSAC: <b>1090</b>	MPSU Plan: New Format – Draft 2: 2005-2010				
pNHA: <b>1090</b>	SPA: N/A				
County: Donegal	Discovery Map: 1 Grid Ref: 189810, 433000				
Aerial photos (2000 series): <b>O 0094</b> 1115- <b>A,B</b>	-B,C,D; O 6 inch Map No: Dg 024				
Annex I habitats currently listed as on <b>No SM habitats listed</b>	ualifying interests for Ballyness Bay cSAC:				
Other SMP sites within this SAC/NHA: N/A					
Saltmarsh type: Sand flats	Substrate type: Peat (Phragmites):sand				

# Dooey

#### 2 SITE DESCRIPTION

Situated in the relative shelter of Ballyness Bay to the east of Bloody Foreland, in North County Donegal, Dooey is located alongside the small rural community that is centred on Magheraroarty (Machaire Uí Robhartaigh) which is the gateway to the inhabited offshore islands of Inishbofin and Tory Island. The nearest small centre of population is Gortahork, which lies approximately 4 kilometres to the west.

Asides from the extent of sand flats which are exposed at low tide, Ballyness Bay contains another topographical feature of national importance. The prominent sand spit at Dooey, is one of two which guards the narrow opening to Ballyness Bay and features what is considered to be the largest unvegetated sand dune in Ireland. The saltmarsh is not overly large and is discontinuous in its distribution. It extends from the northern tip of the sand spit in a southerly direction to the sheltered inlet at the western side of the bay, before continuing as a fringe of marsh around the coast in the direction of Oileán Uí Bhaoill.

The area around the site is rural and the landscape is dominated by the mixed hard-rock geology of Crocknaneeve. The uninhabited upper slopes are dominated by bog and heath, while domestic residences and small farms line the road which follows the mountains contours. The agricultural land is characterised by a series of mostly parallel stripped fields which slope down towards the intertidal area. The majority of the fields are characterised by derelict vegetation that is not intensively managed. Most of the fields support wet grassland of varying condition and scrub.

The site is part of the larger Ballyness Bay candidate Special Area of Conservation (cSAC). This designation is as a result of the range of coastal habitats that it supports. The NATURA 2000 database lists the following percentage areas for the designated habitats.

- Mudflats and sandflats not covered by sea at low tides (1140) 56%
- Fixed coastal dunes with herbaceous vegetation (2130) 15%
- Estuaries (1130) 4%
- Shifting dunes along the shoreline with Ammophila arenaria (2120) 3%
- Embryonic shifting dunes (2110) 1%
- Humid dune slacks (2190) 1%

Saltmarsh habitats, although described in the NPWS notes and Management plan, are not listed as qualifying habitats for the site. In addition, the mollusc, *Vertigo geyeri*, is the only species listed as a qualifying species of interest listed for the site.

The majority of the saltmarsh recorded at Dooey is located within the cSAC. However, small bits have been mapped outside of the designated site. The cSAC boundary is based on the OSI 6inch map and the landward boundary generally follows fence-lines and other landmarks such as embankments etc. that separate agricultural land from semi-natural habitats. Some reasons for the discrepancy include the accuracy of the 6inch map which has not been updated in many years and is often offset slightly from the actual land boundaries that occur on the ground. Elsewhere, some of the embankments are in a state of disrepair and saltmarsh vegetation has extended inland slightly. Overall, the general trend of the current boundary is accurate.

The NPWS site notes indicate that as many as twenty local landowners have commonage rights on the sand spit and it is publicly accessible. Along the innermost fringes of the Bay, the narrow saltmarsh occurs along the edge of the wet enclosed fields. Most of the saltmarsh habitats are recorded outside of private land, although on occasions, it extends inland. Permission was not sought to survey the saltmarsh, although one landowner that was present in his fields was informed of the survey.

### **3 SALTMARSH HABITATS**

#### 3.1 General description

Three Annex I saltmarsh habitats were recorded at Dooey namely: *Salicornia* and other annuals colonizing mud and sand (*Salicornia* flats), Atlantic salt meadows (ASM) and Mediterranean Salt meadows (MSM). The total area mapped for each of the three habitats is

shown in Table 3.1. The majority of the saltmarsh habitats are located within the confines of the cSAC boundary and only small fragments of marsh occur outside the cSAC. The reasons for this have been previously discussed.

The national inventory describes the saltmarsh system as being of the sandflats type, which has developed on a sand and Phragmites peat substrate (Curtis and Sheehy-Skeffington 1998). Much of the saltmarsh is found on the sandflats, although towards the southern end of the site, a narrow fringe extends around the Bay towards Oileán Uí Bhaoill. There is a change in the substrate, in places, from sand to mud, while in some areas patches of exposed shingle and cobble.

The majority of the saltmarsh at Dooey is intimately associated with the extensive sand dune system, which has recently been surveyed (Ryle *et al.* 2009). The site is notable in that it comprises two separate but adjacent areas of saltmarsh that reflect the substrate on which they occur. The first area of marsh is the most extensive and extends almost to the northern tip of the sand spit, a distance of approximately 2.5 kilometres. However, it is discontinuous in its distribution, which is linked to the nature of the intertidal zone. Both *Salicornia* flats and ASM vegetation were mapped along the eastern side of the sand spit. The *Salicornia* flats are mostly found on level, sheltered ground which is often consolidated or has some amount of small cobble associated with its composition. The ASM is more extensive than the *Salicornia* vegetation. There is a good range of typical ASM zones recorded here from pioneer vegetation through low-mid and some small amount of upper marsh communities. Creeks and pans are not well developed although this is not surprising given the relative immaturity of much of the vegetation.

Given that the saltmarsh is associated with the dune system at Dooey, it is not surprising that the upper boundary of the saltmarsh is often marked by a distinct change in vegetation to fixed coastal dunes, or at least a band of bare sand fronting the dunes. At the northern end of the spit large expanses of embryonic dunes are associated with the pioneer ASM habitats. With sand continuously accreting in and around patches of saltmarsh, there appears to be a build up of embryonic dunes at the expense of the saltmarsh vegetation. This was noticeable at the northern end of the site, where a considerable amount of newly developed embryonic dunes, not previously recorded during the coastal monitoring project survey in 2006 (Ryle *et al.* 2009) had developed. Given the wind movements and tidal patterns are ever changing around Ballyness Bay, it is likely that these vegetation types are in constant flux.

The second area of marsh starts in the south-western corner of the site and extends eastwards towards Boyle's Island, where there is a noticeable reduction in ASM vegetation on the increasingly rocky shoreline. Further saltmarsh vegetation was noted to occur some distance beyond the inlet behind Boyle's Island, but this was not surveyed.

The transition between the marsh that occurred on the sandflats and the second area of marsh occurs at the south western corner of the site almost coincides with the sole access track from the car park onto the sand spit itself. The structure and condition of this second area of saltmarsh is quite unlike that which was encountered on the sand flats. The vegetation is largely confined to a narrow band that skirts the indented coastline in an easterly direction. There is a gradual change in the make up of the substrate on which the saltmarsh occurs and the vegetation is much more heterogeneous in appearance than that which was recorded on the sand flats. This reflects the change in nature of the terrain. The underlying geology and soils means that the largely sand-dominated soils of the sand spit are replaced by mud and peat of varying depths.

The marsh is dominated by ASM communities. Asides from the relatively large patch in the south-western corner of the site, most of the vegetation is confined to a narrow fringe. The structure and extent of the vegetation is influenced by tidal inundation and a low perch was noticeable along much of the frontline. There are negligible patches of pioneer vegetation, which is often found in association with the three smaller patches of *Salicornia*-dominated vegetation. The reduced development of the *Salicornia* vegetation is likely due to the fact that the incoming tides reach this part of the marsh and that the conditions are unfavourable for its widespread distribution.

Typically, most of the vegetation consists of mid and upper ASM communities. Despite the narrow nature of the marsh in this section, there is some development of pans but creeks are not common. Any drainage features are usually characterised by wet grassland vegetation (GS4) or patches of Sea Club-Rush (*Bolboschoenus maritimus*). Indeed there is a distinct freshwater influence along the southern flanks of the site, where water drains off the surrounding slopes. It has an impact not alone in countermining the extent of the marine influence inland, but also in influencing the range of habitats that are recorded within and adjacent to the saltmarsh communities. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification, within the areas dominated by ASM, and MSM. They include stands of the Common Reed (*Phragmites australis*), Sea Club-Rush and transitional grassland vegetation dominated by Twitch (*Elymus repens*).

In places, the saltmarsh vegetation was grazed and poaching was locally abundant. Unlike the sand dune system which is largely unenclosed, much of the land which this area of saltmarsh backs onto is fenced into individual landholdings. Most is considered as rough grazing that supports cattle, sheep and horses depending on the landowner. Some areas of semi-improved grassland that is grazed by sheep is located in low-lying ground on the south eastern part of the site. The remainder of the land that is recorded behind the saltmarsh is either abandoned or derelict land. This has occurred either through a reduction in grazing pressure and the subsequent spread of scrub species such as Gorse (*Ulex europaeus*) and Brambles (*Rubus fruticosus* agg.) or because of the presence of blanket peat, particularly evident towards the eastern end of the site.

Unlike the sandflats, two adjacent small patches of MSM vegetation occur within the ASM vegetation. Although the area is showing signs of damage from sheep grazing, and other than a few trails through the MSM, the vegetation remains relatively intact.

The invasive Common Cordgrass (Spartina anglica) was not present at the site.

|--|

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.851
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	7.494
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.025
	Total	8.37

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

A number of large swards of *Salicornia*-dominated vegetation were recorded at Dooey. In total, 0.851ha was mapped; all of it located within the cSAC boundary. The majority of the *Salicornia* flats were located on sand and shingle dominated intertidal zone, particularly in sheltered zones behind cobble ridges and hollows in sand dunes and towards the northern end of the site. Smaller outliers were noted along the perched ASM frontline along the southern end of the site.

Typically the vegetation was characterised by species-poor vegetation. Bare ground often accounted for 75% of a monitoring stop, although in places this was a little as 40%. Dominated by stands of Glasswort spp. (*Salicornia europaea* or *Salicornia decumbens* at one location), other species that were noted included Common Saltmarsh Grass (*Puccinellia maritima*) and Annual Sea-Blite (*Suaeda maritima*). Another feature of the *Salicornia* flats was the presence of both green and brown Algal mats. The localised accumulation of sand resulted in the transition from *Salicornia* flats to low embryonic vegetation dominated by Sand Couch (*Elytrigia juncea*).

### 3.3 Atlantic salt meadows (H1330)

The saltmarsh at Dooey is dominated by ASM and accounts for 7.494ha or approximately 90% of the total saltmarsh vegetation that is mapped (Table 3.1). The majority of the ASM vegetation was recorded inside the cSAC and only a small fraction or 0.241ha was recorded outside.

There are few examples of typical saltmarsh topography throughout the site. Much of the marsh has developed on sandflats and there is little topographical difference between the front and landward side of the marsh. Elsewhere the marsh is perched above the intertidal zone rather than developing directly on it. There is some development of open salt pans present in the southern end of the site. Weaknesses or tears in the surface of the vegetation facilitate the drainage of water into the intertidal zone. However, these are often short and do not develop into creeks. Rather, the larger drainage features are associated with flushes and small streams which commence further inland and are characterised by wetland or brackish species.

The ASM is characterised by a degree of zonation ranging from pioneer vegetation through low, mid and upper marsh communities, although they rarely develop sequentially in classic saltmarsh zonation. The most commonly recorded species in the monitoring stops include Thrift (*Armeria maritima*), Sea Aster (*Aster tripolium*) and Sea Milkwort (*Glaux maritima*). These species were ubiquitous in all zones. Other species that were commonly recorded, flourished in different zones.

While Common Saltmarsh Grass was recorded in a number of places, there was a significant amount of pioneer and developing ASM was recorded from the northern end of the spit. Elsewhere, it was not a common feature of the ASM. It is patchily vegetated with Common Saltmarsh Grass along with spartan Annual sea-blite and Glasswort spp. Bare sand was a feature of this vegetation, and it was often occurred on the edges of large *Salicornia* flats or in transitional situations with embryonic dunes. It was mostly located towards the northern end of the site.

Lower SM vegetation was typified by a high percentage of cover, typically 75-100%, of Common Saltmarsh Grass. There were a number of constant species, all of which were of varied ground cover. They included Sea Plantain and Thrift, whilst species such as Sea Aster, Sea milkwort, Sea plantain, Glasswort, Annual Sea-blite typically accounted for less then 5% cover. Bare ground varied throughout the lower ASM, and it accounted for <1% to 10% in places.

Mid marsh communities were dominated by Sea Plantain along with Sea milkwort, Thrift, Sea Aster. Although the vegetation was naturally short, ground cover was almost always complete with little signs of bare ground due to erosion or other damage such as poaching etc.

In the upper marsh, Red Fescue (*Festuca rubra*) is very dominant and is commonly associated with Saltmarsh Rush (*Juncus gerardii*), Sea Plantain, Sea Arrow-grass (*Triglochin maritima*). Bare ground was not a feature of upper vegetation although in places it was poached. In these situations, algal material accounted for areas devoid of saltmarsh vegetation. In wetter situations, Creeping Bent (*Agrostis stolonifera*) was noted. Other

occasional species included Autumn Hawksbit (*Leontodon autumnalis*) and Extended Sedge (*Carex extensa*).

Notable species from the site include the Saltmarsh Flat-Sedge (*Blysmus rufus*) that was typically located in upper saltmarsh communities that were found around the southern flanks of the site. Elsewhere Sea Hard-Grass (*Parapholis strigosa*) was occasionally recorded. Turf fucoids were also occasionally noted.

In addition to pure stand of ASM vegetation, patches of ASM/rocky shore mosaic were noted, particularly towards the eastern end of the site. The vegetation was in places similar to the Upper ASM community but with increasing exposure of rock/shingle species such as Thrift, Sea Aster and Sea Plantain increased in prominence. Typically these were narrow bands that occurred on gravel substrates with erratic cobbles. This cobble band was seen to continue under the Peat deposits.

Elsewhere Reeds (*Phragmites australis*) were extending into the marsh and a mosaic of ASM/other SM (CM2) was recorded. It does not represent a significant area and is mainly found at the edges of pure stands of reeds, where the freshwater influence flowing off the upland slopes drains out into the inner parts of Ballyness Bay.

# 3.4 Mediterranean salt meadows (H1410)

In comparison with the previous saltmarsh habitats, the MSM is poorly represented at Dooey. A meagre 0.025ha (Table 3.1) was recorded, all of which occurred inside the cSAC. Two small patches surrounded by grazed ASM vegetation were recorded in the south eastern end of the site.

The vegetation is characterised, typically, by Sea Rush (*Juncus maritimus*) which makes it stand out from the surrounding ASM vegetation. The cover of this species doesn't vary much and generally covers between 50 and 75% of the total area. Other species that were noted in the MSM included other common saltmarsh species such as Saltmarsh Rush (*Juncus gerardii*), Red Fescue and other species typical of the upper ASM communities.

### 4 IMPACTS AND ACTIVITIES

The list of impacts and activities is shown in Table 4.1. There are few activities which are causing any long lasting or damage to the marsh, and most are quite localised. Land use in and around the area comprises mostly small scale farming and fishing with the small harbour serving a number of fishing boats and as the main ferry crossing point to the inhabited islands of Tory and Inishbofin. Alongside the single road that leads into the area, that there are many
domestic and holiday dwellings. The sand dunes and sandflats are used by walkers and people with cars. In terms of access, the saltmarsh is readily accessible in most parts, although it is not much impacted upon by locals and tourists alike.

Grazing (140) is not a significant activity at this site. Different grazing regimes are applied throughout this site reflecting the open commonage and the largely enclosed nature of the land in south of the site. Grazing and other associated damage such as trampling or poaching (143) is mostly confined to the fringing marsh at the southern end of the site, which fringes the many agricultural fields. Most are enclosed, but in places the fences are poorly maintained and sheep have accessed the marsh. There are areas where the levels of grazing have been intensive and kept the sward low, with the result that the ground has become locally poached. On the sandy Commonage, there are some pens on one of the sand islands and there was evidence of sheep being herded along the intertidal zone. A sizable population of rabbits occurs in the dunes and there was evidence of many burrows alongside the saltmarsh/sand dune divide towards the northern end of the site.

There are some signs of erosion (900) at this site and while this is a natural feature of saltmarshes, it is difficult to calculate any area or % loss or gain. A comparison between the year 2000 aerial photographs and the year 2005 series shows no measurable loss or gain of saltmarsh. Many of the saltmarsh habitats on the sandflats are not discernible on the aerial photographs or can be misidentified as green algal mats, of which there a number. Given the location of the *Salicornia* flats, they might be expected to suffer from erosion or natural transition to other habitats (990). Despite sediment redistribution, both large and smaller patches of *Salicornia* vegetation persist, mostly in sheltered hollows, where only the highest tides cover. There certainly is patchy visual evidence of erosion along the ASM frontline, with features such as low ridges and isolated clumps of ASM vegetation recorded. These were mostly concentrated in a small number of places along the southern coast, but at no place were they considered as a significant feature of the landscape. It is evident that a significant part of the saltmarsh communities at the northern end of the spit are highly dynamic and occur on the ever-changing sand flats. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is more than compensated by accretion at this site.

There has been some recent disturbance through infilling of saltmarsh; reclamation and agricultural improvement (803). This occurred in a small area where the spit connects with the mainland and a small patch of saltmarsh was infilled. An earthen berm had been constructed after the Coastal Monitoring Project survey in 2006 (Ryle *et al.* 2009) at the back of the saltmarsh. It is estimated that 0.3ha of saltmarsh has been lost to the reclamation.

In a number of locations, dumping of rubble and other household material (423) was witnessed, ostensibly to provide some form of coastal protection (871). However, the material was merely dumped and does not provide any significant form of protection.

Human induced activities at the site include walkers (501), although trails created by foot traffic is minimal. Of more concern, is the uncontrolled activity of allowing cars and quad bikes (623) onto the sandflats. A number of access tracks lead off the sand dunes onto the extensive intertidal area, which is popular with motorists when the tide is out. It is possible to drive out as far as the most northern point of the Sand spit across relatively consolidated sand and shingle. There was clear evidence of cars being driven at speed and doing handbrake turns and the like. It was particularly noticeable at the northern-most, sheltered sandflats. Wheel ruts were common on both the established and emergent saltmarsh vegetation.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	623	С	-1	0.010	Inside
H1310	900	В	0	0.400	Inside
H1310	990	В	+1	0.400	Inside
H1330	140	С	0	7.0	Inside
H1330	143	В	-1	0.49	Inside
H1330	423	С	-1	0.001	Inside
H1330	501	С	0	0.005	Inside
H1330	623	С	-1	0.01	Inside
H1330	803	А	-2	0.3	Inside
H1330	871	С	-1	0.001	Inside
H1330	900	С	0	2.0	Inside
H1330	910	В	+1	2.0	Inside
H1330	990	В	+1	2.0	Inside
H1410	140	С	0	0.025	Inside
H1410	501	С	0	0.025	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown. <sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural

positive influence and +2 = strongly managed positive influence.

<sup>5</sup> 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.

Outside of the site there are a number of impacts and activities that have the potential to have some form of impact on the saltmarsh communities, but these are limited and difficult to quantify and probably limited in intensity. The main impacts adjacent to the site are limited to grazing (140), mostly by sheep but with cattle and horses observed. Other impacts include the Irish College in the South western corner of the site near the small harbour. There were few buildings or any other habitation adjacent to the saltmarsh except the cove in the southern part of the site (403). A number of septic tanks were observed in fields and at one location, a small pipe was observed discharging grey water (700) directly onto the sandflats.

The direct impacts of these features on the saltmarsh is difficult to assess, particularly as the marsh is not extensive at this point.

#### 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

Notwithstanding the fact that the saltmarsh at Dooey comprises two dissimilar topographical units, the conservation status has been applied to the marsh as a single unit, as it is largely contiguous. The overall conservation status of the saltmarsh habitats at Dooey is *unfavourable-inadequate*. This assessment is based upon the fact that whilst most of the target criteria for the individual habitats were met, there has been a quantifiable loss of ASM habitat during the current monitoring period, which was the result of recent reclamation works in the south-western corner of the site. Except for this impact, the conservation status would have warranted a *favourable* assessment (Table 5.1). The remaining saltmarsh is in generally good condition.

The saltmarsh at Dooey is notable, not because of any species that is found there, rather because a large percentage of the marsh is found on the extensive intertidal sand flats. The diurnal tidal influx has an important influence on shifting sediments and hence the distribution and persistence of much of the saltmarsh habitats. Three Annex I saltmarsh habitats are recorded from the site. There are few impacts and activities seriously affecting the site. Grazing activity is low in most places and is only damaging along a narrow fringe along the narrow fringe of saltmarsh that extends around the coast to the eastern perimeter of the site at Oileán Uí Bhaoill. The northern end of the spit is quite dynamic and there are indicators of saltmarsh growth and natural transition from saltmarsh to embryonic dune in places due to sand deposition.

The site is located within the Ballyness Bay cSAC and a current management plan for the site is in place for the years 2005-2010.

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

#### Table 5.1. Conservation status of Annex I saltmarsh habitats at Dooey.

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

#### 5.2.1 Extent

The extent of this habitat is assessed as *favourable* (Table 5.1). There is a notable area of this habitat at Dooey, with a number of large swards occurring on the sand flats and several small patches scattered about elsewhere. There is no accurate data as to the previous extent of the *Salicornia* flats in Ballyness Bay, although its presence was partially mapped during the coastal monitoring project (Ryle *et al.* 2009). The vegetation is highly dynamic and its presence in a number of discrete patches is indicative of the likelihood of its persistence.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. In total four monitoring stops were carried out in this habitat, all of which satisfied the target criteria. There are few impacts which are negatively affecting this habitat, other than some vehicular damage. The annual vegetation is highly dynamic and the habitat is prone to changes in tidal patterns and associated shifts in sediments. The existence of extensive patches of the vegetation indicates that this habitat is functioning healthily.

#### 5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. The assessment assumes that there will be no change in the current management regime and that any activities currently carried out or occurring in this habitat does not intensify. Despite the ever-changing

intertidal sands, the persistence and re-emergence of this annual-dominated habitat is likely to continue particularly in the small sheltered coves where it is currently found. The overall extent is likely to vary in the future due to natural changes in sand deposition, particularly at the northern end of the spit, which is very dynamic.

#### 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The extent of the ASM is rated as *unfavourable-inadequate*. Although the site is not a large saltmarsh, and is narrow in places, the ASM accounts for the greater portion of the saltmarsh vegetation at Dooey (approximately 90%). Saltmarsh vegetation is not shown on the OSI 6 inch maps. However, the general trend of the frontline suggests a gradual retreat or erosion, particularly along the southern coast. Low erosion ridges or perched marsh faces were noted in several places. Comparison of recent aerial photographs does not reveal any measurable loss of habitat. On the sandflats, however, the ASM vegetation is highly dynamic and it is difficult to estimate if there has been any real loss or gain of habitat.

The assessment is based upon the fact that there has been some reclamation of land with a quantifiable loss of habitat from within the boundary of the cSAC (a loss of  $\sim$ 3%). This reclamation has occurred within the past 2 years, as the reclaimed land was previously identified as saltmarsh in 2006 (Ryle *et al.* 2009).

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as favourable (Table 5.1). All thirteen monitoring stops that were made in the ASM satisfied the target criteria. Most of the saltmarsh is in good condition, although there is some localised damage from uncontrolled vehicle use at the northern end of the site and grazing damage along the southern flanks.

The results also indicate that the structural development of the marsh is healthy. A full range of ASM zones were noted, although rarely were they contiguous. Though species such as Sea Purslane (*Atriplex portulacoides*) and Sea lavender (*Limonium* spp.) were not recorded, the ASM at this site has a fairly typical species assemblage.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. The majority of the ASM communities are located on the eastern side of the sand spit. The assessment assumes that all activities and impacts currently recorded for the habitat do not change or intensify. This is an easily accessible area and there are some signs of damage from vehicles doing handbrake turns etc. There is some limited sheep and cattle grazing, but again it is not

considered a serious threat to the integrity of the vegetation. Grazing is however, having an impact on the saltmarsh vegetation elsewhere. This is more evident along the southern flanks of the site where the saltmarsh exists. This relatively narrow fringe of saltmarsh around the coast comprises a naturally low sward that is occasionally grazed by sheep. In places, the saltmarsh extends into enclosed land and that ground is clearly overgrazed and poached. The extent of pioneer and recently developing saltmarsh at the end of the spit is likely to change in the future, as this area is quite dynamic. There may be both natural losses and gains as saltmarsh transitions to embryonic dunes and new saltmarsh develops on accreting sand.

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The assessment of the MSM during this monitoring period is *favourable* (Table 5.1).There is no previous information as to its occurrence at this location. MSM vegetation at Dooey is negligible and is confined to two small patches within the ASM along the southern flanks of the site. However, it would appear from the condition and appearance of the vegetation that it has been here for a number of years.

#### 5.4.2 Habitat structure and functions

Given the paucity of this habitat, monitoring stops were not carried out and the determination is based upon a visual assessment. The assessment of the structure and functions attribute for the MSM at Dooey is *favourable*. The limited amount of MSM vegetation was in good condition and did not appear to be greatly impacted by grazing of the nearby ASM sward.

#### 5.4.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. The assessment assumes that the current activities and levels of the impacts do not change in the near future. The MSM is surrounded by ASM and bog habitats whose vegetation is kept relatively low due to grazing by sheep. They do not appreciate Sea Rush and other than trails through the vegetation, tend to avoid it.

#### 6 MANAGEMENT RECOMMENDATIONS

In light of vehicular damage on the saltmarsh vegetation, it would be prudent to address uncontrolled access onto the sandflats with the county council. Asides from that no other changes are necessary.

# 7 REFERENCES

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

MPSU (?). *Conservation Plan for Ballyness Bay cSAC 2005-2010*. Government of Ireland, Unpublished.

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

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats	0.851	0.851				
2	Spartina swards						
3	1330 Atlantic salt meadow	7.418		7.418			
4	1410 Mediterranean salt meadow	0.025			0.025		
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic	0.021		0.0105			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.774					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.053					
19	1330/rocky shore mosaic	0.130		0.065			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	10.251	0.851	7.494	0.025		

Table 8.1. Areas of SMP habitats mapped using GIS.





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Saltmarsh Monitoring Project 2007-2008 Doeey (Map 2 of 2)

Ballyness Bay SAC (001090)

This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)

SMP code:

SMP0130

eg	end
-	

240

3	20 400 Meters	N
		31
	1330 monitoring stops	1
	1310 monitoring stops	-
	other	1
	Other Saltmarsh (CM2)	
	1330/rocky shore mosaic	
	1330/other SM (CM2) mosaic	10
	1410 Mediterranean salt meadow	s
	1330 Atlantic salt meadows	
1	1310 Salicornia flats	Sec.
	SAC Boundary	N.

A

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

80

0

160

Original Drawing Size: 297 x 420 (A3) Scale 1:7000

# Fahan

# **1 SITE DETAILS**

SMP site name: Fahan	SMP site code: SMP0031			
Site name (Curtis list): Fahan	CMP site code: 174			
	Site No: (Curtis list): 3			
NPWS Site Name: Lough Swilly	Dates of site visit: 11/08/2006			
NPWS designation cSAC: 2287	MPSU Plan: old format available			
pNHA: <b>2287</b>				
County: <b>Donegal</b> 6 inch Map No: <b>Dg038</b>	Discovery Map: 2         Grid Ref: 233220, 427380           Aerial photos (2000 series): 00147-c, 00168-a			
Annex I habitats currently designated for I Atlantic salt meadows (Glauco-	Lough Swilly cSAC: Puccinellietalia maritimae) (1330)			
Other SMP sites within this cSAC/pNHA: Ray, Ramelton, Green Hill, Lower Lough Swilly				

Saltmarsh type: Sand flats

Substrate type: Sand

# **2** SITE DESCRIPTION

Fahan saltmarsh is located midway along the eastern side of Lough Swilly in Co. Donegal, 4 km south of Buncrana. This saltmarsh is part of a larger coastal system, which includes Lisfannon beach (Blue Flag Beach) and sand dune system. The sandy beach is a popular destination for local people and day-trippers from the surrounding areas. The other coastal habitats were surveyed by the Coastal Monitoring Project. The site is relatively recent in origin having developed in the past 100 years. Its development has been related to the erosion of Lisfannon Point to the north and to the construction of embankments out to Inch Island to the south of Fahan (McKenna *et al.* 2003).

The sand dune and saltmarsh coastal ecosystem at Fahan (Lisfannon) has also been the subject of a detailed EU-LIFE study to test approaches to coastal management. This was conducted by Donegal County Council and University of Ulster. The coastal system developed quickly and has been relatively dynamic over the past 100 years with the seaward shoreline and sand dune system changing shape and position. This site is now being eroded and the coastal management is attempting to maintain the coastal system by a series of soft engineering techniques (McKenna *et al.* 2000). The saltmarsh is situated in a sheltered area adjacent to the shoreline with the sand dune system forming a barrier along the seaward side. The site is located at the base of Gollan Hill. The landward side is steeply sloping with a rocky cliff face developing along the boundary towards the south part of the site. The embankment has been reinforced towards the northern end with rock armour. The R238 Buncrana-Burnfoot Road is located along the top of this cliff/embankment and has been cut into the hillside. The lower part of the hillside has some mixed woodland, scattered dwellings and some recent residential development. Fahan Pier and marina is located to the south of the site. Buncrana Golf Course is located to the north of the site on some low-lying land adjacent to the shoreline. A railway line used to run along the landward side of this site is located to the south of the site next to the harbour.

A marina was constructed to the south of this site at Fahan Pier during the late 1990s. There has been some further reclamation on coastal land (2000-2005) between the marina and the rocky embankment/cliff that marks the base of the hillside. This reclamation has infilled a large coastal area within the cSAC. A habitat map presented by the EU-LIFE study and aerial photo taken in 1995 showed that saltmarsh (and sand dune habitat) was situated in this area before the construction of the marina. This saltmarsh has been destroyed by this construction and infilling. McKenna *et al.* (2003) describes the history of the construction of the marina.

One Annex I habitat, Atlantic salt meadows (ASM) is found at this site. This habitat is listed as a qualifying interest for Lough Swilly cSAC. Most of the saltmarsh habitat is situated within the cSAC. A narrow strip 5-15 m wide has been excluded from the cSAC un-intentionally. This is due to small errors in rectification between the 1920s 6 inch map and the 2000 aerial photos. The 1920's 6 inch map was used to draw the boundaries of the cSAC around this site.

The site can be accessed easily via the R 238 Buncrana-Burnfoot Road. A car park has been built by Donegal County Council at the northern end of the site to service the beach.

# **3 HABITATS**

# 3.1 General description

Only one saltmarsh habitat, Atlantic salt meadows, is present at this site (Table 3.1). This habitat is part of a larger coastal ecosystem with a sand dune system sheltering the saltmarsh habitat along the western seaward side. The saltmarsh is quite uniform and forms a generally flat plain filling the area between the sand dune system and the edge of the terrestrial land. This area is flooded from the southern side and is drained by one main creek. Fixed dune and saltmarsh form a complex mosaic along the western saltmarsh boundary. Saltmarsh extends along hollows (fingers) between higher fixed sand dunes. There are scattered mounds containing fixed dune grassland through the saltmarsh, mainly on the western side.

At the northern side sand dunes become dominant but there is a narrow zone along the east landward side where the saltmarsh develops into brackish marsh and eventually freshwater marsh. A steep rocky embankment is situated along the landward boundary and this develops into a rocky cliff face.

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

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	7.51
	Total	7.51

# 3.2 Atlantic salt meadows (H1330)

The saltmarsh is situated in one main block. This habitat is generally quite uniform and is dominated by a mid-upper marsh vegetation community. There is a low sward present that is dominated by Sea Pink (*Armeria maritima*) and Sea Plantain (*Plantago maritima*) with increasing amounts of Red Fescue (*Festuca rubra*) in places. Other species present include Sea Aster (*Aster tripolium*), Greater Sea-Spurrey (*Spergularia media*), Common Scurvygrass (*Cochlearia officinalis*), Long-Bracted Sedge (*Carex extensa*), Saltmarsh Rush (*Juncus gerardii*), Sea Milkwort (*Glaux maritima*), Annual Sea-blite (*Suaeda maritima*) and Common Saltmarsh-grass (*Puccinellia maritima*). The latter two species are confined to some vegetated channels that drain the upper saltmarsh. The northern section of the saltmarsh has frequent low mounds present that are dominated by upper saltmarsh vegetation. Plant community zonation is related to elevation on these mounds. Red Fescue is dominant and Sea Pink and Sea Plantain are reduced in cover. Larger mounds contain fixed dune vegetation and there are natural transitions between the two habitats depending on elevation up the mound. Saltmarsh is dispersed in the lower hollows and plains around these mounds.

The fixed dune vegetation on the lower mounds is indicated by species such as Birdsfoot (*Lotus corniculatus*), but Sea Pink, Red Fescue and Creeping Bentgrass (*Agrostis stolonifera*) are also common. Long-Bracted Sedge is generally found in the upper saltmarsh zones and in the transitional zone between the saltmarsh and the fixed dune vegetation. The larger mounds contain species such as Marram (*Ammophila arenaria*).

Upper saltmarsh vegetation is also situated along narrow bands between taller sand dunes along the western side of the saltmarsh. This vegetation is dominated by Red Fescue with frequent Saltmarsh Rush, Sea Plantain and Sea Milkwort and occasional Sea Aster and Long-Bracted Sedge.

Towards the southern side of the saltmarsh Common Saltmarsh-grass and Annual Sea-blite become more common and Red Fescue disappears. The species assemblage is notable for the absence of Glasswort (*Salicornia* sp.) and Lax-flowered Sea Lavender (*Limonium humile*). The absence of these species is perhaps explained by the fact that this is a relatively new saltmarsh site and is somewhat isolated from other saltmarshes situated towards the head of Lough Swilly.

There is a seaward saltmarsh boundary along the southern edge of the saltmarsh. A sandy ridge has developed and this is colonised by a pioneer saltmarsh community. This area seems to be actively accreting. This community is dominated by Sea Plantain, Annual Sea-blite and Common Saltmarsh-grass and has a significant bare substrate cover (60% bare sand). This zone transitions into embryonic dune towards the western side.

There is a small rock outcrop jutting into the saltmarsh towards the south-east boundary. South of this rock outcrop the saltmarsh transitions to rank grassland dominated by Sea Couch (*Elytrigia atherica*) and Marram on a low ridge. The saltmarsh adjacent to this ridge seems to be enriched from runoff. There are some houses situated on the embankment above the saltmarsh at this location. The saltmarsh is dominated by a tall sward dominated by Red Fescue that transitions into Creeping Bentgrass further up the ridge. The vegetation is rank and has a low diversity. This area shows up on the 2000 aerial photo as a brighter green area so nutrient enrichment is likely. Towards the southern side and along the eastern edge of the channel the ridge develops into dune grassland with Marram and some embryonic dune.

A drain/creek is located along the landward boundary at the base of the embankment. Clumps of Sea Club-rush (*Bolboschoenus maritimus*) appear in this creek and become more common towards the northern end. Sand dunes eventually enclose the northern side of the saltmarsh. There is a narrow low-lying zone between the sand dunes and the landward embankment. This develops into a wider low-lying area that has characteristics of dune slack. This is a brackish area and contains hummocks with Red Fescue. The lower hollows are dominated by Saltmarsh Rush and Creeping Bent-grass. Channels through this area contain Sea Club-rush.

The saltmarsh topography is relatively poorly developed. One main creek drains the saltmarsh and connects to the drain along the eastern boundary at the base of the embankment. There are only a few minor creeks draining into this main creek so the creek network is poorly developed. There are very few salt pans on the saltmarsh. The lack of the creeks and salt pans means that the lower saltmarsh community is poorly represented as there is less internal zonation around these features.

#### **4 IMPACTS AND ACTIVITIES**

Overall there are few major activities affecting this saltmarsh (Table 4.1). This site is not grazed by livestock although there is likely to be some grazing by wild animals and waterbirds. The sward height is naturally low (5-10 cm) in the mid-marsh areas and increases in the Red Fescue-dominated areas. Some of the impacts such as wheel ruts (501) and camp fires (608) are related to the amenity use of this site. Amenity use of the whole site is greater on the beach and sand dune system, but the saltmarsh is also used by walkers including dog walkers and cyclists (622).

A small saltmarsh area is likely to be affected by nutrient enrichment (420). This area has some houses situated adjacent to the saltmarsh on top of the embankment. Runoff

from these houses has possibly created this enrichment. The nutrient enrichment has created rank grassland with low diversity. The rank grassland has developed in the absence of grazing livestock on the site. There are further signs of enrichment along the drain/creek situated at the base of the embankment/rock armour and this is probably related to run off from the road and the surrounding land.

This is a quite dynamic site. The system has only developed in the past 100 years and studies have shown that the sand dune system is eroding at present. There is likely to be further natural transition from saltmarsh to sand dune habitats as the sand dunes migrate south (990) and these trends continue in the future. This will reduce the extent of the saltmarsh habitats. The aim of the EU LIFE project is to slow or reverse these trends and prevent the sand dune system (and associated saltmarsh) from eroding.

A small area of saltmarsh (about 2 ha) adjacent to the marina has now been infilled and destroyed (802). This saltmarsh was present in 1995 before the marina was built and was mapped on the EU-LIFE habitat map.

Activities adjacent to the site include leisure activities in the sand dune and beach area (622). The Buncrana-Burnsfoot road is situated adjacent to the eastern boundary of the site (502). There are several groups of houses along the road (402) mainly to the south-east of the site. A marina is present to the south of the site (504).

EU Habitat	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected	Location of
Coue				(IIa)	activity
1330	420	С	-1	0.18	Inside
1330	501	С	-1	< 0.01	Inside
1330	608	С	-1	< 0.01	Inside
1330	622	С	-1	< 0.01	Inside
1330	802	В	-2	2.0	Inside
1330	990	В	-2	N/A	Inside
1330	401	С	0	all	Outside
1330	502	С	0	all	Outside
1330	504	С	0	all	Outside
1330	622	С	0	all	Outside

**Table 4.1.** Intensity of various activities on saltmarsh habitats at Fahan.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1= natural positive influence and +2 = strongly managed positive influence.
 <sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities

<sup>5</sup> 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 saltmarsh habitat is currently in good condition. However this site has an unfavourable conservation status due the loss of extent adjacent to the marina (Table 5.1).

Table 5.1. Conservation status of Annex I	saltmarsh habitats at Fahan.
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Habitat	EU Conse			
	Favourable	Unfavourable - inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (1330)	Structure and functions, Future prospects,		Extent,	Unfavourable - Bad

# 5.2 Atlantic salt meadows (H1330)

# 5.2.1 Extent

Overall, the extent of this habitat is assessed as *unfavourable*. This is because other information indicates that the previous extent of this habitat was greater. About 2 ha of saltmarsh was destroyed due the construction of the marina and the subsequent infilling of land behind the marina. This was located adjacent to the marina and south of the channel.

The remaining saltmarsh is part of a larger coastal ecosystem, which is eroding. The saltmarsh is not being eroded directly. However, the saltmarsh is likely to be subject to transitional pressures as small mounds of sand dune habitat have developed on the saltmarsh and the western boundary has a complex topography with a mosaic of salt marsh and fixed dune. Due to the current erosional trends these sand dunes are likely to migrate south in the long-term and this will naturally reduce the extent of the saltmarsh due to the transition to another habitat. However, an examination of the 1995 and 2000 aerial photo series indicates that no habitat transition can be confirmed during this period.

# 5.2.2 Habitat structure and functions

The habitat structure and functions are assessed as *favourable*. Four monitoring stops were carried out in this habitat and they all passed. All the attributes reached their targets. There are few impacts on the saltmarsh at this site and the main impacts are related to amenity use of the overall site, so the intensity is low.

This site had a typical species diversity, although some species like Glasswort were not recorded on the site. There was some saltmarsh plant zonation with the main community being mid marsh. The relatively low extent of the lower saltmarsh zone can be related to the saltmarsh topography and the lack of creeks and pans on the site. Only one main creek drains the saltmarsh and there is no creek network. There are also very few salt pans. This may be related to the relative young age of the saltmarsh and the ontological stage of the saltmarsh. There is a small area of lower saltmarsh vegetation along a sand bank at the southern edge of the site.

The saltmarsh habitat is also part of a larger coastal ecosystem. The topography of the site has created mosaics of saltmarsh and fixed dune vegetation and there is transitional vegetation present between these two habitats. These transitional habitats add to the conservation value of the site.

The sward height was also taller compared to other sites around Lough Swilly due to the lack of grazing by livestock. This allows a diverse sward height structure to develop. A small area is probably been affected by nutrient enrichment via runoff and this has created a small patch or rank vegetation with low diversity. No Common Cordgrass (*Spartina anglica*) was recorded at this site although it is found in Lough Swilly at all the other saltmarshes. The absence of this invasive species increases the conservation value of the site.

# 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. This assessment does not take into account the possible negative impacts of long-term transitional change to sand dunes if erosion of the overall ecosystem is continued. However, the success of the EU Life project is likely to stabilise the system so that the saltmarsh habitats will be conserved.

# **6 MANAGEMENT RECOMMENDATIONS**

Further examination of the small area being affected by nutrient enrichment in the south-east of the site to identify the source of the nutrient enrichment is required.

## 7 REFERENCES

- McKenna, J., MacLead, M., Power, J. and Cooper, A. (2000). Rural Beach Management, a good practise guide. Donegal County Council.
- McKenna, J., O'Hagan, AM, MacLead, M., Power, J. and Cooper, A. (2003). Obsolete maps and coastal management: case studies from northwest Ireland. Coastal Management, 31, 229-246.





# Glen Bay

### 1 SITE DETAILS

SMP site name: Glen	i Bay	SMP site code: 0126			
Dates of site visit: 17	September 2008	CMP site code: 146			
SM inventory site nar	ne: <b>Glen Bay</b>	SM inventory site coo	de: <b>26</b>		
NPWS Site Name: SI	ieve Tooey/Tormore Islan	d/Loughros Beg Bay			
NPWS designation	cSAC: <b>190</b>	MPSU Plan: Old Format			
	pNHA: <b>190</b>	SPA: N/A			
County: Donegal		Discovery Map: 10	Grid Ref: 152687, 385717		
Aerial photos (2000 s <b>A</b>	eries): O 0467-C; O 0495-	6 inch Map No: <b>Dg 080</b>			
Annex I habitats curre Bay cSAC:	ently listed as qualifying inte	erests for Slieve Tooey/T	ormore Island/Loughros Beg		
No Saltma	rsh habitats listed				
Other SMP sites with	in this SAC/NHA: Maghera				
Saltmarsh type: Bay	Su	bstrate type: Sand			

# 2 SITE DESCRIPTION

Glen Bay is associated with the historic ecclesiastical village of Glencolmkille, a small isolated village that is located in the Atlantic end of the Slieve League peninsula in the western half of Donegal. The isolated village lies in a narrow valley through which the Murlin River flows from the higher ground of Slieve Tooey to the north-east.

The area around the site is rural and the landscape is dominated by granitic ridges and mountain. Much of the ground is dominated by blanket bog, heath mosaic and scrub mosaic. Asides from the tourism interest in Glencolmkille, agriculture is an important industry that is carried out on all available land. Much of the land in the low lying hinterland and some of the land on the lower slopes are given over to pastorilism with sheep and cattle the main livestock.

In terms of saltmarsh, the site at Glen Bay is deceptive in that the fragmentary patches of saltmarsh vegetation that are associated with the main channel of the Murlin River are negligible. However, on the opposite side of the River from the GAA pitch, the site extends northwards beyond a topographical ridge towards a sheltered low-lying plain known as Fearann Mhic Giolla Bhríde which is surrounded on almost three sides by the Beefan and Garveross Mountain. This area contains a heterogeneous mosaic of saltmarsh, brackish marsh, blanket bog and Reedbeds whose distribution is related to small topological differences along the tidal river that drains this area. The distribution of these habitats and

structure of this areas has also been modified by historical land-use including peat-cutting, drainage and attempted reclamation.

Glen Bay is part of the Slieve Tooey/Tormore Island/Loughros Beg Bay candidate Special Area of Conservation (cSAC), which includes a considerable area of ground in the western half of Donegal. It is one of two saltmarsh sites that are listed in the National Inventory (Curtis and Sheehy-Skeffington 1998), the other being Maghera which also occurs within the cSAC. The cSAC includes a number of Annex I habitats, mostly blanket bog and upland heath communities and to a lesser degree sand dune habitats. Saltmarsh habitats are not listed as qualifying interests, although their presence is recognised in NPWS literature. A Number of Annex II species are known from the site including the snail *Vertigo angustior*, Grey Seal (*Halichoerus grypus*) and the Otter (*Lutra lutra*).

The site, around the mouth of the river was readily accessed and permission was not required. The main body of saltmarsh, however, was located in a sheltered low-lying basin along a smaller tidal tributary river to the north. All of the land in this area was fenced and a number of local landowners were contacted and permission to enter the land was granted.

### **3 SALTMARSH HABITATS**

#### 3.1 General description

Glen Bay is a deceptively large saltmarsh site. Fragments of saltmarsh are found along the Murlin River below Glencolmkille. The bulk of the saltmarsh, however, is located on the northern side of the Murlin River along a small tributary river that drains the almost hidden low-lying basin. It could easily be overlooked, nestling as it is behind a topographical ridge in the low-lying plain of Fearann Mhic Giolla Bhríde.

Two Annex I saltmarsh habitats were recorded at Glen Bay, namely Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). The total area mapped for each habitat is shown in Table 3.1. However, the site is notable owing to the complicated vegetation mosaic that was recorded, which reflects not only the topographical and ground water conditions, but also the land management practices that were formerly carried out here. The majority of the saltmarsh is located within the cSAC, although small fragments of both ASM and MSM, as well as much of the transitional vegetation extends beyond the cSAC boundary.

Most of the vegetation around the main channel of the Murlin River is patchily distributed and is not particularly diverse in terms of saltmarsh communities. It is associated in parts with the small sand dune system that occurs on the southern side of the Murlin River that was recently surveyed in 2006 as part of the Coastal Monitoring Project (Ryle et al. 2009). ASM accounts for most of it, with a single narrow patch of MSM recorded. Several patches of ASM extend

from the small road-bridge over the tributary river eastwards. These are typically small and occur on sand or shingle. Only one sizeable patch of ASM occurs at the bend in the river (the north-eastern corner of the car-park). It is here that the tidal influence starts to diminish and there is an increase in the brackish element of the marsh with narrow patches of Common Reeds (*Phragmites australis*) or Sea Club-Rush (*Bolboschoenus maritimus*) lining the river. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Much of the land around the upper part of the site is characterised by wet transitional grassland which contains some MSM elements, but is dominated by Grasses and Irises, rather than Sea Rush (*Juncus maritimus*).

There is a small break in the saltmarsh vegetation but it quickly re-appears. The main area of saltmarsh is situated on the northern side of the small road-bridge that leads out toward Glen Head. The saltmarsh is found along both sides of the tributary channel and extends a considerable distance inland, having spread along numerous creeks and man-made drainage channels. According to Curtis and Sheehy-Skeffington (1998), the saltmarsh is classified as a Bay type which has developed on sand. While the isolated patches of saltmarsh vegetation that were recorded in the tidal mouth of the Murlin River occurred on sand, the larger section of saltmarsh has developed largely over blanket peat.

The vegetation is characterised by a complicated vegetation mosaic, which although dominated by MSM, also supports relatively large stands of Reeds and transitional grassland along with remnant mounds of blanket bog. This mosaic is indicative, not only of the management of the area, but also the hydrological conditions of this region. Reedbeds become prominent in the eastern section where there is less tidal influence. Naturally wet due to large volumes of water draining off the surrounding upland regions, the low-lying plain at Fearann Mhic Giolla Bhríde was formerly covered in an extensive blanket of peat. Large areas of the peat have been removed by the locals as fuel and much of the land occupied by the saltmarsh is treacherous and in poor condition. Some of the cutover peat has reverted to saltmarsh. It is largely derelict, although some livestock, mostly cattle but some horses, are left to graze the ground.

EU Code	Habitat	Area (ha)
H1310	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	2.332
H1410	Mediterranean salt meadow	12.6
	Total	14.932

Table 3.1.	Area of	saltmarsh	habitats	mapped	at Glen	Bay
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<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

# 3.2 Atlantic salt meadows (H1330)

Although widely distributed, the ASM is not well developed at Glen Bay and is rather patchy in its occurrence and extent. It is not surprising therefore that there is little sign of zonation among the habitat. Overall, approximately 2.3ha (Table 3.1) was recorded, the majority (2.307ha) of it occurring inside the cSAC boundary.

Distinct gradations to other saltmarsh communities were typically a feature of the ASM. In the main area of the saltmarsh, the ASM occurred alongside MSM or other brackish saltmarsh communities and it did not form mosaics. This might be explained by the readily distinguishable growth forms of the MSM or brackish marsh vegetation. The only situation where there was some transition, occurred beside agriculturally improved land such as in the western part of the site, running alongside the road.

In general, the vegetation ranged in height from 5cm to 50cm, but was typically in the 10-25cm range. There was no development of pioneer or low marsh vegetation. The patches of ASM were equally split between mid and upper marsh. Commonly recorded species included Red Fescue (*Festuca rubra*), Sea Milkwort (*Glaux maritima*), Saltmarsh Rush (*Juncus gerardii*) and Sea Plantain (*Plantago maritima*). Elsewhere, some species were typically confined to specific areas. Although lower marsh vegetation was not recorded, Common Saltmarsh Grass (*Puccinellia maritima*) was noted in small runnels and along creeks and in some situations was quite dense. The mid marsh, which was typically confined to small patches and along the edges of creeks, had a greater abundance of species, including Thrift (*Armeria maritima*), Sea Aster (*Aster tripolium*) and Common Scurvy-Grass (*Cochlearia officinalis*).

It is noteworthy that neither Sea Arrow Grass (*Triglochin maritimum*) or White Clover (*Trifolium repens*) were commonly recorded in the ASM community despite their frequency in the MSM and in transitions to agricultural land. Similarly, Creeping Bent (*Agrostis stolonifera*) was occasionally recorded in wetter areas of ASM, but it was more widespread in the MSM community.

# 3.3 Mediterranean salt meadow (H1410)

The MSM occupies the greatest proportion of the saltmarsh that was recorded at Glen Bay (Table 5.1). Of the total 12.6ha, nearly 9.5ha occur within the cSAC with another 1.15ha extending beyond the boundary. A relatively large area of MSM/other brackish saltmarsh mosaic was recorded at Glen Bay. This area may be under recorded as there may be small patches of MSM-rich vegetation elsewhere amongst the Reeds or along small creeks within areas of transitional grassland. It is estimated that MSM accounts for a further 1.5ha of this transitional vegetation.

Much of the MSM is characterised by the presence of Sea Rush (*Juncus maritimus*) and Saltmarsh Rush (*Juncus gerardii*). A feature of the MSM was its occurrence on peaty substrate which was raised almost 1metre above the level of the river channel and the larger creeks. Overall the landscape appeared flat, but underfoot the terrain was often uneven or broken by old drains or the remains of peat cuttings. The vegetation was largely tussocky, although in places it was comprised of pure rush swards. Constant companions included Red Fescue, Creeping Bent, Sea Aster and Sea Plantain. These species are widespread in their distribution throughout the habitat and are indicative of the upper nature of the vegetation. Other commonly recorded species include Common Scurvy-Grass, Sea Milkwort, Sea Arrow-Grass, Autumn Hawksbill and White Clover.

There were also significant amounts of transitional MSM noted at this site. The appearance of Purple Moor-grass (*Molinia caerulea*) and Black Bog-rush (*Schoenus nigricans*) in association with Sea Rush marked a transition to terrestrial bog land. A significant amount of the MSM contains a proportion of these transitional species. A second common transitional community included the intermixing of Sea Rush and Common Reed stands.

The agricultural influence was recorded in a number of locations, particularly at the edge of improved fields such as in the north-western and south-eastern corners of Fearann Mhic Giolla Bhríde. However, the influence of livestock was observed throughout the MSM. While bare ground was rarely a feature, poaching however was locally abundant and was most prominent in wetter substrates particularly around MSM/Bog or MSM/Reed transitions.

Another species of note, which was rarely encountered in saltmarshes in Donegal, is Parsley Water-dropwort (*Oenanthe lachenallii*). It was often found along the MSM / Blanket bog interface.

Much of the upper limits of the MSM might be considered transitional and often graded into a variety of habitats, most of which occurred on wetter substrates. Large stands of Reeds as well as narrow bands of Sea Club-Rush (*Bolboschoenus maritimus*). Elsewhere the MSM is replaced by a large extent of transitional vegetation which has some MSM influence particularly along creeks and old drainage channels.

#### 4 IMPACTS AND ACTIVITIES

The list of impacts and activities that were recorded at Glen Bay are shown in Table 4.1. There are few activities which are considered to be causing any serious damage to the saltmarsh and most are quite localised. Land use in and the around the main section area of saltmarsh relates to small scale farming, although most of that is considered subsistence. Recreational pressures are largely non-existent as the main body of the marsh is not suitable

for walkers or other activities given the treacherous nature of the conditions underfoot and the number of drains and creeks dissecting the site.

Most of the saltmarsh in the sheltered plain is sheltered from erosion. There are few damaging activities in the small patches of discontinuous fringing patches of ASM vegetation along the Murlin River towards Glencolmkille. Natural erosion (900) and a redistribution of sediment is an ongoing feature of the mouth of the Bay. The erosion at this point is largely negated by the accretion of sediment and the fresh growth of the ASM that was observed particularly around the sandflats near the road-bridge (910). In the main body of the marsh, there are some signs of erosion, but this is largely a natural long-term occurrence rather than a recently human-induced event. Signs such as slumping were observed and some undercutting of the peaty terrace, but overall it was not significant. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

The landscape still has relics of its former management when peat was cut and the land was more actively grazed. The main body of the marsh is now largely used for rough grazing (140) and only by a small number of farmers allow cattle onto the treacherous marsh. There are signs of localised overgrazing (143), particularly in the ASM and in places around the MSM. Livestock are generally found around the edges, but the livestock do venture inland in search of better grazingleading to widespread poaching. Common Reed seems to be spreading into the saltmarsh at some locations and this could be related to localised lack of grazing (954).

Outside of the site, there are a number of activities, most of which are difficult to quantify, which have some influence on the condition rather than the extent of the saltmarsh. Some of the higher ground surrounding the saltmarsh is agriculturally improved grassland given over to sheep and cattle. The land is fertilised and there is some enrichment of drains from run-off from these fields (120). Outside of the village of Glencolmkille, dispersed habitation (403) is a feature of the area. It does not appear to have had any great impact on the extent or condition of the saltmarsh, although one land-owner had a malfunctioning septic tank which was leaking into a small creek (423). In another place, the remains of old cars were observed abandoned at the back of a field, alongside the saltmarsh (422).

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	В	0	0.832	Inside
H1330	143	В	-1	1.5	Inside
H1330	501	В	0	0.02	Inside
H1330	900	С	0	0.02	Inside
H1330	910	С	+1	0.02	Inside
H1410	140	В	0	10.1	Inside
H1410	143	В	-1	2.5	Inside
H1410	501	С	0	0.3	Inside
H1410	954	В	-1	0.3	Inside

Table 4.1. Intensity of various activities on saltmarsh habitats at Glen Bay.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence. <sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside =

activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

#### **CONSERVATION STATUS** 5

#### 5.1 **Overall Conservation Status**

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

The overall conservation assessment of the saltmarsh habitats at Glen Bay is unfavourableinadequate, which is a reflection of minor damage to both the ASM and MSM.

In terms of other data, the OSI 6 inch map shows that Fearann Mhic Giolla Bhríde consisted of many individual wet fields that were liable to flooding. The saltmarsh currently recorded along the Murlin River is represented by sandflats. Given the convoluted nature of the tributary river through the main section of the saltmarsh, it might be expected that change in the extent of saltmarsh habitats would be easily quantified. This was not the case and there was no discernible difference between the year 2000 and series 2005 aerial photographs.

This site is located within the Slieve Tooey/Tormore Island/Loughros Beg Bay cSAC. An old format management plan is available for this cSAC but is now out of date.

Habitat	EU Cons			
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (H1330)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Mediterranean Salt meadows (H1410)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate

#### Table 5.1. Conservation status of Annex I saltmarsh habitats at Glen Bay.

### 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

In terms of extent, the ASM is assessed as *favourable*. There is no reliable indication as to the previous extent of the habitat. Indeed the NATURA 2000 map does not separate the ASM from MSM as it only accounts for less then 1% of the total site area. From this survey, it is clear that the ASM vegetation is patchily distributed at Glen Bay and does not generally occur as an extensive sward. However, it is widespread in its distribution and there are some indications of habitat development around the road-bridge. There are no indications of any loss of habitat due to land use changes, development or erosion within the current monitoring period.

#### 5.2.2 Habitat structure and functions

Habitat structure and functions for the ASM are assessed as *unfavourable-inadequate*. Four monitoring stops were carried out across the site, all of which satisfied the target criteria. The ASM is generally in good condition with a small area being damaged by overgrazing, including some poaching damage. The overgrazed area was not assessed by the monitoring stops so the structure and functions assessment is revised as *unfavourable-inadequate*. There was no development of pioneer or lower marsh vegetation. Most of the vegetation is grazed to various degrees, but did not appear to have suffered as badly in terms of overgrazing or poaching, particularly when compared with the upper transitional MSM vegetation. The sward height was quite variable overall. There were no other significant negative indicators.

#### 5.2.3 Future prospects

The future prospects for this habitat are rated as *Unfavourable - Inadequate*. This assessment assumes that the current management activities and level of impacts such as grazing continue in the near future. The ASM is being damaged by localised heavy grazing in places, but this does not affect a large area. This pressure is likely to continue. There are some

indications of an accretional trend along parts of the saltmarsh, although the ASM located adjacent to the sand hills is quite dynamic and the extent is likely to change in response to local sedimentation patterns, which may mean erosion or sedimentation. There are no other significantly damaging activities affecting this habitat.

#### 5.3 Mediterranean salt meadows (H1410)

#### 5.3.1 Extent

The extent of the MSM is assessed as *favourable* (Table 5.1). It is by far the most extensive of saltmarsh habitats that occur at Glen Bay. Given the resources of previous surveys, the MSM has probably been under-recorded. The mosaic with the blanket bog has previously been classified and mapped as wet grassland. There are no indications of any loss of habitat due to land use changes, development or erosion within the current monitoring period.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Of the six monitoring stops that were carried out in the habitat, one failed due to grazing pressure and the level of poaching. Most of the MSM habitat is in relatively good condition. The species assemblage is typical of this habitat. Some of the vegetation is somewhat rank with a low diversity but this is typical of stands of MSM. The structure of the MSM saltmarsh has been considerably modified by historical land-use and peat cutting. Drains and remnant peat face-banks with blanket bog vegetation cross the saltmarsh. The occurrence of such a large area of saltmarsh vegetation coupled with its complex mosaic of transitional communities, however, adds to its ecological value.

#### 5.3.3 Future prospects

The future prospects of the MSM are assessed as *unfavourable-inadequate*. This assessment assumes that were will be no change in the activities or management regime. A small portion of the habitat is being damaged by current management practises. It is likely that much of the land, which is effectively abandoned and in terms of its agricultural value is derelict, is only used as rough grazing only.

#### 6 MANAGEMENT RECOMMENDATIONS

There are no recommendations for this site.

# 7 REFERENCES

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

MPSU (?). *Draft Conservation Plan for Slieve Tooey/Tormore Island/Loughros Beg Bay cSAC* Government of Ireland, Unpublished.

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

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	2.332		2.332			
4	1410 Mediterranean salt meadow	10.560			10.560		
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	2.963					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic	3.904			1.5		
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	4.240					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	23.999		2.332	12.06		

Table 8.1. Areas of SMP habitats mapped using GIS.



# **Green Hill**

# **1 SITE DETAILS**

SMP site name: Green Hill		SMP site code: SMP0029					
Site name (Curtis list): not on list		CMP site code:					
		Site No: (Curtis list): not on list					
NPWS Site Name: Lough Swilly		Dates of site visit: 11/08/2006					
NPWS designation cSAC: 2287		MPSU Plan: old format	MPSU Plan: old format plan available				
	pNHA: <b>2287</b>						
	SPA: Lough Swilly	SPA 2287					
County: Donegal		Discovery Map: 6	Grid Ref: 221990, 413990				
6 inch Map No: Dg05	53, Dg054	Aerial photos (2000 series):					
		00261-a, 00261-b, 00261-c, 00261-d					
Annex I habitats curr	Annex I habitats currently designated for Lough Swilly cSAC:						
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)							
Other SMP sites within this cSAC/pNHA: Ray, Ramelton, Lower Lough Swilly, Fahan							
Saltmarsh type: sand	flats	Substrate type: mud/sar	nd				

# **2** SITE DESCRIPTION

Green Hill saltmarsh is located along the west side of Lough Swilly in Co Donegal, 3 km north-east of Letterkenny. This site is situated in the lower part of Lough Swilly. The main part of the saltmarsh is situated in a small bay along the Lough Swilly shoreline. The bay is partially enclosed by old seawalls/embankments that surround intertidal mudflats and saltmarsh. There is a small opening at the centre of the embankment that allows tidal access. Farmland to the south of this area is enclosed by tall embankments. These embankments are well maintained and prevent the tide flooding this area. The Green Hill site was probably a failed attempt at land reclamation. Patches of Common Cordgrass (*Spartina anglica*) are scattered along this shoreline to the north and south of the Green Hill site with some coalescing to form dense swards and the intertidal flats. The landward boundary of this site slopes steeply up hillside along this area.

One Annex I habitat, Atlantic salt meadows (ASM) is found at this site. This habitat is listed as a qualifying interest for Lough Swilly cSAC. The entire saltmarsh habitat is situated within the cSAC boundary. Most of the site is also located within the

Lough Swilly SPA. The boundary of the SPA is different to the cSAC and is situated along the shoreline boundary with the intertidal mudflats. The intertidal mudflats adjacent to this site are noted for their use by wintering waders and wildfowl by the MPSU conservation plan.

This site is quite isolated. It can be accessed via a narrow lane down a steep hillside. This lane is connected to minor roads that can be accessed from R245 Letterkenny-Rathmelton Road. Permission was sought from a farmer to access the saltmarsh by crossing farmland.

# **3 HABITATS**

# 3.1 General description

Green Hill contains a relatively small area of Atlantic salt meadows (ASM) (Table 3.1). This habitat is situated along the shoreline at north-western side of the small bay. The bay is partially enclosed by low embankments that have been covered with mudflats. Small patches of stones indicate the embankment in places. The embankment is taller along the north side and lower towards the south. This area contains *Spartina* swards along the edge of these embankments and scattered clumps of Common Cordgrass on intertidal mudflats. The tide is likely to flood over the southern part of the embankment to inundate the *Spartina* swards. Some of the *Spartina* swards have developing into mosaics of ASM and *Spartina* swards. A thin band of brackish marsh is present along the landward side of the saltmarsh and this transitions into Alder-dominated scrub/woodland on the lower slope of the hillside.

The brackish marsh at the landward side of the saltmarsh contains patches of Grey Club-rush (*Schoenoplectus tabernaemontani*). There is a further transition to wet grassland on some higher patches containing Soft Rush (*Juncus effusus*), Creeping Bentgrass (*Agrostis stolonifera*), Marsh Arrow-grass (*Triglochin palustris*), Brackish Water-crowfoot (*Ranunculus baudotii*), Branched Bur-weed (*Sparganium erectum*) and Jointed Rush (*J. articulatus*).

A second tall wide embankment marks the south-eastern boundary of the coastal habitats. This embankment encloses a large flat area of farmland to the south of Green Hill that has been reclaimed form the estuary in the past. The embankment is partially marked on the 1860 1<sup>st</sup> edition 6 inch map. There is a thin band of saltmarsh with patches of ASM along the seaward side of this embankment and clumps of Common Cordgrass are scattered over the mudflats and adjacent to the embankment in this area. Further clumps of Common Cordgrass are scattered on the mudflats to the north of Green Hills.

*Spartina* swards and scattered clumps situated on the mudflats adjacent to this site have been mapped using aerial photos and views of the estuary from adjacent sites. The area mapped extends from Castlewray to the north, to Cornagill to the south. It should be noted that the Common Cordgrass is also present outside the surveyed area along the shoreline.

The land the ASM occupies is present on the 1860 1st edition 6 inch map so it did not develop after the construction of the embankments on the intertidal mudflats.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1.92
	Spartina sward	15.1*
	Total (not including Spartina sward)	1.92

Table 3.1. Area of EU Annex I habitats listed at Green Hill.

\*note that saltmarsh habitat continues outside the surveyed site.

# 3.2 Atlantic salt meadows (H1330)

A small area of this habitat is present at this site. The ASM at this site is quite disturbed from moderate-heavy grazing and from older disturbance from drainage. The vegetation is dominated by mid-upper marsh dominated by Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardii*) with increasing amounts of Creeping Bent-grass towards the landward boundary. Other species present include Sea Plantain (*Plantago maritima*), Sea Pink (*Armeria maritima*), Sea Milkwort (*Glaux maritima*), Autumn Hawkbit (*Leontodon autumnalis*) and Common Arrow-grass (*Triglochin maritimum*). This area generally has a tall sward and is not grazed heavily be sheep. This area was drained in the past and there is some internal zonation of vegetation due to this old drainage. The upper parts of the drains contain Creeping Bentgrass while parts of the lower drains contain Common Saltmarsh-grass (*Puccinellia maritima*).

A typical middle marsh zone has developed in the north-east of the ASM and forms a narrow band towards the western side. This zone is dominated by Sea Pink and Sea Plantain with frequent Common Saltmarsh-grass. There are small amounts of Sea Aster (*Aster tripolium*), Sea Milkwort and Saltmarsh Rush. This zone is heavily grazed by sheep and that has created a typical low close-cropped sward. This zone eventually develops into a lower saltmarsh zone dominated by Common saltmarsh-grass along the lower boundary of the ASM and the transition to *Spartina* swards, which are situated adjacent to the ASM. Other species present includes Sea Milkwort and Glasswort (*Salicornia* sp.). This zone has been badly damaged in places by poaching.

The saltmarsh topography has been significantly affected by the drainage that was carried out in the past. These drains are now partially infilled and are likely to continue to infill. There are no creeks and few salt pans on this ASM. There are some pools along the drains that act as salt pans and create internal plant zonation on the saltmarsh.

The boundary between the ASM and the *Spartina* swards is generally quite distinctive and is indicated by the appearance of Common Cordgrass. This boundary generally follows the old shoreline boundary so Common Cordgrass has not spread extensively on this part of the ASM. The boundary is distinctive on the 2000 aerial photo.

Within the *Spartina*-dominated areas there are patches of ASM vegetation. A mosaic has developed with *Spartina* sward and ASM. These ASM areas are dominated by a low sward of Common Saltmarsh-grass. Other species present include Sea Pink, Sea Plantain, Sea Milkwort, Glasswort and Sea-spurrey sp.

There is a narrow band of ASM saltmarsh along the large embankment located along the south side of Green Hill. This band is dominated by Common Saltmarsh-grass. This zone was not mapped as it is quite narrow. This strip is heavily grazed but the poaching damage is localised. There are patches of Common Cordgrass along this zone and this species sometimes dominates.

# 3.3 Spartina swards

This habitat has developed on the mudflats within the old embankment that are situated adjacent to the ASM saltmarsh, and the tall embankment towards the south. The habitat is typically characterised by dense swards of Common Cordgrass with 75-100% sward cover. The sward height was 0.5 m. Within the sward there is occasionally frequent Common Saltmarsh-grass, Sea Milkwort, Glasswort and Seaspurrey sp. These species are most frequent towards the landward side. The *Spartina* sward adjacent to the shoreline is grazed by Sheep and has created a low *Spartina* sward. Sheep tracks extend further into the *Spartina* sward towards the ASM patches in the mosaic area and there are signs that Sheep forage throughout most of the *Spartina* sward. Further seaward the sward breaks up somewhat as it is younger and this area was mapped as a *Spartina*/mudflat mosaic. There are no signs of Common Cordgrass seedlings or numerous small clumps indicating recent spread of this species.

A comparison of the 1995 and 2000 aerial photos shows that the *Spartina* sward within the low embankments increased in extent with new clumps appearing in this period.

There are scattered larger clumps of Common Cordgrass on the intertidal flats along this part of the shoreline. These were mapped using the aerial photos. These scattered clumps account for about 5% of the total area mapped. The area of Common Cordgrass within the *Spartina*/mudflat mosaic is estimated at 50%. A comparison of the 1995 and 2000 aerial photos shows that the *Spartina* sward and clumps have grown and spread somewhat during this period.

# 4 IMPACTS AND ACTIVITIES

There are few activities on this site as it is quite isolated (Table 4.1). The activity codes used in Table 4.1 are given in brackets in the following text. However, the main activity is sheep grazing and its intensity is moderate (140). The sheep have grazed the mid-lower zone heavily and there are also some badly poached areas in this zone (143). The sheep have also grazed the edge of the *Spartina* sward. However, the

mid-upper zone is not extensively grazed and has a higher sward height. The site has also been grazed by cattle and the cattle have poached small areas of saltmarsh.

Common Cordgrass, an invasive species, is present at this site and has formed extensive swards and scattered clumps on the adjacent mudflats. The earliest recorded date of its presence in Lough Swilly was in 1950, where it was recorded at Big Isle (Boyle 1972). However, it has not spread extensively on the main part of the ASM and the boundary between the two habitats is similar to the old seaward boundary for the ASM before the spread of Common Cordgrass. Clumps of Common Cordgrass do appear along the edge of the tall embankment and this was likely to have a narrow band of ASM along it. A small area along the tall embankment now contains a mosaic of Common Cordgrass and ASM and this area was likely to have been ASM in the past before Common Cordgrass was present.

The site has been drained in the past (810). These drains pre-date the 1995 aerial photos but are not marked on the 1920s 6 inch map. The site is recovering from this drainage with most of the drains being partially infilled. This drainage was probably related to land reclamation in conjunction with the old embankments that were placed on the mudflats and mark the seaward boundary of the *Spartina* sward (802). These impacts are not assessed as they occurred some time ago.

The main impacts and activities adjacent to the site include grazing of improved grassland (140) inside the tall embankments and extensive *Spartina* swards on the seaward side on the intertidal mudflats.

EU Habitat Code <sup>1</sup>	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected (ha)	Location of activity <sup>5</sup>
1330	140	С	-1	1.92	Inside
1330	143	А	-1	0.5	Inside
1330	954	С	-1	0.25	Inside
1330	140	С	0	1.92	Outside
1330	954	С	-1	1.92	Outside

Table 4.1. Intensity of various activities on saltmarsh habitats at Green Hill.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> 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

This site has an unfavourable-bad conservation status (Table 5.1). High levels of sheep grazing are having a significant impact on parts of the ASM. The site is also recovering from old attempts at land reclamation.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor. Green Hill saltmarsh is bordered by steeply sloping land at its landward boundaries. This means there are limited prospects for saltmarsh migration up-slope in response to sea level rise. Rises in sea level are likely to erode the seaward edge of the saltmarsh although the presence of the *Spartina* sward along the seaward boundary is likely to slow the rate of erosion. There will only be small narrow bands of new saltmarsh created and this will not compensate for habitat lost due to erosion at the seaward edges. However, Common Cordgrass may respond by spreading on the ASM due to its increased competitiveness up-slope.

This site is situated adjacent to a large area of low-lying farmland that was formerly reclaimed and is protected from tidal inundation by tall embankments. Any medium term sea level rise is not likely to impact on the embankment as they are being maintained. However, it may affect drainage of this area.

A conservation plan is available for the Lough Swilly cSAC/SPA but this site is not specifically mentioned.

Habitat	EU Conse	ervation Status A	ssessment	
	Favourable	Unfavourable - inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (1330)	Extent,		Structure and functions, Future prospects,	Unfavourable - Bad

Table 5.1. Conservation status of Annex I saltmarsh habitats at Green Hill.

# 5.1 Atlantic salt meadows (H1330)

# 5.1.1 Extent

Overall, the extent of this habitat is assessed as *favourable* in the absence of other accurate information on the previous extent of this habitat. There are no signs that the

ASM is being affected by any erosion as the seaward boundaries have remained the same on the 1<sup>st</sup> edition 6 inch map, the 1920s 6 inch map and the 2000 series aerial photos. The spread of Common Cordgrass at this site has not significantly affected the extent of ASM. A small area (0.21 ha) has developed into a *Spartina*/ASM mosaic and this was likely to be ASM in the past.

# 5.1.2 Habitat structure and functions

The structure and functions of this habitat is assessed as *unfavourable-bad*. Three monitoring stops were carried out at this site and two passed. These three stops reflect the status of the whole site. The failed stop was located in the lower marsh zone adjacent to the *Spartina* sward. This zone is heavily grazed and shows signs of heavy poaching. The rest of the saltmarsh has low-moderate levels of grazing. The mid-upper saltmarsh zones have a typical species diversity and plant community zonation is present. There is also a natural transition to some brackish marsh, wet grassland and scrub/woodland along the landward edge. The saltmarsh topography has been significantly affected by the drainage that was carried out in the past. These drains are now partially infilled and are likely to continue to infill. There are no creeks and few salt pans on this ASM.

# 5.1.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. Heavy grazing pressure is having a significant impact on this site and is likely to continue in the future.

# **6 MANAGEMENT RECOMMENDATIONS**

No management required for this site as it is quite small.

# 7 **REFERENCES**

Boyle, P.J. (1972). Two forms of Spartina in Donegal. Irish Naturalists Journal, 37, 239-240.





Saltmarsh

**Monitoring Project** 

# **Green Hill**

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

Killsma leorainneacha a' an léarscáil seo ach noi garshuíomhach ginearáilia. Féadrár a hbhreilimí he adéanamh ar lheorainneacha na gceantar comharthailte . Machasanhail d'ábhar na Suitbhéarachta Ortonáis le chead ón Rialtas . (Ceadunas Vimh. 5953) Lough Swilly cSAC

# Legend 1330 Monitoring stops SAC boundary Habitats 📕 Spartina swards 1330 Atlantic salt meadows Atlantic/Spartina mosaic Spartina clump/mudflat mosaic Isolated Spartina clumps Spartina dom, some 1330 other

				SMP Code: SMP0029	Map produce Map Version	ed by: SN 1:1	MP 2006
	0	200	400	) 600	800	Meters	N Å
(0002287)	Scale:	1:9456					A

# Keadew

#### 1 SITE DETAILS

SMP site name: Kead	dew	SMP site code: 0129	SMP site code: 0129			
Dates of site visit: 9	September 2008	CMP site code: 153	CMP site code: 153			
SM inventory site nar	ne: Keadew	SM inventory site cod	le: 19			
NPWS Site Name: G						
NPWS designation	cSAC: 1141	MPSU Plan: Old For	MPSU Plan: Old Format – Draft 2: Consultation			
	pNHA: <b>1141</b>	SPA: <b>N/A</b>	SPA: N/A			
County: Donegal		Discovery Map: 1	Grid Ref: 174220, 417030			
Aerial photos (2000 s <b>C,D; O 0223-B; O 02</b>	eries): O 0198-D; O 0199 24-A,B	9- 6 inch Map No: <b>Dg 0</b> 4	6 inch Map No: <b>Dg 040, 041</b>			
Annex I habitats currently listed as qualifying interests for Gweedore Bay and Islands cSAC: H1410 Mediterranean salt meadows (Juncetalia maritimi)						
Other SMP sites within this SAC/NHA: <b>N/A</b>						
Saltmarsh type: Sanc	I flats	Substrate type: Sand	ostrate type: Sand			

#### 2 SITE DESCRIPTION

Keadew is located in north-west Donegal within the region known as the Rosses. The area is largely rural with some dispersed habitation, mostly along the small road network although the number of dwellings increases considerably in the higher ground overlooking Keadew Strand. Most of these houses are holiday homes. The nearest centres of population include Kincaslough to the North and Burtonport to the south-west.

Keadew Strand occupies most of the southern shores of the intertidal bay. The saltmarsh community, for the most part is intimately associated with the extensive machair system at Keadew. Starting in the west of Keadew Strand inlet, there is a large intertidal saltmarsh plain. It extends patchily in an easterly direction around Keadew Strand towards Keadew Bridge. It does not extend much further along the northern shore of the inlet and is largely replaced by outcropping granitic rock and blanket bog. A regional road between Burtonport and Kincaslough marks the upper boundary of the coastal area along the southern side of Keadew Strand. This road has cut off former coastal habitats behind the road. Two small streams flow into Keadew Strand from the southern side.

Keadew saltmarsh lies within Gweedore Bay and Islands candidate Special Area of Conservation (cSAC), a large composite site covering a wide area. A number of other saltmarsh systems that are listed in the National Inventory (Curtis and Sheehy-Skeffington 1998) occur within the cSAC, but none were included in the list of sites to be surveyed. Mediterranean salt meadows (Juncetalia maritimi) (MSM) is the only Annex I saltmarsh

habitat found at Keadew that is listed as a qualifying habitat for the site, although Atlantic salt meadows (ASM) are also found there. A further twelve habitats are listed for this cSAC, four of those with priority status. The cSAC is also known for the presence of a number of rare plants and bryophytes including the Annex II species Petalwort (*Petalophyllum ralfsii*) and Slender Najas (*Najas flexilis*).

A large proportion of the saltmarsh is in commonage, all of which is unfenced, or in state ownership and only a small number of fields in the south-eastern part of the site around Keadew Bridge were in private ownership. The site is readily accessible at a number of locations. There are a number of lay-bys leading onto the strand on the coastal road leading to Keadew Bridge. Alternatively, it is possible to cross the machair grassland in the western end of the site.

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

The saltmarsh is primarily associated with Keadew Strand. The coastal vegetation including machair and dune habitats were recently surveyed as part of the Coastal Monitoring Project in 2006 (Ryle *et al.* 2009). That survey made little reference to the occurrence of the saltmarsh habitats other than to map a boundary between sand dune and saltmarsh vegetation. During the current survey, two Annex I saltmarsh habitats were recorded at the site, namely Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). The total area of saltmarsh that is mapped at Keadew is 9.32 ha, of which the major portion (99%) is ASM with some very minor patches of MSM.

All of the saltmarsh vegetation occurs within the confines of the cSAC boundary. It extends discontinuously around Keadew Strand. There are two main areas of saltmarsh vegetation at this site with some fringing vegetation at either end. The smaller area is found at the western end of the site and has developed in a sheltered area behind a sand spit extending to Keadew Point. The saltmarsh transitions to fixed dune and machair grassland along the upper boundary. There are intertidal sandflats exposed at low tide adjacent to the saltmarsh. There is some dynamic development of embryonic dunes on higher mounds near the seaward edge on this saltmarsh, as well as pioneer vegetation where the saltmarsh is accreting.

The largest section is found along the southern side of Keadew Strand, which also drains at low tide to expose intertidal sandflats. These two large areas of saltmarsh are separated by exposed rocky shores e.g. the south-western quadrant of the site and consist of areas of dry heath and blanket bog over a massive granitic intrusion. The road embankment across the southern side of Keadew Strand generally marks the upper boundary of the saltmarsh with some development of disturbed coastal grassland between the road and the saltmarsh. There is also some transition from saltmarsh to modified blanket bog along a landward boundary at the south-east corner of Keadew Strand. Some brackish habitat extends along a river channel south of the road and embankment at Keadew Bridge.

Other non saltmarsh habitats that were recorded along the upper boundary of the saltmarsh included embryonic and fixed coastal dunes, and blanket bog. These habitats are underrecorded as they extend some distance away from the saltmarsh. A small patch of other brackish saltmarsh vegetation, dominated by Common Reeds (*Phragmites australis*), was noted at one location. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Its extent is probably underestimated as the land was privately owned and had a number of horses and ponies at the time of the survey.

|--|

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	9.229
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.089
	Total	9.318

note that saltmarsh habitat may continue outside the mapped area.

#### 3.2 Atlantic salt meadows (H1330)

The saltmarsh at Keadew is dominated by ASM vegetation and it accounts for 99% of the total saltmarsh vegetation that was recorded from this site. The ASM occurs as two separate areas, one located behind the relatively sheltered headland of Keadew Point, whilst the second stretch of ASM is located in the south-eastern or uppermost part of Keadew Strand inlet. Both sections of saltmarsh are characterised by the presence of the large intertidal sand flats that occupy much of the inlet.

Throughout the ASM communities, the most frequently recorded species was Sea Milkwort (*Glaux maritima*), although its abundance changed in various zones. The pioneer vegetation is dominated by Common Saltmarsh Grass (*Puccinellia maritima*), although smaller abundances of Thrift (*Armeria maritima*), Sea Plantain (*Plantago maritima*) and Glasswort (*Salicornia* spp.) were also recorded. This pioneer vegetation is found in the north-west section. The pioneer vegetation is highly dynamic as blowing sand was a feature of the site, and it is likely that the vegetation is regularly reshaped with changes in extent of the saltmarsh and embryonic dunes.

The development of low marsh vegetation was less significant at Keadew and often the pioneer vegetation often graded into mid marsh vegetation. The vegetation, where recorded, was typically characterised by species such as Sea Aster (*Aster tripolium*), Thrift, Common Scurvy-Grass (*Cochlearia officinalis*), Sea Plantain and Sea Arrow-Grass (*Triglochin maritimum*).

Not surprisingly, the upper marsh vegetation generally supported the greater diversity of species, although many of those recorded in lower zones were no less common. The most commonly recorded species included Red Fescue (*Festuca rubra*), Common Scurvy-Grass and Sea Plantain. Other species not previously recorded included Distant Sedge (*Carex distans*), Extended Sedge (*Carex extensa*) and Saltmarsh Rush (*Juncus gerardii*). In wetter situations, Creeping Bent Grass (*Agrostis stolonifera*) was noted whilst at one stop - Buck's Horn Plantain (*Plantago coronopus*) was recorded as having 30-40% ground cover.

One notable species was Flat Saltmarsh sedge (*Blysmus rufus*) and this species was an occasional component of the upper marsh, in vegetation transitional to the sand dune habitats.

#### 3.3 Mediterranean salt meadows (H1410)

There is very little development of MSM vegetation at Keadew and a little under 0.1ha was recorded (Table 3.1). It occurs in three separate patches, all of them confined to the northern perimeter of the site along the Keadew River, where it is typically located behind a narrow fringe of ASM vegetation over rocky substrates. Characterised by the presence of the distinctive Sea Rush (*Juncus maritimus*), this habitat is not floristically diverse or extensive. Other species included Saltmarsh Rush, Creeping Bent and patchy Red Fescue.

#### 4 IMPACTS AND ACTIVITIES

Table 4.1 lists all the activities and their impacts on both of the saltmarsh habitats at Keadew. Few were causing any lasting damage to the vegetation, and all are localised. The land use in and around the locality comprises mostly small or subsistence farm holdings on rocky land which is largely dominated by blanket bog. Unlike most saltmarsh systems in Donegal, the most noticeable activities are associated with tourists, holiday makers and recreational activities rather than agricultural management.

Rough grazing (140) is the main agricultural activity in the area. Much of the land is composed of extensive rocky outcrops with blanket bog and scrub. A number of small fields are dotted around the area, but the land is best described as marginal. Cattle, sheep and donkeys were observed at the time of the survey. As the saltmarsh is not extensive, much of the grazing was confined to enclosed fields in the south-eastern corner of the site. However, there was evidence of livestock being trafficked across the intertidal zone between fields or occasionally grazing on the saltmarsh. These activities were rarely prolonged and the impacts rarely damaging. The overall grazing intensity on the saltmarsh habitats is low.

There are a number of trails (501) that criss-cross some of the saltmarsh habitats, particularly at the western end of the site. They are more prominent in the machair vegetation. The trails are associated with foot traffic (622), mostly recreational users accessing the sand flats by foot. However, there are a number of well defined trails that vehicles use, which lead onto the intertidal zone (623). Some of the vehicular use was associated with tractors accessing small fields. However, there was some evidence of cars being brought onto the beach, and there were clear signs of quad bikes being driven over the saltmarsh at the western end of the site. Although the pioneer vegetation is dynamic in nature, the established saltmarsh communities are prone to damage, as seen on some unvegetated trails.

Although much of the housing is dispersed (403) around Keadew Bridge, a large number of residential and holiday homes were noted around the site, particularly on elevated ground above Keadew Strand (402). The area is popular, particularly in the summer months, and a lot of the domestic dwellings are rented out to tourists. It is likely that the pressure of pedestrian traffic is far greater on parts of the saltmarsh, towards the western end of the site where there are extensive sand flats. Approximately six caravans (608) are located on the dune grassland, adjacent to the upper saltmarsh transition. There is a possibility that waste water from these caravans drains directly down into the sands. Depending on what is released, this could have some impact on the saltmarsh through pollution (421).

The historical OSI 2<sup>nd</sup> edition 6 inch map indicates the presence of a significant area of saltmarsh around Keadew Strand. The map indicated the highest point to which ordinary tides flowed, but much of this former saltmarsh was trapped behind the road. This ground (around Parkkeadew) is now some distance removed from the influence of saline waters and has been redeveloped as a GAA football ground. Another factor which is not assessed as it occurred outside of the monitoring period is the development of the road fronting Parkkeadew. It has been modified, strengthened and culverted in places, which has probably facilitated the drainage of the land to the south of the road for development as a football pitch.

A comparison of the 2<sup>nd</sup> edition 6 inch map to the OSI 2005 series aerial photographs shows that there has been significant growth of saltmarsh into Keadew Strand north of the road. Much of this growth is likely to have been a response to the development of the new road and embankment. However, there has been no significant measurable growth of saltmarsh at this location during the current monitoring period and a low saltmarsh cliff marks most of the lower saltmarsh boundary. There are some active signs of accretion at the mouth of the river flowing into the central part of the saltmarsh (910).

At the western end of the site, it is likely that sand has built up over the past century and the saltmarsh vegetation has subsequently developed. With natural accretion (910) the saltmarsh is likely to have developed and extended over time. The profile of this shoreline has also changed significantly since the 6 inch map was drawn and most of this saltmarsh habitat has developed in the past 100 years (910). This area is quite dynamic. However, as part of this

natural dynamism, there was also some evidence of erosion (900), particularly a low erosion ridge along with remnant tufts of ASM vegetation along the saltmarsh frontline to the east of the site. There is some minor increase in extent noted when comparing the 2000 and 2005 series OSI aerial photos (probably of the order of < 0.005 ha). An assessment of the current trends indicates that there is an overall accretional trend at this site. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is more than compensated by the accretion at the site.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	С	0	2.0	Inside
H1330	501	В	-1	0.01	Inside
H1330	622	С	0	0.01	Inside
H1330	623	В	-1	0.02	Inside
H1330	900	С	0	0.5	Inside
H1330	910	C	+1	0.05	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

#### 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

The conservation assessment of both of the saltmarsh habitats that were recorded at Keadew is shown in Table 5.1. As both the ASM and MSM were favourably assessed, the overall conservation assessment of the saltmarsh habitats at Keadew is *favourable*.

As previously stated, the earliest OSI data does not show the presence of saltmarsh habitat as occurring at Keadew, which suggest that the saltmarsh has only developed over the past 100 years or so. Indeed it may still be developing. Analysis of the aerial photographs, however, does not indicate any measurable change in saltmarsh extent. More recently the sand dune habitats at Keadew were mapped (Ryle *et al.* 2009). There is some discrepancy

between the upper limit of the ASM boundary of the saltmarsh mapped at the western end of the site during this survey with that mapped as part of the Coastal Monitoring Project in 2006. Although that survey was concerned with sand dune habitats, it often indicated saltmarsh habitats that occurred alongside the sand dunes. This does not imply that there has been a substantial loss of habitat in two years, but that the classification criteria used in delineating the upper boundary of pure ASM was different. Indeed, much of the large area of ASM mapped during the coastal monitoring project has been reclassified as transitional coastal grassland which although containing some saltmarsh elements, does not warrant its classification as Annex I habitat.

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

Habitat	EU Conse	ervation Status As	sessment	
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (H1330)	Extent Structure and functions Future prospects			Favourable
Mediterranean salt meadows (H1410)	Extent Structure and functions Future prospects			Favourable

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

#### 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

The extent of the ASM is rated as *favourable* (Table 5.1). There is no quantitative data as to the former magnitude of this habitat at Keadew. The saltmarsh has been modified in the past by the construction of a road along the southern side of Keadew Strand that cut off a significant area of former saltmarsh habitat. Some of this area may have been infilled to create the football pitch. However, these impacts are not assessed as they occurred outside the current monitoring period.

There are no indications of any loss of habitat due to land use changes, development or erosion within the current monitoring period, although there was a low erosion ridge, a short

distance in front of the frontline, toward the south-eastern part of the site. However, the overall assessment is that the ASM is still expanding. There were signs of accretion and a low accretion ramp was found in places along the front of the saltmarsh, particularly at its western end.

#### 5.2.2 Habitat structure and functions

Ten monitoring stops were carried out. All of them satisfied the target criteria resulting in a *favourable* assessment of the structure and functions (Table 5.1). The saltmarsh is in good condition and a range of vegetation zones are present, ranging from pioneer through to upper ASM communities. The saltmarsh topography is moderately well-developed although there are few salt pans in some of the saltmarsh. The ASM is part of a larger coastal ecosystem and there are natural transitions to fixed dune, machair grassland and modified blanket bog vegetation. The pioneer ASM forms a dynamic mosaic with embryonic dunes where there is built up of sand in the north-west corner of the site. There were few impacts of note affecting the quality and condition of the vegetation.

#### 5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. The majority of the saltmarsh at Keadew is comprised of ASM vegetation and the assessment assumes that there will be no change in the management regime.

#### 5.3 Mediterranean salt meadows (H1410)

#### 5.3.1 Extent

In terms of area, the MSM vegetation is relatively small compared to the amount of ASM that occurs at this site. Although MSM vegetation is described from the cSAC, it has not previously been differentiated from ASM, let alone accurately quantified on any vegetation maps of this area. The presence of some MSM vegetation at Keadew, no matter how fragmentary, must be regarded as positive and so the extent is rated as *favourable* (Table 5.1).

#### 5.3.2 Habitat structure and functions

The structure and functions assessment is *favourable* for the MSM. Given the paucity of the habitat at Keadew, monitoring stops were not carried out and the determination of the structure and functions is based solely on a visual estimation. The MSM is neither extensive nor species-rich. Notwithstanding this fact, it can be distinguished from the ASM solely on the presence of Sea Rush.

#### 5.3.3 Future prospects

The future prospects of the habitat are rated as *favourable*. The assessment assumes that the activities and the levels of current impacts do not change in the foreseeable future.

Although small in extent, no known activities or impacts are affecting the MSM and it is likely to persist, albeit remain patchy in its distribution at this site.

#### **6 MANAGEMENT RECOMMENDATIONS**

No specific recommendations are made in relation to the management of this site.

#### 7 REFERENCES

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

NPWS (Undated).Unpublished Draft *Conservation Plan for Gweedore Bay and Islands cSAC.* Government of Ireland, Unpublished.

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

# 8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	9.229		9.229			
4	1410 Mediterranean salt meadow	0.089			0.089		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.783					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.183					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	11.284		9.229	0.089		



# Laghy

### 1 SITE DETAILS

SMP site name: Laghy		SMP site code: 0123			
Dates of site visit: 16	September 2008	CMP site code: N/A			
SM inventory site name: Laghy		SM inventory site cod	e: <b>31</b>		
NPWS Site Name: De	onegal Bay (Murvagh)				
NPWS designation	cSAC: <b>133</b>	MPSU Plan: <b>N/A</b>			
	pNHA: <b>133</b>	SPA: <b>4151</b>			
County: Donegal		Discovery Map: 11	Grid Ref: 192760, 373900		
Aerial photos (2000 series): <b>O 0588-A,B,C,D; O 0589-A,C</b>		6 inch Map No: <b>Dg 009</b>			
Annex I habitats currently listed as qualifying interests for Donegal Bay (Murvagh) cSAC: No SM habitats					
Other SMP sites within this SAC/NHA: Mullanasole, Rossmore					
Saltmarsh type: Bay	Sul	ostrate type: Mud:sand			

# 2 SITE DESCRIPTION

The saltmarsh at Laghy is situated approximately 2 kilometres south-west of the eponymously-named small village on the eastern side of the Murvagh Inlet. Confusingly, this site (Laghy) is situated in the townland of Mullanasole, which is the name of another saltmarsh further west that is also listed on the national inventory (Curtis and Sheehy-Skeffington 1998).

Starting in the east around the townland of Roughan, the saltmarsh extends westwards approximately 1.8 kilometres to the man intertidal channel of Murvagh. Murvagh flows into Donegal Bay and out into the North Atlantic. Although the saltmarsh forms one contiguous unit, it is larger at both ends and narrows in the centre where it has completely infilled the narrow estuarine channel between Inishnevin and the mainland. There are two separate inlets at Laghy, the saltmarsh forms one contiguous unit extending east to west. A narrow finger of marsh extends around Inishnevin and also parts of the headland of Roughan. This shoreline has been modified in the past by reclamation.

The area around the site is rural and the landscape is dominated by the tree and scrubcovered hills and agricultural fields. Dispersed housing and some guesthouses are dotted around the area. Other than locals, most traffic is associated with golfers accessing the Donegal Golf Club at Murvagh Lower (Mullanasole).

The site is described as a Bay type which has developed over sand and mud. It is one of three saltmarsh systems that are listed in the national inventory, the others being Mullanasole

and Rossmore (Curtis and Sheehy-Skeffington 1998), all three of which are included in the candidate Special Area of Conservation of Donegal Bay (Murvagh). None of the Annex I saltmarsh habitats are listed as qualifying interests for this site. In addition to the previously listed discrete saltmarsh sites of saltmarsh, smaller patches of saltmarsh vegetation are scattered around Donegal Bay as noted in the NATURA 2000 files.

The principal ecological interests of the cSAC include the intertidal muds and sandflats which account for an estimated 60% of the cSAC (NATURA 2000 database). Two other habitats of qualifying interest include fixed coastal dunes with herbaceous vegetation (1%) and humid dune slacks (1%). Neither of these sand dune habitats was recorded at Laghy. No rare or noteworthy plant species identified in the NPWS files, nor any interesting saltmarsh species were recorded during the survey of the saltmarsh.

The majority of the saltmarsh recorded at Laghy is located within the cSAC. However, small bits have been mapped outside of the designated site. This is due to the fact that the boundary is based on the OSI 6inch map which was produced over 100 years ago and is slightly out of alignment with boundary features such as roads, stone walls etc. This discrepancy is the main reason for some of the SM vegetation occurring outside of the cSAC. Where berms and other protective structures have not been adequately maintained, there has been some advancement of the saltmarsh. However, this is not a major concern at Laghy.

The majority of the saltmarsh is in private ownership and there are many fenced areas. These are grazed mostly by cattle, although horses were noted at the eastern end of the site, where there is a small stable and outdoor paddocks. The western end of the site is readily accessible from a local road running around to the townland of Rossilly. Elsewhere, permission was sought at a number of locations to enter private land on which saltmarsh vegetation was noted.

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

The saltmarsh within the survey site is somewhat fragmented. There is a large marsh plain on the eastern side which gradually thins to a narrow band that runs through a now infilled channel before opening out onto another level saltmarsh plain in the west. In addition, a further band of fringing saltmarsh vegetation that opens out into the Murvagh channel. This fringing saltmarsh has been separated from the main body of the marsh by a number of agricultural fields which are protected by low earthen berms. Tidal inundation occurs along three separate inlets which feed the saltmarsh. Three Annex I saltmarsh habitats were recorded at Laghy, namely Atlantic salt meadows (ASM), Mediterranean salt meadows (MSM) and a single clump of *Salicornia* and other annuals colonising mud and sand (*Salicornia* flats). The main saltmarsh habitat is ASM, which accounts for over 95% of the total marsh area that is mapped at Laghy (Table 3.1). There are some discrete patches of MSM and a single small clump of *Salicornia*-rich vegetation. Asides from occasional patches of non saltmarsh vegetation, there are a number of discrete creeks and flushes that cross the saltmarsh and a single small unnamed river flows through a part of the saltmarsh at its most southerly point. As a result of this, a number of brackish marsh communities are associated with the saltmarsh, with stands of Common Reed (*Phragmites australis*), Sea Club-Rush (*Bolboschoenus maritimus*) or Transitional *Elymus repens* grassland. These vegetation types have been mapped as other non-Annex I saltmarsh or CM2 in accordance with the SMP project classification. Both the ASM and MSM were recorded occurring in mosaic with other SM (CM2), however, these mosaics were not extensive (Table 8.1).

The national inventory describes the saltmarsh system as being of the Bay type, which has developed on mud and sand. In places the substrate has some shingle and there is some limited development of ASM vegetation over rocky shore mosaic. It should be noted that not all of this habitat is mapped and that small patches of ASM or ASM/rocky shore mosaic are likely to occur in small bays to the north (Rossyvolan townland) of the area that is described in this report.

Much of the marsh is comprised of a level plain whose lower boundary consists of a low perched face of varying heights, typically less than 90cm. Elsewhere, the saltmarsh vegetation develops on the mud and sand flats, but this is not extensive and mostly confined to the western end of the site around the Murvagh bay inlet.

Not all of the saltmarsh is recorded as part of a large plain. In places, narrow bands of fringing saltmarsh vegetation were recorded. These were mostly confined to the northern edges of the rocky headlands around Roughan and Inishnevin townlands.

For a large part of this marsh, there is a discernible upper boundary, which is often marked by other SM (CM2) vegetation, either Common Reeds, Sea Club-Rush or transitional grassland. On some occasions, the vegetation is marked by scrub or non-saltmarsh land such as agricultural pastures or scrub.

Typically the greatest proportion of the ASM vegetation consists of mid and upper ASM communities. There is very little development of lower marsh vegetation. And there is no Pioneer vegetation to speak of, rather small patches of Common Saltmarsh Grass (*Puccinellia maritima*) vegetation within pans and along the edges of creeks

In places, the saltmarsh was grazed and indeed heavy poaching was locally abundant. A large part of the land to the eastern half of the site was enclosed saltmarsh and is grazed by

either horses and cattle at different times during the year. However, at the time of the survey, although poaching was locally abundant, there weren't many livestock in the fields.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.0001
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	19.80
H1410	Mediterranean salt meadows (Juncetalia maritimi)	1.98
	Total	21.78

Table 3.1. Area of saltmarsh habitats mapped at Laghy.

note that saltmarsh habitat may continue outside the mapped area.

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

This occurrence of this habitat type is negligible at Laghy. The total area is less than 0.0001ha. A single, almost insignificant patch was recorded in the north-western part of the site on a vehicle access track that crosses the mudflats onto an isolated part of Rossilly. It consisted largely of Glasswort (*Salicornia* spp.) with minor amounts of Annual Sea-Blite (*Suaeda maritima*). The vegetation is quite open and the vegetative cover was less than 20%. The vegetation was afforded habitat status owing to the presence of both specimens of fresh Glasswort and older, remnant flowering heads.

#### 3.3 Atlantic salt meadows (H1330)

The saltmarsh at Laghy is overwhelmingly dominated by ASM and accounts for 95% of the total saltmarsh vegetation that is mapped (Table 3.1). Most of the ASM is located within the cSAC boundary and the habitat that is outside only consists of narrow, linear patches, reflecting minor errors in the original boundary mapping. Some of the ASM however, was recorded inside agricultural land that has been excluded from the designated site. It was not extensive however.

Much of the ASM extends over a large plain with little topographical variation. A terrace exists along much of its frontline, which is between 0.5cm and 90cm above the sand/mudflats. There is a certain degree of zonation ranging from small amount of pioneer/low vegetation through mid and upper marsh communities, although rarely was any sequential pattern recorded e.g. patches of mid marsh vegetation surrounded by upper marsh vegetation. The ASM is noteworthy in that large areas are uniform in appearance and floristic composition. There are few areas where rank or overgrown saltmarsh vegetation has developed, which is largely as a result of the grazing management. Narrow bands of overgrown ASM vegetation were confined to inaccessible perimeters around fields on the "islands", where livestock are prevented access.

The development of pans was occasionally recorded, although they were rarely extensive or deep. In places their development appears to follow rips in the vegetation surface. The associated network of creeks was not well developed, except in wetter areas that were prone

to poaching. Elsewhere, a number of large linear drains that were built many years ago still remain and extend into the upper reaches of the saltmarsh.

The small patches of low marsh were characterised by the presence of Common Saltmarsh Grass (*Puccinellia maritima*) and Thrift (*Armeria maritima*). There was a change in the vegetative composition of the more widespread mid marsh with species such as Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Sea Arrow-grass (*Triglochin maritima*), Sea Lavender (*Limonium humile*) and Sea Plantain (*Plantago maritima*) along with Thrift and Common Saltmarsh Grass.

The most commonly recorded species in the upper marsh included Red Fescue (*Festuca rubra*), Sea Plantain, Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardii*), Autumn Hawksbit (*Leontodon autumnalis*), Extended Sedge (*Carex extensa*), Distant Sedge (*Carex distans*) and White Clover (*Trifolium repens*).

While the majority of ASM occurred as "pure" marsh, there were two areas where ASM occurred in mosaic with MSM. One further small patch of ASM vegetation occurred in mosaic with Sea Club-Rush was noted at the southern side of the site, where the uppermost limit of the saltmarsh grades into a extensive freshwater marsh characterised by Common Reeds, Sea Club Rush and wet grassland.

#### 3.4 Mediterranean salt meadows (H1410)

The majority of the MSM falls within the boundaries of the cSAC. It is widely distributed throughout the site, although it is not extensive when compared to the area occupied by the ASM (Table 3.1). The MSM vegetation is typically characterised by the presence of Sea Rush (*Juncus maritimus*). Other consistently occurring species included Saltmarsh Rush, Sea Milkwort and Sea Plantain. Other common species, often with high ground cover included Red Fescue, Creeping Bent and Autumn Hawksbit. Another species that was not as common in the MSM as in the ASM was Sea Aster. Bare ground was not a feature of the MSM (<1%), except where the vegetation occurred on mudflats and this figure increased to <10%.

In most cases there was a discrete transition between MSM vegetation and ASM or other non saltmarsh habitats, which was often characterised by the presence of the taller growing Sea Rush. Two patches of MSM/ASM vegetation were noted, which have previously been described in section 3.3 under the ASM heading. A single patch of MSM vegetation was recorded occurring in mosaic with Sea Club-Rush, other saltmarsh species (CM2). It is small and is located at the eastern side of the site along a creek that flows seawards through a relatively large area of reeds.

#### 4 IMPACTS AND ACTIVITIES

The list of impacts and activities that were noted at Laghy are shown in Table 4.1. As this is a largely rural site, there are few recreational activities which might cause any long lasting damage to the saltmarsh. Farming is the major land-use in the area with much of the adjacent farmland given over to pasture or the production of silage. Most of the saltmarsh is in private ownership, but only the larger areas are subdivided by fences.

Cattle grazing (140) is the principle activity that is carried out on the saltmarsh. Evidence of its occurrence was noted throughout the saltmarsh, although only a number of patches were showing signs of excessive damage (143). These were mostly inside enclosed fields at the eastern end of the site, but also some of the unenclosed parts of the marsh at the western end of the site. Most of the damage was due to the pressure of heavy livestock on wet ground. However, in association with the poaching, some of the vegetation was showing signs of excessive grazing pressure and patches of bare ground were recorded (143).

While cattle are the main grazers on the saltmarsh, others include horses (140). A small number of fields to the south eastern edge of the site appear to be solely used by horses. Indeed, a small paddock has been constructed (803) with imported sand and rubble being laid over the saltmarsh.

There are some signs of erosion (900), which would be expected in such a situation. The saltmarsh is exposed to three separate tidal inlets which results in localised impacts. Terracing is found along much of the frontline, ranging in height from sea-level to a little under 1 metre. Slumping of unconsolidated sediments was also recorded, but was not extensive and mainly confined to the central inlet of the saltmarsh where the sediments consisted of a sandy matrix. Overall, the degree of erosion is difficult to quantify, certainly within the current monitoring period. Some of the erosion is counteracted by the natural redistribution of the coastal sediment, resulting in the accretion (910) of mud and sand elsewhere. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

When the 6 inch map is compared against the current extent of saltmarsh communities there has been considerable accretion in some places. This is not surprising given the inputs of fine sediments into the many inlets that are to be found around this site. Although there were some signs of accretion, such as an accretion ramp along parts of the western section, it is difficult to say if the accretional trend is continued elsewhere in the entire site. Overall, there was no measurable change in the extent of the ASM when an examination of the year 2000 aerial and the 2005 series aerial photographs is carried out. Historically, there has, in places been a considerable increase in the area of ASM when the OSI 6inch maps are overlain onto the current vegetation map. This may indicate an accretional trend in the past that may have been partially a response to reclamation works in the area.

Aquaculture is an important industry in this part of Donegal, particularly oyster farming. The extensive sand and mudflats are considered ideal for this type of undertaking and there are several operations dotted around the inner part of the bay. On the western side of the marsh, there are a number of tracks (501), where tractors associated with the oyster farms, access the intertidal sandflats. The damage including vehicle ruts is limited in extent and often confined to narrow areas, many of which do not support saltmarsh vegetation.

Historically, some of the saltmarsh has been altered or reclaimed. The local roads have been built on reclaimed land and at one place completely bisect the marsh. Elsewhere earthen berms surrounding fields were observed at the western end of the site. A number of long linear drains (810) were also seen, but these have not been modified in many years. These reclamation works have had a significant residual impact on the structure of some parts of the saltmarsh but these impacts are not assessed as they occurred outside the current monitoring period. Some of the formerly reclaimed and drained saltmarsh has been left unmanaged and has since reverted back to saltmarsh.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	С	-1	5.80	Inside
H1330	143	В	-1	14.00	Inside
H1330	501	С	-1	0.01	Inside
H1330	803	А	-2	0.01	Inside
H1330	900	С	0	1.0	Inside
H1330	910	С	+1	1.0	Inside
H1410	140	С	0	0.5	Inside
H1410	501	В	-1	0.05	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> 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.

Few other direct human-induced impacts were noted at this site. Locals often venture across the open saltmarsh out onto Murvagh Bay, but the damage is negligible. Outside of the site, there are quite a number of domestic dwellings and holiday homes scattered about the area (403). Although none are built on the marsh, some are adjacent to and there was evidence of dumping of garden waste, overflow of older septic tanks and littering both domestic and dumping of builders rubble (423). These are likely to have some minor localised polluting impact (701) on the saltmarsh, but it is not possible to quantify the impact.

#### 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

The saltmarsh at Laghy is not as extensive as many other sites in Donegal and its isolated setting might suggest that there are fewer impacts than at other more accessible saltmarsh sites. The impacts of historical reclamation have had a significant residual impact on the structure and habitat development at this site. Although the saltmarsh plain is nestled in what at first appears to be a relatively sheltered situation, with 3 separate inlets it is prone to fluctuating tidal inundation. The overall conservation assessment of the site is *unfavourable-inadequate* mainly due to some damage caused by overgrazing. This assessment is a reflection of the results of the individual habitats shown in Table 5.1.

This site is located within the Donegal Bay (Murvagh) cSAC. A management plan is not available for this cSAC. Therefore it would be difficult to manage grazing levels.

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

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

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

#### 5.2.1 Extent

The extent of the *Salicornia* flats is assessed as *favourable*. There is no previous information from this site with which to assist with a determination. Although its extent at Laghy is negligible, it is known from elsewhere in Donegal Bay namely Mullanasole (SMP 122). Notwithstanding its relative scarcity, the presence of this annual habitat at Laghy is considered positive in terms of the overall structural dynamic of the saltmarsh.

#### 5.2.2 Habitat structure and functions

Given the paucity of this habitat, monitoring stops were not carried out. The structure and functions are assessed as *favourable*. The determination is based upon a visual assessment of the small amount of this habitat that was present. It was functioning as expected in so much as it occurred on bare muddy substrates at the front of a low ASM terrace.

#### 5.2.3 Future prospects

It is difficult to be certain as to the persistence of this habitat. It was only recorded on disturbed ground on a vehicle track which crosses the marsh to the oyster trestles. A tentative *favourable* rating is given based on the fact that this habitat has been recorded elsewhere within Donegal Bay and that it is unlikely that there will be any significant change in the environmental conditions where the habitat was recorded.

#### 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

By far the most extensive of the saltmarsh habitats that was recorded at this, the extent of the ASM is assessed as *favourable* (Table 5.1). In a number of places there were small scale indications of natural erosion. However, features such as erosion terraces or eroding remnant patches of ASM were not common and would be expected as part of the natural dynamic system. Elsewhere, there were signs of accretion as suitable substrate becomes available, resulting in the continuing accumulation of mud along the front of the marsh.

Overall, there was no measurable change in the extent of the ASM when an examination of the year 2000 aerial and the 2005 series aerial photographs is carried out. Historically, there has, in places been a considerable increase in the area of ASM when the OSI 6inch maps are overlain onto the current vegetation map. This may indicate an accretional trend in the past that is also likely to continue into the future along parts of the saltmarsh.

#### 5.3.2 Habitat structure and functions

The structure and functions attribute is assessed as *unfavourable-inadequate*. Thirteen monitoring stops were carried out throughout this habitat. All of the stops satisfied the minimum species requirements, which is indicative of a healthy and diverse ASM. Of those stops, however, one failed and this was due to the intensity of grazing and the high degree of poached ground that was recorded around this stop. The saltmarsh extends across a number of separate land parcels. The differing land use regimes were most obvious in terms of grazing and the substrate damage noted. There are a number of different land parcels with different grazing intensities.

Often, grazing intensity isn't the only determining factor in the damaged areas. Land that was easily damaged tended to be wetter and the substrates consisted of peatier soils as was observed towards the back of the saltmarsh.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate* based upon the assumption that the principal management regimes will not be altered. A large part of the habitat is in relatively good condition, mainly as these areas are not actively managed or grazed. Elsewhere the levels of grazing by cattle are clearly having an impact on the condition of the ASM. Areas of ASM on wetter ground at the eastern side of the site are intensively grazed and heavily poached in places.

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of this habitat is assessed as *favourable* (Table 5.1). There is little earlier information as to the extent of MSM vegetation in this area. Quite a number of MSM patches were recorded throughout this site, though none are as extensive as the ASM. Indeed, most occur as discrete patches within the ASM or towards the landward side of the marsh. There is some evidence of erosion such as the presence of terraces, but overall, it is clear from examining the OSI 6 inch maps, that overall the saltmarsh marsh has increased in area over past 100 years or so. Indeed, the accretion is confirmed, particularly towards the western end of the site where the MSM interfaces with the intertidal zone. Relatively large patches of pure Sea Rush are developing on the mudflats.

#### 5.4.2 Habitat structure and functions

The habitat structure and functions are assessed as *favourable* (Table 5.1) as all five monitoring stops carried out in this habitat satisfied the assessment criteria. In general, the MSM was in good condition and supported all of the plant species that are typically associated with this habitat. In some places, there is evidence of some secondary damage

where cattle were creating tracks through the MSM causing bare ground with a subsequent build-up of algal material. Overall, this is limited to small patches, mostly in the eastern half of the site.

#### 5.4.3 Future prospects

The future prospects of this habitat are rated as *favourable*. This assessment assumes that no significant change in the management regime occurs in the future. It is clear that the MSM vegetation is generally avoided in terms of grazing so impacts are lower. The presence of Sea Rush among the ASM is distinctive. However, the vegetation is showing localised signs of damage, which if not controlled, will result in continued creation of tracks and denudation of the vegetation leading to further undermining of the MSM habitat. However, there are also indications that the extent of MSM may be increasing with the spread of Sea Rush on intertidal mud. This is a positive feature.

#### **6 MANAGEMENT RECOMMENDATIONS**

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

# 7 **REFERENCES**

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

# 8 APPENDIX I

# Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)			Area (ha)		
		Area	H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	19.683		19.683			
4	1410 Mediterranean salt meadow	1.876			1.876		
5	ASM/MSM mosaic (50/50)	0.199		0.0995	0.0995		
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic	0.028		0.014			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.350					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	Pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic	0.008			0.004		
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.645					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	24.789		19.797	1.98		



SAC Boundary 1310 Salicornia flats 1330 Atlantic salt meadows 1410 Mediterranean salt meadows 1330/1410 mosaic 1330/other SM (CM2) mosaic 1410/other SM (CM2) mosaic Other Saltmarsh (CM2) other 1330 monitoring stops 1410 monitoring stops



Saltmarsh Monitoring Project 2007-2008

Laghy

Donegal Bay (Murvagh) SAC (000133)

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# Lower Lough Swilly

# **1 SITE DETAILS**

SMP site name: Low	er Swilly	SMP site code: SMP0030			
Site name (Curtis list): Lough Swilly complex		CMP site code: not surveyed			
		Site No: (Curtis list): 4			
NPWS Site Name: L	ough Swilly	Date of site visit: 11/08/2006			
NPWS designation cSAC: 2287		MPSU Plan: old format plan available			
	pNHA: 2287				
	SPA: Lough Swilly SPA 2	287			
County: Donegal		Discovery Map: 6	Grid Ref: 222130, 412700		
6 inch Map No: Dg05	53, Dg054	Aerial photos (2000 series):			
		00261-c, 00261-d			
Annex I habitats currently designated for Lough Swilly cSAC:					
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)					
Other SMP sites within this cSAC/pNHA: Ray, Ramelton, Green Hill, Fahan					
Saltmarsh type: Estu	ary	Substrate type: Mud			

#### **2** SITE DESCRIPTION

Lower Lough Swilly saltmarsh is located mainly along the east side of the lower Swilly Estuary in County Donegal, 4 km east of Letterkenny. The site is positioned high up the estuary. The survey site covers the townlands of Big Isle, Manorcunningham Churchland Isle, Drumardagh, Trimragh, Farsetmore and Glebe. This is a low-lying site and it is situated along flat farmland that was reclaimed in the past. This area now contains arable land and improved grassland in fields divided by deep drains. There is a tall wide embankment running along the shoreline in this area that prevents the tide flooding the farmland. The shoreline topography is dominated by this tall man-made embankment, which has long straight sections. This reclamation pre-dates the 1<sup>st</sup> edition 6 inch map (1860s), although the position of the embankments has changed at some locations and they have been maintained over the years. The farmland within the embankment has been improved since the 2<sup>nd</sup> edition 1920s six inch map was drawn as there are indications from the map that there was marshy land within parts of the embankment.

The saltmarsh is situated along the seaward side of the tall embankment. The majority of the saltmarsh is quite narrow and is a band of vegetation 5-10 m wide. There are several larger sections of saltmarsh where there are pieces of land extending out from the embankment and saltmarsh is also found around some small inlets.

Two Annex I habitats, Atlantic salt meadows (ASM) and *Salicornia* flats (1310), are found at this site. *Spartina* swards and clumps are also quite frequent. Only one habitat, Atlantic salt meadows, is listed as a qualifying interest for Lough Swilly cSAC. Most of the saltmarsh habitat is situated within the cSAC boundary. There are some unintentional omissions as the cSAC boundary was drawn from the 2<sup>nd</sup> edition 1920s 6 inch map along the marked embankment. There are small rectification errors between the 6 inch map and the 2000 aerial photo that mean some of the saltmarsh (and embankment) are outside the cSAC boundary.

This site is also included within the Lower Swilly SPA. The SPA also covers some of the farmland (polderland) within the embankment. This area and the adjacent intertidal mudflats around Big Isle are noted in the MPSU conservation plan for their importance to several species of wintering waders and wildfowl including Whooper Swan and Greenland White-fronted Geese, Annex II species.

This site can be accessed via a new lane that accesses farmland in Drumardagh Townland. This lane is not present on the Discovery Map but is visible on the 2000 aerial photo. The lane can be accessed via minor roads that connect to the N13 Manorcunningham-Derry road. Permission was sought from a farmer to access the saltmarsh by crossing farmland.

#### **3 HABITATS**

#### 3.1 General description

The Annex I saltmarsh habitats at this site are dominated by Atlantic salt meadows and there is only a small single patch of *Salicornia* flats (Table 3.1). The saltmarsh habitats are situated on the seaward side of the tall embankment. Generally the ASM is found along the edge of the embankment and the *Spartina* swards and clumps are scattered on the intertidal mudflats along the edge of the embankment. The ASM appears as a relatively long narrow band along the embankment. There are some relic sections of ASM on pieces of land that jut out from the embankment. These sections are somewhat better developed with occasional salt pans. The ASM transitions on the landward side to dry grassland generally dominated by Twitch (*Elytrigia repens*) higher on the embankment. The mudflats along the edge of the saltmarsh are very soft and slope steeply towards the River Swilly channel at the centre of the estuary.

The management of the saltmarsh area varies as the survey site is spread over a relatively long distance (2.7 km) and therefore covers several different farms or management units. Some of the saltmarsh is grazed while other sections are not grazed at all.

It should be noted that saltmarsh habitat extends outside the survey area upstream along the River Swilly channel (Table 3.1). The eastern side of the survey area shows the limit of saltmarsh extent in this area as the embankment becomes too steep to allow saltmarsh to develop. It was decided to limit the survey area due to time limits on fieldwork and the need to survey other sites in the area. A narrow band of saltmarsh appears again on the eastern side of Big Isle in the Wee Swilly. A narrow saltmarsh is also present on the western side of the Swilly Estuary adjacent to the survey area. There are several small islands towards the west side of the estuary at Glebe. These islands were surveyed using the aerial photos and panoramic views over this part of the estuary from adjacent hillside and included within this habitat map.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	0.01
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	8.46*
	Spartina swards and clumps	2.73*
	Total (not including Spartina swards)	8.47

**Table 3.1.** Area of EU Annex I habitats listed at Lower Lough Swilly.

\*note that saltmarsh habitat continues outside the surveyed site.

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

This habitat was only present as a small patch at one location in the survey area. The dense patch of Glasswort (*Salicornia* sp.) plants is present on soft mud. This area is quite small. The patch is located at the edge of some ASM and *Spartina* sward. This sediment bank has built up along a channel that connects to the estuary channel.

The mudflats adjacent to the saltmarsh slope relatively steeply down to the central channel. This steep slope in conjunction with tidal flow means that *Salicornia* flats can not develop on the mudflats in this area.

# 3.3 Atlantic salt meadows (H1330)

The ASM at this site is mainly quite narrow. This band is well developed in some parts and is up to 5-10 m wide. The fringe extends along most of the survey site but there are some sections where the ASM disappears because the embankment is so steep. These narrow sections have particularly good zonation of vegetation related to elevation along the embankment. The vegetation composition is dependant on the grazing regime. In the ungrazed areas the lower-mid saltmarsh zone is characterised by the dominance of Common Saltmarsh-grass (*Puccinellia martima*) and the presence of frequent Sea Aster (*Aster tripolium*). Other species present include Glasswort, Greater Sea Spurrey (*Spergularia media*), Sea Plantain (*Plantago maritima*) and Sea Pink (*Armeria maritima*). Along the grazed sections the lower saltmarsh zone is dominated by a low sward of Common Saltmarsh-grass with frequent Glasswort, and Sea Aster is much less prominent. Clumps of Common Cordgrass (*Spartina anglica*) are also frequently found in this zone, particularly along the seaward edge of the saltmarsh. Some of the larger sections of the saltmarsh where Common Cordgrass is frequent are mapped as a ASM/*Spartina* mosaic.

Intertidal mudflats occur along the seaward edge of the saltmarsh. The flats frequently have clumps or swards of Common Cordgrass growing on the intertidal mud adjacent to the ASM. There is sometimes a gradual slope along this transition between ASM and *Spartina* swards. The seaward edge of other ASM is marked by a low saltmarsh cliff and Common Cordgrass has developed along the bottom of this low cliff (0.3 m high) so there is a step down onto the *Spartina* sward.

The mid-upper zone of the ungrazed areas is characterised by the dominance of Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardii*). Other species present include Sea Plantain, Long-bracted Sedge (*Carex extensa*), Sea Milkwort (*Glaux maritima*) and Sea Arrowgrass (*Triglochin maritimum*). The upper zone is dominated by a band of Creeping Bentgrass (*Agrostis stolonifera*) with occasional Spear-leaved Orache (*Atriplex prostrata*) along the strandline. This zone transitions into rank

grassland dominated by Twitch and herbaceous species such as Thistles (*Cirsium* spp.) and Nettle (*Urtica dioica*) above the high water mark.

There are some sheltered areas and knobs of land along the embankments where saltmarsh is more extensive. These irregular shaped sections probably reflect the old shoreline topography. At one location at the east side of the survey area there is a low seawall at the front of the saltmarsh that may have allowed saltmarsh to develop. In these areas the zones described above are more extensive. Generally the saltmarsh topography is poorly developed as the saltmarsh is relatively narrow. The narrow band of saltmarsh generally does not have any salt pans or creeks, although one section in a small sheltered area did have some salt pans.

The larger sheltered area towards the western side of the site contains the best developed saltmarsh zonation. This saltmarsh has developed in a small bay adjacent to a deep intertidal hollow. Several drains flood into this area via sluices. This area is connected to the main estuary by a deep channel. This saltmarsh area contains a lower saltmarsh zone dominated by Common Saltmarsh-grass and Sea Aster, a midmarsh zone dominated by Sea Pink and Sea Plantain, a mid-upper marsh zone dominated by Red Fescue and Saltmarsh Rush and a transitional zone along the strandline dominated by Creeping Bentgrass. The saltmarsh is ungrazed so the sward has a variable height range between 10-40 cm high. There are also frequent clumps of Common Cordgrass in the lower saltmarsh zone.

One of these knobs is a raised platform of saltmarsh separated from the embankment by *Spartina* swards and mudflats on lower lying mud. This section is dominated by upper saltmarsh with Creeping Bentgrass and Red Fescue being dominant. Some upper saltmarsh and transitional species that are present include White Clover (*Trifolium repens*), Autumn Hawkbit (*Leontodon autumnalis*), Silverweed (*Potentilla anserina*) and Grey Club-rush (*Schoenoplectus tabernaemontani*). There are also some clumps of Sea Rush (*Juncus maritimus*) (the only clumps noted in the survey site. There are also several patches of Soft Rush (*Juncus effusus*) and Creeping Buttercup (*Ranunculus repens*) is present, indicating that a part of this area is not inundated and lies above the high water mark.

# 3.4 Spartina swards

*Spartina* swards and isolated clumps are present along the entire length of the survey site. The earliest recorded date of its presence in Lough Swilly was in 1950, where it was recorded at Big Isle (Boyle 1972). Common Cordgrass has spread mainly on the intertidal mud adjacent to the saltmarsh and the embankment. It is generally not distributed too far away from the embankment (< 40 m) as the intertidal flats slope relatively steeply down to the central channel. This habitat is characterised by dense swards or clumps of Common Cordgrass. There is usually other saltmarsh species present, particularly Common Saltmarsh-grass and Greater Sea Spurrey and occasional Lax-flowered Sea Lavender. The transition between *Spartina* swards and ASM is generally quite distinctive as the edge of the *Spartina* sward has frequent Common Cordgrass stems.

Some large areas of *Spartina* sward up to 100 m wide have developed at some locations. Common Cordgrass has also infilled some of the small channels between some of the small knobs of ASM and the embankment. There are few seedlings or small clumps of Common Cordgrass present indicating that it is not spreading significantly at the moment. Common Cordgrass also forms a mosaic in places with the lower saltmarsh zone dominated by Common Saltmarsh-grass.

There are some indications that this species was planted along parts of this embankment as one section has a row of regularly sized clumps regularly spaced apart. The *Spartina* sward is grazed by sheep in sections of the site where there is heavy grazing pressure.

# 4 IMPACTS AND ACTIVITIES

The main activity on this site is grazing (Table 4.1). The activity codes used in Table 4.1 are given in brackets in the following text. The intensity of grazing varies as the survey site is spread along several different farms. The impact of grazing also varies depending on whether cattle or sheep are grazing the saltmarsh. The eastern section is grazed by cattle and this has caused heavy levels of poaching in some localised areas. Part of the central area is heavily grazed by sheep. The grazing intensity is so high that the Common Cordgrass is also grazed creating a low sward. This area is also moderately poached. The western section is not grazed and has a relatively tall sward. The ungrazed areas may have a greater species diversity compared to the heavily grazed sections. Grazing may induce the spread of Common Cordgrass in the lower saltmarsh zone by affecting competition between it and Common Saltmarsh-grass.

There has been some old dumping of spoil at the western end of the survey site (811). Several vegetated mounds are present. This was related to drainage works. This work happened some time ago based on the age of the mounds.

The saltmarsh topography along this site has been affected significantly by the presence of the tall embankment (870). The development of this feature is likely to have had a major influence on the saltmarsh habitat at this location and saltmarsh is likely to have been much greater in extent in the past before this area was embanked. These old impacts are not assessed as they did not occur within the assessment period. This embankment has changed position at some locations in the past 80 years. There are several much small seawalls/embankments on parts of the saltmarsh (870). These are also quite old and are likely to be related to old attempts at further land reclamation.

Common Cordgrass has been present in Lough Swilly for a relatively long time (Nairn 1986). The earliest recorded date of its presence in Lough Swilly was in 1950, where it was recorded at Big Isle (Boyle 1972). This can be an invasive species. The 1994 NHA survey noted that clumps of Common Cordgrass were relatively common along this part of the estuary. The 1995 aerial photos series also shows that clumps and swards of Common Cordgrass were quite frequent. A comparison of the two sets

of aerial photos and the current extent of Common Cordgrass as shown by the habitat map indicates that *Spartina* swards seems to have increased in extent along some parts of the shoreline during this period. The increases in extent are mainly on the intertidal mudflats. There are no indications that Common Cordgrass has spread significantly on to the ASM during this period. The MPSU conservation plan mentions that Common Cordgrass is present in the estuary but does not indicate that it is has been spreading significantly in the recent past.

It is difficult to assess how much the extent of Common Cordgrass has increased, as it does not show up well on the 2000 aerial photos. Large isolated clumps of Common Cordgrass are quite distinctive on the black/white aerial photos. However, these photos need to be ground-truthed to measure the extent of Common Cordgrass accurately. It is estimated that Common Cordgrass has increased in extent by 10-20% on mudflats since 1995.

The small patch of *Salicornia* flats (1310) has some Common Cordgrass situated adjacent to it. This habitat is vulnerable to further spread of Common Cordgrass (974).

The main activities adjacent to this saltmarsh are related to farming (100, 120, 140). Parts of the embankment are also grazed. The embankment is maintained to prevent flooding of the adjacent land (870).

EU Habitat Code <sup>1</sup>	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected (ha)	Location of activity <sup>5</sup>
1330	142	В	-1	0.11	Inside
1330	143	В	-1	1.82	Inside
1330	974	С	-1	8.47	Inside
13s	100	С	0	N/a	Outside
13s	120	С	0	8.47	Outside
13s	140	С	0	8.47	Outside
13s	870	С	0	8.47	Outside

**Table 4.1.** Intensity of various activities on saltmarsh habitats at Lower Lough Swilly.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>&</sup>lt;sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>&</sup>lt;sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>&</sup>lt;sup>5</sup> 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 overall conservation status of this site is assessed as *unfavourable-bad* (Table 5.1). The main activity is grazing and significant portions of the site are damaged by overgrazing and poaching. The saltmarsh has also been significantly modified in the past by the development of the tall embankment. Common Cordgrass is also frequently found along most of the saltmarsh, mainly in the lower saltmarsh zone, and is also present as swards or clumps on the adjacent intertidal mudflats.

The short-medium term prospects of saltmarsh migration in response to sea level rise are poor as the entire landward boundary of the saltmarsh is a steep embankment. Any sea level rise may further narrow the band of saltmarsh and possibly induce further spread of Common Cordgrass in the ASM.

Habitat	EU Conse			
	Favourable	Unfavourable - inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Salicornia flats (1310)	Extent, Structure and functions,		Future prospects,	Unfavourable - Bad
Atlantic salt meadows (1330)	Extent,		Structure and functions, Future prospects,	Unfavourable - Bad

Table 5.1. Conservation status of Annex I saltmarsh habitats at Lower Lough Swilly.

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

# 5.2.1 Extent

The extent of this habitat is assessed as *favourable*, in the absence of any information on the previous extent of this habitat. The small patch is situated on a small mud bank that has developed along the edge of a channel. This is a typical place for this habitat to develop. This channel is marked on the 1920s 6 inch map so its topography has not changed significantly. Small patches of *Salicornia* flats could be expected at other parts of the site in some of the sheltered areas along the seaward edge of the ASM. However, most of these areas also contain Common Cordgrass.
# 5.2.2 Habitat structure and functions

The structure and functions of this habitat is assessed as *favourable*. No monitoring stops were carried out in this habitat as its area was so small. However, no negative indicators were noted in the habitat such as erosion. Common Cordgrass is located adjacent to the habitat. This patch may have been larger in the past.

# 5.2.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*. Common Cordgrass is located adjacent to the habitat and it is vulnerable to invasion by this species. The extent is very small so it could be covered with Common Cordgrass relatively quickly.

# 5.3 Atlantic salt meadows (H1330)

# 5.3.1 Extent

The extent of this habitat is assessed as *favourable*, in the absence of accurate information on the previous extent of this habitat. There is likely to have been significant losses of extent of saltmarsh in the past related to the creation of the tall embankment and reclamation within the embankment, but this is not considered for the assessment. Curtis and Sheehy-Skeffington (1998) listed this general area (probably including the west side) as containing saltmarsh habitat and the NHA survey also listed ASM vegetation as being present along this part of the shoreline. Examination of the 1995 aerial photos series indicates that that has been no significant change in extent of ASM in the survey area. The only change is likely to have been some reclassification of ASM to *Spartina* sward due to the spread of Common Cordgrass on the ASM. This may have occurred in the ASM/*Spartina* mosaic area but it is difficult to assess how much spread of Common Cordgrass into the ASM there has been in this period.

# 5.3.2 Habitat structure and functions

The structure and functions of this habitat is assessed as *unfavourable-bad*. Four monitoring stops were carried out in this habitat and two passed. The other two stops failed due to heavy poaching and high levels of grazing. The quality of this habitat varied significantly in different areas due to the management. The overall species diversity was typical of this habitat but the heavily grazed areas may have a lower

diversity. (Some species may have been missed due to the lowness of the sward, which is tightly cropped.) The saltmarsh topography was poorly developed but this is typical of a narrow saltmarsh and is likely to have significantly been affected by the development of the embankment. Some of the relic knobs of saltmarsh jutting out from the embankment do still have some salt pans. The overall sward height is diverse due to the fact that some sections are ungrazed, some areas are moderately grazed and some areas are heavily grazed. This site has no natural transitions to other habitats on the landward side due to the presence of the embankment. Common Cordgrass is a notable feature at this site and while it is mainly found on the intertidal mudflats, it is also present as clumps within the lower zone of the ASM. There is sometimes a natural transition from ASM dominated by Common Saltmarsh-grass to *Spartina* sward.

Some large patches of this habitat are found on the islands at Glebe. These islands could not be surveyed as they were inaccessible. However, they are likely to be relatively good condition as they are not grazed. Common Cordgrass is present on and around these islands. *Spartina* swards may be greater in extent than indicated from the habitat map as this area was not ground-truthed.

## 5.3.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. Heavy grazing pressure is having a significant impact on parts of this site and is likely to continue in the future. Common Cordgrass also has the potential to spread further on the ASM in the lower saltmarsh zone.

## **6 MANAGEMENT RECOMMENDATIONS**

Some moderation of grazing intensity is required to increase the conservation status of parts of this site.

#### 7 REFERENCES

Boyle, P.J. (1972). Two forms of *Spartina* in Donegal. Irish Naturalists Journal, 37, 239-240.

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



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Ní sna leorainneacha a' an léarscáil seo ach nod garshuíomhadh ginearáila. Féadrar a hbhreil ini ine adéanamh ar liteorainneadha na gceanlar comharthaí tre. Machasannaíl d'ábhar na Suirbhéaradhla Ortonáis le chead ón Riallas . (Ceadunas Vimh. 5953) Lough SwillycSAC (002

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		Big Isle	Legence SAC B SAC B 1330 Habitats 1310 Sparti 1330 Atlant	Jooundary Monitoring stops Salicomia flats na swards Atlantic salt mead ic/Spartina mosa na clump/mudflat	dows ic t mosaic	
	a fi	XÀ	SMP Code:	Map Version: <b>1</b>	by: SMP 2	
2287)	0 Scale: 1	200 1:7800	400	600 Meters	s I	i

# Maghera

## 1 SITE DETAILS

SMP site name: Mag	hera	SMP site code: 0125				
Dates of site visit: 17	September 2008	CMP site code: 147				
SM inventory site nam	ne: Maghera	SM inventory site code: 25				
NPWS Site Name: SI	ieve Tooey/Tormore Island	/Loughros Beg Bay				
NPWS designation	cSAC: <b>190</b>	MPSU Plan: Old For	mat – Draft 2: Consultation			
	pNHA: <b>190</b>	SPA: N/A				
County: Donegal		Discovery Map: 10	Grid Ref: 167130, 390420			
Aerial photos (2000 s 0416-C; O 0442-A,B;	eries): O 0415-A,C,D; O O 0443-A,B	6 inch Map No: <b>Dg 073, 082</b>				
Annex I habitats currently listed as qualifying interests for Slieve Tooey/Tormore Island/Loughros Beg Bay cSAC:						
No Saltma	rsh habitats listed					
Other SMP sites withi	in this SAC/NHA: Glen Bay					

#### 2 SITE DESCRIPTION

Saltmarsh type: Fringe

Maghera Strand is located on the southern side of Loughros Beg Bay. The saltmarsh is located in a sheltered inlet behind Maghera Sand dune system on the south side of Loughros Beg Bay. It is an isolated spot, approximately 8.5 kilometres west of Ardara. The approach to the saltmarsh is along a narrow road that runs along the foot of Glengish Mountain. The road continues over the mountain ridge of Slieve Tooey in the west towards Glencolmkille. This road is not well maintained, and at the time of the survey had very little tarmacadam left after being washed away due to the long wet summer that this part of the country suffered.

Substrate type: Mud:sand:peat

The saltmarsh is nestled in relative shelter, between the rocky headland of Carrickshanbally in the east and the projecting sand dune system of Maghera in the west. Extending a little over one kilometre between east and west, the saltmarsh is narrow in places, whilst elsewhere it is extensive and stretches over 300 metres from its frontline along the intertidal sandflats to its backline, which is effectively marked by the road.

The situation is rural and the landscape is dominated by a mountain chain along the southern perimeter of the site and the sandflats of Maghera strand to the north. A full account of the sand dune system and its conservation status at Maghera is included in an earlier survey, (Ryle *et al.* 2009). Much of the landscape is blanket bog and heath, particularly on the hill slopes. Some of the low-lying ground is dotted with dispersed rural dwellings and small farm holdings. Some of the land has been improved, but individual fields tend to be small. Elsewhere, the sand dune system at Maghera is also grazed, but can be accessed by

recreational users. The remainder of the low-lying land is rather derelict in that it supports some rough grazing, but is not intensively used. It is here that much of the saltmarsh is found.

In terms of nature conservation, Maghera saltmarsh is one of two, Glen Bay being the other one from the national inventory (Curtis and Sheehy-Skeffington 1998), which is situated within the large Slieve Tooey, Tormore Island and Loughros Beg Bay candidate Special Area of Conservation (cSAC). The site is primarily designated for the presence of Blanket bog, approximately 35% of the total area of the cSAC according to the NATURA 2000 database. Saltmarsh habitats are not listed as qualifying interests for the site. Other habitats that are listed as qualifying interests of the site are generally associated with sand dune habitats including Decalcified fixed dunes *Empetrum nigrum* and Atlantic decalcified fixed dunes (Calluno-Uliceatea), both of which are priority habitats in a European context, and in Ireland are extremely rare and poorly developed, due in part to the relatively young age of many of our dune systems. No plant species have been listed for the site that merit inclusion as a qualifying interest.

Access to the site was via public right of ways onto the shore at either end of the marsh. However, as a large part of the saltmarsh occurs inside privately-owned land that has been fenced off, landowners, where they could be located, were notified of the survey.

# **3 SALTMARSH HABITATS**

## 3.1 General description

The saltmarsh at Maghera is found in an inlet off the larger bay of Maghera Strand, where it extends between the extensive sand hills at Maghera eastwards towards the townland of Carrickshanbally, a distance of approximately 1 kilometre. It largely occurs as a single unit, although some of it is physically separated from the main body of saltmarsh by the Owenee River channel. The largest area of saltmarsh occurs in the central section of the site, where it reaches its widest point, at approximately 350 metres wide. The saltmarsh has developed and indeed extended along drainage channels within the cutover blanket bog. Elsewhere, the saltmarsh communities are very much constrained by the topographical landscape with outcropping rock or indeed the tidal influence controlling the extent of the saltmarsh vegetation around the inlet. The pattern is further complicated by the imprint of former management regimes such as land reclamation, drainage and peat extraction, all of which add to the structural interest of the vegetation.

The saltmarsh habitats at Maghera are characterised by the presence of two Annex I saltmarsh habitats were recorded at Maghera, namely Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). There was no development of any *Salicornia* flats at Maghera, although the occurrence of *Salicornia* was occasionally noted. The area of the

saltmarsh habitats is shown in Table 3.1. Other habitats that were recorded at Maghera included blanket bog, embryonic dunes, heath and agricultural grassland of varying wetness and condition.

The MSM accounts for approximately 60% of the total saltmarsh area that is mapped, whilst the ASM occupies the remaining 40%. Typically the MSM occurs as larger vegetation units and occupies much of the blanket peat plain in the central part of the site. Notwithstanding the fact that a large part of the saltmarsh is raised above the level of the intertidal zone, sometimes as much as 1.5 metres, there is considerable tidal influence on the vegetation. Numerous creeks and old drainage channels which are diurnally flooded enable considerable amounts of saline water to reach into the site thus ensuring its persistence. The vegetation displayed considerable heterogeneity which related to the former management of this area. The substrates are largely peaty and as such were harvested by the locals at one time. Now much of the land occupied by the saltmarsh is largely derelict and reflects the influence of the historical attempts to drain the land and reclaim it for agricultural purposes.

Unlike the MSM, the ASM is generally recorded as smaller discontinuous patches, many of which are found along the seaward side of the MSM or even as discrete patches within the MSM. Occasionally patches of ASM were recorded that had little direct link with MSM vegetation. The only relatively large area of ASM vegetation was confined to the sandflats, where a relatively extensive patch of developing lower marsh vegetation occurs on the sandflats at the mouth of the inlet to Maghera Strand Bay.

Saltmarsh Flat-sedge (*Blysmus rufus*) was recorded at this site and it was typically associated with the ASM vegetation. It was generally found towards the back of the ASM, where the vegetation graded into MSM. It was not very common however.

Large sections of the upper boundaries of the saltmarsh, mostly dominated by MSM vegetation or transitions with blanket bog are characterised by brackish vegetation with numerous patches of Sea Club-rush (*Bolboschoenus maritimus*) or stands of the Common Reed (*Phragmites australis*) recorded. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The reeds are largely confined to the upper stretches of the saltmarsh where the influence of considerable amounts of freshwater flushing off the steep slopes of Glengish is obvious. Unlike the Reeds, the Sea Club-Rush is less extensive and rarely occurred as large stands. However, it was more widely distributed and occurred as discrete patches throughout the saltmarsh from the landward side of the saltmarsh but including old drainage channels/creeks and in depressions within the relic cut-over landscape.

It was noteworthy that the area where the upper limit of the ASM that did not grade into MSM was often associated with wet, agriculturally-managed grasslands and was mostly confined to the eastern half of the site.

Most of the saltmarsh habitat mapped at this site is located within the cSAC boundary. The cSAC boundary is based on boundaries that are shown on the old OSI 6inch maps. Using GPS, the current survey confirmed the boundaries and as such it reflects that the cSAC boundary is relatively accurate in terms of the saltmarsh around Maghera at least. Of the small patches of habitat that are mapped outside the cSAC, this is easily explained. Some of the land towards the western end of the site has been excluded from the site as it represents the infields of a small farm-holding. The remaining patches of saltmarsh vegetation that were recorded outside the cSAC are negligible and reflect the subtle inaccuracies which are typically encountered between boundaries indicated on the 6inch map and what is actually encountered on the ground.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	5.85
H1410	Mediterranean salt meadows (Juncetalia maritimi)	8.98
	Total	14.83

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

#### 3.2 Atlantic salt meadows (H1330)

The majority of the ASM occurs within the boundary of the cSAC and only 0.155 ha occurs outside. Most of this vegetation which is located at the western end of the site forms part of an exclusion that supports a small farm.

Some minor pioneer vegetation dominated by Common Saltmarsh Grass (*Puccinellia maritima*) was recorded on the sandflats, but the majority of the ASM zonation tended to be low to mid marsh, with some limited development of upper ASM vegetation which was transitional to MSM.

The largest continuous area of ASM habitat has developed on extensive sandflats at the north-western tip of the site. It is characterised by pioneer/lower marsh community, which is still establishing as sediment build-ups. However, it is likely to suffer some loss during winter storms. Along with Common Saltmarsh Grass, the vegetation is typified by the presence of Thrift (*Armeria maritima*), Sea Milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*). Elsewhere other species that were noted as occurring in lower marsh communities included Sea Aster (*Aster tripolium*) and Sea Arrow Grass (*Triglochin maritimus*).

Given the gradients of the land where ASM is mapped, the majority of zonation is mid marsh. Bare sand was less a feature of this zone, which was often found on more consolidated substrates. It was discontinuously found along much of the site from the eastern half extending towards the west and along the Owenee River channel. Thrift was locally abundant, but other species that were recorded were similar to those already described for the lower marsh. However, they were recorded in greater abundance. Towards the upper limits of the zone, there was an increase in species such as Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardii*). The development of pans which is a typical feature of mid marsh zones was retarded, as the extensive areas of level mid marsh vegetation were not common.

Floristically, there was little difference in the composition of the upper ASM marsh, except that Common Saltmarsh Grass was replaced by Creeping Bent (*Agrostis stolonifera*) along with a decrease in the cover afforded by Thrift and Sea Milkwort. The sward was often kept low through grazing and the ground was badly damaged through poaching. The upper reaches of the ASM were quite variable in appearance and condition, which was due not only to the grazing pressure, but also the topographical landscape, with drains and relic peat mounds influencing the transition between ASM and MSM.

Not all of the upper ASM graded into MSM or transitional habitats. Some of the land that has obviously been managed as small agricultural pasture is found to the landward side of ASM. This was mostly the case towards the most easterly part of the site, where MSM vegetation was very much reduced in extent.

A small area of vegetation was not classified as either ASM or MSM. Rather it was mapped as ASM/MSM mosaic. It is limited in extent and was found at the front of unenclosed agricultural ground that is freely grazed by sheep and some cattle.

Elsewhere, two smaller patches of ASM vegetation occurred in mosaic with Sea Club-Rush. This vegetation occurred in the upper reaches of the Owenee River and was almost surrounded in its entirety by a large stand of Sea Club-rush.

## 3.3 Mediterranean salt meadows (H1410)

The MSM represents approximately 60% total saltmarsh vegetation recorded at Maghera. Of the 8.879ha of MSM that was mapped at Maghera (Table 3.1), only 0.303ha occurs outside of the cSAC boundary. Most of this occurs at the upper reaches of the marsh along the Owenee river channel, while smaller linear patches were also noted along the landward or upper boundary of the marsh.

Lower MSM vegetation was occasionally noted in some places, and typically comprised narrows bands of pure Sea Rush (*Juncus maritimus*) on sand or mudflats. The greater proportion of MSM vegetation, however, is classified as upper vegetation. It is relatively extensive, particularly around the central sections of the site, where it has developed on peaty substrates, of which relics of their cutover origins still have a residual influence on the condition of the MSM vegetation. Dominated by Sea Rush, other regularly occurring species included Red Fescue, Creeping Bent, Sea Plantain, Sea Milkwort and Autumn Hawksbill

(*Leontodon autumnalis*). Other species that were less frequently recorded included Saltmarsh Rush, Sea Aster and Common Scurvy Grass (*Cochlearia officinalis*).

A notable feature of the MSM was related to the occurrence of other species, particularly bog species but also species typically found in wet grasslands and freshwater drains. There was a considerable transitional element in large parts of the MSM. This was related to the large area of cutover and intact blanket bog still remains in the centre of the site. Much of the transitional vegetation had considerable ground cover provided by Purple Moor Grass (*Molinia caerulea*) and other bog species including Ling (*Calluna vulgaris*) and Cross Leaved Heather (*Erica tetralix*) although these were more common on isolated bog mounds that were occasionally mapped throughout the cutover plain.

The upper boundary of the largely transitional MSM was typically dominated by brackish vegetation, more often than not, large stands of Common Reeds. There was some minor occurrence of mixed vegetation mosaic between MSM and Common Reeds. The transition to brackish marsh was not always distinct and there is some evidence to suggest that the Reeds may be gradually expanding into some of the upper regions of the MSM.

A small area of disturbed MSM habitat has had rubble and unusable rock fragments from a nearby quarry dumped onto it. The vegetation that is developing through the rubble is largely disturbed with many ruderal species, although still showing signs of its saltmarsh background.

## 4 IMPACTS AND ACTIVITIES

Much of the land occupied by the saltmarsh is now derelict and is used for rough grazing as it not ideal for agricultural improvement. Agriculturally improved pastures are found elsewhere, in particular to the east of the site, and the sand dunes to the west. It is in these areas that the greatest concentration of livestock, both cattle and sheep are kept. The scraw turf has been removed along this coastal fringe and peat cutting does not appear to be carried out any more in the low lying ground at Maghera. The availability of accessible peat from the blanket bog atop the mountains surrounding Maghera or other fuels from local merchants hastened the decline of peat cutting in this difficult terrain. Many of the locals who are not involved in farming travel to Ardara and further afield to work. While this rural site is very scenic many of the recreational visitors that visit, are usually only driving through and stop at the waterfall, or visit the beach further west. A number of impacts and activities have been recorded from this site and are listed in Table 4.1. Few of the activities are considered to pose any significant impact, likely to damage the saltmarsh.

A large part of the land on which the saltmarsh occurs is in poor condition. The land is treacherous and retains relics of its former management regimes including drainage and reclamation. Historically, earthen embankments and some low stone walls were constructed

in an effort to prevent excessive flooding along this coastal fringe. The land was drained which enabled peat extraction for domestic use. The remainder of the land was given over to agricultural management most likely grazing. These are now poorly maintained on the whole and only remain as a reminder of previous management efforts, with some of the reclaimed land having been washed away. They are not however assessed as they do not reflect activities which have occurred during thee current monitoring period.

Grazing (140), mostly by cattle is the only activity that is actively carried out on the saltmarsh, and the numbers of cattle are limited, given the quality and condition of the land. The Sea Rush is largely avoided and only the other less tough vegetation is grazed. Thus large areas of the MSM can appear untouched and are rarely showing any signs of damage to any great extent. The ASM, however, is rarely pristine and most has suffered some minor damage from grazing and poaching (143). Patches of bare ground are commonly encountered in the accessible ASM. Trails (501) were another feature that were commonly observed throughout the MSM and rarely in the ASM, much of which is of low swards and poached. A small amount of ASM was infilled (803) due to the construction of a new house along the shoreline.

There has been some recent small-scale dredging (810) of the river so that the river that leads from the waterfall and crosses under the road does not flood, isolating this rural community.

Erosion (900) is a natural feature of saltmarsh systems and there is some evidence of its impact on both the ASM and MSM habitats. The MSM is largely perched above the sandflats. This can range anywhere from 30cm to 1.5metres. In places, the perched face is undercut by the sea creating indented hollows in the peaty substrate. These are often worn smooth by the repeated influence of the tides. Slumping was occasionally seen along the front of the MSM, although this was not significant.

Erosion was more noticeable in parts of the ASM. Although the ASM was generally found in a perched position along the Owenee river channel and inland, it is generally found in a less elevated position that the MSM. There is little height differential between it and the sand flats, which results in greater possibility of erosion. There were indications of this in the form of indented frontline along the ASM as well as remnant tufts of vegetation. These were commonly observed towards the eastern end of the site and in small coves fronting the perched MSM vegetation. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is more than compensated by accretion.

At the same time as natural erosion is occurring in both the ASM and MSM communities, there was some evidence of accretion (910), particularly on the sandflats fronting the main sand dune system and along the river channel. A large area of pioneer/low marsh vegetation was recorded on the subtly elevated sandflats. There is no concrete evidence as to the permanency of this vegetation, given its location, or whether it develops anew each year after

winter storms. A comparison of the 2<sup>nd</sup> edition OSI 6 inch map to the current 2005 series aerial photos indicates that the saltmarsh has expanded in some small areas. This also relates the situation on the ground with the appearance of recently developed low and pioneer marsh habitat. However, there are no indications of any measurable expansion of saltmarsh during the current monitoring period.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	В	0	0.85	Inside
H1330	143	В	-1	5.0	Inside
H1330	423	С	-1	0.023	Inside
H1330	803	А	-2	0.073	Inside
H1330	900	С	0	0.3	Inside
H1330	910	А	+1	0.03	Inside
H1410	140	С	0	8.98	Inside
H1410	423	С	-1	0.01	Inside
H1410	501	С	0	0.02	Inside
H1410	900	С	0	0.4	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> 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.

Outside of the saltmarsh, the site is rural, mostly given over to subsistence farming. There are two small open-face quarries along the road (331), where stone is extracted for the building trade. There is some dumping of unusable material (423), presumably from this quarry, onto a corner of the MSM which has resulted in some minor loss of saltmarsh habitat. Elsewhere towards the eastern end of the site, old car parts and rubble have been recently dumped along the sand flats at the front of the marsh, in an effort to curtail flooding which is a feature of this end of the site each winter and which can extend up beyond the road and has on occasions flooded several domestic dwellings.

This rural area has two small areas of settlement, which were found at the eastern and western ends of the saltmarsh. The houses are generally clustered together although some were individually sited along the road. There impact is generally negligible, as most have been in existence for some time. One newly built house, however, required that the level of the land be brought up. A considerable amount of infill was brought onto the site, which resulted in an estimated loss of 0.073ha of saltmarsh vegetation, mostly ASM.

# 5 CONSERVATION STATUS

## 5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the 1995, 2000 and 2005 OSI aerial photo series. The baseline information from the NHA survey is generally limited to some descriptions of saltmarsh habitat and does not record the specific condition of the saltmarsh during the survey at this site. There is little other detailed information for this site. More recently, the dune system at Maghera was surveyed in 2006 (Ryle *et al.* 2009), but as this survey makes only brief reference including some limited mapping boundaries of saltmarsh vegetation that occurred adjacent to dune habitats.

The overall conservation status of the saltmarsh at Maghera is *unfavourable-inadequate*, which is a reflection of the least favourable assessment of the Annex I habitats (Table 5.1). Most of the site is relatively intact and in good condition and given the difficult nature of the terrain and saturated soil conditions is no longer heavily utilised.

In historical terms, the site has been heavily modified and still retains many relics of its former management. These include the drainage and reclamation of the extensive low-lying blanket bog. Much of the attempts at reclaiming the land have not been maintained and turf is no longer cut. More recently the site is primarily used as rough grazing, although there have been some limited engineering operations such as the implementation of limited local flood defences in the east of the site or drainage works to prevent a back up of water along the streams which might flood over the road and block the main access road into this isolated area.

This site is located within the Slieve Tooey/Tormore Island/Loughros Beg Bay cSAC. A old format management plan is available for this cSAC but is now out of date.

Habitat	EU Conse			
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (H1330)		Extent Structure and functions Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (H1330)	Extent Structure and functions Future prospects			Favourable

Table 5.1.	Conservation	status of A	Annex I	saltmarsh	habitats	at N	laghera.
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#### 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

The extent of the ASM is assessed as *unfavourable-inadequate* (Table 5.1). The habitat is patchily distributed throughout the site. However it is rarely extensive and the largest areas of ASM vegetation are found along marginal ground on either side of the river as well as an extensive area of developing vegetation on the sandflats. The remainder of the ASM comprises smaller patches, most of which are located towards the seaward boundary of the extensive MSM plain.

Apart from livestock-inflicted damage, which can undermine the integrity of the vegetation, there are signs of erosion along some of the ASM frontline, The low-lying vegetation was convoluted, which is typical of erosion as is isolated clumps of vegetation. These were noted along some parts of the saltmarsh, particularly towards the eastern end of the site behind the low rubble berm that was created after the severe tidal conditions of 2004 which flooded right up to and into some of the houses in that area. There are also indications of accretion and expansion of saltmarsh in other sections of the site.

There has been no measurable loss or expansion along the front of the saltmarsh when the year 2000 and series 2005 aerial photographs were compared. More recently, there was a quantifiable loss of habitat within the cSAC, which was associated with a newly built house. The development, which is located 400 metres further west along the road from the waterfall resulted in the importation of considerable volumes of infill to raise the level of the ground to create a secure footing for the house. An area of approximately 0.073ha of ASM and possibly

MSM vegetation was lost. This represents a loss of > 1% of the ASM area and the extent is therefore assessed as *unfavourable-inadequate*.

#### 5.2.2 Habitat structure and functions

The structure and functions of the habitat have been assessed as *unfavourable-inadequate*. Five of the six monitoring stops that were carried out at Maghera satisfied all of the target criteria. One stop failed, due in part to the excessive nature of the grazing regime and the level of bare ground that was present around this area. Surprisingly, while poaching was evident throughout the remainder of the ASM, it was not noted around the failed monitoring stop.

Most of the ASM habitat is in good condition and there is a typical range of ASM communities present at this site including some pioneer vegetation on an accretional ramp. Several sections have a typical saltmarsh topography including small pans and drainage creeks. There are also natural transitions to fixed dune along the upper boundary at Maghera Sand Hills and transitions to other MSM habitat around the site. The sward height generally varies around the site as the grazing intensity also varies.

#### 5.2.3 Future prospects

The future prospects for this habitat at Maghera are rated as *unfavourable-inadequate*. The determination assumes that there will be no major change in the extent or land management regime at this site in the near future. While the ASM is widespread in its distribution, it is rarely extensive. The largest area of ASM is the developing vegetation on the sandflats, which is prone to the vagaries of the shifting sands. Elsewhere, the established ASM vegetation is not extensive and is often found in mosaic with the MSM. Unlike large areas of MSM, the ASM is heavily utilised and it is evident that the pressure of grazing animals has had an impact on the vegetation and is showing signs of some damage including poaching.

## 5.3 Mediterranean salt meadows (H1410)

#### 5.3.1 Extent

The extent of the habitat is rated as *favourable*. It is clear that the site is predominantly characterised by MSM. It is found along creeks or drainage channels where its presence was recorded a considerable distance inland extending over large parts of the cutover peat plain. Throughout the site, there were signs of erosion, as might be expected in coastal situations. The perched terraces along the front of the MSM plain show some signs of undercutting and slumping, although this latter feature was localised in its occurrence. These are natural features that might be expected of erosion along the frontline. There was some anecdotal information of a severe tidal inundation of the site in the winter of 2004, but the only evidence of its impact on the saltmarsh was the creation of a rubble band along the MSM frontline

towards the eastern end of the site where the sea approaches quite close to residential houses.

In contrast to the extensive and well established MSM vegetation, pioneer MSM vegetation was not widespread and occurred only locally in a small number of areas of the intertidal sandflats, where the influence of the tidal inundation is less severe. Overall, it was not possible to distinguish any significant difference in the extent of the MSM during the current monitoring period, when the frontline was compared on the year 2000 and series 2005 aerial photographs.

#### 5.3.2 Habitat structure and functions

The assessment is *favourable* for the structure and functions of this habitat. All seven monitoring stops passed on all aspects that were measured. There are few activities currently affecting the MSM at Maghera. The species assemblage is typical of this habitat and there are notable transitions to modified blanket bog vegetation that increase the diversity of the site. The structure of the saltmarsh has been significantly modified in the past by peat cutting and associated drainage and attempted reclamation. These impacts have had a significant residual impact on this site but are not assessed. The most notable impact that concerns this habitat is grazing, which results in some damage including poaching and the creation of a network of trails throughout the MSM. And although there was limited zonation associated with the MSM, its large extent and the range of transitional communities, and mosaics with ASM and other brackish marsh communities only adds to its overall structural diversity.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management regime and the levels of impacts do not change in the near future. Much of the MSM is relatively derelict and underused, and except for some rough grazing, is not greatly impacted by any activities.

## 6 MANAGEMENT RECOMMENDATIONS

No specific change in the management regime of the saltmarsh habitats is warranted at present. However, any future developments of one-off housing along the road should be examined and the development footprint clearly established so that further loss of Annex I habitat does not re-occur.

# 7 REFERENCES

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

NPWS (?). *Draft Conservation Plan for Slieve Tooey/Tormore Island/Loughros Beg Bay cSAC* Government of Ireland, Unpublished.

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

# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	5.754		5.754			
4	1410 Mediterranean salt meadow	8.879			8.879		
5	ASM/MSM mosaic (50/50)	0.17		0.085	0.085		
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic	0.011		0.0055			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	6.015					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic	0.037			0.0185		
14	Spartina sward dominated, with some ASM						
15	1310/Spartina mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.209					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	22.075		5.845	8.983		

Table 8.1. Areas of SMP habitats mapped using GIS.



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Saltmarsh Monitoring Project 2007-2008

Maghera

Slieve Tooey/Tormore Island/Loughros Beg Bay SAC (000190)

SAC Boundary 1330 Atlantic salt meadows 1410 Mediterranean salt meadows 1330/1410 mosaic 1330/other SM (CM2) mosaic 1410/other SM (CM2) mosaic Other Saltmarsh (CM2) other 1330 monitoring stops 1410 monitoring stops	Le	egend
<ul> <li>1330 Atlantic salt meadows</li> <li>1410 Mediterranean salt meadows</li> <li>1330/1410 mosaic</li> <li>1330/other SM (CM2) mosaic</li> <li>1410/other SM (CM2) mosaic</li> <li>Other Saltmarsh (CM2)</li> <li>other</li> <li>1330 monitoring stops</li> <li>1410 monitoring stops</li> </ul>		SAC Boundary
<ul> <li>1410 Mediterranean salt meadows</li> <li>1330/1410 mosaic</li> <li>1330/other SM (CM2) mosaic</li> <li>1410/other SM (CM2) mosaic</li> <li>Other Saltmarsh (CM2)</li> <li>other</li> <li>1330 monitoring stops</li> <li>1410 monitoring stops</li> </ul>		1330 Atlantic salt meadows
<ul> <li>1330/1410 mosaic</li> <li>1330/other SM (CM2) mosaic</li> <li>1410/other SM (CM2) mosaic</li> <li>Other Saltmarsh (CM2)</li> <li>other</li> <li>1330 monitoring stops</li> <li>1410 monitoring stops</li> </ul>		1410 Mediterranean salt meadows
<ul> <li>1330/other SM (CM2) mosaic</li> <li>1410/other SM (CM2) mosaic</li> <li>Other Saltmarsh (CM2)</li> <li>other</li> <li>1330 monitoring stops</li> <li>1410 monitoring stops</li> </ul>		1330/1410 mosaic
<ul> <li>1410/other SM (CM2) mosaic</li> <li>Other Saltmarsh (CM2)</li> <li>other</li> <li>1330 monitoring stops</li> <li>1410 monitoring stops</li> </ul>		1330/other SM (CM2) mosaic
Cher Satmarsh (CM2) other 1330 monitoring stops 1410 monitoring stops	12525	1410/other SM (CM2) mosaic
<ul> <li>other</li> <li>1330 monitoring stops</li> <li>1410 monitoring stops</li> </ul>		Other Saltmarsh (CM2)
<ul> <li>130 monitoring stops</li> <li>1410 monitoring stops</li> </ul>		other
A 1410 monitoring stops	-	1330 monitoring stops
		1410 monitoring stops
	65	
MARIA INTON		

SMP0125 This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)

SMP code:

0

Original Drawing Size: 297 x 420 (A3) Date of production: 20/02/2009 Scale 1:4000 Map version: 1

180

240

300

Meters

120

60

0

Ν

# Mullanasole

# 1 SITE DETAILS

SMP site name: Mull	anasole	SMP site code: 0122	SMP site code: 0122				
Dates of site visit: 12 September 2008		CMP site code: 0142	CMP site code: 0142				
SM inventory site nar	ne: Mullanasole	SM inventory site cod	e: <b>32</b>				
NPWS Site Name: Donegal Bay (Murvagh)							
NPWS designation	cSAC: 133	MPSU Plan: N/A					
	pNHA: <b>133</b>	SPA: <b>4151</b>					
County: Donegal		Discovery Map: 11	Grid Ref: 190230, 373890				
Aerial photos (2000 s <b>0611-A,B</b>	eries): O 0588-A,B,C,D;	O 6 inch Map No: Dg 09	6 inch Map No: <b>Dg 099</b>				
Annex I habitats currently listed as qualifying interests for Donegal Bay (Murvagh) cSAC: No SM habitats listed							
Other SMP sites with	Other SMP sites within this SAC/NHA: Laghy, Rossmore						
Saltmarsh type: Sanc	I flats	Substrate type: Sand					

# 2 SITE DESCRIPTION

Mullanasole saltmarsh is located on a sandy spit or headland that extends into Donegal Bay. Projecting northwards into Donegal Bay, the sandy headland at Murvagh provides some protection from the onslaught of the Atlantic Ocean. An extensive sandy intertidal zone has developed in the landward side of the headland and it is here that the saltmarsh is found. Starting in the north, it extends from Bell's Isle at the northern tip of the Murvagh Headland and extends for much of the way southwards along its eastern flank towards Murvagh Bridge, where the Ballintra River and its tributaries enter into the Bay.

Mullanasole headland has been significantly modified by the development of a golf course in the sand dune system and also by extensive forestry. There have also been historical attempts at reclamation to the saltmarsh and intertidal areas at the site. Much of the headland is covered by Conifer plantation and the upper section of the headland has long been modified as a golf course. A sandy beach runs along the western flank of the site and is popular with locals and holiday makers alike. This site was recently surveyed as part of the Coastal Monitoring Project (Ryle *et al.* 2009).

It is one of three saltmarsh sites, the others being Laghy and Rossmore that are listed on the national inventory (Curtis and Sheehy-Skeffington 1998). All three sites largely occur within the boundary of the larger Donegal Bay (Murvagh) candidate Special Area of Conservation (cSAC 133). The Annex I saltmarsh habitats are not listed as qualifying interests for the cSAC, although they are listed a occurring on the NATURA 2000 notes for the site. It has been specifically designated due to the presence of Mudflats and sandflats not covered by

seawater at low tides (60%), Fixed coastal dunes with herbaceous vegetation (1%) and Humid dune slacks (1%). It is also designated due to the presence of the common or harbour seal (*Phoca vitulina*). There are no specific plant species of note listed from the saltmarsh.

The majority of the site is located within the cSAC boundary, although a number of small patches occur outside the boundary. These are mostly located towards the perimeter of the plantation forestry or the edge of the golf course. Elsewhere, small patches of saltmarsh extend into the golf course, which in keeping with NPWS policy are excluded from the cSAC.

The saltmarsh was accessed through Coillte's plantation and also along a drain running adjacent to the golf course. The golf course management were made aware of the survey in advance of walking along their boundary with the saltmarsh.

# **3 SALTMARSH HABITATS**

## 3.1 General description

The site is very much associated with the sand dune system at Murvagh and this is reflected in the transitions between the upper saltmarsh and sand dune habitats. The saltmarsh has largely developed on sandflats adjacent to the sand dune system on the inner or sheltered side of the Murvagh peninsula. Three Annex I habitats were recognised namely, *Salicornia* and other annuals colonizing mud and sand flats (*Salicornia* flats), Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM).

Mullanasole saltmarsh is dominated by ASM vegetation and measures 17.35ha in area. ASM accounts for approximately 60% of the total saltmarsh vegetation, with the remainder largely comprising MSM and some *Salicornia* vegetation (Table 3.1). Some of the ASM habitat occurred in mosaic with rocky shore mosaic and the breakdown of the various habitats shown on the vegetation map accompanying this report are listed in Appendix 1. Other habitats that were encountered along the upper saltmarsh boundary included Scrub and Woodland communities along with transitional grassland communities such as Twitch (*Elytrigia repens*)-dominated grassland, *Molinia*-rich wet grassland and coastal grasslands. The Twitch dominated grassland have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is significant development of wet grassland communities between the conifer plantation and the saltmarsh in the southern section of the site. And unlike many other saltmarsh systems in Donegal, brackish marsh was not a significant feature of this site.

The saltmarsh topography is moderately well developed. Extensive sandflats or in some situations mudflats are common along the lower reaches of the saltmarsh. These areas are diurnally flooded which results in an ever-changing landscape along much of the frontline.

This is mostly the case towards the northern half of the site which is more dynamic, being in a more exposed position. The southern half of the saltmarsh is more stable, indeed pioneer and lower marsh vegetation is rarely recorded there.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.06
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	17.35
H1410	Mediterranean salt meadows (Juncetalia maritimi)	11.52
	Total	28.93

Table 3.1. Area of saltmarsh habitats mapped at Mullanasole.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

Relatively extensive level areas of mid marsh vegetation were noted at Mullanasole, mostly ASM, but also some pure MSM or ASM/MSM mosaic. Where the mid marsh is not fronted by *Salicornia* flats or lower marsh vegetation the gentle incline from the intertidal sands is replaced by a distinct terraced frontline. The height of the terracing, which is quite common along considerable parts of the site ranges from a few centimetres to almost 1.5 metres in places towards the southern half of the site.

The upper marsh areas are the most heterogeneous in terms of appearance. The land is more stable or consolidated, although not always even. The distance from tidal inundation and the proximity of freely draining sand based substrates results in a mosaic of habitats with transitions between sand dune, saltmarsh and transitional habitats. The ASM often grades into MSM, although this is not always the case such as around the lower half of the golf course, where the *Molinia*-dominated grassland backs onto the ASM.

There are still relics of the previous management regimes of the area. Some of the land now occupied by the upper marsh may have had more agricultural management regimes in the past such as potato growing or grazing. Historically, there have been attempts in the past to control or reclaim some land from the sea, as part of the larger ground works associated with the estate that once occupied the lands thereabouts. Old berms are located along the seaward side of one part of the saltmarsh adjacent to the golf course. Attempts were made to reclaim the intertidal area between Bell Isle and a southern peninsula extending from the main headland. This area is partially enclosed by a seawall and is quite sheltered. The established saltmarsh has regularly spaced drains through the habitat that probably are related to former cultivation. Some forestry has been planted in the transitional zone near the upper saltmarsh boundary and has failed, leaving some dead and stunted trees affected by occasional tidal inundation.

There is some development of creeks and pans throughout the site. The pans are generally confined to flat open ground that supports ASM vegetation. The creeks are well developed in places and can extend some distance inland. More recently there has been some

modification of the creeks, presumably as part of the development of the golf course. In places, they have the appearance of being mechanically cleared. It is not known when they were last excavated.

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

Several small patches of *Salicornia*-dominated vegetation were recorded at Mullanasole. In total, 0.06ha was mapped, all of it located within the cSAC boundary. The majority of the *Salicornia* flats were located on sand around the edges towards the northern end of the site. The vegetation is typically species poor and a high percentage of bare ground is a feature of the habitat. Dominated by Glasswort (*Salicornia* spp.), other species that were recorded include Common Saltmarsh Grass (*Puccinellia maritima*), Annual Sea-Blite (*Suaeda maritima*) and Common Sea Spurrey (*Spergularia media*). Much of the *Salicornia* vegetation occurred as discrete patches adjacent to the more established saltmarsh. Some of this vegetation is quite dynamic which is unsurprising given the sediment fluxes which occur in this area.

## 3.3 Atlantic salt meadows (H1330)

Several large patches of ASM are mapped and at 17.35ha, the ASM accounts for the greatest proportion of the saltmarsh habitats that were recorded at Mullanasole (Table 3.1). These ASM patches are widely distributed throughout the site and extend from the northern tip to the mouth of the Ballintra River in the south. The only break in the ASM extends from the south-eastern boundary of the golf course along the plantation forestry, where it is entirely replaced by MSM vegetation.

The largest extent of ASM vegetation is confined to the northern section of the site, from Bell's Isle towards the first wooded headland that extends out into the sheltered intertidal zone. It ranges in width from 45 to 300metres in width. Elsewhere, it rarely exceeds 60 metres and sometimes exists only as a narrow fringe.

Throughout the ASM, the most frequently occurring species, although not always found in each zone included: Thrift (*Armeria maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*) Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*) Sea Arrow-Grass (*Triglochin maritima*) Sea Plantain (*Plantago maritima*), although Buckhorns Plantain (*Plantago coronopus*) was also infrequently recorded.

Other companion species included Glasswort (*Salicornia* spp.), which was associated with dry pans, whilst Common Saltmarsh Grass (*Puccinellia maritima*) which was generally confined to lower marsh and along the edges of some creeks. The upper marsh was often marked by the

increased number and frequency of grasses and other herbs. In addition to being a character species of the MSM habitat, Saltmarsh Rush (*Juncus gerardii*) was also associated with the upper ASM, often forming clumps. Other common species recorded here included: Autumn hawksbill (*Leontodon autumnalis*) and White Clover (*Trifolium repens*) while occasional or infrequent species included Distant Sedge (*Carex distans*), Extended Sedge (*Carex extensa*) and Greater Sea Spurrey (*Spergularia media*).

The best example of creek and pan development is located toward the northern half of the site, where the mid marsh is most extensive. There are a considerable number of pans which drain out through a network of small creeks. Some of the larger creeks have been modified to facilitate the removal of excess water from the golf course. The structure of the central section has been significantly modified by regularly spaced drains. These drains are infilling and creating pan-like features in the saltmarsh.

#### 3.4 Mediterranean salt meadows (H1410)

A considerable amount of MSM vegetation was recorded at Mullanasole. It accounted for 11.52ha (Table 3.1) or 39% of the total saltmarsh area mapped. There were several large patches of MSM-dominated vegetation and it is widely distributed throughout the site. It was generally located towards the landward side of the ASM communities, although on occasions, it was recorded along the saltmarsh frontline, where it occasionally extended onto the sandflats.

The MSM vegetation is characterised by the presence of swards of Sea Rush (*Juncus maritimus*) along with constant species such as Saltmarsh Rush, Red Fescue, Creeping Bent, Sea Milkwort, Autumn Hawksbill and Sea Plantain. Less frequently recorded species included: Common Scurvy Grass (*Cochlearia officinalis*), Sea Aster, Thrift and Prostrate Orache (*Atriplex prostrata*).

Some zonation was discernible within the community reflecting the topographical and substrate conditions. Pure stands of Sea Rush occurring on the sandflats typified the lower zone, whilst the transition to ASM or ASM/MSM areas was recognised where discrete clumps of Sea Rush were surrounded by a low saltmarsh sward. The ground here was typically level and in places there was some creek and pan development, along with the presence of a number of man-made drains which lead from the golf course. By far the greatest area of MSM is characterised by the upper zone, which has a significant cover of Sea Rush. It occurs on level ground but was also on uneven terrain, particularly around the wooded headland to the east of Murvagh Lower and along the front of the coniferous plantation.

In places there was a transition from MSM to acid grassland dominated by Purple Moor Grass (*Molinia caerulea*) but also containing additional species such as Carnation Sedge (*Carex flacca*) and Ribwort Plantain (*Plantago lanceolata*). This was commonly encountered around

the forestry. Elsewhere, there was a gradation from MSM to wet grassland or in places directly onto managed golf course.

# **4 IMPACTS AND ACTIVITIES**

The list of impacts and activities is shown in Table 4.1. There are few current activities which are considered to be excessively damaging or causing lasting damage to the saltmarsh. Most are localised. The saltmarsh has been significantly modified in the past by reclamation works, which have had a significant impact on the current structure of the habitats in several parts of the saltmarsh. Land use in the area is confined to plantation forestry, recreational including the golf course, and some walkers. Elsewhere in the intertidal zone, aquaculture is an important industry in this part of Donegal. A small fleet of fishing vessels use the bay, whilst managed oyster beds have been set up in a number of locations throughout the inner bay.

The golf course was developed in 1973, which has resulted in the loss of a large area of sand dune habitats and also possibly some saltmarsh vegetation. However, it is well established now and there is a permanent out of bounds fence delineating the edge of the golf course, so it is unlikely that this feature has much of an influence on the extent or condition of the saltmarsh. The saltmarsh habitat extends into one portion of the golf course property, part of the driving range and this section is mown (120).

A large part of the southern section of the Murvagh headland was planted with coniferous woodland by Coillte in the 1980's (160). Some of the woodland was planted close to the upper saltmarsh boundary and the trees have failed or become stunted in these sections due to occasional tidal inundations. Some of the planted area is reverting back to MSM saltmarsh and these sections are subdivided by forestry drains. This affects about 0.5ha. There are some indications (P. Neville pers comm.) that some of the woodland may be removed. It is unlikely to have any significant impact on the saltmarsh communities.

There is little active agricultural management in the majority of the saltmarsh. The only evidence of grazing (140) was in some enclosed fields at the southern most tip of the site where the Ballintra River drains into the Bay. Indeed, the MSM is quite rank in most places and would benefit from grazing. Under-grazing (149) may be affecting the diversity and sward structure of the MSM and transitional habitats, but only to a small extent. The only animals for which there were signs of activity included rabbits and other small mammals.

Amenity use (622) of the site is low. Most people not visiting the golf course, head for the blue flag beach on the seaward side of the Headland. However, some walkers do venture onto the intertidal zone, but their impact on the saltmarsh is limited and trails (501), other than those created by small mammals were not common. There were some signs of littering and burning from beach parties, (790) but overall this is not a significant problem, unlike that recorded on the western side of Murvagh Headland (Ryle *et al.* 2009). There are no residential or holiday

houses on the Headland and the only dispersed habitation (403) is located towards Murvagh Bridge, outside of the cSAC boundary.

As with any saltmarsh, erosion (900) is a natural part of the coastal dynamic particularly on intertidal sand flats which can remain unstable for some considerable time. There is likely to be considerable sediment flux throughout the expansive intertidal zone. Indeed it was possible to see changes in the sand dune/saltmarsh transition at the northern tip of the headland when the current extent of saltmarsh habitats was compared to that mapped in the summer of 2006 (Ryle *et al* 2009). Some accretion (910) was noted along the seaward edge of the saltmarsh in the central section. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	910	С	+1	0.03	Inside
H1330	120	С	-1	0.01	Inside
H1330	140	С	0	0.9	Inside
H1330	501	С	0	0.5	Inside
H1330	622	С	0	0.05	Inside
H1330	790	С	0	0.001	Inside
H1330	900	С	0	0.05	Inside
H1330	910	С	+1	0.005	Inside
H1410	149	С	-1	6.0	Inside
H1410	160	С	-1	0.5	Inside
H1410	900	С	0	0.01	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> 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.

Elsewhere, it was apparent that pioneer communities are ephemeral as sediment is reworked by tidal inundations. There are some accretion ramps along the front of the saltmarsh that have allowed the development of *Salicornia* flats (910). There were signs of erosion including undercutting of terraces, low ridges and an indented frontline. However this was effectively counteracted, as mud and sand have accumulated in places and saltmarsh vegetation has become established e.g. at the northern tip of the site at Bell's Isle. In terms of overall loss or gain of saltmarsh habitat during the course of this monitoring period, there has been no appreciable change. Examination of the old OSI 6 inch maps reveals that there has been no significant change during this period. In the recent past, it is difficult to discern any difference between the year 2000 ortho-photographs and the year 2005 series orthophotographs.

## **5 CONSERVATION STATUS**

#### 5.1 Overall Conservation Status

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

In determining extent, the historical 6inch maps from the OSI and more recent aerial photographs are an important source of data when estimating extent and growth/erosion trends at the site. More recently, the Coastal Monitoring Project surveyed the site in 2006 (Ryle *et al.* 2009), but as this survey was primarily concerned with sand dune habitats, makes only brief reference including some limited mapping boundaries of saltmarsh vegetation that occurred adjacent to dune habitats.

The overall conservation status of this site is *favourable* (Table 5.1) as the site is in relatively good condition and supports a range of habitats showing a certain degree of zonation. There is little active management and almost no agricultural input. A small amount of ASM habitat is mowed as part of the golf course management. A small area along the MSM boundary has also been modified by forestry management (failed planting and drainage). However, both of these areas are quite minor (<1%). There are few other current impacts and activities directly affecting the site. Indeed most of the damaging activities (in terms of nature conservation) that influenced this site have been carried out outside of the current monitoring period. One notable feature of this site is the natural transition from wet grassland communities to saltmarsh vegetation that is found along the southern section of the site.

This site is located within the Donegal Bay (Murvagh) cSAC. A management plan is not available for this cSAC.

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

|--|

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

#### 5.2.1 Extent

The extent of the habitat is assessed as *favourable*. The limited extent of *Salicornia* flats should not be taken as a negative as there is little previous quantitative data as to the presence of this habitat. However, while some of the vegetation was located in dynamic situation where there are precarious sedimentary conditions, elsewhere small pockets of the habitat were noted in sheltered areas which would suggest that the habitat has developed and persisted at the site for some time. Certainly its presence increases the conservation value of this site.

## 5.2.2 Habitat structure and functions

A single monitoring stop was carried out in this habitat. It satisfied all of the structure and functions criteria and thus is assessed as *favourable*. The habitat is naturally dynamic and may experience great changes within a single season, a fact which may account for the presence of both live and dead Glasswort specimens together.

## 5.2.3 Future prospects

The future prospects are rated as *favourable*. Although the presence of *Salicornia*-dominated vegetation is often ephemeral especially where shifting sands exist it is likely that the annual vegetation will persist at this site.

# 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The extent of the ASM is assessed as *favourable*. However, it was not possible to see any significant loss of habitat when the aerial photographs from the year 2000 and 2005 series were examined. Other than erosion, there were few damaging activities were recorded at this site. Erosion is part of the natural dynamic of a saltmarsh and while there was localised evidence of erosion including undercutting of the terraced frontline, this would appear to be negated by accretion elsewhere.

#### 5.3.2 Habitat structure and functions

The structure and functions of this site are rated as *favourable*. The monitoring stops, 10 in total, were carried out across the ASM habitat, all of which satisfied the target criteria. There was a good range of species and the zonation across the saltmarsh is indicative of a healthy system with few current activities having any impact on the structural integrity and functioning of the habitat. The structure of one ASM section has been significantly modified by former drainage. A small amount of ASM habitat located at the upper ASM boundary and within the golf course property is mowed as part of the driving range. This activity is not having a significant impact on the diversity of the vegetation but does affect the sward height. However, the remainder of the sward height within the ASM is variable.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as favourable. There are few damaging activities which are likely to greatly impact on the structural integrity, diversity and persistence of the ASM at Mullanasole. The assessment assumes that the current management regime does not alter greatly.

## 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

Although not as large as the ASM in terms of area, nonetheless there is a considerable amount of MSM recorded at Mullanasole. It is widespread in its distribution around this site. While there is no empirical data as to its previous extent, its large scale occurrence at the back of the ASM vegetation coupled with an absence of damaging operations suggests that the extent is assessed as *favourable* (Table 5.1).

#### 5.4.2 Habitat structure and functions

The structure and functions of the MSM at Mullanasole are assessed as *favourable*. All nine monitoring stops satisfied the target criteria indicating that the habitat throughout the site is functioning as might be expected and in relatively good condition with few damaging impacts. A small amount of MSM is re-developing in an area close to the upper saltmarsh boundary that was planted and drained as part of the conifer forestry management, but this is only a small area compared to the overall habitat area.

The species assemblage was typical of this habitat. There is some notable transitional habitats along the upper saltmarsh boundary where species such as Purple Moor-grass mark the transition to wet grassland. This transitional zone is quite wide in places (10-30 metres) due to the gentle gradients that exist between the terrestrial to saltmarsh habitats. Some of the MSM was considered to be quite rank due to the absence of grazing and this may be affecting the diversity and sward structure of the habitat. However, this is only a minor impact and is not considered to be a negative factor.

#### 5.4.3 Future prospects

The future prospects are rated as *favourable*. It is unlikely that there will be any significant change to the area or management regime in this area in the future.

## 6 MANAGEMENT RECOMMENDATIONS

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

## 7 REFERENCES

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

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# 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats	0.062	0.062				
2	Spartina swards						
3	1330 Atlantic salt meadow	17.338		17.338			
4	1410 Mediterranean salt meadow	11.518			11.518		
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	23.532					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.099					
19	1330/rocky shore mosaic	0.021		0.0105			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	52.57	0.062	17.349	11.518		

Table 8.1. Areas of SMP habitats mapped using GIS.



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Saltmarsh Monitoring Project 2007-2008 Mullanasole (Map 1 of 2)

Donegal Bay (Murvagh) SAC (000133)

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# Rathmelton

# **1 SITE DETAILS**

SMP site name: Rath	melton	SMP site code: SMP0028				
Site name (Curtis list): Rathmelton		CMP site code: not surveyed				
		Site No: (Curtis list): 5				
NPWS Site Name: L	ough Swilly	Dates of site visit: 10/08/2006				
NPWS designation	cSAC: 2287	MPSU Plan: old format available				
	pNHA: 2287					
	SPA: Lough Swilly S	SPA 2287				
County: Donegal		Discovery Map: 6	Grid Ref: 224630, 422190			
6 inch Map No: Dg046 Aerial photos (2000 series): 00186-d, 00187-a, 00187-b 00187-c, 00187-d						
Annex I habitats currently designated for Lough Swilly cSAC: Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)						
Other SMP sites within this cSAC/pNHA: Ray, Lower Lough Swilly, Green Hill, Fahan						
Saltmarsh type: Estu	ary	Substrate type: Mud				

# **2** SITE DESCRIPTION

Rathmelton saltmarsh is located along the western side of Lough Swilly in County Donegal, 2 km east of Rathmelton Village. The saltmarsh is located along the southern side of the Rathmelton Channel, which is an estuary of the Leannan River and is an inlet off Lough Swilly. This is an area with low hills dominated by improved grassland. The coastline has an irregular topography along this area and there are several small bays such as Begirris Bay present. There is a small island called Aughnish Island towards the east side of the survey area. A causeway flooded at high tide links the island to the mainland and is only 150 m between the island and the mainland. The survey area extends from Aughnish Island 1.7 km westwards towards The Brows, a small peninsula. There are several other small islands (Craigs Islands) adjacent to the mainland at the western side of the survey area. Saltmarsh extends along this shoreline and varies in extent. There are some narrow stretches of saltmarsh towards the eastern side, while there are some larger sections of saltmarsh in some of the small sheltered bays and inlets. Three Annex I habitats, *Salicornia* flats (1330), Atlantic salt meadows (ASM) (1330) and Mediterranean salt meadows (MSM) (1410) are present at this site. *Spartina* swards and clumps are also present on the saltmarsh and the adjacent intertidal mudflats. Only one Annex I habitat, Atlantic salt meadows, is listed as a qualifying interest for the Lough Swilly cSAC. The entire saltmarsh habitat is situated within the cSAC boundary. The cSAC boundary around this site is generally a boundary between the coastline area and the adjacent farmland.

Some of the saltmarsh is also included within the Lower Swilly SPA. The SPA has a different boundary with the edge of the shoreline (seaward edge of the saltmarsh) used as the boundary. The intertdal mudflats in the Rathmelton channel adjacent to this saltmarsh are noted as an important feeding and roosting area of wintering waders.

The site can be assessed via a minor road from Rathmelton to Aughnish Island. The shoreline can be accessed from the causeway.

#### **3 HABITATS**

#### 3.1 General description

The main saltmarsh habitat is Atlantic salt meadows (ASM) (Table 4.1). This habitat is situated along the whole length of the survey area and is best developed in Begirris Bay. There are small patches of Mediterranean salt meadows (MSM) along the survey site. *Salicornia* flats are only located at the western side of the survey area on mud and sandflats between Craig's Islands.

Saltmarsh is also distributed around Craig's Islands. These are a group of small vegetated outcrops (< 50 in diameter) situated about 120 m from the shoreline. The largest island has scrub developed on the terrestrial part. Saltmarsh is present as a narrow band around the edge of the islands. These islands could not be surveyed directly as the mudflats between the islands and the saltmarsh were inaccessible. The saltmarsh around these islands was surveyed from distance on the saltmarsh adjacent to the islands and from the aerial photos.

*Spartina* swards and clumps are frequent on the survey area, mainly on the mudflats along the seaward edge of the saltmarsh. *Spartina* swards are most extensive to the west of the causeway. This area was not surveyed in detail with notes taken from the causeway. Clumps of Common Cordgrass (*Spartina anglica*) are present in the ASM. Common Cordgrass also forms a sward within the ASM located at Begirris Bay.

It should be noted that a narrow band of mainly ASM saltmarsh continues west towards Rathmelton Village and is likely to be present along the northern shoreline of the Rathmelton Channel (Table 4.1). A band of ASM/*Spartina* sward is also present along the shoreline east of the causeway, at the landward edge of the *Spartina* sward. This saltmarsh was not surveyed due to the constraints of the fieldwork. The aerial photo indicated that the survey area contained the most extensive saltmarsh.

The ASM saltmarsh generally transitions to very soft mudflats at the seaward edge of the saltmarsh. Some of the mudflats are rocky in places and the substrate is mixed. There are small patches of brown algae (Fucoids) on these rocks and stones. The edge of the saltmarsh is marked by a saltmarsh cliff of variable height. The eastern side of the site has a saltmarsh cliff 0.2 m high. Further west of Begirris Point there is a tall saltmarsh cliff (1-2 m). These saltmarsh cliffs are eroding with mud balls at their base on the intertidal flats.

The landward boundaries of the saltmarsh vary and are generally marked by a low artificial embankment or ditch marking the edge of the farmland that are built along the high water mark. These ditches have hedges or tree lines in places. There are only small parts of the saltmarsh where there is a natural transition up slope to brackish habitats. These are situated in the sheltered low-lying areas such as Begirris Bay. These brackish habitats include patches of Common Reed (*Phragmites australis*) or patches of wet grassland. The saltmarsh is generally situated adjacent to improved grassland, although some fields contain rough grazing and could be classed as wet grassland. These fields are located on variable sloped hillsides along the coastline. Adjacent land to the western side of the survey area south of Craig's Islands is flatter and lower-lying.

The management of the saltmarsh area varies as the survey site is spread over a relatively long distance (1.5 km) and therefore covers several different farms or

management units. Some of the saltmarsh is grazed heavily while other sections are not grazed at all.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	1.24
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	10.03
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.53
	Spartina swards and clumps	4.79
	Total (excluding Spartina swards)	11.80*

**Table 3.1.** Area of EU Annex I habitats listed at Rathmelton.

\*note that saltmarsh habitat continues outside the surveyed site.

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

This habitat is located at the western side of the survey site. The main patch is situated on mudflats between the saltmarsh and Craig's Islands. There is a smaller patch further out between two of the small islands. The habitat could only be viewed from distance because of the softness of the mudflats made this area inaccessible. The habitat is distributed on mudflats and is related to elevation. The areas that are colonised are slightly raised compared to the surrounding intertidal area.

There are dense single species swards of Glasswort (*Salicornia* sp.) on soft mudflats. There are no clumps of Common Cordgrass within this habitat, although the southern edge is situated along a band of *Spartina* sward and clumps. This habitat does not form a pioneer saltmarsh zone as it is separated from the main saltmarsh. There is a narrow band of bare mud between these two habitats. The western side of this habitat is mixed substrate with rocks and muddy substrates. The eastern side is situated adjacent to soft mudflats. ASM saltmarsh and *Spartina* swards and clumps are also situated around the largest of the Craig's Islands.

# 3.3 Atlantic salt meadows (H1330)

This habitat is distributed along the entire length of the survey area. The width of the ASM varies between a narrow band 5-10 m wide to extensive flat areas up to 200 m wide such as in Begirris Bay.
#### 3.3.1 Narrow band saltmarsh

A narrow band of saltmarsh towards the east of the survey area is dominated by Saltmarsh Rush (Juncus gerardii). There is some zonation evident in the vegetation as the lower seaward side contains frequent Sea Aster (Aster tripolium) and Common Saltmarsh-grass (*Puccinellia maritima*). Other species present include Glasswort, Sea Milkwort (Glaux maritima), Common Scurvygrass (Cochlearia officinalis) and Sea Arrowgrass (Triglochin maritimum). Towards the landward side the vegetation becomes dominated by Red Fescue (Festuca rubra) and there is a narrow band of Creeping Bentgrass (Agrostis stolonifera) along the strandline. Autumn Hawkbit (Leontodon autumnalis) is also present. Spear-leaved Orache (Atriplex prostrata) and Twitch (*Elytrigia repens*) appear along the strandline. As the saltmarsh widens the zonation in the vegetation becomes more prominent. Further west towards Begirris Bay there are occasional clumps of Sea Rush (Juncus maritimus). The saltmarsh contains occasional small clumps of Common Cordgrass (< 0.5 m diameter). There is a low saltmarsh cliff (0.2-0.3 m high) along the seaward edge of this ASM. There are occasional variable sized clumps of Common Cordgrass on intertidal mud in a narrow zone 10-20 m wide along this saltmarsh. The mudflats along this saltmarsh are quite rocky.

#### 3.3.2 Begirris Bay

The largest section of ASM is located within Begirris Bay. The bay is enclosed by low hills on three sides and there is a stream/drain flowing into the bay. A significant part of this saltmarsh may have accreted in the past 80 years, as much of the bay contained open mudflats on the 1920s 6 inch map (or else it is a mistake on the 6 inch OS map). This area has a well-developed creek network that drains the bay. The creeks are quite deep and are lined with tall saltmarsh cliffs. There are several canalised creeks through this area. There are also frequent salt pans on the saltmarsh surface. There is a large pan or patch of mudflats enclosed by saltmarsh on the western side.

The vegetation in Begirris Bay is quite diverse and there are several different saltmarsh communities present, dependant on elevation. This area is not grazed. The bay is dominated by mid marsh and low-mid vegetation (in the recently developed areas). The lower mid zone is dominated by Common Saltmarsh-grass, Sea Aster and

Sea Plantain with occasional Sea Pink. The mid marsh zone is dominated by Sea Plantain. There is a lower marsh zone dominated by Common Saltmarsh-grass along the edges of the creeks. The older landward parts of the bay are dominated by grassy patches of Red Fescue, Creeping Bentgrass, White Clover and Saltmarsh Rush. Common Cordgrass is quite sparse in the eastern part of this bay. It is more frequent on the western side of the bay and is infilling some of the salt pans. There are several large patches dominated by Common Cordgrass within the bay. Only the largest patches were mapped as *Spartina* sward.

There are small patches of brackish and terrestrial habitats around the landward edges at the back of Begirris Bay. These include a large patch of Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*). Another section contains wet grassland dominated by Soft Rush (*Juncus effusus*) and also contains Devils-bit (*Succisa pratensis*) and Creeping Bentgrass. An old Flax Mill was located at the back of this bay.

#### 3.3.3 Begirris Point and area affected by reclamation

Part of the saltmarsh west of Begirris Point has been affected by reclamation. There is an old ditch/embankment along the seaward edge, although it has been eroded in places and the tide can still flood the enclosed section. Hawthorn (*Crataegus monogyna*) is present on the ditch. The enclosed area has been drained in the past. This area still contains ASM along with some *Spartina* sward that colonised some of the large unvegetated areas within this section. The saltmarsh transitions to grassland along a gradual slope at the landward side, adjacent to a tall hedge.

This area is grazed by sheep with the grazing intensity being low-moderate. Some small patches along drainage channels are badly poached. The vegetation outside the embankment is dominated by a mid-upper saltmarsh zone. The vegetation is dominated by Red Fescue. Other species present include Creeping Bentgrass, White Clover (*Trifolium repens*), Sea Milkwort, Saltmarsh Rush and Autumn Hawkbit. The vegetation inside the embankment has been disturbed and there are several different zones present. There are several large patches of Common Cordgrass that have been mapped as *Spartina* sward. Some of the drains or bare mud strips have infilled and now contain strips of Common Saltmarsh-grass interspersed with strips dominated by Saltmarsh Rush. There are several large patches of mud within the area. Upper

saltmarsh vegetation is present towards the landward side up a gradual slope. The area within the embankment is at a lower level than the seaward edge.

#### 3.3.4 Western section of the survey site

This section of the saltmarsh south of Craig's Islands seems to have grown significantly since the 6 OS inch map was drawn. A drain/stream flows into the saltmarsh and forms a channel that divides this section. The western side is grazed moderately while the eastern side is not grazed and these two sections are divided by a fence.

The eastern side contains an old low rocky embankment, midway up the saltmarsh. Upper saltmarsh vegetation is present above this embankment. This vegetation is dominated by Creeping Bentgrass, White Clover and Red Fescue. Other species present include Long-Bracted Sedge (*Carex extensa*) and Distant Sedge (*C. distans*). The saltmarsh below this embankment seems to have grown recently and contains mid marsh and lower marsh vegetation. There is a zone dominated by Common Saltmarsh-grass along the edge of the creek/channel and this transitions into vegetation dominated by Sea Plantain and Sea Pink adjacent to the low rock embankment.

The western section south of Craig's Islands is grazed by cattle and there are small areas that have been badly poached. Grazing intensity varies in the different saltmarsh zones. This area transitions to Gorse (*Ulex europaeus*) scrub along a boundary above the high water mark. This area contains several patches of MSM and some patches of *Spartina* swards. Clumps of Common Cordgrass are scattered through the lower part of the ASM. There are several zones present in the ASM. A low embankment is present towards the landward side and this separates the upper marsh vegetation dominated by Creeping Bentgrass and Red Fescue from the rest of the saltmarsh. Other species present include Sea Milkwort, Autumn Hawkbit and White Clover. The grazing intensity is high in this zone. The mid-upper marsh zone is poached to a moderate-heavy level. The lower-mid zone is poached and grazed lightly. This zone is dominated by a Sea Pink and Sea Plantain sward. Creeks and salt pans are well developed in this section. A saltmarsh cliff with signs of erosion is present along the seaward edge. The lower zone contains Annual Sea-blite (*Suaeda maritima*).

#### 3.4 Mediterranean salt meadows (H1410)

A small patch of this habitat is located in the north-west section of Begirris Bay. This area is quite elevated and is situated towards the landward side of the saltmarsh. The vegetation is dominated by Sea Rush with frequent Red Fescue and Creeping Bentgrass. Other species present include Autumn Hawkbit, Sea Milkwort, White Clover, Common Scurvygrass, Sea Aster and Sea Arrowgrass. There are small salt pans present within this patch of habitat. There is a deep drain along the landward side of this area and a smaller drain connects this drain to a creek that empties this area.

A patch of this habitat located west of Begirris Point and this area has been fenced off and is grazed heavily. It is also badly poached. Bentgrass sp. are abundant including Creeping Bentgrass. There are small patches with terrestrial species such as Birdsfoot (*Lotus corniculatus*), Soft Rush (*Juncus effusus*), small Gorse bushes and the moss *Rhytidiadelphus squarrosus* within this section, as it is quite elevated and is probably situated close to the high water mark and not flooded often. There are several patches of this habitat close together that have developed at different elevations due to the topography of this area and the presence of a creek that drains this area. One side of the creek is higher than the other.

#### 3.5 Spartina swards

The largest area of *Spartina* sward is located to the east of the causeway between Aughnish Island and the mainland. There is a very high Common Cordgrass stem density with occasional bare mud patches within the sward. The Common Cordgrass is mainly present on the intertidal mudflats. This area contains creeks amongst the *Spartina* sward. The densest part of the sward is adjacent to the causeway and the island. Further east the sward breaks up and large clumps of Common Cordgrass form a mosaic with intertidal mudflats along the seaward side of sward. There are occasional Glasswort plants amongst the Common Cordgrass and in some of the bare mud patches.

The sward has mainly developed on the east side of the causeway and there are only scattered clumps on the west side of the causeway on the mudflats. The clumps are spread in a zone 20 m from the shoreline but there are occasional clumps up to 50 m from the shoreline. The clumps range in size and there are frequent small clumps

indicating that Common Cordgrass was reproducing recently. There is a break in the distribution of the Common Cordgrass and there is no Common Cordgrass along the seaward side of the Begirris Point. Further west of Begirris Point, large clumps of Common Cordgrass appear again. These clumps cover about 10-20% of the mapped area (mapped as scattered clumps on mud).

The abundance of Common Cordgrass increases towards the western side on the survey area. A small sward and associated scattered clumps has developed on mudflats between the saltmarsh and Craig's Island. The sward has developed on intertidal mud and there is no transition between the ASM and *Spartina* sward, and the *Spartina* sward and the *Salicornia* flats, located to the seaward side of the *Spartina* sward. There is a saltmarsh cliff along the edge of the ASM, with mudflats along the seaward edge.

*Spartina* sward is also present in Begirris Bay and is enclosed by ASM. This area is dominated by large coalesced clumps of Common Cordgrass. It also contains patches of ASM saltmarsh (20% of the mapped *Spartina* sward) similar to the adjacent ASM. Some of the clumps are monocultures of Common Cordgrass and have probably developed in salt pans. There is also mixed vegetation that is typical of a 1330/*Spartina* mosaic and this has probably developed when Common Cordgrass has spread into the adjacent ASM.

# 4 IMPACTS AND ACTIVITIES

The main activity on this site is grazing (140) (Table 4.1). However, the intensity of grazing is variable and significant parts of the site are not grazed. There are several enclosures that are badly poached by cattle, although cattle were not present during the survey (143). Other sections are grazed by sheep and the grazing intensity is low-moderate. These areas are not badly poached but may have some local heavy poaching. Grazing along a fence line shows the impact grazing and poaching can have on the saltmarsh sward structure and the surface of the saltmarsh.

Common Cordgrass is present at this site (954). This is an invasive species. The earliest recorded date of its presence in Lough Swilly was in 1950, where it was recorded at Big Isle (Boyle 1972). Some of the ASM has frequent large clumps of

Common Cordgrass present, although it generally does not make up more than 10% of the overall vegetation. There are several large patches within the ASM that have been classified as *Spartina* swards but it should be noted that much of the ASM has Common Cordgrass in it. There is no information on the previous extent of this species at this site. The 1995 aerial photos do show that it was present at this stage. The large area of *Spartina* sward east of the causeway has grown by about 10-20% between 1995-2000. Common Cordgrass also seems to have spread along the saltmarsh to the south of Craig's Islands since 1995, although not to the same extent. This area has frequent small clumps of Common Cordgrass, indicating that its extent on the mudflats is likely to increase in the near future

A comparison of the 6 inch OS map to the 2000 aerial photos indicates that the saltmarsh has grown in extent during this period (2.7 ha) (910). This seems to have occurred at two locations. The 6 inch OS maps indicate that Begirris Bay was not infilled with saltmarsh and the marked shoreline was much further back. There is also some difference between the  $1^{st}$  edition and  $2^{nd}$  edition 6 inch maps with the  $2^{nd}$  edition map showing the bay partly infilled with marshy ground. Saltmarsh now extends nearly to the mouth of the bay and there is a tall saltmarsh cliff at the seaward edge. The presence of a saltmarsh cliff at this location may indicate that the bay has not accreted and this in fact is an error on the 6 inch maps. It would be expected that this seaward boundary would be an accretional ramp or a lower saltmarsh cliff if this area was accreting. It is difficult to assess whether this saltmarsh is the result of fairly recent accretion.

There has also been accretion and growth of saltmarsh south of Craigs Islands (1.5 ha). An examination of the aerial photo shows that there have been several stages of accretion and saltmarsh growth. This saltmarsh growth is mainly westwards in a sheltered indentation along the coastline.

While there are indications from comparisons of the aerial photos and the 6 inch maps that there has been accretion and growth of parts of saltmarsh in the past 80 years, the saltmarsh cliff along the seaward edge currently shows some signs of erosion (900).

There have been attempts at reclamation of some of the saltmarsh along parts of the survey area. The largest area is west of Begirris Point. There is an old

ditch/embankment along the seaward edge enclosing a large area (802). The embankment is now breached and the enclosed area is still flooded by the tide. A deep drain is present along the inside or the landward side of this embankment. This drain has been deepened or cleaned in the past few years (810). The enclosed area has possibly been drained in the past. Regular bare strips of mud are visible in parts of the enclosed area and are clearly seen from the aerial photos. Most of these strips have revegetated. Turf may also have been taken from these strips. There are signs of reclamation at other locations with old rocky embankments present on the saltmarsh.

There has been some recent infilling of construction spoil on the coast line near the causeway (800). The saltmarsh has been infilled with spoil and this is within the cSAC boundary. There are some tracks across the saltmarsh that are used to access the shoreline (501).

The main activities adjacent to the site are related to farming (100, 120, 140). There are several dwellings scattered along the shoreline close to the saltmarsh (401).

EU Habitat	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected	Location of
Code <sup>1</sup>				(ha)	activity
13s	140	С	-1	1.94	Inside
13s	143	А	-1	2.73	Inside
1330	501	С	-1	< 0.1	Inside
1330	800	С	-2	0.02	Inside
1330	810	С	-1	1.75	Inside
1330	900	С	-1	10.03	Inside
1330	954	С	-1	0.4	Inside
13s	100	С	0	1	Outside
13s	120	С	0	11.8	Outside
13s	140	С	0	11.8	Outside

**Table 4.1.** Intensity of various activities on saltmarsh habitats at Rathmelton.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> 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 overall conservation status of Rathmelton saltmarsh is assessed as *unfavourable-bad* (Table 5.1). This is because MSM was assessed as *unfavourable-bad*. However, most of the habitat is in relatively good condition. Grazing is the main activity on this saltmarsh but its intensity varies. A significant section with Begirris Bay is not grazed at all. There are small local patches of heavy grazing and poaching that are having a significant negative impact on species diversity, sward height and the surface of the saltmarsh.

The short-medium term prospects of saltmarsh migration in response to sea level rise are poor as most of the saltmarsh has a low embankment or ditch marking the beginning terrestrial habitats that extend up gentle-steep slopes of the surrounding hills. Any sea level rise may increase erosion of the seaward edge of the saltmarsh and possibly induce further spread of Common Cordgrass in parts of the ASM.

Habitat	EU Conse	ervation Status A	ssessment	
	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

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at Rathmelton.

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

#### 5.2.1 Extent

The extent of this habitat is assessed as *favourable* in the absence of any other information on the previous extent of this habitat. This habitat was not listed as a qualifying interest for the cSAC and there was no record of this habitat in the MPSU Conservation plan.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat is assessed as *favourable*. No monitoring stops were carried out in this habitat as the mudflats were inaccessible. However, no negative indicators were noted in the habitat such as erosion or clumps of Common Cordgrass. The distribution of the habitat is likely to be related to elevation and there are patches of *Spartina* sward situated at both sides of this habitat, probably on ground that is slightly elevated compared to the *Salicornia* flats.

#### 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 no notable impacts or activities on this habitat. Common Cordgrass is located adjacent to the habitat and this habitat may be vulnerable to invasion by this species.

#### 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There is evidence that the saltmarsh has increased in extent between 1920 and 2006 from comparison of the 6 inch map and the 2000 aerial photos. This accretion and growth of saltmarsh is not considered in this assessment, as it was likely to have occurred prior to the period of assessment. Accretion and growth of saltmarsh is not occurring at present. There are signs of erosion along the saltmarsh cliffs at the seaward edge of the ASM. However, there is no indication from a comparison of the 1995 and 2000 aerial photos that erosion has reduced the extent of ASM since 1995.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Ten monitoring stops were carried out in this habitat and eight passed. The remaining two stops failed due to heavy poaching and significant amounts of exposed bare substrate. Generally all the other attributes reached their targets. The species diversity is typical of this habitat. All the typical ASM saltmarsh communities are present. There are good examples of zonation from the seaward cliff back to the landward boundary. There are small patches of natural transition from the ASM to brackish and terrestrial habitats with other sections being backed by a low embankment or boundary marking the beginning of the terrestrial habitats. The sward height is quite diverse with most of the ASM being grazed lightly or not at all. The lower-mid saltmarsh zones have a naturally low sward height.

The largest sections of the ASM contain a well-developed saltmarsh topography. There are frequent salt pans and a complex creek network in these larger sections. The central part of the survey area east of Begirris Point has been disturbed by old and more recent attempts at reclamation and land improvement. A larger area of saltmarsh was enclosed by an embankment that is now breached but a drain along the inside of the embankment has recently been deepened or cleaned. The enclosed area has also been drained or disturbed in the past with strips of bare mud present. The conservation status of this area is considered to be *unfavourable-bad* at present but is recovering from the old and more recent activities. This area is also grazed by sheep but the grazing intensity is low-moderate.

Common Cordgrass is present in this habitat. It is mainly confirmed to patches within salt pans, where the Common Cordgrass colonised bare mud. There are some larger patches that are classed as *Spartina* swards. There are small patches of mixed vegetation with Common Cordgrass spread through the ASM vegetation.

## 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. Heavy levels of grazing are affecting some of the saltmarsh with poaching disturbing the vegetation and the saltmarsh surface.

However the grazing intensity is not uniform and most of the ASM is not grazed or is only grazed lightly.

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of this habitat is assessed as *favourable* in the absence of any information on the previous extent of this habitat. There are several small patches of this habitat scattered along the survey area. This habitat is not listed as a qualifying interest for this cSAC. Swards of Sea Rush are noted in the MPSU Conservation plan around the shoreline of Lough Swilly and particularly in the brackish areas embanked by the old railway line located along the eastern side of Lough Swilly. However, there is no record of this habitat at this site.

## 5.4.2 Habitat structure and functions

The structure and functions of this habitat were assessed as *unfavourable-bad*. Only two monitoring stops were carried out in this habitat, with one stop passing. These stops reflect the general condition of the overall habitat, which has a variable conservation status. The eastern and western sections are in good condition with the western patches being grazed lightly. A significant area in the central section of the survey area is in poor condition due to poaching and high levels of grazing by cattle. The species diversity is typical of this habitat and the species found are generally all upper saltmarsh zone species such as Autumn Hawkbit and White Clover. Most of this habitat is situated at a high elevation and some patches also contain terrestrial species like Gorse indicating that some parts within the MSM are not inundated. The MSM does not have a typical saltmarsh topography, as the patches of habitat are quite small. There are no creeks and few salt pans within the habitat.

## 5.4.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. Cattle grazing is negatively affecting a significant portion of this habitat.

# **6 MANAGEMENT RECOMMENDATIONS**

The grazing intensity on some parts of the site needs to be reduced to improve the conservation status of the site. However, this is not required for the whole of the site.

# 7 REFERENCES

Boyle, P.J. (1972). Two forms of *Spartina* in Donegal. Irish Naturalists Journal, 37, 239-240.





Saltmarsh

**Monitoring Project** 

# Rathmelton

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

Ní sna leorainneacha a' an Barscáil seo ach noi gar shuíomhach ginearáilia. Féadrár a hbhreilimí he adéanamh ar heorainne acha na gceanlar comharthailte. Machasanhail d'ábhar na Suirbhéarachla Ontonáis le chead ón Riallas , (Ceadunas Ulmh, 5953)

Lough Swilly cSAC (0002287)

Aughnish Island				
	Lege 1 1 1 1 1 1 1 1 1 1 1 1 1	nd 410 Mediterrar 330 Monitoring AC boundary tats 310 Salicornia spartina swards 330 Atlantic sa 410 Mediterrar 330/1410 most spartina clump/ solated Spartin ther SMP Code: SMP0028	flats It meadows it meadows it meadows it meadows it meadows aic mudflat mosaic a clumps Map produced by: Map Version: 1	SMP 2006
0	200	400	600	Meters N

Scale: 1:6301

Ray

# **1 SITE DETAILS**

SMP site name: Ray		SMP site code: SMP0027			
Site name (Curtis list	): Ray	CMP site code: not surveyed			
		Site No: (Curtis list): 6			
NPWS Site Name: Lough Swilly		Dates of site visit: 12/08/20	006		
NPWS designation cSAC: 2287 MPSU Plan: old format plan available		an available			
	pNHA: 2287				
SPA: Lough Swilly SPA 2287					
County: Donegal		Discovery Map: 2	Grid Ref: 225769, 425308		
6 inch Map No: Dg03	37	Aerial photos (2000 series): 00166-b, 00166-c, 00166-d			
Annex I habitats currently designated for Lough Swilly cSAC: Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)					
Other SMP sites within this SAC/NHA: Green Hill, Ramelton, Lower Lough Swilly, Fahan					
Saltmarsh type: Estu	ary	Substrate type: Mud/sand/	gravel		

# **2** SITE DESCRIPTION

Ray saltmarsh is located along the western side of Lough Swilly in Co. Donegal, 4.5 south-west of Rathmullan. This site is located at the mouth of the Glenalla River where it meets the coastline at Ray. This area near to the shoreline is mainly low-lying and is dominated by improved grassland. The main Rathmullan-Ramelton road is situated along the shoreline at this location and is embanked on the seaward side. This road forms a boundary with extensive intertidal mud and sandflats. A road bridge crosses the Glenalla River. North of the road-bridge the coastline veers to the east. There are small patches of saltmarsh along the shoreline upstream of the road bridge.

One Annex I habitat, Atlantic salt meadows (ASM), is found at this site. This habitat is listed as a qualifying interest for the Lough Swilly cSAC. All of the saltmarsh habitat is situated within the cSAC. The Lough Swilly SPA overlaps most of the cSAC apart from the section upstream of the road bridge.

The site is easily accessed via the R247 Rathmullan-Ramelton road.

# **3 HABITATS**

# 3.1 General description

The only saltmarsh habitat found at Ray is Atlantic salt meadow (ASM) (Table 3.1). This habitat is very poorly developed and is confined to a narrow band of saltmarsh about 5 m wide situated on both sides of the road bridge.

The saltmarsh to the west of the road bridge is dominated by Saltmarsh Rush (*Juncus gerardii*) and Common Saltmarsh-grass (*Puccinellia maritima*). Other species present include Sea Arrowgrass (*Triglochin maritimum*), Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Common Scurvygrass (*Cochlearia officinalis*), Sea Plantain (*Plantago maritima*) and Sea Pink (*Armeria maritima*). Some zonation is present. A band of Creeping Bentgrass (*Agrostis stolonifera*) is situated along the landward boundary. There is tidal litter covering part of the saltmarsh. There is no typical saltmarsh topography with salt pans and creeks, as the saltmarsh is so small.

The saltmarsh transitions into rank grassland dominated by Twitch (*Elytrigia repens*) on a steep embankment. Part of the shoreline further west upstream has been developed with a relatively new sea wall/embankment built along the shoreline and a single dwelling and gardens adjacent to this sea wall/embankment. A narrow band of saltmarsh is situated adjacent to a small tidal pool/ channel west of the road bridge.

The saltmarsh at the eastern (seaward side) of the road bridge is situated to the north of the river channel. This saltmarsh is quite eroded and patchy and forms a mosaic with a rocky shoreline. The patches of vegetation are similar to the western section. The intertidal mud and sandflats generally extend to the roadside embankment. There is a small piece of saltmarsh jutting out on the seaward side of the road to the south of the road-bridge.

The 1920s 6 inch map indicates saltings at two locations near Ray. (Saltings usually indicate saltmarsh vegetation.) Saltings are indicated upstream of the road bridge on the north side of the river, opposite the old post office. The edge of the river at this location has been developed. Further upstream there is a large patch of Common Reed (*Phragmites australis*) in a man-made pool along the river channel. This pond used to be an old corn mill pond and there is a causeway crossing the river bed

allowing the pond to develop that prevents the tide flowing upstream to this location. The second location is along the Rathmullan-Ramelton road.

**Table 3.1.** Area of EU Annex I habitats listed at Ray.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.06
	Total	0.06

#### 4 IMPACTS AND ACTIVITIES

There are few impacts and activities on the saltmarsh at this site (Table 4.1). The saltmarsh is not grazed. The saltmarsh seaward of the bridge seems to be naturally eroding (900).

Impacts adjacent to the saltmarsh habitats include roads (501) and scattered dwellings (403). The dwelling, embankment/seawall and garden development along the river bank upstream of the road bridge is outside of the cSAC. The causeway and pool seem to be old features related to the old corn mill was formerly located at this site.

EU Habitat Code <sup>1</sup>	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected (ha)	Location of activity <sup>5</sup>
1330	900	В	-2	0.02	Inside
1330	403	С	0	0.06	Outside
1330	501	С	0	0.06	Outside

**Table 4.1.** Intensity of various activities on saltmarsh habitats at Ray.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> 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 overall conservation status is assessed as *unfavourable bad* (Table 5.1). This site was listed by Curtis and Sheehy-Skeffington (1998) and is the smallest site visited during this survey. There is no information on the previous extent of saltmarsh at this site. Examination of the 6 inch maps indicates that saltmarsh around this site was not

significantly more extensive in the past. However, saltmarsh was noted at this site on the maps. The fact that it was listed by Curtis and Sheehy-Skeffington (1998) seems to indicate that the saltmarsh used to be greater in extent compared to today. There may have been more saltmarsh seaward of the road bridge where it is now eroding.

The structure and functions of this habitat are poor as the extent is so small. No monitoring stops were carried out due to the small size of the site. The species diversity is typical of ASM and there is some vegetation zonation related to elevation but there are no creeks and salt pans. The largest section is 5 m wide.

The future prospects of this site are assessed as *unfavourable-bad* as it is assumed that erosion of the saltmarsh seaward of the road bridge will continue.

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

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

# **6 MANAGEMENT RECOMMENDATIONS**

There are no management recommendations for a site that is this small.

# 7 REFERENCES

Curtis, T.G.F.C. and Sheehy-Skeffington, M.J. (1998). The Salt Marshes of Ireland: An Inventory and Account of their Geographical Variation. Biology and Environment: Proceedings of the Royal Irish Academy 98B, 87-104.





# Saltmarsh Monitoring Project



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Ní sna leorainneacha a' an léarscáil seo ach noi garshuíomhadh ginearáila. Féairtar a hbhreil ini ine a déanamh ar leorainneacha na gceantar comharthaílte . Machasannaíl d'ábhar na Suitbhéarachta Ortionáis le chead ón Rialtas . (Ceadunas Vimh. 5953) Lough Swilly cSAC

# Legend

SAC boundary



🥅 1330 Atlantic salt meadows

	-					S.C.	
				SMP Code: SMP0027	Map produce Map Version	ed by: SM :: 1	IP 2006
(0000007)	0	200	400	600	800	Meters	N A
(0002287)	Scale:	1:9456					A

# Rosapenna

#### 1 SITE DETAILS

SMP site name: Rosapenna		SMP site code: 0132				
Dates of site visit: 9 September 2008		CMP site code: 166				
SM inventory site name: Rosapenna		SM inventory site cod	e: 11			
NPWS Site Name: Sheephaven						
NPWS designation	cSAC: <b>1190</b>	MPSU Plan: Old Forr	nat – Draft 2: Consultation			
	pNHA: <b>1190</b>	SPA: N/A				
County: Donegal		Discovery Map: 2	Grid Ref: 212720, 436945			
Aerial photos (2000 series): <b>O 0078-B,D; O</b> 0079-A,C		6 inch Map No: <b>Dg 016, 017</b>				
Annex I habitats curre	ently listed as qualifying inte	erests for Sheephaven c	SAC:			
H1330 Atlantic sa	It meadows (Glauco-Puco	cinellietalia maritimae)				
H1410 Mediterranean salt meadows (Juncetalia maritimi)						
Other SMP sites within this SAC/NHA: Creeslough						
Saltmarsh type: Sand	I flats Su	bstrate type: Sand				

#### 2 SITE DESCRIPTION

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

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

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

and gradually disappears. A large part of the land behind the saltmarsh is sandy and is part of the extensive sand dune complex which was surveyed (CMP site report 166) as part of the coastal monitoring project (Ryle *et al.* 2009). A large part of the saltmarsh is in commonage and freely accessible.

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

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

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

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

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

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

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

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

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

Table 3.1. Area of saltmarsh habitats mapped at Rosapenna.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

#### 3.2 Atlantic salt meadows (H1330)

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

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

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

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

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

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

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

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

#### 3.3 Mediterranean salt meadows (H1410)

This habitat is found throughout the marsh. While most of it occurs as small patches of long linear patches, two larger areas on the Rosapenna side of the site account for the majority of

this habitat. The largest portion of MSM vegetation is located in the south-western corner of the site where it occurs at the back of the ASM vegetation. The other significant area of MSM is situated in the north-eastern corner of the site below the causeway onto Island Roy.

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

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

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

#### 4 IMPACTS AND ACTIVITIES

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

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

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

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

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence, -1 = reparable negative influence, 0 = neutral, +1 = natural

positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

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

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

Given that the marsh is located on low-lying sandflats; natural erosion (900) may have some impact on the saltmarsh habitats. This is the case at Rosapenna where low erosion terraces were observed along much of the marsh frontline. Indeed, remnant ASM clumps were

encountered on the sandflats in places. However, there is no measurable loss of saltmarsh habitat when comparing its extent from the OSI 2000 and 2005 series aerial photos. Low accretion ridges (910) were noted in places along the lower saltmarsh boundary. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is being compensated by accretion at the site.

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

#### 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

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

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

Habitat	EU Conse	ervation Status As	sessment	
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
Atlantic salt meadows (H1330)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (H1410)	Extent Structure and functions, Future prospects			Favourable

Table 5.1.	Conservation	status of	Annex I	saltmarsh	habitats a	t Rosapenr	າລ.
	Conscivation	Status of		SaltinaiSh	nabitats a	i nosapon	ia.

#### 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

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

#### 5.2.2 Habitat structure and functions

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

#### 5.2.3 Future prospects

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

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

#### 5.3 Mediterranean salt meadows (H1410)

#### 5.3.1 Extent

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

#### 5.3.2 Habitat structure and functions

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

#### 5.3.3 Future prospects

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

#### 6 MANAGEMENT RECOMMENDATIONS

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

# 7 REFERENCES

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

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

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

#### 8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	9.195		9.195			
4	1410 Mediterranean salt meadow	3.921		3.921			
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	0.478					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/Spartina mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.161					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	13.755		13.116			



# **Roshin Point**

#### 1 SITE DETAILS

SMP site name: Rosh	in Point	SMP site code: 0128			
Dates of site visit: 18	September 2008	CMP site code: 150			
SM inventory site nam	ne: Roshin Point	SM inventory site code: 22			
NPWS Site Name: We	est of Ardara/ Maas Road				
NPWS designation	cSAC: 197	MPSU Plan: Old Format – Draft 2: Consultation			
	pNHA: <b>197</b>	SPA: N/A			
County: Donegal		Discovery Map: 10	Grid Ref: 176090, 398870		
Aerial photos (2000 series): O 0366-B,D; O 0367-A,C		6 inch Map No: <b>Dg 065</b>			
<ul> <li>Annex I habitats currently listed as qualifying interests for West of Ardara/Maas Road cSAC:</li> <li>H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)</li> <li>H1410 Mediterranean salt meadows (Juncetalia maritimi)</li> </ul>					
Other SMP sites within this SAC/NHA: Sheskinmore-Beagh					
Saltmarsh type: Bay Subs		strate type: Sand:peat			

#### 2 SITE DESCRIPTION

Roshin Point is a rocky headland that is connected to the mainland by a sandy isthmus. The site is located along the southern side of Gweebarra Bay, a short distance north of Maas Road Bridge. The saltmarsh is mainly situated along the eastern side of the isthmus. Although located in a rural setting, the small street-village of Clooney lies approximately 2 kilometres to the west of the site and the popular holiday destination of Portnoo is a further 4 kilometres west of that.

The saltmarsh is largely confined to the eastern side of Roshin Point and extends southwards towards the townland of Clashagh. Most of the saltmarsh is located within the Bay, although a small area is located on the southern side of a local road (R261) that crosses along part of the southern shoreline of the bay. The substrate is largely sandy, although the ground gets wetter in the upper limits and the soils are replaced by a mixture of peats or gleys.

A large expanse of intertidal sand flats called Black Strand is located in the sheltered area east of Roshin Point and is situated adjacent to the saltmarsh. Roshin Point also contains one of the smaller dune systems in the area, all of which have previously been described as part of the Coastal Monitoring Project 2004-2006 (Ryle *et al.* 2009). That survey mapped fixed dune and some machair grassland along the sheltered side of the isthmus and the rocky headland of Roshin Point.

Roshin Point forms a small part of a much greater West of Ardara/Maas Road candidate Special Area of Conservation (cSAC). This large composite site supports a number of habitats and species of note. In terms of saltmarsh ecology, both Atlantic salt meadows - 1330 (ASM) and Mediterranean salt meadows 1410 (MSM) occur. Both of these habitats are listed as qualifying interests for this cSAC. Saltmarsh Flat Sedge (*Blysmus rufus*) was recorded as an occasional component of the vegetation, particularly towards its upper limit. This is one species of local distinctiveness that is found on the site. Turf fucoids are a second feature of local distinctiveness that was recorded.

It is one of two saltmarsh systems, the other being Sheskinmore-Beagh which occur within the West of Ardara Road/Maas Road cSAC. Both of these saltmarshes have been surveyed for this project. The majority of the saltmarsh recorded at Roshin Point is located within the cSAC. Small patches have been mapped outside of the designated area, which is merely a reflection that the boundary is based on the OSI 6inch map which has not been updated in many years.

Access to a large part of the site involved crossing agricultural land that is in the ownership of Roshin House. The owners do not reside at the site and locals indicated that it was permissible to cross a field to access the land around the point. Another public right of way onto the foreshore was identified at the eastern extent of the site.

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

Roshin Point is not a large site relative to Sheskinmore-Beagh, which is also found in this cSAC. It is a small bay type saltmarsh that occurs on a headland (Curtis and Sheehy-Skeffington 1998). It is largely confined to the inner fringe of the intertidal area around the townlands of Clashagh and the Back strand. The saltmarsh has developed on mixed sediment - mostly sand, along with some shingle or rock. Large deposits of peat occur in the inner parts of the saltmarsh, at Clashagh.

Two Annex I saltmarsh habitats were recorded at Roshin Point, namely ASM and MSM vegetation. The total area mapped for each of the habitats is shown in Table 3.1. By far the greatest proportion of saltmarsh is occupied by MSM vegetation. At Ballyriston House, the saltmarsh extends along a narrow corridor up a river beyond the upper limit of the cSAC. The remaining small patches of saltmarsh vegetation that were recorded outside the boundary are due in part to the boundary following the old 6inch field boundaries rather than intentionally mapping exclusions. For this survey the entire area of saltmarsh was mapped and assessed.

The most extensive MSM area is located around the sheltered inlet of Clashagh towards the road. There is also some saline influence on a small area south of the main road with MSM present. There was little MSM vegetation recorded in the open, intertidal zone of the Black Strand, towards the northern side of the site, except on the rockier substrates towards the tip of Roshin Point.

Unlike the MSM, the ASM is more fragmented and widespread in its distribution and extended from the northern-most tip of Roshin Point to the most sheltered inlet at Ballyriston Bridge. The vegetation was typically narrow and with little topographical definition other than the subsurface landscape. The largest section has developed adjacent to the narrow sand dune system that links the mainland to the rocky headland. There is also a small amount of ASM habitat located south of the main road and connected to the outer bay by a drain under the road.

It should be noted that not all of the saltmarsh vegetation was pure ASM or MSM and that some of this total comprises mosaics with other communities such as brackish marsh (CM2) with Reeds (*Phragmites australis*) or 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. Much of the MSM close to Ballyriston House has developed adjacent to modified blanket bog vegetation and some scrub along the upper boundary. This section has been cut for peat in the past. This area was difficult to map as the upper boundary was quite undulating with saltmarsh habitat extending into many of the cutover sections of former blanket bog. Table 8.1 lists the full breakdown of the various mosaics and other habitats that were mapped occurring alongside the saltmarsh in this survey.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	2.18
H1410	Mediterranean salt meadows (Juncetalia maritimi)	4.76
	Total	6.94

Table 3.1. Area of saltmarsh habitats mapped at Roshin Point.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

#### 3.2 Atlantic salt meadows (H1330)

2.18ha of ASM were mapped at Roshin Point, which accounts for a little under 30% of the total saltmarsh habitat that was mapped at this site. Unlike the MSM, it is patchily distributed throughout the site. While *Salicornia* flats or pioneer ASM vegetation were not recorded from at the site, a full range of zones from low to upper marsh was recorded. The zonation, however, was rarely found in a complete sequence, rather as individual units with some overlap in places, particularly along the eastern side of the headland at Roshin Point.

The lower marsh vegetation largely consisted of Thrift (*Armeria maritima*), Sea Milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*) and Common Saltmarsh Grass (*Puccinellia maritima*), which sometimes formed dense tangled swards. In general, the habitat was confined to a narrow band, rarely more than a few metres wide.

The mid marsh often supported the same species as the lower marsh, but was recognised due to the presence of additional species such as Sea Aster (*Aster tripolium*), Sea Lavender (*Limonium humile*), Sea Arrow Grass (*Triglochin maritima*), and minor amounts of Greater Sea-Spurrey (*Spergularia media*). Other species such as Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardii*) make an occasional appearance in this mid marsh zone, but are more abundant in the upper marsh.

Most of the ASM vegetation that was recorded at Roshin Point is ascribed to the upper marsh zone. The vegetation is dominated by grasses, namely Red Fescue and Creeping Bent (*Agrostis stolonifera*), the latter of which was common throughout the wetter parts of the site. Some species such as Thrift and Sea Lavender were replaced by White Clover (*Trifolium repens*), Distant Sedge (*Carex distans*), Common Scurvy Grass (*Cochlearia officinalis*) and Autumn Hawksbill (*Leontodon autumnalis*). Of note was the presence of Saltmarsh Flat Sedge in a number of locations around the site.

The occasional freshwater influence was recognised within the ASM by the small patches of Common Reed (*Phragmites australis*) or Sea Club-Rush (*Bolboschoenus maritimus*). Typically, these were confined to sloping ground at the back of the saltmarsh, or flushes, where surface-water flowed across the marsh.

Another notable feature of this site was the presence of turf fucoids. They were occasionally observed in the southern part of the site, which was underlain by considerable peat deposits. The occurrence of the distinctive fucoids however, was not abundant.

#### 3.3 Mediterranean salt meadows (H1410)

The MSM occupies the bulk of the saltmarsh vegetation recorded from Roshin Point. Much of the surrounding land is given over to agricultural use and except for a number of trails, cattle tend to avoid the rush-dominated vegetation where possible, as it is not as palatable as other vegetation. For this reason, the MSM is largely rank in nature and has a dense sward.

The MSM occurs as small and narrow bands along the mixed sediment shoreline around Roshin Point. Occasionally, the MSM was bounded on its seaward side by fringing patches of ASM or had discrete patches of ASM within. But more often than not, it generally occured as an extensive sward, particularly in the sheltered south western part of the site. The vegetation was characterised by the presence of Sea Rush (*Juncus maritimus*) which forms large tussocks. It varies in the cover of other species, but is mainly dominated by graminoid species. Other frequent, although less obvious, contributors to ground cover include Red Fescue, Creeping Bent and Sea Milkwort. In addition, Saltmarsh Rush, Sea Aster, Common Scurvy Grass, Sea Plantain and Autumn Hawksbill were recorded but were not abundant.

There is some zonation along the small number of creeks/drainage channels, in which patches of ASM occur. The upper reaches of the MSM are characterised by wet ground that is typically characterised by acid grassland/blanket bog mosaic. In wetter situations, such as towards Ballyriston House, or the south-eastern corner of the site, stands of Reeds or Sea Club-Rush can be far-reaching and may in places be expanding their territory at the expense of the MSM. Species such as Purple Moor-grass (*Molinia caerulea*) and Black Bog-rush (*Schoenus nigricans*) are found in the transitional zone between the MSM and the modified blanket bog. Some higher haggs out of reach of the tide contain Gorse (*Ulex europaeus*) and Heather (*Calluna vulgaris*).

#### 4 IMPACTS AND ACTIVITIES

The majority of land at Roshin Point is in the private ownership of a single landowner. The remaining fringing marsh around the eastern and south-eastern corner of the site is either in commonage or in state ownership. The area is not readily accessible to members of the public or recreational users, so only a few damaging impacts and activities were noted, a list of which is shown in Table 4.1.

Much of the land is of poor quality, being located on wet and impoverished soils. Historically, peat was harvested from some areas, although the only remnants of this former operation are the relic mounds and old face banks that are patchily distributed in the MSM and in the adjacent cut-over blanket bog. While the historical land use has had a significant residual impact on the structure of the saltmarsh habitat, the impacts are not assessed, as they occurred outside of the current monitoring period.

The main impact affecting the site is grazing (140). Most of the land currently classified as saltmarsh is given over to agricultural management, consisting solely of livestock grazing – mostly cattle but also some sheep. The grazing intensity varies from area to area. Most of the ASM that was recorded from Roshin Point and some of the MSM, particularly that recorded on the southern side of the road is grazed moderately (140). Some sections are fenced off and are not grazed at present. Some sections are heavily poached and overgrazed (143). Elsewhere livestock are occasionally brought across the intertidal sands to the fields on the eastern side of the site. The gates aren't always closed, allowing the livestock to roam freely

during low tide and there was some damage to the fringing ASM, mostly poaching along access points to fields.

Notwithstanding this damage, the absence of grazing (149) elsewhere in large parts of the saltmarsh has resulted in a rank sward that may be somewhat lower in diversity. Much of the land running along the northern side of the road lies derelict and is there is some evidence of the spread of Common Reeds, which will over time result in a gradual diminution of MSM habitat. Reeds may be spreading due to the lack of grazing.

Although the majority of the saltmarsh is found in relative shelter, along the leeward side of Roshin Point, the intertidal zone is prone to considerable tidal fluctuations. Incoming tides, particularly during stormy conditions can result in considerable amounts of water moving along ever changing channels in the sand, which can result in localised erosion (900). Signs of the natural erosion included isolated tufts of saltmarsh vegetation or undercutting of the larger terraces. Notwithstanding this fact, the level of erosion did not appear to be more pronounced than might be expected. In addition there are some signs of accretion (910) which likely negates most of the small-scale erosion. An accretion ramp was noted along the seaward side of the saltmarsh in the central section, along the isthmus. A comparison of the 2<sup>nd</sup> edition 6 inch map with the 2005 series aerial photograph shows that the saltmarsh has grown in size at several locations during this period (about 0.25ha). However, there has been no measurable accretion during the current monitoring period. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is being compensated by accretion elsewhere at the site.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	В	0	1.0	Inside
H1330	143	В	-1	0.3	Inside
H1330	900	С	0	0.2	Inside
H1330	910	С	+1	0.4	Inside
H1330	140	С	0	2.5	Inside
H1410	143	С	-1	0.1	Inside
H1410	149	С	-1	0.2	Inside
H1410	900	С	0	0.5	Inside

Table 4.1. Intensity of various activit	ies on saltmarsh habitats at Roshin Point.
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<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>&</sup>lt;sup>1</sup> EU codes as per Interpretation Manual.

<sup>&</sup>lt;sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>&</sup>lt;sup>b</sup> 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.

Outside of the saltmarsh, there is some dispersed habitation (403) with a number of small farm holdings. Most of these households are not considered to have any great impact on the saltmarsh. There was some small-scale dumping (421) of household rubbish and garden waste along the access point at the south-eastern end of the site. A regional road is located along the southern side of the bay (502). These impacts have no measurable impact on the saltmarsh habitat.

#### **5 CONSERVATION STATUS**

#### 5.1 Overall Conservation Status

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

The overall conservation status of this site is *unfavourable-inadequate*. The assessment is made on the understanding that there is a paucity of suitable baseline information with which to compare the current extent and condition of the saltmarsh vegetation. Apart from indicating the limit of land covered by high spring tides, the OSI 6 inch map from over a century ago does not show the presence of saltmarsh at this site. Rather it shows a shoreline composed of mixed sediment that is very similar with that which was mapped in this survey.

In excess of 60% of the site is dominated by MSM, while the remainder is ASM vegetation or brackish marsh. Most of the site is not impacted to any great degree by serious or damaging activities. Historically the site has been modified through the removal of peat, mostly from the southern end of Roshin Point itself. Currently, most of the land is under agricultural management with grazing cattle allowed to roam freely. The grazing intensity and associated damage is low in some parts, which is reflected in the rank MSM vegetation owing to the unpalatable nature of the Sea Rush. In the ASM however, the grazing intensity and damage from poaching is negatively impacting some of this habitat.

This site is located within the West of Ardara, Maas Road cSAC. An old format management plan is available for this cSAC, but it is now out of date.
Habitat	EU Conse	EU Conservation Status Assessment				
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment		
Atlantic salt meadows (H1330)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate		
Mediterranean salt meadows (H1410)	Extent Structure and functions Future prospects			Favourable		

Table 5.1.         Conservation status of Annex I saltmarsh habitats at Roshin Point
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### 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

Although the ASM is not extensive at this site, and is in places highly disturbed, it is a tentatively given a *favourable* conservation assessment (Table 5.1). There is little comparable data with which to ascertain its previous extent. There is no indication on early OSI maps that saltmarsh occurred at this site along the sheltered side of Roshin Point, although some is likely to have been present. The ASM saltmarsh is likely to have grown somewhat since these maps were drawn. Current trends indicate some ongoing accretion in places, but at low rates. There was no measurable loss or gain of ASM during the current monitoring period.

#### 5.2.2 Habitat structure and functions

The structure and functions of the habitat are assessed as *unfavourable-inadequate* (Table 5.1). One of the seven monitoring stops that were carried out in this habitat failed due in part to the level of grazing. Most of the habitat is in adequate condition and only isolated areas of the habitat is damaged. Several ASM communities were recorded at the site. The ASM forms part of a larger coastal ecosystem and there are natural transitions to other habitats along the isthmus and rocky headland including fixed dune, machair, wet grassland and MSM. Whilst there is greater differentiation in zonation - from lower to upper ASM communities than the MSM, they were rarely extensive and were confined to narrow bands. All of this made them prone to damaging impacts such as erosion, or more particularly grazing. Much of the ASM vegetation around the site was freely accessible to livestock and showed some signs of damage and poaching was common, particularly in the saltmarsh on the south western side of the road.

#### 5.2.3 Future prospects

The future prospects are assessed as *unfavourable-inadequate*. This assessment assumes that there will be no significant change in the management regime at Roshin Point. It is doubtful if there will be any significant overall increase in the amount of ASM at this site from accretion. The damage to the current habitat from overgrazing is likely to continue and grazing and poaching levels are unlikely to change.

## 5.3 Mediterranean salt meadows (H1410)

#### 5.3.1 Extent

The extent of the MSM habitat is assessed as *favourable* (Table 5.1). There are no indications of any significant loss of habitat during the current monitoring period. Whilst there is some signs of erosion, such as minor slumping or undercutting of high terraces, but in general this does not appear to be significant. Accretion has not affected this habitat to the same extent compared to the ASM.

### 5.3.2 Habitat structure and functions

The habitat structure and functions are assessed as *favourable*. Six monitoring stops were carried out, all of which passed. All of the attributes required for the structure and functions of this habitat reached their targets. The structure of one section of this habitat has been significantly modified in the past from peat cutting. Some of the saltmarsh has also been isolated on the south side of the road. There is some structural difference in the quality or composition of the vegetation. Lower or mid marsh zones are virtually absent except in the northern part of the site and most of it the MSM is classified as upper zone. There is also some transitional vegetation present where MSM is intermixed with modified blanket bog vegetation on the deeper peat. There are few activities acting on this habitat apart from grazing. Indeed unlike the ASM, this habitat might benefit from an increase in the numbers of cattle that trample the vegetation thus opening it up and reducing the overly rank and species poor nature of much of the habitat.

#### 5.3.3 Future prospects

Given that there is unlikely to be any great change in the land use or management regime that is carried out at saltmarsh at Roshin Point, the future prospects are rated as *favourable*. The assessment assumes that the current management strategy does not change and that the levels of grazing continue at the current levels.

# **6 MANAGEMENT RECOMMENDATIONS**

There are no specific management recommendations for the saltmarsh habitats at Roshin Point.

# 7 REFERENCES

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

MPSU, Dublin.

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

# 8 APPENDIX I

# Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	2.171		2.171			
4	1410 Mediterranean salt meadow	4.741			4.741		
5	ASM/MSM mosaic (50/50)						
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic	0.002		0.001			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.959					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic	0.046			0.023		
14	Spartina sward dominated, with some ASM						
15	1310/Spartina mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.083					
19	1330/rocky shore mosaic	0.015		0.0075			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	10.02		2.18	4.76		



# Rossmore

## 1 SITE DETAILS

SMP site name: Rossmore		SMP site code: 0124	SMP site code: 0124				
Dates of site visit: 8 August 2008		CMP site code: N/A	CMP site code: N/A				
SM inventory site name: Rossmore		SM inventory site cod	e: <b>30</b>				
NPWS Site Name: Do	onegal Bay (Murvagh)						
NPWS designation	cSAC: 133	MPSU Plan: N/A					
	pNHA: <b>133</b>	SPA: <b>4151</b>					
County: Donegal		Discovery Map: 11	Grid Ref: 192650, 375930				
Aerial photos (2000 series): O 0588-B; O 0589- A; O 0561-D; O 0562-C		9- 6 inch Map No: Dg 09	6 inch Map No: <b>Dg 099</b>				
Annex I habitats currently listed as qualifying interests for Donegal Bay (Murvagh) cSAC: No SM Habitats							
Other SMP sites within this SAC/NHA: Laghy, Mullanasole							
Saltmarsh type: Bay		Substrate type: Mud					

## 2 SITE DESCRIPTION

Situated approximately 2.5 kilometres due south of Donegal Town, Rossmore saltmarsh is located in the townlands of Tullyearl, Tawnalary and Legacurry. The area around the site is rural and the landscape is dominated by rocky headland overlain by glacial tills which are largely given over to agricultural purposes. It is a relatively small saltmarsh system that has developed occurs in two adjacent narrow intertidal inlets which drain out onto Dungally Strand on the eastern side of Murvagh Bay. The main section of the saltmarsh is visible from the old Laghy to Donegal road. A smaller secondary patch of saltmarsh vegetation has developed in the second inlet to the south of the main section. Both sections of saltmarsh are connected by a fringe of saltmarsh vegetation that occurs on the muddy/rocky shoreline around the western-most point of Tullyearl headland.

The existence of much of the saltmarsh habitat is related to reclamation works. The inlet was enclosed fro reclamation in the late 19<sup>th</sup> or early 20<sup>th</sup> century with a seawall further west along the narrow channel connecting the inlet to the outer bay. Several other intertidal inlets in Donegal Bay were enclosed and reclaimed in a similar way. However, the reclamation at Rossmore was unsuccessful and flooding behind the seawall in the enclosed area meant that the seawall had to be breached again and reclamation was not re-attempted. The majority of the current saltmarsh habitat only developed after this action and is not marked on the 2<sup>nd</sup> edition 6 inch map. Former saltmarsh was present at the eastern end of the main inlet has been nearly all infilled and destroyed due to the realignment of the Donegal-Sligo Road prior to the current monitoring period.

Rossmore is very distinctive, especially when viewed from a height, as it reveals a palimpsest of earlier times, when part of the intertidal area was reclaimed for cultivation. The imprint of man-made parallel creeks are still visible, although the marsh has not been used as such in a number of decades.

It is one of three saltmarsh sites that are listed on the national inventory (Curtis and Sheehy-Skeffington (1998) and which occur in Donegal Bay. It is adjacent to Laghy (SMP 0123) which is located 1.5 kilometres further south of Rossmore.

Donegal Bay (Murvagh) has been proposed as a candidate Special Area of Conservation (cSAC) principally due to the extensive nature of the intertidal Annex I habitats that occur in the bay. And while saltmarsh habitats are not listed as qualifying interests for the site, their presence has previously been recorded in both pNHA and NATURA 2000 site notes. The majority of the saltmarsh at this site lies within the boundaries of the cSAC and only a single negligible patch lies outside the boundary.

Some of the saltmarsh was in private ownership and ownership of the land could not be ascertained in all cases. Access to the site was via a number of small right of ways that local landowners suggested.

## **3 SALTMARSH HABITATS**

### 3.1 General description

Two Annex I saltmarsh habitats are recorded at Rossmore namely; Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). The total area mapped for each of the two habitats is shown in Table 3.1. Rossmore is characterised as a bay saltmarsh system (Curtis and Sheehy-Skeffington 1998) and it has developed primarily over mud, although gravel and pebble outcrop in places and the muds are replaced by a muddy/rocky mosaic around the glacial headland towards the western end of the site.

The saltmarsh system is largely contiguous although it comprises two main sections which have developed in two small inlets at the eastern most perimeter of Donegal Bay. The vegetation is largely dominated by ASM vegetation, which is connected by a narrow fringe of MSM vegetation that extends around the rocky headland to the west of Tullyearl townland.

The majority of the saltmarsh lies within the boundaries of the cSAC. Most of the associated marsh along the upper saltmarsh boundary is characterised by brackish or transitional wet grassland, although it is likely that there has been some change in the extent or condition of ASM vegetation in the north-eastern corner of the site where infilling has occurred during a road improvement scheme.

In terms of zonation, Rossmore saltmarsh is not very diverse and there is little development of pioneer or lower marsh communities. While there is some development of saltmarsh

vegetation (mostly MSM) on the mudflats, particularly towards the western half of the site, most of the saltmarsh vegetation and nearly all of the ASM is perched atop a low indented terrace that is fronted by mudflats.

The upper reaches of the saltmarsh are characterised by brackish marsh habitats (CM2), consisting of Reeds (*Phragmites australis*) or Sea Club-rush (*Bolboschoenus maritimus*) along with transitional wet grassland. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. While the Sea Club-rush is sporadically encountered as relatively small patches, a number of separate stands of reeds were recorded which are of considerable size. There are some notable transitions of habitats at the eastern end of the main inlet from saltmarsh to brackish marsh and into diverse wet grassland along a landward gradient. There is also some development of a mosaic of saltmarsh and brackish habitats at this location. A large part of the land adjoining the saltmarsh is given over to agriculture, which is often delineated by hedgerows and the occasional berm/low stone wall. Elsewhere, the transition from saltmarsh to terrestrial vegetation is marked by the presence of scrub or wet woodland that back onto the saltmarsh.

One species of note that was recorded was the Saltmarsh Flat-Sedge (*Blysmus rufus*). It was occasionally found throughout the site, most often associated with Saltmarsh Rush (*Juncus gerardii*) in the upper reaches of the marsh.

EU Code	Habitat	Area (ha)
H1310	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	4.62
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.93
	Total	5.55

Table 3.1. Area of saltmarsh habitats mapped at Rossmore.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

## 3.2 Atlantic salt meadows (H1330)

The ASM accounts for approximately 83% of the total saltmarsh habitat that was recorded at Rossmore. The majority of the ASM habitat is characterised by mid marsh communities, with some transition into upper marsh habitat. There is no pioneer vegetation to speak of and only a fragmentary amount of low marsh. That is not to say that either Annual Glasswort (*Salicornia* spp.) or Common Saltmarsh Grass (*Puccinellia maritima*) were not recorded at Rossmore. Indeed, Common Saltmarsh Grass was regularly recorded in the monitoring stops and was often found along the edges of small man-made creeks.

Mid Marsh vegetation was naturally low and vegetation height rarely exceeded 10cm. The vegetation typically comprised admixtures of the following species: Sea Plantain (*Plantago maritima*), Sea Arrow-Grass (*Triglochin maritima*), Sea Aster (*Aster tripolium*), Sea Milkwort

(*Glaux maritima*), Common Saltmarsh Grass and Sea Lavender (*Limonium* spp). Pans were occasionally recorded throughout the mid-marsh community and in some cases were relics of the earlier drainage operations.

In upper marsh situations, there was a subtle increase in the number of plant species that were recorded. Unlike the mid marsh community however, the upper zone was more heterogeneous in appearance and with gradations into transitional or brackish vegetation towards its landward side depending on the surface- and ground-water drainage conditions. Grasses such as Red Fescue (*Festuca rubra*) were more dominant, while Creeping Bent (*Agrostis stolonifera*) was found in wetter situations and could be quite extensive in its occurrence, sometimes surpassing Red Fescue. Other species included those already recorded in the mid marsh zone along with Saltmarsh Rush (*Juncus gerardii*), Greater Sea-Spurrey (*Spergularia media*). Sea Plantain was less significant than in the mid marsh communities. Other species which were confined to the upper reaches of the saltmarsh included Saltmarsh Flat-Sedge (*Blysmus rufus*) and occasionally Sea Clubrush (*Bolboschoenus maritimus*).

Overall, grazing was not a significant feature of this site and was mostly confined to the eastern half of the site. Bare ground was not a common feature throughout most of the ASM and was rarely more than 1%. Occasionally, however, this figure was greater due to the pressure of sheep grazing and the damage of that they can cause. This was most evident in the mid marsh community in the north-eastern end of the site.

### 3.3 Mediterranean salt meadows (H1410)

The MSM is not well developed at Rossmore and is rarely found co-existing with the larger ASM plain. Only a small amount of this habitat has developed. It is mostly confined to the western-most half of the site, occurring as a narrow fringe around the glacial headlands that open out onto Dungally Strand. The vegetation was characterised by the presence of Sea Rush (*Juncus maritimus*) and Saltmarsh Rush (*Juncus gerardii*), which were constant species in the MSM, along with Red Fescue and Sea Milkwort. Other common species included Creeping Bent, Sea Plantain and Sea Aster, along with occasional occurrence of other typical ASM species.

Unlike the ASM vegetation that largely occurred on a raised but level plain, the topography on which the MSM was found was heterogeneous, reflecting the nature of the substrate around the headland and the exposure of rocky or gravel. The vegetation was confined to linear bands that rarely exceeded 10 metres in width, but were often less than 5 metres. The vegetation height was typically between 25 and 50cm, but in some locations, such as on the mudflats could reach 90cm. Much of the MSM was backed by transitional wet grassland dominated by twitch (*Elymus repens*), although for large parts, overhanging scrub and woodland overshadowed the MSM vegetation.

## 4 IMPACTS AND ACTIVITIES

The list of impacts and activities is shown in Table 4.1. There are few current activities that are considered to be of great significance. The area is isolated and is not readily accessible. Extensive mudflats and sandflats are a feature of Donegal Bay and for this reason they have become important to the aquaculture industry. Other activities noted at Rossmore included farming, road improvement, dumping and dispersed habitation.

Other than a brief mention of some land being covered by spring tides in the eastern-most corner of the site, the OSI 6 inch map does not show any saltmarsh in this part of Donegal Bay. Despite this fact, it does make reference to a narrow fringe of saltings at one corner of the site, so it is clear that the tidal influence was excluded at some stage (801). Anecdotally the reclamation was never fully successful despite many attempts at harnessing the tide including a number of attempts to dam the inlet. Despite the construction of the low dam, it was later breached through the use of explosive. These activities have had a significant impact on the structure of the saltmarsh habitat at this site, although they are not assessed as they occurred prior to the current monitoring period.

It is clear that the old Laghy to Donegal road has been improved and modified in recent years. As part of the overall scheme, some land was obviously reclaimed and this is evident in the north-eastern part of the site. Rubble and other material was dumped here and the land height has been increased (803). Some reclamation of the infilled area has occurred in the past 10 years with the development of improved grassland. A remnant fringe of saltmarsh vegetation was observed, but it is clear that the recent road improvement scheme has damaged whatever saltmarsh vegetation was present. As part of the road improvement scheme has clear, new drains were constructed (801) which facilitated farmland to the north of the road. By directing all flood water through the culverts, it appears to have inhibited the development of saltmarsh vegetation around this area. The main road alignment occurred within the current monitoring period has not had as significant an impact as the initial infilling and destruction of the saltmarsh related to the road realignment.

Much of the land around this relatively rural setting is under agricultural management, mostly grazing (140) – cattle and sheep although some limited tillage was observed. The impact of grazing on the saltmarsh is limited as most livestock are kept within the fields and are only infrequently let onto the largely unenclosed saltmarsh. There was no great evidence of heavy use of the saltmarsh by livestock, except in the eastern half of the site where several sheep rather than cattle were observed. Some of the fenced-off saltings showed signs of damage through grazing and poaching (143) caused by the sheep, but these cover a minor area. Approximately 15 cattle were observed wandering out on the sandflats amongst the oyster

trestles. At no time did they venture onto the saltmarsh and eventually made their way back into the field from which they must have originally left.

Aquaculture, specifically oyster farming, is the main industry to have an impact on the saltmarsh at Rossmore. There is a large processing plant in Legacurry, where teams go out on tractors to harvest oysters on a number of licensed plots on the sandflats around the Bay. While this activity is not directly damaging to the saltmarsh, a number of tracks and trails have been created along the saltmarsh. These trails are usually found along old fording routes or along the muddy shores of some of the headlands. The vehicle ruts have damaged small sections of saltmarsh (501).

There is a definite freshwater influence noticeable at a number of locations throughout this site, particularly at the east side or landward end of the inlets. This is particularly true at the eastern-most extent of the site where an extensive bed of Reeds was noted. In places it appeared that it was spreading at the expense of the ASM, although this may be as a response to the road improvement works and the installation of concrete drainage culverts which direct the water.

A considerable area of largely unmanaged trees is found towards the back of the saltmarsh in the townland of Tullyearl. There is some minor spread of birch seedlings onto the brackish areas of the marsh.

There are signs of erosion (900) along the indented frontline of the ASM in the main inlet, more so then the MSM which is showing signs of accretion out onto the sandflats around Dungally Strand. However there has been no measurable erosion or loss of saltmarsh during the current monitoring period. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is being compensated by some accretion at this site.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	С	0	0.5	Inside
H1330	423	С	-1	0.1	Inside
H1330	501	С	-1	0.01	Inside
H1330	900	С	0	0.5	Inside
H1330	910	С	+1	0.03	Inside
H1410	501	С	-1	0.01	Inside

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

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> 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.

There has been an historical accretion of a considerable amount of saltmarsh vegetation either as a result of the reclamation or as a result of the natural build-up of sediment in the intertidal zone. Currently there are no signs of active accretion in the main inlet and a saltmarsh cliff is found along the seaward side of the saltmarsh. Active accretion is ongoing in the smaller, southern inlet where there is little topographical difference between the mudflats and the saltmarsh vegetation (910). There is an accretional ramp along the seaward side of the saltmarsh. However, there has been no measurable growth of saltmarsh during the current monitoring period.

Impacts and activities around the site include Dispersed habitation (403) and the oyster farming (200), which has already been mentioned and assessed.

## 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

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

Although the saltmarsh occurs within two separate inlets, for the purposes of this assessment it is treated as a single unit, given that there is a band of MSM vegetation around the glacial headland connecting the two main sections of the saltmarsh. As both saltmarsh habitats are favourably assessed (Table 5.1), the overall conservation status of this site is *favourable*.

Habitat	EU Conse			
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
	Extent Structure and			
(H1330)	functions			Favourable
	Future prospects			
	Extent			
Mediterranean salt meadows (H1410)	Structure and functions			Favourable
	Future prospects			

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

In addition, the OSI maps do not show the occurrence of saltmarsh in this area, and so while it is clear that the saltmarsh has developed considerably over the past 100 years, it is difficult to be certain of any trends in the future. Therefore the determination is based solely on the judgement of the habitat at the time of the survey coupled with any credible changes/impacts that could be ascertained.

This site is located within the Donegal Bay (Murvagh) cSAC. A management plan is not available for this cSAC.

## 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

In terms of extent, the assessment of the ASM habitat is *favourable*. There is little indication of any saltmarsh habitat shown on the OSI 6 inch map, which suggests that the ASM has largely developed over the past century. In the upper inlet, it may have had some external assistance as man attempted to increase the size of the saltings through the construction of the dam.

There is some signs of erosion along the frontline although it was not possible to quantify any significant change when the year 2000 and 2005 series aerial photographs were examined. There is some evidence of accretional trends in the smaller inlet to the south. There has been some loss of ASM habitat, notably in the north eastern corner of the site where the road improvements have acquired land rubble infill was imported, but this occurred prior to the current monitoring period. A smaller section of infill has also recently been completed by a local land owner, but this is negligible in extent.

#### 5.2.2 Habitat structure and functions

The habitat structure and functions are rated as *favourable* (Table 5.1). The ASM occupies the greater percentage of the total saltmarsh area at this site. Six monitoring stops were carried out across the site, all of which satisfied the target criteria. The ASM habitat is generally in good condition. The main section has been considerably modified by drainage related to cultivation in the past and these activities have had a significant residual impact on the structure of the habitat. Although the development of *Salicornia* flats or pioneer vegetation was not recorded, there is a full range of other zones from low to upper marsh. These include all the typical species assemblages and structural features that would be expected of a typical ASM habitat. The sward height is quite variable and the site is not significantly affected by grazing. There are also notable transitions to brackish marsh and wet grassland in the main inlet that add to the overall diversity of the site.

### 5.2.3 Future prospects

The future prospects for this habitat are *favourable*. The majority of the ASM communities are not readily accessible and there are few activities having a serious impact on the structure and condition of the vegetation. The determination assumes that there will be no radical change to the current management regime or that erosion from some unforeseen event alters the dynamic of this site.

## 5.3 Mediterranean salt meadows (H1410)

### 5.3.1 Extent

The extent of this habitat is rated as *favourable*. The MSM is nowhere near as extensive as the ASM and occupies but a fraction of its area. Most of the MSM is found on the western half of the site and occurs as a narrow linear band that extends around the glacial headlands. Only two small patches were recorded occurring among the ASM habitat. There is no indication from an examination of digital data including a range of aerial photographs and the old OSI 6inch map that there has been any significant change in the areas where MSM was recorded during this survey. Indeed, the 6inch map does not show the occurrence of saltmarsh in most of the hinterland around this site.

#### 5.3.2 Habitat structure and functions

The majority of the MSM is confined to a relatively narrow band that extends around the more exposed glacial headlands. Despite the relative paucity of extensive tracts of MSM vegetation, two monitoring stops were carried out in the habitat. Both stops satisfied all the criteria and so the structure and functions are assessed as *favourable*. The vegetation was in good condition and does not appear to be greatly influenced by any activity other than natural tidal cycles. The diversity of the vegetation was typical of this habitat. The saltmarsh topography was poorly developed but this is typical of these relatively narrow bands of MSM.

#### 5.3.3 Future prospects

The future prospects of the MSM are assessed as *favourable*. The assessment assumes that the current extent of the habitat and all activities/impacts do not change in the near future. The MSM is rather isolated and the terrain on which it occurs does not prove useful for anything. It is not subject to many damaging activities such as grazing.

## 6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for this site.

# 7 REFERENCES

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

## 8 APPENDIX I

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1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	4.539		4.539			
4	1410 Mediterranean salt meadow	0.928			0.928		
5	ASM/MSM mosaic (50/50)	0.002		0.001	0.001		
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic	0.158		0.079			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	0.190					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	2.503					
19	1330/rocky shore mosaic	0.002		0.001			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	8.322		4.62	0.929		



Connishabi, Oldhroacht agus Hiatas Átuar Brvianment, Heitage and Local Government National Parks and Wildlife Service Project 2007-2008

Donegal Bay (Murvagh) SAC (000133)

This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)

	Legend   SAC Boundary   130 Atlantic salt meadows   1410 Mediterranean salt meadows   130/1410 mosaic   130/other SM (CM2) mosaic
SMP code: SMP0124	0 60 120 180 240 300 Meters N Date of production: 20/02/2009 Original Drawing Size: 297 x 420 (A3)

Map version: 1

Scale 1:4000

A

# Sheskinmore-Beagh

## **1 SITE DETAILS**

SMP site name: Shes	kinmore-Beagh	SMP site code: 0127			
Dates of site visit: 18	and 19 September 2008	CMP site code: 148			
SM inventory site name: Sheskinmore-Beagh		SM inventory site cod	e: <b>23</b>		
NPWS Site Name: West of Ardara/Mass Road					
NPWS designation	cSAC: 197	MPSU Plan: Old Form	nat – Draft 2: Consultation		
	pNHA: <b>197</b>	SPA: <b>4090</b>			
County: Donegal		Discovery Map: 10	Grid Ref: 171110, 393735		
Aerial photos (2000 series): O 0390-D; O 0416- B,D; O 0417-A		6 inch Map No: <b>Dg073</b>			
<ul> <li>Annex I habitats currently listed as qualifying interests for West of Ardara/Maas Road cSAC:</li> <li>H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)</li> <li>H1410 Mediterranean salt meadows (Juncetalia maritimi)</li> </ul>					
Other SMP sites within this SAC/NHA: Roshin Point					
Saltmarsh type: Sand	flats Sub	bstrate type: Sand:peat			

## 2 SITE DESCRIPTION

Sheskinmore is located on the west Donegal, midway between Ardara and Portnoo off the R261 road. It is a large coastal site that is situated near the northern entrance to Loughros More Bay. It is located in a largely rural setting where the housing is mostly dispersed and the available land is given over to agriculture. Sheskinmore is notable for its extensive machair system (Ryle *et al.* 2009) in which a number of freshwater lagoons and loughs are found. Sheskinmore Lough is the largest and most impressive. It is an internationally important wetland, renowned for its wintering Greenland White-Fronted and Barnacle Geese (Birdwatch Ireland, 2007).

The saltmarsh, which is associated with the sand dune system, occurs towards the southern boundary of the site and is approximately 3 kilometres north-west of Ardara. The saltmarsh is located in three adjacent townlands, namely Murvaghveagh, Beagh and Derryness. It is confined to low-lying ground around the Bellanagoal River crossing under Beagh Bridge and a second unnamed river entering the intertidal zone to the north of Derryness Townland. A small section of the site is bisected by the R261 at Beagh Bridge, where there was some saltmarsh extending further upstream along the Bellanagoal River.

Sheskinmore-Beagh is one of four saltmarsh systems within the the West of Ardara/Maas Road candidate Special Area of Conservation (cSAC) that are listed in the national inventory (Curtis and Sheehy-Skeffington 1998). The others include Lettermacaward, Roshin Point and Loughros More Bay-Ardara, although only Roshin Point was visited as part of this survey. The cSAC covers an extensive area across south-west Donegal. The region is topographically variable and is characterised by its extensive hard rock landscape, which shapes the distribution of many of the habitats. A comprehensive list of 23 habitats has been selected as qualifying interests for the site, most of which cover the intertidal, coastal and blanket bog communities. A number of the habitats including machair, fixed grey dunes, decalcified dune heath, decalcified *Empetrum* dunes, Blanket Bog and orchid-rich calcareous grassland are priority habitats. In terms of the listed saltmarsh habitats, both Atlantic salt meadows - H1330 (ASM) and Mediterranean salt meadows H1410 (MSM) are recorded at Sheskinmore. A number of Annex II plant and animal species have been listed for the site, but none are specifically associated with saltmarsh habitats. Notable species, however, that were recorded at this site included Saltmarsh Flat Sedge (*Blysmus rufus*) which was generally associated with the upper saltmarsh boundary and Tasselweed (*Ruppia* spp.), a submerged aquatic that was found in a number of drains in the MSM and Blanket bog transitions.

This is a large site and it is possible to access it at a number of locations, although most involve crossing private land to reach the saltmarsh. A large part of the coastal system at Sheskinmore has been designated as a nature reserve and some of the land is owned by the state and is managed for conservation purposes by the NPWS. However most of the site is privately owned. A public right of way onto the machair exists at Murvaghveagh, near the football pitch. Elsewhere several landowners were identified and permission sought from all to carry out the survey on private land.

#### **3 SALTMARSH HABITATS**

#### 3.1 General description

Sheskinmore-Beagh is a large site that is found along the southern extent of the Sheskinmore machair complex. The saltmarsh has developed along the north-eastern side of the Loughros More Bay and is associated with two river plains on either side of a rocky headland in the townland of Beagh. The saltmarsh is contiguous however and the two river plains are connected by a band of saltmarsh that extended around the low-lying parts of the headland.

In the national inventory (Curtis and Sheehy-Skeffington 1998), the saltmarsh type is listed as sandflats, and the substrate is sand and peat. It is intimately associated with the sand dune system at Sheskinmore, which was characterised during the Coastal Monitoring Project survey, as a large and complex sand dune system (Ryle *et al* 2009).

Three Annex I habitats were recorded at Sheskinmore-Beagh. These included *Salicornia* and other annuals colonizing mud and sand – H1310 (*Salicornia flats*), Atlantic salt meadows - H1330 (ASM) and Mediterranean salt meadows – H1410 (MSM). There was no development of Common Cordgrass (*Spartina anglica*) swards at the site. The total area of the individual

habitats is listed in Table 3.1, although a further breakdown into the various mosaics that were recorded is listed in Appendix 1.

It should be noted that not all of the saltmarsh vegetation that occurred in Loughros More Bay was surveyed. Further south of Derryness, a large extent of almost contiguous saltmarsh vegetation was observed to extend towards Ranny Point North. It is separated from the saltmarsh at Sheskinmore-Beagh by a small gap in the vegetation around Derryness Isle. This saltmarsh, which is listed in Curtis and Sheehy-Skeffington's (1998) National Inventory is known as Loughros More Bay-Ardara.

The MSM at Sheskinmore accounts for approximately 64% of the total saltmarsh area that is mapped, whilst the ASM occupies most of the remaining land. The *Salicornia* flats are mostly negligible (<0.001%) and occur as a single small patch only. In general, the ASM is typically located towards the seaward side of the marsh plain, where it extensively occurs on a low sandy plain. However, small outliers of ASM vegetation can occur some considerable distance from the intertidal zone, where it is mostly found along creeks and regularly flooded depressions within the MSM-dominated saltmarsh along the Bellanagoal River. There are tall saltmarsh cliffs along this river channel where peat is exposed. For the most part, however, the ASM is naturally low and is in most parts grazed. Where it does not grade into MSM, there are transitions to machair/fixed dune grassland as well as wet grassland along with minor patches of Reeds (*Phragmites australis*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

The MSM dominates the landward side of the marsh and displays a greater structural heterogeneity than the ASM, which is in part related to the topography, but also the previous land management of the area. There is a greater diversity in vegetation communities and transitions between the MSM and other habitat types are not uncommon. Much of the landward side of the saltmarsh occurs over extensive blanket peat, which has in areas historically been extracted for domestic use. Sometimes there is a clear distinction between the MSM and the blanket bog, such as where the cut-face of the bog is still identifiable. However, in most cases, the MSM grades into the blanket bog or other wet grassland vegetation and there is a subtle difference between these two habitats that is difficult to map, especially in areas where they form complicated mosaics due to the variable underlying topography. In parts of the MSM, patches of Reeds and Common Sea-Rush (Bolboschoenus maritimus) or Grey Sea-Rush (Schoenoplectus lacustris spp. tabernaemontani) occurred. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. These were often in wetter situations, along creeks or drains where the freshwater influence flushing over the landscape overwhelmed any saline influence.

Most of the saltmarsh habitat that is mapped at this site is located within the cSAC boundary. The relatively insignificant patches of both ASM and MSM that were recorded outside of the boundary merely reflect inaccuracies between what is marked on the OSI 2<sup>nd</sup> edition 6inch map and that which is encountered on the ground.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.0001
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	15.90
H1410	Mediterranean salt meadows (Juncetalia maritimi)	28.97
	Total	44.87

Table 3.1. Area of saltmarsh habitats mapped at Sheskinmore-Beagh.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

A single, negligible patch of *Salicornia*-dominated vegetation was recorded at Sheskinmore (Table 3.1). It was located in a salt pan where the upper boundary of ASM meets the MSM. It is not extensive and there was no indication that the vegetation occurred on the intertidal sandflats elsewhere in the site.

The habitat was typified by the presence of the eponymously-named species, although other species include Annual Sea-Blite (*Suaeda maritima*), Common Sea-spurrey (*Spergularia media*) along with a small amount of Common Saltmarsh-grass (*Puccinellia maritima*), which commonly extended discontinuously around the frontline of the saltmarsh and further across the lower ASM vegetation.

#### 3.3 Atlantic salt meadows (H1330)

The majority of the 15.8ha of ASM habitat that was recorded at Sheskinmore occurred within the cSAC boundary and only a small number of patches measuring in total, 0.054ha, were recorded outside the cSAC. Most of the ASM was recorded along the front of the saltmarsh and occupied a relatively large expanse, although smaller patches were recorded further inland along creeks throughout the MSM-dominated mosaic.

Throughout the ASM habitat, there was some differentiation within the vegetation and discernible zonation was evident. Apart from pure ASM vegetation, a small area of ASM/MSM mosaic was recorded. It was not extensive and accounted for less than 0.1ha (Table 8.1).

Pioneer vegetation is found at this site and was only occasionally recorded on accretional ramps. The saltmarsh south of Derryness Point is currently accreting and a pioneer community is found along the seaward side of this saltmarsh. Common Saltmarsh Grass is the main species that is recorded although Sea Milkwort (*Glaux maritima*) was locally abundant and in one monitoring stop accounted for over 75% of the total ground cover. Another infrequently recorded species includes Glasswort (*Salicornia* spp.).

There is a greater abundance of lower marsh vegetation at Sheskinmore compared to other sites but it is nonetheless rarely extensive. The vegetation is often characterised by abundant Common Saltmarsh Grass but differed from pioneer vegetation in that in additional species such as Thrift (*Armeria maritima*), Sea Aster (*Aster tripolium*) and Sea Plantain (*Plantago maritima*) were present and the sward was closed with close to 100% vegetation cover. Occasionally, minor amounts of Glasswort were recorded, but these were often associated with subtle depressions or runnels in the marsh topography.

Unlike the earlier ASM zones, the mid marsh is very much more extensive and occurs along large stretches of the seaward part of this site. The vegetation is characterised by a naturally low sward which is often homogenously vegetated by Thrift, Sea Milkwort and Sea Plantain along with Sea Aster and occasional Common Scurvy Grass (*Cochlearia officinalis*). Other species that are locally abundant include Common Saltmarsh Grass and Saltmarsh Rush (*Juncus gerardii*). The saltmarsh structure in this zone is moderately well-developed along the site and this zone contains some well developed pans, particularly along the Bellanagoal River channel.

A greater diversity of species is encountered in the upper marsh, which occupies the greatest area of the ASM vegetation that was recorded at Sheskinmore-Beagh. This community is dominated by Red Fescue (*Festuca rubra*) and also contains small amounts of Autumn Hawksbill (*Leontodon autumnalis*), Sea Plantain, Sea Arrow Grass (*Triglochin maritimum*), Creeping Bent (*Agrostis stolonifera*) and Saltmarsh Rush. The latter two species may be occasionally more abundant in places.

#### 3.4 Mediterranean salt meadows (H1410)

The MSM is largely distinguished from the ASM by the presence of dense Sea Rush (*Juncus maritimus*), which is characteristically taller than much of the surrounding saltmarsh vegetation. In total, 28.7 ha of MSM habitat was recorded at Sheskinmore, the majority of which 28.605ha occurred inside the cSAC boundary (Table 3.1). It is largely confined to the upper stretches of the saltmarsh, where it is characterised as upper marsh. Occasionally, small patches of MSM were recorded along the frontline, particularly around the rocky headland south of the intertidal zone at the Bellanagoal River. Rarely, however, does the vegetation occur on the sandflats except where there has been some slumping along the river bank.

Asides from the occurrence of Sea Rush, grasses accounted for a significant proportion of the MSM and species such as Red Fescue and Creeping Bent were ubiquitously recorded, a fact reflected by its presence in almost all of the monitoring stops, where they typically accounted for 10-40% of ground cover, but on occasion was as high as 75%. Uncharacteristically for MSM habitat in Ireland, the vegetation is somewhat more diverse than seen at other sites.

This is as a result of the complex vegetation mosaic that was recorded at Sheskinmore-Beagh. Sea Plantain, White Clover (*Trifolium repens*), Common Scurvy Grass, Sea Milkwort and Autumn Hawksbit were all common associates. Infrequently recorded species included Thrift, Brookweed (*Samolus valerandi*), Sea Aster, and Sea Arrow Grass as well as Distant and Long-bracted Sedges (*Carex distans & C. extensa*). Interestingly, Saltmarsh Rush was not a common component of the MSM, and where recorded was usually associated with transitional MSM or ASM/MSM vegetation. The MSM located in the northern section at Murvaghveagh adjacent to the machair grassland also contained small amounts of other species more typical of wet Machair such as Glaucous Sedge (*Carex flacca*). Much of the Sea Rush dominated sward along the upper boundary of the MSM contained this species, which became frequent in some of the sward and represented an upper transition to terrestrial grassland. The abundance of this species was used in places to map the upper saltmarsh boundary and where it was dominant the habitat was marked as wet grassland.

The MSM is extensive and highly diverse, with a number of transitions evident throughout the site. The large peaty plains dominated by MSM, still retain relics of the blanket bog origins and there are still relatively large stands of peat that have not been harvested throughout the site, increasing the structural heterogeneity and vegetation complexity of the saltmarsh system. In most parts the MSM and blanket bog habitats are easily separated, although many small individual relic mounds are not uncommon within the MSM. Elsewhere the distinction between MSM and blanket bog vegetation is less clear and the vegetation is very much more transitional with some Purple Moor Grass (*Molinia caerulea*), Black-bog Rush (*Schoenus nigricans*), Ling (*Calluna vulgaris*) or even Deer Grass (*Trichophorum caespitosum*) present in Sea Rush dominated sward.

Transitional vegetation is very much a feature of the MSM, especially at the back of the marsh, where the low-lying ground starts to climb onto the rocky headland. The MSM grades into transitional MSM and transitional wet grasslands where the freshwater influence draining off the surrounding hilly ground dilutes the impact of saline waters. The upper boundaries of the habitat were sometimes difficult to map due to the complicated mosaics that developed due to the underlying topography. Other transitions include relatively small patches of Reeds or Sea Club-Rush, both of which rarely occur together. Not surprisingly, the greatest occurrence of reed/MSM transition or pure stands of reeds is found at the eastern side of the Beagh Bridge. There is a dramatic decrease in the area of saltmarsh vegetation here which indicates the upper limit of the saline influence along the river as well as the land use. Many of the fields in the low-lying ground along this section of the river are mostly derelict as the ground is regularly flooded.

## 4 IMPACTS AND ACTIVITIES

The list of all impacts and activities that were recognised at the site are included in Table 4.1. This is largely a rural site, and unlike elsewhere in the Sheskinmore machair system, access onto the saltmarsh areas is limited. Much of the land is where the saltmarsh occurs is under agricultural management, which is rarely intensive. The list of current activities from within and outside of the site is not extensive and reflects the different activities that are recognised in having an impact on the extent and condition of the saltmarsh habitats.

Much of the saltmarsh is modified and still retains evidence of its former attempts at management. Parts of the saltmarsh have undoubtedly been lost to agricultural improvement such as draining. There is still evidence of minor amounts of saltmarsh vegetation occurring inland along small drains. Elsewhere, larger drains were created to drain the extensively waterlogged ground. This improved access and enabled in places, a better quality of grazing land to be developed. It also facilitated the harvesting of peat for domestic use. Other changes which have resulted in the modification of the saltmarsh include the construction of the Beagh Bridge as part of the scheme to link Ardara with Portnoo. These changes have been in place for some considerable time as it is shown on the 2<sup>nd</sup> edition 6 inch map. None of these impacts are assessed as they occurred outside of the current monitoring period.

Much of the saltmarsh is under the ownership of a small number of people. A large percentage of the saltmarsh is enclosed, and although used for grazing purposes, is still largely derelict in that the ground conditions make it unfeasible to drain and improve. Rough Grazing (140) is the main agricultural activity in the area although some limited cutting of grass (102) was noted in the Murvaghveagh area, some of which included transitional saltmarsh vegetation. In general, the level of grazing is rarely excessive. It is evident that cattle and some sheep are allowed to graze, but their range is sometimes limited by the network of rivers and drainage channels which bisect the site. There are some areas where excessive grazing occurs and where damage (143) was evident. Trampling was observed, particularly at crossing points or in wetter depressions among saltmarsh/other habitat mosaics.

Trails (501) were occasionally encountered, although they were associated with livestock rather than recreational visitors. The trails were more readily observed in the MSM, where it was possible to see the impacts of trampling through the taller vegetation.

A community football pitch was created on the sandy machair plain in the past, at the northern tip of the saltmarsh (607). It is not well marked and cars are often parked around it. This activity has had some impact of the surrounding saltmarsh, especially, when unsocial activities, which were anecdotally reported, occur, with frequent wheel-ruts in the saltmarsh (622).

Erosion (900) is a natural feature of the saltmarsh, although it is often difficult to measure its impact. There is no discernible difference in the extent of most the saltmarsh vegetation. The limited evidence included slumping along the lower banks of the Bellanagoal River, which appeared to have affected the ASM vegetation. However, the slumping was not extensive and is typical of bank cutting along a river channel. No measurable loss of habitat could not be seen when the year 2000 and series 2005 aerial photographs were compared. And although the *Salicornia* flats were insignificant in extent, recent damage to the ASM frontline had resulted in flooding and erosion of the *Salicornia* pan. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh and is being more than being compensated by accretion at the site.

There are also some signs of fairly significant natural habitat change (990) at this site when the OSI 2<sup>nd</sup> edition 6 inch map is compared to the current aerial photos. The most significant change is that the 6 inch map marks the point at which the highest tides flow along the Bellanagoal River as quite far downstream of the current point east of Beagh Bridge. If this was correct on the 6 inch map it would mean that there was much less saltmarsh development at this site compared to now. However, this trend of saltmarsh retreating significantly landward has not been seen at other sites so it may possibly be due to a mapping error. A similar trend can be seen in the smaller stream to the south of the Bellanagoal River. There are more obvious changes in the profile of the shoreline during these period where have mainly affected the machair plain at the seaward side of the saltmarsh at Murvaghveagh. The small ridge at Derryness Point is mapped as being covered by spring tides (an indication of saltmarsh) but there is now a sandy ridge (sand hills somewhat improved to agricultural grassland). These changes indicate that this part of Loughros More Bay is quite dynamic and subject to change due to geomorphological processes. These impacts are not assessed as they mainly occurred outside the current monitoring period.

The accretion and build-up of new sediment (910) along the intertidal frontline of this site is difficult to quantify with any certainty. Some measurable accretion of ASM vegetation, clearly occurred however, and is evident when the year 2000 and series 2005 aerial photographs are examined. An area of approximately 3ha of lower ASM is mapped developing on a gently sloped accretional ramp on the sandflats to the south of Derryness point.

The ecological value of the saltmarsh at Sheskinmore is enhanced due to the range and pattern of the transitional vegetation that is recorded at the site. However, some of the land is largely derelict and in places all agricultural management has been abandoned, to the possible detriment of the saltmarsh vegetation. Although there are no comparable vegetation maps with which to compare the extent of the reeds, it would appear that Reeds are in places spreading (954). It is not a serious problem and is mainly associated with the small area of saltmarsh that is found on the eastern side of the Beagh Bridge.

Outside of the cSAC boundary, the list of impacts is even smaller. Most are continuations of activities that have been recorded inside the saltmarsh including grazing levels, the abandonment of land from formal agricultural management and the spread of species at the expense of other habitats. Another impact for which a limited impact might be suggested is in the construction of individual houses (403) that is adding to the number of houses that are already scattered around the peripheral areas of the saltmarsh.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	910	С	+1	0.0001	Inside
H1330	140	В	0	12.0	Inside
H1330	143	В	-1	1.2	Inside
H1330	501	С	0	0.1	Inside
H1330	607	С	0	0.25	Inside
H1330	622	С	-1	0.25	Inside
H1330	900	С	-1	0.05	Inside
H1330	910	В	+1	0.5	Inside
H1410	102	С	-1	0.75	Inside
H1410	140	С	0	18.0	Inside
H1410	143	В	-1	7.0	Inside
H1410	501	С	0	0.05	Inside
H1410	900	С	0	1.5	Inside
H1410	954	С	-1	0.2	Inside

**Table 4.1.** Intensity of various activities on saltmarsh habitats at Sheskinmore-Beagh.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

## **5 CONSERVATION STATUS**

#### 5.1 Overall Conservation Status

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

The presence of saltmarsh vegetation is well known from Sheskinmore. Early OSI maps, such as the 6inch map indicates that the tidal influence extended a considerable distance inland

along both of the river channels at Sheskinmore. Its presence has more recently been noted in previous NPWS documents such as the pNHA and NATURA 2000 files.

Sheskinmore-Beagh saltmarsh is a large site that has several features of notable conservation interest. The saltmarsh is part of a diverse coastal ecosystem and there are natural transitions to other habitats such as machair grassland and blanket bog. While the site is classified as a Sandflats type site much of the saltmarsh in the southern section could be classified as 'Fringe' as it has developed on blanket peat. The presence of these two types increases the overall structural and habitat diversity of the saltmarsh. There is also some significant development of transitional habitats along the landward boundary of the MSM, mainly with wet grassland and with blanket bog. As the site is relatively large and there are gentle gradients present, these transitional habitats are well represented and add to the diversity of the site. The saltmarsh contains good examples of most typical saltmarsh zones and there is some active accretion in one section, with some pioneer vegetation.

The conservation assessment of the individual saltmarsh habitats that were recorded at Sheskinmore-Beagh is shown in Table 5.1. Overall, the conservation status of the site is assessed as *unfavourable-inadequate*. This assessment suggests that the condition and future prospects of the saltmarsh vegetation are not ideal and without some remedy in the current land use regime, will not improve. However, most of the saltmarsh habitat is good condition. The main damaging impact is overgrazing that is causing some localised damage including poaching. There are some other negative impacts but these are having a limited impact.

This site is located within the West of Ardara/Maas Road cSAC. A old format management plan is available for this cSAC but it is now out of date.

Habitat	EU Conse			
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	Overall EU conservation status assessment
<i>Salicornia</i> flats (H1310)	Extent Structure and functions Future prospects			Favourable
Atlantic salt meadows (H1330)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (H1410)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate

 Table 5.1.
 Conservation status of Annex I saltmarsh habitats at Sheskinmore-Beagh.

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

#### 5.2.1 Extent

Despite the presence of an extensive intertidal zone, a limited area of *Salicornia*-dominated vegetation was recorded at Sheskinmore. There is no previous information as to its extent at this site, unlike the ASM or MSM vegetation. It is difficult to state with any certainty whether the limited extent of annual vegetation is persistent or ephemeral in nature. Thus its extent in this first monitoring period is tentatively assessed as *favourable* (Table 5.1).

### 5.2.2 Habitat structure and functions

The determination of structure and functions is based solely on a visual assessment of the habitat, as monitoring stops were not deemed necessary given the limited extent of the annual vegetation that was recorded at Sheskinmore. The assessment is *favourable*, as the vegetation, where recorded had a typical species assemblage for the habitat and was functioning as expected.

### 5.2.3 Future prospects

The future prospects of the *Salicornia* flats are rated as *favourable*. Notwithstanding the limited extent of this habitat, and apart from natural shifts in sediment along the front of the site, which can limit the development of the annual vegetation, there are few impacts and activities that threaten its persistence.

## 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The extent of the ASM is rated as *favourable*. There are no indications of any significant loss of habitat due to land-use changes or erosion within the current monitoring period. An analysis of the aerial photographs year 2000 and 2005 series, however, does reveal a measurable increase of approximately 3.0ha of vegetation along the southern shore of Derryness Point headland.

#### 5.3.2 Habitat structure and functions

The structure and functions attribute is assessed as *unfavourable-inadequate*. A total of sixteen monitoring stops were carried out across the site. Three of the stops failed, primarily due to the levels of grazing that were recorded and the damage to the ASM from poaching. Most of the ASM habitat is in good condition.

There was clear evidence of zonation throughout the site, ranging from low to mid and upper ASM marsh. There are typical examples of all these zones present. The presence of an accretional ramp along one section where saltmarsh is expanding over sand flats increases

the diversity of the habitat. Some sections of ASM display excellent examples of salt pan and natural creek drainage. The ASM is just one part of a larger coastal ecosystem and there are natural transitions to other habitats including MSM and machair grassland.

### 5.3.3 Future prospects

The future prospects for the site are *unfavourable-inadequate*. The assessment assumes that there will be no significant change in the current land use or management regime at the site. There is some localised damage to the ASM, mainly from grazing and poaching. This is likely to continue in the near future. However, it is positive that the site is widely recognised by local farmers as a nature reserve and that grazing levels are not excessive overall or creating damage within the much of the commonage ASM. Accretion at the site is also a positive feature and there are indications of saltmarsh expansion in one section. However, this site is quite dynamic so there may be other changes in extent and possibly losses of habitat in the longer term.

## 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The MSM is well represented at Sheskinmore. It is widespread in its distribution and forms extensive swards in places. While there is little reliable information with which to compare its previous extent, there was little sign of erosion or land-use changes within the MSM-dominated vegetation. Therefore the extent is assessed as *favourable* (Table 5.1).

#### 5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate* (Table 5.1). In general, the MSM was in relatively good condition and exhibited many of the characteristic features that might be expected from this habitat. Historical attempts at modifying the site to improve the drainage conditions have largely been abandoned or are not well maintained. Presently, much of the MSM is freely grazed and although not excessively so, is showing some localised signs of damage. This was reflected in two of the fifteen monitoring stops that were carried out in this habitat failing. They failed, primarily due to level of damage caused by livestock on the saturated substrates. All of the other attributes required for favourable conservation status reached their targets. There are some notable transitions to transitional wet grassland and blanket bog.

#### 5.4.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. The assessment assumes that the activities and the levels of current impacts do not change in the foreseeable future. There is some localised grazing damage to this habitat that is likely to continue into the near future, particularly without strict grazing management. There are few other activities that are negatively affecting this habitat.

## **6 MANAGEMENT RECOMMENDATIONS**

Sheskinmore-Beagh is an important site in terms of its ecological interest and a number of overlapping conservation designation applies to parts, if not all of the site. Currently the draft management plan for the site is outdated. Although the importance of the site is widely known about in the locale, an updated management agreement should be formalised to ensure the continued success of this ecologically sensitive and important site. The main recommendation is to more strictly control grazing levels. Small reductions in grazing pressure are required.

## 7 REFERENCES

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# 8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	15.852		15.852			
4	1410 Mediterranean salt meadow	28.700			28.700		
5	ASM/MSM mosaic (50/50)	0.098		0.0454	0.0454		
6	ASM/Spartina mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	18.520					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/Spartina mosaic						
13	1410/other SM (CM2) mosaic	0.456			0.228		
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.219					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	63.845		15.897	28.973		





# Tawny

# **1 SITE DETAILS**

SMP site name: Taw	ny	SMP site code: 0133				
Dates of site visit: 11 September 2008		CMP site code: N/A	CMP site code: N/A			
SM inventory site name: Tawny		SM inventory site cod	SM inventory site code: 7			
NPWS Site Name: Mulroy Bay						
NPWS designation cSAC: 2159		MPSU Plan: N/A	MPSU Plan: <b>N/A</b>			
	pNHA: <b>N/A</b>	SPA: N/A				
County: Donegal		Discovery Map: 2	Grid Ref: 219278, 438940			
Aerial photos (2000 series): <b>O 0061-D; O 0080-</b> <b>B</b>		0- 6 inch Map No: Dg 01	6 inch Map No: <b>Dg 017</b>			
Annex I habitats currently listed as qualifying interests for Mulroy Bay cSAC: <b>No SM habitats</b>						
Other SMP sites with	in this SAC/NHA: <b>N/A</b>					
Saltmarsh type: Bay Subs		Substrate type: Sand:grave	strate type: Sand:gravel			

# 2 SITE DESCRIPTION

The saltmarsh is situated to the west of Tawny, which is a small rural village located on the Inishowen Peninsula in North County Donegal. It is approximately 3.5 kilometres due west of Portsalon, which is a popular holiday and recreational resort with its golf courses and long sweeping beach facing into Ballymastocker Bay.

There are two adjacent but topographically separate areas of saltmarsh at Tawny. The main area of saltmarsh is located on the northern side of the Moross Headland and is found in an open coastal lagoon known locally as *the Wee Sea*. A second smaller area of saltmarsh occurs on the southern side of the headland. The sheltered inlet leading to Moross Strand Head supports a narrow fringe of saltmarsh vegetation which is dominated by stands of Reeds (*Phragmites australis*).

Both of the saltmarshes open out into Mulroy Bay which is a sheltered, large and highly convoluted glacial inlet. The bay and the surrounding hinterland support a large and nationally important aquaculture industry. Asides from that the principal land use in the immediate area of the saltmarsh is pastoral with cattle and sheep the predominant grazers. Elsewhere on the Inishowen Peninsula, the area is very popular with holiday makers and there are many holiday homes for rent or in private ownership.

In terms of nature conservation, Mulroy Bay has been designated as a candidate Special Area of Conservation (cSAC), as it is considered to have excellent examples of reefs (5%) and large shallow inlets and bays (90%), both Annex I habitats. Reefs are rare in Ireland and

only a limited number of sites have been designated thus far. There is a variety of different communities which reflects the sedimentary orogenisis of this glacially impacted Bay (Anon 2001). The only other feature for which the cSAC has been specifically designated for is for the presence of Otter (*Lutra lutra*).

No management plan currently exists for the site and NATURA 2000 notes make brief mention of saltmarsh habitats within the cSAC. The majority of the saltmarsh habitats recorded at Tawny occur outside of the cSAC boundary.

The Wee Sea was accessed from across a field adjacent to the old schoolhouse. Permission was sought and given by one landowner to cross private property onto the marsh. Once onto the saltmarsh, it was only a matter of circling the lagoon and crossing a number of boundary fences. The second area of saltmarsh which was easily accessible as a local road encircles it. It is possible to venture onto the marsh at low tide.

## **3 SALTMARSH HABITATS**

### 3.1 General description

The general topography of the area around Tawny is mostly rocky headland sweeping down to the sea. Much of the land has been converted to agricultural pasture, which in places extends onto the low-lying saltmarsh fringe. The marsh at Tawny consists of two separate areas of saltmarsh vegetation. The main area of marsh occurs as a fringe around *the Wee Sea*. Access to the marsh was from a laneway adjacent to the recently abandoned old school building. The substrate found within the Wee Sea is typically an admixture of mud, cobble and gravel. The open lagoon is afforded some shelter by the rocky headland which nearly closes off the lagoon from the ravages of the Northerly winds.

A separate area of remnant saltmarsh vegetation, largely dominated by Reed marsh is located at Moross Strand Head. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This is due south of the main saltmarsh and is easily accessible from a local road that runs around this small inlet. Substrate conditions here are a little different from those noted in the main area of saltmarsh. The small inlet is predominantly mud with some rocky outcrops or patches of gravel. This is in part due to the south facing sheltered inlet which dampens storm surges.

The saltmarsh is neither extensive nor structurally diverse (in most areas) and survives as a fringe which is typically less than 10 metres wide, but which in places extends some 80 metres inland. Three Annex I habitats are recognised from the overall site. These are *Salicornia* mudflats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM).

Table 3.1 lists the overall areas of the respective saltmarsh habitats, although it should be remembered that two distinct areas of saltmarsh vegetation are described from this site.

One saltmarsh species which in Ireland is mostly recorded from saltmarshes in the north-west coast is Saltmarsh Flat-Sedge (*Blysmus rufus*). It was not abundant and patchily distributed, particularly on disturbed ground near tracks.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.006
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1.686
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.387
	Total	2.079

**Table 3.1.** Area of saltmarsh habitats mapped at Tawny.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

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

Glasswort (*Salicornia* spp) - dominated vegetation is not extensive at Tawny and occurs as three separate small patches. In total it occupies 0.006ha, all of which is mapped outside of the current cSAC. Along with Glasswort, these fragmentary patches of vegetation support only a handful of species, including Annual Sea-Blite (*Suaeda maritima*), Common Sea Grass (*Puccinellia maritima*) and occasionally Lesser Sea-Spurrey (*Spergularia marina*). Typically, vegetation cover was complete and there were signs that high tides were having an impact by undermining the vegetation through redistribution of the mud/shingle substrate. This, however, is normal for this annual habitat, which is often decimated, only to return the next year.

## 3.3 Atlantic salt meadows (H1330)

At Tawny, the saltmarsh is dominated by ASM vegetation. And although it accounts for 81% of the total area of saltmarsh vegetation recorded, this is not a large saltmarsh. Of the total 1.686ha, only 0.197ha was recorded inside the cSAC boundary, while the rest, 1.489ha, is located outside the cSAC boundary.

The ASM is characterised by a fringe of vegetation. At the Wee Sea, it extends in a narrow band around the edge of the Lagoon, whilst at Moross Strand Head, thin linear patches of ASM vegetation were noted extending along either side of the narrow inlet (outside the cSAC boundary). Although most of the ASM vegetation recorded at both areas occurs as a narrow fringe, it is possible to identify zonation in places. Pioneer, low, middle and upper marsh communities were all recorded, although they do not occur in sequence.

The pioneer vegetation is often associated with the front of the saltmarsh or wetter depressions further back that are inundated by saltwater. Floristically it is quite spartan and is

dominated by Common Saltmarsh Grass (*Puccinellia maritima*), although Glasswort and Annual Sea-Blite are also recorded here. There is often no clear distinction between pioneer and low marsh vegetation other than the minor occurrence of additional species such as Thrift (*Armeria maritima*) and Sea Plantain (*Plantago maritima*).

Topographically there is little distinction between the low and mid marsh vegetation and the transition is sometimes problematical, given the narrow width of the saltmarsh. Patches of mid marsh are usually identified by the occurrence of additional species such as Sea Arrow-Grass (*Triglochin maritima*) and Sea Milkwort (*Glaux maritima*),. Occasional clumps of Saltmarsh Rush (*Juncus gerardii*) were noted but these often extended across the mid-and upper marsh divide.

Upper marsh vegetation had additional species such as Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Common Scurvy-Grass (*Cochlearia officinalis*) as well as minor amounts of Greater Sea Spurrey (*Spergularia media*). The upper boundary of the saltmarsh typically supported transitional grassland dominated by Couch Grass (*Elymus repens*) along with numerous ruderal and some flush species. Elsewhere the ground conditions were more acidic and supported minor scrub or hedgerows along with acid grassland which graded into pasture land.

The vegetation around much of the lagoon is typically low which is maintained through grazing. The livestock include cattle and horses, but in most fields, sheep were the main grazers. Bare ground ranges from 1% to 20%, which is indicative of the pressure of grazing around parts of the lagoon. Most of these areas are also heavily poached. The severity of grazing in some places was evident when the water level dropped in the lagoon. In an attempt to reach better grazing, it is clear that sheep wander (in vain) out onto the treacherous mudflats and pass around some of the boundary fences.

At Moross Strand Head the vegetation was similar in composition to that recorded elsewhere and the only difference was the occurrence of some rocky material, which in places tended towards an ASM rocky shore mosaic. In all, this accounted for 0.147ha or 8.7% of the total ASM habitat recorded at Tawny.

## 3.4 Mediterranean salt meadows (H1410)

0.387ha of MSM vegetation (Table 3.1) was recorded at Tawny, which represents approximately 20% of the total saltmarsh vegetation. Of that figure, most was located outside the Mulroy Bay cSAC. Only 0.005ha was recorded from within the cSAC boundary.

Most of the MSM vegetation that was recorded around the Wee Sea occurred along the southern and western perimeter of the lagoon with some small outlier patches elsewhere. Commonly occurring species included Sea Rush (*Juncus maritimus*), Saltmarsh Rush (*Juncus gerardii*), Red Fescue (*Festuca rubra*), Sea Plantain (*Plantago maritima*) and Sea
Milkwort (*Glaux maritima*). Other species that were occasionally recorded include: Lesser Sea-Spurrey (*Spergularia marina*), Sea Pink (*Armeria maritima*) and Common Scurvy-Grass (*Cochlearia officinalis*). In general, the vegetation was characteristically taller than the ASM as it is avoided by livestock. However, the density and pressure of sheep at Tawny was so high that palatable material from around and between rush tussocks was often removed.

MSM vegetation was also recorded at the Moross Strand Head. The innermost section of the marsh is dominated by a large stand of Reeds (*Phragmites australis*). To the seaward side of the reeds, Sea Rush-dominated vegetation was noted on mud. In total it occupies 0.165ha of the total MSM area or nearly 42% of the total MSM habitat recorded at Tawny. Most of the vegetation occurs outside of the cSAC.

# 4 IMPACTS AND ACTIVITIES

Other than the small section of saltmarsh at Moross Head, Tawny is a relatively isolated site and remains undisturbed by recreational or tourist traffic. The saltmarsh is not is good condition, which is a reflection of the management regime in the area. A list of the impacts and activities which were recorded at this site are listed in Table 4.1. Owing to the fact that the majority of the saltmarsh occurs outside the cSAC, correspondingly, most of the activities are listed as occurring outside.

Agricultural management is by far the most obvious activity that was noted at this site. The majority of the surrounding land is variously grazed by livestock, both sheep and cattle (140). The make-up of the livestock varies as a number of differing landowners surround the marsh. A large part of the saltmarsh habitats situated around the lagoon are seriously impacted by the levels of sheep that are allowed onto the saltmarsh. The land is showing signs of considerable damage, which is not helped by the fact that sheep can freely roam onto the saltmarsh. This has resulted in considerable poaching (143). Although pedestrian traffic is almost negligible, there are a number of trails (501) around the saltmarsh. They are not extensive or pronounced except in areas where sheep roam.

There has been some agricultural improvement (803) including the removal of a number of mature Conifers, which have been toppled along the frontline of the saltmarsh. Elsewhere, imported rubble was used to infill a section of the saltmarsh shortly before the survey. This unwanted rubble may have been associated with the construction of a cattle shed elsewhere on the farm. Some of the infill included household material and other rubbish (423). Again, there were some signs of dumping around the easily accessible Moross Strand.

There is some dispersed habitation (403) but this only applies to Moross Strand Head section of the saltmarsh. A small number of domestic dwellings occur adjacent to the saltmarsh. They

have been in existence for some time and so it is not possible to quantify their impact, if any, on the saltmarsh communities.

There are some erosion features (900) along the seaward edge of the marsh. However erosional pressure is likely to be low in this sheltered bay. The heavy grazing is also inducing poaching in places. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	143	В	-1	0.006	Inside
H1330	143	А	-1	1.4	Inside
H1330	423	С	-1	0.01	Inside
H1330	501	С	-1	0.15	Inside
H1330	803	В	-2	0.2	Inside
H1330	900	С	-1	0.06	Inside
H1410	423	С	-1	0.01	Inside
H1410	501	В	-1	0.01	Inside

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>5</sup> Location of activity: Inside = activities recorded within and directly impacting the saltmarsh habitat, outside = activities recorded outside but adjacent to saltmarsh habitat that are impacting the saltmarsh habitat.

#### 5 CONSERVATION STATUS

#### 5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the 1995, 2000 and 2005 OSI aerial photo series. There is little other detailed information for this site. Previous NPWS site notes for the area do not cover the saltmarsh.

The overall conservation of this marginal saltmarsh site is *unfavourable-bad*. This determination is a reflection of the least favourable assessment of the individual saltmarsh habitats, which are listed in Table 5.1. Asides from its extent, the ASM failed on the other target categories, which is a reflection of the poorly functioning system and the degree of damage to which the saltmarsh continues to be subjected to. The general status of this relatively small saltmarsh system is poor and it has been considerably damaged, particularly through unsustainable grazing levels.

This site is located within the Mulroy Bay cSAC. A management plan is not available for this cSAC.

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

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

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

#### 5.2.1 Extent

The extent of *Salicornia* vegetation is assessed as *favourable*. The occurrence of this habitat is rather limited at Tawny and there is no previous information as to its occurrence in the area. Asides from trampling by roaming livestock, there are no indications of any natural loss of habitat due to erosion.

#### 5.2.2 Habitat structure and functions

Monitoring stops were not carried out in this habitat given the paucity of its occurrence. The visual assessment is *favourable*. There is no information about the previous structural composition of the *Salicornia* vegetation, although given that it is composed of annual species, it is likely to be similar to that recorded elsewhere around the coastline. Although dominated by a single species, other species typical of the habitat were also noted in similar situations.

# 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 such as the spread of Common Cordgrass continue in the near future.

# 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

Although the ASM accounts for approximately 81% of the total area, its extent is rated as *unfavourable-inadequate*. It was not possible to ascertain any change in habitat extent from an analysis of the year 2000 and 2005 series ortho-photographs. Erosion terraces were evident around parts so the saltmarsh. It is likely that there has been some retreat in the frontline, over the course of the past 100 years when the current frontline is considered against the old OSI 6 inch map.

Notwithstanding these facts, there has been small loss of ASM habitat due to infilling which, coupled with the poor condition of the habitat due to the pressure of livestock, has likely resulted in undermining of the integrity of the ASM in places.

#### 5.3.2 Habitat structure and functions

The structure and functions for the ASM at this site are assessed as *unfavourable-bad*. Of the five monitoring stops that were carried out in this habitat, all but one failed which is indicative of the management activities and damage brought about by uncontrolled grazing regimes. Overgrazing and poaching were recorded in each monitoring stop. A consistent feature of the habitat was the occurrence of bare ground which is indicative of the pressure and damage which the grazing is causing on the ASM.

#### 5.3.3 Future prospects

The future prospects of this habitat are not ideal. The condition of the ASM has declined greatly through agricultural management. The numbers of livestock, sheep in particular, and the intensity of the grazing suggest that poaching and further damage of the vegetation will continue. For this reason the future prospects are rated as *unfavourable-bad*.

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of the MSM is rated as *favourable*. Although not extensive, the occurrence of MSM at Tawny is positive in terms of the overall saltmarsh structure and development. While there is no previous information as to the occurrence of the habitat, it might be assumed that its extent is naturally low. And despite the pressure of livestock for all available gazing material, that there was no quantifiable indications of loss.

#### 5.4.2 Habitat structure and functions

A single monitoring stop was carried out in the MSM habitat. While it satisfied the overall criteria for structure and functions, the assessment is modified to *unfavourable-inadequate* to reflect the overall condition of the MSM habitat. The intensity of sheep grazing is so high that most patches of MSM were considerably poached and contained an amount of bare ground.

# 5.4.3 Future prospects

The future prospects of the MSM vegetation at Tawny are assessed as *unfavourable-inadequate*. This is due to the continuing land use and intensity of the grazing. Despite the limited grazing value of the *Juncus*-dominated vegetation, the paucity of available grass on the marsh has resulted in sheep grazing heavily around the Juncus tussocks for all available herbage. Grazing levels are unlikely to change in the near future.

# 6 MANAGEMENT RECOMMENDATIONS

Owing to the relatively small size and poor quality of this fringing saltmarsh, there are no recommendations for this site in terms of nature conservation. The majority of this saltmarsh is located outside of the cSAC boundary and the land is in private ownership.

# 7 REFERENCES

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

# 8 APPENDIX I

# Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats	0.006	0.006				
2	Spartina swards						
3	1330 Atlantic salt meadow	1.686		1.686			
4	1410 Mediterranean salt meadow	0.387			0.387		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	0.071					
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.340					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	2.490	0.006	1.686	0.387		



# Baldoyle

# **1 SITE DETAILS**

SMP site name: Baldoyle Estuary		SMP site code: SMP0003				
Site name (Curtis lis	st): Baldoyle Estuary	CMP site code: 9				
		Site No: (Curtis list): 2	231			
NPWS Site Name: Baldoyle Estuary		Dates of site visit: 8+9	/06/2006			
NPWS designation cSAC: <b>199</b>		MPSU Plan: old form	at plan available			
pNHA: <b>199</b>						
	SPA: Baldoyle SPA 4	016				
	Nature Reserve: Bald	oyle S.I. No. 233 of 1988				
County: <b>Dublin</b>		Discovery Map: 55	Grid Ref: 324000, 242000			
1 <sup>st</sup> ed 6 inch Map No: <b>Du15</b>		Aerial photos (1995 series): <b>03133-b</b> , <b>03134-a</b> , <b>03065-b</b> , <b>03065-d</b> , <b>03066-a</b> , <b>03066-c</b>				
2 <sup>nd</sup> ed 6 inch Map N	o: <b>Du15</b>	Aerial photos (2000 series): <b>03133-b</b> , <b>03134-a</b> , <b>03065-b</b> , <b>03065-d</b> , <b>03066-a</b> , <b>03066-c</b>				
		Aerial photos (2005 series): not available				
Annex I habitats cur	rently designated for Ba	aldoyle Estuary cSAC:				
Salicornia	and other annuals colo	nizing mud and sand (1	310)			
Atlantic sa	lt meadows (Glauco-P	uccinellietalia maritimae	e) (1330)			
Mediterra	nean salt meadows (Ju	ncetalia maritimi) (1410	))			
Saltmarsh type: Est	uary	Substrate type: Mud				

# **2** SITE DESCRIPTION

Baldoyle Estuary is located in County Dublin to the north of Baldoyle Village and to the south of Portmarnock. This is a small estuary of the River Sluice and is orientated north-south and dominated by intertidal mud and sand flats. It is enclosed by a large sand dune system on the east side. Saltmarshes mainly occur in the northern part of the estuary, on both sides of the estuarine-river channel. Other small areas of saltmarsh occur along the western side, at the end of Portmanock Point and along the southern side of the estuary adjacent to Sutton Dart Station. Another small saltmarsh/brackish marsh area occurs along the Mayne River, which flows into the western side of the estuary. This area contains the rare grass species Borrer's Saltmarsh-grass (*Puccinellia fasciculata*), a species listed on the Flora Protection Order. Baldoyle Estuary also includes a dune system at Portmarnock Point. The conservation status of the sand dune habitats were assessed by the Coastal Monitoring Project in 2004.

Three Annex I habitats, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM), are found at this site. All three habitats are listed as qualifying interests for the Baldoyle Estuary cSAC. *Spartina* swards are also present at this site. Nearly of the saltmarsh habitat is situated within the cSAC. There are some exclusions at the southern end of Portmarnock Spit. Some of the ASM is located outside the cSAC due to the exclusion of the golf course.

Most of the site is also a National Nature Reserve that is managed by NPWS. The saltmarsh located at the southern end of Portmarnock Spit is excluded from the nature reserve. The estuary is also designated as a SPA due to its importance for wintering waders and wildfowl, including internationally important numbers of Brent Geese.

# **3 HABITATS**

# 3.1 General description

There are five main saltmarsh areas, as listed by O'Reilly and Pantin (1957). Atlantic salt meadows is the dominant Annex I saltmarsh habitat (Table 3.1) but *Spartina* swards form the greatest area. The main area (Area 1) occurs in the north-west corner of the estuary and to the south of the estuarine river channel. This area contains the largest area of Atlantic salt-meadow (ASM) and contains a general band of Mediterranean salt-meadow (MSM) (widening to form patches in places and disappearing in other areas) on its landward side. There is extensive *Spartina* sward formation on the seaward side, along the river channel and into the estuary. The saltmarsh habitats narrow towards the south and ASM and MSM eventually develop into a narrow band of vegetation to the landward side of *Spartina* sward. The *Spartina* sward continues to the south of the Mayne Bridge, with only a narrow band of ASM vegetation occurring to its landward side.

Further south, around some formerly reclaimed land adjacent to Baldoyle Racecourse, the *Spartina* sward narrows and eventually meets the shoreline. Some Atlantic saltmarsh occurs at this location (Area 2), having developed behind a small shingle spit, although it is poorly developed with narrow zones and no creeks or pans. A

narrow band of *Salicornia* flats occurs on the sandy mud to the seaward side of the saltmarsh.

A small patch of saltmarsh also occurs adjacent to Sutton Golf Club in the south-east corner of the estuary (Area 3). Here, there is some ASM vegetation, but it is poorly formed, showing signs of erosion and there are no creeks or pans. Some small patches of *Spartina* swards and several isolated clumps occur on the mudflats at this location in addition to several small patches of *Salicornia* flats.

Saltmarsh to the north and north-east of the river channel in the north-east corner of the estuary is dominated by *Spartina* swards (Area 4). A band of mainly ASM occurs to the landward side, widening in places. Sea Rush (*Juncus maritimus*) is present in this area and some of the larger patches are classified as Mediterranean salt meadow. Atlantic salt meadow continues around the eastern side of the estuary and eventually narrows to form a very narrow band to the landward side of the *Spartina* sward. The ASM widens out somewhat to the south of the entrance to Portmarnock Golf Club. The area of saltmarsh located at the end of Portmarnock Point is dominated by ASM (Area 5). There is some *Spartina* sward formation and *Salicornia* flat development to the seaward side and along the estuarine-creek channel.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand	0.39
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	12.68 <sup>-1</sup>
1410	Mediterranean salt meadows (Juncetalia maritimi)	2.64 <sup>1</sup>
	Spartina swards	38.42 <sup>2</sup>
	Total (excluding Spartina swards and clumps)	15. 71

**Table 3.1.** Area of EU Annex I habitats listed at Ballyteige Estuary.

<sup>1</sup>this total includes 50% of the 1330/1410 mosaic <sup>2</sup> this total includes 50% of the Spartina sward/mudflat mosaic.

#### 3.2 Salicornia flats (H1310)

There are several small patches of this habitat located towards the lower end of the estuary on both sides. A narrow band (5-10 m wide) of sandy mudflats along the seaward edge of ASM located on the western side of the estuary (Area 2) is dominated by Glasswort (*Salicornia* sp.). Glasswort is quite sparse in this area (10-30%) and there are occasional isolated plants of Common Saltmarsh-grass (*Puccinellia martima*, Annual Sea-blite (*Suaeda maritima*) and Lax-flowered Sea

Lavender (*Limonium humile*) within this zone. Towards the northern end Common Cordgrass (*Spartina anglica*) becomes more frequent and eventually forms *Spartina* swards, replacing the band of *Salicornia* flats along the lower edge of the saltmarsh.

There are also several patches of this habitat located on the eastern side of the estuary within Area 5. *Salicornia* flats are mainly situated on both sides of a small creek, seaward of *Spartina* swards. These patches are denser (30-40%) and do not contain other pioneer saltmarsh species. These patches transition to intertidal flats on the seaward side.

Small patches of dense Glasswort may also be found in salt pans within the ASM located in the north-west of the estuary (Area 1). Some pans may be totally filled with Glasswort creating patches 5 m in diameter. These areas where not considered when measuring extent.

# 3.3 Spartina swards

*Spartina* swards are the most extensive habitat at this site. This habitat is not listed as a qualifying interest for this site. These swards are quite mature and developed quite quickly during and soon after the 1950's (O'Reilly & Pantin 1957). There has not been much significant change since this period. This habitat is usually characterised by a high stem density of Common Cordgrass. There are small amounts of Common Saltmarsh-grass, Lax-flowered Sea Lavender and Greater Sea-spurrey within the sward, particularly closer to the landward boundary. These swards are quite mature and a complex creek structure has developed in the swards. The development of these swards has significantly narrowed the upper part of the Sluice River channel in the north-western corner of the estuary.

There is still a distinctive boundary between the ASM and the *Spartina* sward along much of the boundary with a low saltmarsh cliff situated along the border. Sometimes the ASM/*Spartina* sward boundary follows the exact lower boundary of the saltmarsh marked on the  $2^{nd}$  edition 6 inch map, as indicated from the GPS. This indicates that the *Spartina* sward has predominately developed on intertidal mudflats. In other places the boundary is less distinct and there is a gradual transition from dense *Spartina* sward to a mosaic of *Spartina* sward and ASM and then to isolated clumps of Common Cordgrass situated within the ASM.

Much of the *Spartina* sward located on the southern part of the estuary contains a mosaic of isolated clumps and mudflats at the seaward edge of the denser sward. There are actually signs of recent dieback along the seaward side of the sward lower down in the estuary (within the areas mapped as *Spartina* clump/mudflat mosaic). Some clumps have died back and are being eroded. There are no signs of Glasswort amongst the clumps of Common Cordgrass forming the clump/mudflat mosaic, seaward of the denser swards.

# 3.4 Atlantic salt meadows (H1330)

This habitat dominates the older area marked as saltmarsh and covered by spring tides in Baldoyle Estuary. The largest area is located in Area 1 in the north-west part of the estuary. O'Reilly and Pantin (1957) described the vegetation composition of the saltmarsh in Baldoyle Estuary in detail.

The largest area of ASM is located in the north-west part of the estuary. This area contains several zones of ASM saltmarsh vegetation. The lower zone is dominated by Sea Purslane with frequent Common Saltmarsh-grass and occasional Greater Seaspurrey and Lax-flowered Sea Lavender. This zone is quite narrow in places and is most frequent along the northern side of this area. There is generally a distinct boundary with the adjacent *Spartina* swards. The lower zone has frequent clumps of Common Cordgrass spread through it. Within Area 1 there is a low-lying area that was formerly a small bay containing mudflats. This area now contains *Spartina* swards and lower zone ASM with frequent cover of Common Cordgrass. Common Cordgrass within the ASM may reach 40%. Lower marsh ASM vegetation dominated by Sea Purslane has developed along the edges of the Sluice River channel.

Higher up on the marsh there is a mid marsh zone dominated by Sea Pink and Sea Plantain. Other species present in this zone include Sea Aster, Lax-flowered Sea Lavender and Red Fescue. This area has frequent large salt pans and a complex creek network. Common Cordgrass is frequent in this zone within salt pans but it becomes less frequent towards the back of the marsh. This species has also infilled some small creeks within this area. This area contains the best developed topography present at the site. Upper saltmarsh vegetation is dominated by Saltmarsh Rush along the landward boundary and adjacent to the MSM also in this area. The ASM generally transitions to rank grassland or scrub above the high water mark.

There is a generally narrow band of ASM located in Area 4 in the north-east of the estuary. This band of saltmarsh is situated between *Spartina* swards and an embankment along the road or further north with brackish vegetation located at the landward side. There are patches of MSM vegetation scattered along this band of saltmarsh. The ASM vegetation in the northern section is generally dominated by Red Fescue. The topography is quite uneven. Common Cordgrass is present in the pans and as clumps within the ASM vegetation.

There is a small area of ASM located in the south-east corner of the estuary, adjacent to Sutton Golf Club (Area 3). The saltmarsh is poorly developed and is dominated by Sea Purslane with frequent Common Saltmarsh-grass and occasional Lax-flowered Sea Lavender and Greater Sea-spurrey. There is a narrow band of Red Fescue dominated vegetation along the upper boundary, higher on the embankment, and this contains occasional Sea Arrowgrass and Sea Plantain. There are signs of erosion along the seaward side of the saltmarsh and some clumps of Common Cordgrass have colonised the mudflats adjacent to this area.

A small area of ASM is located at the southern end of Portmarmock Point, adjacent to the golf course (Area 5). This saltmarsh has developed in low-lying sheltered areas between dune ridges in conjunction with the growth of the sand spit in the past 150 years at this location. This area has been modified by the creation of the golf course. A small sheltered area is dominated by a typical mid zone sward dominated by Sea Pink, Sea Plantain and Red Fescue. This area also contains the Rock Sea Lavender (Limonium binervosum), which forms a distinctive saltmarsh community with frequent bare substrate, Sea Pink and low growing Sea Purslane This is a feature of local distinctiveness. The sward height is lower compared to the rest of the site and there are significant areas with a low sward height typical of mid zone marsh areas. Common Cordgrass is also present within this saltmarsh and is frequent or dominant in some of the lower zone areas. There is a band of upper marsh vegetation dominated by Red Fescue along an embankment that transitions to amenity grassland. This embankment also contains Sea Beet (Beta maritima) and occasional Orache sp. (Atriplex sp.) along with Twitch (Elytrigia repens). The rest of the saltmarsh transitions to sand dune vegetation with fixed dune along the southern boundary and a dune slack located at the eastern end of the saltmarsh. The ASM transitions to *Spartina* sward at the seaward boundary.

A small area of ASM saltmarsh is situated adjacent to the Racecourse (Area 2). Saltmarsh was more extensive at this site but there has been infilling and reclamation in the past. This area is eroding at present. This area of saltmarsh is dominated by lower zone vegetation dominated by Sea Purslane and Common Saltmarsh-grass.

#### 3.5 Mediterranean salt meadows (H1410)

This habitat is characterised by clumps of Sea Rush. It is found on small scattered clumps in a generally narrow band (1-20 m) along the landward side of most of the saltmarsh. The habitat may be represented by clumps only 1-2 m wide. Its distribution breaks up in places and clumps become isolated from each other. It also forms a mosaic with ASM in places where there are small scattered clumps of Sea Rush mixed with ASM vegetation that forms a narrow zone of saltmarsh.

Sea Rush forms large clumps in places and though it may not actually dominate the cover (cover varies from 30-75%), it is the most characteristic and obvious part of the vegetation. Many of the clumps have other saltmarsh species colonising these clumps and this reduces the actual overall cover of Sea Rush. Sea Purslane is found quite frequently amongst these clumps with Red Fescue. Other species found occasionally include Saltmarsh Rush, Sea Arrowgrass, Sea Aster, Sea Plantain, Sea Pink, Creeping Bentgrass, Common Scurvygrass and Lax-flowered Sea Lavender.

One notable aspect of the distribution of Sea Rush is that it is sometimes found to the seaward side of ASM vegetation and adjacent to the *Spartina* sward. This occurs in the narrow bands of ASM/MSM mosaic. Common Saltmarsh-grass and Lax-flowered Sea Lavender are found within this vegetation associated with the clumps of Sea Rush. This zone also contains pans infilled with common Saltmarsh-grass. The ASM and MSM were mapped as a mosaic as the saltmarsh is quite narrow and it would be difficult to map the two habitats separately. This saltmarsh on the western side of the estuary transitions to rank grassland dominated by Twitch.

This habitat is also situated behind a low embankment in the northern part of the estuary. It forms patches dominated by Sea Rush amongst brackish vegetation.

Species such as Common Reed, Silverweed (*Potentilla anserina*), Curled Dock (*Rumex crispus*) Reed Canarygrass (*Phalaris arundinacea*) indicate the brackish nature of the adjacent vegetation. There are also patches dominated by Twitch, and Nettle (*Urtica dioica*), Thistle (*Cirsium arvense*) and Bramble (*Rubus fruticosus*) are spreading in to this area and forming thickets in areas elevated above the high water mark.

There is generally little development of saltmarsh topography within the MSM habitat as it forms generally narrow zones. Small salt pans are present but these occur infrequently and there are few creeks.

Part of the brackish marsh located along the Mayne River can be classified as MSM due to the presence of Borrer's Saltmarsh-grass (*Puccinellia fasciculata*). This species is very rare in Ireland and is listed on the Flora Protection Order. It has only been recorded from seven 10 km<sup>2</sup> squares in Ireland (Preston *et al.* 2002). Borrer's Saltmarsh-grass was not recorded during this survey but Saltmarsh-grass sp. (*Puccinellia* sp.) was present. Meadow Barley (*Hordeum secalinum*) has also been recorded from this site, although it is not known if it was present in the saltmarsh habitat. This species is also listed on the Flora Protection Order.

A small low-lying area is inundated occasionally by the tide accessing this area via the Mayne River and several drains. This area contains hollows with mid-upper zone marsh, ASM-like vegetation with frequent Red Fescue, Creeping Bentgrass, Sea Milkwort, Sea Plantain, Sea Arrowgrass and Saltmarsh Rush along with Saltmarshgrass spp. (Puccinellia spp.). It has been disturbed in the past and some creek-like drains are connected to a larger drain to the west. This large drain/channelised stream is partially infilled with Common Reed (Phragmites australis) and Sea Club-rush (Bolboschoenus maritimus). This is a mosaic area that is dependant on the topography and there are frequent tussocks with more brackish and terrestrial vegetation within the MSM saltmarsh area. There are signs of brackish conditions with Silverweed, White Clover (Trifolium repens), Twitch and Curled Dock appearing around the edges of this area and on some low mounds and tussocks within the MSM area. The vegetation around the edge of this habitat is dominated by Twitch and meadow grassland (GS3). The sward height is quite high and this area is not grazed at present.

# 4 IMPACTS

There are several impacts on this site (Table 4.1). These impacts can be divided into older impacts that are still having a residual impact and current impacts and activities on the site. There are few current impacts within the site, with the main impact being the presence of Common Cordgrass. The activity codes used in Table 4.1 are given in brackets in the following text.

There are frequent signs of old reclamation works, infilling (800) drainage (810) and modification of the drainage channels (850) around the estuary that have affected the saltmarsh. These activities, while they may still be having a residual impact are not assessed as they occurred prior to the current period of assessment. A drain crosses the north-east part of the estuary and this drain has a low ridge alongside it created by the spoil from the embankment. This drain looks like it has been deepened or cleaned in the past 20 years. The north-west corner of the estuary and saltmarsh adjacent to the bridge has also been modified with an old wall along the Sluice River channel. This area also has a series of sea walls that may have been part of a small harbour or boat jetty in the past. This area also has a series of grassy mounds that are likely to have been spoil or soil dumped on the site in the past. Some old rubble has been dumped in this area. The saltmarsh vegetation seems to have colonised this area and developed in the hollows.

There are also signs of older reclamation works and drainage along the western side of the estuary. There are a series of old embankments and ridges along the upper saltmarsh and landward boundary of the saltmarsh along this side of the estuary. A small area of saltmarsh located adjacent to the Race Course has been reclaimed (probably infilled) and now contains several houses, gardens and some rank grassland. Further north there are signs that some of the saltmarsh has been infilled in the past with this area now containing rank grassland and scrub along the road.

The small area of ASM saltmarsh located in Area 5 has been slightly damaged by wheel ruts and vehicle use along an old track (501). These vary in age and some old ruts have been vegetated by Common Cordgrass. Portmarnock Golf Course is situated very close to this part of the saltmarsh with a fairway situated on higher land adjacent to an embankment down to the saltmarsh.

Much of the saltmarsh habitat has embankments (870), sea walls or sea defence features such as large boulders (871) along the landward boundary. The presence of these hard artificial boundaries prevents the potential landward migration of saltmarsh habitats in response to sea level rise.

The saltmarsh around this estuary is not grazed by livestock and this has allowed a diverse sward structure to develop. The upper saltmarsh is generally dominated by tall grasses (0.4 m high). The sward height is noticeably higher than at Bull Island indicating that natural grazing levels are quite low. This is probably related to the fact that the estuary is quite enclosed and surrounded by roads and urban areas, so there are few wildlife corridors to the site. The saltmarsh in Area 5 had a lower sward height and this may indicate that it is grazed by Hares and other animals, as there are mammal tracks present. The Mediterranean salt meadows located in Area 6 north of Racecourse area also have tall sward height and this area is not grazed extensively.

There are some signs of erosion (900) along the seaward edge of the saltmarsh situated in the mid part of the estuary (Area 2). Saltmarsh has developed on a thin band of mud overlying shingle and pebbles, and the mud is eroding away back to the stony deposits. There are also signs of erosion on the saltmarsh located in the south-eastern corner of the estuary. Accretion (910) has also occurred at the lower end of Portmarnock Spit. The sand spit has grown significantly since the 2<sup>nd</sup> ed. 6 inch OS map was drawn (by 250 m), allowing the development of sand dunes and saltmarsh within the lower lying areas between the dune ridges. Most of this accretion has occurred prior to the current period of assessment.

The development of the *Spartina* swards has also had a significant impact in the estuary in the past 100 years. Common Cordgrass has mainly colonised intertidal mudflats seaward of the saltmarsh and has formed extensive swards (954). The impacts on the mudflats (also an Annex I habitat) are not assessed during this survey. These swards developed in the 1950's (O'Reilly & Pantin 1957). There has also been some transition to ASM along the edges of the Sluice River channel.

There is no evidence to indicate that *Spartina* swards are still spreading within Baldoyle Estuary. There are actually signs of recent dieback along the seaward side of the sward lower down in the estuary (within the areas mapped as *Spartina* 

clump/mudflat mosaic). Some clumps have died back and are being eroded. The development of these *Spartina* swards has more than doubled the vegetated area of saltmarsh in the estuary. Common Cordgrass has spread onto the former saltmarsh but has not replaced significant areas of ASM with *Spartina* sward. Clumps of Common Cordgrass are also present within the *Salicornia* flats habitat although at low cover values.

Activities occurring outside the site include roads (502) situated very close to or adjacent to the saltmarsh, extensive urban areas (401) and golf course (601).

EU Habitat Code <sup>1</sup>	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected (ha)	Location of activity <sup>5</sup>
1310	954	С	-1	0.39	Inside
1330	501	С	-1	< 0.01	Inside
1330	900	С	-2	< 0.01	Inside
1330	954	С	-1	12.68	Inside
1410	954	С	0	1	Inside
13s	401	С	0	12	Outside
13s	502	С	0	12	Outside
13s	601	С	0	2.2	Outside

**Table 4.1.** Intensity of various activities on saltmarsh habitats at Baldoyle Estuary.

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> 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 sand dune habitat that are impacting the saltmarsh habitat.

#### **5** CONSERVATION STATUS

Overall, this site has a favourable conservation status (Table 5.1). This site has been subject to significant infilling, reclamation, drainage and modification of drainage channels in the past 150 years. These activities are still having a residual impact on the site in places. There are few current activities or impacts within the site. The most significant impact is the presence of Common Cordgrass, an invasive species. This saltmarsh is also notable for the presence of several species of local distinctiveness, including Borrer's Saltmarsh-grass and Meadow Barley, both Red Data Book species, and Rock Sea Lavender, a species of local distinctiveness. There are several significant activities acting on the site from outside, including roads situated close or alongside the boundaries of both sides of the estuary, the presence of urban areas and the presence of a golf course on Portmarnock Spit.

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

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at Baldoyle Estuary.

#### 5.1 Salicornia and other annuals colonizing mud and sand (H1310)

#### 5.1.1 Extent

The extent of this habitat is assessed as favourable in the absence of accurate information on the previous extent of this species within the assessment period. O'Reilly and Pantin (1957) surveyed the saltmarsh plant communities of the Baldoyle Estuary. This survey indicated that patches of Glasswort were previously more extensive on the mudflats. A strip of Glasswort was found in the south-east corner of the estuary and no *Salicornia* flats are present at this location during the current survey. Glasswort patches may have also been more extensive on sandflats adjacent to the racecourse but this area has been disturbed by infilling. *Salicornia* flats are still present in this area but are not extensive. These losses in extent are not considered as they occurred prior to the current period of assessment.

#### 5.1.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Two monitoring stops were recorded in this habitat and both passed. All the attributes reached their targets. This habitat is acting as a pioneer saltmarsh community along

the ASM saltmarsh located adjacent to the Race Course (Area 2). However, there are signs of erosion at this site and this may aiding the development of this habitat by providing bare substrate for colonisation. Common Cordgrass is present within this habitat and is a negative indicator. However, it is currently found at low cover values < 10%). There were no other negative indicators on this habitat. On the other side of the estuary the *Salicornia* flats transitions to *Spartina* swards. Patches of *Salicornia* flats are also present in salt pans within the large area of ASM. These patches also act as pioneer saltmarsh vegetation.

# 5.1.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This is due to the presence of Common Cordgrass within and adjacent to this habitat. This species has the potential to colonise within the *Salicornia* flats habitat and replace it. There are no other significant impacts or activities on this habitat.

# 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 significant loss of habitat within the current assessment period. There have been losses of extent during the past 50 years but these are not assessed as they occurred prior to the current assessment period. There are signs of erosion at Areas 2 and 3. These are small ASM areas and erosion may have been exacerbated by infilling or sea defence measures (sea wall) located adjacent to these patches of ASM. There are no indications that there have been significant losses of extent due to erosion during the assessment period as these patches of saltmarsh are quite small in relation to the rest of the site.

O'Reilly and Pantin (1957) surveyed the saltmarsh plant communities of the Baldoyle Estuary. Since then Common Cordgrass has spread and colonised significant areas of mudflats and has also spread into the ASM. However, it has not transformed much ASM into *Spartina* swards. In fact the opposite has occurred and some *Spartina* swards are now developing into lower zone ASM saltmarsh. This is particularly notable along the edge of the Sluice River channel. This channel has narrowed and the *Spartina* sward banks have been raised somewhat to a higher level compared to

the sward landward of the bank, probably due to siltation from the river. This has allowed the development of vegetation dominated by Sea Purslane in a narrow band along these banks. There are no indications that Common Cordgrass has spread significantly on the ASM during the current assessment period.

Some saltmarsh along the western side of the estuary has been infilled since the O'Reilly and Pantin (1957) survey and the extent of ASM was likely to have been reduced. Counter-acting some of this loss of habitat, there has been some creation of saltmarsh habitat at the southern end of Portmarnock Spit since this survey.

#### 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as unfavourable- inadequate. Twelve stops were carried out in this habitat and eleven passed. One monitoring stop failed due to damage from wheel ruts, which damaged part of the saltmarsh located at the southern end of Pormarnock Spit. All the attributes reached their targets. The saltmarsh had a typical species diversity and several different saltmarsh communities were present, including one with Rock Sea Lavender, which is a species of local distinctiveness. The sward height was relatively tall due to the absence of livestock grazing and lower levels of grazing by wild birds and animals. However, the sward structure was still quite diverse due to the presence of several different communities including the taller grassier communities of the mid-upper marsh and the lower communities dominated by Sea Pink and Sea Plantain of the mid-lower marsh. The largest area of saltmarsh has a well developed creek and salt pan structure. The other parts of the saltmarsh have a poorly developed structure and are more typical of a fringe type saltmarsh as they occur as a narrow band of saltmarsh around the landward boundary of the estuary, with Spartina swards extensive at the seaward side of the ASM.

Common Cordgrass is a prominent part of parts of the ASM, particularly in the lower zone areas of Area 1. It may reach cover values of 40%. Areas with cover above 40% were classified as *Spartina* swards, but these areas still had significant amounts of ASM vegetation within them. Broader natural transitions have developed between the *Spartina* sward and the ASM in this area due to the spread of Common Cordgrass onto the ASM, compared to the more abrupt boundary between these two habitats where *Spartina* swards colonised mudflats at the edge of the ASM. Between the

period 1950 and 1955, saltmarsh of almost pure stands of Sea Purslane and Common Saltmarsh-grass in the raised saltmarsh in the north-west corner of the estuary (Area 1) were replaced by Common Cordgrass (O'Reilly and Pantin, 1957). This change in vegetation structure is not assessed as it occurred prior to the current assessment period. The spread of Common Cordgrass has significantly limited the extent of lower zone saltmarsh dominated by Saltmarsh-grass although small patches of this vegetation can be seen along the edges of some of the creeks and salt pans. This species is more usually found occasionally or frequently in conjunction with Sea Purslane and common Cordgrass. There are no indications that Common Cordgrass has spread on the ASM during the current assessment period.

There are relatively few transitional areas where the saltmarsh naturally transitions to terrestrial habitats. Most of the saltmarsh is situated along man-made boundaries, such as seawalls along road sides. There are some small transitions to Twitch-dominated grassland and rank grassland up narrow embankments that were probably affected by infilling. Natural transitional areas can be seen at the southern end of Portmarnock Spit where saltmarsh transitions to sand dune habitats and in the north-east corner where there is a small area of brackish vegetation behind a low embankment. These areas increase in importance due to the relatively limited extent of natural transitions around the rest of the estuary.

# 5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that current management activities and impacts on this habitat continue in the near future. There are few impacts or activities affecting this habitat. Most of this habitat is located within the Baldoyle Nature Reserve. The area located at the southern end of Portmarnock Spit is excluded for the nature reserve and may be vulnerable to future disturbance from the adjacent golf course.

#### 5.3 Mediterranean salt meadows (H1410)

#### 5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There are no signs that the extent of the Sea Rush-dominated community has changed recently and there are no significant impacts on it such as erosion.

There are some indications that the area of brackish marsh at Mayne including the MSM community containing Borrer's Saltmarsh-grass has decreased. Older maps showed that brackish vegetation was more extensive in the recent past (Natura 2000 explanatory map etc). However, more information is required before the extent for this community is assessed as unfavourable. This perceived reduction may be related to differences in classification of plant communities, with a narrower classification being used during this survey.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Seven monitoring stops were carried out in this habitat and they all passed. All attributes reached their targets. The Sea Rush dominated community has a typical species diversity. The presence of this community adds to the overall habitat diversity and sward height diversity. This community does not form extensive uniform areas at this site but is generally present as a narrow band of vegetation in mosaic with the ASM vegetation. Saltmarsh topography is poorly developed within this community as its distribution is so narrow and disjunct in places.

The presence of a salt marsh community at Mayne Marsh with Borrer's Saltmarshgrass increases the conservation value of this habitat, as this is a species of local distinctiveness. This is a brackish saltmarsh community and contains frequent indications of transitional vegetation.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts or activities affecting this habitat. Most of this habitat is located within the nature reserve. The brackish marsh at Mayne Marsh is excluded from the nature reserve.

# 6 MANAGEMENT RECOMMENDATIONS

No management is required for this site.

# 7 REFERENCES

- O'Reilly, H. & Pantin, G. (1957). Some observations on the salt marsh formation in Co. Dublin. *Proceedings of the Royal Irish Academy*, 58B, 89-128.
- Preston, C.D. Pearman, A. & Dines, D. (2002). New atlas of the British and Irish *Flora*. Oxford University Press.





Saltmarsh

**Monitoring Project** 

# **Baldoyle Estuary**

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

Kilisma leorainneacha a' an léarscáil seo ach noi garshuíomhadh ginearáila. Féadrar alhbineilimí ine adéanamh ar heorainneacha na gceantar comharthaílte. Machasanhaíl d'ábhar na Suirbhéarachta Ortionáis le chead ón Rialtas. (Ceadunas Vimh. 5953)

# Baldoyle Estuary cSA

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# **Booterstown**

#### **1 SITE DETAILS**

Dates of site visit: 20/09/2007 CMP site code: N/A	
SM inventory site name: Booterstown Marsh SM inventory site code: 229	
NPWS Site Name: Booterstown Marsh	
NPWS designation cSAC: N/A MPSU Plan: N/A	
pNHA: <b>1205</b> SPA: <b>N/A</b>	
County: Dublin Discovery Map: 50 Grid Ref: 320147, 230412	
Aerial photos (2000 series): O 3329-B,D; O 6 inch Map No: Du 023 3330-A,C	
Other SMP sites within this SAC/NHA: N/A	
Saltmarsh type:SandflatsSubstrate type:Mud/Sand	

# 2 SITE DESCRIPTION

Booterstown Marsh is a small enclosed area of marshland found in the southern suburbs of Dublin that developed due to the construction of the Dublin-Kingstown (Dun Laoghaire) railway in the 19<sup>th</sup> century. The marsh developed in low-lying land cut off by the railway embankment and it drains by a series of sluices and one main outflow to the south-east of the DART Station (Williamstown Pond). There is some freshwater seepage into the marsh from a culverted stream at the north-west corner and probably also from seepage along the western embankment.

Part of this marsh was reclaimed in the past when a sluice was constructed and part of the marsh was used for growing vegetables in the early part of the 20<sup>th</sup> Century (although there is likely to have been permanent saline influence along the drain adjacent to the railway). The old ridges created by the vegetable cultivation can still be seen in the marsh. During the 1960's the marsh was grazed for pasture. In the 1950's and 1960's, land was further infilled at both ends of the marsh; a car park was constructed at the south-western corner, while the Trimleston stream was culverted along the northern edge of the marsh, to discharge to the sea (Reynolds and Reynolds 1990). However, the valves of the sluice corroded allowing tidal influence to re-enter the site. This created a brackish marsh with freshwater, brackish and saltmarsh vegetation present (Reynolds and Reynolds 1990). There is a salinity gradient from the western to eastern side of the marsh. The site was affected by oil spills in the early 1980's. The damaged valves where removed by the local authority in recent years to allow more saline water to re-enter the site.

The land is held on long term lease by An Taisce and its primary ecological value is as a bird sanctuary in the largely suburban setting. The site has been proposed as a National Heritage Area (pNHA), although it may in the future be given additional protection by its inclusion in the revised and enlarged Dublin Bay candidate Special Area of Conservation (cSAC). The site is largely surrounded by urban habitats with some disturbed ground also found in the vicinity of the marsh.

Sandymount Strand, with extensive intertidal sand flats, is located on the seaward side of the railway embankment. A small area of dune vegetation is developing on a new accumulating sandbank along the shoreline of Sandymount Strand, north of Booterstown Marsh. This area was also surveyed.

An intrinsic value of the marsh at Booterstown is the wildfowl population that it supports within an urban setting. Three Annex I saltmarsh communities were recorded at the site, *Salicornia* mudflats, Atlantic salt meadow (ASM) and Mediterranean salt meadow (MSM), although the overall extent of these habitats is quite low (Table 3.1). Booterstown is also noteworthy for the presence of Borrer's saltmarsh grass (*Puccinellia fasciculata*), a rare and legally protected grass, which is only known from a small number of locations around Ireland. This species is listed on the Flora Protection Order and is also listed in the Red Data Book. This species is found in more brackish conditions than found typically 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 also an indicator of a rarer sub-type of MSM. This species has only been found from seven 10 km<sup>2</sup> squares along the Barrow Estuary, Wexford and Dublin shorelines since 1960. It was first recorded at the site in 1904 and then was re-discovered in 1971 (Reynolds and Reynolds 1990).

Access to the marsh is made at the newly constructed seating and viewing area or alternatively from the car park adjacent to the railway station. Despite the fact that the marsh may be unflooded for long periods of time, the bare mud is extremely treacherous, even among the edges of the vegetated areas.

The whole of the marsh is located within the pNHA boundary. However, the outflow channel south of the Dart Station (Williamstown Pond) has been excluded from the pNHA.

# 3 SALTMARSH HABITATS

#### 3.1 General description

Booterstown is primarily a brackish marsh, and some fragmentary saltmarsh vegetation is found around its fringes. A large part of the marsh is unvegetated and contains bare intertidal mudflats. Most of the vegetated marsh is situated along the western side of the marsh, parallel to the Rock road. The majority of the vegetation recorded within the marsh comprises dense 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, and are typical of more brackish conditions. There are signs that these stands have died back on the mud towards the south-western end. Other species found in this sward include Sea Aster (*Aster tripolium*), Sea Purslane (*Atriplex portulacoides*), Spear-leaved Orache (*Atriplex prostrata*) and Common Saltmarsh-grass (*Puccinellia maritima*) and these species are found at low densities at the landward side of the stands. There is some transition with wet grassland type vegetation along the back of the Sea Clubrush stands, particularly at the north-western corner of the site.

Transitional vegetation comprising Twitch-dominated grassland and scrub are found at the uppermost levels of the marsh and extend along the front of the car-park and around below Rock road. The Railway embankment is characterised by scrub and other vegetation including in places narrow bands of Sea Purslane. The final edge of the marsh is bounded by the culverted Trimlestown River.

Several patches of *Salicornia* flats vegetation occur on muddy substrates, often to the front of extensive stands of Sea Club-rush. The remainder of the Annex I saltmarsh communities consist of two adjacent patches of ASM and MSM that develop in a narrow band along the marsh shoreline.

EU Code	Habitat	Area (ha)
H1310	Salicornia and other annuals colonizing mud and sand	0.022
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.062
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.018
	Total	0.102

Table 3.1. Area of saltmarsh habitats mapped at Booterstown.

<sup>\*</sup>note that saltmarsh habitat may continue outside the mapped area.

The small area of coastal habitat, developing along Sandymount Strand on the seaward side of Booterstown marsh is dominated by immature sand dune vegetation. This area is within the South Dublin Bay cSAC. This sand bank has only developed in the past few years. The newly accreting sand is highly disturbed and characterised by Marram (*Ammophila arenaria*), Lyme grass (*Leymus arenarius*), Sand couch (*Elytrigia juncea*), Red Fescue (*Festuca rubra*), and Sea Mayweed (*Tripleurospermum maritimum*).

A rudimentary stand of vegetation containing saltmarsh species was also recorded in a lowlying area behind the main sand bank that is also used as a track by walkers. The combination of species which were recorded here, many of them typical of a salt marsh habitat, are indicative of the disturbed nature of this area. Species recorded included Red Fescue, Creeping Bent (*Agrostis stolonifera*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea Lavender (*Limonium humile*), Rock Sea Lavender (*Limonium binervosum*), Sea Beet (*Beta vulgaris* ssp. *maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Reflexed Saltmarsh-grass (*Puccinellia distans*) and Common Sea-spurrey (*Spergularia media*). There is no development of a typical saltmarsh topography with creeks and pans. There is also no distinct development of typical saltmarsh and sand dune communities that would be seen at a more mature site. It is characteristic of pioneer vegetation.

Elsewhere, the vegetation on the sand bank is characteristic of the Annex I Perennial vegetation of stony banks (H1220) and species such as Curled Dock (*Rumex crispus*), Sea Plantain, Sea Sandwort (*Honckenya peploides*), Sea Kale (*Cakile maritima*), Prickly saltwort (*Salsola kali*) and Orache (*Atriplex* sp.). There were also several small patches of *Salicornia* flats on the sandy mud along the seaward edge of this sand bank and the north end. These patches were too small to map.

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

This habitat is characterised by the presence of Glasswort (*Salicornia* sp.) and was found on soft mud. This habitat is quite narrow, only several metres wide and was found on the seaward side of the MSM and the stands of the Sea Club-rush. A small number of other species were noted such as Annual Sea-blite (*Suaeda maritima*) and Sea Purslane (*Atriplex portulacoides*), the latter species occurring on substrates which were more consolidated or had shingle mixed with the mud. The majority of the *Salicornia* vegetation was recorded along the front of the Sea club-rush sward within the marsh. This is a typical pioneer saltmarsh habitat.

Small individual clumps of Glasswort were also noted around the seaward edge of the sand bank on the seaward side of the railway embankment. Smaller isolated clumps were also recorded further out on the intertidal mud, although the development of extensive *Salicornia* mudflats was not recorded.

# 3.3 Atlantic salt meadows (H1330)

The ASM accounted for more than 50% of the total Annex I saltmarsh communities that were recorded at Booterstown (Table 3.1) but the overall extent is quite small. The majority of the ASM vegetation was located along the western side of the marsh and has developed in a narrow band along the marsh shoreline where Sea Club-rush does not dominate. The most consistently recorded species included Sea Purslane, Sea Aster, Common Saltmarsh-grass, Glasswort, Sea Mayweed, Greater Sea Spurrey, Spear-leaved Orache, Lax-flowered Sea Lavender, Rock Sea Lavender and Sea Plantain. Sea Club-rush is also present but at low densities.

This vegetation is quite open and immature and is typical of pioneer saltmarsh. There is some bare mud present within this sward. The ASM habitat is poorly developed and there is no significant zonation into different ASM communities. Bare mudflats are present along the seaward or marsh side of this vegetation. However, some zonation is evident with a transition to Twitch-dominated vegetation along the landward side of this band.

Small patches of Annual Sea-blite and Sea Purslane are found on disturbed ground around a small bridge that connects the railway station with the car park. Some elements of saltmarsh vegetation were occasionally encountered along the railway embankment including Common Saltmarsh-grass, Greater Sea-spurrey, Glasswort, Spear-leaved Orache, Lax-flowered Sea Lavender and Sea Plantain. However, most of this vegetation is quite narrow (< 5m wide) and not extensive.

# 3.4 Mediterranean salt meadows (H1410)

There are several small patches of the more typical form of this habitat characterised by the presence of Sea Rush (*Juncus maritimus*) mapped at the site. However, this habitat is very poorly developed and there is no significant development of a distinctive vegetation type. Other species that were associated with the MSM include Sea Aster (*Aster tripolium*), Greater Sea-spurrey, Sea Arrowgrass (*Triglochin maritimum*) and Glasswort.

A second rarer sub-type MSM with Borrer's Saltmarsh-grass as an indicator species is present at this site. The extent of this habitat is quite low and there were only 20-30 plants recorded during this survey scattered over a very small area. The Borrer's Saltmarsh-grass was found in association with other typical ASM species such as Common Saltmarsh-grass, Glasswort, Sea Plantain and Sea Aster. The Borrer's Saltmarsh-grass appears in open patches in the sward with bare mud. Twitch dominated vegetation is also present close by. There is no distinctive vegetation type at Booterstown Marsh that contains this species although the Borrer's Saltmarsh-grass seems to be found in a particular linear zone. This suggests that periodic flooding is an important ecological factor in determining its current distribution.

# 4 IMPACTS AND ACTIVITIES

Booterstown marsh is primarily managed as a wildlife sanctuary and the list of impacts and activities which were noted at Booterstown are listed in Table 4.1. The marsh is landlocked by the railway embankment. The tidal influence on this site is restricted and may be affected by the use of the sluices. This has a very significant influence on the ecological conditions of the site. It is not known if flooding of the marsh can be manually controlled at present (853). Flooding has also occurred accidentally in the past when the sluice sticks in a closed position but this restricts tidal inundations and promotes brackish conditions. The current extent of Sea Club-rush stands indicate that brackish conditions are most typically found at this site. This species can also withstand longer periods of temporary flooding compared to other saltmarsh species, so periodic flooding for long periods may promote this species. The changes in the cover of Sea Club-rush can be assessed as natural change (990) that may be having a negative impact on the Annex I saltmarsh habitats. Any man-made changes to the flooding regime could be assessed as modifications of water levels (853), although it was not confirmed if this has taken place.

The site is used by nature enthusiasts such as the Dublin Naturalists Field Club (DNFC). The saltmarsh is infrequently used by walkers (622) and there is no well-defined track. Local people are attempting to maintain the status of Borrer's Saltmarsh-grass by removing adjacent competing vegetation dominated by Twitch, which has the potential to cover and outcompete the Borrer's Saltmarsh-grass. The population is being monitored unofficially by the DNFC.

Recently two artificial islands within the marsh for the purposes of providing suitable nesting ground for some of the bird species have been constructed (800). These islands were built on bare mud and did not directly affect the Annex I saltmarsh habitats. This plan came about as a result of recent road improvements and pipe-laying work on the nearby Rock road. The excess unsuitable road-building material was used to construct the two islands. It would appear that the material had not been fully screened which led to the highly publicised debate. The offending materials were removed, but to date the islands remain largely unvegetated and are not used significantly by birds. The islands may be too high.

Some disturbance and infilling along the railway embankment and at the back of the railway station as part of the DART upgrading works has occurred. This includes the planting of Sycamore (*Acer pseudoplatanus*), which is an invasive species (954). However, this does not affect the saltmarsh.

The site is not grazed by livestock (140) and there is no significant natural grazing as the site is land-locked. This site is not affected by erosion as it is quite sheltered (900). Common Cordgrass, an invasive species that spreads on saltmarsh and bare intertidal mudflats is not present (954). However, this species has the potential to spread on the bare mud if it ever colonises this site.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	622	С	0	0.062	Inside
H1330	990	В	-1	0.062	Inside
H1410	622	С	0	0.018	Inside
H1410	990	В	-1	0.018	Inside

Table 4.1.	Intensity	of various	activities	on saltmarsh	habitats a	t Booterstown.
		01 10000	000000	on oundination	naonato a	

<sup>1</sup> EU codes as per Interpretation Manual.

<sup>2</sup> Description of activity codes are found in Appendix III, Summary Report 2007-2008.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> Impact is rated as -2 = irreparable negative influence, -1 = reparable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

<sup>b</sup> 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 at this site during the survey. There are no specific notes in the NHA survey for the saltmarsh at this site. There are several descriptions of the vegetation of this site available from several sources (NPWS rare plant survey, Goodwillie *et al.* 1970, Reynolds and Reynolds 1990). Goodwillie *et al.* (1970) noted that the largest part of the marsh was dominated by grasses in 1970.

Reynolds and Reynolds (1990) describe the vegetation of the site in detail from surveys in the 1980s. The marsh has changed significantly since this survey, which described very little bare mud in the marsh compared to the status in 2007-2008, where the marsh is dominated by bare mud. Several different communities were noted in 1988 including freshwater vegetation in both corners adjacent to the Rock Road. Some freshwater vegetation is still present in the north-west corner but the area in the south-west corner is now dominated by Sea Club-rush. There were extensive stands of Sea Club-rush along the western side in 1988 (in a similar position to the stand of Sea Club-rush in 2007-2008). Sea Club-rush stands may have been more extensive in 1988 in the north-western quarter, where a shallow pond was also noted within this area. More typical open saltmarsh vegetation was noted in the south-eastern quarter of the marsh in 1988, where there are now bare mudflats.

A comparison of aerial photographs from 1995, 2000 and 2005 also reflects these changes in vegetation cover. The stands of Sea Club-rush and other vegetated areas within the marsh have visibly diminished between 1995-2000-2005 and there is increased bare mud cover in 2005.

The overall conservation status of the site is assessed as *unfavourable-bad* (Table 4.1). Booterstown Marsh is primarily a brackish marsh dominated by Sea Club-rush vegetation and there is very little development of typical Annex I ASM or MSM saltmarsh communities. The current mapped ASM and MSM at the site is poorly developed. The presence of Borrer's Saltmarsh-grass is the main feature of conservation interest. This is an indicator species of a rarer subtype of MSM. However, there is no significant development of a distinctive vegetation community or habitat containing this species. Borrer's Saltmarsh-grass is found associated with other ASM species. It has declined significantly in distribution and frequency compared to its status around 1988 when it was described as growingly vigorously over the old allotment flats.

Reynolds and Reynolds (1990) described some changes in the management regime in 1988 when a dyke was dug across the flats to connect the pond with the saline ditch. A sluice was constructed in 1989 to control the flow of saline water into the marsh from Williamstown Pond (south-east of the DART station). The sluice was fixed permanently open for a period in 1989. It is not known if there is any current active management of the sluice gates to control water flow.

Other than the pNHA designation which covers the site, the NPWS have no published management or conservation plan for the site. A new NGO called Friends of Booterstown (<u>www.friendsofbooterstown.ie</u>) was set up in 2006 to promote the conservation of the site.

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

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

#### 5.2.1 Extent

The extent of this habitat is assessed as *favourable*. Only a very small amount of this habitat was recorded. There are no indications of any loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period. There is no information to suggest that this habitat was more extensive in Booterstown Marsh in the past.

This habitat was also recorded during this survey associated with the sand bank developing on Sandymount Strand north of Booterstown marsh. The extent was also quite limited and sparse. This habitat has been noted along other parts of Sandymount Strand in the past (Irishtown).

# 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. It was not assessed using monitoring stops as the habitat is relatively limited in its occurrence, However, a visual assessment indicated that the small patch of *Salicornia* flats vegetation was nonetheless functioning as expected. It forms part of the pioneer saltmarsh community at this site and is located on the seaward or marsh side of the more typical ASM and Sea Club-rush vegetation.

# 5.2.3 Future prospects

The future prospects of the habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There is little information on which to assess this target. However, it is unlikely that there will be any significant change in the occurrence or extent of the habitat, unless there is a significant change in the flooding regime currently in operation at Booterstown marsh. For this reason, its future prospects are assessed as *favourable*.

# 5.3 Atlantic salt meadows (H1330)

# 5.3.1 Extent

The extent of the habitat is assessed as *unfavourable-bad*. Only a very small amount of this habitat was recorded. Previous descriptions of Booterstown Marsh indicate that vegetation cover was more extensive and this included some saltmarsh vegetation. It is likely that typical pioneer ASM vegetation communities were more extensive in Booterstown Marsh in the past (Reynolds & Reynolds 1990).

# 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. It was not assessed using monitoring stops as the habitat is relatively limited in its occurrence. A visual assessment indicated that the ASM was in fairly good condition. However, the ASM habitat is very poorly developed and is typical of pioneer vegetation developing at a disturbed site. The flooding regime seems to be the most significant factor affecting the ecological conditions of the site and the current ecological conditions do not seem to be promoting the development of typical ASM.

#### 5.3.3 Future prospects

The future prospects of the habitat are assessed as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. The flooding regime seems to be the most significant factor affecting the ecological conditions of the site and the current ecological conditions do not seem to be promoting the development of typical ASM. Brackish conditions are prevalent in the site and the site shows significant signs of disturbance.

# 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of the habitat is assessed as *unfavourable-bad*. Only a very small amount of this habitat was recorded. There are no indications of any loss of habitat due to land-use changes, erosion or the spread of Common Cordgrass within the current monitoring period.

This habitat is classified using Borrer's Saltmarsh-grass as an indicator species. Previous descriptions of Booterstown Marsh indicate that the occurrence of this species was more frequent in the past (+ 300 plants) and its distribution was also more extensive (NPWS Rare plant database 1991). Reynolds and Reynolds (1990) also describe 100's of plants growing over the allotment flats (now bare mudflats). Doogue *et al.* (1998) recorded the status of Borrer's Saltmarsh-grass at Booterstown as locally abundant. Therefore it could be expected that the extent of MSM habitat was also greater in the past. Its current location is generally similar to that previously noted although there has been a reduction in the extent.

#### 5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. One monitoring stop was carried out in this habitat and all the attributes required for favourable conservation status reached their targets. The remaining habitat is in good condition. Borrer's Saltmarsh-grass is found in relatively open patches of sward with other typical ASM species. It was not always found on bare or disturbed mud and was sometimes overshadowed by Sea Club-rush or found close to the adjacent band of vegetation dominated by Twitch. Both these species have the capacity to out-compete Borrer's Saltmarsh-grass by creating a closed dense sward. The assessment of *unfavourable-inadequate* is related to the fact that there is no development of a distinctive MSM community with Borrer's Saltmarsh-grass

The current flooding regime may be one of the main factors affecting the ecological conditions of the site and the current ecological conditions do not seem to be promoting the development of typical ASM. Brackish conditions have promoted the development of extensive stands of Sea Club-rush along the western side of the site (although these stands have contracted in recent years). It was thought that the anoxic conditions created by the oil spill in the 1980s also promoted the spread of this species (www.friendsofbooterstown.ie). Long periods of flooding in the marsh may also promote the development of bare mud and prevent extensive vegetation of the mudflats. Previously much more of the site was vegetated and Borrer's Saltmarsh-grass was more widespread and more frequent in occurrence in the past. Reynolds and Reynolds (1990) recorded both extensive Sea Club-rush and stands of more typical open saltmarsh vegetation with Borrer's Saltmarsh-grass together in the marsh in 1990, which may suggest that the extent of Sea Club-rush is not a significant limiting factor to the status of Borrer's Saltmarsh-grass. The presence of more extensive vegetated areas and less bare mudflats suggests that there may be less prolonged flooding in the past and tidal inundations were more regular.

#### 5.4.3 Future prospects

The future prospects of the habitat are assessed as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. The assessment is based on the current status of the population of Borrer's Saltmarsh-grass, which is very low compared to the population in the past.

In other saltmarsh sites that have been surveyed as part of the SMP, Borrer's Saltmarshgrass is a species that prefers a high degree of disturbance and is found in areas that have been heavily poached. The ground on which it thrives is generally heavily trampled and bare of vegetation in places. It seems to prefer to colonise bare mud as a pioneer species. This was also noted by Reynolds and Reynolds (1990) at Booterstown where it was thriving in open mud over the Allotment Flats. There is no grazing at this site and any future spread of Sea Club-rush or Twitch at this site has the capacity to out-compete and smother this plant at its current location.

This rare species is found in a site owned by and managed as a wildlife sanctuary. It is therefore protected from impacts related to land-use changes. The current unofficial monitoring by interested members of the Dublin Naturalists Field Club may highlight a change in its long-term status. However current flooding regime seems to be the most significant factor affecting the ecological conditions of the site. The reduction in the population of Borrer's Saltmarsh-grass seems to indicate that the ecological conditions during the current monitoring period have not favoured this species. Periodic flooding is one way of introducing disturbance into the site and this has affected the vegetation, although it is promoting brackish conditions and maintaining bare mud cover on the mudflats.

Borrer's Saltmarsh-grass has persisted at this site for a relatively long time (> 100 years) and there have been many changes in the ecological conditions of the site during this period. It was first recorded in 1900-1901 alongside a salt-ditch along the railway (Doogue *et al.* 1998). Reynolds and Reynolds (1990) also note that much of the marsh was unvegetated for a period in 1986, although there was much more extensive vegetation present over the marsh in 1988. This suggests that conditions in the marsh fluctuated significantly in the past and also suggest that the marsh can re-vegetate in the future if appropriate conditions are created. The fact that this species is still present at the site indicates that it is quite resilient and this should not be discounted. However, the current trend in the past 20 years is a reduction in population status of this species. Therefore, the status of this species in the future is threatened.

#### **6 MANAGEMENT RECOMMENDATIONS**

Care should be taken to actively manage water levels at the site. It is suggested that prolonged periods of flooding is one of the main reasons for the reduction in vegetation cover on the bare mudflats. This may be due to the sluice gate being closed for long periods of time. It is not known if the sluice gates are being actively managed. Regular tidal inundation into the marsh should be promoted and prolonged periods of flooding should be reduced. Active management should consider the conditions that developed during the 1980's when Borrer's Saltmarsh-grass thrived at the site. There is likely to be additional information available held by either the local authority or An Taisce.

As a pNHA which is managed primarily for its avian fauna, the presence of the rare Borrer's Saltmarsh-grass increases the conservation value of this brackish marsh. The plant is monitored by interested members of the DNFC.

In terms of the plant's status, no significant change in the current management regime is recommended. This plant may be vulnerable to significant changes in the flooding regime.

# 7 REFERENCES

Doogue, D., Nash, D., Parnell, J., Reynolds, S. & Wyse Jackson, P. (1998). *Flora of County Dublin.* Dublin Naturalists Field Club, Dublin.

Goodwillie, R. & O. & Brandt, E. (1970). Ecological Survey of Bull Island mud flats and Booterstown marsh. Student thesis, Department of Botany, Trinity College, Dublin. Dublin.

NPWS (1995). NHA survey notes. National Parks and Wildlife Service, Dublin.

Reynolds, JD; and Reynolds, SCP. (1990). Development and present vegetational state of Booterstown Marsh, Co. Dublin, Ireland. *Bulletin of the Irish Biogeographical Society* **13**, no. 2, pp. 173-184.

#### 8 APPENDIX I

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 Salicornia flats	0.022	0.022				
2	Spartina swards						
3	1330 Atlantic salt meadow	0.062		0.062			
4	1410 Mediterranean salt meadow	0.018			0.018		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)						
10	Spartina clump/mudflat mosaic (50/50)						
11	Isolated Spartina clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	Spartina sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.583					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	0.69	0.022	0.062	0.018		

Table 8.1. Areas of SMP habitats mapped using GIS.


Connishabi, Oldhreacht agus Hiatlas Áthui Brutianment, Heitlage and Local Government National Parks and Wildlife Service Saltmarsh Monitoring Project 2007-2008

Booterstown

Booterstown Marsh NHA (001205)



SMP0035

SMP code:

This habitat map was created with a combination of fieldwork, GPS and interpretation of aeral photos. Boundaries of designated areas are subject to revision. Produced from Ordinance Survey material by permission of the Government (Permit number 5953)

0	40	80	120	160	200	Meters	
Date of pro Map versio	duction: : n: 1	22/02/2009	Origin Scale	nal Drawin 1:3000	ng Size:	297 x 420 (A3)	

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### **Malahide Estuary**

### **1 SITE DETAILS**

SMP site name: Malahide Estuary		SMP site code: SMP0002		
Site name (Curtis list): Malahide Estuary		CMP site code: 7		
		Site No: (Curtis list): 232		
NPWS Site Name: Malahide Estuary		Dates of site visit 21-22/06	5/2006	
NPWS designation cSAC: 205		MPSU Plan: old format pl	an available	
	pNHA: <b>205</b>			
	SPA: Broadmeadow/	/Swords Estuary SPA 4025		
County: Dublin		Discovery Map: 55	Grid Ref: 321900, 247360	
6 inch Map No: Du012		Aerial photos (2000 series): <b>02925-d, 02926-b, 02926-c,</b> <b>02926-d, 02927-c, 02995-a, 02925-b, 02996-a</b>		
Annex I habitats curr	ently designated for Ma	alahide Estuary cSAC:		
Salicornia a	nd other annuals color	nizing mud and sand (1310	)	
Atlantic salt	t meadows (Glauco-Pu	(1 (1 (1 ) (1	1330)	
Mediterranean salt meadows (Juncetalia maritimi) (1410)				
Saltmarsh type: Estuary		Substrate type: Mud		

#### **2** SITE DESCRIPTION

Malahide Estuary is located in north County Dublin, east of Swords and north of Malahide. This estuary is similar to Rogerstown Estuary in that it is divided into an inner and an outer section by the Belfast-Dublin Railway. The railway crosses a viaduct that was built in the 1800s. The estuary is surrounded by low-lying land that is mainly agricultural along the northern side and mainly urban along the southern and western sides. The estuary is enclosed from the sea by a large sand spit that contains a large and dune system and a golf course (known as Malahide Island). The Coastal Monitoring Project surveyed this site in 2004. The outer estuary is dominated by intertidal mudflats. The tidal regime of the inner estuary has been modified by the construction of the viaduct and does not complexly empty at low tide, creating a lagoon. The Broadmeadow River flows into the inner estuary. The Broadmeadow M1 motorway bridge has been constructed at the western side of the inner estuary and covers some saltmarsh.

Three Annex I saltmarsh habitats, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM), are found at this site. All three habitats are

listed as qualifying interests for Malahide Estuary cSAC. *Spartina* swards are also present at this site and are also listed on the Natura 2000 form as a qualifying interest. Saltmarsh habitats are located in the inner and outer estuary and at the southern end of the sand spit. O'Reilly and Pantin (1957) surveyed the saltmarshes of Malahide Estuary in the 1950's and this information can be used as a baseline assessment. Ní Lamhna, (1982) also studied the saltmarsh at Malahide Island. Murray (2003) monitored the impacts of the construction of the Broadmeadow M1 Motorway bridge on saltmarsh and other habitats located at the western end of the inner estuary.

Most of the Annex I saltmarsh habitats are situated within the cSAC. There are some patches of these habitats around the site that are located outside the cSAC boundary. Some of these sections seem to be intentional exclusions. There is a portion of ASM located in the north-western corner of the outer estuary that is situated in an area that was probably reclaimed in the past. There are several small patches of ASM along the southern edge of the inner estuary that are also situated outside the cSAC boundary. These may be unintentional exclusions and are probably related to the use of the shoreline to draw the SAC boundary.

Malahide Estuary cSAC also includes the large sand dune system located on Malahide Island. The site is also important for wintering waders and wildfowl and both the inner and outer part of the estuary is also part of the Broadmeadow/Swords Estuary SPA. It holds internationally important numbers of Brent Geese and nationally important numbers of nationally important populations of Shelduck, Pintail, Goldeneye, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Redshank and Greenshank.

Saltmarsh at this site is easily accessible from several points. Saltmarsh around the outer estuary and on Malahide Island can be accessed from minor roads linked to Donabate. A minor road is also situated along the southern side and along the northern side of the inner estuary.

#### **3 HABITATS**

#### **3.1** General description

Annex I Saltmarsh habitats at this site can be divided into a series of sub-sites and described separately. Overall, Atlantic salt meadows (ASM) are the most common saltmarsh habitat (Table 3.1). There are only small amounts of *Salicornia* flats and Mediterranean salt meadows (MSM). The cover of *Spartina* swards is about 30% of the total amount of the other saltmarsh habitats.

#### 3.1.1 Malahide Island

This saltmarsh is located at the eastern side of the outer estuary on the sand spit. Atlantic salt meadows dominate in this habitat. This site has an unusual topography and there are long narrow bands of saltmarsh situated between sand dune ridges. Creeks flow into these narrow bands and drain them. *Salicornia* flats occur at the seaward side of the ASM on sand and mud. Common Cordgrass (*Spartina anglica*) is frequently found in parts of the lower saltmarsh, although there is a small patch of dense *Spartina* sward mapped in this saltmarsh.

#### 3.1.2 Outer Estuary

Saltmarsh is also located along the northern side of the outer estuary and is mainly situated in both of the corners of the estuary. The north-eastern corner of the estuary contains a range of different Annex I saltmarsh habitats that are located in a sheltered area and are typically zoned in an arc around the edge of the shoreline. The most prominent habitat is ASM. There are several patches of MSM located to the landward side of the ASM. This is the only MSM present in Malahide Estuary. A minor road and track along the shoreline marks the landward boundary and there is a small strip of transitional vegetation on a bank against the road, dominated by Twitch (*Elytrigia repens*) and containing Sea Beet (*Beta matitima*). *Spartina* swards have developed to the seaward side of the ASM and form a dense band about 60 m wide. Further seaward there is a mosaic of clumps of Common Cordgrass and mudflats and these clumps form another zone. The *Spartina* sward breaks up to the southern end of the saltmarsh and some *Salicornia* flats have developed along the ASM where the substrate becomes sandier. The saltmarsh eventually peters out as the shoreline

becomes rockier and transitions into a band of pebble. Common Cordgrass clumps continue northwards adjacent to the shoreline.

The north-eastern corner of the outer estuary is dominated by a dense *Spartina* sward. There is a narrow band of ASM along the shoreline at the landward edge of the *Spartina* sward. This narrow ASM band forms the transition along the shore road and along the hedgerows that follow the railway. A small stream flows into the estuary and the channel through the mudflats divides the saltmarsh into a northern and southern section. ASM is more extensively developed on the southern side of the channel and along a small portion of land that juts out eastwards into the estuary from the railway line. ASM occurs around the edge of this portion of land and there are scattered clumps of Common Cordgrass situated to the seaward side of the ASM on soft mud. The portion of land contains improved grassland, although there is a section within the field boundaries that is still saltmarsh. There is a transition from ASM to Twitch-dominated rank grassland to improved grassland at this location.

#### 3.1.3 Inner Estuary

Most of the saltmarsh in the inner estuary is situated at the western end, although there are several other fragments on the north and southern sides further east. The saltmarsh at the western side of the inner estuary is made up of several low-lying islands at Lissenhall including Horse bank and Mill Marsh. These are dominated by ASM although were are some ridges on these islands that contain transitional Twitch-dominated brackish grassland and also containing drift line species such as Sea Beet and Curled Dock (*Rumex crispus*). This plant community is not classified as ASM as it does not form part of the Glauco-Puccinellietalia maritimae. Common Cordgrass is occasionally frequent on these small islands and also on mudflats in the channels between some of these islands. The saltmarsh is overshadowed by the Broadmeadow M1 motorway bridge that crosses the marsh. ASM is mainly confined to the eastern side of the bridge. The area under the bridge and to the west of the bridge is dominated by brackish grassland dominated by stands of Twitch and Sea Club-rush (*Bolboschoenus maritimus*). Curled Dock, Nettle (*Urtica dioca*) and Sow-thistle (*Sonchus asper*) are present in these stands of Twitch.

A very small patch of mosaic saltmarsh occurs at Prospect Point on a small spit of land that juts south, from the northern shoreline. Saltmarsh has developed on the western sheltered side of this small spit. Saltmarsh also occurs in a small inlet located at Yellow Walls in the south-eastern corner of the estuary. This saltmarsh is dominated by ASM and there are several patches of *Spartina* swards on the established marsh in this area. This saltmarsh occurs in a small enclosed inlet and there is a narrow transition to wet and brackish grassland along the edges of this inlet.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	1.95
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	26.21
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.64
	Spartina swards	11.09
	Total (not including Spartina swards)	28.79

**Table 3.1.** Area of EU Annex I habitats listed at Malahide Estuary.

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

This habitat is present in the outer estuary adjacent to each section of the established marsh. It is not present in the inner estuary. The most extensive patches of *Salicornia* flats are located at the southern tip of Malahide Island on sandy mud. These patches are dominated by dense stands of Glasswort (*Salicornia* sp.) on a moderate slope. There are occasional Common Saltmarsh-grass (*Puccinellia martima*), Annual Seablite (*Suaeda maritima*), Lax-flowered Sea Lavender (*Limonium humile*) and Greater Sea-spurrey (*Spergularia media*) along the upper part of these patches. The lower section of these patches is generally a mono-specific sward of Glasswort. Common Cordgrass clumps are rare in these patches. There is an abrupt boundary between the *Salicornia* flats and the ASM that is marked by a low saltmarsh cliff dominated by Sea Purslane (*Atriplex portulacoides*). These patches of Glasswort transition to sandy mudflats further down the slope into the channel.

Further east along Malahide Island a transitional zone is present along the main creek between the *Salicornia* flats and the ASM. There is active accretion and growth of saltmarsh occurring at this location. This zone is a mosaic of *Salicornia* flats (75%) and lower zone ASM (25%) dominated by Sea Purslane and also containing Common Saltmarsh-grass and Lax-flowered Sea Lavender.

There are several patches of Glasswort amongst the clumps of Common Cordgrass on very soft mud located at the north-western corner of the outer estuary. Some of these patches were not mapped as the mud was so soft. Some of these patches have developed in areas where the Common Cordgrass has died back. There is also frequent Glasswort associated within the isolated clumps of Common Cordgrass.

#### 3.3 Atlantic salt meadows (H1330)

#### 3.3.1 Outer estuary

Atlantic salt meadows are present in both the north-eastern and north-western corners of the outer estuary. None of these saltmarshes are grazed. The largest section is located in the north-eastern corner. This ASM contains several saltmarsh plant communities. There is a natural transition along a very gradual slope at the seaward side with Spartina swards. Common Cordgrass is prominent in the lower zones of the ASM, which is dominated by Sea Purslane and contains frequent Common Saltmarshgrass. Lax-flowered Sea Lavender, Sea Arrowgrass (Triglochin maritimum) and Sea Aster (Aster tripolium). This zone transitions into a typical low-mid marsh zone dominated by Sea Pink (Armeria maritima), Sea Plantain (Plantago maritima) and containing frequent Sea Purslane, Lax-flowered Sea Lavender and Greater Seaspurrey. This zone has a low sward height. Further landward on some higher banks Red Fescue (Festuca rubra) and Saltmarsh Rush (Juncus gerardii) become prominent along with Sea Plantain. Mid zone ASM dominated by Sea Pink is present along some of the higher mounds that contain MSM. There are few creeks on this saltmarsh, although a small area that was probably a large pan or part of a creek has been infilled by Common Cordgrass and is mapped as *Spartina* swards.

There is a narrow strip of ASM situated along the landward edge of the *Spartina* swards in the north-western corner of the outer estuary. This is dominated by Sea Purslane and contains occasional clumps of Sea Rush (*Juncus maritimus*) and transitions sharply to a strip of twitch-dominated grassland and then the hedgerow.

The ASM along the southern side of the main channel in the north-western corner is notable for the lack of extensive Sea Purslane cover. There is a distinctive transition of saltmarsh plant communities through several saltmarsh zones on a moderate slope. There were no salt pans or creeks in this strip of ASM. Saltmarsh is located to the landward side of a field boundary on a low embankment. This area contains Longbracted Sedge (*Carex extensa*) in the upper zone dominated by Saltmarsh Rush. This zone transitions to a narrow zone dominated by Creeping Bent-grass (*Agrostis stolonifera*) on the landward side

#### 3.3.2 Inner estuary

The main area of saltmarsh is located at Lissenhall at the western end of the inner estuary. There are several small flat islands present that mainly contain ASM vegetation and are divided by narrow channels. There are also some low ridges that contain Twitch-dominated vegetation and other brackish or drift-line species and are not classified as ASM. The channels contain intertidal mud and occasional clumps of Common Cordgrass. The Broadmeadow M1 motorway bridge crosses the saltmarsh in a north-south orientation. This area was studied by Murray (2003) and several vegetation monitoring plots are present on both sides and under the motorway bridge.

The northern section of saltmarsh is situated along the shoreline. The landward edge of this section, including the area under the motorway bridge, is dominated by Twitch with occasional Red Fescue. Dense patches of Sea Club-rush dominate the rest of this area, with patches of Twitch. Other species present include Common Cordgrass, Creeping Bentgrass and Curled Dock. There are small brackish hollows that contain occasional Sea Aster, Spear-leaved Orache (Atriplex prostrata) and Sea Arrowgrass and were probably salt pans at one stage. The western part of this section is dominated by rank grassland with species such as Perennial Rye-grass (Lolium perenne) prominent. These areas were not classified as ASM. The eastern part of this area is classified as ASM. This area is dominated by mid-upper zone species with Saltmarsh Rush prominent. Other species present include Sea Aster, Common Scurvygrass, Common Saltmarsh-grass and Sea Arrowgrass. Clumps of Common Cordgrass are also present and there is a small patch of Spartina sward along the seaward edge, adjacent to the shoreline. A ditch is located along the northern side of this area with a pool at the western end. The ditch is notable for the presence of Tasselweed (Ruppia maritima). Parts of the ditch are filled with Sea Club-rush.

The small islands of the Horse Marsh are also similar to the area described above. There is a large area to the west of the bridge that is dominated by a dense sward of Twitch. There are some ASM features still present with occasional brackish hollows or old pans but overall the habitat is classified as upper saltmarsh (CM2) and not ASM. There is some ASM extending under the motorway bridge but this has been disturbed by shade from the motorway bridge. Species such as Sea Aster, Sea Arrowgrass, Parsley Water-dropwort (*Oenanthe lachenalii*) and Spear-leaved Orache are present and the vegetation is quite luxuriant. Common Cordgrass and Common Saltmarsh-grass are present in a zone along the edge of the mudflats. Saltmarsh to the east of the motorway bridge is dominated by Creeping Bentgrass with occasional Sea Aster, Common Saltmarsh-grass, Common Scurvygrass (*Cochlearia officinalis*) and Spear-leaved Orache.

Further eastward a large island of the Horse Marsh is dominated by mid-upper marsh communities (Monitoring stops 19-20). The northern section is quite grassy and is dominated by Creeping Bentgrass. There are occasional patches of Sea Club Rush. The southern side of the saltmarsh is dominated by lower marsh species such as Common Saltmarsh-grass and Sea Aster. Common Cordgrass is also prominent along the southern edge of this island and on the mudflats. Sea Rush is also present but is not frequent. These islands also have wildfowl grazing on them and there is frequent plant litter in places. There are relatively few salt pans or creeks on these islands.

Further eastward there is another large island at Millbank. This island is also dominated by extensive mid-upper zone ASM saltmarsh communities along with patches of brackish and drift-line communities dominated by Sea Club-rush and Twitch.

There is a small patch of saltmarsh located at Prospect Point on the western side of a small spit. This patch of saltmarsh contains several zones with a band of Sea Purslane along the seaward edge, a band of Saltmarsh Rush and Red Fescue. Other species present include Sea Milkwort, Lax-flowered Sea Lavender, Common Saltmarsh-grass and Sea Plantain. This saltmarsh transitions into derelict grassland dominated by Red Fescue higher up the slope.

A small area of saltmarsh is located in a small inlet at Yellow Walls. The saltmarsh is divided by one main channel into two sections and this is fed by a small stream. There are occasional small salt pans on both sides of the saltmarsh. This saltmarsh is not grazed and the vegetation is quite luxuriant. There are several saltmarsh zones

present but the mid-upper zone dominated by Red Fescue and or Saltmarsh Rush dominates. A typical mid marsh zone dominated by Sea Pink and Sea Plantain is present on the western side of the channel. The lower zone is dominated by Sea Purslane with various amounts of Common Cordgrass growing through this zone. Common Cordgrass dominates some patches and these are mapped as *Spartina* swards, although they also contain occasionally frequent ASM species. There is path along the shoreline and track crosses the saltmarsh. At the southern end of the saltmarsh near the landward transition species such as Curled Dock appear in the saltmarsh zone dominated by Creeping Bentgrass. This saltmarsh transitions into wet brackish grassland containing Yellow Flag (*Iris pseudacorus*) and Willowherb sp (*Epilobium* sp.), and rank grassland dominated by Twitch. There are also several patches of scrub with Bramble (*Rubus fructicosis*) thickets.

#### 3.3.3 Malahide Island

This is the largest section of ASM in Malahide Estuary. It forms a mosaic with an intact sand dune system and part of the saltmarsh also is situated adjacent to the golf course located in part of the dune system. The sand dune system was surveyed and assessed by the Coastal Monitoring Project in 2004. Unusual and characteristic features of ASM at this site are the long narrow bands of saltmarsh that extend north-eastwards into Malahide Island and are situated between sand dune ridges. The saltmarsh is flooded by the tide from the southern side of the sand spit and is protected from the sea by high dunes and sandy beach along the eastern shoreline. These strips of saltmarsh between the dunes may be quite narrow (10-15 m wide) although some sections are much larger (140 m wide). Some of the saltmarsh extends up to 900 m back into the dunes from the seaward side.

The influence of the sandy substrate on the vegetation and topography of the saltmarsh is significant. There are occasional large wind-eroded sections dominated by bare substrate. The sandier substrate is easier to erode. Much of the saltmarsh has a characteristic plant community dominated by low-growing Sea Purslane on muddy sand and containing Rock Sea Lavender (*Limonium binervosum*). Other species present include Common Saltmarsh-grass, Red Fescue, Sea Pink and Sea Plantain. Some of this ASM shows signs of wind erosion and bare substrate is usually frequent. Overall, there is not much upper saltmarsh vegetation present, although there is a

narrow band of Red Fescue along these strips of ASM adjacent to the Marram-grass (*Ammophila arenaria*) that characterise the sand dune habitats. These narrow strips of saltmarsh do not contain any salt pans or creeks. Some of the larger areas of saltmarsh are drained by one main creek with some minor creeks draining into the main creek.

There is some saltmarsh zonation extending up these strips of saltmarsh and along the creeks, with low-mid marsh species occurring close to the main creek and a mid marsh zone occurring further away from the creek. Sea Purslane grows well along the sides of the creeks and forms its normal low bushes. The vegetation may change subtly further away from the main creeks and towards the edges of the dunes with less cover of Sea Purslane, which is also lower-growing, and increased cover of Sea Pink and Sea Plantain.

The seaward edge of the ASM is indicated by a low saltmarsh cliff that is slightly eroding. The lower zone pioneer saltmarsh plant community is particularly significant along a creek and inlet towards the east, where there is active accretion and growth of saltmarsh. The ASM is dominated by Sea Purslane and Common Saltmarsh-grass. However, the sward is still in transition and there are substantial areas of bare mud and Glasswort cover. The accreting zone contains a mosaic of pioneer ASM and *Salicornia* flats (1310). Further west the lower zone is more established and is dominated by a band of Sea Purslane. Small salt pans are more frequent in this lower zone.

Common Cordgrass is distributed widely over the southern end of this saltmarsh and it is found high up the western strip along the creek. It is most prevalent in the lower zone close to the seaward edge and along the main creeks. It does dominate in some small patches on the saltmarsh and also infills some narrow creeks.

#### 3.4 Mediterranean salt meadows (H1410)

This habitat is located at the north-eastern corner of the outer estuary. There are several portions situated on the landward side of the ASM and adjacent to a minor road and track that runs along the shoreline. One section is situated adjacent to *Spartina* swards and there is a low saltmarsh cliff between these habitats. The MSM forms a mosaic in places with ASM. The MSM occurs on some higher mounds. The

ASM is located in hollows and is dominated by patches of Sea Pink. The vegetation is characterised by frequent Sea Rush and Red Fescue and Sea Purslane is sometimes dominant. Other species present in lower amounts include Common Scurvygrass, Saltmarsh Rush, Sea Plantain, Sea Arrowgrass and Sea Pink. Some Twitch and Sea Beet is present on some higher mounds within this habitat that are situated above the high-water mark. There is little development of saltmarsh structure within these patches of MSM as the patches are quite small, although the variable topography within these areas is part of the wider structure of the whole of the saltmarsh. This habitat is not grazed and the sward structure is quite variable.

#### 3.5 Spartina swards

The largest area of *Spartina* sward is situated in the north-western corner of the outer estuary. This is a quite dense stand and there are frequent creeks draining the sward that link to the main channel. There are some small open patches within the sward with exposed mud and less aggregated clumps of common Cordgrass. Some of these areas contain patches of Glasswort (1310). There is occasional Common Saltmarshgrass, Greater Sea-spurrey, Lax-flowered Sea Lavender and Sea Arrowgrass within the sward adjacent to the landward edge. The seaward edge of the sward shows some signs of erosion and die-back. There is a steep slope from the edge of the Spartina sward down into the main channel. The Spartina sward along the southern side of the main channel is situated on a moderate slope and there is a gradual transition from the Spartina sward into the ASM further up slope. The cover of Common Cordgrass gradually decreases and the cover of Sea Purslane, Common Saltmarsh-grass and Lax-flowered Sea Lavender gradually increases upslope. There is some erosion along the seaward edge of the *Spartina* sward that is probably related to movements of the relatively deep main channel. Further south, around the tip of the portion of land that juts into the estuary, clumps of Common Cordgrass occur on mudflats amongst patches of Eelgrass (Zostera sp.).

*Spartina* sward is also located in the north-east corner of the outer estuary. There is a natural transition seaward from ASM to dense *Spartina* swards to a mosaic of frequent clumps of Common Cordgrass and exposed mudflats to isolated clumps of Common Cordgrass.

Some small patches of *Spartina* sward are located in the inner estuary on the saltmarsh at Lissenhall. Here, Common Cordgrass has colonised the edge of the established saltmarsh and along the adjacent mudflats. There is also a natural transition from ASM to *Spartina* swards in a narrow zone along a relatively moderate slope. There are several other small patches of *Spartina* swards on or adjacent to established marsh in this area.

There is a small area of *Spartina* sward located at the southern end of Malahide Island. Common Cordgrass seems to have colonised a small lower-lying area in the established saltmarsh along a creek that drains the ASM. There is frequent Common Saltmarsh-grass and occasional Sea Purslane, Lax-flowered Sea Lavender and Greater Sea-spurrey present in this patch.

#### 4 IMPACTS AND ACTIVITIES

This site has a range of varied activities, which is typical of a large site with several habitats that are quite spread out over a wide area, with a range of different management units and activities (Table 4.1). The activity codes used in Table 4.1 are given in brackets in the following text. The saltmarsh habitats have been disturbed in the past by the construction of the railway viaduct across the estuary. This led to the development of more brackish or lagoonal-type conditions in the inner estuary and a reduced tidal range.

There is some amenity use of the saltmarsh on Malahide Island. The dunes and saltmarsh are used by walkers and probably by off-road vehicles and motorbikes (622, 623). This use has created eroded tracks in the saltmarsh (501). There are also wheel ruts present in the ASM saltmarsh at the north-eastern corner of the outer estuary. It should also be noted that O'Reilly and Pantin (1957) recorded cart tracks across this saltmarsh, possibly to collect gravel from the fore-shore. Telegraph poles are present on the MSM at north-eastern corner of outer estuary (511).

The M1 Broadmeadow Motorway Bridge was constructed across the saltmarsh at Lissenhall in 2001-2003 (507). The area covered by the saltmarsh is 0.96 ha. An EIS was carried out for this development. As part of the EIS, plots to monitor vegetation were set up on the saltmarsh under the motorway and on both sides. The bridge casts

considerable shade over the saltmarsh, even though it was designed to allow light through the central reservation. There are also two large pillars supporting the bridge that are on former saltmarsh. Considerable care was also taken during the construction of the bridge not to damage the structure or the surface of the saltmarsh and by and large the structure of the saltmarsh has remained intact. There is very little evidence of physical damage to the saltmarsh from the construction works. A comparison of the current status of the vegetation to the previous status before the construction of the bridge indicates that there has been some change in this part of the saltmarsh. Small areas (about 0.5 ha) formerly dominated by saltmarsh communities not considered ASM). The switch from saltmarsh to brackish communities may only be temporary, as the saltmarsh recovers from the disturbance of the bridge construction.

Common Cordgrass is a prominent feature of the saltmarsh at Malahide Estuary. This is an invasive species (954). This species has formed extensive swards on the intertidal mudflats in the north-east and north-west corners of the outer estuary in the past 50 years. Small patches are present adjacent to the saltmarsh in the inner estuary. These swards generally have a transition from adjacent ASM to *Spartina* swards along variable slopes depending on the topography. The width or the extent of the transition depends on the steepness of the slope, with a wider transition zone on a gentler slope. Common Cordgrass is also present in the ASM, but it is generally only found occasionally or rarely. O'Reilly and Pantin (1957) noted the development of the large *Spartina* sward in the north-west corner of the outer estuary. They also noted that Common Cordgrass was not present in the inner estuary (it now is).

There are small sections of the lower marsh ASM where Common Cordgrass is found frequently (estimated < 0.5 ha) (954). The spread of Common Cordgrass since the 1950s has been most significant in the lower marsh zones and it is likely to have transformed some established saltmarsh formerly dominated by Sea Purslane, Common Saltmarsh-grass and Lax-flowered Sea Lavender into areas dominated by Common Cordgrass. This mainly occurs close to the transition zone with *Spartina* swards.

Common Cordgrass is also found in association with *Salicornia* flats mainly in the north-eastern and north-western corner of the outer estuary. Glasswort forms small

patches within a zone of frequent clumps of Common Cordgrass and in areas where there has been dieback of Common Cordgrass. These patches are vulnerable to the further spread of Common Cordgrass.

A comparison of the aerial photos from 1995 and 2000 indicates that Common Cordgrass has not spread significantly on mudflats of the inner or outer estuaries during this period. It is difficult to interpret the extent of Common Cordgrass on the established saltmarsh from the aerial photos. There were no indications that it has spread significantly in the recent past.

A comparison of the 1920's OSI 6  $2^{nd}$  edition six inch map to the current extent of saltmarsh shows there has been some minor gains and losses of saltmarsh around the estuary. The southern edge of Malahide Island indicates some erosion and realignment of saltmarsh since 6 inch map was drawn (900). There has also been some accretion in portions of this site (910), and accretion is actively occurring, through probably at a slow rate. There has also been some transition of saltmarsh to sand dune and vice versa, as the sand dunes naturally migrated east across the salt marsh channels (990). Active accretion at this location may also affect the extent of *Salicornia* flats as this habitat transitions to ASM (990).

A substantial area of the estuary at the north-western corner was reclaimed between the drawing of the 1<sup>st</sup> and 2<sup>nd</sup> edition 6 inch maps. This probably occurred in the 19<sup>th</sup> century and was facilitated by the construction of the viaduct across the estuary. The area reclaimed was behind the viaduct in Mullan Intake. There has been some loss of saltmarsh around this old shoreline due to this reclamation (802). These impacts are not assessed.

Some of the islands at Lissenhall have not changed significantly in shape since the 6 inch map was drawn. There have been some minor losses of saltmarsh along the southern shoreline of the inner estuary, which were probably infilled (802). As most of this reclamation and erosion/accretion took place prior to the current assessment period, it is not assessed.

Activities and impacts occurring outside the site include farming practises (100, 120, 140), urban areas (401), roads (502) situated very close to or to the saltmarsh, extensive urban areas (401) and a golf course (601) on Malahide Island.

EU Habitat	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected	Location of
Code				(ha)	activity
1310	954	В	-1	0.07	Inside
1310	990	С	-1	0.2	Inside
1330	501	С	-1	0.1	Inside
1330	507	А	-1/-2	0.96	Inside
1330	622	С	-1	0.1	Inside
1330	623	С	-1	0.1	Inside
1330	900	С	-1	0.0001	Inside
1330	910	С	-1	0.36	Inside
1330	954	С	-1	0.5	Inside
1330	990	С	-1	0.5	Inside
1410	511	С	-1	0.001	Inside
13s	100	С	0	N/A	Outside
13s	120	С	0	N/A	Outside
13s	140	С	0	N/A	Outside
13s	401	С	0	N/A	Outside
13s	502	С	0	N/A	Outside
13s	601	С	0	17.2	Outside

Table 4.1. Intensity of various activities on saltmarsh habitats at Malahide Estuary.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> 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 overall conservation status of the site is *unfavourable-inadequate* (Table 5.1). However, most of the Annex I saltmarsh habitats are in good condition. The saltmarsh at Lissenhall has been disturbed somewhat by the construction of the Broadmeadow Motorway Bridge. However, only a relatively minor area of former saltmarsh has transitioned to brackish habitats in response to the disturbance from construction and possible shading from the bridge. This has led to a loss of extent of ASM. There were no signs of any major physical damage to the saltmarsh due to the construction of the bridge. Mitigation taken by Fingal County Council during the construction of the bridge to reduce impacts on saltmarsh and brackish habitats has been quite successful.

Common Cordgrass is present at this site and has formed large areas of *Spartina* sward on mudflats. It is also present on the established saltmarsh but is only abundant

in small parts of the lower saltmarsh and in a transitional zone between the 1330 and the Spartina sward. Part of the saltmarsh is affected by amenity pressure with tracks criss-crossing Malahide Island, but this only affects a small area. The conservation value of the saltmarsh in Malahide Estuary is enhanced by the presence of a mosaic of saltmarsh and sand dunes and the presence of natural transition zones between these habitats. These two habitats are part of a dynamic system and sand dunes have moved across this area covered saltmarsh on the south-east side and creating saltmarsh on the north-west side. The sandy influence on the saltmarsh has lead to the development of a characteristic saltmarsh plant community containing Rock Sea Lavender (Limonium binervosum). The presence of significant areas of brackish habitat at Lissenhall in association with saltmarsh communities is also of conservation interest. The Broadmeadow River creates a significant freshwater influence on the marsh creating a diverse range of plant communities that probably relate to a wide environmental gradient in salinity. At many other sites these brackish communities have been destroyed while the saltmarsh is still intact.

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

Table 5.1. Conservation status of Annex I saltmarsh habitats at Malahide Estuary.

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

### 5.2.1 Extent

The extent of this habitat is assessed as *favourable* in the absence of any accurate information on the previous extent of this habitat. There are no indications that the extent of *Salicornia* flats has increased or decreased significantly in the current assessment period.

O'Reilly and Pantin (1957) noted a large patch of Glasswort on either side of the channel in the north-western corner of the estuary. No Glasswort was noted at this location during the current survey. Mudflats are still intact at this location and *Spartina* sward is present to the west of this location.

O'Reilly and Pantin (1957) also noted large patches of Glasswort in each of the indentations along the southern edge of Malahide Island and these are still present. O'Reilly and Pantin (1957) also noted active accretion at this location.

The spread of Common Cordgrass has not negatively affected the extent of this habitat. Several patches of Glasswort were noted during this survey within the *Spartina* swards and clumps of the north-western outer estuary. O'Reilly and Pantin (1957) did not record Glasswort at this location so this may be result of accretion during the formation of the *Spartina* sward and clumps (now died-back to allow Glasswort colonisation). No *Salicornia* flats were recorded in the inner estuary.

### 5.2.2 Habitat structure and functions

The habitat structure and function of this habitat is assessed as *favourable*. Five monitoring stops were carried out in this habitat and all passed. The largest patches of this habitat are situated along the southern end of Malahide Island on sandy mud. Glasswort generally occurs at cover values less than 30%. These patches are dominated by Glasswort. There are occasional Annual Sea-blite, Common Saltmarshgrass, Greater Sea-spurrey and Lax-flowered Sea Lavender towards the landward side of these patches that may indicate the beginning of a pioneer zone along the edge of the ASM cliff. Further along the creek there is a transitional zone between the ASM and *Salicornia* flats. This is a feature of particular significance and indicates active accretion is occurring and the saltmarsh is in transition.

There are also several clumps of Glasswort within or associated with the *Spartina* swards and clumps of the north-west corner of the outer estuary. Some of these occur on areas previously colonised by Common Cordgrass, but have now died back. Some occur on patches of mud amongst clumps of Common Cordgrass. *Salicornia dolichostachya* is the main species which occurs on the open mudflats (O'Reilly & Pantin 1957). No classification could be made of individual Glasswort species could be made during the current survey due to its timing in early summer when Glasswort is poorly developed.

#### 5.2.3 Future prospects

The future prospects of this habitat is assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. This habitat is vulnerable to the invasion of Common Cordgrass, which is present at this site. The small patches of Glasswort located in the north-western corner of the estuary are vulnerable to the invasion of Common Cordgrass in the future. However, the largest area of *Salicornia* flats is present at the southern end of Malahide Estuary where the cover of *Spartina* swards is not as significant. The substrate at this location does not favour Common Cordgrass as it is sandier and the intertidal flats are on a steeper slope. Both these factors may reduce the potential for the invasion of Common Cordgrass in the 1970's has not significantly lowered the extent of *Salicornia* flats in Malahide Estuary compared to Rogerstown Estuary.

#### 5.3 Atlantic salt meadows (H1330)

#### 5.3.1 Extent

The extent of this habitat is assessed as *unfavourable-inadequate*. ASM saltmarsh has reduced in extent by about 0.5 ha at Lissenhall due to the construction of the M1 motorway bridge. Some ASM has transitioned to brackish habitats dominated either by Twitch or by Sea Club-rush. This represents a loss of only 2% of habitat for the whole of the site. This loss of extent is quite minor considering the major construction works that were carried out.

There have been some losses of habitat prior to the current assessment period, but these are not assessed. Saltmarsh (mainly ASM) has been infilled along the southern

shoreline of the inner estuary. There has been some natural erosion and accretion of saltmarsh on Malahide Island as the sand dunes have migrated south-east. However, this erosion and accretion probably compensate each other. Erosion and realignment has occurred along the southern boundary of Malahide Island but any losses of habitat are probably quite minor and there is also active accretion along one of the main creeks.

There have been no significant losses of ASM due to invasion of Common Cordgrass. This has probably only affected < 0.5 ha of established saltmarsh, mainly ASM.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Twenty-seven monitoring stops were carried out in this habitat and twenty-six passed (96%). Each of the various sections of saltmarsh around Malahide Estuary has not changed significantly in the assessment period. Grazing by livestock is not present in this site so the vegetation cover is high and there is a wide range of sward heights. Some of the vegetation around the motorway bridge is quite rank and could benefit from some grazing (mainly the brackish communities).

Saltmarsh at Malahide Island is in good condition. This saltmarsh shows many signs of the influence of a sandier substrate. This saltmarsh has a typically natural low sward height and a feature of local distinctiveness is the presence of Rock Sea Lavender. Common Cordgrass has infilled some small patches in this saltmarsh. The saltmarsh shows typical zonation along the main creeks that drain each of the indentations. There are fewer salt pans in this saltmarsh but this is typical of a saltmarsh associated with a sandier substrate. There is some natural transition between the ASM and the 1310 in an actively accreting area. There are also natural transitions between the ASM and the sand dune habitats. A comparison of the state of the saltmarsh to the description in O'Reilly and Pantin (1957) indicates that most of the ASM has not changed significantly.

ASM saltmarsh located at the north of the outer estuary is also in relatively good condition. There is a natural transition between the *Spartina* swards and the ASM in both of these corners and Common Cordgrass may be occasionally frequent in the ASM. It is widely distributed over most of the ASM but it generally occurs at low

cover values (< 5%). Both these saltmarshes show a typical range of plant communities with the lower and mid-marsh communities dominating.

ASM saltmarsh at Lissenhall is also in relatively good condition considering the disturbance that was caused by the construction of the motorway bridge across this marsh in the assessment period. A comparison of the quadrats surveyed by Murray (2003) to the current state of the saltmarsh indicates that the vegetation has changed in only several of the quadrats. Quadrat A12 has changed from being dominated by Common Cordgrass to being dominated by Creeping Bentgrass. Quadrat A11 has changed from being dominated by Creeping Bentgrass to being dominated by Twitch (more brackish). There has been some increase in the dominance of Twitch in Quadrat A10. Quadrat A2 was dominated by Creeping Bentgrass and Sea Club-rush and is now dominated by Twitch. All of the other quadrats are still quite similar to the original state. The conservation value of this saltmarsh is enhanced by the transitions to more brackish plant communities dominated by Twitch and Sea Clubrush. There are few signs of disturbance to the physical structure of the saltmarsh, which is quite remarkable. Old pans are still present in some of the brackish plant communities and these are probably a refection that some of these areas were saltmarsh at one stage (prior to the construction of the viaduct). O'Reilly and Pantin (1957) noted that Common Cordgrass was not present in the inner estuary. This species is now present on the saltmarsh at Lissenhall and dominates some small patches. It is also occasionally frequent on the ASM but generally does not dominate.

#### 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few significant impacts or activities on this habitat. The spread of Common Cordgrass on the established saltmarsh can be considered as a negative factor but it is not likely to increase significantly in the future as it is already present in much of the lower saltmarsh zone. The impact of the M1 motorway bridge may decrease in the future as the saltmarsh recovers from disturbance caused during construction works. It is not likely to spread significantly into the mid-marsh zones. Most of the saltmarsh is not being grazed by livestock so grazing is not significant.

There are no indications of any major erosion of the saltmarsh. ASM at Malahide Island is being affected by amenity use but the intensity is quite low.

#### 5.4 Mediterranean salt meadows (H1410)

#### 5.4.1 Extent

The extent of this habitat is assessed as *favourable*. The only MSM in the site is located in the north-eastern corner of the outer estuary. These patches were noted by O'Reilly and Pantin (1957). There are no indications that the extent of MSM has increased or decreased significantly in the current assessment period.

O'Reilly and Pantin (1957) also noted small patches of eroding saltmarsh containing Saltmarsh Rush and Sea Rush along the northern shoreline of the outer estuary. These have nearly all eroded away

#### 5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Three monitoring stops were carried out in this habitat and they all passed. This habitat has a typical species diversity and its presence increases the sward height diversity of the overall saltmarsh habitat. This habitat occupies some elevated banks and mounds somewhat higher than the adjacent ASM. Upper saltmarsh zone species such as Red Fescue, Saltmarsh Rush and Creeping Bentgrass are frequent. There is a small zone of transition grassland along the landward side of the MSM, which is dominated by Twitch and contains Sea Beet and occupies a narrow bank between the MSM and the adjacent track. One notable feature of this habitat is that Sea Rush cover in this habitat is lower compared to some sites and there are significant amounts of other ASM species within this habitat.

#### 5.4.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are no major impacts or activities affecting this habitat. This habitat is not vulnerable to the further spread of Common Cordgrass, as it generally occurs at elevations where Common Cordgrass is un-competitive.

### **6 MANAGEMENT RECOMMENDATIONS**

Some grazing may be beneficial in the Twitch-dominated brackish areas at the western end of the inner estuary to increase plant diversity in these areas.

Further monitoring is required to monitor the impact of the motorway bridge on the saltmarsh. Saltmarsh may be permanently damaged at this location or it may be temporally disturbed by the construction of the bridge and may recover in the future.

### 7 REFERENCES

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Ní Lamnha, E. (1982). *The vegetation of saltmarshes and sand-dunes at Malahide Island, County Dublin.* Journal of Life Sciences of the Royal Dublin Society **3**, 111-129.

O'Reilly, H. & Pantin, G. (1957). Some observations on the salt marsh formation in Co. Dublin. Proceedings of the Royal Irish Academy, 58B, 89-128.





## Saltmarsh **Monitoring Project**

# Malahide west (Map 1 of 4) (Broadmeadowater M

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

N'i sna leorainneacha a' an léar scáil seo ach nod gar shuíomhach ginearáila. Féachar a hbhreilimí ine adéanamh ar fheorainne acha na gceanlar comharthaille. Machasanhail d'ábhar na Suirbhéarachla Ortonáis le chead ón Riallas . (Ceadunas Vimh. 5953) Malahide Estuary cSAC (000205)

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			<ul> <li>1310 Salicornia flats</li> <li>Spartina swards</li> <li>1330 Atlantic salt meadows</li> <li>1410 Mediterranean salt meadows</li> <li>1330/1410 mosaic</li> <li>Spartina clump/mudflat mosaic</li> <li>Isolated Spartina clumps</li> <li>other</li> <li>M1 Broadmeadow Motorway Bridge</li> </ul>	
M1 Bridge)		SMP Code: SMP0002	Map produced by: SMP 2006 Map Version: 1	
0	90	180	270 Meters N	

Scale: 1:3255

Prospect Point

A





## Saltmarsh Monitoring Project

# Malahide Estuary south (Map 2 of 4)

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Nil sna leorainneacha a' an léarscáil seo ach noi garshuíomhach ginearáila. Féadrar a hbhreilimí he a déanamh a' theorainneacha na gceantar comharthailte. Machasanhail d'ábhar na Suitbhéarachta Ordonáis le chead ón Riallas. (Ceadunas Ulmh, 5953) Malahide Estuary cSAC (0

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## Saltmarsh **Monitoring Project**

# Maahide Estuary north (Map 3 of 4)

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Kil sna leorainneacha a' an Karscáil seo ach noil gar shuíomhach ginearáila. Féadrar a hbhreil fní he adéanamh ar freorainneacha na gceantar comharthaí tre. Machasanhaí d'ábhar na Suirbhéarachta Ordonáis le chead ón Riallas . (Ceadunas Ulmh, 5953)

1 Alex Map produced by: SMP 2006 SMP Code: SMP0002 Map Version: 1 90 360 Meters 180 270 0 Ν Malahide Estuary cSAC (000205) Scale: 1:4686

SAC boundary 1330 Monitoring stops 1410 Monitoring stops 1310 Monitoring stops

1310 Salicornia flats Spartina swards 1330 Atlantic salt meadows 1410 Mediterranean salt meadows 1330/1410 mosaic Spartina clump/mudflat mosaic Isolated Spartina clumps



3400



Malahide Island



## Saltmarsh Monitoring Project

# Malahide Estuary east (Map 4 of 4)

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Ní sna leorainneacha a' an léarscáil seo ach noi garshuíomhadh ginearáila. Féadtar athbhreilimí he adéanamh ar leorainneacha na gceantar comharthaílte . Machasanhail d'ábhar na Suitbhéarachta Ortonáis le chead ón Rialtas . (Ceadunas Vimh. 5953) Malahide Estuary cSAC (0

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## North Bull Island

### **1 SITE DETAILS**

SMP site name: North Bull Island		SMP site code: SMP0004		
Site name (Curtis list): North Bull Island		CMP site code: <b>10 + 11</b>		
		Site No: (Curtis list): 230		
NPWS Site Name: North Dublin Bay		Dates of site visit: 6+7/06/2	2006	
NPWS designation	n cSAC: 206 MPSU Plan: old plan (date)		e)	
	pNHA: <b>206</b>			
	SPA: North Bull Isla	and SPA4006		
	Nature Reserve: Nort	h Bull Island (S.I. No 231 o	of 1988)	
	Nature Reserve: Nort	h Bull Island (S.I. No 232 o	of 1988)	
County: Dublin		Discovery Map: 55	Grid Ref: 323000, 237000	
1 <sup>st</sup> ed 6 inch Map No:		Aerial photos (1995 series): O3133-D, O3134-C, O3199-		
Du15, Du19		A, O3199-B, 31999-C, O3199-D, O3200-A		
2 <sup>nd</sup> ed 6 inch Map No	):	Aerial photos (2000 series)	: O3133-D, O3134-C, O3199-	
Du15, Du19		A, O3199-B, 31999-C, O3199-D, O3200-A		
		Aerial photos (2005 series): not available		
Annex I habitats curr	ently designated for No	orth Dublin Bay cSAC:		
Salicornia a	nd other annuals colo	nizing mud and sand (1310	)	
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)				
Mediterran	ean salt meadows (Jur	ncetalia maritimi) (1410)		
Saltmarsh type: Estuary		Substrate type: Mud		

### **2** SITE DESCRIPTION

North Bull Island is located in the northern section of Dublin Bay on the east coast of Ireland. The island is a sandy spit about 5 km long and 1 km wide in places. It is dominated by a dune system and the saltmarsh has developed on the landward side of the island facing the mainland. The island is separated from the mainland by intertidal mud and sandflats. It is split into two sections by the Bull Island causeway, which also divides the intertidal areas. This causeway allows access to the two golf courses on the island and to Dollymount Strand, which is an important amenity area and is a Blue Flag beach (2006). The main land uses on the island are leisure (golf courses), nature conservation (nature reserves) and amenity. The saltmarsh can be accessed from the causeway.

North Bull Island is probably the most famous and studied saltmarsh site in Ireland. It is also one of the most protected sites in Ireland in recognition of its conservation importance, particularly to wintering waders and wildfowl and for the dune/saltmarsh system located on the island. North Bull Island has been designated a Special Protection Area under the EU Birds Directive and it is also a statutory Wildfowl Sanctuary, a Ramsar Convention site, a Biogenetic Reserve, a Biosphere Reserve and a Special Area Amenity Order site. Two separate Statutory Nature Reserves cover much of the island east of the Bull Wall and the surrounding intertidal flats. The first (S.I. 231 of 1988) covers the intertidal and subtidal areas around the island while the second covers the terrestrial dune, beach and saltmarsh habitat (S.I. 232 of 1988). The intertidal areas are owned by the State, while the second nature reserve is owned and managed by Dublin City Council.

Three Annex I habitats, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM), are found at this site. All three habitats are listed as qualifying interests for North Bull Island cSAC. *Spartina* swards are also present at this site. Nearly of the saltmarsh habitat is situated within the cSAC.

North Bull Island and its saltmarsh have a very interesting history as the island is only 200 years old and developed after the construction of the north and south Bull Walls of Dublin Port (Jeffrey 1977, McCorry 2002). The ecology of the island has been examined extensively. Doyle (1934) made the first record of Cordgrass (*Spartina townsendi*) at Bull Island. O'Reilly and Pantin (1957) studied the vegetation of the saltmarsh and there have been several subsequent studies (Boyle, 1976, Boyle 1977, Moore and O'Reilly 1977). Many undergraduate and postgraduate theses have studied various aspects of ecology of the saltmarshes and other intertidal habitats.

The construction of the causeway to the island in 1965 has had a significant impact on the saltmarsh and intertidal habitats at North Bull Island. This affected tidal currents and lead to the deposition of sediment north of the causeway. This area was soon colonised by *Salicornia* spp. Around this time *S. anglica* began to spread in this area. There have been several attempts with varying success to control *S. anglica* on the mudflats from 1970 to 1995. There has been several surveys and reports carried out by An Foras Forbartha (1977, 1980, 1984) and for Dublin City Council by independent consultants (CAAS 1989, ESB International 2002) to examine various

aspects of nature conservation and land use on the island and various issues with the construction of the causeway, subsequent sedimentation and the spread of *S. anglica*.

Dublin Corporation commissioned a study in 1996 to examine the impact of reopening the causeway and allowing tidal currents to flow north and south with the aim to reduce or prevent further sedimentation in the intertidal areas. This was in response to continued public concerns about sedimentation in the intertidal areas between North Bull Island and the mainland. The Environmental Impact Assessment (ESB International 2002) came to the conclusion that re-opening the causeway would have a minimal or no impact on sedimentation and that the 'do-nothing approach' was recommended.

The south Bull actually occurs south of the Dublin Port in Dublin Bay and is the name given to the extensive sandflats in this part of the bay (also called Sandymount sandflats or strand).

Three Annex I habitats, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM), are found at this site. All three habitats are listed as qualifying interests for the North Dublin Bay cSAC. *Spartina* swards are also present at this site. Most of the saltmarsh habitat is situated within the cSAC and Nature Reserve. However there is a portion of saltmarsh outside the cSAC and nature reserve boundaries due to the use of the old 3<sup>rd</sup> edition OS maps to draw the boundaries. These maps are out of date. There are also some rectification errors between the OS map used to the draw the boundaries and the aerial photos. This means there is poor overlap between the actual golf course boundary and the cSAC and nature reserve boundaries.

#### **3 HABITATS**

#### 3.1 General description

The general saltmarsh mainly occurs along the west side of Bull Island facing the mainland. A small area of saltmarsh extends along the north side of the causeway to the midway point. A small patch of saltmarsh also occurs on the mainland north of the causeway, at the confluence of the Santry River. This saltmarsh was formerly

larger in size and was called Watermill Lane saltmarsh (O'Reilly & Pantin 1957). However most of it was destroyed by the construction of the causeway in 1964.

The main area of saltmarsh is dominated by Atlantic salt meadows (ASM) (Table 3.1). This was the largest single section of saltmarsh surveyed during the project in 2006. There is a gradual slope from the boundary (marked by the golf course boundaries) to the edge, marked by a low salt marsh cliff. At the back of the salt marsh, there are several areas with frequent Sea Rush (*Juncus maritimus*) and these areas are classified as Mediterranean salt meadows (MSM) on the northern side. At the front of the saltmarsh there is a narrow strip in places on bare mud dominated by Glasswort (*Salicornia* spp). This species also dominates a large area in the mudflats to the north of the causeway (called the *Salicornia* bank) where it forms a mosaic with Common Cordgrass (*Spartina anglica*). These areas are classified as (1310) *Salicornia* flats. There are small patches on the *Salicornia* bank that have a Common Cordgrass density greater than 40%. These areas are classified as *Spartina* swards. This habitat is not listed as a qualifying interest for this site.

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand	28.69 <sup>1</sup>
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	82.34 1
1410	Mediterranean salt meadows (Juncetalia maritimi)	8.21 2
1320	Spartina swards (Spartinion maritimae)	0.83 12
	Total (not including Spartina swards and clumps)	119.24

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

<sup>1</sup> this total includes 33% of the 1310/1330/*Spartina* mosaic <sup>2</sup> this total includes 50% of the 1330/1410 mosaic.

#### 3.2 Salicornia flats (H1310)

This habitat is mainly situated in a large area on the mudflats north of the causeway called the *Salicornia* bank. This area developed soon after the construction of the causeway in 1964 so this section of habitat is relatively young. Glasswort (*Salicornia* sp.) is quite dense in places (20-30%) but becomes sparser at the edges of its distribution. This area contains frequent clumps of Common Cordgrass at various distributions that are scattered over the mudflats. In places the Common Cordgrass is dense enough (> 40%) to be classified as *Spartina* swards. There are few other saltmarsh species found in this area. Common Saltmarsh-grass (*Puccinellia* 

*martima*), Lax-flowered Sea Lavender (*Limonium humile*) and Greater Sea-spurrey (*Spergularia media*) are present but in rare amounts. Brown and green algae are frequent to abundant with brown algae associated with the Common Cordgrass clumps and green algae forming large sheets that cover the whole area at times. This area has a complex creek network and there are frequent small depressions on the mud surface. Some of the small creeks and depressions towards the seaward side of the *Salicornia* flats contain Eelgrass (*Zostera angustifolia*).

The habitat is also situated along the edge of the (ASM cliff) on mudflats or on eroding saltmarsh mud. In this situation it usually forms a band or zone between 5-10 m wide. The habitat may be wider at the mouths of creeks and extend further onto the mudflats along the bank of creeks for up to 25 m in places. This zone of Glasswort is discontinuous and disappears in places leaving a boundary between ASM and the mudflats. This is particularly seen along the edge of the southern section where it disappears frequently and reappears at and around the mouths of the creeks. It is dominated by dense Glasswort and also contains frequent Annual Sea-blite (Suaeda maritima) and occasional small individual plants of Lax-flowered Sea Lavender, Greater Sea-spurrey (Spergularia media) and Common Saltmarsh-grass. Clumps of Common Cordgrass are also found along the edge of the saltmarsh on the mudflats in this habitat. They are rare at the north end of the saltmarsh and become more common towards the causeway (5-10%). They are also quite frequently distributed along the edge of the southern saltmarsh section with an average frequency of between 5-10%. Common Cordgrass may occasionally become more frequent at times (> 25% cover). There is an accretional ramp along the edge of the saltmarsh adjacent to the causeway. In this area there is a natural transition along a gradual slope from mudflats to Salicornia flats to ASM.

A small isolated patch of this habitat occurs on the mudflats south of the causeway. It is almost entirely dominated by Glasswort with no other saltmarsh species occurring, apart from Common Cordgrass. This species forms several small clumps and is the only location south of the causeway where Common Cordgrass is found on the mudflats some distance (20 m) from the ASM. Common Cordgrass is also found along the edge of the southern saltmarsh section but is not generally distributed further than 10 m from the edge.

Patches of dense Glasswort may also be found within the ASM in pans. Some pans may be totally filled with Glasswort creating patches 5-10 m in diameter. These areas where not considered when measuring extent.

#### 3.3 Spartina swards

This habitat occurs in places on the *Salicornia* bank north of the causeway. Clumps of Common Cordgrass are widely scattered over a much larger area, forming a mosaic with Glasswort. However there are some smaller patches where is has denser cover (> 40%) and is classified as *Spartina* sward. Generally these are areas where there are aggregations of frequent clumps. Common Cordgrass is still patchy and forms a mosaic with Glasswort and generally does not form the dense swards seen at other sites.

#### 3.4 Atlantic salt meadows (H1330)

This habitat dominates the saltmarsh vegetation. It extends from the saltmarsh cliff (the boundary with the mudflats) back to the golf course boundary or with MSM dominated by Sea Rush. Both O'Reilly and Pantin (1957) and Moore and O'Reilly (1977) have described the vegetation composition and zonation in detail. The front of the saltmarsh is dominated by the presence of Sea Purslane (Atriplex portulacoides). Common Saltmarsh-grass, Glasswort, Annual Sea-blite and Lax-flowered Sea Lavender are all frequent to abundant in cover. Other species such as Sea Arrowgrass (Triglochin maritima), Greater Sea Spurrey and Sea Pink (Armeria maritima) are less Clumps of Common Cordgrass are also frequent in this zone and frequent. occasionally abundant in places. The cover of this species is less frequent towards the tips of the island and most frequent on the saltmarsh in the areas closer to the causeway. Parts of the edge of the saltmarsh show signs of erosion and the Sea Purslane seems to be dying off. These areas are dominated by or have abundant bare mud and there is frequent Lax-flowered Sea Lavender, Common Saltmarsh-grass, Sea Arrowgrass and Greater Sea-spurrey present.

Distinct zonation can be seen as the Sea Purslane becomes less frequent and almost disappears and the vegetation is comprised of the classic Sea Pink-Sea Plantain (*Plantago maritima*) sward of the middle marsh. This zone has a characteristically very low sward height and also contains occasional or frequent Sea Arrowgrass, Lax-

flowered Sea Lavender and Common Saltmarsh-grass. Common Cordgrass is less evident in this zone and clumps are generally confined to pans. This zone then transitions into upper saltmarsh. In places this is dominated by Sea Rush and is therefore classified as MSM. There are other sections where this species is less common or absent and the upper saltmarsh vegetation is dominated by Red Fescue (*Festuca rubra*). Other species present include Saltmarsh Rush (*Juncus gerardii*) and Sea Aster (*Aster tripolium*).

The boundary between the ASM and the mudflats or the *Salicornia* flats (1310) is usually quite distinct and marked by the saltmarsh cliff, which is dominated by Sea Purslane. However, a transition between ASM and *Salicornia* flats (1310) is present along the northern side of the causeway adjacent to the saltmarsh and within the crescent-shaped feature seen along the northern saltmarsh.

#### 3.5 Mediterranean salt meadows (H1410)

This habitat is found at the back of the saltmarsh section found north of the causeway. One area is located on upper saltmarsh and its landward boundary is the St Anne's Golf Course embankment. The other main section is found towards the northern tip of the island, north of the golf course. Here there is an excellent natural transition between the ASM to MSM on upper saltmarsh, and then into fixed dunes.

This habitat is distinguished by the presence of Sea Rush. This tall rush forms large clumps in places and though it may not actually dominate the cover (cover varies from 20-50%), it is the most significant part of the vegetation. Many of the clumps have other species colonising within them and this reduces the actual overall cover of Sea Rush. Towards the ASM boundary the habitat is distinguished by isolated large clumps developing on the Sea Pink-Sea Plantain –dominated sward. Sea Purslane is frequently found colonising only these clumps of Sea Rush. Higher on the marsh, the clumps of Sea Rush become more aggregated and Red Fescue becomes more common. Saltmarsh Rush also appears, growing between the clumps of the larger rush. Other species frequently present at low cover values include Common Scurvygrass (*Cochlearia officinalis*), Lax-flowered Sea Lavender, Sea Plantain, Sea Aster and Sea Milkwort (*Glaux maritima*).

Several other species are present in this habitat situated adjacent to the sand dunes at the northern end of the island. Small grassy areas in the transitional area to the dune slack contain Rock Sea Lavender (*Limonium binervosum*) and Long-bracted Sedge (*Carex extensa*).

The sward height within this habitat is quite diverse and tall (0.2-0.8 m high). The tall rushes may be shielding the other vegetation from natural grazing to some extent. The topography of the saltmarsh becomes somewhat less uniform in this habitat. There is a series of low mounds and shallow hollows and the slope is moderate in places compared to the wide ASM area that has a uniform flat topography over a very gentle slope. There are small salt pans present within this habitat but salt pans are more developed on the ASM. Creeks generally do not reach this high up the saltmarsh but some canalised drains from the golf course crossing this habitat.

Towards the edge of its distribution the clumps of Sea Rush become less frequent. Part of the saltmarsh along the golf course boundary is mapped as a mosaic between ASM/MSM and there is a narrow zone with regular sized clumps scattered along the boundary. There are occasional clumps of Sea Rush located in the southern saltmarsh section but they are isolated and generally do not form any appreciable areas of MSM.

#### 4 IMPACTS

The saltmarsh habitats at North Bull Island are mainly located within the nature reserves so the main activity is nature conservation. This means there are few activities of high intensity affecting the saltmarsh (Table 4.1). Walkers (622) use a track (501) along the landward edge of the saltmarsh (adjacent to the golf courses). These include walking enthusiasts, dog walkers and bird watchers. The grassy embankment at the bank of the saltmarsh prevents the landward migration of the saltmarsh. The golf courses reclaimed the area of saltmarsh transition to dunes in the past. There is some light grazing (146) of the ASM by Hares and by wildfowl (147). Wildfowl also graze or forage amongst of the *Salicornia* bank, amongst the Common Cordgrass clumps. The whole of the saltmarsh and mudflats are subject to water pollution (701) from Dublin Bay and from the Santry River and other minor watercourses. However, there is no visible impact on the flora and fauna and the
mudflats support some of the highest densities of waders and wildfowl recorded in Ireland. Litter occurs along the tide lines.

Signs of natural erosion (900) occur along the seaward side of the saltmarsh and the saltmarsh cliff at certain places, particularly to the north of the northern section and the central part of the southern section. The vegetation of the seaward side of the saltmarsh seems to be dying back in places and the layers of mud (distinct from the mudflats) on which the saltmarsh is present is eroding in places. *Salicornia* spp. are colonising the bare mud patches in the eroded areas, so erosion is creating pioneer saltmarsh. The erosion of the saltmarsh seems to be part of a relatively long cycle, as signs of erosion were noted at these locations in the 1950s (O'Reilly & Pantin 1959).

Common Cordgrass occurs on the *Salicornia* bank in the *Salicornia* flats (1310) and within the Atlantic salt meadows (ASM). This is an invasive species and will generally spread over the mud to exclude the *Salicornia* spp. It is spreading on the *Salicornia* bank and reducing the extent of the *Salicornia* flats. Generally it occurs in densities of between 5-25% within the *Salicornia* flats. Some patches have densities of greater than 40% and are classified as *Spartina* swards.

Common Cordgrass occurs all along the Atlantic saltmarsh on both sides of the causeway. It generally occurs as clumps (between 0.1-5 m in diameter) within pans and in most instances the clumps are confined to the pans. Some old pans have filled and the Common Cordgrass clump is now part of the general saltmarsh vegetation. Some of these clumps have broken up, or other saltmarsh vegetation has invaded them and so there are aggregates of smaller Common Cordgrass clumps. There are no signs that it is spreading extensively on the saltmarsh. Generally it occurs in densities of 1-5% but there are some small areas on both sides of the causeway where it occurs up to 40% cover. Many of the clumps within the pans also contain other saltmarsh species, particularly Common Saltmarsh-grass.

Activities occurring outside the site include golf courses (601), amenity use (620) and the causeway (870). Golf courses (601) mark the landward side of both the north and southern saltmarshes, with the boundary marked by an embankment and or a fence. These have an outside impact with disturbance to the wildlife. Some of the creeks on the saltmarsh have been canalised and act as drains from the golf courses.

EU Habitat Code <sup>1</sup>	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected (ha)	Location of activity <sup>5</sup>
1310	900	С	+1	0.10	Inside
1310	910	С	+1	28.69	Inside
1310	954	А	-1	28.69	Inside
1330	146	С	0	82.34	Inside
1330	147	С	0	82.34	Inside
1330/1410	501	С	-1	< 1	Inside
1330/1410	622	С	-1	< 1	Inside
1330	900	D	0	N/A	Inside
1330	910	D	0	N/A	Inside
1330	954	С	0	82.34	Inside
1410	146	С	0	8.21	Inside
13s	701	С	0	N/A	Outside
13s	601	В	-1	119.24	Outside
13s	620	С	0	119.24	Outside
13s	870	С	0	119.24	Outside

Table4.1. Intensity of various activities on saltmarsh habitats at North Bull Island.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> 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 sand dune habitat that are impacting the saltmarsh habitat.

# **5** CONSERVATION STATUS

Overall this site has a favourable conservation status (Table 5.1). This site is one of the best examples of saltmarsh habitat in Ireland and is an excellent example of zonation of saltmarsh plant communities. The habitats are located within a Nature Reserve where the primary objective is nature conservation. There are some negative impacts due to disturbance activities relating to the amenity use of the island. However, these activities have a low impact on the saltmarsh structure and functions.

Common Cordgrass is present at the site and this species is present on the *Salicornia* flats where it forms a mosaic with Glasswort. However, it is generally not dominant in terms of cover and only several small areas were classified as *Spartina* swards. It is also widely distributed on the ASM, though it is generally found at low cover values (0-5%). The abundance of Common Cordgrass may increase up to 40% at some locations towards the seaward edge of the ASM. There are no indications that it is spreading significantly at this site, although it is likely to increase in extent in the future at the expense of *Salicornia* flats.

There are some signs of erosion along the edge of the saltmarsh, particularly at the extremities towards the northern and southern ends of the saltmarsh. However, there are also signs of accretion along the saltmarsh adjacent to north side of the causeway. An accretional ramp is present in this area and there is a gradual transition from mudflats to *Salicornia* flats to ASM with several communities present within the ASM.

Habitat	EU Conse			
	Favourable	Unfavourable	Unfavourable	<b>Overall EU</b>
		- inadequate	- Bad	conservation
				status
				assessment
Salicornia flats	Extent,	Future		Unfavourable
(1310)	Structure and	prospects		- inadequate
	functions			
Atlantic salt	Extent,			Favourable
meadows (1330)	Structure and			
	functions			
	Future			
	prospects			
Mediterranean	Extent,			Favourable
salt meadows	Structure and			
(1410)	functions			
	Future			
	prospects			

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at North Bull Island.

# 5.1 Salicornia and other annuals colonizing mud and sand (H1310)

#### 5.1.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications that there has been any loss of habitat due to erosion, sediment redistribution or transformation to *Spartina* sward during the current assessment period. This habitat is mainly distributed in a large area north of the causeway and as a fringe along the edge of the ASM. This was by far the largest area of this habitat recorded during the survey and this is therefore a feature of local distinctiveness.

The area of the *Salicornia* bank was monitored and mapped during the 1970s (Goodwille *et al.* 1971, Jeffrey *et al.* 1977) and 1980's (An Foras Forbartha 1980, 1984) and subsequently by CAAS (1990) and McCorry (2002). The current extent is similar to the extents mapped during these surveys. Its area in 1989 was measured at 25 ha. There are some fluctuations during each period with some losses and gains.

These surveys allow much more detailed analysis of the changes in extent and distribution of Glasswort compared to any other site. The current survey shows that Glasswort has extended towards the south and connected to the saltmarsh along the causeway in places. This may indicate that accretion in this area is continuing since the construction of the causeway.

The extent of this habitat was much lower before the construction of the causeway in 1965-6 (O'Reilly & Pantin 1957).

# 5.1.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Four monitoring stops were recorded in this habitat and all four stops passed. All the attributes reached their targets. Glasswort could not be classified to species level due to the timing of the survey, which took place relatively early in the year. However, Madden (1984) classified the Glasswort colonising on the *Salicornia* bank as *S. dolichostachya*. Glasswort along the edges of the ASM tended to be *S. europaea*. There are no negative impacts on this habitat apart from the presence of Common Cordgrass. This species forms a mosaic with Glasswort on the *Salicornia* Bank and in places along the edge of the saltmarsh. The cover of Common Cordgrass varies and is generally 0-5%, but may increase to 40% in places. Common Cordgrass colonised in this area around the same time as Glasswort.

# 5.1.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-inadequate*. This assessment assumes that current management activities and impacts on this habitat continue in the near future. There are few impacts on this site apart from the presence of Common Cordgrass. This species is likely to increase in extent on the *Salicornia* bank and create more patches of *Spartina* sward at the expense of *Salicornia* flats. The rate of increase may be quite slow.

# 5.2 Atlantic salt meadows (H1330)

#### 5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications that there has been any significant loss of extent during the assessment period. There are

signs of erosion along the saltmarsh cliff boundary at the northern and southern ends of the island. However, these erosion signs have been present for some time (Jeffrey *et al.* 1977) and are present in both aerial photo series (1995 and 2000). There is no indication that there has been any measurable loss of extent due to erosion from a comparison of the two sets of aerial photos. (However, this is complicated by the poor rectification of the 1995 aerial photos in this area and there is up to 15 m error between the two sets of photos.) GPS points along the edge of the saltmarsh generally overlap with the edge of the saltmarsh as indicated from the 2000 aerial photos, indicating that there is no measurable loss of extent during this period.

The actual rate of erosion is quite slow. A comparison of the  $2^{nd}$  edition 6 inch map to the 2000 aerial photos indicates that there has been some shifting of the island at the northern tip seaward during this period. However this movement is only 30-40 m.

# 5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Sixteen monitoring stops were carried out in this habitat and all sixteen passed. All attributes reached their targets. The ASM at this site is an excellent example of this habitat. Several saltmarsh plant communities are present including pioneer, lower, mid and upper zones depending on elevation. The ASM has a typical species diversity. This site is an excellent example of saltmarsh zonation and different zones can be picked out from the aerial photos. The sward height is quite diverse even though the grazing intensity is moderate from wild birds and animals. The mid zone marsh has a typical very low sward height while the lower and upper zones have a more varied height due the presence of grasses and Sea Purslane.

Common Cordgrass is present in the ASM. It is widely distributed over most of the ASM but is more common towards both sides of the causeway. It also becomes more common towards the seaward edge of the ASM. Common Cordgrass is confined to distinct clumps mainly in salt pans at the back of the ASM. Towards the mid and lower marsh zones Common Cordgrass becomes more frequent with small areas having cover up to 40%. Scattered clumps may be found in salt pans and amongst the ASM vegetation. However the clumps rarely exclude other saltmarsh species and there are frequent amounts of Common Saltmarsh-grass, Lax-flowered Sea Lavender and Sea Purslane.

The saltmarsh topography is well developed and there is a very complex creek and salt pan structure. These creeks are functioning adequately. There has been some disturbance of the drainage of the saltmarsh with several drains crossing the saltmarsh from the golf courses. These drains were dug some time ago and are therefore not assessed.

There are signs of erosion along the saltmarsh cliff (0.3-0.5 m high) mainly at the northern and southern ends of the island. There is a small patch towards the northern end of the island where the surface of the saltmarsh seems to be eroding and is being colonised by Glasswort with occasional relic Sea Purslane plants. This area is visible on the aerial photos and does not seem to have developed recently. An accretional ramp is present along the edge of the ASM adjacent to the north of the saltmarsh and the pioneer zone is particularly well-developed in this area.

# 5.2.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that current management activities and impacts on this habitat continue in the near future. There are no significant impacts or activities on this habitat apart from disturbance from tracks running though this area and from potential disturbance from the adjacent golf course. Common Cordgrass is present on the saltmarsh though generally at low cover values. This species is not likely to spread significantly over the saltmarsh to transform the ASM to *Spartina* swards. The habitat is found within an area that is primarily managed for nature conservation.

There are signs of erosion along the edge of the ASM. However the rate of erosion is likely to be quite slow. Erosion is also countered by accretion along the north side of the causeway. Saltmarsh is likely to increase in extent in this area as accretion continues.

# 5.3 Mediterranean salt meadows (H1410)

# 5.3.1 Extent

The extent of this habitat is assessed as *favourable*. This habitat is mainly situated along the boundary of St Anne's Golf Course. This boundary is not mapped accurately. There has been some landscaping along this boundary recently and there

were signs that the golf course may have encroached onto the saltmarsh (MSM habitat). However, there are no indications that this took place between 1995 and 2000 from a comparison of the aerial photos. There are also no indications that any significant encroachment took place between 2000 and 2006 when GPS points taken along the boundary are compared to the 2000 aerial photos. However, small encroachments of several metres can not be distinguished from a comparison of the GPS points and the aerial photos. This habitat is shielded from potential erosion by the ASM.

The extent of this habitat was likely to have been greater in the past before the development of the St Anne's Golf Course and the extension of this golf course.

#### 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Four monitoring stops were carried out in this habitat and they all passed. All the attributes reached their targets. This habitat has a typical species diversity. It also displays some zonation. The lower seaward side of the MSM has large isolated clumps of Sea Rush with ASM vegetation dominated by Sea Pink and Sea Plantain amongst the clumps. Further landward the clumps become less defined and the vegetation is more heterogeneous. Upper saltmarsh zone species such as Red Fescue, Saltmarsh Rush and Creeping Bentgrass become prominent. One notable feature of this habitat is that Sea Rush cover in this habitat is lower compared to some sites and there are significant amounts of other ASM species within this habitat. There are occasional salt pans present within this habitat. Creeks generally do not reach this high up the saltmarsh but there are several canalised drains from the golf course that pass through this habitat.

This habitat has an artificial boundary along the edge of the golf course. The boundary is a low embankment. Further north there are natural transitions to fixed dune habitat and these natural transitions add significantly to the conservation value of the habitat and the site. This habitat forms a transition with ASM along part of the golf course boundary and it forms a mosaic of scattered clumps of Sea Rush amongst ASM vegetation. Common Cordgrass is generally not found in this habitat as this habitat is mainly situated in the upper zone of the marsh.

# 5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that current management activities and impacts on this habitat continue in the near future. There are no significant impacts or activities on this habitat apart from disturbance from tracks running though this area and from potential disturbance from the adjacent golf course. The habitat is found within an area that is primarily managed for nature conservation.

# **6 MANAGEMENT RECOMMENDATIONS**

No management of saltmarsh habitats is required at this site. Regular monitoring of Common Cordgrass distribution and abundance is required in the future, particularly on the mudflats and on the saltmarsh south of the causeway.

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# **Rogerstown Estuary**

# **1 SITE DETAILS**

SMP site name: Rogerstown Estuary		SMP site code: SMP0001			
Site name (Curtis list): Rogerstown Estuary		CMP site code: 6 (Portrane)			
		Site No: (Curtis list): 23	33		
NPWS Site Name: Rogerstown Estuary		Dates of site visit 23/06, 19/07 & 20/07/2006			
NPWS designation	cSAC: 208	MPSU Plan: old forma	t plan available		
	pNHA: <b>208</b>				
	SPA: Rogerstown Estua	ary SPA 15			
	Nature Reserve: Rogerst	town Estuary IE01 (S.I.	No.71 of 1988)		
	Wildfowl Sanctuary: Ro	gerstown Estuary Wild	fowl Sanctuary IE05		
County: Dublin		Discovery Map: 43	Grid Ref: 321580, 251580		
6 inch Map No: <b>Du008</b>		Aerial photos (2000 series): <b>02857-b</b> , <b>02857-d 02858-</b> <b>a</b> , <b>02858-b</b> , <b>02858-c</b> , <b>02858-d</b> , <b>02859-a</b> , <b>02859-c</b> , <b>02790-d</b> , <b>02791-d</b>			
Annex I habitats currently designated for Rogerstown Estuary cSAC:					
Salicornia and other annuals colonizing mud and sand (1310)					
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (1330)					
Mediterranean salt meadows (Juncetalia maritimi) (1410)					
Saltmarsh type: Estua	ary	Substrate type: Mud/Sa	and		

# **2** SITE DESCRIPTION

Rogerstown Estuary is a relatively small-sized estuary situated in north County Dublin. It is situated 2 km north from Donabate and 3 km south from Rush. This part of Co. Dublin is low-lying and dominated by agricultural land with arable crops prominent. There are also many urban areas of various sizes around the estuary. The estuary is divided into two main sections by the Belfast-Dublin railway line, which crosses a viaduct built in the 19<sup>th</sup> Century. The outer larger section contains a large area of intertidal mudflats and is partially enclosed from the sea by Portrane Burrow. There is a small connection between the estuary and the sea north of Portrane Burrow. The smaller inner section is fed by the Ballyboghil and Ballough Rivers. There is a large opening in the embankment that allows the tide to flood the inner section, although not all tides (low neaps) will flood the inner estuary. A large part of the north-east corner of the inner estuary has been infilled by the Ballealy Landfill. Rogerstown Estuary cSAC extends westward a river channel to the A1 Dublin-Belfast Road, which is located at Daws Bridge and is orientated north-south. Some areas adjacent to the inner part of the estuary contain low-lying land that was formerly enclosed by berms and was reclaimed, but is now reverting back to saltmarsh.

Three Annex I saltmarsh habitats, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM), are found at this site. All three habitats are listed as qualifying interests for Rogerstown Estuary cSAC. *Spartina* swards are also present at this site and are also listed on the Natura 2000 form as a qualifying interest. Saltmarsh habitats are located in the inner and outer estuary and on Portrane Burrow. O'Reilly and Pantin (1957) surveyed the saltmarshes of Rogerstown Estuary in the 1950's and this information serves as a good comparison to the current status.

Nearly all of the Annex I saltmarsh habitats are situated within the cSAC. There are some sections outside the cSAC boundary. The main excluded area is located at Whitestown along the north-eastern corner of the outer estuary. This section of saltmarsh was originally included in the cSAC but has been excluded from the latest version. Other small patches of saltmarsh habitat are excluded all around the boundary. These unintentional exclusions are probably related to the poor rectification in some cases between the map features used to draw the cSAC boundary and the 2000 series aerial photo, or may be result of the SAC appeals process.

Rogerstown Estuary cSAC also includes a large section of Portrane Burrow, which contains a sand dune system. This sand dune system (and associated saltmarsh) was surveyed by the Coastal Monitoring Project in 2004. Several rare plant species are also present in the Burrow. The estuary is important for wintering waders and wildfowl and the outer estuary has also been designated as an SPA. The site holds international important numbers of Brent Geese as well as nationally important numbers of Greylag Goose, Shelduck, Teal, Pintail, Shoveler, Oystercatcher, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Sanderling, Black-tailed Godwit, Curlew, Redshank and Greenshank. Most of the outer part of the estuary is owned by NPWS and has been designated as a nature reserve. Birdwatch Ireland own two plots of land on either side of the inner estuary and these areas are managed as a nature reserve.

Two plant species, which are legally protected under the Flora (Protection) Order, 1999, occur within the site: Hairy Violet (*Viola hirta*) occurs on the sand spit and

Meadow Barley (*Hordeum secalinum*) occurs in the saline fields of the inner estuary. This species has declined apparently due to reclamation and embankment of lands fringing the estuaries. Another rare species, Green-winged Orchid (*Orchis morio*), occurs in the sandy areas of the outer estuary.

The site was accessed from several locations around the estuary. Portrane Burrow was accessed via roads that lead to the beach from Portrane Village. The eastern section of the outer estuary was accessed by following the coastline around the spit. There was another access point at the south-eastern corner of the outer estuary where a minor road is situated close to the coastline. The western part of the outer estuary was accessed via a minor road that leads to Beaverstown Golf Course. The northern part of the outer estuary was accessed via a track that runs along the coastline. The southern part of the inner estuary was accessed via tracks that lead to Birdwatch Ireland's hide, through allotments owned by Fingal County Council. The northern part of the inner estuary was accessed via a track that leads to Birdwatch Ireland's northern hide.

# **3 HABITATS**

# 3.1 General description

Saltmarsh habitats at this site can be divided into a series of sub-sites and described separately. Overall, Atlantic salt meadows are the most common saltmarsh habitat (Table 3.1). There are only small amounts of *Salicornia* flats and Mediterranean salt meadows. The cover of *Spartina* swards is about 40% of the total amount of the other saltmarsh habitats.

# 3.1.1 Portrane Burrow

Saltmarsh at this location is dominated by Atlantic salt meadows (ASM). This saltmarsh is found in a sheltered location with sand dunes protecting the saltmarsh along the eastern seaward edge. There has been a recent blow-out in the dunes at this location since the site was surveyed by the CMP team in 2004. The saltmarsh is flooded from the northern side where there is one main creek. Old sand dunes are also present along the landward boundary.

There are also several small patches of saltmarsh along the northern side of Portrane Burrow. These are long and quite narrow and have developed in some sheltered patches of the shoreline. The saltmarsh is dominated by ASM with a strip of *Salicornia* flats at the seaward side. This saltmarsh borders sandflats on the seaward side and improved grassland on the landward side.

# 3.1.2 Outer Estuary

There are several patches of saltmarsh around the fringes of the outer estuary. Most of the saltmarsh is dominated by *Spartina* swards. These are best developed in the south-east corner and the north-west corner of the estuary. The sward extends as a narrow band along the southern edge of the estuary. Scattered clumps on mud are also associated with the denser swards. There are some patches of *Salicornia* flats also in the south-eastern corner of the outer estuary, adjacent to clumps of Common Cordgrass (*Spartina anglica*). ASM is located along the southern side of the estuary, although there is a relatively small amount and it has mainly developed as a narrow strip bordering the *Spartina* sward. ASM becomes somewhat wider in the two southern corners of the outer estuary. The ASM generally transitions to a narrow band of Twitch (*Elytrigia repens*)-dominated grassland before the development of the mature hedgerows marking the terrestrial boundaries. There is also a small patch of MSM in the south-western corner of the estuary.

There is also a patch of ASM saltmarsh in an enclosure located at the north-eastern corner of the estuary at Whitestown. This saltmarsh is mainly enclosed from the sea, but is still flooded via two drains/creeks that drain this area. The saltmarsh at this location is more brackish than standard ASM and has been disturbed by excavation in the recent past and by older attempts at reclamation. Saltmarsh at this location transitions into Twitch-dominated grassland on higher ground.

# 3.1.3 Inner Estuary (southern side)

Saltmarsh extends along nearly all of the southern side of the inner estuary. The seaward side of these saltmarsh habitats are marked by mudflats on quite steeply sided channels. The saltmarsh is dominated by ASM. Mediterranean salt meadows (MSM) also occur in a large block in the central section (west of the Birdwatch Ireland hide) and to the landward side of the ASM. Common Cordgrass is present

along most of the saltmarsh. Several sections at the seaward side of the ASM have been classified as either *Spartina* swards or mosaics between *Spartina* swards and ASM. Further west the channel narrows and a tall berm or embankment follows the edge of the channel. This berm was built to exclude the tide and reclaim low-lying land (former saltmarsh) behind the berm. There is a narrow strip of ASM saltmarsh along the channel side of the berm extending quite high up the river channels before petering out where the tide becomes less influential and brackish habitats with stands of Sea Club-rush (*Bolboschoenus maritimus*) and Common Reed (*Phragmites australis*) develop. The berm has not been maintained and is breached in several locations. This has led to the restoration of ASM on land behind the berms. This ASM is still quite disturbed and in the process of succession back to ASM.

The landward boundaries of the saltmarsh are marked by several features. The eastern point is enclosed by the railway embankment. Beaverstown Golf Course is situated along the landward side of the eastern part of the saltmarsh and there are some low embankments or drains separating the saltmarsh from the higher land of the golf course. There are occasional patches of Common Reed at the landward side of the saltmarsh. Further west of the golf course there is arable land or improved grassland in various stages of management along the landward side of the saltmarsh. This arable land or grassland occupies higher land and there is usually a mature hedgerow or treelike marking the boundary. Further west (west of the bird hide) drains and embankments are situated along the back of the saltmarsh. Much of the adjacent land contains unmanaged rank grassland with some scrub encroachment. Some of this grassland is dominated by Twitch and can be classified as upper saltmarsh (CM2). The Twitch dominated areas can be classified as upper saltmarsh (CM2) but are not classified as ASM because this community does not fit into the Glauco-Puccinellietalia maritimae (Rodwell 2000).

# 3.1.4 Inner Estuary (north side)

The northern side of the inner estuary has a similar morphology and landscape to the southern side. Ballealy Landfill has infilled a large section of the estuary (and probably some saltmarsh) at the north east corner adjacent to the railway embankment. *Spartina* swards have developed extensively on mudflats between the landfill and an embanked area which is part of Newhaggard. This embanked area has

a berm around its edge. However, this berm has been unmanaged and is breached at several locations. ASM saltmarsh has developed behind the berm and this area is grazed by horses. Further west there is a small intricate channel leading northwards from the estuary. Birdwatch Ireland own saltmarsh on both sides of the channel and the large area behind the berm. The topography of this section is quite complex, particularly higher up the channel. Saltmarsh on both sides of the channel is dominated by ASM. Further south, Common Cordgrass is prominent within the established saltmarsh and a large area is classified as a mosaic of *Spartina* sward and ASM. ASM continues westwards where the estuary narrows into a small channel. This area is also embanked with a large berm. There has been some re-establishment of ASM saltmarsh in low-lying areas behind the berm.

The landward boundary of the saltmarsh is generally marked by old embankments or berms and may be associated with drains. There are still signs of old saltmarsh creeks in these reclaimed areas and some saltmarsh vegetation may extend along some of these creeks that are still active as drainage channels. Much of the land adjacent to the saltmarsh along the northern side of the inner estuary contains rank grassland dominated by Twitch, (which can be classified as upper saltmarsh CM2).

EU Code	Habitat	Area (ha)
1310	Salicornia and other annuals colonizing mud and sand (1310)	2.6
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	33.02
1410	Mediterranean salt meadows (Juncetalia maritimi)	1.57
	Spartina swards	15.79
	Total (not including Spartina swards)	37.49

**Table 3.1.** Area of EU Annex I habitats listed at Rogerstown Estuary.

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

This habitat occurs at several locations within the inner and outer estuary. Small strips of Glasswort (*Salicornia* sp.) between 1-5 m wide occur along the seaward edge of the ASM, along the southern side of the inner estuary. These patches are dominated by Glasswort and also contain rare individual plant of Greater Sea-spurrey (*Spergularia media*) and Common Saltmarsh-grass (*Puccinellia maritima*). There is no transition between the patches of *Salicornia* flats and the ASM as the boundary is the ASM cliff. Patches of *Salicornia* flats along the ASM are located at the eastern

end of the southern inner estuary adjacent to the railway embankment. These patches have more frequent Annual Sea-blite (*Suaeda maritima*) along with abundant Glasswort.

Narrow strips of this habitat 2-5 m wide are situated along the edge of the berm along the northern side of the inner estuary. Glasswort has vegetated a strip of mud along the eroded edge of the berm where old car wrecks are being exposed. Glasswort has also vegetated small raised platforms to the seaward side of the *Spartina* sward that occupies the mudflats adjacent to the Ballealy Landfill. These patches are occupying areas where Common Cordgrass has died back in places.

This habitat also occurs along the saltmarsh at the tip of Portrane Burrow. Here, there is a narrow strip about 5 m wide on sandy mud dominated by Glasswort and also containing occasional or rare Common Saltmarsh-grass, Greater Sea-spurrey, Annual Sea-blite and Lax-flowered Sea Lavender (*Limonium humile*). There is an abrupt boundary between the *Salicornia* flats and the ASM, marked by a low ASM cliff.

This habitat is also present in the south-eastern corner of the outer estuary. At the northern side, some small patches of *Salicornia* flats occur on a narrow band of exposed mud between the *Spartina* swards and the ASM vegetation along the shore. There are also small patches further out to the seaward side of the *Spartina* swards on slightly raised mounds. This is the only location where clumps of Common Cordgrass occur in association with the *Salicornia* flats.

# 3.3 Atlantic salt meadows (H1330)

# 3.3.1 Inner Estuary (southern side)

The ASM along the southern part of the inner estuary has a saltmarsh cliff 0.3-0.4 m high (east of the bird hide). Sometimes the cliff height increases to 1 m. There are occasional signs of erosion along the cliff with mud balls forming. The ASM along this part of the estuary shows saltmarsh plant community zonation. The lower saltmarsh zone along the saltmarsh cliff is dominated by Common Cordgrass, Sea Purslane (*Atriplex portulacoides*) and frequent Lax-flowered Sea Lavender, along with Glasswort. The salt pan structure is generally quite poor in this zone and there are few pans present. There are occasional small clumps of Common Cordgrass along the seaward side of the saltmarsh cliff to the east of the bird hide.

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Along most of the inner estuary Common Cordgrass has established on the existing ASM and formed patches of *Spartina* swards with some ASM species. It was sometimes difficult to map the ASM and the *Spartina* swards as there was quite variable cover of Common Cordgrass on the established saltmarsh and it occurred in a mosaic with the ASM. *Spartina* swards were mapped on established saltmarsh where the overall cover was greater than 40%, although the cover within these areas varied considerably (mainly between 20-75%) and there were sometimes small patches of ASM with no Common Cordgrass.

This lower zone transitions into a middle marsh zone dominated by Sea Pink (*Armeria maritima*) and Sea Plantain (*Plantago maritima*). Other species present include Greater Sea-spurrey, Common Saltmarsh-grass, Sea Arrowgrass (*Triglochin maritimum*), Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*) and Annual Sea-blite. This zone has a typical low sward height. The saltmarsh creek and pan topography is well developed in this zone, particularly in the area adjacent to Beaverstown Golf Course. There are clumps of Common Cordgrass of various sizes scattered through the middle marsh zone but generally has an overall cover of < 5%. Common Cordgrass has infilled some of the large salt pans and some old creeks. There are several deep large drains that cut across the saltmarsh and lead from drains in Beaverstown Golf Course.

A mid-upper ASM saltmarsh zone has also developed in this part of the saltmarsh (adjacent to Beaverstown Golf Club) with grassy patches dominated by Saltmarsh Rush (*Juncus gerardii*) and Red Fescue (*Festuca rubra*), along with Sea Aster, Sea Milkwort and Common Scurvy-grass (*Cochlearia officinalis*). Sea Purslane colonises some patches in pans, as does Common Cordgrass. Sea Beet (*Beta maritima*) colonises some of the low mounds that are situated near the drift line level.

Upper zone ASM vegetation occupies slightly raised parts of the saltmarsh further west of the bird hide. These patches are dominated by Red Fescue with frequent Sea Milkwort, Sea Plantain, and occasional Lax-flowered Sea Lavender and Sea Purslane. These raised areas are not uniform and there are patches of lower zone saltmarsh dominated by Common Saltmarsh-grass in lower hollows and channel-like areas, sometimes to the landward side of these raised sections.

Further west, the ASM is confined to a narrow strip along a high berm. Saltmarsh pans are still present and the ASM vegetation is dominated by the middle-marsh zone (Sea Pink and Sea Plantain). The berm is vegetated with Twitch, Creeping Bentgrass (*Agrostis stolonifera*) and occasional Nettle (*Urtica dioica*) and Creeping Thistle (*Cirsium arvense*) on the top.

This narrow band of ASM saltmarsh eventually transitions to more brackish vegetation. Saltmarsh Rush and Sea Plantain become prominent, with Sea Aster, Creeping Bentgrass and Common Scurvygrass also present. Species such as Curled Dock (*Rumex crispus*) and Twitch appear within the ASM vegetation. There are also patches of Grey Club-rush (*Schoenoplectus tabernaemontani*).

The area on the inside of the berm contains some disturbed ASM vegetation. Most of this area was probably reclaimed at one stage for agricultural use. A deep drain runs along the inside of the berm. There are several breaches along the berm allowing the tide to flood this drain and flood this area but most of the berm is still intact and in The vegetation varies between lower hollows with saltmarsh good condition. vegetation along side slightly raised sections dominated by Twitch and Sea Couchgrass (*Elvtrigia pycnanthus*). There is a complex network of vegetated channels and some large old bare pans still present in this area and ASM vegetation is present along many of this old channels. The ASM vegetation is dominated by Common Saltmarsh grass in places with frequent Sea Plantain, Sea Arrowgrass, Saltmarsh Rush and Sea Aster. Some Common Cordgrass is also present. There are also zones dominated by Creeping Bentgrass and Red Fescue. Some parts of the ASM have an unusual species assemblage dominated by Sea Arrowgrass or Sea Aster and also containing frequent bare mud, and seem to be in transition back to typical ASM communities. Other species present include Annual Sea-blite, Lax-flowered Sea Lavender and Sea Milkwort. Sea Purslane is present but rare.

# 3.3.2 Inner Estuary (northern side)

There is a large ASM area on the eastern side enclosed by a berm that is grazed by horses (owned by Birdwatch Ireland). The berm is in poorer condition compared to those on the southern side and there are several large breaches. Some of the berm is eroding badly. The ASM vegetation in this area is somewhat disturbed or has an unusual species assemblage and this is probably related to old reclamation works and

more recent disturbance from horses. Some large sections are in poor condition. This area has a low sward height and shows some disturbance with frequent bare mud amongst the ASM vegetation being colonised by Glasswort and Annual Sea-blite. There is some light poaching. There are several zones present within this area behind the berm. The north-west section is slightly raised and is dominated by Red Fescue with frequent Sea Plantain and Saltmarsh Rush along with frequent Glasswort. It also contains low mounds with transitional species such as Autumn Hawkbit (Leontodon autumnalis), Curled Dock and Spear-leaved Orache (Atriplex prostrata). A large deep drain divides this area into two sections and some of the drain has been infilled. There is also a large deep drain and associated berm along the northern boundary of this area. There are few pans or creeks in this area. Creek formation is best in the lower section close to the berm. The south-east and eastern sections contains more frequent lower zone species with Common Saltmarsh-grass prominent. There are some areas with abundant Glasswort and occasional Annual Sea-blite and Greater Sea-spurrey that have colonised bare mud, and there are patches that could be classified as 1310 Salicornia flats. These areas may have developed in response to grazing and disturbance by horses.

ASM saltmarsh is also present on both sides of the main channel that leads into the northern side of the estuary and west of the new Birdwatch Ireland bird hide. This ASM is dominated by mid-marsh salt marsh communities with a low Sea Pink sward present in hollows and Red Fescue and Saltmarsh Rush-dominated patches on low There is some zonation of saltmarsh plant communities related to the mounds. distance from the main channel. There are steep high saltmarsh cliffs along the edge of the channel. This area has some pans present and some minor channels connecting to the main channel. Common Cordgrass is present but is not prominent. Further north, patches of transitional upper marsh vegetation have developed with Twitch dominating large sections and Sea Club-rush (Bolboschoenus maritimus) occupying some of the creeks or drainage channels. Hard Grass (Parapholis strigosa) is present along the bank leading to the bird hide. There are still some patches of ASM vegetation present in hollows but these are less prominent compared to the Twitchdominated areas. Upper ASM vegetation is dominated by Red Fescue and Creeping Bentgrass with occasionally frequent White Clover (Trifolium repens) and occasional Autumn Hawkbit, Sea Aster, Sea Arrowgrass, Sea Milkwort and Sea Plantain.

The saltmarsh at the western side of the main channel contains more frequent Common Cordgrass. This species is scattered through the ASM in small dense patches and is also dominant in those larger areas mapped as *Spartina* swards with some ASM on the established saltmarsh. Sea Purslane and Common Saltmarsh-grass dominate along a narrow zone at the seaward edge of the established saltmarsh and also along the edges of the some of the larger creeks. Both mid-marsh and upper marsh zones are present. There are unusually abrupt boundaries between these zones that are related to the edges of low flat plateaus that are vegetated by a grassy upper saltmarsh plant community. These low green plateaus are visible on the OSI 2000 series aerial photo. A low-mid saltmarsh community dominated by Lax-flowered Sea Lavender is also present.

ASM saltmarsh is also present behind a berm at the western end of the northern side of the inner estuary. A drainage channel is situated 10-15 m from along the inner edge of the berm and this drain floods this area. The ASM contains several saltmarsh communities with a lower marsh community dominated by Common Saltmarsh-grass, Sea Arrowgrass and Sea Plantain present and upper marsh vegetation dominated by Creeping Bentgrass and Red Fescue on raised mounds present. This ASM transitions into Twitch-dominated grassland.

#### 3.3.3 Outer estuary

ASM has developed along a narrow strip at the north-western corner of the outer estuary. This ASM transitions to shingle/pebbles along the lower boundary and there is a band of Twitch-dominated vegetation and Sea Beet along the upper boundary before hedgerows develop. The ASM is made up with a strip of Sea Purslane with frequent Sea Arrowgrass and Sea Plantain. The ASM is dominated by a band of Saltmarsh Rush further east and is about 10 m wide in places. There is very little structure with no salt pans present. Other species include Creeping Bentgrass, Orache (*Atriplex* sp.) and Sea Milkwort.

ASM saltmarsh is also present in an enclosure at Whitestown, which is located in the north-east corner of the outer estuary. A minor road on an embankment is situated along the seaward side of this area. This enclosure contains a large channel that drains this section and allows the tide to flood the area at times. This area is not grazed at present. The vegetation along the channels is characterised by Red Fescue

and Creeping Bentgrass-dominated vegetation. Species such as Saltmarsh Rush, Sea Aster and Sea Arrowgrass are prominent. There are few signs of saltmarsh topography with several salt pans present. This area has been modified in the past with signs of drainage and there was probably a sluice at the end of the channel to limit the flow of seawater into this area. Spoil heaps are situated along a large drain at the western side. This area is probably more brackish compared to other saltmarsh and there are transitional species such as Curled Dock present.

The eastern side of the outer estuary is dominated by a shingle or pebble bank. There are occasional small patches of Annual Sea-blite developing amongst the shingle, but these were not classified as saltmarsh vegetation as the substrate was not mud or sand. Towards the southern end small relic patches of mud appear over the shingle/pebble substrate. These patches of mud mainly contain Sea Purslane.

ASM vegetation begins to develop again towards the south-eastern corner of the outer estuary. Initially there is a narrow band dominated by Sea Purslane and there are occasional clumps of Common Cordgrass scattered along the seaward side on stony mud. Further south into the corner the clumps of Common Cordgrass amalgamate to form *Spartina* swards. There is a unique transition zone on a gradual slope between the ASM and the *Spartina* swards, rather than the boundary being marked by a saltmarsh cliff. Species such as Sea Purslane, Common Saltmarsh-grass and Laxflowered Sea Lavender become less common and Common Cordgrass begins to dominate down the slope. The ASM becomes characterised by a narrow strip dominated by Saltmarsh Rush and Sea Rush (*Juncus maritimus*) is also present.

The ASM saltmarsh in the south-eastern corner is divided into two sections by a main channel that flows through the centre. There is a wall marking the landward boundary of the saltmarsh adjacent to a minor road along the shoreline. The southern saltmarsh is characterised by a large patch of established saltmarsh dominated by Common Cordgrass (and mapped as *Spartina* swards with some ASM). Much of this section contains a mosaic of lower marsh ASM and *Spartina* sward. There are frequent small dense patches of Common Cordgrass where it has colonised old pans. There are patches of mid marsh vegetation dominated by Sea Pink and Sea Plantain at the landward side.

A narrow band of ASM is present along the southern side of the outer estuary. This strip of saltmarsh varies in width but is generally about 5 m in width. There are sections with very little zonation and the ASM strip is dominated by a band of Saltmarsh Rush with occasional clumps of Sea Rush along the seaward cliff, adjacent to the *Spartina* sward. Some sections have occasionally frequent Sea Rush. (These have not been mapped as 1410 as they are quite small and the bands of Sea Rush is generally quite narrow being 1 m or less.) A band of Creeping Bentgrass occurs at the landward side of the Rush-dominated strip. Species such as Silverweed (*Potentilla anserina*), Spear-leaved Orache and Sea Beet occur on some low mounds raised slightly above the high water mark. Further west, Sea Purslane becomes more prominent along the seaward edge and there are signs of erosion. There is no *Spartina* sward along the ASM in this area. In the south-western corner the ASM widens somewhat and there are several zones present. A patch of Sea Club-rush occurs at the landward side of this ASM.

# 3.3.4 Portrane

This area of ASM saltmarsh is protected by some embryonic dunes along the edges of sand dunes. There is some zonation of saltmarsh communities with upper saltmarsh communities at the southern end. The southern section is quite flat and uniform with few pans. There are indicators of wind erosion and bare ground reaches 5-10% in some patches. This area is dominated by Red Fescue with frequent Sea Plantain and Long-bracted Sedge (*Carex extensa*) was present. There are small amounts of Sea Pink, Sea Purslane and Sea Milkwort. This saltmarsh is notable for the presence of Rock Sea-Lavender (*Limonium binervosum*). The sward is quite short and uniform.

Sand is encroaching from a blow-out in the dunes along the eastern side. There has been some dune repair works by Fingal County Council in this area. The sand is blowing over the saltmarsh and is being colonised by Sea Couch (*Elytrigia pycnanthus*) and Lyme Grass (*Leymus arenarius*). Saltmarsh vegetation in this area is characterised by the dominance of Common Saltmarsh-grass and this is probably related to the disturbed nature of this area.

Pans become more prominent towards the northern end and one large creek drains the saltmarsh. There are very small patches of Glasswort and Annual Sea-blite on mud within the creek beds. The northern saltmarsh section contains frequent Common

Saltmarsh-grass along with Sea Aster, Lax-flowered Sea Lavender, Glasswort and Sea Purslane. A track occurs along the landward edge of the saltmarsh that is used by walkers and vehicles. Common Cordgrass is quite rare in this saltmarsh and appears in some creeks towards the northern end.

There has been some recent deposition of sand and shingle at the northern end of the saltmarsh and some development of embryonic dune since the CMP survey in 2004. A ridge dominated by Sea Purslane is present along part of the front of the saltmarsh, protecting the front of the saltmarsh somewhat. The saltmarsh transitions to sandy mud further seaward.

Further eastward around the tip of Portane Burrow there are several strips of ASM vegetation. This ASM saltmarsh is characterised by a band of Sea Purslane along the seaward edge. There is a small platform of eroded mud along the edge where the established saltmarsh is eroding back. Behind this band there is a zone dominated by Sea Plantain, Sea Arrowgrass, Lax-flowered Sea Lavender and Common Saltmarsh-grass.

#### **3.4** Mediterranean salt meadows (H1410)

This habitat mainly occurs within the southern side of the inner estuary although there is a small patch on the northern side and a small patch in the south-western corner of the outer estuary. It is generally situated along the landward side of the saltmarsh and along the landward boundary, with ASM vegetation to the seaward side. The eastern side of this habitat is quite narrow (east of the bird hide). There is a dense band of Sea Rush along the lower boundary adjacent to the ASM. Further landward the Sea Rush breaks up somewhat and there are scattered clumps of Sea Rush amongst ASM vegetation. Occasionally there are patches of middle marsh vegetation dominated by Sea Plantain and Sea Pink within the MSM.

The largest area of MSM occurs west of the bird hide. There is an abrupt boundary between the MSM and the ASM. The MSM generally occurs on slightly raised areas (about 0.3 m above the ASM) and there is a slight bank along the boundary. This is an unusual feature and may indicate old reclamation works or may also indicate several stages of saltmarsh accretion. These raised plateaus are characterised by the presence of clumps of Sea Rush. However, the Sea Rush generally does not

dominate. There is generally abundant Red Fescue and frequent Sea Plantain, with smaller amounts of Saltmarsh Rush, Creeping Bentgrass, Sea Arrowgrass, Common Scurvygrass and Autumn Hawkbit. There are occasional slightly raised mounds that contain Twitch. There are lower strips or channels between the plateaus that contain ASM vegetation. The MSM transitions to dry earthen berms or banks at the landward side.

# 3.5 Spartina swards

This habitat can be divided into two categories, *Spartina* sward that has developed on open mudflats and *Spartina* sward that has developed on established saltmarsh.

There are several large patches of *Spartina* swards that have developed on mudflats, particularly adjacent to Ballealy Landfill and in the south-eastern corner of the outer estuary. In both of these areas the *Spartina* swards are characterised by dense swards or large clumps of Common Cordgrass on very soft mud. Common Saltmarsh-grass, Lax-flowered Sea Lavender, Greater Sea-spurrey and Glasswort are all occasionally frequent at the landward side of the *Spartina* sward. There is generally few other saltmarsh species present although Lax-flowered Sea Lavender, Common Saltmarsh-grass and Greater Sea-spurrey may appear quite far out in the sward. The *Spartina* swards are generally broken up by an intricate network of creeks, particularly in the area adjacent to Ballealy Landfill. In this area there are also some enclosed patches of bare mud within the sward. There are few signs of seedlings at the seaward side of the main *Spartina* sward.

The area in the south-eastern corner of the outer estuary is characterised by more scattered aggregates of large clumps that have not coalesced as significantly to form dense swards. Further seaward the clumps become much less frequent. There is an unusual natural transition from the ASM to *Spartina* sward along a gradual slope in this corner of the estuary. There seems to be some recent growth of Common Cordgrass along the seaward side of an old saltmarsh cliff (on the south side) that originally marked the edge of the *Spartina* sward. There are patches of *Salicornia* flats to the seaward side of the *Spartina* sward. Further west Glasswort appears within the *Spartina* sward in small patches. The sward develops into a narrow band of dense Common Cordgrass adjacent to the shoreline. There are occasional isolated clumps of Common Cordgrass further seaward on the mudflats. There are no

indications of any Common Cordgrass seedlings along this zone. The extent of Common Cordgrass continues west but then the sward breaks up and there are no clumps of Common Cordgrass on the mudflats adjacent to the ASM in the southwestern corner of the outer estuary.

There is patchy *Spartina* sward formation at the north-west corner of the outer estuary. This sward has colonised pebbly mud. There are several isolated clumps of Common Cordgrass in a zone about 100 m out from the seaward side of the established sward. Some boulders have been left along the landward side of the *Spartina* sward. There is very little ASM development along the landward side of the *Spartina* sward and this habitat abruptly stops at or near the edge of the mudflats.

There are also significant amounts of Common Cordgrass on established saltmarsh. It was sometimes difficult to map the ASM and the *Spartina* swards as there was quite variable cover of Common Cordgrass on the established saltmarsh and it occurred in a mosaic with the ASM. *Spartina* swards were mapped on established saltmarsh where the overall cover was greater than 40%, although the cover within these areas varied considerably (mainly between 20-75%) and there were sometimes small patches of ASM with no Common Cordgrass.

Common Cordgrass has infilled some small inlets along the ASM that originally contained mudflats along the southern side of the inner estuary. These inlets were marked on the 2<sup>nd</sup> edition OSI 6 inch map. There were some signs of die back of Common Cordgrass at the seaward side of the sward on mudflats. These lower-lying areas contain dense mono-specific swards of common Cordgrass. There are also significant areas dominated by Common Cordgrass within the established saltmarsh generally have significant amounts of Sea Purslane and Common Saltmarsh-grass, along with occasional Sea Lavender and Greater Sea-spurrey. The cover of Common Cordgrass varies between 20-70%. These have been mapped as *Spartina* swards with some ASM. There are also occasional relic patches of ASM dominated by Sea Pink and Sea Plantain within the *Spartina* sward.

Further west of the bird hide along the southern side of the inner estuary the saltmarsh cliff is quite high (1 m) and remains high where the river channel narrows. The saltmarsh cliff occurs adjacent to relatively steep intertidal mudflats that slope down

to a central channel, and there is no Common Cordgrass seaward of the cliff. There is a narrow band of ASM vegetation along the saltmarsh cliff and to the seaward side of *Spartina* sward. This band may be slightly raised compared to the level of the *Spartina* sward.

*Spartina* swards also occur on established saltmarsh on the western side of the northern side of the inner estuary. This plant community is dominated by Common Cordgrass. However, there are only a few small patches with cover > 75%. Generally the cover of Common Cordgrass is between 20-60%. Other species present include Sea Purslane, Common Saltmarsh-grass, Greater Sea-spurrey, Sea Arrowgrass, Sea Plantain and Lax-flowered Sea Lavender. There are small patches of mid marsh ASM dominated by Sea Pink and Sea Plantain within these areas mapped as *Spartina* swards. ASM generally occurs as a narrow band along the seaward boundary of the established saltmarsh and follows the edges of the large creeks that protrude into this part of the saltmarsh.

# 4 IMPACTS AND ACTIVITIES

This site has a range of varied activities, which is typical of a large site with several habitats that are quite spread out over a wide area with a range of different management units and activities (Table 4.1). The saltmarsh habitats have been disturbed in the past by activities associated with reclamation, the construction of the railway viaduct and Ballealy Landfill. These impacts are still having some residual impacts but have not been assessed as the activities occurred prior to 1993.

The saltmarsh at Portrane is affected by some impacts and activities related to amenity use (the activity codes use in Table 4.1 are given in parentheses in the following text). Cars park on the flat saltmarsh to access Portrane Strand (623). There are also wheel ruts in places over the saltmarsh (623). A sandy track is situated along the western side of the saltmarsh that accesses the northern shoreline (501). There has been a recent blow-out in the dunes along the eastern side and sand is encroaching onto the saltmarsh. There is some natural transition from saltmarsh to embryonic dunes (990). Fingal County Council are attempting to restore the dunes in this section. There are frequent wheel ruts on the saltmarsh related to these

restoration works. Tracks on the saltmarsh (and sand dunes) are used by walkers, dog walkers and horse riders (622).

There are occasional deep channelised creeks that cross the saltmarsh and drain the adjacent land (810). Examples of these can be seen adjacent to Beaverstown Golf Course (southern side of the inner estuary). These have probably not been modified in the current assessment period and therefore are not assessed. There are still probably residual impacts from these drains. There are still signs of spoil heaps or ridges along these channels and they may be vulnerable to cleaning or deepening in the future.

Most of the saltmarsh is ungrazed by livestock and has a relatively high sward height, particularly in grassy mid-upper marsh areas (140). Hares and waterfowl do graze on the saltmarsh and the mid marsh zone has a typical natural low sward height. An area behind a berm along the northern side of the inner estuary has been grazed by horses at times. These horses may be encroaching into this area (owned by Birdwatch Ireland) from adjacent land and their presence is generally unwanted by Birdwatch Ireland. The horses have poached the ground in this section and there are signs of disturbance in the vegetation with Glasswort frequently occurring.

The inner estuary is notable for the large areas of Twitch-dominated grassland adjacent to the Annex I ASM. The Twitch dominated areas can be classified as upper saltmarsh (CM2) but are not classified as ASM because this community does not fit into the Glauco-Puccinellietalia maritimae (Rodwell 2000). These areas sometimes contain small brackish hollows or old creeks and pans that contain more typical ASM vegetation. Fingal County Council owns many of these fields along the southern side of the inner estuary. However, they are not managed at present. Some grazing may be beneficial in these areas in increase plant diversity in the Twitch-dominated stands (149). Meadow Barley (*Hordeum secalinum*), a plant listed in the Flora Protection order, is present within Rogerstown Estuary SAC and has been recorded in some of these brackish hollows, particularly in Newhaggard along the north side of the inner estuary.

The berms that enclose land along the inner estuary are indicators that saltmarsh was reclaimed in the past (802). Many of these berms have fallen into various states of

disrepair and have been breached or are eroding. Some of the berms may have been breached deliberately. This is leading to the re-establishment of ASM saltmarsh in some of the land inside these berms. This ASM has an unusual species assemblage in places and this is an indicator of the habitat in transition. There are further possibilities for managed retreat and the restoration of saltmarsh in the inner estuary, particularly on the land owned by Fingal County Council. The frequent drains and banks that mark the landward boundaries are also indicators of the previous history of reclamation.

Birdwatch Ireland own 45 ha of land along the northern side of the inner estuary. This land is managed positively for the wintering waders and wildfowl that use the estuary. Birdwatch Ireland has constructed a bird hide on this reserve. Birdwatch Ireland has a management agreement with land owners to the west of this area to also manage the land sensitively for the use of waders and wildfowl. There has been some drainage works to control water levels on sections of the saltmarsh for the benefit of the waterfowl. There was a small area being tilled inside the berm at the western end of the northern side of the inner estuary that is situated within the area that is in the management agreement.

Many of the older published and unpublished sources on Rogerstown Estuary mention the impact of Ballealy Landfill on the estuary. Pollution from heavy metals and eutrophication has been noted as affecting the mudflats (Fahy *et al.* 1975) (701). Water quality within the estuary has been monitored regularly by Fingal County Council. More recent studies have indicated that leachate from the dump has moderated somewhat (MPSU Conservation Plan). There were no signs of pollution affecting the saltmarsh vegetation.

Common Cordgrass is a prominent part of the saltmarsh at Rogerstown Estuary. This is an invasive species (954). This species has formed swards on both the intertidal mudflats and also forms mosaics with ASM vegetation on the established saltmarsh. The area mapped as *Spartina* swards with some ASM on established saltmarsh is 3.8 ha. Common Cordgrass was first recorded from the estuary in 1938 (Praeger, 1939), although in 1957 it was noted "that nowhere in the Estuary does *Spartina* occur" by O'Reilly and Pantin, (1957). However, by the 1970s it had become well established (Fahy *et al.*, 1975). In more recent years some natural dieback has been recorded

(Madden cited in McManus *et al.*, 1992). Common Cordgrass has been present at this site since the 1960s and Nairn (1986) noted that it had increased significantly in extent during this period.

A comparison of the aerial photos from 1995 and 2000 indicates that Common Cordgrass has not spread significantly on mudflats in either the area adjacent to Ballealy Landfill or the area in the south-eastern corner of the inner estuary. Both these swards show up well on the aerial photos. Since then there does not seem to have been any significant growth or reduction of the extent of *Spartina* swards on mudflats. There were no signs of new seedlings present and many of the clumps are quite large and relatively old. Signs of old die-back were noted on both sides of the inner estuary although the extent of die-back was not significant. A reduction in the extent of *Spartina* sward may have occurred in the north-eastern corner of the outer estuary. Both these swards have developed in areas that formerly contained significant stands of *Salicornia* flats, as indicated by O'Reilly and Pantin (1957).

It is difficult to interpret the extent of Common Cordgrass on the established saltmarsh from the aerial photos. There were no indications that it has spread significantly in the recent past. The spread of Common Cordgrass since the 1950s has been most significant in the lower marsh zones and it is likely to have transformed large areas formerly dominated by Common Saltmarsh-grass and Lax-flowered Sea Lavender into areas dominated by Common Cordgrass.

A comparison of the 1920's OSI 2<sup>nd</sup> edition six inch map to the current extent of saltmarsh shows there has been several gains and losses of saltmarsh around the estuary. Some of these gains and losses may be related to adjustments after infilling of mudflats by the Ballealy Landfill. The landfill covered some established saltmarsh in the north-west corner of the inner estuary. There are minor changes to the boundaries of the saltmarsh in the western part of the inner estuary although there are indications of erosion (900) along both sides of the channel where it is narrower, where the saltmarsh is undercut, and accretion is occurring on the opposite side. The western side of the berm around Newhaggard has also been eroded. The boundary of the saltmarsh along the southern side of the inner estuary shows some losses and gains. There has been some natural erosion of saltmarsh along the eastern side of the

outer estuary since the survey carried out by O'Reilly and Pantin (1957). Saltmarsh

(and sand dunes) at Portrane Burrow were also previously much more extensive.

EU Habitat	Activity code <sup>2</sup>	Intensity <sup>3</sup>	Impact <sup>4</sup>	Area affected	Location of
Code <sup>1</sup>				(ha)	activity <sup>5</sup>
1310	954	В	-1		Inside
1330	140	В	-1	10.4	Inside
1330	501	С	-1	1.71	Inside
1330	622	С	-1	1.71	Inside
1330	623	С	-1	0.5	Inside
1330	900	С	-1	0.01	Inside
1330	954	В	-1	3.8	Inside
1330	990	С	-1	0.5	Inside
13s	100	С	0	all	Outside
13s	120	С	0	all	Outside
13s	140	С	0	all	Outside
13s	502	С	0	all	Outside
13s	601	С	0	all	Outside
13s	701	С	0	all	Outside
13s	990	С	-1	0.75	Outside

**Table 4.1.** Intensity of various activities on saltmarsh habitats at Rogerstown

 Estuary.

<sup>1</sup> EU codes as per Interpretation Manual. Code 13s is an additional code used to signify the entire saltmarsh habitat.

<sup>2</sup> Description of activity codes are found in Appendix III summary report.

<sup>3</sup> Intensity of the influence of an activity is rated as A = high, B = medium, C = low influence and D unknown.

<sup>4</sup> 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 overall conservation status of the site is *unfavourable-inadequate* (Table 5.1). The saltmarsh in the inner estuary has been affected by reclamation in the past and these activities are probably still having a residual impact. However, the saltmarsh is slowly recovering from this disturbance. Part of the saltmarsh is affected by amenity pressure but this only affects a small area. *Spartina* swards are extensive around the site and are mainly confined to the mudflats and the lower zones of the established saltmarsh. The impacts of Common Cordgrass on the mudflats and Eelgrass communities are not considered with this assessment. *Spartina* swards are likely to have replaced *Salicornia* flats in the past but this occurred prior to the current assessment period and therefore is not assessed. The conservation value of this site is

enhanced by the presence of extensive brackish areas dominated by Twitch at the landward side of the ASM.

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

**Table 5.1.** Conservation status of Annex I saltmarsh habitats at Rogerstown Estuary.

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

#### 5.2.1 Extent

The extent of this habitat (2.6 ha) is assessed as *favourable* in the absence of any accurate information on the previous extent of this habitat. There are no indications that the extent of *Salicornia* flats has increased or decreased significantly in the current assessment period.

The spread of Common Cordgrass has probably negatively affected the extent of this habitat but as most of the *Spartina* sward established prior to 1995 it is not considered during this assessment. A comparison of the current extent of *Salicornia* flats to the previous extent as mapped by O'Reilly and Pantin (1957) indicates that there has been a significant reduction of extent due to the spread of Common Cordgrass on mudflats. This is especially significant in the south-east corner of the outer estuary and along the southern edge of the outer estuary and in an area adjacent to the Ballealy Landfill. Some patches of *Salicornia* flats are still present in this area. However, O'Reilly and Pantin (1957) did indicate that the strip of *Salicornia* flats stretched to the south-west corner of the outer estuary. No *Salicornia* flats were recorded in this area but

Common Cordgrass is not present on the mudflats in this area. O'Reilly and Pantin (1957) also indicated that *Salicornia* flats were present in the north-western corner of the outer estuary. This area now contains scattered clumps of common Cordgrass and no patches of *Salicornia* flats were present in this area.

A small area of *Salicornia* flats in the north-east corner of the inner estuary has been covered by Ballealy landfill.

# 5.2.2 Habitat structure and functions

The habitat structure and function of this habitat is assessed as *favourable*. Four monitoring stops were carried out in this habitat and all passed. The largest patches of this habitat were situated in the south-eastern corner of the outer estuary. Small clumps of Common Cordgrass and some Fuciods are the only other species present within these patches. However, the overall cover of Common Cordgrass within the habitat is less than 1%. There are no other major activities or impacts on these patches. All the other patches are typically long narrow strips situated along the edge of the ASM and usually contain occasional Annual Sea-blite, Common Saltmarshgrass, Greater Sea-spurrey and Lax-flowered Sea Lavender. There was generally no transitional zone between the ASM and the *Salicornia* flats as an abrupt boundary between the two habitats was indicated by the saltmarsh cliff. This may be due to the lack of actively accreting zones along the edge of the saltmarsh and the presence of Common Cordgrass in these zones.

*Salicornia dolichostachya* is the main species which occurs on the open mudflats, notably at the extreme south east and north west corners of the outer estuary but also in the inner estuary (west of the railway line). Doogue *et al.*, in The Flora of Co. Dublin (1998), note the presence of *S. ramosissima* and *S. europaea* on the muds at Raheen Point. No classification could be made of individual Glasswort species could be made during the current survey due to its timing in early summer when Glasswort is poorly developed.

# 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. This habitat is vulnerable to the invasion of Common

Cordgrass. Whilst the cover of Common Cordgrass is low within this habitat, there are frequent clumps occurring around the habitat, especially on the mudflats in the south-eastern corner of the outer estuary. The spread of Common Cordgrass in the 1970's significantly lowered the extent of *Salicornia* flats in Rogerstown Estuary. It is difficult to predict with accuracy if Common Cordgrass will continue to spread in Rogerstown Estuary.

There are no other activities or impacts affecting this habitat. This habitat is prone to natural changes in distribution and extent in response to erosion and accretion of sediment banks within creeks and along the seaward saltmarsh cliffs.

# 5.3 Atlantic salt meadows (H1330)

# 5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications that there has been any significant loss of extent during the assessment period. There have been some natural losses of saltmarsh, as there is a transition to embryonic sand dune at Portrane Burrow. The spread of sand onto the saltmarsh was also noted by O'Reilly and Pantin (1957). This is an indication of a natural dynamic system changing as the position of the edge of the Burrow and the sand dunes changes. There are no indications that Common Cordgrass has spread significantly on the established saltmarsh during the current assessment period. There are also no indications that there has been any significant erosion of saltmarsh during the current assessment period.

There has been some natural erosion of a narrow saltmarsh strip along the northeastern side of the outer estuary. Common Cordgrass has also spread significantly into the established saltmarsh and *Spartina* swards occupy about 10% of the established saltmarsh that was probably formerly ASM. As this has largely occurred prior to the current assessment period it is not assessed. An examination of the survey map produced by O'Reilly and Pantin (1957) indicates that the saltmarsh at Portrane Burrow is probably reducing in size due to natural erosion (of the sand dunes). The sand dunes are moving westwards over the saltmarsh. The saltmarsh located at Whitestown is not marked on O'Reilly and Pantin (1957) survey. This is a more brackish area than typical ASM and may have not been regarded as ASM during their survey.

# 5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Twenty-eight monitoring stops were carried out in this habitat and twenty-three passed (82%). Several saltmarsh plant communities are present including lower, mid and upper zones depending on elevation. The ASM has a typical species diversity. The sward height is quite diverse even though the grazing intensity overall is low. The mid zone has a typical very low sward height while the lower and upper zones have a more varied height due the presence of grasses and Sea Purslane.

A comparison of the current state of the saltmarsh to the description in O'Reilly and Pantin (1957) indicates that most of the ASM has not changed significantly. The greatest change in the structure and functions has been the spread of Common Cordgrass into established saltmarsh. The saltmarsh at Portrane Burrow and around the northern edge is similar to the description given in O'Reilly and Pantin (1957).

Common Cordgrass is present in the ASM. It is widely distributed over most of the ASM but it generally occurs at low cover values (< 5%). It is more frequent in the areas mapped as *Spartina* swards with some ASM. These areas contain a mosaic of Common Cordgrass and ASM vegetation but overall Common Cordgrass is dominant. There are several failed monitoring stops in some of these areas due to the high cover of Common Cordgrass.

The saltmarsh topography is well developed in most of the larger sections of the ASM and there is a very complex creek and salt pan structure, particularly in the area adjacent to Beaverstown Golf Club and the area in the BirdWatch Ireland Reserve along the northern creek. These creeks are functioning adequately. There has been some disturbance of the drainage of the saltmarsh with several drains crossing the saltmarsh from adjacent land. These drains were dug some time ago and are therefore not assessed. The ASM also contains some areas that were reclaimed in the past. These areas were enclosed from the sea by large berms. However, the reclamation was unsuccessful and some of this land is reverting back to ASM saltmarsh. The large area in the northern side of the inner estuary shows some recent disturbance with poaching by horses. There are sections of this area that contain pioneer saltmarsh vegetation and this could indicate that the intensity of the disturbance was greater in the past, but that these areas are now attempting to recover. There were several failed monitoring stops in this area. Sections of ASM behind berms along the southern side of the estuary contain unusual species assemblages that probably indicate the land is transitioning back to saltmarsh.

The conservation value of this saltmarsh is enhanced by the presence of Rock Sea Lavender (*Limonium binervosum*). This species is present in the sandier parts of the mid marsh zone and is associated with patches of bare substrate.

#### 5.3.3 Future prospects

The future prospects of this habitat is assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few significant impacts or activities on this habitat. Most of the saltmarsh in the outer estuary is located within the Nature Reserve. Some of the inner estuary is also been managed to benefit wintering waders and wildfowl within the Birdwatch Ireland Nature Reserve and the area under active management agreement. The spread of Common Cordgrass on the established saltmarsh can be considered as a negative factor but it is not likely to increase significantly in the future as it is already present in much of the lower saltmarsh zone. It is not likely to spread significantly into the mid-marsh zones. Most of the saltmarsh is not being grazed by livestock so grazing is not significant. The area damaged by grazing is under the control of Birdwatch Ireland and they have indicated that the encroachment of horses into this area from adjacent land is unwelcome. There are no indications of any major erosion of the saltmarsh. ASM at Portrane Burrow is being affected by amenity use but the intensity is quite low.
### 5.4 Mediterranean salt meadows (H1410)

## 5.4.1 Extent

The extent of this habitat is assessed as *favourable*. This habitat is mainly located along the southern side of the inner estuary with small patches at other locations. There is no information to indicate that the extent of this habitat has increased or reduced in the current assessment period. A comparison of the O'Reilly and Pantin (1957) survey to the current situation indicates that Sea Rush dominated areas were present in the areas that they were recorded during the current survey. Some of the descriptions of the narrow strip of saltmarsh located along the southern side of the outer estuary indicate that the abundance of Sea Rush may have decreased somewhat since the 1950's.

## 5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as favourable. Five monitoring stops were carried out in this habitat and they all passed. This habitat has a typical species diversity and its presence increases the sward height diversity of the overall saltmarsh habitat. It also displays some zonation. Upper saltmarsh zone species such as Red Fescue, Saltmarsh Rush and Creeping Bentgrass are frequent. One notable feature of this habitat is that Sea Rush cover in this habitat is lower compared to some sites and there are significant amounts of other ASM species within this habitat. The largest section of this habitat located along the southern side of the inner estuary is situated on flat raised plateaus and there is an abrupt transition to the ASM. The western side of this habitat contains an area with frequent low mounds containing Twitch-dominated grassland. The height variation between the MSM and the ASM may be related to various different stages of saltmarsh accretion or reclamation. An examination of the 1<sup>st</sup> edition 6 inch map (1840s) indicates that these MSM areas were not mapped as part of the saltmarsh but were mapped similar to the adjacent land, indicating they may have been reclaimed in the past.

There are occasional salt pans present within this habitat. Creeks generally do not reach this high up the saltmarsh but there are several channelised drains from adjacent land that pass through this habitat. There are few other impacts on this habitat.

## 5.4.3 Future prospects

The future prospects of this habitat is assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are no major impacts or activities affecting this habitat. This habitat is not vulnerable to the further spread of Common Cordgrass, as it generally occurs at elevations where Common Cordgrass is un-competitive.

## **6 MANAGEMENT RECOMMENDATIONS**

Some grazing may be beneficial in the Twitch-dominated areas along the inner estuary to increase plant diversity in these areas. There are possibilities for managed retreat in these areas behind the berms by increasing the influence of the tide by breaching the berms and restoring creek function. Fingal County Council owns many of these fields along the southern side of the inner estuary. However, they are not managed at present.

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(Ceadunas Ulmh, 5953)









## Saltmarsh Monitoring Project

## Rogerstown Estuary (Rush) (Map 3 of 3)

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

Ní sna leorainneacha a' an Barscáil seo ach noi garshuíomhadh ginearáila. Féaltár alhbhreilimí he adéanamh a' feorainneacha na gceanlar comharthailte . Machasanhail d'ábhar na Suirbhéarachla Ordonáis le chead ón Riallas . (Ceadunas Vimh. 5953) Rogerstown Estuary cSAC (000208)

# Legend SAC boundary 1330 Monitoring stops 1410 Monitoring stops . • 1310 Monitoring stops Habitats 1310 Salicornia flats E Spartina swards 1330 Atlantic salt meadows 1410 Mediterranean salt meadows 🚟 Spartina clump/mudflat mosaic Isolated Spartina clumps 1410/transitional mosaic 🗱 Spartina dom, some 1330 other SMP Code: Map produced by: SMP 2006 SMP0001 Map Version: 1 0.2 0.4 Kilometers N 0 Scale: 1:4822